

AQ1300/AQ1301 ETHERNET Multi Field Tester



IM AQ1300-01EN 9th Edition Thank you for purchasing the AQ1300/AQ1301 ETHERNET Multi Field Tester. This user's manual explains the features, operating procedures, and handling precautions of the AQ1300/AQ1301. To ensure correct use, please read this manual thoroughly before operation. Keep this manual in a safe place for quick reference in the event that a question arises. This manual is one of five AQ1300/AQ1301 AQ1301 manuals. Please read all the manuals.

## **List of Manuals**

Manual Title	Manual No.	Description
AQ1300/AQ1301 ETHERNET Multi Field Tester Operation Guide	IM AQ1300-02EN	This guide focuses on the handling precautions, basic operations, and specifications of the AQ1300/ AQ1301.
AQ1300/AQ1301 ETHERNET Multi Field Tester User's Manual (included in CD)	IM AQ1300-01EN	This manual. It explains all the AQ1300/AQ1301 features and how to use them.
AQ1300/AQ1301 ETHERNET Multi Field Tester Communication Interface User's Manual (included in CD)	IM AQ1300-17EN	The manual explains the AQ1300 communication interface features and instructions on how to use them.
AQ1300 MFT10GbE Setup Software User's Manual (included in CD)	IM AQ1300-61EN	This manual explains how to use a PC to create AQ1300/AQ1301 setup files, display result files, and generate CSV files.
AQ1300/AQ1301 Remote Control Software User's Manual (in CD)	IM AQ1300-63EN	This manual explains how to remotely control the AQ1300/AQ1301 from a PC.

The "-EN" in the manual number is the language code.

## **Notes**

• This manual (IM AQ1300-01EN 7th edition) applies to AQ1300/AQ1301 ETHERNET Multi Field Testers with firmware version R1.10.01.001 and later.

If you are using an older version, you will not be able to use all the features described in this manual.

Check the firmware version of your product on the product information screen. For information on how to view the product information, see section 15.4. For information on how to update the firmware, see section 15.5.

- The contents of this manual are subject to change without prior notice as a result of continuing
  improvements to the instrument's performance and functionality. The figures given in this manual
  may differ from those that actually appear on your screen.
- Every effort has been made in the preparation of this manual to ensure the accuracy of its contents. However, should you have any questions or find any errors, please contact your nearest YOKOGAWA dealer.
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6th Edition	June 2014
7th Edition	September 2015
8th Edition	July 2016
9th Edition	October 2017

## **Conventions Used in This Manual**

## **Notes**

The notes and cautions in this manual are categorized using the following symbols.

	Improper handling or use can lead to injury to the user or damage to the instrument. This symbol appears on the instrument to indicate that the user must refer to the user's manual for special instructions. The same symbol appears in the corresponding place in the user's manual to identify those instructions. In the user's manual, the symbol is used in conjunction with the word "WARNING" or "CAUTION."	
WARNING	Calls attention to actions or conditions that could cause serious or fatal injury to the user, and precautions that can be taken to prevent such occurrences.	
CAUTION	Calls attention to actions or conditions that could cause light injury to the user or cause damage to the instrument or user's data, and precautions that can be taken to prevent such occurrences.	
French		
AVERTISSE	<b>MENT</b> Attire l'attention sur des gestes ou des conditions susceptibles de provoquer des blessures graves (voire mortelles), et sur les précautions de sécurité pouvant prévenir de tels accidents.	
ATTENTION	Attire l'attention sur des gestes ou des conditions susceptibles de provoquer des blessures légères ou d'endommager l'instrument ou les données de l'utilisateur, et sur les précautions de sécurité susceptibles de prévenir de tels accidents.	
Note	Calls attention to information that is important for proper operation of the instrument.	

## Symbols and Conventions Used in Procedural Explanations

The contents of the procedural explanations are indicated using the following symbols.

Procedure	Carry out the procedure according to the step numbers. All procedures are written under the assumption that you are starting operation at the beginning of the procedure, so you may not need to carry out all the steps in a procedure when you are changing the settings.
Explanation	This section describes the setup items and the limitations regarding the procedures. It may not give a detailed explanation of the feature. For a detailed explanation of the feature, see chapter 1.

## **Character Notations**

Hard Key Names and Soft Key Names in Bold Characters Indicate panel keys that are used in the procedure and soft keys and menu items that appear on the screen.

## Unit

k

Denotes 1000. Example: 12 kg, 100 kHz

# Contents

	Conve	entions Used in This Manual	iii	
Chapter 1	Feat	tures		
	1.1	Interaction between the Setup Software and the AQ1300/AQ1301	1-1	
	1.2	Test Menu (Top Menu)		
	1.3	Test Modes	1-4	
	1.4	Test Configurations	1-5	
	1.5	Layer 1 Control	1-8	
	1.6	Transmission Features	1-10	
	1.7	Reception Features	1-16	
	1.8	Statistics	1-20	
	1.9	Emulation	1-31	
	1.10	Ping and Traceroute Testing	1-36	
	1.11	Logging Statistics	1-37	
	1.12	Simple Test Creation and Execution	1-38	
	1.13	Displaying Test Pass/Fail Results	1-39	
	1.14	File	1-40	
	1.15	Optical Power Measurement (AQ1300 Option)	1-41	
	1.16	RFC2544 Measurement (AQ1300 Option)	1-42	
	1.17	VLAN Test	1-49	
	1.18	Telnet Remote Control	1-50	
	1.19	E-OAM Test	1-51	
	1.20	Y.1564 Test	1-54	
Chapter 2	Screen Explanations			
·	2.1	Measurement Screens (Common Items)		
	2.2	Measurement Screens (Test-mode-specific items)		
Chapter 3	Com	amon Operations		
onaptor o	3 1	Key Rotary Knoh, and Arrow Key Operations	3_1	
	3.2	Entering Strings		
	0.2			
Chapter 4	Auto	omatic Test Settings (Auto)		
	4.1	Selecting a Setup File	4-1	
	4.2	Setting Up a Test		
	4.3	Configuring Link and Address Settings	4-5	
	4.4	Configuring Test Items	4-16	
	4.5	Configuring a Traffic Test	4-17	
	4.6	Configuring a Loopback Test	4-21	
	4.7	Configuring a QoS Test	4-22	
	4.8	Configuring a Ping Test	4-24	
	4.9	Configuring a BERT	4-26	
	4.10	Displaying Pass/Fail Judgment Conditions	4-27	
	4.11	Configuring Options (Auto)	4-28	

## Contents

Chapter 5	Auto	omatic (Remote Control) Test Settings (Auto(Remote))	5-1	1
	5.2	Setting I na Test	5-3	
	53	Configuring Link Settings	5-4	2
	54	Configuring the Master Settings	5-6	2
	5.5	Configuring the Slave Settings	5-13	
	5.6	Switching between the Master and Slave Settings	5-15	2
	5.7	Controlling the Other Device Remotely	5-16	<b>.</b>
Chapter 6	Man	ual Test Settings (Manual)		4
	6.1	Selecting a Setup File	6-1	
	6.2	Setting Up a Test	6-2	
	6.3	Configuring Link and Address Settings	6-3	5
	6.4	Selecting a Test Mode	6-11	
	6.5	Configuring a Traffic Test	6-12	
	6.6	Configuring a Loopback Test	6-29	6
	6.7	Configuring a QoS Test	6-30	
	6.8	Configuring a Ping Test	6-43	
	6.9	Configuring a BERT	6-45	7
	6.10	Configuring the Statistics Log	6-50	-
	6.11	Configuring Options (Manual)	6-52	
Chapter 7	Mea	suring		8
	7.1	Starting and Stopping Measurement	7-1	
	7.2	Performing L1 Control	7-8	9
	7.3	Changing the Tx Rate	7-10	
	7.4	Inserting Errors	7-11	
	7.5	Performing a Traceroute Test		10
	7.6	Displaying Test Results	7-14	
	7.7	Comparing Transmission and Reception	7-15	
	7.8	Customizing the Display	7-17	11
	7.9	Displaying Detailed Statistics	7-19	••
	7.10	Changing the Displayed Screen	7-21	
	7.11	Operating the Other Device	7-23	12
	7.12	Switching between the Master and Slave Displays	7-24	12
	7.13	Clearing the History	7-25	
	7.14	Displaying the Header Information of Received Frames	7-26	13
Chapter 8	Con	figuring RFC2544 Measurement Settings (AQ1300 Option	)	
	8.1	Selecting a Setup File	8-1	14
	8.2	Setting Up a Test	8-4	17
	8.3	Configuring Link Address Settings	8-5	
	8.4	Configuring Common RFC2544 Test Items	8-11	15
	8.5	Configuring Throughput Test Settings	8-15	
	8.6	Configuring Latency Test Settings	8-17	
	8.7	Configuring Frame Loss Rate Test Settings	8-19	16
	8.8	Configuring Back to Back Test Settings	8-21	
	8.9	Configuring Packet Jitter Test Settings	8-22	
	8.10	Configuring RFC2544 Options	8-24	Арр

\_\_\_\_

۷

Index

Contents

Chapter 9	Perfo	orming RFC2544 Measurements (AQ1300 Option)	
•	9.1	Starting Measurement	
	9.2	Displaying the Test Results	
	9.3	Displaying Throughput Test Results	
	9.4	Displaying Latency Test Results	
	9.5	Displaying Frame Loss Rate Test Results	
	9.6	Displaying Back to Back Test Results	
	9.7	Displaying Packet Jitter Test Results	
	9.8	Changing the Displayed Screen	
Chapter 10	Optio	cal Power Measurement (AQ1300 Option)	
	10.1	Pre-Measurement Calibration	10-1
	10.2	Setting Optical Power Measurement Conditions and Holding the Display	10-2
Chapter 11	VLAI	N Test	
	11.1	Selecting a Setup File	11-1
	11.2	Configuring the Test Settings	11-3
	11.3	Configuring Link Address Settings	11-4
	11.4	Configuring the Tx Settings	11-9
	11.5	Configuring the VLAN ID Tx Settings	11-10
	11.6	Configuring the VLAN ID Rx Settings	11-14
	11.7	Starting and Stopping Measurement	11-17
	11.8	Switching Screens and Saving Measured Results	11-20
Chapter 12	E-OA	AM Test	
	12.1	Selecting a Setup File	12-1
	12.2	Configuring the Test Settings	12-3
	12.3	Setting the Test Mode	12-4
	12.4	Configuring Link Address Settings	12-5
	12.5	Configuring the LB Test	12-11
	12.6	Configuring the CC Test	12-12
	12.7	Setting Options (E-OAM)	12-16
	12.8	Starting and Stopping an LB Test	12-17
	12.9	Starting and Stopping a CC Test	
	12.10	Executing an LT and Multicast LB	12-22
Chapter 13	Y.156	64 Test	
	13.1	Selecting a Setup File	13-1
	13.2	Selecting the Configuration Type	
	13.3	Setting Up a Test	13-5
	13.4	Configuring Link Address Settings	13-7
	13.5	Configuring Common Y.1564 Test Items	
	13.6	Configuring the Detailed Settings (Service Setup) of the Y.1564 Test	
	13.7	Configuring Y.1564 Options	
	13.8	Configuring the AQ1300/AQ1301 as a Master Device	
	13.9	Configuring the AQ1300/AQ1301 as a Slave Device	
	13.10	Starting weasurement	
	13.11	Displaying the IP Load Test Desuits	
	13.12 13.12	Displaying the Ruret Size Teet Deculte	13-3/ 12 20
	13.13	Displaying the Parformance Test Results	05-51 12_20
	13 15	Displaying the rest freshills	13-39 13-40
	10.10		

			Contents
	13.16	Changing the Displayed Screen	13-41
Chapter 14	File	Operation	
-	14.1	Connecting a USB Storage Medium to the USB Port	
	14.2	Saving and Loading Data	
	14.3	Deleting and Copying Files	14-6
	14.4	Changing File Names	
	14.5	Creating Directories	14-9
	14.6	Deleting and Copying Directories	14-10
	14.7	Specifying the Items That Are Displayed in the File List	14-11
Chapter 15	Othe	er Operations	
-	15.1	Configuring the Language, Beep, and USB Function	15-1
	15.2	Setting the Date and Time	
	15.3	Configuring Power Save Settings	15-3
	15.4	Configuring Network Settings	15-4
	15.5	Resetting the AQ1300/AQ1301 to Its Factory Default Settings	15-6
	15.6	Setting the Top Menu Type	15-7
	15.7	Using the Utility Menu	
Chapter 16	Trou	bleshooting, Maintenance, and Inspection	
•	16.1	If a Problem Occurs	
	16.2	Messages and Corrective Actions	
	16.3	Performing a Self Test	
	16.4	Viewing the Product Information	
	16.5	Updating the Firmware	
	16.6	Replacing the Battery Pack	
	16.7	Routine Maintenance	
	16.8	Recommended Replacement Parts	
	16.9	Calibration	16-12
Appendix			
1.1	Appen	dix 1 Data File Format	App-1

## Index

\_\_\_\_

Арр

13

14

15

16

## 1.1

# Interaction between the Setup Software and the AQ1300/AQ1301

Create a test scenario with the setup software PC application, and then save the scenario to a setup file. Upload the saved setup file to the AQ1300/AQ1301 (AQ1300 and AQ1301), and then use the test scenario to perform a test. The test results are saved to a result file. Use the PC to download the result file, and then use the setup software to print a report.

You can upload and download files using the Ethernet (FTP), USB storage media, and USB memory.



After loading a setup file, begin measurement simply by pressing START.
You can also change the parameters based on the loaded settings.



#### Operation Example (for Auto Mode)

For details about the setup software, see the Setup Software User's Manual, IM AQ1300-61EN.

1

## 1.2 Test Menu (Top Menu)

## Auto

Select Auto to perform automatic testing on a device according to the test items in the selected setup file. You can execute up to eight test items in order or at the same time. You can display pass/fail results for each test and automatically save the measurement results to a file.

You can configure setup files and test items using the setup software, which runs on Windows PC.

## Auto(Remote)

Select Auto(Remote) to use a master device to perform automatic testing of a remote slave device according to the test items in the selected setup file. You can execute up to eight test items in order or at the same time. You can display pass/fail results for each test and automatically save the measurement results to a file.

Because the master device controls the slave device remotely, a single person can perform the tests. The slave device can be configured remotely, and its measurements can be collected by the master device.

You can configure setup files and test items using the setup software, which runs on Windows PC.

## Manual

Select Manual to perform manual testing on a device using a single test item in the selected setup file. You can generate traffic and perform analysis in greater detail than you can when you select Auto or Auto(Remote).

You can configure setup files and test items using the setup software, which runs on Windows PC.

## **OPM (AQ1300 Option)**

Select OPM to measure optical input power using the optical power meter.

## RFC2544 (AQ1300 Option)

An automated test function in conformity with RFC2544, the standard benchmarking methodology for a performance examination of Ethernet service and network systems.

- Throughput: Maximum frame transfer rate without frame loss.
- Latency: Delay time of a frame
- Frame loss rate: Incidence rate of frame loss with excess traffic.
- Back-to back: Maximum burst value not causing a frame loss.
- · Packet jitter: Variation of latency

## **VLAN Test**

The VLAN Test is used to check the VLAN trunk configuration. You can compare the VLAN ID list that you plan to receive with the actual received VLAN ID list. The VLAN Test consists of transmission, reception, analysis, and result display and storage features.

## **E-OAM Test**

Ethernet Operation, Administration and Maintenance (hereafter referred to as E-OAM) tests can be performed in compliance with the ITU-T Y.1731 Recommendation and IEEE802.1ag Standard. This is supported in firmware version R1.10.01.001 and later.

- · CC (continuity check) test: Connection check between network devices
- LB (loop back) test: Response check between network devices
- LT (link trace): Link check between network devices

## System

Select System to configure the AQ1300/AQ1301 system settings.

Language, Beep, USB Function, Date & Time Set, Power Save mode, Network Setup, Factory Setting, Product Info. display, Selftest, Version Up

## Y.1564 Test

An automated test function in conformity with ITU-T Y.1564, the standard benchmarking methodology for a performance examination of Ethernet service and network systems.

- IR step test
  - Measurement of information rate (IR), frame loss (FL), frame transfer delay (FTD), frame delay variation (FDV)
- Burst size test
- Measurement of frame loss (FL), frame transfer delay (FTD), frame delay variation (FDV) • Service performance test
  - Measurement of information rate (IR), frame loss (FL), frame transfer delay (FTD), Frame delay variation (FDV), availability

(AVAIL)

## 1.3 Test Modes

## **Traffic Test Mode**

In this mode, you generate traffic and measure the network throughput by defining a single Tx frame and specifying the frame length and Tx rate.

When the other device is in Loopback Test mode, you can perform latency measurement.

## Loopback Test Mode

In this mode, the source and target addresses of received frames are reversed, and the frames are sent back to their source. The AQ1300/AQ1301 takes statistics of the received frames. Testing is performed with the other device set to Traffic Test, QoS Test, or BERT mode.

## **QoS Test Mode**

In this mode, you can generate QoS measurement traffic and measure the network QoS performance by defining a Tx frame with up to eight channels of QoS parameters and specifying the frame length and Tx rate. The AQ1300/AQ1301 takes statistics of each individual QoS channel. When the device under test is in Loopback Test mode, you can perform latency measurement on individual QoS channels.

## **PING Test Mode**

In this mode, you can verify layer 3 connectivity. You can ping a single host at intervals of 1 s or less (1 ms minimum).

You can also use traceroute testing to check the route to the target (the other device).

## **BERT Mode**

In this mode, bit error rate testing is performed. The AQ1300/AQ1301 inserts a pseudo-random pattern (PN15) into the payload of the Tx frame and checks whether or not bit errors are occurring between itself and the other device.

The other device must be set to BERT mode or Loopback Test mode.

## 1.4 Test Configurations

The test configurations in which the AQ1300/AQ1301 can be used are listed below.

## **Two-Way Traffic Test**

The AQ1300/AQ1301 and the other device measure the network throughput by sending and receiving traffic between themselves.



## Loopback Traffic Test (Latency measurement)

The other device is set to Loopback Test mode so that the AQ1300/AQ1301 receives the traffic that it sends, and the AQ1300/AQ1301 measures the network round-trip latency.



## **QoS Test**

The AQ1300/AQ1301 measures the network QoS performance by sending and receiving up to eight channels of QoS traffic.



## **Ping Test**

The AQ1300/AQ1301 verifies layer 3 connectivity.



## **Traceroute Test**

You can also use traceroute testing to check the route to the target (the other device).



## **BERT Test**

The AQ1300/AQ1301 performs a bit error rate test.



## 1.4 Test Configurations

## **Inband Remote**

This is the test configuration for an Auto(Remote) test.

You can use dedicated remote commands to perform testing on the slave, change settings, and acquire measurement results. Because the slave device can be controlled remotely, a single person can perform this test.



#### Just bring the slave device, connect the cables, and turn it on.

The master can control the slaves remotely through the measured connection. Searching for slaves: The AQ1300 can search for up to 64 slaves.
 Controlling slaves: The AQ1300 can only control one slave at a time.

## 1.5 Layer 1 Control

## **Tx Clock Master/Slave Synchronization**

When Manual has been selected in the Test menu and the interface is XFP or SFP, you can select the Tx clock source.

Tx Clock Source

Internal CLK: The internal clock is used.

Received CLK: The AQ1300/AQ1301 synchronizes with the Rx line signal.

## **Rx Clock Measurement**

When the interface is XFP, SFP, or RJ-45 100BASE-TX, you can measure the frequency deviation of the Rx clock.

Link State	Measurement Result Display
Linkdown	"" is displayed.
Linkup	The frequency deviation of the Rx clock is displayed [ppm].

When the interface is RJ-45, the AQ1300/AQ1301 cannot measure the frequency deviation of the Rx clock for 1000BASE-T or 10BASE-T connections. To measure the frequency deviation of the Rx clock through the RJ-45 interface, use a 100BASE-TX connection.

## LF and RF Transmission and Detection

When the interface is XFP, because the AQ1300/AQ1301 supports the notification of physical layer failures through LFS (link fault signaling), it can transmit and detect LF (local fault) and RF (remote fault) signals.

The AQ1300/AQ1301 can transmit LF and RF signals consecutively (start/stop).

Also, when Manual has been selected in the Test menu, the AQ1300/AQ1301 can automatically send an RF signal upon linkdown detection or LF signal reception.

## **RxLF (Local Fault reception)**

Detection: Four or more sequence columns that indicate LF at an interval less than 128 columns. Sequence columns that indicate RF must not be received during this period.

Clear: When sequence columns that include LFs are not received 128 times.

## **RxRF (Remote Fault reception)**

- Detection: Four or more sequence columns that indicate RF at an interval less than 128 columns. Sequence columns that indicate LF must not be received during this period.
- Clear: When sequence columns that include RFs are not received 128 times.

## **Simple Optical Power Monitor**

When the interface is XFP or SFP, the AQ1300/AQ1301 can monitor the received optical power level and indicate it using three levels.

Indication	Colors	Description
<u>ب</u>	Black and black	When the RJ-45 interface is being used or when the XFP or SFP interface is
		being used and the interface module is not installed
×	Red and black	When the level of received light is too low
<b>*</b>	Green and green	When the level of received light is appropriate
<b>*</b>	Red and red	When the level of received light is too high

## Turning the Optical Output Off and On

When the interface is XFP or SFP, you can turn the optical output (laser) off and on. You can force the link of the device under test down or up.

## Linkdown Transmission Continuation

When Manual has been selected in the Test menu and the interface is XFP, you can choose to continue or stop transmission during linkdown detection.

## Sync Loss Detection of 66 Bits Blocks

When the interface is XFP, the AQ1300/AQ1301 detects the condition when the signal reception changes from a block sync (block lock) state of 66 bits blocks to a loss of sync (block lock loss) state as defined in IEEE802.3. When a sync loss of 66 bits blocks is detected, the link is disconnected. This feature is supported in firmware version (FW Ver.) R1.08.01.001 and later.

## **66B Sync Error Detection**

When the interface is XFP, the AQ1300/AQ1301 detects 66 bits blocks whose sync header (2 bits) is except 00 or 11 when signal reception is in a sync (block lock) state as defined in IEEE802.3. This feature is supported in firmware version (FW Ver.) R1.08.01.001 and later.

## 66B Sync hi-ber Detection/Clear

When the interface is XFP, the AQ1300/AQ1301 detects and clears 66B Sync hi-ber on the basis of the following conditions when signal reception is in a sync (block lock) state as defined in IEEE802.3. This feature is supported in firmware version (FW Ver.) R1.08.01.001 and later.

Detection: When 16 or more sync headers (2 bits) set to 00 or 11 are detected in a 125 µs window when signal reception is in a sync (block lock) state as defined in IEEE802.3.

Clear: When less than 16 sync headers (2 bits) that are not set to 01 or 10 are detected in a 125 µs window when signal reception is in a sync (block lock) state as defined in IEEE802.3.

## Note.

IEEE802.3 defines the sync (block lock) state of 66 bits blocks as follows: Detection: When 64 consecutive sync headers (2 bits) set to 01 or 10 are received correctly. Clear: When 16 sync headers (2 bits) that are not set to 01 or 10 are detected within 64 sync headers in a sync (block lock) state.

## Link Setting Acquisition

If the interface is SFP(GbE) or RJ-45, this feature is used to check the link settings of the DUT (the device on the user side). You can acquire and display link setting information of the other device connected to the AQ1300/AQ1301 or the DUT connected to the AQ1300/AQ1301 on the slave side as well as the status of the differences in the negotiation settings. In addition, you can check the UTP cable condition and display the results.

## 1.6 Transmission Features

## **Transmission Load Configuration**

When the test mode is Traffic Test, QoS Test, or BERT, you can set the transmission load by setting the Tx rate and the Tx mode.

When the mode is Traffic Test or BERT, you can define a single frame. In QoS test mode, you can define up to eight frames and assign them to the various transmission channels.

## **Tx Rate Settings**

## Traffic Format

When Manual has been selected in the Test menu, you can select a traffic format.

## Constant

When the traffic format is Constant, frames are sent continuously at a constant interval. You can change the interframe gap (IFG) by changing the Tx rate.





## Burst

When the traffic format is Burst, frames are transmitted in bursts: frame transmission starts and stops repeatedly at a specified interval. You can change the interframe gap (IFG) by changing the Tx rate. You can specify the number of Tx frames in the burst interval by setting Burst Number, and you can specify the interval of repetition by setting Interval.



If the burst transmission interval determined by the value you set for Burst Number is greater than the value you set for Interval, the AQ1300/AQ1301 will transmit frames at a constant rate without any idle condition.

### Tx Rate

#### When the Mode is Traffic Test or BERT

When Manual has been selected in the Test menu, you can set the Tx rate as a percentage or in units of bits or fps. You can only set values that exceed 100% in units of bits. When Test Interface is set to SFP(FE), you cannot set values that exceed 100%.

You can only set values as percentages when Auto or Auto(Remote) has been selected in the Test menu.

#### Note\_

When the you set the Tx rate in bits, specify the number of bits in the IFG.

### In QoS Test Mode

Regardless of the Test menu, you can only set the Tx rate as a percentage.

### **Tx Mode Settings**

## Continuous

In this mode, frames are transmitted continuously. After you start transmission, it continues until you stop it.

#### Frames

In this mode, a specified number of frames is transmitted. After you start transmission, the specified number of frames is sent, and then transmission is stopped automatically.

## **Tx Time**

In this mode, frames are transmitted for a specified period of time. After you start transmission, it continues for the specified period of time and is then stopped automatically.

## **Tx Frame Definition**

For the Tx frame definition, in addition to basic frame editing, you can also set the payload, variable field setting, error addition, etc.

## Frame Editing

When Manual has been selected in the Test menu, you can edit the following frames.

- When the test layer is L2: MAC+TYPE
- When the test layer is L3-IPv4: MAC+TYPE+IPv4

MAC+TYPE+IPv4+UDP

When the test layer is L3-IPv6: MAC+TYPE+IPv6
 MAC+TYPE+IPv6+UDP

The fields and settings that you can edit are listed below.

Field		Setting
MAC	Destination	Manual, the same as Destination Setting
	Address value format	**_**_**_**
	Source	Manual, the same as Source Setting
	Address value format	**_**_**_**_**
VLAN	Flag use	Used, Source Address
	VLAN stacks	None, 1, 2
	VLAN-[1-2]TPID	0x0000-0xFFFF
	VLAN-[1-2]CoS	0-7
	VLAN-[1-2]CFI	0-1
	VLAN-[1-2]VLANID	0-4095
IPv4	Destination address	Manual, the same as Destination Setting
	Address value format	*** *** ***
	Source address	Manual, the same as Source Setting
	Address value format	*** *** ***
	ToS/DS(DSCP)	Manual, IPv4-ToS, IPv4-DSCP
	Service type value	0x00-0xFF (manual), 0-7 (IPv4-ToS), 0-63 (IPv4-DSCP)
	Protocol	0-255 (when Frame Structure is MAC+TYPE+IPv4)
IPv6	Destination address	Manual, the same as Destination Setting
	Address value format	****.****.****.****.****.****.****
	Source address	Manual, the same as Source Setting
	Address value format	****.****.****.****.****.****.****
	ToS/DS(DSCP)	0x00-0xFF (manual), 0-7 (IPv6-TrafficClass), 0-63 (IPv6-DSCP)
	NextHeader	0-255 (when Frame Structure is MAC+TYPE+IPv6)
UDP	Destination port number	0 to 65535
	Source port number	0 to 65535

When Auto or Auto(Remote) has been selected in the Test menu, the frame structures are fixed as indicated below, and frames cannot be edited.

Test Layer	Add UDP to Tx Frame		
	OFF	ON	
L2	MAC+TYPE		
L3-IPv4	MAC+TYPE+IPv4	MAC+TYPE+IPv4+UDP	
L3-IPv6	MAC+TYPE+IPv6	MAC+TYPE+IPv6+UDP	

L2 Protocol Type	L2/L3 Tags	L3 Protocol Type	L4 Protocol Type	Notes
DIX/IEEE802.3	Mac in Mac (IEEE802.1ah/ EoE, B-Tag) VLAN Tag (4 stacks) MPLS/EoMPLS (4 stacks)	IPv4	UDP	IPv4 multicast is
			TCP	supported.
			IGMP	
			ICMP	]
		IPv6	UDP	]
			TCP	]
			IGMP	]
			ICMP	
			ICMPv6	
		IPX	—	
		E-OAM	ITU-T	
			IEEE	
Pause	Mac in	—	—	
ARP	Mac (IEEE802.1ah/	—	—	
	EoE, B-Tag)			
	VLAN Tag (4 stacks)			
ECP	EoE VLAN Tag	<u> </u>	<b>—</b>	
Custom (with MAC)	<b>—</b>	<u> </u>	—	
Custom (without	<b> </b> —			
MAC)				

You can use the setup software to create the following frames for manual testing. For details see the *Setup Software User's Manual*, IM AQ1300-61EN.

## **Payload Settings**

#### **User-Defined Data**

You can use the setup software to attach a specified data sequence to the payload areas of the various protocols. You can enter data sequences into payload areas of up to 256 bytes that include the protocol headers. A fill pattern is inserted after the user-defined data.

## Fill Pattern

You can insert a fill pattern into the payload areas of the various protocols.

AQ1300/AQ1301	ALL0, ALL1, 0/1 alt., Random, Manual (4 bytes)
Setup software	Random, manual (4 bytes)

## Variable Field

You can change the specified field when Manual has been selected in the Test menu and the test mode is Traffic Test. There are two methods for changing a field: field specification, in which you select a field directly, and offset specification, in which you set the offset, bit offset, and variable bit width manually.

- Variable fields: 1
- Variable mode: Increment/random
- Variable size: Maximum width of 32 bits

## Variable Frame Length

You can change the frame length when Manual has been selected in the Test menu and the test mode is Traffic Test, QoS Test, or BERT. You can change a single frame when the mode is Traffic Test or BERT. In QoS Test mode, you can change field lengths by channel.

- · Variable mode: Increment/decrement/random
- · Variable range: 64 to 9999 bytes

When Test Interface is set to SFP(FE), the sending and receiving of frames that exceed 2048 bytes in length is outside of the AQ1300/AQ1301 guaranteed operating range.

## **Automatic Checksum Calculation**

This feature guarantees the L3 header checksum when Manual has been selected in the Test menu, field variation is enabled, and the variable field has been set to a field within the L3 header checksum (IPv4 header) computation range.

## **Test Tags**

When you are using two AQ1300/AQ1301 in a two-way or loopback test configuration, you can attach test tags for analysis to the Tx frames.

Test tags are inserted immediately before the Tx frame FCS.

Test tags can be inserted when the test mode is Traffic Test or QoS Test.

When Auto or Auto(Remote) has been selected in the Test menu, test tags are always inserted. When Manual has been selected in the Test menu, you can select whether or not to insert test tags.

Preamble	Data	Test tags	FCS
8 bytes	Arbitrary	16 bytes	4 bytes

#### Inserted Data

The following data is inserted into test tags.

Data Type	Description
Test ID	The IDs of the AQ1300/AQ1301 and the test item
Additional test data	For status notification and exchanging test setup information
Frame ID	The frame (QoS channel) number
Timestamp	Latency measurement data is inserted here.
Sequence number	A sequence number is inserted here.
Payload check CRC	A CRC for the payload
Tag identifier	A fixed identifier that indicates that the data is a tag.
Tag length	Tag field length in units of 2 bytes (for expansion)

## Timestamp

The timestamp (time data) is inserted into a (32-bit) field in the test tag. If the other device is in Loopback Test mode, you can use the timestamp to measure the latency.

## **Sequence Number**

By inserting a sequence number into a (32-bit) field in a test tag and then sending the frame, the AQ1300/AQ1301 can check for sequence errors between itself and the other device. When the test mode is Traffic Test, the same sequence number is inserted for all ports. When the test mode is QoS test, sequence numbers are inserted separately for each channel.

## **Payload Check CRC**

By computing a (16-bit) CRC of the Tx frame payload, inserting the result into a test tag field, and then sending the frame, the AQ1300/AQ1301 can check for payload errors between itself and the other device.

## **PN Pattern**

By inserting a pseudo-random pattern (PN15) into the fill pattern data area of a Tx frame payload and then sending the Tx frame to the other device, the AQ1300/AQ1301 can perform a BER measurement to check for device errors.

## **Error Addition**

The AQ1300/AQ1301 can add the following errors to the frames that it sends. CRC errors, symbol errors, sequence errors, payload errors, bit errors, undersize errors,<sup>\*</sup> oversize errors<sup>\*</sup>

\* Set the Tx frame length.

#### **1.6 Transmission Features**

## **Transmitting by QoS Channel**

When Manual has been selected in the Test menu and the test mode is QoS test, you can specify different frames, frame lengths, and transfer rates for each channel and send the frames separately. When Auto or Auto(Remote) has been selected in the Test menu and the test mode is QoS test, you can specify different QoS values, frame lengths, and transfer rates for each channel and send the frames separately.

When Manual has been selected in the Test menu, you can select up to eight QoS channels; when Auto or Auto(Remote) has been selected in the Test menu, you can select up to four.

## 1.7 Reception Features

## **Base Filter**

You can use the base filter to specify the conditions for selecting the received frames to take statistics from.

You can set the base filter when Manual has been selected in the Test menu and the test mode is Traffic Test, QoS Test, or BERT.

There are two filter types that you can choose from: field filtering, in which you select the field of the protocol that you want take statistics of, and offset filtering, in which you set the filter location and pattern.

There are two base filters. You can combine them and set whether to take the statistics of frames that pass or do not pass through them.

## **QoS Channel Measurement**

When Manual has been selected in the Test menu, you can measure up to eight QoS channels (classes) separately; when Auto or Auto(Remote) has been selected in the Test menu, you can measure up to four. By taking statistics for different flows, you can evaluate the priority control of a network device. The QoS filter operates on the frames that pass through the base filters.

You can use the QoS filter when Manual has been selected in the Test menu and the test mode is QoS Test.

There are two filter types that you can choose from: field filtering, in which you select the field of the protocol that you want take statistics of, and offset filtering, in which you set the filter location and pattern.

There are two QoS filters, and the AQ1300/AQ1301 takes the statistics of the frames that pass through them.

## **Latency Measurement**

If you set the other device to Loopback Test mode, the AQ1300/AQ1301 can insert a timestamp in a Tx frame and measure the latency by determining the difference between the timestamp and the time that the frame comes back.

## **Gap Measurement**

The AQ1300/AQ1301 measures the maximum, minimum, and average gaps (IFGs) between packets. The values are displayed both in µs and bits.

## Note.

Frames whose length is between 48 and 9999 bytes can be received. Frames whose length exceeds 9999 bytes are detected as oversized frames.

When Test Interface is set to SFP(FE), frames whose length is between 48 and 2048 bytes are guaranteed to be received.

## Sequence Measurement

The AQ1300/AQ1301 monitors the sequence numbers inserted in frames and takes sequence error statistics for loss packets, maximum burst loss, reorder packets, and duplicate packets. When the test mode is Traffic Test, all the ports are measured together. When the test mode is QoS test, the channels are measured separately.

### **Detected Sequence Errors**

Detected Error Type	Error Description
Loss Packet	The total number of lost frames
Max Burst Loss	The maximum number of consecutive frames that have been lost
Reorder Packet	The total number of frames that have been received out of the order that they were sent in
Duplicate Packet	The number of received frames that have been received again

## **Sequence Error Detection Examples**

#### Loss Packet

Frames that were sent but not received are counted as loss packets. The Loss Packet number represents the total number of loss packets.



#### Note.

- Burst loss packets are also counted as loss packets.
- · Reorder packets are not counted as loss packets.

## Max Burst Loss

Consecutive frames that the AQ1300/AQ1301 is unable to receive are counted as burst loss packets. The Max Burst Loss number represents the maximum burst loss value.



Reorder packets do not affect the measurement of the maximum burst loss.

#### **Reorder Packet**

Frames that are received out of the order that they were sent in are counted as reorder packets. The Reorder Packet number represents the total number of reorder packets.





#### **Duplicate Packet**

Frames that are received more than once are counted as duplicate packets. The Duplicate Packet number represents the total number of duplicate packets.



#### Note.

All consecutive reorder packets after the first are counted as duplicate packets.



## **Payload Error Measurement**

Using the (16-bit) payload CRC data in fields in Rx frame test tags, the AQ1300/AQ1301 can check for payload errors between itself and the other device.

## **BER Measurement**

By inserting a pseudo-random pattern (PN15) into the fill pattern data area of a Tx frame payload and then sending the Tx frame to the other device, the AQ1300/AQ1301 can perform a BER measurement to check for device errors.

## **Condition for Synchronization**

A sync loss state changes to a synchronized state when a matching PN pattern of 32 bits or more is detected in the payload.

## **Condition for Sync Loss**

A synchronized state changes to a sync loss state when an error of 50 bits or more is detected within 128 bits.

## Note

The bytes that undergo BER measurement include the first 32 bits that result in synchronization.

## Pause

When Flow Control is set to ON and the AQ1300/AQ1301 detects a pause frame, it will stop transmission until the pause time passes.

## **Collision Detection**

When the interface is RJ-45 10BASE-T or 100BASE-TX and half duplex is selected, the AQ1300/ AQ1301 detects collisions.

- Frames that are received when a collision is detected are considered invalid and are not used in statistics.
- Late collisions (collisions that occur after a string of 512 bits that includes the preamble have been sent) are treated as collisions.

## 1.8 Statistics

## **List of Statistics**

Group Name	Display	Display Digits	Condition
Common	Acquisition Time	YYYY/MM/DD hh:mm:ss	
	Measurement Duration	hh:mm:ss	
Link	Link Status	Up to 22 characters	
	Laser Off Count	16-digit integer	XFP or SFP
			interface
	Linkdown Count	16-digit integer	
	Tx Freq Deviate(ppm)	+/- sign and 1 digit after the decimal point	
	Rx Freq Deviate(ppm)	+/- sign and 1 digit after the decimal point	When the interface
			is XFP, SFP, or
			RJ-45 100BASE-TX
	LF Send Count	16-digit integer	When the interface
	RF Send Count	16-digit integer	is XFP
	LF Detect Count	16-digit integer	
	RF Detect Count	16-digit integer	
	LF receve column count	16-digit integer	When the interface
	RF receive column count	16-digit integer	is XFP.
	66B sync loss count	16-digit integer	Supported in
	66B sync error count	16-digit integer	firmware version
	66B sync hi-ber count	16-digit integer	(FW Ver.)
			R1.08.01.001 and
			later.
Тх	Frame	16-digit integer	
	Byte	16-digit integer	
	Rate(%)	5 digits after the decimal point	
	Rate(fps)	10-digit integer	
	Rate(Bps) <sup>*</sup>	10-digit integer	
	Rate(bps)*	10-digit integer	
	Reply Frame	10-digit integer	
	Error Frame	16-digit integer	
	CRC Error	16-digit integer	
	Undersize Error	16-digit integer	
	Oversize Error	16-digit integer	
	Symbol Error	16-digit integer	
Rx:	Frame	16-digit integer	
	Byte	16-digit integer	
	Rate(%)	5 digits after the decimal point	
	Rate(fps)	10-digit integer	
	Rate(Bps)	10-digit integer	
	Rate(bps)	10-digit integer	
	Peak Rate(%)	5 digits after the decimal point	
	Peak Rate(fps)	10-digit integer	
	Peak Rate(bps)	10-digit integer	
	Average Rate(%)	5 digits after the decimal point	
	Average Rate(fps)	10-digit integer	
	Average Rate(bps)	10-digit integer	
	PAUSE Frame	16-digit integer	
	Collision Detect	16-digit integer	When the interface is RJ-45
	Error Frame	16-digit integer	
Rx Error	CRC Error	16-digit integer	
	Undersize Error	16-digit integer	
	Oversize Error	16-digit integer	
	Alignment Error	16-digit integer	When the interface is RJ-45
	Symbol Error	16-digit integer	

#### Group Name Display **Display Digits** Condition Latency Max IFG(us) Integer part: 10 digits, fractional part: 1 digit Min IFG(us) Integer part: 10 digits, fractional part: 1 digit Integer part: 10 digits, fractional part: 1 digit Avg IFG(us) Max IFG(bit) Integer part: 16 digits Min IFG(bit) Integer part: 16 digits Avg IFG(bit) Integer part: 16 digits Integer part: 10 digits, fractional part: 1 digit Max Latency(us) Integer part: 10 digits, fractional part: 1 digit Min Latency(us) Avg Latency(us) Integer part: 10 digits, fractional part: 1 digit Sequence When the mode is Loss Packet 16-digit integer Reorder Packet 16-digit integer Traffic Test or QoS Duplicate Packet 16-digit integer Test 10-digit integer Max Burst Loss Payload Error Payload Error 13-digit integer Tx Channel (1 to 8) Frame 16-digit integer When the mode is QoS Test Byte 16-digit integer Rate(%) 5 digits after the decimal point Rate(fps) 10-digit integer Rate(bps) 10-digit integer Rx Channel (1 to 8) Frame 16-digit integer Byte 16-digit integer Rate(%) 5 digits after the decimal point Rate(fps) 10-digit integer Rate(bps) 10-digit integer Peak Rate(%) 5 digits after the decimal point 10-digit integer Peak Rate(fps) Peak Rate(bps) 10-digit integer Average Rate(%) 5 digits after the decimal point Average Rate(fps) 10-digit integer Average Rate(bps) 10-digit integer Max Latency(us) Integer part: 10 digits, fractional part: 1 digit Integer part: 10 digits, fractional part: 1 digit Min Latency(us) Avg Latency(us) Integer part: 10 digits, fractional part: 1 digit Loss Packet 16-digit integer Reorder Packet 16-digit integer Duplicate Packet 16-digit integer Max Burst Loss 10-digit integer 13-digit integer Payload Error BERT Bit Error Rate (×E-12) Integer part: 13 digits, fractional part: 1 digit When the mode is Bit Error Count 16-digit integer BERT Bit Error Frame 16-digit integer Sync Loss Count 16-digit integer **BERT Target Byte** 16-digit integer Bit Error Insertion 10-digit integer PING When the mode is Send 16-digit integer Loss Count 16-digit integer PING Test ARP Error Disable IPv4 Checksum Error 16-digit integer ICMP Checksum Error 16-digit integer Timeout 16-digit integer Loss Rate(%) Integer part: 3 digits, fractional part: 1 digit

Integer part: 3 digits, fractional part: 3 digits

Integer part: 3 digits, fractional part: 3 digits

Integer part: 3 digits, fractional part: 3 digits

1.8 Statistics

\* Bps: Byte/s, bps: bit/s

Max Response Time(ms)

Min Response Time(ms)

Avg Response Time(ms)

Group Name	Display	Display Digits	Conditions
LoopBack(LB)	Test Count	16-digit integer	When the mode is LB test
	Loss Count	16-digit integer	
	Loss Rate	Integer part: 3 digits, fractional part: 1 digit	
	Max Response Time(ms)	Integer part: 3 digits, fractional part: 3 digits	
	Min Response Time(ms)	Integer part: 3 digits, fractional part: 3 digits	
	Avg Response Time(ms)	Integer part: 3 digits, fractional part: 3 digits	
	Link Down Count	16-digit integer	
	CRC Error	16-digit integer	
	Undersize Error	16-digit integer	
	Alignment Error	16-digit integer	
	Symbol Error	16-digit integer	
Continuity Check(CC)	Tx CCM count	16-digit integer	When the mode is CC test
	Tx RDI count	16-digit integer	
	Rx CCM count	16-digit integer	
	Rx RDI count	16-digit integer	
	LOC detected count	16-digit integer	
	Through CCM count	16-digit integer	
	UnExpected MEP count	16-digit integer	
	Mismerge count	16-digit integer	
	Unexpected MEG Level count	16-digit integer	
	Unexpected Period count	16-digit integer	
	Link Down Count	16-digit integer	
	CRC Error	16-digit integer	
	Undersize Error	16-digit integer	
	Alignment Error	16-digit integer	
	Symbol Error	16-digit integer	

## **E-OAM Test Statistics**

## **Common Group**

## **Acquisition Time**

The time when the screen was last updated is displayed (YYYY/MM/DD hh:mm:ss).

## **Measurement Duration**

The amount of time that has elapsed since the start of testing (statistics) is displayed (to the second; hh:mm:ss).

## Link Group

## Link Status

The port UP/DOWN link status is displayed. When the status is UP, the connection speed and MDI status are displayed.

Display
Linkdown-Unfixed, Linkdown-Straight, Linkdown-Cross
10M-FULL-Straight, 10M-FULL-Cross, 10M-HALF-Straight, 10M-HALF-Cross
100M-FULL-Straight, 100M-FULL-Cross, 100M-HALF-Straight, 100M-HALF-Cross
1000M-FULL-Straight, 1000M-FULL-Cross
Linkdown
1000M-FULL
Linkdown
10G-FULL

## Laser Off Count

Indicates the number of times the laser has been turned off

## Linkdown Count

Indicates the number of linkdown detections

## Tx Freq Deviate(ppm)

Indicates the frequency deviation of the Tx clock

#### Rx Freq Deviate(ppm)

Indicates the frequency deviation of the Rx clock

## LF Send Count and RF Send Count

Indicate the number of sent LFs and RFs

## LF Detect Count and RF Detect Count

Indicate the number of detected LFs and RFs

#### LF Column Count and RF Column Count

Indicate the number of detected LF sequence column and RF sequence column. You can check the status of reception frequency does not lead to detection LFS. This feature is supported in firmware version (FW Ver.) R1.08.01.001 and later.

#### 66B Sync Loss Count

Indicates the number of times the AQ1300/AQ1301 detected signal reception changes from a sync (block lock) state to a loss of sync (block lock loss) state as defined in IEEE802.3. This feature is supported in firmware version (FW Ver.) R1.08.01.001 and later.

#### 66B Sync Error Count

Indicates the number of times the AQ1300/AQ1301 detected blocks whose sync header (2 bits) is 00 or 11 when signal reception is in a sync (block lock) state as defined in IEEE802.3. This feature is supported in firmware version (FW Ver.) R1.08.01.001 and later.

#### 66B Sync hi-ber Count

Indicates the number of times the AQ1300/AQ1301 detected 16 or more sync headers (2 bits) set to 00 or 11 in a 125  $\mu$ s window when signal reception is in a sync (block lock) state as defined in IEEE802.3.

This feature is supported in firmware version (FW Ver.) R1.08.01.001 and later.

## **Tx Group**

#### Frame

Indicates the number of frames that have been transmitted normally

#### Byte

Indicates the number of bytes in the frames that have been transmitted normally

#### Rate(%)

Indicates the data transmission rate (as a percentage)

#### Rate(fps)

Indicates the number of frames that have been transmitted normally in a single second

#### Rate(Bps)

Indicates the number of bytes in the frames that have been transmitted normally in a single second

#### Rate(bps)

Indicates the number of bits in the frames that have been transmitted normally in a single second

#### **Reply Frame**

Indicates the total number of emulation reply frames that have been transmitted ARP/PING/PING6/NA

## Error Frame

Indicates the total number of frames that have been sent with a CRC, undersize, oversize, or symbol error

#### **CRC Error**

Indicates the number of frames that have been sent with a CRC error attached to FCS

## **Undersize Error**

Indicates the number of transmitted frames that have been larger than 17 bytes but smaller than 64 bytes (not including the preamble but including the FCS)

#### **Oversize Error**

Indicates the number of transmitted frames whose size has been at or above the user-defined oversize value (not including the preamble but including the FCS)

#### Symbol Error

Indicates the number of frames that have been sent with an error code attached to them

## **Rx Group**

## Frame

Indicates the number of frames that have been received normally

#### **Byte**

Indicates the number of bytes in the frames that have been received normally

#### Rate(%)

Indicates the data reception rate (as a percentage)

#### Rate(fps)

Indicates the number of frames that have been received normally in a single second

#### Rate(Bps)

Indicates the number of bytes in the frames that have been received normally in a single second

#### Rate(bps)

Indicates the number of bits in the frames that have been received normally in a single second

## **Peak Rate**

Indicates the highest rate detected during measurement (as a percentage, in fps, or in bps)

#### **Average Rate**

Indicates the average rate (as a percentage, in fps, or in bps) within the period during measurement from the first normally received frame until the last normally received frame\*

\* However, the data in the first and last 100 ms of the period is not included in the average rate calculation.

## **PAUSE Frame**

Indicates the number of pause frames that have been received

#### **Collision Detect**

Indicates the number of collisions that have occurred Collision Detect is only valid when Duplex is set to Half.

#### **Error Frame**

Indicates the total number of received frames that have had a CRC, undersize, oversize, alignment, or symbol error

## **Rx Error Group**

## **CRC Error**

Indicates the number of frames in which FCS errors were detected.

The AQ1300/AQ1301 detects errors by comparing the CRC values calculated from the received frames to the FCS (Frame Check Sequence) values in the received frames.

## Undersize

Indicates the number of undersized frames.

An error occurs when a received frame is shorter than 64 bytes (excluding the preamble but including the FCS).

- If the interface is XFP, frames shorter than 48 bytes will not be detected.
- If the interface is SFP or RJ-45, frames shorter than 18 bytes will not be detected.

#### Oversize

Indicates the number of oversized frames.

When a received frame is longer than the frame length that user defined (excluding the preamble but including the FCS), a received frame is considered oversized.

When Manual has been selected in the Test menu, you can set the oversized frame length on the Manual Setup screen. The factory default value is 1519 byte.

When Auto or Auto(Remote) has been selected in the Test menu and "Use Jumbo Frame" has not been selected, frames that are longer than 1518 + the value set for "VLAN stacks" in the source settings × 4 bytes are considered oversized.

### Alignment Error

Indicates the number of alignment error frames.

An error occurs when a received frame's length is not in units of bytes and a FCS value is incorrect (CRCerror).

An error will not occur if the FCS value is correct, even if a received frame's length is not in units of bytes. Alignment errors are valid only for 10M and 100M connections.

#### Symbol Error

Indicates the number of received frames that contain symbol errors.

- An error occurs when any of the following conditions is detected:
- If there are codes that cannot be encoded.
   Errors are not detected if the interface is RJ-45 (10M connection).
- If the end value of a received frame is incorrect.
- If a link fault signaling (LFS) exists in a received frame. (Interface type: XFP)

## **Latency Group**

## Max IFG (µs and bit)

Indicates the maximum interframe gap in terms of time and bits.

#### Min IFG (µs and bit)

Indicates the minimum interframe gap in terms of time and bits.

## Avg IFG (µs and bit)

Indicates the average interframe gap in terms of time and bits.

### Max Latency (µs)

Indicates the maximum difference between a frame's timestamp and the time that it was received

#### Min Latency (µs)

Indicates the minimum difference between a frame's timestamp and the time that it was received

## Avg Latency (µs)

Indicates the average difference between a frame's timestamp and the time that it was received

## **Sequence Group**

## Loss Packet

Indicates the total number of frames that have been lost. This is enabled when two or more sequence measurement source frames are received.

#### **Reorder Packet**

Indicates the total number of frames that have been received out of the order that they were sent in. This is enabled when two or more sequence measurement source frames are received.

#### **Duplicate Packet**

Indicates the number of received frames that have been received again. This is enabled when two or more sequence measurement source frames are received.

#### Max Burst Loss

Indicates the maximum number of consecutive frames that have been lost. This is enabled when two or more sequence measurement source frames are received.

## **Payload Group**

## **Payload Error**

Indicates the number of errors that have been detected in the received payloads. Payload error detection is enabled when at least one sequence measurement source frame is received. The AQ1300/AQ1301 detects errors by comparing the CRC values calculated from the payload in received frames to the CRC values for payload checking that is included in the received frames.

## CH1 to CH8 Tx Groups

#### Frame

For each QoS channel, this item indicates the number of frames that have been transmitted from the port normally

#### Byte

For each QoS channel, this item indicates the number of bytes in the frames that have been transmitted normally

#### Rate(%)

Indicates the data transmission rate (as a percentage) for each QoS channel

#### Rate(fps)

For each QoS channel, this item indicates the number of frames that have been transmitted normally in a single second

#### Rate(bps)

For each QoS channel, this item indicates the number of bits in the frames that have been transmitted normally in a single second

## CH1 to CH8 Rx Groups

## Frame

For each QoS channel, this item indicates the number of frames that have been received normally

#### Byte

For each QoS channel, this item indicates the number of bytes in the frames that have been received normally

## Rate(%)

Indicates the data reception rate (as a percentage) for each QoS channel

## Rate(fps)

For each QoS channel, this item indicates the number of frames that have been received normally in a single second

## Rate(bps)

For each QoS channel, this item indicates the number of bits in the frames that have been received normally in a single second

## **Peak Rate**

Indicates the highest rate detected during measurement (as a percentage, in fps, or in bps) for each QoS channel

## Average Rate

For each QoS channel, this item indicates the average rate within the period during measurement (as a percentage, in fps, or in bps) from the first normally received frame until the last normally received frame<sup>\*</sup>

\* However, the data in the first and last 100 ms of the period is not included in the average rate calculation.

## Max Latency(us)

For each QoS channel, this item indicates the maximum difference between a frame's timestamp and the time that it was received

## Min Latency(us)

For each QoS channel, this item indicates the minimum difference between a frame's timestamp and the time that it was received

## Avg Latency(us)

For each QoS channel, this item indicates the average difference between a frame's timestamp and the time that it was received

## Loss Packet

For each QoS channel, this item indicates the total number of frames that have been lost. This is enabled when two or more sequence measurement source frames are received.

## **Reorder Packet**

For each QoS channel, this item indicates the total number of frames that have been received out of the order that they were sent in. This is enabled when two or more sequence measurement source frames are received.

## **Duplicate Packet**

For each QoS channel, this item indicates the number of received frames that have been received again. This is enabled when two or more sequence measurement source frames are received.

## Max Burst Loss

For each QoS channel, this item indicates the maximum number of consecutive frames that have been lost. This is enabled when two or more sequence measurement source frames are received.

## **Payload Error**

For each QoS channel, this item indicates the number of errors that have been detected in the received payloads. This is enabled when one or more payload error measurement source frames are received.

## BERT Group

## **Bit Error Rate**

Indicates the bit error rate ( $E^{-12}$ ). This is enabled when the AQ1300/AQ1301 synchronizes with the received frame at least once (when the BERT target byte is not zero).

#### **Bit Error Count**

Indicates the number of bit errors detected during synchronization. This is enabled when the AQ1300/AQ1301 synchronizes with the received frame at least once (when the BERT target byte is not zero). The AQ1300/AQ1301 detects errors by comparing the CRC values calculated from the payload in received frames to the CRC values for payload checking that is included in the received frames.

#### **Bit Error Frame**

Indicates the number of received frames that contain a bit error. This is enabled when the AQ1300/ AQ1301 synchronizes with the received frame at least once (when the BERT target byte is not zero).

#### Sync Loss Count

Indicates the number of sync loss occurrences. This is enabled when the AQ1300/AQ1301 synchronizes with the received frame at least once (when the BERT target byte is not zero).

#### **BERT Target Byte**

Indicates the number of synchronized bytes that have been received

## **Bit Error Insertion**

Indicates the number of inserted bit errors

## **PING Group**

Test Count Indicates the number of sent ping frames

#### Loss Count

Indicates the number of failed ping attempts

#### **ARP Error**

Indicates the number of failed ping attempts that resulted from ARP address resolution failures. In the firmware version R1.07 and later, this item is always disabled because the address resolution is executed before measurement.

#### **IPv4 Checksum Error**

Indicates the number of failed ping attempts that resulted from IPv4 header checksum errors

#### **ICMP Checksum Error**

Indicates the number of failed ping attempts that resulted from ICMP checksum errors

#### Timeout

Indicates the number of timeouts

## Loss Rate(%)

Indicates the percentage of frames that have been lost as a result of timeouts

#### Max Response Time(ms)

Indicates the maximum response time

## Min Response Time(ms)

Indicates the minimum response time

#### Avg Response Time(ms)

Indicates the average response time
# LoopBack (LB) Group

Test Count

Indicates the number of sent LBM frames

Loss Count Indicates the number of failed attempts

Loss Rate Indicates the percentage of frames that have been lost as a result of timeouts

Max Response Time(ms) Indicates the maximum response time

Min Response Time(ms) Indicates the minimum response time

Avg Response Time(ms) Indicates the average response time

Link Down Count Indicates the number of link-down detections

CRC Error Indicates the number of CRC error frames that have been received

**Undersize Error** Indicates the number of undersize frames (less than 64 bytes) that have been received

Alignment Error Indicates the number of alignment error frames that have been received

Symbol Error Indicates the number of symbol error frames that have been received

# **Continuity Check (CC) Group**

Tx CCM Count Indicates the number of sent CCM frames

Tx RDI Count Indicates the number of sent RDI frames

Rx CCM Count Indicates the number of received CCM frames

Rx RDI Count Indicates the number of received RDI frames

# LOC Detected Count

Indicates the number of LOC (loss of continuity) detections This is detected when three consecutive CCM frames cannot be received from the other network device (MEP).

## **Through CCM Count**

Indicates the number of received CCM frames whose maintenance domain level (MD level) is higher than the MD level of the AQ1300/AQ1301

### **Unexpected MEP Count**

Indicates the number of unexpected MEP detections

This is detected when the maintenance domain level (MD level) and domain name in the received CCM frame are correct but the MEP ID of the other network device (MEP) is different from the "target MEP ID." The domain name is either Short MA Name (IEEE802.1ag standard) or MEG ID (ITU-T Y1731 recommendation).

#### **Mismerge Count**

Indicates the number of mismerge detections

This is detected when the maintenance domain level (MD level) in the received CCM frame is correct but the domain name is not.

#### **Unexpected MEG Level Count**

Indicates the number of unexpected MEG level detections This is detected when the maintenance domain level in the received CCM frame is less than the MD level of the AQ1300/AQ1301.

#### **Unexpected Period Count**

Indicates the number of unexpected period detections

This is detected when the maintenance domain level (MD level), domain name, and MEP ID in the received CCM frame are correct but the transmission interval of the other network device (MEP) is different from that of the AQ1300/AQ1301.

#### Link Down Count

Indicates the number of link-down detections

## **CRC Error**

Indicates the number of CRC error frames that have been received

#### **Undersize Error**

Indicates the number of undersize frames (less than 64 bytes) that have been received

#### Alignment Error

Indicates the number of alignment error frames that have been received

#### Symbol Error

Indicates the number of symbol error frames that have been received

# 1.9 Emulation

# IPv4 Host

# **ARP Reply**

To perform address resolution, the AQ1300/AQ1301 sends an ARP reply when it receives an ARP request.

When you enable ARP replying, it is always enabled regardless of the test mode setting, filter condition, or measurement or transmission condition.

When Auto or Auto(Remote) has been selected in the Test menu, ARP replying is always enabled and set to "Source Address only."

When Manual has been selected in the Test menu and the test layer is L3-IPv4, you can configure ARP replying using the emulation settings.

## **ARP Requests That Are Not Answered**

The AQ1300/AQ1301 will not send an ARP reply in response to the following kinds of ARP requests.

- ARP requests with a LLC/SNAP header attached (only ARP requests that conform to the DIX specification are supported)
- · ARP requests with an MPLS label attached
- · ARP requests that are counted as errors, except for payload and sequence errors
- · ARP requests that are received at the same time that a linkdown occurs
- ARP requests that are received at the same time that a collision occurs
- ARP requests whose packet lengths are less than 63 bytes, greater than 1519 bytes (greater than 1523 when there is one VLAN stack or greater than 1527 when there are two VLAN stacks), or greater than the oversize threshold.
- ARP requests with three or more VLAN stacks.

## VLAN Tag Handling

The AQ1300/AQ1301 sends ARP replies in response to ARP requests with VLAN tags attached.

## **ARP Requests with Test Tags**

The AQ1300/AQ1301 sends ARP replies in response to ARP requests with test tags attached.

## **ARP Reply Transmission Conditions**

- · If a collision occurs while an ARP reply is being sent, it is resent.
- If an ARP request is received while transmission is paused, an ARP reply is sent after transmission is resumed.
- If transmission is paused and the AQ1300/AQ1301 is waiting to send an ARP reply and a normal test frame, after transmission resumes, the AQ1300/AQ1301 will send the ARP reply first and then the normal test frame.
- Replies are not sent for ARP requests that are received before the transmission of the current ARP reply has finished.
- If a linkdown occurs immediately after an ARP request is received, the AQ1300/AQ1301 will not send a reply to that request.

# **Ping Reply**

The AQ1300/AQ1301 sends a ping reply when it receives a ping request.

When you enable ping replying and the test mode is not Loopback Test, ping replying is always enabled regardless of the test mode setting, filter condition, or measurement or transmission condition. When Auto or Auto(Remote) has been selected in the Test menu, ping replying is always enabled. When Manual has been selected in the Test menu and the test layer is L3-IPv4, you can configure ping replying by specifying the emulation settings.

## Ping Requests That Are Not Answered

The AQ1300/AQ1301 will not send a ping reply in response to the following kinds of ping requests.

- Ping requests with an LLC/SNAP header attached (only ping requests that conform to the DIX specification are supported)
- · Ping requests with an MPLS label attached
- · Ping requests that are counted as errors, except for payload and sequence errors
- · Ping requests that are received at the same time that a linkdown occurs
- · Ping requests that are received at the same time that a collision occurs
- Ping requests whose packet lengths are less than 63 bytes, greater than 10000 bytes, or greater than the oversize threshold.
- IP fragmented ping requests
- · Ping requests with three or more VLAN stacks.

#### **VLAN Tag Handling**

The AQ1300/AQ1301 sends ping replies in response to ping requests with VLAN tags attached.

#### **Ping Reply Transmission Conditions**

- If a collision occurs while a ping reply is being sent, it is resent.
- If a ping request is received while transmission is paused, a ping reply is sent after transmission is resumed.
- If transmission is paused and the AQ1300/AQ1301 is waiting to send a ping reply and a normal test frame, after transmission resumes, the AQ1300/AQ1301 will send the ping reply first and then the normal test frame.
- Replies are not sent for ping requests that are received before the transmission of the current ping reply has finished.
- If a linkdown occurs immediately after a ping request is received, the AQ1300/AQ1301 will not send a reply to that request.

# **Automatic MAC Address Acquisition**

In automatic MAC address acquisition, the AQ1300/AQ1301 uses ARP processing to automatically obtain the MAC address of the device under test (DUT) and then uses that address as the frame destination MAC address.

## Automatic MAC Address Acquisition Conditions

- When automatic acquisition is enabled, ARP acquisition is performed with the specified target host (IP address) at the start of measurement. If the target host is not in the same segment as the AQ1300/AQ1301, ARP acquisition is performed with the default gateway. (Acquisition is performed before measurement starts. Afterwards, the statistics are cleared and measurement starts.)
- The AQ1300/AQ1301 waits for a reply after it sends an ARP packet. The timeout value is 1 second. The AQ1300/AQ1301 will try again after timing out.
- The acquired MAC address is cleared at the start of the next test.
- If the MAC address increment feature is enabled, it has priority.
- If the variable field feature is enabled, it has priority.

## Ignored ARP Replies

The following ARP replies are not recognized as ARP replies when they are received.

- ARP replies with an LLC/SNAP header attached (only ARP replies that conform to the DIX specification are supported)
- · ARP replies with an MPLS label attached
- · ARP replies that are counted as errors, except for payload and sequence errors
- · ARP replies that are received at the same time that a linkdown occurs

- · ARP replies that are received at the same time that a collision occurs
- ARP replies whose packet lengths are less than 63 bytes, greater than 1519 bytes (greater than 1523 when there is one VLAN stack or greater than 1527 when there are two VLAN stacks), or greater than the oversize threshold.
- · ARP replies with three or more VLAN stacks.

# Automatic IP Address Acquisition (DHCP)

In automatic IP address acquisition, the AQ1300/AQ1301 requests an address from the DHCP server and then uses the acquired IPv4 address as the source IPv4 address.

# **Multi Host**

If the test menu is set to Manual and the test layer is IPv4, this feature automatically generates multiple MAC addresses from the VLAN ID or IP address information and make the AQ1300/AQ1301 emulate multiple hosts in the VLAN.

- · Returns ARP replies as a multi host.
- Automatically performs ARP acquisition of frame destination MAC addresses for each QoS channel in Qos test mode. This feature also automatically generates frame source MAC addresses.
- Automatically configures Rx QoS filters for each QoS channel in QoS test mode.

# **IPv6 Host**

# NDP Reply

In NDP (Neighbor Discovery Protocol) replying, the AQ1300/AQ1301 resolves the address by sending an NA (Neighbor Advertisement) when it receives an NS (Neighbor Solicitation). When you enable NDP, it is always enabled regardless of the test mode setting, filter condition, or transmission condition. When Auto or Auto(Remote) has been selected in the Test menu, NDP replying is always enabled. When Manual has been selected in the Test menu and the test layer is L3-IPv6, you can configure NDP replying by specifying the emulation settings.

## **NSs That Are Not Answered**

The AQ1300/AQ1301 will not send an NA in response to the following kinds of NS.

- NSs with an LLC/SNAP header attached (only NSs that conform to the DIX specification are supported)
- · NSs with an MPLS label attached
- · NSs that are counted as errors, except for payload and sequence errors
- NSs that are received at the same time that a linkdown occurs
- NSs that are received at the same time that a collision occurs
- NSs whose packet lengths are less than 81 bytes, greater than 10000 bytes, or greater than the oversize threshold.
- · NSs with three or more VLAN stacks.

## VLAN Tag Handling

The AQ1300/AQ1301 sends NAs in response to NSs with VLAN tags attached.

## NDP Requests with Test Tags

The AQ1300/AQ1301 sends NDP replies in response to NDP requests with test tags attached.

1

#### **NA Transmission Conditions**

- If a collision occurs while an NA is being sent, it is resent.
- If an NS is received while transmission is paused, an NA is sent after transmission is resumed.
- If transmission is paused and the AQ1300/AQ1301 is waiting to send an NA, an insert frame, and a normal test frame, after transmission resumes, the AQ1300/AQ1301 will send the insert frame, the NA, and then the normal test frame.
- NAs are not sent for NSs that are received before the transmission of the current NA has finished.
- If a linkdown occurs immediately after an NS is received, the AQ1300/AQ1301 will not send a reply to that request.

# **Ping6 Reply**

In Ping6 replying, the AQ1300/AQ1301 sends a ping6 reply (ICMPv6 echo reply) when it receives a ping6 request (ICMPv6 echo request).

When you enable ping6 replying and the test mode is not Loopback Test, ping replying is always enabled regardless of the test mode setting, filter condition, or transmission condition.

When Auto or Auto(Remote) has been selected in the Test menu, ping6 replying is always enabled. When Manual has been selected in the Test menu and the test layer is L3-IPv6, you can configure ping6 replying by specifying the emulation settings.

### **Ping6 Requests That Are Not Answered**

The AQ1300/AQ1301 will not send a ping6 reply in response to the following kinds of ping6 requests.

- Ping6 requests with an LLC/SNAP header attached (only ping6 requests that conform to the DIX specification are supported)
- Fragmented ping6 requests.
- Ping6 requests with an MPLS label attached
- · Ping6 requests that are counted as errors, except for payload and sequence errors
- Ping6 requests that are received at the same time that a linkdown occurs
- · Ping6 requests that are received at the same time that a collision occurs
- Ping6 requests whose packet lengths are less than 81 bytes, greater than 1519 bytes (greater than 1523 when there is one VLAN stack or greater than 1527 when there are two VLAN stacks), or greater than the oversize threshold.
- · Ping6 requests with three or more VLAN stacks.

## VLAN Tag Handling

The AQ1300/AQ1301 sends ping6 replies in response to ping6 requests with VLAN tags attached.

#### Ping6 Reply Transmission Conditions

- If a collision occurs while a ping6 reply is being sent, it is resent.
- If a ping6 request is received while transmission is paused, a ping6 reply is sent after transmission is resumed.
- If transmission is paused and the AQ1300/AQ1301 is waiting to send a ping6 reply and a normal test frame, after transmission resumes, the AQ1300/AQ1301 will send the ping6 reply first and then the normal test frame.
- Replies are not sent for ping6 requests that are received before the transmission of the current ping6 reply has finished.
- If a linkdown occurs immediately after a ping6 request is received, the AQ1300/AQ1301 will not send a reply to that request.

# **Stateless Address Autoconfiguration**

In stateless address autoconfiguration, the AQ1300/AQ1301 sends a router solicitation message to the router and uses the router advertise message that it receives to set the source IPv6 address.

### **Ignored RAs**

The following RAs are not recognized as RAs when they are received.

