User's Manual

Model 417322900
AE5511 TrafficTesterPro

YOKOGAWA
Yokogawa Electric Corporation

IM 417322900-01E
1st Edition

Thank you for purchasing the AE5511 TrafficTesterPro.
This user's manual explains the functions and lists the handling precautions of the AE5511 and describes the operation of the Windows application (TTPro Control Window) used to control the AE5511. To ensure correct use, please read this manual thoroughly before beginning operation. After reading the manual, keep it in a convenient location for quick reference whenever a question arises during operation.
The following three manuals, including this one, are provided as manuals for the Windows version of the AE5511. Please read all of them.

Manual Title	Manual No.	Description
AE5511 TrafficTesterPro User's Manual (Windows Version)	IM417322900-01E	This manual. Explains all functions and procedures of the AE5511 excluding the communication functions.
AE5511 TrafficTesterPro Startup Manual	IM417322900-02E	Explains the procedures for setting up the AE5511 so that it can be accessed.
AE5511 TrafficTesterPro Remote Command Manual	IM417322900-17E	Explains automated measurement using the communication function (remote control function) of the AE5511 and commands.

Please also read the manuals for the respective units that are to be installed in the AE5511.

- AE5520 10/100BASE-T Unit (Manual No. AS-84713EY)
- AE5521 1000BASE-X Unit (Manual No. AS-84714EY)
- AE5522 10GBASE-X Unit (Manual No. AS-84721EY)
- AE5523 1000BASE-T Unit (Manual No. IM731010-01E)
- AE5524 1000BASE-X Unit (Manual No. IM731011-01E)

If you are controlling the AE5511 from a Web browser, read the Web version of the manual (Manual No. AS-84711-1EY).

Notes

- The contents of this manual are subject to change without prior notice as a result of continuing improvements to the instrument's performance and functions. 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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Revisions

- 1st Edition: July 2005

1st Edition : July 2005 (YK)

Terms and Conditions of the Software License

Install the software only after you agree with the terms and conditions listed below.

Exemption of Responsibility and Other Terms

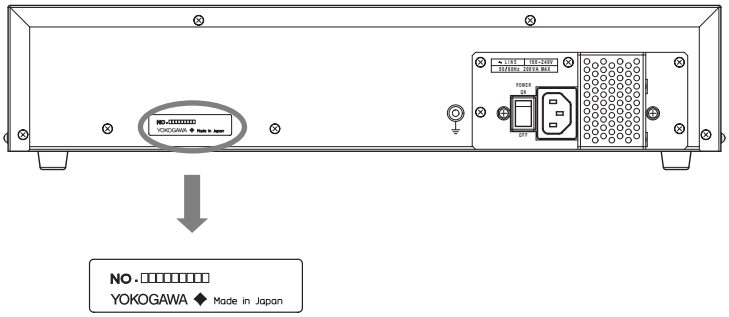
- The software (TTPro Control Window) is subject to change without prior notice as a result of continuing improvements to its performance and functions. The help information of the software may not be updated even when there have been improvements to the functions or changes to the specifications.
- The software is provided with the AE5511 TrafficTesterPro. However, this does not imply unlimited guarantee that the software is flawless. YOKOGAWA will not be held responsible for correcting problems and answering questions regarding the software.
- YOKOGAWA does not assume any responsibility for problems resulting from installing the software.
- YOKOGAWA holds all rights including property rights and intellectual property rights to the software.

Checking the Contents of the Package

Unpack the box and check the contents before operating the instrument. If some of the contents are not correct, or if any items are missing or damaged, contact the dealer from whom you purchased them.

AE5511

Check that the model name and suffix code given on the name plate on the rear panel match those on your order.



Model	Suffix Code	Description
417322900		AE5511 TrafficTesterPro
Power cord	-C	UL, CSA standard power cord Maximum rated voltage: 125 VAC; Maximum rated current: 7 A
	-E	VDE standard power cord Maximum rated voltage: 250 VAC; Maximum rated current: 10 A
	-G	AS standard power cord Maximum rated voltage: 250 VAC; Maximum rated current: 6 A
	-S	BS standard power cord Maximum rated voltage: 250 VAC; Maximum rated current: 10 A
	-V	GB standard power cord (CCC-compatible) Maximum rated voltage: 250 VAC; Maximum rated current: 10 A
Language	-LNE	English display
Options	-001	Standard specifications

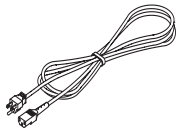
- No. (Instrument No.)
  When contacting the dealer from which you purchased the instrument, please give them the instrument number.

Standard Accessories

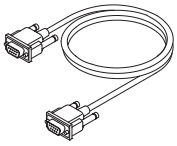
The standard accessories below are supplied with the instrument. Check that all contents are present and undamaged.

Name	Qty.	Notes
Power cord	1	One of the selected power cords below is provided. UL, CSA standard power cord VDE standard power cord AS standard power cord BS standard power cord GB standard power cord (CCC-compatible)
CONSOLE cable	1	RS-232 cable (9 pin), cross, 1.5 m. Complies with EIA-574
CONTROL cable	1	LAN cable, cross, 1.5 m
Blank panel	2	Attached to the AE5511
Software	1	CD (part No.: M3400KL) • AE5511 TTPro Control WindowE Application CD
User's manual	1	CD (part No.: M3939MB) • AE5511 TrafficTesterPro User's Manual (Windows Version): IM417322900-01E • AE5511 TrafficTesterPro Remote Command Manual: IM417322900-17E • AE5511 TrafficTesterPro User's manual (Web Version): AS-84711-1EY • AE5511 TrafficTesterPro User's manual (Auto Test Supplement): AS-84711-1EY
User's manual	1	AE5511 TrafficTesterPro Startup Manual: IM417322900-02E

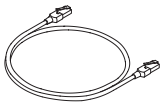
Power cord



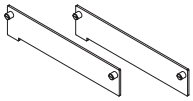
CONSOLE cable



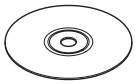
CONTROL cable



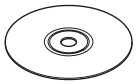
Blank panels (2)



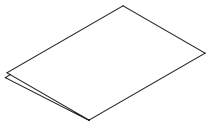
Software (CD)
M3400KL



User's Manual (CD)
M3939MB



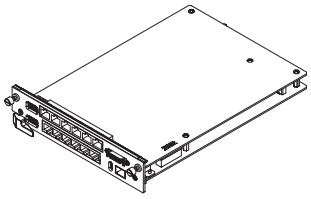
User's Manual
(Startup Manual)



Units (Sold Separately)

The following units are available for purchase separately.

Model	Name	Specifications	Standard Accessories
417322901	AE5520 10/100BASE-T Unit	10/100BASE-T • 16 RJ-45 ports	User's manual
417322902	AE5521 1000BASE-X Unit	1000BASE-X/-T • 4 GBIC ports	User's manual
417322904	AE5522 10GBASE-X Unit	10GBASE-X • 2 XENPAK ports	User's manual
731010	AE5523 1000BASE-T Unit	10/100/1000BASE-T (PoE compatible) • 12 RJ-45 ports 1000BASE-X • 1 SFP port	User's manual
731011	AE5524 1000BASE-X Unit	1000BASE-X • 12 SFP ports	User's manual



Note

For details, see the manual for the respective unit.

Interface Modules (Sold Separately)

The following interface modules are available for purchase separately.

Name	Model	Manufacturer	Notes
GBIC SX Module	HFBR-5601	Agilent	For the AE5521
GBIC LX Module	HFCT-5611	Agilent	
GBIC T Module	FCM-8519-3	Finisar	
XENPAK LR Module	HFCT-701XB	Agilent	For the AE5522
	TRE5021EN-SW	OPNEXT	
XENPAK ER Module	TRE7051EN-SW	OPNEXT	
1000BASE-SX SFP Module	TRF2816ANLB000	OPNEXT	For the AE5523/AE5524
	FTRJ8519P1BNL	Finisar	
1000BASE-LX SFP Module	TRF5836ANLB000	OPNEXT	
	FTRJ1319P1BTL	Finisar	

Note

Warranty applies only to interface modules that you purchase from YOKOGAWA.

Other Parts (Sold Separately)

Use the Rack Mount Kit sold separately to rack mount the AE5511.

Name	Part No.	Notes
Rack Mount Kit	M3400KM	Parts for mounting to a 19-inch rack

Safety Precautions

This instrument is equivalent to an IEC safety class I instrument (provided with a terminal for protective earth grounding).
The general safety precautions described herein must be observed during all phases of operation. If the instrument is used in a manner not specified in this manual, the protection provided by the instrument may be impaired. Yokogawa Electric Corporation assumes no liability for the customer's failure to comply with these requirements.

The following symbols are used on this instrument.

Warning: handle with care. Refer to the user's manual or service manual. This symbol appears on dangerous locations on the instrument which require special instructions for proper handling or use. The same symbol appears in the corresponding place in the manual to identify those instructions.

Hazard, radiation of laser apparatus

Alternating current

Direct current

ON (power)

OFF (power)

Ground (earth) or functional ground terminal (do not use this terminal as a protective ground terminal.)

Make sure to comply with the precautions below. Not complying might result in injury or death.

WARNING

- **Use the Correct Power Supply**
  Before connecting the power cord, ensure that the source voltage matches the rated supply voltage of the instrument and that it is within the maximum rated voltage of the provided power cord.
- **Use the Correct Power Cord and Plug**
  To prevent the possibility of electric shock or fire, be sure to use the power cord supplied by YOKOGAWA. The main power plug must be plugged into an outlet with a protective earth terminal. Do not disable this protection by using an extension cord without protective earth grounding.
- **Connect the Protective Grounding Terminal**
  Make sure to connect the protective earth to prevent electric shock before turning ON the power. The power cord that comes with the instrument is a three-prong type power cord. Connect the power cord to a properly grounded three-prong outlet.
- **Do Not Impair the Protective Grounding**
  Do not operate the instrument if the protective earth or fuse might be defective. Also, make sure to check them before operation.
- **Do Not Operate in an Explosive Atmosphere**
  Do not operate the instrument in the presence of flammable liquids or vapors. Operation in such an environment constitutes a safety hazard.
- **Do Not Remove Covers**
  The cover should be removed by YOKOGAWA's qualified personnel only. Opening the cover is dangerous, because some areas inside the instrument have high voltages.
- **Precautions to Be Taken When Using the Units**
  Do not install or remove the units with the AE5511 turned ON. Touching the parts on the circuit board of the unit while the power is turned ON is dangerous.
- **Do Not Look at the Laser Light**
  The GBIC, XENPAK, and SFP optical interface modules that are installed to the AE5521, AE5522, AE5523, and AE5524 are equipped with lasers. An invisible laser light is emitted from the optical connector of the interface module.
  Never look into the optical output section or the tip of the optical fiber connected to the optical output section.
  Though not visible to the human eye, if the laser light enters the eye, it can damage the eye and impair one's vision.

Conventions Used in This Manual

Markings

The following markings are used in this manual.

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 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 attentions to actions or conditions that could cause light injury to the user or damage to the instrument or user’s data, and precautions that can be taken to prevent such occurrences.

Note Calls attention to information that is important for proper operation of the instrument.

Subheadings

On pages that describe the operating procedures in chapters 3 through 9, the following symbols, displayed characters, and terminology are used to distinguish the procedures from their explanations.

Procedure Carry out the procedure according to the step numbers. All procedures are written with inexperienced users in mind; experienced users may not need to carry out all the steps.

Explanation This section describes the setup items and the limitations regarding the procedures. It may not give a detailed explanation of the function. For a detailed explanation of the function, see chapter 2.

Displayed Characters and Terminology Used in the Procedural Explanations

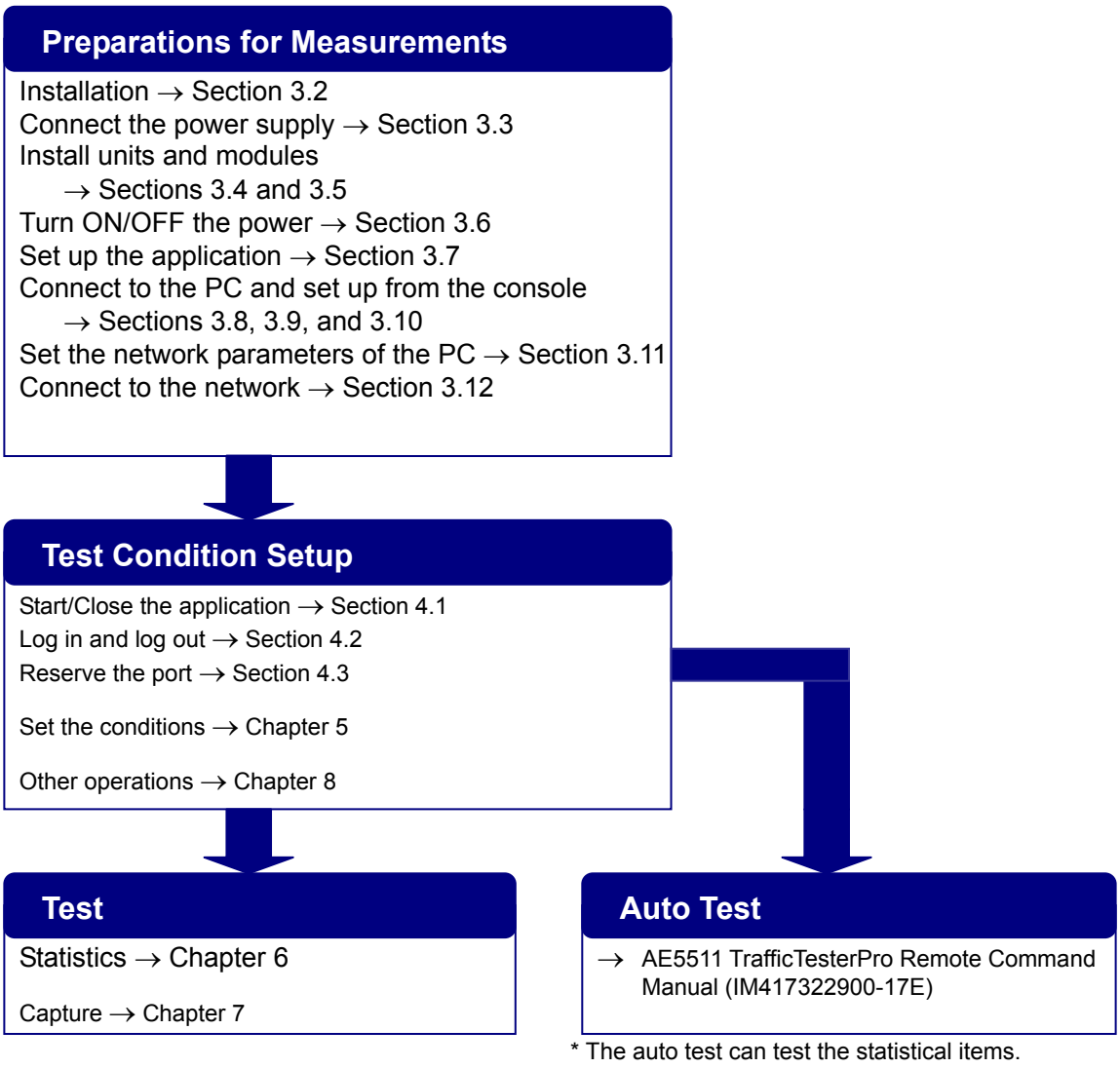
- Software buttons: Bold characters Example) Click **OK**.
- Parameters: Bold characters Example) Select **TRAFFIC**.
- Switches: xxx switch Example) Press the power switch.
- Hard keys: xxx key Example) Press the cursor key.

Unit

k: Denotes 1000. Example: 100 kHz and 10 kg
K: Denotes 1024. Example: 100 KB
M: Denotes 1000000 if the unit is bps or Hz. Example: 100 Mbps and 10 MHz
Denotes 1048576 if the unit is bytes. Example: 100 MB
G: Denotes 1000000000 if the unit is bps or Hz. Example: 10 Gbps and 10 GHz

Operation Flow Diagram

The figure below is provided to familiarize the first-time user with the general flow of the AE5511 operation. For a description of each item, see the relevant section or chapter. In addition to the sections and chapters that are referenced in the figure below, this manual also contains safety precautions for handling the instrument and performing wiring work. Keep them in mind and make sure to observe them.



* The auto test can test the statistical items.

Contents

Chapter 5 Setup

Chapter 6 Statistics

Chapter 7 Capture

Chapter 8 Other Operations

Chapter 9 Troubleshooting, Maintenance, and Inspection

Chapter 10 Specifications

Chapter 11 Appendix

1.1 Product Overview

The AE5511 is an Ethernet traffic tester equipped with multiple test ports.
It can be used for performance evaluation during development, delivery inspection during mass production or acceptance inspection, and performance evaluation when building IP networks of network equipment (LAN switches, routers, media converters, transmission devices, and so forth) with Ethernet functionality.
An application (TTPro Control Window) installed in the controller PC can be used to easily carry out effective throughput, latency, and bit error measurements.
By replacing units (sold separately), 10-Mbit to 10-Gbit Ethernet can be supported.

Main Functions and Features

- **The following five units are available.**

Name	Specifications
AE5520 10/100BASE-T Unit	10/100BASE-T, 16 RJ-45 ports
AE5521 1000BASE-X Unit	1000BASE-X/T, 4 GBIC ports (SX/LX/T)*
AE5522 10GBASE-X Unit	10GBASE-X, 2 XENPAK ports (LR/ER)*
AE5523 1000BASE-T Unit	10/100/1000BASE-T, 12 RJ-45 ports (PoE compatible) 1000BASE-X, 1 SFP port (SX/LX)*
AE5524 1000BASE-X Unit	1000BASE-X, 12 SFP ports (SX/LX)*

* GBIC, XENPAK, and SFP interface modules are options. For the supported modules, see “Interface Modules (Sold Separately)” on page v.

- **Full-Wire Rate**
  Generates full-wire traffic on all ports and displays the statistics of the measured results.

- **Throughput Measurement**
  Measures the throughput of network equipment and installations.

- **BERT (Bit Error Rate Test)**
  Tests the hardware of the network equipment (cache memory, etc.) using pseudo-random pattern data.

- **Latency Measurement**
  Measures frame delay and frame gap.

- **Capture Function (AE5522, AE5523, and AE5524)**
  Captures received frames. The captured data can be saved to a file for evaluation such as by using Ethereal.

- **Transmission Frame Generation**
  Easily edit various field parameters of transmission frames. Capable of generating frames ranging from short frames to jumbo frames. Up to 127 frames can be registered for each port.

- **Variable Field Function**
  Frames can be transmitted while changing a field of each frame. (Up to four fields can be changed on the AE5523 and AE5524.)
  In addition, frames can be transmitted while increasing/decreasing the frame length within a specified range or changing the length randomly.

- **Network Emulation Function**
  All units have ARP reply, PING reply, and MAC address auto learn functions. The AE5523 and AE5524 have address resolution through the NDP (Neighbor Discovery Protocol), PING6 reply, and auto address generation function for checking the operation of IPv6 network devices.

- **PoE Measurement Function (AE5523)**
  The AE5523 is equipped with a Power Device (PD) emulation function, class declaration, and line power detection function complying with IEEE 802.3af for checking the operation of network devices supporting PoE (Power over Ethernet).

- **QoS Control Function (AE5523 and AE5524)**
  The statistical display of individual flow of up to 8 channels enables the evaluation of the priority control of network devices.

- **Sequence Check (AE5523 and AE5524)**
  The sequence check function enables the testing of packet loss with ease. Maximum burst packet loss, reordered packets, and duplicate packets can be verified.

- **Multi User Support (AE5523 and AE5524)**
  Up to eight users can log in. A port can be reserved by a single user. The ports provided by each unit (12 ports on the AE5524) can be shared among eight users.

- **Alarm Log Function (AE5523 and AE5524)**
  Up to 1000 alarm incidents can be logged.

- **File Function**
  Setup conditions, measured results (CSV format), and captured data (TTP, PCAP, or CSV format) can be saved to files.

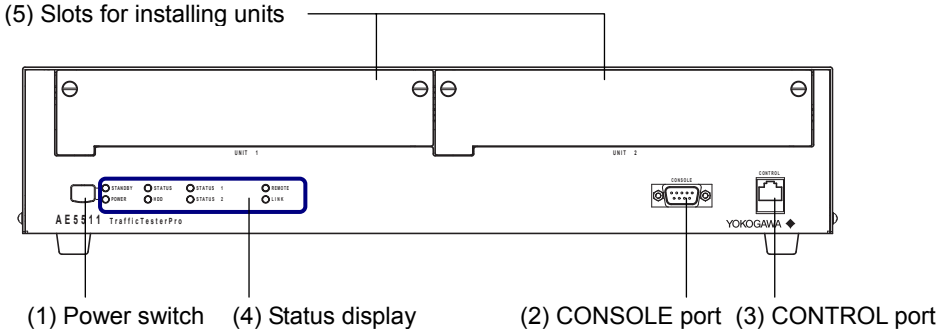
- **Auto Test Function**
  Auto tests can be carried out through remote control (Telnet) Measured results can be retrieved using ftp.

CAUTION

This instrument has functions allowing it to transmit frames at high loads from its measurement ports. Incorrect operation can result in breakdown or deterioration of network media or related devices. Sufficient care must be taken when performing tests while connected to networks. Yokogawa does not assume any responsibility for damages resulting from incorrect operation.

1.2 Front Panel, Rear Panel, and Side Panels

Front Panel

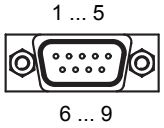


(1) Power switch

When the main power switch on the rear panel is ON (power standby mode), you can use this switch to turn the power ON/OFF.

(2) CONSOLE port

A 9-pin D-Sub male serial port for connecting a console.
This port is used to set up the instrument from a controller PC through console connection. Use the CONSOLE (RS-232 cable, cross) cable that comes with the instrument to connect to the controller PC.
Pin arrangement and pin assignments are shown below.



Pin	Signal
1	DCD
2	RX
3	TX
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

(3) CONTROL port

An Ethernet port (RJ-45, MDI, 10/100BASE-T, and auto negotiation) for controlling the instrument.
This port is used to control the instrument from a controller PC through an Ethernet network or direct connection. To connect through an Ethernet network, use a LAN cable that is commercially sold. To directly connect the controller PC to the instrument, use the CONTROL cable (LAN cable, cross) that comes with the instrument.
Pin arrangement and pin assignments are shown below.

Pin	Signal
1	TX+
2	TX-
3	RX+
4	–
5	–
6	RX-
7	–
8	–

(4) Status display LEDs

Name	Color	Illumination/Blink Conditions
POWER	Green	Illuminates when the power is ON. The main power switch and power switch are ON.
STANDBY	Orange	Illuminates in power standby mode. The main power switch is ON, but the power switch is OFF.
HDD	Orange	Illuminates when the hard disk drive is being accessed.
STATUS	Green/Red	Illuminates in green when the instrument is running normally. Blinks in green when the instrument is starting up, undergoing a self-test, or shutting down. Illuminates in red when the instrument has malfunctioned.*1
STATUS1	Green/Red	Illuminates in green when unit 1 is running normally. Blinks in green when unit 1 is undergoing a self-test. Illuminates in red unit 1 has malfunctioned.*2
STATUS2	Green/Red	Illuminates in green when unit 2 is running normally. Blinks in green when unit 2 is undergoing a self-test. Illuminates in red unit 2 has malfunctioned.*2
LINK	Green	Illuminates during CONTROL port link up status.
REMOTE	Green	Illuminates when the CONSOLE or CONTROL port is connected.

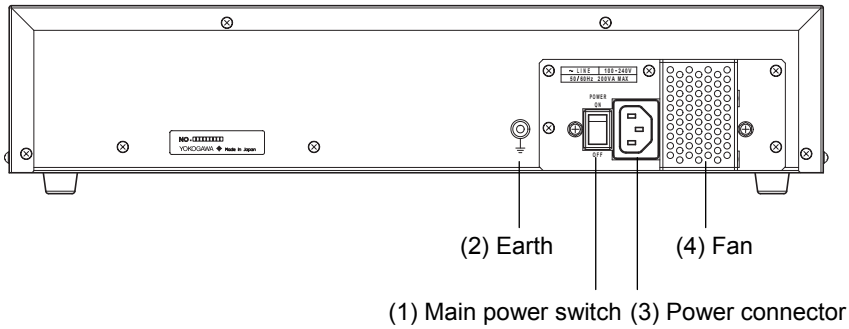
*1: Memory check failure, fan alarm activated, CPU error, or self-test failure

*2: Self-test failure or configuration failure

(5) Slots for installing units

Up to two units can be installed in the slots.

Rear Panel



(1) Main power switch

Turns ON/OFF the power. When turned OFF, all powers including the standby power are turned OFF.

(2) Earth terminal

A functional ground terminal.

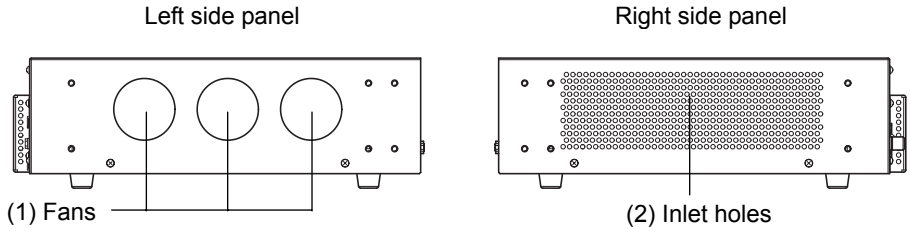
(3) Power connector

A connector (with a terminal for protective earth grounding) used to connect the instrument to a power supply. Connect the power cord that comes with the instrument.

(4) Fan

An exhaust fan.

Side Panel



(1) Fans
Three exhaust fans.

(2) Inlet holes
Air inlet holes.

2.1 Function Table

The following table lists the functions that are supported by each unit and test mode.

Function			Unit (AE55xx)*1					Test Mode*2		Notes
			20	21	22	23	24	T	B	
Login	Multi user support (8 users)		-	-	-	x	x	x	x	AE5520 to 22: By units AE5523/24: By ports
Setup	Auto negotiation	Speed DUPLEX, MDI/MDI-X	x	-	-	x	-	x	x	
		Flow control	x	x	-	x	x	x	x	
	Clock extraction setup		-	-	-	x	x	x	x	Available on the AE5523 on the 1000BASE-T
	Link UP/DOWN	Single	x	x	x	x	x	x	x	
		Cycle	-	-	-	x	x	x	x	
	PoE setup		-	-	-	x	-	x	x	
	Transmit setup (constant/burst)		x	x	x	x	x	x	x	
	End by (manual/count/time)		x	x	x	x	x	x	x	
	Transmission mode (variable/fixed)		x	x	x	x	x	x	-	
	Number of registered frames		x	x	x	x	x	127	1	Traffic: 127 frames BERT: 1 frame
	Error frame setting	CRC error	x	x	x	x	x	x	x	
		Symbol error	-	-	-	x	x	x	x	
	Insert time stamp		x	x	x	x	x	x	-	
	Insert sequence counter		-	-	-	x	x	x	-	
	Variable frame length		x	x	x	x	x	x	x	
	Variable field	1 variable field	x	x	x	x	x	x	-	
		4 variable fields	-	-	-	x	x	x	-	
	Insert mode setup	Single	x	x	x	x	x	x	x	
		Cycle	-	-	-	x	x	x	x	
	Oversize threshold		x	x	x	x	x	x	x	
	Base filter setup		x	x	x	x	x	x	x	
	Sequence error object setup		-	-	-	x	x	x	-	
	BERT checked byte setup		-	-	x	x	x	-	x	
	QoS setup		-	-	-	x	x	x	-	
	Alarm setup		-	-	-	x	x	x	x	
	Own port address setup	MAC, IPv4, and IPv6 addresses	x	x	x	x	x	x	x	
		VLAN setup	-	-	-	x	x	x	x	
	IPv4 emulation (ARP and PING)		x	x	x	x	x	x	x	
	IPv6 emulation (NDP and PING6)		-	-	-	x	x	x	x	
	MAC address auto learn (IPv4)		x	x	x	x	x	x	x	
	Auto address generation (IPv6)		-	-	-	x	x	x	x	
	Transmit clock adjustment		-	-	-	x	x	x	x	

Function		Unit (AE55xx)*1					Test Mode*2		Notes
		20	21	22	23	24	T	B	
Statistics	Transmission start/stop/reset	x	x	x	x	x	x	x	
	Insert frame transmission start/stop	x	x	x	x	x	x	x	
	Link down generation start/stop	x	x	x	x	x	x	x	
	Bit error insertion	x	x	x	x	x	-	x	
	LF transmission start/stop	-	-	x	-	-	x	x	
	RF transmission start/stop	-	-	x	-	-	x	x	
	Screen freeze/release	x	x	x	x	x	x	x	
	Statistics result display	x	x	x	x	x	x	x	For a list of statistical items, see section 2.3.
	Statistics for each QoS	-	-	-	x	x	x	-	
	Late collision detection	-	-	-	x	-	x	x	
Capture	Capture filter setup	-	-	x	x	x	x	x	
	Capture trigger setup	-	-	x	x	x	x	x	
	Capture buffer setup	-	-	x	x	x	x	x	
	Receive frame capture	-	-	x	x	x	x	x	
	Link partner ability display	-	-	-	x	x	x	x	

x: Supported, -: Unsupported

*1 20: AE5520, 21: AE5521, 22: AE5522, 23: AE5523, 24: AE5524

*2 T: Traffic mode, B: BERT mode

2.2 Login Function

This section explains the login function. For the operating procedure, see section 4.2.

Login Mode

The following are the AE5511 login modes.

Login Mode		Description
Online	Admin	With the Windows application started and connected to the AE5511, this access mode enables all functions and environmental settings of the AE5511 to be configured in addition to editing and saving of setup files, making of measurements, and saving of measurement files. This mode also applies to the login on the console.
	User	With the Windows application started and connected to the AE5511, this access mode enables editing and saving of setup files, making of measurements, and saving of measurement files.
Offline		With the Windows application started but not connected to the AE5511, this access mode enables editing and saving of setup files and viewing of saved measurement files.

Limitation on the Number of Users

In online mode, up to eight users can simultaneously access a single AE5511.

- Admin mode: One user (including the console)
- User mode: Up to seven users.

In offline mode, one user can use a single PC.

Limitation on the Unit

The level at which the unit can be shared among users while logged in varies depending on the unit.

Unit	Level of Sharing	Description
AE5520 10/100BASE-T Unit	Unit	A user uses the entire unit (16 ports)
AE5521 1000BASE-X Unit	Unit	A user uses the entire unit (4 ports)
AE5522 10GBASE-X Unit	Unit	A user uses the entire unit (2 ports)
AE5523 1000BASE-T Unit	Port	A user uses one or more ports.
AE5524 1000BASE-X Unit	Port	A user uses one or more ports.

Note

The ports on the AE5523 and AE5524 can be shared among up to eight users (multi user support).

Port Lock Function

By specifying port lock when you log out, the application on your PC can be closed while continuing the measurement on the AE5511. When you login again with the same user name, you can reconnect to the AE5511 with the measurement in progress. When you reconnect, the configuration that existed when you logged out is used.

Note

Because the communication between the PC and AE5511 may be cut off depending on the controller PC that you are using or the network environment, it is recommended that you use the port lock function when carrying out measurements that take an extended time.

FTP Passive Mode

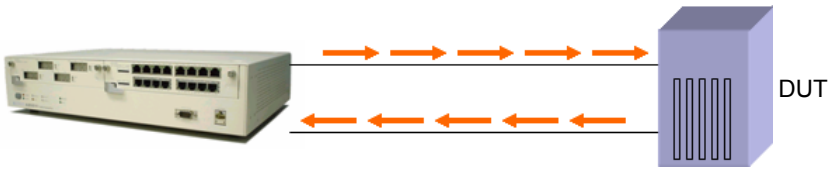
FTP passive mode is available on the AE5511.
Specify FTP Passive as necessary.
Enable **FTP Passive** such as when external access is prohibited in the firewall settings. In addition, if you are using the firewall function on Windows XP SP2 or a virus checking program, select the **FTP Passive** check box.

2.3 Statistics Function

This section explains the traffic, latency, and BERT functions of the statistics function. It also describes a list of statistical items, base filter, statistics for each QoS, and sequence error check.

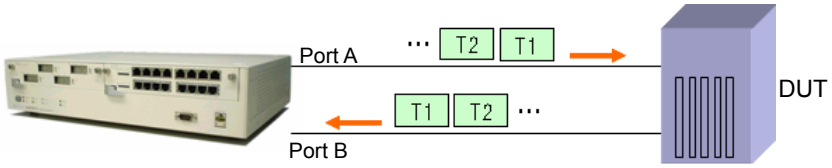
Traffic

The traffic function generates traffic on the Ethernet network. It transmits Ethernet frames to the reserved ports. The measured results are displayed on the Statistics window.
The traffic function is enabled when the test mode is set to **TRAFFIC**.



Latency

The latency function measures the latency. By inserting time stamps and transmitting frames, the latency can be measured for frames transmitted from port A and received in port B. The measured results are displayed on the Statistics window.
The latency function is enabled when the test mode is set to **TRAFFIC**.



- Latency Measurement Operation
  In latency measurement, the latency is measured on all frames on which **Insert Time Stamp** is specified. The AE5511 measures the time difference in the time stamps of the received frames.

- Time Stamps
  The time stamp used in the latency measurement is 8 bytes in length including the identifier and is inserted immediately before the frame FCS.

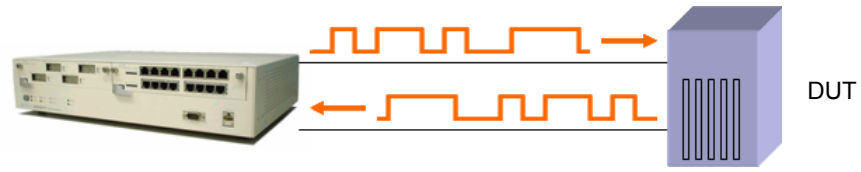
8 bytes	Arbitrary	8 bytes	4 bytes
Preamble	Data	Time stamp	FCS

Note

It is not possible to carry out latency measurement across multiple AE5511s. Measure the latency between ports on the same unit or different units installed to the same AE5511.

BERT

The BERT (Bit Error Rate Test) function measures the bit error rate. The AE5511 embeds a PN pattern (PN15) in the payload section of the frame and checks whether bit errors are occurring in the PN pattern of the frame passing through the device under test. The measured results are displayed on the Statistics window.
The BERT function is enabled when the test mode is set to **BERT**.



- Sync in and Sync Loss Condition
  - Sync in Condition:
    When 32 or more bits of the PN pattern that is embedded in the payload section match, synchronization is established and bit error checking starts.
  - Sync Loss Condition:
    When 50 or more bits of error are detected in 128 bits when synchronization is established, sync loss occurs.

Note

- The number of bytes tested in the BERT measurement includes the 32 bits when sync in starts.
- After sync loss occurs, sync in starts again from the next frame.

List of Statistical Items

The following are items that can be measured on the Statistics window.

Group	Item Name	Function	Unit	Mode
Common	[Common] Measured Time	Displays the measured time as a 10-digit integer in seconds.	All units	TRAFFIC/ BERT
Link	[Link] Link Status	Displays the link status as LinkDown, 10M-Full, 10M-Half, 100M-Full, 100M-Half, 1000M-Full, or 10G-Full.	All units	TRAFFIC/ BERT
	[Link] Link Down	Displays the link down count as a 16-digit integer.	AE5523/24	
	[Link] Tx Frequency Deviation (ppm)	Displays the Tx frequency deviation as a 3-digit signed integer.		
	[Link] Rx Frequency Deviation (ppm)	Displays the Rx frequency deviation as a 3-digit signed integer.		
	[Link] 1000BASE-T Clock Mode	Displays the 1000BASE-T clock mode as MASTER or SLAVE.	AE5523	
	[Link] PoE Line Power Detect	Displays the PoE line power as ON or OFF.	AE5523	
	[Link] LF Detect	Displays the LF detect count as a 16-digit integer.	AE5522	
	[Link] RF Detect	Displays the RF detect count as a 16-digit integer.		
Tx	[Tx] Normal Frame	Displays the total number of frames as a 16-digit integer.	All units	TRAFFIC/ BERT
	[Tx] Byte	Displays the total number of bytes as a 16-digit integer.		
	[Tx] Rate (%)	Displays the rate (%) with 5 digits to the right of the decimal.		
	[Tx] Rate (frame/s)	Displays the current number of frames as a 10-digit integer.		
	[Tx] Rate (byte/s)	Displays the current number of bytes as a 10-digit integer.		
	[Tx] Rate (bps)	Displays the rate (BPS) as a 10-digit integer.		
	[Tx] Insert Frame	Displays the number of insert frames as a 16-digit integer.		
	[Tx] Reply Frame	Displays the number of PING and ARP replies as a 16-digit integer.		
	[Tx] Error Frame	Displays the total number of error frames as a 16-digit integer.		
	[Tx] CRC Error	Displays the total number of CRC error frames as a 16-digit integer.		
	[Tx] Under Size Error	Displays the total number of undersize frames as a 16-digit integer.		
	[Tx] Over Size Error	Displays the total number of oversize frames as a 16-digit integer.		
	[Tx] Symbol Error	Displays the total number of symbol error frames as a 16-digit integer.	AE5523/24	
	[Tx] Error Frame (frame/s)	Displays the current number of error frames as a 10-digit integer.	All units	
	[Tx] CRC Error (frame/s)	Displays the current number of CRC error frames as a 10-digit integer.		
	[Tx] Under Size Error (frame/s)	Displays the current number of undersize frames as a 10-digit integer.		
	[Tx] Over Size Error (frame/s)	Displays the current number of oversize error frames as a 10-digit integer.		
	[Tx] Symbol Error (frame/s)	Displays the current number of symbol error frames as a 10-digit integer.	AE5523/24	
Rx	[Rx] Normal Frame	Displays the total number of frames as a 16-digit integer.	All units	TRAFFIC/ BERT
	[Rx] Byte	Displays the total number of bytes as a 16-digit integer.		
	[Rx] Rate (%)	Displays the rate (%) with 5 digits to the right of the decimal.		
	[Rx] Rate (frame/s)	Displays the current number of frames as a 10-digit integer.		
	[Rx] Rate (byte/s)	Displays the current number of bytes as a 10-digit integer.		
	[Rx] Rate (bps)	Displays the rate (BPS) as a 10-digit integer.		
	[Rx] Pause Frame	Displays the number of pause frames as a 16-digit integer.		
	[Rx] Collision Detect	Displays the collision detect count as a 16-digit integer.	AE5520/23	
	[Rx] Late Collision Detect	Displays the late collision detect count as a 16-digit integer.	AE5523	
	[Rx] Error Frame	Displays the total number of error frames as a 16-digit integer.	All units	
	[Rx] CRC Error	Displays the total number of CRC error frames as a 16-digit integer.		
	[Rx] Under Size Error	Displays the total number of undersize frames as a 16-digit integer.		
	[Rx] Over Size Error	Displays the total number of oversize frames as a 16-digit integer.		
	[Rx] Alignment Error	Displays the total number of alignment error frames as a 16-digit integer.	AE5520/23	
	[Rx] Symbol Error	Displays the total number of symbol error frames as a 16-digit integer.	All units	
	[Rx] Error Frame (frame/s)	Displays the current number of error frames as a 10-digit integer.		
	[Rx] CRC Error (frame/s)	Displays the current number of CRC error frames as a 10-digit integer.		
	[Rx] Under Size Error (frame/s)	Displays the current number of undersize frames as a 10-digit integer.		
	[Rx] Over Size Error (frame/s)	Displays the current number of oversize error frames as a 10-digit integer.		
	[Rx] Alignment Error (frame/s)	Displays the current number of alignment error frames as a 10-digit integer.	AE5520/23	
	[Rx] Symbol Error (frame/s)	Displays the current number of symbol error frames as a 10-digit integer.	All units	

Group	Item Name	Function	Unit	Mode
Latency	[Latency] Max IFG (μs)	Displays the maximum interframe gap (μs) with a 10-digit integer part and a 1-digit fractional part.	All units	TRAFFIC
	[Latency] Min IFG (μs)	Displays the minimum interframe gap (μs) with a 10-digit integer part and a 1-digit fractional part.		
	[Latency] Avg IFG (μs)	Displays the average interframe gap (μs) with a 10-digit integer part and a 1-digit fractional part.		
	[Latency] Max Packet Latency (μs)	Displays the maximum packet latency with a 10-digit integer part and a 1-digit fractional part.		
	[Latency] Min Packet Latency (μs)	Displays the minimum packet latency with a 10-digit integer part and a 1-digit fractional part.		
	[Latency] Avg Packet Latency (μs)	Displays the average packet latency with a 10-digit integer part and a 1-digit fractional part.		
Sequence Check	[Seq] Loss Packet	Displays the number of sequence errors (lost packets) as a 16-digit integer.	AE5523/24	TRAFFIC
	[Seq] Reorder Packet	Displays the number of sequence errors (reordered packets) as a 16-digit integer.		
	[Seq] Duplicate Packet	Displays the number of sequence errors (duplicate packets) as a 16-digit integer.		
	[Seq] Max Burst Packet Loss	Displays the number of sequence errors (maximum burst loss) as a 16-digit integer.		
QoS Traffic (CH1-4)	[CH1] Frame	Displays the total number of frames as a 16-digit integer.	AE5523/24	TRAFFIC
	[CH1] Byte	Displays the total number of bytes as a 16-digit integer.		
	[CH1] Rate (%)	Displays the rate (%) with 5 digits to the right of the decimal.		
	[CH1] Rate (frame/s)	Displays the current number of frames as a 10-digit integer.		
	[CH1] Rate (bps)	Displays the rate (BPS) as a 10-digit integer.		
	[CH2] Frame	Displays the total number of frames as a 16-digit integer.		
	[CH2] Byte	Displays the total number of bytes as a 16-digit integer.		
	[CH2] Rate (%)	Displays the rate (%) with 5 digits to the right of the decimal.		
	[CH2] Rate (frame/s)	Displays the current number of frames as a 10-digit integer.		
	[CH2] Rate (bps)	Displays the rate (BPS) as a 10-digit integer.		
	[CH3] Frame	Displays the total number of frames as a 16-digit integer.		
	[CH3] Byte	Displays the total number of bytes as a 16-digit integer.		
	[CH3] Rate (%)	Displays the rate (%) with 5 digits to the right of the decimal.		
	[CH3] Rate (frame/s)	Displays the current number of frames as a 10-digit integer.		
	[CH3] Rate (bps)	Displays the rate (BPS) as a 10-digit integer.		
	[CH4] Frame	Displays the total number of frames as a 16-digit integer.		
	[CH4] Byte	Displays the total number of bytes as a 16-digit integer.		
	[CH4] Rate (%)	Displays the rate (%) with 5 digits to the right of the decimal.		
	[CH4] Rate (frame/s)	Displays the current number of frames as a 10-digit integer.		
	[CH4] Rate (bps)	Displays the rate (BPS) as a 10-digit integer.		
QoS Traffic (CH5-8)	[CH5] Frame	Displays the total number of frames as a 16-digit integer.	AE5523/24	TRAFFIC
	[CH5] Byte	Displays the total number of bytes as a 16-digit integer.		
	[CH5] Rate (%)	Displays the rate (%) with 5 digits to the right of the decimal.		
	[CH5] Rate (frame/s)	Displays the current number of frames as a 10-digit integer.		
	[CH5] Rate (bps)	Displays the rate (BPS) as a 10-digit integer.		
	[CH6] Frame	Displays the total number of frames as a 16-digit integer.		
	[CH6] Byte	Displays the total number of bytes as a 16-digit integer.		
	[CH6] Rate (%)	Displays the rate (%) with 5 digits to the right of the decimal.		
	[CH6] Rate (frame/s)	Displays the current number of frames as a 10-digit integer.		
	[CH6] Rate (bps)	Displays the rate (BPS) as a 10-digit integer.		
	[CH7] Frame	Displays the total number of frames as a 16-digit integer.		
	[CH7] Byte	Displays the total number of bytes as a 16-digit integer.		
	[CH7] Rate (%)	Displays the rate (%) with 5 digits to the right of the decimal.		
	[CH7] Rate (frame/s)	Displays the current number of frames as a 10-digit integer.		
	[CH7] Rate (bps)	Displays the rate (BPS) as a 10-digit integer.		
	[CH8] Frame	Displays the total number of frames as a 16-digit integer.		
	[CH8] Byte	Displays the total number of bytes as a 16-digit integer.		
	[CH8] Rate (%)	Displays the rate (%) with 5 digits to the right of the decimal.		
	[CH8] Rate (frame/s)	Displays the current number of frames as a 10-digit integer.		
	[CH8] Rate (bps)	Displays the rate (BPS) as a 10-digit integer.		

Group	Item Name	Function	Unit	Mode
QoS Latency (CH1-4)	[CH1] Max Packet Latency (μs)	Displays the maximum packet latency (μs) 10-digit integer part and a 1-digit fractional part.	AE5523/24	TRAFFIC
	[CH1] Min Packet Latency (μs)	Displays the minimum packet latency (μs) 10-digit integer part and a 1-digit fractional part.		
	[CH1] Avg Packet Latency (μs)	Displays the average packet latency (μs) 10-digit integer part and a 1-digit fractional part.		
	[CH2] Max Packet Latency (μs)	Displays the maximum packet latency (μs) 10-digit integer part and a 1-digit fractional part.		
	[CH2] Min Packet Latency (μs)	Displays the minimum packet latency (μs) 10-digit integer part and a 1-digit fractional part.		
	[CH2] Avg Packet Latency (μs)	Displays the average packet latency (μs) 10-digit integer part and a 1-digit fractional part.		
	[CH3] Max Packet Latency (μs)	Displays the maximum packet latency (μs) 10-digit integer part and a 1-digit fractional part.		
	[CH3] Min Packet Latency (μs)	Displays the minimum packet latency (μs) 10-digit integer part and a 1-digit fractional part.		
	[CH3] Avg Packet Latency (μs)	Displays the average packet latency (μs) 10-digit integer part and a 1-digit fractional part.		
	[CH4] Max Packet Latency (μs)	Displays the maximum packet latency (μs) 10-digit integer part and a 1-digit fractional part.		
	[CH4] Min Packet Latency (μs)	Displays the minimum packet latency (μs) 10-digit integer part and a 1-digit fractional part.		
	[CH4] Avg Packet Latency (μs)	Displays the average packet latency (μs) 10-digit integer part and a 1-digit fractional part.		
QoS Latency (CH5-8)	[CH5] Max Packet Latency (μs)	Displays the maximum packet latency (μs) 10-digit integer part and a 1-digit fractional part.	AE5523/24	TRAFFIC
	[CH5] Min Packet Latency (μs)	Displays the minimum packet latency (μs) 10-digit integer part and a 1-digit fractional part.		
	[CH5] Avg Packet Latency (μs)	Displays the average packet latency (μs) 10-digit integer part and a 1-digit fractional part.		
	[CH6] Max Packet Latency (μs)	Displays the maximum packet latency (μs) 10-digit integer part and a 1-digit fractional part.		
	[CH6] Min Packet Latency (μs)	Displays the minimum packet latency (μs) 10-digit integer part and a 1-digit fractional part.		
	[CH6] Avg Packet Latency (μs)	Displays the average packet latency (μs) 10-digit integer part and a 1-digit fractional part.		
	[CH7] Max Packet Latency (μs)	Displays the maximum packet latency (μs) 10-digit integer part and a 1-digit fractional part.		
	[CH7] Min Packet Latency (μs)	Displays the minimum packet latency (μs) 10-digit integer part and a 1-digit fractional part.		
	[CH7] Avg Packet Latency (μs)	Displays the average packet latency (μs) 10-digit integer part and a 1-digit fractional part.		
	[CH8] Max Packet Latency (μs)	Displays the maximum packet latency (μs) 10-digit integer part and a 1-digit fractional part.		
	[CH8] Min Packet Latency (μs)	Displays the minimum packet latency (μs) 10-digit integer part and a 1-digit fractional part.		
	[CH8] Avg Packet Latency (μs)	Displays the average packet latency (μs) 10-digit integer part and a 1-digit fractional part.		

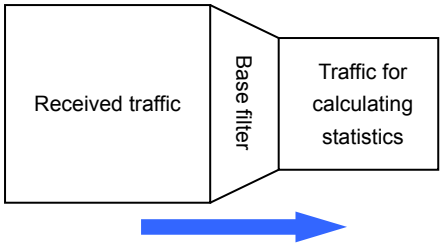
Group	Item Name	Function	Unit	Mode
BERT	[BERT] Bit Error Rate ($\times 10^{-12}$)	Displays the bit error rate ($\times 10^{-12}$) as a 13-digit integer.	AE5522/23/24	BERT
	[BERT] Bit Error Count	Displays the total number of bit errors as a 16-digit integer.	All units	
	[BERT] Bit Error Frame	Displays the total number of bit error frames as a 16-digit integer.		
	[BERT] Sync Loss	Displays the total BERT sync loss count as a 16-digit integer.		
	[BERT] BERT Checked Byte	Displays the total number of BERT checked bytes as a 16-digit integer.		
	[BERT] Bit Error (bps)	Displays the bit error (bps) as a 10-digit integer.		
	[BERT] Bit Error Frame (frame/s)	Displays the bit error frames (frames/s) as a 10-digit integer.		
	[BERT] Sync Loss /sec	Displays the BERT sync loss count per second as a 10-digit integer.		
	[BERT] BERT Checked Byte/s	Displays the BERT checked bytes (bytes/s) as a 10-digit integer.		
	[BERT] Bit Error Insert	Displays the number of bit error insertions as a 16-digit integer.		
	[BERT] Bit Error Insert Frame	Displays the total number of bit error insert frames as a 16-digit integer.		

Note

The AE5520, AE5521, and AE5522 units run on a transmission clock independent of the 1-s sampling clock for calculating the statistics used on the AE5511. Therefore, the specified transmission rate and [Tx] Rate (%) displayed on the Statistics window may not match depending on the accuracy of the transmission clock.

Base Filter

The base filter function sets the conditions for calculating the statistics on the received frames.



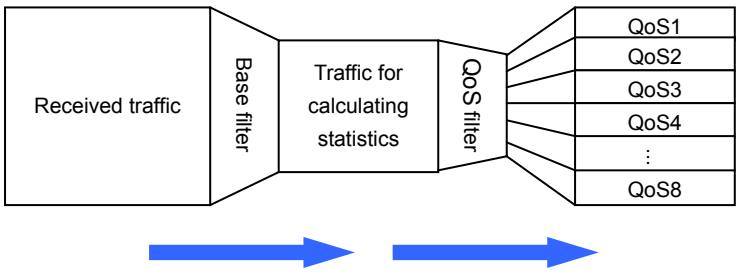
The base filter can be selected from the following:

- Disable: All received frames are used to calculate statistics.
- Manual: Frames that match the filter conditions set manually are used to calculate statistics.
- VLAN ID Filter: Frames whose VLAN ID and TPID match are used to calculate statistics.
- VLAN QoS Filter: Frames whose Priority and TPID match are used to calculate statistics.
- DA Filter: Frames whose destination MAC address matches are used to calculate statistics.
- SA Filter: Frames whose source MAC address matches are used to calculate statistics.
- L2 Unicast Filter: L2 unicast frames are used to calculate statistics.

For the setup procedure, see section 5.10.

Statistics for Each QoS

Statistics of each QoS can be displayed on up to eight channels (classes) on the AE5523 and AE5524. The statistical display of each flow and each frame length enables the evaluation of the priority control of network devices.



- Statistics mode: Each frame and each frame length (combination possible)
- Statistics channel: Up to eight channels (7 + Other)
- Statistical items: Total (number of frames and number of bytes)
  Rate (%, frame/s, and bps)
  Latency (maximum, minimum, and average packet latency (μs))
- Relationship with the base filter: Calculates statistics for each QoS on frames that pass the base filter.

Note

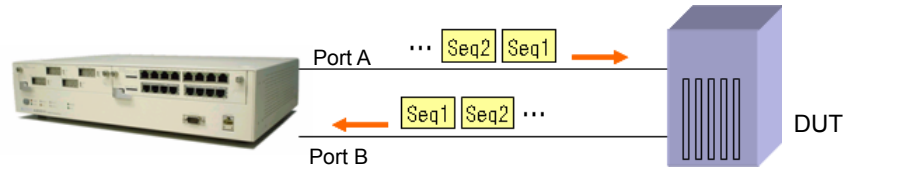
When QoS channel 8 is specified, statistics are calculated on frames that do not meet the conditions of QoS 1 to 7.

For the setup procedure, see section 5.11.

Sequence Error Check

The sequence check function on the AE5523 and AE5524 can be used to easily test packet loss. The sequence error check function inserts a sequence counter in the frame to check the frames transmitted from port A and received in port B. Packet loss, maximum burst packet loss, reordered packets, and duplicate packets can be checked. For the setup procedure, see section 5.8.

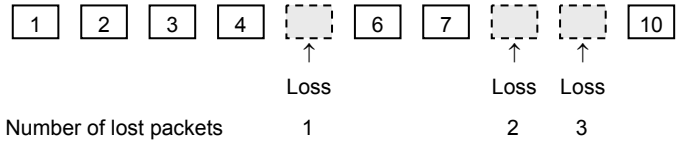
- Sequence Error Detection Items
  - Loss Packet: The total number of lost frames
  - Max Burst Packet Loss: The maximum number of consecutive lost frames
  - Reorder Packet: The total number of frames that are received in a different order from the transmitted order.
  - Duplicate Packet: The number of redundant frames that are received.



Seq: Sequence counter

- Sequence Error Detection Condition
  - Loss Packet

    Of those frames that are transmitted, those that could not be received are counted as lost packets. Loss Packet in the Statistics window indicates the total number of lost packets.

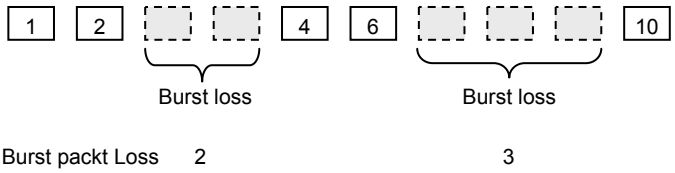


Note

- Burst loss is included in the loss packet.
- Reordered packets are not included in the loss packet.

  - Max Burst Packet Loss

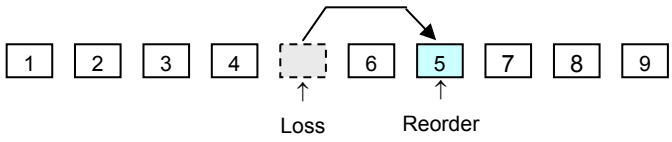
    When multiple consecutive frames are not received, they are counted as burst loss. Max Burst Packet Loss in the Statistics window indicates the maximum value of the burst loss.



Note

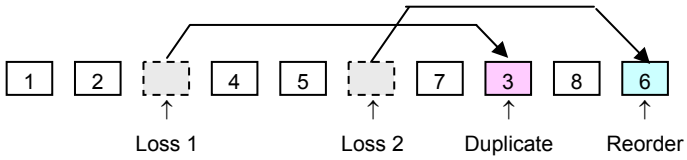
Reordered packets to not affect the maximum burst packet loss measurement.

- Reorder Packet
  Packets of which the received frame order differs from the transmitted order are counted as reordered packets. Reorder Packet in the Statistics window indicates the total number of reordered packets.

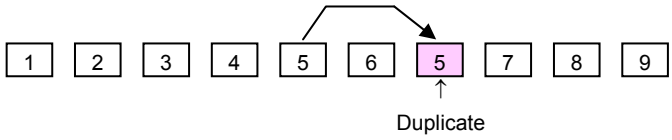


Note

- A reordered packet is detected for the previous loss or burst loss section.
- A reordered frame for a loss or a burst loss section that occurs before the previous one is counted as a duplicate packet.

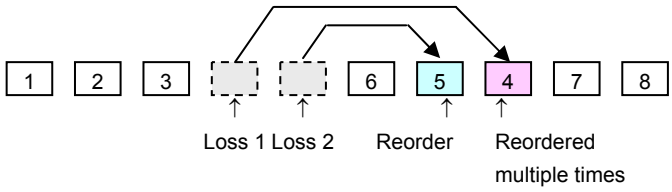


- Duplicate Packet
  Same frames that are received multiple times are counted as duplicate packets. Duplicate Packet in the Statistics window indicates the total number of duplicate packets.



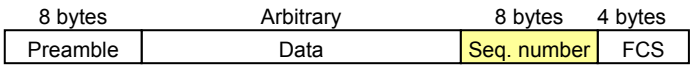
Note

Frames that are reordered multiple times are counted as duplicate packets.

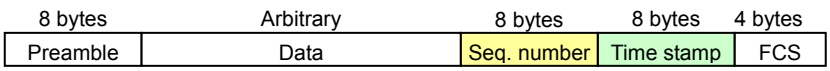


- Sequence Number
  The sequence number is 8 bytes in length including the identifier and is inserted immediately before the frame FCS.
  If time stamps are being inserted, the sequence number is inserted immediately before the time stamp.

  - When only the sequence number is inserted



  - When the sequence number and time stamp are inserted



2.4 Capture Function

The capture function consists of a capture filter, capture trigger, and link partner ability display. For the operating procedure, see chapter 7.

Capture Function

The AE5522, AE5523, and AE5524 are equipped with a function for capturing received Ethernet frames to the memory. The event number, relative time, frame length, destination MAC address, source address, the event display of the data, and the detailed data display through hexadecimal dump are possible on the received frames.

- Captured Frames
  The portion of the frame that is captured is from the data immediately after the preamble (SFD) to the FCS. The minimum IFG and minimum frame length that can be captured are indicated below.

Unit	Minimum IFG (BT)	Minimum Frame Length (Bytes)
AE5522	40	48
AE5523 and AE5524	48	18

  The minimum frame length does not include the preamble but includes the FCS.

- Capture Buffer
  The AE5522 has 128 KB of capture buffer. The AE5523 and AE5524 have 1 MB of buffer. The number of frames that can be captured for various frame sizes on each unit is indicated below.

Frame Size (Bytes)	Number of frames	
	AE5522	AE5523, AE5524
64	2048, 512, 64, or 8	16384, 4096, 512, or 64
256	512, 64, 8	4096, 512, 64
2048	64, 8	512, 64
9999	8	64

- Error Priority
  When multiple errors occur simultaneously, the error with the highest priority is displayed.

Priority	Error
1	Symbol error
2	Undersize error
3	Oversize error
4	Alignment error
5	FCS error
6	Sequence error
7	Bit error
8	Late collision

Capture Filter

Various capture filter conditions can be combined.

- Record or not record normal frames.
- Record or not record error frames.
- Record or not record layer 1 events.
- Record or not record insert frames.

When recording normal frames, the filter pattern, combination, and filter action can be selected through user definition.
For the setup procedure, see section 7.6.

Capture Trigger

You can specify capture trigger conditions. When a trigger is detected, the AE5511 receives a given frame according to the trigger position setting and stops the capture operation.
For the setup procedure, see section 7.7.

- Capture Trigger Conditions
  None, error frame, CRC error, undersize error, oversize error, symbol error, LF/RF reception*1, alignment error, sequence error*2, bit error, link up, link down, insert frame, late collision, and user defined.

  *1 LF/RF reception is available on the AE5522.
  *2 Sequence error is available on the AE5523 and AE5524.

- Trigger position: TOP, CENTER, and END

  The number of captured frames after the trigger detection at each trigger position is as follows:

Trigger Position	Number of Captured Frames after Trigger Detection
TOP	The specified number of frames – 1
CENTER	The specified number of frames/2
END	0

  When multiple triggers are detected, the AE5511 captures the specified number of frames after the first trigger detection.

- Auto Stop
  If the trigger condition is set to **None**, the capture operation can be stopped automatically when a specified number of frames are captured. When the trigger condition and auto stop are set to **None** and frames exceeding the specified number of frames are captured, the old data is overwritten with new data.

Link Partner Ability Display

The AE5523 and AE5524 are equipped with a link partner ability function. When auto negotiation is enabled, the AE5511 analyzes the FLP notified by the link partner, and displays the link partner ability.
The AE5511 displays each parameter in the link partner ability in the link up event information of the capture function.

The parameters and statuses shown in the link partner ability display are as follows:

Parameter		Status Display
Speed/Duplex	1000BASE-T Full-Duplex	ON/OFF
	1000BASE-T Half-Duplex	ON/OFF
	100BASE-TX Full-Duplex	ON/OFF
	100BASE-TX Half-Duplex	ON/OFF
	10BASE-T Full-Duplex	ON/OFF
	10BASE-T Half-Duplex	ON/OFF
Pause		NO Pause/Symmetric/Asymmetric/ Both
Auto-Negotiation Able		ON/OFF

For the operating procedure, see section 7.5.

2.5 Network Emulation Function

All units have IPv4 network emulation functions consisting of ARP reply, PING reply, and MAC address auto learn.
In addition, the AE5523 and AE5524 are equipped IPv6 functions consisting of address resolution through NDP (Neighbor Discovery Protocol), PING6 reply, and address auto generation.
For the setup, see section 5.13. For the procedure, see section 6.12.

ARP Reply (IPv4)

All units have an address resolution function that sends an ARP reply when an ARP request is received. When ARP reply is enabled, it is always enabled regardless of the test mode setting, filter conditions, and transmission status.

- Inapplicable ARP Requests
  If the following ARP request is received, the units do not send an ARP reply.
  - An ARP request with an LLC/SNAP header added (supports ARP requests complying with the DIX specifications).
  - An ARP request with an MPLS label added.
  - An ARP request that has been counted as an error. This excludes bit errors and sequence errors.
  - An ARP request if link down occurs while the ARP request is being received.
  - An ARP request if a collision occurs while the ARP request is being received.
  - An ARP request with a packet length of 63 bytes or less, 1519 bytes or more (1523 bytes if the VLAN tag stacks is 1 and 1527 bytes if it is 2), or exceeding the oversize threshold level.

- Handling of the VLAN Tags
  The AE5522, AE5523, and AE5524 generate ARP replies for ARP requests with a VLAN tag added.