- · RAs with an MPLS label attached
- RAs with an LLC/SNAP header attached (only RAs that conform to the DIX specification are supported)
- · RAs that are counted as errors
- · RAs that are received at the same time that a linkdown occurs
- · RAs that are received at the same time that a collision occurs
- RAs whose packet lengths are less than 81 bytes, greater than 1519 bytes (greater than 1523 when there is one VLAN stack or greater than 1527 when there are two VLAN stacks), or greater than the oversize threshold.
- RAs with three or more VLAN stacks.

# Automatic MAC Address Acquisition through NDP

In automatic MAC address acquisition through NDP, the AQ1300/AQ1301 uses NDP (neighbor discovery protocol) message processing at the start of testing to automatically obtain the MAC address of the IPv6 target host and then uses that address as the frame destination MAC address.

### Automatic MAC Address Acquisition Conditions

 When automatic acquisition is enabled, MAC address acquisition through NDP is performed with the specified target host (IP address) at the start of measurement. If the target host is not in the same segment as the AQ1300/AQ1301 from the prefix length, MAC acquisition is performed with the IPv6 router.

(Acquisition is performed before measurement starts. Afterwards, the statistics are cleared and measurement starts.)

- The AQ1300/AQ1301 waits for a reply after it sends an NS (neighbor solicitation) packet. The timeout value is 1 second. The AQ1300/AQ1301 will try again after timing out.
- · The acquired MAC address is cleared at the start of the next test.
- If the MAC address increment feature is enabled, it has priority.
- · If the variable field feature is enabled, it has priority.

1

# 1.10 Ping and Traceroute Testing

# **Ping Test**

You can perform IPv4/IPv6 ping testing.

- Destination: A single host
- Interval: 1 ms, 10 ms, 100 ms, 1 s
- Tx Mode: Frames, Time, Continuous
- Frame Length

IPv4: 64 (+up to two VLAN stacks) to 9999 bytes IPv6: 84 (+up to two VLAN stacks) to 9999 bytes

## **Unsupported Ping Frames**

- IEEE802.3 ping frames
- Fragmented ping frames
- · Ping frames with an MPLS label attached
- Ping frames with three or more VLAN stacks.

# **Traceroute Test**

You can perform IPv4 (ICMP) or IPv6 (ICMPv6) traceroute testing.

• Destination: A single host

# **Unsupported Ping Frames**

- IEEE802.3 ping frames
- Ping frames whose frame length is not 64 bytes (+VLAN tag)
- Ping frames with an MPLS label attached
- Ping frames with three or more VLAN stacks.
- Tests with more than 64 hops

# 1.11 Logging Statistics

When Manual has been selected in the Test menu, you can log statistics on the AQ1300/AQ1301. The logged data is saved to a CSV file.

•	Logging interval:	1 s
•	Logging time:	Specify the time in seconds up to 4 hours (14400 seconds), or
		select 12, 24, 48, or 72 hours.
•	End settings:	Stop, Overwrite
	Maximum number of log items:	Λ

Maximum number of log items: 4

End Setting	Description
Stop	Logging stops after the logging time has passed.
Overwrite	After the logging time has passed, old logs are overwritten by new logs.

## Note\_

You can save logged statistics to a specific file name by opening the Measurement menu, selecting File, selecting File Name Setup, and then specifying a file name.

# **1.12 Simple Test Creation and Execution**

# **Test Item Registration**

When Auto or Auto(Remote) has been selected in the Test menu, you can perform different tests (test modes) according to a test scenario that you have created in the setup software.

The test modes that have been registered in the test scenario are referred to as test items. You can configure test items using the setup software. You can save up to eight test modes (test items)

to a single test scenario file.

You can execute tests by loading the setup file that you created with the setup software onto the AQ1300/AQ1301 and selecting the configured test items.

# **Consecutive Test Item Execution**

You can execute registered test items consecutively.

For consecutive test item execution, you can set the starting test number, the interval between test items, and whether or not to display a confirmation message when a test item has finished.

# 1.13 Displaying Test Pass/Fail Results

When Auto or Auto(Remote) has been selected in the Test menu, you can display the pass/fail results of measurement.

You can set the pass/fail conditions in the setup software for each test mode.

You can only use the AQ1300/AQ1301 to display the pass/fail conditions, not to set them. You can set whether or not to perform pass/fail judgment.

For details about the pass/fail conditions, see the Setup Software User's Manual, IM AQ1300-61EN.

# 1.14 File

File Type	File Format	Extension	AQ1300/AQ1301 (AQ1300 and AQ1301)		Setup Software	
			Save	Load	Save	Load
Setup file	Binary	.sd	Yes	Yes	Yes	Yes
Management file	Binary	.dmf	No	Yes	Yes	Yes
Statistical result file	Binary	.mr	Yes	Yes	No	Yes
Statistic log file	Text	.CSV	Yes	No	No	Yes
VLAN ID definition file	Text	.csv or .txt	No	Yes	No	Yes

The AQ1300/AQ1301 and the setup software use the following files.

# **Setup File**

A measurement setup file. You can register up to eight test items on a single setup file. The type of setup file that you can save varies depending on what you select in the Test menu. You cannot load a setup file that was created for a different Test menu option.

# Management File (Display management file)

A file for managing the display of setup files. You can save four pages with 12 measurement setup files each.

The management file name is fixed at "disManage.dmf".

# **Statistical Result File**

A file of the measured results or the measured statistical results. You can save the results of one test to a single statistical result file.

You can also automatically save a statistical result or a statistical result file whenever a test finishes.

# **Statistic Log File**

When Manual has been selected in the Test menu, you can save up to four statistical items to a statistic log file.

You can also automatically save a statistic log file whenever a test finishes.

# **VLAN ID Definition File**

VLAN ID definition files (csv format; .csv or .txt extension) created in advance can be loaded into the VLAN ID list of VLAN tests.

# Note\_

- You can save a setup file to a specific file name by opening the Setup menu, selecting File, selecting File Name Setup, and then specifying a file name.
- You can save a statistical result file or statistic log file to a specific file name by opening the Measurement menu, selecting File, selecting File Name Setup, and then specifying a file name.

# 1.15 Optical Power Measurement (AQ1300 Option)

On models with the /SPML option, when OPM has been selected in the Test menu, you can measure optical power.

Wavelength range	850, 1300, 1310, 1490, 1550, 1625, 1650 nm		
Measurement range	-60 to +10 dBm		
Modulation mode	CW, 270 Hz, 1 kHz, 2 kHz		
	You can select the modulation frequency of the incident rays from a list. You can also		
	select CW (continuous).		
Unit	dB, dBm, W		
Reference	You can make the displayed measured value the reference and display subsequent		
	measured values as relative values.		
Zero Set	You can adjust the internal deviation of the optical power measurement section and obtain		
	more accurate absolute optical power values.		
Average Count	You can display averaged measured values.		
Max/Min Value Display	You can display the maximum and minimum measured values.		
Offset	You can add a specified value (the offset value) to measured optical power values.		
Threshold Value	You can set upper and lower threshold values and determine whether or not the measured		

# 1.16 RFC2544 Measurement (AQ1300 Option)

RFC2544 was published by the IETF. This document contains evaluation methods (benchmark tests) for measuring the processing capabilities of network devices.

The AQ1300/AQ1301 can perform the following measurements contained in RFC2544. The test configuration that you need to use for these measurements is Loopback Traffic Test, in which the other device is set to Loopback Test mode.

- Throughput
- Latency
- Frame loss rate
- Back to back

For each measurement, the length of transmit and receive frames is changed automatically to retrieve a measured value. Then, the processing capability for each frame length is displayed on a graph. In addition to the features listed above, the AQ1300/AQ1301 can measure the frame signal delay variations when these frame signals travel across the network.

· Delay variations (packet jitter)

# **Throughput Measurement**

The throughput measurement measures the maximum amount of traffic (rate) that a network device can transmit without losing frame signals. In this measurement, a fixed number of frame signals are transmitted (at the initial rate) over the specified measurement time (the test duration).

During the test duration, if a loss is detected, the rate is automatically decreased. The AQ1300/ AQ1301 performs another measurement to detect whether a loss occurs at this new rate. If a loss is detected, the same operations are repeated. These operations are repeated until the rate is decreased to the specified minimum rate.

During the test duration, if no losses are detected, the rate is automatically increased. The AQ1300/ AQ1301 performs another measurement to detect whether a loss occurs at this new rate. If no losses are detected, the same operations are repeated. These operations are repeated until the rate is increased to the specified maximum rate.

These rate increasing and decreasing operations are repeated until the difference (the resolution) between the rates when a loss was detected and when no losses were detected reaches a value that is equal to or less than the specified value. The series of operations from the start of measurement to the point where the rate converges to this specified value is a single measurement (a trial). The specified number of trials are measured, and the average of the rates at the end of each trial is the throughput value.



For the test configuration, see "Two-Way Traffic Test" in section 1.4.

## **Test Duration**

This is the length of one measurement for detecting losses.

## **Number of Trials**

The number of times that the AQ1300/AQ1301 will perform the series of operations from the start of measurement to the point where the rate converges to the specified value. In one trial, frame signals of the preset frame lengths are used to perform the loss detection measurements. The throughput is the average of the values from all the trials.

### **Initial Rate**

The traffic rate that is used when the throughput measurement starts.

#### **Minimum Rate**

This is the lower limit for the rate. The rate is decreased automatically whenever a loss is detected. This is the minimum traffic rate that is used to converge the throughput measurement.

## **Maximum Rate**

This is the upper limit for the rate. The rate is increased automatically when no losses are detected. This is the maximum traffic rate that is used to converge the throughput measurement.

# Resolution

This is the range that is used to converge the throughput measurement. When the difference between the rates when a loss was detected and when no losses were detected falls within the resolution range, the AQ1300/AQ1301 concludes the throughput measurement.

## **Acceptable Loss**

This threshold value specifies the percentage of a frame signal that can be lost without a loss being detected.

## **Pass/Fail Judgment**

You can perform pass/fail judgments by setting the throughput threshold on the AQ1300/AQ1301 in advance. If the value falls below the threshold, a fail judgment occurs.

# Latency Measurement

In the latency measurement, the AQ1300/AQ1301 measures the delay when a network device transmits frame signals. In this measurement, a fixed number of frame signals are transmitted (at the test rate) over the specified measurement time (the test duration). These frame signals are looped back by the other device. The delay of the intermediate frame signal from the fixed number of frame signals is measured.



#### **Transmission and Reception of Frame Signals**



#### Selecting the Way That Measured Results Are Displayed

There are two transmission methods that can be used depending on the other network device. You can select the method that the AQ1300/AQ1301 displays measured results with that is suitable for the other device.

For the different transmission methods, the delay measurement method differs as shown in the following figures.

· Store&Forward:

The delay of frame signals transmitted in the store and forward method is displayed.

• Cut Through: The delay of frame signals transmitted in the cut through method is displayed.

#### **Store and Forward Method**

The time from when the last bit of the frame signal is received at the input port to when the first bit of the frame signal is transmitted from the output port is measured as the delay.





#### **Cut Through Method**

The time from when the first bit of the frame signal is received at the input port to when the first bit of the frame signal is transmitted from the output port is measured as the delay.



Cut through delay

## **Test Duration**

This is the time that frame signals are transmitted for during a single delay measurement.

### **Number of Trials**

The number of times that delays are measured. For each trial, the delay measurement is performed for the time specified by the test duration. In one trial, frame signals of the preset frame lengths are used to perform the delay measurements. The delay is the average of the values from all the trials.

### **Test Rate**

The traffic rate that the AQ1300/AQ1301 uses to measure the delay. You can change the test rate value. If you have already performed the throughput measurement, you can set the traffic rate to the measured throughput result.

#### **Pass/Fail Judgment**

You can perform pass/fail judgments by setting the delay threshold on the AQ1300/AQ1301 in advance. If the value exceeds the threshold, a fail judgment occurs.

# Frame Loss Rate Measurement

In the frame loss rate measurement, frame signals are transmitted to the network device at a traffic rate that exceeds the frame signal transfer capability of the network device, and the frame loss rate is measured for each frame length.

In this measurement, the frame loss rate is measured while the rate is continually stepped down from the initial rate that the measurement started at until losses are no longer detected.

The series of operations from the start of measurement to the finding of the rate at which losses are no longer detected is a single measurement (a trial).



The frame loss rate is computed using the following equation.

Frame loss rate (%) = Number of input frames - number of output frames ×100 Number of input frames

# **Test Duration**

This is the time that frame signals are transmitted for during a frame loss rate measurement at a single rate.

## **Number of Trials**

The number of times that the AQ1300/AQ1301 will perform the series of operations from the start of measurement to the point where the rate at which losses are no longer detected is found. In one trial, frame signals of the preset frame lengths are used to perform the frame loss rate measurements. The frame loss rate is the average of the values from all the trials.

## **Initial Rate**

The traffic rate that is used when the frame loss rate measurement starts.

## **Step Down**

After the measurement starts, the AQ1300/AQ1301 continually detects for losses while it automatically decreases the traffic rate by the specified step.Measurement is stopped automatically when a rate is found at which losses are no longer detected.

## **Pass/Fail Judgment**

You can perform pass/fail judgments by setting the frame loss rate threshold (the rate's upper limit) on the AQ1300/AQ1301 in advance. If the value exceeds the threshold, a fail judgment occurs.

1

# **Back to Back Measurement**

In the back to back measurement, the maximum burst size (number of consecutive frames) that a network device can transmit without losing frame signals is measured. In this measurement, a burst of frame signals (a group of consecutive frame signals) is transmitted over the specified measurement time (the test duration).

During the test duration, if a loss is detected, the number of burst frames is automatically decreased. The AQ1300/AQ1301 performs another measurement to detect whether a loss occurs with this new number of burst frames. If a loss is detected, the same operations are repeated.

During the test duration, if no losses are detected, the number of burst frames is automatically increased. The AQ1300/AQ1301 performs another measurement to detect whether a loss occurs with this new number of burst frames. If no losses are detected, the same operations are repeated. These operations that increase and decrease the number of burst frames are repeated until the difference (the resolution) between the number of burst frames when a loss was detected and when no losses were detected reaches a value that is equal to or less than the specified value.

The series of operations from the start of measurement to the point where the number of burst frames converges to the specified value is a single measurement (a trial). The traffic rate is fixed to 100%.



## **Test Duration**

This is the length of one measurement for detecting losses.

#### **Number of Trials**

The number of times that the AQ1300/AQ1301 will perform the series of operations from the start of measurement to the point where the number of burst frames converges to the specified value. In one trial, frame signals of the preset frame lengths are used to perform the loss detection measurements.

The number of burst frames is the average of the values from all the trials.

#### Resolution

This is the range that is used to converge the back to back measurement. When the difference between the number of burst frames when a loss was detected and when no losses were detected falls within the resolution range, the AQ1300/AQ1301 concludes the back to back measurement.

### **Pass/Fail Judgment**

You can perform pass/fail judgments by setting the threshold on the number of burst frames (the lower limit on the number of frames) on the AQ1300/AQ1301 in advance. If the value falls below the threshold, a fail judgment occurs.

# **Delay Variation (Packet Jitter) Measurement**

In the delay variation measurement, the AQ1300/AQ1301 measures the delay variations when a network device transmits frame signals. In this measurement, a fixed number of frame signals are transmitted (at the test rate) over the specified measurement time (the test duration). The AQ1300/AQ1301 then measures the frame signal delay in units of the specified test window size. The maximum variation width and minimum variation width of the delays are measured per sampling period. For each sampling period, the largest and smallest values are selected as the measured

results for the sampling period and are displayed on a graph. Additionally, the statistically processed variation widths of each sampling period are displayed on the graph as percentile variations.

## **Test Duration**

This is the length of one measurement for measuring delay variations.

## **Number of Trials**

The number of times that delay variations are measured. For each trial, the delay variation measurement is performed for the time specified by the test duration. In one trial, frame signals of the preset frame lengths are used to perform the delay variation measurements. The delay variation is the average of the values from all the trials.

- Time

## Test Rate

The traffic rate that the AQ1300/AQ1301 uses to measure the delay variation. You can change the test rate value. If you have already performed the throughput measurement, you can set the traffic rate to the measured throughput result.

## Test Window Size (Sampling Time)

**Test duration** 

The AQ1300/AQ1301 measures frame signal delay variations in units of the specified length of time.

## Resolution

This is the percentile variation value's measurement resolution. The variation value measurement ranges for all the resolutions are shown below.

Resolution	Measurement Range		
0.05 ms	0 ms to 3.00 ms		
0.1 ms	0 ms to 6.00 ms		
0.5 ms	0 ms to 30.00 ms		
1.0 ms	0 ms to 60.00 ms		
2.5 ms	0 ms to 150.00 ms		
5.0 ms	0 ms to 300.00 ms		

If you set Resolution to Auto, the AQ1300/AQ1301 statistically processes the frame signal delay that was sampled during the preliminary measurement, which was done before the start of the test, and automatically sets the resolution to the most appropriate value.

1

## **Calculation Criterion for Result**

The AQ1300/AQ1301 uses this setting to select the variation value from the statistically processed values. During statistical processing, the value that you specified with the measurement resolution specifies the class interval, and the size of the statistically processed values is split into 60 classes. The AQ1300/AQ1301 sets the percentile value to the largest value that is within the class that contains the value that corresponds to the threshold value.

Example of the 75th percentile: In a single period of the test duration, 5000 values (statistically

processed values) were measured. Starting from the first measurement, the value that corresponds to 75% is measurement number 3750. Each class contains a certain number of statistically processed values, and the percentile value is set to the largest value within the class that contains measurement number 3750.



#### Example: 5000 samples

## **Pass/Fail Judgment**

You can perform pass/fail judgments by setting the delay variation threshold (the variation value's upper limit) on the AQ1300/AQ1301 in advance. If the value exceeds the threshold, a fail judgment occurs.

# 1.17 VLAN Test

The VLAN Test is used to check the VLAN trunk configuration. You can compare the VLAN ID list that you plan to receive with the actual received VLAN ID list. Then, you can display the results or save them to a file.

# Transmission

The AQ1300/AQ1301 transmits VLAN ID frames according to the VLAN ID list set on the AQ1300 using up to 4096 VLAN IDs. A VLAN ID definition file can also be loaded into the VLAN ID list.

# **Transmittable Frame Formats**

- When the test layer is L2: MAC+TYPE(0x00)
- When the test layer is L3-IPv4: MAC+TYPE+IPv4
  - MAC+TYPE+IPv4+UDP 6: MAC+TYPE+IPv6
- When the test layer is L3-IPv6:

MAC+TYPE+IPv6+UDP

# **Reception and Analysis**

The AQ1300/AQ1301 compares the list of the VLAN IDs that are planned to be received with the actual received VLAN IDs and displays the result. You can edit VLAN ID lists on the AQ1300/AQ1301 or load VLAN ID definition files into the VLAN ID list.

# **Display Format**

Map or list

The comparison results are displayed in different colors: Rx ID success (green), Rx ID fail (yellow), and RX ID error (red).

# **Saving Result Files**

Received and analyzed result files can be saved in the AQ1300/AQ1301 in binary format (.mr extension). Saved result files can be uploaded to a Windows PC with the Setup Software.

# 1.18 Telnet Remote Control

The AQ1300/AQ1301 can be controlled remotely as a Telnet server. This feature is supported in auto test or auto(remote) test modes. For details, see the Communication Interface User's Manual, IM AQ1300-17EN.

# 1.19 E-OAM Test

The AQ1300/AQ1301 is equipped with an Ethernet OAM (Ethernet operation, administration and maintenance; hereafter referred to as E-OAM) function that complies with the ITU-T Y.1731 Recommendation and IEEE802.1ag Standard. The following tests can be performed.

- CC (continuity check) test
- · LB (loop back) test, multicast LB execution
- LT (link trace) execution

# **Overview of the E-OAM Test**

The E-OAM test checks the connection of network devices that are connected to a network segment configured with an E-OAM router. In this test, the AQ1300/AQ1301 sends E-OAM frames and checks whether response frames are returned from devices connected at the far end of the network (MEP; maintenance end point) or routers connected in the middle of the network (MIP; maintenance intermediate point).

Moreover, another AQ1300/AQ1301, functioning as an emulator, can be connected in place of the other network device (MEP) and return response frames to the AQ1300/AQ1301 on the transmitting end.



# **CC test**

CC (Continuity Check) is a test in which CCM frames (Continuity Check Message) are sent periodically to a device (MEP) at the far end of the network in order to check whether the route to the device is connected. You can set the transmission interval to 100 ms, 1 s, 10 s, or 60 s. When the route is disconnected (LOC: loss of continuity detection), an RDI (remote defect indication) frame is transmitted to the network device at the destination address.

## When LOC Is Detected

When a loss of continuity is detected (CCM frame is not received), if the auto RDI transmission is enabled on the AQ1300/AQ1301, an RDI frame is sent to the network device at the destination address.



\* RDI frames refer to periodically sent CCM frames with the RDI bit set to on.

# **LB** Test

LB (Loop Back) is a test in which LBM (loopback message) frames are sent to a device (MEP) at the far end of the network to check whether LBR (loopback reply) frames are returned from the device.

## LB Test Mode

Set the length of the LB test.

Tx mode: Time







Tx mode: Frames



## LB Reply

If LB reply is enabled in the AQ1300/AQ1301 emulation settings, when an LBM frame addressed to the AQ1300/AQ1301 is received, an LBR frame is sent to the network device at the destination address.

# LT Execution

LT (link trace) can be used to send LTM frames to a device (MEP) at the far end of the network and check whether LTR (link trace reply) frames are returned from all the routers in the middle receiving the LTM (link trace message) frames. The MAC addresses of routers and network devices that responded are listed in the AQ1300/AQ1301 measurement screen.

# **Multicast LB Execution**

Multicast LB (loop back) can be used to send multicast LBM frames to network devices connected to the same network segment and receive LBR frames from them. The MAC addresses of network devices that responded are listed in the AQ1300/AQ1301 measurement screen.

# 1.20 Y.1564 Test

Y.1564 is a ITU-T recommendation that defines the procedure for measuring the processing capability of Ethernet services.

It can be used to measure the communication traffic processing capability for a given network bandwidth setting and verify the effect of traffic congestion on the circuit.

The AQ1300/AQ1301 can perform the following measurements contained in ITU-T Y.1564:

- IR step test
- Burst size test
- Service performance test

# IR Step Load Test (IR test)

In an IR step load test, frame signals are sent to network devices while increasing the traffic rate in steps to measure the following parameters:

• Information rate (IR)

- Frame loss (FL)
- Frame transfer delay (FTD)
- Frame delay variation (FDV)

In a single measurement, up to eight service circuits can be measured in order.



# Example of IR step load (per service)

#### Minimum rate (CIR × %): 25%

The Tx rate when the minimum rate of CIR test is set to 25% is 250 Mbps, which is one-fourth the CIR Tx rate (1000 Mbps).

#### Service setting example (SLA)

Enter the CIR and EIR regions for each service (service numbers 1 to 8) on the AQ1300/AQ1301, and set the Tx rate.

- CIR: 1000 Mbps
- EIR: 250 Mbps

Green and yellow frames are sent when colors are assigned (CoS, ToS, DSCP).

Red frames are sent automatically during traffic policing tests. When colors are assigned, red frames correspond to the region where the EIR value of yellow frames sent at 125% the EIR rate is exceeded.

# CIR Test (STEP1 to STEPn)

Traffic within the committed information rate is sent for the specified time (T seconds), and the Tx rate is increased in steps (STEP1 to STEP n). Traffic parameters (IR, FL, FTD, FDV) are measured in each step.

You can set up to seven steps.

# **EIR Test**

Traffic at the summed rate of the committed information rate (CIR) and excess information rate (EIR) is sent for the specified time (T seconds).

When colors (green and yellow) are assigned to frames, green frames are sent at the CIR rate and yellow frames at the EIR rate. Traffic parameters (IR, FL, FTD, FDV) are measured for each frame (green, yellow, and total).

When colors are not assigned to frames (OFF), traffic parameters are measured for Total.

# **Traffic policing Test**

Traffic at the summed rate of the committed information rate (CIR) and 125% the excess information rate (EIR×125%) is sent for the specified time (T seconds).

When colors (green and yellow) are assigned to frames, green frames are sent at the CIR rate and yellow frames at 125% the EIR rate. Traffic parameters (IR, FL, FTD, FDV) are measured for each frame (green, yellow, and total).

When colors are not assigned to frames (OFF), traffic parameters are measured for Total. Note that red frame assignment and measurement result display are not available. Red frames correspond to the portion of traffic that exceeds the EIR.

## • Margin (M)

If necessary, you can set a margin on the upper limit of the excess information rate for policing tests.

Red frames correspond to the portion of traffic that exceeds this margin.

Example: For the Tx rate of "CIR+EIR 1250 Mbps" on the previous page, if the margin (M) is set to 10.000 Mbps, red frames correspond to the portion of traffic that exceeds 1260 Mbps.

# Burst Size Test (BS TEST)

In a burst size test, burst frame signals (consecutive frame signals) are periodically sent to a network device to measure the following parameters.

The AQ1300/AQ1301 automatically calculates the burst transmission period from the specified burst size (CBS, EBS) and frame length.

- Frame loss (FL)
- Frame transfer delay (FTD)
- Frame delay variation (FDV)

In a single measurement, up to eight service circuits can be measured in order.

## **CBS Test (Committed Burst Size)**

Burst frame signals corresponding to the specified CBS value are sent. When transmission is complete, frame signal transmission is stopped for a given time. Then, traffic is resumed at the specified committed information rate (CIR). When the transmission at the CIR rate for a given time is complete, frame signal transmission is stopped for a given time.

This operation is repeated to measure the parameters (FL, FTD, FDV) of burst frame traffic for the specified time (T seconds).



Example of CBS test (per service)

T = 1 to 60 s

# EBS Test (Excess Burst Size)

Burst frame signals corresponding to the specified EBS value are sent. When transmission is complete, frame signal transmission is stopped for a given time. Then, traffic is resumed at the summed rate of the committed information rate (CIR) and excess information rate (EIR).

When colors (green and yellow) are assigned to frames, green frames are sent at the CIR rate and yellow frames at the EIR rate.

When the transmission at the CIR+EIR rate for a given time is complete, frame signal transmission is stopped for a given time.

This operation is repeated to measure the parameters (FL, FTD, FDV) of burst frame traffic for the specified time (T seconds).



### Example of EBS test (per service)

Test time T = 1 to 60 s

# Service performance test

In a service performance test, frame signals at the committed information rate (CIR) for all service circuits (up to eight) are sent simultaneously to a network device to measure the following parameters:

- Information rate (IR)
- Frame loss (FL)
- Frame transfer delay (FTD)
- Frame delay variation (FDV)
- Availability (AVAIL)

Indicates the percentage of time (seconds) in which there are no critical errors when service circuits are in a usable state.

In a single measurement, up to eight service circuits can be measured simultaneously.

#### Example of service performance test



Test time: 1 minute to 72 hours

# 2.1 Measurement Screens (Common Items)

This section explains the common items in the measurement screens.



Link status

Remote control status

Screen after Measurement Has Finished (In Auto or Auto(Remote) mode without pass/fail judgment or in Manual mode)

2009/10/23 17:10:58 mm =AC = Mea				
Auto	Remain 0[s] Stat LASER LFS			
Traffic	Tx Rate(%) : 100.00000 Frame Len.(byte):64	Start Transmit		
	Tx Time(s) : 60 Fill Pattern: Random	TTOISIITU		
	Test Results	Stop Transmit		
	Page 1/1 00:00:09			
10G FULL —— PRUSĘ Frame	[Rx] Peak Rate (%): 99,91743	Special Control		
TX RX L2 ERR LFS	[Latency] Max Latency(us): 5,504.0	File		
IxLF IxKF RxLF RxRF	[Tu] Date(W); 0.00000 [Du] Date(W); 00.70224	Next 1/3		
	LIX] Kate(%). U.U00000 [KX] Kate(%): 99.76324			
	Tx: 20,784 Rx: 41,742 Rx Frame Length(byte): 72.9			

#### Screen after Measurement Has Finished (In Auto or Auto(Remote) mode with pass/fail judgment)



Pass/fail indication (Pass, Fail)

# **Title Bar**

## **Simple Optical Power Monitor**

When the interface is XFP or SFP, the AQ1300/AQ1301 can monitor the received optical power level and indicate it using three levels.

Indication	Colors	Description
×.	Black and black	When the RJ-45 interface is being used or when the XFP or SFP interface is
		being used and the interface module is not installed
×	Red and black	When the level of received light is too low
	Green and green	When the level of received light is appropriate
	Red and red	When the level of received light is too high

If you are using optical modules that are not recommended on an AQ1300/AQ1301 whose firmware version is R1.05.01.001 or later, black and black is displayed.

### **Current Time**

The current time is displayed (YYYY/MM/DD hh:mm:ss).

#### **Selected Setup File**

When Auto or Auto(Remote) has been selected in the Test menu, the comment or file name that has been specified by the setup file selection is displayed.

When Manual has been selected in the Test menu, the file name is displayed.

Displayed characters: Up to 30

### Note.

When Auto(Remote) has been selected in the Test menu and the screen is sent from the master to the slave, "Send Screen Image" appears on the slave.

## **Link Status Indication**

The link status is indicated.

Indication	Color	Description
100	Blue	Linkdown
LING	Green	Linkup

# **Power Supply Status Indication**

The power supply status is indicated.

Indication	Color	Description
=AC=	—	The AC adapter is being used.
	Green	The battery is sufficiently full.
	Yellow	The battery is about half full.
	Red	The battery is almost empty.

# **Test Information**

The test type, mode, and item execution status are indicated.

Information Type	Indication	Description
Test type	Auto	Auto mode
	Auto (RMT)	Auto(Remote) mode
	Manual	Manual mode
Test mode	Traffic	Traffic mode
	Loopback	Loopback mode
	QoS	QoS test mode
	PING	PING test mode
	BERT	BERT mode
Test item execution		The test type is Auto or Auto(Remote), and Execution Type is set to
status		Single.
	TEST D+D+D+	The test type is Auto or Auto(Remote), and Execution Type is set to Continue.
	1 to 8	The number of the test item that is currently being executed or is currently selected. The number blinks when the test item is being executed.

# **Link Status Indications**

The link status is indicated.

Category	Status Name	Status Indication	Description
L1	I/F type	XFP	The XFP interface is selected.
		SFP	The SFP interface is selected.
		RJ-45	The RJ-45 interface is selected.
	Module type	SR	The I/F type is XFP, and the module type is SR.
		LR	The I/F type is XFP, and the module type is LR.
		ER	The I/F type is XFP, and the module type is ER.
		SX	The I/F type is SFP(GbE), and the module type is SX.
		LX	The I/F type is SFP(GbE), and the module type is LX.
		FX	The I/E type is SEP(EE) and the module type is $EX$
		_	The I/E type is RJ-45
		?	No module is installed, or the module that is installed is
			unsupported.
	Link	LINK (grav)	Linkdown
		LINK (green)	Linkup
		LINK (vellow)	Auto negotiation configuration mismatch
	Connection	2	The connection speed has not been confirmed (because of a
	speed		linkdown or some other reason).
		10M	10 Mbps
		100M	100 Mbps
		16	1 Ghns
		100	10 Gbps
	Dupley	2	The dupley has not been confirmed (because of a linkdown
	Duplex	:	or some other reason)
		FILL	Full dupley
			An ontical interface is selected
		_	All optical interface is selected.
		?	whether the interface is MDI or MDI-X has not been
			Commended (Decause of a mikdown of some other reason).
			MDI Vieterface
			MDI-A Interface
	Flow control	PAUSE/COL (Ieu)	A PAUSE frame is being received, or a consistent that is
			A PALISE frame has been received, or a collision has been
		(orange)	detected
		PALISE/COL (grev)	No PALISE frames have been received, and no collisions
			have been detected
Frame	ТХ	TX (green)	Frames are being sent
		TX (grav)	Frames are not being sent
	RX	RX (green)	Frames are being received
		RX (grav)	Frames are not being received
	FRROR	12 FRR (red)	An L2 error frame is being received
		12 ERR (orange)	An L2 error frame has been received
		12 ERR (grav)	No L2 error frames have been received
LES	I E transmission	Ty-LE (red)	An LE signal is being sent
		$T_{X-L} = (red)$	No LE signals have been or are being sent
	RF transmission	Tx-EF (gray)	An RE signal is being sent
		Tx-RF (grav)	No RE signals have been or are being sent
	LE reception	Py LE (rod)	An LE signal is being received
		KX-LF (orange)	An LF signal has been received.
		KX-LF (red)	INO LE SIGNAIS NAVE DEEN RECEIVED.
	RF reception		An KE signal is being received.
		KX-RF (orange)	An RF signal has been received.
	1	KX-RF (gray)	INO KE SIGNAIS NAVE DEEN RECEIVED.

The measurement status is indicated.				
Status Name	Status Indication	Description		
Tx time	The remaining Tx time/ number of frames	The remaining time is indicated in seconds. The remaining number of frames is indicated by a number from 0 to 99999999.		
Statistic logging	STAT LOG (gray)	Statistic logging is stopped.		
	STAT LOG (blue)	Statistic logging is in progress.		
Optical output off	LASER OFF (gray)	The laser is not off.		
control	LASER OFF (red)	The laser is off.		
LFS control LFS Control (gray)		LF and RF signals are not being sent.		
	LFS Control (red)	LF and RF signals are being sent.		

# **Measurement Status Indications**

# **Summary**

A summary of the settings is displayed, or the addresses are displayed.

- Summary: A summary of representative settings is displayed. For details, see section 2.2.
- Address: The source and destination MAC and IP addresses are displayed.

For information about switching between the summary and the address display, see section 7.6.

# **Remote Control Status Indications**

The remote control status is indicated.

Except for the unconnected status, all the statuses are for when the test type is Auto(Remote).

Status Name	Status Indication	Description		
Unconnected		A test type other than Auto(Remote) is selected.		
Disconnected -Master settings/results		<ul> <li>The test type is Auto(Remote).</li> <li>The remote control status is "disconnected."</li> <li>The settings and results for the master are displayed.</li> </ul>		
Disconnected -Slave settings/results	Slave ?	<ul> <li>The test type is Auto(Remote).</li> <li>The remote control status is "disconnected."</li> <li>The settings and results for the slave are displayed.</li> </ul>		
Connected No slave statistic errors -Master control	Master	<ul> <li>The test type is Auto(Remote).</li> <li>The remote control status is "connected."</li> <li>The slave has no statistic errors.</li> <li>The settings, results, and controls are all for the master's ports.</li> </ul>		
Connected Slave statistic errors -Master control	Master	<ul> <li>The test type is Auto(Remote).</li> <li>The remote control status is "connected."</li> <li>The slave has statistic errors.</li> <li>The settings, results, and controls are all for the master's ports.</li> </ul>		
Connected No slave statistic errors -Slave control	Slave	<ul> <li>The test type is Auto(Remote).</li> <li>The remote control status is "connected."</li> <li>The slave has no statistic errors.</li> <li>The settings, results, and controls are all for the slave's ports.</li> </ul>		
Connected Slave statistic errors -Slave control	Err Slave	<ul> <li>The test type is Auto(Remote).</li> <li>The remote control status is "connected."</li> <li>The slave has statistic errors.</li> <li>The settings, results, and controls are all for the slave's ports.</li> </ul>		

# **Test Result Indications**

# **Common Items**

#### **Pass/Fail Indication**

This indication appears when the test type is Auto or Auto(Remote) and you have chosen to perform pass/fail judgment.

- · Pass:The results meet the requirements.
- Fail: The results do not meet the requirements.

#### **Measurement Indication**

"Measuring" appears while measurement is being performed.

#### **Measurement Duration Indication**

The measurement duration is indicated in the following format: hh:mm:ss.

#### **Transmission and Reception Rates**

During measurement, the transmission and reception rates are indicated (as percentages).

#### **Normal Frames**

The number of normal frames that have been sent and received during the measurement period is indicated.

#### **Received Frame Length**

The average frame length of the frames that have been received during measurement is indicated.

#### **Error History**

During measurement, link errors, L2 errors (L2 frame errors), and L3 errors (payload errors, sequence errors, etc.) are detected and displayed.

Display Item	Indication	Description		
LINK	LINK (gray)	No linkdowns have been detected during measurement.		
	LINK (red)	If even one linkdown is detected during measurement, the indication		
		becomes red and display the number of detected errors. "over" is		
		displayed when the number of detected errors exceeds 999.		
L2	L2 (gray)	During measurement, no frames have been received with any of the		
		following errors.		
		CRC errors		
		Undersize errors		
		Oversize errors		
		Symbol errors		
		Alignment errors		
	L2 (red)	During measurement, if even one frame is received with any of the		
		following errors, the indication becomes red and display the number		
		of detected errors. "over" is displayed when the number of detected		
		errors exceeds 999.		
		CRC errors		
		Undersize errors		
		Oversize errors		
		Symbol errors		
		Alignment errors		
L3	L3 (gray)	During measurement, no frames have been received with any of the		
		following errors.		
		Bit errors		
		Sequence errors		
		Payload errors		
	L3 (red)	During measurement, if even one frame is received with any of the		
		following errors, the indication becomes red and display the number		
		of detected errors. "over" is displayed when the number of detected		
		errors exceeds 999.		
		Bit errors		
		Sequence errors		
		<ul> <li>Payload errors</li> </ul>		

The number of detected errors is cleared when:

- Measurement is started
- Setup data is loaded
- You log in to the AQ1300/AQ1301

## **Test-Mode-Specific Items**

Different measurement items are displayed for different test modes. For details, see section 2.2.

# Measurement Screens (Test-mode-specific 2.2 items)

This section explains the test-mode-specific items in the measurement screens.



# Loopback Test

2009/	10/26 08:56:11 🔤 = AC =	Measurement	
Auto	Remain 35[s] Stat LASER LFS Control		
Loopback	Loopback TargetAll ports	Start Transmit	Summary (looph
<u> </u>			
	Test Results	Stop	
XFP 🔤	Measuring Duration	Transmit	
LINK LR	Page 1/1 10:35:03		
10G FULL		Special	
PAUSE		Control	
TX BX			
L2 ERR		File	L Test-mode-spec
LFS			
HxLF HxHF		Next 1/3	
	[Tx] Rate(%): 0.25990 [Rx] Rate(%): 99.87450		
	Normal Frame: Error History Tx: 28.685 ITTNZII9II9		
	Rx: 39,775 LINK L2 L3		
	Rx Frame Length(byte): EKKJEKK		

ack target)

ific indications (none)

## QoS Test

in 1009, 👔 🙀	/10/26 08:57:04		=AC=	Measurement	
Auto QoS	Remain         42[s]           CH1(%):         25.00000         CH           CH4(%):         30.00000         CH           CH7(%):          CH	∑ <u>ETAT</u> LASER UFF Control 2(%): 10.00000 CH3(%): 5(%): CH6(%): 8(%):	5.00000	Start Transmit	– Summary (Tx rate )
	Test Results Page 1/1	Measurins Dura	ation 12:59:36	Stop Transmit	
106 FULL PRUSE Frame	Rx QoS channel CH1 Rate(%) CH2 Rate(%)		Maximum 99.96096 99.81826	Special Control	
	CH3 Rate(%) CH4 Rate(%) CH5 Rate(%) CH6 Rate(%)		99.97057 99.75878 - 	Frie	<ul> <li>Test-mode-specific (Rx rate for each cl</li> </ul>
R×LF R×RF	CH7 Rate(%) CH8 Rate(%) [Tx] Rate(%): 0	.06227 [Rx] Rate(%):	  99.81543	Next 1/3	
	Normal Frame: Tx: Rx: Rx Frame Length(byte	8,624 37,222 a): ERRE	story 2123 RRERR		

for each channel)

c indications hannel)
ING Test						
2009/	10/26 08:57:43 🔤 = AC =	Measurement				
Auto	Remain 2 Stat LASER LFS Control					
PING	Destinatio192.168.0.2	Start Transmit				
<b>4</b>	Interval:1s Frames: 20					
	Test Results	Stop Transmit				
10G FULL	[PING] Loss Cour 17,148 Seg No. Round Trip Time(mc) Longth TH	▲ Special Control				
TX RX	20 (1 $62$ 44 19 (1 $69$ 67	4				
	18 $(1   74  49)17  (1   63  55$	FTIE				
R×LF R×RF	Latest 16 <1 92 63	Next				
	[Tx] Rate(%): 0.26927 [Rx] Rate(%): 99.87973	1/3				
	Normal Frame: Tx: 7,901 Rx: 49,939 Rx Frame Length(byte):					

 Summary (destination IP address, Tx interval, number of frames)

Test-mode-specific indications (loss count, sequence number, round trip time, packet length, TTL)

## BERT



# Summary

A summary of the settings is displayed, or the addresses are displayed.

• Summary: Representative settings are displayed.

Test Mode	Displayed Items
Traffic Test	Tx rate; Tx time (when Tx Mode is set to Time), number of frames (when Tx Mode is set to Frames), or elapsed time (when Tx Mode is set to Continuous); frame length; fill pattern
Loopback Test	Loopback target
QoS Test	Tx rate for each channel
PING Test	Destination IP address, Tx interval, Tx time (when Tx Mode is set to Time), number of frames (when Tx Mode is set to Frames), or elapsed time (when Tx Mode is set to Continuous)
BERT	Tx rate; Tx time (when Tx Mode is set to Time), number of frames (when Tx Mode is set to Frames), or elapsed time (when Tx Mode is set to Continuous); frame length

• Address: The source and destination MAC and IP addresses are displayed.

For information about switching between the summary and the address display, see section 7.6.

# **Test-Mode-Specific Indications**

A summary of the test results is displayed.

Test Mode	Displayed Items					
Traffic Test	Maximum Rx rate (%, fps, bps), maximum packet latency (us)					
	Average Rx rate (%, fps, bps), average packet latency (us)					
Loopback Test	None					
QoS Test Maximum Rx rates for each channel (%, fps, bps)						
Average Rx rates for each channel (%, fps, bps)						
	Current Rx rates for each channel (%, fps, bps)					
PING Test	Loss count, sequence number, round trip time, packet length, TTL					
BERT	Bit error rate, bit error, BERT target byte					

### **Explanations of PING Test Mode Items**

Indication	Description				
Loss Count	Indicates the number of failed ping attempts				
Seq. No.	ndicates the sequence number.				
Round Trip Time(ms)	Indicates the round trip time in ms. <1: Indicates a value of less than 1 ms Value: The value in ms				
Length	Indicates the packet length.				
TTL	Indicates the TTL.				

# 3.1 Key, Rotary Knob, and Arrow Key Operations

This chapter explains key, rotary knob, and arrow key operations and the ways that they are explained throughout the rest of the manual.

To make this manual easier to read, we have abbreviated or simplified explanations of the kinds of operations listed below.

- · Repetitive operations.
- Detailed operations for proceeding to the desired setup menu or dialog box and information about the accompanying screen changes.
- · Setup items that users can configure if they have a general understanding of them.

# **Key Operations**

The examples below explain the process for turning on the power, waiting for the top menu to appear, and then opening the File menu.

- 1. Press the Manual soft key (F3) to display the Manual Setup (1/2) menu.
- 2. Press the Next 1/2 soft key (F5) to display the Manual Setup (2/2) menu.
- 3. Press the File soft key (F3) to display the File menu.



- If you press MENU to return to the top menu, the settings that you have configured up to that point are saved as the latest setup.
- If you changed the top menu display type, key operations are different. For details, see the explanation in section 13.6.
- If you have not changed the settings and have not performed any measurements, the confirmation message that appears when you press MENU will not appear.
- If you press ESC on the first page of a setup menu (Auto, Auto(Remote), Manual, Option, or System), the AQ1300/AQ1301 will operate in the same manner as when MENU is pressed.

## About the Explanations in this Manual

In this manual, steps 1 through 3 listed previously and the setup operations in the menu that follows them are written as shown below.

#### Setup Operation Example

Press the **Manual** soft key, the **Next 1/2** soft key, and then the **File** soft key to display the following screen.



- Step numbers are used when there are many operations and when operations must be performed in different menus.
- The explanation for returning to the previous menu is omitted.

# **Rotary Knob and Arrow Key Operations**

This section explains how to operate a menu and the operations to perform when a setup dialog box appears. As an example, we will use the dialog box that appears when you press the **System** soft key and then the **System** softkey in the system setup.

- 1. Press the System soft key (F5) to display the system menu.
- 2. Press the System soft key to display the System Setup dialog box.
- **3.** Use the **rotary knob** or the **arrow** keys to move the cursor to the item that you want to configure or execute.

The item at the cursor location is highlighted.

- 4. Press ENTER.
  - Next, follow the instructions in the figure below that correspond to the type of item that you are configuring or executing.
  - In this manual, steps 3 and 4 listed above are indicated using the expression "using the rotary knob and ENTER."



Setup operation types D through H are listed below.

- **D:** Press **ENTER** to confirm the item or execute its corresponding action.
- E: Press ENTER to display a menu. Turn the rotary knob or press the up and down arrow keys to move the cursor to the item that you want to select. Then press ENTER to select the item.
- F: The selected setting switches each time you press ENTER.
- G: Press ENTER to display a text box. Turn the rotary knob or press the up and down arrow keys to increase or decrease a number. To move between digits, press the left and right arrow keys. After you have entered a number, press ENTER to set the value to that number.
- E: Press ENTER to display a dialog box.

For setup operation types E, G and H to reset the selected item to its previous settings, press ESC. To return to the top menu, press MENU.



Example of





## About the Explanations in this Manual

In this manual, steps 1 through 4 listed previously and the setup operations in the menu that follows them are written as shown below.

#### Setup Operation Example

Press the **OPM** soft key and then the **Setup** soft key to display the following screen.

System	
Language English	<b>Set the display language.</b> The options that appear vary depending on the language specification.
Beep OFF ON	Turns the beep on and off
USB Function Storage	Set the USB function (Storage, Control I/O).
Date & Time Set	At this point, the settings that the items are used to configure and the actions that selecting them causes are
Power Save mode	explained. Options and ranges are listed afterwards.
I Network Setup	
📮 Initialize	

- The explanations of rotary knob, arrow key, and ENTER key operations are omitted.
- The explanation of how to reset the selected item to its previous setting is omitted.
- The explanation for returning to the previous menu is omitted.

# 3.2 Entering Strings

After you have selected a setup item and pressed ENTER, a character input dialog box will appear if it is necessary. This section explains the operations that you can perform after the dialog box appears.

# **Entering Strings**

- 1. Using the **rotary knob** and **ENTER**, enter a string. The string that you entered appears in the edit screen.
- 2. Press the various soft keys to edit the string as necessary.
- **3.** After you have finished entering and editing the string, press the **Commit** soft key to confirm the string that you entered and close the character input dialog box. The string is applied to the relevant item.

You can also confirm the string by moving the cursor to **ENT** on the displayed keyboard and then pressing **ENTER**.



# Note.

If there is a limit to the length of the string, you will not be able to enter characters after the limit is reached.

# **Entering Strings from the History**

- 1. Using the rotary knob and ENTER, select **v** to display the input history screen.
- 2. Using the **rotary knob** and **ENTER**, choose the string that you want to enter. The string appears in the edit screen.



#### Note.

Entered strings are saved to the input history when you confirm them. Up to 30 strings can be saved. Newer strings appear at the top of the input history.

#### Selecting a Setup File 4.1

# Procedure

# Select Setup File Screen

Press the Auto soft key to display the following screen.

							<ul> <li>Registered setup files</li> </ul>
<u></u> ж	2	2009/10/21	18:02:59	last Ostan Eile	=AC:	Select Setup File	A comment or file name appears next to each number.
			56	IECT SETUP FILE		1	
				Page	e Number 1/4	Latest Setu <u>p</u>	<ul> <li>Latest setup</li> </ul>
	1	for demo			Select		
	2				<u>Select</u>	Default —	<ul> <li>Default setup</li> </ul>
	3	VLAN1000			Select		
	4	VLAN1001			Select	■ File	Load a file.
	5	VLAN1002			Select		Load a setup file from the file list.
	6	VLAN1003			Select		
	7				Select	Switch	Switches the setup file list display
	8	VLAN2100			Select	Comment	(Comment, File Name)
	9	VLAN2101			Select	Next Pare	Switches the setup file list page
	10	VLAN2102			Select	Mext rage —	(page numbers: 1/4 to 4/4)
l	11	VLAN2103			Select		
	12	n			Select		
_						J	
							<ul> <li>Select a setup file.</li> </ul>
S	Setu	p file lis	st .				Select a registered setup file from the

Appears when you have created a display management file using the setup software and sent it to the AQ1300/AQ1301 setup file list.

#### Note.

In Auto and Auto(Remote) mode, to select a setup file, you can choose to use the latest setup, use the default setup, load a setup file from the file list, or select a setup file from the setup file list.

# **File Screen**

Press the File soft key to display the following screen.



The files that you have created using the setup software or the AQ1300/AQ1301 appear.

4

# **Auto Setup Screen**

The following screen appears when you select a setup file.



# Explanation

### Latest Setup

Select this item to use the setup that was displayed previously.

## **Default Setup**

Select this item to return to the default setup.

In the default setup, the following test items are selected.

- 1 Traffic Test
- 2 Loopback Test
- 3 QoS Test
- 4 PING Test
- 5 BERT

### File

Select this item to load a setup file (with an .sd extension) from the file list. Select this item when you want to load a setup file that is not in the setup file list. To create a setup file, you can use the setup software and send the file to the AQ1300/AQ1301, or you can save the settings on the AQ1300/AQ1301.

#### **Setup File Selection**

To select a registered setup file, use the setup file list.

You can register up to 48 setup files to the setup file list (4 pages with 12 files per page).

A comment or file name is displayed for each of the registered setup files in the setup file list. The setup file list is updated when you open the Select Setup File screen after you have created a display management file and setup files with the setup software and sent the files to the AQ1300/AQ1301.

For details, see the Setup Software User's Manual, IM AQ1300-61EN.

### Note.

 The AQ1300/AQ1301 can only display the setup file list if the display management file that you created using the setup software (disManage.dmf) and the setup (.sd) files that it refers to are saved to the /setup directory in the AQ1300/AQ1301.

Example: /setup/disManage.dmf /setup0000.sd /setup0001.sd

• When you are performing automatic testing, you can only select setup files that are used for automatic testing.

# 4.2 Setting Up a Test

# Procedure

# Test Setup Screen

Follow the procedure in section 4.1 to display the Auto Setup screen. Press the **Test Setup** soft key to display the following screen.

Test Setup	Set the test interface
<< Test Setup >>	(XFP(10GbE), SFP(GbE), RJ-45).
Test Interface XFP(1	)GbE)
Test Layer L3-IPv	Test Set the test laver
Add UDP to Tx Frame	(1 2 Test 1 3-IPv4 Test 1 3-IPv6 Test)
😱 Use Jumbo Frame	
Select this check be	ox to treat oversize frames like normal frames.

 Select this check box to add UDP to Tx frames.
 This setting can be selected when Test Layer is set to L3-IPv4 Test or L3-IPv6 Test.

# Explanation

# **Test Interface**

Specify which test interface to use.

- XFP (10GbE): Select this option to use the 10GBASE-R measurement port.
- SFP (GbE): Select this option to use the 1000BASE-X measurement port.
- SFP (FE): Select this option to use the 100BASE-FX measurement port. This interface is supported by firmware version R1.05.01.001 or later.
- RJ-45: Select this option to use the 10BASE-T/100BASE-TX/1000BASE-T easurement port.

# **Test Layer**

Set the layer to test.

- L2 Test: Select this option to test layer 2.
- L3-IPv4 Test: Select this option to test layer 3 according to the IPv4 protocol.
- L3-IPv6 Test: Select this option to test layer 3 according to the IPv6 protocol.

# Add UDP to Tx Frame

Select whether or not to add UDP to Tx frames. You can configure this setting when the test layer is L3-IPv4 or L3-IPv6.

# Use Jumbo Frame

Select whether or not to treat oversize frames like normal frames.

- Selected: Frames with lengths of 64 to 9999 bytes are treated as normal frames.
- Cleared: Frames whose size is above 1518 + the value set for "VLAN stacks" in the source settings × 4 are considered oversized.

# 4.3 Configuring Link and Address Settings

# Procedure

# Link Setting Screen

Follow the procedure in section 4.1 to display the Auto Setup screen. Press the **Link/Address** soft key and then the **Link Setting** soft key to display the following screen.

<b>∲</b> 2013/2/19 15:07:	24	LINK	$\square$	Link/Address
	Link Setting			
<pre>&lt;&lt; Link Setting &gt;&gt;</pre>				Link Setting
Negotiation		Manual	-	<b>J</b>
Speed Dup Lov		100M -		Source
Flow Control				Address
MD1		MDI		
		1.2.1		Destination Address
This item appea	ars when Tes	t Interface		
Detect a mismatch	of Auto-nego set	tings(at link-up)		
	0.1	h h 4 -		

Select this check box to automatically detect mismatches in the auto negotiation during link establishment.

Set the negotiation (Auto, Manual) This setting is valid when Test Interface is set to RJ-45 or SFP(GbE).

#### Set the speed (1G, 100M, 10M, Auto).

This setting is valid when Test Interface is set to RJ-45.

The Auto setting for Speed is valid when Negotiation is set to Auto.

Set the duplex (FULL, HALF, Auto). This setting is valid when Speed is set to 100M or 10M.

The Auto setting for Duplex is valid when Negotiation is set to Auto.

Set the flow control (ON, OFF).

Set the MDI (MDI, MDI-X, Auto). The Auto setting for MDI is valid when Negotiation is set to Auto.

## Link Setting Acquisition

MDI (MDI, MDI-X)

Appears when Test Interface is set to RJ-45



# Source Address Screen

Press the Link/Address soft key and then the Source Address soft key to display the following screen.



## **MAC Address Table**

Press Refer next to the MAC address to display the following screen.

🍇 📘 2009/09/07 14:	39:34	A社向け開通試験No.	00	(	MACアドレス テーブル	
		MACアドレステーフ	ブル			
<< 送信元アドレス	1	00-00-00-00-00-01	<u> </u>	æ Ì	グローバル     アドレス	– s
送信元MAC	2	00-00-00-00-00-02	選	訳		
	3	00-00-00-00-00-03	[]]	訳		
VLAN段数	4	00-00-00-00-00-04	選	訳コ	自動(ARP)	
VLAN1	5	00-00-00-00-01-01	Ĩ	訳		
VLAN2	6	00-00-00-00-02-02	Ĩ	訳		
	7	00-00-00-00-03-03	- III	観日		
送信元IPv4	8	00-00-00-00-04-04	」選	観日		
アドレス	9	NoEntry	選	観日		⊢ s
ネットマスク	10	NoEntry	選	観日		tl
ゲートウェイ	11	NoEntry		ŧ択」		
	12	NoEntry		ŧ <del>択</del> 」		
	13	NoEntry		観灯		
	14	NoEntry		<u>健沢</u>		
	15	NoEntry		観日		
	16	NoEntry	選	観日		

Select a global MAC address.

elect the source MAC address from ne MAC Address table.

MAC Address Table

Use the setup software to create this table.

# VLAN Table

Press Refer next to a VLAN address to display the following screen.

\$ 2009/10/22 15:	26:27		=AC=	VLAN Table
		VLAN Table		
<< Source Address Source MAC VLAN stacks VLAN1 VLAN2 Source IPv4 Address Subnet Mask Gateway	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	Cos 0 : 1D 1000 Cos 0 : 1D 4095 Cos 1 : 1D 4095 Cos 2 : 1D 4095 Cos 2 : 1D 4095 Cos 2 : 1D 4095 Cos 2 : 1D 4095 Cos 7 : 1D 4095 Cos 7 : 1D 4095 NoEntry NoEntry NoEntry NoEntry NoEntry NoEntry NoEntry NoEntry NoEntry	Selecti Select	
		NoLITETY		

 Select the VLAN CoS and ID from the VLAN table.

#### VLAN table

Use the setup software to create this table.

### **IP Address Table**

Press Refer next to an IP address to display the following screen.

IPv4	27-06		-40-	IP Address			
<ul> <li>2009/10/22 15:</li> <li>Source Address Source MAC</li> <li>YLAN stacks YLAN1 YLAN2</li> <li>Source IPv4 Address Subnet Mask Gateway</li> </ul>	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	IP Address Table  192.168. 0. 1  192.168. 0. 2  192.168. 0.101  192.168. 0.102  10. 0. 0. 1  10. 0. 0. 1  10. 0. 0.101  10. 0. 0.101  10. 0. 0.102  NoEntry NE	=AC =	IP Address Get IP Address =			
IP Address table							

Press this soft key to automatically acquire an IP address. When you press this soft key, the

AQ1300/AQ1301 acquires an IPv4 address through DHCP.

# Select the source IPv4 address from the IP Address table.

Use the setup software to create this table.



Press this soft key to automatically acquire an IP address.

When you press this soft key, the AQ1300/AQ1301 acquires an IPv6 address through stateless autoconfiguration.

# Select the source IPv6 address from the IP Address table.

## Gateway

Press Refer next to the gateway address to display the following screen.



Select to set the gateway manually.

Select to automatically set the gateway to xxx.xxx.1.

Select to automatically set the gateway to xxx.xxx.254.

# **Destination Address Screen**

Press the **Link/Address** soft key and then the **Destination Address** soft key to display the following screen.



## Search List

Press the Search List soft key to display the following screen.

<u>¢</u>	2009/10/	22 15:39:51		=AC=	Search List
			Search List		
1	Host Name	SerialNo	Version	Select	Search other device
2 3				Select Select	🔹 Switch
4 5				Select Select	SerialNo+Ver
6 7				Select Select	
8 9				Select Select	
10 11				Select Select	
12 13				<u>Select</u>	Next Page
14 15				<u>Select</u> Select	
16				<u>Select</u>	

#### Search for other devices. When you press this soft key, the AQ1300/AQ1301 searches for other devices (AQ1300 or AQ1301) on the same network segment.

2009/10/22 15:39:51 =AC= Searc Search List Search other device SerialNo Version 6.0.134.10 Host Name Select Select Select SN0000001 mitaka 5.1.133.11 yokohama SN0000002 2 Switch fukuoka SN0000003 4.2.132.12 SerialNo+Ver SN0000004 3.3.131.13 Select sapporo kofu 5 SN0000005 2.4.130.14 <u>Select</u> SN0000006 6 kanazawa 1.5.129.15 Select elect 8 9 Select Select 10 11 12 13 14 15 16 elect

Search for other devices

Area of the search list that changes when you switch the display

Switches the search list display (SerialNo+Ver, Test Setup, Status+MAC, IPv4/IPv6, Master Addr)



Set the address type (MAC Address, IP Address). This setting appears when Switch is set to Master Addr.

Select the address of the other device (the destination address) from the search list. To the next page (1-16, 17-32, 33-48, 49-64)

## **MAC Address Table**

Press Refer next to the MAC address to display the following screen.

\$ 2009/10/22 16:	14:12		=AC=	MAC Address
		MAC Address Table		10010
<pre>&lt;&lt; Destination Ad Destination MAC Destination IPv4</pre>	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	00-00-00-00-00-01 00-00-00-00-00-02 00-00-00-00-00-03 00-00-00-00-00-03 00-00-00-00-00-04 00-00-00-00-02-02 00-00-00-00-02-02 00-00-00-00-03-03 00-00-00-00-04-04 NoEntry NoEntry NoEntry NoEntry NoEntry NoEntry NoEntry NoEntry NoEntry NoEntry NoEntry NoEntry NoEntry NoEntry NoEntry	Selecti Selecti Selecti Selecti Selecti Selecti Selecti Selecti Selecti Selecti Selecti Selecti Selecti Selecti Selecti Selecti Selecti	Global Address MAC Address

Press this soft key to automatically acquire the destination MAC address. When the test layer is L3-IPv4, MAC Address (ARP) appears. When the test layer is L3-IPv6, MAC Address (NDP) appears.

Select the destination MAC address from the MAC Address table.

#### MAC Address table

Use the setup software to create this table.

## **IP Address Table**

Press Refer next to an IP address to display the following screen.

IPv4		
🍇 🚺 2009/10/22 16:	15:00	
Contraction Address A Address Address Addres Address Address Address Address Address Address Address Address Addre Address Address Ad	1	192.168
	2	192.168
Destination MAC	3	192.168
	4	192.168
Destination IPv4	5	10. 0

2009/10/22 16:	15:00			=AC=	IP Address Table
		IP	Address Tab	le	
<< Destination Ad Destination MAC Destination IPv4	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	192.168. 192.168. 192.168. 192.168. 192.168. 10. 0. 10. 0. 10. 0. NoEntry NoEntry NoEntry NoEntry NoEntry NoEntry	0. 1 0. 2 0.101 0.102 0. 1 0. 2 0.101 0.102	Selecti Selecti Selecti Selecti Selecti Selecti Selecti Selecti Selecti Selecti Selecti Selecti Selecti Selecti Selecti Selecti Selecti Selecti	

Use the setup software to create this table.

Select the destination IPv4 address from the IP Address table.

#### IPv6

2000/10/22 16-	15-44		- 10-	IP Address
2003/10/22 10.	10-41		-AC-	Table
		IP Address Table		
<< Destination Ad	1 2	2000:0000:0000:0000 FE00:0000:0000:0000	Select Select	
Destination MAC	3 4	FF11:0000:0000:0000 0000:0000:0000:0000	Select Select	
Destination IPv6	5 6	0000:0000:0000:0000 0000:0000:0000:000	Select Select	
	7 8	0000:0000:0000:0000 0000:0000:0000:000	Select Select	
	9 10	NoEntry NoEntry	<u>Select</u>	
	11 12	NoEntry NoEntry	<u>Select</u> Select	
	13 14 15	NoEntry NoEntry	Select Select	
	16	NoEntry	Select	

IP Address table

Select the destination IPv6 address from the IP Address table.

### Note\_

#### Address Settings

In Auto and Auto(Remote) mode, you can set the source and destination MAC, IPv4, and IPv6 addresses in the test item screens.

#### Traffic Setup Example (L3-IPv4 Test)



# Explanation

# Link Setting Screen

## Negotiation

Select whether or not to use auto negotiation. This setting is valid when Test Interface is set to RJ-45 or SFP(GbE).

- Auto: The link between the AQ1300/AQ1301 and the device that it is connected to is configured automatically through auto negotiation.
- · Manual: The link must be configured manually.

#### Speed

When Test Interface is set to RJ-45, you can set the link speed.

- 1G: A 1 Gbit/s 1000BASE-T connection is used.
- 100M: A 100 Mbit/s 100BASE-TX connection is used.
- 10M: A 10 Mbit/s 10BASE-T connection is used.
- Auto: The link speed is set automatically. This setting is valid when Negotiation is set to Auto.

#### Note.

When Test Interface is set to XFP(10GbE), the link speed is fixed at 10G. When Test Interface is set to SFP(GbE), the link speed is fixed at 1G. When Test Interface is set to SFP(FE), the link speed is fixed at 100M.

#### Duplex

You can set the communication mode for when Speed is set to 100M or 10M. This setting is valid when Test Interface is set to RJ-45.

- FULL: Full duplex communication
- HALF: Half duplex communication
- Auto: The AQ1300/AQ1301 chooses full or half duplex automatically. This setting is valid when Negotiation is set to Auto.

#### Note.

When Test Interface is set to XFP(10GbE), or SFP(GbE), or SFP(FE), or when it is set to RJ-45 and Speed is set to 1G, the duplex mode is fixed at FULL.

## **Flow Control**

You can enable or disable flow control.

- ON: Flow control is enabled.
- OFF: Flow control is disabled.

## MDI

You can set the measurement port to straight or crossover mode. This setting is valid when Test Interface is set to RJ-45.

- MDI: Straight
- MDI-X: Cross
- Auto: The AQ1300/AQ1301 switches between straight and crossover mode automatically (this setting is valid when Negotiation is set to Auto).

### **Link Setting Acquisition**

If the interface is SFP(GbE) or RJ-45, you can acquire and display link setting information of the other device (DUT; the device on the user side) connected to the AQ1300/AQ1301.

#### Acquired Link Setting Information

- Negotiation: Auto, Manual
- Speed: 1G, 100M, 10M
- Duplex: Full, half, --- (when negotiation is set to manual)
- MDI: MDI, MDI-X

The AQ1300/AQ1301 acquires the speed, duplex, and MDI when Test Interface is set to RJ-45.

#### Acquisition Status

The acquisition status of the other device's link setting information is indicated as follows: Preparing, Finish, Fail

### • UTP Cable Type

When the measurement interface is RJ-45, select which type of UTP cable you are using. Straight, Cross

#### • UTP Cable Status

Indicates the UTP cable status as follows. Normal, The cable may be defective. It is two-pair cable

### • Applying Link Settings

You can apply the acquired other device's link settings to the AQ1300/AQ1301. You can do this when the measurement interface is RJ-45 or SFP(GbE) and the acquisition status is Finish.

#### Auto Detection of Auto Negotiation Configuration Mismatch

If the "Detect a mismatch of Auto-nego settings" check box on the link setting screen is selected and the auto negotiation configuration between the AQ1300/AQ1301 and the other device is not matched, the background of "LINK" in the link status area of the measurement screen (see section 2.1) turns yellow.

Detection occurs at the following times.

- · When a setup file is loaded (including when logged in)
- When link settings are changed
- When link changes from link-down to link-up

# Source Address Screen

# Source MAC Address

Set the source MAC address. You can refer to the MAC Address table to set the address.

## **VLAN Stacks**

Set the number of VLAN stacks.

- None: No VLAN stacks.
- 1: One VLAN stack.
- 2: Two VLAN stacks.

## VLAN1 and VLAN2

Set the CoS (Class of Service) and VLAN-ID for 1 or 2 VLAN stacks. You can refer to the VLAN table to set the values.

- CoS: 0 to 7
- ID: 0 to 4095
- TPID: 0 to FFFF (supported in firmware version (FW Ver.) R1.08.01.001 and later)

### IPv4

Select whether to specify the source IPv4 address manually or to acquire and set it automatically through DHCP. This setting is valid when Test Layer is set to L3-IPv4 Test.

- Manual: You must set the source IPv4 address manually.
- DHCP: When you press Get IP Address, the AQ1300/AQ1301 acquires and sets the source IPv4 address using DHCP.

### Source IPv4 Address, Subnet Mask, and Gateway

Set the source IPv4 address, subnet mask, and gateway when IPv4 is set to Manual. You can refer to the IP Address table and the gateway reference to configure the settings.

• Subnet Mask: 1 to 31

### IPv6

Select whether to specify the source IPv6 address manually or to specify it through stateless autoconfiguration using the RA from an IPv6 router. This setting is valid when Test Layer is set to L3-IPv6 Test.

- Manual: You must set the source IPv6 address manually.
- Stateless Address: When you press Get IP Address, the AQ1300/AQ1301 autoconfigures the source IPv6 address.

## Source IPv6 Address

Set the source IPv6 address when IPv6 is set to Manual. You can refer to the IP Address table to set the address.

### **IPv6 Router Address**

You can automatically acquire the router address or set it manually.

- Automatic: Clear the Set Router Address manually check box. The IPv6 prefix length and router
   address that have been acquired automatically are displayed.
- Manual: Select the Set Router Address manually check box. You can manually set the prefix length and router address.

### MAC Address Table

Select the source MAC address from the MAC Address table.

• Global Address: You can set the source MAC address to a global address.

#### VLAN Table

Select the VLAN CoS and ID from the VLAN table.

## **IP Address Table**

Select the source IP address from the IP Address table.

 Get IP Address: Press this soft key to get the IP address. The AQ1300/AQ1301 will acquire an IP address, using DHCP when the test layer is L3-IPv4 or stateless autoconfiguration when the test layer is L3-IPv6.

#### Gateway

Set the gateway.

- Manual: Select this option to set the gateway manually.
- Auto.1: Select this option to set the gateway to xxx.xxx.xx.1.
- Auto.254: Select this option to set the gateway to xxx.xxx.254.

# **Destination Address Screen**

# **Destination MAC Address**

Set the destination MAC address. You can refer to the MAC Address table to set the address.

#### IPv4

Set the destination IPv4 address. This setting is valid when Test Layer is set to L3-IPv4 Test. You can refer to the IP Address table or select Search List to set the address.

# IPv6

Set the destination IPv6 address. This setting is valid when Test Layer is set to L3-IPv6 Test. You can refer to the IP Address table or select Search List to set the address.

#### Search List

Select the address of the other device (the destination address) from the search list.

#### Searching for Other Devices

When you select Search other Device, the AQ1300/AQ1301 searches for other devices (AQ1300 or AQ1301) on the same VLAN or network segment and displays the results in the search list.

### Switching the Display

You can switch between different search list displays.

- SerialNo+Ver: The equipment name, serial number, and version are displayed.
- Test Setup: The equipment name, test interface, and test layer are displayed.
- · Status+MAC: The equipment name, status, and MAC address are displayed.
- IPv4/IPv6: The equipment name and IP address are displayed.
- · Master Addr: The device name and master address (MAC or IP address) are displayed.