- Conditions for Transmitting ARP Replies
  - If a collision occurs while transmitting an ARP reply, it is retransmitted.
  - If an ARP request is received during a transmission paused condition, the ARP reply is transmitted after the pause is released.
  - If an ARP reply, insert frame, and normal test frame are put on hold during a transmission paused condition, the insert frame, ARP reply, and normal test frame are transmitted when the pause is released in this order.
  - An ARP reply is not transmitted for an ARP request that is received before the transmission of the previous ARP reply is completed.
  - If a link down is carried out immediately after receiving an ARP request, the corresponding reply is not transmitted.
  - If the test mode is changed, ARP replies waiting to be transmitted are cleared.

PING Reply (IPv4)

All units have a function that sends a PING reply when a PING request is received. When PING reply is enabled, it is always enabled regardless of the test mode setting, filter conditions, and transmission status.

- Inapplicable PING Requests
  If the following PING request is received, the units do not send a PING reply.
  - A PING request with an LLC/SNAP header added (supports PING requests complying with the DIX specifications).
  - A PING request with an MPLS label added.
  - A PING request that has been counted as an error. This excludes bit errors and sequence errors.
  - A PING request if link down occurs while the PING request is being received.
  - A PING request if a collision occurs while the PING request is being received.

  - A PING request with a packet length of 63 bytes or less, 1519 bytes or more (1523 bytes if the VLAN tag stacks is 1 and 1527 bytes if it is 2), or exceeding the oversize threshold level.
  - A PING request that is IP fragmented.
- Handling of the VLAN Tags
  The AE5522, AE5523, and AE5524 generate PING replies for PING requests with a VLAN tag added.
- Conditions for Transmitting PING Replies
  - If a collision occurs while transmitting a PING reply, it is retransmitted.
  - If a PING request is received during a transmission paused condition, the PING reply is transmitted after the pause is released.
  - If a PING reply, insert frame, and normal test frame are put on hold during a transmission paused condition, the insert frame, PING reply, and normal test frame are transmitted when the pause is released in this order.
  - A PING reply is not transmitted for a PING request that is received before the transmission of the previous PING reply is completed.
  - If a link down is carried out immediately after receiving a PING request, the corresponding reply is not transmitted.
  - If the test mode is changed, PING replies waiting to be transmitted are cleared.

NDP (IPv6)

The AE5523 and AE5524 have an NDP (Neighbor Discovery Protocol) address resolution function that transmits NA (Neighbor Advertisement) when an NS (Neighbor Solicitation) is received. When NDP is enabled, it is always enabled regardless of the measurement mode setting, filter conditions, and transmission status.

- Inapplicable NSs
  NA is not transmitted if the following NS is received.
  - An NS with an LLC/SNAP header added (supports NSs complying with the DIX specifications).
  - An NS with a VLAN tag added.
  - An NS with an MPLS label added.
  - An NS that has been counted as an error. This excludes bit errors and sequence errors.
  - An NS if link down occurs while the NS is being received.
  - An NS if a collision occurs while the NS is being received.
  - An NS with a packet length of 81 bytes or less, 1519 bytes or more (1523 bytes if the VLAN tag stacks is 1 and 1527 bytes if it is 2), or exceeding the oversize threshold level.
- Handling of the VLAN Tags
  The AE5523 and AE5524 generate an NA for an NS with a VLAN tag added.
- Conditions for Transmitting NAs
  - If a collision occurs while transmitting an NA, it is retransmitted.
  - If an NS is received during a transmission paused condition, the NA is transmitted after the pause is released.
  - If an NA, insert frame, and normal test frame are put on hold during a transmission paused condition, the insert frame, NA, and normal test frame are transmitted when the pause is released in this order.
  - An NA is not transmitted for an NS that is received before the transmission of the previous NA is completed.
  - If a link down is carried out immediately after receiving an NS, the corresponding NA is not transmitted.
  - If the test mode is changed, NAs waiting to be transmitted are cleared.

PING6 Reply (IPv6)

The AE5523 and AE5524 has a function that transmits an ICMPv6 echo reply (PING6 reply) when an ICMPv6 echo request (PING6 request) is received. When ICMPv6 echo reply (PING6 reply) is enabled, it is always enabled regardless of the test mode setting, filter conditions, and transmission status.

- Inapplicable PING Requests
  If the following ICMPv6 echo request is received, the AE5523 and AE5524 do not send an ICMPv6 echo reply.
  - An ICMPv6 echo request with an LLC/SNAP header added (supports ICMPv6 echo requests complying with the DIX specifications).
  - A fragmented ICMPv6 request.
  - An ICMPv6 echo request with an MPLS label added.
  - An ICMPv6 echo request that has been counted as an error. This excludes bit errors and sequence errors.
  - An ICMPv6 echo request if link down occurs while the request is being received.
  - An ICMPv6 echo request if a collision occurs while the request is being received.
  - An ICMPv6 echo request with a packet length of 81 bytes or less, 1519 bytes or more (1523 bytes if the VLAN tag stacks is 1 and 1527 bytes if it is 2), or exceeding the oversize threshold level.

- Handling of the VLAN Tags
  The AE5523, and AE5524 generate ICMPv6 echo replies for ICMPv6 echo requests with a VLAN tag added.

- Conditions for Transmitting ICMPv6 Echo Replies
  - If a collision occurs while transmitting an ICMPv6 echo reply, it is retransmitted.
  - If an ICMPv6 echo request is received during a transmission paused condition, the ICMPv6 echo reply is transmitted after the pause is released.
  - If an ICMPv6 echo reply, insert frame, and normal test frame are put on hold during a transmission paused condition, the insert frame, ICMPv6 echo reply, and normal test frame are transmitted when the pause is released in this order.
  - An ICMPv6 echo reply is not transmitted for an ICMPv6 echo request that is received before the transmission of the previous ICMPv6 echo reply is completed.
  - If a link down is carried out immediately after receiving an ICMPv6 echo request, the corresponding reply is not transmitted.
  - If the test mode is changed, ICMPv6 echo replies waiting to be transmitted are cleared.

MAC Address Auto Learn (IPv4)

The MAC address auto learn function automatically obtains the MAC address of the DUT through ARP and applies the address to the destination MAC address of the frames transmitted from the corresponding port.

- Conditions for MAC Address Auto Learn
  - On ports on which the result of the MAC address auto learn is successful, the MAC address that has been resolved through ARP is applied to the MAC-DA for transmission.
  - On ports on which the MAC address has not been learned or has failed the auto learn, the MAC-DA address specified by Frame Builder is used for transmission.
  - When the setting is applied, the address auto learn result is cleared (unexecuted condition).
  - If a frame without a MAC is registered, the auto learn result is not applied to the MAC-DA position.

  - If the MAC address increment function is enabled, the MAC address increment function takes precedence.
  - If the variable field function is enabled, the auto learned MAC address takes precedence.
  - For insert frame transmission, you can specify whether to apply the auto learn result. Insert frames cannot be transmitted while auto learn is in progress (either manually or cyclically). The insert frame transmission resumes after the auto learn is complete.
  - The auto learn result is not applied to all reply frames (ARP reply, PING reply, NA, and ICMPv6 echo reply).

- Inapplicable ARP Replies
  If the following ARP reply is received, the units do not recognize it as an ARP reply.
  - An ARP reply with an LLC/SNAP header added (only DIX specifications are supported).
  - An ARP reply with an MPLS label added.
  - An ARP reply that has been counted as an error. This excludes bit errors and sequence errors.
  - An ARP reply if link down occurs while the ARP reply is being received.
  - An ARP reply if a collision occurs while the ARP reply is being received.
  - An ARP reply with a packet length of 63 bytes or less, 1519 bytes or more (1523 bytes if the VLAN tag stacks is 1 and 1527 bytes if it is 2), or exceeding the oversize threshold level.

Auto Address Generation (IPv6)

The auto address generation function consists of the auto MAC address generation function and the auto IP address generation function.

- Auto MAC Address Generation Function
  The AE5523 and AE5524 automatically obtain the destination MAC address through the RA from a router.

- Auto IP Address Generation Function
  The AE5523 and AE5524 automatically generate the source IP address through the auto stateless address generation function.

The results of the auto address generation are applied to the destination MAC address (MAC-DA) and source IP address (IP SA). This function is available on the AE5523 and AE5524.

- Conditions for Auto Address Generation
  - On ports that have successfully obtained an address, the learned destination MAC address is applied to the destination MAC address field (MAC-DA) of transmission frames, and the generated source IP address is applied to the source IP address field (IP-SA) of transmission frames.
  - On ports that have not obtained an address or have failed to obtain an address, the transmission frame specified by Frame Builder is transmitted.
  - When the setting is applied, the address auto learn result is cleared (unexecuted condition).
  - If a frame without a MAC is registered, the auto learn result is not applied to the MAC-DA position.
  - If the MAC address increment function is enabled, the MAC address increment function takes precedence.
  - If the variable field function is enabled, the auto learned MAC address and IP address take precedence.

- For insert frame transmission, you can specify whether to apply the auto learn result. Insert frames cannot be transmitted while auto learn is in progress (either manually or cyclically). The insert frame transmission resumes after the auto learn is complete.
- The auto learn result is not applied to all reply frames (ARP reply, PING reply, NA, and ICMPv6 echo reply).

- Statistical Values While Processing RS Transmission and RA Reception
  The transmitted RS frames are counted as normal transmission frames. RA frames that passed the filter and are received are counted as normal received frames.

  * RS: Router Solicitation
    RA: Router Advertisement

- Inapplicable RAs
  If the following RA is received, the units do not recognize it as an RA.
  - An RA with an MPLS label added.
  - An RA with an LLC/SNAP header added (only DIX specifications are supported).
  - An RA that has been counted as an error.
  - An RA if link down occurs while the RA is being received.
  - An RA if a collision occurs while the RA is being received.
  - An RA with a packet length of 81 bytes or less, 1519 bytes or more (1523 bytes if the VLAN tag stacks is 1 and 1527 bytes if it is 2), or exceeding the oversize threshold level.

2.6 Transmission Function

This section explains the transmission frame, traffic mode, and “end by” of the AE5511.

Transmission Frame

There are two types of transmission frames on the AE5511, fixed frame and variable frame.
For the setup procedure, see section 5.8.

- Fixed Frame
  Fixed frames have a fixed frame length. Various properties such as the frame structure and frame length are defined in each frame. Up to 127 frames can be defined.

- Variable Frame
  Variable frames vary in their frame contents and length. On the AE5520 to AE5522, one field can be varied. On the AE5523 and AE5524, up to four fields can be varied and can be chained.

Insert Frame

An insert frame is a frame that is inserted separately from the traffic. Insert frames can be transmitted using single generation or cycle generation (AE5523 and AE5524).
For the setup procedure, see section 5.9.

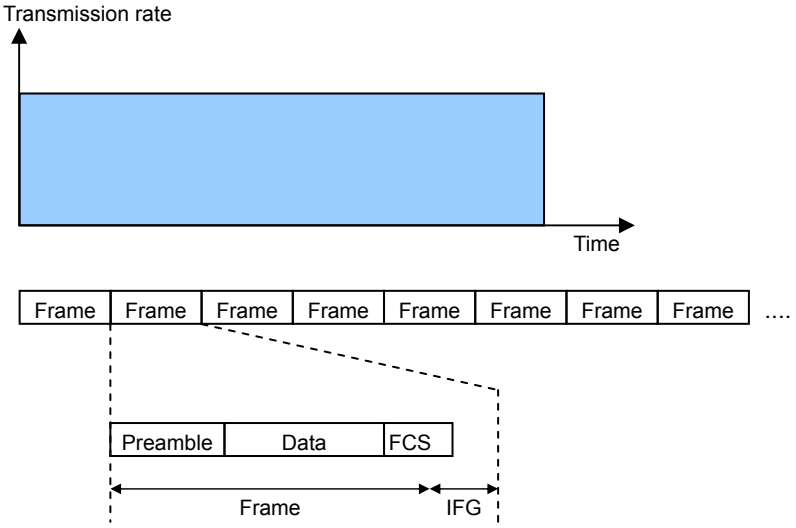
Frame Builder

Frame Builder is used to define and construct transmission frames. It is used to set the traffic, insert frame, and QoS.
For the setup procedure, see section 5.14.

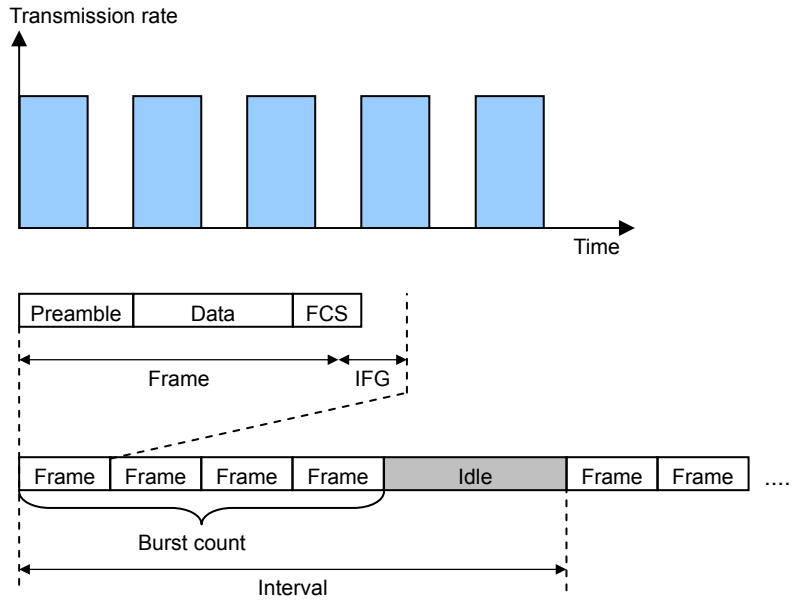
Traffic Mode

Two traffic modes are available on the AE5511, Constant and Burst.
For the setup procedure, see section 5.8.

- Constant
  In constant mode, frames are transmitted at a constant interval. The frame transmission interval can be changed by setting the IFG (Interframe Gap). The utilization (%) can be changed by setting the IFG.



- Burst
  In burst mode, frames are transmitted for a given period and stopped for a given period, and this operation is repeated in a burst fashion. The frame transmission interval can be changed by setting the IFG (Interframe Gap). The burst count is used to set the number of transmitted frames in the burst section. Interval is used to set the repeat time.



Note

If the burst section specified by the burst count exceeds the interval, frames are transmitted at a constant rate at the specified interframe gap (IFG).

End By

Three settings are available for “end by” on the AE5511, Manual, Count, and Time.
For the setup procedure, see section 5.8.

- Manual
  In this mode, frames are transmitted continuously. After the transmission is started, transmission continues until it is stopped.

- Count
  In this mode, the specified number of frames are transmitted. After the transmission is started, the transmission automatically stops after transmitting the specified number of frames.

- Time
  In this mode, frames are transmitted for the specified time. Transmission automatically stops after the specified time elapses after starting the transmission.
  • Time range: 1 s to 24 hours
  • Time resolution: 1 s

2.7 Layer 1 Control Function

The layer 1 control function consists of the transmit clock adjustment, link up/down control, and PoE measurement.

Transmit Clock Adjustment

The transmit clock adjustment is used to manually change the transmit clock of the TrafficTester. This function is available on the AE5523 and AE5524.
For the setup procedure, see section 8.6.

- This function can be used when logged in with the user name “admin.”
- The transmit clock can be set for each unit. It cannot be set for each port.
- It does not affect the receiving side.
- This function is disabled in slave mode for 1000BASE-T.
- This function is disabled for SFP on 1000BASE-T.
- When the clock is changed, errors may be detected in the transmit and receive frames.

- Specifications
  - Setting range: ±100 ppm
  - Resolution: 1 ppm
  - Accuracy: 5 ppm ± 1 digit

Link Up/Down Control

The link up/down control forces the DUT link up or down.
For the setup procedure, see section 5.7.

- Link Down Generation
  - Single: One link down is generated when activated.
  - Cycle*1: The specified number of link downs is generated at the specified interval when activated.

  *1 Available on the AE5523 and AE5524.

- Link down period: 1 s

- Cycle
  - Cycle 10 to 3600 s in unit of 1 s
  - Repeat count: 1 to 65535 or infinite

Note

If you are generating link downs multiple times using single generation, allow at least 10 s between link downs.

PoE Measurement

The following PoE measurement complying with IEEE 802.3af can be carried out on the 12 RJ-45 ports on the AE5523.

- PD (Power Device) emulation function
- Power classifications
- Line power monitor function

- **PD (Power Device) Emulation Function**
  Sequence emulation complying with IEEE 802.3af can be carried out.

- **Power classifications**
  The class declaration of the line power capability can be set between 0 and 4.

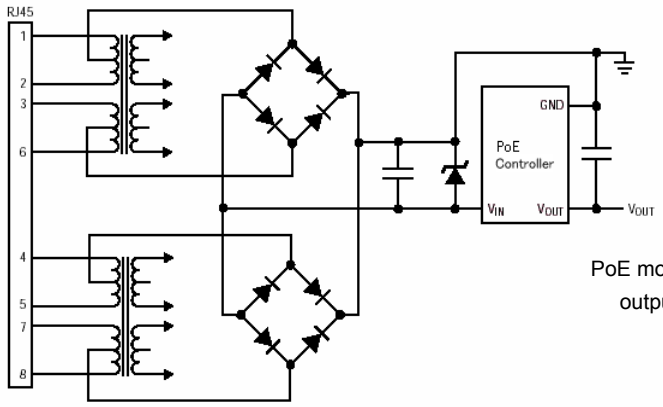
Class	Usage	Minimum Output Power
0	Default	15.4 W
1	Option	4.0 W
2	Option	7.0 W
3	Option	15.4 W
4	Reserved	–

- **Line Power Monitor Function**
  The line power of each port can be monitored through the PoE monitor connector.

- **PoE Circuit Characteristics**
  The PoE measurement function on the AE5523 supports both Alternative A and Alternative B.

Note

- The load resistance when nothing is connected to the PoE monitor connector is approximately 16 kΩ (approximately 3 mA). If DCMPS signature monitor is enabled, connect a load around 3.3 kΩ to the PoE monitor connector.
- If a load current greater than or equal to 100 mA is supplied through the PoE monitor connector, the current limit protection at the rising edge of the current may cause the current to not be output correctly. If this happens, be sure to add the load after the PoE LED on the front panel illuminates.
- PoE is configured with the circuit shown below. The PoE monitor output causes a voltage drop of approximately 1 V due to the diode bridge as compared to the RJ-45 input.



RJ-45 input

For the setup procedure, see section 5.7.

2.8 Alarm Log Function

The alarm log function records the details and the time of occurrence of alarms each second. This function is available on the AE5523 and AE5524.
For the setup procedure, see section 5.12.

- One alarm is recorded even if multiple alarms occur within 1 second.
- When the maximum number of logs is reached, the old log is overwritten.
- Each user can set the items to be logged. The log items can be selected by specifying the reserved or locked unit, port, and QoS channel.

- Maximum number of logs: 1000 logs/user
- Log time resolution: 1 s
- Time display: Year, month, day, hour, minute, and second

Group	Log Item	Test Mode			Notes
		Traffic		BERT	
		Port	QoS ch	Port	
Rx rate	Less than the lower Rx rate limit	x	x	x	Set the rate as [%], [fps], or [bps].
	Greater than the upper Rx rate limit	x	x	x	
Packet error	CRC error	x	x	x	Logs the events that occur within 1 second
	Alignment error	x	x	x	
	Symbol error	x	x	x	
	Undersize	x	x	x	
	Oversize	x	x	x	
	Late collision	x	x	x	
	Bit error	-	-	x	
	Sequence error	x	x	-	
Packet latency	Less than the minimum latency	x	x	-	Logs the events that occur within 1 second
	Greater than the maximum latency	x	x	-	
Gap error	Less than 96 bits	x	x	x	
L1 state change	Link up	x	x	x	
	Link down	x	x	x	
	PoE line power on	x	x	x	PoE line power on/off can only be logged on ports 1 to 12 of the AE5523.
	PoE line power off	x	x	x	

x: Supported, -: Unsupported

2.9 File Function

File Types

The AE5511 uses the following files.

File Type	File Format	Extension	SAVE	LOAD	Notes
Setup file	Text format	setup	x	x	
Statistical results file	Text format	csv	x	-	
Capture data file	Binary format	cap	x	x	TTP format
	Text format	csv	x	-	
	Binary format	bin	x	-	PCAP format (can be loaded in Ether Real)
Frame definition file	Binary format	frd	x	x	
Variable field information file	Text format	csv	x	x	
Displayed statistical items information file	Binary format	dinf	x	x	
Auto test file	Text format	wscp	-	-	Editable using a text editor
Auto test log file	Text format	log	x	-	
Upgrade file	Binary format	ttp	-	x	

x: Supported, -: Unsupported

Setup File

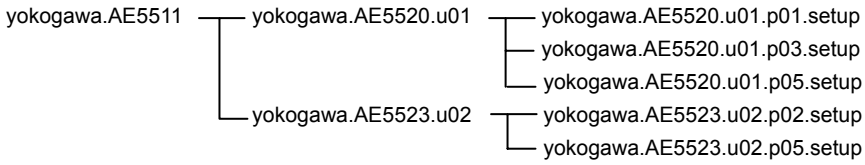
- Saving the File
  When the setup is saved, the data is saved in the following directory structure.

  When the save name is set to “yokogawa”

Model (Directory)	Unit (Directory)	Port (File)
yokogawa.AE5511	yokogawa.ae552x.u0x.	yokogawa.ae552x.u0x.p0x.setup

  Example
  - Product configuration: AE5511, UNIT1: AE5520, and UNIT2: AE5523
  - Port reserve status: Ports 1, 3, and 5 on UNIT1 and ports 2 and 5 on UNIT2
  - Save name: yokogawa

  Directory/File structure



  Directory path displayed by default
  C:\program files\TTProE\TTProCtrlWndE\file\setup

- Loading the File
  The file can be loaded at the model, unit, or port level.

Model (Directory)	Unit (Directory)	Port (File)
yokogawa.AE5511.setup	yokogawa.ae552x.u0x.setup	yokogawa.ae552x.p0x.setup

Statistical Results File

- Saving the File
  The ports that are saved are reserved ports.
  All statistical items are saved regardless of the displayed statistical items.
  The file includes statistical information and alarm logs (AE5523 and AE5524).

  Directory path displayed by default
  C:\program files\TTProE\TTProCtrlWndE\file\stat

- Loading the File
  The statistical results file cannot be loaded.

Capture Data File

- Saving the File
  The file is saved in unit of ports.

  Directory path displayed by default
  C:\program files\TTProE\TTProCtrlWndE\file\cap

- Loading the File
  The file is loaded in unit of ports.
  Only files in TTP format can be loaded.

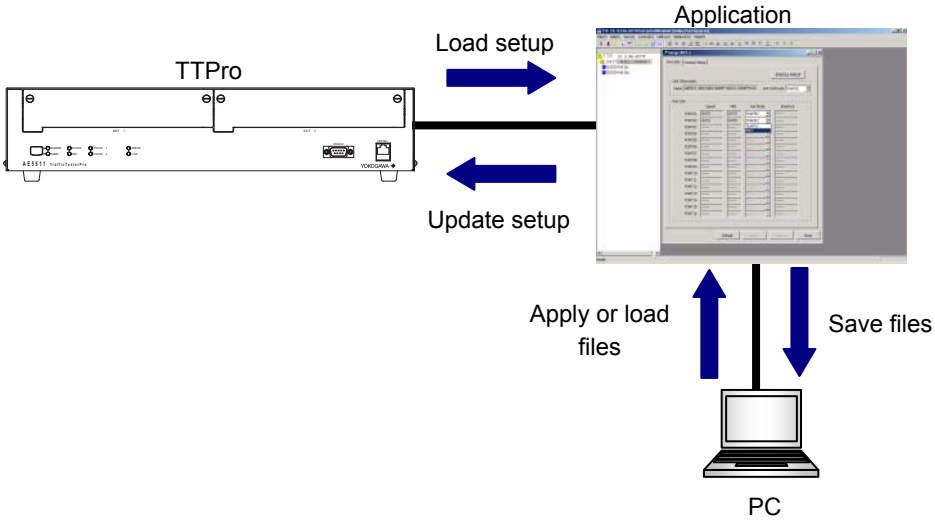
2.10 Auto Test Function

In the auto test, you log into the AE5511 from a PC using TELNET. The auto test function carries out the tests on the statistical items of the AE5511 according to the execution file.

For details on the auto test, see the *AE5511 TrafficTesterPro Remote Command Manual (IM417322900-17E)*.

2.11 Setup Data Handling

The handling of the setup data is illustrated below.



Click **Apply** to apply the setup data on the application.
Click **Update** to save the setup data to the AE5511.

Click **Download setup from AE5511** to load the AE5511 setup data to the application.

If you choose **Load Setup File** or **Load Setup File at a time** from the **Control** menu, the setup data saved to files on the PC are applied to the application.
If you choose **Save Setup** from the **Control** menu, the setup data on the application is saved to files on the PC.

Note

- If you click **Apply** or choose **Load Setup File** or **Load Setup File at a time** from the **Control** menu, the setup is not applied to the AE5511.
  To apply the setup to the AE5511, click the **Update** icon or choose **Update** from the **Control** menu.
- For the operating procedure, see chapter 5.

3.1 Handling Precautions

Read the Safety Precautions

- **Safety Precautions**
  If you are using this instrument for the first time, make sure to thoroughly read “Safety Precautions” on pages vi and vii.

- **Do Not Remove the Case**
  Do not remove the case from the instrument. Some parts of the instrument use high voltages, which are extremely dangerous. For internal inspection and adjustment, contact your nearest YOKOGAWA dealer.

- **Unplug If Abnormal Behavior Occurs**
  If there are any symptoms of trouble such as strange odors or smoke coming from the instrument, immediately turn OFF the main power switch and unplug the power cord. If these symptoms occur, contact your nearest YOKOGAWA dealer.

- **Do Not Damage the Power Cord**
  Nothing should be placed on top of the power cord. The power cord should also be kept away from any heat sources. When unplugging the power cord from the outlet, never pull by the cord itself. Always hold and pull by the plug. If the power cord is damaged, check the part number indicated on page iv and purchase a replacement.

General Handling Precautions

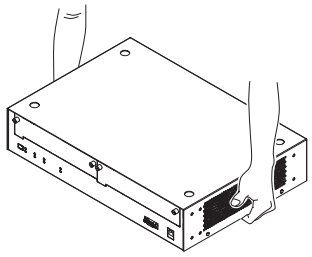
- **Do Not Place Objects on Top of the Instrument**
  Never place other instruments or objects containing water on top of the instrument, otherwise a breakdown may occur.

- **Do Not Apply Shock or Vibration**
  Do not apply shock or vibration to the instrument. Doing so may cause malfunction. In addition, applying shock to the input/output terminal or the connected cable can cause electrical noise to enter or output from the instrument.

- **Keep Electrically Charged Objects Away from the Instrument**
  Keep electrically charged objects away from the input terminals. They may damage the internal circuitry.

- **Unplug during Extended Non-Use**
  Turn off the instrument and remove the power cord from the outlet.

- **Carry the Instrument Properly**
  First, turn off the instrument and remove the power cord and other cables. Carry the instrument with both hands as shown below.



- **When Wiping off Dirt**
  When cleaning the case or units, turn OFF the instrument and remove the power cord from the outlet. Then, wipe with a dry, soft, clean cloth. Do not use volatile chemicals since this might cause discoloring and deformation.

3.2 Installation

Installation Conditions

Install the instrument indoors that meets the following conditions:

- **Flat, Even Surface**
  Install the instrument in the correct direction in a stable horizontal place.

- **Well-Ventilated Location**
  Inlet/Vent holes are located on the side panels and the rear panel of the instrument. To prevent internal overheating, allow at least 10 cm of space around the inlet and vent holes.

- **Ambient Temperature and Humidity**
  Ambient temperature: 5 to 40°C
  Ambient humidity: 35 to 80%RH
  No condensation.

- **Do not install the instrument in the following places:**
  - In direct sunlight or near heat sources.
  - Where an excessive amount of soot, steam, dust, or corrosive gas is present.
  - Near strong magnetic field sources.
  - Near high voltage equipment or power lines.
  - Where the level of mechanical vibration is high.
  - On an unstable surface.

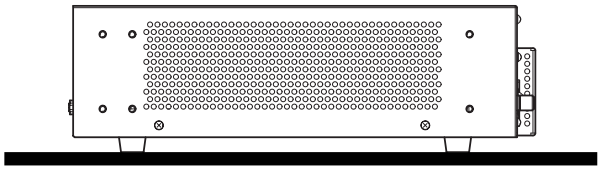
Note

Condensation may occur if the instrument is moved to another place where the ambient temperature is higher, or if the temperature changes rapidly. In this case, let the instrument adjust to the new environment for at least one hour before using the instrument.

Installation Position

- **Desktop**

  As shown below, place the instrument on a flat even surface.



Note

Up to four instruments can be stacked. If you are stacking them, be sure the instruments do not fall over or slide due to vibrations or shock.

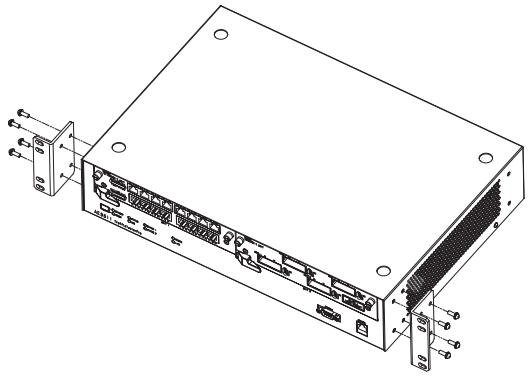
- **Rack Mount**

  Use the Rack Mount Kit sold separately to rack mount the instrument. The instrument can be mounted on a 19-inch rack.

Name	Part No.	Notes
Rack Mount Kit	M3400KM	Parts for mounting to a 19-inch rack

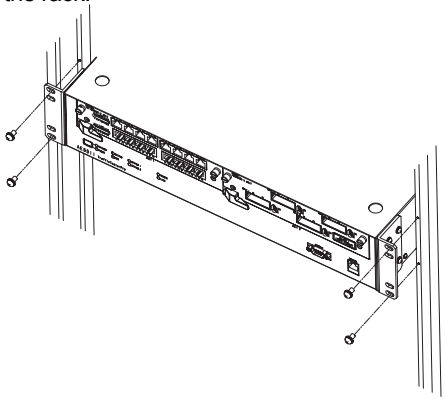
1. Attach the Rack Mount Kit to the instrument.

   Use the four accompanying screws to attach the rack mount kit to the attachment holes on the side panels at the front of the instrument. Attach the left and right fittings.



2. Mount the instrument on the rack.

   Use the four accompanying screws to fasten the four attachment holes on the rack mount kit to the rack.



Note

When rack mounting the instrument, allow at least 10 cm of space around the inlet and vent holes to prevent internal overheating.

3.3 Connecting to the Power Supply

Before Connecting the Power Supply

To prevent the possibility of electric shock and damage to the instrument, follow the warnings below.

WARNING

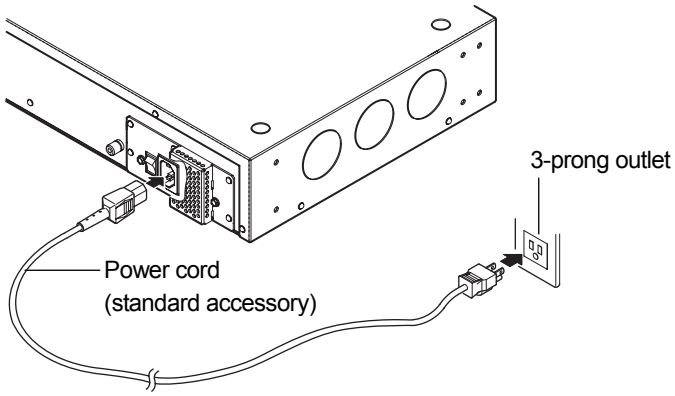
- Connect the power cord only after confirming that the voltage of the power supply matches the rated electric power voltage for the instrument.
- Connect the power cord after checking that the main power switch of the instrument is turned OFF.
- To prevent electric shock or fire, always use the power cord supplied by YOKOGAWA.
- Make sure to provide protective grounding to prevent the possibility of electric shock. Connect the power cord to a three-prong power outlet with a protective earth terminal.
- Do not use an extension cord without protective earth ground. Otherwise, the protection function will be compromised.
- Use an AC outlet that complies with the power cord provided and securely connect the protective grounding. If such an AC outlet is unavailable and protective grounding cannot be furnished, do not use the instrument.

Connecting the Power Cord

1. Check that the main power switch on the rear panel is OFF.
2. Connect the power cord plug to the power connector on the rear panel. (Use the power cord that comes with the package.)
3. Connect the plug on the other end of the power cord to the outlet that meets the conditions below. The AC outlet must be of a three-prong type with a protective earth ground terminal.

Item	Specifications
Rated supply voltage	100 to 240 VAC
Permitted supply voltage range	90 to 264 VAC
Rated power supply frequency	50/60 Hz
Permitted supply voltage frequency range	48 to 63 Hz
Maximum power consumption	200 VA

*: The instrument can use a 100-V or a 200-V system for the power supply. Check that the voltage supplied to the instrument is less than or equal to the maximum rated voltage of the provided power cord (see page iii) before using it.

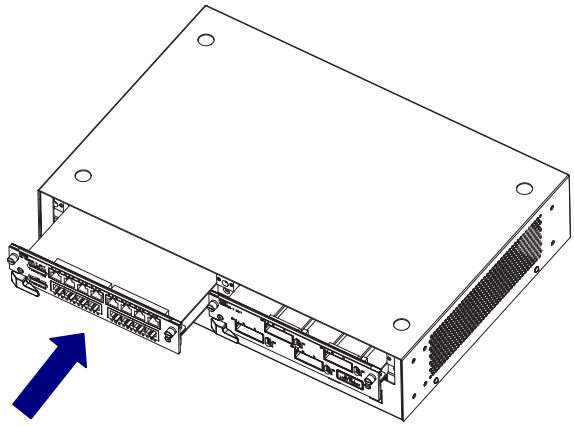


3.4 Installing the Unit

Installing the Unit

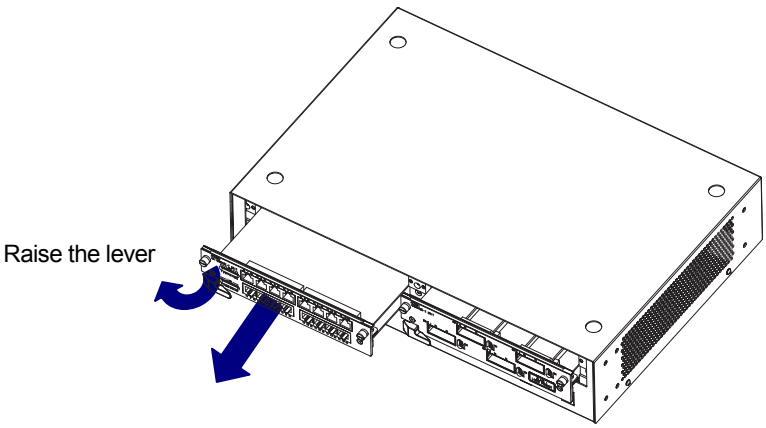
CAUTION

- Install or remove the unit with the main power of the AE5511 turned OFF (STANDBY LED: OFF and POWER LED: OFF). Otherwise, malfunction may result.
- Attach blank panels to unused AE5511 slots to prevent accidents.



1. Check that the main power of the AE5511 is turned OFF.
2. Align the unit with the slot guide of the AE5511 and insert it slowly toward the back of the AE5511.
3. Press the panel section of the unit with your thumbs until the connectors on the unit and AE5511 engage.
4. Fasten the two attachment screws of the unit to fix the unit in place.

Removing the Unit



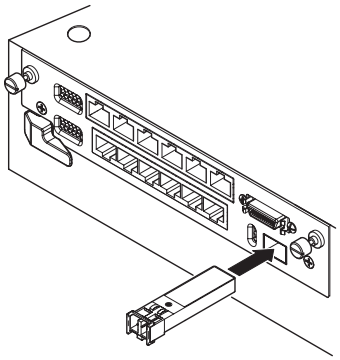
1. Check that the main power of the AE5511 is turned OFF.
2. Loosen the two attachment screws of the unit.
3. Pull the unit lever slowly toward you. The connectors disengage, and the unit comes out from the AE5511.
4. Hold the attachment screw with each hand, and pull the unit slowly out from the AE5511.

3.5 Installing the Interface Module

Installing the SFP Module

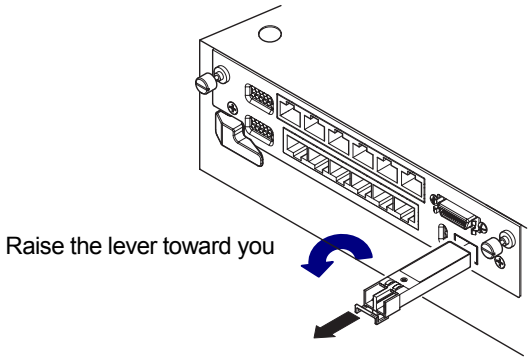
CAUTION

- Be careful of static electricity when installing or removing the SFP module. If you install or remove the module when static electricity is built up, it can cause damage.
- Do not install or remove the module with the cable connected. Doing so may cause malfunction.



Align the SFP module with the SFP module guide of the unit and insert the module slowly into the unit. Press the module in firmly until the connectors engage.

Removing the SFP Module



Pull out the lever at the front, top section of SFP module and pull the lever toward you. The connectors disengage, and the SFP module comes out from the AE5511.

Note

The SFP module can be installed or removed with the power turned ON.

Installing the GBIC Module

CAUTION

- Be careful of static electricity when installing or removing the GBIC module. If you install or remove the module when static electricity is built up, it can cause damage.
- Install or remove the GBIC module with the main power of the AE5511 turned OFF (POWER LED: OFF). Otherwise, malfunction may result.
- Do not install or remove the module with the cable connected. Doing so may cause malfunction.

1. Check that the main power of the AE5511 is turned OFF.
2. Align the GBIC module with the GBIC module guide of the unit and insert the module slowly into the unit.
3. Press the module in firmly until the connectors engage. The lock on the side of the module locks.

Removing the GBIC Module

1. Check that the main power of the AE5511 is turned OFF.
2. Press the lock on the side of the GBIC module inward and pull it out. The connectors disengage, and the GBIC module comes out from the AE5511.
3. Remove the GBIC module from the AE5511.

Installing the XENPAK Module

CAUTION

- Be careful of static electricity when installing or removing the XENPAK module. If you install or remove the module when static electricity is built up, it can cause
- damage. Install or remove the XENPAK module with the main power of the AE5511 turned OFF (POWER LED: OFF). Otherwise, malfunction may result.
- Do not install or remove the module with the cable connected. Doing so may cause malfunction.

1. Align the XENPAK module with the XENPAK module guide of the unit and insert the module slowly into the unit. Press the module in firmly until the connectors engage.
2. Fix the XENPAK module in place using the two attachment screws.

Removing the XENPAK Module

1. Unfasten the attachment screws of the XENPAK module from the AE5511.
2. Hold the two attachment screws (one in each hand) and pull the module out slowly. The connectors disengage, and the XENPAK module comes out from the AE5511.
3. Remove the XENPAK module from the AE5511.

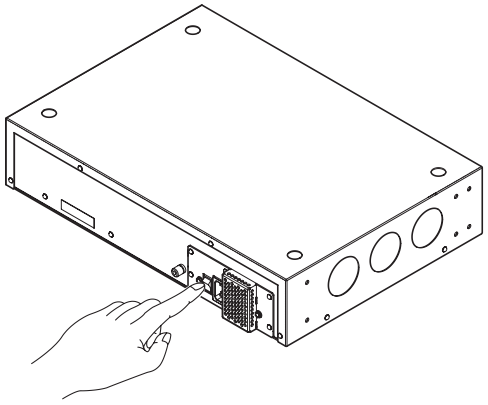
3.6 Turning the Power ON/OFF

Items to Be Checked before Turning ON the Main Power Switch

- Check that the instrument is installed properly (see section 3.2, “Installation”).
- Check that the power cord is connected properly (see section 3.3, “Connecting to the Power Supply”).

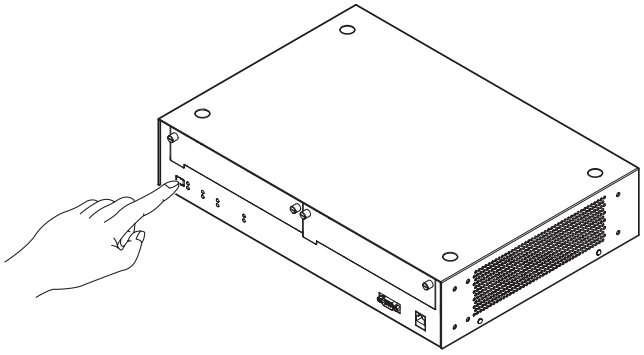
Turning ON the Main Power Switch

1. Check that the power switch on the front panel is not pressed in (not ON).
2. Press the ON side of the main power switch on the rear panel.
   The AE5511 enters standby mode. The STANDBY LED on the front panel at the lower left illuminates. Standby mode refers to a condition in which the power is being supplied to the internal CPU board.



Turning ON the Power Switch on the Front Panel

3. Press the power switch on the front panel.
   The AE5511 starts the boot procedure.
   While the AE5511 is starting up, the STANDBY LED on the front panel at the lower left turns OFF and the STATUS LED blinks.
   The boot procedure takes approximately 2 minutes. When the boot procedure completes successfully, the STATUS LED illuminates in green. If the boot procedure fails, the STATUS LED illuminates in red.



CAUTION

Do not turn the main power switch OFF or set the power switch on the front panel to STANDBY while the AE5511 is booting. Doing so may cause malfunction.

Note

- The AE5511 employs Linux as its operating system.
- Allow at least 10 s when turning ON the power after turning it OFF.
- If the STATUS LED does not blink when the power is turned ON, turn OFF the power and check the following points.
  - Check that the power cord is securely connected.
  - Check that the correct voltage is coming to the power outlet.

  If the AE5511 still does not work properly when the power switch is turned ON after checking these items, contact your nearest YOKOGAWA dealer for repairs.

Turning OFF the Power Switch on the Front Panel

Press the power switch on the front panel.
The shutdown procedure starts. The STATUS LED on the front panel at the lower left blinks while the AE5511 is shutting down. When the STATUS LED starts blinking, release the power switch.
The shutdown procedure takes approximately 30 seconds. The AE5511 enters STANDBY mode (see page 3-8) when the shutdown procedure completes successfully (STANDBY LED illuminated and STATUS LED turned OFF).

CAUTION

Do not turn OFF the main power switch on the rear panel while the AE5511 is shutting down. Doing so may cause malfunction.

Note

When you turn the power OFF, the setup data existing at that time is saved to the setup data backup area on the internal hard disk. The next time the power is turned ON, the AE5511 starts using the settings that existed before the power was turned OFF previously or in the default condition. For details, see section 8.4.

Turning OFF the Main Power Switch

Press the OFF side of the main power switch on the rear panel.
The STANDBY LED on the front panel at the lower left turns OFF.

CAUTION

Do not turn OFF the main power switch on the rear panel with the power switch on the front panel turned ON. Doing so may cause malfunction.

Note

If you do not plan to use the AE5511 for an extended time, turn OFF the main power switch.

3.7 Setting Up the Application

System Requirements

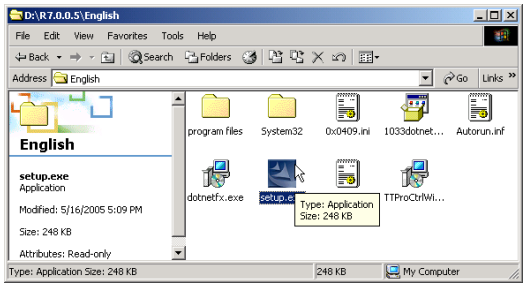
- PC: Windows PC
- OS: Windows 2000 SP3 or SP4 or Windows XP SP1 or SP2
- CPU: Pentium III 1.2 GHz or faster
- Memory: 512 MB or more
- Hard disk: Free space of 200 MB or more (300 MB or more recommended)
- Disk drive: CD-ROM drive

Note

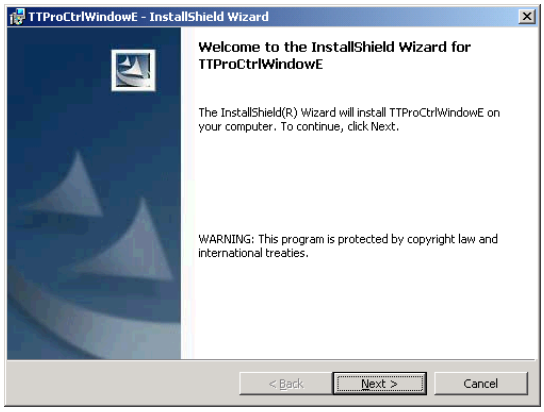
A PC of higher specifications may be necessary if you are running this software application along with various firewalls and virus checking programs.

Installing the Application

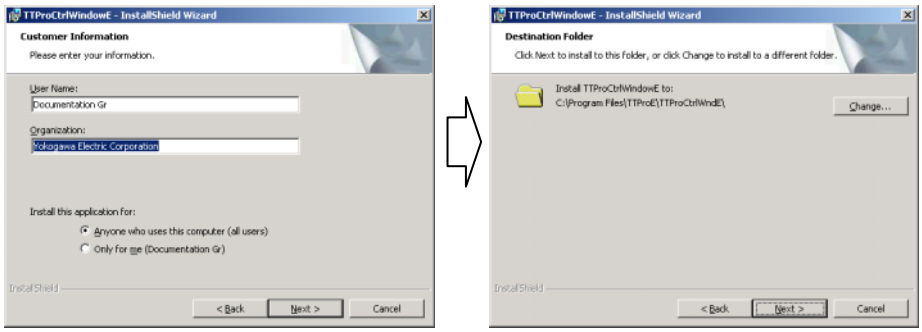
1. Log on to Windows with administrator privileges.
2. Load the software CD-ROM (TTPro Control WindowE) into the CD-ROM drive.
3. Double-click **My Computer**, and then double-click the **CD-ROM** icon. The CD-ROM dialog box opens. Double-click setup.exe on the CD-ROM. TTProControlWindowE setup dialog box opens.



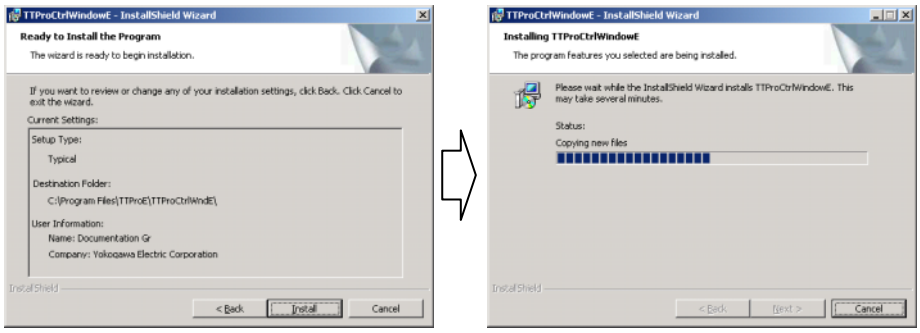
4. Click **Next**.



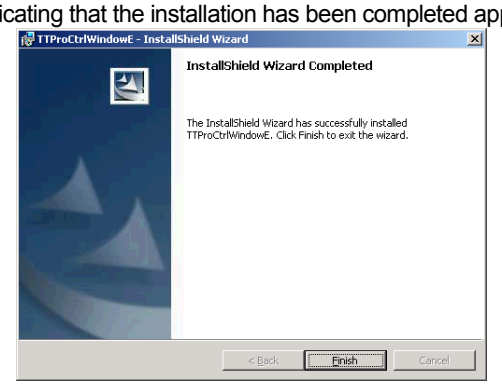
5. Enter the customer information and click **Next**. Specify the destination folder and click **Next**.



6. On the Ready to Install the Program screen, click **Install** to start the installation.



7. A message indicating that the installation has been completed appears. Click **Finish**.



Note

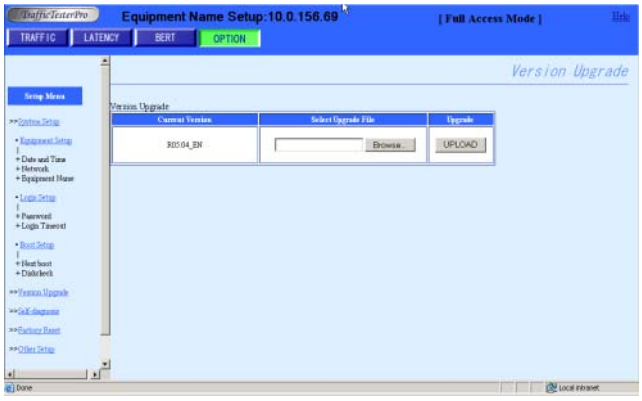
Microsoft .NET Framework is required to start the software application. If the target PC does not have Microsoft .NET Framework installed, an installation menu automatically appears. Install it according to the menu instructions.

Upgrading the Windows Version of the AE5511

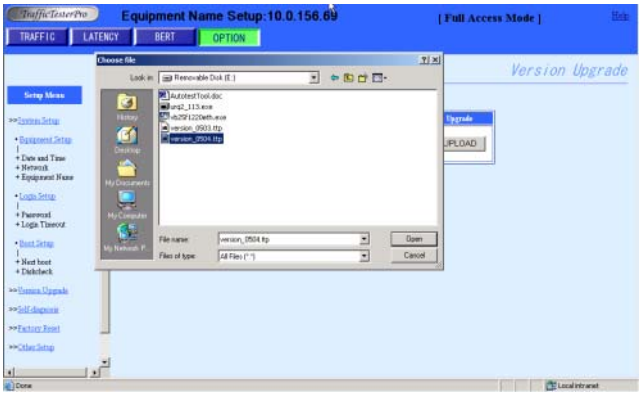
This operation is possible when you log into the AE5511 using the user name admin. For details, see section 9.5, “Upgrading the Software”.

Upgrading from the CGI Version of the AE5511 (R05.**) to the Windows Version

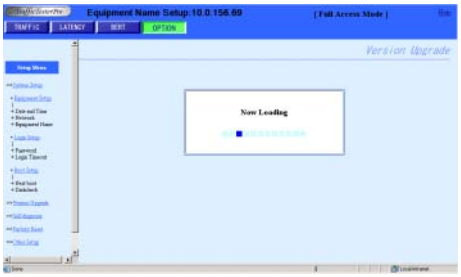
1. Install TTProControlWindowE to your PC. For details, see “Installing the Application” on page 3-10.
2. Log into the AE5511. Use the browser on your PC and log in using Full Access mode.
3. From the **OPTION** screen, choose **Version Upgrade**. The Version Upgrade screen appears. Install TTProControlWindowE to your PC by referring to “Installing the Application” on page 3-10.

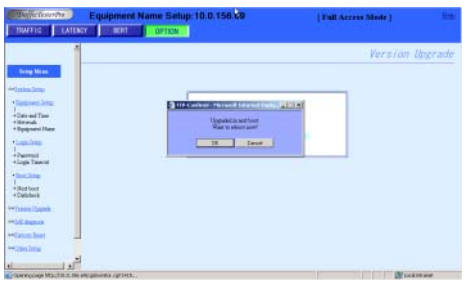


4. Click **Browse**. The Choose file dialog box opens.
5. Select the file to be installed. The file is located under the directory shown below. The path inside the parentheses is what is displayed if the TTProControlWindowE was installed to the default directory.
(C:\Program files\TTProE)\TTProCtrlWndE\system\fw\versionupimage.ttp



6. Click **Open**. A dialog box containing the message “Setup parameters may be lost. Want to upgrade now?” opens.
7. Click **OK**. The upgrading operation starts. When the upgrade operation is complete, restart the AE5511.



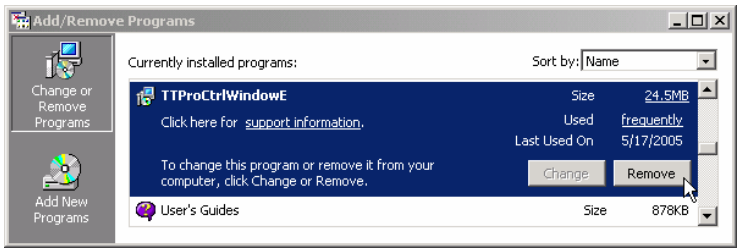


Note

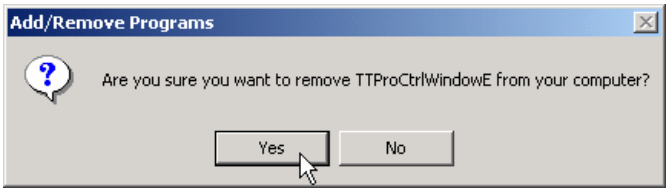
- The STATUS lamp on the AE5511 blinks while the upgrade operation is in progress.
- The STATUS lamp illuminates when the operation is complete.
  After upgrading, the network settings are reset to default values. Reconfigure them as necessary.
- You cannot log into the AE5511 using a browser after it has been upgraded.
- If the CGI version is R04.** or earlier, upgrade to R05.** first, and then upgrade to the TTProControlWindowE version.

Uninstalling the Application

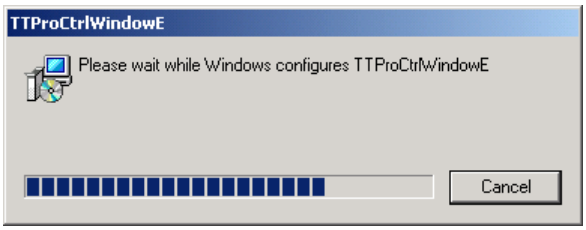
1. Log on to Windows with administrator privileges.
   From the taskbar, click the Windows **Start** button, point to **Settings**, and click **Control Panel**. Then, double-click **Add or Remove Programs**.
   The Add or Remove Programs dialog box opens.
2. Select **TTProCtrlWindowE** and click **Remove**. The Add/Remove Programs dialog box opens.



3. Click **Yes**.



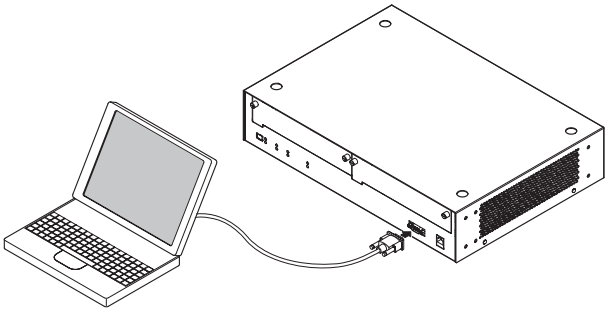
4. The program is removed, and the message box automatically closes when the operation is complete.



5. Uninstallation is finished when the message box closes.

3.8 Connecting to the PC

1. Check that the PC and the AE5511 are turned OFF, and connect the PC's serial port to the AE5511 CONSOLE port using the CONSOLE cable (RS-232 cable, cross) that comes with the AE5511.



CONSOLE port settings

Item	Setting
Data rate	38,400 bps
Data bit	8 bit
Parity	None
Stop bit	1
Flow control	Xon/Xoff

2. Turn ON the power switch on the PC and the AE5511 (rear panel and front panel).

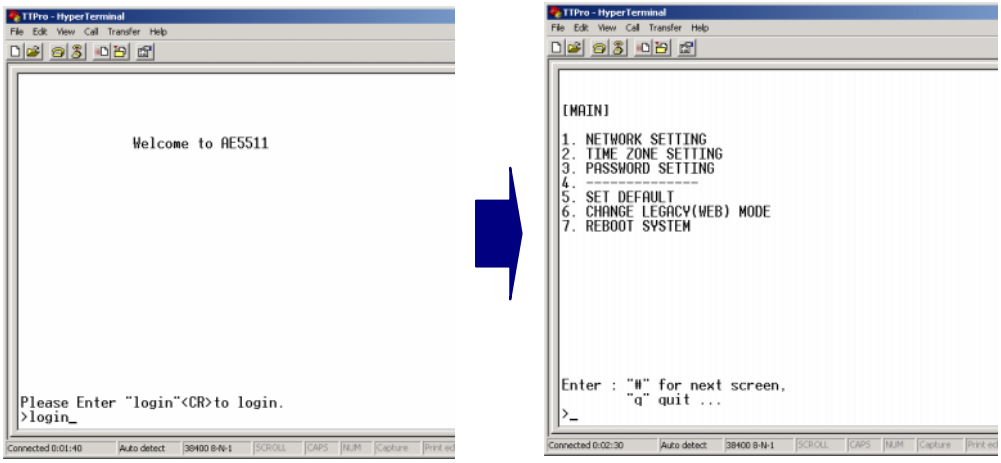
3.9 Setting the Network from the Console

Use a terminal program (such as HyperTerminal) and set the network parameters of the AE5511.
Below is a configuration example using HyperTerminal. If you are using another program, see the manual of the program that you are using.

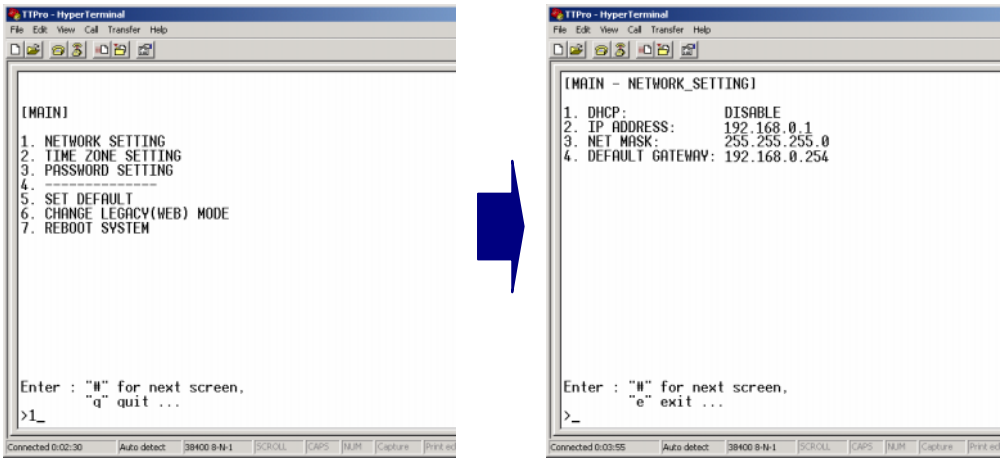
Procedure

- Starting HyperTerminal
  1. On the taskbar, click the Windows **Start** button, point to **All Programs** > **Accessories** > **Communications**, and click **HyperTerminal**. HyperTerminal starts. If you start HyperTerminal for the first time, a location information dialog box opens.
  2. Specify the **Country/region**, **Area code**, **Phone number**, and **Connect using** and click **OK**.
  3. Check the **New Location** on the **Dialing Rules** tab and click **OK**.
  4. Assign a name for the new connection and click **OK**. (Example: AE5511)
  5. Select the port to be used on the PC (example: COM1) and click **OK**. A Properties dialog box of the selected port opens.
  6. Set the parameters as shown below and click **OK**. A HyperTerminal window opens.
  - Bits per second: 38400 • Data bits: 8 • Parity: None
  - Stop bits: 1 • Flow control: Xon/Xoff

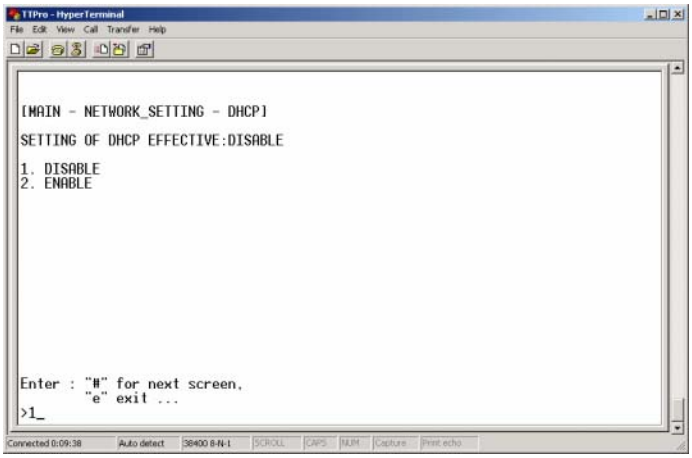
- Logging into Console Control
  7. Type **login** and press the **Enter** key. The MAIN menu appears.



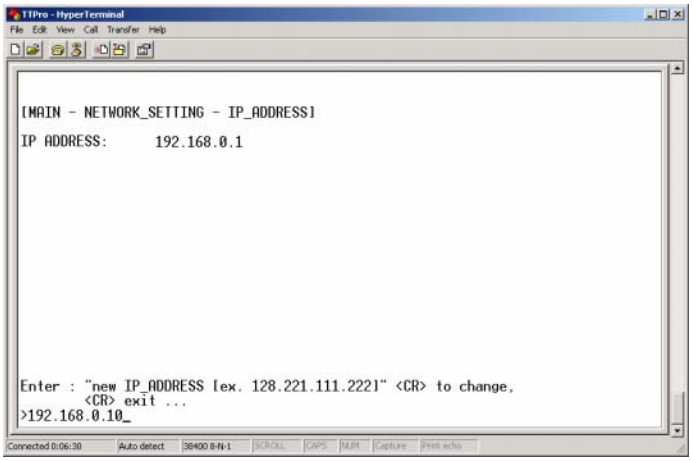
- Setting the Network (set appropriate values for your network)
  8. Type **1** and press the **Enter** key. The NETWORK_SETTING menu appears.



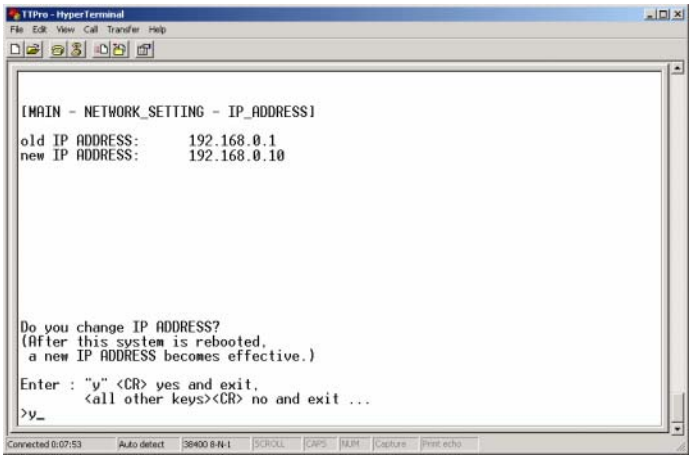
- Setting DHCP
  9. At the NETWORK_SETTING menu, type **1**, and press the **Enter** key. The DHCP menu appears.
  10. If you are not using the DHCP server, type **1** (DISABLE). If you are, type **2** (ENABLE). Then, press the **Enter** key.



- Setting the IP Address
  9. At the NETWORK_SETTING menu, type **2**, and press the **Enter** key. The IP ADDRESS menu appears.
  10. Type the address and press the **Enter** key. A confirmation message for changing the address appears.



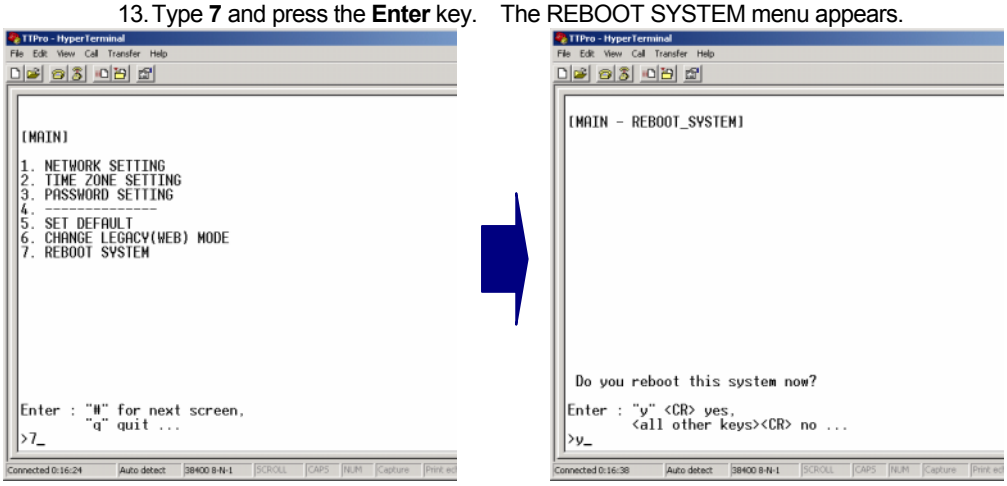
  11. Type **y** and press the **Enter** key.



- Setting the Subnet Mask (see “Setting the IP Address” for the screens)
  9. At the NETWORK_SETTING menu, type **3**, and press the **Enter** key. The NET MASK menu appears.
  10. Type the address and press the **Enter** key. A confirmation message for changing the address appears.
  11. Type **y** and press the **Enter** key.

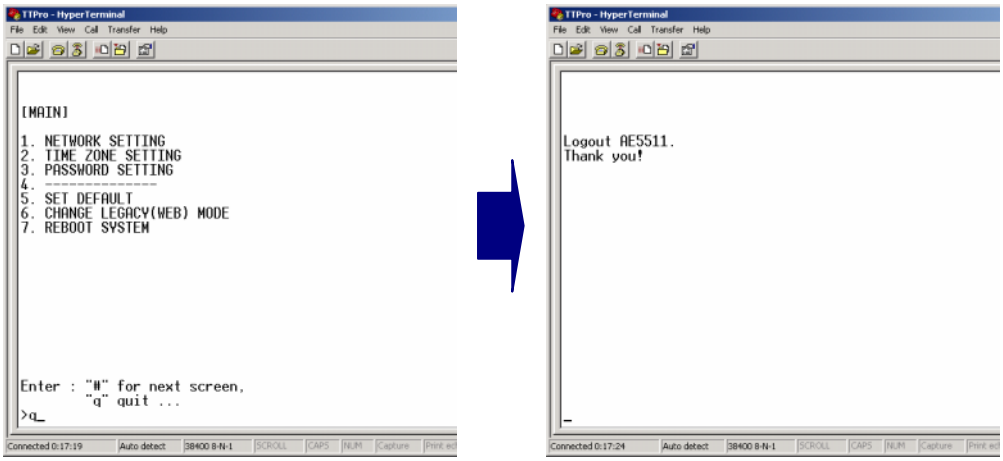
- Setting the Default Gateway (see “Setting the IP Address” for the screens)
  9. At the NETWORK_SETTING menu, type **4**, and press the **Enter** key. The DEFAULT GATEWAY menu appears.
  10. Type the address and press the **Enter** key. A confirmation message for changing the address appears.
  11. Type **y** and press the **Enter** key.

- Rebooting the System
  12. Type **e** and press the **Enter** key. The MAIN menu appears.
  13. Type **7** and press the **Enter** key. The REBOOT SYSTEM menu appears.



  14. Type **y** and press the **Enter** key. The system is rebooted (restarted).

- Logging Out from Console Control
  15. Type **e** and press the **Enter** key. The MAIN menu appears.
  16. Type **q** and press the **Enter** key. The logout screen appears, and you are logged out from console control.



Explanation

- Setting DHCP
  DISABLE: When setting the network parameters manually
  ENABLE: When obtaining network parameters automatically from a DHCP server

  If you set DHCP to ENABLE, you cannot set the IP ADDRESS, NETMASK, and DEFAULT GATEWAY parameters. In this case, the parameters automatically obtained from the DHCP server are shown.

- Updating the Settings
  To apply the settings, type **y** and press the **Enter** key.
  To not apply the settings, type a key other than **y** and press the **Enter** key.

Note

The network settings of the AE5511 take effect after rebooting the system. After changing the network settings, be sure to reboot the system.

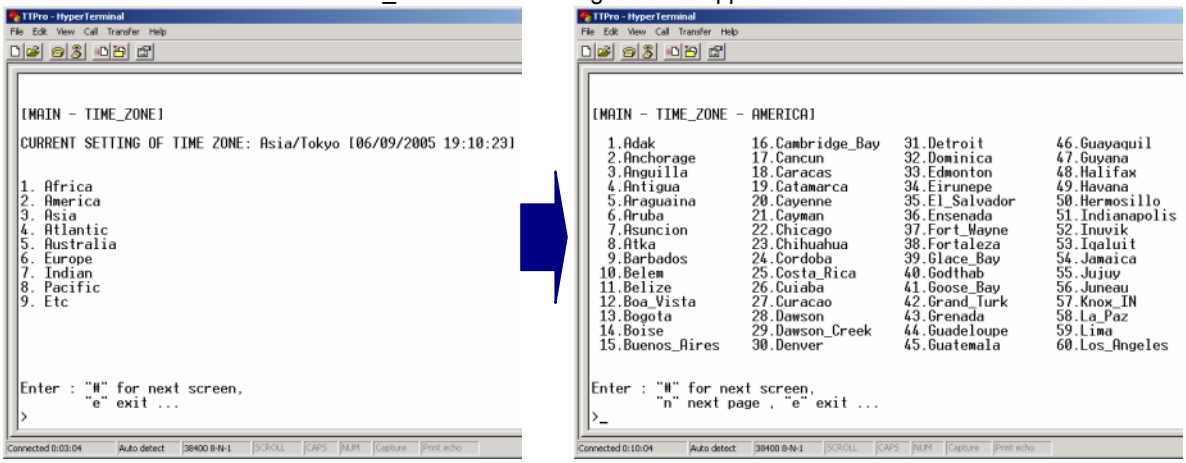
3.10 Setting Other Parameters from the Console

Setting the Time Zone

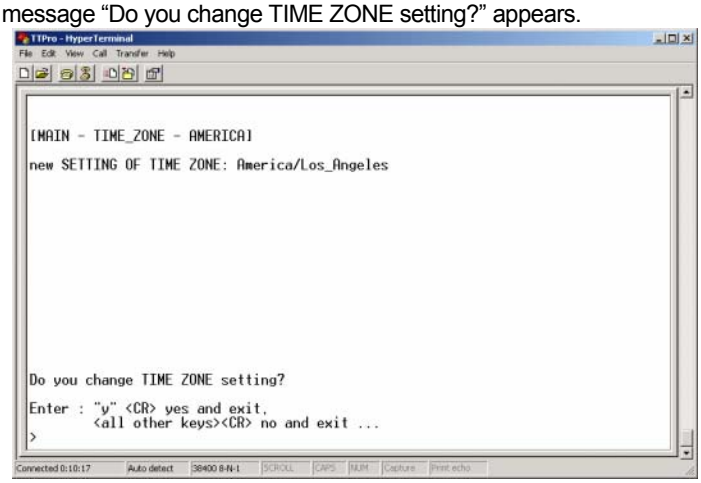
Carry out the procedure below to set the time zone in which the AE5511 will be used. The default setting is Asia/Tokyo. Change it to the appropriate region for your case.

Procedure

1. At the MAIN menu, type **2**, and press the **Enter** key. The TIME_ZONE menu appears.
2. Type the number corresponding to your region and press the **Enter** key. The TIME_ZONE - selected region menu appears.



3. Type the number corresponding to the city and press the **Enter** key. A confirmation message “Do you change TIME ZONE setting?” appears.



4. Type **y** and press the **Enter** key. The selected time zone is entered.

- Rebooting the System

5. Type **e** and press the **Enter** key. The MAIN menu appears.
6. Type **7** and press the **Enter** key. The REBOOT SYSTEM menu appears.
7. Type **y** and press the **Enter** key. The system is rebooted (restarted).

Note

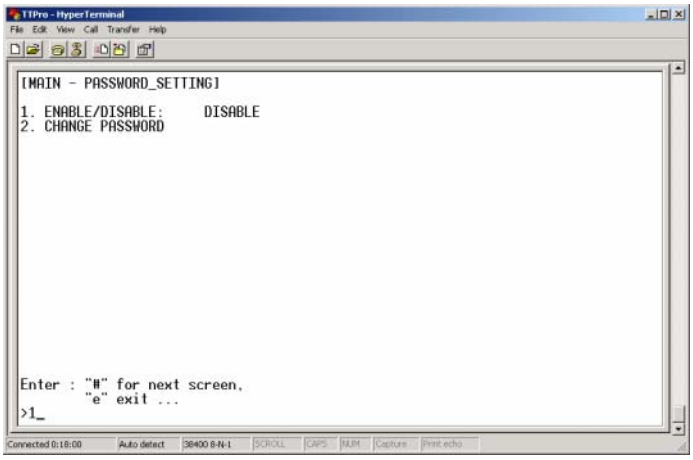
After setting the time zone, reboot the AE5511.

Setting the Password

Carry out the procedure below to set or change the password used to log into the AE5511.

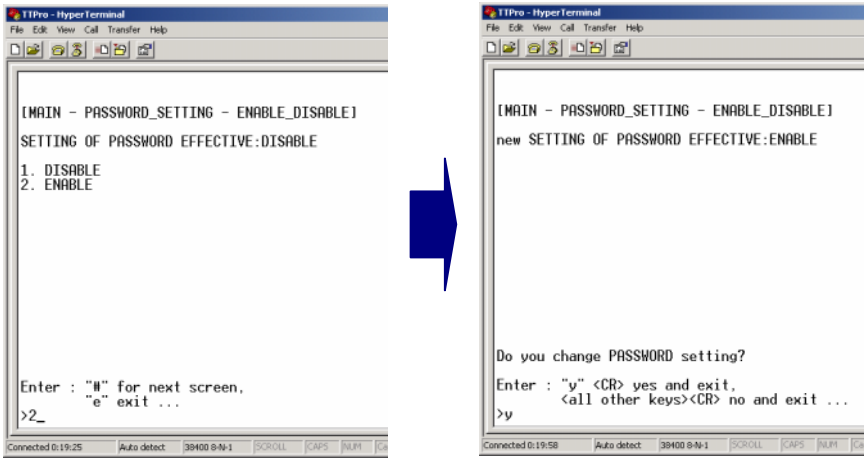
Procedure

1. At the MAIN menu, type **3**, and press the **Enter** key. The PASSWORD_SETTING menu appears.



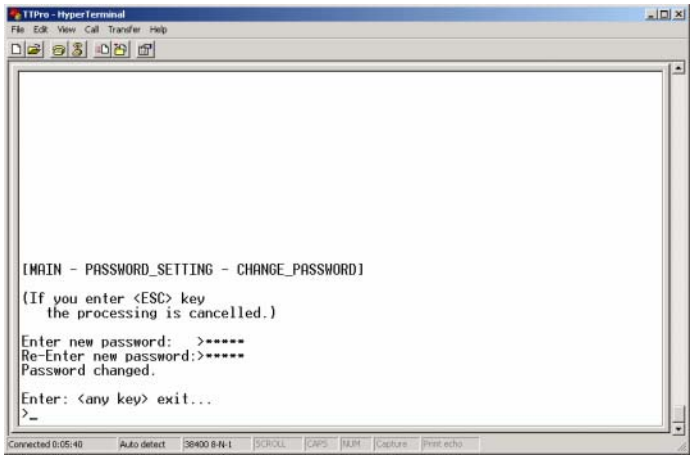
- Enabling/Disabling the Password

2. Type **1** and press the **Enter** key. The ENABLE_DISABLE menu appears.
3. If you are not using the password, type **1** (DISABLE). If you are, type **2** (ENABLE). Then, press the **Enter** key. A confirmation message "Do you change PASSWORD setting?" appears.



4. If you are changing the password enable/disable setting, type **y**. If you are not, type a key other than **y**. Then, press the **Enter** key. The PASSWORD_SETTING menu appears.

- Changing the Password
  4. Type **2** and press the **Enter** key. The CHANGE_PASSWORD menu appears.
  5. Type a new password and press the **Enter** key. Type the new password again for confirmation and press the **Enter** key. A message indicating that the password has been changed appears.
  6. Press any key.



Explanation

- Password Limitations

  The password setting specifies or changes the password used to log into the AE5511. If the password function is enabled, you will need to enter the password to log in.
  You can set one password for each TTPro.

  - Characters that can be used: Alphanumeric characters (a-z, A-Z, and 0-9), hyphen, and underscore
    However, a hyphen cannot be used for the first character of the password.
  - Number of characters that can be used: 0 to 15 characters

Note

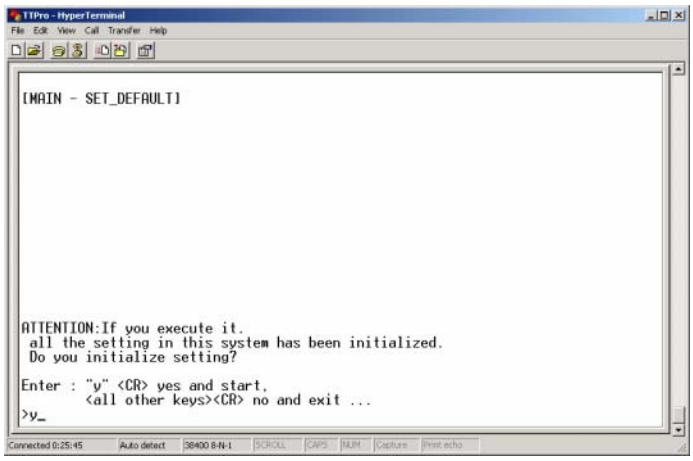
- You can also set the password on the application. For details, see section 8.3.
- For the operating procedure, see section 4.2.

Resetting the AE5511

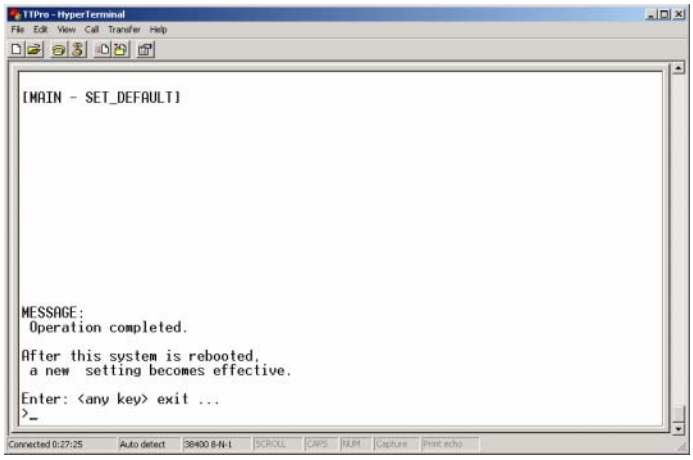
Carry out the procedure below to reset the AE5511 settings to factory default.

Procedure

1. At the MAIN menu, type **5**, and press the **Enter** key. The SET_DEFAULT menu appears.



2. Type **y** and press the **Enter** key. The operation complete screen appears.



Explanation

Note

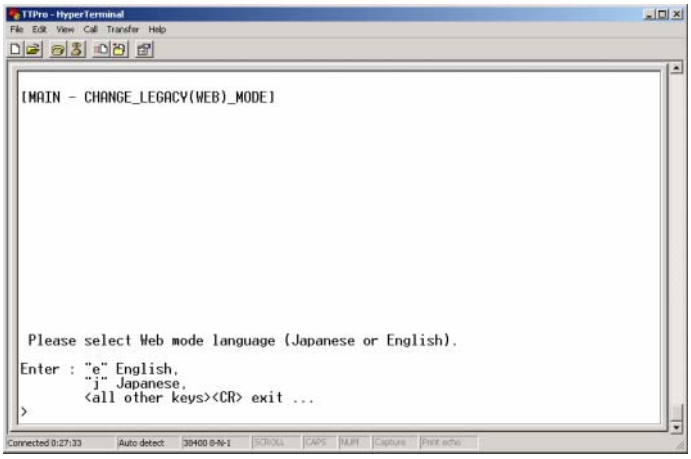
- You can also reset the AE5511 on the application. For details, see section 8.5.
- For the default values, see section 11.1.

Changing to the Web System

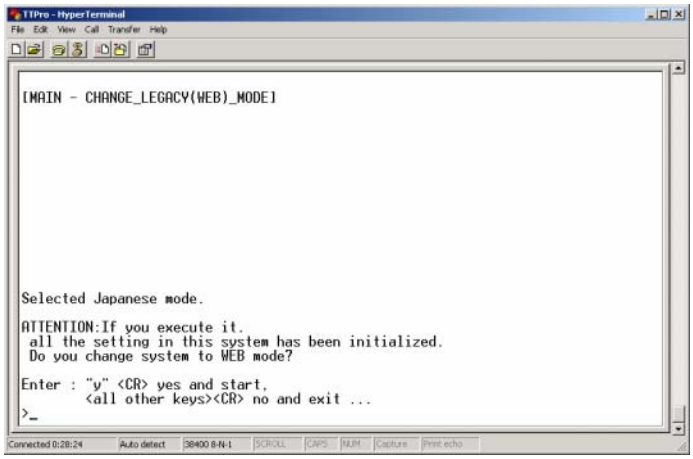
Carry out the procedure below to change the AE5511 control to the Web system.

Procedure

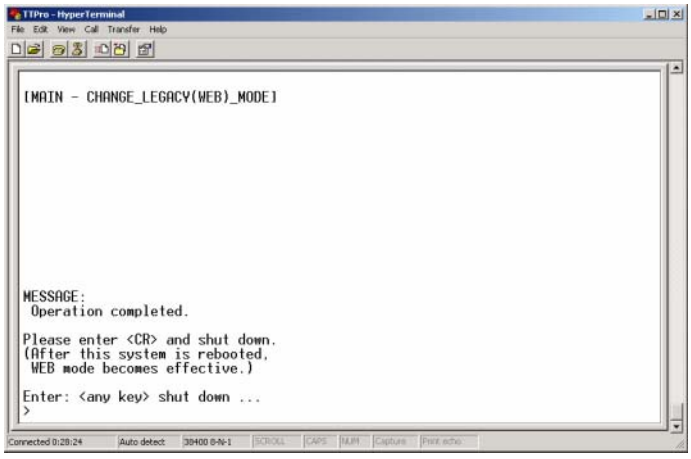
1. At the MAIN menu, type **6**, and press the **Enter** key. A menu used to select the English or Japanese version of “CHANGE_LEGACY(WEB)_MODE” appears.



2. To change to the English version of the Web system (CGI), type **e** and press the **Enter** key. To change to the Japanese version of the Web system (CGI), type **j** and press the **Enter** key. A message “Do you change system to WEB mode?” appears.



3. Type **y** and press the **Enter** key. The operation complete message appears.



4. Press any key. The AE5511 is shut down.

5. To start the Web system (CGI), turn the AE5511 ON again.

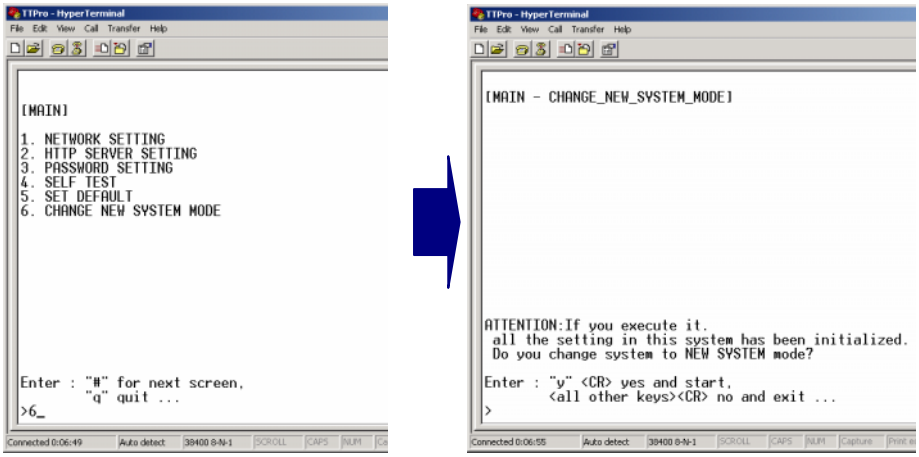
Explanation

Note

- If you change to the Web system, be sure to recycle the power.
- For the operating procedures of the Web system, see the Web version of the manual (manual No.: AS-84711-1EY).

- You can revert to the Windows system after changing to the Web system.

1. At the MAIN menu, type **6**, and press the **Enter** key. The CHANGE_NEW_SYSTEM_MODE menu appears.



MAIN menu of the Web system

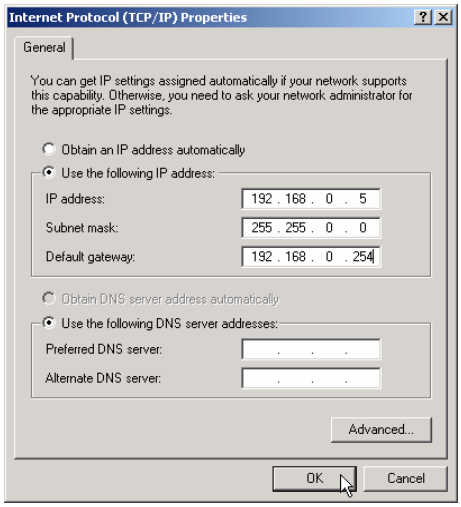
2. Type **y** and press the **Enter** key. The operation complete message appears.
3. Press any key. The AE5511 is shut down.
4. To start the Windows system, turn the AE5511 ON again.

3.11 Setting the Network Parameters of the Controller PC

This section describes the network settings of the controller PC that is used to connect to the AE5511 through the network.
This manual explains the setup procedures for Microsoft Windows 2000. If you are using a different OS, see the user's manual of the respective OS.

Procedure

1. From the taskbar, click the Windows **Start** button, point to **Settings**, and click **Network and Dial-up Connections**. The Network and Dial-up Connections window opens.
2. Double-click **Local Area Connection**. The Local Area Connection Status screen opens.
3. Click **Properties**. The Local Area Connection Properties screen opens.
4. Select **Internet Protocol (TCP/IP)** and click **Properties**. The Internet Protocol (TCP/IP) Properties screen opens.
5. Select **Use the following IP address** and set **IP address**, **Subnet mask**, and **Default gateway**.



6. Click **OK**. The Local Area Connection Properties screen appears.
7. Click **OK** to close the screen.

Explanation

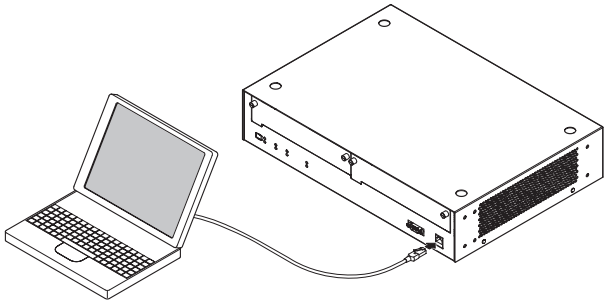
- Note the following points when you are specifying the settings.
  - Set the same values as the AE5511 for the subnet mask and default gateway.
  - Set the same value as the AE5511 for the network address section of the IP address specified by the subnet mask.

Example)

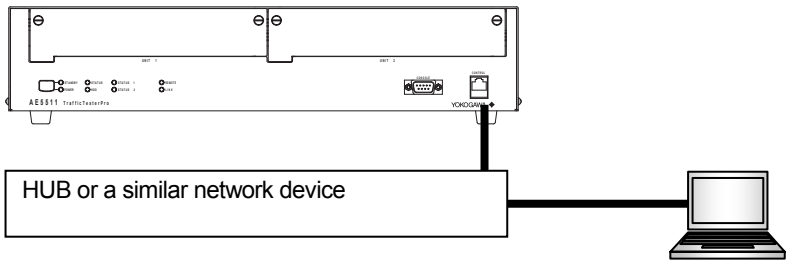
Parameter	AE5511	Controller PC
IP address	192.168.0.10	192.168.0.5
Subnet mask	255.255.0.0	255.255.0.0
Default gateway	192.168.0.254	192.168.0.254

3.12 Connecting to the Network

- When Connecting the AE5511 Directly to a PC
  Connect the AE5511 CONTROL port to the LAN port of the controller PC using the CONTROL cable (LAN cable, cross) that comes with the AE5511.



- When Connecting the AE5511 through a Network
  Connect the AE5511 CONTROL port to the LAN port of the controller PC via a HUB or a similar network device using a LAN cable (straight).



4.1 Starting/Closing the Application

To control the AE5511, start the TTProControlWindowE application on the PC. Chapter 4 explains the operations on the main screen, the procedure to log into the AE5511, and the procedure to reserve the measurement ports to be used.

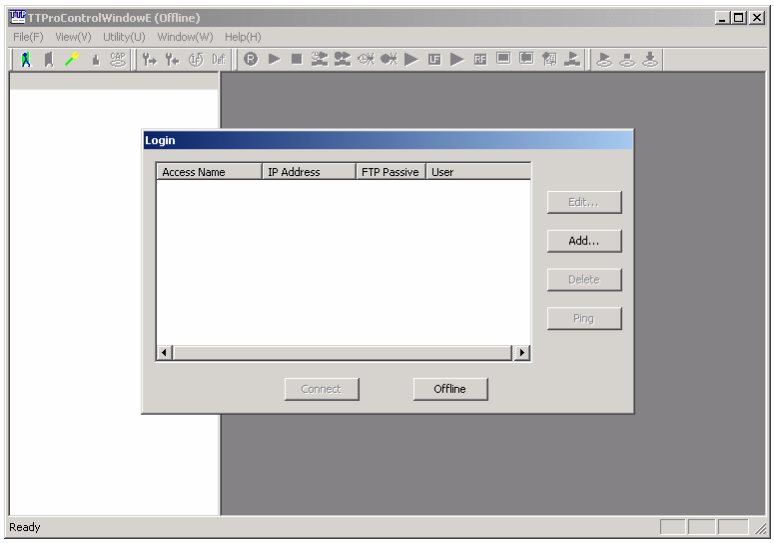
Starting the Application

Procedure

1. On the taskbar, click the Windows **Start** button, point to **All Programs** , point to **TTProControlWindowE**, and click **TTProCtrlWndE**. The application starts and a Login dialog box opens.

- Connecting to the AE5511
  2. Click **Add** or **Connect**. For the operating procedure, see section 4.2.

- Creating the Setup Conditions on the PC
  2. Click **Offline**. For the operating procedure, see chapter 5.



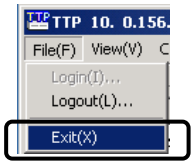
Explanation

- Starting the Application Using the Icon on the Desktop
  You can also double-click the TTProCtrlWndE icon on the desktop to start the application.

Closing the Application

Procedure

1. From the **File** menu, choose **Exit**. A dialog box containing the message “Quit the application?” opens.



2. Click **Yes**. The application closes.

Explanation

Note

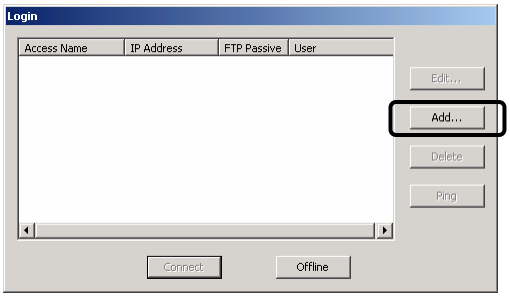
If the PORT maintenance condition in login setup (see section 8.3) is Port Reserve and you close the application without logging out while online, the port is released.

4.2 Login and Logout

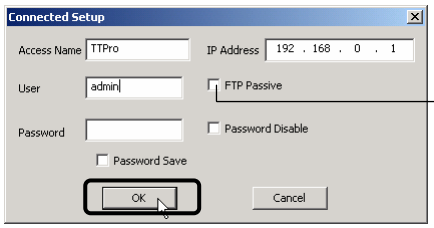
Login

Procedure

- Registering the Connection Destination
  1. In the Login dialog box, click **Add**. The Connected Setup dialog box opens.

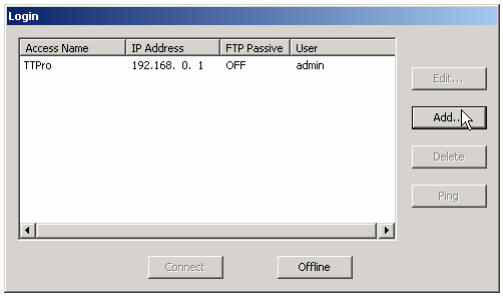


  2. Enter the destination information.
     (Example) Access Name: TTPro, IP Address: 192.168.0.1
     User: admin



Select this check box when using a firewall function

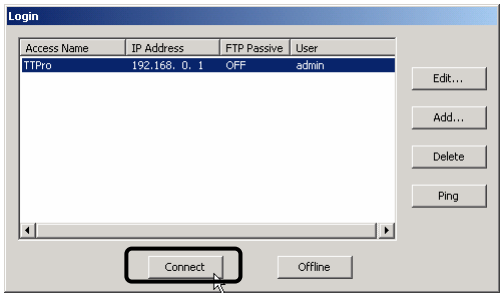
  3. Click **OK**. The entered destination is registered.



Note

- If you enter admin for User, you can login with administrator privileges. For the operations that you can carry out with administrator privileges, see chapter 8.
- Password is valid when Enable Password Function is specified in the Login Setup. For details, see section 8.3.
- Specify FTP Passive as necessary.
- If you are using the firewall function on Windows XP SP2 or a virus checking program, select the **FTP Passive** check box.
- If you wish to change the information after it is registered, click **Edit**. To delete the registered information, click **Delete**.

- Logging into the Registered Destination
  1. Select the destination to which you wish to connect.



  2. Click **Connect**. The Port Reserve dialog box opens. See section 4.3.

- Checking the Connection Using PING
  1. Select the destination to which you wish to connect.
  2. Click **PING**. A command prompt screen (an accessory) on the PC automatically starts and the PING command is executed.
  3. Press any key. The PC command prompt screen closes.

Explanation

- To login from an offline condition, choose **Login** from the **File** menu.

Note

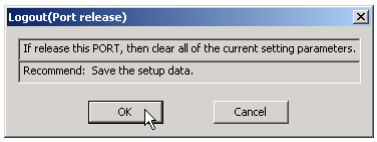
You can also log in by clicking the Login icon.

Logout

Procedure

1. From the **File** menu, choose **Logout**. The Logout dialog box opens.

- Releasing the Port
  2. Click **Port Release**. The Logout (Port release) dialog box opens.



  3. Click **OK** to log out.

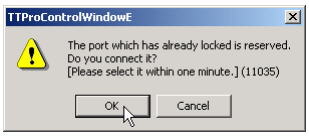
- Locking the Port
  2. Click **Port Lock**. You are logged out.

Note

- You can also log out by clicking the Logout icon.
- To log out while retaining the measurement condition, select Port Lock. If you log out using Port Lock, you can reconnect with the conditions that existed when you logged out when you log in using the same user name.
- If you release the port, the transmission port stops, and all statistics and capture data are cleared. Save the settings as necessary. For the operating procedure, see section 5.2.

Explanation

- If you log into a destination that has been port locked, a dialog box with the message "The port which has already locked is reserved. Do you connect it?" opens.



Note

Because the communication between the PC and AE5511 may be cut off depending on the controller PC that you are using or the network environment, it is recommended that you use the port lock function when carrying out measurements that take an extended time.

4.3 Port Reserve

Because the AE5511 is controlled from multiple PCs, be sure to reserve the necessary number of ports for the measurement when you log in. This section explains the procedure to reserve the ports.

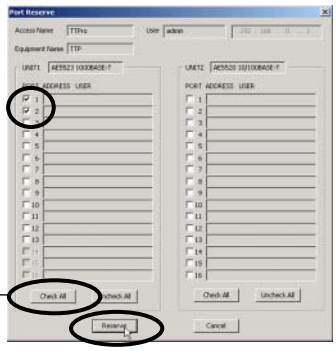
Procedure

1. Log in. See section 4.2.

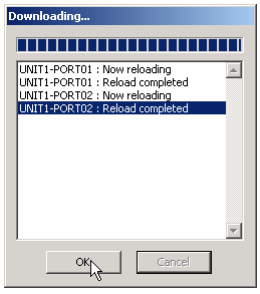
- On the AE5523 and AE5524

2. Select the unit port check boxes that are to be used for the measurement. (In the example below, ports 1 and 2 are selected.)

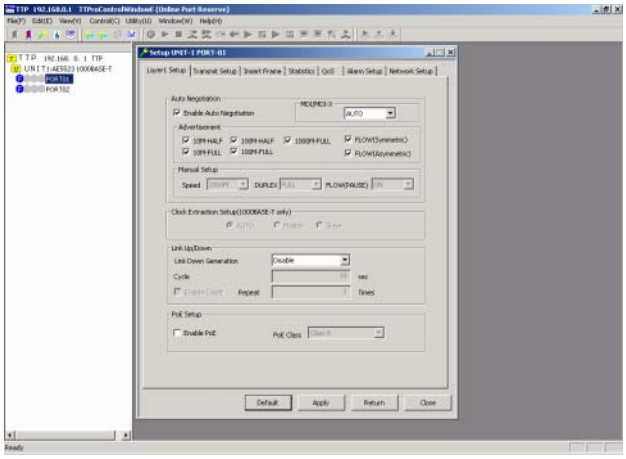
Click to use all ports



3. Click **Reserve**. The Downloading dialog box opens.



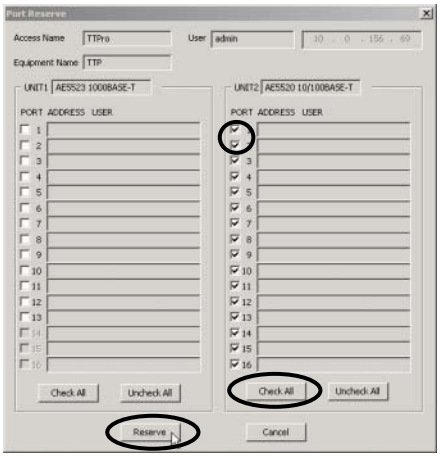
4. Click **OK**. The TTProControlWindowE opens.



TTProControlWindowE window

- On the AE5520 to AE5522

2. Select a unit port check box or click **Check All**. All ports on the unit is selected.



3. Click **Reserve**. The Downloading dialog box opens.
4. Click **OK**. The TTProControlWindowE opens.

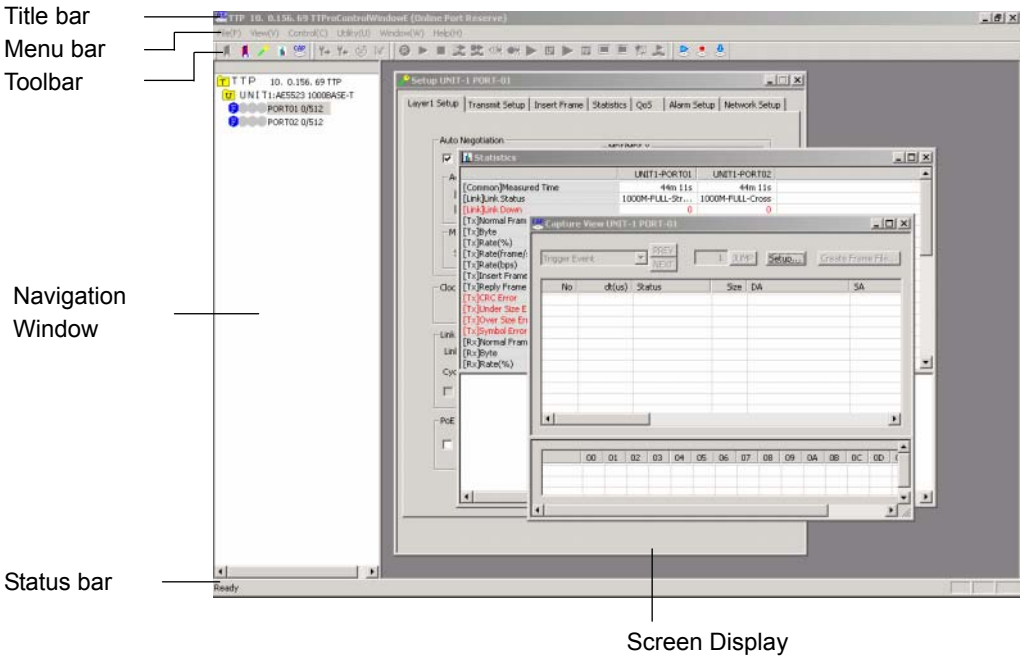
Explanation

- Ports can be reserved individually on the AE5523 and AE5524.
- Ports are reserved by units on the AE5520 to AE5522. Even if you select the check box of a single port, all ports are selected.

4.4 Screen Description

Main Screen

The main screen consists of a Navigation Window, Screen Display Area, and various Windows bars.



- Navigation Window
  This window is used to select or control the AE5511 ports.

- Screen Display Area
  This area shows the screens used to control the measurements, Setup, Statistics, and Capture windows.
  For details of each screen in the screen display area, see the respective chapter.
  - For details on the Setup window, see chapter 5.
  - For details on the Statistics window, see chapter 6.
  - For details on the Capture window, see chapter 7.

- Title bar
  Shows the status of the application screen and the online/offline state of the AE5511. When online, the device name and IP address are also shown.

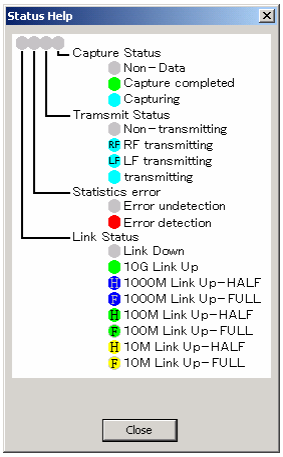
- Menu bar
  Shows the application menus for controlling the software.

- Toolbar
  Shows the application toolbar containing icons for controlling the software.

- Status bar
  Shows the AE5511 status and descriptions of the menus and icons.

Status Help Screen

If you double-click a port on the Navigation Window, a Status Help screen opens. This screen shows the usage of port in color.



Status Help screen

4.5 Switching the Screen Displays

Procedure

Switching the Setup, Statistics, and Capture Windows from the Menu

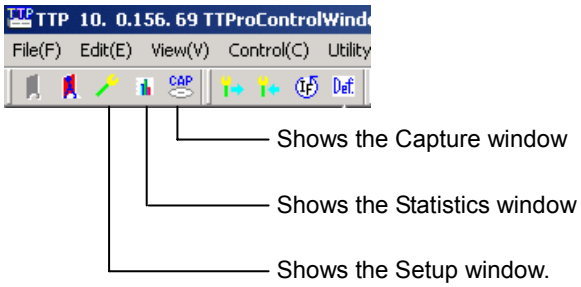
- Displaying the Setup Window
  From the **View** menu, choose **Setup**. The screen display area shows the Setup window.

- Displaying the Statistics Window
  From the **View** menu, choose **Statistics**. The screen display area shows the Statistics window.

- Showing the Capture Window
  From the **View** menu, choose **Capture**. The screen display area shows the Capture window.

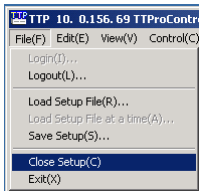
Switching the Setup, Statistics, and Capture Windows from the Toolbar

Click the following buttons. The same window described above opens.



Closing the Setup Window

From the **File** menu, choose **Close Setup**. The Setup window in the screen display area closes.



Note

This command is used when setup is finished and there is no need to show the window during measurement.

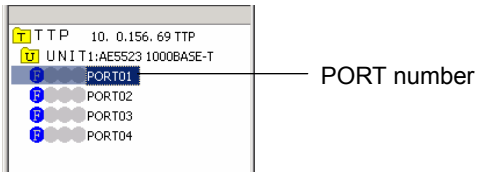
5.1 Loading and Saving the Setup File

This section explains the details of loading, collectively loading, and saving the setup files of the AE5511.

Loading the Setup File

Procedure

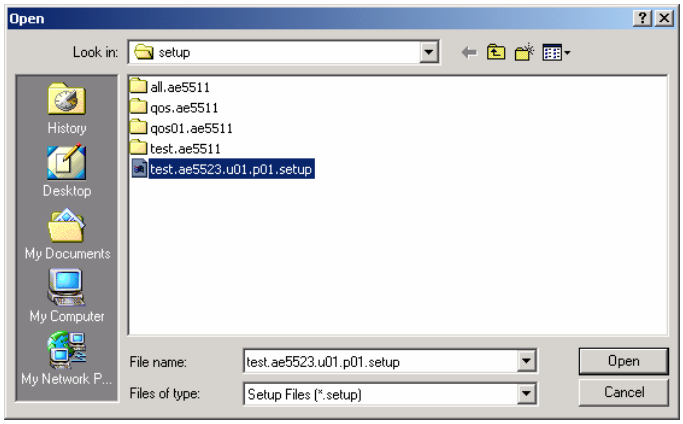
1. On the Navigation Window, click the PORT number for loading the setup file.



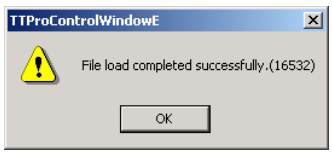
2. From the **File** menu, choose **Load Setup File**. A dialog box containing the message “Present settings are lost. OK?” opens.

- **When Loading the Setup File**

3. Click **Yes**. The Open dialog box opens.



4. Select the setup file you wish to load and click **Open**. A dialog box containing the message “File load completed successfully.” opens.



5. Click **OK** to return to the original screen.

- **When Not Loading the Setup File**

3. Click **No**. The original screen appears.

Explanation

- A port setup file that has been saved on the PC is loaded to a single port on the application.

- The items that are loaded from a setup file are as follows:
  Version information, mode settings, statistics settings, QoS settings, insert frame settings, transmit settings, layer 1 settings, network settings, and alarm settings

- Setup file of different test modes (BERT and TRAFFIC)
  - Items that can be set are loaded.
  - Items not in the setup file are set to their default values.

- Setup files of different units
  - Items that can be set are loaded.
  - Items not in the setup file are set to their default values.
  - Items in the setup file but not available on the unit are not loaded.

Note

If a setup file of a different unit is loaded, Default List is shown.

- You can also load the setup file by right-clicking on the Navigation Window.

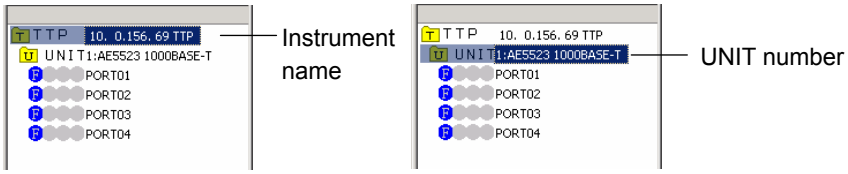
Note

The AE5511 settings are not updated at the time the file is loaded. To update the AE5511 settings, use the **Update** command. For the setup data handling, see section 2.11.

Collectively Loading Setup Files

Procedure

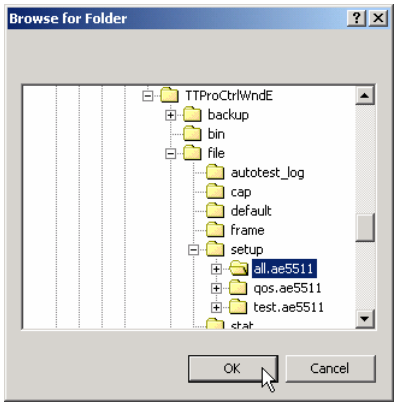
1. On the Navigation Window, click the instrument name or UNIT number for loading the setup files.



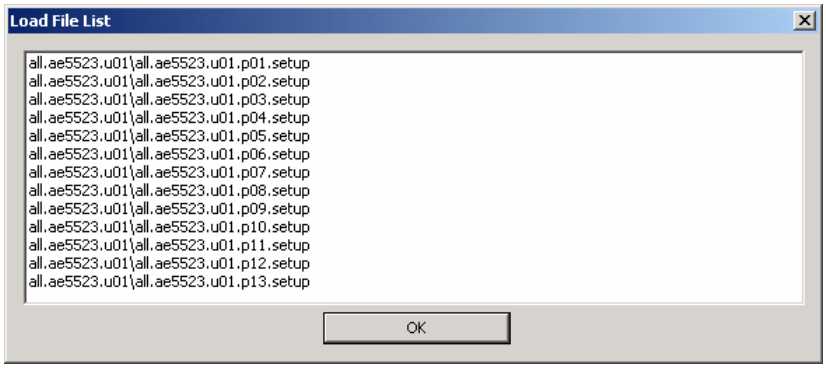
2. From the **File** menu, choose **Load Setup File at a time**. A dialog box containing the message “Present settings are lost. OK?” opens.

- **When Loading the Setup Files**

3. Click **Yes**. The Browse for Folder dialog box opens.



4. Select the setup files to be loaded and click **Open**. The Load File List dialog box opens.



5. Click **OK** to collectively load the files.

- **When Not Loading the Setup Files**

3. Click **No**. The original screen appears.

Explanation

- The setup files of the entire instrument or unit that have been saved on the PC are loaded collectively to the entire instrument or unit on the application.

- In online mode, the setup files are collectively loaded to the reserved ports. In offline mode, the setup files are collectively loaded to the entire instrument or unit.

- The items that are collectively loaded from the setup files are as follows:
  Version information, mode settings, statistics settings, QoS settings, insert frame settings, transmit settings, layer 1 settings, network settings, and alarm settings

- Setup file of different test modes (BERT and TRAFFIC)
  - Items that can be set are loaded.
  - Items not in the setup file are set to their default values.

- Setup files of different units
  - Items that can be set are loaded.
  - Items not in the setup file are set to their default values.
  - Items in the setup file but not available on the unit are not loaded.

Note

If a setup file of a different unit is loaded, a Default List is shown.

- You can also load the setup file by right-clicking on the Navigation Window.

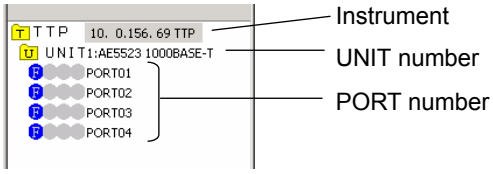
Note

The AE5511 settings are not updated at the time the file is loaded. To update the AE5511 settings, use the **Update** command. For the setup data handling, see section 2.11.

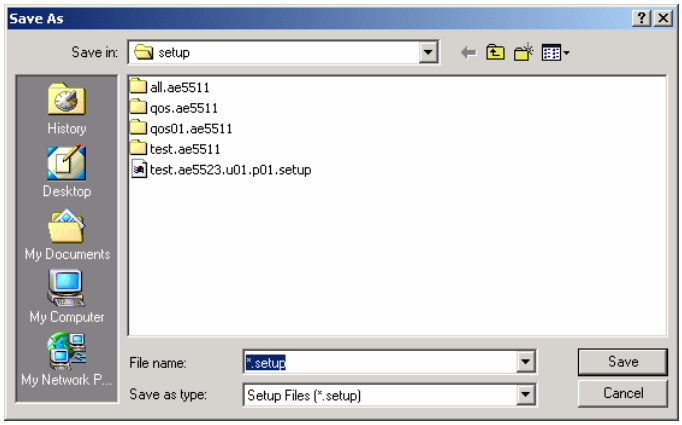
Saving the Setup

Procedure

1. On the Navigation Window, click the instrument name, UNIT number, or PORT number for saving the setup files.

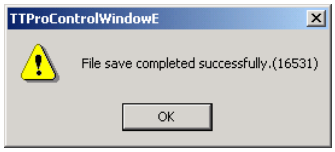


2. From the **File** menu, choose **Save Setup**. The Save As dialog box opens.



- **When Saving the Setup File**

3. Type the file name and click **Save**. A dialog box containing the message “File save completed successfully.” opens.



4. Click **OK** to return to the original screen.

- **When Not Saving the Setup File**

3. Click **Cancel**. The original screen appears.

Explanation

- The setup data on the application can be saved as setup files on the PC. You can specify on the Navigation Window to save the setup data at the instrument level, unit level, or port level.

- The ports that are saved vary between online mode and offline mode. In addition, the ports that are saved vary depending on the specified type of save operation.

Type	Ports That Are Saved	
	Online Mode	Offline Mode
Entire instrument (Instrument name)	All reserved ports	All ports
Unit level (UNIT number)	Reserved ports on the specified unit	All ports on the specified unit
Port level (PORT number)	Specified ports that are reserved	Specified ports

- The items that are saved to the setup file are as follows:
  Version information, mode settings, statistics settings, QoS settings, insert frame settings, transmit settings, layer 1 settings, network settings, and alarm settings

- You can also save the setup file by right-clicking on the Navigation Window.

Note

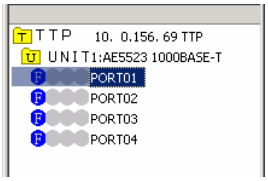
- When multiple ports are saved, the files are saved in a directory structure. When a single port is saved, the setup is saved to a single file.
- For a description of the file function, see section 2.9.

5.2 Copying and Pasting Setup Data

This section explains the details of copying the setup data of one port to another port.

Procedure

- **Copying**
  1. On the Navigation Window, click the PORT number of the copy source of setup data.



  2. From the **Edit** menu, choose **Copy**.

- **Pasting**
  3. Click the PORT number of the copy destination.
  4. From the **Edit** menu, choose **Paste**. The setup data is copied.

Note

If a setup file of a different unit is copied and pasted, Default List may be shown.

Explanation

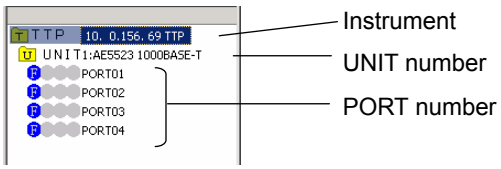
- You can also copy the setup data by right-clicking on the Navigation Window.

5.3 Resetting the Settings to Default

This section explains the details of resetting the settings to default.

Procedure

1. On the Navigation Window, click the instrument name, UNIT number, or PORT number for resetting the settings.



2. Click the Def. icon or choose **Default** from the **Edit** menu. A dialog box containing the message “Set default.” opens.

- When Resetting the Settings to Default
  3. Click **Yes**. The settings are reset to default.

- When Not Resetting the Settings to Default
  3. Click **No**. The original screen appears.

Explanation

- The ports that are reset vary between online mode and offline mode. In addition, the ports that are reset vary depending on the specified type of operation.

Type	Ports That Are Reset	
	Online Mode	**Offline Mode**
Entire instrument (Instrument name)	All reserved ports	All ports
Unit level (UNIT number)	Reserved ports on the specified unit	All ports on the specified unit
Port level (PORT number)	Specified ports that are reserved	Specified ports

- You can also reset the settings by right-clicking on the Navigation Window or clicking **Default** on the Setup window.

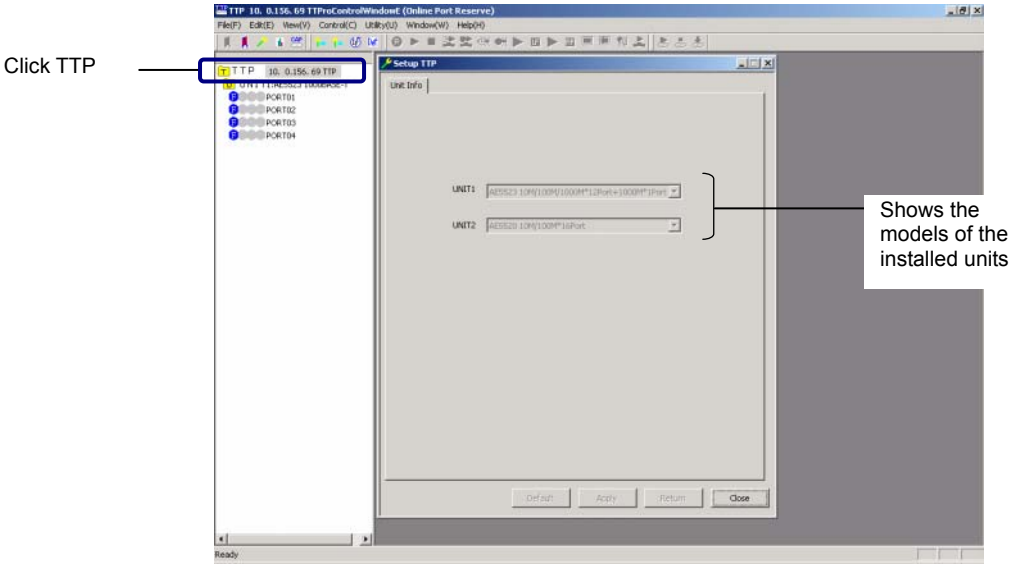
5.4 Unit Information

In online mode, the models of installed units are shown. In offline mode, the unit model can be selected and shown.

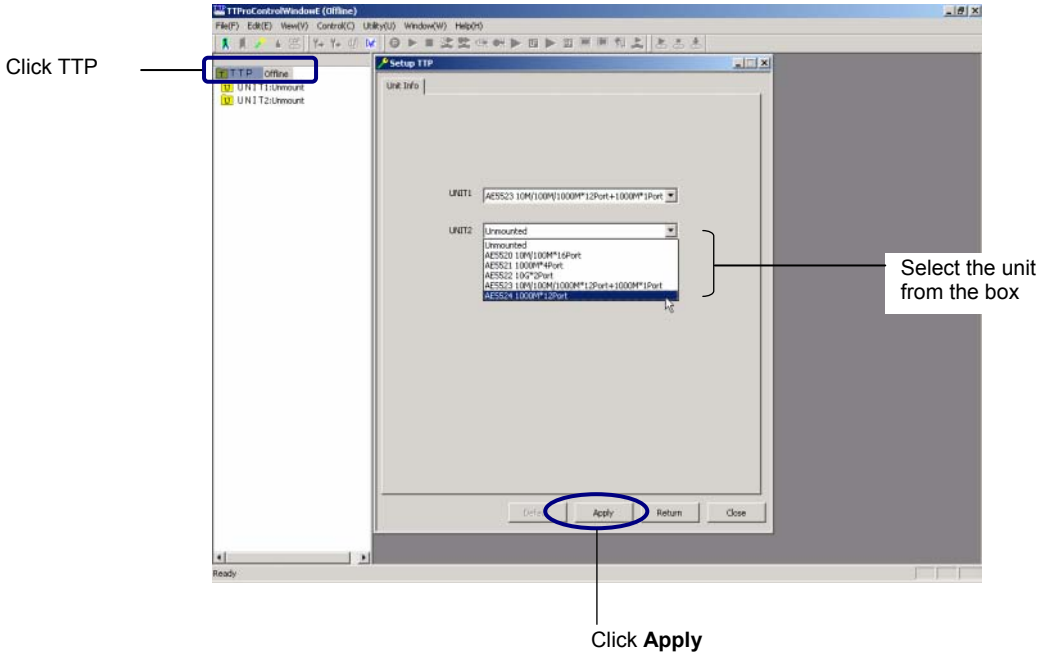
Procedure

1. On the Navigation Window, click TTP. The Setup TTP Unit Info is shown.

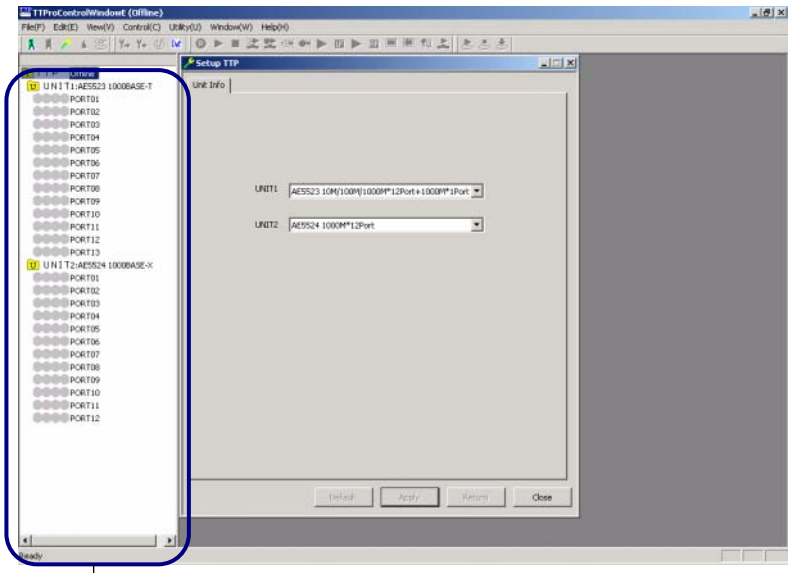
- Online



- Offline



2. From the drop-down box, select the unit to be configured.
3. Click **Apply**. The Navigation Window changes to show the configuration of the selected unit.



Changed to the configuration of the selected

Explanation

- The unit configuration cannot be changed in online mode.

- To reset the settings to default, click **Default**.
  To reset the settings to the original values, click **Return**.
  To close the screen, click **Close**.

- UNIT1/UNIT2

Item	Display/Selection	Description
UNIT1/UNIT2	AE5520 10M/100M × 16 ports AE5521 1000M × 4 ports AE5522 10G × 2 ports AE5523 10M/100M/1000M × 12 ports + 1000M × 1 port AE5524 1000M × 12 Port	In online mode, the names of installed units are shown. In offline mode, you can select the units. The names of the selected units are shown.

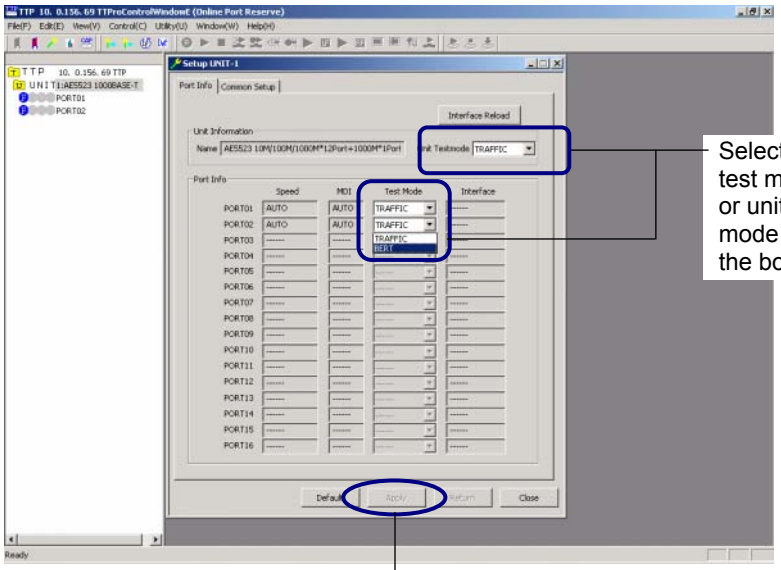
5.5 Setting the Test Mode

This section explains the details of setting the test mode. You can set the test mode at the port level on the AE5523 and AE5524 and at the unit level on the AE5520 to AE5522.

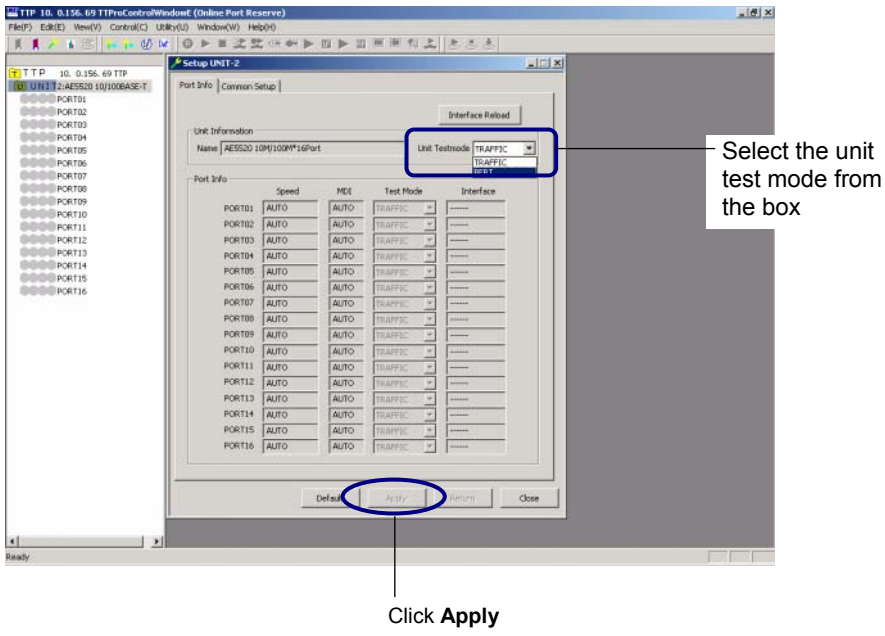
Procedure

1. On the Navigation Window, click the desired UNIT number. The Setup UNIT-n window of the selected unit opens.
2. Click the **Port Info** tab. The port information is shown and the reserved ports become selectable.