#### Note\_

You can check the equipment name and serial number of the AQ1300/AQ1301 in the system settings.

## Address Type

You can switch the address type that is displayed when Switch is set to Master Addr.

- MAC address
- IP address

## **MAC Address Table**

Select the destination MAC address from the MAC Address table.

- MAC Address (ARP): When the test layer is L3-IPv4, press this soft key to automatically acquire the destination MAC address.
- MAC Address (NDP): When the test layer is L3-IPv6, press this soft key to automatically acquire the destination MAC address.

### **IP Address Table**

Select the destination IP address from the IP Address table.

### Note.

All the tables are created on the setup software. For details, see the Setup Software User's Manual.

# 4.4 Configuring Test Items

# Procedure

# **Select Test Item Screen**

Follow the procedure in section 4.1 to display the Auto Setup screen. Press the **Select Test Item** soft key to display the following screen.

Example with the Default Settings



**Registered test items** You can register up to eight items using the setup software.

# Explanation

Select the test item to execute.

You can register up to eight test items using the setup software. For details, see the Setup Software User's Manual.

# 4.5 Configuring a Traffic Test

# Procedure

# **Traffic Setup Screen**

Follow the procedure in section 4.4 to display the Traffic Setup screen.

	- Set the Tx rate
	(0.00001-100.00000%).
	(Continuous, Frames, Time).
	- Set the (actual) frame length
	(For L2 and L3-IPv4:
	No VLAN stacks: 64 (64)-9999 (9999) bytes
2009/10/22 16:16:45	1 VLAN stack: 64 (68)-9999 (9999) bytes
Traffic Selur 🖉 Test	2 VLAN stacks: 64 (72)-9999 (9999) bytes
<< Test Setup >> Setup	No VI AN stacks: 74 (74)-9999 (9999) bytes
Test Interface XFP(10GbE)	1 VLAN stack: 74 (78)-9999 (9999) bytes
Source MAC 00 00 00 00 00 00 Top 01 Refer	2 VLAN stacks: 74 (82)-9999 (9999) bytes).
Destination MAC 00 00 00 00 00 02 Refer Test Iten 1	If you do not select Use Jumbo Frame in the
Source IPV6  FE80 0000 0100 0000 Refer	Test Setup and you specify an oversize
Destination IPv6 FE80 0000 00 00 000 Refer	trame length, the actual frame length will be displayed as "OVER."
0000 0000 000 0002 <u>Refer</u>	Set the time (1 1110 minutes)
Tx Rate 100.00000 X Referring	This setting appears when Tx Mode is set to
Tx Mode Time 1 min Refer	Time.
Fill Pattern Random	- Refer to the Tx Rate table.
	- Refer to the Tx Time table.
	- Refer to the Frame Length table.
	- Set the fill pattern
· · · · · · · · · · · · · · · · · · ·	(ALL0, ALL1, 0/1 alt., Random).
<pre>&lt;&lt; Irattic Setup &gt;&gt; Tx Rate 100 00000 # Refer 1</pre>	<ul> <li>Set the number of frames</li> </ul>
Tx Mode Frames 500 Refer	(1-4294967295).
Frame Length(Actual) 64 (64) byte Refer	This setting appears when Tx Mode is set
	to Frames.
France Longth Eived Version	- Refer to the Frame Length table.
Frame Length 64 - 1518 - byte	<ul> <li>Set the frame length (64-9999)</li> </ul>
(Actual Length) (68 - 1522) byte	(For L2 and L3-IPv4:
Step +1	No VLAN stacks: 64 (64)-9999 (9999) bytes
	1 VLAN stack: 64 (68)-9999 (9999) bytes 2 VLAN stacks: 64 (72) 9999 (9999) bytes
	2 VLAN Stacks: 64 (72)-9999 (9999) Dytes For I 3-IPv6
	No VLAN stacks: 74 (74)-9999 (9999) bytes
	1 VLAN stack: 74 (78)-9999 (9999) bytes
	2 VLAN stacks: 74 (82)-9999 (9999) bytes).
	This setting appears when frame length is
	- Set the step (+1, -1, Random).

# **Tx Rate Table**

Press Refer next to the Tx rate to display the following screen.

2009/10/22 16:2	29:45		=AC=	Tx Rate Table
		Tx Rate Table		
<< Test Setup >>	1	100.00000	Select	
Test Interface	2	80.00000	Select	
<< Address Settin	3	60.00000	Select	
Source MAC	4	50,00000	Select	
Destination MAC	5	40.00000	Select	
Source IPv6	6	30.00000	Select	
	7	10.00000	Select	
Destination IPv6	8	5.00000	Select	
	9	NoEntry	Select	
<< Traffic Setup	10	NoEntry	Select	
Tx Rate	11	NoEntry	Select	
Tx Mode	12	NoEntry	Select	
Frame Length(Actua	13	NoEntry	Select	
Fill Pattern	14	NoEntry	Select	
	15	NoEntry	Select	
	16	NoEntry	Select	

Select a Tx rate from the Tx Rate table.

## **Tx Time Table**

Press Refer next to the Tx time to display the following screen.

2009/10/22 16:	30:43		=AC=	Tx Time Table
		Tx Time Table		
<< Test Setup >>	1	1	Select	
Test Interface	2	3	Select	
Address Settin	3	5	Select	
Source MAC	4	7	Select	
Destination MAC	5	10	Select	
Source IPv6	6	20	Select	
	7	30	Select	
Destination IPv6	8	60	Select	
	9	NoEntry	Select	
<< Traffic Setup	10	NoEntry	Select	
Tx Rate	11	NoEntry	Select	
Tx Mode	12	NoEntry	Select	
Frame Length(Actua	13	NoEntry	Select	
Fill Pattern	14	NoEntry	Select	
	15	NoEntry	Select	
	16	NoEntry	Select	
			,	

Select a Tx time from the Tx Time table.

# Frame Length Table

Press Refer next to the frame length to display the following screen.



Select a frame length from the Frame Length table.

## **Frames Table**

Press Refer next to the number of frames to display the following screen.

2009/10/22 16:	31:19		=AC=	Frames Table	
		Frames Table		TUDTO	
<pre>&lt;&lt; Test Setup &gt;&gt; Test Interface &lt;&lt; Address Settin Source NAC Destination MAC Source IPv6 Destination IPv6 &lt;&lt; Traffic Setup Tx Rate Tx Mode Frame Length(Actua Fill Pattern</pre>	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	50 100 500 1000 5000 65535 NoEntry NoEntry NoEntry NoEntry NoEntry NoEntry NoEntry NoEntry NoEntry NoEntry NoEntry NoEntry	Salecti Selecti		<ul> <li>Select a number of frames from the Frames table.</li> </ul>

#### Note.

All the tables are created on the setup software.

# Explanation

# **Traffic Setup Screen**

#### **Tx Rate**

Set the Tx rate. Range: 0.00001 to 100.00000%

### **Tx Mode**

Set the Tx mode.

- Continuous: In this mode, frames are transmitted continuously. After you start transmission, it continues until you stop it.
- Frames: In this mode, a specified number of frames is transmitted. After you start transmission, the specified number of frames is sent, and then transmission is stopped automatically.
- Time: In this mode, frames are transmitted for a specified period of time. After you start transmission, it continues for the specified period of time and is then stopped automatically.

### Tx Time

When Tx Mode is set to Time, set the Tx time. Range: 1 to 1440 minutes

## Frames

When Tx Mode is set to Frames, set the number of frames. Range: 1 to 4294967295

# Frame Length (Actual)

Set the Tx frame length. The actual frame length that corresponds to the length you set is also displayed.

VLAN	L2, L3-IPv4	L3-IPv6				
None	64 (64) to 9999 (9999) bytes	74 (74) to 9999 (9999) bytes				
1 stack	64 (68) to 9999 (9999) bytes	74 (78) to 9999 (9999) bytes				
2 stacks	64 (72) to 9999 (9999) bytes	74 (82) to 9999 (9999) bytes				

4

## Variable Frame Length Screen

This feature is supported in firmware version (FW Ver.) R1.08.01.001 and later.

#### Range

Set the frame length adjustment range. Range: 64 to 9999 bytes

#### Step

Set the frame length adjustment step.

- +1: The length is adjusted within the specified range in steps of +1.
- -1: The length is adjusted within the specified range in steps of -1.
- · Random: The length is adjusted within the specified range randomly.

#### Note\_

If you do not select Use Jumbo Frame in the Test Setup, the actual frame length will be displayed as "OVER" when (1) there are no VLAN stacks and you specify a value greater than 1519 bytes, (2) there is one VLAN stack and you specify a value greater than 1523, or (3) there are two VLAN stacks and you specify a value greater than 1527.

# Fill Pattern

Specify the fill pattern to insert into the payload area.

- ALLO: All zeros
- ALL1: All ones
- 0/1: Alternating zeros and ones
- Random: A random pattern

### Tx Rate, Tx Time, Frames, and Frame Length Tables

You can refer to the Tx Rate, Tx Time, Frames, and Frame Length tables to configure the settings. All the tables are created on the setup software. For details, see the *Setup Software User's Manual*.

# 4.6 Configuring a Loopback Test

# Procedure

# Loopback Setup Screen

Follow the procedure in section 4.4 to display the Loopback Setup screen.

¥ 2009/10/22 16:36:39	=AC=	Auto Setup	
Loopback Setup		Test	
<	Refer I Refer I	Setup L3-IPv4 Test Select Test Item Test Item 2	
<< Loopback Setup >> Target All Frames -		Select Setup File Next 1/2	<ul> <li>Set the loopback target frames (Source Address, All Frames).</li> </ul>

# Explanation

# Loopback Target Frame

Set the loopback target frames.

- Source Address: Only frames from the source address are looped back.
- All Frames: All frames are looped back.

### Note.

If you select Add UDP to Tx Frame in the Test Setup, you can switch the L4 port number (TCP, UDP Dst Port, Src Port).

# 4.7 Configuring a QoS Test

# Procedure

# **QoS Setup Screen**

Follow the procedure in section 4.4 to display the QoS Setup screen.

			– Set the Tx mode
2009/10/22 16:37:05		Auto	(Continuous, Frames, Time).
		40 Cotup	<ul> <li>Set the QoS test type</li> </ul>
400 00 10		lest Setup	(Frame_ID, VLAN-ID, VLAN-CoS (when
<< li>lest Setup >> Test Interference >> XED(4001E)		13-IPv4 Test	there are VLAN stacks), IPv4-ToS, IPv4-
<pre>dest interface AFP(10GDE)</pre>		/ Select	DSCP (when the test layer is L3-IPv4),
Source MAC 00 00 00 0	00 01 Refe	Test Item	IPv6-TrafficClass, IPv6-DSCP (when the
Destination MAC 00 00 0	0 02 <u>Refe</u>	r Test Item 3	test layer is L3-IPv6), L4-DP, L4-SP(when
Source IPv4 192 168 0	Refe		UDP is selected)).
Destination IPV4   192   168   0	Refe	Link/Address	<ul> <li>Set the time (1-1440 minutes).</li> </ul>
			This setting appears when Tx Mode is set
<< QoS Setup >>		Select	to Time.
Tx Mode Time	1 min <u>Refe</u>	Setup File	Refer to the Tx Time table. ► section 4.5
Value Frame Length(Actual	V4-10S		Refer to the QoS Value table.
	) byte 25.00000	Noxt	- Set the rates (0.00000-100.00000%).
🖌 CH2 2 72 ( 72 )	) byte 10.00000 %	1/2	- Set the fill pattern
CH3 4 128 ( 128 )	) byte 5.00000 %		(ALL0, ALL1, 0/1 alt., Random).
ill Pattern	0/1		
			Set the (actual) frame length*
			(For L2 and L3-IPv4:
			No VLAN stacks: 64 (64)-9999 (9999) bytes
			1 VLAN stack: 64 (68)-9999 (9999) bytes
Set the QoS	values.		2 VLAN stacks: 64 (72)-9999 (9999) bytes
This setting is	s valid when QoS Fie	ld is set	For L3-IPv6:
to any option	other than Frame_ID	)	No VLAN stacks: 74 (74)-9999 (9999) bytes
(VLAN-ID: 0-4	4095, VLAN-CoS: 0-7	7,	1 VLAN stack: 74 (78)-9999 (9999) bytes
IPv4-IoS: 0-	7, IPv4-DSCP: 0-63,		2 VLAN stacks: 74 (82)-9999 (9999) bytes).
IPv6-TrafficC	lass: 0-7, IPv6-DSCH	P: 0-63,	
L4-DP: 0-655	35, L4-SP: 0-65535)	•	
Select the Q	oS channels to use.		
* If you do not select Us	se Jumbo Frame in th	ne ⊺est Setup a	ind you specify an oversize frame length, the
actual frame length w	ill be displayed as "O	VER."	Sat the number of frames
<< QoS Setup >>	<b>F</b> 00 - (	_	- Set the humber of frames
IX Mode Frames	500' <u>Refe</u>	ur.]	(1-423430/233). This sotting appears when Tx Mode is set
			This setting appears when TX Mode is set

~ ~			
QoS	Value	lable	

Press Refer above the QoS values to display the following screen.

100	2009/10/22 16:38:57 =AC=					=AC=	QoS Value Table	
			QoS Va	lue Table				
	Va 20 CH1 20 CH2 20 CH3 20 CH4	ilue 7 5 3 1	Frame 64 64 64 64	Length byte byte byte byte	QoS Value Rate 25.00000 25.00000 25.00000 25.00000	Table 1 Select X X X X X X	Next Page =	<ul> <li>To the next page</li> <li>To the previous page</li> </ul>
	Va CH1 CH2 CH3 CH3 CH4	1lue 2 3 4 5	Frame 48 48 48 50	Length byte byte byte byte	QoS Value Rate 20.00000 30.00000 40.00000 50.00000	Table 2 Select X X X X X X		<ul> <li>Select the QoS values that you want to use from the QoS Value table.</li> </ul>
								QoS Value table (1-16) Use the setup software to create this table.

to Frames.

Refer to the Frames table. ► section 4.5

# Explanation

# **QoS Setup Screen**

## Selecting the QoS Channels to Use

You can select up to four QoS channels.

# QoS Field

Select the type of QoS test.

Test Type	Test Layer			Description	Notes
	L2	L3- IPv4	L3- IPv6		
Frame_ID	Yes	Yes	Yes	The frame number for each QoS channel	
VLAN-ID	Yes	Yes	Yes	The VLAN ID	When there
				The data in the VLAN tag in the MAC frame	are VLAN
VLAN-CoS	Yes	Yes	Yes	The VLAN Class of Service	stacks
				The user priority field data in the VLAN tag in the	
				MAC frame	
IPv4-ToS	No	Yes	No	The IPv4 Type of Service	
				The ToS field data in the IPv4 header (IP	
				Precedence)	
IPv4-DSCP	No	Yes	No	The IPv4 DiffServ Code Point	
				The DS (DiffServ) field data in the IPv4 header	
IPv6-TrafficClass	No	No	Yes	The IPv6 Traffic Class	
				The Traffic Class field data in the IPv6 header	
IPv6-DSCP	No	No	Yes	The IPv6 DiffServ Code Point	
				The DS (DiffServ) field data in the IPv6 header	
L4-DP	No	Yes	Yes	The L4 destination port	When UDP is
				The Destination Port field data in the L4 header	selected
L4-SP	No	Yes	Yes	The L4 source port	
				The Source Port field data in the L4 header	

## **QoS Value**

Set the QoS value. This setting valid when QoS Field is set to any option other than Frame\_ID.

Test Type	Range
VLAN-ID	0 to 4095
VLAN-CoS	0 to 7
IPv4-ToS	0 to 7
IPv4-DSCP	0 to 63
IPv6-TrafficClass	0 to 7
IPv6-DSCP	0 to 63
L4-DP	0 to 65535
L4-SP	0 to 65535

## Rate

Set the QoS Tx rate. The total for the four QoS channels must be below 100%. Range: 0.00000 to 100.00000%

# Tx Mode, Frame Length (Actual), Tx Time Table, and Frames Table

These are the same as the settings for a traffic test. For details, see section 4.5.

## QoS Value Table

You can refer to the table to select the QoS values. The table is created on the setup software. For details, see the *Setup Software User's Manual*.

# 4.8 Configuring a Ping Test

# Procedure

# **PING Setup Screen**

Follow the procedure in section 4.4 to display the PING Setup screen.

When Test Layer Is Set to L3-IPv4 Test or L3-IPv6 Test

2009/10/22 16:40:21		=AC= Auto					
2003/10/22 16:40:21         PING         << Test Setup >>         Test Interface       >FP(10         << Address Setting >>         Source HAC       00 00 0         Destination MAC       00 00 0         Source IPv4       192         I68         << PING Setup >>         Destination IPv4       192         Source IPv4       192         I68       192         Use       192         Source IPv4       192         Use       192	Setup           GbE)           0         00         01           0         00         02           0         1           0         2             Destination Address           68         0         2           Source Address	Auto Setup IIII Teet Setup IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	<ul> <li>Select this check bo destination IPv4 or I the address settings</li> <li>Set the destination I This setting is valid wi Destination Address"</li> <li>Refer to the IP Address</li> <li>Refer to the IP Addres</li> <li>section 4.3</li> <li>The source IPv4 or I the address settings</li> <li>Set the transmission</li> </ul>	ex to use the Pv6 address from S. Pv4 or IPv6 address hen the "Use check box is cleared. ess table. Pv6 address from is used n interval			
Interval Tx Mode Frame Length(Actual)	1ms <b>ine</b> 64 64 64	nin Referi	(1ms, 10ms, 100ms, – Set the Tx Mode (Co Time). ∫Refer to the Tx Time	1s). ntinuous, Frames, table.			
		L	─ Refer to the Frame L ▶ section 4.5	ength table.			
	Set the (actual	)) from a longth	<ul> <li>Set the time (1-1440 This setting appears v to Time.</li> </ul>	<b>minutes).</b> when Tx Mode is set			
	Set the (actual	) frame length	lavor				
	VLAN Stacks	I 3-IPv4					
	None	64(64)-9999(9999) byte	84(84)-9999(9999) byte				
	1	64(68)-9999(9999) byte	84(88)-9999(9999) byte				
	2	64(72)-9999(9999) byte	84(92)-9999(9999) byte				
Interval Tx Mode Fi Frame Length(Actual)	1ms rames 10 64 (64)	000 <u>Refer</u> byte <u>Refer</u>	<ul> <li>Set the number of fr (1-4294967295).</li> <li>This setting appears v to Frames.</li> </ul>	ames when Tx Mode is set			
When Test Laver Is Set to L2 Test or L3-IPv6 Test Refer to the Frames table. ► section 4.5							
	Contraction IPv4 address.						
Subnet Mask 255		8 Refer	Source IPv4 address	6.			
Gateway	0 0 0	Refer	Gateway.				

# Explanation

# **PING Setup Screen**

When Test Layer Is Set to L3-IPv4 Test or L3-IPv6 Test

### **Destination IPv4 or IPv6 Address**

#### "Use Destination Address" Check Box (Always selected)

The destination IPv4 or IPv6 address in the address settings is used (fixed). To specify a different destination IPv4 address, clear this check box.

#### Source IPv4 or IPv6 Address

The source IPv4 or IPv6 address from the address settings is used (fixed).

#### When Test Layer Is Set to L2 Test

Each address is set automatically from the MAC address. Destination IPv4 address: 10.lower three bytes of the destination MAC address Source IPv4 Address: 10.lower three bytes of the source MAC address Netmask: 255.0.0.0 (fixed) Gateway: 0.0.0.0 (fixed).

## **Transmission Interval**

Set the interval at which to send ping requests. 1 ms, 10 ms, 100 ms, 1 s

The timeout value is 1 second.

# Tx Mode, Frame Length (Actual), Tx Time Table, Frames Table, and Frame Length Table

These are the same as the settings for a traffic test. For details, see section 4.5.

## Configuring a BERT 4.9

# Procedure

# **BERT Setup Screen**

Follow the procedure in section 4.4 to display the BERT Setup screen.

		<ul> <li>Set the Tx rate (0.00001-100.00000%).</li> </ul>
		<ul> <li>Set the Tx mode</li> <li>(Continuous Frames Time)</li> </ul>
2009/10/22 16:44:33         BERI Setu         << Test Setup >>         Test Interface       XFP(10GbE)         << Address Setting >>         Source MAC       00         00       00         Destination MAC       00         Source IPv4       192         Destination IPv4       192         X Rate       100.0000         Tx Rate       100.0000         Frame Length(Actual)       64	Auto       Image: Select rest liten       Image: Select rest rest rest liten       Image: Select rest rest rest rest rest rest rest res	<ul> <li>Set the (actual) frame lengths* (For L2 and L3-IPv4: No VLAN stacks: 64 (64)-9999 (9999) bytes 1 VLAN stacks: 64 (68)-9999 (9999) bytes 2 VLAN stacks: 64 (72)-9999 (9999) bytes For L3-IPv6: No VLAN stacks: 74 (74)-9999 (9999) bytes 1 VLAN stacks: 74 (78)-9999 (9999) bytes 2 VLAN stacks: 74 (82)-9999 (9999) bytes 2 VLAN stacks: 74 (82)-9999 (9999) bytes).</li> <li>Set the time (1-1440 minutes). This setting appears when Tx Mode is set to Time.</li> <li>Refer to the Tx Rate table. Refer to the Tx Time table.</li> <li>Refer to the Frame Length table.</li> <li>▶ section 4.5</li> </ul>
* If you do not select Use the actual frame length	e Jumbo Frame in the Test Setup an will be displayed as "OVER."	nd you specify an oversize frame length,

1	<< BERT Setup >>				Set the number of frames
I	Tx Rate	100.00000	<b>X</b> [	Refer	(1 A20A067205)
	Tx Mode Frame Length(Actual)	Frames	500 <sup>1</sup>	Refer	This setting appears when Tx Mode is set
l		04	( 64) Dyte	Keler	to Frames.

Refer to the Frames table. Section 4.5

# Explanation

# **BERT Setup Screen**

# Tx Rate, Tx Mode, Frame Length (Actual), Tx Rate Table, Tx Time Table, Frames Table, and Frame Length Table

These are the same as the settings for a traffic test. For details, see section 4.5.

# 4.10 Displaying Pass/Fail Judgment Conditions

# Procedure

# Pass/Fail Screen

Follow the procedure in section 4.1 to display the Auto Setup screen. Press the **Pass/Fail** soft key to display the following screen.



# Explanation

You can display the pass/fail judgment conditions of the selected test items.

The pass/fail conditions are created on the setup software. For details, see the Setup Software User's Manual.

# 4.11 Configuring Options (Auto)

# Procedure

# **Advance Setup Screen**

Follow the procedure in section 4.1 to display the Auto Setup screen. Press the **Option (Auto)** soft key and then the **Advance setup** soft key to display the following screen.



# **Measurement Screen**

Press the **Option (Auto)** soft key and then the **Measurement Setting** soft key to display the following screen.

🕸 📘 2012/5/31 11:55:20 🔤 🔤	Option (Auto)
Measurement Measurement START Condition	Advance setup
<ul> <li>Request ARP/NDP</li> <li>Not start the measurement when Link is down.</li> <li>Measurement STOP Condition</li> </ul>	Measurement Setting
When Link Down is detected When L2 Error is detected When L3 Error is detected When L3 Error is detected	
Operation after Neasurement Stops Judge Pass or fail Save measurement results	
Synchronization Control Setting Try synchronizing with the other device Others	
Subtract the fixed latency from the result	
# Explanation

# Advance Setup Screen

### Select setup file after selecting Auto

Select whether or not to display the Select Setup File screen after you select Auto or Auto(Remote) in the Test Menu.

- Selected: The Select Setup File screen is displayed.
- Cleared: The Select Setup File screen is not displayed. The Test Item 1 screen appears. The previous settings are automatically selected.

### Allow to Change the Test Setup

Select whether or not to allow the Test Setup screen settings to be changed.

- · Selected: The Test Setup screen settings can be changed.
- Cleared: The Test Setup screen settings cannot be changed.

### Synchronize Measurement and Transmission controls

Select whether or not to start transmission when the START key is pressed.

- Selected: Transmission is started when the START key is pressed. Also, measurement is stopped when transmission finishes.
- · Cleared: Transmission is not started when the START key is pressed.

### Wait time before starting transmission

Set the interval between when the START key is pressed and when transmission is started and between when transmission finishes and when measurement is stopped. This setting is valid when the "Synchronize Measurement and Transmission controls" check box is selected. Range: 1 to 10 s

### **Procedure function**

### **Execution Type**

Select whether to execute a single test item or to execute test items consecutively. Single: The test item specified in the Select Test Item screen is executed. Continue: The test items in the Select Test Item screen are executed consecutively.

### **First Test Item Number**

Specify the test item number to start at when Execution Type is set to Continue. The test items after the selected test item number are executed. Range: 1 to 8

### **Continuance Confirmation**

Select whether or not to confirm that you want to proceed before proceeding to the next test item whenever a test item has finished. This setting is valid when Execution Type is set to Continue.

- ON: Whenever a test item has finished, you must confirm that you want to proceed before the AQ1300/AQ1301 will proceed to the next test item.
- OFF: Whenever a test item has finished, the AQ1300/AQ1301 will proceed to the next test item without confirmation.

### Interval

Set the interval between test items for when Execution Type is set to Continue. Range: 1 to 10 s  $\,$ 

### Method for saving continuance test result files

You can save each test item of a continuous test to separate files or save multiple test items to a single file.

- Single: Each test item is saved to a separate file. This is the conventional method.
- · Bundle: Selected test items are saved to a single file.

#### Note.

- Files cannot be loaded into the setup software when the firmware version is older than R1.08.01.001, regardless of whether Single or Bundle is selected.
- If a continuous test is stopped in the middle of execution (as a result of an error or pressing of the STOP key), the test results up to that point are saved.

### **Measurement Screen**

### **Measurement START Condition**

#### **Request ARP/NDP**

For ARP (IPv4) and NDP (IPv6) destination MAC addresses, select whether or not to use an ARP or NDP request to acquire the MAC address when the START key is pressed. This setting is valid when the test layer is L3-IPv4 or L3-IPv6.

- · Selected: An ARP/NDP request is sent.
- Cleared: An ARP/NDP request is not sent.

#### Not start the measurement when Link is down

Select whether or not to start measurement when the START key is pressed and a linkdown is detected.

- · Selected: Measurement is not started when a linkdown is detected.
- Cleared: Measurement starts even when a linkdown is detected.

### **Measurement STOP Condition**

### When Link Down is detected

Select whether or not to stop measurement when a linkdown is detected during measurement.

- Selected: Measurement is stopped when a linkdown is detected.
- · Cleared: Measurement is not stopped even when a linkdown is detected.

#### When L2 Error is detected

Select whether or not to stop measurement when an L2 error is detected during measurement.

- Selected: Measurement is stopped when an L2 error is detected.
- Cleared: Measurement is not stopped even when an L2 error is detected.

### When L3 Error is detected

Select whether or not to stop measurement when an L3 error is detected during measurement.

- · Selected: Measurement is stopped when an L3 error is detected.
- Cleared: Measurement is not stopped even when an L3 error is detected.

### When Test Fail is detected

Select whether or not to stop continuance test when a test fail judgment is detected during continuance test. This feature is supported in firmware version (FW Ver.) R1.08.01.001 and later.

- · Selected: Continuance test is stopped when a test fail judgment is detected.
- Cleared: Continuance test is not stopped even when a test fail judgment is detected.

### **Operation after Measurement Stops**

### Judge Pass or fail

Select whether or not to perform pass/fail judgment after measurement finishes.

- · Selected: Pass/fail judgment is performed after measurement finishes.
- Cleared: Pass/fail judgment is not performed after measurement finishes.

### Save measurement results

Select whether or not to save the measurement results to a file after measurement finishes. When Execution Type is set to Continue, the AQ1300/AQ1301 saves the measurement results to a file whenever a test item finishes.

- · Selected: The measurement results are saved to a file when measurement finishes.
- Cleared: The measurement results are not saved to a file when measurement finishes.

### Synchronization Control Setting

### Try synchronizing with the other device

Select whether or not to try synchronizing with the other device (the address specified as the destination address) when the START or STOP key is pressed. When the START or STOP key is pressed, the AQ1300/AQ1301 sends a measurement start or stop packet to the other device at the destination address.

You can select this option in Auto mode. The AQ1300/AQ1301 is already synchronized with the other device in Auto(Remote) mode.

- Selected: The AQ1300/AQ1301 tries to synchronize with the other device.
- Cleared: The AQ1300/AQ1301 does not try to synchronize with the other device.

### Note\_

When you are performing BERT test, the AQ1300/AQ1301 does not send measurement stop packets.

### Others

### Subtrac the fixed latency from the result

During latency measurement, the fixed delay that occurs in the other device during loopback is subtracted from the measured results. The subtracted results are displayed as measurement results. If the measured value is less than the fixed delay,  $0.00 \ \mu$ s is displayed.

This feature is supported in firmware version (FW Ver.) R1.08.01.001 and later.

- · Selected: The fixed delay is subtracted from the measured values.
- · Cleared: The fixed delay is not subtracted from the measured values.

Fixed delay value based on the interface

Interface	Delay	
XFP	1.0 µs	
SFP (GbE)	1.4 µs	
SFP (FE)	12 µs	
RJ-45 (1000M)	1.6 µs	
RJ-45 (100M)	11 µs	
RJ-45 (10M)	108 µs	

### Selecting a Setup File 5.1

# Procedure

# Select Setup File Screen

Press the Auto(Remote) soft key to display the following screen.

¢	2009/10/21 18:02:59	=AC	= Select Setup File	<ul> <li>Registered setup files</li> <li>A comment or file name appears next to</li> </ul>
1 2 3 4 5 6 7 8 9 10 11 12	2009/10/21 18:02:59 Se for demo VLAN1000 VLAN1001 VLAN1002 VLAN1002 VLAN2100 VLAN2100 VLAN2101 VLAN2102 VLAN2103	=AC lect Sotup File Page Number 1/4 Selecti	Select Setup File Latest Setup_ Default = File Switch Connent Next Page =	<ul> <li>Latest setup</li> <li>Default setup</li> <li>Load a file.</li> <li>Load a setup file from the file list.</li> <li>Switches the setup file list display (Comment, File Name)</li> <li>Switches the setup file list page (page numbers: 1/4-4/4)</li> </ul>
Setu	up file list		Master	<ul> <li>Select a setup file.</li> </ul>

Appears when you have created a display management file using the setup software and sent it to the AQ1300/AQ1301 Select a registered setup file from the setup file list.

### Note.

In Auto and Auto(Remote) mode, to select a setup file, you can choose to use the latest setup, use the default setup, load a setup file from the file list, or select a setup file from the setup file list.

# File Screen

Press the File soft key to display the following screen.



#### File list

The files that you have created using the setup software or the AQ1300/AQ1301 appear.

5

# Explanation

### Latest Setup

Select this item to use the setup that was displayed previously.

### **Default Setup**

Select this item to return to the default setup.

In the default setup, the following test items are selected.

- 1 Traffic Test [M] <=> [S] Traffic Test
- 2 Traffic Test [M] <=> [S] Loopback Test
- 3 QoS Test [M] <=> [S] QoS Test
- 4 QoS Test [M] <=> [S] Loopback Test
- 5 PING Test [M] <=> [S] PING Test

### Note\_

You cannot perform a BERT in Auto(Remote) mode.

### File

Select this item to load a setup file (with an .sd extension) from the file list. Select this item when you want to load a setup file that is not in the setup file list. To create a setup file, you can use the setup software and send the file to the AQ1300/AQ1301, or you can save the settings on the AQ1300/AQ1301.

### **Setup File Selection**

To select a registered setup file, use the setup file list.

You can register up to 48 setup files to the setup file list (4 pages with 12 files per page). A comment or file name is displayed for each of the registered setup files in the setup file list. The setup file list is updated when you open the Select Setup File screen after you have created a display management file and setup files with the setup software and sent the files to the AQ1300/ AQ1301.

For details, see the Setup Software User's Manual, IM AQ1300-61EN.

### Note\_

- The AQ1300/AQ1301 can only display the setup file list if the display management file that you created using the setup software (disManage.dmf) and the setup (.sd) files that it refers to are saved to the /setup directory in the AQ1300/AQ1301.
  - Example: /setup/disManage.dmf /setup0000.sd /setup0001.sd
- When you are performing automatic(remote control) testing, you can only select setup files that are used for automatic(remote control) testing.

5

Automatic (Remote Control) Test Settings (Auto(Remote))

# 5.2 Setting Up a Test

# Procedure

# **Test Setup Screen**

Follow the procedure in section 5.1 and then select a setup file to display the following screen.

_				
144	2009/10/22 1	7:06:03	=AC=	Test Setup
		Select Setup File		o o corp
Ī		Test Setup		Next —
I		<pre>&lt;&lt; Test Setup &gt;&gt;</pre>		
I	1	Test Interface XFP(10Gb	F)	
I	2	Test Layer L3-IPv4 T	est	Back —
I	3	Add UDP to Tx Frame		
I	4	🖗 <mark>Use Jumbo Frame</mark>		
I	5	Se	lect	
I	6			
I	0	50		
I	1	<u>Se</u>	lect	
I	8	Se Se	lectí	
I	9	Se	lectí	
I	10	Se	lectí	
I	11			
I	40			<b>?</b>
I	12	<u>80</u>	lecii	
L				Master

Configure the link settings. ▶ section 5.3

Select a setup file ► section 5.1

Set the test interface (XFP(10GbE), SFP(GbE), RJ-45).

Set the test layer (L2 Test, L3-IPv4 Test, L3-IPv6 Test).

Select this check box to treat oversize frames like normal frames.

Select this check box to add UDP to Tx frames.

This setting can be selected when Test Layer is set to L3-IPv4 Test or L3-IPv6 Test.

# Explanation

### **Test Interface**

Specify which test interface to use.

- XFP (10GbE): Select this option to use the 10GBASE-R measurement port.
- SFP (GbE): Select this option to use the 1000BASE-X measurement port.
- SFP (FE): Select this option to use the 100BASE-FX measurement port.
  - This interface is supported by firmware version R1.05.01.001 or later.
- RJ-45: Select this option to use the 10BASE-T/100BASE-TX/1000BASE-T measurement port.

### **Test Layer**

Set the layer to test.

- L2 Test: Select this option to test layer 2.
- L3-IPv4 Test: Select this option to test layer 3 according to the IPv4 protocol.
- L3-IPv6 Test: Select this option to test layer 3 according to the IPv6 protocol.

### Add UDP to Tx Frame

Select whether or not to add UDP to Tx frames. You can configure this setting when the test layer is L3-IPv4 or L3-IPv6.

### Use Jumbo Frame

Select whether or not to treat oversize frames like normal frames.

- Selected: Frames with lengths of 64 to 9999 bytes are treated as normal frames.
- Cleared: Frames whose size is above 1518 + the value set for "VLAN stacks" in the source settings × 4 are considered oversized.

# 5.3 Configuring Link Settings

# Procedure

### Link Setting Screen

Follow the procedure in section 5.2 and then select a test setup to display the following screen.



# Explanation

Configure the link settings.

### Negotiation

Select whether or not to use auto negotiation. This setting is valid when Test Interface is set to RJ-45 or SFP(GbE).s

- Auto: The link between the AQ1300/AQ1301 and the device that it is connected to is configured automatically through auto negotiation.
- Manual: The link must be configured manually.

### Speed

When Test Interface is set to RJ-45, you can set the link speed.

- 1G: A 1 Gbit/s 1000BASE-T connection is used.
- 100M: A 100 Mbit/s 100BASE-TX connection is used.
- 10M: A 10 Mbit/s 10BASE-T connection is used.
- Auto: The link speed is set automatically. This setting is valid when Negotiation is set to Auto.

### Note\_

When Test Interface is set to XFP(10GbE), the link speed is fixed at 10G. When Test Interface is set to SFP(GbE), the link speed is fixed at 1G. When Test Interface is set to SFP(FE), the link speed is fixed at 100 M.

### **Duplex**

You can set the communication mode for when Speed is set to 100M or 10M. This setting is valid when Test Interface is set to RJ-45.

- FULL: Full duplex communication
- HALF: Half duplex communication
- Auto: The AQ1300/AQ1301 chooses full or half duplex automatically. This setting is valid when Negotiation is set to Auto.

### Note.

When Test Interface is set to XFP(10GbE), SFP(GbE), or SFP(FE), or when it is set to RJ-45 and Speed is set to 1G, the duplex mode is fixed at FULL.

### **Flow Control**

You can enable or disable flow control.

- ON: Flow control is enabled.
- · OFF: Flow control is disabled.

### MDI

You can set the measurement port to straight or crossover mode. This setting is valid when Test Interface is set to RJ-45.

- MDI: Straight
- MDI-X: Cross
- Auto: The AQ1300/AQ1301 switches between straight and crossover mode automatically (this setting is valid when Negotiation is set to Auto).

### Link Setting Acquisition

If the interface is SFP(GbE) or RJ-45, you can acquire and display link setting information of the other device (DUT; the device on the user side) connected to the AQ1300/AQ1301. For details, see section 4.3.

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# 5.4 Configuring the Master Settings

### Procedure

These are the procedures for configuring the AQ1300/AQ1301 when it is the master in Auto(Remote) mode.

# **Source Address Screen**

Follow the procedure in section 5.3 and then press the **Master Setting** soft key to display the following screen.



# **Destination Address Screen**

Press the Next soft key to display the following screen.



Set the destination MAC address. Refer to the MAC Address table.

► section 4.3 Select from the search list.

#### Manual Setting This soft key is valid when you have selected a destination address from the search list. Connect to the other device.

Configure the source address settings.

Refer to the IP Address table. ► section 4.3 Set the destination IPv4 address.

This setting appears when Test Layer is set to L3-IPv4.

Set the destination IPv6 address. This setting appears when Test Layer is set to L3-IPv6. Refer to the IP Address table.

▶ section 4.3

### Search List

Press the Search List soft key to display the following screen.



### Search for other devices.

When you press this soft key, the AQ1300/AQ1301 searches for other devices (AQ1300 or AQ1301) on the same network segment.

			• •		4011000	
	2009/10/	22 15:39:51		=AC=	Search	Area of the sea
		ę	Search List			when you swite
123456789012345	Host Name mitaka yokohama fukuoka sapporo kofu kanazawa	Ser i al No SN000001 SN0000002 SN0000003 SN0000004 SN0000005 SN0000006	Version 6.0.134.10 5.1.133.11 4.2.132.12 3.3.131.13 2.4.130.14 1.5.129.15	Selecti Selecti Selecti Selecti Selecti Selecti Selecti Selecti Selecti Selecti Selecti Selecti Selecti	Search other device Switch SerialNo+Veri	when you switc Switches the so (SerialNo+Ver, IPv4/IPv6, Mast Addr Type (MA MAC Address Sw Sw Select the addr (the destination search list. To the next pag (1 to 16, 17 to 3)
6				Select		

rch list that changes ch the display earch list display Test Setup, Status+MAC, ter Addr)

t the address type AC Address, IP Address).

is setting appears when vitch is set to Master Addr. ress of the other device

n address) from the

ge 32, 33 to 48, 49 to 64)

5

### **Connect Screen**

Press the **Connect** soft key to display the following screen.

∰ <mark></mark> 2009/10/26 12:12:49	=AC= Destination
Destination Address	
<< Destination Address >>	<ul> <li>Search List</li> </ul>
Desti Information(Code:16)	anual etting
Connecting Inband Sesstion	onnect
	Back
	2 Master
Ļ	
2009/10/26 12:18:35	=AC= Slave Setup



Select when you don't want to change the slave settings. Pressing this soft key will open the Auto Setup screen.

Select to apply the currently displayed settings to the slave. You must perform remote reconnection after you press this key.

# Select to copy the slave data on the master.

You must press "Apply to Slave" after you press this key.

# **Auto Setup Screen**

Press the **Complete** soft key to display the following screen.

<b>* 2009/10/29 14:05:19</b>	=AC=	Auto	
Traffic Setup           << Test Setup	Refer 1 Refer	Execution Setup L2 Test Select Test Item	Set up the test. ▶ section 4.2 Configure the test items. ▶ section 4.4
<< Traffic Setup >> Tx Rate 100.00000 % Tx Mode Time 3 min Frame Length(Actual) 64 (64) byte Fill Pattern All 1	Refer Refer Refer	Link/Address Select Setup File Next 1/2	Configure link and address settings. ▶ section 4.3 Select a setup file. ▶ section 5.1 To Auto Setup page 2/2
		Auto Setup Haster <-> Slave Haster Remote Control Pass/Fail Test I ten 1 Option (Auto) Next 2/2	Switch between the master and slave. ▶ section 5.6 Remote control ▶ section 5.7 Displays pass/fail judgment conditions ▶ section 4.10. Configure the options (Auto). ▶ section 4.11 To Auto Setup page 1/2

### Note.

Except for the "Master <-> Slave" and "Remote Control" soft keys, the settings for the Auto Setup screen in Auto(Remote) mode are the same as the settings in Auto mode. When you want to change the settings, refer to the explanations for the settings in Auto mode.

# Explanation

# **Source Address Screen**

### Source MAC Address

Set the source MAC address. You can refer to the MAC Address table to set the address.

### **VLAN Stacks**

Set the number of VLAN stacks.

- None: No VLAN stacks.
- 1: One VLAN stack.
- 2: Two VLAN stacks.

### VLAN1 and VLAN2

Set the CoS (Class of Service) and VLAN-ID for 1 or 2 VLAN stacks. You can refer to the VLAN table to set the values.

- CoS: 0 to 7
- ID: 0 to 4095
- TPID: 0 to FFFF (supported in firmware version (FW Ver.) R1.08.01.001 and later)

### IPv4

Select whether to specify the source IPv4 address manually or to acquire and set it automatically through DHCP. This setting is valid when Test Layer is set to L3-IPv4 Test.

- Manual: You must set the source IPv4 address manually.
- DHCP: When you press Get IP Address, the AQ1300/AQ1301 acquires and sets the source IPv4 address using DHCP.

### Source IPv4 Address, Subnet Mask, and Gateway

Set the source IPv4 address, subnet mask, and gateway when IPv4 is set to Manual. You can refer to the IP Address table and the gateway reference to configure the settings.

• Subnet Mask: 1 to 31

### IPv6

Select whether to specify the source IPv6 address manually or to specify it through stateless autoconfiguration using the RA from an IPv6 router. This setting is valid when Test Layer is set to L3-IPv6 Test.

- Manual: You must set the source IPv6 address manually.
- Stateless Address: When you press Get IP Address, the AQ1300/AQ1301 autoconfigures the source IPv6 address.

### Source IPv6 Address

Set the source IPv6 address when IPv6 is set to Manual. You can refer to the IP Address table to set the address.

### **IPv6 Router Address**

You can automatically acquire the router address or set it manually.

- Automatic: Clear the Set Router Address manually check box. The IPv6 prefix length and router
   address that have been acquired automatically are displayed.
- Manual: Select the Set Router Address manually check box. You can manually set the prefix length and router address.

### MAC Address Table

Select the source MAC address from the MAC Address table.

· Global Address: You can set the source MAC address to a global address.

### VLAN Table

Select the VLAN CoS and ID from the VLAN table.

### **IP Address Table**

- Select the source IP address from the IP Address table.
- Get IP Address: Press this soft key to get the IP address. The AQ1300/AQ1301 will acquire an IP address, using DHCP when the test layer is L3-IPv4 or stateless autoconfiguration when the test layer is L3-IPv6.

### Gateway

Set the gateway.

- Manual: Select this option to set the gateway manually.
- Auto.1: Select to automatically set the gateway to xxx.xxx.1.
- Auto.254: Select to automatically set the gateway to xxx.xxx.254.

# **Destination Address Screen**

### **Destination MAC Address**

Set the destination MAC address. You can refer to the MAC Address table to set the address.

### IPv4

Set the destination IPv4 address. This setting is valid when Test Layer is set to L3-IPv4 Test. You can refer to the IP Address table or select Search List to set the address.

### IPv6

Set the destination IPv6 address. This setting is valid when Test Layer is set to L3-IPv6 Test. You can refer to the IP Address table or select Search List to set the address.

### Search List

Select the address of the other device (the destination address) from the search list.

### **Searching for Other Devices**

When you select Search other Device, the AQ1300/AQ1301 searches for other devices (AQ1300 or AQ1301) on the same VLAN or network segment and displays the results in the search list.

### Switching the Display

You can switch between different search list displays.

- SerialNo+Ver: The equipment name, serial number, and version are displayed.
- Test Setup: The equipment name, test interface, and test layer are displayed.
- Status+MAC: The equipment name, status, and MAC address are displayed.
- IPv4/IPv6: The equipment name and IP address are displayed.
- Master Addr: The device name and master address (MAC or IP address) are displayed.

### Note.

You can check the equipment name and serial number of the AQ1300/AQ1301 in the system settings.

### Setting the Address Type

You can switch the address type that is displayed when Switch is set to Master Addr.

- MAC address
- IP address

### **Manual Setting**

Press this soft key to cancel the selection that you made in the search list and enter the destination address manually. This soft key is valid when you have selected a destination address from the search list.

### Connect

Press this soft key to connect to the other device.

### **MAC Address Table**

Select the destination MAC address from the MAC Address table.

- MAC Address (ARP): When the test layer is L3-IPv4, press this soft key to automatically acquire the destination MAC address.
- MAC Address (NDP): When the test layer is L3-IPv6, press this soft key to automatically acquire the destination MAC address.

### **IP Address Table**

Select the destination IP address from the IP Address table.

### Note.

All the tables are created on the setup software. For details, see the Setup Software User's Manual.

# **Connect Screen**

The AQ1300/AQ1301 will connect remotely to the other device with the specified destination address. After the connection, you can use the test interface to control the other device remotely.

### **Slave Setup**

-	
Complete:	Press this soft key when you do not need to change the slave settings. Pressing
	this soft key will open the Auto Setup screen.
Apply to Slave:	Press this soft key to apply the currently displayed test and link settings to the
	slave. You must perform remote reconnection after you press this key.
Copy from setup:	Press this soft key to use the slave data on the master to configure the setup
	items. You must press "Apply to Slave" after you press this key.
Note	

After the connection is established, you cannot change the source and destination addresses.

# **Auto Setup Screen**

In this screen, you can change the master's settings (select test items and setup files), switch between the master and slave settings, perform remote control, display pass/fail judgments, and configure the options (Auto).

### Note\_

- Except for the "Master <-> Slave" and "Remote Control" soft keys, the settings for the Auto Setup screen in Auto(Remote) mode are the same as the settings in Auto mode. When you want to change the settings, refer to the explanations for the settings in Auto mode.
- You cannot change the test setup or link address settings from the Auto Setup screen in Auto(Remote) mode. To change the settings, return to the top menu.

# 5.5 Configuring the Slave Settings

### Procedure

These are the procedures for configuring the AQ1300/AQ1301 when it is the slave in Auto(Remote) mode.

# **Source Address Screen**

Follow the procedure in section 5.3 and then press the **Slave Setting** soft key to display the following screen.

★ 2012/5/31 15:00:54		Source Address	
Source Address           <         Source Address           Source MAC         00         00         00         01	Referi	Slave Execution	<ul> <li>Slave Execution</li> </ul>
VLAN stacks VLAN2 (TPID 8888 CoS () ID (1001)	Refer	Back	<ul> <li>Configure the link settings.</li> <li>▶ section 5.3</li> </ul>
VLAN1         TP ID         8100         CoS         0         ID         10000           Source         IPv4         Manual	Keter		<ul> <li>VLAN settings</li> <li>Automatically configured on the basis of the connected network environment</li> </ul>
Address         192         168         0         1           Subnet Mask         2255         2555         0         / 24           Gateway         192         168         0         254	Refer I	Get IP. Address	<ul> <li>IPv4 setting</li> <li>(Manual, DHCP, Alloc From Master)</li> <li>This setting appears when Test Layer is set to L3-IPv4.</li> </ul>
		Slave ?	<ul> <li>Configure the source address settings.</li> <li>▶ section 5.4</li> </ul>
Source IPv6         Hanual           Address         FE80         0000         0000         0000           0000         0000         0000         0001         0001           IPv6 Router         Set Router Address manually         Prefix Length         64           Address         FE80         0000         0000         0000           0000         0000         0000         0000         0000	Refer Refer		<ul> <li>IPv6 setting (Manual, Stateless, Alloc From Master) This setting appears when Test Layer is set to L3-IPv6.</li> </ul>
			<ul> <li>Configure the source address settings.</li> <li>▶ section 5.4</li> </ul>

### **Slave Execution**

🎄 🚺 2009/1	10/27 15:53:02	=AC=	Slave
Auto(Remote) Traffic	Remain         O[s]         ™ 100 Insteam         List of the second s	64 Random	Release
XFP 🔤	Test Results Duratin O	on 0:00:00	
10M HALF PRUSE	[Rx] Peak Rate % :		
TX RX L2 ERR LFS T IF T RE	[Latency] Max Latency(us):		
R×LF R×RF	[Tx] Rate(#): [Rx] Rate(#):		
	Normal Frame: Tx: Rx: Rx Frame Length(byte):	ry L3 RERR	Slave ?

Press this soft key to exit the slave (connection standby) state. Pressing this soft key will open the top menu. 5

### Explanation

When you press the Slave Execution soft key, the AQ1300/AQ1301 enters into slave (connection standby) mode. The AQ1300/AQ1301 enters into slave mode when the master connects to it.

### Source MAC Address, VLAN Stacks, and VLAN1 and VLAN2

These are the same as the settings for the master. See section 5.4.

### IPv4

Select whether to specify the source IPv4 address manually, acquire and set it automatically through DHCP, or assign it from the master. This setting is valid when Test Layer is set to L3-IPv4 Test.

- Manual: You must set the source IPv4 address manually.
- DHCP: When you press Get IP Address, the AQ1300/AQ1301 acquires and sets the source IPv4 address using DHCP.
- Alloc From Master: The master automatically provides the AQ1300/AQ1301 with a source IPv4 address.

### Source IPv4 Address, Subnet Mask, and Gateway

These are the same as the settings for the master. See section 5.4.

### IPv6

Select whether to specify the source IPv6 address manually, specify it through stateless autoconfiguration using the RA from an IPv6 router, or assign it from the master. This setting is valid when Test Layer is set to L3-IPv6 Test.

- Manual: You must set the source IPv6 address manually.
- Stateless Address: When you press Get IP Address, the AQ1300/AQ1301 autoconfigures the source IPv6 address.
- Alloc From Master: The master automatically provides the AQ1300/AQ1301 with a source IPv6 address.

### Source IPv6 Address and IPv6 Router Address

These are the same as the settings for the master. See section 5.4.

### MAC Address, VLAN, and IP Address Tables

These are the same as the settings for the master. See section 5.4.

### Note\_

- In an Auto(Remote) test, if the slave unit is set to perform automatic loopback, the frames that control the other device (the inband control frames) are also used in the calculation of statistics.
- When the AQ1300/AQ1301 is displaying the top menu, it is in slave (connection standby) mode. When the master connects to the AQ1300/AQ1301, the AQ1300/AQ1301 enters into slave mode and displays the slave execution screen.

When the AQ1300/AQ1301 is in slave mode, even if you change the AQ1300/AQ1301 link or address settings from the master, they will not be saved as the latest setup.

# 5.6 Switching between the Master and Slave Settings

### Procedure

Follow the procedure in section 5.4 to display the Auto Setup screen.

Press the Master <-> Slave soft key to switch between the displays of the master and slave settings.



# Explanation

### Master <-> Slave

Press this soft key to switch between the displays of the master and slave settings. The settings that appear are the test, address, and test item settings. For details about the test item settings, see section 4.4.

### Note

You can change the test item settings when you are displaying the slave settings.

# 5.7 Controlling the Other Device Remotely

# Procedure

Follow the procedure in section 5.4 to display the Auto Setup screen. Press the **Remote Control** soft key to display the following screen.



# Explanation

### **Remote Disconnect**

Press this soft key to stop remote control from the master. When you press this key, the remote communication between the master and the slave through the test interface is cut off.

### **Remote Reconnect**

Press this soft key after the remote connection has been cut off to reconnect from the master. When you press this key, the remote communication between the master and the slave through the test interface is re-established.

### Direction

In Auto(Remote) mode, you can specify the direction in which remote testing is performed.

### Non-Loopback Testing

- M => S: Testing is performed in the direction of the master to the slave.
- M <= S: Testing is performed in the direction of the slave to the master.
- M <=> S : Testing is performed in both directions: from the master to the slave and from the slave to the master.

### Loopback Testing

 M <=> LOOP: When the slave is set to Loopback Test mode, the direction setting is fixed at M <=> LOOP.

# 6.1 Selecting a Setup File

### Procedure

# Manual Setup Screen

Press the Manual soft key and then the Next 1/2 soft key to display the following screen.



### **File Screen**

Press the File soft key to display the following screen.



**File list** The files that you have created using the setup software or the AQ1300/AQ1301 appear.

# Explanation

### Default Setup

Select this item to return to the default setup.

### File

Select this item to load a setup file (with an .sd extension) from the file list. To create a setup file, you can use the setup software and send the file to the AQ1300/AQ1301, or you can save the settings on the AQ1300/AQ1301. 6

# 6.2 Setting Up a Test

# Procedure

# Test Setup Screen

Press the Manual soft key and then the Test Setup soft key to display the following screen.



# Explanation

### **Test Interface**

Specify which test interface to use.

- XFP (10GbE): Select this option to use the 10GBASE-R measurement port.
- SFP (GbE): Select this option to use the 1000BASE-X measurement port.
- SFP (FE): Select this option to use the 100BASE-FX measurement port.
- RJ-45: This interface is supported by firmware version R1.05.01.001 or later.
   Select this option to use the 10BASE-T/100BASE-TX/1000BASE-T measurement
  - port.

### **Test Layer**

Set the layer to test.

- L2 Test: Select this option to test layer 2.
- L3-IPv4 Test: Select this option to test layer 3 according to the IPv4 protocol.
- L3-IPv6 Test: Select this option to test layer 3 according to the IPv6 protocol.

# 6.3 Configuring Link and Address Settings

# Procedure

# Link Setting Screen

Press the **Manual** soft key, the **Link/Address** soft key, and then the **Link Setting** soft key to display the following screen.



IS SET to RJ-45 or SFP(GDE).	Set the negotiation (Auto, Manual)
─Select this check box to continue	This setting is valid when Test Interface is
transmission while the link is down.	set to SFP(GbE) or RJ-45.
This setting is valid when Test Interface is set	Advertisement
to XFP(10GbE).	This setting is valid when Test Interface is
2013/2/19 15:25:19 🔤	Link/Address set to SFP(GbE) or RJ-45 and Negotiation
Link Setting	is set to Auto.
<pre><!-- Link Setting -->&gt;</pre>	Link Setting Link Setting screen (this screen)
Negatiation	Source Address Screen
Advertisement	Source Emulation Satting Sereen
🖸 1000M-FULL	Address Emulation Setting Screen
Ø 100M-FULL Ø 100M-HALF	
FLOW(Sym)	Emulation — Destination Address Screen
Speed 16	(Set the speed (1G, 100M, 10M, Auto)
Duplex Full	Destination This setting is valid when Test Interface is
Flow Control ON	Address Set to RJ-45. The Auto setting for Speed is
MDI MDI	valid when Negotiation is set to Auto.
Continue to transmit while link is down	Set the duplex (FULL, HALF, Auto).
TX Clock Source Internal CLK	This setting is valid when Speed is set to
Detect a mismatch of Auto-nego settings(at link-up)	100M or 10M. The Auto setting for Duplex
	is valid when Negotiation is set to Auto.
	Set the flow control (ON, OFF).
Select this check box to	Set the MDI (MDI, MDI-X, Auto).
automatically detect	I he Auto setting for MDI is valid when
mismatches in the auto	
negotiation during link	Set the RF response (Auto, Manual).
establishment.	
	Set the Tx clock source (Internal CLK Received CLK)
. ↓	This setting is valid when Test Interface is set to XFP
Link Setting Acquisition	(10GbE) or SFP(GbE).
a 2013/2/19 15:25:47	Executes link setting information
Configuration for Link partner acquisition	acquisition
	Acquires the link setting information of the other
Status Preparing -	device connected to the AQ1300/AQ1301
Cable Type Straight	Annlies link settings
	Link Set. Applies the acquired other device's link
<< Result >>	settings to the AQ1300/AQ1301. You can
Negotiation	execute this when the measurement
Speed	interface is RJ-45 or SFP(GbE) and the
NDI	acquisition status is Finish.
	Status (Preparing, Finish, Fail)
<< UTP Cable >>	Cable type (Straight Cross)
Status	Einish This setting is valid when Test Interface is
Result of link setting information acquisition	set to RJ-45.
Negotiation (Auto, Manual)	Returns to the link setting screen
<ul> <li>Speed (1G, 100M, 10M)</li> </ul>	
Appears when Test Interface is set to RJ-45	UTP Cable Status
Duplex (Full, Half, (when negotiation	Indicates the UTP cable status as follows.
IS SET TO MANUAL)	(Normal, The cable may be defective. It is
• MDI (MDI MDI_X)	two-pair cable)
Anneare when Test Interface is set to DI 46	

### Source Address Screen

Press the **Manual** soft key, the **Link/Address** soft key, and then the **Source Address** soft key to display the following screen.



View and set the IPv6 prefix length and the IPv6 router address.

# **Emulation Setting Screen**

0000 0000 0000 0000

Press the **Manual** soft key, the **Link/Address** soft key, and then the **Emulation Setting** soft key to display the following screen.

<u>⊯ 2</u> 013/2/19 15:37:18		=AC=	Link/Address
Emulation	Setting		
<< Emulation Setting >>		ĺ	Link Setting
IP\4 ARP Reply ARP Reply Target	All Vlan/addresses		Source Address
MAC address auto-gene Generation method	IP Address	-	Emulation Setting
PING Reply			Destination Address
Select this check bo replying. This setting is valid wh to L3-IPv6.	<b>x to perform ping</b> nen Test Layer is s	6 et	
Select this check box t	o perform NDP		
replying. This setting is valid whe	n Test Layer is set	<u>ج</u> ا	Select this his setting

Select this check box to perform ARP replying.

This setting is valid when Test Layer is set to L3-IPv4.

Set the ARP reply target (Source Address only, All addresses, All Vlan/addresses)

• This setting is valid when Test Layer is set to L3-IPv4.

• You can select the All Vlan/addresses options when VLAN stacks of the Source Address setting is set to 1 or 2.

Select this check box to automatically generate MAC addresses.

- This setting is valid when Test Layer is set to L3-IPv4.
- You can select this when ARP reply is selected.

# Set the MAC address generation method (IP Address, VLAN ID).

- This setting is valid when Test Layer is set to L3-IPv4.
- You can select the VLAN ID option when ARP reply target is set to All Vlan/addresses.

Select this check box to perform ping replying.

This setting is valid when Test Layer is set to L3-IPv4.

to L3-IPv6.

# **Destination Address Screen**

Press the **Manual** soft key, the **Link/Address** soft key, and then the **Destination Address** soft key to display the following screen.



## Search List

Press the Search List soft key to display the following screen.

<u>چ</u>	2009/10/	23 09:34:54		=AC=	Search List
			Search List		
Г	Host Name	SerialNo	Version		Search
1				Select	
2				Select	<ul> <li>Switch</li> </ul>
4				Select	SerialNo+Ver
5				Select	
6				Select	
				Select	
9				Select	
10				Select	
11				Select	
13				Select	Next Page
14				Select	
15				Select	
				Select	

Search for other devices. When you press this soft key, the AQ1300/AQ1301 searches for other devices (AQ1300 or AQ1301) on the same network segment.

پ	2009/10/	22 15:39:51		=AC=	Search	
		ę	Search List			,
1 2 3 4 5 6 7 8 9 10 11 12 13 14	Host Name mitaka yokohama fukuoka sapporo kofu kanazawa	SerialNo SN000001 SN0000002 SN0000003 SN000004 SN000005 SN000006	Version 6.0.134.10 5.1.133.11 4.2.132.12 3.3.131.13 2.4.130.14 1.5.129.15	Selecti Selecti Selecti Selecti Selecti Selecti Selecti Selecti Selecti Selecti Selecti Selecti Selecti Selecti Selecti	Search other device	
15 16				<u>Select</u> Select		(

Search for other devices

Area of the search list that changes when you switch the display

Switches the search list display SerialNo+Ver, Test Setup, Status+MAC, IPv4/IPv6, Master Addr)



Set the address type (MAC Address, IP Address). This setting appears when Switch is set to Master Addr.

Select the address of the other device (the destination address) from the search list.

Го the next page 1 to 16, 17 to 32, 33 to 48, 49 to 64)

# Explanation

# Link Setting Screen

### Negotiation

Select whether or not to use auto negotiation. This setting is valid when Test Interface is set to RJ-45 or SFP(GbE).

- Auto: The link between the AQ1300/AQ1301 and the device that it is connected to is configured automatically through auto negotiation.
- Manual: The link must be configured manually.

### Advertisement

The connection types that can be offered are advertised when Test Interface is set to SFP(GbE) or RJ-45 and Negotiation is set to Auto.

Advertisement	SFP	RJ-45
1000M-FULL	No	Yes
100M-FULL, 100M-HALF	No	Yes
10M-FULL, 10M-HALF	No	Yes
Flow(Sym), Flow(Asym)	Yes	Yes

### Speed

When Test Interface is set to RJ-45, you can set the link speed.

- 1G: A 1 Gbit/s 1000BASE-T connection is used.
- 100M: A 100 Mbit/s 100BASE-TX connection is used.
- 10M: A 10 Mbit/s 10BASE-T connection is used.
- Auto: The link speed is set automatically. This setting is valid when Negotiation is set to Auto.

### Note\_

When Test Interface is set to XFP(10GbE), the link speed is fixed at 10G. When Test Interface is set to SFP(GbE), the link speed is fixed at 1G. When Test Interface is set to SFP(FE), the link speed is fixed at 100M

### Duplex

You can set the communication mode for when Speed is set to 100M or 10M. This setting is valid when Test Interface is set to RJ-45.

- FULL: Full duplex communication
- HALF: Half duplex communication
- Auto: The AQ1300/AQ1301 chooses full or half duplex automatically. This setting is valid when Negotiation is set to Auto.

### Note\_

When Test Interface is set to XFP(10GbE), SFP(GbE), or SFP(FE), or when it is set to RJ-45 and Speed is set to 1G, the duplex mode is fixed at FULL.

### **Flow Control**

You can enable or disable flow control.

- ON: Flow control is enabled.
- OFF: Flow control is disabled.

### MDI

You can set the measurement port to straight or crossover mode. This setting is valid when Test Interface is set to RJ-45.

- MDI: Straight
- MDI-X: Cross
- Auto: The AQ1300/AQ1301 switches between straight and crossover mode automatically (this setting is valid when Negotiation is set to Auto).

### **RF Response Setting**

You can select whether or not to automatically respond with an RF when Test Interface is set to XFP(10GbE) and a linkdown is detected or an LF is received.

- Auto: The AQ1300/AQ1301 automatically responds with an RF.
- Manual: The AQ1300/AQ1301 does not automatically respond with an RF.

### Continuing to Transmit while the Link Is Down

When Test Interface is set to XFP(10GbE), you can specify whether to continue or stop transmission after a linkdown is detected.

- · Selected: Transmission continues when a linkdown is detected.
- · Cleared: Transmission stops when a linkdown is detected.

### **Tx Clock Source Setting**

Specify the Tx clock source for when Test Interface is set to XFP(10GbE) or SFP(GbE).

When Test Interface is set to SFP(FE) or RJ-45, the Tx clock source is fixed to the internal clock.

- The internal clock is used. Internal CLK:
- Received CLK: The AQ1300/AQ1301 synchronizes with the Rx line signal.

When Test Mode is set to Loopback Test, if Test Interface is set to XFP(GbE) or SFP(GbE), the AQ1300/AQ1301 uses the received clock regardless of the Tx clock source setting.

### Link Setting Acquisition

If the interface is SFP(GbE) or RJ-45, you can acquire and display link setting information of the other device (DUT; the device on the user side) connected to the AQ1300/AQ1301. For details, see section 4.3.

# Source Address Screen

### Source MAC Address

Set the source MAC address. You can refer to the MAC Address table to set the address.

### **VLAN Stacks**

Set the number of VLAN stacks.

- None: No VLAN stacks.
- One VLAN stack. 1:
- 2: Two VLAN stacks.

### VLAN1 and VLAN2

Set the TPID (Tag Protocol Identifier), CFI (Canonical Format Indicator), CoS (Class of Service), and VLAN-ID for when there are one or two VLAN stacks. You can refer to the VLAN table to set the values.

- TPID: 0 to FFFF
- CFI: 0 or 1
- CoS: 0 to 7
- ID: 0 to 4095

### IPv4

Select whether to specify the source IPv4 address manually or to acquire and set it automatically through DHCP. This setting is valid when Test Laver is set to L3-IPv4 Test.

- Manual: You must set the source IPv4 address manually.
- DHCP: When you press Get IP Address, the AQ1300/AQ1301 acquires and sets the source IPv4 address using DHCP.

### Source IPv4 Address, Subnet Mask, and Gateway

Set the source IPv4 address, subnet mask, and gateway when IPv4 is set to Manual. You can refer to the IP Address table and the gateway reference to configure the settings.

Subnet Mask: 1 to 31

### IPv6

Select whether to specify the source IPv6 address manually or to specify it through stateless autoconfiguration using the RA from an IPv6 router. This setting is valid when Test Layer is set to L3-IPv6 Test.

- Manual:
  - You must set the source IPv6 address manually. Stateless Address: When you press Get IP Address, the AQ1300/AQ1301 autoconfigures the source IPv6 address.

### Source IPv6 Address

Set the source IPv6 address when IPv6 is set to Manual. You can refer to the IP Address table to set the address.

### **IPv6 Router Address**

You can automatically acquire the router address or set it manually.

- Automatic: Clear the Set Router Address manually check box. The IPv6 prefix length and router address that have been acquired automatically are displayed.
- Manual: Select the Set Router Address manually check box. You can manually set the prefix length and router address.

### **MAC Address Table**

Select the source MAC address from the MAC Address table.

• Global Address: You can set the source MAC address to a global address.

### **VLAN Table**

Select the VLAN CoS and ID from the VLAN table.

### **IP Address Table**

Select the source IP address from the IP Address table.

Get IP Address: Press this soft key to get the IP address. The AQ1300/AQ1301 will acquire
 an IP address, using DHCP when the test layer is L3-IPv4 or stateless
 autoconfiguration when the test layer is L3-IPv6.

### Gateway

Set the gateway.

- Manual: Select this option to set the gateway manually.
- Auto.1: Select this option to set the gateway to xxx.xxx.xx.1.
- Auto.254: Select this option to set the gateway to xxx.xxx.254.

# **Emulation Setting Screen**

### **ARP Reply**

Select whether or not to send ARP replies to ARP requests when the test layer is L3-IPv4.

- · Selected: ARP replies are sent.
- · Cleared: ARP replies are not sent.

### **ARP Reply Target Setting**

When the test layer is L3-IPv4 and ARP Reply is selected, you can specify the ARP reply target frames.

- Source Address only: The AQ1300/AQ1301 will send ARP replies to ARP requests that are directed at the source address.
- All addresses: The AQ1300/AQ1301 will send ARP replies to ARP requests, regardless of the address that they are directed at.
- All Vlan/addresses: The AQ1300/AQ1301 will send ARP replies to ARP requests that are directed at all VLAN ID/addresses. You can select this option when the VLAN stacks in the source address settings is set to 1 or 2.

### Automatically Generating MAC Addresses

If the test layer is L3-IPv4, set whether to automatically generate its own port's MAC address that is included in ARP replies.

- Selected: The MAC address is automatically generated. You can select this check box when the ARP reply check box is selected.
- Cleared: The MAC address is not automatically generated. The source MAC address is used in ARP replies.

### Setting the MAC Address Generation Method

If the test layer is L3-IPv4 and the "MAC address auto-generated" check box is selected, set the MAC address generation method.

- IP Address: The MAC address is generated automatically from the IP address. The request IP address (4 bytes) of the received ARP request frame is included in the lowest four bytes of the source MAC address.
- VLAN ID: The MAC address is generated automatically from the VLAN ID. The outer VLAN ID value (12 bits) of the received ARP request frame is included in the lowest 12 bits of the source MAC address. You can select this option when ARP Reply is set to All Vlan/ addresses.

### **PING Reply**

Select whether or not to send ping replies to ping requests when the test layer is L3-IPv4.

- Selected: Ping replies are sent.
- Cleared: Ping replies are not sent.

When the test mode is set to Loopback, ping replies are not sent.