- On the AE5523 and AE5524
  3. Select the test mode from the **Test Mode** box of the reserved port or the **Unit Testmode** box.



- On the AE5520 to AE5522
  3. Select the test mode from the **Unit Testmode** box of the reserved unit.



- Updating the Settings
  4. Click **Apply**. The test mode selected on the application is shown.
  5. Click the **Update** icon or choose **Update** from the **Control** menu.

Explanation

- Test Mode
  - TRAFFIC: The traffic generation mode. Select TRAFFIC mode also to measure the latency. For a description of this function, see section 2.3.
  - BERT: Bit error test mode. For a description of this function, see section 2.3.

- In online mode, the test mode can be specified on the reserved ports. In offline mode, the test mode of all ports can be specified.

- To reset the settings to default, click **Default**.
  To reset the settings to the original values, click **Return**.
  To close the screen, click **Close**.

- If you click **Interface Reload** while online, the interface information of the reserved ports is reloaded.

- Unit Display

Item	Input Method	Range/Selection	Description
Unit name	–	AE5520 16 10M/100M ports AE5521 4 1000M ports AE5522 2 10G ports AE5523 12 10M/100M/1000M ports + 1 1000M port AE5524 12 1000M ports	In online mode, the names of installed units are shown. In offline mode, the name of the selected unit is shown.
Unit test mode	Drop-down box	TRAFFIC/BERT	Sets the test mode at the unit level. On the AE5523 and AE5524, all reserved ports can be set collectively.

- Port Information

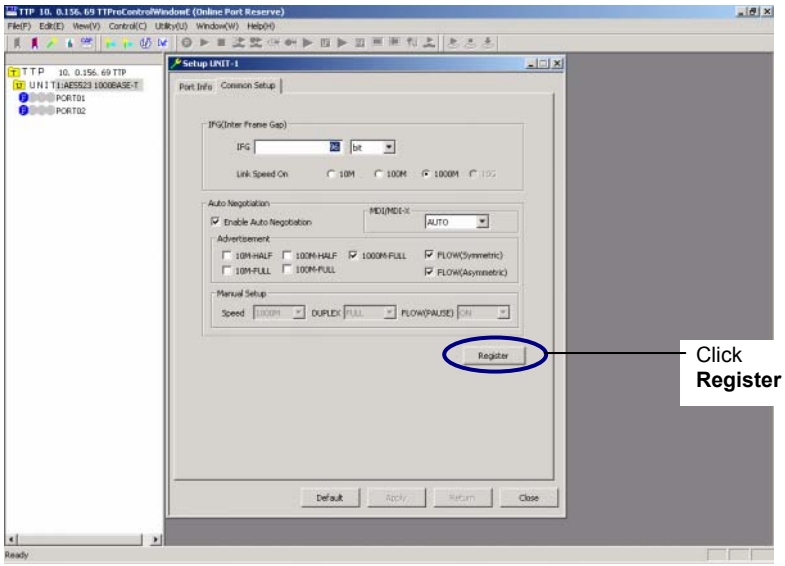
Item	Input Method	Range/Item	Description
PORT No.	–	1 to 16	The port number. The number of ports shown corresponds to that of each unit. However, only the information of the reserved ports is shown.
Speed	–	10/100/1000/Auto	The speed setting.
MDI	–	|| / X/Auto	Straight, cross, or auto detect
Test Mode	Drop-down box	TRAFFIC/BERT	Sets the test mode at the port level.(AE5523 and AE5524)
Interface	–	LX/SX/T/LR/ER/ Unmounted/ Unsupported	Shows the installed interface module when the AE5521, the AE5522, PORT13 on the AE5523 or the AE5524 is logged in. If an unsupported interface module is detected, “Unsupported” is shown. “------“ is shown when logged out. “------“ is shown for units and ports (PORT1 to PORT12 on the AE5523) that do not install interface modules.

5.6 Common Port Settings

If multiple ports are reserved, common port settings can be specified. Common port settings enable the IFG (Inter Frame Gap) and auto negotiation settings of the reserved ports to be specified collectively.

Procedure

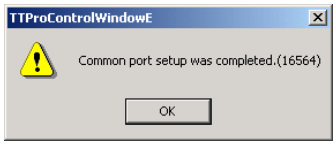
1. On the Navigation Window, click the desired UNIT number. The Setup UNIT-n window of the selected unit opens.
2. Click the **Common Setup** tab. The Common Setup screen appears.



- Setting the IFG
  3. Type the IFG value and select the unit and link speed. For details, see transmit setup in section 5.8.

- Setting the Auto Negotiation
  4. Enable or disable auto negotiation, select MDI/MDI-X, advertisement, and manual setup. For details, see auto negotiation in section 5.7.

  5. Click **Register**. A dialog box containing the message “Common port setup was completed.” opens.



  6. Click **OK**.

- Updating the Settings
  7. Click **Apply**. The test mode selected on the application is shown.
  8. Click the **Update** icon or choose **Update** from the **Control** menu.

Explanation

Note

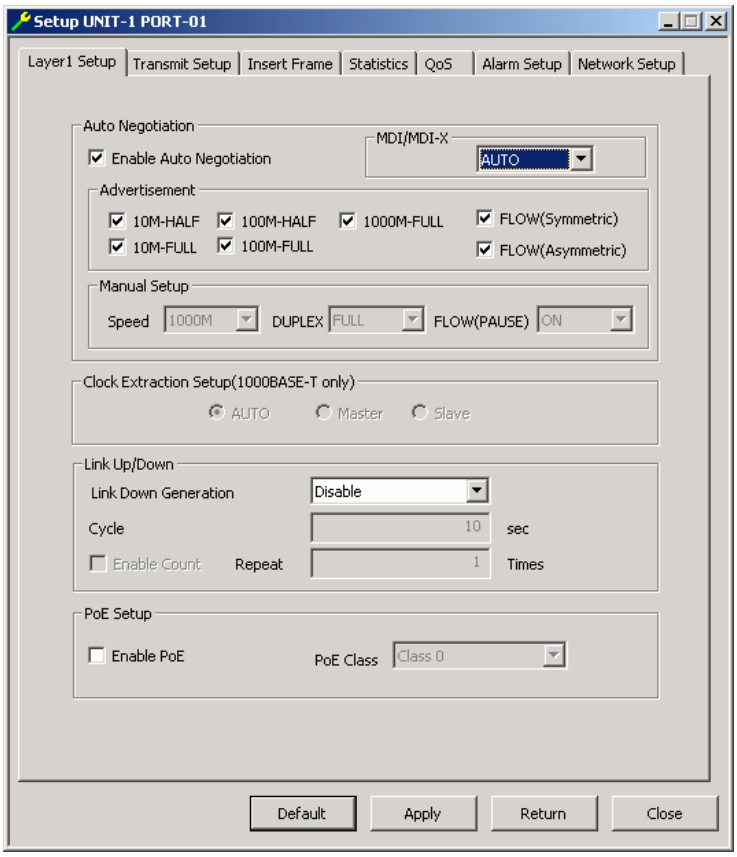
- Common port settings do not appear if only one port is reserved.
- The settings on the Common Setup screen are not held. The settings are reset to default values when you switch the tab.
- PORT13 of the AE5523 is excluded from the common port settings.

5.7 Layer1 Setup

In Layer1 Setup, you can set the auto negotiation, clock extraction, link up/down, and PoE of the reserved port.

Procedure

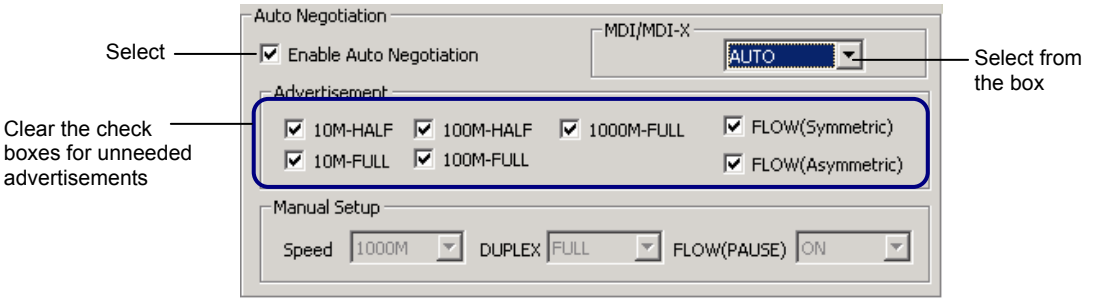
1. On the Navigation Window, click the desired PORT number. The Setup UNIT-n PORT-n window of the selected port opens.
2. Click the **Layer1 Setup** tab.



Auto Negotiation

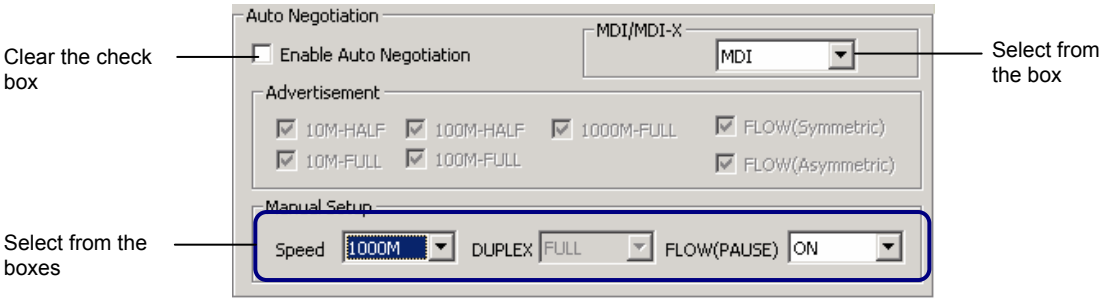
The displayed items vary depending on the unit.

- Using Auto Negotiation



3. Select the **Enable Auto Negotiation** check box. The check boxes for advertisements that can be used are selected.
4. Clear the check boxes for unneeded advertisements.
5. If the interface is T, select **MDI**, **MDI-X**, or **AUTO** from the **MDI/MDI-X** box. If the unit is the AE5523, proceed to step 6. For other units, proceed to step 8.

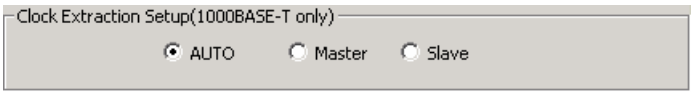
- Not Using Auto Negotiation



3. Clear the **Enable Auto Negotiation** check box. The Manual Setup parameters become selectable.
4. Select the appropriate parameters from the **Speed**, **DUPLEX**, and **FLOW (PAUSE)** boxes.
5. If the interface is T, select **MDI** or **MDI-X** from the **MDI/MDI-X** box. If the unit is the AE5523, proceed to step 6. For other units, proceed to step 8.

Clock Extraction Setup

The clock extraction setup is enabled on the AE5523 for 1000BASE-T.



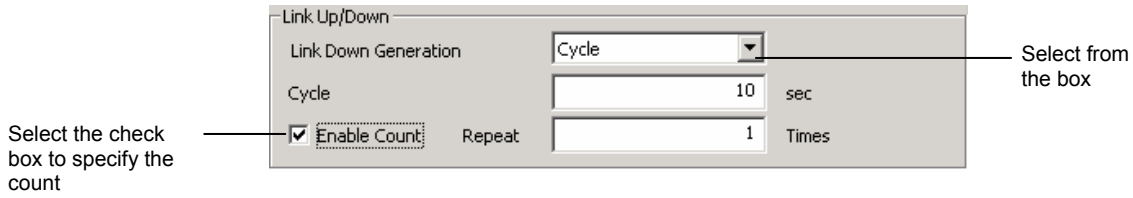
6. Clear the **Enable Auto Negotiation** check box. The Clock Extraction Setup parameter becomes selectable.
7. Select the **AUTO**, **Master**, or **Slave** option button. Proceed to step 8.

Note

Normally, select **AUTO**. If you are manually selecting the parameter, be sure that a master-slave relationship is established between the measured ports.

Link UP/DOWN

Link down can be generated singularly or cyclically (AE5523 and AE5524).



- Disabling the Link Down Generation Mode
  8. From the **Link Down Generation** box, select **Disable**. If the unit is the AE5523, proceed to step 12. For other units, proceed to step 14.

- Single Generation
  8. From the **Link Down Generation** box, select **Single**. If the unit is the AE5523, proceed to step 12. For other units, proceed to step 14.

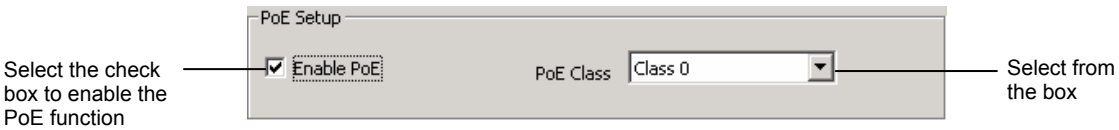
- Cycle Generation (AE5523 and AE5524)
  8. From the **Link Down Generation** box, select **Cycle**. The **Cycle** text box and **Repeat** check box become selectable.
  9. Type the cycle in the **Cycle** text box (10 to 3600 in unit of seconds).

  • Specifying the Repeat Count
  10. Select the **Enable Count** check box. The **Repeat** text box becomes available.
  11. Type the count value in the **Repeat** text box (1 to 65535). Then, proceed to step 12.

- Not Specifying the Repeat Count
  10. Clear the **Enable Count** check box. The **Repeat** text box becomes unavailable. Proceed to step 12.

PoE Setup

You can set the PoE emulation on the AE5523.



- Enabling the PoE Function
  12. Select the **Enable PoE** check box. The **PoE Class** box becomes selectable.
  13. Select the class (0 to 4) from the **PoE Class** box. Proceed to step 14.

- Disabling the PoE Function
  12. Clear the **Enable PoE** check box. The **PoE Class** box becomes unavailable. Proceed to step 14.

- Updating the Settings
  14. Click **Apply**. The data is applied on the application.
  15. Click the **Update** icon or choose **Update** from the **Control** menu.

Explanation

- The parameters that you can specify vary depending on the installed unit.

Parameter	Input Method	Input Range/ Selection	Unit (AE55xx)*1						Description
			20	21	22	23*2 1-12	23*2 13	24	
Auto Negotiation									
Auto Negotiation	Check box	ON/OFF	x	x	-	x	x	x	
Advertisement									Available when Auto Negotiation is enabled
10M-Half	Check box	ON/OFF	x	-	-	x	-	-	
10M-Full	Check box	ON/OFF	x	-	-	x	-	-	
100M-Half	Check box	ON/OFF	x	-	-	x	-	-	
100M-Full	Check box	ON/OFF	x	-	-	x	-	-	
1000M-Full	Check box	ON/OFF	-	-	-	x	-	-	
Flow(Symmetric)	Check box	ON/OFF	x	x	-	x	x	x	
Flow(Asymmetric)	Check box	ON/OFF	x	x	-	x	x	x	
Manual Setup									Available when Auto Negotiation is disabled
Speed	Drop-down box	10M/100M/1000M	x	-	-	x	-	-	AE5520: 10M/100M AE5523: 10M/100M/ 1000M
DUPLEX	Drop-down box	FULL/HALF	x	-	-	x	-	-	Fixed to FULL on the AE5523 if Speed is 1000M.
FLOW(PAUSE)	Drop-down box	ON/OFF	x	x	x	x	x	x	
MDI/MDI-X	Drop-down box	MDI/MDI-X/AUTO	x	-	-	x	-	-	
Clock Extraction Setup									
Clock Extraction	Option buttons	AUTO/ Master/Slave	-	-	-	x	-	-	
Link UP/DOWN									
Link Down Generation	Drop-down box	Disable/ Cycle/Single	x	x	x	x	x	x	Only **Single** can be selected on the AE5520, AE5521, and AE5522.
Cycle	Text box	10 to 3600	-	-	-	x	x	x	Available when **Link Down Generation** is **Cycle**
Enable Count	Check box	ON/OFF	-	-	-	x	x	x	Available when **Link Down Generation** is **Cycle**
Repeat	Text box	1 to 65535	-	-	-	x	x	x	Available when **Link Down Generation** is **Cycle** and **Enable Count** is selected
PoE Setup									
Enable PoE	Check box	ON/OFF	-	-	-	x	-	-	
Class	Drop-down box	Class 0/Class 1/ Class 2/Class 3/ Class 4	-	-	-	x	-	-	Available when **Enable PoE** is selected

x: Supported, -: Unsupported

*1 Unit. 20: AE5520, 21: AE5521, 22: AE5522, 23: AE5523, and 24: AE5524

*2 “1-12” of the AE5523 represent the parameters for PORT1 to PORT12, and “13” represents PORT13.

- The clock extraction setup becomes available when the interface is 1000BASE-T. A port set to master uses the unit's clock for the transmission clock. A port set to slave uses the clock extracted from the received data for the transmission clock.

- If the **Enable PoE** check box is selected, a 25-kΩ signature resistance is used as a response in the PD detection phase. If the **Enable PoE** check box is cleared, a 9-kΩ signature resistance is used to invalidate the detection in the PD detection phase.
  If the **Enable PoE** check box is selected, a limited current according to the class setting is returned in the classification phase. The signature current for each class is as follows:

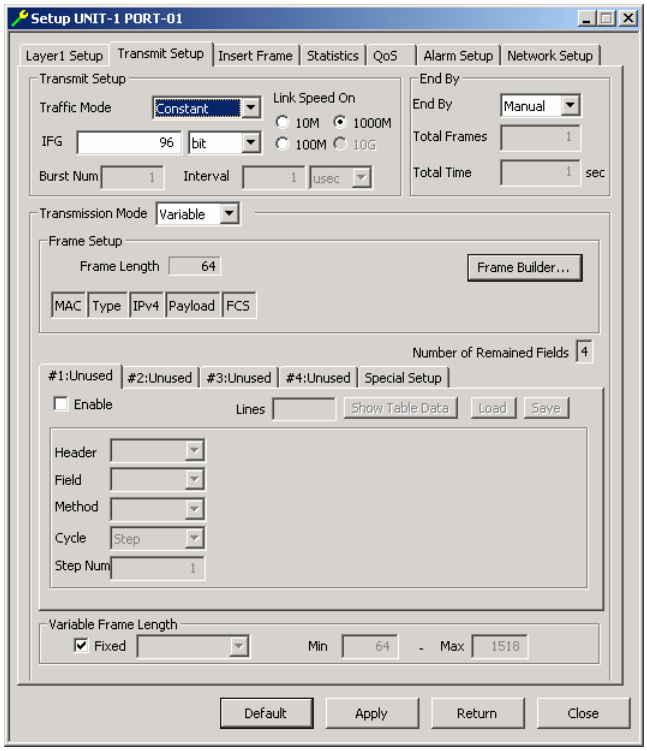
Class	Signature Current
0	4 mA or less
1	10.5 mA
2	18.5 mA
3	28 mA
4	40 mA

5.8 Transmit Setup

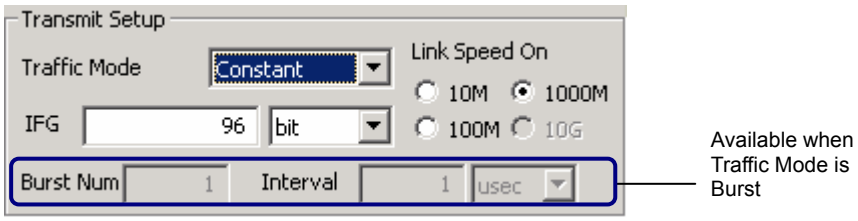
In Transmit Setup, you can set the “transmit setup,” “end by,” and “transmission mode.” The transmission mode parameters that can be specified vary depending on the specified traffic mode (Traffic or BERT) and the transmission mode (Variable or Fixed).

Procedure

1. On the Navigation Window, click the desired PORT number. The Setup UNIT-n PORT-n window of the selected port opens.
2. Click the **Transmit Setup** tab.



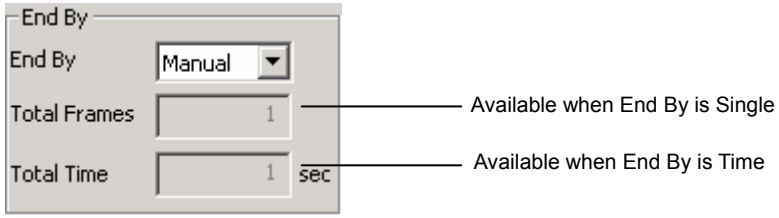
Setting Transmit Setup



- Transmitting at a Constant Rate
  3. Select **Constant** from the **Traffic Mode** box. The **Burst Num** and **Interval** parameters become unavailable.
  4. Type the IFG value in the **IFG** text box and select the unit from the drop-down box.
  5. On the AE5520 and AE5523, select the **Link Speed On** from the option buttons. The IFG according to the selected link speed is calculated. Proceed to step 8.

- Transmitting Bursts
  3. Select **Burst** from the **Traffic Mode** box. The **Burst Num** and **Interval** parameters become available.
  4. Type the IFG value in the **IFG** text box and select the unit from the drop-down box.
  5. On the AE5520 and AE5523, select the **Link Speed On** from the option buttons. The IFG according to the selected link speed is calculated.
  6. Type a value in the **Burst Num** text box.
  7. Type a value in the **Interval** text box and select the unit from the drop-down box. Proceed to step 8.

Setting End By



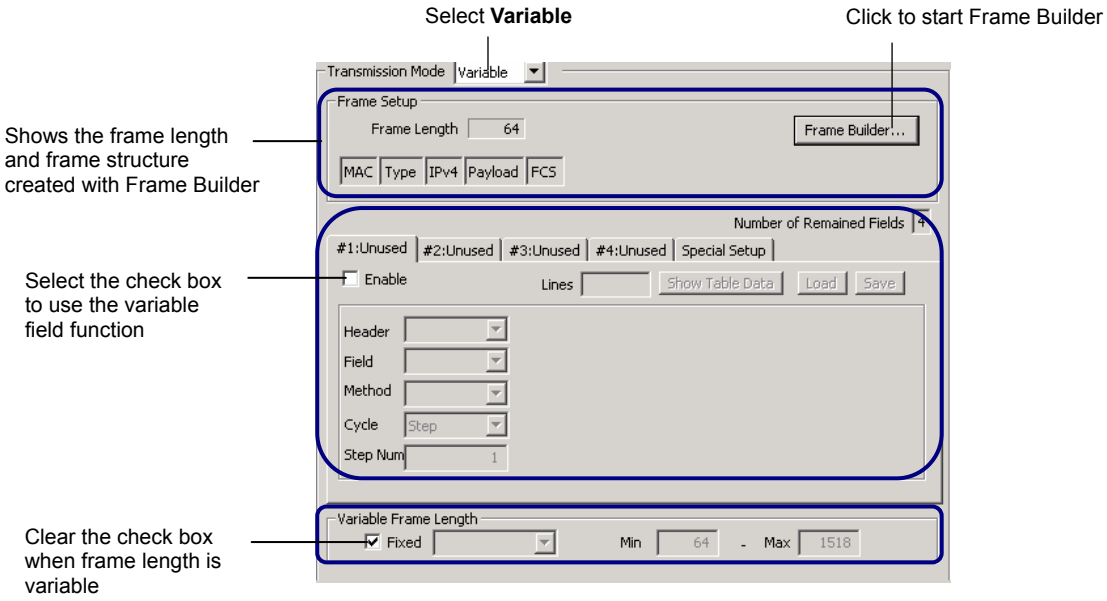
- Transmitting Continously
  8. Select **Manual** from the **End By** box. Proceed to step 10.

- Transmitting Once
  8. Select **Count** from the **End By** box. The **Total Frames** text box becomes available.
  9. Type a value in the **Total Frames** text box. Proceed to step 10.

- Transmitting for a Specified Time
  8. Select **Time** from the **End By** box. The **Total Time** text box becomes available.
  9. Type a time value in the **Total Time** text box. Proceed to step 10.

Setting the Transmission Mode (Variable Traffic Mode)

10. Select **Variable** from the **Transmission Mode** box. The variable transmission parameters are shown.



- Setting the Frame

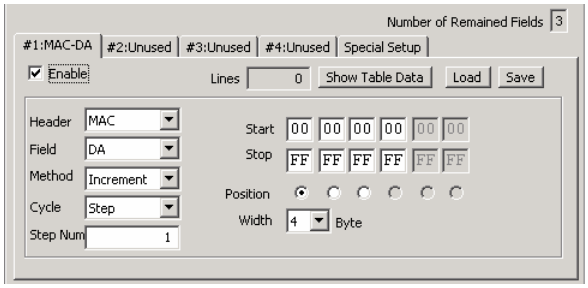
11. Click **Frame Builder**. The Frame Builder starts on a separate window.
12. Create the frame using Frame Builder. For details, see section 5.14.
13. Close Frame Builder. The frame length and frame structure of the created frame are shown in the Frame Setup area.

Note

These parameters set the base frame for the variable transmission.

- Setting the Variable Fields

One variable field can be specified on the AE5520 to AE5522; four variable fields can be specified on the AE5523 and AE5524.



14. Click the tab of the variable field you wish to use. The variable field parameters are shown.
15. To use the variable field, select the **Enable** check box. The variable field parameters become selectable.
16. Set the Header parameter from the **Header** box.
17. Set the field parameter from the **Field** box. For the AE5520 to AE5522, proceed to step 20.
18. From the **Method** box, select **Increment**, **Random**, or **Table**.
19. From the **Cycle** box, select **Step** or **Chain**. If **Step** is selected, **Step Num** becomes selectable.
20. Type the number of steps.

When Method Is Set to **Increment** or **Random** on the AE5523 or AE5524

21. Enter the **Start** and **Stop** values of the variable field.
22. Set other parameters.

Note

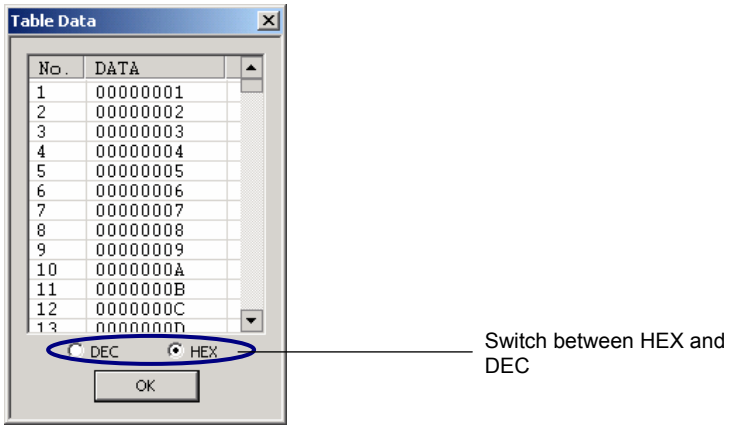
The other parameters vary depending on the selected parameters. For details, see the explanation.

When Method Is Set to **Table** on the AE5523 or AE5524

Note

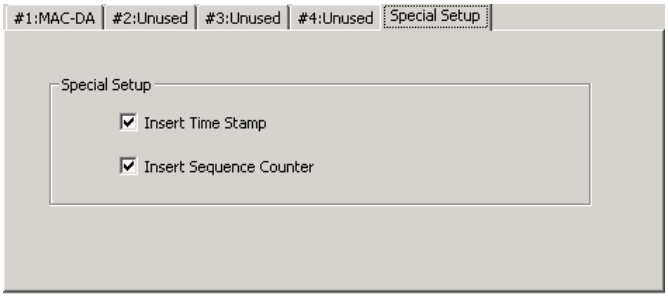
The application does not have a function for creating a table. Create the table in advance using a text editor or a similar program.

21. Click **Load** to show the Open dialog box.
22. Select a file name and click **Load**. The table file is loaded, and the number of lines in the table is shown.
23. To view the contents of the table, click **Show Table Data**. The Table Data dialog box opens.



24. Click **OK** to close the dialog box.

- Setting the Time Stamp and Sequence Counter



25. Click the **Special Setup** tab.

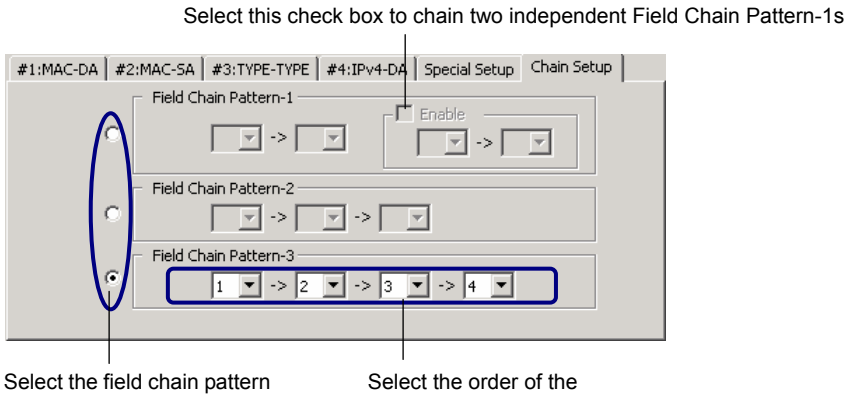
Setting the Latency Measurement

26. To measure the latency, select the **Insert Time Stamp** check box. Otherwise, clear the check box.

Setting the Sequence Check (AE5523 and AE5524)

27. To carry out a sequence check, select the **Insert Sequence Counter** check box. Otherwise, clear the check box.

- Setting the Field Chain (AE5523 and AE5524)
  If multiple variable fields are enabled and the cycle is set to **Chain** in multiple setting tabs, the **Chain Setup** tab is shown.



28. Click the **Chain Setup** tab.
29. Select the chain pattern to use with the **Field Chain Pattern** option buttons. The parameters of the selected field chain pattern become selectable.
30. Select the order of the variable fields to be chained using the drop-down boxes.

Note

- When fields are chained, the field value of the next stage is updated each time the field value of the previous stage cycles through the range of available values.
- When fields are not chained, the value of each field is updated each time a frame is transmitted.

- Varying the Frame Length

• Using a Fixed Frame Length

31. Select the **Fixed** check box. The other Variable Frame Length parameters become unavailable. Proceed to step 34.

• Using Variable Frame Length

31. Clear the **Fixed** check box. The other Variable Frame Length parameters become available.
32. Select the method to vary the frame length from the drop-down box.
33. Enter the **Min** and **Max** values of the variable frame length range. Proceed to step 34.

Note

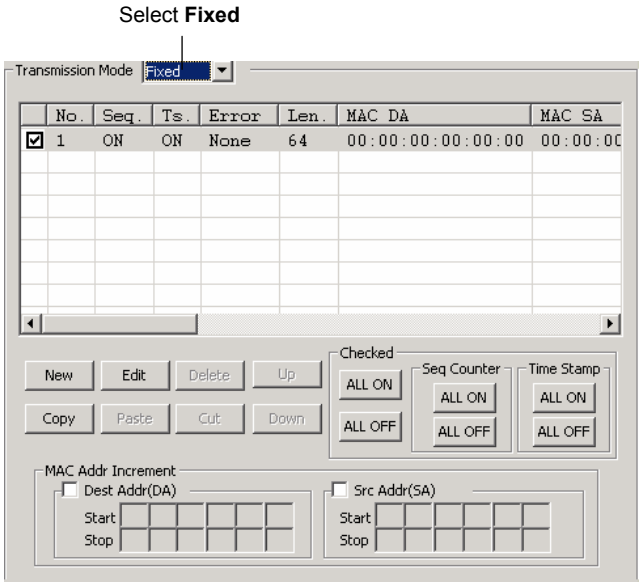
If variable frame length is selected, the following fields are not automatically calculated.

- Length field of the IEEE 802.3 format
- Total Length field of the IPv4 header
- UDP Data Length and Checksum fields of the UDP header
- Checksum field of the TCP header
- Checksum field of the ICMP header
- Checksum field of the IGMP header

- Updating the Settings
  34. Click **Apply**. The data is applied on the application.
  35. Click the **Update** icon or choose **Update** from the **Control** menu.

Setting the Transmission Mode (Fixed Traffic Mode)

10. Select **Fixed** from the **Transmission Mode** menu. The fixed transmission parameters are shown.



- Defining the Frame
  - Creating a New Frame
    11. Click **New**. The Frame Builder starts on a separate window.
    12. Create the frame using Frame Builder. For details, see section 5.14.
    13. Close Frame Builder. The created frame is inserted before the selected frame.

  - Editing the Frame
    11. Select a frame and click **Edit**. The Frame Builder starts on a separate window.
    12. Create the frame using Frame Builder. For details, see section 5.14.
    13. Close Frame Builder. The edited frame is shown.

  - Deleting Frames
    11. Select a frame or multiple frames and click **Delete**. The selected frames are deleted.

  - Copying and Pasting Frames
    11. Select a frame or multiple frames and click **Copy**.
    12. Select the copy destination frame and click **Paste**. The copied frames are inserted before the selected frame.

  - Cutting Frames
    11. Select a frame or multiple frames and click **Cut**.
    12. Select the paste destination frame and click **Paste**. The cut frames are inserted before the selected frame.

  - Moving a Frame
    11. Select the frame you wish to move and click **Up** or **Down**. The selected frame moves in the specified direction.

Proceed to step 14.

- Selecting the Frames to Be Transmitted
  - Transmit All Defined Frames
    14. Click **ALL ON**. The check boxes of all frames are checked. Proceed to step 15.

  - Transmit None of the Defined Frames
    14. Click **ALL OFF**. The check boxes of all frames are cleared. Proceed to step 15.

  - Selecting the Frames to Be Transmitted Individually
    14. Select the individual frame check boxes. Proceed to step 15.

- Inserting Time Stamps

Note

- On the AE5523 and AE5524, time stamps are inserted or not inserted in the frames whose transmit check box is selected.
- On the AE5520, AE5521, and AE5522, time stamps are inserted in all registered frames regardless of the transmit check box setting.

  - Inserting Time Stamps to All Transmitted Frames
    15. Click **ALL ON** under Time Stamp. The **Ts.** field shows **ON**. For the AE5523 and AE5524, proceed to step 16. For other units, proceed to step 17.

  - Not Inserting Time Stamps to All Transmitted Frames
    15. Click **ALL OFF** under Time Stamp. The **Ts.** field shows **OFF**. For the AE5523 and AE5524, proceed to step 16. For other units, proceed to step 17.

- Inserting Sequence Counters (AE5523 and AE5524)

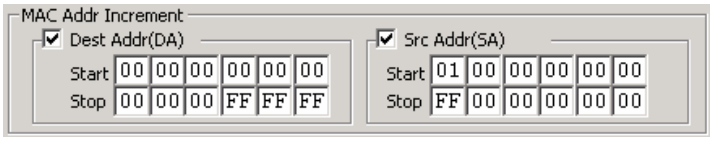
Note

The sequence counters are inserted in the frames whose transmit check box is selected.

  - Inserting Sequence Counters to All Transmitted Frames
    16. Click **ALL ON** under Seq Counter. The **Seq.** field shows **OFF**. Proceed to step 17.

  - Not Inserting Sequence Counters to All Transmitted Frames
    16. Click **ALL OFF** under Seq Counter. The **Seq.** field shows **OFF**. Proceed to step 17.

- Incrementing the MAC Address



  - Incrementing the Destination MAC Address
    17. Select the **Dest Addr (DA)** check box. The **Start** and **Stop** destination MAC addresses become selectable.
    18. Type the MAC address into the **Start** and **Stop** boxes.

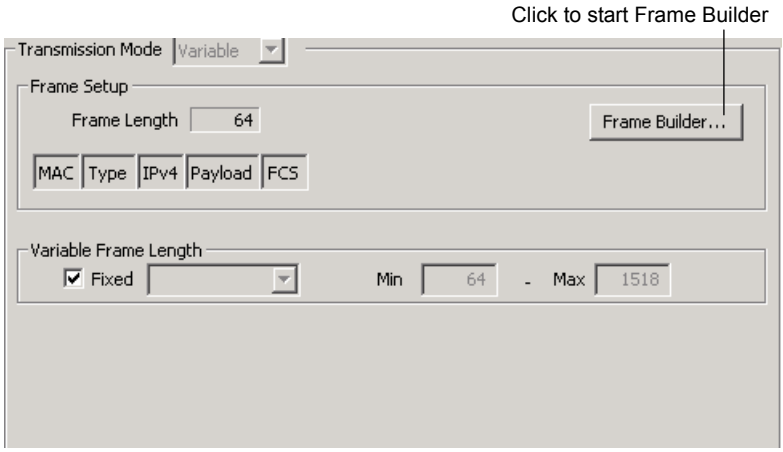
  - Incrementing the Source MAC Address
    19. Select the **Src Addr (SA)** check box. The **Start** and **Stop** source MAC addresses become selectable.
    20. Type the MAC address into the **Start** and **Stop** boxes.

Note

- If the MAC address increment function is enabled, the address is incremented every frame transmission.
- Even if multiple frames are defined, the address is incremented every frame transmission. In other words, the address is not incremented after each round of all defined frames are transmitted.

- Updating the Settings
  21. Click **Apply**. The data is applied on the application.
  22. Click the **Update** icon or choose **Update** from the **Control** menu.

Setting the Transmission Mode (BERT Mode)



- Selecting the Frame Type
  10. Click **Frame Builder**. The Frame Builder starts on a separate window.
  11. Set the transmission frame using Frame Builder. For details, see section 5.14.
  12. Close Frame Builder. The specified frame length and frame structure are shown.

Time stamps and sequence counters cannot be inserted.

Note

- In BERT mode, the PN pattern is embedded entirely in the Payload field to be transmitted. Even if you define an arbitrary data in the Payload field using
- Frame Builder, it is replaced by the PN pattern.
  Time stamps and sequence counters cannot be inserted in BERT mode.

- Varying the Frame Length
  - Using a Fixed Frame Length
    13. Select the **Fixed** check box. The other Variable Frame Length parameters become unavailable. Proceed to step 16.

  - Using Variable Frame Length
    13. Clear the **Fixed** check box. The other Variable Frame Length parameters become available.
    14. Select the method to vary the frame length from the drop-down box.
    15. Enter the **Min** and **Max** values of the variable frame length range. Proceed to step 16.

- Updating the Settings
  16. Click **Apply**. The data is applied on the application.
  17. Click the **Update** icon or choose **Update** from the **Control** menu.

Explanation

Common Parameters

Parameter	Input Method	Input Range/ Selection	Unit (AE55xx)*1						Description
			20	21	22	23*2 1-12	23*2 13	24	
Transmit Setup									
Traffic Mode	Drop-down box	Constant/Burst	x	x	x	x	x	x	
IFG	Text box		x	x	x	x	x	x	
IFG unit	Drop-down box	bit/μsec/nsec/%/ (bit/s)/(frame/s)	x	x	x	x	x	x	
Link Speed On	Option buttons	10M/100M/1000M	x	-	-	x	-	-	AE5520: 10M/100M AE5523: 10M/100M/ 1000M
Burst Num	Text box	1 to 65535	x	x	x	x	x	x	Available when **Traffic Mode** is **Burst**
Interval	Text box	1 to 1000000 (Unit: μsec) 0.001 to 1000.000 (Unit: msec)	x	x	x	x	x	x	Available when **Traffic Mode** is **Burst**
Interval Unit	Drop-down box	msec/μsec	x	x	x	x	x	x	Available when **Traffic Mode** is **Burst**
End By									
End By	Drop-down box	Manual/Count/ Time	x	x	x	x	x	x	
Total Frames	Text box	1 to 4294967295	x	x	x	x	x	x	Available when **End By** is **Const**
Total Time (sec)	Text box	1 to 86400	x	x	x	x	x	x	Available when **End By** is **Time**
Transmission Mode									
Transmission Mode	Drop-down box	Variable/Fixed	x	x	x	x	x	x	Available when the test mode is **Traffic** Not selectable when the test mode is **BERT**

x: Supported, -: Unsupported

*1 Unit. 20: AE5520, 21: AE5521, 22: AE5522, 23: AE5523, and 24: AE5524

*2 "1-12" of the AE5523 represent the parameters for PORT1 to PORT12, and "13" represents PORT13.

- Operation When Burst Is Specified
  The frames are transmitted as shown in the figure below in burst mode.
  The frames are transmitted according to the inter frame gap (IFG) setting during the burst section specified by the number of bursts.
  Specify the spacing between bursts with the interval setting.
  If the end of the burst section exceeds the burst interval, the frames are transmitted in the same manner as constant rate transmission.

Variable Transmission Mode in Traffic Mode

- Variable Field Parameters

Parameter	Input Method	Input Range/ Selection	Description
Variable Field			
Field #1 to #4 Tabs			AE5520 to AE5522:#1 field AE5523, AE5524:#1 to #4 field
Enable	Check box	ON/OFF	Sets the variable field. • ON: Use variable fields • OFF: Not use variable fields
Header	Drop-down box	MAC/EMAC/ TYPE/ETYPE/ VLAN1/VLAN2/ VLAN3/VLAN4/ MPLS1/MPLS2/ MPLS3/MPLS4/ EMPLS1/ EMPLS2/ EMPLS3/ EMPLS4/ IPv4/IPv6/ TCP/UDP/ PAYLOAD	Selects the header. The selectable parameters vary depending on the frame selected using Frame Builder. • MAC: Selects MAC address. • EMAC: Selects EoMPLS MAC address. • TYPE: Selects TYPE. • ETYPE: Selects EoMPLS TYPE. • VLAN1 to 4: Selects VLAN tag. • MPLS1 to 4: Selects MPLS. • EMPLS1 to 4: Selects EoMPLS. • IPv4: Selects IPv4. • IPv6: Selects IPv6. • TCP: Selects TCP. • UDP: Selects UDP. • PAYLOAD: Selects payload.
Field	Drop-down box	DA/SA/TYPE/ VLAN ID/Priority/ EXP/LABEL/TOS/ID/ Protocol/ TrafficClass/ FlowLabel/ NextHeader/ DPort/SPort/ PAYLOAD	Selects the field. The selectable parameters vary depending on the frame and header selected using Frame Builder. • DA: Selects destination address. • SA: Selects source address. • TYPE: Selects TYPE field. • VLAN ID: Selects VLAN ID of the VLAN tag. • Priority: Selects Priority of the VLAN tag. • EXP: Selects EXP field of the MPLS header. • LABEL: Selects the label value of the MPLS header. • TOS: Selects TOS field of IPv4. • ID: Selects IPv4 ID. • Protocol: Selects IPv4 protocol. • TrafficClass: Selects IPv6 traffic class. • FlowLabel: Selects IPv6 flow label. • NextHeader: Selects IPv6 next header. • DPort: Selects destination port number of TCP and UDP. • SPort: Selects source port number of TCP and UDP. • PAYLOAD: Selects payload.
Method	Drop-down box	Increment/Random/ Table	Selects the method of varying the field. Only Increment is available on the AE5520 to AE5522. • Increment: Varies the field by the step number from start to stop. • Random: Varies the field randomly from start to stop. *: If the cycle is **Chain**, **Random** cannot be specified. • Table: The field is varied by referring to a table.
Cycle	Drop-down box	Step/Chain	Selects the cycle for varying the field. Only Step is available on the AE5520 to AE5522. • Step: Varies the field at the interval specified by the step number. • Chain: Varies multiple fields in a chain.

Parameter	Input Method	Input Range/ Selection	Description
Step Num	Text box	1 to 4294967295	Sets the number of steps for varying the field. Available when cycle is set to step on the AE5523 and AE5524. Fixed to 1 on the AE5520 to AE5522.
Special Setup Tab			
Insert Time Stamp	Check box	ON/OFF	Inserts time stamps in the transmission frame for latency (delay) measurement. • ON: Insert time stamps. • OFF: Not insert time stamps.
Insert Sequence Counter	Check box	ON/OFF	Inserts counters in the transmission frame for sequence error measurement. Available on the AE5523 and AE5524. • ON: Insert sequence counters. • OFF: Not insert sequence counters.
Chain Setup Tab			
Chain Pattern Selection	Option buttons	Field Chain Pattern-1/ Field Chain Pattern-2/ Field Chain Pattern-3	Selects the field chain pattern. Available only on the AE5523 and AE5524. • Field Chain Pattern-1: Varies two fields in a chain. • Field Chain Pattern-2: Varies three fields in a chain. • Field Chain Pattern-3: Varies four fields in a chain.
Enable	Check box	ON/OFF	Used to chain two independent Field Chain Pattern-1s when four fields are selected. • ON: Chain two independent patterns. • OFF: Not chain two independent patterns.
Chained Fields	Drop-down box	1/2/3/4	Selects the fields to be chained. The selectable fields vary depending on the fields that have been enabled.
Variable Frame Length			
Fixed	Check box	ON/OFF	ON: Fixed frame length OFF: Variable frame length
Method	Drop-down box	Increment/ Decrement/ Random	Increment: Transmits frames by incrementing the frame length from the minimum frame length to the maximum frame length at 1 byte steps. Decrement: Transmits frames by decrementing the frame length from the maximum frame length to the minimum frame length at 1 byte steps. Random: Transmits frames by varying the frame length randomly between the minimum frame length to the maximum frame length.
Min.	Text box	64 to 1518	Sets the minimum frame length.
Max.	Text box	64 to 9999	Sets the maximum frame length.

- Parameters by Header and Field

Header	Field	Parameter	Input Method	Input Range/ Selection	Description
MAC	DA	Start	Text box	00 to FFFFFFFFFFFF (HEX)	Sets the start value of the destination MAC address.
		Stop	Text box	00 to FFFFFFFFFFFF (HEX)	Sets the stop value of the destination MAC address.
		Position	Option buttons	1st to 6th	Selects the position in the destination MAC address to be varied.
		Width	Drop-down box	1 to 6	Selects the width in the destination MAC address to be varied.
	SA	Start	Text box	00 to FFFFFFFFFFFF (HEX)	Sets the start value of the source MAC address.
		Stop	Text box	00 to FFFFFFFFFFFF (HEX)	Sets the stop value of the source MAC address.
		Position	Option buttons	1st to 6th	Selects the position in the source MAC address to be varied.
		Width	Drop-down box	1 to 6	Selects the width in the source MAC address to be varied.
EMAC	DA	Start	Text box	00 to FFFFFFFFFFFF (HEX)	Sets the start value of the destination MAC address of EoMPLS.
		Stop	Text box	00 to FFFFFFFFFFFF (HEX)	Sets the stop value of the destination MAC address of EoMPLS.
		Position	Option buttons	1st to 6th	Selects the position in the destination MAC address of EoMPLS to be varied.
		Width	Drop-down box	1 to 6	Selects the width in the destination MAC address of EoMPLS to be varied.
	SA	Start	Text box	00 to FFFFFFFFFFFF (HEX)	Sets the start value of the source MAC address of EoMPLS.
		Stop	Text box	00 to FFFFFFFFFFFF (HEX)	Sets the stop value of the source MAC address of EoMPLS.
		Position	Option buttons	1st to 6th	Selects the position in the source MAC address of EoMPLS to be varied.
		Width	Drop-down box	1 to 6	Selects the width in the source MAC address of EoMPLS to be varied.
TYPE	TYPE	Start	Text box	00 to FFFF(HEX)	Sets the start value of TYPE.
		Stop	Text box	00 to FFFF(HEX)	Sets the stop value of TYPE.
ETYPE	TYPE	Start	Text box	00 to FFFF(HEX)	Sets the start value of EoMPLS TYPE.
		Stop	Text box	00 to FFFF(HEX)	Sets the stop value of EoMPLS TYPE.
VLAN1 to 4	Priority	Start	Text box	0 to 7	Sets the start value of Priority of the VLAN tag.
		Stop	Text box	0 to 7	Sets the stop value of Priority of the VLAN tag.
	VLAN ID	Start	Text box	0 to 4095	Sets the start value of VLAN ID of the VLAN tag.
		Stop	Text box	0 to 4095	Sets the stop value of VLAN ID of the VLAN tag.

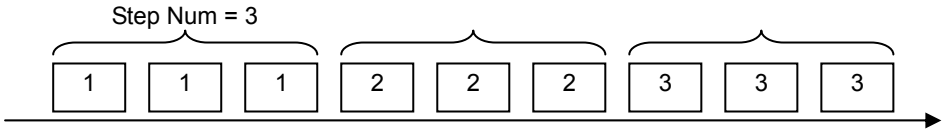
Header	Field	Parameter	Input Method	Input Range/ Selection	Description
MPLS1 to 4	EXP	Start	Text box	0 to 7	Sets the start value of EXP of the MPLS header.
		Stop	Text box	0 to 7	Sets the stop value of EXP of the MPLS header.
	Label	Start	Text box	0 to 1048575	Sets the start value of the label of the MPLS header.
		Stop	Text box	0 to 1048575	Sets the stop value of the label of the MPLS header.
EMPLS1 to 4	EXP	Start	Text box	0 to 7	Sets the start value of EXP of the EoMPLS header.
		Stop	Text box	0 to 7	Sets the stop value of EXP of the EoMPLS header.
	Label	Start	Text box	0 to 1048575	Sets the start value of the label of the EoMPLS header.
		Stop	Text box	0 to 1048575	Sets the stop value of the label of the EoMPLS header.
IPv4	DA	Target	Option buttons	Network Part/ Host Part	Selects the part of the IPv4 destination address to be varied. • Network Part: Varies the network address. • Host Part: Varies the host address.
		Start	Text box	0.0.0.0 to 255.255.255.255	Sets the start value of the IPv4 destination address.
		Stop	Text box	0.0.0.0 to 255.255.255.255	Sets the stop value of the IPv4 destination address.
		Netmask	Text box	0.0.0.0 to 255.255.255.255	Sets the netmask of the IPv4 destination address.
	SA	Target	Option buttons	Network Part/Host Part	Selects the part of the IPv4 source address to be varied. • Network Part: Varies the network address. • Host Part: Varies the host address.
		Start	Text box	0.0.0.0 to 255.255.255.255	Sets the start value of the IPv4 source address.
		Stop	Text box	0.0.0.0 to 255.255.255.255	Sets the stop value of the IPv4 source address.
		Netmask	Text box	0.0.0.0 to 255.255.255.255	Sets the netmask of the IPv4 source address.
	TOS	Start	Text box	00 to FF(HEX)	Sets the start value of the IPv4 TOS field.
		Stop	Text box	00 to FF(HEX)	Sets the stop value of the IPv4 TOS field.
	ID	Start	Text box	0 to 65535	Sets the start value of the IPv4 ID.
		Stop	Text box	0 to 65535	Sets the stop value of the IPv4 ID.
	Protocol	Start	Text box	0 to 255	Sets the start value of the IPv4 protocol.
		Stop	Text box	0 to 255	Sets the stop value of the IPv4 protocol.

Header	Field	Parameter	Input Method	Input Range/ Selection	Description
IPv6	DA	Start	Text box	0000 to FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF (HEX)	Sets the start value of the IPv6 destination address.
		Stop	Text box	0000 to FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF (HEX)	Sets the stop value of the IPv6 destination address.
		Position	Option buttons	1st to 8th	Selects the position in the IPv6 destination address to be varied.
		Width	Drop-down box	2/4/8/12/16	Selects the width in the IPv6 destination address to be varied.
	SA	Start	Text box	0000 to FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF (HEX)	Sets the start value of the IPv6 source address.
		Stop	Text box	0000 to FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF (HEX)	Sets the stop value of the IPv6 source address.
		Position	Option buttons	1st to 8th	Selects the position in the IPv6 source address to be varied.
		Width	Drop-down box	2/4/8/12/16	Selects the width in the IPv6 source address to be varied.
	TrafficClass	Start	Text box	00 to FF(HEX)	Sets the start value of the IPv6 traffic class.
		Stop	Text box	00 to FF(HEX)	Sets the stop value of the IPv6 traffic class.
	FlowLabel	Start	Text box	0 to 1048575	Sets the start value of the IPv6 flow label.
		Stop	Text box	0 to 1048575	Sets the stop value of the IPv6 flow label.
	NextHeader	Start	Text box	0 to 255	Sets the start value of the IPv6 next header.
		Stop	Text box	0 to 255	Sets the stop value of the IPv6 next header.
TCP	DPort	Start	Text box	0 to 65535	Sets the start value of the TCP destination port.
		Stop	Text box	0 to 65535	Sets the stop value of the TCP destination port.
	SPort	Start	Text box	0 to 65535	Sets the start value of the TCP source port.
		Stop	Text box	0 to 65535	Sets the stop value of the TCP source port.
UDP	DPort	Start	Text box	0 to 65535	Sets the start value of the UDP destination port.
		Stop	Text box	0 to 65535	Sets the stop value of the UDP destination port.
	SPort	Start	Text box	0 to 65535	Sets the start value of the UDP source port.
		Stop	Text box	0 to 65535	Sets the stop value of the UDP source port.

Header	Field	Parameter	Input Method	Input Range/ Selection	Description
PAYLOAD	PAYLOAD	Start	Text box	0 to 9990	Sets the start value of the payload.
		Stop	Text box	0 to 9990	Sets the stop value of the payload.
		Position	Text box	0 to 9990	Sets the position in the payload to be varied.
		Width	Drop-down box	1/2/4/8/12/16	Sets the width in the payload to be varied.

- Table Data
  The application does not have a function for creating table data. Create the table using a text editor, Excel, or other programs.
  The format of the table data file is as follows:
  - 32-bit data per data value.
  - Each data value is separated by a line feed. (1 data value per line)
  - If the data value starts with "0x," it is read as a hexadecimal value. Otherwise, the data value is read as a decimal value.
  - The file name extension is .csv.
  - When saved, the data is saved as hexadecimal data.

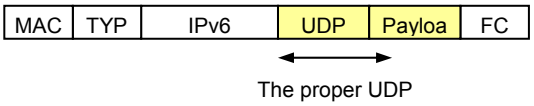
- Operation When Cycle Is Set to Step
  If Cycle is set to Step, the same frame is transmitted for the number of frames specified by Step Num.
  The following example shows the step operation when Method is set to Increment.



- Header Parameter
  The header parameter can be selected when the protocol field is within the base frame length.
  If the frame length is shown in yellow, it indicates that there are protocol fields that are outside the base frame length.

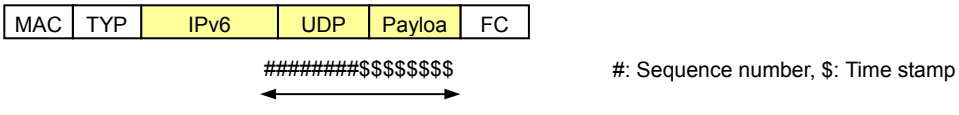
  Example 1: When the frame length of the selected frame structure is short
  - Frame structure: MAC+TYPE+IPv6+UDP+PAYLOAD+FCS
  - Frame length: 64 bytes

  Since the UDP frame and Payload are outside the base frame length, UDP and Payload cannot be selected for the Header parameter. They can be selected by increasing the frame length.



  Example 2: When the configured protocol fields are overwritten (time stamp and sequence counter insertion)
  - Frame structure: MAC+TYPE+IPv6+UDP+PAYLOAD+FCS
  - Frame length: 64 bytes

  The time stamp and sequence counter are normally inserted in the Payload section (8-byte data each). If the payload size is exceeded, the protocol field immediately before it is overwritten. Overwritten protocol fields cannot be selected.



IPv6, UDP, and Payload cannot be selected, because they were overwritten.

Fixed Transmission Mode in Traffic Mode

- Variable Field Parameters

Parameter	Input Method	Input Range/ Selection	Description
Variable Field			
No.	Check box	ON/OFF	Selects the frames to be transmitted. Up to 127 frames can be set. • ON: Transmit the frame. • OFF: Not transmit the frame.
New	Button		Creates a new frame.
Edit	Button		Edits the specified frame.
Delete	Button		Deletes the specified frame.
Copy	Button		Copies the specified frame.
Paste	Button		Pastes the copied or cut frame before the specified frame.
Cut	Button		Cuts the specified frame.
Up	Button		Reorders the specified frame and the previous frame.
Down	Button		Reorders the specified frame and the next frame.
Checked			
ALL ON	Button		Selects all frames to be transmitted.
ALL OFF	Button		Does not select all frames to be transmitted.
Seq Counter			
ALL ON	Button		Inserts a sequence counter to all frames selected as transmit frames (AE5523 and AE5524).
ALL OFF	Button		Does not insert a sequence counter to all frames selected as transmit frames (AE5523 and AE5524).
Time Stamp			
ALL ON	Button		Inserts a time stamp to all frames selected as transmit frames.
ALL OFF	Button		Does not Insert a time stamp to all frames selected as transmit frames.
MAC Addr Increment			
Dest Addr (DA)	Check box	ON/OFF	Selects whether to increment the destination address. •ON: Increment the destination address. •OFF: Not increment the destination address.
Start	Text box	000000000000 to FFFFFFFFFFFF (HEX)	Sets the start value of the destination MAC address.
Stop	Text box	000000000000 to FFFFFFFFFFFF (HEX)	Sets the stop value of the destination MAC address.
Src Addr (SA)	Check box	ON/OFF	Selects whether to increment the source address. •ON: Increment the source address. •OFF: Not Increment the source address.
Start	Text box	000000000000 to FFFFFFFFFFFF (HEX)	Sets the start value of the source MAC address.
Stop	Text box	000000000000 to FFFFFFFFFFFF (HEX)	Sets the stop value of the source MAC address.

*: Time stamp insertion applies to all registered frames on the AE5520, AE5521, and AE5522, regardless of the Checked setting.

- Displayed Parameters

Displayed Parameters	Description
Seq.	Shows the sequence counter.
Ts.	Shows the time stamp.
Length	Shows the length.
MAC DA	Shows the destination MAC address.
MAC SA	Shows the source MAC address.
TYPE	Shows the TYPE field.
DATA	Shows the data.

Variable Field Parameters in BERT Mode

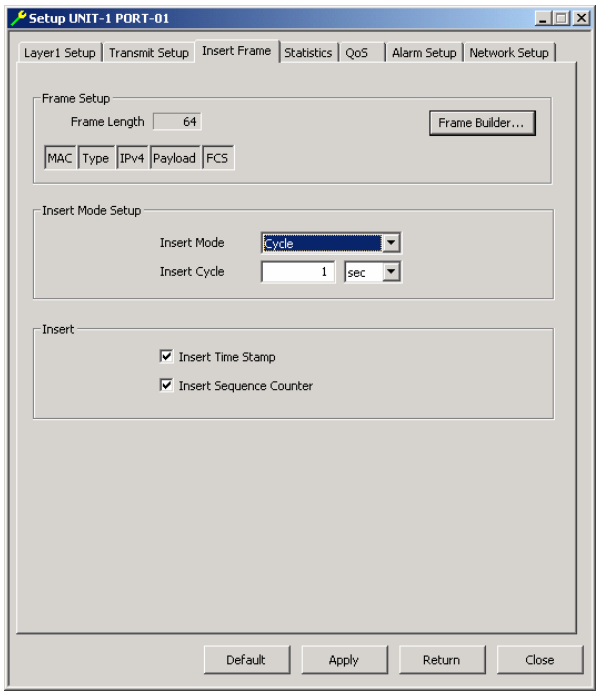
Parameter	Input Method	Input Range/ Selection	Description
Variable Frame Length			
Fixed	Check box	ON/OFF	ON: Fixed frame length OFF: Variable frame length
Method	Drop-down box	Increment/ Decrement/ Random	Increment: Transmits frames by incrementing the frame length from the minimum frame length to the maximum frame length at 1 byte steps. Decrement: Transmits frames by decrementing the frame length from the maximum frame length to the minimum frame length at 1 byte steps. Random: Transmits frames by varying the frame length randomly between the minimum frame length to the maximum frame length.
Min.	Text box	64 to 1518	Sets the minimum frame length.
Max.	Text box	64 to 9999	Sets the maximum frame length.

5.9 Setting the Insert Frame

The specified insert frame can be generated singularly or cyclically (AE5523 and AE5524 only).

Procedure

1. On the Navigation Window, click the desired PORT number. The Setup UNIT-n PORT-n window of the selected port opens.
2. Click the **Insert Frame** tab.



Setting the Insert Mode

- Disabling the Insert Mode
  3. Select **Disable** from the **Insert Mode** box. Proceed to step 5.

- Single Generation
  3. Select **Single** from the **Insert Mode** box. The **Frame Builder** button becomes selectable. Proceed to step 5.

- Cycle Generation
  3. Select **Cycle** from the **Insert Mode** box. The **Frame Builder** button and **Insert Cycle** box become selectable.
  4. Type a value in the **Insert Cycle** text box and select the unit from the drop-down box. Proceed to step 5.

Frame Setup

5. Click **Frame Builder**. The Frame Builder starts on a separate window.
6. Set the frame structure, address, and frame pattern on the Frame Builder. For details, see section 5.14.
7. Close Frame Builder. The specified frame length and frame structure are shown.

Insert

If the test mode is **TRAFFIC** and the insert mode is set to **Single** or **Cycle** (AE5523 and AE5524), time stamps and sequence counters (AE5523 and AE5524) can be inserted in the insert frame.

- Inserting Time Stamps and Sequence Counters
  8. Select the **Insert Time Stamp** and **Insert Sequence Counter** (AE5523 and AE5524) check boxes. Proceed to step 9.

- Not Inserting Time Stamps and Sequence Counters
  8. Clear the **Insert Time Stamp** and **Insert Sequence Counter** (AE5523 and AE5524) check boxes. Proceed to step 9.

- Updating the Settings
  9. Click **Apply**. The data is applied on the application.
  10. Click the **Update** icon or choose **Update** from the **Control** menu.

Explanation

Parameter	Input Method	Input Range/Selection	Description
Insert Mode Setup			
Insert Mode	Drop-down box	Disable/ Cycle/ Single	Sets the transmission mode of the insert frame. • Disable: Disables insert frame. • Cycle: (AE5523 and AE5524) Transmits insert frames cyclically. • Single: Transmits one insert frame.
Insert Cycle	Text box	1 to 600 (Unit: sec) 1 to 600000 (Unit: msec)	Sets the transmission cycle of the insert frame. Available on the AE5523 and AE5524 when Insert Mode is **Cycle**.
Insert Cycle Unit	Drop-down box	sec/msec	Sets the transmission cycle unit of the insert frame. Available on the AE5523 and AE5524 when Insert Mode is **Cycle**. • sec: Unit of seconds • msec: Unit of milliseconds
Insert			
Insert Time Stamp	Check box	ON/OFF	Inserts time stamps in the insert frame for latency (delay) measurement. Available when Insert Mode is **Single** or **Cycle**. • ON: Insert time stamps. • OFF: Not insert time stamps.
Insert Sequence Counter	Check box	ON/OFF	Inserts counters in the insert frame for sequence error measurement. Available on the AE5523 and AE5524 when Insert Mode is **Single** or **Cycle**. • ON: Insert sequence counters. • OFF: Not insert sequence counters.