### NDP Reply

Select whether or not to send an NA (NDP reply) when an NS is received and the test layer is L3-IPv6.

- Selected: NDP replies are sent.
- Cleared: NDP replies are not sent.

### **PING6 Reply**

Select whether or not to send ping6 replies to ping6 requests when the test layer is L3-IPv6.

- Selected: Ping6 replies are sent.
- Cleared: Ping6 replies are not sent.

When the test mode is set to Loopback, ping6 replies are not sent.

# **Destination Address Screen**

### **Destination MAC Address**

Set the destination MAC address. You can refer to the MAC Address table to set the address.

### IPv4

Set the destination IPv4 address. This setting is valid when Test Layer is set to L3-IPv4 Test. You can refer to the IP Address table or select Search List to set the address.

### IPv6

Set the destination IPv6 address. This setting is valid when Test Layer is set to L3-IPv6 Test. You can refer to the IP Address table or select Search List to set the address.

### Search List

Select the address of the other device (the destination address) from the search list.

### **Searching for Other Devices**

When you select Search other Device, the AQ1300/AQ1301 searches for other devices (AQ1300 or AQ1301) on the same VLAN or network segment and displays the results in the search list.

### Switching the Display

You can switch between different search list displays.

- SerialNo+Ver: The equipment name, serial number, and version are displayed.
- Test Setup: The equipment name, test interface, and test layer are displayed.
- Status+MAC: The equipment name, status, and MAC address are displayed.
- IPv4/IPv6: The equipment name and IP address are displayed.
- Master Addr: The device name and master address (MAC or IP address) are displayed.

### Note.

You can check the equipment name and serial number of the AQ1300/AQ1301 in the system settings.

### Setting the Address Type

You can switch the address type that is displayed when Switch is set to Master Addr.

- MAC address
- IP address

### **MAC Address Table**

Select the destination MAC address from the MAC Address table.

- MAC Address (ARP): When the test layer is L3-IPv4, press this soft key to automatically acquire the destination MAC address.
- MAC Address (NDP): When the test layer is L3-IPv6, press this soft key to automatically acquire the destination MAC address.

### **IP Address Table**

Select the destination IP address from the IP Address table.

### Note.

All the tables are created on the setup software. For details, see the Setup Software User's Manual.

# 6.4 Selecting a Test Mode

# Procedure

# Select Test Mode Screen

Press the Manual soft key and then the Test Item soft key to display the following screen.

Select Test Mode	
Traffic Test	Selecti
Loopback Test	Selecti
QoS Test	Selecti
PING Test	Selecti
BERT	Selecti

Traffic setup ► section 6.5 Loopback setup ► section 6.6 QoS setup ► section 6.7

- PING setup ► section 6.8
- BERT setup ► section 6.9

# Explanation

Select a test mode.

When you select a test mode, its setup screen will appear.

### **Configuring a Traffic Test** 6.5

# Procedure

### **Traffic Setup Screen**

Follow the procedure in section 6.4 to display the Traffic Setup screen.

# **Tx Setting Screen**

Press the Detail Setup soft key and then the Tx Setting soft key to display the following screen.

2009/10/23 09:59:24		=AC=	Traffic	<ul> <li>Frame structure indication</li> </ul>
Tr	affic Setup			<ul> <li>Configure the frame settings.</li> </ul>
Tx Frame Setting			Tx Setting	0
Frame Structure	MAC	Detail		Set the frame length (18-9999 bytes)
(Actual Length)	64 by	te	Tx Rate	Actual frame length indication
Variable Cetting				
Frame Length	Detail 4		Tx Hode	<ul> <li>Select this check box to adjust the</li> </ul>
Contents	+1 ( 64 - 15	518) —	Setting	frame length.
C Field	Detail : Offset	i i		<ul> <li>Configure the frame length settings.</li> </ul>
	011501		- <del>Rx</del> Set ing	<ul> <li>Contents</li> </ul>
Payload Check Offset Sett	ing	v to	╗╼╟╼┝╧══╧┪	<ul> <li>Configure field adjustment.</li> </ul>
		,		<ul> <li>Target field</li> </ul>
				<ul> <li>Select this check box to adjust field</li> </ul>
				settings.
			<b>1</b>	- Set the payload check offset
				(USE IX Frame Setting, Manual).
				Set the offset (byte 0-255).

This setting is valid when Manual is selected.

### Frame Setting Screen

Press Detail next to Frame Structure.

Press the Basic Setting soft key to display the following screen.

Frame Setting (Basic setting) Screen 2009/10/23 09:59:58 =AC= Frame Frame Setting sic Setting Frame Structure MAC+TYPE+1Pv4+UDP CREfer to Source Address for the VLAN Setting MAC VLAN stacks 1 VLAN Frame Length 64 byte (Actual Length) 64 byte IP Fill Pattern Random Error Addition Unused UDI

Set the frame structure (MAC+TYPE, MAC+TYPE+IPv4, MAC+TYPE+IPv4+UDP, MAC+TYPE+IPv6, MAC+TYPE+IPv6+UDP).

Select this check box to refer to the source address for the VLAN settings.

Set the VLAN stack number (None, 1, 2). This setting is valid when the "Refer to Source Address for the VLAN Setting" check box is cleared. Set the frame length (48-9999 bytes).

Actual frame length indication

Set the fill pattern (ALL0, ALL1, 0/1 alt., Random, Manual).

Set the pattern value (0-FFFFFFF). This setting is valid when Manual is selected. Configure error addition (Unused, CRC Error, Symbol Error). Press the **MAC** soft key to display the following screen.

#### Frame Setting (MAC) Screen



# Set the source MAC address (Manual, Source Setting).

This setting is valid when Source MAC is set to Manual.

# Set the destination MAC address (Manual, Destination Setting).

This setting is valid when Destination MAC is set to Manual.

Press the VLAN soft key to display the following screen.

### Frame Setting (VLAN) Screen



Configure the VLAN settings (TPID: 0-FFF, CFI: 0-1, CoS: 0-7, ID: 0-4095). These settings are valid when VLAN stacks is set to 1 or 2.

### Note.

- The VLAN soft key is valid in the following situations.
- · When the number of VLAN stacks specified in the basic settings is one or two.
- When the "Refer to Source Address for the VLAN Setting" check box is selected in the basic settings and the number of VLAN stacks set for the source address is one or two.

Press the IP soft key to display the following screen.

#### Frame Setting (IPv4) Screen

2009/10/23 10:01:0	2	=AC=	F	ame	
	Frame Setting				
IPv4			Basic	Setti	ng
Source IPv4	Source Setting           192         168         0         1		ļ	ыd	
Destination IPv4	Manua 1 192 168 0 2		V	LAN	
ToS/DS(DSCP)	IPv4-ToS	0 -			
Protocol	UDP	17		IP	
				IDP	
				Ö	

# Set the source IPv4 address (Manual, Source Setting).

This setting is valid when Source IPv4 is set to Manual.

Set the destination IPv4 address (Manual, Destination Setting).

This setting is valid when Destination IPv4 is set to Manual.

Set the ToS/DS (DSCP) (Manual, IPv4-ToS, IPv4-DSCP). Value

(Manual: 0-FF, IPv4-ToS: 0-7, IPv4-DSCP: 0-63)

 Set the protocol (0-255).
 This setting is valid when Frame Structure is set to MAC+TYPE+IPv4.

#### Frame Setting (IPv6) Screen

🅸 📄 2009/10/23 10:04:0	2	=AC=	Frame
	Frame Setting		
IPv6			Basic Setting
Source IPv6	Source Setting		
	FE80 0000 0000 0000		MAC
Destination IPv6	Destination Setting -		VLAN
	0000 0000 0000 0002	ŀ	
ToS/DS(DSCP)	IPv6-TrafficClass 0 _		IP
Next Header	UDP 17	-	╘━━┓┤┙
			UDP
			<b>S</b>
			J <u>138</u> ]

Set the source IPv6 address (Manual, Source Setting).

This setting is valid when Source IPv6 is set to Manual.

Set the destination IPv6 address (Manual, Destination Setting).

This setting is valid when Destination IPv6 is set to Manual.

Set the ToS/DS (DSCP)

(Manual, IPv6-TrafficClass, IPv6-DSCP). — Value

(Manual: 0-FF, IPv6-TrafficClass: 0-7, IPv6-DSCP: 0-63)

 Set the next header (0-255).
 This setting is valid when Frame Structure is set to MAC+TYPE+IPv6.

### Note.

The IP soft key is valid when Frame Structure is set to MAC+TYPE+IPv4, MAC+TYPE+IPv4+UDP, MAC+TYPE+IPv6, or MAC+TYPE+IPv6+UDP.

Press the **UDP** soft key to display the following screen.

### Frame Setting (UDP) Screen



#### Note.

The UDP soft key is valid when Frame Structure is set to MAC+TYPE+IPv4+UDP or MAC+TYPE+IPv6+UDP.

### Variable Frame Length Screen

Press Detail next to Frame Length to display the following screen.

F	2009/10/23 10:08:43	=AC=	Traffic	
	Variable Frame Length			
	Frame Length Range <mark>64</mark> - <u>1518</u> byte ——— Step +1 -		Tx Setting	<ul> <li>Set the adjustment range (64-9999 bytes).</li> </ul>
				<ul> <li>Set the adjustment step (+1, -1, Random).</li> </ul>
	Pavlaad Check Offcet Satting			
	Offset Use Tx Frame setting 42 byte			

### Variable Field Setting Screen

Press Detail next to Field to display the following screen.

¥ 2009/10/23 10:13:08	=AC=	Traffic	Set the method
Variable F Position Method Field Offset Bit Offset Bit Offset Bit Width Range Form Minimum Value Maximum Value Step	Field Field MAC-DA 0 byte 0 bit 32 bit HEX 00000000 FFFFFFFF +1	Tx Setti Ng Tx Rate Tx Mode Setting Rx Setting	(Field, Offset). Set the field. This setting is valid when Method is set to Field. (MAC-DA, MAC-SA, VLAN-ID, VLAN-CoS, IPv4-ToS, IPv4-DSCP, IPv4-DA, IPv4-SA, IPv4-Protocol, IPv6-DA, IPv6-SA, IPv6-TrafficClass, IPv6-DSCP, IPv6-NextHeader, L4-DP, L4-SP) The items that you can set vary depending on how the settings in the Tx Setting screen and the frame structure and VLAN
			settings in the Frame Setting screen are configured. Set the offset. This setting is valid when Method is set to Offset. Offset (0-9998 bytes) Bit offset (0-31 bits) Bit width (1-32 bits) Set the input format (DEC, HEX). Set the upper and lower limits of the adjustment range (DEC: 0-4294967295, HEX: 0-FFFFFFF). The range varies depending on the specified bit width.

# **Tx Rate Screen**

Press the **Detail Setup** soft key and then the **Tx Rate** soft key to display the following screen.

🄆 🚺 2009/10/23 10:16:	:22	=AL	- Traffic
	Traffic Setup		
Tx Rate Setting		F	Tx Setting
Traffic format Tx Rate	Burst	<u>ال</u>	Tx Rate
	100.00000	× ×	Tx Mode
Burst Setting Burst Number	1		setting
Interval	1		Rx Setting

# Set the traffic format (Constant, Burst).

 Select this check box to send frames at rates that exceed 100% of the Tx rate (when this check box is selected, the Tx rate can only be set in bits).

Set the Tx rate

(when Frame Length is set to 64 bytes and Test Interface is set to XFP). Percentage range: 0.00001-100.00000 Bit range: 72-9999999424 fps range: 1.00000-14880952.38095 fps Set the unit (%, bit, fps).

Set the burst number (1-65535).

Set the interval (1-1000000 us, 1-1000 ms).

1-1000000 us, 1-1000 ms,

Set the unit (us, ms).

These settings are valid when the traffic format is "Burst."

# **Tx Mode Setting Screen**

Press the **Detail Setup** soft key and then the **Tx Mode Setting** soft key to display the following screen.



Set the Tx mode (Continuous, Frames, Time).

Set the number of frames (1-4294967295). This setting appears when Tx Mode is set to Frames.

Set the time (1-86400 s). This setting appears when Tx Mode is set to Time.

# **Rx Setting Screen**

Press the Detail Setup soft key and then the Rx Setting soft key to display the following screen.

2009/10/23 10:17:15			:	F <del>AC</del> =	Traffic
Trat	fic Setur				
Oversize Threshold	1519	byte or m	nore		Tx Setting
Detect Payload Error Offset Match to Tx	Setting	42	byte		Tx Rate
Target Frame Rx Base Filter Setting Frame Structure Filter1 Combination AND	Cond	ame Only - MAC Offset Offset ition	Detai Detai Detai Match		Tx Hode Setting Rx Setting

Set the oversize threshold (65-10,000 bytes).

Select this check box to detect payload errors.

Set the offset (Match to Tx Setting, Manual).

Set the offset byte (byte 0-255). This setting is valid when offset is set to Manual.

Set the frames to take statistics of (Test Frame Only, All Frames).

Frame structure indication Configure the frame settings.

Set the Rx base filter methods. Configure the Rx base filter.

Set the frame pass condition (Match, Mismatch).

Set how Rx base filters 1 and 2 are combined (AND, OR).

Select a check box to use the corresponding Rx base filter.
# Frame Setting Screen

Press Detail next to Frame Structure to display the following screen.



Set the frame structure (MAC+TYPE, MAC+TYPE+IPv4, MAC+TYPE+IPv4+UDP, MAC+TYPE+IPv6, MAC+TYPE+IPv6+UDP).

Select this check box to refer to the source address for the VLAN settings.

Set the VLAN stack number (None, 1, 2). This setting is valid when the "Refer to Source Address for the VLAN Setting" check box is cleared.

#### Note.

The AQ1300/AQ1301 will receive the type of frames specified by the Frame Structure setting.

# **Rx Base Filter Setting Screen**

Press Detail next to a filter to display the following screen.

2009/10/23 10:28:09 Rx Base Position Method Field Offset Offset Bit/Mask Bit/Mask Bit Offset Width in bits	Filter Setting Offset HAC-DA D Bit 0 bit 32 bit	=AC = Traffi	<ul> <li>Set the method (Field, Offset).</li> <li>Set the field. This setting is valid when Method is set to Field. (MAC-DA, MAC-SA, VLAN-ID, VLAN-CoS, IPv4-ToS, IPv4-DSCP, IPv4-DA, IPv4-SA, IPv4-Protocol, IPv6-DA, IPv6-SA, IPv6-TrafficClass,</li> </ul>
Pattern Form Pattern	HEX 00 00 00 00	Rx Setting	IPv6-DSCP, IPv6-NextHeader, L4-DP, L4-SP) The items that you can set vary depending on how the settings in the Rx Setting screen and the frame structure and VLAN settings in the Frame Setting screen are configured. Set the offset. This setting is valid when Method is set to Offset. Offset (0-255 bytes). Bit/Mask
			Bit offset (0-47 bits) Bit width (1-48 bits) This setting appears when Bit/Mask is set to Bit. Set the input format (DEC, HEX, IPv4).
Offset Offset Bit/Mask Length Mask Pattern	0 byte Mask FF FF FF FF		<ul> <li>Set the pattern.</li> <li>Set the byte length (1-6 bytes) and the master pattern.</li> <li>This setting appears when Bit/Mask is set to Mask.</li> </ul>

# Explanation

# **Tx Setting Screen**

# **Tx Frame Setting**

# Frame Structure

The specified frame structure is displayed.

# Detail

Press to configure the Tx frame settings in the Frame Setting screen.

# Frame Length and Actual Length

Set the Tx frame length. The actual frame length that corresponds to the length you set is also displayed. For details, see the Frame Setting (basic setting) screen. Range: 48 to 9999 bytes

# Variable Setting

# Frame Length

Select whether or not to adjust the frame length.

- Selected: The frame length is adjusted.
- Cleared: The frame length is not adjusted.

# Detail

Press to adjust the frame length in the Variable Frame Length screen.

# **Contents Indication**

The frame length adjustment that you have specified is indicated next to contents.

# Field

Select whether or not to adjust the field settings.

- Selected: The field settings are adjusted.
- · Cleared: The field settings are not adjusted.

# Detail

Press to adjust the field settings in the Variable Field Setting screen.

# **Target Field Indication**

The field adjustment type that you have specified is indicated next to Target Field.

# **Payload Check Offset Setting**

## Offset

You can specify the offset from the start of the payload frame.

- Use Tx Frame setting: The offset is based on the start of the Tx frame payload.
- Manual: You must set the offset manually.

# **Offset Setting**

When you have chosen to specify the offset manually, you can specify a value within the following range.

Range: 0 to 255 bytes

# Note\_

# **Cautions about Manual Offset**

When the payload offset is set behind the test tag of the Tx frame, payload checking may not work properly.

### Frame Setting (Basic setting) Screen

#### **Frame Structure**

Set the Tx frame structure. MAC+TYPE MAC+TYPE+IPv4 MAC+TYPE+IPv4+UDP MAC+TYPE+IPv6 MAC+TYPE+IPv6+UDP

#### Note\_

- In Manual mode, regardless of the test layer specified in the test setup, the frames of the type specified by the Frame Structure setting are sent.
- If you use the frame builder in the setup software and create a frame whose structure does not match one of those listed above, the frame structure is indicated as "Unknown."
- After you change from an unknown frame structure to another frame structure, you cannot return to the unknown frame structure.

# Refer to Source Address for the VLAN Setting

Select whether or not to refer to the source address for the VLAN settings.

- Selected: The AQ1300/AQ1301 refers to the source address for the VLAN settings.
- Cleared: The AQ1300/AQ1301 does not refer to the source address for the VLAN settings.

## **VLAN Stacks**

When the "Refer to Source Address for the VLAN Setting" check box is cleared, set the number of VLAN stacks.

- None: No VLAN stacks.
- 1: One VLAN stack.
- 2: Two VLAN stacks.

## Note\_

If you use the setup software to specify three or more VLAN stacks, the frame structure is indicated as "Unknown" on the AQ1300/AQ1301.

## Frame Length and Actual Length

Set the Tx frame length. Range: 48 to 9999 bytes

The actual frame length that corresponds to the length you set is also displayed. When the "Refer to Source Address for the VLAN Setting" check box is selected, the actual frame length changes according to the number of VLAN stacks specified for the source address.

1 VLAN stack: +4 bytes

2 VLAN stacks: +8 bytes

## Fill Pattern

Specify the fill pattern to insert into the payload area.

- ALLO: All zeros
- ALL1: All ones
- 0/1: Alternating zeros and ones
- Random: A random pattern
- Manual: A user-specified pattern

# Pattern Value

When Fill Pattern is set to Manual, specify the pattern value. Range: 0 to FFFFFFF

# **Error Addition**

Select whether or not to add errors to Tx frames.

- Unused: Errors are not added to Tx frames.
- CRC Error: CRC errors are added to Tx frames.
- Symbol Error: Symbol errors are added to Tx frames.

# Frame Setting (MAC) Screen

# Source MAC Address

Set the source MAC address.

- Manual: You must set the source MAC address manually.
- · Source Setting: The MAC address specified in the source address settings is used.

# Source MAC Address Value

Set the MAC address when Source MAC is set to Manual.

# **Destination MAC Address**

Set the destination MAC address.

- Manual: You must set the destination MAC address manually.
- · Destination Setting: The MAC address specified in the destination settings is used.

### **Destination MAC Address Value**

Set the MAC address when Destination MAC is set to Manual.

# Frame Setting (VLAN) Screen

# VLAN1/VLAN2

Set the TPID (Tag Protocol Identifier), CFI (Canonical Format Indicator), CoS (Class of Service), and VLAN-ID for when there are VLAN stacks.

- TPID: 0 to FFFF
- CFI: 0 or 1
- CoS: 0 to 7
- ID: 0 to 4095

#### Note.

The VLAN soft key is valid in the following situations.

- · When the number of VLAN stacks specified in the basic settings is one or two.
- When the "Refer to Source Address for the VLAN Setting" check box is selected in the basic settings and the number of VLAN stacks set for the source address is one or two.

# Frame Setting (IPv4) Screen

#### Source IPv4 Address

Set the source IPv4 address.

- Manual: You must set the source IPv4 address manually.
- Source Setting: The IPv4 address specified in the source settings is used.

# Source IPv4 Address Value

Set the IPv4 address when Source IPv4 is set to Manual.

### Destination IPv4 Address

Set the destination IPv4 address.

Manual:

• Destination Setting: The IPv4 address specified in the destination settings is used.

You must set the destination IPv4 address manually.

#### **Destination IPv4 Address Value**

Set the IPv4 address when Destination IPv4 is set to Manual.

# ToS/DS (DSCP)

Set the IPv4 ToS/DS (DSCP).

- Manual: Set the ToS/DS (DSCP) manually.
- IPv4-ToS: Set the IPv4-ToS.
- IPv4-DSCP: Set the IPv4-DSCP.

#### Value

Set the IPv4 ToS/DS (DSCP) value.

- Manual: 0 to FF
- IPv4-ToS: 0 to 7
- IPv4-DSCP: 0 to 63

# Protocol

Set the protocol value for when Frame Structure is set to MAC+TYPE+IPv4. Range: 0 to 255

# Frame Setting (IPv6) Screen

#### Source IPv6 Address

Set the source IPv6 address.

- Manual: You must set the source IPv6 address manually.
- Source Setting: The IPv6 address specified in the source settings is used.

### Source IPv6 Address Value

Set the IPv6 address when Source IPv6 is set to Manual.

# **Destination IPv6 Address**

Set the destination IPv6 address.

- Manual: You must set the destination IPv6 address manually.
- · Destination Setting: The IPv6 address specified in the destination settings is used.

### **Destination IPv6 Address Value**

Set the IPv6 address when Destination IPv6 is set to Manual.

#### ToS/DS (DSCP)

Set the IPv6 ToS/DS (DSCP).

- Manual: Set the ToS/DS (DSCP) manually.
- IPv6-TrafficClass: Set the IPv6-TrafficClass.
- IPv6-DSCP: Set the IPv6-DSCP.

# Value

Set the IPv6 ToS/DS (DSCP) value.

- Manual: 0 to FF
- IPv6-TrafficClass: 0 to 7
- IPv6-DSCP: 0 to 63

# **Next Header**

Set the next header for when Frame Structure is set to MAC+TYPE+IPv6. Range: 0 to 255

## Note.

The IP soft key is valid when Frame Structure is set to MAC+TYPE+IPv4, MAC+TYPE+IPv4+UDP, MAC+TYPE+IPv6, or MAC+TYPE+IPv6+UDP.

# Frame Setting (UDP) Screen

# Source Port#

Set the source port number. Range: 0 to 65535

# **Destination Port#**

Set the destination port number. Range: 0 to 65535

## Note.

The UDP soft key is valid when Frame Structure is set to MAC+TYPE+IPv4+UDP or MAC+TYPE+IPv6+UDP.

# Variable Frame Length Screen

## Range

Set the frame length adjustment range. Range: 64 to 9999 bytes

# Step

Set the frame length adjustment step.

- +1: The length is adjusted within the specified range in steps of +1.
- -1: The length is adjusted within the specified range in steps of -1.
- Random: The length is adjusted within the specified range randomly.

# Variable Field Setting Screen

#### Method

Select the field adjustment method.

- Field: Specify a field.
- Offset: Specify an offset.

# Field

Set the fields to adjust when Type is set to Field.

Field	Frame Structure*					Description	Notes
	MAC	IPv4	UDP(v4)	IPv6	UDP(v6)		
MAC-DA/MAC-SA	Yes	Yes	Yes	Yes	Yes	The least significant four bytes of the source/destination MAC address are adjusted.	
VLAN-ID	Yes	Yes	Yes	Yes	Yes	The VLAN ID	When there
VLAN-CoS	Yes	Yes	Yes	Yes	Yes	The VLAN Class of Service	are VLAN stacks
IPv4-ToS	No	Yes	Yes	No	No	The IPv4 Type of Service The most significant three bits of the ToS field are adjusted.	
IPv4-DSCP	No	Yes	Yes	No	No	The IPv4 DiffServ Code Point The most significant six bits of the ToS field are adjusted.	
IPv4-DA/IPv4- SA	No	Yes	Yes	No	No	The source/destination IPv4 address	
IPv4-Protocol	No	Yes	Yes	No	No	The IPv4 protocol	
IPv6-DA/IPv6- SA	No	No	No	Yes	Yes	The least significant four bytes of the source/destination IPv6 address are adjusted.	
IPv6-TrafficClass	No	No	No	Yes	Yes	The IPv6 Traffic Class The most significant three bits of the ToS field are adjusted.	
IPv6-DSCP	No	No	No	Yes	Yes	The IPv6 DiffServ Code Point The most significant six bits of the ToS field are adjusted.	
IPv6-NextHeader	No	No	No	Yes	Yes	The IPv6 NextHeader	
L4-DP/L4-SP	No	No	Yes	No	Yes	The L4 Dst/Src Port	When UDP is selected

*	MAC:	MAC+TYPE
	IPv4:	MAC+TYPE+IPv4
	UDP(v4):	MAC+TYPE+IPv4+UDP
	IPv6:	MAC+TYPE+IPv6
	UDP(v6):	MAC+TYPE+IPv6+UDP

# **Offset Setting**

Set the fields to adjust when Type is set to Offset.

#### Offset

Select the field adjustment offset. Range: 0 to 9998 bytes

# Bit Offset

Select the field adjustment bit offset. Range: 0 to 31 bits

# **Bit Width**

Select the field adjustment bit width. Range: 1 to 32 bits

# Form

Select the field adjustment value input format.

- DEC: The value input format is decimal.
- HEX: The value input format is hexadecimal.

# **Minimum and Maximum Values**

Set the field adjustment value range. When Type is set to Offset: 0 to 4294967295 (DEC) or 0 to FFFFFFF (HEX) The range varies depending on the specified bit width.

When	Туре	is	set	to	Field:
------	------	----	-----	----	--------

Field	Range	Range				
	DEC	HEX				
MAC-DA/MAC-SA <sup>*</sup>	0 to 4294967295	0 to FFFFFFF				
VLAN-ID	0 to 4095	0 to FFF				
VLAN-CoS	0 to 7	0 to 7				
IPv4-ToS	0 to 7	0 to 7				
IPv4-DSCP	0 to 63	0 to 3f				
IPv4-DA/IPv4-SA	0 to 4294967295	0 to FFFFFFF				
IPv4-Protocol	0 to 255	0 to FF				
IPv6-TrafficClass	0 to 7	0 to 7				
IPv6-DSCP	0 to 63	0 to 3f				
IPv6-DA/IPv6-SA <sup>*</sup>	0 to 4294967295	0 to FFFFFFF				
IPv6-NextHeader	0 to 255	0 to FF				
L4-DP/L4-SP	0 to 65535	0 to FFFF				

\* The least significant 32 bits are adjusted.

## Step

Select the field adjustment step.

- +1: The length is adjusted within the specified range in steps of +1.
- Random: The length is adjusted within the specified range randomly.

# **Tx Rate Screen**

# **Traffic Format**

Set the traffic format to use when sending frames.

- Constant: Frames are sent at a constant rate.
- Burst: Frames are sent in bursts. (Frame transmission starts and stops repeatedly at a specified interval.)

# **Tx Rate**

# Rate over 100%

Select whether or not to send frames at rates that exceed 100% of the Tx rate.

- Selected: Frames are sent at rates that exceed 100% of the Tx rate.
- Cleared: Frames are not sent at rates that exceed 100% of the Tx rate.

When the "Rate over 100%" check box is selected, the Tx rate can only be set in bits.

When Test Interface is set to SFP(FE), this setting is fixed to off, and you cannot select this check box to send frames at rates that exceed 100% of the Tx rate.

## **Tx Rate Value**

Set the Tx rate value.

When Frame Length is set to 64 bytes and Test Interface is set to XFP(10GbE).

- Percentage range: 0.00001 to 100.0000%
- Bit range: 72 to 9999999424 bits
- fps range: 1.00000 to 14880952.38095 fps

# Unit

Set the Tx rate unit. %, bit, fps

6

### **Burst Setting**

These settings are valid when the traffic format is "Burst."

#### **Burst Number**

Specify the number of burst frames. Range: 1 to 65535

### Interval

Set the interval. 1 to 1000000 us, 1 to 1000 ms

## **Unit Setting**

Set the unit of the interval. us, ms

# **Tx Mode Setting Screen**

# Tx Mode

Set the Tx mode.

- Continuous: In this mode, frames are transmitted continuously. After you start transmission, it continues until you stop it.
- Frames: In this mode, a specified number of frames is transmitted. After you start transmission, the specified number of frames is sent, and then transmission is stopped automatically.
- Time: In this mode, frames are transmitted for a specified period of time. After you start transmission, it continues for the specified period of time and is then stopped automatically.

# Frames

When Tx Mode is set to Frames, set the number of frames. Range: 1 to 4,294,967,295

# Tx Time

When Tx Mode is set to Time, set the Tx time. Range: 1 to 86400 s

# **Rx Setting Screen**

# **Oversize Threshold**

Set the threshold for determining oversize frames. Range: 65 to 10000 bytes

# **Detect Payload Error**

Select whether or not to detect payload errors.

- · Selected: Payload errors are detected.
- · Cleared: Payload errors are not detected.

#### Offset

You can specify the offset from the start of the payload frame.

- Match to Tx Setting: The offset is based on the source setting.
- Manual: You must set the offset manually.

#### **Offset Byte Setting**

Specify the offset byte for when Offset is set to Manual. Range: Byte 0 to 255

# **Target Frame Setting**

Set which frames to take statistics of.

- Test Frame Only: Statistics are only taken for test frames.
- All Frames: Statistics are taken for all frames.

# **Rx Base Filter Setting**

## Frame Structure

The specified frame structure is displayed.

## Note.

The AQ1300/AQ1301 will receive the type of frames specified by the Frame Structure setting.

### Detail

Press to configure the Rx frame settings in the Frame Setting screen.

#### Filter 1 and 2

Specify the Rx base filters that you want to use.

- · Selected: The Rx base filter is used.
- Cleared: The Rx base filter is not used.

The selected Rx base filter type is displayed.

#### Detail

Press to configure the Rx base filter settings in the Rx Base Filter Setting screen.

#### Combination

Set the combination condition for Rx base filters 1 and 2.

- AND: The conditions of the Rx base filters are combined using AND logic.
- OR: The conditions of the Rx base filters are combined using OR logic.

#### Condition

Select the type of frame to allow to pass through the Rx base filters. The AQ1300/AQ1301 takes the statistics of the frames that pass through the filters.

- Match: Frames that match the filter conditions pass through the filters.
- Mismatch: Frames that do not match the filter conditions pass through the filters.

### Frame Setting Screen

#### Frame Structure, Refer to Source Address for the VLAN Setting, and VLAN Stacks

These settings are the same as the settings in the Frame Setting (Basic setting) screen. For details, see the Frame Setting (basic setting) screen.

#### **Rx Base Filter Setting Screen**

#### Method

Set the Rx base filter method.

- Field: Specify a field.
- Offset: Specify an offset.

## Field

Set the Rx base filter when Type is set to Field.

The settings that you can specify are the same as the ones that you can specify in the Variable Field Setting screen. For details, see the Variable Field Setting screen.

## **Offset Setting**

Set the Rx base filter when Type is set to Offset.

### Offset

Set the Rx base filter offset. Range: 0 to 255 bytes

# Bit/Mask

Set the pattern comparison method for when the Rx base filter method is offset.

- Bit: The Rx data is compared using the specified bit offset, width, and comparison pattern. Comparison occurs within the specified bit width.
- Mask: The Rx data is compared using the specified comparison byte length, mask pattern, and comparison pattern. Only areas where the mask pattern bit is 1 are compared.

# Bit Offset

Set the Rx base filter bit offset. This setting is valid when Bit/Mask is set to Bit. Range: 0 to 47 bits

# Width in bits

Set the Rx base filter width in bits. This setting is valid when Bit/Mask is set to Bit. Range: 1 to 48 bits

## Length

Set the Rx base filter comparison byte length. This setting is valid when Bit/Mask is set to Mask. Range: 1 to 6 bytes

#### Mask Pattern

Set the Rx base filter mask pattern. This setting is valid when Bit/Mask is set to Mask.

# Form

Select the field adjustment value input format.

- DEC: The value input format is decimal.
- HEX: The value input format is hexadecimal.
- IPv4: The value input format is IPv4.

## Pattern

Set the Rx base filter comparison pattern.

# 6.6 Configuring a Loopback Test

# Procedure

# Loopback Setup Screen

Follow the procedure in section 6.4 to display the Loopback Setup screen. Press the **Detail Setup** soft key to display the following screen.



Set the loopback target frames (Source Address, All Frames).

Select this check box to also switch the L4 port number. This setting is valid when the test layer is L3-IPv4 or L3-IPv6.

# Explanation

# Loopback Target Frame

Set the loopback target frames.

- · Source Address: Only frames from the source address are looped back.
- All Frames: All frames are looped back.

# Swap L4 Port#(TCP/UDP)

Select whether or not to switch the L4 port number (TCP/UDP Dst Port/Src Port) when the test layer is L3-IPv4 or L3-IPv6 and the MAC or IP address changes between DA and SA.

- Selected: The L4 port number is switched.
- Cleared: The L4 port number is not switched.

## Switched Items for Each Layer

Switched Item	L2 Test	L3-IPv4/L3-IPv6 Test		
		Swap L4 Port#(TCP/L		
		Cleared	Selected	
MAC address DA/SA	Yes	Yes	Yes	
IP address DA/SA	No	Yes	Yes	
TCP/UDP Dst/Src Port	No	No	Yes	

## Note.

When the test layer is L3-IPv4 or L3-IPv6, if you set the loopback target frame to All Frames, loopback processing is carried out under the assumption that the received frames have a frame structure that matches that of the test layer.

Be careful when you use the AQ1300/AQ1301 in an environment where many different types of frame structures are mixed together.

# Configuring a QoS Test 6.7

# Procedure

# **QoS Setup Screen**

Follow the procedure in section 6.4 to display the QoS Setup screen.

# **Tx Frame Setting Screen**

Press the Detail Setup soft key and then the Tx Frame Setting soft key to display the following screen.

				<ul> <li>Select the QoS channels that you want to send.</li> </ul>
凄	2013/2/19 15:51:34	=AC=	QoS	Frame length and actual length indications
	l oS Setup		Tx Frame	Configure frame length adjustment. ▶ section 6.5
	Ix QoS Setting	Setting		Set the Tx rate
ſ	CH1         64         68         )         Detail         10.00000         Detail         IPv4           CH2         64         68         )         Detail         0.00000         IPv4	Detail Detail	Tx Mode Setting	
	☑ CH3         64         68         ) Detail         0.00000         IPv4           ☑ CH4         64         68         ) Detail         0.00000         IPv4	Detail Detail	Rx QoS	Set the CH1 IX rate.
	CH5         64         68         )         Detail         0.00000         IPv4           CH6         64         68         )         Detail         0.00000         IPv4	Detail Detail	Setting	Frame structure indication
	CH7         64         68         ) Detail         0.00000         IPv4           CH8         64         68         ) Detail         0.00000         IPv4	<u>Detail</u> Detail	Rx Setting	
	Total Rate 10.00000 <b>%</b>			
	Payload Check Offset Setting			Total Tx rate indication
				<ul> <li>Set the payload check offset (Use Tx CH1 setting, Manual).</li> </ul>
				<ul> <li>Set the offset (byte 0-255).</li> <li>This setting is valid when Manual is selected.</li> </ul>

# CH1 Tx Rate Setting Screen

Press Detail under Tx Rate. The following screen appears.

	Tx Rate Setting	- ÁC -	Ų05	<ul> <li>Set the traffic format (Constant, Burst).</li> </ul>
Tx Rate Setting Traffic format	Burst		T <u>Tx Frame</u> Setting	Set the Tx rate (0.00001-100.00000%). This setting is valid when the traffic format
Tx Rate	100.00000	<b>x</b>	Ix Mode Setting	is set to Constant.
Burst Setting Burst Number Burst Time	Burst Number	US -	Rx QoS Setting	Gurst Number, Burst Time).     This setting is valid when the traffic format     is set to Burst.
Interval	10000	us -	Rx Setting	Set the burst number (1-65535). This setting is valid when Burst Setting is set to Burst Number.
				Set the burst time (1-1000000 us, 1-1000 ms). This setting is valid when Burst Setting is set to Burst Time.
		L		— Set the interval (1-1000000 us, 1-1000 ms).

# Frame Setting Screen

Press Detail next to Frame Structure.

Press the Basic Setting soft key to display the following screen.

#### Frame Setting (Basic setting) Screen



Set the frame structure (MAC+TYPE, MAC+TYPE+IPv4, MAC+TYPE+IPv4+UDP, MAC+TYPE+IPv6, MAC+TYPE+IPv6+UDP).

Select this check box to refer to the source address for the VLAN settings.

Set the VLAN stack number (None, 1, 2). This setting is valid when the "Refer to Source Address for the VLAN Setting" check box is cleared.

Set the frame length (48-9999 bytes). Actual frame length indication

Set the fill pattern (ALL0, ALL1, 0/1 alt., Random, Manual).

Set the pattern value (0-FFFFFFF). This setting is valid when Manual is selected. Configure error addition

(Unused, CRC Error, Symbol Error).

Press the **MAC** soft key to display the following screen.

# Frame Setting (MAC) Screen

=AC =	Frame Basic Setting HAC
	Basic Setting MAC
	Basic Setting
	MAC
וור	
	VLAN
	IP
	UDP

#### Set the source MAC address (Manual, Source Setting, Generate from IP, Generate from VLAN ID).

- You can select the Generate from IP option when Frame Structure on the Frame Setting (Basic setting) Screen includes the IPv4 header.
- You can select the Generate from VLAN ID option when VLAN Stacks on the Frame Setting (Basic setting) Screen is set to 1 or 2.

This setting is valid when Source MAC is set to Manual.

#### Set the destination MAC address (Manual, Destination Setting, Refer to ARP)

You can select the Refer to ARP option when Frame Structure on the Frame Setting (Basic setting) Screen includes the IPv4 header.

However, the VLAN stacks in the frame structure and the VLAN stacks in the source address settings must be the same.

This setting is valid when Destination MAC is set to Manual.

6

Press the VLAN soft key to display the following screen.

#### Frame Setting (VLAN) Screen

2009/10/23 10:00:42	=AC=	Frano
Frame Setting		
YLAN		Basic Setting
YLAN2 TP10 (\$100 CF1 (0 CoS (0 10 0		
VLANI IPID BIOO CFI O CoS O ID O		MAC
VLAN stacks can be changed in the Basic Setting		
		YLAN
		IP
		UEP
		I PI

 Configure the VLAN settings (TPID: 0-FFFF, CFI: 0-1, CoS: 0-7, ID: 0-4095).
 These settings are valid when VLAN stacks is set to 1 or 2.

#### Note\_

The VLAN soft key is valid in the following situations.

- · When the number of VLAN stacks specified in the basic settings is one or two.
- When the "Refer to Source Address for the VLAN Setting" check box is selected in the basic settings and the number of VLAN stacks set for the source address is one or two.

Press the IP soft key to display the following screen.

#### Frame Setting (IPv4) Screen

×.	2013/2/19 16:06:13		= AC =	Fi <del>piie</del>	– Set the source IPv4 address
		Frame Setting			(Manual, Source Setting).
IP	v4			Basic Se <u>tting</u>	<ul> <li>This setting is valid when Source IPv4 is set to Manual.</li> </ul>
:	Source IPv4	Manua 1		MAC	<ul> <li>Set the destination IPv4 address (Manual, Destination Setting).</li> </ul>
1	Destination IPv4	Destination Setting		VLAN	<ul> <li>This setting is valid when Destination IPv4 is set to Manual.</li> </ul>
	ToS/DS(DSCP)	IPv4-ToS	0		Set the ToS/DS (DSCP)
1	Protocol	UDP	17		(Manual, IPv4-ToS, IPv4-DSCP).
					<sup>-</sup> Value
	Subnet Mask Gateway	255         255         0         /           192         168         0         254	24 Refer	UDP	(Manual: 0-FF, IPv4-ToS: 0-7, IPv4-DSCP: 0-63)
					Set the protocol (0-255).
					This setting is valid when Frame Structure is set to MAC+TYPE+IPv4.
			Refe	r to the gate	way reference ► section 4.3

You can set the following items when Destination MAC on the Frame (MAC) screen is set to Refer to ARP and Source IPv4 on this screen is set to Manual. Set the subnet mask (1-31). Set the gateway.

#### Note.

The IP soft key is valid when Frame Structure is set to MAC+TYPE+IPv4, MAC+TYPE+IPv4+UDP, MAC+TYPE+IPv6, or MAC+TYPE+IPv6+UDP.

Frame Setting (IPv6) Screen

2009/10/23 10:04:	02 =AC =	Frame
	Frame Setting	
IPv6		Basic Setting
Source IPv6	Source Setting           [FE80]0000         [0000]0000           [0000]0000         [0000]0001	MAC
Destination IPv6	Destination Setting           [FE80 [0000 ]0000 ]0000           [0000 ]0000 ]0000 ]0002	VLAN
ToS/DS(DSCP) Next Header	UDP 17	

# Set the source IPv6 address (Manual, Source Setting).

This setting is valid when Source IPv6 is set to Manual.

# Set the destination IPv6 address (Manual, Destination Setting).

This setting is valid when Destination IPv6 is set to Manual.

Set the ToS/DS (DSCP)

(Manual, IPv6-TrafficClass, IPv6-DSCP).

#### Value

(Manual: 0-FF, IPv6-TrafficClass: 0-7, IPv6-DSCP: 0-63)

# Set the next header (0-255).

This setting is valid when Frame Structure is set to MAC+TYPE+IPv6.

Press the **UDP** soft key to display the following screen.

## Frame Setting (UDP) Screen



# Note

The UDP soft key is valid when Frame Structure is set to MAC+TYPE+IPv4+UDP or MAC+TYPE+IPv6+UDP.

# **Tx Mode Setting Screen**

Press the Detail Setup soft key and then the Tx Mode Setting soft key to display the following screen.



Set the Tx mode (Continuous, Frames, Time).

Set the number of frames (1-4294967295). This setting appears when Tx Mode is set to Frames.

Set the time (1-86400 s). This setting appears when Tx Mode is set to Time.

# **Rx QoS Setting Screen**

Press the Detail Setup soft key and then the Rx QoS Setting soft key to display the following screen.



## Note.

The AQ1300/AQ1301 will receive the type of frames specified by the Frame Structure setting.

# **Rx QoS Filter Setting Screen**

Press Detail next to an Rx QoS filter to display the following screen.



# **Rx Setting Screen**

Press the Detail Setup soft key and then the Rx Setting soft key to display the following screen.

				 Set the oversize threshold (65-10000 bytes).
2009/10/23 10:57:50 Qc Dversize Threshold ☑ Detect Payload Error Offset Match to Tx Farget Frame Rx Base Filter Setting Frame Structure ☑ Filter1 ☐ Filter2 Combination AND	S Setup 1519 by Setting Test Frame MA Offs Offs Conditio	te or more	AC Que Tx Frame Setting Tx Hode Setting Rx Qo3 Setting	Select this check box to detect payload errors. Set the offset (Match to Tx Setting, Manual). Set the offset byte (byte 0-255). This setting is valid when offset is set to Manual. Set the frames to take statistics of (Test Frame Only, All Frames). Frame structure indication Configure the frames. ► section 6.5 Set the Rx base filter methods. Configure the Rx base filters. ► section 6.5. Set the frame pass condition (Match, Mismatch). Set how Rx base filters 1 and 2 are combined (AND, OR). Select a check box to use the corresponding Rx base filter.

#### Note.

The AQ1300/AQ1301 will receive the type of frames specified by the Frame Structure setting.

6

# Explanation

# **Tx Frame Setting Screen**

# **QoS Channels**

Select the QoS channels that you want to send. CH1 to CH8

# Frame Length (Actual)

The frame lengths and actual frame lengths of the Tx QoS channels are displayed.

# Detail

Press to adjust the frame length in the Variable Frame Length screen. For details, see section 6.5.

# **Payload Check Offset Setting**

You can specify the offset from the start of the payload frame. For details, see section 6.5.

# Tx Rate

Set the Tx rates of the Tx QoS channels. Range: 0.00000 to 100.00000%

# **Total Rate**

The total of the Tx rates of the Tx QoS channels is displayed.

# CH1 Tx Rate

You can set the Tx frame format to Burst for CH1.

# Traffic Format

Set the traffic format for transmitting frames.

- Constant: Frames are transmitted at a constant rate.
- Burst: Frames are transmitted in bursts. (The process of transmitting frames for a certain duration and stopping transmission is repeated.)

## Tx Rate

Set the Tx rate. This setting is valid when the traffic format is set to Constant. Range: 0.00001 to 100.00000 %

# Burst Setting

This setting is valid when the traffic format is set to Burst. Set the burst as a burst number or burst time.

Burst Number	Burst Time
Range: 1 to 65535 frames	Range: 1 to 1000000 us, 1 to 1000 ms

## Interval

Set the interval. Range: 1 to 1000000 us, 1 to 1000 ms

• Unit

Set the interval unit. us, ms



(CH2 and later channels) Burst transmission cannot be specified on CH2 or later channels.

## **Frame Settings**

•

Set the Tx frame on the frame setting screen.

- Frame Setting (Basic setting) Screen
  - This screen is the same as that of the traffic test. For details, see section 6.5.

#### Frame Setting (MAC) Screen

## Source MAC Address

Set the source MAC address

Set the source MAC addres	Set the source made address.							
<ul> <li>Manual</li> </ul>	Set the source MAC address manually.							
<ul> <li>Source Setting</li> </ul>	The MAC address in the source address setting is used.							
Generate from IP	The source MAC address is generated from the IP address. You can select this item when Frame Structure on the Frame Setting (Basic setting) Screen includes the IPv4 header.							
Generate from VLAN ID	The source MAC address is generated from the VLAN ID. You can select this item when VLAN Stacks on the Frame Setting (Basic setting) Screen is set to 1 or 2.							
Source MAC Address Valu	le							
Set the source MAC addres	s when Source MAC set to Manual.							
<b>Destination MAC Address</b>								
Set the destination MAC ad	dress.							
Manual	Set the destination MAC address manually.							
<ul> <li>Destination Setting</li> </ul>	The MAC address in the destination address setting is used.							
Refer to ARP	ARP acquisition is used to obtain the destination MAC address. You can select this item when Frame Structure on the Frame Setting (Basic setting) Screen							

# includes the IPv4 header. Destination MAC Address Value

Set the destination MAC address when Destination MAC set to Manual.

#### Frame Setting (VLAN) Screen

This screen is the same as that of the traffic test. For details, see section 6.5.

#### Frame Setting (IPv4) Screen

For details on the source IPv4 address, source IPv4 address value, destination IPv4 address, destination IPv4 address value, ToS/DS (DSCP) setting, and protocol, see section 6.5.

#### Subnet Mask and GateWay

You can set the subnet mask and gateway when Destination MAC on the Frame (MAC) screen is set to Refer to ARP and Source IPv4 on this screen is set to Manual.

S	ubnet Mask	
R	ange	1 to 31
G	ateway	
•	Manual	Select this option to set the gateway manually.
•	Auto.1	Select this option to set the gateway to xxx.xxx.1.
•	Auto.254	Select this option to set the gateway to xxx.xxx.254.

#### • Frame Setting (IPv6) Screen

This screen is the same as that of the traffic test. For details, see section 6.5.

#### Frame Setting (UDP) Screen

This screen is the same as that of the traffic test. For details, see section 6.5.

6

Manual Test Settings (Manual

# **Tx Mode Setting Screen**

### **Tx Mode**

Set the Tx mode.

- Continuous: In this mode, frames are transmitted continuously. After you start transmission, it continues until you stop it.
- Frames: In this mode, a specified number of frames is transmitted. After you start transmission, the specified number of frames is sent, and then transmission is stopped automatically.
- Time: In this mode, frames are transmitted for a specified period of time. After you start transmission, it continues for the specified period of time and is then stopped automatically.

# Frames

When Tx Mode is set to Frames, set the number of frames. Range: 1 to 4,294,967,295

# Tx Time

When Tx Mode is set to Time, set the Tx time. Range: 1 to 86400 s

# **Rx QoS Setting Screen**

The Rx frames that pass through the Rx base filter are tested.

# **Rx QoS Setting**

Set how to classify the Rx frames for QoS identification.

- Classify by Frame ID: QoS identification is performed on the Rx frames on the basis of the frame ID.
- Classify by Tx Frame: QoS identification is performed on the Rx frames on the basis of the Rx filter frame structure, enabled filters, fields, and other settings that are aligned with the Tx frame settings of the Tx channel.
- Manual: QoS identification is performed on the Rx frames on the basis of the specified channel ID and ID patterns.

#### **Classification Type**

If "Classify by Tx Frame" is specified, set the classification conditions. Based on the specified conditions, field values are extracted from the Tx frames of each QoS channel, and Rx QoS filters are automatically configured.

MAC-DA	MAC-SA	VLAN1-ID	VLAN1-CoS	VLAN2-ID	VLAN2-CoS	IPv4-DA
IPv4-SA	IPv4-ToS	IPv4-DSCP	IPv6-DA	IPv6-SA	IPv6-TrafficClass	IPv6-DSCP
L4-DP(IPv4)	L4-SP(IPv4)	L4-DP(IPv6)	L4-DP(IPv6)			

#### Note.

If you select the "Remove Test Tag from Test Frame" check box in the Option (Manual) Advance setup, frame ID classification may not work properly.

# **Channel ID**

## Frame Structure

The frame structure specified in the Frame Setting screen is displayed.

#### Detail

Press to configure the Rx QoS channel frame settings in the Frame Setting screen. For details, see section 6.5.

# QoS Filter 1 and 2

Specify the QoS filters that you want to use.

- · Selected: The QoS filter is used.
- Cleared: The QoS filter is not used.

The specified QoS test type is displayed.

### Detail

Press to configure the Rx QoS filter settings in the Rx QoS Filter Setting screen.

## Pattern

#### QoS Pattern1 and Pattern2

Specify the settings for the selected QoS fill patterns.

# Note.

When QoS Filter 1 and 2 are selected, statistics are performed on the AND of QoS patterns 1 and 2.

# QoS Channels

Select the QoS channels that you want to receive. CH1 to CH8

# • Form

Set the input format for QoS pattern values.

- DEC: The value input format is decimal.
- HEX: The value input format is hexadecimal.

# Setting the QoS Pattern Values

Set the QoS pattern values.

When Type is set to Offset: 0 to 4294967295 (DEC) or 0 to FFFFFFF (HEX) The range varies depending on the specified bit width and comparison byte length.

When Type is set to Field:

Field	Range				
	DEC	HEX			
VLAN-ID	0 to 4095	0 to FFF			
VLAN-CoS	0 to 7	0 to 7			
IPv4-ToS	0 to 7	0 to 7			
IPv4-DSCP	0 to 63	0 to 3F			
IPv6-TrafficClass	0 to 7	0 to 7			
IPv6-DSCP	0 to 63	0 to 3F			
L4-DP/L4-SP	0 to 65535	0 to FFFF			

## Use CH8 as Other Channel

Select whether or not to use CH8 as the Other channel.

- Selected: CH8 is used as the Other channel.
- Cleared: CH8 is not used as the Other channel.

#### Note.

When the "Use CH8 as Other Channel" check box is selected, frames that do not meet the conditions for other channels are assigned to CH8.

# **Rx QoS Filter Setting Screen**

## Method

- Set the Rx QoS filter method.
- · Field: Specify a field.
- Offset: Specify an offset.

#### • Field

Set the Rx QoS filter when Type is set to Field.

Field	Frame Structure*				Description	Notes	
	MAC	IPv4	UDP(v4)	IPv6	UDP(v6)		
VLAN-ID	Yes	Yes	Yes	Yes	Yes	The VLAN ID	When there
VLAN-CoS	Yes	Yes	Yes	Yes	Yes	The VLAN Class of Service	are VLAN stacks
IPv4-ToS	No	Yes	Yes	No	No	The IPv4 Type of Service	
IPv4-DSCP	No	Yes	Yes	No	No	The IPv4 Diffserv Code Point	
IPv6-TrafficClass	No	No	No	Yes	Yes	The IPv6 Traffic Class	
IPv6-DSCP	No	No	No	Yes	Yes	The IPv6 Diffserv Code Point	
L4-DP/L4-SP	No	No	Yes	No	Yes	The L4 Dst/Src Port	When UDP is selected

\* MAC: MAC+TYPE IPv6: MAC+TYPE+IPv6 IPv4: MAC+TYPE+IPv4 UDP(v6): MAC+TYPE+IPv6+UDP UDP(v4): MAC+TYPE+IPv4+UDP

#### Offset Setting

Set the Rx QoS filter when Type is set to Offset.

#### Offset

Set the Rx QoS filter offset. Range: 0 to 255 bytes

## Bit/Mask

Set the pattern comparison method for when the Rx QoS filter method is offset.

- Bit: The Rx data is compared using the specified bit offset, width, and comparison pattern.
- Mask: The Rx data is compared using the specified comparison byte length, mask pattern, and comparison pattern. Only areas where the mask pattern bit is 1 are compared.

# Bit Offset

Set the Rx QoS filter bit offset. This setting is valid when Bit/Mask is set to Bit. Range: 0 to 31 bits

# Width in bits

Set the Rx QoS filter width in bits. This setting is valid when Bit/Mask is set to Bit. Range: 1 to 32 bits

# Length

Set the Rx QoS filter comparison byte length. This setting is valid when Bit/Mask is set to Mask. Range: 1 to 4 bytes

# Mask Pattern

Set the Rx QoS filter mask pattern. This setting is valid when Bit/Mask is set to Mask.

# **Rx Setting Screen**

# **Oversize Threshold**

Set the threshold for determining oversize frames. Range: 65 to 10,000 bytes

# **Detect Payload Error**

Select whether or not to detect payload errors.

- Selected: Payload errors are detected.
- Cleared: Payload errors are not detected.

# Note\_

If you select the "Remove Test Tag from Test Frame" check box in the Option (Manual) Advance setup, the AQ1300/AQ1301 will be unable to detect payload errors.

Offset

Set the payload error offset.

- Match to Tx Setting: The offset is based on the source setting.
- Manual: You must set the offset manually.
- Offset Byte Setting

Specify the offset byte for when Offset is set to Manual. Range: Byte 0 to 255

# **Target Frame Setting**

Set which frames to take statistics of.

- Test Frame Only: Statistics are only taken for test frames.
- All Frames: Statistics are taken for all frames.

## Note.

When you are using an Rx base filter, statistics are taken of the frames that pass through the filter.

# **Rx Base Filter Setting**

Frame Structure

The specified frame structure is displayed.

## Detail

Press to configure the Rx frame settings in the Frame Setting screen. For details, see section 6.5.

Filter 1 and 2

Select whether or not to use Rx base filters 1 and 2.

- Selected: The Rx base filter is used.
- · Cleared: The Rx base filter is not used.

The selected Rx base filter type is displayed.

# Detail

Press to configure the Rx base filter settings in the Rx Base Filter Setting screen. For details, see section 6.5.

# Combination

Set the combination condition for Rx base filters 1 and 2.

- AND: The conditions of the Rx base filters are combined using AND logic.
- OR: The conditions of the Rx base filters are combined using OR logic.

# Condition

Select the type of frame to allow to pass through the Rx base filters.

- Match: Frames that match the filter conditions pass through the filters.
- Mismatch: Frames that do not match the filter conditions pass through the filters.

# 6.8 Configuring a Ping Test

# Procedure

# **PING Setup Screen**

Follow the procedure in section 6.4 to display the PING Setup screen. Press the **Detail Setup** soft key to display the following screen.

Fixed this check box to use the source IPv4 address from the address settings.

When T	est Layer is set to L3-IP	/6, the source IPv6 add	dress is always used (no check box appears).
			<ul> <li>Select this check box to use the</li> </ul>
			destination IPv4 or IPv6 address from
2009/10/23 11:	3:08	FAC = PING	the address settings.
	PING Setup		This setting is valid when the test layer is
72575 55 752678			L3-IPv4 or L3-IPv6.
Destination IPv4	Use Destination Address	(1970)	<ul> <li>Set the destination IPv4 or IPv6 address.</li> </ul>
nutros			<ul> <li>Refer to the IP Address table.</li> </ul>
Source IPv4	😡 Use Source Address		► section 4.3
Address School Hack		Bateri	The source IPv4 or IPv6 address.
Gateway		Refer	
			<ul> <li>Refer to the gateway reference.</li> </ul>
TX Setting			Section 4.5
(Actual Length)	64 byte		Actual frame length indication
Tx Mode	Time		(64 to 9999 bytes)
Franos	500		- Set the Tx Mode
Interval	10ms		(Continuous Frames Time)
Time-out	1s -		Set the number of frames
			(1-4294967295)
			This setting appears when Tx Mode is set
			to Frames.
			— Set the time (1-86400 s)
			This setting appears when Tx Mode is set
			to Time.
			<ul> <li>Set the transmission interval</li> </ul>
			(1ms, 10ms, 100ms, 1s).
			<ul> <li>Set the timeout</li> </ul>
			(100ms, 1s).

# Explanation

# **Destination IPv4 or IPv6 Address**

Set the destination IPv4 or IPv6 address.

## "Use Destination Address" Check Box

When the test layer is L3-IPv4 or L3-IPv6, select this check box to use the destination IPv4 or IPv6 address from the address settings. To specify a different destination IPv4 or IPv6 address, clear this check box.

# Source IPv4 or IPv6 Address

Set the source IPv4 or IPv6 address, the subnet mask (1 to 31), and the gateway.

#### When Test Layer Is Set to L2 Test

Each address is set automatically from the MAC address. Destination IPv4 address: 10.lower three bytes of the destination MAC address Source IPv4 Address: 10.lower three bytes of the source MAC address Netmask: 255.0.0.0 (fixed) Gateway: 0.0.0.0 (fixed).

# **TX Setting**

### Frame Length and Actual Length

Set the Tx frame length. The actual frame length that corresponds to the length you set is also displayed.

VLAN	L2 and L3-IPv4	L3-IPv6
None	64(64) to 9999(9999) bytes	84(84) to 9999(9999) bytes
1	64(68) to 9999(9999) bytes	84(88) to 9999(9999) bytes
2	64(72) to 9999(9999) bytes	84(92) to 9999(9999) bytes

### Tx Mode

Set the Tx mode.

- Continuous: In this mode, frames are transmitted continuously. After you start transmission, it continues until you stop it.
- Frames: In this mode, a specified number of frames is transmitted. After you start transmission, the specified number of frames is sent, and then transmission is stopped automatically.
- Time: In this mode, frames are transmitted for a specified period of time. After you start transmission, it continues for the specified period of time and is then stopped automatically.

### Frames

When Tx Mode is set to Frames, set the number of frames. Range: 1 to 4,294,967,295

# **Tx Time**

When Tx Mode is set to Time, set the Tx time. Range: 1 to 86400 s

#### **Transmission Interval**

Set the interval at which to send ping requests. 1 ms, 10 ms, 100 ms, 1 s

# Timeout

Specify the ping timeout period. 100 ms, 1 s

#### IM AQ1300-01EN

# 6.9 Configuring a BERT

# Procedure

# BERT Setup Screen

Follow the procedure in section 6.4 to display the BERT Setup screen.

# **Tx Setting Screen**

Press the Detail Setup soft key and then the Tx Setting soft key to display the following screen.

2009/10/23 11:13:32	2	=AC=	BERT	<ul> <li>Frame structure indication</li> </ul>
	BERT Setup			─ Configure the frames. ► section 6.5
Tx Frame Setting Frame Structure	MAG	Detail	IX Setting	
Frame Length	64	byte		_∫Set the frame length (48-9999 bytes).
(Actual Length)	64	byte	Tx Rate	Actual frame length indication
Variable Setting	D 1 1			<ul> <li>Select this check box to adjust the</li> </ul>
Contents	+1 (	64 - 1518)	Setting	frame length.
				<ul> <li>Configure frame length adjustment.</li> </ul>
			BERT Rx Settin <del>g</del>	- Contents

# **Tx Rate Screen**

Press the Detail Setup soft key and then the Tx Rate soft key to display the following screen.

2000/10/22 11-16	- 26			DEDT
2003/10/23 11.10	- 30		-AC-	BERT
	BERT Setup			
Tx Pata Catting				Ty Sotting
TA Nate Setting				Ŭ
Traffic format	Conctant	<u> </u>		
	oonstant			Ty Pato
Tx Rate	Rate over 100	)¥		TA Note
IFG		72 hit	ן ו	
			ן ע	Tx Mode
Burst Setting				Setting
Burst Number	1			
Interval	1	US	İ	DEDT
	U			Rx Setting
				10

# Set the traffic format (Constant, Burst).

Select this check box to send frames at rates that exceed 100% of the Tx rate (when this check box is selected, the Tx rate can only be set in bits).

#### Set the Tx rate

(when Frame Length is set to 64 bytes and Test Interface is set to XFP).

(Percentage range: 0.00001-100.00000 Bit range: 72-9999999424

fps range: 1.00000-14880952.38095 fps). Set the unit (%, bit, fps).

Set the unit (%, bit, ips).

Set the burst number (1-65535).

Set the interval

(1-1000000 us, 1-1000 ms).

Set the unit (us, ms).

These settings are valid when the traffic format is "Burst."

# **Tx Mode Setting Screen**

Press the **Detail Setup** soft key and then the **Tx Mode Setting** soft key to display the following screen.



Set the Tx mode (Continuous, Frames, Time).

Set the number of frames (1-4294967295). This setting appears when Tx Mode is set to Frames. Set the time (1-86400 s). This setting appears when Tx Mode is set to Time.

# **BERT Rx Screen**

Press the Detail Setup soft key and then the Bert Rx Setting soft key to display the following screen.

4			<ul> <li>Set the oversize threshold (65-10000 bytes).</li> </ul>
2009/10/23 11:27:18	=AC=	BERT	(
BERT Setup			Select this check box to include error
BERT Rx		Tx Setting	frames in the BERT.
Oversize Threshold 15	19 byte or more	To Rote	Set the timeout period for detecting sync loss (None, 2s).
🛑 Include Error frames in BER Te	st		
Timeout Period for Syncloss	None	Tx Mode Setting	<ul> <li>Select this check box to set the Tx frame payload as the comparison location</li> </ul>
🗹 Start Pattern comparison from	Payload of Tx Frame		
		BERT	Set the offset (byte 0-255).
UT1501 34	Dyte	Rx Setting	This setting is valid when the "Start Pattern
Rx Base Filter Setting		,	comparison from Payload of Tx Frame"
Frame Structure	IPv4 Detail		check box is cleared.
Filter1	MAC-DA Detail		Frame structure indication
Combination AND Cor	Uttset Detail		Configure the frames. ► section 6.5
			$\int$ Set the Rx base filter methods.
		┖────┤━─└──╜╶	Configure the Rx base filters.
			► section 6.5.
			Set the frame pass condition (Match, Mismatch).
			Set how Rx base filters 1 and 2 are combined (AND, OR).
			Select a check box to use the corresponding Rx base filter.

# Explanation

# **Tx Setting Screen**

# **Tx Frame Setting**

# Frame Structure

The specified frame structure is displayed.

# Detail

Press to configure the Tx frame settings in the Frame Setting screen. For details, see section 6.5.

# Frame Length and Actual Length

Set the Tx frame length. The actual frame length that corresponds to the length you set is also displayed. For details, see the Frame Setting (basic setting) screen in section 6.5. Range: 48 to 9999 bytes

# Variable Setting

# Frame Length

Select whether or not to adjust the frame length.

- Selected: The frame length is adjusted.
- Cleared: The frame length is not adjusted.

# Detail

Press to adjust the frame length in the Variable Frame Length screen. For details, see section 6.5.

# **Contents Indication**

The frame length adjustment that you have specified is indicated next to contents.

# **Tx Rate Screen**

# **Traffic Format**

Set the traffic format to use when sending frames.

- · Constant: Frames are sent at a constant rate.
- Burst: Frames are sent in bursts. (Frame transmission starts and stops repeatedly at a specified interval.)

# Tx Rate

# Rate over 100%

Select whether or not to send frames at rates that exceed 100% of the Tx rate.

- Selected: Frames are sent at rates that exceed 100% of the Tx rate.
- Cleared: Frames are not sent at rates that exceed 100% of the Tx rate.

When the "Rate over 100%" check box is selected, the Tx rate can only be set in bits.

## Tx Rate Value

When Frame Length is set to 64 bytes and Test Interface is set to XFP(10GbE).

- Percentage range: 0.00001 to 100.0000%
- Bit range: 72 to 9999999424 bits
- fps range: 1.00000 to 14880952.38095 fps

# Unit

Set the Tx rate unit. %, bit, fps 6

### **Burst Setting**

These settings are valid when the traffic format is "Burst."

# Burst Number

Specify the number of burst frames. Range: 1 to 65535

# Interval

Set the interval. 1 to 1000000 us, 1 to 1000 ms

# **Unit Setting**

Set the unit of the interval. us, ms

# **Tx Mode Setting Screen**

# **Tx Mode**

Set the Tx mode.

- Continuous: In this mode, frames are transmitted continuously. After you start transmission, it continues until you stop it.
- Frames: In this mode, a specified number of frames is transmitted. After you start transmission, the specified number of frames is sent, and then transmission is stopped automatically.
- Time: In this mode, frames are transmitted for a specified period of time. After you start transmission, it continues for the specified period of time and is then stopped automatically.

# Frames

When Tx Mode is set to Frames, set the number of frames. Range: 1 to 4,294,967,295

## **Tx Time**

When Tx Mode is set to Time, set the Tx time. Range: 1 to 86400 s

# **BERT Rx Screen**

# **Oversize Threshold**

Set the threshold for determining oversize frames. Range: 65 to 10000 bytes

# Include Error frames in BER Test

Select whether or not to include error frames in the BERT.

- · Selected: Error frames are included in the BERT.
- Cleared: Error frames are not included in the BERT.

### **Timeout Period for Syncloss**

Specify the timeout period for determining sync loss.

- None: No timeout period is set.
- 2s: A timeout period of 2 s is set.

# Start Pattern comparison from Payload of Tx Frame

Select whether or not to set the Tx frame payload as the comparison location.

- · Selected: The Tx frame payload is set as the comparison location.
- Cleared: The Tx frame payload is not set as the comparison location. You must set the payload comparison location as an offset value.

# Offset

You must set the payload comparison location as an offset value. Range: Byte 0 to 255

# **Rx Base Filter Setting**

# Frame Structure

The specified frame structure is displayed.

# Detail

Press to configure the Rx frame settings in the Frame Setting screen. For details, see section 6.5.

# Filter 1 and 2

Select whether or not to use Rx base filters 1 and 2.

• Selected: The Rx base filter is used.

Cleared: The Rx base filter is not used.

The selected Rx base filter type is displayed.

# Detail

Press to configure the Rx base filter settings in the Rx Base Filter Setting screen. For details, see section 6.5.

# Combination

Set the combination condition for Rx base filters 1 and 2.

- AND: The conditions of the Rx base filters are combined using AND logic.
- OR: The conditions of the Rx base filters are combined using OR logic.

# Condition

Select the type of frame to allow to pass through the Rx base filters.

- Match: Frames that match the filter conditions pass through the filters.
- Mismatch: Frames that do not match the filter conditions pass through the filters.

# 6.10 Configuring the Statistics Log

# Procedure

# **Statistics Log Setting Screen**

Press the **Manual** soft key, the **Next 1/2** soft key, and then the **Statistics Log Setting** soft key to display the following screen.

		Monuo
		Setup
Statistics Log Setting		Rtatistics
Execute Logging		Log Setting
to the second construction of the second constru		
	14400	DO TOUT C
End Setting	Stop	
🖄 Save a statistic log after the measurement		
Group Ite I Latency Max IF 2 CH1 Rx Fra 3 Tx Rate 4 Tx Rate	m G(us) Current Deta me Deta (%) Deta (fps) Deta	Pile Pile Option (Manual)
		Next 2/2

Select this check box to execute logging.
Save the log after measurement is complete.
Set the maximum logging time (1-14400 s).
Set the end setting (Stop, Overwrite).
Select this check box to log using current values (appears when the group is set to Latency or CH1-8 RX).
Set the statistics log items.
Select the items that you want to log the statistics of (up to four items).

# **Statistics Item Set**

Press Detail next to the statistics log item that you want to set to display the following screen.



# Explanation

# Execute Logging

Select whether or not to execute logging.

- · Selected: Logging is executed.
- · Cleared: Logging is not executed.

## Max Logging time

Set the maximum logging time. Range: 1 to 14400 s

## **End Setting**

Specify what to do after the maximum logging time has been exceeded.