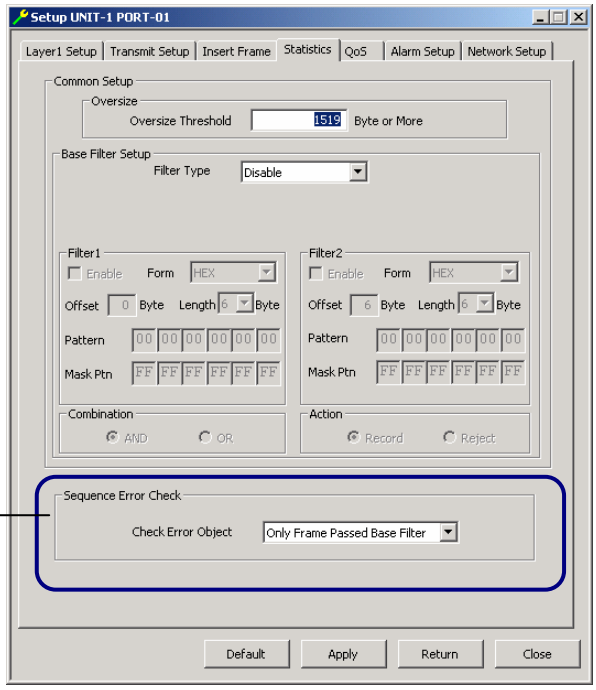
- The time stamp and sequence counter are linked with the Frame Builder settings.
- If the transmission timing of the insert frame and normal transmission frame overlaps, the insert frame takes precedence. A minimum IFG of 96 bits is reserved before and after the insert frame.
- The PN pattern is not inserted in the Payload field for the insert frame in BERT mode. The continuity of the PN pattern is guaranteed only for normal transmission frames.

5.10 Setting the Statistical Conditions

This section explains the details of setting the statistical conditions on the receiving side.

Procedure

1. On the Navigation Window, click the desired PORT number. The Setup UNIT-n PORT-n window of the selected port opens.
2. Click the **Statistics** tab.



Available on the AE5523 and AE5524 in Traffic mode
Shows BERT settings in BERT mode

Setting the Oversize Threshold

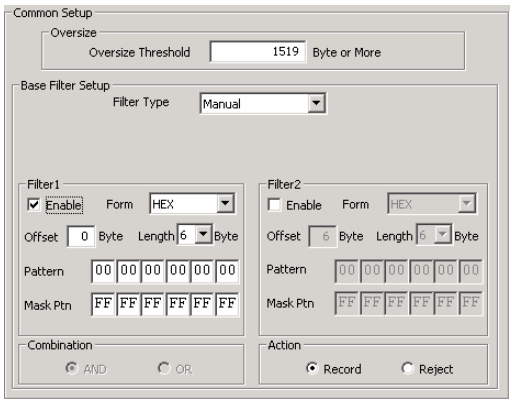
3. Type the oversize threshold value in the **Oversize Threshold** box.

Setting the Base Filter

- Disabling the Base Filter

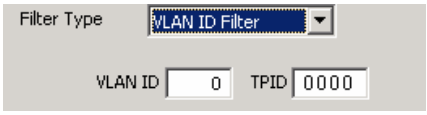
4. Select **Disable** from the **Filter Type** box. All other Base Filter Setup parameters become unavailable.

- Setting the Filter Manually



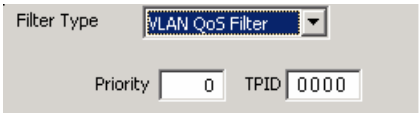
4. Select **Manual** from the **Filter Type** box. The Filter 1 and 2 Enable check boxes become selectable.
5. Select the **Enable** check box of Filter 1. The Filter 1 parameters and **Action** become selectable.
6. From the **Form** box, select **HEX**, **DEC**, or **IPv4Addr**.
7. Set the **Offset**, **Length**, **Pattern**, and **Mask Ptn**.
8. Select **Record** or **Reject** under **Action.**
9. If you are setting filter 2, set the parameters in the same fashion. The Filter 2 parameters and **Combination** become selectable.
10. Select **AND** or **OR** under **Combination.** Proceed to step 11.

- VLAN ID Filter



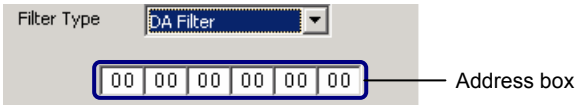
4. Select **VLAN ID Filter** from the **Filter Type** box. The **VLAN ID** and **TPID** boxes becomes selectable.
5. Type values in the **VLAN ID** and **TPID** boxes. Proceed to step 11.

- VLAN QoS Filter



4. Select **VLAN QoS Filter** from the **Filter Type** box. The **Priority** and **TPID** boxes becomes selectable.
5. Type values in the **Priority** and **TPID** boxes. Proceed to step 11.

- DA Filter and SA Filter



4. Select **DA Filter** from the **Filter Type** box to set the destination address or **SA Filter** to set the source address. The address box becomes selectable.
5. Type the address. Proceed to step 11.

- L2 Unicast Filter

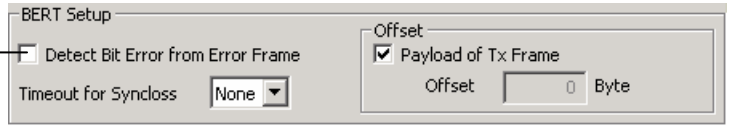
4. Select **L2 Unicast Filter** from the **Filter Type** box. Proceed to step 11.

Setting the Sequence Error Object (On the AE5523 and AE5524 in Traffic Mode)

11. Select the sequence error check target from the **Check Error Object** box. Proceed to step 15.

Setting BERT (BERT Mode)

Available on the AE5522, AE5523, and AE5524



- Setting the Bit Error Detection Target (AE5522, AE5523, and AE5524)
  - When Detecting Bit Errors on Error Frames
    11. Select the **Detect Bit Error from Error Frame** check box. Proceed to step 12.
  - When Not Detecting Bit Errors on Error Frames
    11. Clear the **Detect Bit Error from Error Frame** check box. Proceed to step 12.

- Setting the Sync Loss Timeout Value
  12. Select **None** or **2s** from the **Timeout for Syncloss** box.

- Setting the Comparison Start Position
  - Aligning to the Payload Position of the Transmission Frame
    13. Select the **Payload of Tx Frame** check box. Proceed to step 15.
  - Not Aligning to the Payload Position of the Transmission Frame (Using the Offset)
    13. Clear the **Payload of Tx Frame** check box. The Offset box becomes selectable.
    14. Type the offset value in the **Offset** box. Proceed to step 15.

- Updating the Settings
  15. Click **Apply**. The data is applied on the application.
  16. Click the **Update** icon or choose **Update** from the **Control** menu.

Explanation

Parameter	Input Method	Input Range/ Selection	Description
Oversize			
Oversize Threshold	Text box	65 to 10000	Sets the threshold level of the oversize error.
Base Filter Setup			
Filter Type	Drop-down box	Disable/ Manual/ VLAN ID Filter/ VLAN QoS Filter/ DA Filter/ SA Filter/ L2 Unicast Filter	Selects the base filter type. • Disable: All received frames are used to calculate statistics. • Manual: Frames that match the filter conditions set manually are used to calculate statistics. • VLAN ID Filter: Frames whose VLAN ID and TPID match are used to calculate statistics. • VLAN QoS Filter: Frames whose Priority and TPID match are used to calculate statistics. • DA Filter: Frames whose destination MAC address matches are used to calculate statistics. • SA Filter: Frames whose source MAC address matches are used to calculate statistics. • L2 Unicast Filter: L2 unicast frames are used to calculate statistics.
Manual			
Enable	Check box	ON/OFF	Enables/Disables Filter 1 and Filter 2 individually. • ON: Enable • OFF: Disable
Form	Drop-down box	HEX/DEC/IPv4Addr	Select the input format of the comparison pattern. • HEX: Hexadecimal input • DEC: Decimal input • IPv4Addr: Decimal input
Offset	Text box	0 to 58	Sets the start position for comparing the pattern. Set a value between 0 to 58 bytes in decimal notation.
Length	Drop-down box	1/2/3/4/5/6	Sets the length of the comparison pattern. Available when From is set to HEX or DEC. Set a value in the range of 1 to 6.
Pattern	Text box	HEX/DEC/IPv4Addr	Sets the comparison pattern. Varies depending on the Form and Length settings. • HEX: 00 to FFFFFFFFFFFF • DEC: 0 to 281474976710655 • IPv4Addr: 0.0.0.0 to 255.255.255.255
Mask Ptn	Text box	00 to FFFFFFFFFFFF (HEX)	Sets the mask pattern. Compares the bits set to 1.
Combination	Option buttons	AND/OR	Compares the patterns of Filter 1 and Filter 2. Available when both Filter 1 and Filter 2 are enabled. • AND: AND logic is applied to Filter 1 and Filter 2. • OR: OR logic is applied to Filter 1 and Filter 2.
Action	Option buttons	Record/Reject	Sets the filter action. • Record: Frames whose pattern matches are used to calculate statistics. • Reject: Frames whose pattern does not match are used to calculate statistics.

Parameter	Input Method	Input Range/ Selection	Description
VLAN ID Filter			
VLAN ID	Text box	0 to 4095	Sets the VLAN ID.
TPID	Text box	0000 to FFFF (HEX)	Sets the TPID.
VLAN QoS Filter			
Priority	Text box	0 to 7	Sets the Priority.
TPID	Text box	0000 to FFFF (HEX)	Sets the TPID.
DA Filter			
MAC Address	Text box	000000000000 to FFFFFFFFFFFF (HEX)	Sets the destination MAC address.
SA Filter			
MAC Address	Text box	000000000000 to FFFFFFFFFFFF (HEX)	Sets the source MAC address.
Sequence Error Check			
Check Error Object	Drop-down box	Only Frame Passed Base Filter/ QoS CH. 1/ QoS CH. 2/ QoS CH. 3/ QoS CH. 4/ QoS CH. 5/ QoS CH. 6/ QoS CH. 7/ QoS CH. 8	Selects the object for checking the sequence error. Available on the AE5523 and AE5524 when Test Mode is Traffic.
BERT Setup			
Detect Bit Error from Error Frame	Check box	ON/OFF	Sets whether to detect bit errors on error frames. Available on the AE5522, AE5523, and AE5524 when Test Mode is BERT. • ON: Detect bit errors on error frames. • OFF: Not detect bit errors on error frames.
Timeout for Syncloss	Drop-down box	None/2s	Selects the sync loss timeout value of the PN pattern. • None: No timeout • 2s: 2-s timeout
Offset			
Payload of Tx Frame	Check box	ON/OFF	Sets the comparison start position of the PN pattern. • ON: Compares the PN pattern from the payload start position of the transmission frame. • OFF: Compares the PN patter from the position specified by offset.
Offset	Text box	0 to 255	Sets the offset position (bytes). Available when the Payload of Tx Frame check box is cleared.

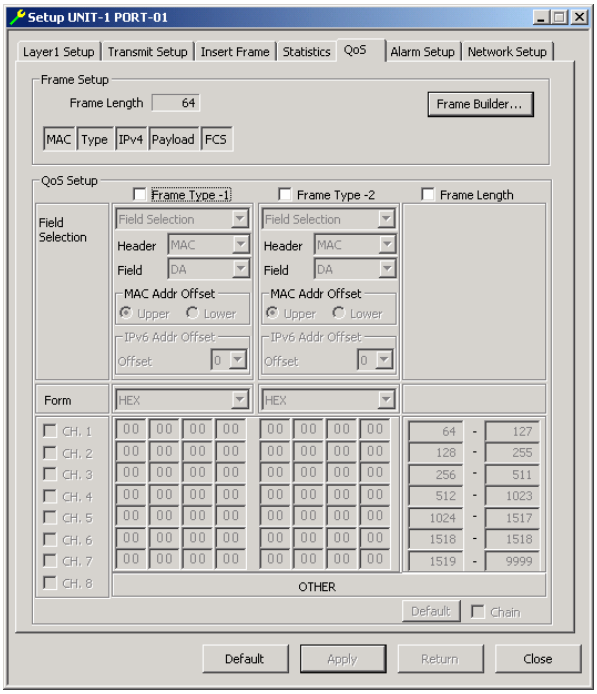
- For the capture filter conditions, see section 7.6.

5.11 Setting the QoS Conditions

Statistical conditions for each QoS can be specified on up to eight flows when the test mode is **TRAFFIC** on the AE5523 and AE5524.

Procedure

1. On the Navigation Window, click the desired PORT number. The Setup UNIT-n PORT-n window of the selected port opens.
2. Click the **QoS** tab.



Frame Setup

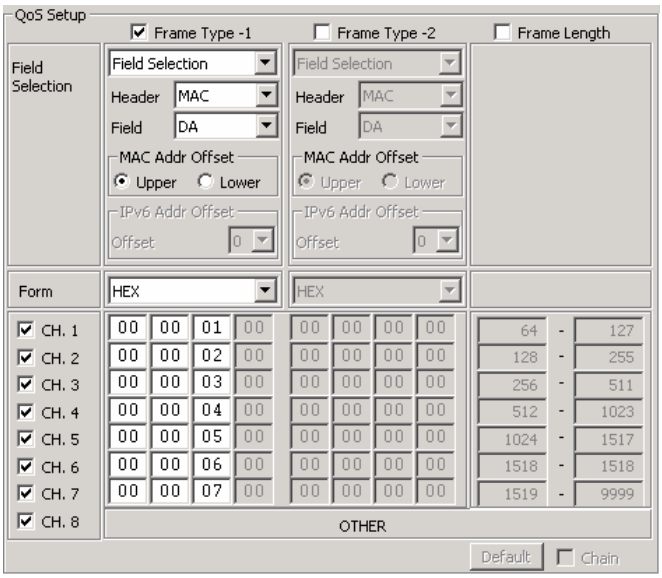
3. Click **Frame Builder**. The Frame Builder starts on a separate window.
4. Using the Frame Builder, set the frame structure, address, and frame pattern of the receive frame used to calculate statistics for each QoS. For details, see section 5.14.
5. Close Frame Builder. The specified frame length and frame structure are shown.

QoS Setup

- Setting Statistics by Frames

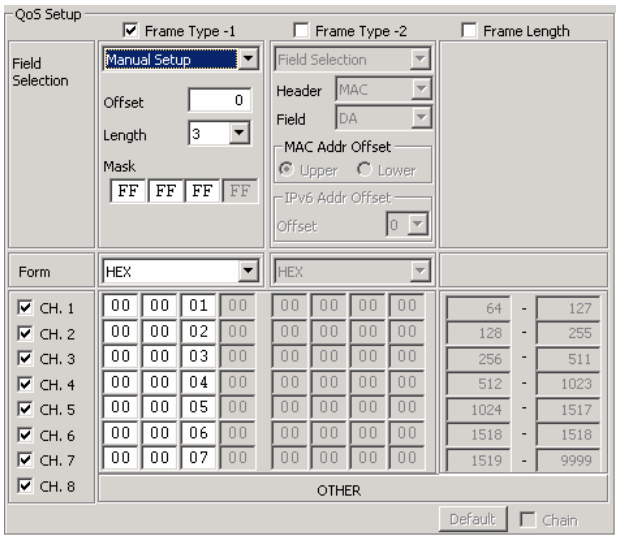
6. Select the **Frame Type-1** or **Frame Type-2** check box. The Field Selection, Form, and Channel areas become selectable.

• Selecting the Field



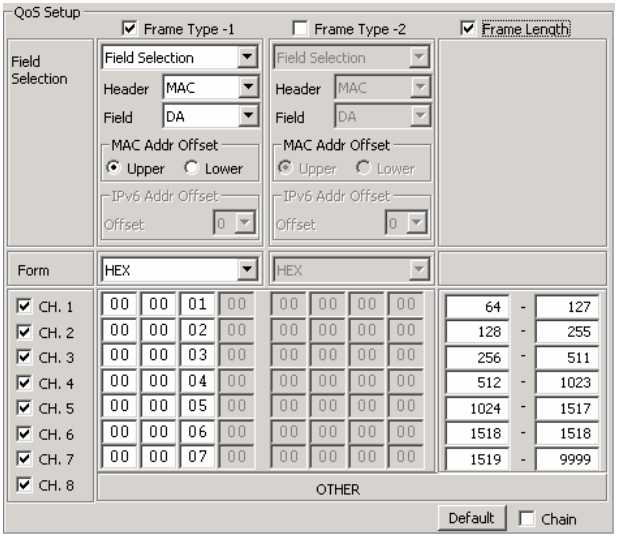
7. From the drop-down box, select **Field Selection**. The **Header** and **Field** boxes become selectable.
8. Select the header from the **Header** box. Fields corresponding to the selected header become selectable.
9. Select the field from the **Field** box. Parameters corresponding to the selected field become selectable.
10. If the header is set to **MAC**, select **MAC Addr Offset**. If Header is set to **IPv6** and Field is set to **DA** or **SA**, select the **IPv6 Addr Offset** (offset within the address).
11. From the Form box, select the input format. The channel area is changed according to the input format.
12. Select the check boxes for the channels you wish to use (CH. 1 to CH. 8). The boxes for the selected channels become selectable.
13. Type the values to be compared in the boxes. Proceed to step 13.

- Setting the Frame Manually



7. From the drop-down box, select **Manual Setup**. The Offset, Length, and Mask boxes becomes selectable.
8. Type a value in the **Offset** box.
9. Select the length to be compared from the **Length** box. The selected length of **Mask** becomes selectable.
10. Type hexadecimal values in the **Mask** boxes.
11. From the Form box, select the input format. The channel area is changed according to the input format.
12. Select the check boxes for the channels you wish to use (CH. 1 to CH. 8). The boxes for the selected channels become selectable.
13. Type the values to be compared in the boxes. Proceed to step 13.

- Setting Statistics by Frame Length



14. Select the **Frame Length** check box. The channel area, the **Default** button, and the **Chain** check box become available.
15. Select the check boxes for the channels you wish to use (CH. 1 to CH. 8). The frame length ranges for the selected channels become selectable.

16. To change the frame length range, type values in the Start and Stop boxes of the frame length of the selected channel.
17. To chain the frame length range, select the **Chain** check box. The stop frame length of the selected channel is disabled, and the frame length ranges become continuous.
18. To reset the frame length ranges to default, click **Default**.

- Updating the Settings
  19. Click **Apply**. The data is applied on the application.
  20. Click the **Update** icon or choose **Update** from the **Control** menu.

Explanation

Parameter	Input Method	Input Range/ Selection	Description
QoS Setup			
Frame Type -1 Frame Type -2	Check box	ON/OFF	Sets the statistics by frames. Frame Type -1 and Frame Type -2 can be set individually. • ON: Calculates statistics by frames. • OFF: Does not calculate statistics by frames.
Field Selection			
Field Selection	Drop-down box	Field Selection/ Manual Setup	Sets the method of selecting the field used to calculate the statistics for each QoS. • Field Selection: Selects using header and field. • Manual Setup: Manual sets the Offset, Length, and Mask.
Header	Drop-down box	MAC/EMAC/ TYPE/ETYPE/ VLAN1/VLAN2/ VLAN3/VLAN4/ MPLS1/MPLS2/ MPLS3/MPLS4/ EMPLS1/ EMPLS2/ EMPLS3/ EMPLS4/ IPv4/IPv6/ TCP/UDP	Selects the header. The selectable parameters vary depending on the frame selected using Frame Builder. • MAC: Selects MAC address. • EMAC: Selects EoMPLS MAC address. • TYPE: Selects TYPE. • ETYPE: Selects EoMPLS TYPE. • VLAN1 to 4: Selects VLAN tag. • MPLS1 to 4: Selects MPLS. • EMPLS1 to 4: Selects EoMPLS. • IPv4: Selects IPv4. • IPv6: Selects IPv6. • TCP: Selects TCP. • UDP: Selects UDP.
Field	Drop-down box	DA/SA/TYPE/ VLAN ID/Priority/ EXP/LABEL/TOS/ID/ Protocol/ TrafficClass/ FlowLabel/ NextHeader/ DP/SP	Selects the field. The selectable parameters vary depending on the frame and header selected using Frame Builder. • DA: Selects destination address. • SA: Selects source address. • TYPE: Selects TYPE field. • VLAN ID: Selects VLAN ID of the VLAN tag. • Priority: Selects Priority of the VLAN tag. • EXP: Selects EXP field of the MPLS header. • LABEL: Selects the label value of the MPLS header. • TOS: Selects TOS field of IPv4. • ID: Selects IPv4 ID. • Protocol: Selects IPv4 protocol. • TrafficClass: Selects IPv6 traffic class. • FlowLabel: Selects IPv6 flow label. • NextHeader: Selects IPv6 next header. • DP: Selects destination port number of TCP and UDP. • SP: Selects source port number of TCP and UDP.
MAC Addr Offset	Option buttons	Upper/Lower	Selects the comparison position of the MAC address. Available when Header is set to **MAC** and Field is set to **DA** or **SA**. • Upper: Compares the upper 3 bytes of the MAC address. • Lower: Compares the lower 3 bytes of the MAC address.

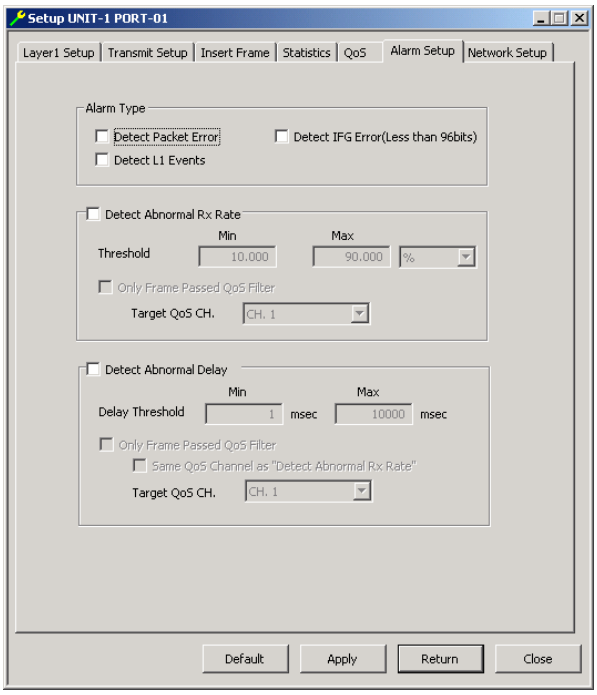
Parameter	Input Method	Input Range/ Selection	Description
IPv6 Addr Offset			
Offset	Drop-down box	0/2/4/6/8/10/12	Selects the offset position of the IPv6 address. Available when Header is set to **IPv6** and Field is set to **DA** or **SA**. • 0: Compares 4 bytes at the offset 0 position. • 2: Compares 4 bytes at the offset 2 position. • 4: Compares 4 bytes at the offset 4 position. • 6: Compares 4 bytes at the offset 6 position. • 8: Compares 4 bytes at the offset 8 position. • 10: Compares 4 bytes at the offset 10 position. • 12: Compares 4 bytes at the offset 12 position.
Offset	Text box	0 to 255	Sets the start position for comparing the pattern. Set a value between 0 to 255 bytes in decimal notation.
Length	Drop-down box	1/2/3/4/	Sets the length of the comparison pattern. Available when From is set to HEX or DEC. Set a value in the range of 1 to 4.
Mask	Text box	00 to FFFFFFFF(HEX)	Sets the mask pattern. Compares the bits set to 1.
Form	Drop-down box	HEX/ DEC/ IPv4 Address/ IPv6 Address	Selects the input format. The selectable parameters vary depending on the Field Selection setting. • HEX: Enter the value in hexadecimal notation. • DEC: Enter the value in decimal notation. • IPv4 Address: Enter an IPv4 address. • IPv6 Address: Enter an IPv6 address.
CH.1 to CH. 8	Check box	ON/OFF	Selects the QoS channels (classes) to be used. • ON: Enable the QoS channel (class). • OFF: Disable the QoS channel (class).
Comparison Value Box	Text box		Sets the QoS comparison value of the selected channel. The displayed contents vary depending on the setup conditions.
Frame Length	Check box	ON/OFF	Sets the statistics by frame length. • ON: Calculates statistics by frame length. • OFF: Does not calculate statistics by frame length.
Comparison Value Box	Text box	18 to 9999	Sets the start and stop values of the frame length of the selected channel. The displayed range varies depending on the number of selected channels.
Chain	Check box	ON/OFF	Adjusts the stop value so that the frame length ranges among the selected channels are continuous. • ON: Chains the range. • OFF: Does not chain the range.
Default	Button		Resets the chained frame length ranges to default.

5.12 Setting Alarms

Alarm settings are available on the AE5523 and AE5524. The alarm function detects errors by alarm types, errors in the receive rate, and abnormal delay and logs the results.
This function is not available on the AE5520 to AE5522.

Procedure

1. On the Navigation Window, click the desired PORT number. The Setup UNIT-n PORT-n window of the selected port opens.
2. Click the **Alarm Setup** tab.



Selecting the Alarm Type

- Selecting the Alarm Type
  3. Select the check boxes for the type of errors to be detected. Proceed to step 4.

- Not Selecting the Alarm Type
  3. Clear the check boxes for the type of errors you do not wish to detect. Proceed to step 4.

Detecting Abnormal Receive Rate (Available When Test Mode Is TRAFFIC)

- Detecting Abnormal Receive Rate
  4. Select the **Detect Abnormal Rx Rate** check box. The **Threshold** parameters and the **Only Frame Passed QoS Filter** check box become selectable.
  5. Select the **Unit** and enter values in **Min** and **Max** boxes.
  6. To set a QoS channel, select the **Only Frame Passed QoS Filter** check box. The **Target QoS CH.** check box becomes selectable.
  7. Select the QoS channel. Proceed to step 8.

- Not Detecting Abnormal Receive Rate
  4. Clear the **Detect Abnormal Rx Rate** check box. Proceed to step 8.

Detecting Abnormal Delay (Available When Test Mode Is TRAFFIC)

- Detecting Abnormal Delay
  8. Select the **Detect Abnormal Delay** check box. The **Delay Threshold** parameters and the **Only Frame Passed QoS Filter** check box become selectable.
  9. Type values in the **Min** and **Max** boxes.
  10. Select the **Only Frame Passed QoS Filter** check box as necessary. The **Target QoS CH.** check box becomes selectable. If the **Only Frame Passed QoS Filter** check box is selected, the **Same QoS Channel as "Detect Abnormal Rx. Rate"** check box also becomes selectable.
  11. Select the QoS channel. Proceed to step 12.

- Not Detecting Abnormal Delay
  8. Clear the **Detect Abnormal Delay** check box. Proceed to step 12.

- Updating the Settings
  12. Click **Apply**. The data is applied on the application.
  13. Click the **Update** icon or choose **Update** from the **Control** menu.

Explanation

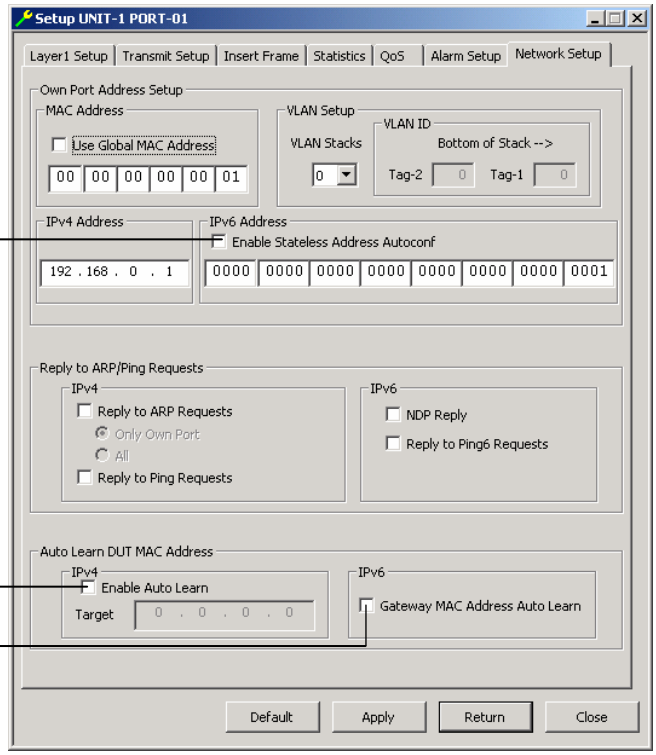
Parameter	Input Method	Input Range/Selection	Description
Alarm Type			
Detect Packet Error	Check box	ON/OFF	Selects whether to detect packet errors.
Detect IFG Error	Check box	ON/OFF	Selects whether to detect gap errors.
Detect L1 Events	Check box	ON/OFF	Selects whether to detect L1 status changes.
Detect Abnormal Rx Rate			
Detect Abnormal Rx Rate	Check box	ON/OFF	Selects whether to detect abnormal receive rate.
Threshold			Available when the **Detect Abnormal Rx Rate** check box is selected.
Min	Text box		Sets the minimum threshold value of the abnormal receive rate.
Max	Text box		Sets the maximum threshold value of the abnormal receive rate.
Unit	Drop-down box	%/(bit/s)/ (frame/s)	Sets the unit of the abnormal receive rate.
Only Frame Passed QoS Filter	Check box	ON/OFF	Selects whether to detect errors only in frames that passed the QoS filter. Available when the **Detect Abnormal Rx Rate** check box is selected.
Target QoS CH.	Drop-down box	CH. 1/ CH. 2/ CH. 3/ CH. 4/ CH. 5/ CH. 6/ CH. 7/ CH. 8	Selects the target QoS channel. Available when the **Detect Abnormal Rx Rate** and **Only Frame Passed QoS Filter** check boxes are selected.
Detect Abnormal Delay			
Detect Abnormal Delay	Check box	ON/OFF	Selects whether to detect abnormal delay.
Delay Threshold			Available when the **Detect Abnormal Delay** check box is selected.
Min	Text box		Sets the minimum delay threshold value.
Max	Text box		Sets the maximum delay threshold value.
Only Frame Passed QoS Filter	Check box	ON/OFF	Selects whether to detect errors only in frames that passed the QoS filter. Available when the **Detect Abnormal Delay** check box is selected.
Same QoS Channel as “Detect Abnormal Rx Rate”	Check box	ON/OFF	Selects whether to specify the same QoS channel as that of the abnormal receive rate detection. Available when the **Only Frame Passed QoS Filter** check boxes under **Detect Abnormal Rx Rate** and **Detect Abnormal Delay** are selected.
Target QoS CH.	Drop-down box	CH. 1/ CH. 2/ CH. 3/ CH. 4/ CH. 5/ CH. 6/ CH. 7/ CH. 8	Selects the target QoS channel. Available when the **Detect Abnormal Delay** and **Only Frame Passed QoS Filter** check boxes are selected and the **Same QoS Channel as “Detect Abnormal Rx Rate”** check box is not selected.

5.13 Setting the Network

This section explains the details of setting the port addresses of the reserved ports and the IPv4/IPv6 emulation function.

Procedure

1. On the Navigation Window, click the desired PORT number. The Setup UNIT-n PORT-n window of the selected port opens.
2. Click the **Network Setup** tab.



Select the check box when automatically generating the destination IP address

Select the check box when auto learning the IPv4 destination MAC address

Select the check box when auto learning the IPv6 destination MAC address

Setting the Port Address

- Setting the MAC Address
  - Using a Global MAC Address
    3. Select the **Use Global MAC address** check box. The MAC address boxes become unavailable. Proceed to step 5.

  - Using a Local MAC Address
    3. Clear the **Use Global MAC address** check box. The MAC address boxes become selectable.
    4. Type the local MAC address in the boxes in hexadecimal notation. Proceed to step 5.

- Setting VLAN (AE5523 and AE5524)
  5. Select the number of VLAN stacks from the **VLAN Stacks** box. If the number of VLAN stacks is set to 1 or 2, the VLAN ID parameters become selectable.
  6. Type the VLAN ID in the VLAN ID boxes.

- Setting the IPv4 Address
  7. Type the IPv4 address in the **IPv4 Address** box.

- Setting the IPv6 Address (AE5523 and AE5524)
  - Enabling Stateless Address Auto Configuration
    8. Select the **Enable Stateless Address Autoconf** check box. The IPv6 address boxes become unavailable. Proceed to step 10.

  - Disabling Stateless Address Auto Configuration
    8. Clear the **Enable Stateless Address Autoconf** check box. The IPv6 address boxes become selectable.
    9. Type the IPv6 address in the **IPv6 Address** box. Proceed to step 10.

Note

To automatically configure the source IP address, select the **Enable Stateless Address Autoconf** check box. For details on carrying out the stateless auto configuration, see section 6.12.

Replying to ARP/Ping Requests

- Enabling IPv4 Emulation
  10. To reply to ARP requests, check the **Reply to ARP Requests** check box.
  11. Select the **Only Own Port** or **All** option button.
  12. To reply to Ping requests, check the **Reply to Ping Requests** check box.

- Enabling IPv6 Emulation (AE5523 and AE5524)
  13. To reply to NDP requests, check the **NDP Reply** check box.
  14. To reply to Ping6 requests, check the **Reply to Ping6 Requests** check box.

Auto Learn DUT MAC Address

- Enabling IPv4 Emulation
  15. Select the **Enable Auto Learn** check box to use the function. The Target box becomes selectable.
  16. Type the target IP address in the **Target** box.

- Enabling IPv6 Emulation (AE5523 and AE5524)
  17. Select the **Gateway MAC Address Auto Learn** check box to use the function.

Note

For details on carrying out the DUT MAC address auto learn, see section 6.12.

- Updating the Settings
  18. Click **Apply**. The data is applied on the application.
  19. Click the **Update** icon or choose **Update** from the **Control** menu.

Explanation

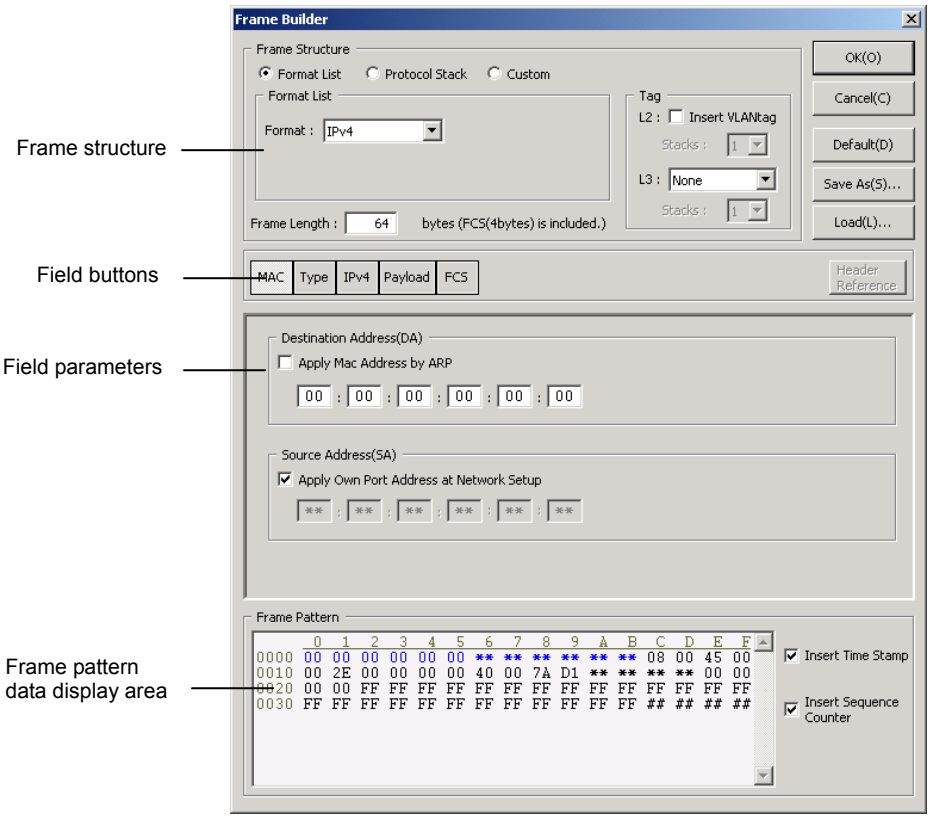
Parameter	Input Method	Input Range/ Selection	Description
Own Port Address Setup			
MAC Address			
Use Global MAC Address	Check box	ON/OFF	Selects whether to use a global MAC address. • ON: Use a global MAC address. • OFF: Not use the global MAC address.
MAC Address	Text box	000000000000 to FFFFFFFFFFFF (HEX)	Sets the MAC address. Available when the **Use Global MAC Address** check box is not selected.
VLAN Setup			
VLAN Stacks	Drop-down box	0/1/2	Selects the number of VLAN tag stacks. Available on the AE5523 and AE5524. • 0: Does not use VLAN. • 1: Uses 1 VLAN stack. • 2: Uses 2 VLAN stacks.
VLAN ID			
Tag-1	Text box	0 to 4095	Sets the VLAN ID of Tag-1
Tag-2	Text box	0 to 4095	Sets the VLAN ID of Tag-2
IPv4 Address	Text box	0.0.0.0 to 255.255.255.255	Sets the IPv4 address.
IPv6 Address			
Enable Stateless Address Autoconf	Check box	ON/OFF	Selects whether to use stateless address auto configuration. Available on the AE5523 and AE5524. • ON: Enables stateless address auto configuration. • OFF: Disables stateless address auto configuration.
IPv6 Address	Text box	00000000000000000000000000000000 to FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF (HEX)	Sets the IPv6 address. Available on the AE5523 and AE5524 when the **Enable Stateless Address Autoconf** check box is cleared.
Reply to ARP/Ping Requests			
IPv4			
Reply to ARP Requests	Check box	ON/OFF	Selects whether to reply to ARP requests. • ON: Replies to ARP requests. • OFF: Does not reply to ARP requests.
Only Own Port	Option buttons	Only Own Port/All	Selects the ARP reply operation of its own port. • Reply only to ARP requests for its own IPv4 address. • Reply to all ARP requests.
Reply to Ping Requests	Check box	ON/OFF	Selects whether to reply to PING requests. • ON: Replies to Ping requests. • OFF: Does not reply to Ping requests.
IPv6			
NDP Reply	Check box	ON/OFF	Selects whether to reply to NDP requests. Available on the AE5523 and AE5524. • ON: Replies to NDP requests. • OFF: Does not reply to NDP requests.
Reply to Ping6 Requests	Check box	ON/OFF	Selects whether to reply to Ping6 requests. Available on the AE5523 and AE5524. • ON: Replies to Ping6 requests. • OFF: Does not reply to Ping6 requests.

Parameter	Input Method	Input Range/ Selection	Description
Auto Learn DUT MAC Address			
IPv4			
Enable Auto Learn	Check box	ON/OFF	Selects whether to auto learn the DUT MAC address. • ON: Auto learns the address. • OFF: Does not auto learn the address.
Target	Text box	0.0.0.0 to 255.255.255.255	Sets the MAC address of the DUT port. Available when the **Enable Auto Learn** check box is selected.
IPv6			
Gateway MAC Address Auto Learn	Check box	ON/OFF	Selects whether to auto learn the MAC address of the gateway. Available on the AE5523 and AE5524. • ON: Auto learns the address. • OFF: Does not auto learn the address.

5.14 Frame Builder

Procedure

1. Click **Frame Builder** on the **Transmit Setup**, **Insert Frame**, or **QoS** screen. The Frame Builder starts on a separate window.



Setting the Frame Structure

- Creating Frames by Selecting from a List

2. Select the **Format List** option button under **Frame Structure**. The **Format List** area is shown.
3. Select the frame format from the **Format** box. The related parameters become selectable.
4. Type a value in the **Frame Length** box.

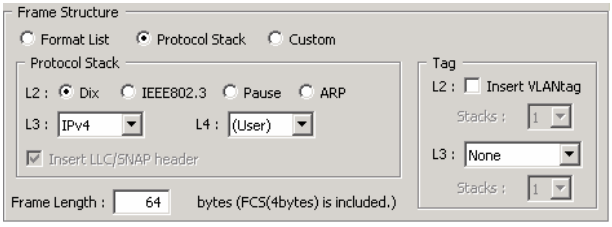
- Inserting Tags

5. To insert VLAN tags, select the **Insert VLANtag** check box. The **Stacks** box becomes selectable.
6. Select the number of stacks from the **Stacks** box.
7. To insert L3 tags, select **MPLS** or **EoMPLS** from the **L3** box. The **Stacks** box becomes selectable.
8. Select the number of stacks from the **Stacks** box.

- Not Inserting Tags

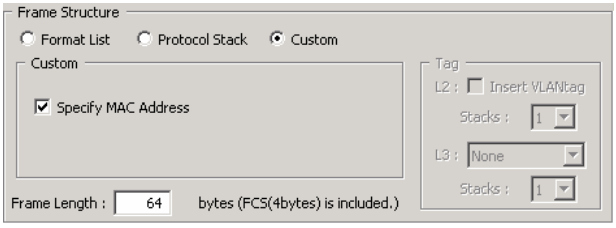
5. To not insert VLAN tags, clear the **Insert VLANtag** check box.
6. To not insert L3 tags, select **None** from the **L3** box. Proceed to step 9.

- Creating Frames by Specifying the Protocol Stack



2. Select the **Protocol Stack** option button under **Frame Structure**. The **Protocol Stack** area is shown.
3. Select the protocol stack from the **L2** option buttons. The related parameters become selectable.
4. Select the protocol stack from the **L3** box. The related parameters become selectable.
5. Select the protocol stack from the **L4** box. The related parameters become selectable.
6. Type a value in the **Frame Length** box.
7. Set the tag as necessary. Proceed to step 9.

- Creating Frames Using Custom Settings



2. Select the **Custom** option button under **Frame Structure**. The **Custom** area is shown.

• Specifying the MAC Address

3. Select the **Specify MAC address** check box. The related parameters become selectable.

• Not Specifying the MAC Address

4. Clear the **Specify MAC address** check box. The related parameters become selectable.
5. Type a value in the **Frame Length** box. Proceed to step 9.

Creating the Frame Data

9. Click a **Field** button on the Frame Builder window. Parameters related to the selected Field button are shown.
10. Select the parameters or type the data.
11. Set other Fields as well.

Note

For the selectable parameters, see the explanation.

- Confirming the Settings
  12. Click **OK**. The frame data you created is confirmed, and Frame Builder closes.

- Canceling the Settings
  12. Click **Cancel**. A dialog box containing the message “Present settings will be lost. OK?” opens.
  13. Click **Yes**. The frame data you created is cancelled, and Frame Builder closes.

- Initializing the Settings to Default
  12. Click **Default**. A dialog box containing the message “Default settings will be lost. OK?” opens.
  13. Click **Yes**. The frame data initialized.

- Saving the Frame Data to a File
  12. Click **Save As** to open the Save As dialog box.
  13. Type the file name and click **Save**. The frame data you created is saved to the file.

- Loading the Frame Data from a File
  12. Click **Load**. A dialog box containing the message “Present settings are lost. OK?” opens.
  13. Click **Yes**. The Open dialog box opens.
  14. Select a file name and click **Open**. The frame data is loaded from the file.

Explanation

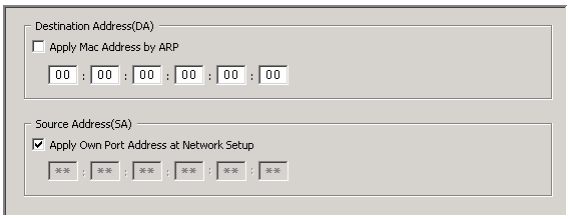
Frame Structure Parameters

Displayed Parameters	Description			
Format List/ Protocol Stack/ Custom	Sets the method of constructing the format of the frame structure.			
Format List	Select from the following formats. (User)/Pause/ARP/IPv4/IPv4+UDP/ IPv4+TCP/ IPv4+IGMP/ IPv4+ICMP/IPv6/IPv6+UDP/IPv6+TCP/ IPv6+IGMP/ IPv6+ICMP/ IPv6+ICMPv6/IPX			
Protocol Stack	Set L2, L3, and L4 individually. The selectable parameters of the higher layer vary depending on the parameters selected on the lower layers.			
			Selectable Parameters	
	L2		Dix/IEEE802.3/Pause/ARP	
	L3	Selectable Parameters of L2		
		Dix	(User)/IPv4/IPv6/IPX	
		IEEE802.3	(User)/IPv4/IPv6/IPX	
		Pause	None	
		ARP	None	
	L4	Selectable Parameters of L3		
		(User)	None	
		IPv4	UDP/TCP/IGMP/ICMP	
		IPv6	UDP/TCP/IGMP/ICMP/ICMPv6	
		IPX	None	
Custom	Select whether to specify the MAC address. All other fields are handled as user data.			
	Specify MAC Address		ON/OFF	
Tag	Set L2 and L3 tags individually. However, if the frame format is Pause or ARP, the L3 tag cannot be specified. If Custom is specified, the L2 and L3 tags cannot be specified.			
	L2	Insert VLANtag	ON/OFF	
		Stacks	1 to 4	Available when the VLANtag check box is selected
	L3	L3 Tag	None/MPLS/EoMPLS	
		Stacks	1 to 4	Available when L3 Tag is set to MPLS or EoMPLS
Frame length	Set the frame length including the FCS. The minimum value of the frame length that can be specified varies depending on the unit.			
	AE5520 and AE5521		18 to 9999 [bytes]	
	AE5522 to AE5524		48 to 9999 [bytes]	

Various Screens for Fields in the Frame Structure

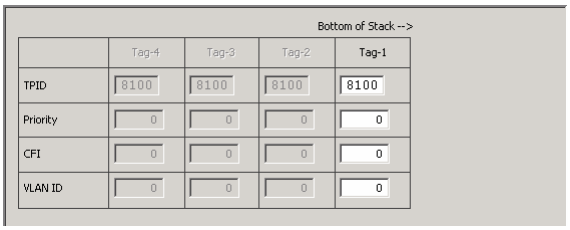
The screen that is displayed when each Field button is clicked is described below.

• MAC Address Setup Screen and EMAC Address Setup Screen



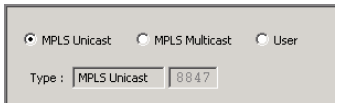
Parameter	Description		
Destination Address (DA)	Set the destination MAC address in hexadecimal notation.		
	Apply Mac Address by ARP check box	Select	When referring to the address obtained by address resolution (ARP) for the destination address. For the setup procedure, see section 5.13.
		Clear	When manually setting the destination MAC address.
Source Address (SA)	Set the source MAC address in hexadecimal notation.		
	Apply Own Port Address at Network Setup check box	Select	When referring to its own port address of the network emulation setting. For the setup procedure, see section 5.13.
		Clear	When manually setting the source MAC address.

• VLAN Tag Setup Screen



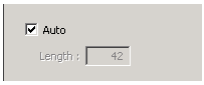
Parameter	Description
TPID	Set the TPID in hexadecimal notation in the range of 0000 to FFFF.
Priority	Set the priority in decimal notation in the range of 0 to 7.
CFI	Set the CFI to 0 or 1.
VLAN ID	Set the VLAN ID in decimal notation in the range of 0 to 4095.

• Type Setup Screen and EType Setup Screen



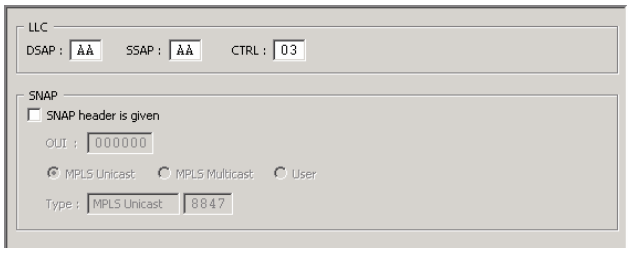
Parameter	Description	
Type	If MPLS is specified in the Tag setting, select the Type from MPLS Unicast, MPLS Multicast, and User.	
	Select **User**	If User is selected, set the value in hexadecimal notation in the range of 0000 to FFFF.
EType	If EoMPLS is specified in the Tag setting, select the EType from MPLS Unicast, MPLS Multicast, and User.	
	Select **User**	If User is selected, set the value in hexadecimal notation in the range of 0000 to FFFF.

- Length Setup Screen
  The length can be specified when Protocol Stack is specified and L2 is set to IEEE802.3.



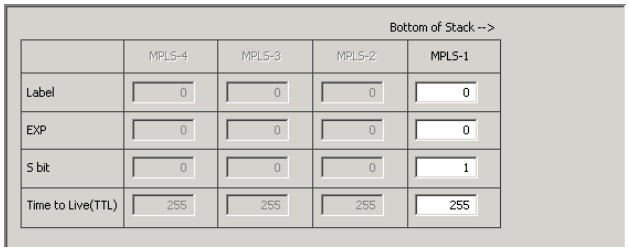
Parameter	Description		
Length	Set the length in decimal notation in the range of 0 to 65535.		
	Auto check box	Select	Automatically calculates and sets the length based on the current frame length.
		Clear	When manually setting the length.

- LLC and SNAP Setup Screens
  The LLC and SNAP can be specified when Protocol Stack is specified and L2 is set to IEEE802.3.



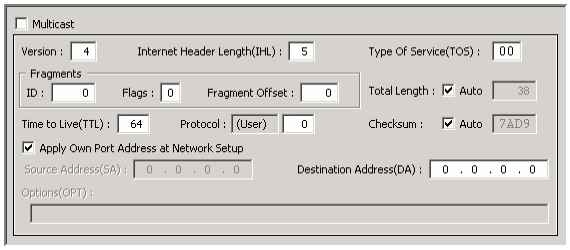
Parameter	Description		
LLC	Set the LLC header individually.		
	DSAP	Set the DSAP field in hexadecimal notation in the range of 00 to FF.	
	SSAP	Set the SSAP field in hexadecimal notation in the range of 00 to FF.	
	CTRL	Set the CTRL field in hexadecimal notation in the range of 00 to FF.	
SNAP	Set the SNAP header.		
	SNAP header is given check box	Select	When including the SNAP header
		Clear	When not including the SNAP header
		OUI	Set the OUI field in hexadecimal notation in the range of 000000 to FFFFFF.
		Type	When L3 Tag is set to MPLS, select from MPLS Unicast, MPLS Multicast, and User.
		User	If User is selected, set the value in hexadecimal notation in the range of 0000 to FFFF.

• MPLS Setup Screen and EMPLS Setup Screen



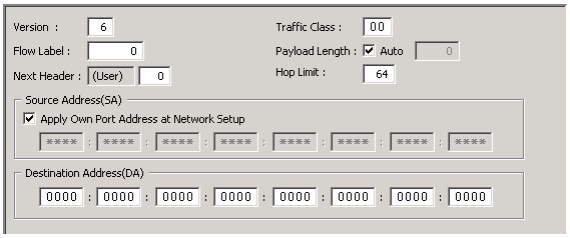
Parameter	Description
Label	Set the label value in decimal notation in the range of 0 to 1048575.
EXP	Set EXP in decimal notation in the range of 0 to 7.
S bit	Set the S bit to 0 or 1.
Time to Live (TTL)	Set the Time to Live (TTL) in decimal notation in the range of 0 to 255.

• IPv4 Setup Screen



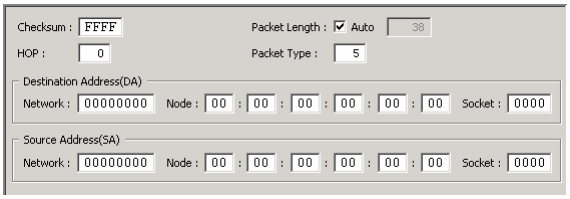
Parameter	Description		
Version	Set the version in decimal notation in the range of 0 to 15.		
Internet Header Length (IHL)	Set the header length in decimal notation in the range of 0 to 15.		
Type Of Service (TOS)	Set the Type of Service in hexadecimal notation in the range of 00 to FF.		
Total Length	Set the total length in decimal notation in the range of 0 to 65535.		
	Auto check box	Select	When automatically calculating the total length
		Clear	When manually typing the total length
Fragments	Set the fragment information individually.		
	ID	Set the ID in decimal notation in the range of 0 to 65535.	
	Flags	Set the flag in decimal notation in the range of 0 to 7.	
	Fragment Offset	Set the offset in decimal notation in the range of 0 to 8191.	
Time to Live (TTL)	Set the Time to Live in decimal notation in the range of 0 to 255.		
Protocol	Displays the protocol selected in the frame structure. If (User) is selected, set the value in decimal notation in the range of 0 to 255.		
Checksum	Set the checksum in hexadecimal notation in the range of 0000 to FFFF.		
	Auto check box	Select	When automatically calculating the checksum
		Clear	When manually typing the check sum
Source Address (SA)	Set the source IP address in decimal notation.		
	Apply Own Port Address at Network Setup check box	Select	When referring to its own port IP address of the network emulation setting.
		Clear	When manually setting the source IP address.
Destination Address (DA)	Set the destination IP address in decimal notation.		
Options (OPT)	Set the options field data in hexadecimal notation.		

• IPv6 Setup Screen



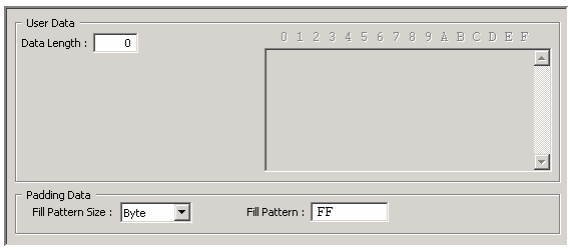
Parameter	Description		
Version	Set the version in decimal notation in the range of 0 to 15.		
Traffic Class	Set the traffic class in hexadecimal notation in the range of 00 to FF.		
Flow Label	Set the flow label in decimal notation in the range of 0 to 1048575.		
Payload Length	Set the payload length in decimal notation in the range of 0 to 65535.		
	Auto check box	Select	When automatically calculating the payload length
		Clear	When manually typing the payload length
Next Header	Displays the protocol selected in the frame structure. If (User) is selected, set the value in decimal notation in the range of 0 to 255.		
Hop Limit	Set the hop limit in decimal notation in the range of 0 to 255.		
Source Address (SA)	Set the source IP address in hexadecimal notation.		
	Apply Own Port Address at Network Setup check box	Select	When referring to its own port IP address of the network emulation setting.
		Clear	When manually setting the source IP address.
Destination Address (DA)	Set the destination IP address in hexadecimal notation.		

• IPX Setup Screen



Parameter	Description		
Checksum	Set the checksum in hexadecimal notation in the range of 0000 to FFFF.		
Packet Length	Set the packet length in decimal notation in the range of 0 to 65535.		
	Auto check box	Select	When automatically calculating the packet length
		Clear	When manually typing the packet length
HOP	Set HOP in decimal notation in the range of 0 to 255.		
Packet Type	Set the packet type in decimal notation in the range of 0 to 255.		
Destination Address (DA)	Set the destination address (DA) individually.		
	Network	Set the network in hexadecimal notation in the range of 00000000 to FFFFFFFF.	
	Node	Set the node in hexadecimal notation in the range of 000000000000 to FFFFFFFFFFFF.	
	Socket	Set the socket in hexadecimal notation in the range of 0000 to FFFF.	
Source Address (SA)	Set the source address (DA) individually.		
	Network	Set the network in hexadecimal notation in the range of 00000000 to FFFFFFFF.	
	Node	Set the node in hexadecimal notation in the range of 000000000000 to FFFFFFFFFFFF.	
	Socket	Set the socket in hexadecimal notation in the range of 0000 to FFFF.	

• Payload Setup Screen

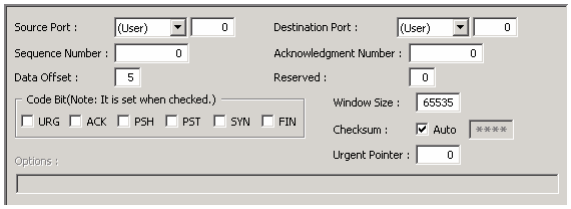


Parameter	Description	
User Data	Set the user data in hexadecimal notation.	
	Data Length	Set the user data length in decimal notation in the range of 0 to 2048.
Padding Data	Set the padding data after the user data in the payload section.	
	Fill Pattern Size	Set the fill pattern size to Byte, Word, or Long.
	Fill Pattern	Set the fill pattern in hexadecimal notation. The fill pattern range varies depending on the selected fill pattern size. • Byte: 00 to FF (1 byte) • Word: 0000 to FFFF (2 bytes) • Long: 00000000 to FFFFFFFF (4 bytes) If the fill pattern you type is short of the required number of digits, the higher digits are filled with 0s.

• FCS Setup Screen

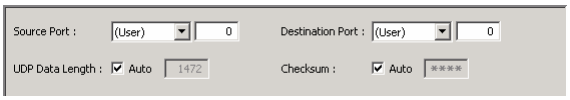
Parameter	Description	
Error Frame Setting	Sets the transmit frame error setting.	
	Correct	Transmit a correct frame.
	CRC Error	Transmits a CRC error frame.
	Symbol Error	Transmit a symbol error frame (AE5523 and AE5524 only).

• TCP Setup Screen



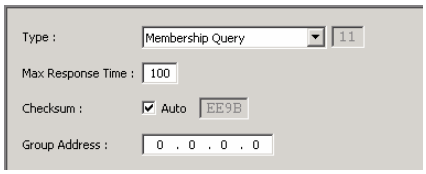
Parameter	Description		
Source Port	Set the source port. (User)/echo/discard/daytime/chargen/ftp-data/ftp/telnet/smtp/time/name/nickname/domain/http/www/pop3/sunrpc/nntp/ntp		
	User	If User is selected, set the value in decimal notation in the range of 0 to 65535.	
	Other than User	If a setting other than User is selected the corresponding value is automatically shown. echo (7)/discard (9)/daytime (13)/chargen (19)/ftp-data (20)/ftp (21)/telnet (23)/smtp (25)/time (37)/name (42)/nickname (43)/domain (53)/http/www (80)/pop3 (110)/sunrpc (111)/nntp (119)/ntp (123)	
Destination Port	Set the destination port. (User)/echo/discard/daytime/chargen/ftp-data/ftp/telnet/smtp/time/name/nickname/domain/http/www/pop3/sunrpc/nntp/ntp		
	User	If User is selected, set the value in decimal notation in the range of 0 to 65535.	
	Other than User	If a setting other than User is selected the corresponding value is automatically shown. echo (7)/discard (9)/daytime (13)/chargen (19)/ftp-data (20)/ftp (21)/telnet (23)/smtp (25)/time (37)/name (42)/nickname (43)/domain (53)/http/www (80)/pop3 (110)/sunrpc (111)/nntp (119)/ntp (123)	
Sequence Number	Set the sequence number in decimal notation in the range of 0 to 4294967295.		
Acknowledgment Number	Set the acknowledgment number in decimal notation in the range of 0 to 4294967295.		
Data Offset	Set the data offset in decimal notation in the range of 0 to 15.		
Reserved	Set the reserved value in decimal notation in the range of 0 to 63.		
Code Bit	Set the individual code bits to 0/1.		
	URG check box	Select	Sets the URG bit to 1.
		Clear	Sets the URG bit to 0.
	ACK check box	Select	Sets the ACK bit to 1.
		Clear	Sets the ACK bit to 0.
	PSH check box	Select	Sets the PSH bit to 1.
		Clear	Sets the PSH bit to 0.
	PST check box	Select	Sets the PST bit to 1.
		Clear	Sets the PST bit to 0.
	SYN check box	Select	Sets the SYN bit to 1.
		Clear	Sets the SYN bit to 0.
	FIN check box	Select	Sets the FIN bit to 1.
		Clear	Sets the FIN bit to 0.
Window Size	Set the window size in decimal notation in the range of 0 to 65535.		
Checksum	Set the checksum in hexadecimal notation in the range of 0000 to FFFF.		
	Auto check box	Select	Automatically calculates and sets the checksum.
		Clear	When manually setting the checksum.
Urgent Pointer	Set the urgent pointer in decimal notation in the range of 0 to 65535.		
Options	Set the options field data in hexadecimal notation. * You may not be able to enter the data depending on the data offset value.		

• UDP Setup Screen



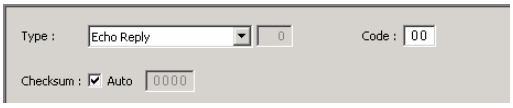
Parameter	Description		
Source Port	Set the source port. (User)/echo/discard/daytime/chargen/time/name/nickname/domain/bootps/bootpc/tftp/pop3/sunrpc/ntp/snmp/snmp-trap/nfs		
	User	If User is selected, set the value in decimal notation in the range of 0 to 65535.	
	Other than User	If a setting other than User is selected the corresponding value is automatically shown. echo (7)/discard (9)/daytime (13)/chargen (19)/time (37)/ name (42)/nickname (43)/domain (53)/bootps (67)/bootpc (68)/ tftp (69)/pop3 (110)/sunrpc (111)/ntp (123)/snmp (161)/ snmp-trap (162)/nfs (2049)	
Destination Port	Set the destination port. (User)/echo/discard/daytime/chargen/time/name/nickname/domain/bootps/bootpc/tftp/pop3/sunrpc/ntp/snmp/snmp-trap/nfs		
	User	If User is selected, set the value in decimal notation in the range of 0 to 65535.	
	Other than User	If a setting other than User is selected the corresponding value is automatically shown. echo (7)/discard (9)/daytime (13)/chargen (19)/time (37)/ name (42)/nickname (43)/domain (53)/bootps (67)/bootpc (68)/ tftp (69)/pop3 (110)/sunrpc (111)/ntp (123)/snmp (161)/ snmp-trap (162)/nfs (2049)	
UDP Data Length	Set the UDP data length in decimal notation in the range of 0 to 65535.		
	Auto check box	Select	Automatically calculates and sets the UDP data length.
		Clear	When manually setting the UDP data length.
Checksum	Set the checksum in hexadecimal notation in the range of 0000 to FFFF.		
	Auto check box	Select	Automatically calculates and sets the checksum.
		Clear	When manually setting the checksum.