- Stop: Logging is stopped. When the maximum logging time has been exceeded, logging stops.
- · Overwrite: Old logs are overwritten by new logs.

# Save a statistic log after the measurement

Set whether to automatically save statistical results.

This feature is supported in firmware version (FW Ver.) R1.08.01.001 and later.

- Selected: The statistical log file will be saved. Selecting the Execute Logging check box will
   automatically select this check box.
- Cleared: The statistical log file will not be saved.

### Note\_

You cannot set this feature if the Save measurement results and Statistics Log check box on the measurement screen in section 6.11 is selected.

# **Statistics Log Items**

You can log statistics for up to four items.

## **Statistics Item Set**

Set the statistics log item by group and item. For information about the items that you can specify, see section 1.8.

## **Current Values of Statistical Items**

Statistics logs can be recorded using the current values of statistical items of each second. This feature is supported in firmware version (FW Ver.) R1.08.01.001 and later.

- · Selected: Statistics logs are recorded using current values.
- Cleared: Statistics logs are recorded using maximum values during the logging time. This is the conventional method.

The statistical items that are logged using current values are listed below.

Group Name	Statistical Item
Latency	Max IFG(µs, bit)
	Min IFG(µs, bit)
	Avg IFG(µs, bit)
	Max Latency(µs)
	Min Latency(µs)
	Avg Latency(µs)
Rx Channel (1 to 8)	Max Latency(µs)
	Min Latency(µs)
	Avg Latency(µs)

The word "Current" is attached to the item names in the statistical log files (CSV format).

Start Time	2012/4/1 09:00
Time (YY/MM/DD/hh/mm:ss)	Latency:[Current] Max IFG (µs)
2012/4/1 09:00::00	0
2012/4/1 09:00::01	1
2012/4/1 09:00::02	0

# 6.11 Configuring Options (Manual)

# Procedure

# **Advance Setup Screen**

Press the **Manual** soft key, the **Next 1/2** soft key, the **Option (Manual)** soft key, and then the **Advance setup** soft key to display the following screen.



# **Measurement Screen**

Press the **Manual** soft key, the **Next 1/2** soft key, the **Option (Manual)** soft key, and then the **Measurement Setting** soft key to display the following screen.



# Explanation

# Advance Setup Screen

## Synchronize Measurement and Transmission controls

Select whether or not to start transmission when the START key is pressed.

- Selected: Transmission is started when the START key is pressed. Also, measurement is stopped when transmission finishes.
- · Cleared: Transmission is not started when the START key is pressed.

#### Wait time before starting transmission

Set the interval between when the START key is pressed and when transmission is started and between when transmission finishes and when measurement is stopped. This setting is valid when the "Synchronize Measurement and Transmission controls" check box is selected. Range: 1 to 10 s

# **Remove Test Tag from Test Frame**

When the test mode is Traffic Test or QoS Test, you can send test frames without test tags.

- · Selected: The test tags are removed from test frames.
- Cleared: The test tags are not removed from test frames.

#### Note.

If you select the "Remove Test Tag from Test Frame" check box, the following operations may not work properly.

- · Payload error detection
- Sequence error measurement
- Latency measurement
- Frame ID classification in QoS measurement

# **Measurement Screen**

# **Measurement START Condition**

#### Request ARP/NDP

For ARP (IPv4) and NDP (IPv6) destination MAC addresses, select whether or not to use an ARP or NDP request to acquire the MAC address when the START key is pressed. This setting is valid when the test layer is L3-IPv4 or L3-IPv6.

- Selected: An ARP/NDP request is sent.
- Cleared: An ARP/NDP request is not sent.

#### Not start the measurement when Link is down

Select whether or not to start measurement when the START key is pressed and a linkdown is detected.

- Selected: Measurement is not started when a linkdown is detected.
- · Cleared: Measurement starts even when a linkdown is detected.

# **Measurement STOP Condition**

#### When Link Down is detected

Select whether or not to stop measurement when a linkdown is detected during measurement.

- · Selected: Measurement is stopped when a linkdown is detected.
- Cleared: Measurement is not stopped even when a linkdown is detected.

# When L2 Error is detected

Select whether or not to stop measurement when an L2 error is detected during measurement.

- · Selected: Measurement is stopped when an L2 error is detected.
- · Cleared: Measurement is not stopped even when an L2 error is detected.
### When L3 Error is detected

Select whether or not to stop measurement when an L3 error is detected during measurement.

- · Selected: Measurement is stopped when an L3 error is detected.
- Cleared: Measurement is not stopped even when an L3 error is detected.

#### **Operation after Measurement Stops**

#### Save measurement results and Statistics Log

Select whether or not to save the measurement results and the statistics log to a file after measurement finishes. The statistics log is only saved to a file when the "Execute Logging" check box is selected.

- Selected: The measurement results and the statistics log are saved to a file when measurement finishes.
- Cleared: The measurement results and the statistics log are not saved to a file when measurement finishes.

#### Note\_

The measurement results and the statistics log are saved to the directory that you specify in the File Name			
Setup in the Measurement menu with the same file name but different extensions.			
Example	When the file name is test_0001		
	Statistical result file: test_0001.mr		
	Statistical log file: test_0001.csv		

# Synchronization Control Setting

#### Try synchronizing with the other device

Select whether or not to try synchronizing with the other device (the address specified as the destination address) when the START or STOP key is pressed. When the START or STOP key is pressed, the AQ1300/AQ1301 sends a measurement start or stop packet to the other device at the destination address.

- Selected: The AQ1300/AQ1301 tries to synchronize with the other device.
- Cleared: The AQ1300/AQ1301 does not try to synchronize with the other device.

#### Note.

When you are performing BERT test, the AQ1300/AQ1301 does not send measurement stop packets.

### Others

#### Subtrac the fixed latency from the result

During latency measurement, the fixed delay that occurs in the other device during loopback is subtracted from the measured results. The subtracted results are displayed as measurement results. If the measured value is less than the fixed delay, 0.00  $\mu$ s is displayed. This feature is supported in firmware version (FW Ver.) R1.08.01.001 and later.

- Selected: The fixed delay is subtracted from the measured values.
- Cleared: The fixed delay is not subtracted from the measured values.

#### Fixed delay value based on the interface

Delay	
1.0 µs	
1.4 µs	
12 µs	
1.6 µs	
11 µs	
108 µs	
	Delay           1.0 μs           1.4 μs           12 μs           1.6 μs           11 μs           108 μs

# **Starting and Stopping Measurement** 7.1

# Procedure

# When Measurement and Transmission Control Are Synchronized

Follow the procedure in section 4.11 or 6.11 to synchronize measurement and transmission control.

### **Starting Measurement**

Press START to display the following screen and start measurement and transmission.



Indication that measurement is in

**Measurement duration** 

Measuring

7

When the transmission end conditions are met, the following screen appears, transmission stops automatically, and measurement finishes.

### Screen after Measurement Has Finished (Traffic Test)

2009/10/23 12:09:33	Meacurement	Remaining
Auto Remain 0[s]		
Traffic Tx Rate(%) : 100.00000 Frame Len.(byte):64	Start Transmit	
Tx Time(s) : 60 Fill Pattern: Random		Indication
Test Results	Stop	finished
XFP 🔤	Transmit	
LINK LR Page 1/1 00:00:08		Measurem
10G FULL [Rx] Peak Rate (%):	Special	
	Control	
TX BX [leterou] Mey Leterou(up)		
	File	
	Next	
	1/3	
[Ix] Rate(%): 0.00000 [Rx] Rate(%): 0.00000		
Rx: 0 Rx Frame Longth(byte):		

g Tx time that measurement has

ent duration

### **Stopping Measurement**

Press STOP to display the following screen, stop transmission, and finish measurement.

× 2009/	10/23 12:10:48 = A.C.= Moscuromont	Remaining Tx time
Auto Traffic	Remain     33[5]     100.00000     Frame Len. (byte): 64     Start Transmit       Tx Tate(X)     :     100.00000     Frame Len. (byte): 64     Start Transmit       Tx Time(s)     :     60     Fill     Reation	Indication that measurement has
	Page 1/1 Duration 10:22:45	finished Measurement duration
10G FULL PRUSE Frame	[Rx] Peak Rate (%): 99.99640	
TX RX L2 ERR LFS TJE TJRE	[Latency] Max Latency(us): 5,466.9	
R×LF R×RF	Next           [Tx] Rate(#):         0.10093 [Rx] Rate(#):         99.91167	
	Normal Frame: Tx: 18,345 Rx: 61,907 Rx Frame Length(byte):	

#### Screen after Measurement Has Been Stopped (Traffic Test)

Note

- · When Auto(Remote) has been selected in the Test menu, measurement and transmission control are synchronized regardless of the measurement and transmission control synchronization setting.
- When Auto or Auto(Remote) has been selected in the Test menu, the test item Execution Type setting is set to Continue, and Continuance Confirmation is set to ON, a confirmation screen appears whenever a test item ends during measurement.
- If Auto or Auto(Remote) has been selected in the Test menu and the "Judge Pass or fail" check box is selected, the Pass/Fail Screen appears when measurement finishes.

# When Measurement and Transmission Control Are Not Synchronized

Follow the procedure in section 4.11 or 6.11 to desynchronize measurement and transmission control.

#### **Starting Measurement**

Press START to display the following screen and start measurement.

#### Screen during Measurement (Traffic Test)



**Remaining Tx time** 

Starts transmission

Indication that measurement is in **Measurement duration** 

# **Starting Transmission**

Press the Start Transmit soft key to start transmission.

#### Screen during Measurement (Traffic Test)



**Remaining Tx time** 

Indication that measurement is in progress Stops transmission

**Measurement duration** 

When the transmission end conditions are met, transmission stops automatically. Press **STOP** to display the following screen and stop measurement.

#### Screen after Measurement Has Finished (Traffic Test)

🎄 🚺 2009/	10/23 12:12:00	Moacuromont	- 1
Manua 1	Remain 0[s] Stat LASER LFS		
Traffic	Tx Rate(%) : 100.00000 Frame Len.(byte):64	Start Transmit	
1	Tx Time(s) : 60 Fill <u>Pattern: Random</u>	TT GHOMT C	- 1
XFP 📴	Test Results	Stop Transmit	1
LINK LR	Page 1/1 00:01:40		
10G FULL PHUSE	[Rx] Peak Rate (%): 99 67951	Special Control	- 1
TX RX L2ERR LFS	[Latency] Max Latency(us): 4,537.6	File	
RxLF RxRF		Next 1/3	
	[IX] Kate(%): 0.12795 [KX] Kate(%): 99.68414		
	Tx: 31,902 Rx: 57,619 Rx Frame Length(byte): 79.6		

Remaining Tx time

Indication that measurement has finished

Measurement duration

### **Stopping Transmission**

Press the Stop Transmit soft key to display the following screen and stop transmission.

Screen after Transmission Ha	s Been Stopp	oed (Traffic Test)
------------------------------	--------------	--------------------



Remaining Tx time

Starts transmission

Indication that measurement is in progress

Measurement duration

#### **Stopping Measurement**

Press STOP to display the following screen and stop measurement.

Screen after Measurement Has Been Stopped (Traffic Test)



#### Note.

- If you press STOP without pressing the Stop Transmit soft key first, transmission and measurement are both stopped.
- When Auto(Remote) has been selected in the Test menu, measurement and transmission control are synchronized regardless of the measurement and transmission control synchronization setting.
- When Auto or Auto(Remote) has been selected in the Test menu, the test item Execution Type setting is set to Continue, and Continuance Confirmation is set to ON, a confirmation screen appears whenever a test item ends during measurement.
- If Auto or Auto(Remote) has been selected in the Test menu and the "Judge Pass or fail" check box is selected, the Pass/Fail Screen appears when measurement finishes.

# When Auto or Auto(Remote) Has Been Selected, Execution Type Is Set to Continue, and Continuance Confirmation Is Enabled

Follow the procedure in section 4.11 to set the test item Execution Type setting to Continue and Continuance Confirmation to ON.

During measurement, whenever a test item finishes, the following screen appears.



### Note.

- To stop measurement without proceeding to the next test item, press STOP.
- When the test item Execution Type setting is set to Continue and Continuance Confirmation is set to OFF, the confirmation screen will not appear.

# Performing Pass/Fail Judgment When Auto or Auto(Remote) Has Been Selected

Follow the procedure in section 4.11 to select the "Judge Pass or fail" check box. After measurement finishes, the following screen appears.

ž – 2009/1	10/23 17:13:56 =AC=	Measurement	
Auto Traffic	Remain         O[s]         ™ First LFS control           Tx Rate(X)         :         100.00000         Frame Len.(byte):         64           Tx Time(nin):         1         Fill Pattern:         Random	Start Transmit	
	Test Results Passi Luration	Stop Transmit	Pass/fail indication (Pass, Fail)
LINK LR 10g Full	Page 1/1 00:00:18	Special	
PRUSE	99.99640	Control	
	[Latency] Max Latency(us): 5,466.9	File	
R×LF R×RF	[Tx] Rate(%): 0.10093 [Rx] Rate(%): 99.91167	Next 1/3	
	Normal Frame: Tx: 18,345 Rx: 61,907 Rx Frame Length(byte): 97.3 ERR ERR ERR		

### Note.

The Pass/Fail screen appears after measurement finishes. It will not appear if you just stop transmission.

# When Measurement and Transmission Control Are Synchronized

Start and stop measurement this way when you want to perform measurement and transmission at the same time.

START key: Press this key to start measurement and transmission.

STOP key: Press this key to stop transmission and finish measurement.

When the transmission end conditions are met, transmission stops automatically, and measurement finishes.

#### Note.

When Auto(Remote) has been selected in the Test menu, measurement and transmission control are synchronized regardless of the measurement and transmission control synchronization setting.

# When Measurement and Transmission Control Are Not Synchronized

Start and stop measurement this way when you want to perform measurement and transmission separately.

START key:	Press this key to start measurement.
Start Transmit soft key:	Press this soft key to start transmission.
Stop Transmit soft key:	Press this soft key to stop transmission.
STOP key:	Press this key to stop measurement.

When the transmission end conditions are met, transmission stops automatically.

#### Note.

If you press STOP without pressing the Stop Transmit soft key first, transmission and measurement are both stopped.

# When Auto or Auto(Remote) Has Been Selected, Execution Type Is Set to Continue, and Continuance Confirmation Is Enabled

When Auto or Auto(Remote) has been selected in the Test menu, the test item Execution Type setting is set to Continue, and Continuance Confirmation is set to ON, a confirmation screen appears whenever a test item ends during measurement.

# Performing Pass/Fail Judgment When Auto or Auto(Remote) Has Been Selected

This indication appears when the test type is Auto or Auto(Remote) and you have chosen to perform pass/fail judgment.

- · Pass: The results meet the requirements.
- Fail: The results do not meet the requirements.

# Displaying Test Results in Auto or Auto(Remote) Mode When the Test Item Execution Type Is Continue

During continuous test item execution, results of tests that have been completed can be displayed.

- **1.** Follow the procedure in section 4.4 to set the test items to execute.
- 2. Follow the procedure in section 4.11 to set the test item execution type to Continue.
- 3. Start measurement. The following screen appears.

# Test Result Page (Page 1)

		Measurement	—The number of the test item being
Auto Remain 🖾 Ltag	LASER LFS UFF Control		executed
Loopback Loopback Target:Source only		Start Transmit	In this example, number 2, which indicates
<u>0+0+0+</u>			the loopback test, is displayed.
Test Results		Stop	
SFP GLE 💽	<b>Duration</b>	Transmit	—Test result display page
LINK SX Page 1/6	12:29:12		Page 1 displays a list of test items.
1G FULL 1 Traffic Test	Finish Pass	Special	Page 2 and subsequent pages display the
Frame 2 Loopback lest	Executing Dro Exec	Control	test results of the test items.
TX RX 4 PING Test	Pre Exec		In the left example, five test items are
L2 ERR 5 BERT	Pre Exec	File	displayed.
6			the test result is "Deep"
		Novt	The second test leaphack test is in
8 [Tr] Pate(#): 0.06222 [E		1/3	nrogress
Normal Frame:	Frror History		progress.
Tx: 13,61	LINK L2 L3		
Rx Frame Length(byte)			



Use the **up and down arrow keys** to change the displayed test result page. Test result pages are in the same order as the test items in the list.

### Test Result Page (Page 2 and later)

2012/6/5 15:50:43		Heasurement	The number of the displayed test result
Auto Remain Traffic Tx Rate(%) : BADADA TX Time(min):	Instantion           100.00000         Frame Len.(byte): Variab           3         Fill Pattern: Random	le Start Transmit	In this example, number 1, which indicates the traffic test, is displayed. The number blinks if the test item is being
XFP III	Pass	Stop Transmit	executed. — Pass/fail indication (Pass Fail)
LINK LR Page 2/6	00:00:0		This does not appear when the test item is
	ge Rate(%): 0.0000	Special Control	being executed.
TX RX [Latency]	Average Latency(us):	◀ File	
RxLFRxRF		Next 1/3	
[Tx] Ra e(%):	0.00000 [Rx] Rate(%): 0.0000		
Normal I rame: Tx: Rx: Rx Frame Length	0 0 (byte): 0 0 0		
			-

#### **Test results**

This example shows the test results of the traffic test.

# Note.

A list of test items is always displayed on the first page.

# 7.2 Performing L1 Control

# Procedure

L1 control is valid when Test Interface is set to XFP(10GbE) or SFP(GbE). Press the **Special Control** soft key and then the **L1 Control** soft key to display the following screen.



# Explanation

# Laser OFF Execution and Release

- Laser OFF Execution: When you press the Laser OFF Execution soft key, it changes to the Laser OFF Release soft key, and the laser is turned off.
   Laser OFF Release: When you press the Laser OFF Release soft key, it changes to the Laser
- Laser OFF Release: When you press the Laser OFF Release soft key, it changes to the Laser OFF Execution soft key, and the laser is turned on.

### Send LF Start and Stop

Send LF Start: When you press the Send LF Start soft key, it changes to the Send LF Stop soft key, and LFs are sent.
 Send LF Stop: When you press the Send LF Stop soft key, it changes to the Send LF

Start soft key, and LF transmission is stopped.

### Send RF Start and Stop

Send RF Start: When you press the Send RF Start soft key, it changes to the Send RF Stop soft key, and RFs are sent.
 Send RF Stop: When you press the Send RF Stop soft key, it changes to the Send RF Start soft key, and RF transmission is stopped.

# Note.

- · You can perform L1 control regardless of whether transmission is in progress or stopped.
- Send LF and RF Start and Stop are valid when Test Interface is set to XFP(10GbE).
- LF and RF transmission are exclusive. If you start LF transmission during RF transmission, RF transmission will stop. If you start RF transmission during LF transmission, LF transmission will stop.

# **Changing the Transmission Frequency**

You can change the transmission frequency in the range of  $\pm 100$  ppm. Resolution: 1 ppm Accuracy:  $\pm$  2 ppm

# Note.

- While frames are being sent, you cannot change the transmission frequency.
- When the 1000BASE-T (RJ-45) interface is in use, the AQ1300/AQ1301 may not be able to send or receive frames normally when it is configured as follows:
  - The test type is set to Manual mode, the transmission IFG is set less than 96 bytes, and the Tx frame length is set to 1526 or greater.

# 7.3 Changing the Tx Rate

# Procedure

Follow the procedure in section 7.1 to start measurement and transmission for a traffic, QoS, or BER test.

Press the **Special Control** soft key and then the **Tx Rate Change** soft key to display the following screen.

### Example When a QoS Test Is Being Performed



# Explanation

# Target

Specify the QoS channel whose rate you want to change. This setting is valid when you are performing a QoS test. CH1 to CH8 (Manual) CH1 to CH4 (Auto, Auto(Remote))

# Tx Rate

Set the Tx rate. Range: 0-100.00000%

# Note

During a QoS test, you can change the Tx rates of the channels selected in the QoS transmission settings.

# Default

Press this soft key to return the Tx rates to their original settings.

# 7.4 Inserting Errors

# Procedure

Follow the procedure in section 7.1 to start measurement and transmission for a traffic, QoS, or BER test.

Press the **Special Control** soft key and then the **Error Insertion** soft key to display the following screen.

#### Example When a BERT Is Being Performed



# Explanation

#### Bit Error

A single bit error is inserted. This soft key is valid during a BER test.

### **CRC Error**

A single frame is inserted with a CRC error. This setting is valid when you are performing a traffic, QoS, or BER test.

### Symbol Error

A single frame is inserted with a symbol error. This setting is valid when you are performing a traffic, QoS, or BER test.

### Sequence Error

A single frame is inserted with a sequence error. This setting is valid when you are performing a traffic, QoS, or BER test.

#### **Payload Error**

A single frame is inserted with a payload error. This setting is valid when you are performing a traffic, QoS, or BER test.

### Note.

When Manual has been selected in the Test menu, if you select the "Remove Test Tag from Test Frame" check box in the Option (Manual) Advance setup, sequence errors and payload errors are not inserted.

# 7.5 Performing a Traceroute Test

# Procedure

Follow the procedure in section 4.8 or 6.8 to set the test mode to PING Test, and press STOP. The PING measurement screen appears.

Press the Special Control soft key and then the Traceroute soft key to display the following screen.



If measurement ends as a result of success, error detection, or manual stopping, the following screen appears.



#### Measurement Result Indications (Example with an error)

Status

(Unexecution, Executing.., Success!, Error(Hop Count Over), Error(Route Error), Error(Target Unreachable), Cancel..)

# Start

Press this key to start Traceroute testing.

# Stop

Press this key to stop Traceroute testing.

# File

Press this key to save the Traceroute measurement results to a .csv file. For details, see section 9.3.

### To the next page

Press this key to switch between Traceroute result screens. IPv4: Pages 1/4 to 4/4 IPv6: Pages 1/8 to 8/8

# **Measurement Result Display**

# Hop Number

Indicates the number of hops performed in the Traceroute test.

#### Events

No.

Indicates the hop number.

# 1st(ms), 2nd(ms), and 3rd(ms)

Indicates the response time for three separate ping requests to the host.

Indication	Description
*	Indicates that no response was received from the host.
Number	Indicates the response time in ms.

# **IP Address**

Indicates the host IP address from which the responses were received. If no response was received to any of the three requests, "\*.\*.\*" appears.

#### **Status Indications**

Description
Execution has not yet taken place.
Execution is taking place.
A response was received from the target host.
After 64 hops, no response was received from the target host.
Responses for the 1st, 2nd, and 3rd ping requests came from more than one
IP address.
A "Destination Unreachable" notification was received three times in a row.
The user stopped the Traceroute test in the middle of execution.

# 7.6 Displaying Test Results

# Procedure

Follow the procedure in section 7.1 to start or stop measurement. Press the **Test Result Display** soft key to display the following screen.

### Example When a Traffic Test Is Being Performed



# **Explanation**

### Rate Unit

This soft key switches the unit of the measured rate. This setting is valid when you are performing a traffic or QoS test.

- %: The rate is displayed as a percentage.
- fps: The number of frames that have been received normally in a single second is indicated.
- bps: The number of bits that have been received normally in a single second is indicated.

### Traffic

This soft key switches between the types of values that are displayed for the Rx rate and the packet latency. This soft key is valid when you are performing a traffic test.

- Maximum: The maximum values are indicated.
- Average: The average values are indicated.

### QoS

This soft key switches the types of values that are displayed for the Rx QoS channel rates. This setting is valid when you are performing a QoS test.

- Maximum: The maximum values are indicated.
- Average: The average values are indicated.
- Current: The current values are indicated.

#### Summary display

You can switch the contents of the summary display.

· Summary: A summary of the settings is displayed.

Test Mode	Displayed Items
Traffic Test	Tx rate, Tx time, frame length, fill pattern
Loopback Test	Loopback target
QoS Test	Tx rate for each channel
PING Test	Destination IP address, Tx interval, number of frames
BERT	Tx rate, Tx time, frame length

• Address: The source and destination MAC and IP addresses are displayed.

# Note.

You can change the contents of the Test Result Display regardless of whether measurement is in progress or stopped.

# 7.7 Comparing Transmission and Reception

# Procedure

# Setting the Tx/Rx Comparison Display Items

Follow the procedure in section 7.1 to start or stop measurement. Press the **Tx/Rx Comparison** soft key and then the **Tx/Rx Comparison** soft key to display the

following screen.



Select the lines that you want to display. Lines with cleared check boxes are blank.

# Displaying the Tx/Rx Comparison

START to display the items that you added.

× 2009/1	0/23 14:24:31		=AC=	Measurement
Manua 1				
Traffic	Tx Rate(%) :	100.00000 Frame L	en.(byte): 64	Start Transmit
1	Tx Time(s) :	60 Fill Pa	ttern: Random	THOMSMELL
LI	Tx/Rx Compared		Page 1/2	Stop
XFP 🔤	ltems	Tx	Rx	Transmit
	Freq. Deviation	9.0	15.5	
<b>TUG FULL</b> PRUSE <sub>fea</sub>	Rate(∦) Rate(fps)	0.22608	99.72262 1,354	Special Control
Frame	Rate(bps)	7,682	10, 648	
IX KX L2ERR LFS	Byte Frame	4,954 15,813	35,226 34,575	File
TxLF TxRF	Error Frame	22,750	46,902	
R×LF R×RF		<u>99,770</u>	64,077	Next 1/3

The added item is displayed.

IM AQ1300-01EN

# Setting the Tx/Rx Comparison Display Items

# Pages 1 and 2

You can switch between the two pages of comparison display items.

- Page 1: Press this soft key to show the first page.
- Page 2: Press this soft key to show the second page.

### All Clear

Press this soft key to clear the check boxes for all the display items.

### Lines 1 to 19

Select the check boxes of the items that you want to display Tx/Rx comparisons for.

- Selected: The item is displayed.
- Cleared: The item is not displayed. The line that corresponds to the item is blank.

### **Display Items**

Select the items that you want to display. You can select up to 38 of the items listed in the table below.

Display Item	Notes
Freq. Deviation	
LF	
RF	
Frame	
Byte	
Rate(%)	
Rate(fps)	
Rate(Bps)	
Rate(bps)	
Error Frame	
CHn Frame	n = 1 to 8
CHn Byte	(CH1 to CH8)
CHn Rate(%)	
CHn Rate(fps)	
CHn Rate(bps)	

# **Displaying the Tx/Rx Comparison**

You can display the same statistics for transmission and reception next to each other.

# 7.8 Customizing the Display

# Procedure

# **Configuring the Custom Display Items**

Follow the procedure in section 7.1 to start or stop measurement. Press the **Custom Display** soft key and then the **Custom Display Item** soft key to display the following screen.

		Г	Master/sla	we indication (M: r	naster, S	: slave)	
3	2009	/10/2	23 14:41:56		=AC=	luser Lester	
			Gusten Disp	lay Items(Page ()		0150103	
		M/S	Group	Display Item		Page 1 🗕	Shows page 1
	Linet	[M]	Tx	Rate(%)	Detail		
	Line2	[M]	R×	Rate(%)	Detail		
	Line8	[M]	Rx	Average Rate(%)	Detail	Page 2	Shows nade 2
	Line4	IMI	Common	Acquisition Time	Detail		Shows page 2
	L ine5	IWI	Latency	Max Latency(us)	Detai		
	Line6	IMI	Latency	Ava Latency(us)	Detail		
	Line/	IMI	Common	Acquisition lime	Detail		
	Line8	IMI	1×	Frame	Detail		
	Line9	IWI	KX	Frame	Detail		
	Line10	IMI	Sequence	Loss Packet	Detail		
	Linel1	IMI	Lommon	ACQUISITION TIME	Detail		
M	Line12	IMI	Payload	Payload Error	Detail		
	Line13	INT	Lommon	Acquisition lime	Detail		
	Line14	INT	LINK	Link Down Count	Detail	All Clear 🗕	<ul> <li>Clears all display items</li> </ul>
	Linela	TMT	LIDE	PE Detect Count	Detail		
	Line10	INT	LIDK	Pr Etco Deviato (per)	Detail		
	Line17	LU1 DAT	Composes	Racried Deviate(ppm)	Detail		Select the item that you want to display
	Line10	TWI	Common	Acquisition Time	Detail	-48	- Generic the item that you want to display.
	r meta	101	Pointing()	примателян тир	Detall		

Select the lines that you want to display. Lines with cleared check boxes are blank.

### **Custom Display Items Screen**

Press Detail next to the line that you want to customize to display the following screen.



Select Master or Slave.

When the test mode is Auto(Remote), the controlling device is the master and the controlled device is the slave.

Set the group.

Set the display item.

# **Custom Display**

Press START to display the items that you added.

🍇 🚺 2009/*	10/23 14:42:12	=AC=	Measurement
Manua 1	Remain 23[s] Stat LASER LFS Log DFF Control		
Traffic	Tx Rate(%) : 100.00000 Frame Len.(byte):64		Start
1	Tx Time(s) : 60 Fill Pattern: Ram	ndom	TTOUSHITT
Ll	Custom Display Page	1/2	Stop
	Items Tx:Rate( <b>X</b> ) M 0.	'alues 14101	Transmit
10G FULL	Rx:Rate(%) M 999. Rx:Average Rate(%) M 99.	99311 68400	Special
Frame	Latency:Max Latency(us) M 3, Latency:Avg Latency(us) M 4,	908.8 496.7	Control
IX RX L2 ERR LFS	Tx:Frame N Rx:Frame M 3 Sequence:Loss Packet N 3	5,052 7,258 9,093	◀ File
R×LF I×KF	Payload:Payload Error N 3	9, 133 3. 160	Next 1/3
	Link:LF Detect Count N 5 Link:RF Detect Count N 4 Link:RF Detect Count N 4	7,396 5,373	D
	Sequence:Reorder Packet N 5	7,644	

The added item is displayed.

# **Configuring the Custom Display Items**

# Pages 1 and 2

You can switch between the two pages of custom display items.

- Page1: Press this soft key to show the first page.
- Page2: Press this soft key to show the second page.

### All Clear

Press this soft key to clear the check boxes for all the display items.

#### Lines 1 to 19

Select the check boxes of the items that you want to display Tx/Rx comparisons for.

- Selected: The item is displayed.
- Cleared: The item is not displayed. The line that corresponds to the item is blank.

# **Custom Display Items**

### Master/Slave

Select Master or Slave.

#### Note\_

If you specify Slave for a statistical item when the test mode is not Auto(Remote), results are not shown for that item.

### Group

Select the group of the item that you want to display.

### **Display Item**

Select the item that you want to display. You can select up to 38 of the statistical items. For details, see section 1.8.

# **Custom Display**

The specified statistical items are displayed.

# **Displaying Detailed Statistics** 7.9

# Procedure

# **Configuring the Detailed Statistics**

Follow the procedure in section 7.1 to start or stop measurement. Press the Detail Display soft key and then the Detail Display Item soft key to display the following screen.

2009/10/2	23 14:43:52		=AC=	Detail Display	1
Auto Ren	Deta	ail Display Items		0130103	
Traffic Tx	Page17	Display Items CH1 Rx Group	_	Page 1 😐	Shows page 1
	<ul><li>✓ Page18</li><li>✓ Page19</li><li>✓ Page20</li></ul>	CH2 Rx Group CH3 Rx Group CH4 Rx Group		Page 2 _	Shows page 2
10G FULL	✓ Page21 ✓ Page22 ✓ Page23	CH5 Rx Group CH6 Rx Group CH7 Rx Group			
TX RX L2 ERR LFS	፼ Page24 ፼ Page25 ፼ Page26	CH8 Rx Group BERT Group PING Group	_		
TxLF TxRF RxLF RxRF	Page27 Hide Hide	Link Group Common Group Common Group		All Clear _	Clears all display items
	☐ Hide ☐ Hide ☐ Hide	Common Group Common Group Common Group	_		
					8

Select the pages that you want to display. Pages with cleared check boxes are not displayed.

# **Displaying the Detailed Statistics**

Press START to display the items of the groups that you added.

🍇 🚺 2009/	10/27 12:07:44	=AC=	Measurement	
Auto Traffic	Remain         33[s]         Stat         Linsen           Tx Rate(X)         :         100.00000         Fr           Tx Time(min):         1         Fi	FF_LES <sub>trol</sub> ame Len.(byte):64 11 Pattern: Random	Start Transmit	
	Detail Display ink Group	Page 27/27		A nage had h
	I tems Link Status	Values 10M-FULL-Cross	Stop Transmit	A page had b
106 FULL	Laser Off Count Link Down Count Tx Freq Deviate(ppm)	56,630 60,122	Special	The items of t
Frame TV RV	Rx Freq Deviate(ppm) F Send Count RE Send Count	18.3 37,598 63.352	GONTROT	are displayed
	LF Detect Count RF Detect Count	40,310 42,059	File	Each group na
TxLF TxRF				
K×LF K×KF			Next 1/3	

een added.

the group that you added as its own page.

# Note.

Each group of detailed statistics is displayed on a single page.

# **Configuring the Detailed Statistics**

# Pages 1 and 2

You can switch between the two pages of detailed statistic items.

- Page 1: Press this soft key to configure the settings on the first page.
- Page 2: Press this soft key to configure the settings on the second page.

### All Clear

Press this soft key to clear the check boxes for all the display items.

### Pages 1 to 32

Select the check boxes of the detailed statistic groups that you want to display.

- · Selected: The group's items are displayed.
- Cleared: The group's items are not displayed.

### Note\_

If you clear the check box of a group, it is not displayed, and the page numbers of the following groups are adjusted accordingly.

# **Displaying the Detailed Statistics**

Statistical items are displayed in groups.

# 7.10 Changing the Displayed Screen

# Procedure

Follow the procedure in section 7.1 to start or stop measurement.

Configure the AQ1300/AQ1301 so that a soft key from Next 1/3 to 3/3 is displayed on the measurement screen.



Press the arrow keys to switch screens in the manner indicated below when the Test Result Display screen is displayed.



In any screen other than the Test Result Display screen, press the up and down arrow keys to switch pages in the manner indicated below.



# ▶ and ◀ Keys

These keys change the displayed screen. They are valid in measurement screens when a soft key from Next 1/3 to 3/3 is displayed on the screen.

Test Result Display, Tx/Rx Comparison, Custom Display, Detail Display

# ▲ and ▼ Keys

These keys switch between the pages of the displayed screen.

# Note\_

- You can use the keys in measurement screens when a soft key from Next 1/3 to 3/3 is displayed.
- You can change the displayed screen regardless of whether measurement is in progress or stopped.

### **Operating the Other Device** 7.11

# Procedure

Perform the following operation when measurement has finished. Press the Operate Other device soft key to display the following screen.



Valid when the test mode is Auto or Manual

Acquires the settings	
Acquires the measurement results	<u></u>

Sends a screen image Valid when the test mode is Auto(Remote)

# Explanation

### **Setup File Acquisition**

When the test mode is Auto or Manual, you can acquire the current settings of the other device and save them to /inband/rmtSetup.sd.

### **Result File Acquisition**

When the test mode is Auto or Manual, you can acquire the current measured results of the other device and save them to /inbandrmtResult.mr.

#### Send Screen Image

When the test mode is Auto(Remote), you can send the master's measurement results screen to the slave.

### Note.

- · You can control the other device after measurement has finished.
- · If a file with the same name already exists, it is overwritten.

# 7.12 Switching between the Master and Slave Displays

# Procedure

Perform the following operation when the test mode is Auto(Remote) and measurement has finished. Press the **Master <-> Slave** soft key to display the following screen.



Switches between the master and slave displays (Master, Slave) Valid when the test mode is Auto(Remote)

# Explanation

# Switching between the Master and Slave Displays

On the master, you can switch between showing the measurement results of the master and the slave.

- Master: The master's measurement results are displayed.
- · Slave: The slave's measurement results are displayed.

# Note.

You can switch between the master and slave displays when the test mode is Auto(Remote) and measurement has finished.

# 7.13 Clearing the History

# Procedure

Follow the procedure in section 7.1 to start or stop measurement. Press the **History Clear** soft key to display the following screen.



# Explanation

### **History Clear**

The flow control, L2 error, and LFS histories are cleared. When you clear the history, the flow control (PAUSE/COL), L2 error (L2 ERR), and LFS (TxLF, TxRF, RxLF, RxRF) status indications become gray.

### Note.

The History Clear operation does not clear the error history (LINK ERR, L2 ERR, L3 ERR).

# 7.14 Displaying the Header Information of Received Frames

This feature is supported in firmware version (FW Ver.) R1.08.01.001 and later.

# Procedure

Display the measurement screen. To start measurement and display the measurement screen, press **START**. To display the measurement screen without starting measurement, press **STOP**. Press the **Received Frame Format** soft key. The following screen appears.



Pause the updating of the Rx frame format

# Explanation

# **Displaying Received Headers**

The AQ1300/AQ1301 displays the header information of received frames.

The following header information can be displayed.

VLAN         MAC         MAC address         When the first type value is [88A8], [9100], [           VLAN         Cos, VLAN-ID         or [9300].           802.1Q         MAC         MAC address           C-VLAN         Cos, VLAN-ID         When the first type value is [8100].           602.1ad         MAC         MAC address	9200], [9300] 00],
VLAN         Cos, VLAN-ID         or [9300].           802.1Q         MAC         MAC address         When the first type value is [8100].           C-VLAN         Cos, VLAN-ID         When the first type value is [88A8] and the           802.1ad         MAC         MAC address         When the first type value is [88A8] and the	[9300] 00],
802.1Q         MAC         MAC address         When the first type value is [8100].           C-VLAN         Cos, VLAN-ID         When the first type value is [88A8] and the           802.1ad         MAC         MAC address         When the first type value is [88A8] and the	[9300] 00],
C-VLAN         Cos, VLAN-ID           802.1ad         MAC         MAC address         When the first type value is [88A8] and the	[9300] 00],
802.1ad MAC MAC address When the first type value is [88A8] and the	[9300] 00],
	[9300] 00],
C-VLAN Cos, VLAN-ID subsequent type value is [8100].	[9300] 00],
S-VLAN Cos, VLAN-ID	[9300] 00],
QinQ MAC MAC address When the first type value is [9100], [9200], or	00],
VLAN1 Cos, VLAN-ID and the subsequent type value is [8100], [97	
VLAN2 Cos, VLAN-ID [9200], or [9300].	
PBB-I MAC MAC address When the first type value is [88E7].	
I-SID I-SID, I-PCP	
PBB-IB MAC MAC address When the first type value is [88A8] and the	
I-SID I-SID, I-PCP subsequent type value is [88E7].	
B-VLAN B-VLAN-ID, B-PCP	
EoE         MAC         MAC address         When the first type value is [E0E0].	
EoE TTL, EID	
EoE VLAN MAC MAC address When the first type value is [A100] and the	
EoE TTL, EID subsequent type value is not [E0E0].	
EoE-VLAN VPN-ID, PCP	
VPLS MAC MAC address When the first type value is [88E7] or [8848]	
VC Label Label, Exp, TTL	
T Label Label, Exp, TTL	
E-Type E-TYPE	
No reception — — Other than those above.	
Other MAC MAC address	

The header information is updated every second. Press the Pause soft key to pause the screen updating.

#### Note.

Header information can be displayed when Manual is selected in the Test menu.

# 8.1 Selecting a Setup File

# Procedure

# Select Setup File Screen

Press the Option soft key and then the RFC2544 soft key to display the following screen.

							<ul> <li>Registered setup files</li> <li>A comment or file name appears next to each number.</li> </ul>
¢	2010/9/24 1	15:53:53 Se	lect Setup Film	e		Select Setup File	- <b>Test type from the setup file</b> Values other than "RFC2544" appear dimmed.
				Page	Number 1/4	Latest Setup	⁻ Latest setup
	1         RFC2544           2         RFC2544           3         RFC2544	test_no.1 test_no.2 test_no.3	for Yokogawa ( for Yokogawa ( for Yokogawa (	RFC2544 RFC2544 RFC2544	Select Select Select	Default —	- Default setup
	4 RFC2544 1 5 RFC2544 1	test_no.4 test_no.5	for Yokogawa for Yokogawa	RFC2544 RFC2544	Select Select	◀ File	Loads a file Loads the selected setup file from the file list
	6 7 8				Select Select	Switch Comment	Switches the setup file list display (Comment, File Name)
	9 10				<u>Select</u> Select	Next Page —	Switches the setup file list page (page numbers: 1/4 to 4/4)
	11 12				<u>Select</u> Select	BFC	
	Setup file lis Appears whe management	s <b>t</b> en you h t file usi	ave created	l a displa o softwar	ay re		- Select the setup file. Select a registered setup file from the setup file list.

# Note

and sent it to the AQ1300/AQ1301

To select an RFC2544 setup file, you can choose to use the latest setup, use the default setup, load a setup file from the file list, or select a setup file from the setup file list.

# **File Screen**

Press the File soft key to display the following screen.



The files that you have created using the setur software or the AQ1300/AQ1301 appear.

8

Configuring RFC2544 Measurement Settings (AQ1300 Option)

**RFC2544 Setup Screen** The following screen appears when you select a setup file.

2010/9/24 16:07:13	RFC2544 Setup	
RFC2544 Test Setup         << Test Setup >>         Test Interface       XFP(10GbE)         <<< Address Setting >>         Source MAC       00       00       00       01         Destination MAC       Image: Im	Refer     Common Setting       Refer     Common Setting       Refer     Link/Address       64byte     Detail Setup	Set up the test. ► section 8.2 Configure the settings that are common to all RFC2544 tests. ► section 8.4 Configure link and address settings. ► section 8.3 Configure the detailed settings for the individual RFC2544 tests. ► section 8.5 to 8.9
Frame Loss Rate 5 Back to Back 10 Packet Jitter 15 User120 User2(40 User3(81	112byte     Next       124byte     1/2       128byte     1/2       18byte     1/2       18byte     1/2       192byte     1/2       192byte     1/2       192byte     1/2       192byte     1/2       192byte     1/2	— To RFC2544 setup page 2/2
	<sup>4</sup> Select Setup File =	Select the setup file. ▶section 8.1
	Option (RFC2544)           Next 2/2           RFC2544)	Configure the options (RFC2544). ▶ section 8.10 — To RFC2544 setup page 1/2

### Latest Setup

Select this item to use the setup that was displayed previously.

# **Default Setup**

Select this item to return to the default setup.

# File

Select this item to load a setup file (with an .sd extension) from the file list. Select this item when you want to load a setup file that is not in the setup file list. To create a setup file, you can use the setup software and send the file to the AQ1300/AQ1301, or you can save the settings on the AQ1300/AQ1301.

# **Setup File Selection**

To select a registered setup file, use the setup file list.

You can register up to 48 setup files to the setup file list (4 pages with 12 files per page). A comment or file name is displayed for each of the registered setup files in the setup file list. The setup file list is updated when you open the Select Setup File screen after you have created a display management file and setup files with the setup software and sent the files to the AQ1300/ AQ1301.

For details, see the Setup Software User's Manual, IM AQ1300-61EN.

# Note.

- The AQ1300/AQ1301 can only display the setup file list if the display management file that you created using the setup software (disManage.dmf) and the setup (.sd) files that the display management file refers to are saved to the AQ1300/AQ1301 /setup directory.
  - Example: /setup/disManage.dmf /setup/0000.sd /setup/0001.sd
- When you are performing RFC2544 tests, you can only select setup files for RFC2544 tests.

# 8.2 Setting Up a Test

# Procedure

# **Test Setup Screen**

Follow the procedure in section 8.1 to display the RFC2544 Setup screen. Press the **Test Setup** soft key to display the following screen.



# Explanation

# **Test Interface**

Specify which test interface to use.

- XFP (10GbE): Select this option to use the 10GBASE-R measurement port.
- SFP (GbE): Select this option to use the 1000BASE-X measurement port.
- SFP (FE): Select this option to use the 100BASE-X measurement port.
- RJ-45: Select this option to use the 10BASE-T/100BASE-TX/1000BASE-T measurement port.

# **Test Layer**

Set the layer to test.

- L2 Test: Select this option to test layer 2.
- L3-IPv4 Test: Select this option to test layer 3 according to the IPv4 protocol.
- L3-IPv6 Test: Select this option to test layer 3 according to the IPv6 protocol.

# 8.3 Configuring Link Address Settings

# Procedure

# Link Setup Screen

Follow the procedure in section 8.1 to display the RFC2544 Setup screen. Press the **Link/Address** soft key and then the **Link Setting** soft key to display the following screen.



Select this check box to automatically detect mismatches in the auto negotiation during link establishment.

Set the negotiation (Auto, Manual). This setting is valid when Test Interface is set to RJ-45 or SFP(GbE).

Set the speed (1G, 100M, 10M, Auto). This setting is valid when Test Interface is set to RJ-45. The Auto setting for Speed is valid when Negotiation is set to Auto.

Set the duplex (FULL, HALF, Auto). This setting is valid when Speed is set to 100M or 10M. The Auto setting for Duplex is valid when Negotiation is set to Auto.

Set the flow control (ON, OFF).

Set the MDI (MDI, MDI-X, Auto). The Auto setting for MDI is valid when Negotiation is set to Auto.

# Link Setting Acquisition

2013/2/19 16:25:42		= OA=	Link/Address
Configuration for Link partner	acquisition		
<< Setting >> Status	Preparing		Get Information
Cable Type	Straight		To Link Set.
<< Result >>			
Negotiation			
Speed			
Duplex			
[MD1			
		L L	
<< UTP Cable >>			
Status			Finish
Result of link setting informat • Negotiation (Auto, Manual) • Speed (1G, 100M, 10M)	ion acquisiti	ion	RFC 2544
Appears when Test Interfac	e is set to F	₹J-45	<u> </u>
<ul> <li>Duplex (Full, Half, (whe</li> </ul>	en negotiatio	on 🛛	Inc
is set to manual)	•		(N)
Appears when Test Interfac	e is set to F	کا-45	(110
MDI (MDI_MDI-X)		-	lwo
Appears when Test Interfac	e is set to F	₹J-45	

# Executes link setting information acquisition

Acquires the link setting information of the other device connected to the AQ1300/AQ1301

#### Applies link settings

Applies the acquired other device's link settings to the AQ1300/AQ1301. You can execute this when the measurement interface is RJ-45 or SFP(GbE) and the acquisition status is Finish.

Status (Preparing, Finish, Fail)

#### Cable type (Straight, Cross)

This setting is valid when Test Interface is set to RJ-45.

Returns to the link setting screen

#### **TP Cable Status**

Indicates the UTP cable status as follows. (Normal, The cable may be defective. It is two-pair cable)

# Source Address Setup Screen

Press the Link/Address soft key and then the Source Address soft key to display the following screen.



# **Destination Address Setup Screen**

Press the Link/Address soft key and then the Destination Address soft key to display the following screen.



# Note

When Test Layer is set to L3-IPv4 Test or L3-IPv6 Test, the destination MAC address is fixed to ARP (NDP).
Address Settings

When you are configuring RFC2544 settings, you can also set the source and destination MAC, IPv4, and IPv6 addresses on the top RFC2544 setup screen.

2010/9/24 16:26:14	RFC2544 Setup
RFC2544 Test Setup	Test
<< Test Setup >>	Setup
Test Interface XFP(10GbE)	L3-IPv4 Test
<	afer Common Setting
Source         IPv4         192         168         0         1         Re           Destination         IPv4         192         168         0         1         Re	eferi eferi Link/Address
<< Common Setting >> Test Select Throughput Frame Length 64by Latency 128by	yte Detail Setup
Frame Loss Rate 512by Back to Back 1024by Packet Jitter 1518by	vte vte vte vte vte
User1 (2048b) User2 (4096b) User3 (8192b)	yte) <b>BFC</b> yte) <b>BFC</b>

# Link Setup Screen

### Negotiation

Select whether to use auto negotiation. This setting is valid when Test Interface is set to RJ-45 or SFP(GbE).

- Auto: The link between the AQ1300/AQ1301 and the device that it is connected to is configured automatically through auto negotiation.
- · Manual: The link must be configured manually.

### Speed

When Test Interface is set to RJ-45, you can set the link speed.

- 1G: A 1 Gbit/s 1000BASE-T connection is used.
- 100M: A 100 Mbit/s 100BASE-TX connection is used.
- 10M: A 10 Mbit/s 10BASE-T connection is used.
- Auto: The link speed is set automatically. This setting is valid when Negotiation is set to Auto.

### Note\_

```
When Test Interface is set to XFP(10GbE), the link speed is fixed at 10G. When Test Interface is set to SFP(GbE), the link speed is fixed at 1G. When Test Interface is set to SFP(FE), the link speed is fixed at 100M.
```

### **Duplex**

You can set the communication mode for when Speed is set to 100M or 10M. This setting is valid when Test Interface is set to RJ-45.

- FULL: Full duplex communication
- · HALF: Half duplex communication
- Auto: The AQ1300/AQ1301 chooses full or half duplex automatically. This setting is valid when Negotiation is set to Auto.

#### Note\_

When Test Interface is set to XFP(10GbE), SFP(GbE), or SFP(FE), or when it is set to RJ-45 and Speed is set to 1G, the duplex mode is fixed at FULL.

### **Flow Control**

You can enable or disable flow control.

- ON: Flow control is enabled.
- OFF: Flow control is disabled.

#### MDI

You can set the measurement port to straight or crossover mode. This setting is valid when Test Interface is set to RJ-45.

- · MDI: Straight
- MDI-X: Cross
- Auto: The AQ1300/AQ1301 switches between straight and crossover mode automatically (this setting is valid when Negotiation is set to Auto).

# Link Setting Acquisition

If the interface is SFP(GbE) or RJ-45, you can acquire and display link setting information of the other device (DUT; the device on the user side) connected to the AQ1300/AQ1301. For details, see section 4.3.
# Source Address Setup Screen

## Source MAC Address

Set the source MAC address. You can refer to the MAC address table to set the address.

## **VLAN Stacks**

Set the number of VLAN stacks.

- None: No VLAN stacks
- 1: One VLAN stack
- 2: Two VLAN stacks

## VLAN1 and VLAN2

Set the CoS (Class of Service) and VLAN-ID for 1 or 2 VLAN stacks. You can refer to the VLAN table to set the values.

- CoS: 0 to 7
- ID: 0 to 4095
- TPID: 0 to FFFF (supported in firmware version (FW Ver.) R1.08.01.001 and later)

## IPv4

Select whether to specify the source IPv4 address manually or to acquire and set it automatically through DHCP. This setting is valid when Test Layer is set to L3-IPv4 Test.

- Manual: You must set the source IPv4 address manually.
- DHCP: When you press Get IP Address, the AQ1300/AQ1301 acquires and sets the source IPv4 address using DHCP.

## Source IPv4 Address, Subnet Mask, and Gateway

Set the source IPv4 address, subnet mask, and gateway when IPv4 is set to Manual. You can refer to the IP Address table and the gateway reference to configure the settings.

• Subnet Mask: 1 to 31

## IPv6

Select whether to specify the source IPv6 address manually or to specify it through stateless autoconfiguration using the RA from an IPv6 router. This setting is valid when Test Layer is set to L3-IPv6 Test.

- Manual: You must set the source IPv6 address manually.
- Stateless Address: When you press Get IP Address, the AQ1300/AQ1301 automatically configures the source IPv6 address.

## Source IPv6 Address

Set the source IPv6 address when IPv6 is set to Manual. You can refer to the IP address table to set the address.

## **IPv6 Router Address**

You can automatically acquire the router address or set it manually.

- Automatic: Clear the Set Router Address manually check box. The IPv6 prefix length and router
   address that have been acquired automatically are displayed.
- Manual: Select the Set Router Address manually check box. You can manually set the prefix length and router address.

#### 8.3 Configuring Link Address Settings

### MAC Address Table

Select the source MAC address from the MAC Address table.

• Global Address: You can set the source MAC address to a global address.

#### VLAN Table

Select the VLAN CoS and ID from the VLAN table.

### **IP Address Table**

Select the source IP address from the IP address table.

 Get IP Address: Press this soft key to get the IP address. The AQ1300/AQ1301 will acquire an IP address, using DHCP when the test layer is L3-IPv4 or stateless address autoconfiguration when the test layer is L3-IPv6.

#### Gateway

Set the gateway.

- Manual: Select this option to set the gateway manually.
- Auto.1: Select this option to set the gateway to xxx.xxx.1.
- Auto.254: Select this option to set the gateway to xxx.xxx.254.

#### **UDP Port Number**

Set the test frame's source UDP port number.

# **Destination Address Setup Screen**

#### **Destination MAC Address**

Set the destination MAC address. You can refer to the MAC address table to set the address.

#### IPv4

Set the destination IPv4 address. This setting is valid when Test Layer is set to L3-IPv4 Test. You can refer to the IP address table or select Search List to set the address.

#### IPv6

Set the destination IPv6 address. This setting is valid when Test Layer is set to L3-IPv6 Test. You can refer to the IP address table or select Search List to set the address.

# 8.4 Configuring Common RFC2544 Test Items

## Procedure

# **Test Information Setup Screen**

Follow the procedure in section 8.1 to display the RFC2544 Setup screen. Press the **Common Setting** soft key and then the **Information Setup** soft key to display the following screen.



## **Test Item Setup Screen**

Press the **Common Setting** soft key and then the **Test Select Setup** soft key to display the following screen.



## Frame Length Setup Screen

Press the **Common Setting** soft key and then the **Frame Length Setup** soft key to display the following screen.



## Frame Setup Screen

Press the **Common Setting** soft key and then the **Frame Setup** soft key to display the following screen.



## Explanation

# **Test Information Setup Screen**

#### **Test Information**

You can enter the following information. Follow the procedure in section 3.2 to enter characters.

- Test Name
- Customer
- Operator Name
- Comment
  - You can enter up to 30 characters.
  - When you press the Commit soft key in the character input dialog box, the character string changes to the characters that you entered.

#### Note.

The information that you enter here will be included in the report of the test results. Use the setup software to generate the report. For details, see the *Setup Software User's Manual*, IM AQ1300-61EN.

# Test Item Setup Screen

## **Test Item Selection**

Select the tests that you want to execute. Select the check boxes of the tests that you want to perform.

- Throughput test
- Latency test
- Frame loss rate test
- Back to back test
- Packet jitter test

# Frame Length Setup Screen

## **Test Frame Length Selection**

Select the frame lengths of the tests that you want to execute. Select the check boxes of the frame lengths that you want to use.

You can select from the following 10 frame lengths.

- Default RFC2544 frame lengths (64, 128, 256, 512, 1024, 1280, and 1518)
- Three user-defined frame lengths

### Note.

- The frame lengths that you select here do not include VLAN tags.
  - Example: If there are two VLAN stacks and you select 64byte, the length of the frame that is actually transmitted is 72 bytes.
- When Test Layer is set to L3-IPv6 Test on the Test Setup screen, you cannot select 64byte.

## **User-Defined Frame Length**

Use one of the user-defined frame lengths when you want to specify your own frame length. Range: 64 to 9999 bytes

## Note.

- The maximum frame length of a frame that can be transmitted is 9999 bytes, including the VLAN tags.
   Example: If there are two VLAN stacks and you set a user-defined frame length to 9996 bytes, the length of the frame that is actually transmitted is 9999 bytes.
- When Test Layer is set to L3-IPv6 Test on the Test Setup screen, you cannot specify a frame length that is less than 82 bytes.

# Frame Setup Screen

## Field

Set the field of the QoS value that will be inserted into the test frame.

- None
- VLANn-CoS
- IPv4-ToS
- IPv4-DSCP
- IPv6-TrafficClass
- IPv6-DSCP

## Note.

- VLANn-CoS can be selected when VLAN Stacks is set to n or greater on the Link/Address Source Address setup screen. The VLANn-CoS value that you set here is only inserted into the test frame. The CoS value that has been set in the link and address source address settings is inserted into ARP (NDP) request frames and response frames.
- IPv4-ToS and IPv4-DSCP can be selected when Test Layer is set to L3-IPv4 Test on the Test Setup screen.
- IPv6-TrafficClass and IPv6-DSCP can be selected when Test Layer is set to L3-IPv6 Test on the Test Setup screen.

#### Value

Set the value that will be inserted in the field that you selected with Field. Range VI ANn-CoS/IPv4-ToS/IPv6-TrafficClass: 0 to 7

VLANII-CU3/IF V4-103/IF V0-114110Class.	0107
IPv4-DSCP/IPv6-DSCP:	0 to 63

### **Fill Pattern**

Set the test frame's payload pattern.

- Random: A random pattern
- ALLO: All zeros
- ALL1: All ones
- 0/1: Alternating zeros and ones

#### Note\_

A 16-byte block of test management information is always inserted at the end of the test frame payload.

# 8.5 Configuring Throughput Test Settings

## Procedure

# **Throughput Test Setup Screen**

Follow the procedure in section 8.1 to display the RFC2544 Setup screen. Press the **Detail Setup** soft key and then the **Throughput Setup** soft key to display the following screen.

× 2010/9/24 16:40:33		🔤 Detail Setup	
RFC25	44 Test Setup		
Test Duration	<b>-</b> c	Throughput Setup	
Number Of Trial 1	Times		- Set the test duration (1 to 999).
<< Test Rate >>		Setup	- Set the number of trials (1 to 60).
Initial Rate	100.00	Loce Rate	<ul> <li>Set the initial rate (0.01 to 100.00).</li> </ul>
Min Rate	0.00 *	Setup	<ul> <li>Set the minimum rate (0.00 to 100.00).</li> </ul>
Max Rate	100.00 *		- Set the maximum rate (0.01 to 100.00).
Resolution	0.50 -	Back to Back Setup	<ul> <li>Set the resolution (0.01 to 100.00).</li> </ul>
🖌 Acceptable Loss	0.00001		<ul> <li>Set the acceptable loss</li> </ul>
<< Pass/Fail >>		Packet Jitter	(0.00001 to 100.00000).
🖌 Pass/Fail Judge		oc tup	Salaat this abaak hay to parform
Threshold Criterion	100.00 %		pass/fail judgment.
12			<ul> <li>Set the judgment threshold</li> </ul>
			(0.01 to 100.00).

# Explanation

### **Test Duration**

Set the test duration. The value that you specify here is the time that a single test frame is transmitted for. Range: 1 to 999 seconds

#### Number of Trial

Set the number of trials that you want to perform. Range: 1 to 60

#### **Initial Rate**

Set the initial traffic rate that the throughput test will use. Range: 0.01 to 100.00%

#### Min Rate

Set the minimum rate that the result of the throughput test will be converged toward. Enter a value that is less than or equal to the initial rate. Range: 0.00 to 100.00%

#### Max Rate

Set the maximum rate that the result of the throughput test will be converged toward. Enter a value that is greater than or equal to the initial rate. Range: 0.01 to 100.00%

#### Resolution

Select whether to accept frame loss during the throughput test.

- Selected: Loss during the throughput test will be accepted.
- Cleared: Loss during the throughput test will not be accepted.

If loss will be accepted, set the acceptable frame loss as a percentage. Range: 0.01 to 100.00%

#### Acceptable Loss

Set the acceptable frame loss during the throughput test as a percentage. Range: 0.00001 to 100.00000%

#### Pass/Fail Judge

Set whether to perform pass/fail judgments on the throughput test result.

- Selected: Pass/fail judgments are performed.
- Cleared: Pass/fail judgments are not performed.

#### Note\_

If you want to perform pass/fail judgments, enable the pass/fail judgment setting in the optional measurement settings as well.

#### **Threshold Criterion**

If you select to perform pass/fail judgments on the throughput test result, set the judgment threshold.

Range: 0.01 to 100.00%

# 8.6 Configuring Latency Test Settings

## Procedure

# Latency Test Setup Screen

Follow the procedure in section 8.1 to display the RFC2544 Setup screen. Press the **Detail Setup** soft key and then the **Latency Setup** soft key to display the following screen.

2010/9/24 16:41:08	Detail Setup	
RFC2544 Test Setup		
Test Duration	Throughput Setup	
Number Of Trial 1 Times		- Set the test duration (1 to 999).
<pre>&lt;&lt; Test Rate &gt;&gt;</pre>	Setup	- Set the number of trials (1 to 60).
🛛 Result of Throughput Test ——————	Loce Pata	<ul> <li>Select this check box to use the</li> </ul>
Test Rate 50.00 X	Setup	throughput test result.
<< Pass/Fail >>		- Set the measurement rate (0.01 to 100.00)
🕅 Pass/Fail Judge	Back to Back	- Select this check how to perform
Threshold Criterion 100000.0 us	Se tup	pass/fail judgment.
	Packet Jitter Setup	– Set the upper limit on the delay (0.1 to 999999.9).
	<b>RFC</b> 0 2544	

# Explanation

## **Test Duration**

Set the test duration. The value that you specify here is the time that a single test frame is transmitted for. Range: 1 to 999 seconds

#### **Number of Trial**

Set the number of trials that you want to perform. Range: 1 to 60

#### **Result of Throughput Test**

Set whether to use the result of the throughput test as the latency test's measurement rate.

- · Selected: The result of the throughput test is used.
- · Cleared: The result of the throughput test is not used.

#### **Test Rate**

Set the measurement rate of the latency test. You can specify this value when you are not using the result of the throughput test as the measurement rate. Range: 0.01 to 100.00%

## Pass/Fail Judge

Set whether to perform pass/fail judgments on the latency test result.

- Selected: Pass/fail judgments are performed.
- Cleared: Pass/fail judgments are not performed.

### Note\_

If you want to perform pass/fail judgments, enable the pass/fail judgment setting in the optional measurement settings as well.

### **Threshold Criterion**

If you select to perform pass/fail judgments on the latency test result, set the judgment threshold. Range: 0.1 to 999999.9µs

# 8.7 Configuring Frame Loss Rate Test Settings

## Procedure

# Frame Loss Rate Test Setup Screen

Follow the procedure in section 8.1 to display the RFC2544 Setup screen. Press the **Detail Setup** soft key and then the **Loss Rate Setup** soft key to display the following screen.

× 2010/9/24 16:41:41	Detail Setup	
RFC2544 Test Setup	( Throughout	
Test Duration	Setup	
Number Of Trial 1 Times		- Set the test duration (1 to 999).
<pre>&lt;&lt; Test Rate &gt;&gt;</pre>	Setup	- Set the number of thats (1 to 60).
Initial Rate 100 👻	Less Pate	— Set the initial rate (1 to 100).
🖌 Step Down ————————————————————————————————————	Costup	<ul> <li>Select this check box to have the rate</li> </ul>
Step Down Rate 10%		decreased between measurements.
Ress/Fail .judge	Se tup	<ul> <li>Select this check box to perform</li> </ul>
Threshold Criterion 100.00 %	Poskat littar	pass/fail judgment.
	Cotup	Set the upper limit on the loss rate
		(0.01 to 100.00).
	RFC 2544	

# Explanation

#### **Test Duration**

Set the test duration. The value that you specify here is the time that a single test frame is transmitted for.

Range: 1 to 999 seconds

### **Number of Trial**

Set the number of trials that you want to perform. Range: 1 to 60

### **Initial Rate**

Set the initial traffic rate that the frame loss rate test will use. Range: 1 to 100%

#### **Step Down**

Set whether the rate is decreased between measurements in the frame loss rate test.

- · Selected: The rate is decreased between measurements.
- Cleared: The rate is not decreased between measurements.

#### Note.

The test result format is different depending on whether the rate is decreased between measurements. For details, see section 9.5, "Displaying Frame Loss Rate Test Results."

## Step Down Rate

If you have selected to have the rate decreased between measurements, set the step down rate. • Value: 10%, 20%

### Pass/Fail Judge

Set whether to perform pass/fail judgments on the frame loss rate test result.

- Selected: Pass/fail judgments are performed.
- Cleared: Pass/fail judgments are not performed.

#### Note\_

If you want to perform pass/fail judgments, enable the pass/fail judgment setting in the optional measurement settings as well.

#### **Threshold Criterion**

If you select to perform pass/fail judgments on the frame loss rate test result, set the judgment threshold.

Range: 0.01 to 100.00%

# 8.8 Configuring Back to Back Test Settings

## Procedure

## **Back to Back Test Setup Screen**

Follow the procedure in section 8.1 to display the RFC2544 Setup screen. Press the **Detail Setup** soft key and then the **Back to Back Setup** soft key to display the following

screen.

ě	2010/9/24 16:42:12	Detail Setup	
	RFC2544 Test Setup		
	Test Duration	Throughput Setup	
			<ul> <li>Set the test duration (1 to 999).</li> </ul>
	Number Ut Irial 50 <u>limes</u>	 Latonoy	<ul> <li>Set the number of trials (1 to 60).</li> </ul>
	<< Measuerment Setup >>	Se tup	
	Resolution(Frames) 1		<ul> <li>Set the resolution (1 to 65535).</li> </ul>
	<< Pass/Fail >>	Loss Kate Setup	
	🖌 Pass/Fail Judge	 	<ul> <li>Select this check box to perform</li> </ul>
	Threshold Criterion 0	Back to Back	pass/fail judgment.
		Setup	<ul> <li>Set the lower limit on the number of</li> </ul>
		Packet Jitter Setup	frames (0 to 1486607142).
		RFC 0	

## Explanation

#### **Test Duration**

Set the test duration. The value that you specify here is the time that a single test frame is transmitted for.

Range: 1 to 999 seconds

#### Number of Trial

Set the number of trials that you want to perform. Range: 1 to 60

#### **Resolution(Frames)**

Set the range that the result of the back to back test will be contained within. Range: 1 to 65535 frames

#### Pass/Fail Judge

Set whether to perform pass/fail judgments on the back to back test result.

· Selected: Pass/fail judgments are performed.

· Cleared: Pass/fail judgments are not performed.

#### Note.

If you want to perform pass/fail judgments, enable the pass/fail judgment setting in the optional measurement settings as well.

### **Threshold Criterion**

If you select to perform pass/fail judgments on the back to back test result, set the judgment threshold.

Range: 0 to 1486607143 frames

# 8.9 Configuring Packet Jitter Test Settings

## Procedure

# Packet Jitter Test Setup Screen

Follow the procedure in section 8.1 to display the RFC2544 Setup screen. Press the **Detail Setup** soft key and then the **Packet Jitter Setup** soft key to display the following screen.

<mark>∲ 2010/9/24</mark> 16:43:11	Detail Setup	
RFC2544 Test Setup Test Duration	Throughput Setup	
120     c       Number Of Trial     1     Times	Latonoy Setup	<ul> <li>Set the test duration (1 to 999).</li> <li>Set the number of trials (1 to 60).</li> </ul>
☑ Result of Throughput Test Test Rate 50.00 ¥	Loss Rate Setup	<ul> <li>Select this check box to measure at the throughput result rate.</li> </ul>
Keasuerment Setup >> Test Window Size 1s Resolution Auto	Back to Back	<ul> <li>Set the measurement rate (0.01 to 100.00).</li> <li>Set the test window size (100ms, 500ms, 1s, 10s, Test duration).</li> </ul>
Calculation Criterion for Result 75Percentile	Facket Jitter Setup	<ul> <li>Set the measurement resolution (Auto,</li> <li>0.05ms, 0.1ms, 0.5ms, 1.0ms, 2.5ms, 5.0ms).</li> </ul>
☑ Pass/Fail Judge Threshold Criterion 300.00 ms		<ul> <li>Set the delay variation threshold (50Percentile, 75Percentile, 90Percentile).</li> </ul>
		Select this check box to perform pass/fail judgment.
		<ul> <li>Set the upper limit on the delay variation (0.05 to 300.00).</li> </ul>

# Explanation

## **Test Duration**

Set the test duration. The value that you specify here is the time that a single test frame is transmitted for. Range: 1 to 999 seconds

## **Number of Trial**

Set the number of trials that you want to perform. Range: 1 to 60

## **Result of Throughput Test**

Set whether to use the result of the throughput test as the packet jitter test's measurement rate.

- · Selected: The result of the throughput test is used.
- Cleared: The result of the throughput test is not used.

## **Test Rate**

Set the measurement rate of the packet jitter test. You can specify this value when you are not using the result of the throughput test as the measurement rate. Range: 0.01 to 100.00%

## **Test Window Size**

Set the sample width for the calculation of the delay variation value. The AQ1300/AQ1301 statistically processes a delay variation value for each sample width. For details, see section 1.16, "RFC2544 Measurement."

- 100ms
- 500ms
- 1s
- 10s
- Test duration

### Resolution

Set the resolution for the calculation of the delay variation value. If you set Resolution to Auto, the AQ1300/AQ1301 automatically selects the value of the setting when it performs the measurement. For details, see section 1.16, "RFC2544 Measurement."

- Auto
- 0.05ms
- 0.1ms
- 0.5ms
- 1.0ms
- 2.5ms
- 5.0ms

#### Note.

If the delay variation changes greatly depending on the test frame length, the percentile value may not be measurable when the resolution is set to Auto. If this is the case, set the resolution to a specific value, and perform the measurement.

## **Calculation Criterion for Result**

Set the threshold value that is used to calculate the statistical result of the delay variations. For details, see section 1.16, "RFC2544 Measurement."

- 50Percentile
- 75Percentile
- 90Percentile

#### Pass/Fail Judge

Set whether to perform pass/fail judgments on the packet jitter test result.

- Selected: Pass/fail judgments are performed.
- · Cleared: Pass/fail judgments are not performed.

#### Note-

If you want to perform pass/fail judgments, enable the pass/fail judgment setting in the optional measurement settings as well.

## **Threshold Criterion**

If you select to perform pass/fail judgments on the packet jitter test result, set the judgment threshold.

Range: 0.05 to 300.00 ms

# 8.10 Configuring RFC2544 Options

## Procedure

# **Advance Setup Screen**

Follow the procedure in section 8.1 to display the RFC2544 Setup screen.

Press the **Option (RFC2544)** soft key and then the **Advance setup** soft key to display the following screen.



## **Measurement Setup Screen**

Press the **Option (RFC2544)** soft key and then the **Measurement Setting** soft key to display the following screen.



# Explanation

# Advance Setup Screen

# Select setup file after selecting RFC2544

Select whether to display the Select Setup File screen after you select RFC2544 on the Test Menu.

- Selected: The Select Setup File screen is displayed.
- Cleared: The Select Setup File screen is not displayed. The previous settings are automatically selected.

# Allow to Change the Test Setup

Select whether to allow the Test Setup screen settings to be changed.

- Selected: The Test Setup screen settings can be changed.
- Cleared: The Test Setup screen settings cannot be changed.

# Measurement Setup Screen

# **Measurement START Condition**

# Request ARP/NDP (During RFC2544 tests, this is fixed to selected and appears dimmed.)

For ARP (IPv4) and NDP (IPv6) destination MAC addresses, select whether to use an ARP or NDP request to acquire the MAC address when the START key is pressed. This setting is valid when the test layer is L3-IPv4 or L3-IPv6.

- Selected: An ARP/NDP request is sent.
- Cleared: An ARP/NDP request is not sent.

# Not start the measurement when Link is down. (During RFC2544 tests, this is fixed to selected and appears dimmed.)

Select whether to start measurement when the START key is pressed and a linkdown is detected.

- Selected: Measurement is not started when a linkdown is detected.
- Cleared: Measurement is started when a linkdown is detected.

# Measurement STOP Condition

# When Link Down is detected (During RFC2544 tests, this is fixed to selected and appears dimmed.)

Select whether to stop measurement when a linkdown is detected during measurement.

- · Selected: Measurement is stopped when a linkdown is detected.
- Cleared: Measurement is not stopped when a linkdown is detected.

# When L2 Error is detected

Select whether to stop measurement when an L2 error is detected during measurement.

- Selected: Measurement is stopped when an L2 error is detected.
- Cleared: Measurement is not stopped when an L2 error is detected.

# When Fail Result is detected

Select whether to stop measurement when the result of the test currently being performed produces a fail judgment.

- Selected: Measurement is stopped when the test result produces a fail judgment.
- Cleared: Measurement is not stopped when the test result produces a fail judgment.

#### **Operation after Measurement Stops**

#### Judge Pass or fail

Select whether to perform pass/fail judgments after measurements finish.

- Selected: Pass/fail judgments are performed after measurements finish.
- · Cleared: Pass/fail judgments are not performed after measurements finish.

#### Note\_

To perform pass/fail judgments for a particular test, you have to set the pass/fail judgment setting on the test's setup screen.

#### Save measurement results

Select whether to save the measurement results to a file after measurement finishes.

- · Selected: The measurement results are saved to a file when measurement finishes.
- Cleared: The measurement results are not saved to a file when measurement finishes.

#### Save measurement logs

Select whether to save the measurement log to a file after measurement finishes.

- · Selected: The measurement log is saved to a file when measurement finishes.
- · Cleared: The measurement log is not saved to a file when measurement finishes.

#### Others

#### Subtrac the fixed latency from the result

During latency measurement, the fixed delay that occurs in the other device during loopback is subtracted from the measured results. The subtracted results are displayed as measurement results. If the measured value is less than the fixed delay,  $0.00 \ \mu s$  is displayed.

This feature is supported in firmware version (FW Ver.) R1.08.01.001 and later.

- · Selected: The fixed delay is subtracted from the measured values.
- · Cleared: The fixed delay is not subtracted from the measured values.

#### Fixed delay value based on the interface

Interface	Delay
XFP	1.0 µs
SFP (GbE)	1.4 µs
SFP (FE)	12 µs
RJ-45 (1000M)	1.6 µs
RJ-45 (100M)	11 µs
RJ-45 (10M)	108 µs

# 9.1 Starting Measurement

## Procedure

## Starting Measurement

Press **START** to display the following screen and start measurement and transmission.



Network status ► section 2.1

#### Note.

Before starting the measurement, check that the AQ1300/AQ1301 connected to the other device is set to Loopback Test mode. For instructions on how to specify Loopback Test mode, see section 4.6, "Configuring a Loopback Test" or section 6.6, "Configuring a Loopback Test."

# Explanation

# **Test Information**

The name of the test that is currently being performed and the number of trials that will be performed are displayed here.

#### **Test Items**

•

- Throughput: Throughput test
  - Latency: Latency test
- Frame Loss Rate: Frame loss rate test
  - Back to Back: Back to back test
- Packet Jitter: Packet jitter test

## **Number of Trials**



9

Performing RFC2544 Measurements (AQ1300 Option)

## Summary

A summary of the settings is displayed, or the addresses are displayed.

- · Summary: A summary of representative settings is displayed.
- · Address: The source and destination MAC and IP addresses are displayed.

For information about switching between the summary and the address display, see section 9.2.

# **Test Results**

#### **Display during Measurement**



Measuring:

This appears while measurement is being performed. Measurement duration: Indicated in the following format: hh:mm:ss.

#### **Display When Measurement Has Finished**

Test Results Page 1/1	Duration 00:00:03	
	— Pass/fa	il judgment

#### · Pass/Fail Judgment Indication

The pass/fail judgment of the test is displayed here. This appears when the pass/fail judgment is enabled. For details on the pass/fail judgment setting, see section 8.10.

- · Pass: The results meet the requirements.
- Fail: The results do not meet the requirements.

#### **Results Display**

Throughput	Finish	Fail	
Latency	Finish	Pass	
Frame Loss Rate	Executing		<ul> <li>Pass/fail judgment</li> </ul>
Back to Back	Pre Exec		Execution status
Packet Jitter			

For each test, the current measurement execution state and the pass/fail judgment result are displayed here.

· Execution State

Pre Exec:	The AQ1300/AQ1301 is waiting to execute the test.
Learning:	The AQ1300/AQ1301 is learning an address.
Preparing:	The AQ1300/AQ1301 is performing the preliminary measurement (only during the packet jitter test).
Executing:	The AQ1300/AQ1301 is executing the test.
Finish:	The test has finished.
Aborted:	During test execution, the STOP button was pressed to force the test to stop or the test stopped automatically because an error was detected.
:	The test is not enabled.

- Pass/Fail Judgment
  - The results meet the requirements. Pass:
  - Fail: The results do not meet the requirements.

#### Note\_

The pass/fail judgment result is not displayed while a test is being executed or if the pass/fail judgment is not enabled.

# **Statistics Counter and Error Detection History Display**

During measurement, the statistical information of the frames that are transmitted from and received by the measurement port and the status of error detection are displayed here.

Transmission and Reception Rates

During measurement, the transmission and reception rates are indicated (as percentages).

Normal Frames

The number of normal frames that have been sent and received during a single measurement period is indicated.

Received Frame Length

The currently received frame length is indicated as an average over 1-second intervals.

#### • Error Detection History

From the start of measurement to the time that measurement is stopped, link errors and L2 errors (L2 frame errors) are displayed here as they are detected.

<b>Display Item</b>	Display	Explanation
LINK ERR	LINK ERR	No linkdowns have been detected during measurement.
	(gray)	
	LINK ERR	If even one linkdown is detected during measurement, the indication becomes
	(red)	red.
L2 ERR	L2 ERR (gray)	During measurement, no frames have been received with any of the following
		errors.
		CRC errors
		Undersize errors
		Oversize errors
		Symbol errors
		Alignment errors
	L2 ERR (red)	During measurement, if even one frame is received with any of the following
		errors, the indication becomes red.
		CRC errors
		Undersize errors
		Oversize errors
		Symbol errors
		Alignment errors

# 9.2 Displaying the Test Results

# Procedure

# **Test Result Display Screen**

Follow the procedure in section 9.1 to start and stop measurement.

🎄 🚺 2010/s	9/27 10:04:03		Measurement	
RFC2544 Trial Count	Remain 0 <mark>⊠tay</mark> Tx Rate(%) : 100.00000 Fra Frames: 29761904 Fil	<sup>hSER</sup> FF <mark>LES</mark> me Len.(byte):64 1 Pattern: Rando	Start Transmit	
	Page 1/1	Duration 00:00:0	Stop Transmit	
10G FULL PRUSE	Throughput Latency	Finish Pas Finish Pas	Special Control	
TX RX L2 ERR	Frame Loss Rate	Finish Pas	File _	Displays the file operation screen ▶section 12.2
T×LF T×RF R×LF R×RF	Packet Jitter		Next 1/3 =	<ul> <li>To measurement page 2/3</li> </ul>
	Normal Frame: Tx: 0 Rx: 0 Rx Frame Length(byte):	Error History LINK L2 ERR ERR	RFC C	

Measurement Throughput	Displays the results screen for the throughput test ▶ section 9.3
Latency =	Displays the results screen for the latency test ▶ section 9.4
Loss Rate	Displays the results screen for the frame loss rate test ▶ section 9.5
Back to Back	Displays the results screen for the back to back test
Next 2/3	► section 9.6 To measurement page 3/3
BFC 0 4544	
Measurement ¶ Packet Jitte⊑	Displays the results screen for the packet jitter test ▶ section 9.7
Summary Display	Switches the contents of the summary
Next	display (Summary, Address) To measurement page 1/3

#### Note.

- During measurement, you can select menu items other than "File."
- If you press ESC while another measurement screen is displayed, the measurement results screen will appear.
- You can also use the left and right arrow keys to switch between measurement screens. For details, see section 9.8.

# Explanation

## Switching the Summary Display

You can switch the contents of the summary display.

- Summary: The transmission rate, transmission time, frame length, and fill pattern are displayed.
- · Address: The source and destination MAC and IP addresses are displayed.

# 9.3 Displaying Throughput Test Results

# Procedure

# **Throughput Test Results Screen**

Follow the procedure in section 9.1 to start and stop measurement. Press the **Throughput** soft key to display the following screen.

×	9/27 10:10:56				Throughput	
RFC2544	Remain	0[s] 🔀	STAT LASER LFS LOG DFF Contro	4	Switch	
	Tx Rate(%) :	85.37000	Frame Len.(b)	yte): 64		Switches the graph display
Trial Count	Tx Time(min):	0	Fill Patterna	: Random	%	· · · · · · · · · · · · · · · · · · ·
0/0 0						
Ll	Throughput			Page 1/	2	
XFP 🔤	100.00					
LINK LR						
106 EUL						
PRIISE						<ul> <li>Throughput test results graph</li> </ul>
Frame	•					••••••••
TX BX						
12 FRR	0.00					
LFS	64	128 256	512 1024 1	280 1518		
T*LF T*BF		Theoret	<del>ical value - M</del>	<del>acured val</del> u	2	
Byle ByRE	No Length	Rate(%)	Rate(fps)	Rate(bps)		
	1 64	26.57	39539	20243853	_	<ul> <li>Throughput test results table</li> </ul>
	2 120	71.87	32551	66664908	-	
	4 512	98.45	23131	94744660		
	5 1024	99.09	11864	97190557		
	<b>6</b> 1280	98.76	9496	97240294		
	1016	00.37	0939	01202010		1

#### Note\_

- You can display this screen even during measurement.
- You can also use the left and right arrow keys to switch between measurement screens. For details, see section 9.8.
- Press ESC to return to the Test Result Display screen (see section 9.2).

# Explanation

## Throughput Test Results Graph

The measured results are displayed on a graph.

- · Horizontal axis: Test frame length
- Vertical axis: Throughput. You can switch the units that the graph is displayed in between rate (%), frames/second (fps), and bits/second (bps).

Two types of graphs are displayed: a graph that displays theoretical values and a graph that displays actual measured values.

- (theoretical values): The maximum theoretical values of the test interface are displayed.
- - (actual measured values): The measured results are displayed.

## Throughput Test Results Table

The following items are displayed.

- No: This is the test frame length number. If pass/fail judgment is enabled, the pass/fail judgment results are indicated with colors for each frame length.
  - Green: Pass
  - Red: Fail
- Length: Test frame length
- Rate(%): The measured result is displayed as a rate (%).
- Rate(fps): The measured result is displayed as frames per second.
- Rate(bps): The measured result is displayed as bits per second.

#### Note.

- Use the up and down arrow keys to switch the displayed page. If more than seven test frame lengths are enabled, the first seven frame lengths are displayed on the first page, and the remaining test frame lengths are displayed on the second page.
- During measurement or for any test frame lengths that have not yet gone through measurement, the result columns display "----."

No	Length	Rate(%)	Rate(fps)	Rate(bps)
1	64	26.57	39539	20243853
2	128	42.49	35887	36748434
3	256	71.87	32551	66664908
4	512			
5	1024			
6	1280			
7	1518			

• For any test frame lengths that the throughput measured result could not be obtained for (for example, if a loss was detected even at the minimum rate), the result columns display "\*\*\*\*."

No	Length	Rate(%)	Rate(fps)	Rate(bps)
1	64	26.57	39539	20243853
2	128	42.49	35887	36748434
3	256	71.87	32551	66664908
4	512	жжжж	****	****
5	1024	жжж	жжжж	жжжж
6	1280	жжжж	****	жжжж
7	1518	****	****	****

## Switching the Graph Display

You can switch the unit of the measured result graph.

- %: Rate (%)
- fps: Frames per second
- · bps: Bits per second

# 9.4 Displaying Latency Test Results

# Procedure

# Latency Test Results Screen

Follow the procedure in section 9.1 to start and stop measurement. Press the **Latency** soft key to display the following screen.



### Note.

- You can display this screen even during measurement.
- You can also use the left and right arrow keys to switch between measurement screens. For details, see section 9.8.
- Press ESC to return to the Test Result Display screen (see section 9.2).

# Explanation

## Latency Test Results Graph

The measured results are displayed on a graph.

- Horizontal axis: Test frame length
- Vertical axis: Delay (µs). You can switch the units that the graph is displayed in between store and forward (Store&Forward) and cut through (Cut Through).

## Latency Test Results Table

The following items are displayed.

- No: This is the test frame length number. If pass/fail judgment is enabled, the pass/fail judgment results are indicated with colors for each frame length.
  - Green: Pass
  - Red: Fail
- Length: Test frame length
- TestRate(%): Test rate (%)
- S&F(us): The measured result under the store and forward system is displayed.
- CT(us): The measured result under the cut through system is displayed.

#### Note\_

- Use the up and down arrow keys to switch the displayed page. If more than seven test frame lengths are enabled, the first seven frame lengths are displayed on the first page, and the remaining test frame lengths are displayed on the second page.
- During measurement or for any test frame lengths that have not yet gone through measurement, the result columns display "----."
- During measurement, the No cells for any test frame lengths whose delay measurement frames were lost are displayed in orange.
- For any test frame lengths that the throughput measured result could not be obtained for (if the delay measurement frames were lost for all trials), the result columns display "\*\*\*\*."

## Switching the Graph Display

You can switch the unit of the measured result graph.

- Store&Forward: Store and forward values are displayed.
- Cut Through: Cut through values are displayed.

# 9.5 Displaying Frame Loss Rate Test Results

## Procedure

## Frame Loss Rate Test Results Screen

Follow the procedure in section 9.1 to start and stop measurement. Press the **Loss Rate** soft key.

#### When the Rate Is Decreased between Measurements

If you have selected the **Step Down** check box in the frame loss rate test settings (see section 8.7), the following screen is displayed.



#### When the Rate Is Not Decreased between Measurements

If the Step Down check box is not selected, the following screen is displayed.



#### Note.

- You can display this screen even during measurement.
- You can also use the left and right arrow keys to switch between measurement screens. For details, see section 9.8.
- Press ESC to return to the Test Result Display screen (see section 9.2).

## Explanation

## When the Rate Is Decreased between Measurements

### **Test Frame Length**

This indicates the frame length that was used to generate the results graph and results table that are currently displayed.

You can use the up and down arrow keys to switch the displayed test frame length.

### Frame Loss Rate Test Results Graph

- The measured results are displayed on a graph.
- Horizontal axis: Test rate (%)
- Vertical axis: Frame loss rate (%)

### Frame Loss Rate Test Results Table

The following items are displayed.

- No: This is the test rate number. If pass/fail judgment is enabled, the pass/fail
  - judgment results are indicated with colors for each test rate.
    - Green: Pass
  - Red: Fail
- TestRate(%): Test rate (%)
- · LossRate(%): The measured results are displayed as frame loss rates (%).
- LossFrame: The measured results are displayed as the number of lost frames.

#### Note.

- During measurement or for any test frame lengths that have not yet gone through measurement, the result columns display "----."
- If no frame losses are detected for two consecutive rates, no frame signals at lower rates are measured.
   In this case, "0" is displayed for the measured results of the frame signals at the rates that were not measured.

# When the Rate Is Not Decreased between Measurements

### Frame Loss Rate Test Results Graph

The measured results are displayed on a graph.

- · Horizontal axis: Test frame length
- Vertical axis: Frame loss rate (%)

#### Frame Loss Rate Test Results Table

The following items are displayed.

• No: This is the test frame length number. If pass/fail judgment is enabled, the pass/fail judgment results are indicated with colors for each frame length.

- Green: Pass Red: Fail
- Teet frame langth
- Length: Test frame length
- LossRate(%): The measured results are displayed as frame loss rates (%).
- LossFrame: The measured results are displayed as the number of lost frames.

#### Note.

- Use the up and down arrow keys to switch the displayed page. If more than seven test frame lengths are enabled, the first seven frame lengths are displayed on the first page, and the remaining test frame lengths are displayed on the second page.
- During measurement or for any test frame lengths that have not yet gone through measurement, the result columns display "----."

# 9.6 Displaying Back to Back Test Results

# Procedure

# **Back to Back Test Results Screen**

Follow the procedure in section 9.1 to start and stop measurement. Press the **Back to Back** soft key to display the following screen.



#### Note.

- You can display this screen even during measurement.
- You can also use the left and right arrow keys to switch between measurement screens. For details, see section 9.8.
- Press ESC to return to the Test Result Display screen (see section 9.2).

# Explanation

## Back to Back Test Results Graph

The measured results are displayed on a graph.

- · Horizontal axis: Test frame length
- Vertical axis: Number of burst frames

## Back to Back Test Results Table

The following items are displayed.

- No: This is the test frame length number. If pass/fail judgment is enabled, the pass/fail judgment results are indicated with colors for each frame length.
  - Green: Pass
  - Red: Fail
- Length: Test frame length
- NumOfFrames: The measured results are displayed as the number of burst frames.

#### Note.

- Use the up and down arrow keys to switch the displayed page. If more than seven test frame lengths are enabled, the first seven frame lengths are displayed on the first page, and the remaining test frame lengths are displayed on the second page.
- During measurement or for any test frame lengths that have not yet gone through measurement, the result columns display "----."

### **Displaying Packet Jitter Test Results** 9.7

# Procedure

# Packet Jitter Test Results Screen

Follow the procedure in section 9.1 to start and stop measurement. Press the **Packet Jitter** soft key to display the following screen.

🎄 📄 2010/:	9/27 10:36:31	Packet Jitter	
RFC2544	Remain 10[s] <mark>⊠ LASER LESER LES</mark> Tx Rate( <b>X</b> ) : 95.93000 Frame Len.(byte):64	Max Value	<ul> <li>Set whether the maximum value graph is</li> </ul>
Trial Count 0/0 0	Tx Time(min): 0 Fill Pattern: Random	ON OFF	displayed (ON, OFF).
		IN OFF	<ul> <li>Set whether the minimum value graph is displayed (ON, OFF).</li> </ul>
10G FULL PRUSE		Percentile ON OFF	Set whether the percentile graph is displayed (ON, OFF).
TX RX	0.00		<ul> <li>Packet jitter test results graph</li> </ul>
LFS TxLF TxRF B-LE B-RE	64 128 256 512 1024 1280 1518 No Length Rate(%) Max(ms) Min(ms) Percentile(ms)		
	1         64         26.57         2.32         0.64         1.50           2         128         42.43         2.48         0.20         2.50           3         256         71.93         3.06         0.08         3.00		<ul> <li>Packet jitter test results table</li> </ul>
	4         512         98.10 <i>i</i> .42         0.15         3.40           5         1024         99.04         9.14         0.29         4.40           6         1280         95.93         2.61         0.38         1.50           7         1514         05         2.42         0.46         1.60	BFC	

### Note.

- You can display this screen even during measurement.
- You can also use the left and right arrow keys to switch between measurement screens. For details, see section 9.8.
- Press ESC to return to the Test Result Display screen (see section 9.2).

# Explanation

## **Packet Jitter Test Results Graph**

The measured results are displayed on a graph.

- · Horizontal axis: Test frame length
- · Vertical axis: Delay variation

Three types of graphs are displayed: a graph that displays maximum values of delay variations, a graph that displays minimum values of delay variations, and a graph that displays percentile values.



- (maximum values): The maximum measured delay variations are displayed.

- (minimum values): The minimum measured delay variations are displayed.
  - (percentile values): The statistically processed values (percentiles) of the measured delay variations are displayed.

## **Packet Jitter Test Results Table**

The following items are displayed.

- No: This is the test frame length number. If pass/fail judgment is enabled, the pass/fail judgment results are indicated with colors for each frame length.
  - Green: Pass
  - Red: Fail
- Length: Test frame length
- Rate(%): Test rate (%)
- · Max(ms): Maximum delay variations
- Minimum delay variations Min(ms):
- · Percentile(ms): Percentile value of the delay variations

#### Note\_

- Use the up and down arrow keys to switch the displayed page. If more than seven test frame lengths are enabled, the first seven frame lengths are displayed on the first page, and the remaining test frame lengths are displayed on the second page.
- During measurement or for any test frame lengths that have not yet gone through measurement, the result columns display "----."
- During measurement, the No cells for any test frame lengths whose test frames were lost are displayed in orange.
- For any test frame lengths that the percentile value could not be obtained for (for example, if the measurement resolution setting was smaller than an appropriate value), the result columns display "\*\*\*\*."

## Switching the Graph Display

You can select whether each of the following graphs is displayed on the screen.

Maximum value graph

Minimum value graph

Percentile value graph

- ON: The graph is displayed.
- OFF: The graph is not displayed.

# 9.8 Changing the Displayed Screen

## Procedure

You can switch the displayed measurement screen by pressing the left and right arrow keys.



On every screen except for the Test Result Display screen, you can switch between pages of results on the displayed screen by pressing the up and down arrow keys.

## Explanation

## ▶ and ◀ Keys

These keys change the displayed screen. They are valid when a measurement screen is displayed.

## ▲ and ▼ Keys

These keys switch between the pages of the displayed screen. They are valid on any screen other than the Test Result Display screen.

# 10.1 Pre-Measurement Calibration

Before you calibrate the optical power meter, remove the optical fiber cable from the AQ1300, and close the AQ1300 optical connector covers.

# Procedure

## **Performing Zero Set**

Press the **OPM** soft key and then the **Setup** soft key to display the following screen.

ļ	Optical	Power Meter Setup	
		ZERO SET	Performs zero set
	Avg Times	1	
	Max/Min Menu	Diff On	
	Offset	0.000dB	
	<sub>C</sub> Threshold		
	Upper	-5.00dBm	
	Lower	-28.00dBm	

# Explanation

Perform zero set whenever necessary. Performing zero set adjusts the offset of the optical power measurement section and enables you to obtain more accurate absolute optical power values.

# 10.2 Setting Optical Power Measurement Conditions and Holding the Display

# Procedure

## **Power Meter Screen**

Press the **OPM** soft key to display the following screen.



These lines indicate the upper and lower threshold values (see the detail setup screen in the next section).

# **Detail Setup Screen**

Press the OPM soft key and then the Setup soft key to display the following screen.



## Explanation

## Wavelength

The light receiving element of the optical power measurement section has a wavelength sensitivity distribution. The AQ1300 measures optical power more accurately by adjusting the sensitivity according to the specified wavelength.

You can set the measurement wavelength to one of the following values. 850 nm, 1300 nm, 1310 nm, 1490 nm, 1550 nm, 1625 nm, 1650 nm

Set the wavelength according to the test interface as indicated in the table below.

Test Interface	Wavelength
100BASE-FX (SFP)	1310 nm
1000BASE-SX (SFP)	850 nm
1000BASE-LX (SFP)	1310 nm
10GBASE-SR (XFP)	850 nm
10GBASE-LR (XFP)	1310 nm
10GBASE-ER (XFP)	1550 nm

## **Modulation**

You can set the frequency of the measured light to one of the following options. CW (continuous light), 270 Hz, 1 kHz, 2 kHz

# Unit

You can set the optical power display unit to one of the following options. dB (relative value), dBm (absolute value), W (absolute value)

• The following prefixes are attached to W: m  $(10^{-3})$ , m  $(10^{-6})$ , and n  $(10^{-9})$ .

• The relationship between the absolute values dBm and W is indicated below.

 $P_{dBm} = 10 \times \log (P_w/10^3)$ 

where  $P_{dBm}$  is the optical power in units of dBm and  $P_w$  is the optical power in units of W.

# Reference

You can set a reference and display measured values as relative values (display their difference from the reference).

- Press the DREF soft key to make the displayed measured value the reference and display subsequent measured values as relative values. The unit will change to dB.
- Press the DREF soft key or set the unit to dB to display the Reference box in the Power Meter screen.
- You can set the reference manually in the Reference box. The range is -70 to 5 dBm.
- If you set the unit to dBm or W, the Reference box disappears and the measured values are displayed as absolute values.

# **Average Count**

Averages of the measured values are displayed. You can set the number of values to average to one of the following options.

1, 10, 50, 100
## Turning the Maximum and Minimum Value Menu On and Off

In the Power Meter screen, you can display a menu that shows the maximum (Max) and minimum (Min) measured values.

On	The menu is displayed.
Off	The menu is not displayed.

#### Turning the Maximum and Minimum Value Display On and Off

In the menu that appears in the Power Meter screen, you can start the display of the maximum and minimum measured values. The maximum and minimum value displays are constantly updated while measurement is being performed.



## Offset

The value that you specify (the offset value) is added to the measured optical power values that are displayed.

The range is -9.900 to 9.900 dBm.

## **Threshold Value**

You can set upper and lower threshold values and determine whether or not the measured values fall within them.

- The range for the upper and lower threshold values is -70 to 5 dBm. You must set the values so
  that the upper threshold value is greater than the lower threshold value.
- When a measured value is within the upper and lower thresholds, its bar graph is green.
- When a measured value exceeds the upper threshold or falls below the lower threshold, its bar graph is red.

 Test Interface
 Upper Limit
 Lower Limit

 1000BASE-SX (SFP)\*
 0.0 dBm
 -17.0 dBm

Test Interface	Upper Limit	Lower Limit
1000BASE-SX (SFP)*	0.0 dBm	–17.0 dBm
1000BASE-LX (SFP)*	–3.0 dBm	–19.0 dBm
10GBASE-SR (XFP)*	–1.0 dBm	–9.9 dBm
10GBASE-LR (XFP)*	+0.5 dBm	–14.4 dBm
10GBASE-ER (XFP)*	–1.0 dBm	–15.8 dBm
100BASE-FX (SFP)**	–14.0 dBm	–31.0 dBm

\*: Taken from the average receive power values listed in IEEE 802.3

\*\*: Taken from the ISO/IEC 9314-3

## Holding the Measured Value Display

When you press the HOLD soft key, the updating of the measured values, bar graph, and maximum and minimum values is held. The values at the time that you pressed the HOLD soft key remain displayed. To release the hold on the display, press the HOLD soft key again.



## 11.1 Selecting a Setup File

## Procedure

## VLAN Test Setup Screen

Press the Option soft key and then the VLAN Test soft key to display the following screen.

🔆 2013/2/19 16:32:30 🚥 = AC =	VLAN Setup
VLAN Test Setup	Test
<< Test Setup >> Test Interface XFP(10GbE) << Address Satting >>	XFP(106bE) — Set up the test. L3-IPv4 Test ► section 11.2
Source NAC         00	
Destination IPv4 192 168 0 1 Refer	Configure link and address settings. Section 11.3
Test For VLAN VLAN stacks 2	Detail Setup Configure the detailed settings for the individual VLAN tests.
VLAN2     TPID     0000     CFI     0     Cos     7     ID     Target     Refer       YLAN1     TPID     8100     CFI     1     Cos     0     ID     4095     Refer       Target:Please set ID in VLAN ID TX Setting menu.	► section 11.4 to 11.6 Next 1/2 = To VLAN Test Setup 2/2

Press the Next 1/2 soft key to display the following screen.



## File Screen

Press the File soft key to display the following screen.



The files that you have created using the setup software or the AQ1300/AQ1301 appear.

## Explanation

#### **Default setup**

Select this item to return to the default setup.

#### Loads a file

Select this item to load a VLAN test setup file (with an .sd extension) from the file list. To create a setup file, you can use the setup software and send the file to the AQ1300, or you can save the settings on the AQ1300.

For details on the Setup Software, see the Setup Software User's Manual, IM AQ1300-61EN.

#### **VLAN ID Definition File**

VLAN ID definition files (csv format; .csv or .txt extension) created in advance can be loaded into the VLAN ID list of the AQ1300/AQ1301. For the procedure, see section 11.5.

## 11.2 Configuring the Test Settings

## Procedure

## Test Setup Screen

Follow the procedure in section 11.1 to display the VLAN Test Setup screen. Press the **Test Setup** soft key to display the following screen.

Test S	Setup	- S
<< Test Setup >> Test Interface Test Layer	XFP(10GbE)	()   - s
Add UDP to Tx Fram Suse Jumbo Frame	e	(L

Set the test interface (XFP(10GbE), SFP(GbE), SFP(FE), RJ-45).

et the test layer \_2 Test, L3-IPv4 Test, L3-IPv6 Test).

Select this check box to add UDP to Tx frames. This setting can be selected when Test Layer is set to L3-IPv4 Test or L3-IPv6 Test.

## Explanation

### Test Interface

Specify which test interface to use.

- XFP(10GbE): Select this option to use the 10GBASE-R measurement port.
- SFP(GbE): Select this option to use the 1000BASE-X measurement port.
- SFP(FE): Select this option to use the 100BASE-X measurement port. This feature is supported in firmware version R1.05.01.001 and later.
- RJ-45: Select this option to use the 10BASE-T/100BASE-TX/1000BASE-T measurement port.

## **Test Layer**

Set the layer to test.

- L2 Test: Select this option to test layer 2.
- L3-IPv4 Test: Select this option to test layer 3 according to the IPv4 protocol.
- L3-IPv6 Test: Select this option to test layer 3 according to the IPv6 protocol.

## Add UDP to Tx Frame

Set whether to add UDP to Tx frames. You can select this check box when the test layer is L3-IPv4 or L3-IPv6.

## 11.3 Configuring Link Address Settings

## Procedure

## **Link Setting Screen**

Follow the procedure in section 11.1 to display the VLAN Test Setup screen. Press the **Link/Address** soft key and then the **Link Setting** soft key to display the following screen.



Set the negotiation (Auto, Manual). This setting is valid when Test Interface is set to RJ-45 or SFP(GbE).

Set the speed (1G, 100M, 10M, Auto). This setting is valid when Test Interface is set to RJ-45. The Auto setting for Speed is valid when

Negotiation is set to Auto.

Set the duplex (FULL, HALF, Auto). This setting is valid when Speed is set to 100M or 10M. The Auto setting for Duplex is valid when Negotiation is set to Auto.

Set the flow control (ON, OFF).

Set the MDI (MDI, MDI-X, Auto). The Auto setting for MDI is valid when Negotiation is set to Auto.

## **Source Address Screen**

Press the Link/Address soft key and then the Source Address soft key to display the following screen.



#### Set the source MAC address.

Refer to the MAC Address table. ► section 4.3

Set the VLAN stack number (1, 2).

Configure the VLAN settings (TPID: 0-FFFF, CFI: 0-1,CoS: 0-7, ID: 0-4095). When VLAN stacks is set to 1, the word "Target" appears by the VLAN1 ID, and you cannot set the ID.

When VLAN stacks is set to 2, the word "Target" appears by the VLAN2 ID, and you cannot set the ID.

Refer to the VLAN table. ► section 4.3 Set IPv4 (Manual, DHCP).

This setting appears when Test Layer is set to L3-IPv4.

Refer to the IP address table. ▶ section 4.3

Refer to the gateway reference. ► section 4.3

Set IPv6 (Manual, Stateless Address). This setting appears when Test Layer is set to L3-IPv6.

Set the source IPv6 address. This setting is valid when IPv6 is set to

Refer to the IP Address table.

Select this check box when you want to manually set the router address.

View and set the IPv6 prefix length and the IPv6 router address.

## **Destination Address Screen**

Press the Link/Address soft key and then the Destination Address soft key to display the following screen.



#### Note.

#### Address Settings and VLAN Settings

For the VLAN test, you can also set the source and destination MAC, IPv4, and IPv6 addresses and VLAN settings on the top VLAN test setup screen.

<b>a</b> 2013/2/19 17:58:59	=AC=	VLAN Setup	
VLAN Test Setup		Test	
<< Test Setup >> Test Interface XEP(10GbE)		XFP(10GbE) L3-IPv4 Test	
<pre>     Address Setting &gt;&gt; </pre>			
Source MAC 00 00 00 00 01	Refer		
Destination MAC         00         00         00         00         00         01           Source IPv4         192         168         0         1	Refer		<ul> <li>Address settings</li> </ul>
Destination IPv4 192 168 0 1	Refer	◀ Link/Address	
Test For VLAN	]	Detail Setup	
VLAN stacks         2           VLAN2         TPID         0000         CFI         0         CoS         7         ID         Target           VLAN1         TPID         8100         CFI         T         CoS         0         ID         4095           Target:Please set ID in VLAN         ID         TX         Setting met	Referi Referi mu.	Next 1/2	— VLAN settings

## Explanation

## **Link Setting Screen**

#### Negotiation

Select whether to use auto negotiation. This setting is valid when Test Interface is set to RJ-45 or SFP(GbE).

- Auto: The link between the AQ1300 and the device that it is connected to is configured automatically through auto negotiation.
- · Manual: The link must be configured manually.

#### Speed

When Test Interface is set to RJ-45, you can set the link speed.

- 1G: A 1 Gbit/s 1000BASE-T connection is used.
- 100M: A 100 Mbit/s 100BASE-TX connection is used.
- 10M: A 10 Mbit/s 10BASE-T connection is used.
- Auto: The link speed is set automatically. This setting is valid when Negotiation is set to Auto.

#### Note\_

When Test Interface is set to XFP(10GbE), the link speed is fixed at 10G. When Test Interface is set to SFP(GbE), the link speed is fixed at 1G. When Test Interface is set to SFP(FE), the link speed is fixed at 100M.

#### Duplex

You can set the communication mode for when Speed is set to 100M or 10M. This setting is valid when Test Interface is set to RJ-45.

- FULL: Full duplex communication
- · HALF: Half duplex communication
- Auto: The AQ1300 chooses full or half duplex automatically. This setting is valid when Negotiation is set to Auto.

#### Note.

When Test Interface is set to XFP(10GbE), SFP(GbE), or SFP(FE), or when it is set to RJ-45 and Speed is set to 1G, the duplex mode is fixed at FULL.

#### **Flow Control**

You can enable or disable flow control.

- ON: Flow control is enabled.
- OFF: Flow control is disabled.

#### MDI

You can set the measurement port to straight or crossover mode. This setting is valid when Test Interface is set to RJ-45.

- MDI: Straight
- MDI-X: Cross
- Auto: The AQ1300 switches between straight and crossover mode automatically (this setting is valid when Negotiation is set to Auto).

## Source Address Screen

## Source MAC Address

Set the source MAC address. You can refer to the MAC address table to set the address.

#### **VLAN Stacks**

Set the number of VLAN stacks.

- 1: One VLAN stack.
- 2: Two VLAN stacks.

## VLAN1 and VLAN2

Set the TPID (Tag Protocol Identifier), CFI (Canonical Format Indicator), CoS (Class of Service), and VLAN-ID for 1 or 2 VLAN stacks. You can refer to the VLAN table to set the values.

- TPID: 0 to FFFF
- CFI: 0 or 1
- CoS: 0 to 7
- ID: 0 to 4095

When VLAN stacks is set to 1, the word "Target" appears by the VLAN1 ID, and you cannot set the ID.

When VLAN stacks is set to 2, the word "Target" appears by the VLAN2 ID, and you cannot set the ID.

## IPv4

Select whether to specify the source IPv4 address manually or to acquire and set it automatically through DHCP. This setting is valid when Test Layer is set to L3-IPv4 Test.

- Manual: You must set the source IPv4 address manually.
- DHCP: When you press Get IP Address, the AQ1300 acquires and sets the source IPv4 address using DHCP.

### Source IPv4 Address, Subnet Mask, and Gateway

Set the source IPv4 address, subnet mask, and gateway when IPv4 is set to Manual. You can refer to the IP Address table and the gateway reference to configure the settings.

• Netmask: 1 to 31

### IPv6

Select whether to specify the source IPv6 address manually or to specify it through stateless autoconfiguration using the RA from an IPv6 router. This setting is valid when Test Layer is set to L3-IPv6 Test.

- Manual: You must set the source IPv6 address manually.
- Stateless Address: When you press Get IP Address, the AQ1300 automatically configures the source IPv6 address.

## Source IPv6 Address

Set the source IPv6 address when IPv6 is set to Manual. You can refer to the IP address table to set the address.

## **IPv6 Router Address**

You can automatically acquire the router address or set it manually.

- Automatic: Clear the Set Router Address manually check box. The IPv6 prefix length and router address that have been acquired automatically are displayed.
- Manual: Select the Set Router Address manually check box. You can manually set the prefix length and router address.

## MAC Address Table

Select the source MAC address from the MAC Address table.

Global Address: You can set the source MAC address to a global address.

#### VLAN Table

Select the VLAN CoS and ID from the VLAN table.

### IP Address Table

Select the source IP address from the IP address table.

 Get IP Address: Press this soft key to get the IP address. The AQ1300 will acquire an IP address, using DHCP when the test layer is L3-IPv4 or stateless address autoconfiguration when the test layer is L3-IPv6. 11 VLAN Test

#### Gateway

Set the gateway.

- Manual: Select this option to set the gateway manually.
- Auto.1: Select this option to set the gateway to xxx.xxx.xx.1.
- Auto.254: Select this option to set the gateway to xxx.xxx.254.

## **Destination Address Screen**

## **Destination MAC Address**

Set the destination MAC address. You can refer to the MAC address table to set the address.

#### IPv4

Set the destination IPv4 address. This setting is valid when Test Layer is set to L3-IPv4 Test. You can refer to the IP address table or select Search List to set the address.

#### IPv6

Set the destination IPv6 address. This setting is valid when Test Layer is set to L3-IPv6 Test. You can refer to the IP address table or select Search List to set the address.

#### Search List

Select the address of the other device (the destination address) from the search list.

#### **Searching for Other Devices**

When you select Search other Device, the AQ1300/AQ1301 searches for other devices (AQ1300 or AQ1301) on the same VLAN or network segment and displays the results in the search list.

#### Switching the Display

You can switch between different search list displays.

- SerialNo+Ver: The equipment name, serial number, and version are displayed.
- Test Setup: The equipment name, test interface, and test layer are displayed.
- Status+MAC: The equipment name, status, and MAC address are displayed.
- IPv4/IPv6: The equipment name and IP address are displayed.
- Master Addr: The device name and master address (MAC or IP address) are displayed.

#### Note.

You can check the equipment name and serial number of the AQ1300/AQ1301 in the system settings.

#### Setting the Address Type

You can switch the address type that is displayed when Switch is set to Master Addr.

- MAC address
- IP address

#### **MAC Address Table**

Select the destination MAC address from the MAC Address table.

- MAC Address (ARP): When the test layer is L3-IPv4, press this soft key to automatically acquire the destination MAC address.
- MAC Address (NDP): When the test layer is L3-IPv6, press this soft key to automatically acquire the destination MAC address.

### **IP Address Table**

Select the destination IP address from the IP Address table.

#### Note\_

All the tables are created on the setup software. For details, see the Setup Software User's Manual.

## 11.4 Configuring the Tx Settings

## Procedure

## **TX Setting Screen**

Follow the procedure in section 11.1 to display the VLAN Test Setup screen. Press the **Detail Setup** soft key and then the **TX Setting** soft key to display the following screen.



## Explanation

## **TX Setting Screen**

## Interval

Set the Tx frame transmission interval. 1ms, 10ms, 100ms, 1s

#### Frame Length (Actual)

Set the frame length of Tx frames. The actual frame length of the specified frame is also displayed.

VLAN	L2 and L3-IPv4	L3-IPv6
1 stack	64 (68) to 9999 (9999) bytes	74 (78) to 9999 (9999) bytes
2 stacks	64 (72) to 9999 (9999) bytes	74 (82) to 9999 (9999) bytes

## **Frame Length Table**

You can refer to the frame length table to select the value. The table is created on the setup software. For details, see the Setup Software User's Manual.

#### **Repeat Count**

Set the number of times to transmit the VLAN ID group. Range: 1 to 15

## 11.5 Configuring the VLAN ID Tx Settings

## Procedure

## **VLAN ID TX Setting Screen**

Follow the procedure in section 11.1 to display the VLAN Test Setup screen.

Press the **Detail Setup** soft key and then the **VLAN ID TX Setting** soft key to display the following screen.

🗱 🔁 2013/2/19 18-11-18 🔤 🔤 AC –	VLAN Setup
VLAN ID TX Setting	
< Vlan ID Setting >>	Ty Satting
🗅 Not Send VLAN ID	
Input Single Range	1
ID 0 - 0 Step 1 Add Delete	YLAN ID
Set VLAN ID Rx Setting All Add All Del	IX Setting
<< Vlan ID List >>	-
3 4 5 9 12 13	VLAN ID
	KA Setting
	Sub
	Menu
Lint of VI AN IDe to cond	

#### List of VLAN IDs to send How to create a list

- On the sub menu, load a VLAN ID definition file. Edit the loaded list using the input method described above.
- Create a list from scratch using the input method described above.

#### Applies the VLAN ID Rx settings Copies the contents of the VLAN ID list

registered in the VLAN ID Rx setting (see section 11.6) to the VLAN ID list of the VLAN ID Tx setting (this screen).

## Select this check box to not send VLAN IDs.

Set the input method (Single, Range). Set the method to use to add and delete IDs when you create VLAN ID lists.

Set the ID (0-4095). Left box: Set the first ID to add or delete from the list.

Right box: Set the last ID to add or delete from the list.

Set the step (1-1000).

If the input method is set to Range, set in how many steps between the first and the last IDs to add or delete.

#### Sub menu

Load VLAN ID definition files and scroll VLAN ID lists.

Add

Adds an ID to the VLAN ID list according to the ID and step settings described above **Delete** 

Deletes an ID from the VLAN ID list according to the ID and step settings described above

## All Add

Adds all IDs from 0 to 4095 to the VLAN ID list

## All Del

Deletes all IDs from 0 to 4095 from the VLAN ID list

## Sub Menu

Press the Sub Menu soft key to display the following screen.



Unentered IDs appear dimmed (light gray).

Press the **Next 1/2** soft key to display the following screen.



## Explanation

## **VLAN ID TX Setting Screen**

## Not Send VLAN ID

Set whether to send VLAN IDs.

- Selected: VLAN IDs are not sent. You will not be able to create VLAN ID lists or load VLAN ID definition files. You can use this setting to prevent mistakes in operation.
- Cleared: VLAN IDs are sent. You will be able to create VLAN ID lists and load VLAN ID definition files.

#### Setting the Input Method

Set the method to use to add and delete IDs when you create VLAN ID lists.

- · Single: You can set a single ID and add it or delete it from the VLAN ID list.
- Range: You can set a range of IDs and add them or delete them from the VLAN ID list.
- ID

Specify the ID to add or delete from the VLAN ID list. Range: 0 to 4095

Left box

If the input method is set to Single, set the ID to add or delete.

If the input method is set to Range, set the first ID to add or delete.

- Right box: Set the last ID to add or delete. You can set this when the input method is set to Range.
- Step

Set in how many steps between the first and the last IDs to add or delete from the VLAN ID list. You can set this when the input method is set to Range. Range: 1 to 1000

## **VLAN ID List**

The VLAN ID list contains the VLAN IDs to send. You can create this list in the following ways.

- On the sub menu, load a VLAN ID definition file. The data is loaded into the VLAN ID list. After loading, you can edit the list using the input method described above.
- Create a VLAN ID list from scratch using the input method described above.

#### Add

Adds an ID to the VLAN ID list according to the ID and step settings described above

#### Delete

Deletes an ID from the VLAN ID list according to the ID and step settings described above

## All Add

Adds all IDs from 0 to 4095 to the VLAN ID list

## All Del

Deletes all IDs from 0 to 4095 from the VLAN ID list

## Set VLAN ID Rx Setting

The contents of the VLAN ID list registered in the VLAN ID Rx setting (see section 11.6) are copied to the VLAN ID list of the VLAN ID Tx setting that you are editing. When you execute this operation, a confirmation message will appear.

## Sub Menu

## **Refer File**

The File screen opens. Select a VLAN ID definition file, and execute Load.

- File Operation: Fixed to Load.
- File Type: Select \*.csv or \*.txt.
- Drives: Select internal memory or USB memory.

### **VLAN ID Definition File**

VLAN ID definition files (csv format; .csv or .txt extension) created in advance can be loaded into the VLAN ID list of VLAN tests. You can use a text editor or spreadsheet application to create VLAN ID definition files.

#### **Allowed Characters**

- ID value: A number up to four digits; preceding zeros are allowed (example: 0001)
- Delimiter: Comma or line feed (LF or CR+LF)
- Others: Consecutive spaces or tabs around the delimiter

If a file contains a character other than those described above, an error will occur when the file is loaded into the AQ1300/AQ1301.

#### Example

1, 2, 3, 0004, 5, 6 , 7, 8, 9 , 0010 0011 ,12 ,13, 14,15,16,17,18 ,19, 20

## List Disp

Select the display format of the VLAN ID list from the following:

- All ID: All IDs from 0 to 4095 are displayed. Unentered IDs appear dimmed (light gray).
- Input ID Only the entered IDs are displayed.

## Scrolling the VLAN ID List

You can scroll the list up and down by page or by line.

## 11.6 Configuring the VLAN ID Rx Settings

## Procedure

## **VLAN ID RX Setting Screen**

Follow the procedure in section 11.1 to display the VLAN Test Setup screen. Press the **Detail Setup** soft key and then the **VLAN ID RX Setting** soft key to display the following screen.

		<ul> <li>Select this check box to use the AQ1300/AQ1301 as a monitor.</li> </ul>
2013/2/19 18:34:50 $III = b/C =$	VLAN Setup	Sets the frames to receive
VLAN ID RX Setting		(All, Unly AQ130X) Select the type of frames to reasive
<pre></pre>	Tx Setting	Select the type of frames to receive.
Use as Monitor larget Frame All		— Set the input method (Single, Range).
ID 0 - 12 Step 2 Add Delete	VLAN ID	Set the method to use to add and delete
Set VLAN ID Tx Setting All Add All Del	TX Setting	IDs when you create VLAN ID lists that are
<pre></pre>		planned to be received.
0 2 4 6 8 10 12	VLAN ID	└─ Set the ID (0-4095).
	KA Setting	Left box: Set the first ID to add or delete
		from the list.
		Right box: Set the last ID to add or delete
		from the list.
	Sub .	Set the step (1-1000).
	Menu	If the input method is set to Range, set in
		how many steps between the first and the
		last IDs to add or delete.
		」└─ Sub menu
		Load VLAN ID definition files and scroll
VLAN ID list that is planned to be received		VLAN ID lists.
How to create a list		— Add
• On the sub menu, load a VLAN ID definition		Adds an ID to the VLAN ID list according to
file. Edit the loaded list using the input		the ID and step settings described above
Create a list from corateb using the input		Delete
Create a list from scratch using the input     mothed described above		Deletes an ID from the VLAN ID list
method described above.		according to the ID and step settings
Set VLAN ID Tx Setting		described above
Copies the contents of the VLAN ID list		All Add
registered in the VLAN ID Tx setting (see		Adds all IDs from 0 to 4095 to the VLAN ID
section 11.5) to the VLAN ID list that is		list
planned to be received (this screen).		All Del Deletes all IDs from 0 to 4005 from the
· · ·		VI AN ID list

## Sub Menu

Press the Sub Menu soft key to display the following screen.



Unentered IDs appear dimmed (light gray).

Press the Next 1/2 soft key to display the following screen.



## Explanation

## **VLAN ID RX Setting Screen**

## **Use as Monitor**

Set whether to use as a monitor.

- Selected: The VLAN ID list that is planned to be received is not used, and the actual received VLAN IDs are monitored. Judgment is not performed on the measured results. You will not be able to create VLAN ID lists or load VLAN ID definition files. You can use this setting to prevent mistakes in operation.
- Cleared: The VLAN ID list that is planned to be received is compared against the actual received VLAN IDs, and judgment is performed on the measured results. You will be able to create VLAN ID lists and load VLAN ID definition files.

### Setting the Frames to Receive

Select the type of frames to receive.

- All: All frames are received.
- Only AQ130x: Only the test frames that the AQ1300/AQ1301 transmits are received.

#### Setting the Input Method

Same as VLAN ID Tx Setting. For details, see section 11.5.

#### VLAN ID List That Is Planned to Be Received

Same as VLAN ID Tx Setting. For details, see section 11.5.

#### Add, Delete, All Add, and All Del

Same as VLAN ID Tx Setting. For details, see section 11.5.

#### Set VLAN ID Tx Setting

The contents of the VLAN ID list registered in the VLAN ID Tx setting (see section 11.5) are copied to the VLAN ID list that is planned to be received. When you execute this operation, a confirmation message will appear.

## Sub Menu

#### Refer File

Same as VLAN ID Tx Setting. For details, see section 11.5.

#### List Disp

Same as VLAN ID Tx Setting. For details, see section 11.5.

#### Scrolling the VLAN ID List

You can scroll the list up and down by page or by line.

## 11.7 Starting and Stopping Measurement

## Procedure

After entering the settings described in sections 11.1 to 11.6, you can execute the VLAN test.

## **Starting Measurement**

- 1. Press **START** on the Tx and Rx sides. The following screen appears, and measurement starts.
- Press the Start Transmit soft key on the Tx side. VLAN ID transmission starts. The Stop Transmit soft key is enabled. If you want to stop transmission before the specified repeat count, press the Stop Transmit soft key.



#### "Received the unexpected TPID."

## **Stopping Measurement**

Press **STOP** on the Tx side and then **STOP** on the Rx side. Measurement stops. The following screen appears on the Rx side.



## Explanation

## **Test Information**

The type of test that is currently being performed and the repeat count are displayed.

## Test Type VLAN

: Indicates a VLAN test

## **Repeat Count**

The current Tx count and the specified repeat count (see section 11.4) are displayed.



Specified repetition count Current transmission count

## **Measurement Status**

The measurement status is indicated.

Remain40Indicates the remaining number of Tx frames in measurementThe other areas of the measurement status are not used in VLAN tests.

## **Starting and Stopping Transmission**

Press START on the Tx and Rx sides to start measurement, and then start or stop transmission.

- Start Transmit soft key: VLAN ID transmission starts according to the VLAN ID list specified in the VLAN ID Tx setting.
- Stop Transmit soft key: Transmission stops.

After stopping the transmission, press STOP. Measurement will stop.

#### Note.

If you press STOP without pressing the Stop Transmit soft key first, transmission and measurement are both stopped.

## Measured Result Display

The judgment result and measurement results are displayed on the Rx side. The display varies depending on whether the Use as Monitor check box is selected (see section 11.6).

### If the Use As Monitor Check Box Is Cleared

The judgment result and measurement results are displayed.

	Duration:	00:00:18	Status:Executi	ng
-Meàsuring	Rx ID Suc	cess:4096	/Plan:4096	
-	Rx ID Fai	1: 0	Rx ID Frror:	

#### -Judgment result

Displays "Measuring" during measurement

Judgment result	No display	Before measurement
	Measuring	Measuring
	Pass	Pass (judgment result after measurement completion)
	Fail	Fail (judgment result after measurement completion)
Measurement time	Time elapsed from the start of measurement	Displayed as hh:mm:ss (hour:minute:second)
Status	Unexecution	Before measurement
	Executing	Measurement in execution
	Finish	Measurement complete
	Error	Error detected
Rx ID Success	The value in green	The number of received VLAN IDs that matched the IDs in the VLAN ID list that is planned to be received
Plan	The value in white	The number of IDs in the VLAN ID list that is planned to be received
Rx ID Fail	The value in yellow	The number of IDs in the VLAN ID list that is planned to be received that has not been received
Rx ID Error	The value in red	The number of IDs that are not in the VLAN ID list that is planned to be received

### If the Use As Monitor Check Box Is Selected

The measurement time, status, and the total number of received IDs are displayed.

Durati Rx ID Rx ID Rx ID	on: 00:00:05 Status:Finish Total:4096/Plan: Fail: Rx ID Error:	
Judgment result	No display	No display at all times
Measurement time	Time elapsed from the start	Displayed as hh:mm:ss (hour:minute:second)
	of measurement	
Status	Unexecution	Before measurement
	Executing	Measurement in execution
	Finish	Measurement complete
	Error	Error detected
Rx ID Total	The value in blue	The total number of received VLAN IDs
Plan	"–––" in white	Invalid indication
Rx ID Fail	"" in yellow	Invalid indication
Rx ID Error	"" in red	Invalid indication

## **Displaying the Received VLAN IDs**

The received VLAN IDs can be displayed on a map or a list. For details, see section 11.8.

# 11.8 Switching Screens and Saving Measured Results

## Procedure

After making measurements in section 11.7, the received VLAN IDs can be displayed on a map or a list.

## **Map Screen**

When you press **STOP** to stop the measurement, the measured results of all VLAN IDs are displayed on a map.



## **List Screen**

IDs are listed starting from the VLAN ID that is selected on the Map screen.

	Measurement	
Pass Rx ID Success: 1897 / Plan:3035	Start Transmit	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Switch pages.         Press the left and right arrow keys to switch pages.         To Hop       To the map screen         VLAN ID       Set the VLAN ID (0-4095).         Switches to the page containing the specified VLAN         Next 1/2       To List screen 2/2	N ID
Duration:         00:00:19         Status:Finish Rx         Pass           Rx         ID         Success:         1897         /Plan:3035           Rx         ID         Fail:1138         Rx         ID         Error:         1897           (1)         (2)         (3)         (4)         (5)         (6)         (7)         (8)           0         1         4         5         7         8         9         12           13         15         16         7         20         21         23         24           25         28         29         31         32         33         36         37           39         40         41         44         45         47         48         49           52         53         55         55         57         60         61         63           64         65         68         99         71         72         73         76           77         78         79         80         81         82         83         84           85         86         87         88         89         90         91         92 <th>Heasurement         Disp         All         Construction         Bisp         All         Construction         Displays the Rx frame format         ► section 7.14         File         Save the measured results of VLAN tests.         ► section 12.2</th> <th></th>	Heasurement         Disp         All         Construction         Bisp         All         Construction         Displays the Rx frame format         ► section 7.14         File         Save the measured results of VLAN tests.         ► section 12.2	

## Explanation

## Map Screen

The measured results of all VLAN IDs (from 0 to 4095) are mapped to 16 by 16 grids.

## All and Part

You can display the entire map or expand a part of the map.

- All: 16 VLAN IDs are assigned to each grid. If the statuses of the IDs are different, the color is displayed according to the order of precedence explained later.
- · Part: A single VLAN ID is assigned to each grid. The status of each ID is indicated by color.

#### Color

Depending on the ID Rx status, the grids on the map are displayed using different colors as follows. The colors used in the ID list are the same. However, IDs that correspond to none or other are not displayed on the list, so they are not applicable.

Success	Green	The received VLAN ID matches the ID in the VLAN ID list that is planned to be received.
Fail	Yellow	An ID in the VLAN ID list that is planned to be received that has not yet been received
Error	Red	An ID that is not in the VLAN ID list that is planned to be received
Monitor	Blue	A VLAN ID that has been received when the Use As Monitor check box is selected
None	Black	An ID that is not in the VLAN ID list that is planned to be received and has not been received
Other	Gray	An ID whose status is other than the above For example, an ID that is not specified in the "Disp" menu

#### **Color Precedence**

When the Map screen is set to All, 16 VLAN IDs are assigned to each grid. If the statuses of these 16 IDs are different, the color with the highest precedence is displayed. The order of precedence is defined below.

- If the Use As Monitor Check Box Is Cleared
   Highest precedence → red > yellow > green > black ← Lowest precedence
- If the Use As Monitor Check Box Is Selected
   Highest precedence → blue > > blue 
   black ← Lowest precedence
   There are no settings between blue and black.

## What to Display

You can set which VLAN IDs to display depending on their status. IDs whose status are other than the specified will be displayed in the "other" (gray) color.

All	All received VLAN IDs are displayed.
Success	Only the successfully received VLAN IDs are displayed.
Fail	Only the unreceived VLAN IDs are displayed.
Error	Only the erroneous VLAN IDs are displayed.

## **List Screen**

IDs are listed in a 16 line by 8 column spreadsheet starting from the VLAN ID that is selected on the Map screen.

#### Color

Depending on the ID Rx status, the IDs are displayed using different colors. The colors are the same as those of the Map screen. For details, see "Map Screen" on the previous page. However, IDs that correspond to none or other are not displayed on the list, so they are not applicable.

#### **Switching Pages**

Press the up and down arrow keys to switch pages.

#### VLAN ID

You can specify a VLAN ID and display the page that contains the ID. Range: 0 to 4095

#### What to Display

You can set which VLAN IDs to display depending on their status. Only the specified IDs are displayed. The options are the same as those of the Map screen.

## **Saving Measured Results**

You can save the measured results of VLAN tests. Set the save destination and file name on the File menu, and save the results. For details, see section 12.2.

## 12.1 Selecting a Setup File

## Procedure

## E-OAM Test Setup Screen

Press the **Option** soft key, the **Next 1/2** soft key and then the **E-OAM** soft key to display the following screen.



Press the Next 1/2 soft key to display the following screen.

€ 2014/6/19 14:37:50	= OA=	E-OAM Setup	
CC Setup		1	
<< Test Setup >> Test Interface SFP(GbE) << Address Setting >>			
Source MAC 00 00 00 00 00 01 MDLevel 0	<u>Refer</u>	Default —	— Default setup
Domain Prirst Rx CCM apply to domain Short MA Name Format User Text Short MA Name	Detail	◀ File _	Load a file. Loads the selected setup file from the file list
wer in 0 << CC test >>		Option (E-OAM)	Set options (E-OAM). ▶section 12.7
Destination MAC         Unicast           00         00         00         00         01           Interval         1s         Interval         0         00         00         01           Tx START Condition         First Rx CCM         Interval         0         00         00         01	<u>Refer</u>	Next 2/2	— To E-OAM Test Setup 1/2
Rx Target MEP ID Designation 0	Referi		

## **File Screen**

Press the File soft key to display the following screen.



#### File List

The files that you have created using the setup software or the AQ1300/AQ1301 appear.

## Explanation

#### **Default setup**

Select this item to return to the default setup.

### Load a file

Select this item to load an E-OAM test setup file (with an .sd extension) from the file list. To create a setup file, you can use the setup software and send the file to the AQ1300/AQ1301, or you can save the settings on the AQ1300/AQ1301.

For details on the Setup Software, see the Setup Software User's Manual, IM AQ1300-61EN.

## 12.2 Configuring the Test Settings

## Procedure

## Test Setup Screen

Follow the procedure in section 12.1 to display the E-OAM Test Setup screen. Press the **Test Setup** soft key to display the following screen.

E-0	AM	— Set the test interface
<< Test Setup >>		(XFP(10GbE), SFP(GbE), SFP(FE), RJ-45).
Test Interface	XFP(10GbE)	
Test Layer	L2 Test	
E-OAM	IEEE802.1ag -	Set the E-OAM standard
		(IEEE802.1ag, ITU-T Y1731).

## Explanation

## Test Interface

Specify which test interface to use.

- XFP (10GbE): Select this option to use the 10GBASE-R measurement port.
- SFP (GbE): Select this option to use the 1000BASE-X measurement port.
- SFP (FE): Select this option to use the 100BASE-X measurement port.
- RJ-45: Select this option to use the 10BASE-T/100BASE-TX/1000BASE-T measurement port.

## **E-OAM Standard**

Set the E-OAM standard to comply with.

- IEEE802.1ag: Test complying with IEEE802.1ag, Connectivity Fault Management
- ITU-T Y1731: Test complying with ITU-T Y1731, OAM Functions and Mechanisms for Ethernet based networks

## 12.3 Setting the Test Mode

## Procedure

## Select Test Mode Screen

Follow the procedure in section 12.1 to display the E-OAM Test Setup screen. Press the **Test Item** soft key to display the following screen.

Select Test Mod	е	
LB(L2 Ping)	Select	LB test settings ► section 12.5
CC(Continuity Check)	Select	CC test settings ► section 12.6

## Explanation

Select a test mode. When you select a test mode, its setup screen will appear.

## 12.4 Configuring Link Address Settings

## Procedure

## Link Setting Screen

Follow the procedure in section 12.1 to display the E-OAM Test Setup screen. Press the **Link/Address** soft key and then the **Link Setting** soft key to display the following screen.



## **Source Address Screen**

Press the Link/Address soft key and then the Source Address soft key to display the following screen.



## **Emulation Setting Screen**

Press the Link/Address soft key and then the Emulation Setting soft key to display the following screen.

Select this check box to send LT replies. Select this check box to send LB replies.

<b>ě</b>	Т	2014/6/10 09:27:08	 l ink/Address
		Emulation Setting	
	<< ()	Emulation Setting >>	Link Setting
	-6	) LT Reply	Source Address
			Emulation Setting
			Destination Address

## **Destination Address Screen**

Press the **Link/Address** soft key and then the **Destination Address** soft key to display the following screen.



#### Note.

## Address Settings and MD Level Setting

For the E-OAM test, you can also set the source and destination MAC address and MD level settings on the top E-OAM test setup screen.

🖗 2014/6/19 14:41:14 🔤 = AC	= E-OAM Setup
LB Setup	Test
<< Test Setup >> Test Interface SFP(GbE)	SFP (GbE) IEEE802.1ag
<pre>K Address Setting &gt;&gt;</pre>	
ource MAC 00 00 00 00 00 01 Refer	Address
MDLevel 0	MD level
<< LB test >>	
lestination MAC 00 00 00 00 00 01 Refer	Address
Interval 1ms	
Tx Mode Time 3 min <u>Refer</u>	Next
Frame Length(Actual) 64 (64) byte <u>Refer</u>	1/2

## Explanation

## **Link Setting Screen**

#### Negotiation

Select whether or not to use auto negotiation. This setting is valid when Test Interface is set to RJ-45 or SFP(GbE).

- Auto: The link between the AQ1300/AQ1301 and the device that it is connected to is configured automatically through auto negotiation.
- Manual: The link must be configured manually.

#### Advertisement

The connection types that can be offered are advertised when Test Interface is set to SFP(GbE) or RJ-45 and Negotiation is set to Auto.

Advertisement	SFP	RJ-45
1000M-FULL	No	Yes
100M-FULL, 100M-HALF	No	Yes
10M-FULL, 10M-HALF	No	Yes
Flow(Sym), Flow(Asym)	Yes	Yes

#### Speed

When Test Interface is set to RJ-45, you can set the link speed.

- 1G: A 1 Gbit/s 1000BASE-T connection is used.
- 100M: A 100 Mbit/s 100BASE-TX connection is used.
- 10M: A 10 Mbit/s 10BASE-T connection is used.
- Auto: The link speed is set automatically. This setting is valid when Negotiation is set to Auto.

#### Note\_

When Test Interface is set to XFP(10GbE), the link speed is fixed at 10G. When Test Interface is set to SFP(GbE), the link speed is fixed at 1G. When Test Interface is set to SFP(FE), the link speed is fixed at 100M

#### Duplex

You can set the communication mode for when Speed is set to 100M or 10M. This setting is valid when Test Interface is set to RJ-45.

- FULL: Full duplex communication
- HALF: Half duplex communication
- Auto: The AQ1300/AQ1301 chooses full or half duplex automatically. This setting is valid when Negotiation is set to Auto.

#### Note\_

When Test Interface is set to XFP(10GbE), SFP(GbE), or SFP(FE), or when it is set to RJ-45 and Speed is set to 1G, the duplex mode is fixed at FULL.

#### **Flow Control**

You can enable or disable flow control.

- ON: Flow control is enabled.
- · OFF: Flow control is disabled.

#### MDI

You can set the measurement port to straight or crossover mode. This setting is valid when Test Interface is set to RJ-45.

- MDI: Straight
- MDI-X: Cross
- Auto: The AQ1300/AQ1301 switches between straight and crossover mode automatically (this setting is valid when Negotiation is set to Auto).

### **RF Response Setting**

You can select whether or not to automatically respond with an RF when Test Interface is set to XFP(10GbE) and a linkdown is detected or an LF is received.

- Auto: The AQ1300/AQ1301 automatically responds with an RF.
- · Manual: The AQ1300/AQ1301 does not automatically respond with an RF.

#### Continuing to Transmit while the Link Is Down

When Test Interface is set to XFP(10GbE), you can specify whether to continue or stop transmission after a linkdown is detected.

- · Selected: Transmission continues when a linkdown is detected.
- Cleared: Transmission stops when a linkdown is detected.

#### **Tx Clock Source Setting**

Specify the Tx clock source for when Test Interface is set to XFP(10GbE) or SFP(GbE). When Test Interface is set to SFP(FE) or RJ-45, the Tx clock source is fixed to the internal clock.

- Internal CLK: The internal clock is used.
- Received CLK: The AQ1300/AQ1301 synchronizes with the Rx line signal.

When Test Mode is set to Loopback Test, if Test Interface is set to XFP(GbE) or SFP(GbE), the AQ1300/AQ1301 uses the received clock regardless of the Tx clock source setting.

#### Link Setting Acquisition

If the interface is SFP(GbE) or RJ-45, you can acquire and display link setting information of the other device (DUT; the device on the user side) connected to the AQ1300/AQ1301. For details, see section 4.3.

## Source Address Screen

### Source MAC Address

Set the source MAC address. You can refer to the MAC address table to set the address.

#### **VLAN Stacks**

Set the number of VLAN stacks.

- None: No VLAN stacks
- 1: One VLAN stack
- 2: Two VLAN stacks

## VLAN1/VLAN2

Set the TPID (Tag Protocol Identifier), CFI (Canonical Format Indicator), CoS (Class of Service), and VLAN-ID for 1 or 2 VLAN stacks. You can refer to the VLAN table to set the values.

- TPID: 0 to FFFF
- CFI: 0 or 1
- CoS: 0 to 7
- ID: 0 to 4095

#### **MAC Address Table**

Select the source MAC address from the MAC Address table.

Global Address: You can set the source MAC address to a global address.

#### VLAN Table

Select the VLAN CoS and ID from the VLAN table.

#### **MD** (Maintenance Domain) Level

Set the test target domain level. MDLevel: 0 to 7

## **Emulation Setting Screen**

## Enabling LB (Loop Back) Reply

Set whether to use the AQ1300/AQ1301 as the other device and send an LBR frame when an LBM is received in an LB test or multicast LB test.

- Selected: An LBR frame is transmitted.
- Cleared: An LBR frame is not transmitted.

## Enabling LT (Link Trace) Reply

Set whether to use the AQ1300/AQ1301 as the other device and send an LBR frame when an LBM is received during a link trace.

- Selected: An LBR frame is transmitted.
- Cleared: An LBR frame is not transmitted.

## **Destination Address Screen**

## **Destination MAC Address**

Set the destination MAC address. You can refer to the MAC address table to set the address.

#### **MAC Address Table**

Select the destination MAC address from the MAC Address table.

· Global Address: You can set the destination MAC address to a global address.

#### Search List

Select the address of the other device (the destination address) from the search list.

#### **Searching for Other Devices**

When you select Search other Device, the AQ1300/AQ1301 searches for other devices (AQ1300 or AQ1301) on the same VLAN or network segment and displays the results in the search list.