• IGMP Setup Screen



Parameter	Description		
Type	Set the type. (User)/Membership Query/Version 1 Membership Report/Version 2 Membership Report/ Leave Group		
	User	If User is selected, set the value in hexadecimal notation in the range of 00 to FF.	
	Other than User	If a setting other than User is selected the corresponding value is automatically shown. Membership Query (11)/ Version 1 Membership Report (12)/ Version 2 Membership Report (16)/ Leave Group (17)	
Max Response Time	Set the maximum response time in decimal notation in the range of 0 to 255.		
Checksum	Set the checksum in hexadecimal notation in the range of 0000 to FFFF.		
	Auto check box	Select	Automatically calculates and sets the checksum.
		Clear	When manually setting the checksum.
Group Address	Set the group address in decimal notation in the range of 0 to 255.		

• ICMP Setup Screen

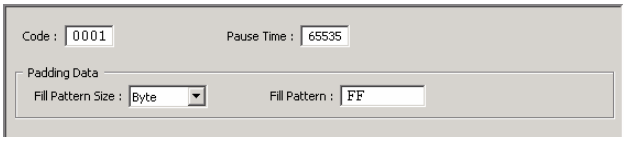


Parameter	Description		
Type	Set the type. (User)/Echo Reply/Host Unreacheable/Source Quench/Redirect/Echo/Time Exceeded/Parameter Problem/Time Stamp/Time Stamp Reply/Address Mask Request/Address Mask Reply/Traceroute		
	User	If User is selected, set the value in decimal notation in the range of 0 to 255.	
	Other than User	If a setting other than User is selected the corresponding value is automatically shown. Echo Reply (0)/Host Unreacheable (3)/Source Quench (4)/Redirect (5)/Echo (8)/Time Exceeded (11)/Parameter Problem (12)/Time Stamp (13)/Time Stamp Reply (14)/Address Mask Request (17)/Address Mask Reply (18)/Traceroute(30)	
Code	Set the code in hexadecimal notation in the range of 00 to FF.		
Checksum	Set the checksum in hexadecimal notation in the range of 0000 to FFFF.		
	Auto check box	Select	Automatically calculates and sets the checksum.
		Clear	When manually setting the checksum.

• ICMPv6 Setup Screen

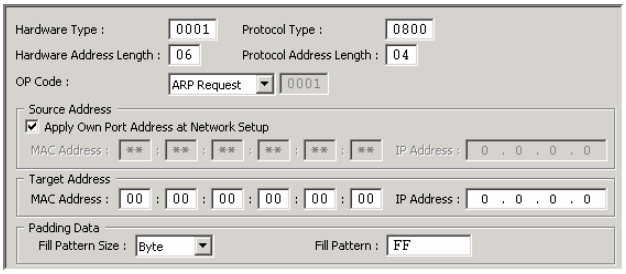
Parameter	Description		
Type	Set the type. (User)/Destination Unreachable/Packet Too Big/Time Exceeded/Parameter Problem/Echo Request/Echo Reply/Multicast Listener Query/Multicast Listener Report/Multicast Listener Done/Router Solicitation/Router Advertisement/Neighbor Solicitation/Neighbor Advertisement/Redirect Message		
	User	If User is selected, set the value in decimal notation in the range of 0 to 255.	
	Other than User	If a setting other than User is selected the corresponding value is automatically shown. Destination Unreachable (1)/Packet Too Big (2)/Time Exceeded (3)/Parameter Problem (4)/Echo Request (128)/Echo Reply (129)/Multicast Listener Query (130)/Multicast Listener Report (131)/Multicast Listener Done (132)/Router Solicitation (133)/Router Advertisement (134)/Neighbor Solicitation (135)/Neighbor Advertisement (136)/Redirect Message (137)	
Code	Set the code in hexadecimal notation in the range of 00 to FF.		
Checksum	Set the checksum in hexadecimal notation in the range of 0000 to FFFF.		
	Auto check box	Select	Automatically calculates and sets the checksum.
		Clear	When manually setting the checksum.

• Pause Setup Screen



Parameter	Description	
Code	Set the code in hexadecimal notation in the range of 0000 to FFFF.	
Pause Time	Set the Pause Time in decimal notation in the range of 0 to 65535.	
Padding Data	Set the padding data after the user data in the payload section.	
	Fill Pattern Size	Set the fill pattern size to Byte, Word, or Long.
	Fill Pattern	Set the fill pattern in hexadecimal notation. The fill pattern range varies depending on the selected fill pattern size. • Byte: 00 to FF (1 byte) • Word: 0000 to FFFF (2 bytes) • Long: 00000000 to FFFFFFFF (4 bytes) If the entered value is short of the required number of digits, the value is justified to the right and the left digits are filled with 0s.

• ARP Setup Screen



Parameter	Description		
Hardware Type	Set the hardware type in hexadecimal notation in the range of 0000 to FFFF.		
Protocol Type	Set the protocol type in hexadecimal notation in the range of 0000 to FFFF.		
Hardware Address Length	Set the hardware address length in hexadecimal notation in the range of 00 to FF.		
Protocol Address Length	Set the protocol address length in hexadecimal notation in the range of 00 to FF.		
OP Code	Set the OP code to (User), ARP Request, or ARP Reply.		
	User	If User is selected, set the value in hexadecimal notation in the range of 0000 to FFFF.	
	Other than User	If a setting other than User is selected the corresponding value is automatically shown. ARP Request (0001)/ARP Reply (0002)	
Source Address	Set the source MAC address and source IP address. Set the source MAC address in hexadecimal notation and source IP address in decimal notation.		
	Apply Own Port Address at Network Setup check box	Select	When referring to its own port MAC address and IP address of the network emulation setting.
		Clear	When manually setting the source MAC address and source IP address.
Target Address	Set the target MAC address and target IP address.		
	MAC Address	Set the address in hexadecimal notation.	
	IP Address	Set the address in decimal notation.	
Padding Data	Set the fill pattern of the padding data.		
	Fill Pattern Size	Set the fill pattern size to Byte, Word, or Long.	
	Fill Pattern	Set the fill pattern in hexadecimal notation. The fill pattern range varies depending on the selected fill pattern size. • Byte: 00 to FF (1 byte) • Word: 0000 to FFFF (2 bytes) • Long: 00000000 to FFFFFFFF (4 bytes) If the entered value is short of the required number of digits, the value is justified to the right and the left digits are filled with 0s.	

Frame Data Display Section

The frame pattern data that you are creating is displayed in hexadecimal notation.
The data of the field section to be changed is displayed in blue.

Parameter	Description	
Insert Time Stamp	Inserts the latency measurement pattern (time stamp).	
	Select	Inserts a time stamp in the 4 bytes before the FCS.
	Clear	Does not insert the time stamp.
Insert Sequence Counter	Inserts the sequence counter.	
	Select	Inserts the sequence counter. The position where the sequence counter is inserted varies depending on whether the time stamp is inserted. • Insert the time stamp: Inserts an 8-byte sequence counter 12 bytes before the FCS. • Not insert the time stamp: Inserts a sequence counter in the 8 bytes before the FCS.
	Clear	Does not insert the sequence counter.

The sequence counter can be inserted on the AE5523 and AE5524.
The **Insert Time Stamp** and **Insert Sequence Counter** check boxes are linked to the same parameters on the **Transmit Setup** and **Special Setup** screens.

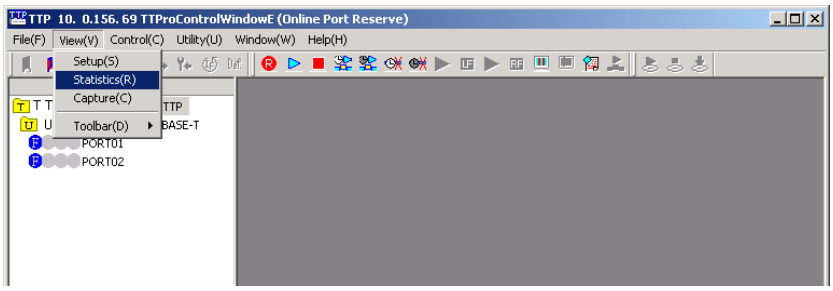
6.1 Resetting the Measured Results

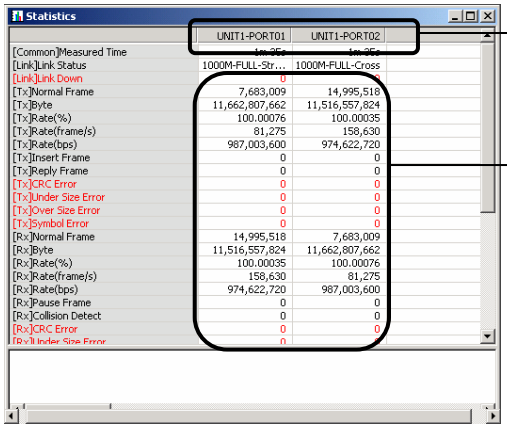
Chapter 6 explains how to control the traffic test and show the statistical test results. For setting the test conditions, see chapter 5. This section explains the details of resetting (clearing) the measured results.

Procedure

- **Resetting (Clearing) the Measured Results**

1. From the **View** menu, choose **Statistics**. The Statistics window opens.



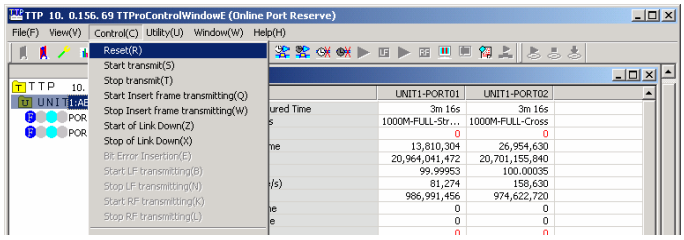


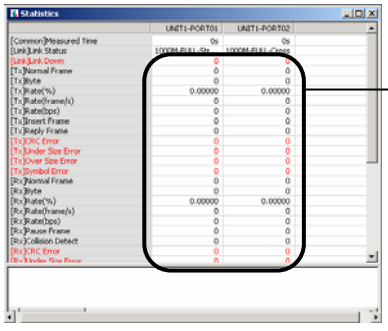
Shows the reserved ports. For the procedure to display the ports, see section 6.11.

Shown when the data of the previous measurement remains.

Statistics window

2. From the **Control** menu, choose **Reset**. All the counter displays of the measured results shown on the Statistics window are cleared.

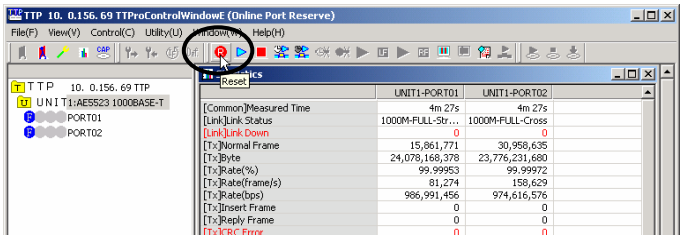




All counter values are cleared.

Note

You can also click the **Reset** icon to reset the measured results.

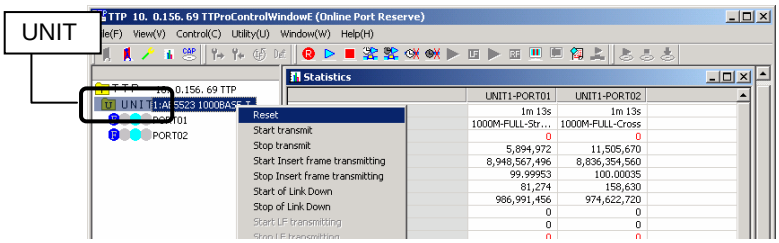


Explanation

- The Statistics window can be shown only when logged in.
- The **Control** menu and **Control** icon are available only when the Statistics window is active.

- The counter values of measured results are held while the AE5511 is running. Reset the counter values when making a measurement. The only ports on which the counter values are reset are reserved ports.
  Even if the counter of a reserved port is hidden on the Statistics window, the counter value is reset. The transmission does not stop when the measured results are reset.

- You can also reset measured results from the shortcut menu on the Navigation Window. To show the shortcut menu, select a port and right-click it.



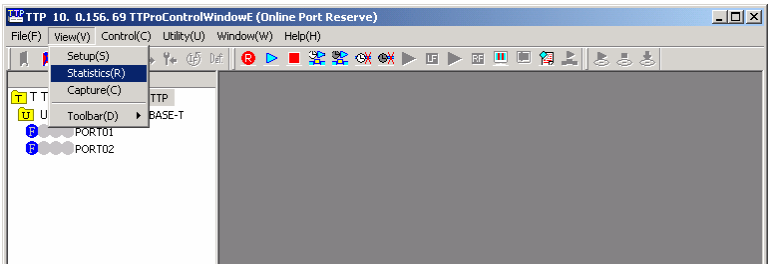
- The statistical results of the port selected on the Navigation Window are reset. If you select **TTP**, the statistical results of all ports that are reserved on the AE5511 are reset. If you select a unit, the statistical results of all ports that are reserved on the unit are reset.

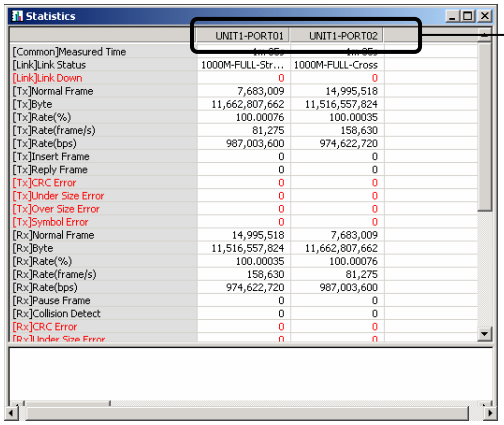
6.2 Starting/Stopping the Transmission

This section explains the details of starting or stopping the transmission on a selected reserved ports.

Procedure

1. From the **View** menu, choose **Statistics**. The Statistics window opens.

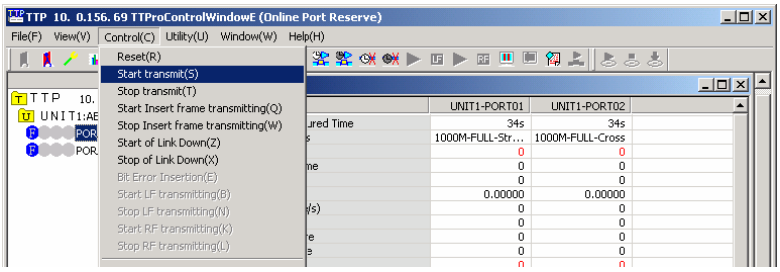


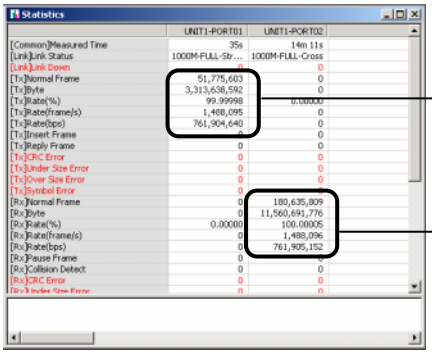


Shows the reserved ports. For the procedure to display the ports, see section 6.11.

- Starting the Transmission

2. On the Navigation Window, click the port on which to start the transmission.
3. From the **Control** menu, choose **Start transmit**. The counter values with [Tx] in their name on the Statistics window advance.

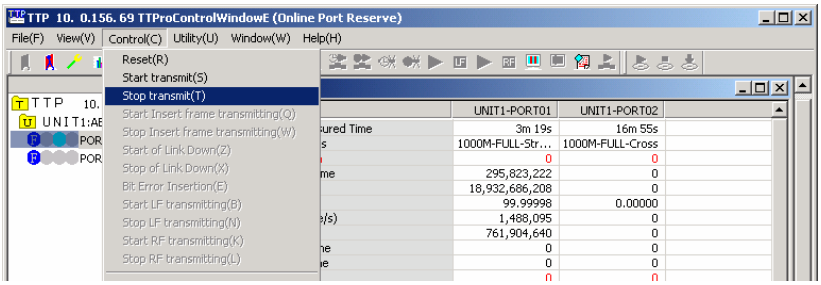




The [Tx] counter values advance.

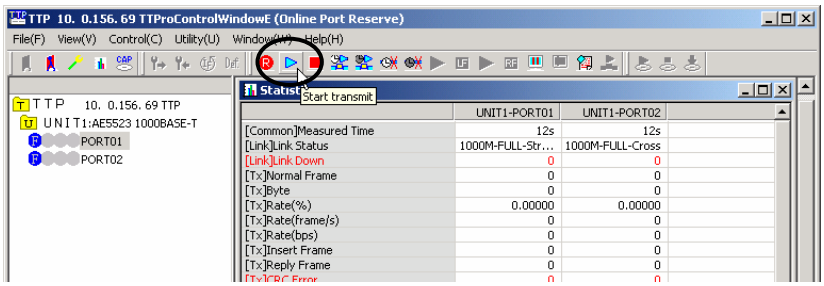
In this screen example, the transmit data of PORT1 is received on PORT2.

- Stopping the Transmission
  2. On the Navigation Window, click the port on which to stop the transmission.
  3. From the **Control** menu, choose **Stop transmit**. The counter values with [Tx] in their name on the Statistics window stop.



Note

You can also click the Start transmit and Stop transmit icons to control the transmission.

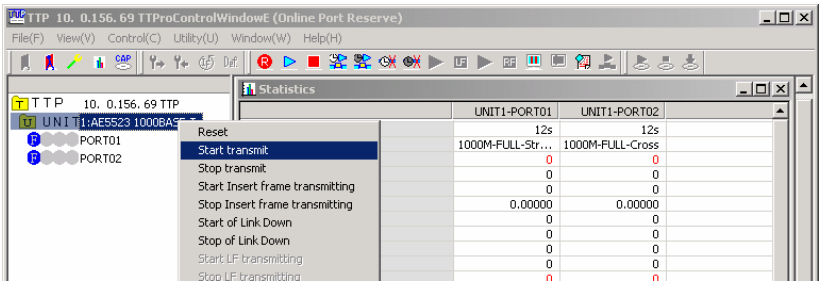


Explanation

- The Statistics window can be shown only when logged in.
- The **Control** menu and **Control** icon are available only when the Statistics window is active.

- Transmission can be started or stopped only on the reserved ports. The transmission can be controlled on each port or on all reserved ports collectively.

- You can also start and stop the transmission from the shortcut menu on the Navigation Window. To show the shortcut menu, select a port and right-click it.



Note

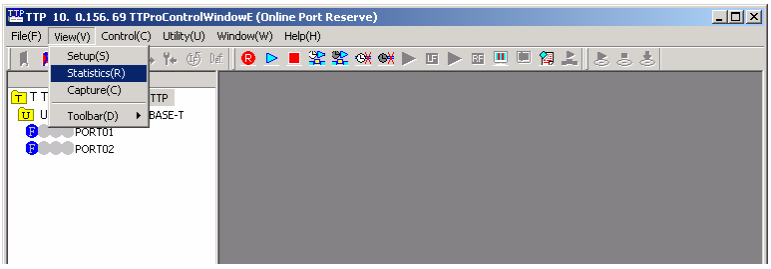
The counter values that advance and stop vary depending on the usage condition.

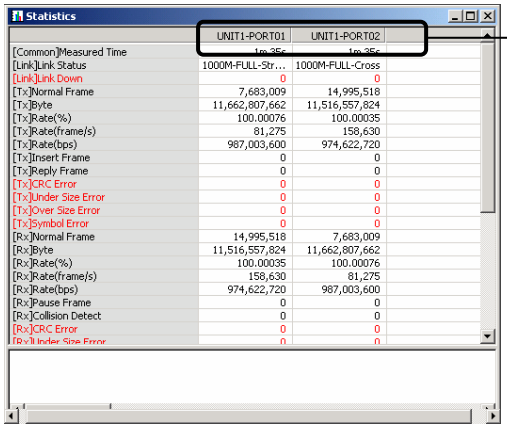
6.3 Starting Insert Frame Transmission and Starting/Stopping Cycle Transmission

A frame different from the normal frames that are transmitted in section 6.2 can be inserted and transmitted. This frame can be setup as an insert frame. For details, see section 5.9.

Procedure

1. From the **View** menu, choose **Statistics**. The Statistics window opens.

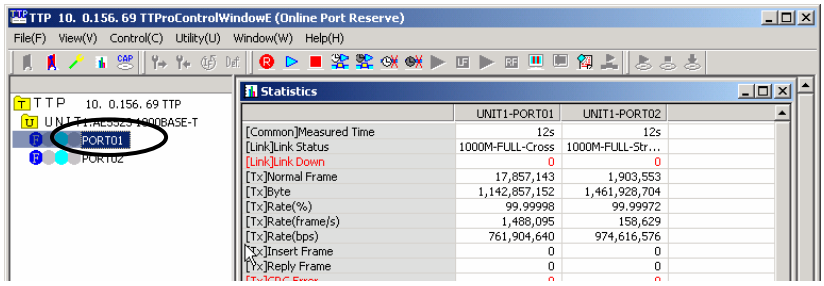




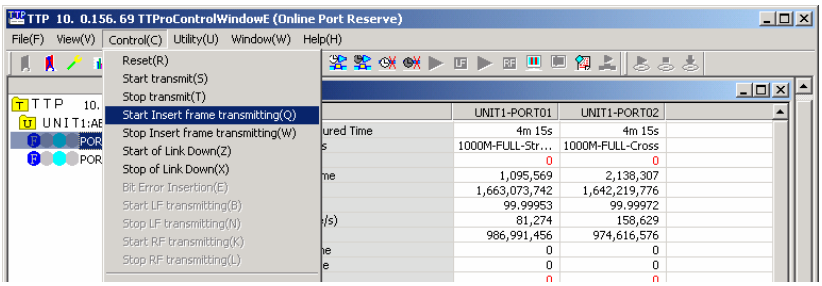
Shows the reserved ports. For the procedure to display the ports, see section 6.11.

- Starting the Insert Frame Transmission

2. On the Navigation Window, click the port on which to start the insert frame transmission.

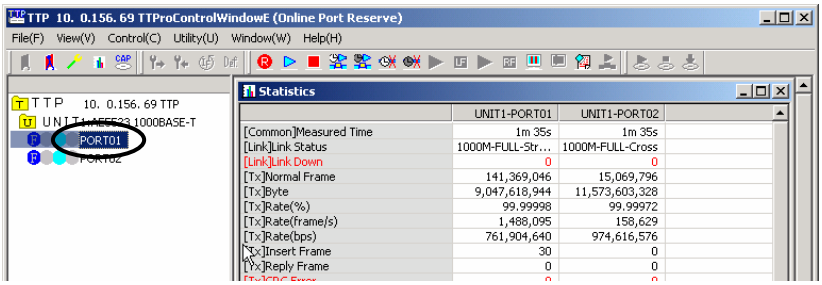


3. From the **Control** menu, choose **Start Insert frame transmitting**.

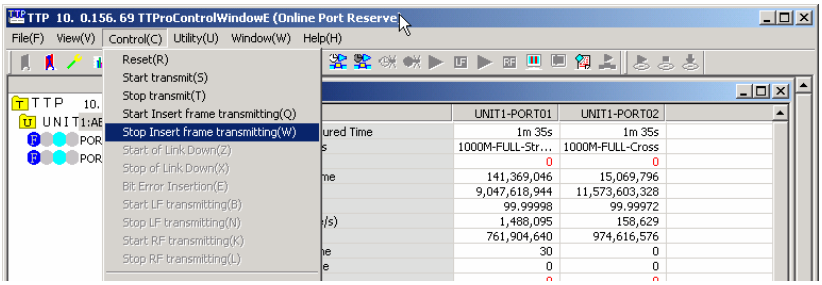


- Stopping the Insert Frame Transmission

4. On the Navigation Window, click the port on which to stop the insert frame transmission.

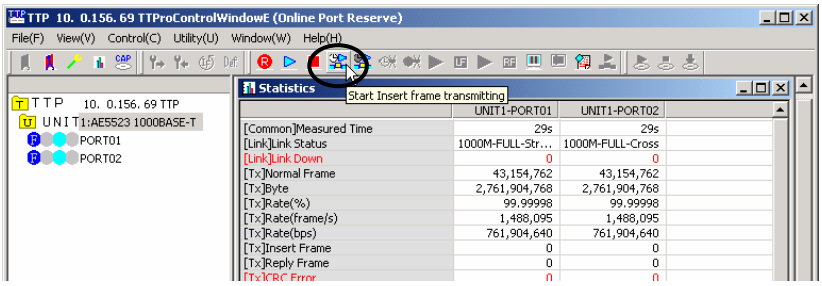


5. From the **Control** menu, choose **Stop Insert frame transmitting**.



Note

You can also click the Start Insert frame transmitting and Stop Insert frame transmitting icons to control the transmission.

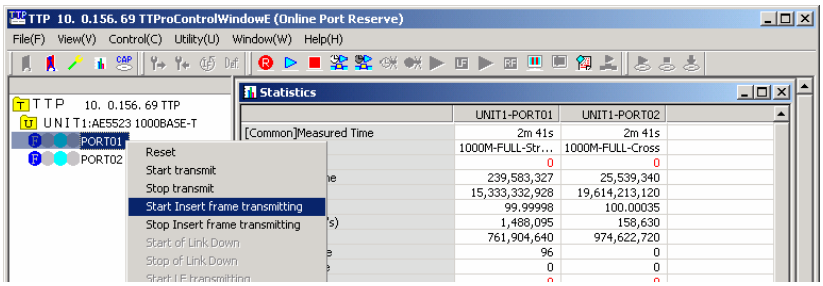


Explanation

- The Statistics window can be shown only when logged in.
- The **Control** menu and **Control** icon are available only when the Statistics window is active.

- Insert frame transmission can be started or stopped only on the reserved ports. The transmission can be controlled on each port or on all reserved ports collectively. Click the ports you wish to control on the Navigation Window.

- You can also start and stop the insert frame transmission from the shortcut menu on the Navigation Window. To show the shortcut menu, select a port and right-click it.



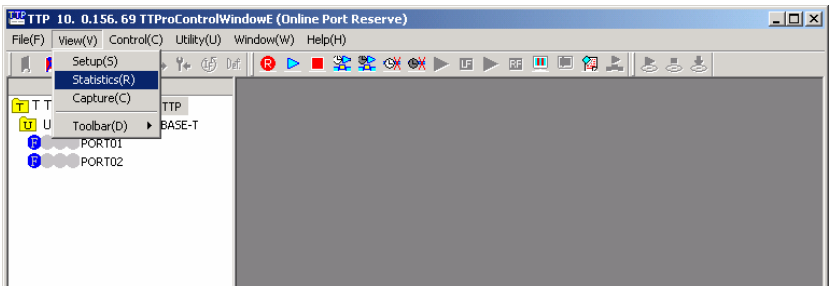
- If the insert mode is set to Single in section 5.9, there is no need to stop the insert frame transmission.

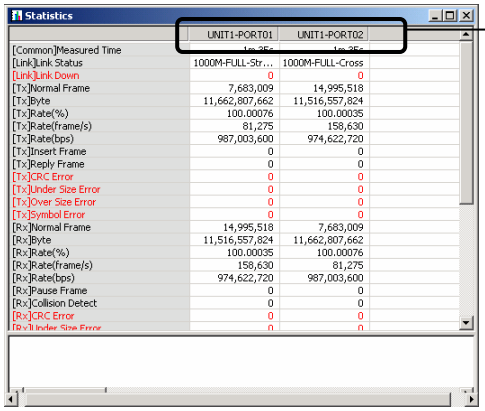
6.4 Generating Link Down and Starting/Stopping Cycle Generation

This section explains the details of generating link down on the reserved ports.

Procedure

1. From the **View** menu, choose **Statistics**. The Statistics window opens.

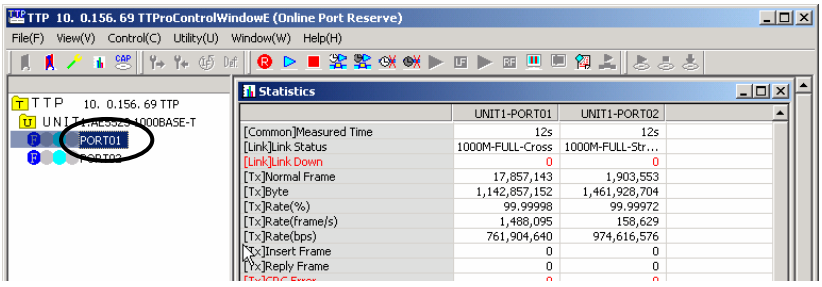




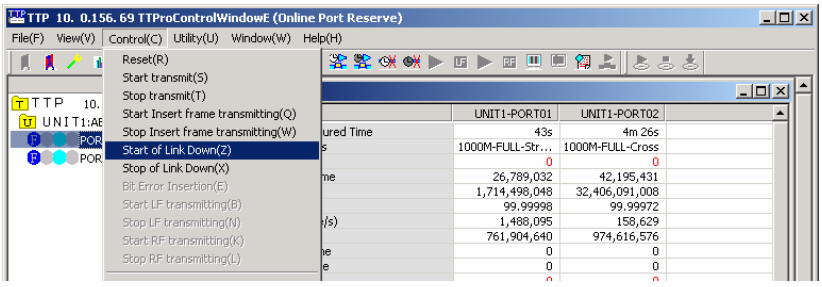
Shows the reserved ports. For the procedure to display the ports, see section 6.11.

- Starting the Link Down Generation

2. On the Navigation Window, click the port on which to start the link down generation.

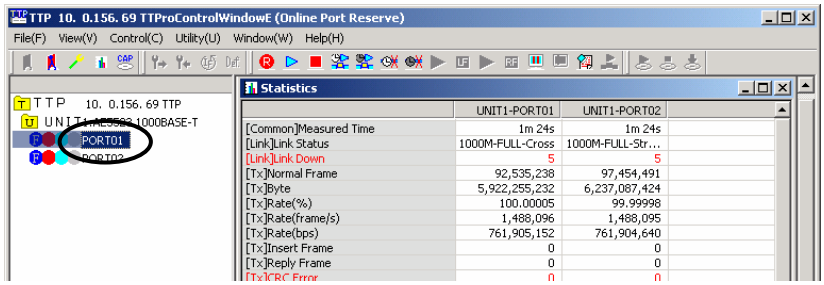


3. From the **Control** menu, choose **Start of Link Down**. The [Link] status on the Statistics window changes to Link Down.

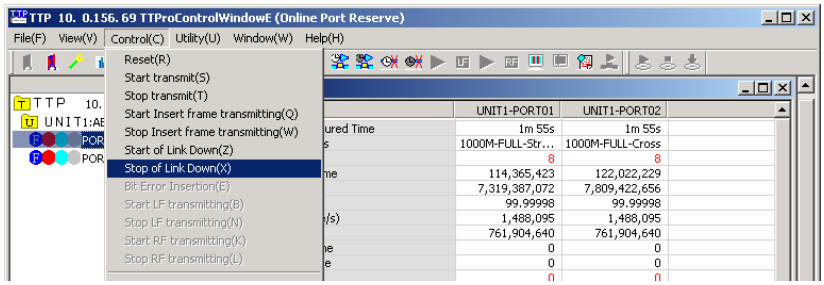


- Stopping the Link Down Generation

2. On the Navigation Window, click the port on which to stop the link down generation.



3. From the **Control** menu, choose **Stop of Link Down**.



Note

You can also click the Start of Link Down and Stop of Link Down icons to control the generation.

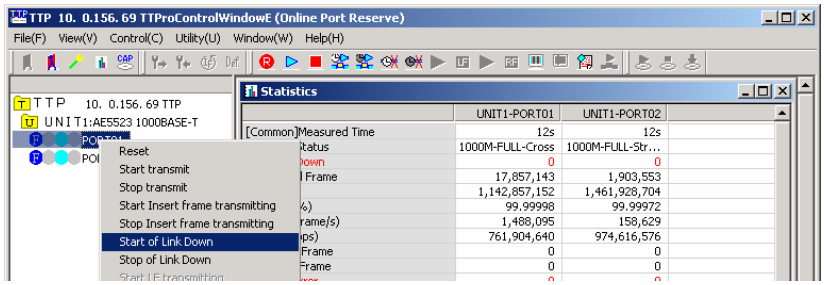
Explanation

- The **Control** menu and **Control** icon are available only when the Statistics window is active.

- Link down generation can be started or stopped only on the reserved ports. The transmission can be controlled on each port or on all reserved ports collectively. Click the ports you wish to control on the Navigation Window.

- If the Link Up/Down condition is set to Single in section 5.7, there is no need to stop the link down generation.

- You can also start and stop the link down generation from the shortcut menu on the Navigation Window.

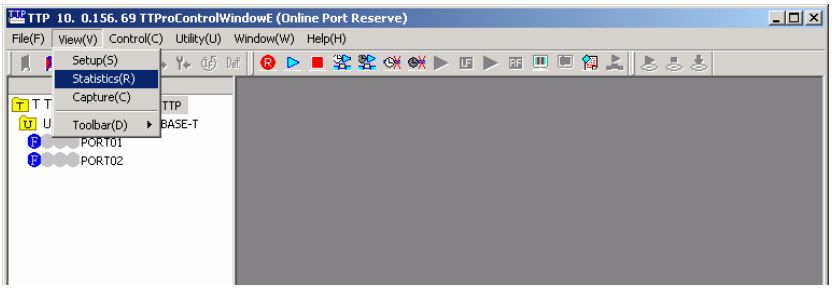


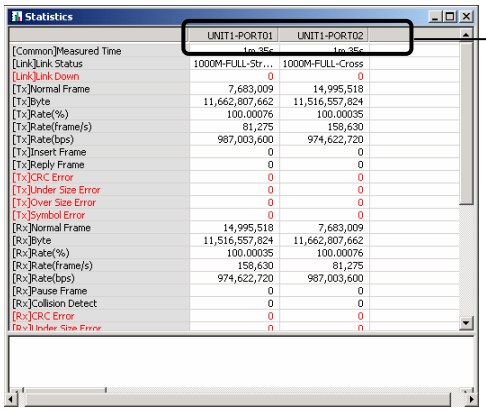
6.5 Inserting Bit Errors

This section explains the details of inserting 1 bit of error in the data section (PN pattern) of the transmitted frame.

Procedure

1. From the **View** menu, choose **Statistics**. The Statistics window opens.

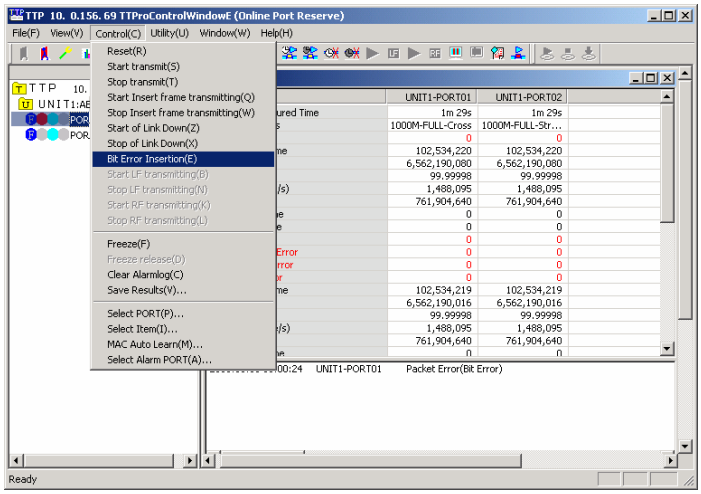




Shows the reserved ports. For the procedure to display the ports, see section 6.11.

- Starting the Transmission
  See section 6.2.

- Inserting the Bit Error
  2. From the **Control** menu, choose **Bit Error Insertion**. The counter value of [BERT] Bit Error Insert on the Statistics window advance.



Note

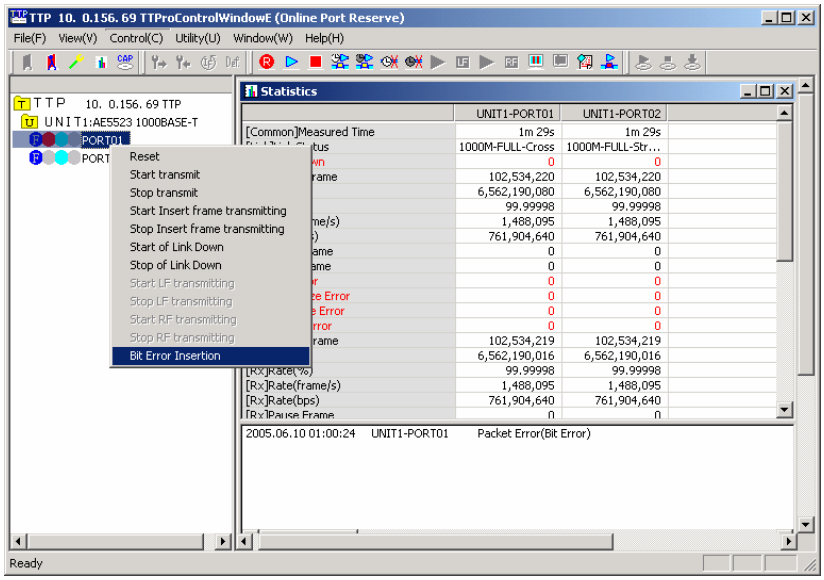
- Bit errors can be inserted when the test mode is BERT.
- You can also click the Bit Error Insertion icon to insert a bit error.

Explanation

- The Statistics window can be shown only when logged in.
- The **Control** menu and **Control** icon are available only when the Statistics window is active.

- Bit errors can be inserted only on the reserved ports. The transmission can be controlled on each port or on all reserved ports collectively. Click the ports you wish to control on the Navigation Window.

- You can also insert bit errors from the shortcut menu on the Navigation Window. To show the shortcut menu, select a port and right-click it.

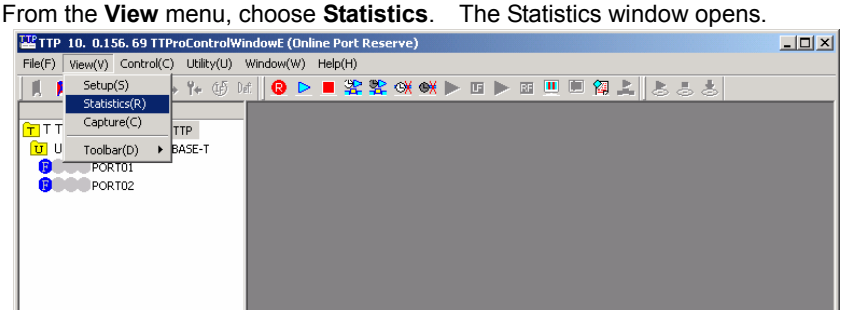


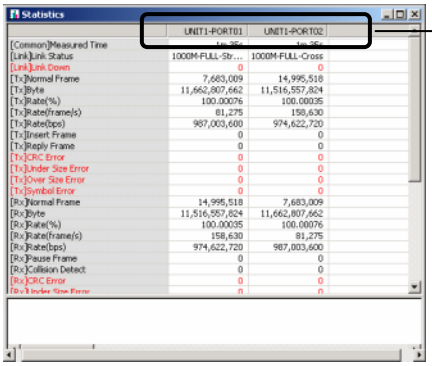
6.6 Starting/Stopping the LF Transmission

This section explains the details of transmitting LF (Local Fault) from the AE5522 10GBASE-X unit.

Procedure

1. From the **View** menu, choose **Statistics**. The Statistics window opens.

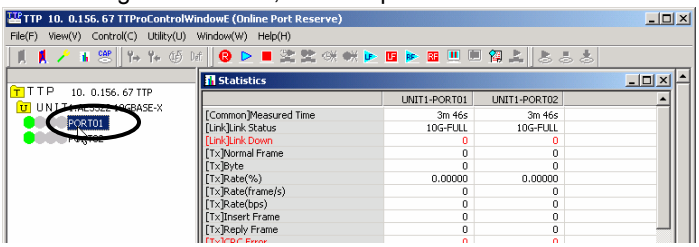




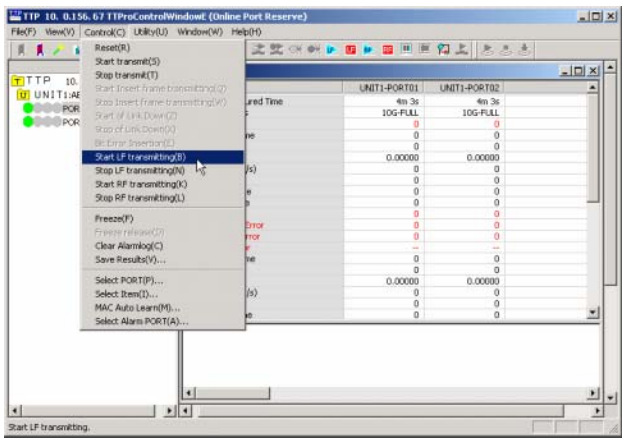
Shows the reserved ports.
For the procedure to display the ports, see section 6.11.

- Starting the LF Transmission

2. On the Navigation Window, click the port on which to start the LF transmission.

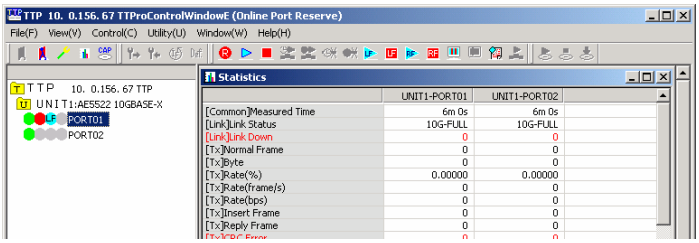


3. From the **Control** menu, choose **Start LF transmitting**.

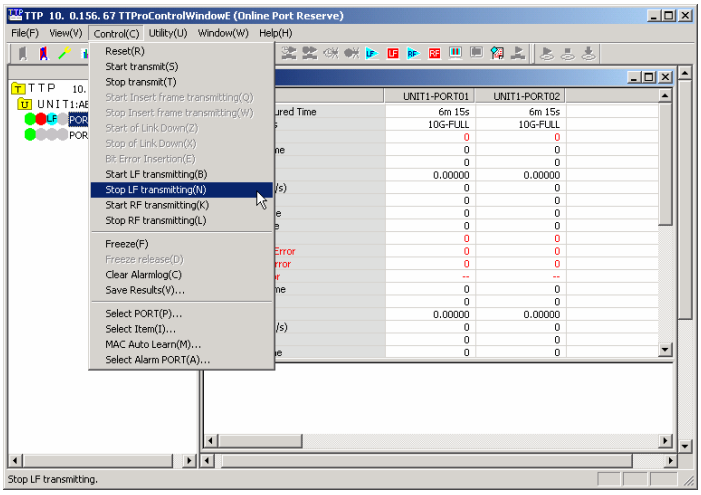


- Stopping the LF Transmission

2. On the Navigation Window, click the port on which to stop the LF transmission.



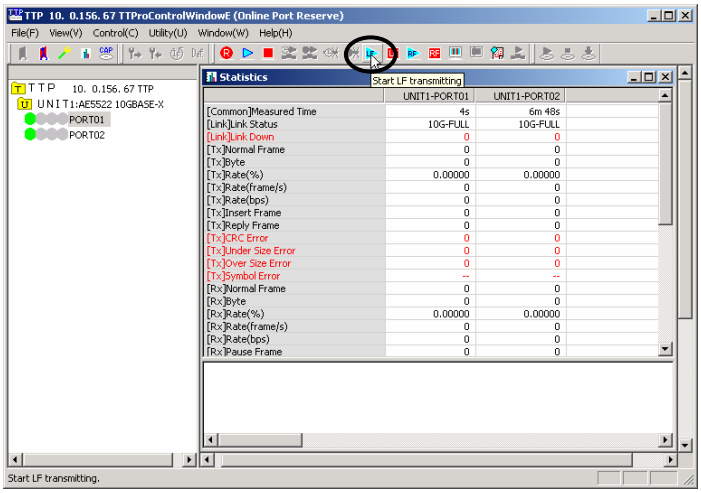
3. From the **Control** menu, choose **Stop LF transmitting**.



Note

- You can also click the Start LF transmitting and Stop LF transmitting icons to
- control the transmission.

  LF transmission can be controlled only on the AE5522 10GBASE-X unit.

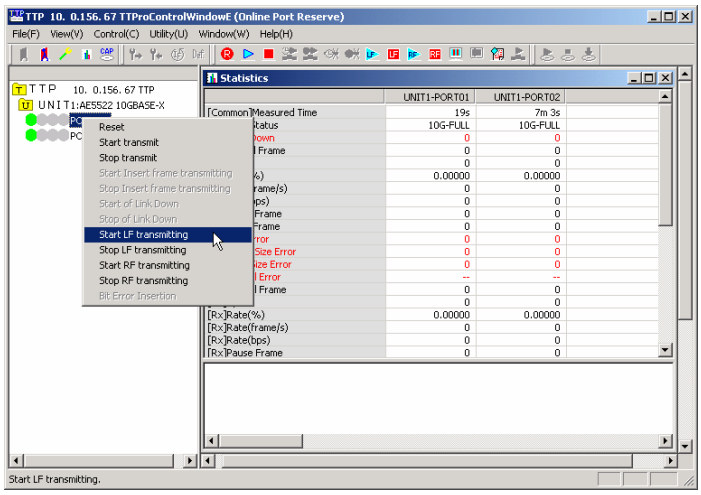


Explanation

- The Statistics window can be shown only when logged in.
- The **Control** menu and **Control** icon are available only when the Statistics window is active.

- LF transmission can be started or stopped only on the reserved ports. The transmission can be controlled on each port or on all reserved ports collectively. Click the ports you wish to control on the Navigation Window.

- You can also start and stop the LF transmission from the shortcut menu on the Navigation Window. To show the shortcut menu, select a port and right-click it.

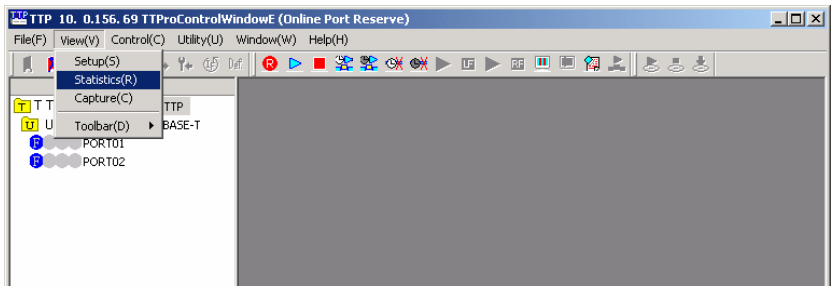


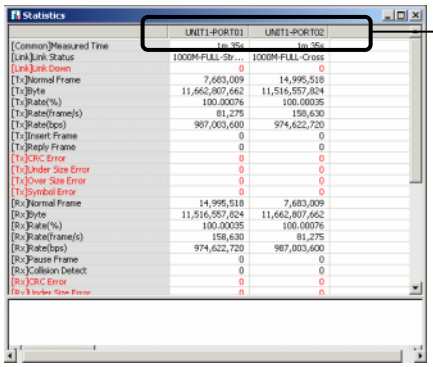
6.7 Starting/Stopping the RF Transmission

This section explains the details of transmitting RF (Remote Fault) from the AE5522 10GBASE-X unit.

Procedure

1. From the **View** menu, choose **Statistics**. The Statistics window opens.

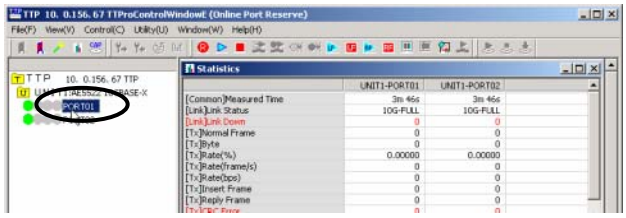




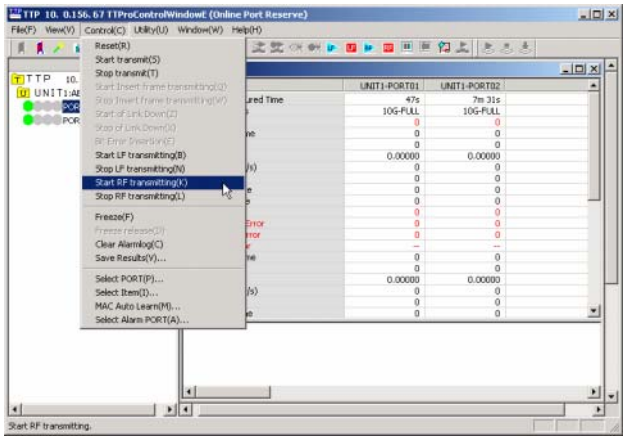
Shows the reserved ports.
For the procedure to display the ports, see section 6.11.

- Starting the RF Transmission

2. On the Navigation Window, click the port on which to start the RF transmission.

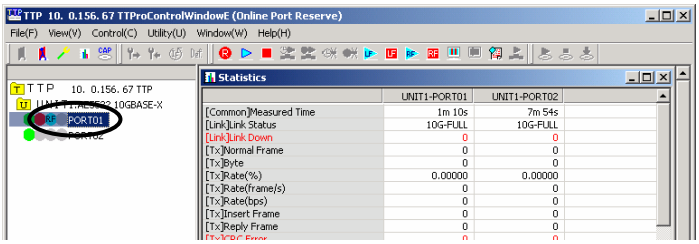


3. From the **Control** menu, choose **Start RF transmitting**.

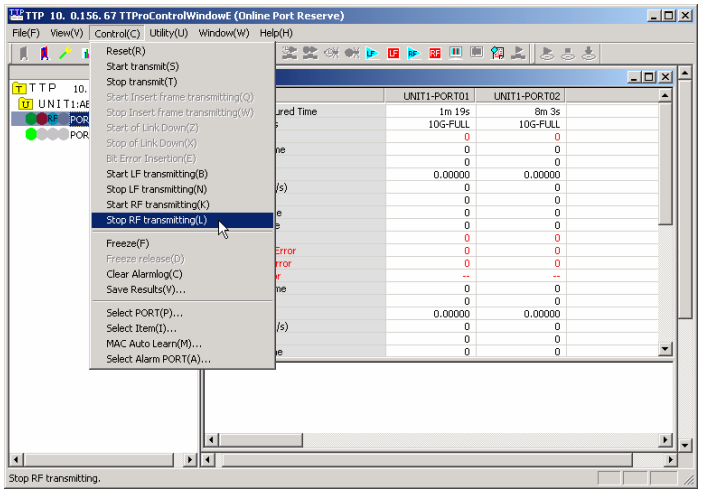


- Stopping the RF Transmission

2. On the Navigation Window, click the port on which to stop the RF transmission.



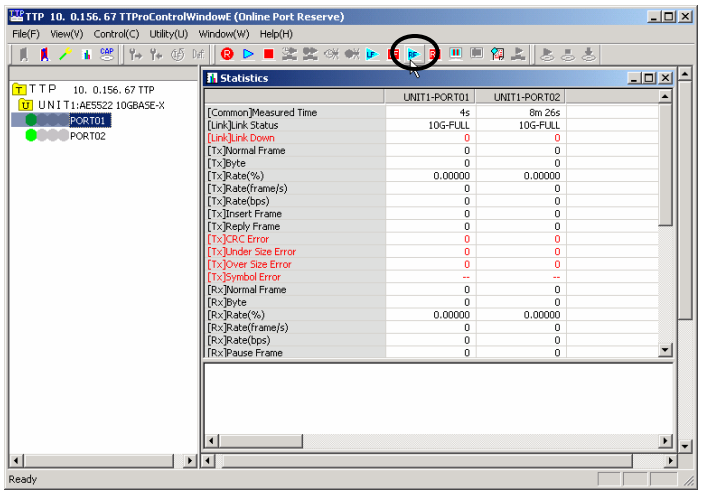
3. From the **Control** menu, choose **Stop RF transmitting**.



Note

- You can also click the Start RF transmitting and Stop RF transmitting icons to
- control the transmission.

  RF transmission can be controlled only on the AE5522 10GBASE-X unit.

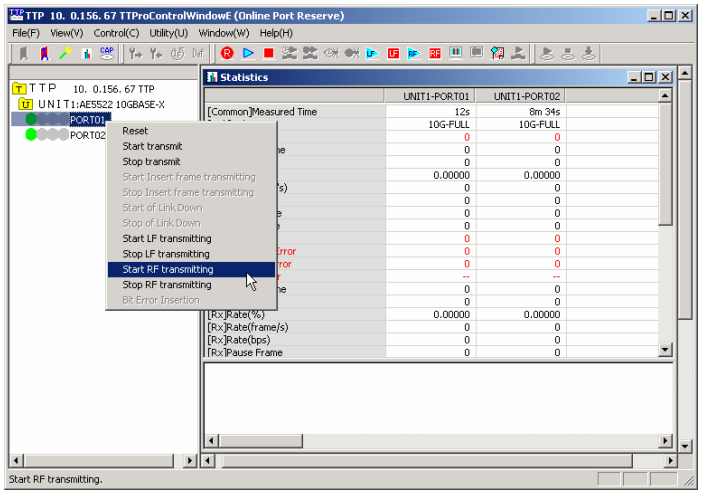


Explanation

- The Statistics window can be shown only when logged in.
- The **Control** menu and **Control** icon are available only when the Statistics window is active.

- RF transmission can be started or stopped only on the reserved ports. The transmission can be controlled on each port or on all reserved ports collectively. Click the ports you wish to control on the Navigation Window.

- You can also start and stop the RF transmission from the shortcut menu on the Navigation Window. To show the shortcut menu, select a port and right-click it.

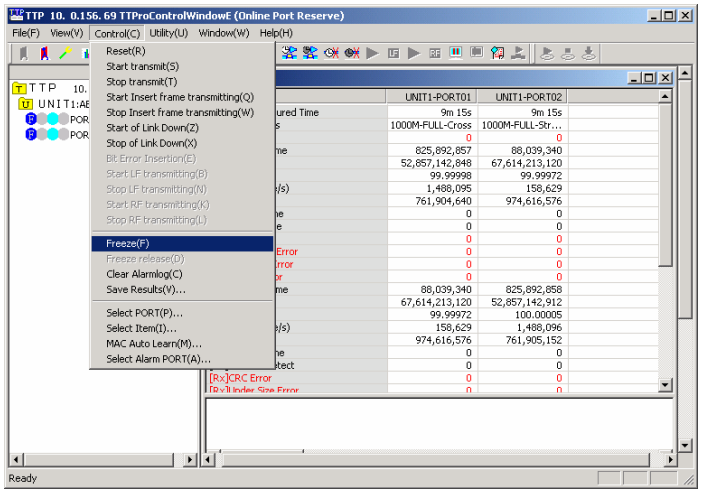


6.8 Freezing/Releasing the Screen

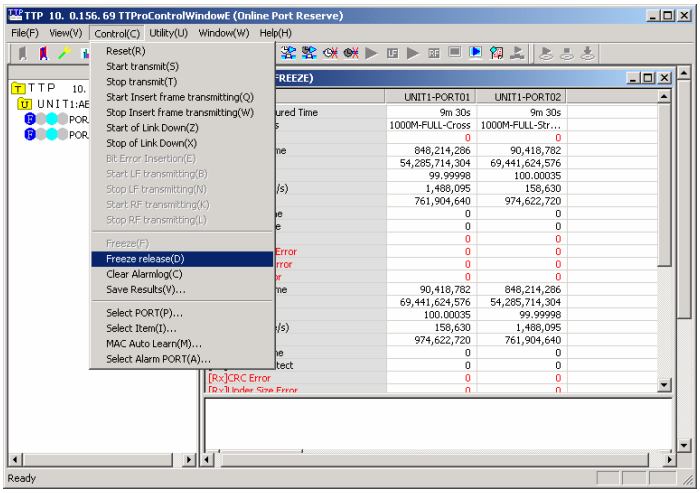
The screen updating needs to be paused (frozen) such as when recording the counter values on the Statistics window in the middle of the measurement. This section explains the details of this operation.

Procedure

- Freezing the Screen (Counter Updating)
  1. From the **Control** menu, choose **Freeze**. "(FREEZE)" is shown on the title bar of the TTProControlWindowE.

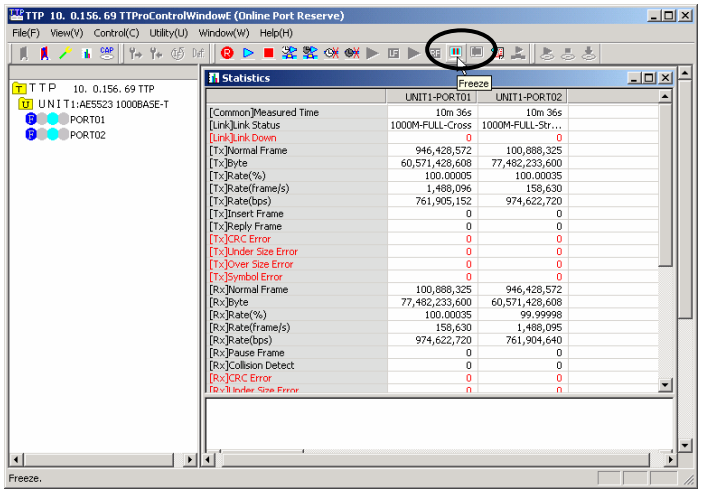


- Releasing the Frozen Screen (Counter Updating)
  1. From the **Control** menu, choose **Freeze release**. "(FREEZE)" disappears from the title bar of the TTProControlWindowE.



Note

You can also click the Freeze icon to freeze the screen.



Explanation

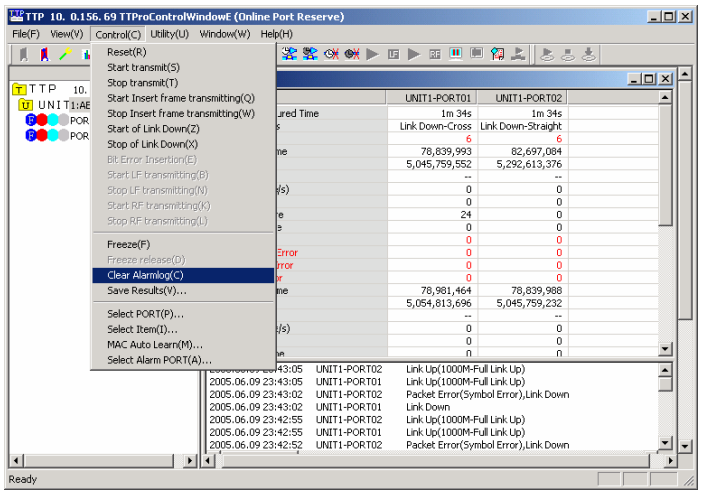
The screen freeze function pauses the display of the counter values. Because the measurement continues in the background, the current counter values are displayed when the frozen screen is released.

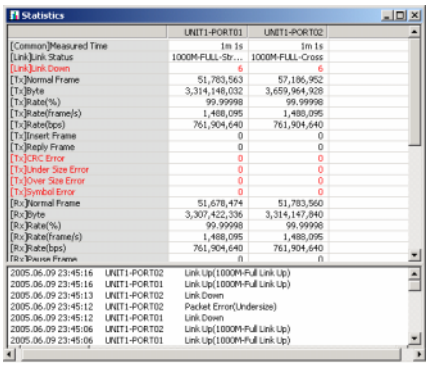
6.9 Clearing the Alarm Log

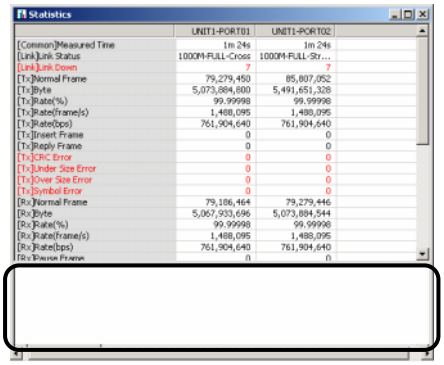
This section explains the details of clearing all alarm logs shown on the Statistics window.

Procedure

1. From the **Control** menu, choose **Clear Alarmlog**. All of the alarm logs shown on the Statistics window are cleared.







Before clearing the log

After clearing the log

Explanation

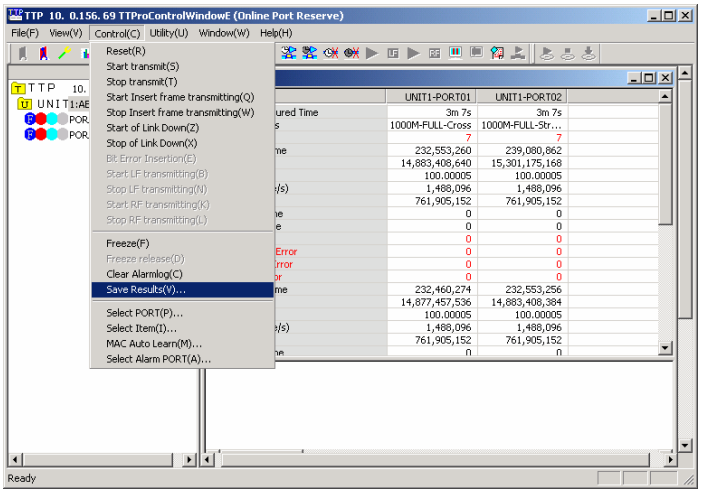
The alarm log is held while the AE5511 is running. Clear the log as necessary. Only the alarm logs of reserved ports are cleared.

6.10 Saving the Entire Statistical Data

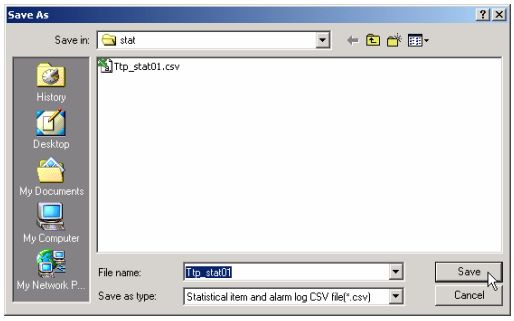
This section explains the details of saving the ports and statistical items shown on the Statistics window and the alarm log items of the selected ports to a file in CSV format.

Procedure

1. From the **Control** menu, choose **Save Results**. The Save As dialog box opens.



2. Specify the save destination and the file name.
3. Click **Save** to save the selected measured results.



Explanation

- The file is CSV format. If the statistics are being calculated (counted), the most recent data is saved.
- If the screen is frozen, the data of the frozen screen is saved.
- The alarm log can save the data of up to 1000 events.