#### Switching the Display

You can switch between different search list displays.

- SerialNo+Ver: The equipment name, serial number, and version are displayed.
- Test Setup: The equipment name, test interface, and test layer are displayed.
- · Status+MAC: The equipment name, status, and MAC address are displayed.
- IPv4/IPv6: The equipment name and IP address are displayed.
- · Master Addr: The device name and master address (MAC address) are displayed.

#### Note\_

You can check the equipment name and serial number of the AQ1300/AQ1301 in the system settings.

#### Address Type

For the E-OAM test, this is fixed to MAC address display.

## 12.5 Configuring the LB Test

## Procedure

## LB Setup Screen

Follow the procedure in section 12.1 to display the E-OAM Test Setup screen. Follow the procedure in section 12.3 to display the Select Test Mode screen, and then select LB (L2 Ping). The following screen appears.



## Explanation

### Interval

Set the LBM frame transmission interval. 1ms, 10ms, 100ms, 1s

## Tx Mode

Set the length of the LB test.

- Continue: An LB test is executed from the start of the test (pressing of the START button) to the end of the test (pressing of the STOP button).
- Time: An LB test is executed until the specified time elapses.
   1 min to 1440 min (24 hours)
- Frames: An LB test is executed until the specified number of frames are transmitted. 1 to 4294967295

## **Tx Time and Frame Length Tables**

You can refer to the tables to select the values. The table is created on the setup software. For details, see the Setup Software User's Manual.

## Frame Length (Actual)

Set the frame length of Tx frames. The actual frame length of the specified frame is also displayed.

- VLAN 1 stack: 64 (68) to 9999 (9999) bytes
- VLAN 2 stacks: 64 (72) to 9999 (9999) bytes

## 12.6 Configuring the CC Test

## Procedure

## **CC Setup Screen**

Follow the procedure in section 12.1 to display the E-OAM Test Setup screen. Follow the procedure in section 12.3 to display the Select Test Mode screen, and then select CC(Continuity Check). The following screen appears.


# Setting the Maintenance Domain Information

Press the Detail soft key under Domain to display the following screen.



(String, Integer, VLAN-ID, ICC-Base string, User).

# **MEP ID Table**

Press the Refer soft key under the Target MEP ID of the Rx to display the following screen.

🌞 📃 2014/6/10 09:41	:46		-AC =	MEP ID Table	
		MEP ID Table			
<< Test Setup >>	1	5	Select )		
Test Interface	2	10	Select		
Address Setting	3	50	Select		
Source MAC 00	4	100	Select		
MDLevel 0	5	500	Select		
	6	1000	Select		
Short MA Name Fo	7	5000	Select		
	8	8191	Select		<ul> <li>Select the MEP-ID from the MEP ID table.</li> </ul>
	9	NoEntry	Select >		
	10	NoEntry	Select		
_ ⊻	11	NoEntry	Select		
	12	NoEntry	Select		
Interval	13	NoEntry	Select		
	14	NoEntry	Select		
	15	NoEntry	Select		
	16	NoEntry	Select		

# Explanation

# **Setting the Domain Details**

### Setting the Maintenance Domain Information

• When the Test Setting Is IEEE802.1ag

### First Rx CCM apply to domain Check Box

After a CC test is started, the AQ1300/AQ1301 receives the first CCM frame from the target MEP, reads the maintenance domain information in the frame, and saves it as its own domain name. The AQ1300/AQ1301 also copies the information into its Tx CCM frames. To set the information manually, clear the check box.

### Maintenance Domain (Maintenance Domain Name)

Manually set the maintenance domain name. The following methods (formats) are available.

- Not use: The maintenance domain name is not entered.
- String: Enter a maintenance domain name of your choice using the notation defined in RFC2579.
- DNS: Enter a maintenance domain name of your choice using the notation defined in RFC1035.

- MAC+ID: Enter a maintenance domain name by combining the MAC address and a two-digit integer of your choice.
- User: Enter a maintenance domain name by using a character string of your choice (binary or ASCII format).

### Short MA (Short Maintenance Group Name)

Manually set the short maintenance group name. The following methods (formats) are available.

- String: Enter a short maintenance group name of your choice using the notation defined in RFC2579.
- Integer: Enter a short maintenance group name of your choice using a 2-digit integer.
- VLAN-ID: Enter a short maintenance group name using the VLAN ID value.
- ICC-Base string: Enter a short maintenance group name using the MEG ID value in ICC format as defined in ITU-T Y1731.
- User: Enter a short maintenance group name by using a character string of your choice (binary or ASCII format).

### When the Test Setting Is ITU-T Y1731

### First Rx CCM apply to domain Check Box

After a CC test is started, the AQ1300/AQ1301 receives the first CCM frame from the target MEP, reads the MEG ID in the frame, and copies it into its Tx CCM frames. To set the information manually, clear the check box.

### MEG ID

Manually enter the MEG ID. The input format is fixed to ICC-Base string.

• ICC-Base string: Enter a MEG ID value in ICC format as defined in ITU-T Y1731.

# **CCM Frame Transmission Settings**

### Тх

Set whether to transmit CCM frames during CC tests.

- · Selected: CCM frames are transmitted during CC tests.
- · Cleared: CCM frames are not transmitted during CC tests.

### **Destination MAC**

Set the target MEP's MAC address for CC tests.

- · Unicast: CCM frames are transmitted to the specified destination MAC address.
- Multicast: CCM frames are transmitted simultaneously to multiple MEPs set to the same MD level. The destination MAC address is fixed at the following values depending on the MD level.

### Multicast Address

Destination MAC	Address	MD Leve	
01:80:C2:00:0	00:30	0	
01:80:C2:00:0	00:31	1	
01:80:C2:00:0	0:32	2	
01:80:C2:00:0	00:33	3	
01:80:C2:00:0	0:34	4	
01:80:C2:00:0	0:35	5	
01:80:C2:00:0	00:36	6	
01:80:C2:00:0	0:37	7	

### Interval

Set the CCM frame transmission interval. 100 ms, 1 s, 10 s, 60 s

### Auto Tx RDI

Set whether to transmit an RDI frame to the network device at the destination address when a loss of continuity is detected (CCM frame is not received).

- Selected: An RDI frame is transmitted.
- Cleared: An RDI frame is not transmitted.

### **Tx START Condition**

The CCM frame transmission and reception timing can be synchronized within the same maintenance domain.

- First Rx CCM: After a CC test is started, CCM frame transmission starts when the AQ1300/ AQ1301 receives the first CCM frame from the target MEP.
- Test Start: CCM frame transmission starts when the specified wait time elapses after the START key is pressed.
- Wait Time: Set the wait time for when the Tx START Condition is set to Test Start. 0 to 999 s (approx. 16 minutes)

# **CCM Frame Reception Settings**

### Rx

Set whether to receive CCM frames during CC tests.

- Selected: CCM frames are received during CC tests.
- Cleared: CCM frames are not received during CC tests.

### Target MEP ID

Select how to set the ID number of the target network device (MEP) to receive CCM frames from.

- First CCM: After a CC test is started, the AQ1300/AQ1301 receives the first CCM frame, reads the MEP ID in the frame, and saves it as its target MEP.
- Designation: Manually enter the MEP ID. 0 to 8191

### MEP ID table

Select the ID value from the MEP ID table. Displayed when the method of setting the ID number is set to Designation.

# 12.7 Setting Options (E-OAM)

# Procedure

### Measurement Screen

Press the Next 1/2 soft key, the Option (E-OAM) soft key, and then the Advanced setup soft key to display the following screen.



# Explanation

# **Measurement Screen**

### **Measurement START Condition**

### Not start the measurement when Link is down.

If linkdown is detected when START is pressed, measurement does not start. You cannot clear this check box.

### **Measurement STOP Condition**

### When Link Down is detected

Select whether to stop measurement when a linkdown is detected during measurement.

- · Selected: Measurement is stopped when a linkdown is detected.
- Cleared: Measurement is not stopped when a linkdown is detected.

### When L2 Error is detected

Select whether to stop measurement when an L2 error is detected during measurement.

- · Selected: Measurement is stopped when an L2 error is detected.
- · Cleared: Measurement is not stopped when an L2 error is detected.

# 12.8 Starting and Stopping an LB Test

### Procedure

After entering the settings described in sections 12.1 to 12.5 and 12.7, you can execute an E-OAM LB test.

# Starting an LB Test

1. Press START. The following screen appears, and an LB test starts.



▶ section 2.1

# Stopping an LB Test

When the transmission end conditions are met, transmission stops automatically. Press **STOP** to display the following screen and stop measurement.



**Remaining Tx time** 

Indication that measurement has finished

**Measurement duration** 

# **Detailed Statistics Display**

Start or stop a measurement.

Press the Detail Display soft key to display the following screen.

<u>∲</u> 2014/€	6/19 14:49:29	<b>= AC</b>	Detail Display
E-OAM	Remain 166[s]	ASER LFS DFF Control	
LB	Dst: 00-00-00-00-00-01	MDLevel: 0	
	Interval: 1ms Tx Time(mir	n): 3	
Ll			
SFP GLE 📴	ltems	¥alues	
LINK LX	Measurement Duration	2014/00/19 14:46:26	
1G FULL	Link Status	1000M-FULL-Straight	
en Prije	Send Count	14,015	
Frame	Loss Rate(%)	0.0	
TX RX	Max Response Time(ms)	0.003	
L2 ERR	Ave Response Time(ms)	0.003	
	Link Down Count	0.000	
	CRC Error	0	
	Alignment Error	0	
	Symbol Error	Ŏ	

# Explanation

### **Test Results**

Indication that measurement is in progress



### **Results Display**



### Sequence Number

A number is assigned in sequence from the start of transmission. When an LBM frame is lost, the sequence number of the corresponding frame is not displayed.

### **Response Time**

The time from when the AQ1300/AQ1301 transmits an LBM frame until it receives an LBR frame from the destination network device (MEP). The unit is ms.

# 12.9 Starting and Stopping a CC Test

### Procedure

After entering the settings described in sections 12.1 to 12.4, 12.6, and 12.7, you can execute an E-OAM CC test.

# **Starting a CC Test**

1. Press START. The following screen appears, and a CC test starts.



Statistics counter and error detection history ▶ section 2.1

# **Stopping a CC Test**

Press STOP to display the following screen and stop measurement.

<b>∲ 2014</b> ∕	/6/19 14:51:32	<b>Ξ</b> ΑΩΞ	Moacurement	<ul> <li>Remaining Tx time</li> </ul>
E-OAM	Remain 💹	STAT LASER LFS LOG DFF Control		
CC			Start Transmit	<ul> <li>Indication that measurement has finished</li> </ul>
SFP GLE	<< RX >> Status Count	<< TX >> Status Count	Stop Transmit	
IG FULL	CCM - 38 RDI - 26 LOC d	CCM - 38 RDI - 26	Special Control	
TX RX L2 ERR	Rx CCM information           DA 00-00-00-00-01           SA 00-00-00-00-01	Tx CCM information DA 00-00-00-00-00-01 SA 00-00-00-00-00-01	File	
	MEP ID 0 Interval 1s	MEP ID 0 Interval 1s	Next 1/2	
	Normal Frame: Tx: Rx: Rx Frame Length(byte):	Bit Stress     38     38     38     0     0		

# **Detailed Statistics Display**

Start or stop a measurement.

Press the Detail Display soft key to display the following screen.

<b>∲ 2014/</b> €	Detail Display					
E-OAM	Remain		STAT L	ASER LFS		
CC		I		an control		
Ll						
SFP GLE 👥	ltems				Values	
	Acquisi	tion Time		2014/06/1	9 14:51:23	
10 5001	Measurer	nent Duration		1000M-EU	00:00:41	
	Tx CCM c	count		TOOVIETUL	38	
	Tx RDI o	count			26	
Frame	Rx CCM o	count			38	
TX RX	Rx RDI o	count			26	
L2 ERR	LUC dete	CCM count				
	Inevnec	ted MFP			Ň	
	Mismerge	9			ŏ	
	Unexpect	ted MEG Level			Ō	
	Unexpect	ted_Period			0	
	Link Dow	un Count			0	
	Undore i	JI 70 Error			X	
	Alignmer	nt Error			ŏ	
	Symbol E	rror			Ŏ	

# **Displaying Tx/Rx CCM information**

Start or stop a measurement.

Press the Tx/Rx CCM information soft key to display the following screen.

#### **Rx CCM Frame Information Display Example** 2014/8/4 11:06:33 x/Rx CCM information STAT LASER LFS LOG DFF Control -OAI main Remain Rx CCH information NAC-DA 00-00-00-00-00-01 NAC-DA <t CCM informati Tx CCM information **Rx CCM** information L1CCM inform<del>ati</del> SFP GLE 📴 0 /ersion OpCode CCH LINK Interval 1s 1G FULL 70 TLV Offset PAUSĘ Maintenance <u>D</u>o omain Name Not use(1) Format TX BX Short MA Name L2 ERR String(2) orma ength 29 Yokogawa Meters & Instruments

# **Transmitting RDI Frames**

Start a measurement.

Press the **Special Control** soft key and then the Manual **RDI soft** key. The following screen appears, and RDI frames are transmitted.

Press the RDI soft key soft key again to stop the RDI frame transmission.

	Control	
	Manual RD OFF	— <b>Manually transmit RDI frames.</b> OFF is displayed during transmission;
<< TX >> Status Count	↓ LinkTrace(LT)	ON is displayed otherwise.
CCN <u>21</u> (RD1 <u>15</u> )	MultissetLB	RDI frames are sent and counted.

# Explanation

# **Test Results**

Indication that measurement is in progress



### **Results Display**

Rx results	Tx results	
CCM Status CCM 5 RDI 1 LOC 0	CCH - 5 RDI 0	— Tx and Rx status
DA         00-00-00-00-00-00           SA         00-00-00-00-000           MEP         ID         0           Interval         Unknown	DA         00-00-00-00-00           SA         00-00-00-00-00-01           MEP         ID         0           Interval         100ms	—Simple CCM frame information display

The Tx and Rx results show counters that indicate the number of transmitted and received frames and the transmission and reception status.

The transmission and reception status is displayed in the following manner depending on the frame type and fault signaling.

Туре	Color	Description
Rx CCM	Gray	Not received
	Green	Receiving
	Yellow	Received
Rx RDI	Gray	Not received
	Red	Receiving
	Yellow	Received
Rx LOC	Gray	Not detected
	Red	Being detected
	Yellow	Detected
Tx CCM	Gray	Not transmitted
	Green	Transmitting
	Yellow	Transmitted
Tx RDI	Gray	Not transmitted
	Red	Transmitting
	Yellow	Transmitted

# 12.10 Executing an LT and Multicast LB

# Procedure

# **Executing an LT**

Follow the procedure in section 12.8 to select LB test or section 12.9 to select CC test, and press **STOP**. The LT execution screen appears.

Press the **Special** soft key and then the **LinkTrace(LT)** soft key to display the following screen.

🌞 📄 2014/0	6/10 10:5	0:33	<u></u> {		Measurement	
E-OAM	Remain		ASER IFF Control			
CC	Dst:	00-00-00-00-00-00	MDLevel: 0		Start Transmit <del>-</del>	<ul> <li>Starts a link trace</li> </ul>
LI SFP FE 💷	Result No.	Number : 0 Source MAC Address	Page Forward	1/4	Stop Transmit =	<ul> <li>Stops a link trace</li> </ul>
100H FULL PRUSE	2 3 4 5				Special Control =	— Save to file ► section 13.2
TX RX L2 ERR	6 7 8 9				File	
	11 12 13 14				Next 1/2 =	— Next page 1/4 to 4/4
	15 16 Unexect	ution				

When the measurement is completed successfully or with an error or when the measurement is forcibly stopped, the following screen appears.



### Measurement Result Display (Success example)

Status

(Unexecution, Executing.., Success!, Error(Hop Count Over), Error(Route Error), Error(Target Unreachable), Cancel..)

# **Executing a Multicast LB**

Follow the procedure in section 12.8 to select LB test or section 12.9 to select CC test, and press **STOP**. The LT execution screen appears.

Press the **Special** soft key and then the **MulticastLB** soft key to display the following screen.



When the measurement is completed successfully or with an error or when the measurement is forcibly stopped, the following screen appears.

	Inster         LFS           MDLevel:         0           Page         1/4           Source MAC Address         8A-88-80-80-8E-85           90-91-92-93-94-95         96-97-98-99-9A-98           90-90-9E-9F-A0-A1         92-A3-A4-85-A6-17           92-91-A4-A5-A6-17         92-A1-A5-A6-17	Start Stop File	<ul> <li>The number of hops performed in the test</li> <li>Events         <ul> <li>(No.: Hop number; response time, Source MAC Address)</li> </ul> </li> </ul>
00-00-00-00-00 Number :16 1st(ns) 10700 2600 2500 2500 21000 26900 26900	MDLevel: 0 Page 1/4 Source MAC Address 8A-88-8C-8D-8E-8 90-91-92-93-94-95 96-97-98-99-9A-98 90-90-9E-9F-AD-A1 42-A3-A4-85-A6-A1	Start Stop File	<ul> <li>The number of hops performed in the test</li> <li>Events         <ul> <li>(No.: Hop number; response time, Source MAC Address)</li> </ul> </li> </ul>
Number :16 1st(ms) 2600 2500 21000 26900 47000	Page 1/4 Source HAC Address 8A-8B-8C-8D-8E-8F 90-91-92-93-94-95 96-97-98-99-9A-98 9C-90-9E-9F-AD-A1 42-83-44-85-86-87	Stop File	<ul> <li>The number of hops performed in the test</li> <li>Events         <ul> <li>(No.: Hop number; response time, Source MAC Address)</li> </ul> </li> </ul>
Number 16 15t(ns) 10700 2600 2500 21000 26900 26900	Page 1/4 Source MAC Address 8A-8B-8C-8D-8E-8F 90-91-92-93-94-95 96-97-98-99-9A-9B 9C-9D-9E-9F-AO-A1 42-A3-A4-A5-A6-A7	Stop File	<ul> <li>Events</li> <li>(No.: Hop number; response time, Source MAC Address)</li> </ul>
10700 2600 2500 21000 26000	8A-8B-8C-8D-8E-8F 90-91-92-93-94-95 96-97-98-99-9A-9B 9C-9D-9E-9F-AO-A1 42-43-44-45-46-47	File	<ul> <li>Events         <ul> <li>(No.: Hop number; response</li> <li>time, Source MAC Address)</li> </ul> </li> </ul>
2600 2500 21000 26900	90-91-92-93-94-95 96-97-98-99-9A-9B 9C-9D-9E-9F-A0-A1 42-42-45-46-47	File	(No.: Hop number; response time, Source MAC Address)
2500 21000 26900	96-97-98-99-9A-9B 9C-9D-9E-9F-A0-A1 42-43-44-45-46-47	File	time, Source MAC Address)
21000 26900	9C-9D-9E-9F-A0-A1 A2-A3-A4-A5-A6-A7	File	time, source MAC Address)
26900	02-03-04-05-06-0f		
1/900	A8-A9-AA-AB-AU-AU AE-AE-D0-D1-D2-D2		
13400	R4-R5-R6-R7-R8-R9	tet to Dect	Assimus the second MAC address of
9800	BA-BB-BC-BD-BF-BF		- Assigns the source MAC address of
15300	CO-C1-C2-C3-C4-C5		the selected event to the destination
16400	C6-C7-C8-C9-CA-CB		MAC address of the LB or CC test
5000	CC-CD-CE-CF-D0-D1	Next Page	
10600	D2-D3-D4-D5-D6-D7		
24200	DE-DE-E0-E1-E2-E2		
27100	E4-E5-E6-E7-E8-E9		
	9800 15300 16400 5000 10600 24200 10300 27100	19400         BA BB BC BD BC BD BE BF           15300         C0 - C1 - C2 - C3 - C4 - C5           16400         C6 - C7 - C8 - C9 - C4 - C8           5000         CC - CD - CE - CF - D0 - D1           10600         D2 - D3 - D4 - D5 - D6 - D7           24200         D8 - D9 - D8 - D0 - D0 - D0           10300         DE - DF - E0 - E1 - E2 - E3           27100         E4 - E5 - E6 - E7 - E8 - E9	9800 BA BB BC BD BF BF 15300 C0 - C1 - C2 - C3 - C4 - C5 16400 C6 - C7 - 28 - C9 - CA - C5 16400 C6 - C7 - 28 - C9 - CA - C5 16400 C6 - C7 - 28 - C9 - CA - C5 10600 C6 - C7 - 28 - C9 - CA - C5 10600 D2 - U3 - U4 - U5 - D6 - D7 24200 D8 - D9 - D4 - D8 - D6 - D7 10300 DE - DF - E0 - E1 - E2 - E3 27100 E4 - E5 - E6 - E7 - E8 - E9

### Measurement Result Display (Success example)

Status

(Unexecution, Executing.., Success!, Error(Hop Count Over), Error(Route Error), Error(Target Unreachable), Cancel..)

# Explanation

# **Executing an LT**

### Start

Starts a link trace.

### Stop

Stops a link trace.

### File

The measurement results of a link trace is saved to a CSV file. For details, see section 13.2.

### **Next Page**

Flips the link trace result pages. Pages 1/4 to 4/4

### **Measurement Result Display**

### **Events**

No.

Indicates the hop number.

### Source MAC Address

The source MAC addresses of the devices that responded are displayed.

#### Status Indications

Indication	Description
Unexecution	Execution has not yet taken place.
Executing	Execution is taking place.
Success!	A response was received from the target host.
Error(Target Unreachable)	No response was received from the target host.
Cancel	The user stopped the link trace in the middle of execution.

# **Executing a Multicast LB**

### Start

Starts a multicast LB.

### Stop

Stops a multicast LB.

### File

The measurement results of a multicast LB is saved to a CSV file. For details, see section 13.2.

### **Next Page**

Flips the multicast LB result pages. Pages 1/4 to 4/4

### Measurement Result Display

Events

No.

Indicates the hop number.

### 1st(ms)

The response time for when an LBM frame was sent to the connected device is displayed.

Indication	Description
*	No response was received from the host.
Value	The response time is displayed in 100 ms resolution. The smallest value is 100 ms.

### Source MAC Address

The source MAC addresses of the devices that responded are displayed.

### **Status Indications**

The indications are the same as those of LT execution. See the previous page.

# 13.1 Selecting a Setup File

### Procedure

# Select Setup File Screen

Press the **Option** soft key and then the **Y.1564** soft key to display the following screen.

					Registered setup files A comment or file name appears next to each number.
ž 2	2016/6/24 13:26:15 Se	lect Setup File	=AC	= Select Setup File	Test type from the setup file Values other than "Y.1564" appear dimmed.
			Page Number 1/4	Latest Setup	Latest setup
1 2 3 4 5 6 7 8 9 10 11 12	Y1564 test_no.1 f Y1564 test_no.2 f Y1564 test_no.3 f Y1564 test_no.4 f Y1564 test_no.5 f	or Yokogawa or Yokogawa or Yokogawa or Yokogawa or Yokogawa Yi	564 Selecti 564 Selecti 564 Selecti 564 Selecti 564 Selecti 564 Selecti 561 Selecti 561 Selecti 561 Selecti 561 Selecti	Default File Switch Connent Next Page	Default setup Loads a file Loads the selected setup file from the file list Switches the setup file list display (Comment, File Name) Switches the setup file list page (page numbers: 1/4-4/4)
Setup file list			L		Select a setup file. Select a registered setup file from the

Appears when you have created a display Select a regis setup file using the setup software and sent Select a regis

Note\_

it to the AQ1300/AQ1301

To select an Y.1564 setup file, you can choose to use the latest setup, use the default setup, load a setup file from the file list, or select a setup file from the setup file list.

# File Screen

Press the File soft key to display the following screen.



# Y.1564 Setup Screen

The following screen appears when you select a setup file whose configuration type is standalone. For details on the configuration type, see section 13.2.



### Note.

Selecting a setup file whose configuration type is MasterDevice opens the screen in section 13.8. Selecting a setup file whose configuration type is SlaveDevice opens the screen in section 13.9.

# Explanation

### Latest Setup

Select this item to use the setup that was displayed previously.

### **Default Setup**

Select this item to return to the default setup.

### File

Select this item to load a setup file (with an .sd extension) from the file list. Select this item when you want to load a setup file that is not in the setup file list. To create a setup file, you can use the setup software and send the file to the AQ1300/AQ1301, or you can save the settings on the AQ1300/AQ1301.

### **Setup File Selection**

To select a registered setup file, use the setup file list.

You can register up to 48 setup files to the setup file list (4 pages with 12 files per page). A comment or file name is displayed for each of the registered setup files in the setup file list. The setup file list is updated when you open the Select Setup File screen after you have created a display management file and setup files with the setup software and sent the files to the AQ1300/ AQ1301.

For details, see the Setup Software User's Manual, IM AQ1300-61EN.

### Note\_

•	The AQ1300/AQ1301 can only display the setup file list if the display management file that you created						
	using the setup software (disManage.dmf) and the setup (.sd) files that the display management file refers						
	to are saved	to the AQ1300/AQ1301 /setup folder.					
	Example:	Example: /setup/disManage.dmf					
	/setup/0000.sd						
	/setup/0001.sd						
		:					
•	When you are	e performing Y.1564 tests, you can only select setup files for Y.1564 tests.					

# 13.2 Selecting the Configuration Type

# Procedure

# **Configuration Type Selection Screen**

Follow the procedure in section 13.1 to display the Select Setup File screen. Press the **Default** soft key to display the following screen.



### Explanation

### **Configuration Type**

Select the test configuration you want to use on the AQ1300/AQ1301.

Standalone:

A single AQ1300/AQ1301 is used to make measurements. The optical fiber cable must be looped back or a dedicated loopback device (or another AQ1300/AQ1301 set to loopback test mode) must be connected at the other end of the network to be measured. See "Loopback Traffic Test (Latency measurement)" in section 1.4.

When the test configuration is inband remote (see "Inband Remote" in section 1.4), measurement is performed with the AQ1300/AQ1301 as the master device.

An AQ1300/AQ1301 set to SlaveDevice must be connected at the other end of the network to be measured.

SlaveDevice:

MasterDevice:

When the test configuration is inband remote (see "Inband Remote" in section 1.4), measurement is performed with the AQ1300/AQ1301 as the slave device.

An AQ1300/AQ1301 set to MasterDevice must be connected at the other end of the network to be measured.

# 13.3 Setting Up a Test

### Procedure

# **Test Setup Screen**

### Standalone

Follow the procedure in section 13.1 to display the Y.1564 Setup screen. Press the **Test Setup** soft key to display the Test Setup screen.

### MasterDevice

Follow the procedure in section 13.8 to display the Y.1564 Setup screen. Press the **Test Setup** soft key to display the Test Setup screen.

### SlaveDevice

Follow the procedure in section 13.9 to display the Test Setup screen. Note that the following items are not available.

- Test direction
- · Frame delay variation measurement reference

Y.15	Y.1564						
<< Test Setup >> Test Interface Test Layer Direction	XFP(10GbE) - L3-IPv4 Test - Two-way -						
Asymmetric lest	🖌 Asymmetric Test						

Set the test interface (XFP(10GbE), SFP(GbE), SFP(FE), RJ-45)

Set the test layer (L2 Test, L3-IPv4 Test, L3-IPv6 Test).

Set the test direction (Loopback, One-way(M->S), One-way(S->M), Two-way)

### Explanation

### **Test Interface**

Specify which test interface to use.

- XFP (10GbE): Select this option to use the 10GBASE-R measurement port.
- SFP (GbE): Select this option to use the 1000BASE-X measurement port.
- SFP (FE): Select this option to use the 100BASE-FX measurement port. This feature is supported in firmware version (FW Ver.) R1.05.01.001 and later.
- RJ-45: Select this option to use the 10BASE-T/100BASE-TX/1000BASE-T measurement port.

### **Test Layer**

Set the layer to test.

- L2 Test: Select this option to test layer 2.
- L3-IPv4 Test: Select this option to test layer 3 according to the IPv4 protocol.
- L3-IPv6 Test: Select this option to test layer 3 according to the IPv6 protocol.

### Direction

Set the test direction when executing Y.1564 tests with the AQ1300/AQ1301 set to MasterDevice. When the configuration type is set to Standalone, this is fixed to Loopback.

Loopback

The slave device is set to loopback. Traffic is sent from the master to the slave. The master receives the traffic that is looped back from the slave to execute tests.

### • One-way(M->S)

Test is executed in the master-to-slave direction.

• One-way(S->M)

Test is executed in the slave-to-master direction.

• Two-way

Test is executed in the master-to-slave direction and slave-to-master directions.

Asymmetric Test

Different services can be set on the master device and slave device. The frame length and Tx rate can be set to different values to perform tests on different traffic conditions in the master-to-slave and slave-to-master directions. Use this option when the uplink and downlink speeds of the network segment are different. When Asymmetric Test is unselected, the service setting of the slave device is set the same as the master device.

# 13.4 Configuring Link Address Settings

### Procedure

# Link Setup Screen

### Standalone

Follow the procedure in section 13.1 to display the Y.1564 Setup screen. Press the **Link/Address** soft key and then the **Link Setting** soft key to display the Link Setup screen.

### MasterDevice

Follow the procedure in section 13.8 to display the Y.1564 Setup screen. Press the **Link/Address** soft key and then the **Link Setting** soft key to display the Link Setup screen.

### SlaveDevice

Follow the procedure in section 13.9 to display the Link Setup screen.



Select this check box to automatically detect mismatches in the auto negotiation during link establishment.

### Link Setting Acquisition

<u>چ</u>	2013/2/19 16:25:42	= ac =	Link/Address
	Configuration for Link partner acquisition		
< \$	< Setting >> tatus Preparing		Get Information
C	able Type Straight	━╢	To Link Set.
<	< Result >>		
N C	egotiation		
Нň			
M	DI		
<	< UIP Cable >>		
R	esult of link setting information acquisit	ion	Finish =
•	Negotiation (Auto, Manual)		J
•	Speed (1G, 100M, 10M)		1.15
	Appears when Test Interface is set to RJ-4	15	
•	Duplex (Full, Half, (when negotiatio	nis	
	set to manual)		Indi
	Appears when Test Interface is set to RJ-4	15	(No
•	MDI (MDI, MDI-X)		two
	Appears when Test Interface is set to RJ-4	45	

Set the negotiation (Auto, Manual). This setting is valid when Test Interface is set to RJ-45 or SFP(GbE).

#### Set the speed (1G, 100M, 10M, Auto).

This setting is valid when Test Interface is set to RJ-45.

The Auto setting for Speed is valid when Negotiation is set to Auto.

### Set the duplex (FULL, HALF, Auto).

This setting is valid when Speed is set to 100M or 10M. The Auto setting for Duplex is valid when

Negotiation is set to Auto.

#### Set the flow control (ON, OFF).

Set the MDI (MDI, MDI-X, Auto). The Auto setting for MDI is valid when Negotiation is set to Auto.

# Executes link setting information acquisition

Acquires the link setting information of the other device connected to the AQ1300/AQ1301

### Applies link settings

Applies the acquired other device' s link settings to the AQ1300/AQ1301. You can execute this when the measurement interface is RJ-45 or SFP(GbE) and the acquisition status is Finish.

Status (Preparing, Finish, Fail)

### Cable type (Straight, Cross)

This setting is valid when Test Interface is set to RJ-45.

### Returns to the link setting screen

\_\_\_\_ IP Cable Status

ndicates the UTP cable status as follows. Normal, The cable may be defective. It is wo-pair cable) 13 Y.1564 Test

# Source Address Setup Screen

### Standalone

Follow the procedure in section 13.1 to display the Y.1564 Setup screen. Press the **Link/Address** soft key and then the **Source Address** soft key to display the Source Address Setup screen.

### MasterDevice

Follow the procedure in section 13.8 to display the Y.1564 Setup screen. Press the **Link/Address** soft key and then the **Source Address** soft key to display the Source Address Setup screen.

### SlaveDevice

Follow the procedure in section 13.9 to display the Source Address Setup screen.



# **Destination Address Setup Screen**

### Standalone

Follow the procedure in section 13.1 to display the Y.1564 Setup screen. Press the Link/Address soft key and then the **Destination Address** soft key to display the Destination Address Setup screen.

### MasterDevice

Follow the procedure in section 13.8 to display the Y.1564 Setup screen. Press the **Link/Address** soft key and then the **Destination Address** soft key to display the Destination Address Setup screen.



# **Emulation Setting Screen**

### Standalone

Follow the procedure in section 13.1 to display the Y.1564 Setup screen. Press the **Link/Address** soft key and then the **Emulation Setting** soft key to display the Emulation Setting screen.

### MasterDevice

Follow the procedure in section 13.8 to display the Y.1564 Setup screen. Press the **Link/Address** soft key and then the **Emulation Setting** soft key to display the Emulation Setting screen.

ж́	2016/5/18 15:40:12	=AC =	Link/Address	
	Emulatio	on Setting		Select this check how to perform APP
	<< Emulation Setting >>		Link Setting	replying. This setting is valid when Test Laver is set to
	IPv4 MARP Reply		Source Address	L3-IPv4.
	ARP Reply Target	Source Address only -		<ul> <li>Set the ARP reply target</li> </ul>
Enulat Setting	Emulation Setting	<ul> <li>(Source Address only, All addresses, A Vlan/addresses).</li> <li>This setting is valid when Test Layer is s</li> </ul>		
	<b>IP∨6</b> ↓ NDP Reply		Destination Address	<ul> <li>to L3-IPv4.</li> <li>You can select the All Vlan/addresses options when VLAN stacks of the Source Address setting is set to 1 or 2.</li> </ul>
				Select this check box to perform NDP
			Y.15	replying. This setting is valid when Test Layer is set to L3-IPv6.

### Explanation

# Link Setting Screen

### Negotiation

Select whether to use auto negotiation. This setting is valid when Test Interface is set to RJ-45 or SFP(GbE).

- Auto: The link between the AQ1300/AQ1301 and the device that it is connected to is configured automatically through auto negotiation.
- Manual: The link must be configured manually.

### Speed

When Test Interface is set to RJ-45, you can set the link speed.

- 1G: A 1 Gbit/s 1000BASE-T connection is used.
- 100M: A 100 Mbit/s 100BASE-TX connection is used.
- 10M: A 10 Mbit/s 10BASE-T connection is used.
- Auto: The link speed is set automatically. This setting is valid when Negotiation is set to Auto.

### Note\_

When Test Interface is set to XFP(10GbE), the link speed is fixed at 10G. When Test Interface is set to SFP(GbE), the link speed is fixed at 1G. When Test Interface is set to SFP(FE), the link speed is fixed at 100M.

### Duplex

You can set the communication mode for when Speed is set to 100M or 10M. This setting is valid when Test Interface is set to RJ-45.

- FULL: Full duplex communication
- HALF: Half duplex communication
- Auto: The AQ1300/AQ1301 chooses full or half duplex automatically. This setting is valid when Negotiation is set to Auto.

#### Note\_

When Test Interface is set to XFP(10GbE), SFP(GbE), or SFP(FE), or when it is set to RJ-45 and Speed is set to 1G, the duplex mode is fixed at FULL.

### **Flow Control**

You can enable or disable flow control.

- ON: Flow control is enabled.
- OFF: Flow control is disabled.

### MDI

You can set the measurement port to straight or crossover mode. This setting is valid when Test Interface is set to RJ-45.

- · MDI: Straight
- · MDI-X: Cross
- Auto: The AQ1300/AQ1301 switches between straight and crossover mode automatically (this setting is valid when Negotiation is set to Auto).

# Source Address Setup Screen

### Source MAC Address

Set the source MAC address. You can refer to the MAC address table to set the address.

### **VLAN Stacks**

Set the number of VLAN stacks.

- 1: One VLAN stack
- · 2: Two VLAN stacks

### VLAN1/VLAN2

Set the CoS (Class of Service) and VLAN-ID for 1 or 2 VLAN stacks. You can refer to the VLAN table to set the values.

- CoS: 0 to 7
- ID: 0 to 4095
- TPID: 0 to FFFF (supported in firmware version (FW Ver.) R1.08.01.001 and later)

### IPv4

Select whether to specify the source IPv4 address manually or to acquire and set it automatically through DHCP. This setting is valid when Test Layer is set to L3-IPv4 Test.

- Manual: You must set the source IPv4 address manually.
- DHCP: When you press Get IP Address, the AQ1300/AQ1301 acquires and sets the source IPv4 address using DHCP.

### Source IPv4 Address, Subnet Mask, and Gateway

Set the source IPv4 address, subnet mask, and gateway when IPv4 is set to Manual. You can refer to the IP Address table and the gateway reference to configure the settings.

• Subnet Mask: 1 to 31

### IPv6

Select whether to specify the source IPv6 address manually or to specify it through stateless autoconfiguration using the RA from an IPv6 router. This setting is valid when Test Layer is set to L3-IPv6 Test.

- · Manual: You must set the source IPv6 address manually.
- Stateless Address: When you press Get IP Address, the AQ1300/AQ1301 automatically configures the source IPv6 address.

### Source IPv6 Address

Set the source IPv6 address when IPv6 is set to Manual. You can refer to the IP address table to set the address.

### **IPv6 Router Address**

You can automatically acquire the router address or set it manually.

- Automatic: Clear the Set Router Address manually check box. The IPv6 prefix length and router
   address that have been acquired automatically are displayed.
- Manual: Select the Set Router Address manually check box. You can manually set the prefix length and router address.

### **MAC Address Table**

Select the source MAC address from the MAC Address table.

Global Address: You can set the source MAC address to a global address.

### VLAN Table

Select the VLAN CoS and ID from the VLAN table.

### **IP Address Table**

Select the source IP address from the IP address table.

 Get IP Address: Press this soft key to get the IP address. The AQ1300/AQ1301 will acquire an IP address, using DHCP when the test layer is L3-IPv4 or stateless address autoconfiguration when the test layer is L3-IPv6.

### Gateway

Set the gateway.

- · Manual: Select this option to set the gateway manually.
- Auto.1: Select this option to set the gateway to xxx.xxx.1.
- Auto.254: Select this option to set the gateway to xxx.xxx.254.

### QoS Field

Set the ToS value (Type of Service). Range: 0 to 7

### TTL

Set the TTL value (Time To Live). Range: 1 to 255

### **UDP Port Number**

Set the source UDP port of the test frame. Range: 0 to 65535

# **Destination Address Setup Screen**

### **Destination MAC Address**

Set the destination MAC address. You can refer to the MAC address table to set the address.

### IPv4

Set the destination IPv4 address. This setting is valid when Test Layer is set to L3-IPv4 Test. You can refer to the IP address table or select Search List to set the address.

### IPv6

Set the destination IPv6 address. This setting is valid when Test Layer is set to L3-IPv6 Test. You can refer to the IP address table or select Search List to set the address.

# **Emulation Setting Screen**

### **ARP** reply

Select whether to send ARP replies to ARP requests when the test layer is L3-IPv4.

- Selected: ARP replies are sent.
- · Cleared: ARP replies are not sent.

### **ARP Reply Target Setting**

When the test layer is L3-IPv4 and ARP Reply is selected, you can specify the ARP reply target frames.

· Source Address only:

The AQ1300/AQ1301 will send ARP replies to ARP requests that are directed at the source address.

All addresses:

The AQ1300/AQ1301 will send ARP replies to ARP requests, regardless of the address that they are directed at.

· All Vlan/addresses:

The AQ1300/AQ1301 will send ARP replies to ARP requests that are directed at all VLAN ID/addresses. You can select this option when the VLAN stacks in the source address settings is set to 1 or 2.

# 13.5 Configuring Common Y.1564 Test Items

# Procedure

# **Test Information Setup Screen**

### Standalone

Follow the procedure in section 13.1 to display the Y.1564 Setup screen. Press the **Common Setting** soft key to display the Common Setting screen.

### MasterDevice

Follow the procedure in section 13.8 to display the Y.1564 Setup screen. Press the **Common Setting** soft key to display the Common Setting screen.

184	2016/5/18 16:04:41		<u>™</u> =∀C=	Common Setting	
	Y	.1564 Test Setup		Information	
	<pre>&lt;&lt; Test Information &gt;</pre>	>		Setup	
	Test Name	10GbE-Pass test for YOKOGAW	A ]	Test Select	
	Customer	Yokogawa Meters & Instrument	ts		Test information actions
	Operator Name	Taro Yokogawa		Unit Setup	- rest mormation settings
	Comment	Opening of L2-Service			
				<b>Y.15</b>	

# **Test Select Screen**

Press the Common Setting soft key and then the Test Select soft key to display the following screen.



# **Unit Setup Screen**

Press the Common Setting soft key and then the Unit Setup soft key to display the following screen.



# Explanation

# **Test Information Setup Screen**

# **Test Information**

You can enter the following information. Follow the procedure in section 3.2 to enter characters.

- Test Name
- Customer
- Operator Name
- Comment
- You can enter up to 30 characters.
- When you press the Commit soft key in the character input dialog box, the character string changes to the characters that you entered.

### Note.

The information that you enter here will be included in the report of the test results. Use the setup software to generate the report. For details, see the Setup Software User's Manual, IM AQ1300-61EN.

# **Test Select Screen**

### Select a test item.

Select the tests that you want to execute. Select the check boxes of the tests that you want to perform.

- Configuration Test Test Duration: 1 to 60 seconds
  - CIR Test

Step count: Set the number of test steps to be executed. Range: 1 to 7 Min. Rate (CIR×n[%]): Set the test's start rate. Range: 10 to 90%

- EIR Test
- Policing Test Margin (M): Set the margin on the upper limit of the EIR rate.

Range: 0.000 to 10000.000 (when unit is IR or UIR), 0.000 to 100.000 (when unit is %)

- CBS Test
- EBS Test
- Performance Time Test Duration: 15m, 2h, 24h, User User range: 1 to 4320 minutes

# **Unit Setup Screen**

Set the unit of the Tx load rate.

IR (effective speed: bps), UIR (data rate), % (ratio of the data rate to the Tx rate)

#### Frame Frame Frame Frame Frame Frame Frame Frame . . . . . 1514 bytes (ex.) 4 bytes 8 bytes Preamble Data FCS The amount of traffic is approximately 1 Gbps. IFG (Frame + IFG)×number of frames per second×8 Frame 12byte Number of frames per second: Approx. 81274 Amount of traffic when the unit is UIR IFG is not included when the percentage is 100. or % (100%+α)

#### Example of when Tx rate is 1 Gbps (unit: UIR or %)





### **Frame Measurement**

Set the condition for the reference used to measure the frame delay variation (FDV).

Previous Frame

The maximum, minimum, and average are calculated from the delay time of the frame received previous to the measurement target.

### • Min. Threshold

The maximum, minimum, and average are calculated from the minimum delay time recorded within the measurement duration.

User

The maximum, minimum, and average are calculated from the specified delay reference. If the calculated result is negative, it is calculated as zero.

### **FD Reference**

Specify the delay time that will be the reference when measuring the delay variation using userdefined conditions.

Range: 0.000 ms to 1000 ms

# 13.6 Configuring the Detailed Settings (Service Setup) of the Y.1564 Test

# Service Setup Screen

### Standalone

Follow the procedure in section 13.1 to display the Y.1564 Setup screen. Press the **Service Setup** soft key to display the Service Setup screen.

### MasterDevice

Follow the procedure in section 13.8 to display the Y.1564 Setup screen. Press the **Service Setup** soft key to display the Service Setup screen.

### Set the service circuits to run the Y.1564 test on.



Switch between the master and slave (Master, Slave).

Press this soft key to switch between the displays of the master and slave settings. The settings that appear are the service and detailed service settings.

Select the services (Service 1-Service 8). Select the service numbers to display the detailed settings of.

#### **Detail settings** Set the details of test frames.

### Unit settings ► section 13.5

# **Detail Screen of Service Setup**

Press the **Detail** soft key to display the following screen.

2016/7/20 10:28:22			Set the service type	
Serv ce	e Setup		(Data, Voice, Video).	
Service     Service     Service     Service     Type     Data     Payload     Pattern     Random     Frame     Length     512     Service     Solution     Solution     Sta     Color     Cos     Green     O     Coso     Sta     CIR     10.00000     FLR     0.00     Solution     Solutio	G.711         CH Num.           EMIX         abceg         Detail           Yellow         0         [SS0(000000)]           0000 %         CBS         512         byte           EBS         512         byte           000 msec         FDV(%ile)         99.9%ile	Alester (>)     Service     Service     Service     Service     Copy	<ul> <li>Set the channel number (1 to 367647).</li> <li>Set the payload pattern (Random, All 0, All 1, 0/1)</li> <li>Set the frame length (64, 128, 256, 512, 1024, 1280, 1518, MTU, USER, EMIX).</li> <li>Set the color (OFF, CoS, ToS, DSCP).</li> <li>Set the SLA (Service Level Agreement).</li> <li>Set the traffic conditions such as the committed information rate and excess information rate</li> </ul>	
			- Set the frame structure. ► section 1.6	

When Test Layer is set to L3-IPv6, the IPv6 address is always used (fixed).

# Setting the Frame Length (EMIX)

Press the **Detail** soft key and then the **Detail** soft key next to EMIX under Frame Length to display the following screen.



# Frame Structure Setup Screen for each Service Setup

Press the **Detail** soft key, the **Detail** soft key next to Frame Structure, and then the **Basic Setting** soft key to display the following screen.



Press the **MAC** soft key to display the following screen.

Frame Setting (MAC) Screen

2016/5/26 10:07:20		=AC=	Frame	
	Frame Setting			
MAC			Basic Setting	
Source MAC	Source Setting		MAC	<ul> <li>Set the source MAC address (Manual, Source Setting).</li> </ul>
Destination MAC	Destination Setting           100         00         00         00         01		VLAN	<ul> <li>This setting is valid when Source MAC is set to Manual.</li> </ul>
			IP	<ul> <li>Set the destination MAC address (Manual, Destination Setting).</li> </ul>
	l		UDP	<ul> <li>This setting is valid when Destination MAC is set to Manual.</li> </ul>
			Y.15	

Press the VLAN soft key to display the following screen.

#### Frame Setting (VLAN) Screen



### Note.

- The VLAN soft key is valid in the following situations.
- · When VLAN stacks is 1 or 2 under Basic Setting
- When the Refer to Source Address for the VLAN stacks Setting check box is selected under Basic Setting and VLAN stacks of Source Address Setup is 1 or 2

Press the IP soft key to display the following screen.

0.	,		
\$ 2016/7/20 12:00:03	Link =	AC =	Frame
	Frame Setting		
IPv4		B	asic Setting
Source IPv4	Manua 1		
			MAI
Destination IPv4	Manua 1		
			VLAN
ToS/DS(DSCP)	IPv4-ToS 0		
Protocol	UDP 17		IP
TIL	64		
Subnet Mask	255 255 255 0 / 24		
Gateway	192 168 0 254 <u>Ref</u>	ат	UDP
			1.15
			L

#### Frame Setting (IPv4) Screen

# Set the source IPv4 address. (Manual, Source Setting).

 This setting is valid when Source IPv4 is set to Manual.

 Set the destination IPv4 address. (Manual, Destination Setting).

 This setting is valid when Destination IPv4 is set to Manual.

Set the ToS/DS (DSCP) (Manual, IPv4-ToS, IPv4-DSCP).

### Value

(Manual: 0-FF, IPv4-ToS: 0-7, IPv4-DSCP: 0-63)

Set the protocol (0-255). This setting is valid when Frame Structure is set to MAC+TYPE+IPv4.

# — Set the TTL (1 to 255).

Set the subnet mask (1-31). Set the gateway.

These settings are valid when IPv4 is set to Manual.

#### Frame Setting (IPv6) Screen

2016/7/20 12:12:08	LINK = AC =	Frame	
	Frame Setting		
IPv6		Basic Setting	
Source IPv6	Source Setting           FE80         10000         10000           [0000         [0000         0000	MAI	<ul> <li>Source IPv6 address.</li> <li>The address used the port settings is displayed.</li> </ul>
Destination IPv6	Destination Setting           FE80         0000         0000         0000           [0000         [0000         0000         0001	VLAN	<ul> <li>Destination IPv6 address.</li> <li>The address used the port settings is displayed.</li> </ul>
ToS/DS(DSCP)	IPv6-TrafficClass 0	IP	
Next Header	UDP 17		The address used the port settings is
		UDP	displayed.
		Y.15	

#### Note\_

The IP soft key is valid when Frame Structure is set to MAC+TYPE+IPv4, MAC+TYPE+IPv4+UDP, MAC+TYPE+IPv6, or MAC+TYPE+IPv6+UDP.

# **Copying Service Settings**

Press the Detail soft key and then the Copy soft key to display the following screen.



# Explanation

### Setting the Service Circuit to Perform the Test On

Set whether to perform the Y.1564 test for the service number currently displayed on the screen.

- Selected: Y.1564 test is performed.
- Cleared: Y.1564 test is not performed.

### Service Type

Set the type of test frame.

- Data: The test signal is set to a data sequence (Random, All 0, All 1, 0/1).
- Voice: The test signal is set to voice (G.711 compliant PCM code, G.729 compliant CS-ACELP format, G.723.1 compliant codec format).
- · Video: The test signal is set to video (MPEG2, MPEG3, MPEG4).
- CH Num.: When VOICE or VIDEO has been selected as the service type, specify the number of channels.

### **Frame Length**

Set the Tx frame length.

- 64, 128, 256, 512, 1024, 1280, 1518
   The length is set to the specified number of bytes.
- MTU (Maximum Transmission Unit)

The length is set to the maximum number of frames to send in a single transmission. Range: 64 to 9000

• User

The length is set to the specified number of bytes. Range: 64 to 9000

• EMIX

The length of a single transmission is defined to be the combination of the above three methods of setting the length (up to five types: a to e below).

A: 64, B: 128, C: 256, D: 512, E: 1024, F: 1280, G: 1518, H: MTU, U: User Defined

Example: 1st (64) $\rightarrow$ 2nd (512) $\rightarrow$ 3rd (MTU) $\rightarrow$ 4th (USER) $\rightarrow$ 5th (512) Example of the text shown in the EMIX box for the above setting: ADHUD Redundant settings are possible (512 in the above example is redundant).

### Color

Set the field of the QoS value that will be inserted into the test frame. Assign a high-priority value to green frames (Color: Green) and a low-priority value to yellow frames (Color: Yellow).

- · OFF: No color frame setting
- CoS, ToS: Green range 0 to 7, Yellow range 0 to 7
- DSCP: 000000 to 111111 (binary format)

### SLA (Service Level Agreement)

- CIR (0 to 10000) The unit is Mbps.
- EIR (0 to 10000) The unit is Mbps.
- CBS (0 to 1000) The unit is Kbyte.
- EBS (0 to 1000) The unit is Kbyte.
- FLR (0.00000 to 100.00000) The unit is %.
- FD (0.001 to 10000.000) The unit is msec.
- FDV (0.001 to 10000.000) The unit is msec.
- FDV (%ile) (100%ile, 99.9%ile, 90%ile, 75%ile) The unit is percentile (%ile).1
- AVAIL (0.001 to 100.000) The unit is %. This is valid when the check box is selected.
- 1 Percentile is a number that represents a measurement position counted from the smallest of all the values measured in a single test duration.
  - Example of 75th percentile: If 5000 values are measured in a single test duration, starting from the first measurement, the value that corresponds to 75% is measurement number 3750. In this case, the 75% percentile value is the 3750th value.

# 13.7 Configuring Y.1564 Options

### Procedure

# **Advance Setup Screen**

### Standalone

Follow the procedure in section 13.1 to display the Y.1564 Setup screen. Press the **Option (Y.1564)** soft key and then the **Advance setup** soft key to display the Advance

### MasterDevice

setup screen.

Follow the procedure in section 13.8 to display the Y.1564 Setup screen. Press the **Option (Y.1564)** soft key and then the **Advance setup** soft key to display the Advance

setup screen.



# **Measurement Setup Screen**

### Standalone

Follow the procedure in section 13.1 to display the Y.1564 Setup screen. Press the **Option (Y.1564)** soft key and then the **Measurement Setting** soft key to display the Measurement Setting screen.

MasterDevice

Follow the procedure in section 13.8 to display the Y.1564 Setup screen. Press the **Option (Y.1564)** soft key and then the **Measurement Setting** soft key to display the Measurement Setting screen.
#### 13.7 Configuring Y.1564 Options



## Explanation

## **Advance Setup Screen**

#### Select setup file after selecting Y.1564

Select whether to display the Select Setup File screen after you select Y.1564 on the Test Menu.

- Selected: The Select Setup File screen is displayed.
- Cleared: The Select Setup File screen is not displayed. The previous settings are automatically selected.

#### Allow to Change the Test Setup

Select whether to allow the Test Setup screen settings to be changed.

- Selected: The Test Setup screen settings can be changed.
- · Cleared: The Test Setup screen settings cannot be changed.

## Measurement Setup Screen

#### **Measurement START Condition**

Request ARP/NDP (During Y.1564 tests, this is fixed to selected and appears dimmed.) For ARP (IPv4) and NDP (IPv6) destination MAC addresses, select whether to use an ARP or NDP request to acquire the MAC address when the START key is pressed. This setting is valid when the test layer is L3-IPv4 or L3-IPv6.

- Selected: An ARP/NDP request is sent.
- Cleared: An ARP/NDP request is not sent.

## Not start the measurement when Link is down. (During Y.1564 tests, this is fixed to selected and appears dimmed.)

Select whether to start measurement when the START key is pressed and a linkdown is detected.

- · Selected: Measurement is not started when a linkdown is detected.
- Cleared: Measurement is started when a linkdown is detected.

#### **Measurement STOP Condition**

## When Link Down is detected (During Y.1564 tests, this is fixed to selected and appears dimmed.)

Select whether to stop measurement when a linkdown is detected during measurement.

- · Selected: Measurement is stopped when a linkdown is detected.
- · Cleared: Measurement is not stopped when a linkdown is detected.

#### When L2 Error is detected

Select whether to stop measurement when an L2 error is detected during measurement.

- · Selected: Measurement is stopped when an L2 error is detected.
- Cleared: Measurement is not stopped when an L2 error is detected.

#### When Fail Result is detected

Select whether to stop measurement when the result of the test currently being performed produces a fail judgment.

- · Selected: Measurement is stopped when the test result produces a fail judgment.
- Cleared: Measurement is not stopped when the test result produces a fail judgment.

#### **Operation after measurement stops**

#### Judge Pass or fail

Select whether to perform pass/fail judgments after measurements finish.

- Selected: Pass/fail judgments are performed after measurements finish.
- · Cleared: Pass/fail judgments are not performed after measurements finish.

#### Note\_

To perform pass/fail judgments for a particular test, you have to set the pass/fail judgment setting on the test's setup screen.

#### Save measurement results

Select whether to save the measurement results to a file after measurement finishes.

- · Selected: The measurement results are saved to a file when measurement finishes.
- · Cleared: The measurement results are not saved to a file when measurement finishes.

#### Save measurement logs

Select whether to save the measurement log to a file after measurement finishes.

- · Selected: The measurement log is saved to a file when measurement finishes.
- Cleared: The measurement log is not saved to a file when measurement finishes.

#### Others

#### Subtract the fixed latency from the result

During latency measurement, the fixed delay that occurs in the other device during loopback is subtracted from the measured results. The subtracted results are displayed as measurement results. If the measured value is less than the fixed delay, 0.00 µs is displayed.

- · Selected: The fixed delay is subtracted from the measured values.
- · Cleared: The fixed delay is not subtracted from the measured values.

#### Fixed delay value based on the interface

Interface	Delay	
XFP	1.0 µs	
SFP(GbE)	1.4 µs	
SFP(FE)	12 µs	
RJ-45(1000M)	1.6 µs	
RJ-45(100M)	11 µs	
RJ-45(10M)	108 µs	

## 13.8 Configuring the AQ1300/AQ1301 as a Master Device

## Procedure

Perform the following procedure when the configuration type is set to MasterDevice.

## **Test Setup Screen**

Select MasterDevice by following the procedure in section 13.2, and then press the **Next** soft key to display the following screen.



## **Link Setting Screen**

Press the Next soft key to display the following screen.



## Source Address Setup Screen

Press the Next soft key to display the following screen.

َ≆ 2016/5/19 11:58:48	= 3A= 🎫	Source Address	
Source Address			
<	Refer	Next	<ul> <li>Set the destination address.</li> <li>▶ section 13.4</li> </ul>
VLAN stacks         None           VLAN2         TP1D         88A8         CoS         0         ID         1001           VLAN1         TP1D         8100         CoS         0         ID         1000	Refer 1 Refer 1	Back —	<ul> <li>Configure the link settings.</li> <li>▶ section 13.4</li> </ul>
Source         IPv4         Hanual           Address         192         168         0         1           Subnet Mask         255         255         255         0         / 24           Gateway         192         168         0         254	Refer		
		Get IP Address	
		? 1.1503 Mastar	

## **Destination Address Setup Screen**

Press the Next soft key to display the following screen.



#### Search List

Press the Search List soft key to display the following screen.

<u>ب</u>	2016/5/1	9 12:16:33		= AC =	Search List
			Search List		
1	Host Name	SerialNo	Version	Select	Search other device
23				Select Select	<ul> <li>Switch</li> </ul>
4				Select	SerialNo+Ver
5 6				Select	
7 8				Select Select	
9 10				Select	
11				Select	
12 13				<u>Select</u>	Next Page
14 15				Select	
16				Select	2 11562

#### Search for other devices. When you press this soft key, the AQ1300/AQ1301 searches for other devices (AQ1300 or AQ1301) on the same network segment.

			Ļ	Search for other	devices	
÷	2016/5/1	9 12:16:33		THR:=YC=	Search List	Area of the s
1 2 3 4 5 6 6 7 7 8 9 9 10 11 12 13 14 15 16	Host Name ni taka yokohama fukuoka sapporo kofu kanazawa	SerialNo SN0000001 SN0000002 SN0000003 SN00000005 SN0000005 SN0000005	Version           6.0.134.10           5.1.133.11           4.2.132.12           3.3.131.13           2.4.130.14           1.5.129.15	Selecti Selecti Selecti Selecti Selecti Selecti Selecti Selecti Selecti Selecti Selecti Selecti Selecti Selecti Selecti Selecti Selecti Selecti Selecti	Search other device SerialNotVer	Area of the s when you sv Switches the (SerialNo+Vo IPv4/IPv6, M Addr Type MAC Address Select the ac (the destinat search list. To the next j (1 to 16, 17 t

search list that changes vitch the display

e search list display er, Test Setup, Status+MAC, aster Addr)

Set the address type

(MAC Address, IP Address). This setting appears when Switch is set to Master Addr.

ddress of the other device tion address) from the

page

o 32, 33 to 48, 49 to 64)

## **Connect Screen**

Press the **Connect** soft key to display the following screen.

<b>∲</b> 2	016/5/19 13:51:14	=AC =	Destination Address
<<	Destination Address	● Search List	
Dest	i Information(Code:16)		anual etting
	Connecting Inband Sesstion		onnect
			Back
	<u> </u>		
			2 1.15(2) Master



Select when you don t want to change the slave settings. Pressing this soft key will open the Y.1564 Setup screen.

Select to apply the currently displayed settings to the slave. You must perform remote reconnection after you press this key.

Select to copy the slave data on the master.

You must press "Apply to Slave" after you press this key.

## Y.1564 Setup Screen

Press the **Complete** soft key to display the following screen.

× 2016/5/18 13:44:50	=AC=	Y.1564 Setup	
Y.1564 Test	Setup	👝 Test	$\mathbf{r}$
<	10 00 01 Refer 1 Refer 1 Refer 1 Refer 1 Refer 1 Refer 1 Refer	Setup XFP(10GbE) L3-IPv4 Test Common Setting Link/Address Service Setup	─ ▶ section 13.1
Test SelectConfiguration TestSeCIR TestEIR TestPolicing TestSeCBS TestEBS TestPerformance TestSe	Service Setup rvice 1:Data Service 5:Data rvice 2:Data Service 6:Data rvice 3:Data Service 7:Data rvice 4:Data Service 8:Data	Next 1/2	J

#### Explanation

## **Destination Address Screen**

#### Search List

Select the address of the other device (the destination address) from the search list.

#### **Searching for Other Devices**

When you select Search other Device, the AQ1300/AQ1301 searches for other devices (AQ1300 or AQ1301) on the same VLAN or network segment and displays the results in the search list.

#### Switching the Display

You can switch between different search list displays.

- · SerialNo+Ver: The equipment name, serial number, and version are displayed.
- Test Setup: The equipment name, test interface, and test layer are displayed.
- Status+MAC: The equipment name, status, and MAC address are displayed.
- IPv4/IPv6: The equipment name and IP address are displayed.
- Master Addr:

The device name and master address (MAC or IP address) are displayed.

#### Note.

You can check the equipment name and serial number of the AQ1300/AQ1301 in the system settings.

#### Setting the Address Type

You can switch the address type that is displayed when Switch is set to Master Addr.

- MAC address
- IP address

#### **Manual Setting**

Press this soft key to cancel the selection that you made in the search list and enter the destination address manually. This soft key is valid when you have selected a destination address from the search list.

#### Connect

Press this soft key to connect to the other device.

### **Connect Screen**

The AQ1300/AQ1301 will connect remotely to the other device with the specified destination address. After the connection, you can use the test interface to control the other device remotely.

#### **Slave Setup**

Complete: Press this soft key when you do not need to change the slave settings. Pressing this soft key will open the Auto Setup screen.

Apply to Slave: Press this soft key to apply the currently displayed test and link settings to the slave.

You must perform remote reconnection after you press this key.

Copy from setup: Press this soft key to use the slave data on the master to configure the setup items. must press "Apply to Slave" after you press this key.

#### Note.

After the connection is established, you cannot change the source and destination addresses.

# 13.9 Configuring the AQ1300/AQ1301 as a Slave Device

## Procedure

Perform the following procedure when the configuration type is set to SlaveDevice.

## **Test Setup Screen**

Select SlaveDevice by following the procedure in section 13.2, and then press the **Next** soft key to display the following screen.



## **Link Setting Screen**

Press the Next soft key to display the following screen.



## Source Address Setup Screen Press the Next soft key to display the following screen.

瘶 2016/5/19 14	22:39	=AC =	Source Address	
	Source Address			
<< Source Addre Source MAC	s >> 00 00 00 00 00 01	Refer	Slave Execution =	<ul> <li>Slave Execution</li> </ul>
VLAN stacks VLAN2 T VLAN1 T	None           ID         8848         CoS         0         ID         1001           'ID         8100         CoS         0         ID         1000	Refer 1	Back =	<ul> <li>Configure the link settings.</li> <li>▶ section 13.4</li> </ul>
Source IPv4	Manual			
Address Submet Mook		Refer		
Gateway	200         200         200         0         7         24           192         168         0         254	Refer		
			Get IP Address	
			1.15	

#### Slave Execution

🎪 🚺 2016/	5/27 10:08:17				=AC=	Slave
?	Remain	0[s] 🔀	TAT LASER LFS .OG DFF Con	; itrol		
Traffic	Tx Rate(%) :	100.00000	Frame Len.	(byte):	64	Release _
	Tx Time(min):	1	Fill Patte	rn:	Random	
	Test Results					
	Page 1/1			Durat	ion 00:00:00	
10G FULL						
Frame TX RX						
L2 ERR LFS						
T×LF T×RF R×LF R×RF						
	[Tx] Rate(%):		[Rx] Rate(%	():		
	Normal Frame: Tx: Rx:	(1 . L .	III LIN	or Histo  K  L2	ory 2 L3	1.15
	Kx Frame Length	by te J	(	<u>vr</u>		Slave 🕐

Press this soft key to exit the slave (connection standby) state. Pressing this soft key will open the top menu.

## **13.10 Starting Measurement**

## Procedure

## **Starting Measurement**

Press START to display the following screen and start measurement and transmission.



Network status ► section 2.1

## Explanation

## **Test Information**

The name of the test that is currently being performed and the number of steps that will be performed are displayed here.

#### **Test Items**

- IR load test
- · Burst size test
- Performance test

#### Number of Steps and Services



## **Test Results**

**Display during Measurement** 



Measurement duration Indication that measurement is in progress

Measuring: This appears while measurement is being performed. Measurement duration: Indicated in the following format: hh:mm:ss.

#### **Display When Measurement Has Finished**



#### Pass/Fail Judgment Indication

The pass/fail judgment of the test is displayed here. This appears when the pass/fail judgment is enabled. For details on the pass/fail judgment setting, see section 13.7.

- Pass: The results meet the requirements.
- Fail: The results do not meet the requirements.

#### **Results Display**



For each test, the current measurement execution state and the pass/fail judgment result are displayed here.

Execution State

Pre Exec: The AQ1300/AQ1301 is waiting to execute the test.

Executing: The AQ1300/AQ1301 is executing the test.

Finish: The test has finished.

Aborted: During test execution, the STOP button was pressed to force the test to stop or the test stopped automatically because an error was detected.

-----: The test is not enabled.

Pass/Fail Judgment

Pass: The results meet the requirements.

Fail: The results do not meet the requirements.

#### Note.

The pass/fail judgment result is not displayed while a test is being executed or if the pass/fail judgment is not enabled.

## **Statistics Counter and Error Detection History**

During measurement, the statistical information of the frames that are transmitted from and received by the measurement port and the status of error detection are displayed here.

#### Transmission and Reception Rates

During measurement, the transmission and reception rates are indicated (as percentages).

#### Normal Frames

The number of normal frames that have been sent and received during a single measurement period is indicated.

#### Received Frame Length

The currently received frame length is indicated as an average over 1-second intervals.

#### • Error Detection History

From the start of measurement to the time that measurement is stopped, link errors and L2 errors (L2 frame errors) are displayed here as they are detected.

Display Item	Display	Explanation
LINK ERR	LINK ERR (gray)	No linkdowns have been detected during measurement.
	LINK ERR (red)	If even one linkdown is detected during measurement, the indication becomes red.
L2 ERR	L2 ERR (gray)	During measurement, no frames have been received with any of the following errors.
		CRC errors
		Undersize errors
		Oversize errors
		Symbol errors
		Alignment errors
	L2 ERR (red)	During measurement, if even one frame is received with any of the following errors, the indication becomes red.
		CRC errors
		Undersize errors
		Oversize errors
		Symbol errors
		Alignment errors

## 13.11 Displaying the Test Results

## Procedure

## **Test Result Display Screen**

Follow the procedure in section 13.10 to start and stop measurement.



#### Note.

- During measurement, you can select menu items other than "File."
- If you press ESC while another measurement screen is displayed, the measurement results screen will appear.
- You can also use the left and right arrow keys to switch between measurement screens. For details, see section 13.16.

## 13.12 Displaying the IR Load Test Results

### Procedure

## IR Load Test Results Screen

Follow the procedure in section 13.10 to start and stop measurement. Press the **IR Load Test** soft key to display the following screen.

🎄 🚺 201	2016/5/19 15:20:01							=AC=	IR Load Test	
Y.1564	-	Remain	(1)			ISER DFF Contro	]		<b>∢M</b> aster <->	Switch between the master and slave
Sv. STE	EP F	rames:	(%)	2	50000 Fra Fil	me Len.(by 1 Pattern:	rtej: 64 Ra	<del>i</del> andom	Slave Master	(Master, Slave)
1.4		IR Loa	d Tes	st			Page	1/2	◀ Service Select =	<ul> <li>Select the services</li> </ul>
	no R	ALL	P/F Fail	Min	IR(Mbit/s) Mean	Max	F Count	FLR	Service 1	(Service 1-Service 8).
10G FU	ILL SE	step1	Pass Pass	3.300	3.500	3.700	2000	1.0E-2		
Frame TX B	X	step3 step4	Pass Pass	11.300 15.300	11.500	11.700	0	0.0E-2 0.0E-2		
L2 ERR		step5 step6	Pass Pass	*****	*****	*****	***** *****	*****		
TxLF TxF	RF E	Step/ EIR green	Pass Fail Pass	15 000	15 000	15 000	2000	******		
	Ŋ	yellow total	Pass	25.000	25.000	25.000	0	0.0E-2 0.0E-2		
	F	POL green	Fail Pass	15.000	15.000	15.000	2000	1.0E-2		
	2	total	Pass	25.000 40.000	25.000 40.000	25.000 40.000	0	0.0E-2 0.0E-2		

#### Note\_

- · You can display this screen even during measurement.
- You can also use the left and right arrow keys to switch between measurement screens. For details, see section 13.16.
- Press ESC to return to the Test Result Display screen (see section 13.11).

## Explanation

## **IR Load Test Results Table**

The following items are displayed.