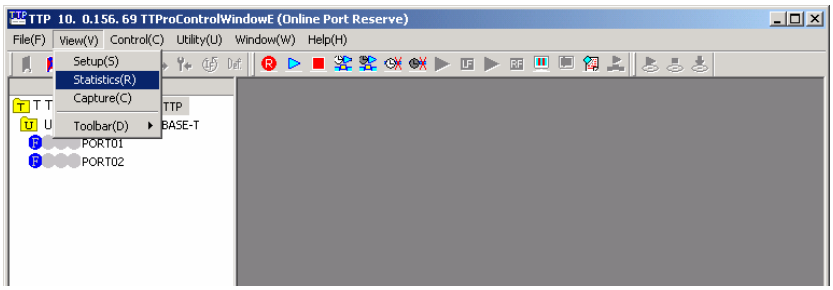
	A	B	C	D	E
1	System Version	7.1.0.0			
2	End Time of statistics	2005.6.9 23:48:17			
3	UNIT1	AE5523 1000BASE-T			
4	UNIT2	AE5520 10/100BASE-T			
5	UNIT number-PORT number	UNIT1-PORT01	UNIT1-PORT02		
6	Interface	unmount	unmount		
7	Measurement Mode	Traffic/Latency	Traffic/Latency		
8	Measurement Time(seconds)	240	240		
9	SPEED	1000M-FULL-Cross	1000M-FULL-Straight		
10	Auto Negotiation	ON	ON		
11	SPEED	--	--		
12	Duplex	--	--		
13	MDI/MDI-X	Auto	Auto		
14	[Common]Measured Time	240	240		
15	[Link]Link Status	1000M-FULL-Cross	1000M-FULL-Straight		
16	[Link]Link Down	7	7		

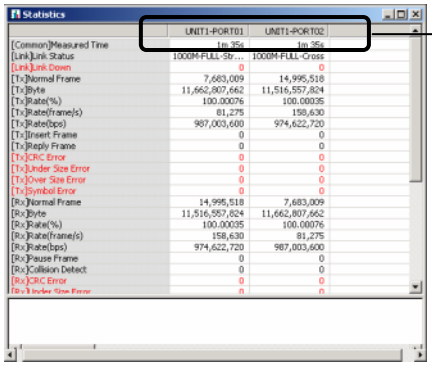
6.11 Selecting the Ports and Items Shown on the Statistics Window

This section explains the details of selecting the ports and statistical items shown on the Statistics window.

Procedure

1. From the **View** menu, choose **Statistics**. The Statistics window opens.





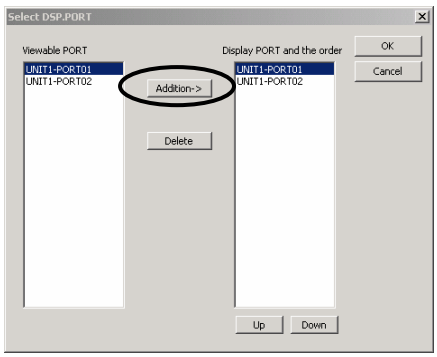
Shows the reserved ports.

Selecting the Ports Shown on the Statistics Window

- Selecting (Showing) the Ports

2. From the **Control** menu, choose **Select PORT**. The Select DSP.PORT dialog box opens.

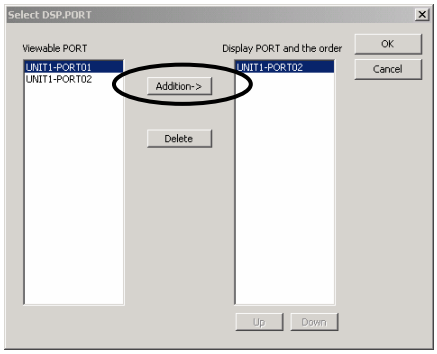
3. Select the ports you wish to show in the **Viewable PORT** box.
4. Click **Addition**. The added port is shown in the **Display PORT and the order** box.



- Deselecting (Hiding) the Port

2. From the **Control** menu, choose **Select PORT**. The Select DSP.PORT dialog box opens.

3. Select the port you wish to hide on the **Viewable PORT** box.
4. Click **Delete**. The port is cleared from the **Display PORT and the order** box.

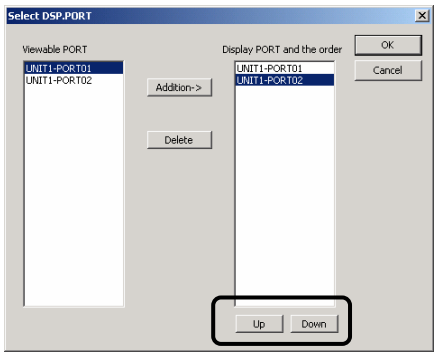


5. Click **OK**.

- Reordering the Displayed Ports

2. From the **Control** menu, choose **Select PORT**. The Select DSP.PORT dialog box opens.

3. In the **Display PORT and the order** box, click the port you wish to reorder.
4. Click **Up** or **Down**. The selected port moves accordingly.

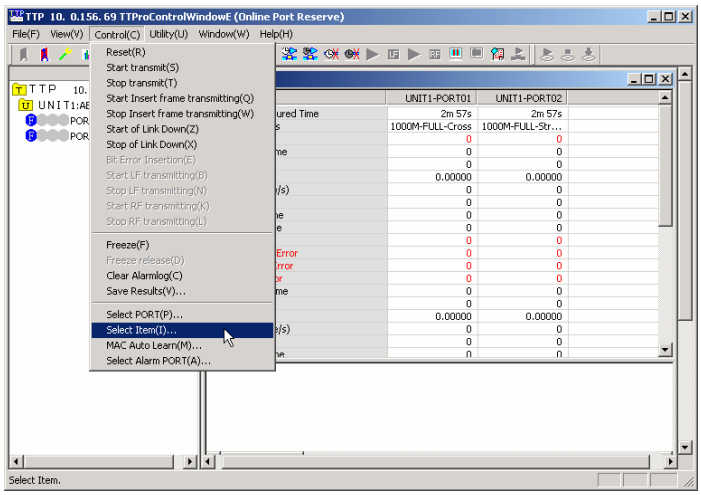


5. Click **OK**.

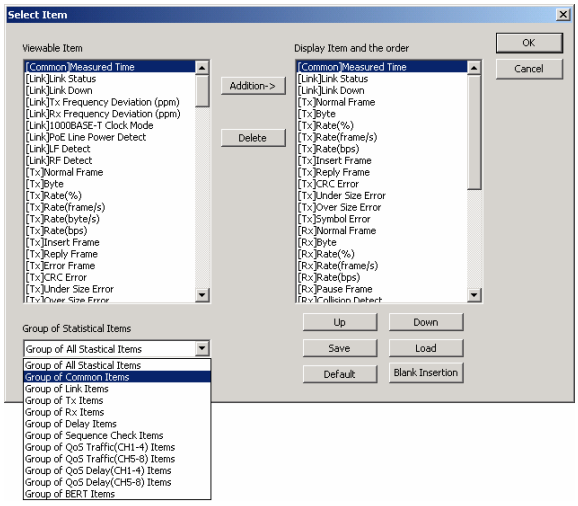
Selecting the Statistical Items Shown on the Statistics Window

- Selecting (Showing) the Statistical Items

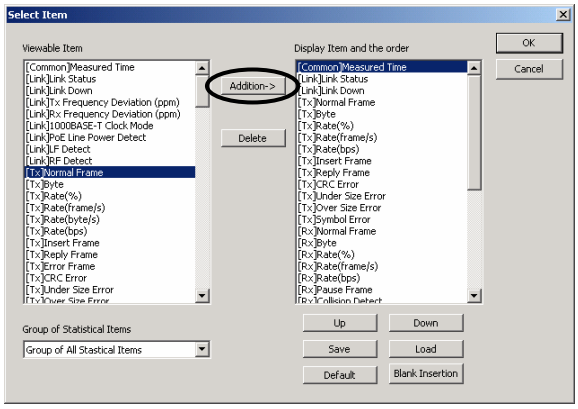
2. From the **Control** menu, choose **Select Item**. The Select Item dialog box opens.



3. Select the group you wish to display from the **Group of Statistical Items** list. The statistical items in the group are shown in the **Viewable Item** box.

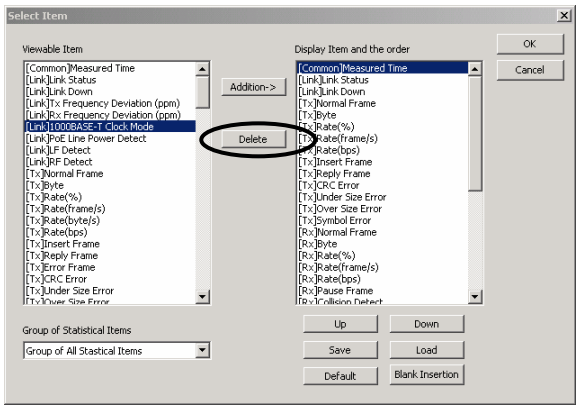


4. Select the statistical items you wish to show on the **Viewable Item** box.



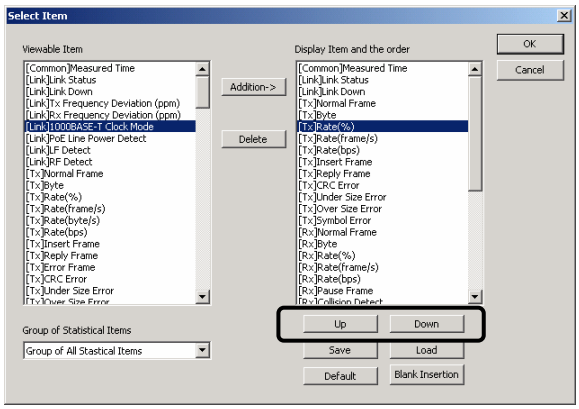
5. Click **Addition**.

- Deselecting (Hiding) the Statistical Items
  2. From the **Control** menu, choose **Select Item**. The Select Item dialog box opens.
  3. Select the statistical items to hide in the **Display Item and the order** box.



  4. Click **Delete**.

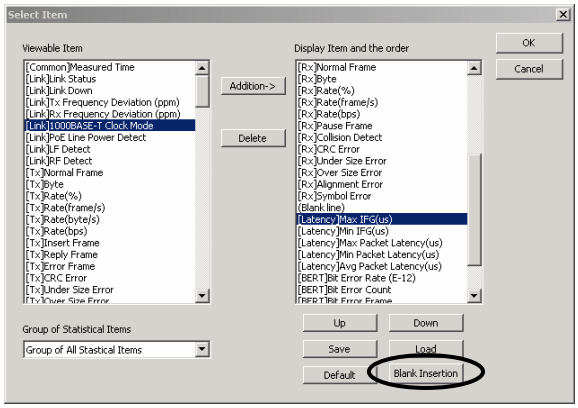
- Reordering the Displayed Items
  2. From the **Control** menu, choose **Select Item**. The Select Item dialog box opens.
  3. In the **Display Item and the order** box, click the statistical item you wish to reorder.



  4. Click **Up** or **Down**. The selected statistical item moves accordingly.

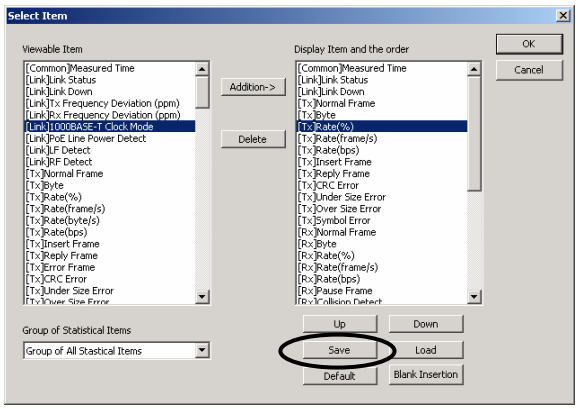
- Inserting a Blank Line

2. From the **Control** menu, choose **Select Item**. The Select Item dialog box opens.
3. In the **Display Item and the order** box, move the cursor to the item before which you wish to insert the blank line.
4. Click **Blank Insertion** to insert a blank line above the cursor position.

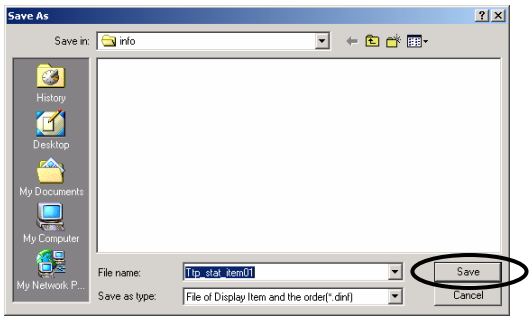


- Saving the Information of the Selected Statistical Items

2. From the **Control** menu, choose **Select Item**. The Select Item dialog box opens.
3. Click **Save**. The Save As dialog box opens.

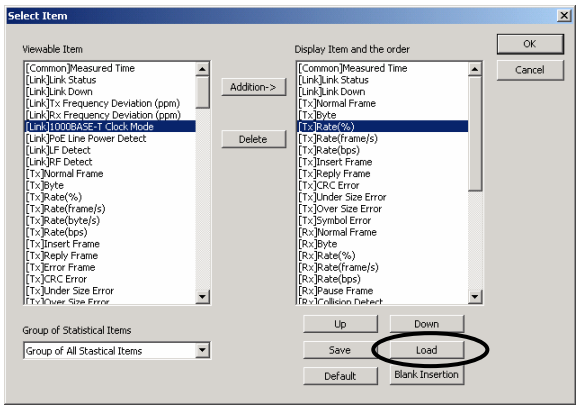


4. Specify the save destination and the file name.

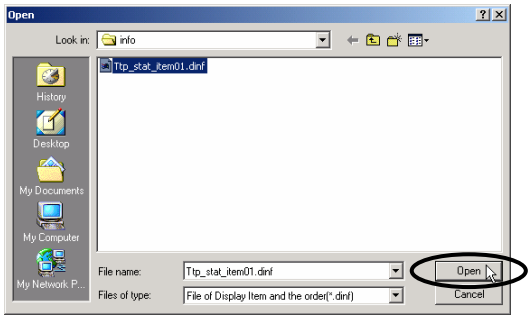


5. Click **Save**. The statistical items to be shown and their order are saved.

- Loading the Information of the Selected Statistical Items
  2. From the **Control** menu, choose **Select Item**. The Select Item dialog box opens.
  3. Click **Load**. The Open dialog box opens.



  4. Select a file name and click **Open**. The loaded statistical items are shown in the **Display Item and the order** box.

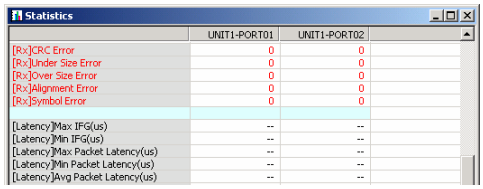


- Resetting the Displayed Statistical Items to Default
  2. From the **Control** menu, choose **Select Item**. The Select Item dialog box opens.
  3. Click **Default** to show the default statistical item in the **Display Item and the order** box.

Explanation

- The displayed statistical items can be changed even in the middle of the measurement. For details on the statistical item groups, see “List of Statistical Items” in section 2.3.

- Blank lines are shown in light blue.

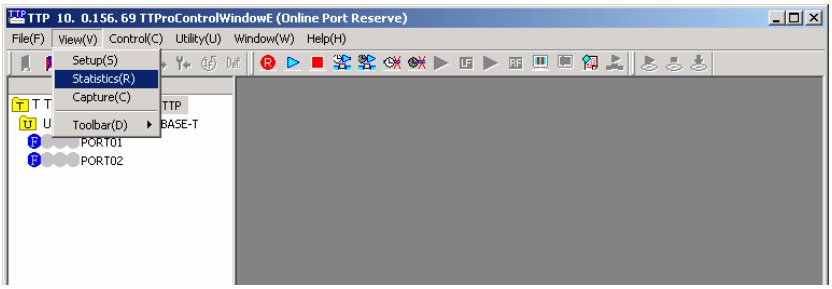


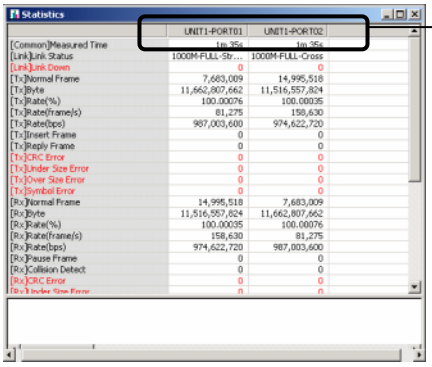
6.12 Showing the MAC Auto Learn Screen

This section explains the details of auto learning the MAC address of the device under test to be used as the destination address in the frames transmitted from the AE5511.

Procedure

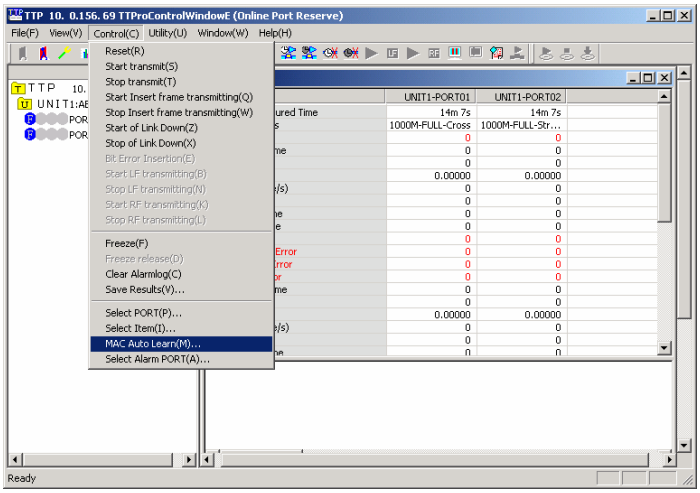
1. From the **View** menu, choose **Statistics**. The Statistics window opens.



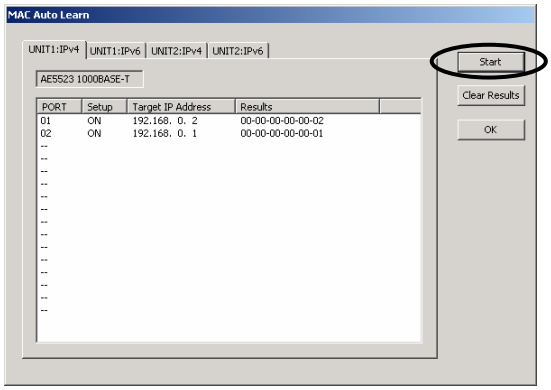


Shows the reserved ports.
For the procedure to display the ports, see section 6.11.

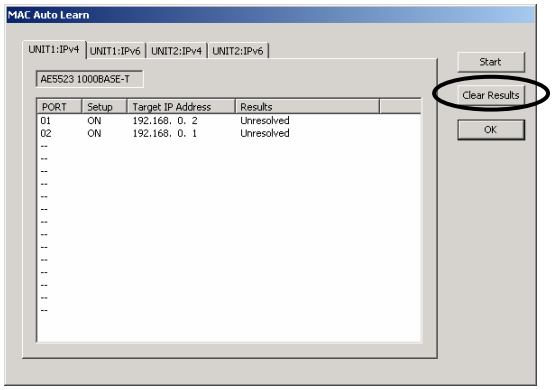
2. From the **Control** menu, choose **MAC Auto Learn**. The MAC Auto Learn dialog box opens.



- Auto Learning the MAC Address
  3. Click **Start**. The results are shown in the **Results** column.



- Clearing the MAC Auto Learn Results
  3. Click **Clear Results**. The **Results** column shows Unresolved.



Explanation

When the MAC address is auto learned, the address value is used as the destination address (DA) of the transmitted frames. If the MAC address auto learn fails, the value specified in Frame Builder of Transmit Setup is used as the DA. For details on Frame Builder, see section 5.14. If you click **Clear Results**, the results of all reserved ports are cleared regardless of the **Setup** ON/OFF condition.

Note

- When the Transmit Setup settings are applied, the MAC auto learn results are
- cleared.

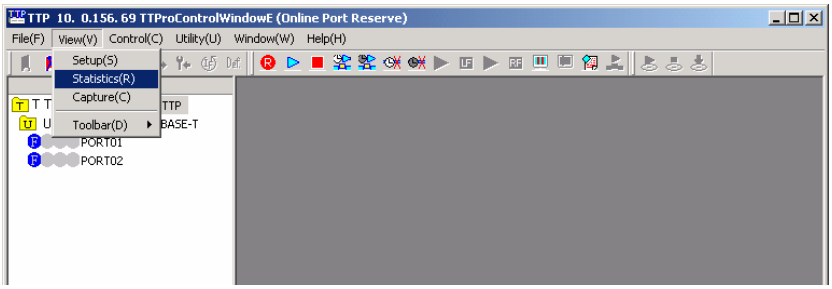
  The following operations cannot be carried out while auto learning the MAC address.
  - Updating settings to the ports
  - Starting/Stopping the transmission

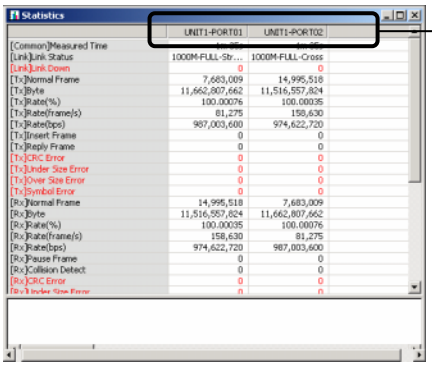
6.13 Port Filter for Showing the Alarm Log

This section explains the details of selecting the port on which to show the alarm log on the Statistics window.

Procedure

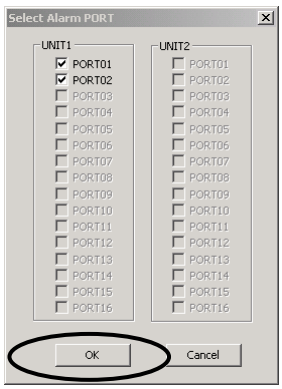
1. From the **View** menu, choose **Statistics**. The Statistics window opens.





Shows the reserved ports.
For the procedure to display the ports, see section 6.11.

2. From the **Control** menu, choose **Select Alarm PORT**. The **Select Alarm PORT** dialog box opens.
3. Select the check boxes for the ports on which to show the alarm log.



4. Click **OK**.

Note

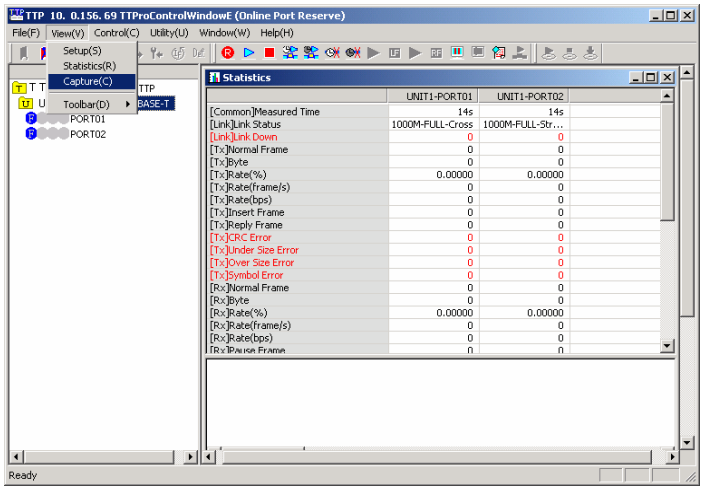
The ports that can be selected are the ports that were reserved when you logged into the AE5511.

7.1 Loading Capture Data from a File

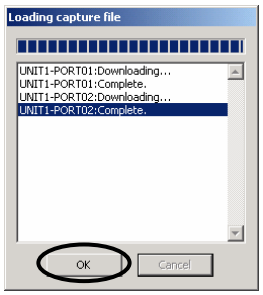
The AE5511 can load data captured and in TTP format saved in the past to the selected port and display the data.

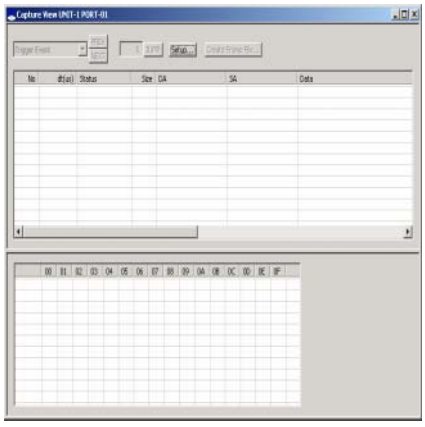
Procedure

1. From the **View** menu, choose **Capture**. The Loading capture file dialog box opens the first time after logging in.



2. Click **OK** to open the Capture View window.

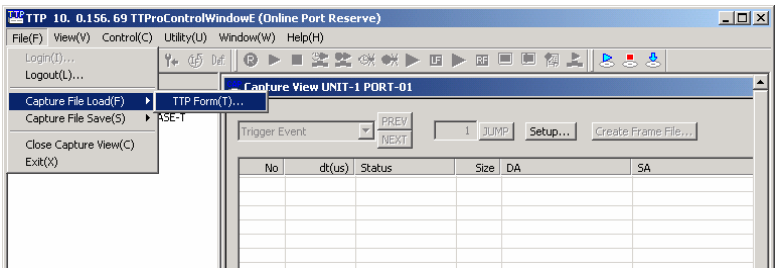




Capture View Window (before Loading the Data)

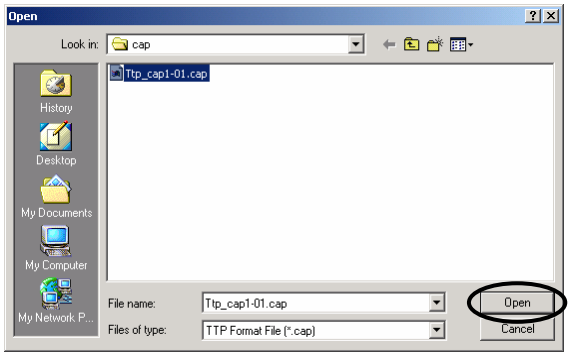
- Loading the Data

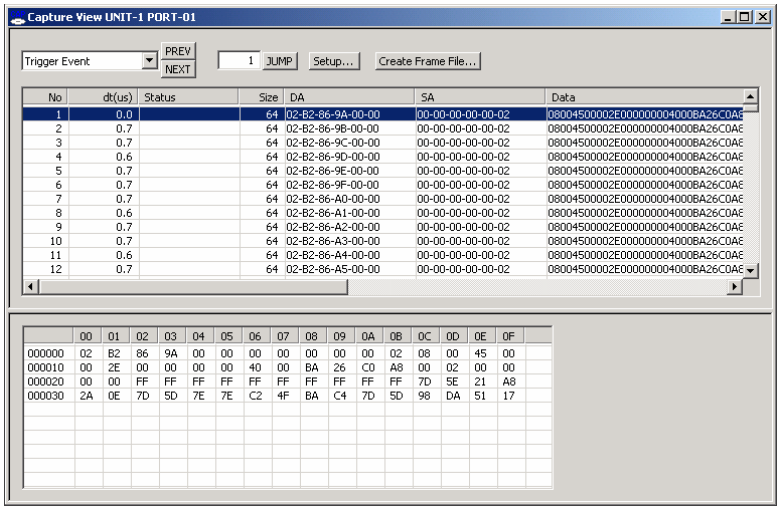
3. Select the port in which the data is to be loaded in the Navigation Window.
4. From the **File** menu, point to **Capture File Load**, and click **TTP Form**. A dialog box containing the message “Present settings are lost. OK?” opens.



5. Click **OK**. The Open dialog box opens.

6. Select a file and click **Open**. The loaded capture data is shown in the Capture View window.





Capture View Window

Note

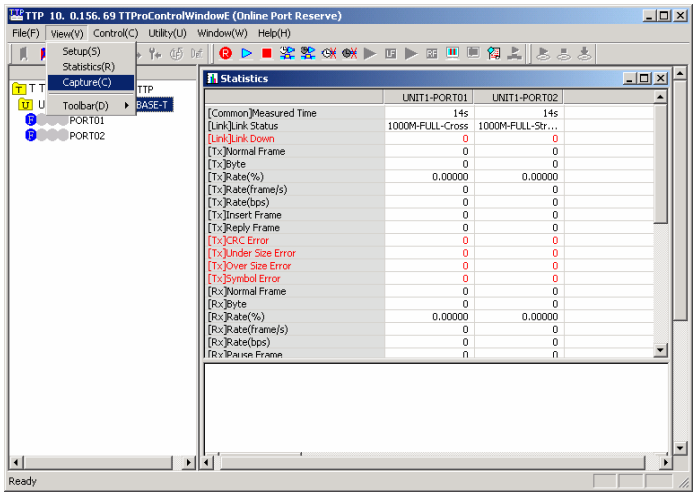
- Only capture data in TTP format can be loaded. Data in CSV and PCAP format cannot be loaded.
- Capture data can be loaded only to the reserved ports. The data is loaded for each port separately.

7.2 Saving Capture Data

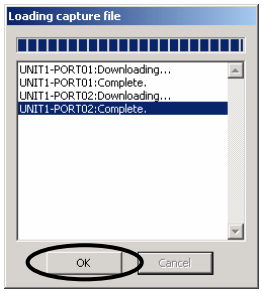
The captured results in view can be saved to a file for each port separately. The available save format are TTPro (TTP), CSV, and PCAP.

Procedure

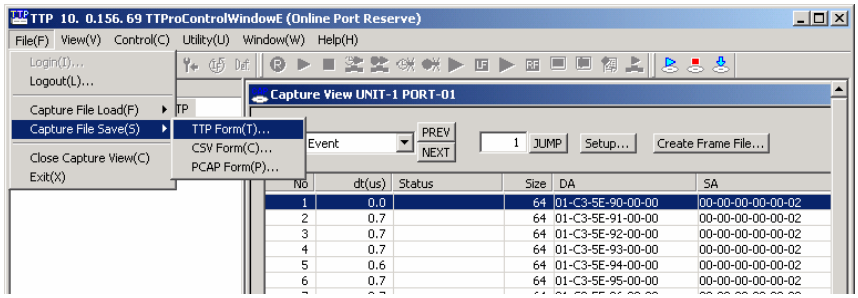
1. From the **View** menu, choose **Capture**. The Loading capture file dialog box opens the first time after logging in.



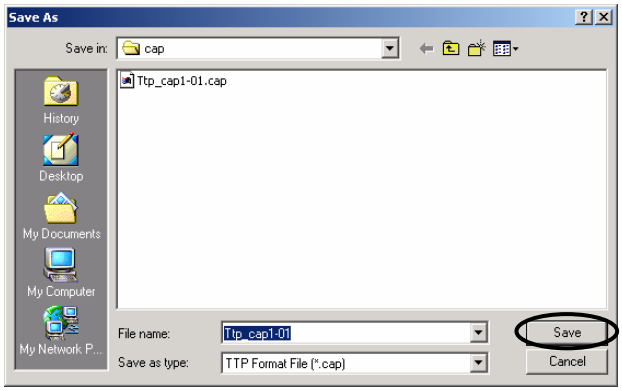
2. Click **OK** to open the Capture View window.



3. Select the port from which the data is to be saved in the Navigation Window.
4. From the **File** menu, point to **Capture File Save**, and click **TTP Form**, **CSV Form**, or **PCAP Form**. The Save As dialog box opens.



5. Specify the save destination and the file name.
6. Click **Save**. The captured results are saved.



Explanation

- Save Format of Data
  The capture setup for the current display can be saved to a file in TTP format (.cap extension). Capture data can be saved to one of three formats, TTP, CSV, or PCAP.
  - TTP Form: A file for the TTProControlWindowE application.
  - CSV Form: A file containing data values separated by commas. The data can be edited using a spreadsheet application or similar programs.
  - PCAP Form: Can be loaded to free programs such as Ethereal.

Note

Capture data can be saved only on the reserved ports. The data is saved for each port separately.

7.3 Staring/Stopping the Capture Operation

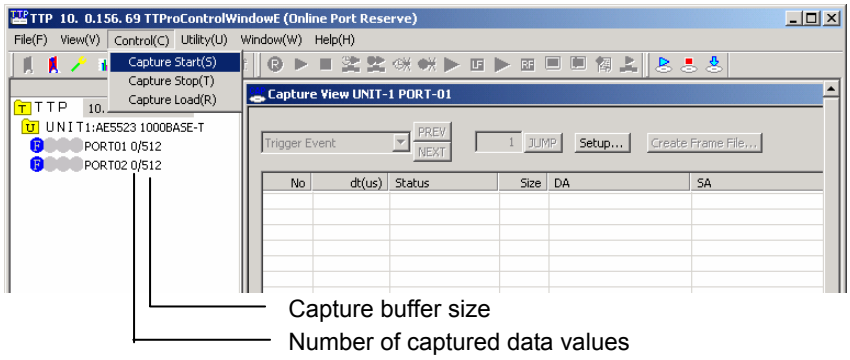
This section explains the details of starting/stopping the capture operation on the selected port.

Procedure

1. From the **View** menu, choose **Capture**. The Loading capture file dialog box opens the first time after logging in.
2. Click **OK** to open the Capture View window.

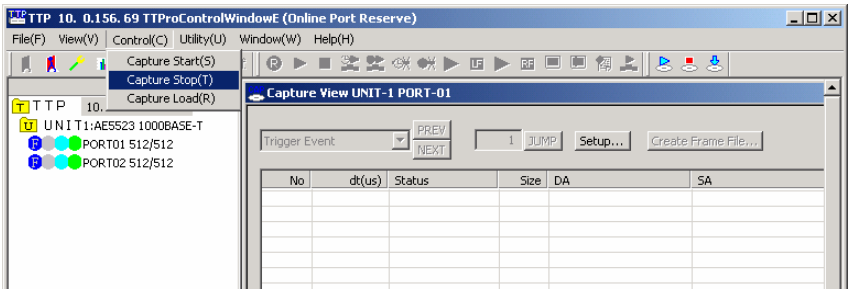
- Starting the Capture Operation

3. Select the port or unit on which the capture operation is to be started in the Navigation Window.
4. From the **Control** menu, choose **Capture Start**. The port status displayed in the Navigation Window turns light blue.



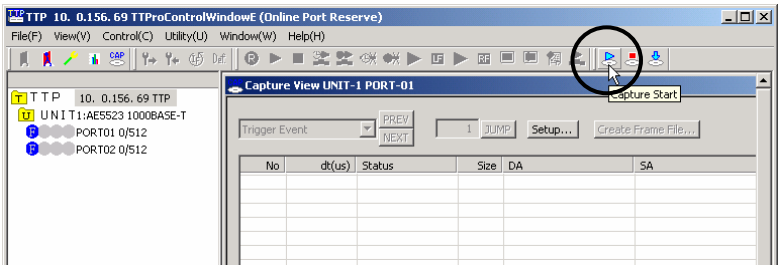
- Stopping the Capture Operation

5. Select the port or unit on which the capture operation is to be stopped in the Navigation Window.
6. From the **Control** menu, choose **Capture Stop**. The port status displayed in the Navigation Window turns green.



Note

- If the captured data does not exist, the port status display turns gray.
- You can also click the Capture Start or Capture Stop icon to start or stop the capture operation.



Explanation

The capture function acquires frames that flow through the same network segment. To set the conditions for capturing frames, see section 7.6 and 7.7.

Note

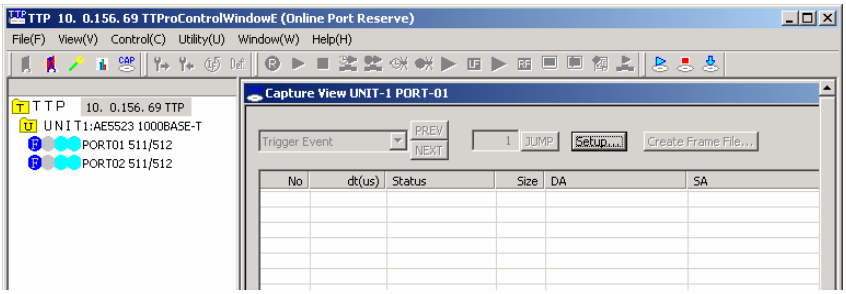
- The capture operation can be started or stopped only on the reserved ports.
- If you select a port, the capture operation starts or stops on the selected port. If you select a unit, the capture operation starts or stops on the reserved ports on the selected unit.

7.4 Loading Capture Data from the AE5511

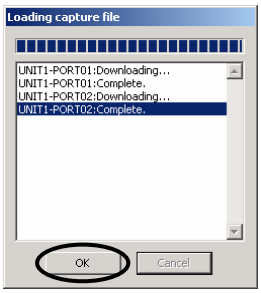
This section explains the details of downloading the capture information (capture data and capture setup) from the AE5511 and displaying the information.

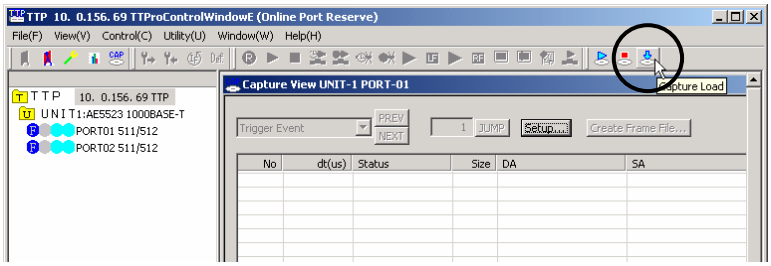
Procedure

1. Select the port or unit in the Navigation Window from which the capture information is to be downloaded.
2. From the **Control** menu, choose **Load**. The Loading Capture File dialog box opens.



3. Click **OK**. The Capture View window shows the captured results.





Note

You can also click the Capture Load icon to load the information.

Explanation

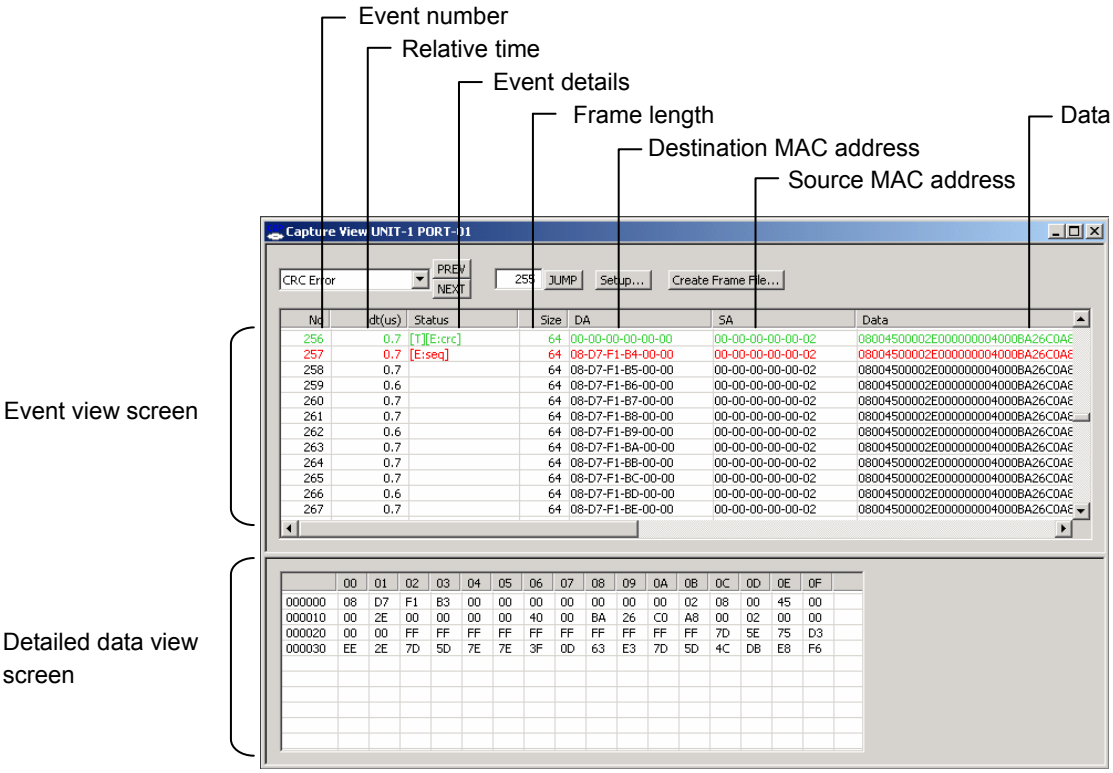
The capture information can be loaded any time. If the information is loaded in the middle of a capture operation, the capture operation is stopped, and the intermediate results are displayed.

Note

- The capture information can be loaded only from the reserved ports.
- If you select a port, the capture information is loaded from the selected port. If you select a unit, the capture information is loaded from the reserved ports on the selected unit.

7.5 Displaying Capture Data

The capture data loaded from a port can be listed. All of the captured data in the buffer are listed. The data can be displayed by search for the trigger event.



Capture View Screen

- Event View Screen

  No (even number): The displayed order of the received capture data (decimal)

  dt(us) (relative time): The time between the event numbers (resolution: 0.1 μs)

  Status (event status): The status of the received frame

  Size (frame length): Displayed in decimal notation

  DA (destination MAC address): Displayed in hexadecimal notation

  SA (source MAC address): Displayed in hexadecimal notation

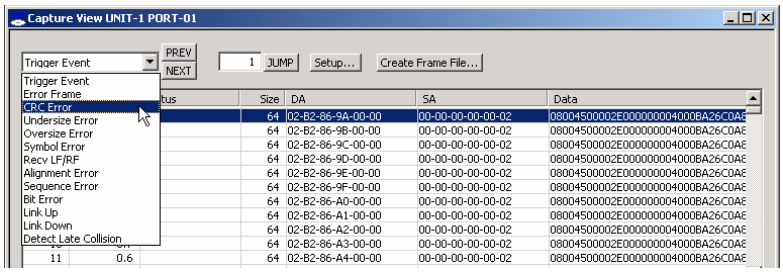
  Data: Displayed in hexadecimal notation. The 32 bytes after the MAC address field (the entire data is displayed in the detailed data view screen.

- Detailed Data View Screen

  Shows the entire contents of the data shown under “Data” in the Event View screen. The maximum number of data values that is displayed is the number of bytes selected in the buffer setting. If there are more data values than the selected number of bytes, “...” is shown after the last data value displayed.

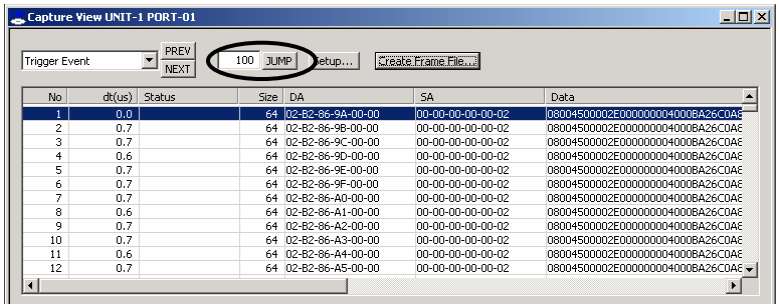
Procedure

- Searching Events
  1. From the **Event** box, select the event to be searched.

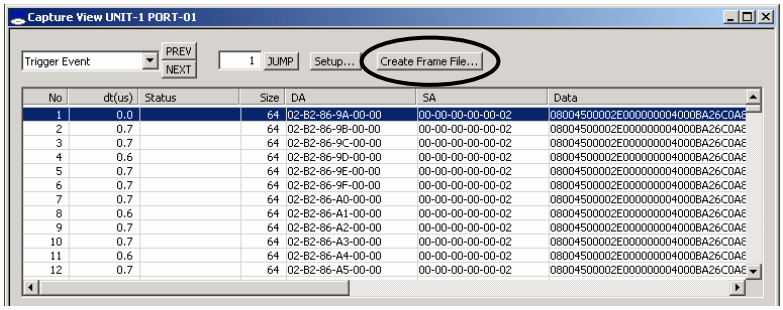


  2. Click **NEXT** or **PREV**. The cursor jumps from the current event number to the next or previous event number. If the corresponding trigger does not exist, a message dialog box opens without moving the cursor.

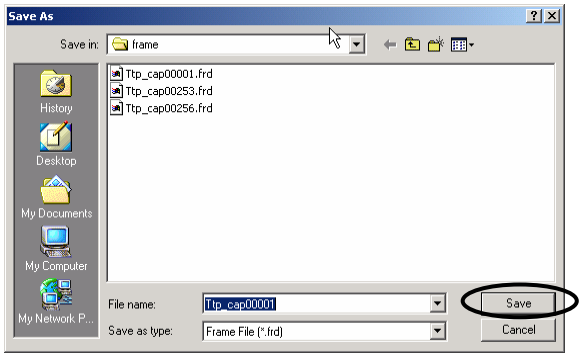
- Jumping to an Event Number
  1. Type a value in the text box.
  2. Click **JUMP**. The cursor jumps to the specified event number.



- Saving the Captured Data as a Transmission Frame
  1. Click **Create Frame File**. The Save As dialog box opens.



2. Specify the save destination and the file name.
3. Click **Save**. The captured frame is saved.



Explanation

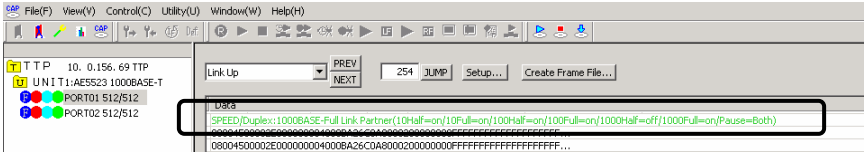
- Saving the Captured Data as a Transmission Frame
  The selected frame in the Event View screen can be saved. The saved frame can be used as a transmission frame on Frame Builder. For the procedure, see the setup procedure in section 5.14.

- Event Description
  The details of events shown in Status are given below.

Event Shown under Status

Status Display	Frame Status	Notes
Blank	Normal	
E:crc	FCS error	
E:under	Undersize	
E:over	Oversize	
E:symbol	Symbol error	
E:bit	Bit error	
E:align	Alignment error	On the AE5523
E:seq	Sequence error	On the AE5523 and AE5524
E:late col	Late collision detection	On the AE5523
T	Trigger occurrence	Displayed by the other status
lfs	LF/RF detection	On the AE5522
up	Link up	
down	Link down	
ins	Insert frame transmission	

- Data Display Description
  The details of events shown under Data are given below.
  - Received frame data
    Up to 32 bytes of data after the MAC field are displayed in hexadecimal notation.
  - Layer 1 information
    When auto negotiation is enabled, the link status and link partner information are displayed (shown below). When auto negotiation is disabled, the link status is displayed.

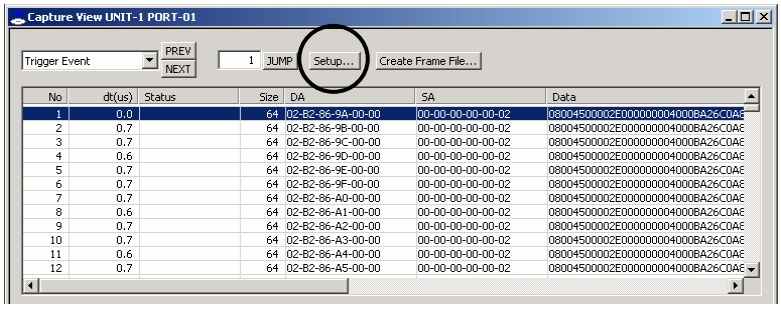


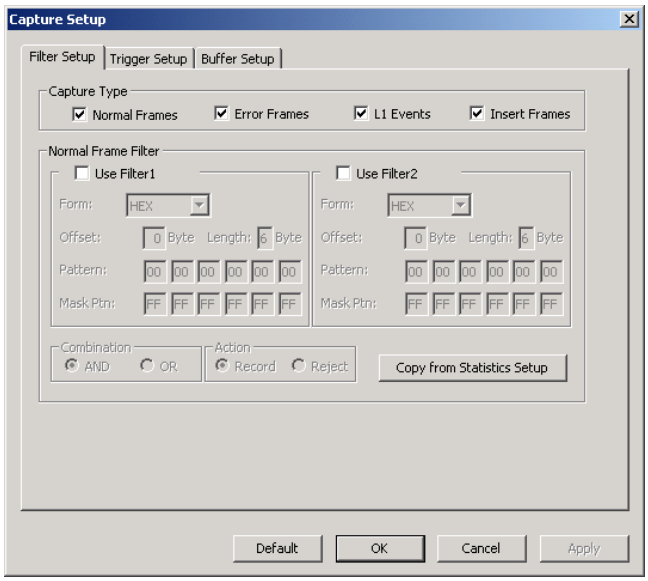
7.6 Setting the Capture Filter

By setting the filter to an arbitrary pattern, the received frames can be compared with the arbitrary pattern to capture frames containing or not containing the pattern.

Procedure

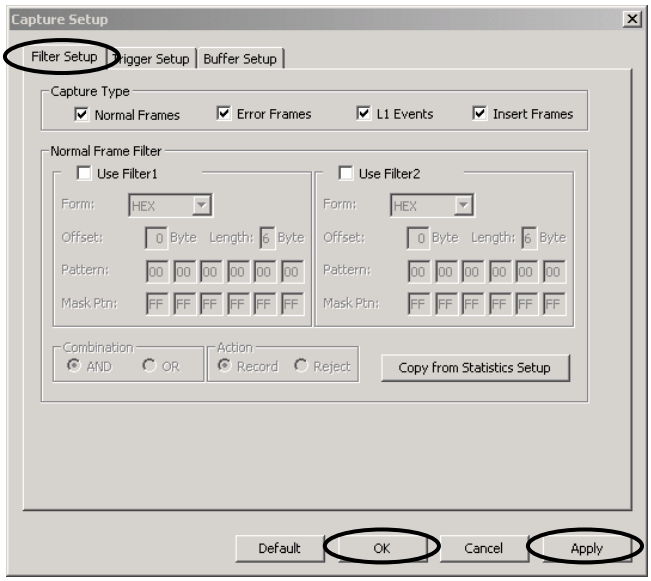
1. From the **View** menu, choose **Capture**. The Loading capture file dialog box opens the first time after logging in.
2. Click **OK** to open the Capture View window.
3. Select the port to be captured in the Navigation Window.
4. Click **Setup** in the Capture View window. The Capture Setup dialog box opens.





Capture Setup Dialog Box

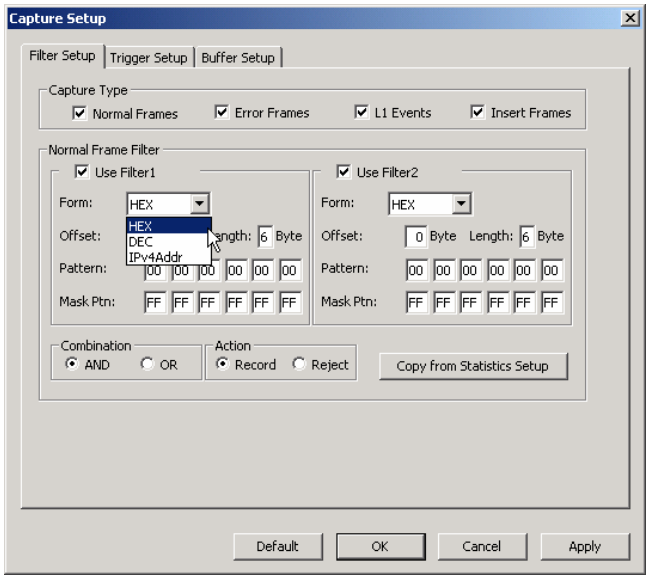
- Selecting the Frames to Be Captured
  5. Click the **Filter Setup** tab.
  6. From the **Capture Type** area, select the type of frames you wish to capture.



- Updating the Settings
  7. Click **Apply**.
  8. Click **OK**.

Capturing Normal Frames with Detailed Conditions

- Capturing Certain Patterns
  7. In the **Normal Frame Filter** area, select the **Use Filter 1** check box. As necessary, select the **Filter 2** check box. The parameters in the area become available.

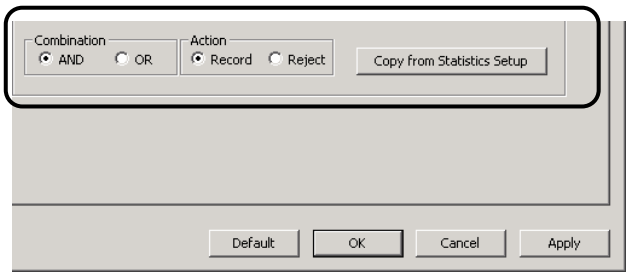


Note

This area can be specified when the **Normal Frames** check box is selected.

8. In the **Pattern** box, type the pattern you wish to capture.

- Selecting Whether to Record or Reject the Captured Results
  9. In the **Action** area, select **Record** or **Reject**.
- Combining Filter 1 and Filter 2
  10. In the **Combination** area, select the combination logic (only when both Filter 1 and Filter 2 are selected).
- Capturing Frames with the Same Conditions as the Statistics Conditions
  11. In the **Normal Frame Filter** area, click **Copy from Statistics Setup**.



- Updating the Settings
  12. Click **Apply**.
  13. Click **OK**.

Explanation

- Form
  There are three input formats, HEX, DEC, and IPv4Addr. HEX and DEC can be used to specify data at any position in the frame. IPv4Addr is used to specify the source address (SA) or destination address (DA) in the IPv4 header.

- Offset
  - For HEX and DEC
    Specify the position of the data to be compared with the number of bytes from the beginning of the frame. Type a value in the range of 0 to 58 bytes. The value 0 indicates the beginning of the frame.
  - For IPv4Addr
    The offset for the IP address varies depending on the frame structure. Set the offset to the position where the IP address is contained in the frame.
    - 0: DA
    - 6: SA

- Pattern
  Type the data used to compare with the captured frame.

- Length
  Type the length of the data to be compared. Type a value in the range of 1 to 6 bytes. The length is fixed 4 for IPv4Addr (cannot be changed).

- Mask Ptn
  If the mask pattern is 1, the comparison pattern and the normal frame pattern are compared. If the mask pattern is 0, the corresponding bit is considered to be matched regardless of the received normal frame pattern.

  Example 1) Only the specified pattern is considered to be matched.

	D7	D6	D5	D4	D3	D2	D1	D0
Pattern	0	0	0	0	0	0	0	0
Mask Ptn	1	1	1	1	1	1	1	1

  Data that matches: 00h

  Example 2) Only patterns in which the D0 bit is 0 is considered to be matched.

	D7	D6	D5	D4	D3	D2	D1	D0
Pattern	0	0	0	0	0	0	0	0
Mask Ptn	0	0	0	0	0	0	0	1

  Data that matches: 00h, 02h, 04h, 06h, 08h, 0Ah, 0Ch, 0Eh,
  10h, 12h, 14h, 16h, 18h, 1Ah, 1Ch, 1Eh,
  ...
  F0h, F2h, F4h, F6h, F8h, FAh, FCh, FEh

- Action
  This parameter is used to select whether the captured frames that matched the pattern are displayed or discarded.
  - Record: The frames that matched the pattern are recorded and displayed. The frames that did not match are discarded and not displayed.
  - Reject: The frames that match the pattern are discarded and not displayed. The frames that did not match are recorded and displayed.

- Combination
  Select the combination logic of Filter 1 and Filter 2 of the normal frame filter.
  - AND:
    If the action is set to **Record**, frames that match both Filter 1 and Filter 2 patterns are recorded and displayed.

    If the action is set to **Reject**, frames that match both Filter 1 and Filter 2 patterns are rejected and not displayed.

  - OR:
    If the action is set to **Record**, frames that match either the Filter 1 or Filter 2 pattern are recorded and displayed.

    If the action is set to **Reject**, frames that matches either the Filter 1 or Filter 2 pattern are rejected and not displayed.

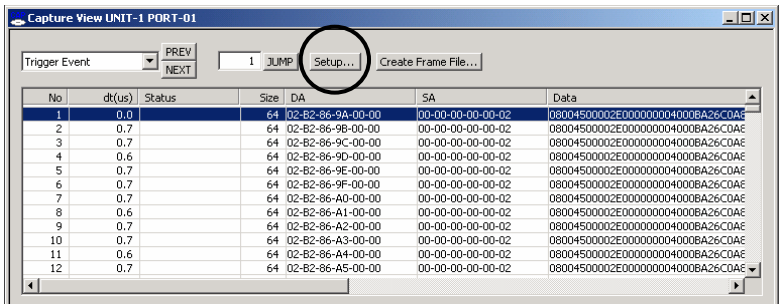
- Matching the Filter Conditions to the Statistics Conditions
  The normal frame filter settings are matched to the statistics condition filter settings (Filter 1 and Filter 2) specified in section 5.10.

7.7 Setting the Capture Trigger

Trigger conditions can be specified to capture frames the match the conditions from the received frames.
The trigger condition can be set to receiving of a specified error frame or receiving of an arbitrary pattern.

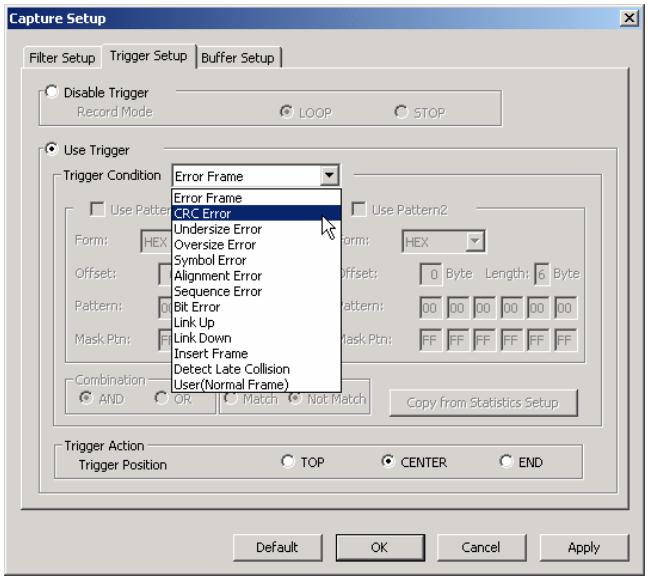
Procedure

1. From the **View** menu, choose **Capture**. The Loading capture file dialog box opens the first time after logging in.
2. Click **OK** to open the Capture View window.
3. Select the port to be captured in the Navigation Window.
4. Click **Setup** in the Capture View window. The Capture Setup dialog box opens.



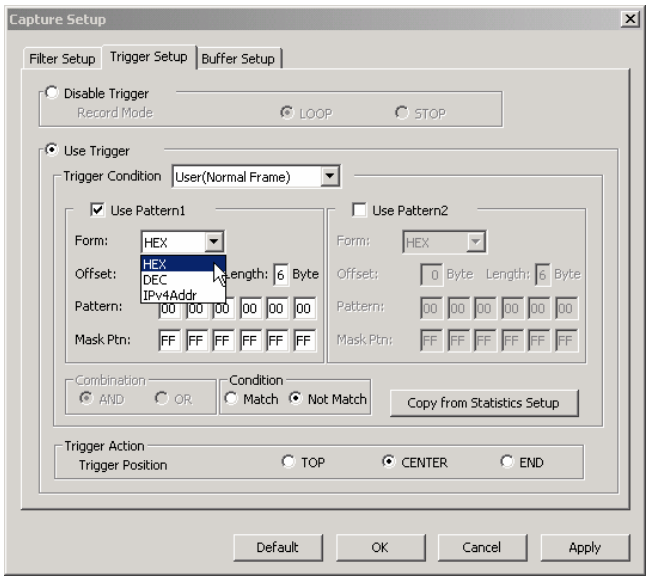
- Selecting the Trigger from a List

5. Click the **Trigger Setup** tab.
6. Select the **Use Trigger** option button.



7. In the **Use Trigger** area, select the condition from the **Trigger Condition** box.
8. In the **Trigger Action** area, select one of the **Trigger Position** option buttons.
9. Click **Apply**.
10. Click **OK**.

- Using a Pattern as a Trigger (User (Normal Frame))
  6. Select the **Use Trigger** check box.
  7. In the **Use Trigger** area, select **User (Normal Frame)** from the **Trigger Condition** box.
  8. Select the **Use Pattern1** check box. As necessary, select the **Use Pattern2** check box. The parameters in the area become available.



  9. In the **Pattern** box, type the pattern on which to activate the trigger.
  10. In the **Condition** area, select **Match** or **Not Match**.
  11. In the **Combination** area, select the combination logic (only when both Use Pattern1 and User Pattern2 are selected).
  12. In the **Trigger Action** area, select one of the **Trigger Position** option buttons.
  13. Click **Apply**.
  14. Click **OK**.

- Activating the Trigger Using the Same Pattern as the Statistics Conditions
  6. Select the **Use Trigger** check box.
  7. In the **Use Trigger** area, select **User (Normal Frame)** from the **Trigger Condition** box.
  8. Click **Copy from Statistics Setup**.
  9. Click **Apply**.
  10. Click **OK**.

Explanation

- Trigger Condition

Trigger Item	Unit			
	AE5522	AE5523*		AE5524
		P1-12	P13	
Error Frames	x	x	x	x
CRC Error	x	x	x	x
Undersize Error	x	x	x	x
Oversize Error	x	x	x	x
Symbol Error	x	x	x	x
Alignment Error	-	x	-	-
Sequence Error	-	x	x	x
Bit Error	x	x	x	x
Link Up	x	x	x	x
Link Down	x	x	x	x
Insert Frame	x	x	x	x
Detect Late Collision	-	x	-	-
User (Normal Frame)	x	x	x	x
LF/RF	x	-	-	-

x: Supported, -: Unsupported

* P1-12 of the AE5523 represent the parameters for PORT1 to PORT12, and P13 represents PORT13.

- Form

  There are three input formats, HEX, DEC, and IPv4Addr. HEX and DEC can be used to specify data at any position in the frame. IPv4Addr is used to specify the source address (SA) or destination address (DA) in the IPv4 header.

- Offset
  - For HEX and DEC

    Specify the position of the data to be compared with the number of bytes from the beginning of the frame. Type a value in the range of 0 to 58 bytes. The value 0 indicates the beginning of the frame.
  - For IPv4Addr

    The offset for the IP address varies depending on the frame structure. Set the offset to the position where the IP address is contained in the frame.
    - 0: DA
    - 6: SA

- Pattern

  Type the data used to compare with the frame on which to activate the trigger.