•	P/F:	The pass/fail judgment (Pass/Fail) is displayed. If pass/fail judgment is enabled, the pass/fail judgment results are indicated with colors for each item. Green: Pass Red: Fail
•	IR(Mbit/s):	Information rate (minimum, average, maximum) is displayed.
•	FL:	Frame loss (frame loss count, loss rate) is displayed. If the measured result has been exceeded 999999, the result columns display "Over."
•	FTD(ms):	Frame transfer delay (minimum, average, maximum) is displayed. If the measured result has been exceeded a second, the result columns display "1s OVER."
•	FDV(ms):	Frame delay variation (minimum, average, maximum) is displayed. If the measured result has been exceeded a second, the result columns display "1s OVER."

#### Note\_

- Use the up and down arrow keys to switch the displayed page.
- During measurement, items that have not yet been measured are displayed as "\*\*\*\*\*."
- Pass/fail judgment is not performed on green frame measurement results when Color is set to OFF.
- Pass/fail judgment is not performed on yellow frame measurement results regardless of the Color setting.
  FTD(ms) is valid when the test direction is set to loopback.

13 Y.1564 Test

## 13.13 Displaying the Burst Size Test Results

## Procedure

## **Burst Size Test Result Display Screen**

Follow the procedure in section 13.10 to start and stop measurement. Press the **Burst Size Test** soft key to display the following screen.



#### Note\_

- · You can display this screen even during measurement.
- You can also use the left and right arrow keys to switch between measurement screens. For details, see section 13.16.
- Press ESC to return to the Test Result Display screen (see section 13.11).

## Explanation

## **Burst Size Test Results Table**

The following items are displayed.

•	P/F:	The pass/fail judgment (Pass/Fail) is displayed. If pass/fail judgment is enabled, the pass/fail judgment results are indicated with colors for each item. Green: Pass Red: Fail								
•	FL:	Frame loss (frame loss count, loss rate) is displayed. If the measured result has been exceeded 999999, the result columns display "Over."								
•	FTD(ms):	Frame transfer delay (minimum, average, maximum) is displayed. If the measured result has been exceeded a second, the result columns display "1s OVER."								
•	FDV(ms):	Frame delay variation (minimum, average, maximum) is displayed. If the measured result has been exceeded a second, the result columns display "1s OVER."								
	Note									
	<ul> <li>Durin</li> </ul>	g measurement, items that have not yet been measured are displayed as "*****."								
	<ul> <li>Pass/fail judgment is not performed on green frame measurement results when Color is set to OFF.</li> </ul>									
	<ul> <li>Pass</li> </ul>	fail judgment is not performed on yellow frame measurement results regardless of the Color setting.								

• FTD(ms) is valid when the test direction is set to loopback.

## 13.14 Displaying the Performance Test Results

### Procedure

## Performance Test Result Screen

Follow the procedure in section 13.10 to start and stop measurement. Press the **Performance Test** soft key to display the following screen.

<b>*</b>	2016/	5719-15	:41:4	3			<u>™</u> =4C=	Performance Tes	
Y.156	4	Remain			- Stat LA	iER DFF Contro	]	<b>∢</b> Master (-)	Outline between the measure of a large
Perfo	rnance	Tx Rate	e(%)	: 100.0	00000 Fram	ie Len.(by	'te): 64	Slave	Switch between the master and slave
Sv.	STEP	Frames	:	2	Fill	Pattern:	Random	Master	(Master, Slave)
- :	-			_					
	L1	Perfor	mance	Test			Page 1/3		
XF	P 🔤		P/F		lR(Mbit∕s)		FL		
LINK	LB	ALL	Fail	Min	Mean	Max	Count FLR		
106		<u>Sv. 1</u>	Pass	15.300	15.500	15.700	2000 1.0E-2	2	
Iou	PAUSE	<u>Sv. 2</u>	Pass	15.300	15.500	15.700	2000 1.0E-2		
Fr	700	<u>87.3</u> 80.4	Pacc	15.300	15.500	15.700	2000 1.0E-2		
TV	RV	Sv 5	Pass	15.300	15.500	15.700	2000 1.0E 2	5	
		Sv. 6	Pass	15.300	15.500	15.700	2000 1.0E-2		
LE ENT	l FS	Sv. 7	Pass	15.300	15.500	15.700	2000 1.0E-2	2	
T.IF	T.RF	Sv. 8	Fail	15.300	15.500	15.700	2000 1.0E-2	2	
NXLF	nxnr								
								45 63	

#### Note.

- You can display this screen even during measurement.
- You can also use the left and right arrow keys to switch between measurement screens. For details, see section 13.16.
- Press ESC to return to the Test Result Display screen (see section 13.11).

## Explanation

## **Performance Test Results Table**

The following items are displayed.

P/F:	The pass/fail judgment (Pass/Fail) is displayed. If pass/fail judgment is enabled, the
	pass/fail judgment results are indicated with colors for each item.
	Green: Pass
	Red: Fail

- IR(Mbit/s): Information rate (minimum, average, maximum) is displayed.
- FL: Frame loss (frame loss count, loss rate) is displayed. If the measured result has been exceeded 999999, the result columns display "Over."
- FTD(ms): Frame transfer delay (minimum, average, maximum) is displayed. If the measured result has been exceeded a second, the result columns display "1s OVER."
- FDV(ms): Frame delay variation (minimum, average, maximum) is displayed. If the measured result has been exceeded a second, the result columns display "1s OVER."
- AVAIL(%): Service circuit availability is displayed.

#### Note.

- Use the up and down arrow keys to switch the displayed page.
- During measurement, items that have not yet been measured are displayed as "\*\*\*\*\*."
- FTD(ms) is valid when the test direction is set to loopback.

## 13.15 Displaying a Table of Test Results

## Procedure

## **Test Summary Screen**

Follow the procedure in section 13.10 to start and stop measurement. Press the **Summary List** soft key to display the following screen.

#### IR load test, burst size test

2016/5/27 10:37:13								=AC=	Summry List	
Y.1564 Sv. STEP	Rema i n	1		🛃	2517 T LA!	iER LFS DFF Con	trol		<pre> •Naster &lt;-&gt; Slave Master </pre>	Switch between the master and slave (Master, Slave)
L1 XFP E UNK LR 10G FULL Frame TX RX L2 ERR LFS TALF TARF RALF RARF	Sumry ALL V. 1 V. 2 V. 3 V. 3 V. 5 V. 6 V. 6 V. 7 V. 8	List P/F Pass Pass Pass Pass Pass Pass Pass	CIR Pass Pass Pass Pass Pass Pass Pass	Con EIR Pass Pass Pass Pass Pass Pass Pass	figurat POL Pass Pass Pass Pass Pass Pass Pass	tion CBS Pass Pass Pass Pass Pass Pass Pass Pas	EBS Pass Pass Pass Pass Pass Pass Pass	Perfor- mance Pass Pass Pass Pass Pass Pass Pass	Service Select Service 1 Test Select CIR Test Detail =	<ul> <li>Select the services (Service 1-Service 8).</li> <li>Select the test (CIR Test, EIR Test, Policing Test, CBS Test, EBS Test, Performance Test)</li> <li>Detail Displays the detail screen of the test results for the selected test. For a description of the detail screen of each test, see sections 13.12 to 13.14.</li> </ul>
Service numbers							Per	formance to	est	

#### Cursor (brown)

Displays the service number of the selected service and the position of the test results that corresponds to the selected test result. Pressing the Detail soft key or ENTER displays the detail screen of the test results at the cursor position.

## Explanation

The pass/fail judgment results (Pass/Fail) of the test items in sections 13.12 to 13.14 are displayed in a tabular form.

## 13.16 Changing the Displayed Screen

## Procedure

You can switch the displayed measurement screen by pressing the left and right arrow keys.



On the IR load test result screen and performance test result screen, you can switch between pages of results on the displayed screen by pressing the up and down arrow keys.

## Explanation

#### ► and < Keys

These keys change the displayed screen. They are valid when a measurement screen is displayed.

#### ▲ and ▼ Keys

These keys switch between the pages of the displayed screen. They are valid on the IR load test result screen and performance test result screen.

## 14.1 Connecting a USB Storage Medium to the USB Port

Use a portable USB storage medium. Connect it directly to the USB Type A port on the AQ1300/ AQ1301.

Hot-plugging is supported: you can connect or disconnect the USB device at any time, regardless of whether the AQ1300/AQ1301 is on or off. When the power is on, the AQ1300/AQ1301 automatically detects the USB storage medium after it is connected.



#### Note

- Connect USB storage devices to the AQ1300/AQ1301 directly, not through a USB hub.
- Use a portable USB storage medium. Do not connect an incompatible USB storage medium.
- Do not connect and disconnect a USB device repetitively. Provide a 10-second interval between removal and connection.
- Do not connect or disconnect a USB device during the time from when the AQ1300/AQ1301 is turned on until key operation becomes available.
- You can use USB storage devices that comply with USB 1.1.

## 14.2 Saving and Loading Data

## Procedure

### **File Screen**

Display the screen for manipulating files. Operate according to the test menu.

#### Setting

#### • Auto, Auto(Remote), or RFC2544

Follow the procedure in the relevant section to display the Select File Display.

•	Auto	Section 4.1
		 o // - /

- Auto(Remote) Section 5.1
- RFC2544 Section 8.1

Press the File soft key.

#### Manual

Press the soft keys in the following sequence. Manual > Next 1/2 > File

#### VLAN Test

Press the soft keys in the following sequence. Option > VLAN Test > Next 1/2 > File

#### Loading a VLAN ID Definition File

Option > VLAN Test > Detail Setup > VLAN ID TX Setting or VLAN ID RX Setting > Sub Menu > Refer File

#### • E-OAM Test

Press the soft keys in the following sequence. Option > Next 1/2 > E-OAM > Next 1/2 > File

#### **Measured Results**

Follow the procedure in the relevant section to end the measurement.

•	Auto, Auto(Remote), or Manual	Section 7.1
•	RFC2544	Section 9.2
•	VLAN test	Section 11.7
•	E-OAM test	Sections 12.8, 12.9, and 12.10

Press the File soft key.

The following screen appears.

#### **Directory path**

The number of directories and files in the selected directory

2009/10/23 16:28:01			=4	\C=	File
	File List				<b>∢</b> File
Path <u>USB Memory</u> Num Of Files : 5				-	Operation - Save
FileName	▲  Size	Date			<b>∢</b> File Type
USB Memory		2009/10/06	13:28:54		*.mr
LoggingData		2009/10/05	17:53:26		▲ Drive
0000.mr	280K	2009/10/03	16:54:04		Select - USB Memory
E) 0001.mr	203K	2009/10/23	10.27.24		File Name
Line the rotory kn	ob and EN	TED to	<b> </b>		Se tup 🗧
select the save de	estination or	the file th	nat		Com
you want to load.					Save _
				•	
0002.mr					

#### -Set the action (Save, Load).

-Set the file type.

Set the extension of the file type you want to save or load. For details, see the explanation later in this section.

-Set the drive (Internal, USB Memory).

#### -Set the file name (see the File Name Setup screen in the next section).

- Saves or loads the file Whether "Save" or "Load" is displayed depends on which option you choose for the Action setting.

The file name candidate for the next save operation

This indication appears when you set the action to "Save."

## File Name Setup Screen

File Name	Setup	Set the file name form Test Item No. + No., Co Date, Comment + Date	at (No., Comment + No., omment + Test Item No. + No., ).
File Name Type No. Comment Attach Directory Directory Type Directory Name	Comment + No. – 1 – Directory Name –	Set the ID number (0 to Specify a comment (up To enter a comment, fol Select when you want Valid for statistical resul Set the directory name Setun File Name, Setu	o 9999). to to 30 characters). low the procedure in section 3.2. to specify a directory name. t and log files format (Directory Name, p File Comment)
File Name 0001.mr		Specify the directory r To set the directory nan 3.2. File name The file name that is pro displayed.	hame (up to 30 characters). The, follow the procedure in section aduced by the above settings is

## Explanation

### **File Operation**

Select "Save" or "Load."

### File Type

Set the extension for the measurement result data.

### Note.

Because the file type is fixed, you cannot set the extension when you save or load settings or load measurement results.

#### Saving

The types of files that you can save are listed below.				
Extension	Description			
.sd	Measurement setup files			
.mr	File containing measured results or statistic results			
.CSV	Statistic log files (in Manual mode)			
	Result file of LT execution or multicast LB execution (for E-OAM tests)			

**1** File Operation

#### Loading

The types of files that you can load are listed below.

21	,
Extension	Description
.sd	Measurement setup files
.mr	File containing measured results or statistic results
.csv, .txt	VLAN ID definition file (for VLAN tests)
	The VLAN ID definition file is a list of VLAN IDs that are registered in a VLAN ID list of a VLAN test.
	It is a text file in CSV format that you can create with a text editor or a spreadsheet application.

\* For details on how to load display management files (disManage.dmf) and package files (.dmfz), see section 14.7.

#### **Drives**

You can select one of the following drives.

nternal	The AQ1300/AQ1301 internal memory
USB Memory	The USB storage medium connected to the USB Type A port on the AQ1300/AQ1301.

## File Name

#### **File Name Format**

You can set the file name format to one of the following options. For all formats, the maximum number of characters is 30.

No., Comme	No., Comment + No., Test Item No. + No., Comment + Test Item No. + No., Date, Comment + Date			
Comment	Up to 30 characters			
ID No.	Four characters			
	The range is 0 to 9999. Four characters are used in the file name. For example, if you set the			
	number to "1," "0001" will be used in the file name.			
Test Item No. 1 to 8				
	The registered test item number is displayed.			
Date	Displayed in the following format: YYMMDD_hhmmss			
Extension	Four characters, including the period.			

 If the length of the specified file name, including the extension, exceeds 30 characters, the file is named "Name Over."

#### String and Character Types That Can Be Used in File and Directory Names

There are limitations on the types of strings and characters that you can use in file and directory names.

 The following character strings cannot be used as file or directory names due to MS-DOS limitations.

AUX, CON, PRN, NUL, CLOCK, CLOCK\$, LPT0, LPT1, LPT2, LPT3, LPT4, LPT5, LPT6, LPT7, LPT8, LPT9, COM0, COM1, COM2, COM3, COM4, COM5, COM6, COM7, COM8, COM9

The following types of characters can be used: 0 to 9, A to Z, a to z, \_, -, (, ), {, }, #, \$, %, &, ~, !, `,and @

@ cannot be entered consecutively.

 Make sure that the full file path (absolute path from the root directory) is less than or equal to 200 characters in length. If it exceeds 200 characters, an error occurs when you perform a file operation (such as saving, copying, renaming, or creating a directory).

Full file path: When an operation is being performed on a directory, the full path is up to the name of the directory.

When an operation is being performed on a file, the full path is up to the name of the file.

• If the specified file or directory name contains characters that cannot be used, the file or directory is named "Bad File Name."

## **Directory Name**

You can specify a destination directory when you save statistical result and log files. When you specify a directory name, the directory name appears followed by a slash in front of the file name.

#### **Attach Directory**

Select this check box when you want to specify a directory name.

#### **Directory Name Format**

You can set the directory name format to one of the following options. For all formats, the maximum number of characters is 30.

Directory Name, Setup File Name, Setup File Comment

Directory Name	Up to 30 characters
Setup File Name	The name of the loaded setup file is displayed.
Setup File Comment	The comment of the loaded setup file is displayed.

Even when specifying a directory name, make sure that the name, including the extension, is 30 characters or less. If the specified directory name exceeds 30 characters, the directory is named "Name Over."

## **Saving Files Automatically**

In the measurement settings, when you set the "Operation after Measurement Stops" setting as described below, a file is saved automatically after measurement finishes. Files that are saved automatically are saved to the "result" folder in internal memory.

Mode	Condition	Saved Files	
Auto or	When the "Save measurement results" check Statistical result file (.mr)		
Auto(Remote)	box is selected		
Manual When the "Save measurement results a		Statistical result file (.mr) and statistical log	
	Statistics Log" check box is selected	file (.csv)	

#### **Deleting and Copying Files** 14.3

### Procedure

#### File Screen

Follow the procedure in section 14.2 to display the file screen.

#### **Directory path**

The number of directories and files in the selected directory



Set the action (Delete, Copy).

Set the extension of the file type you want

Set the drive (Internal, USB Memory).

## Deletes the selected files or displays a screen for selecting the copy

Whether "Delete" or "Dest. Folder" is displayed depends on which option you choose for the Action setting.

When you press the Dest. Folder soft key, a screen for selecting the copy destination directory appears.

In the screen that appears, select the destination directory and press the Copy soft key to copy the files.

## Explanation

## File Operation

Select "Delete" or "Copy."

## **File Type**

The files of the type that you selected appear in the File List screen.

- For details about file types, see "Explanation" in section 14.2.
- To display all the files in the current directory, set the file type to "\*.\*".

## Drives

See "Explanation" in section 14.2.

## Selecting All Files

All the files in the current directory will be deleted or copied.

- · When you press the All Select soft key, "All Select" changes to "All Deselect."
- · When you press the All Deselect soft key, "All Deselect" changes to "All Select." All the files in the current directory are deselected.

## Deleting

The selected files are deleted.

## Setting the Copy Destination and Copying

After selecting the files to copy, set the destination directory and copy the selected files to it.

#### Note.

Using the mini B USB port on the AQ1300/AQ1301, you can send the files and directories in the AQ1300/ AQ1301 internal memory to a PC. To do this, set the AQ1300/AQ1301 mini B USB port function to Storage (see section 14.1). When the PC accesses the AQ1300/AQ1301 and downloads the files, the download speed depends on the performance of the PC.

## 14.4 Changing File Names

## Procedure

#### **File Screen**

Follow the procedure in section 14.2 to display the file screen.

#### **Directory path**

The number of directories and files in the selected directory



Set the action (Rename).

#### Set the file type.

Set the extension of the file type of the file whose name you want to change.

Set the drive (Internal, USB Memory).

#### Enter a new file name.

The character input dialog box appears. To set the file name, follow the procedure in section 3.2. Enter the extension as well. After you have entered the file name, press the **Commit** soft key in the character input dialog box to change the file name to the name that you entered.

## Explanation

## **File Operation**

Select "Rename."

## **File Type**

The files of the type that you selected appear in the File List screen.

- For details about file types, see "Explanation" in section 14.2.
- To display all the files in the current directory, set the file type to "\*.\*".

## **Drives**

See "Explanation" in section 14.2.

## **Entering a File Name**

Enter a file name into the character input dialog box that appears. Follow the procedure in section 3.2.

- · Use the character input dialog box to enter the extension as well.
- When you press the Commit soft key in the character input dialog box, the file name changes to the name that you entered.

## 14.5 Creating Directories

## Procedure

#### **File Screen**

Follow the procedure in section 14.2 to display the file screen.

#### **Directory path**



## Explanation

**File Operation** 

Select "Make Dir."

## **Drive to Save To**

See "Explanation" in section 14.2.

## **Entering a Directory Name**

Enter a directory name into the character input dialog box that appears. You can use up to 20 characters. Follow the procedure in section 3.2. When you press the Commit soft key in the character input dialog box, a directory with the name that you specified is created.

## 14.6 Deleting and Copying Directories

## Procedure

#### **File Screen**

Follow the procedure in section 14.2 to display the file screen.

#### **Directory path**

The number of directories and files in the selected directory



directory appears. Make sure that the copy destination and source drives are different (see the explanation later in this section). In the screen that appears, select the destination directory and press the **Copy Dir** soft key to copy the files.

## Explanation

## **File Operation**

Select "Delete Dir" or "Copy Dir."

#### Drives

See "Explanation" in section 14.2.

## Deleting

The selected directories are deleted.

## Setting the Copy Destination and Copying

After selecting the directories to copy, set the destination directory and copy the selected directories to it.

You cannot copy from the internal memory to the internal memory or from the USB memory to the USB memory. Copy directories from the internal memory to the USB memory or from the USB memory to the internal memory.

#### Note.

- · You may not be able to copy or delete the selected directory if it contains many levels of directories.
- Using the mini B USB port on the AQ1300/AQ1301, you can send the files and directories in the AQ1300/AQ1301 internal memory to a PC. To do this, set the AQ1300/AQ1301 mini B USB port function to Storage (see section 14.1). When the PC accesses the AQ1300/AQ1301 and downloads the files, the download speed depends on the performance of the PC.

# 14.7 Specifying the Items That Are Displayed in the File List

This feature is supported in firmware version (FW Ver.) R1.08.01.001 and later.

## Procedure

## **File List Setup Screen**

- 1. Press the System soft key and then the System soft key.
- 2. Using the rotary knob and ENTER, select File List Setup to display the following screen.

#### When Display is set to Default or File List

File L	ist Setup	
Display	Default -	Set Display to "Default" or "File List."
Customize Size Date Date Format Sort by Sort Order Tree View	$0ff$ $0n$ $0ff$ $0n$ $2009/11/25$ $12:00:00$ $Date$ File Name $A \rightarrow Z$ $Z \rightarrow A$ $0ff$ $0n$	-You cannot perform these operations.
FileName DriveName TreeA FileNameA FileNameC FileNameB	Size Date 15:00 12:00 09:00	<ul> <li>File list preview</li> <li>You can use this preview to check the way that the File List is displayed on the file operation screen (see section 14.2).</li> </ul>

#### When Display is set to Customize

	File Li	st Setup	
	Display	Customize	Set Display to "Customize."
	<sub>r</sub> Customize———		
	Size	Off On	Turns the file size display on or off
	Date	Off On	Turns the display of the date when the file was saved on or
	Date Format	2009/11/25 12:00:00	_ off
	Sort by	Date File Name	Set the date format (Year/month/day hour:minute:second,
	Sort Order	A -> Z Z -> A	hour:minute, month/day hour:minute, hour:minute).
	Tree View	Off On	Set what to sort by (Date, File Name).
	FileName		─Set the sort order (A -> Z, Z -> A).
	FileNameC FileNameA		Turns the tree view on or off
	Trendilen		Preview
			You can use this preview to check the way that the File List is
-			displayed on the file operation screen (see section 14.2).

## Explanation

You can select the items that are displayed in the internal memory and USB memory file lists. You can also display a preview of the file list display.

## Default

File names, file sizes, and dates are displayed.

## **File List**

Only file names are shown in a list. File names can be displayed up to their first 36 characters.

## Customize

You can specify the items you want to display in the file list.

- · File size, date the file was saved, and tree view on or off
- Date format, what to sort by, and the sort order

## Configuring the Language, Beep, and USB 15.1 **Function**

## Procedure

#### System Screen

Press the System soft key and then the System soft key to display the following screen.

System	
Language English	<b>Set the display language.</b> The options that appear vary depending on the language specification.
Beep OFF ON	Turns the beep on and off
USB Function Storage	Set the USB function (Storage, Control I/O).
Date & Time Set	
Power Save mode	
Metwork Setup	
💷 Initialize	

## Explanation

## **Display Language**

Set the language to display on the AQ1300/AQ1301 screen. The options that appear vary depending on the product's language specification.

## **Turning the Beep On and Off**

You can make the AQ1300/AQ1301 beep whenever an operation error occurs, an error message is displayed, measurement finishes, or an error occurs during measurement.

ON	The AQ1300/AQ1301 beeps.
OFF	The AQ1300/AQ1301 does not beep.

If Beep is set to ON, the following beeps are generated depending on the operating status.

Operating Status	Веер	
During measurement		
Measurement completion	One long beep	
Measurement error	Three short beeps	
When displaying a message		
Status notification	One short beep	
Error	Two short beeps	
System error	Three long beeps	

## **USB** Function

You can set the function of the mini B USB port on the AQ1300/AQ1301.

Storage	You can access the AQ1300/AQ1301 internal memory from a PC and load and save data.
Control I/O	You can use the MFT remote control software to control the AQ1300/AQ1301 from a PC.

## 15.2 Setting the Date and Time

## Procedure

## Date & Time Set Screen

- 1. Press the System soft key and then the System soft key.
- 2. Using the rotary knob and ENTER, select Date & Time Set to display the following screen.

	Date &	Fime Set	
Date	Year	2009	
	Month	10	Set the year, month, and day.
	Day	23	
Time	Hour	16	
	Minute	54	<ul> <li>Set the time, minute, and second.</li> </ul>
	Second	47	
	Se	t <del>i</del>	<ul> <li>Applies the settings</li> </ul>
Туре	Γ	2007/1/14 12:00 -	<ul> <li>Set the date and time display format</li> </ul>
			(2007/1/14 12:00, 14/1/2007 12:00, 2007.JAN.14 12:00)

## Explanation

## Туре

You can specify how the date and time are displayed on the title bar.2007/1/14 12:00:Year/Month (Number)/Day Hour:Minute:Second14/1/2007 12:00:Day/Month (Number)/Year Hour:Minute:Second2007.JAN.14 12:00:Year.Month (Abbreviated English).Day Hour:Minute:Second

#### Note.

Date and time settings are backed up using an internal lithium battery. They are retained even if the power is turned off.

## 15.3 Configuring Power Save Settings

## Procedure

## Power Save Screen

- 1. Press the System soft key and then the System soft key.
- 2. Using the rotary knob and ENTER, select Power Save mode to display the following screen.

Power Save mode	Using AC power
Using AC power	┌ Configure the auto power off feature (OFF, AutoPowerOff 1m,
Auto Power Off OFF -	AutoPowerOff 5m, AutoPowerOff 10m, AutoPowerOff 30m).
LCD Brightness Bright -	Set the LCD brightness (Bright, Normal, Power save, OFF).
Using battery	Using battery
Auto Power Off OFF -	Configure the auto power off feature (OFF, AutoPowerOff 1m,
LCD Brightness Bright -	AutoPowerOff 5m, AutoPowerOff 10m, AutoPowerOff 30m).
Screen Save OFF ON -	Set the LCD brightness (Bright, Normal, Power save, OFF).
	Switch screen saving on or off.

## Explanation

To reduce power consumption, you can set separate power save settings for when the AQ1300/ AQ1301 is using an AC adapter and for when it is using a battery.

## **Auto Power Off**

When the AQ1300/AQ1301 is on, it can turn itself off automatically after it has not been used for awhile.

OFF	The power does not turn off automatically.
AutoPowerOff 1m	The power turns off automatically after one minute.
AutoPowerOff 5m	The power turns off automatically after 5 minutes.
AutoPowerOff 10m	The power turns off automatically after 10 minutes.
AutoPowerOff 30m	The power turns off automatically after 30 minutes.

## **LCD Brightness**

You can set the LCD brightness.

Bright	The screen is bright. Choose this setting when you are in a bright area. Because this setting uses a great deal of power, pay close attention to the remaining battery power when you are using a battery.
Normal	Normal brightness.
Power save	The screen is less bright than it is when you select Normal. You can view the screen at this brightness when you are in a dark area. You can use the battery longer than you can when you select Bright.
OFF	The LCD backlight is turned off. When you are viewing the screen beneath the sun or in another bright area, the screen will be difficult to view even if you select Bright. In this kind of situation, you can make the screen easier to view by selecting Off. You can use the battery even longer than you can when you select Power save.

## Switching Screen Saving On and Off

When the AQ1300/AQ1301 is on, it can turn the display off automatically after it has not been used for 15 seconds.

## **15.4 Configuring Network Settings**

## Procedure

## Network Setup Screen

- 1. Press the System soft key and then the System soft key.
- 2. Using the rotary knob and ENTER, select Network Setup to display the following screen.

Network Setup		
Valid / Invalid Valid Invalid		
Host Name	]	$_{\!$
User Name	anonymous	To set the host name, user name, and password,
Password		follow the procedure in section 3.2.
Time Out(sec)	0	<ul> <li>Set the timeout value.</li> </ul>
DHCP	OFF ON	
IP Address	192 168 0 2	
Subnet Mask	255 255 255 0	TCP/IP settings
Gateway	192 168 0 1	
To apply the changes, power-cycle the AQ1300.		

#### Note\_

You must restart the AQ1300/AQ1301 after you have changed the network settings. Before you restart the AQ1300/AQ1301, the settings from before you changed the settings are used.

## **Explanation**

For details about the network that you intend to connect the AQ1300/AQ1301 to, contact your network administrator.

## **Enabling or Disabling the Network Setup**

After you have set the user name, password, timeout value, and TCP/IP parameters, select Valid to use the network connection.

Valid	The AQ1300/AQ1301 can communicate over the network.
Invalid	The AQ1300/AQ1301 cannot communicate over the network.

If Valid is selected and the AQ1300/AQ1301 is not connected to a network, it will require more time to start.

## Host Name, User Name, and Password

Specify the host name for when you are performing remote control in Auto(Remote) mode using the test interface and for when you are searching for other devices.

Set the user name and password to use for user authentication when the AQ1300/AQ1301 is accessed by a PC.

The password is also used for authentication in Auto(Remote) mode when you are performing remote control using the test interface.

#### **Host Name**

You can use up to 11 characters.

#### **User Name**

You can use up to 15 characters. The default setting is "anonymous."

#### Password

You can use up to 15 characters.

#### Note\_

- The AQ1300/AQ1301 terminates the connection if there is an error in the user authentication process.
- · You do not need to enter a password when the user name is set to "anonymous."

### **Timeout Value**

The connection to the network is automatically disconnected if there is no access to the AQ1300/ AQ1301 for the specified time.

Range: 0 to 3600 s

The AQ1300/AQ1301 will not time out if you set the timeout value to 0. If the AQ1300/AQ1301 is connected to a network and the connection between the AQ1300/AQ1301 and another device is broken abnormally due to an external cause, the AQ1300/AQ1301 will remain connected to the network until the power is turned off. To avoid this kind of situation, we recommend that you set a finite timeout value.

### **TCP/IP Settings**

#### DHCP

If you are connecting the AQ1300/AQ1301 to a network with a DHCP server and you want to use the server, set DHCP to "ON."

ONThe IP address, subnet mask, and gateway information is assigned automatically.OFFYou must enter the IP address, subnet mask, and gateway information.

- · Ask your network administrator whether or not DHCP is available.
- When DHCP is set to ON, the information can change whenever you restart the AQ1300/ AQ1301 or enable or disable the network setup as described in the previous section. Check the information when you access the AQ1300/AQ1301 from a PC.

#### **IP Address**

You can set the IP address assigned to the AQ1300/AQ1301. The IP address is an ID that is assigned to each device on a network such as the Internet or an intranet. Obtain an IP address from your network administrator. In a network that supports DHCP, this parameter is set automatically when DHCP is set to ON.

#### Subnet Mask

You can set the mask value used to determine the subnet network address from the IP address. Networks such as the Internet are often divided up into smaller networks called subnetworks. The subnet mask is a value that specifies the number of bits of the IP address that are used to identify the network address. Consult your network administrator for the subnet mask value. In a network that supports DHCP, this parameter is set automatically when DHCP is set to ON.

#### Gateway

You can set the IP address of the default gateway (which is a gateway used to communicate with other networks). The default gateway handles data exchange between multiple networks so that data transmission proceeds smoothly. Consult your network administrator for the default gateway value. In a network that supports DHCP, this parameter is set automatically when DHCP is set to ON.

## 15.5 Resetting the AQ1300/AQ1301 to Its Factory Default Settings

## Procedure

## **Initialize Screen**

- 1. Press the System soft key and then the System soft key.
- 2. Using the rotary knob and ENTER, select Initialize to display the following screen.

Initialize	
Se tup	Initializes the measurement settings All measurement settings are returned to their factory defaults.
Factory Setting	Initializes all settings
	All settings are returned to their factory defaults, and the internal memory is
	formatted.

## Explanation

You can reset the AQ1300/AQ1301 to its factory default settings.

## **Initializing the Measurement Settings**

The measurement settings are returned to their factory defaults. The internal memory is not initialized.

## **Initializing All Settings**

All settings are returned to their factory defaults. The internal memory is also initialized. All the data in the internal memory is deleted. Before you initialize the internal memory, backup the data as necessary.

#### Note.

Using the mini B USB port on the AQ1300/AQ1301, you can send the files and directories in the AQ1300/ AQ1301 internal memory to a PC. To do this, set the AQ1300/AQ1301 mini B USB port function to Storage (see section 14.1). When the PC accesses the AQ1300/AQ1301 and downloads the files, the download speed depends on the performance of the PC.

## 15.6 Setting the Top Menu Type

This feature is supported in firmware version (FW Ver.) R1.08.01.001 and later.

## Procedure

### Type 1

This is the conventional menu (default). The top menu is the test menu. For details on the test menu, see section 1.2.

2012/6/4 14:31:27	Top Menu
Executes Auto test after selecting a setup file.	Auto
Control the other device remotely. Executes Auto test after selecting a setup file.	∮ Auto(Remote)
Executes an in-depth test with manually selected setup.	◀ Manua 1
Displays the Menu of the Optional Applications. OPW, RFC2544, etc.	Option
<b>FS</b> Sets the time, network address, etc.	System
AQ1300 MFT-10GbE R1.09.01.001	уокодама

## Type 2

The top menu displays each test menu's test modes that you can select. You can use the soft keys to configure test items, files, system settings, etc.

- 1. On the type 1 screen, press the System soft key and then the System soft key again.
- 2. Using the rotary knob and ENTER, set the top menu type to Type2. The top menu display will change.


#### Explanation

Menus for configuring different items are assigned to soft keys. When you display a setup screen from one of the menus, the operation from this point is the same as with the conventional menu.

[f]: Displays the test item menu. For details on setting the test items, see the following chapters or sections.

Test Item	Reference	Reference	Notes
Auto test	Auto	Chapter 4	
	Auto(Remote)	Chapter 5	
	RFC2544	Chapter 8	
Manual test	Chapter 6	Chapter 6	
Options	Chapter 10	Chapter 10	Applies only to the AQ1300

F2 :

: Items common to the F1 test items are displayed. For details on the items, see the following sections.

Setup Item	Reference
Measurement interface	Section 6.2
Test layer	
Link settings	Section 6.3
Source address settings	

**F3**: Save or load setup files or result files, and perform other similar operations. For details on the items, see the following sections.

Setup Item	Reference
Load a setup file	Section 14.7
Result file viewer	
Import a setup file	
File operations	Chapter 14

**F5**: Configure the system, perform self tests, and update the firmware. For details on the items, see the following sections.

Setup Item	Reference	
System configuration	Chapter 15	
Self test	Section 16.3	
Firmware updating	Section 16.5	

## 15.7 Using the Utility Menu

#### Procedure

### Utility Menu Screen

On the Top Menu screen, press **SETUP** to display the following screen.



#### Note.

Press ESC to return to the Top Menu screen.

#### Explanation

#### Setup File Load

Press this soft key to display the Select Setup File screen. Use this screen to select the setup file whose tests you want to perform.

You can select one of the following types of setup files.

- Auto
- · Auto(Remote)
- Manual
- RFC2544

The AQ1300/AQ1301 automatically determines the test type of the selected setup file, and then displays the corresponding test setup screen. For information about how to operate the Select Setup File screen, see sections 4.1, 5.1, and 8.1, "Selecting a Setup File."

#### **Result File Viewer**

Press this soft key to display the File screen. Select the test result file (.mr) that you want to display on the screen, and then press the Load soft key. You can display on the screen one of the following types of test result files.

- Auto
- Auto(Remote)
- Manual
- RFC2544

#### **Setup File Import**

Press this soft key to display the File screen. Select the display management file (disManage.dmf) or the package file (.dmfz) for the setup file that you want to copy to the AQ1300/AQ1301. The corresponding setup file is copied to the /setup folder in the AQ1300/AQ1301 internal memory.

#### • If You Select the Display Management File (disManage.dmf)

The AQ1300/AQ1301 automatically finds the multiple setup files (.sd) that are registered to the list in the disManage.dmf file that you selected and that are located in the same folder as disManage.dmf, and then copies all these files to the /setup folder in its internal memory.

#### • If You Select a Package File (.dmfz)

The AQ1300/AQ1301 decompresses the contents of the package file to the /setup folder in its internal memory.

## 16.1 If a Problem Occurs

## **Dealing with Unusual Circumstances**

- If a message appears on the screen, see the following pages for reference.
- If servicing is necessary or the AQ1300 and AQ1301 do not operate properly even after you have attempted to deal with the problem according to the instructions in this section, contact your nearest YOKOGAWA dealer.

Symptom	Solution	Reference
Even when the power is on, nothing appears on the screen.	If you are using an AC adapter, make sure that the plug is connected firmly to the outlet, the power cord is connected firmly to the AC adapter, and the AC adapter's DC plug is connected firmly to the AQ1300 and AQ1301.	1
	If you are using a battery pack, make sure that it is attached firmly.	_1
	Charge the battery pack, and make sure that the ON lamp is illuminated.	16.6
	The LCD turns black at high temperatures. At low temperatures, its display speed becomes slower. Make sure that the temperature of the area where you are using the AQ1300 or AQ1301 is within the operating temperature range.	1
The display disappears after time passes.	The AQ1300 or AQ1301 turns off automatically when its battery is low. Check the remaining battery power.	16.6
	If you have specified a time for the Power Save setting, the AQ1300 or AQ1301 will turn off automatically if no operations have been performed for the specified time. Check the settings.	15.3
The screen is dark.	The screen is dark when the LCD Brightness setting is set to "Power save." Check the settings.	15.3
	The LCD may be worn out. Servicing is required.	16.8
	When the temperature of the AQ1300, AQ1301, or its battery pack is high, the AQ1300 or AQ1301 lowers the LCD brightness automatically to prevent damage. Make sure that the temperature of the area where you are using the AQ1300 or AQ1301 is within the operating temperature range.	1
The measurement conditions cannot be changed.	In the setup software, when "Enable to edit with MFT" is set to OFF, the measurement conditions cannot be changed. Check the settings.	2
The power turns off automatically while the AQ1300 or AQ1301 is being used.	The AQ1300 or AQ1301 turns off automatically when it detects an error. A warning message will appear when this happens. Read the message. Fix the problem indicated in the message, and then turn on the AQ1300 or AQ1301.	16.2 <sup>3</sup>
The battery pack cannot be charged.	The battery pack temperature may be too low or too high. Make sure that the temperature of the area where you are using the AQ1300 or AQ1301 is within the operating temperature range. Remove the battery pack from the AQ1300 or AQ1301 and let it sit for awhile in a room temperature environment.	1
	The battery pack may be reaching the end of its life expectancy. Replace it with a new one.	16.6, 16.8
The power turns off automatically while the AQ1300 or AQ1301 is starting.	You may be holding down the power switch for too long when you turn on the power.	_
The fan has stopped.	Press the power switch to turn off the power immediately. Contact your nearest YOKOGAWA dealer for repairs.	
Unexpected optical interface measurement errors occur.	Clean the ends of the XFP and SFP module optical components with a stick-shaped cleaning tool.	
The OPM port measured values are unstable.	Clean the OPM port.	16.7
1 Se	ee the operation guide, IM AQ1300-02EN.	

3 When it is likely that the usage limitations of the AQ1300 or AQ1301 will be exceeded, the AQ1300 or AQ1301 will display a warning message and turn off automatically to prevent damage. For the conditions under which messages appear, see section 16.2.

16

## 16.2 Messages and Corrective Actions

## **Error Messages**

Messages may appear on the screen while you are using the AQ1300 or AQ1301. This section explains the meanings of the error messages and how to respond to them. You can display the error messages in English or Japanese (see section 14.1). If servicing is necessary to solve the problem indicated by a message, contact your nearest YOKOGAWA dealer.

Other error messages related to the setup software may also appear. These messages are described in the *Setup Software User's Manual*, IM AQ1300-61EN.

Error Number	Message	Solution	
1001	File Operation Error.	Make sure that the directory or file that you are trying to access exists. Or.	
1004	Failed to access to the file.	in the System screen, initialize the settings to their factory default values.	
1005	The file/folder doesn't exist.		
1008	The file already exists.		
1010	Failed to open the file.		
1011	Insufficient disk space.	Delete unnecessary files and directories.	
1012	The file/folder doesn't exist.	Make sure that the directory or file that you are trying to access exists. Or,	
1013	Failed to access to the file.	in the System screen, initialize the settings to their factory default values.	
1014	The file/folder doesn't exist.		
1015	It cannot be copied or deleted due to the	Change the directory structure so that all path names are shorter than	
	nested structure.	200 characters.	
1250	The file is in use.	Wait a moment, and then try again.	
1251	No USB memory.	Make sure that a USB memory device is connected.	
1252	Formatting failed.	After restarting the AQ1300 or AQ1301, in system settings, initialize it.	
1253	Invalid file name.	Check the file name.	
1254	Too long path name.		
1255	Unreadable file.	Check that the file you tried to load is the correct file.	
1257	Cannot be loaded.	Update the firmware.	
1260	Unreadable setup/result file.	The file may be corrupt.	
1261	Save Error.	In the System screen, initialize the settings to their factory default values.	
1262	Load Error.		
1264	Detect Bad Container.		
1265	Load Error for "DisManage.dmf".	Use the setup software to create new setup file list data.	
1266	Load Error for "DisManage.dmf". (Bad Version)		
1267	Load Error for "DisManage.dmf".		
	(Bed Language)		
1268	Invalid file name or folder name.	Check the file name or directory name that you specified.	
1269	Invalid path name.	Check the file path that you specified.	
1270	Destination and Source is same folder.	Specify the correct directory name.	
1271	Detect VersionUp Failure Please Retry	Upgrade the firmware again.	
1272	Fail Getting Address	Check the source and destination addresses and the network settings of the device under measurement.	
1273	Load Error(Bad Measurement Type).	Make sure that the current test type and the file test type match.	
	(This File is for "Auto".)		
1274	Load Error(Bad Measurement Type).		
	(This File is for "Auto(Remote)".)		
1275	Load Error(Bad Measurement Type).		
	(This File is for "Manual".)		
1276	Bad Passward.	Check the password setting in the network settings in system settings.	
1277	Connection Timeout.	Check the source and destination addresses and the network settings of the device under measurement.	
1278	In USB Storage mode, all keys are locked.	Remove the USB cable first before operating. To use USB	
	Please disconnect the USB Cable.	communication, in system settings, set USB Function to Control I/O.	
1279	Fail verionup! Retry after reboot.	Update the system again.	

#### 16.2 Messages and Corrective Actions

Error Number	Message	Solution
1280	Inband Session is disconnected.	Check the network settings of the other device.
1281	Incorrect date and time setting. Set the correct date and time.	Set the correct date and time.
1282	Incorrect User Name setting. Set the correct User Name.	Set the user name using up to 15 characters.
1284	The control to the destination machine failed.	Check the source/destination address and the network settings of the other device. If you do not want to use the function that tries to synchronize to the other device, disable this function in the test option settings.
1285	The control to the destination machine failed. There is a possibility that is not the measurement result display.	Press STOP on the other measuring device to display the measurement screen, and then start measurement again. If you do not want to use the function that tries to synchronize to the other device, disable this function in the test option settings.
1286	It failed in making of the file for the screen forwarding.	Wait a moment, and then try again.
1287	It failed in forwarding the screen.	Check the source/destination address and the network settings of the other device.
1288	Cannot make file or folder in this folder.	Delete unnecessary files and directories.
1289	Cannot make statistics log file, because log data doesn't exist.	Measure first and then save. Or, check the statistics log settings.
1290	The system version of the destination is mismatch.	Check the version of the other device.
1291	Cannot make measurement result file, because measurement data doesn't exist.	Measure first and then save.
1292	Load Error(Bad Measurement Type). (This File is for "RFC2544".)	Match the test type that you are loading to the test type that you used to create the test and then load.
1293	Some sd files were not found.	Check that all the setup files (sd files) that are defined in the setup file list are in the specified directory.
1294	Decompression of the dmfz file failure.	Create the dmfz file again using the setup software.
1295	This File is for "10G". The test interface was changed into SFP from XFP.	To test 10G, use the AQ1300.
1296	Load Error(Bad Measurement Type) (This File is for "VLAN Test".)	Match the test type that you are loading to the test type that you used to create the test and then load.
1297	The file format is not valid.	Check the contents of the file.
5001	System Error.	The system may be broken.
5002	FPGA Configuration Error.	Contact your nearest YOKOGAWA dealer.
5003	FAN Alarm.	1
5004	Detect Bad Clock.	1
5005	Detect Bad Optical Module.	The optical module may be broken.

## 16.3 Performing a Self Test

## Procedure

#### System Menu

Press the System soft key and then the Selftest soft key to display the following screen.



### Explanation

In the self test, the AQ1300 or AQ1301 performs the following operations.

• Internal 10 Gbps and 1 Gbps loopback tests.

#### Status

The self test status is indicated.

Status	Description	
Unexecution	The self test has not been executed yet.	
Executing	The self test is being executed.	
Normal.	The results of the self test are normal.	
Error.	An error occurred during the self test.	

#### ErrorCode.

An error code appears when the result of the self test is "Error." If "Error" is displayed, contact your nearest YOKOGAWA dealer.

## **16.4 Viewing the Product Information**

## Procedure

## Product Info. Screen

Press the System soft key and then the Product Info. soft key to display the following screen.

2009/10/23 16:58:42		System
Р	Product Info.	
Product Info. Model Name	AQ1300	System
Serial Number Suffix Code	-HJ-M/SPML/SR/LR/ER/SX/LX/7A	Product Info.
MAC Address Information COM Port Measure Port	1 00006493E002 00006493E009	Selftest
Version Information FW Ver.	1.0.1.X	↓ Version Up

## Explanation

The following information about the AQ1300 or AQ1301 is displayed.

Model Name, Serial Number, Suffix Code, MAC Address Information (COM port, measure port), Version Information, etc.

## 16.5 Updating the Firmware

### Procedure

Press the System soft key and then the Version Up soft key to display the following screen.



When you execute the firmware update, the following screen appears.



Executes the firmware update

#### Note\_

- When you are updating the firmware, use the AC adapter.
- When you are updating the firmware, do not turn off the power until the firmware update has finished.

### Explanation

To update the firmware, select a firmware update file (.YMC extension).

- The AQ1300 or AQ1301 will automatically restart when the firmware update ends successfully. After the AQ1300 or AQ1301 restarts, check the version information in the Product Info. screen.
- If the firmware update fails, the AQ1300 or AQ1301 will automatically restart and then display an error message. Make sure that there are no problems with the firmware update file.

## **16.6 Replacing the Battery Pack**

## **Handling Precautions**

Failure to comply with the precautions below could lead to damage to the instrument, injury, or death.

## WARNING

#### Prohibitions against Actions That Cause Leaking, Heating, Ignition, and Explosion

- Do not charge the battery pack or leave it in a location that is exposed to direct sunlight, such as on a car dashboard or by a window, or in a location that is subject to high temperatures, such as in a car parked under the scorching sun.
- · Do not throw the battery pack into fire or heat it.
- · Do not expose the battery pack to strong mechanical shock.
- Do not allow the battery pack to be covered in water or other liquids.
- Do not disassemble or modify the battery pack.
- Do not short the positive and negative battery pack terminals. Also, do not move the battery or store it with metal items such as necklaces, hair pins, coins, or keys.
- Do not place combustible material on top of the battery pack or cover it with anything other than its case while it is providing electricity or being charged.
- Leakage from the battery pack can cause blindness if it comes into contact with your eyes. If you get leakage from the battery in your eyes, do not rub them; clean them thoroughly with clean water and then see a doctor immediately.
- Do not use or charge battery packs with the AQ1300 or AQ1301 that are not made by YOKOGAWA.
- When you attach the battery pack to the AQ1300 or AQ1301, attach it properly.

#### **Prohibitions against Careless Use**

- Keep the battery pack away from infants so that they do not lick it, put it in their mouths, bite it, or do other dangerous things with it.
- Leakage from the battery pack may cause damage to clothing and skin.

#### Prohibition against Use under Abnormal Conditions

If you notice that the battery pack is leaking, smells strange, is becoming hot, has changed color or shape, or exhibits some other abnormality, stop charging or using it, and turn off the power. If the battery pack is leaking, move it away from sources of fire.

#### Changing the Battery Pack

- To prevent electric shock, turn the AQ1300 or AQ1301 off, and disconnect the AC adapter power supply from it.
- When you remove the battery pack cover, do not do so with the back of the AQ1300 or AQ1301 facing down. Also, after you attach the battery pack, be sure to close the battery cover completely. Otherwise, the battery pack may fall out and cause injury or be damaged.

## CAUTION

#### Replacement Procedure

- Do not touch the battery pack electrodes. Doing so may damage the battery pack.
- When you put the battery pack in the battery case, make sure that the battery pack is facing the right direction.
- When you place the AQ1300 or AQ1301 so that its LCD is facing down, be careful not to damage the LCD.

#### **Storage Precautions**

- If you will not be using the battery pack for an extended period of time, remove it from the AQ1300 or AQ1301 and store it in a dry place.
- Avoid storing the battery pack for an extended period of time when it is fully charged (after it has just been charged) or when it has no power left (when the AQ1300 or AQ1301 will not turn on). Storing the battery pack under these conditions will degrade its performance and reduce its longevity. It is best to store the battery pack when it is 40 to 50% charged. This is equivalent to the state the battery is in after you turn off the AQ1300 or AQ1301 and charge an empty battery for an hour at room temperature.

#### Disposal

- When disposing of the batteries, follow the proper disposal regulations as specified by the relevant ordinance in your area.
- When disposing of the batteries in the EU, follow the Waste Electrical and Electronic Equipment (WEEE) Directive.

Contact your nearest YOKOGAWA dealer under the following circumstances.

- · When the battery pack is broken or behaves strangely.
- When the battery run time becomes short and the battery pack needs to be replaced (the battery pack is a consumable item).

### **Removing the Battery Pack**

Before you remove the battery, turn off the power and unplug the AC adapter from the AQ1300 or AQ1301.

1. Release the battery cover lock.

Insert a coin or screwdriver with a thickness that will not damage the lock slot into the lock slot, and release the lock.

- 2. Remove the battery cover.
- 3. Slide the battery pack towards the top panel.
- **4.** Turn the AQ1300 or AQ1301 so that it is facing you, and remove the battery pack from the case.

Put your hand next to the battery case so that the battery pack does not fall out.



**Battery case** 

### Attaching a Battery Pack

Before you attach the battery, turn off the power, and unplug the AC adapter from the AQ1300 or AQ1301.

- 1. Remove the battery cover by following the first two steps in the previous section.
- 2. Insert the battery pack into the battery case, towards the top panel.
  - · Insert the battery pack so that its electrodes are near the bottom panel facing down.
  - Make sure that the entire battery pack is inserted into the case securely.
- 3. Pushing the battery pack towards the back of the case, pull it towards the bottom panel.
- 4. Close the battery cover.
  - Attach the battery cover from the bottom panel side, making sure that the hooks on the cover enter into their holes on the case.
- 5. Lock the battery cover.

Insert a coin or screwdriver with a thickness that will not damage the lock slot into the lock slot, and lock the battery cover.



## **Charging a Battery Pack**

When the battery is low, a warning message will appear. When this happens, charge the battery.

- **1.** Connect the power cord to the AC adapter.
- 2. Connect the AC adapter plug to the AQ1300 or AQ1301.
- 3. Connect the power plug to an outlet.

The remaining battery pack power appears at the top of the screen.

#### Remaining battery power indicator



- The AQ1300 or AQ1301 will turn off automatically a few minutes after the warning message about the remaining battery power appears.
- · If the battery pack is hot, wait for it to return to room temperature before you charge it.
- The battery run time depends on whether or not you make the screen bright and the other ways in which you use the AQ1300 or AQ1301.

16

## 16.7 Routine Maintenance

### Cleaning the Outside of the AQ1300 or AQ1301

To clean the LCD and the outside of the AQ1300 or AQ1301, turn off the power; remove the power cord from the outlet; use a damp, well-wrung cloth to wipe the LCD and the outside of the AQ1300 or AQ1301; and then wipe them off with a dry cloth.

#### Note\_

- Turn the power off when you clean the AQ1300 or AQ1301.
- Do not use chemicals such as thinner, benzene, or alcohol. Doing so may cause deformation and discoloring.
- Use a well-wrung cloth. Otherwise, water may get inside the AQ1300 or AQ1301.

### **Cleaning the OPM Port**

- 1. Open the OPM port cover.
- 2. Turn the optical adapter knob to the left.



3. Use a lens cleaner to clean the optical components.



4. Turn the optical adapter knob to the right.

#### Note\_

- Clean the optical components using a smooth lens cleaner that will not leave lint or dust on the lenses.
- The OPM port cannot be cleaned with a stick-shaped cleaning tool.

## 16.8 Recommended Replacement Parts

For part replacement, contact your nearest YOKOGAWA dealer.

#### Parts with Limited Service Lives

Part Name	Service Life	Notes
Battery pack	Approx. 300 charges	The service life varies depending on the environment
		in which the battery pack is used.

#### Consumables

We recommend replacing the following parts at the intervals listed below.

Part Name	Recommended Replacement Interval*
Cooling fan	3 years
Backup battery (lithium battery)	5 years
LCD backlight	Approx. 50,000 hours
DC power supply connector	5000 times
USB connector	1500 times
XFP module connector	200 times
SFP module connector	100 times
RJ-45 connector	200 times

\* The recommended replacement interval can vary greatly depending on the operating environment and the frequency of use. The above intervals are estimates.

16

# 16.9 Calibration

Periodic calibration is an effective means of keeping the instrument performing correctly for a long time and of detecting malfunctions at an early stage. We recommend that you have the AQ1300 or AQ1301 calibrated once a year.

## Appendix 1 Data File Format

### **Statistic Log File Example**

The following example shows the saved statistic log file being displayed in a spreadsheet program.

	А	В	С	D	E
1	Time(YY/MM/DD hh:mm:ss)	Tx:Rate(fps)	Rx:Rate(fps)	Tx:Rate(%)	Rx:Rate(%)
2	2009/12/1 9:00:00	14881	1 4881	10.00000	10.00000
З	2009/12/1 9:00:01	14881	1 4881	10.00000	10.00000
4	2009/12/1 9:00:02	14881	1 4881	10.00000	10.00000
5	2009/12/1 9:00:03	14881	29762	10.00000	20.00000
6	2009/12/1 9:00:04	1 4881	119048	10.00000	80.00000
7	2009/12/1 9:00:05	1 4881	37202	10.00000	25.00000
8	2009/12/1 9:00:06	1 4881	1 4881	10.00000	10.00000
9	2009/12/1 9:00:07	1 4881	1 4881	10.00000	10.00000
10	2009/12/1 9:00:08	1 4881	1 4881	10.00000	10.00000
11	2009/12/1 9:00:09	1 4881	1 4881	10.00000	10.00000

### Symbols

Symbols	Page
.CSV	
.dmf	
.mr	
.sd	
.YMC	

Α	Page
additional test data	1-14
advance setup (Auto)	4-28
advance setup (Manual)	6-52
ARP reply	1-31
arrow key operation	3-3
automatic checksum calculation	1-13
automatic IP address acquisition (DHCP)	1-33
automatic MAC address acquisition	1-32
automatic MAC address acquisition (NDP)	1-35
Auto menu item	1-2
auto power off	15-3
Auto(Remote) menu item	1-2
auto setup screen (Auto)	4-2
auto setup screen (Auto(Remote))	5-9
average count	10-3

<u>B</u>	Page
back to back	1-46
back to back test results, displaying (RFC2544)	9-12
back to back test settings, configuration (RFC2544)	8-21
base filter	1-16
battery pack disposal	16-8
battery pack, replacing	16-7
battery power, remaining	16-9
beep	15-1
BER measurement	1-19
BERT	1-4, 1-6
BERT (Auto), configuring	4-26
BERT (Manual), configuring	6-45
BERT Rx	6-46
bit error	7-11
burst	1-10

С	Page
calibration	
collision detection	1-19
common RFC2544 test items, configuration	8-11
connect screen	5-8
consecutive reorder	1-18
consecutive test item execution	1-38
constant	1-10
consumables	
continuous	1-11
conventions	iii
copying	14-7, 14-10
CRC error	7-11
current time	

D	Page
date, setting	15-2
dB	10-3
dBm	10-3
delay variation	1-47

deleting	14-6, 14-10
destination address (Auto)	
destination address (Auto(Remote))	5-7
destination address (Manual)	
destination address setup (RFC2544)	8-7
destination address setup (VLAN)	11-5
detailed statistics, displaying	7-19
DHCP	1-33, 15-5
directories, copying	14-10
directories, creating	14-9
directories, deleting	14-10
directory name	14-5
display, customizing	7-17
displayed screen, changing	
displayed screen, changing (RFC2544)	
display hold	10-4
disposal (battery pack)	16-8
drives	14-4
duplicate packet	1-18

E	Page
emulation	
emulation setting	
error addition	
error history	
error messages	
errors, inserting	7-11

## F

F	Page
file format	App-1
file list (Auto)	4-1
file list (Auto(Remote))	5-1
file list (Manual)	6-1, 11-2
file list (RFC2544)	8-1
file name	14-4
file names, changing	14-8
files, copying	14-6
files, deleting	14-6
files, renaming	14-8
files, saving automatically	14-5
file type	14-3
fill pattern	1-13
firmware	16-6
folder name	14-5
folders, copying	14-10
folders, creating	14-9
folders, deleting	
frame	2-3
frame editing	1-12
frame ID	1-14
frame length table	4-18
frame loss rate	1-45
frame loss rate test results, displaying (RFC2544)	9-10
frame loss rate test settings, configuration (RFC254	44) 8-19
frames	1-11
frame setting (basic setting)	6-12, 6-31
frame setting (IP)	6-14, 6-32
frame setting (MAC)	6-13, 6-31
frame setting (Rx)	6-18
frame setting (Tx)	6-12, 6-31
frame setting (UDP)	6-15, 6-33
frame setting (VLAN)	6-13, 6-32
frames table	4-19

Index

IM AQ1300-01EN

G	Page
gap measurement gateway	
н	Page

<u>11</u>	i age
history, clearing	
hold	
host name	

<u> </u>	Page
inband remote	1-7
initialization (internal memory)	15-6
initialization (to factory default settings)	15-6
input history	3-6
IP address	15-5
IP address, address acquisition (DHCP)	1-33
IP address table (destination)	4-10
IP address table (source)	
IPv4 host	
IPv6 host	1-33

## Κ

Κ	Page
key operations	

L	Page
 L1	
L1 control	7-8
L2 ERR	
L3 ERR	2-5
language	15-1
laser off execution	
laser off release	7-8
latency	1-43
latency measurement	1-5, 1-16
latency test results, displaying (RFC2544)	
latency test settings, configuration (RFC2544)	8-17
layer 1 control	1-8
LCD brightness	15-3
LF (local fault)	1-8
LFS	2-3
LFS (link fault signaling)	1-8
linkdown transmission continuation	1-9
LINK ERR	2-5
link setting (Auto)	4-5
link setting (Auto(Remote))	5-4
link setting (Manual)	6-3
link setting (VLAN)	11-4
link setup (RFC2544)	8-5
link status indication	2-2, 2-3
loading	
loopback test	1-4
loopback test (Auto), configuring	
loopback test (Manual), configuring	6-29
loopback traffic test	1-5
loss packet	1-17

### Μ

M	Page
MAC address, automatic acquisition	1-32
MAC address, automatic acquisition (NDP)	1-35
MAC address information	16-5
MAC address table (destination)	4-10
MAC address table (source)	4-6
maintenance	16-10
malfunction	16-1
management file	1-40
manual menu item	1-2

### Ν

Ν	Page
NDP reply	
network settings	
normal frames	

0	Page
offset	
OPM (option) menu item	1-2
OPM port, cleaning	16-10
optical output, turning off and on	1-9
optical power measurement	1-41
options (Auto), configuring	
options (Manual), configuring	6-52
other device, operating	

Р	Page
packet jitter	1-47
packet jitter test results, displaying (RFC2544)	9-13
packet jitter test settings, configuration (RFC2544	) 8-22
parts, limited service life	16-11
pass/fail indication	
pass/fail judgment	1-39, 7-5
pass/fail judgment conditions, displaying	4-27
password	15-4
pause	1-19
payload check CRC	1-14
payload error	7-11
payload error measurement	1-19
payload settings	1-13
Ping6 reply	1-34
ping reply	1-31
ping test	. 1-4, 1-6, 1-36
ping test (Auto), configuring	4-24
ping test (Manual), Configuring	6-43
PN pattern	1-14
power save	15-3
power supply status indication	
prefixes	10-3
product information	16-5

Q	Page
QoS channel measurement	1-16
QoS channel, transmitting by	1-15
QoS test	1-4, 1-5
QoS test (Auto), configuring	4-22
QoS test (Manual), configuring	6-30
QoS value table	4-22

## R

R	Page
received frame length	
recommended replacement parts	16-11
reference	10-3
remote control	5-16
remote control status indications	
reorder packet	1-18
RFC2544 setup screen	8-2
RF (remote fault)	1-8
rotary knob and ENTER	3-3
rotary knob operation	3-3
Rx base filter setting	6-18
Rx clock	1-8
Rx QoS	6-34
Rx QoS filter setting	6-35
Rx rate	
Rx setting	6-17
Rx setting (QoS)	6-35

S	Page
saving	14-3
screen, changing	7-21, 7-22
screen saving	15-3
search list (Auto)	4-9
search list (Auto(Remote))	5-7
search list (Manual)	6-5
selected setup file	
select setup file (RFC2544)	8-1
self test	16-4
send LF start	7-8
send LF stop	7-8
send RF start	7-8
send RF stop	7-8
sequence error	1-17, 7-11
sequence measurement	1-17
sequence number	1-14
serial number	16-5
setup file	1-40
setup file list (Auto)	4-1
setup file list (Auto(Remote))	5-1
setup file list (RFC2544)	8-1
setup file selection (Auto)	4-1
setup file selection (Auto(Remote))	5-1
setup file selection (Manual)	6-1
setup file selection (VLAN)	11-1
setup software	1-1
simple optical power monitor	1-8, 2-2
slave execution	5-13
slave settings	5-13
source address (Auto)	
source address (Auto(Remote))	5-6, 5-13
source address (Manual)	6-4
source address setup (RFC2544)	8-6
source address setup (VLAN)	11-4
stateless address autoconfiguration	1-35
statistical result file	1-40
statistic log file	1-40
statistics, list	1-20

	IIIdex
statistics log	1-37
statistics log, configuring	
strings, entering	
strings, input history	
sub menu (VLAN ID RX)	11-15
sub menu (VLAN ID TX)	
subnet mask	15-5
suffix code	
summary	
symbol error	7-11
symbols	

	Page
tag identifier	1-14
tag length	1-14
TCP/IP	15-5
test configurations	1-5
test continuance confirmation	
test ID	1-14
test information	
test item. consecutive execution	1-38
test item execution status	
test item registration	1-38
test items, configuring	4-16
test menu	1-2
test mode	1-4, 2-2
test mode, selecting	6-11
test-mode-specific indications	
test result indications	
test results, displaying	7-14
test results, displaying (RFC2544)	9-4
test setup (Auto)	4-4
test setup (Auto(Remote))	5-3
test setup (Manual)	6-2
test setup (RFC2544)	8-4
test setup (VLAN)	11-3
test tags	1-14
test type	
threshold value	10-4
throughput	1-42
throughput test results, displaying (RFC2544)	9-6
throughput test settings, configuration (RFC2544)	8-15
timeout value	15-5
time, setting	15-2
timestamp	1-14
title bar	2-2
top menu	1-2
traceroute, performing	7_12
traceroute test	1-6, 1-36
traceroute testtrademarks	1-6, 1-36
traceroute test trademarks traffic format	1-6, 1-36 i 1-10
traceroute test trademarks traffic format traffic test	1-6, 1-36 i 1-10 1-4
traceroute test trademarks traffic format traffic test traffic test (Auto), configuring	1-6, 1-36 i 1-10 1-4 4-17
traceroute test trademarks traffic format traffic test traffic test (Auto), configuring traffic test (Manual), configuring	1-6, 1-36 i 1-10 1-4 4-17 6-12
traceroute test trademarks traffic format traffic test traffic test (Auto), configuring traffic test (Manual), configuring transmission and reception, comparing	1-6, 1-36 i 1-10 1-4 4-17 6-12 7-15
traceroute test trademarks traffic format traffic test. traffic test (Auto), configuring traffic test (Manual), configuring transmission and reception, comparing transmission load configuration	1-6, 1-36 i 1-10 1-4 4-17 6-12 7-15 1-10
traceroute test trademarks traffic format traffic test. traffic test (Auto), configuring traffic test (Manual), configuring transmission and reception, comparing transmission load configuration transmission, starting	1-6, 1-36 i 1-10 1-4 4-17 6-12 7-15 1-10 7-3
traceroute test trademarks traffic format traffic test. traffic test (Auto), configuring traffic test (Manual), configuring transmission and reception, comparing transmission load configuration. transmission, starting transmission, stopping	1-6, 1-36 i 1-10 1-4 4-17 6-12 7-15 1-10 7-3 7-4
traceroute test trademarks traffic format traffic test. traffic test (Auto), configuring traffic test (Manual), configuring transmission and reception, comparing transmission load configuration. transmission, starting transmission, starting troubleshooting	1-6, 1-36 10 1-10 1-10 
traceroute test trademarks traffic format traffic test traffic test (Auto), configuring traffic test (Manual), configuring transmission and reception, comparing transmission load configuration. transmission, starting transmission, starting transmission, stopping troubleshooting two-way traffic test	1-6, 1-36 10 1-10 6-12 7-15 7-15 7-3 7-4 16-1 1-5
traceroute test trademarks traffic format traffic test. traffic test (Auto), configuring traffic test (Manual), configuring transmission and reception, comparing transmission load configuration. transmission, starting transmission, starting transmission, stopping troubleshooting two-way traffic test Tx clock	1-6, 1-36 10 1-10 1-4 4-17 6-12 7-15 7-15 7-3 7-4 1-5 1-5
traceroute test trademarks traffic format traffic test. traffic test (Auto), configuring traffic test (Manual), configuring transmission and reception, comparing transmission load configuration. transmission, starting transmission, starting transmission, stopping troubleshooting two-way traffic test Tx clock Tx frame definition	1-6, 1-36 1 1-10 1-10 1-14 
traceroute test trademarks traffic format traffic test. traffic test (Auto), configuring traffic test (Manual), configuring transmission and reception, comparing transmission load configuration transmission, starting transmission, starting transmission, stopping troubleshooting two-way traffic test Tx clock Tx frame definition Tx frame setting (QoS)	1-6, 1-36 i 1-10 1-10 1-4 4-17 6-12 7-15 7-15 7-3 7-4 16-1 1-5 1-18 1-18 1-18 1-24 1-24
traceroute test trademarks traffic format traffic format traffic test. traffic test (Auto), configuring traffic test (Manual), configuring transmission and reception, comparing transmission load configuration transmission, starting transmission, starting transmission, stopping troubleshooting two-way traffic test Tx clock Tx frame definition Tx frame setting (QoS) Tx mode	1-6, 1-36 i 1-10 1-10 1-14 
traceroute test trademarks traffic format traffic format traffic test. traffic test (Auto), configuring traffic test (Manual), configuring transmission and reception, comparing transmission load configuration. transmission, starting transmission, starting transmission, starting troubleshooting two-way traffic test Tx clock Tx frame definition Tx frame setting (QoS) Tx mode Tx mode setting (DeS).	1-6, 1-36 i 1-10 1-10 1-4 6-12 7-15 1-10 7-3 7-4 1-5 1-5 1-5 1-8 1-12 6-30 I-11, 6-17 6-46
traceroute test trademarks traffic format traffic format traffic test. traffic test (Auto), configuring traffic test (Manual), configuring transmission and reception, comparing transmission load configuration. transmission, starting transmission, starting transmission, starting transmission, stopping. troubleshooting two-way traffic test Tx clock Tx frame definition Tx frame setting (QoS) Tx mode Tx mode setting (QoS) Tx mode setting (QoS) Tx mode setting (QoS) Tx mode setting (QoS)	1-6, 1-36 i 1-10 1-10 1-4 4-17 6-12 7-15 7-15 7-3 7-4 1-5 1-5 1-5 1-5 1-5 1-5 1-5 1-10 6-30 I-11, 6-17 6-34
traceroute test trademarks traffic format traffic format traffic test. traffic test (Auto), configuring traffic test (Manual), configuring transmission and reception, comparing transmission load configuration transmission, starting transmission, starting transmission, starting transmission, stopping troubleshooting two-way traffic test Tx clock Tx frame definition Tx frame setting (QoS) Tx mode Tx mode setting (BERT) Tx rate	1-6, 1-36 i 1-10 1-4 

Index

Tx rate, changing	
Tx rate table	4-18
Tx setting	6-12
Tx setting (BERT)	6-45
Tx setting (VLAN)	11-9
Tx time	1-11
Tx time table	4-18

U	Page
unit	10-3
updating	
USB function	15-1
USB port (Type A)	
user-defined data	1-13
user name	15-4

V	Page
variable field	
variable field setting	
variable frame length	
version information	
VLAN ID RX setting	
VLAN ID TX setting	
VLAN table	
VLAN test setup	11-1

W	Page
W	10-3
wavelength	10-3
Ζ	Page
zero set, performing	