- Length

  Type the length of the data to be compared. Type a value in the range of 1 to 6 bytes. The length is fixed 4 for IPv4Addr (cannot be changed).

- Mask Ptn

  If the mask pattern is 1, the comparison pattern and the normal frame pattern are compared.

  If the mask pattern is 0, the corresponding bit is considered to be matched regardless of the received normal frame pattern.

Example 1) Only the specified pattern is considered to be matched.

	D7	D6	D5	D4	D3	D2	D1	D0
Pattern	0	0	0	0	0	0	0	0
Mask Ptn	1	1	1	1	1	1	1	1

Data that matches: 00h

Example 2) Only patterns in which the D0 bit is 0 is considered to be matched.

	D7	D6	D5	D4	D3	D2	D1	D0
Pattern	0	0	0	0	0	0	0	0
Mask Ptn	0	0	0	0	0	0	0	1

Data that matches: 00h, 02h, 04h, 06h, 08h, 0Ah, 0Ch, 0Eh,
10h, 12h, 14h, 16h, 18h, 1Ah, 1Ch, 1Eh,
...
F0h, F2h, F4h, F6h, F8h, FAh, FCh, FEh

- Condition
  Selects whether the frame on which the pattern matched is used to activate the trigger.
  - Match: The frame on which the pattern matched is used as a trigger frame.
  - Not Match: The frame on which the pattern did not match is used as a trigger frame.

- Combination
  Selects the combination logic of the trigger conditions of User Pattern1 and User Pattern2.
  - AND
    When the condition is set to **Match**, the frame on which the patterns of both the Use Pattern1 and User Pattern2 settings match is used to activate the trigger.

    When the condition is set to **Not Match**, the frame on which the patterns of neither the Use Pattern1 nor User Pattern2 settings match is used to activate the trigger.

  - OR
    When the condition is set to **Match**, the frame on which the patterns of either the Use Pattern1 or User Pattern2 settings match is used to activate the trigger.

    When the condition is set to **Not Match**, all frames other than the frame on which the patterns of either the Use Pattern1 or User Pattern2 settings match is used to activate the trigger.

- Matching the Filter Conditions to the Statistics Conditions
  The trigger conditions of Use Pattern1 and Use Pattern2 are matched to the statistics condition filter settings (Filter 1 and Filter 2) specified in section 5.12.

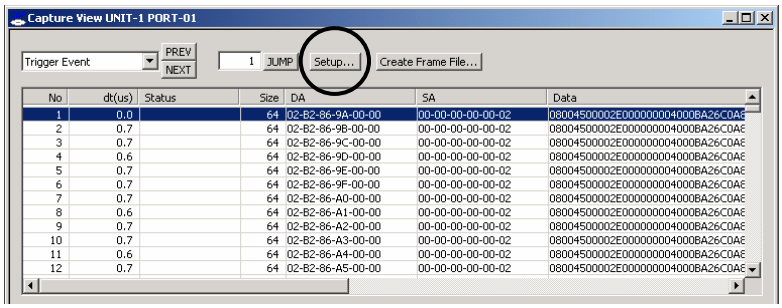
- Setting the Trigger Position
  - TOP: Sets the trigger position to be the beginning of the buffer.
  - CENTER: Sets the trigger position to be the center of the buffer.
  - END: Sets the trigger position to be the end of the buffer.

7.8 Setting Buffers

For each port, you can specify the size of the buffer to receive the captured data. Because the size (the number of bytes) of one frame to be received can be changed, specify the **Size (Byte)** and **Event Count** by considering the number of frames (events) you wish to capture.

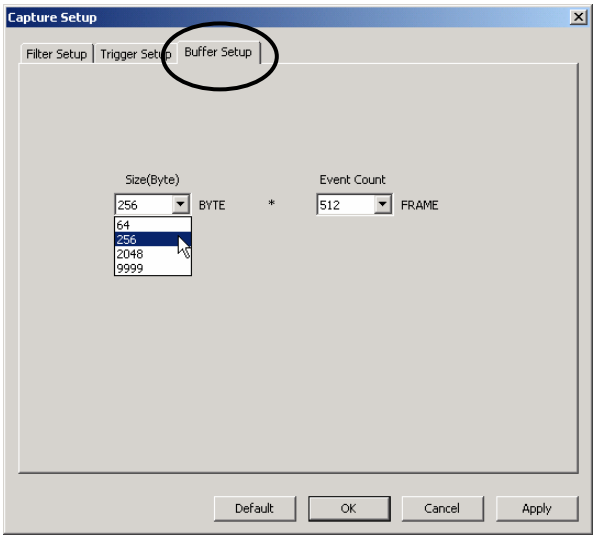
Procedure

1. From the **View** menu, choose **Capture**. The Loading capture file dialog box opens the first time after logging in.
2. Click **OK** to open the Capture View window.
3. Select the port to be captured in the Navigation Window.
4. Click **Setup** in the Capture View window. The Capture Setup dialog box opens.



- Selecting the Buffer Size

5. Click the **Buffer Setup** tab.
6. Select the maximum frame size to be captured in the **Size (Byte)** box.



7. Select the number of events (frames) to be captured in the **Event Count** box.
8. Click **Apply**.
9. Click **OK**.

Explanation

The following combinations of **Size (Byte)** and **Event Count** can be specified.

- **AE5523 and AE5524**

Number of Bytes	Selectable Event Counts
64	64, 512, 4096, and 16384
256	64, 512, and 4096
2048	64 and 512
9999	64

- **AE5522**

Number of Bytes	Selectable Event Counts
64	8, 64, 512, and 2048
256	8, 64, and 512
2048	8 and 64
16384	8

Note

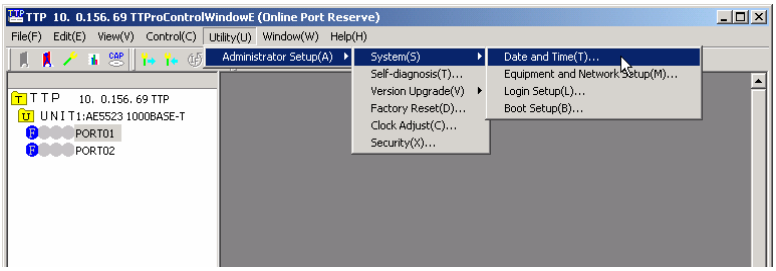
If the capture operation is stopped manually, the recorded event count may be less than the event count specified in the Buffer Setup.

8.1 Setting the Date and Time

This section explains how to set the date and time on the AE5511. You can synchronize the date and time with a PC or enter them manually.

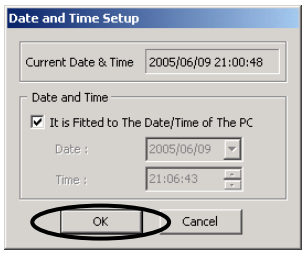
Procedure

1. From the **Utility** menu, point to **Administrator Setup**, point to **Systems**¸ and click **Date and Time**. The Date and Time Setup dialog box opens.



- Synchronizing to the Date and Time on a PC

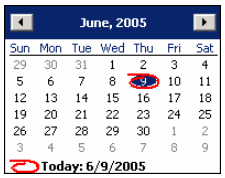
2. Select the **It is Fitted to the Date/Time of The PC** check box.



3. Click **OK**. A dialog box containing the message “A correct result is not obtained. Are you sure?” opens.
4. Click **Yes** or **No**.

- Entering the Date and Time Manually

2. Click the **Date** arrow. A calendar screen opens.



3. Select the current date.
4. Click the **Time** arrows to set the time or type it from the keyboard.
5. Click **OK**.

Note

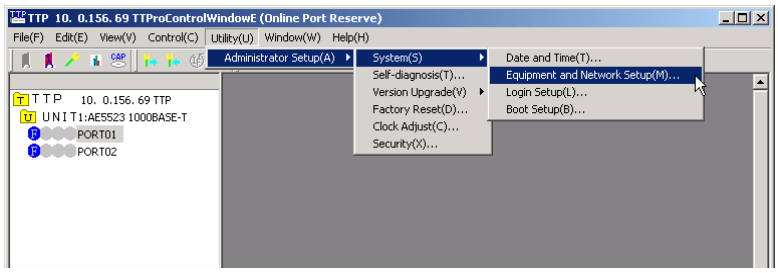
The date and time can be set when you login with the “admin” user name.

8.2 Setting the AE5511 and Network

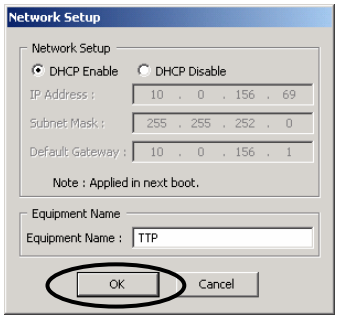
This section explains how to set the network parameters to enable remote control of the AE5511. You can set the network parameters automatically through a DHCP server or enter them manually.

Procedure

1. From the **Utility** menu, point to **Administrator Setup**, point to **Systems**¸ and click **Equipment and Network Setup**. The Network Setup dialog box opens.



- Obtaining the Network Parameters Automatically from a DHCP Server
  2. Click the **DHCP Enable** option button.
  3. As necessary, type an arbitrary name in the **Equipment Name** box.



  4. Click **OK**.

- Setting the Network Parameters Manually
  2. Click the **DHCP Disable** option button.
  3. In the **IP Address** box, type in the appropriate value.
  4. In the **Subnet Mask** box, type in the appropriate value.
  5. As necessary, type the appropriate value in the **Default Gateway** box.
  6. As necessary, type an arbitrary name in the **Equipment Name** box.
  7. Click **OK**.

Explanation

- Enabling DHCP
  If you enable DHCP, the network parameters are automatically obtained from a DHCP server and configured. To check the parameters after they are configured, connect a PC to the CONSOLE port. For the setup procedure, see section 3.8.

- Disabling DHCP
  If you are disabling DHCP, set the network parameters manually.
  However, the following values cannot be assigned.
  • 0.0.0.0
    This value cannot be assigned to an IP address or default gateway address.
  • 224.0.0.0 to 255.255.255.255
    Subnet mask can be set to a value with consecutive 1s from the highest bit.

- Setting the Equipment Name
  The following characters can be entered (up to 15 characters).
  • Numeric characters from 0 to 9
  • Lowercase alphabet characters from a to z
  • Uppercase alphabet characters from A to Z
  • Symbols: Hyphen and underscore
    However, the first character cannot be a hyphen.

Note

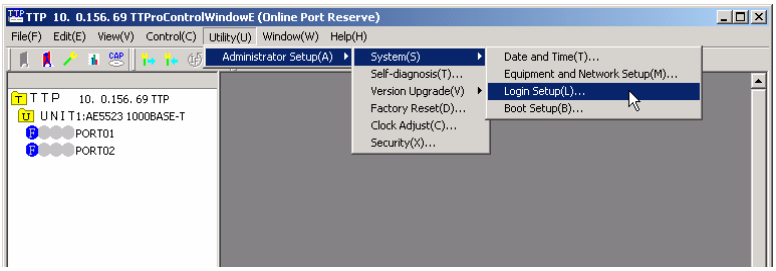
The network parameters can be set when you login with the “admin” user name.

8.3 Setting the Login

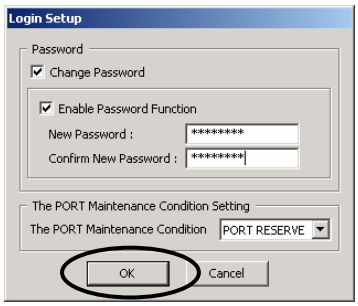
This section explains the details of setting the password and port maintenance condition when logging into the AE5511.

Procedure

1. From the **Utility** menu, point to **Administrator Setup**, point to **Systems**¸ and click **Login Setup**. The Login Setup dialog box opens.



- Setting the Password
  2. Select the **Enable Password Function** check box.
  3. Type the new password in the **New Password** box.
  4. Type the same password in the **Confirm New Password** box.
  5. Click **OK**.



- Setting the Port Maintenance Condition
  2. From the **Port Maintenance Condition** check box, select **PORT RESERVE** or **PORT LOCK**.
  3. Click **OK**.

Explanation

- Setting the Password
  The password setting specifies or changes the password used to log into the AE5511. If the password function is enabled, you will need to enter the password to log in.
  You can set one password for each AE5511.

  • Characters that can be used: Alphanumeric characters (a-z, A-Z, and 0-9), hyphen, and underscore
  However, a hyphen cannot be used for the first character of the password.
  • Number of characters that can be used: 1 to 15 characters

  You can also set the password on the console. For details, see section 3.10.
  For the operating procedure, see section 4.2.

- Setting the Port Maintenance Condition
  The port maintenance condition sets the mode when you log in.

  • PORT RESERVE
  Port reserve is a login mode in which the ports are reserved only when the controller PC and the AE5511 are connected.

  • PORT LOCK
  Port lock is a login mode in which the ports are reserved at all times.
  This function can be used when the controller PC and the AE5511 are connected and also when they are disconnected.

  For the setup procedure, see section 4.3.

Note

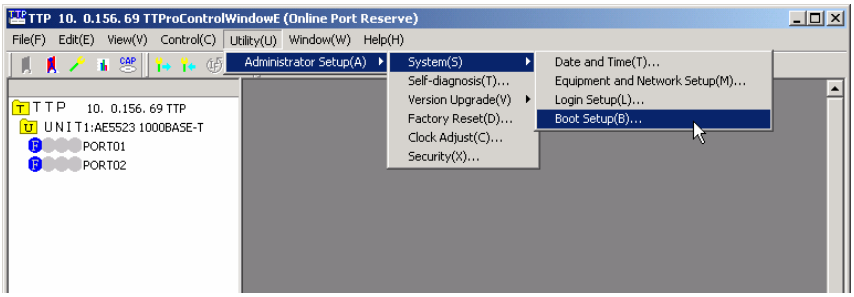
- Because the communication between the PC and AE5511 may be cut off depending on the controller PC that you are using or the network environment, it is recommended that you use the port lock function when carrying out
- measurements that take an extended time.
  The login setup can be set when you login with the “admin” user name.

8.4 Setting the Boot Operation

In boot setup, you can set whether to use the current unit settings the next time the AE5511 is booted or carry out a disk check.

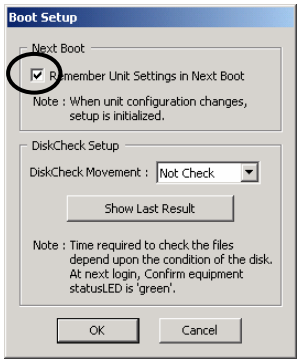
Procedure

1. From the **Utility** menu, point to **Administrator Setup**, point to **Systems**¸ and click **Boot Setup**. A Boot Setup dialog box opens.



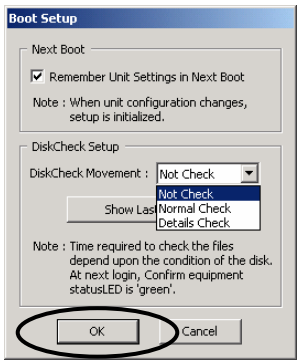
- Setting the Next Boot Parameters

2. To use the current settings in the next boot, select the **Remember Unit Settings in Next Boot** check box. Otherwise, clear the check box.



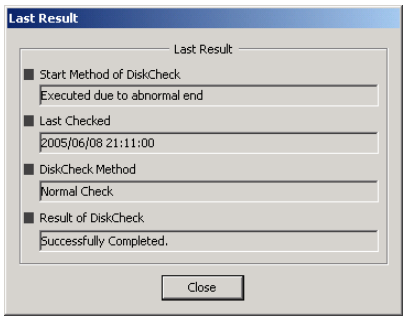
- Setting the Disk Check Operation

3. From the **DiskCheck Movement** box, select **Not Check**, **Normal**, or **Detail check**.



4. Click **OK**.

- Showing the Last Check Result
  Click **Show Last Result**. The **Last Result** dialog box opens.



Last Result screen

Explanation

The parameters on the Boot Setup dialog box take effect the next time the AE5511 is booted.
The disk check is carried out when the AE5511 is booted (rebooted) based on the conditions specified on the Boot Setup dialog box. The result is shown after the disk check is complete.

Parameter	Result Display	Description
Start Method of DiskCheck	Executed due to abnormal end	Boot by the system not by the user.
Last Checked	Year, month, day, hour, and minute	Time the check was started.
DiskCheck Method	Normal	
	Detail check	Includes a cluster check
Result of DiskCheck	Successfully Completed.	

- Normal Check vs. Detail Check
  The detail check includes a cluster check.

- Last Result
  The last disk check result is shown after the AE5511 boots and you log in with the “admin” user name. When you log in, check that the STATUS lamp on the AE5511 front panel is illuminated in green.

Note

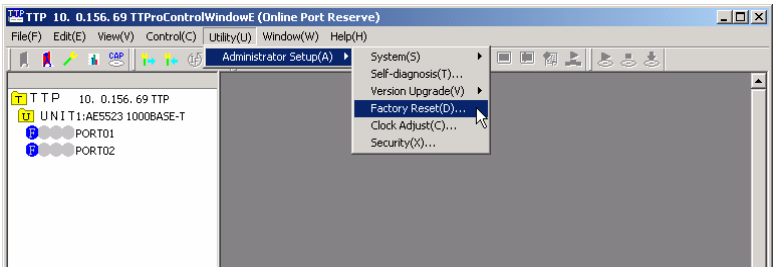
- Boot setup can be carried out when you login with the “admin” user name.
- The disk check may take a long time depending on the disk condition.

8.5 Initializing the Settings

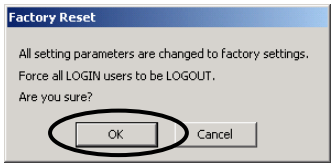
This section explains how to initialize the AE5511 to factory default settings.

Procedure

1. From the **Utility** menu, point to **Administrator Setup**, point to **Systems**¸ and click **Factory Reset**. The Factory Reset dialog box opens.



2. Click **OK**. The AE5511 is initialized.



Note

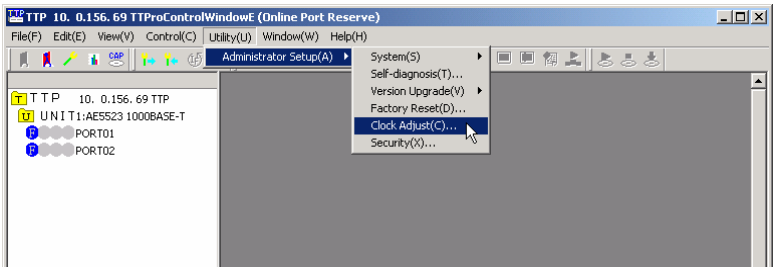
- If you initialize the AE5511, all users that are logged in are logged out.
- Initialization can be carried out when you login with the “admin” user name.
- You can also initialize the AE5511 on the console. For details, see section 3.10.
- For the default values, see section 11.1.

8.6 Adjusting the Clock

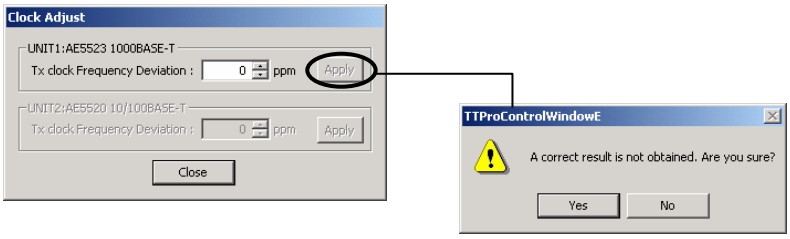
This section explains how to adjust the transmission frequency of the AE5511.

Procedure

1. From the **Utility** menu, point to **Administrator Setup**, point to **Systems**¸ and click **Clock Adjust**. The Clock Adjust dialog box opens.



2. Enter the value (-100 to 100) in the **Tx clock Frequency Deviation** box of the unit for which the clock is to be adjusted (UNIT1 or UNIT2).
3. Click **Apply**. A dialog box containing the message “A correct result is not obtained. Are you sure?” opens.



4. Click **Yes** or **No**.
5. Click **Close**.

Note

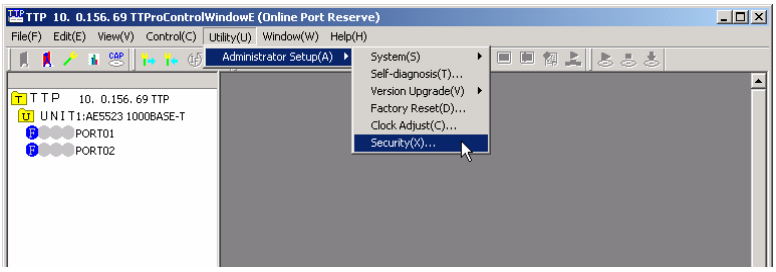
- Clock adjustment is available when the AE5523 or AE5524 is installed.
- Clock adjustment can be carried out when you login with the “admin” user name.

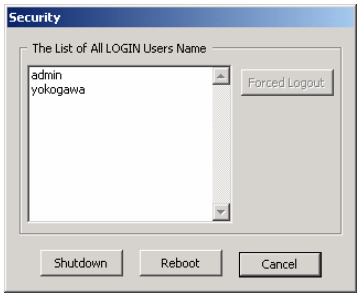
8.7 Security

This section explains how to shut down, log out users, and reboot the AE5511.

Procedure

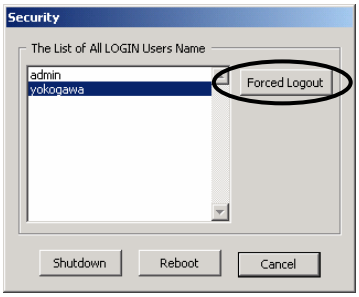
1. From the **Utility** menu, point to **Administrator Setup**, point to **Systems**¸ and click **Security**. The Security dialog box opens.





- Logging Out Other Users

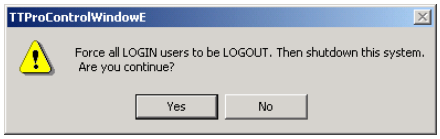
2. Select a user in **The List of All LOGIN Users Name** box.



3. Click **Forced Logout**. A dialog box containing the message “Force selected user to LOGOUT. Are you continue?” opens.

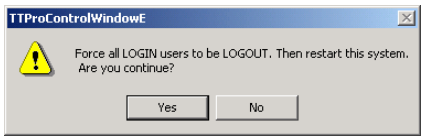
4. Click **Yes**.

- Shutting Down the AE5511.
  2. Click **Shutdown**. A dialog box containing the message “Force all LOGIN users to be LOGOUT. Then shutdown this system. Are you continue?” opens.



  3. Click **Yes**.

- Rebooting the AE5511
  2. Click **Reboot**. A dialog box containing the message “Force all LOGIN users to be LOGOUT. Then restart this system. Are you continue?” opens.



  3. Click **Yes**.

Explanation

- Logging Out Other Users
  You can force users other than “admin” to log out.

- Shutting Down the AE5511.
  Shuts down the AE5511 power. Because other users are forcibly logged out when the AE5511 is shut down, a confirmation message appears.

- Rebooting the AE5511
  Because other users are forcibly logged out when the AE5511 is rebooted, a confirmation message appears.

Note

Security can be accessed when you login with the “admin” user name.

9.1 Troubleshooting

Troubleshooting

- If a message is displayed on the screen, read the following pages.
- If servicing is necessary, or if the instrument is not operating correctly after performing the corrective actions, contact your nearest YOKOGAWA dealer.

Problem and Corrective Action	Reference Section
The STANDBY lamp does not illuminate. (Power is not being supplied to the AE5511.)	
Securely connect the power cord plug to the power connector on the rear panel. (Use the power cord that comes with the package.)	3.3
Check that the power switch on the rear panel is turned ON.	3.6
The STANDBY lamp is illuminated, but the POWER lamp is not. (Power is not being supplied internally to the AE5511.)	
Press the power switch on the front panel one more time.	3.6
A beep sound is not heard even when the power switch on the front panel is turned ON.	
1. Hold down the power switch on the front panel for more than 1 second. The power turns OFF. 2. Press the power switch on the front panel one more time.	3.6
The STATUS lamp does not illuminate even when the power switch on the front panel is turned ON.	
1. Hold down the power switch on the front panel for more than 1 second. The power turns OFF. 2. Press the power switch on the front panel one more time.	3.6
The STATUS lamp continuously illuminates in red.	
1. Hold down the power switch on the front panel for more than 1 second. The power turns OFF. 2. Press the power switch on the front panel one more time.	3.6
The STATUS lamp continues to blink for more than 5 minutes after the power switch on the front panel is turned ON.	
1. Hold down the power switch on the front panel for more than 1 second. The power turns OFF. 2. Press the power switch on the front panel one more time.	3.6
The STATUS1 or STATUS2 lamp continuously illuminates in red.	
1. Hold down the power switch on the front panel for more than 1 second. The power turns OFF. 2. Press the power switch on the front panel one more time.	3.6
Securely insert the units. • If STATUS1 lamp is illuminated: The unit installed in UNIT1 • If STATUS2 lamp is illuminated: The unit installed in UNIT2	3.4
The STATUS1 or STATUS2 lamp continuously illuminates in red when the AE5523 or AE5524 is installed.	
1. Check the AE5511 firmware and application software. STATUS1 or STATUS2 lamp illuminates on the WEB version because the units are not supported. 2. If you are using the WEB version, upgrade to the Windows version.	3.7
The LINK lamp does not illuminate even when connected to a PC.	
Check that you are using the correct cable (cross or straight).	1.2, 3.12
The REMOTE lamp does not illuminate even when login is carried out.	
Check the network settings on the AE5511 and the PC.	3.9, 3.11
1. Check that the AE5511 firmware and application software are consistent (Windows version or WEB version). 2. If they are not, consolidate them to the Windows version or WEB version.	3.7, 9.5
The fan stopped.	
1. Hold down the power switch on the front panel for more than 1 second. The power turns OFF. 2. Turn OFF the power switch on the rear panel. 3. Contact your nearest YOKOGAWA dealer for repairs.	3.6

9.2 Messages and Corrective Actions

Error Messages

There are cases in which error messages are displayed on the screen while using the AE5511. This section describes the meanings of the messages and their corrective actions. If the corrective action requires servicing, contact your nearest YOKOGAWA dealer for repairs.

System Control Error Messages

Code	Message	Corrective Action	Reference Section
11017	User is not input	Specify the login user name correctly.	4.2
11018	Failed to get reserve information.	Communication error occurred. Check the LAN cables connected to the PC and AE5511. Then, restart the PC and the AE5511.	3.6, 3.12, 4.1
11019	Failure the PORT reservation.	Another user may have reserved the port at the same time. Try to reserve the port again.	4.2
11020	A port to reserve is not selected	Select the port to be reserved.	4.3
11021	Auto MAC failed.	Check the **Auto Learn DUT MAC Address** settings.	5.13
11022	Failure the PORT release.	Communication error occurred. Check the LAN cables connected to the PC and AE5511. Then, restart the PC and the AE5511.	3.6, 3.12, 4.1
11023	Failure LOGOUT.	Communication error occurred. Check the LAN cables connected to the PC and AE5511. Then, restart the PC and the AE5511.	3.6, 3.12, 4.1
11035	The port which has already locked is reserved. Do you connect it?	Connect to the locked port.	4.2
11036	TELNET connection fialed.	Communication error occurred. Check the LAN cables connected to the PC and AE5511. Then, restart the PC and the AE5511.	3.6, 3.12, 4.1
11037	TimeOut	Communication error occurred. Check the LAN cables connected to the PC and AE5511. Then, restart the PC and the AE5511.	3.6, 3.12, 4.1
11038	FTP connection failed.	Communication error occurred. Check the following items and restart the PC and the AE5511. • Check the LAN cables connected to the PC and AE5511. • If the firewall function is enabled on the PC, specify FTP passive in the login settings.	3.6, 3.12, 4.1, 4.2
11039	Unauthorized password.	Specify the password correctly.	4.2
11040	The username has already been used.	The same login name is used. Log in again using a different login name.	4.2
11041	Exceeded maximum number of login.	Maximum number of users (eight) are already logged in. Log in after another user logs out.	4.2
11042	It is now shutting down.	The AE5511 is shutting down. To continue operation, start the AE5511.	4.1
11043	Unknown Error	Restart the PC and the AE5511.	3.6, 4.1

Code	Message	Corrective Action	Reference Section
11044	Disconnected	Communication error occurred. Check the following items and restart the PC and the AE5511. • Check the LAN cables connected to the PC and AE5511. • Check the specifications of your PC. • If the firewall function is enabled on the PC, specify FTP passive in the login settings.	3.6, 3.7, 3.12, 4.1, 4.2
11045	Disconnected	Communication error occurred. Check the following items and restart the PC and the AE5511. • Check the LAN cables connected to the PC and AE5511. • Check the specifications of your PC. • If the firewall function is enabled on the PC, specify FTP passive in the login settings.	3.6, 3.7, 3.12, 4.1, 4.2
11046	Application is shut down because forced logout was done.	Forced to log out by a user logged in with the name “admin.” Measured data and setup may be lost.	4.2
11053	Can’t execute MEASUREMENT and SETTING functions by current TTProCtrlWindowE version. Strongly recommended to install newest version of TTProCtrlWindowE software. And then all locked PORTs are unlocked by a install.	The AE5511 firmware version is newer than the TTPControlWindowE version. Upgrade the TTPControlWindowE.	3.7

Error Message When Transmission Frames Are Created

Code	Message	Corrective Action	Reference Section
15910	An error occurred while attempting to save file	Check whether the save destination drive is set to read-only, whether the drive has enough free space, and so on. For an external drive, check the cabling.	2.9
15911	It is a file of handle impossible.	The file that you tried to load is not supported. Check the file type.	2.9
15912	This file version is unsupported.	There is no compatibility with the file. Reinstall the most recent version of TTPControlWindowE and load the file again.	3.7
15913	Line n: Illegal form.	The syntax used in the file is not correct. Check the syntax.	2.9
15914	Line n : Setup value outside the effective range was specified.	The setup values in the file are not correct. Check the values.	2.9

Error Message When Capture Data Is Saved or Loaded

Code	Message	Corrective Action	Reference Section
13020	Could not open file.	Check whether the access to the save destination drive is prohibited. For an external drive, check the cabling.	–
13021	The kind of the file is different.	The file that you tried to load is not supported. Check the file.	7.2
13022	This file version is unsupported.	There is no compatibility with the file. Reinstall the most recent version of TTPControlWindowE and load the file again.	3.7

Code	Message	Corrective Action	Reference Section
13025	Error occurred in communication part.	System error. Restart the PC and the AE5511.	3.6, 4.1
13026	Could not read from File.	An error was found in the file. Check whether the file on the drive is corrupt.	–
13027	Could not write to File.	Check whether the save destination drive is set to read-only, whether the drive has enough free space, and so on. For an external drive, check the cabling.	–

Error Message When Statistics Data Is Saved or Loaded

Code	Message	Corrective Action	Reference Section
12204	Could not open file.	Check whether the access to the save destination drive is prohibited. For an external drive, check the cabling.	–
12205	Could not read from File.	An error was found in the file. Check whether the file on the drive is corrupt.	–
12206	This file version is unsupported.	There is no compatibility with the file. Reinstall the most recent version of TTPControlWindowE and load the file again.	3.7
12207	Could not write to File.	Check whether the save destination drive is set to read-only, whether the drive has enough free space, and so on. For an external drive, check the cabling.	–

Error Message When the Setup Is Updated from TTPControlWindowE to the TTPro

Code	Message	Corrective Action	Reference Section
16502	Internal error, Invalid return from MESSAGE BOX.	System error. Restart the PC and the AE5511.	3.6, 4.1
16503	Invalid reply.	System error. Restart the PC and the AE5511.	3.6, 4.1
16504	Can not discriminate file extension.	The file that you tried to load is not supported. Check the file.	2.9
16505	The period stop of the file name is illegal.	Check the file name syntax.	2.9
16506	The port number of the file name is illegal.	Check the port number syntax.	2.9
16507	The unit name of the file name is illegal.	Check the unit name syntax.	2.9
16508	Could not open file.	Check whether the access to the save destination drive is prohibited. For an external drive, check the cabling.	–
16509	Could not read from File.	An error was found in the file. Check whether the file on the drive is corrupt.	–
16510	Could not write to File.	Check whether the save destination drive is set to read-only, whether the drive has enough free space, and so on. For an external drive, check the cabling.	–
16511	Could not close file.	Check whether the save destination drive is set to read-only, whether the drive has enough free space, and so on. For an external drive, check the cabling.	–
16513	Failure the DIALOG file creation.	System error. Restart the PC and the AE5511.	3.6, 4.1
16514	Update failed.	Communication error occurred. Check the LAN cables connected to the PC and AE5511. Then, restart the PC and the AE5511.	3.6, 3.12, 4.1

Code	Message	Corrective Action	Reference Section
16515	Fail to read reply command.	Communication error occurred. Check the LAN cables connected to the PC and AE5511. Then, restart the PC and the AE5511.	3.6, 3.12, 4.1
16517	The op code was not corresponding.	Communication error occurred. Check the LAN cables connected to the PC and AE5511. Then, restart the PC and the AE5511.	3.6, 3.12, 4.1
16521	Fail to create inner file.	Check whether the save destination drive is set to read-only, whether the drive has enough free space, and so on. For an external drive, check the cabling.	–
16522	Fail to load inner file.	An error was found in the file. Check whether the file on the drive is corrupt.	–
16530	Can not paste because a copy buffer is empty.	Specify copy before paste.	–
16534	Failed to create the directory.	Check whether the save destination drive is set to read-only, whether the drive has enough free space, and so on. For an external drive, check the cabling.	–
16535	Three and more directory is under the top directory.	The directory structure or file name of the setup file is invalid. Change the directory structure or file.	–
16537	The file loaded together exceeded 32.	Limit the number of files loaded collectively to less than or equal to 32.	2.9
16538	A directory name is inconsistent with the file name.	Check the syntax of the directory name or file name included in the setup file.	2.9
16539	The unit number of the file name is illegal.	Check the unit number syntax.	2.9
16541	The equipment name of the directory name is inconsistent.	Check the equipment name syntax.	2.9
16542	Fail to download setup.	Communication error occurred. Check the LAN cables connected to the PC and AE5511. Then, restart the PC and the AE5511.	3.6, 3.12, 4.1
16543	Interface Reload failed.	Communication error occurred. Check the LAN cables connected to the PC and AE5511. Then, restart the PC and the AE5511.	3.6, 3.12, 4.1
16551	An error occurred while cursor moved.	System error. Restart the PC and the AE5511.	3.6, 4.1
16555	UNITn-PORTnn : Communication error occurred.	Communication error occurred. Check the LAN cables connected to the PC and AE5511. Then, restart the PC and the AE5511.	3.6, 3.12, 4.1
16568	This file version is unsupported.	There is no compatibility with the file. Reinstall the most recent version of TTPControlWindowE and load the file again.	3.7
16569	This file version is unsupported.	There is no compatibility with the file. Reinstall the most recent version of TTPControlWindowE and load the file again.	3.7
16570	Can not execute in off-line.	Log into the AE5511 first before executing.	4.2
16571	Can not execute in off-line.	Change the file name.	2.9

9.3 Maintenance and Inspection

Check the appearance and the mechanical operation of the front panel parts.

Appearance

Visually check for damage or deformation.

Mechanical Operation

Check the operation of the following items.

- Loose knobs
- Loose levers
- Smooth operation of the power switch

Simple Operation Test

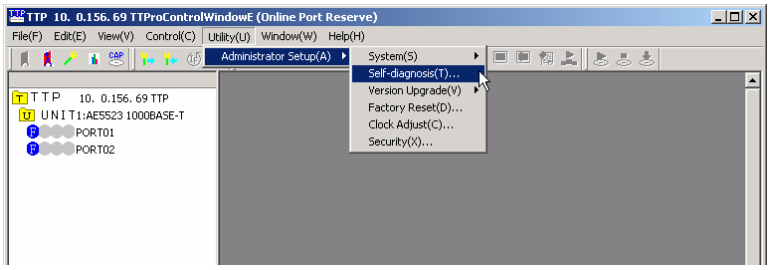
Carry out a self-diagnosis. For details, see section 9.4.

9.4 Self-Diagnosis

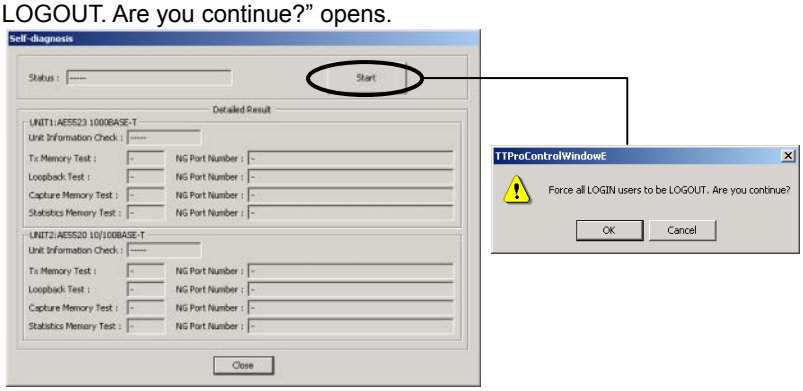
This section explains how to carry out a self-diagnosis on the units installed in the AE5511.

Procedure

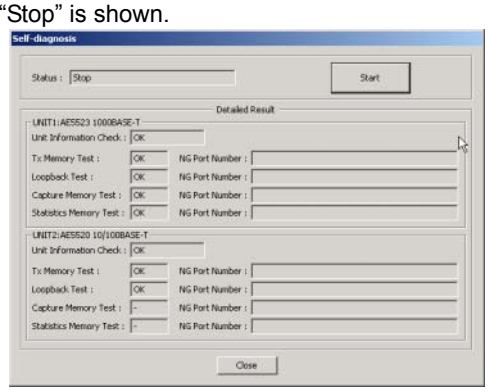
1. From the **Utility** menu, point to **Administrator Setup**, and click **Self-diagnosis**. The Self-diagnosis dialog box opens.



2. Click **Start**. A dialog box containing the message “Force all LOGIN users to be LOGOUT. Are you continue?” opens.



3. Click **OK**. The **Status** box shows the status of the self-diagnosis. Wait until “Stop” is shown.



Explanation

The test results are shown for each unit separately. The **UNIT1** and **UNIT2** boxes show the OK or NG result. If OK is shown, the unit operation is normal. If NG is shown, the unit may be broken. Notify your nearest YOKOGAWA dealer of the information shown under Detailed Result.

Note

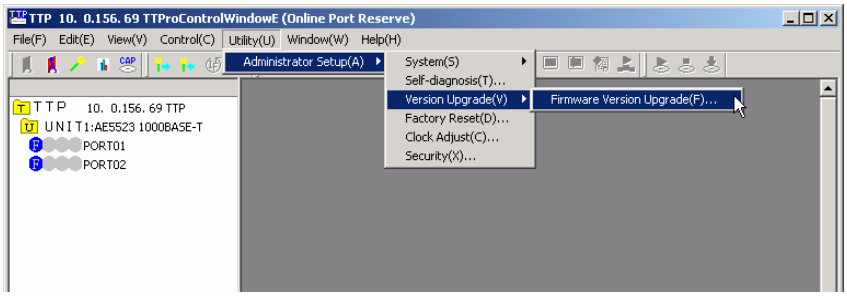
- Self-diagnosis can be carried out when you login with the “admin” user name.
- Other users cannot log in while the self-diagnosis is in progress.
- The LEDs on the AE5511 and units blink while the self-diagnosis is in progress.

9.5 Upgrading the Software

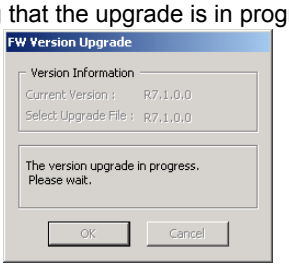
This section explains the details of upgrading the AE5511 firmware.

Procedure

1. From the **Utility** menu, point to **Administrator Setup**, point to **Version Upgrade**, and click **Firmware Version Upgrade**. The FW Version Upgrade dialog box opens.

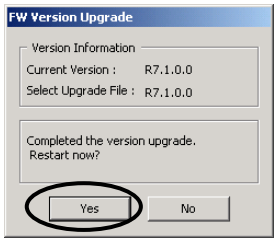


2. Click **OK**. A message indicating that the upgrade is in progress is shown.



When the upgrade is complete, a confirmation message is shown.

3. Click **Yes**. The AE5511 restarts.



Explanation

The file for upgrading the AE5511 is included in the TTPControlWindowE system file. Before upgrading the AE5511, install the most recent version of TTPControlWindowE to your PC. For the installation procedure, see section 3.7.

Note

Upgrade can be carried out when you login with the “admin” user name.

9.6 Recommended Replacement Parts

The one-year warranty applies only to the AE5511 TrafficTesterPro (starting from the day of delivery) and does not cover any other items or expendable items (items which wear out). The replacement period for expendable items varies depending on the conditions of use. Refer to the table below as a general guideline. Contact your nearest YOKOGAWA dealer to have parts replaced.

Parts Name	Warranty Period
Internal hard disk	2 years after purchase* (However, the data saved on the internal hard disk is not covered.)

* When the AE5511 is turned ON 8 hours/day.

Parts Name	Recommended Replacement Period
Cooling fan	3 years
Backup battery (lithium battery)	5 years

10.1 Interface Specifications

AE5511 TrafficTesterPro

Item	Specifications	
External I/F	CONTROL port	10BASE-T/100BASE-TX RJ-45 port
	CONSOLE port	RS-232 port (D-Sub 9-pin male)
Display LED	POWER	Power ON/OFF display
	STANDBY	Power standby status display
	HDD	HDD access status display
	REMOTE	CONTROL/CONSOLE connection status display
	STATUS	Operation status display
	STATUS1	Unit 1 status display
	STATUS2	Unit 2 status display
	LINK	Link status display of the CONTROL port
Switch	MAIN POWER	Rocker switch (rear panel) POWER ON: Power standby state POWER OFF: Power OFF state
	POWER	Push-button switch (front panel) Press this switch when MAIN POWER is ON to turn the power ON.

AE5520 10/100BASE-T Unit

Item	Specifications	
External I/F	Measurement port (16 RJ-45 ports)	10BASE-T (IEEE 802.3 compliant) and 100BASE-TX (IEEE802.3u compliant)
Display LED	TX	Data transmission status display
	RX	Data reception status display
	LINK	Link status display
Line speed		10 Mbits/s and 100 Mbits/s
Duplex mode		Full duplex and half duplex
Flow control		ON/OFF setting (complies with IEEE802.3x)
MDI/MDI-X		MDI (straight), MDI-X (cross), and AUTO (auto setting)

AE5521 1000BASE-X Unit

Item	Specifications	
External I/F	Measurement port (4 GBIC module interfaces)	Recommended GBIC Modules • For 1000BASE-SX: HFBR5601 (Agilent) • For 1000BASE-LX: HFCT5611 (Agilent) • For 1000BASE-T: FCM-8519-3 (Finisar)
Display LED	TX	Data transmission status display
	RX	Data reception status display
	LINK	Link status display
Line speed		1000 Mbits/s
Duplex mode		Full duplex
Flow control		ON/OFF setting (complies with IEEE802.3x)

AE5522 10GBASE-X Unit

Item	Specifications	
External I/F	Measurement port (2 XENPAK module interfaces)	Recommended XENPAK Modules • For 10GBASE-LR: HFCT-701XB (Agilent) TRE5021EN-SW (OPNEXT) • For 10GBASE-ER: TRE7051EN-SW (OPNEXT)
Display LED	TX	Data transmission status display
	RX	Data reception status display
	LINK	Link status display
	ALARM	LF/RF detection status display
Line speed		10 Gbits/s
Duplex mode		Full duplex
Flow control		ON/OFF setting (complies with IEEE802.3x)

AE5523 1000BASE-T Unit

Item	Specifications	
External I/F	Measurement port (12 RJ-45 ports)	10BASE-T, 100BASE-TX, and 1000BASE-T
	Measurement port (1 SFP port)	Recommended SFP modules • For 1000BASE-SX: TRF2816ANLB000 (OPNEXT) FTRJ8519P1BNL (Finisar) • For 1000BASE-LX: TRF5836ANLB000 (OPNEXT) FTRJ1319P1BTL (Finisar)
	PoE monitor connector	26 pins (PoE voltage of each RJ-45 port can also be monitored.)
Display LED	TX	Data transmission status display
	RX	Data reception status display
	LINK	Link status display
	PoE	Line power status display
Line speed		10 Mbits/s, 100 Mbits/s, and 1000 Mbits/s
Duplex mode		Full duplex/half duplex (only full duplex on 1000BASE-T)
Flow control		ON/OFF setting (complies with IEEE802.3x)
MDI/MDI-X		MDI (straight), MDI-X (cross), and AUTO (auto setting)

AE5524 1000BASE-X Unit

Item	Specifications	
External I/F	Measurement port (12 SFP ports)	Recommended SFP modules • For 1000BASE-SX: TRF2816ANLB000 (OPNEXT) FTRJ8519P1BNL (Finisar) • For 1000BASE-LX: TRF5836ANLB000 (OPNEXT) FTRJ1319P1BTL (Finisar)
Display LED	TX	Data transmission status display
	RX	Data reception status display
	LINK	Link status display
Line speed		1000 Mbits/s
Duplex mode		Fixed to full duplex
Flow control		ON/OFF setting (complies with IEEE802.3x)

10.2 TRAFFIC Function

AE5520 10/100BASE-T Unit

Item	Specifications		
Transmit	Transmission mode	Rate	Constant rate: %, µs, ns, bit (48 bits minimum), frames/s, or bps
			Burst (interval setting: 1 µs to 1 s)
		End By	Continuous, single shot (specify the number of transmission frames), time designation (in unit of s)
	Transmitted data (fixed)	Defined no. Of frames	128 frames/port max. (one frame is used for the insert frame)
		Frame length	18–9999 bytes (fixed frame length)
		Defined frames	IPv4, IPv6, IPX, UDP, TCP, IGMP, ICMP, ICMPv6, ARP, PAUSE custom (with MAC), custom (without MAC) tag (VLAN tag, MPLS tag, EoMPLS)
		Increment	MAC address increment can be set
		Payload setting	Set in the range of 00 to FFh. Set the size to Byte, Word, or Long Word.
		Error	CRC error, IP header checksum error, TCP checksum error, UDP checksum error, ICMP checksum error, ICMPv6 checksum error, and IGMP checksum
	Transmitted data (variable)	No. of variable fields	1 field/port
		Variable size	32-bit width
		Variable field offset	0 to 9990 bytes
		Variable method	Increment
		Frame length	Range: 64 to 9999 bytes (set increment, decrement, or random)
	Insert frame function		One frame can be sent manually.
Receive	Filter	MAC filter	Receive frames only from a specified destination MAC address, source MAC address, or unicast frames
		VLAN filter	VLANID, TPID, and Priority can be set
		Pattern filter	Two filters each consisting of 6-byte comparison and mask patterns and offset can be set. AND or OR logic, pass, or reject on the two filters can be set.
	Transmit statistics display	Normal	No. of frames, no. of bytes, rate (%), rate (frames/s), rate (bytes/s), rate (bps), no. of insert frames, and no. of reply frames
		Error	No. of error frames, no. of CRC error frames, no. of undersize frames, and no. of oversize frames
			Error frames (frames/s), CRC errors (frames/s), undersize (frames/s), and oversize (frames/s)
	Receive statistics display	Normal	No. of frames, no. of bytes, rate (%), rate (frames/s), rate (bytes/s), rate (bps), no. of pause frames, and no. of collisions detected
		Error	No. of error frames, no. of CRC error frames, no. of undersize frames, no. of oversize frames, no. of alignment errors, and no. of symbol error frames
			Error frames (frames/s), CRC errors (frames/s), undersize (frames/s), oversize (frames/s), alignment error (frames/s), and symbol errors (frames/s)

AE5521 1000BASE-X Unit

Item	Specifications		
Transmit	Transmission mode	Rate	Constant rate: %, µs, ns, bit (32 bits minimum), frames/s, or bps
			Burst (interval setting: 1 µs to 1 s)
		Transmission mode	Continuous, single shot (specify the number of transmission frames), time designation (in unit of s)
	Transmitted data (fixed)	Defined no. Of frames	128 frames/port max. (one frame is used for the insert frame)
		Frame length	18–9999 bytes (fixed frame length)
		Defined frames	IPv4, IPv6, IPX, UDP, TCP, IGMP, ICMP, ICMPv6, ARP, PAUSE custom (with MAC), custom (without MAC) tag (VLAN tag, MPLS tag, EoMPLS)
		Increment	MAC address increment can be set
		Payload setting	Set in the range of 00 to FFh. Set the size to Byte, Word, or Long Word.
		Error	CRC error, IP header checksum error, TCP checksum error, UDP checksum error, ICMP checksum error, ICMPv6 checksum error, and IGMP checksum
	Transmitted data (variable)	No. of variable fields	1 field/port
		Variable size	32-bit width
		Variable field offset	0 to 9990 bytes
		Variable method	Increment
		Frame length	Range: 64 to 9999 bytes (set increment, decrement, or random)
	Insert frame function		One frame can be sent manually.
Receive	Filter	MAC filter	Receive frames only from a specified destination MAC address, source MAC address, or unicast frames
		VLAN filter	VLANID, TPID, and Priority can be set
		Pattern filter	Two filters each consisting of 6-byte comparison and mask patterns and offset can be set. AND or OR logic, pass, or reject on the two filters can be set.
	Transmit statistics display	Normal	No. of frames, no. of bytes, rate (%), rate (frames/s), rate (bytes/s), rate (bps), no. of insert frames, and no. of reply frames
		Error	No. of error frames, no. of CRC error frames, no. of undersize frames, and no. of oversize frames
			Error frames (frames/s), CRC errors (frames/s), undersize (frames/s), and oversize (frames/s)
	Receive statistics display	Normal	No. of frames, no. of byte, rate (%), rate (frames/s), rate (bytes/s), rate (bps), and no. of pause frames
		Error	No. of error frames, no. of CRC error frames, no. of undersize frames, no. of oversize frames, and no. of symbol error frames
			Error frames (frames/s), CRC errors (frames/s), undersize (frames/s), oversize (frames/s), and symbol errors (frames/s)

AE5522 10GBASE-X Unit

Item	Specifications		
Transmit	Transmission mode	Rate	Constant rate: %, µs, ns, bit (72 bits minimum), frames/s, or bps
			Burst (interval setting: 1 µs to 1 s)
		Transmission mode	Continuous, single shot (specify the number of transmission frames), time designation (in unit of s)
	Transmitted data (fixed)	Defined no. Of frames	128 frames/port max. (one frame is used for the insert frame)
		Frame length	48–9999 bytes (fixed frame length)
		Defined frames	IPv4, IPv6, IPX, UDP, TCP, IGMP, ICMP, ICMPv6, ARP, PAUSE custom (with MAC), custom (without MAC) tag (VLAN tag, MPLS tag, EoMPLS)
		Increment	MAC address increment can be set
		Payload setting	Set in the range of 00 to FFh. Set the size to Byte, Word, or Long Word.
		Error	CRC error, IP header checksum error, TCP checksum error, UDP checksum error, ICMP checksum error, ICMPv6 checksum error, and IGMP checksum
	Transmitted data (variable)	No. of variable fields	1 field/port
		Variable size	32-bit width
		Variable field offset	0 to 9990 bytes
		Variable method	Increment
		Frame length	Range: 64 to 9999 bytes (set increment, decrement, or random)
	Insert frame function		One frame can be sent manually.
	LFS function		Manually transmit LF (Local Fault) and RF (Remote Fault)
Receive	Filter	MAC filter	Receive frames only from a specified destination MAC address, source MAC address, or unicast frames
		VLAN filter	VLANID, TPID, and Priority can be set
		Pattern filter	Two filters each consisting of 6-byte comparison and mask patterns and offset can be set. AND or OR logic, pass, or reject on the two filters can be set.
	Transmit statistics display	Normal	No. of frames, no. of bytes, rate (%), rate (frames/s), rate (bytes/s), rate (bps), no. of insert frames, and no. of reply frames
		Error	No. of error frames, no. of CRC error frames, no. of undersize frames, and no. of oversize frames
			Error frames (frames/s), CRC errors (frames/s), undersize (frames/s), and oversize (frames/s)
	Receive statistics display	Normal	No. of frames, no. of byte, rate (%), rate (frames/s), rate (bytes/s), rate (bps), and no. of pause frames
		Error	No. of error frames, no. of CRC error frames, no. of undersize frames, no. of oversize frames, no. of symbol error frames, no. of LFs received, no. of RFs received, and no. of link down occurrences
			Error frames (frames/s), CRC errors (frames/s), undersize (frames/s), oversize (frames/s), and symbol errors (frames/s)

AE5523 1000BASE-T Unit

Item	Specifications		
Transmit	Transmission mode	Rate	Constant rate: %, µs, ns, bit (48 bits minimum), frames/s, or bps
			Burst (interval setting: 1 µs to 1 s)
		Transmission mode	Continuous, single shot (specify the number of transmission frames), time designation (in unit of s)
	Transmitted data (fixed)	Defined no. Of frames	128 frames/port max. (one frame is used for the insert frame)
		Frame length	48–9999 bytes (fixed frame length)
		Defined frames	IPv4, IPv6, IPX, UDP, TCP, IGMP, ICMP, ICMPv6, ARP, PAUSE custom (with MAC), custom (without MAC) tag (VLAN tag, MPLS tag, EoMPLS)
		Increment	MAC address increment can be set
		Payload setting	Set in the range of 00 to FFh. Set the size to Byte, Word, or Long Word.
		Error	CRC error, symbol error, IP header checksum error, TCP checksum error, UDP checksum error, ICMP checksum error, ICMPv6 checksum error, and IGMP checksum
	Transmitted data (variable)	No. of variable fields	Up to 4 fields can be varied simultaneously
		Variable size	128 bit width (can be divided in to 4 fields in unit of 32 bits)
		Variable field offset	0 to 9990 bytes
		Variable method	Increment, random, or table reference (max. no. of ref. tables: 1024)
		Frame length	Range: 64 to 9999 bytes (set increment, decrement, or random)
	Insert frame function	Manual	One frame can be sent manually.
		Periodic	Sends insert frames periodically. Period setting: 1 ms to 600 s (1 ms resolution)
	Link up/down control function	Manual	Generate link up or link down through manual operation
		Periodic	Repetitively generate link up and link down. Min. period: 10 s. Max. period: 3600 s. Step: 1 s
Receive	Filter	MAC filter	Receive frames only from a specified destination MAC address, source MAC address, or unicast frames
		VLAN filter	VLANID, TPID, and Priority can be set
		Pattern filter	Two filters each consisting of 6-byte comparison and mask patterns and offset can be set. AND or OR logic, pass, or reject on the two filters can be set.
	Transmit statistics display	Normal	No. of frames, no. of bytes, rate (%), rate (frames/s), rate (bytes/s), rate (bps), no. of insert frames, and no. of reply frames
		Error	No. of error frames, no. of CRC error frames, no. of undersize frames, no. of oversize frames, and no. of symbol error frames
			Error frames (frames/s), CRC errors (frames/s), undersize (frames/s), oversize (frames/s), and symbol errors (frames/s)
	Receive statistics display	Normal	No. of frames, no. of bytes, rate (%), rate (frames/s), rate (bytes/s), rate (bps), no. of pause frames, and no. of collisions detected
		Error	No. of error frames, no. of CRC error frames, no. of undersize frames, no. of oversize frames, no. of alignment errors, no. of symbol error frames, no. of link down occurrences, and no. of late collisions detected
			Error frames (frames/s), CRC errors (frames/s), undersize (frames/s), oversize (frames/s), alignment error (frames/s), and symbol errors (frames/s)
	QoS statistics display	Statistics mode	For each flow (frame pattern comparison) and for each frame length
		Statistics channel	8 channels
		Statistical items	Total (frame), total (byte), rate (frames/s), rate (%), and rate (bps)
		QoS statistical filter	Two filters each consisting of 32-bit comparison and mask patterns and offset can be set.

AE5524 1000BASE-X Unit

Item	Specifications		
Transmit	Transmission mode	Rate	Constant rate: %, µs, ns, bit (48 bits minimum), frames/s, or bps
			Burst (interval setting: 1 µs to 1 s)
		Transmission mode	Continuous, single shot (specify the number of transmission frames), time designation (in unit of s)
	Transmitted data (fixed)	Defined no. Of frames	128 frames/port max. (one frame is used for the insert frame)
		Frame length	48–9999 bytes (fixed frame length)
		Defined frames	IPv4, IPv6, IPX, UDP, TCP, IGMP, ICMP, ICMPv6, ARP, PAUSE custom (with MAC), custom (without MAC) tag (VLAN tag, MPLS tag, EoMPLS)
		Increment	MAC address increment can be set
		Payload setting	Set in the range of 00 to FFh. Set the size to Byte, Word, or Long Word.
		Error	CRC error, symbol error, IP header checksum error, TCP checksum error, UDP checksum error, ICMP checksum error, ICMPv6 checksum error, and IGMP checksum
	Transmitted data (variable)	No. of variable fields	Up to 4 fields can be varied simultaneously
		Variable size	128 bit width (can be divided in to 4 fields in unit of 32 bits)
		Variable field offset	0 to 9990 bytes
		Variable method	Increment, random, or table reference (max. no. of ref. tables: 1024)
		Frame length	Range: 64 to 9999 bytes (set increment, decrement, or random)
	Insert frame function	Manual	One frame can be sent manually.
		Periodic	Sends insert frames periodically. Period setting: 1 ms to 600 s (1 ms resolution)
	Link up/down control function	Manual	Generate link up or link down through manual operation
		Periodic	Repetitively generate link up and link down. Min. period: 10 s. Max. period: 3600 s. Step: 1 s
Receive	Filter	MAC filter	Receive frames only from a specified destination MAC address, source MAC address, or unicast frames
		VLAN filter	VLANID, TPID, and Priority can be set
		Pattern filter	Two filters each consisting of 6-byte comparison and mask patterns and offset can be set. AND or OR logic, pass, or reject on the two filters can be set.
	Transmit statistics display	Normal	No. of frames, no. of bytes, rate (%), rate (frames/s), rate (bytes/s), rate (bps), no. of insert frames, and no. of reply frames
		Error	No. of error frames, no. of CRC error frames, no. of undersize frames, no. of oversize frames, and no. of symbol error frames
			Error frames (frames/s), CRC errors (frames/s), undersize (frames/s), oversize (frames/s), and symbol errors (frames/s)
	Receive statistics display	Normal	No. of frames, no. of byte, rate (%), rate (frames/s), rate (bytes/s), rate (bps), and no. of pause frames
		Error	No. of error frames, no. of CRC error frames, no. of undersize frames, no. of oversize frames, no. of symbol error frames, and no. of link down occurrences
			Error frames (frames/s), CRC errors (frames/s), undersize (frames/s), oversize (frames/s), and symbol errors (frames/s)
	QoS statistics display	Statistics mode	For each flow (frame pattern comparison) and for each frame length
		Statistics channel	8 channels
		Statistical items	Total (frame), total (byte), rate (frames/s), rate (%), and rate (bps)
		QoS statistical filter	Two filters each consisting of 32-bit comparison and mask patterns and offset can be set.

10.3 LATENCY Function

AE5520 10/100BASE-T Unit

Item	Specifications
IFG	Measures the max., min., and average IFG (Inter Frame Gap) (unit: µs)
Packet latency	Measures the max., min., and average packet latency (unit: µs)
Display	10 Mbits/s: 100-ns resolution, 3-µs ± 1-digit accuracy 100 Mbits/s: 100-ns resolution, 1-µs ± 1-digit accuracy

AE5521 1000BASE-X Unit

Item	Specifications
IFG	Measures the max., min., and average IFG (Inter Frame Gap) (unit: µs)
Packet latency	Measures the max., min., and average packet latency (unit: µs)
Display	100-ns resolution, 1-µs ± 1-digit accuracy

AE5522 10GBASE-X Unit

Item	Specifications
IFG	Measures the max., min., and average IFG (Inter Frame Gap) (unit: µs)
Packet latency	Measures the max., min., and average packet latency (unit: µs)
Display	100-ns resolution, 1-µs ± 1-digit accuracy

AE5523 1000BASE-T Unit

Item	Specifications
IFG	Measures the max., min., and average IFG (Inter Frame Gap) (unit: µs)
Packet latency	Measures the max., min., and average packet latency (unit: µs)
Packet delay for each QoS	Measures the packet delay for each flow (8 channels)
Display	10 Mbits/s: 100-ns resolution, 3-µs ± 1-digit accuracy 100 Mbits/s and 1000 Mbits/s: 100-ns resolution, 1-µs ± 1-digit accuracy

AE5524 1000BASE-X Unit

Item	Specifications
IFG	Measures the max., min., and average IFG (Inter Frame Gap) (unit: µs)
Packet latency	Measures the max., min., and average packet latency (unit: µs)
Packet delay for each QoS	Measures the packet delay for each flow (8 channels)
Display	10 Mbits/s: 100-ns resolution, 3-µs ± 1-digit accuracy 100 Mbits/s and 1000 Mbits/s: 100-ns resolution, 1-µs ± 1-digit accuracy

10.4 BERT Function

AE5520 10/100BASE-T Unit

Item	Specifications		
Transmit	Transmission mode	Rate	Constant rate: %, µs, ns, bit (32 bits minimum), or frames/s
		Transmission mode	Continuous, single shot (specify the number of transmission frames), time designation (in unit of s)
	Transmitted data (fixed)	Defined no. Of frames	1 frame/port (64 to 9999 bytes)
		Frame length	64–9999 bytes (fixed frame length)
		Test pattern (payload)	PN15
Receive	Statistics display	Displayed items	Bit error rate, bit error frame, bit error count, sync loss, checked byte, bit error (bps), bit error frame (frames/s), sync loss/s, checked bytes/s, bit error insert, and bit error insert frame

AE5521 1000BASE-X Unit

Item	Specifications		
Transmit	Transmission mode	Rate	Constant rate: %, µs, ns, bit (32 bits minimum), or frames/s
		Transmission mode	Continuous, single shot (specify the number of transmission frames), time designation (in unit of s)
	Transmitted data (fixed)	Defined no. Of frames	1 frame/port (64 to 9999 bytes)
		Frame length	64–9999 bytes (fixed frame length)
		Test pattern (payload)	PN15
Receive	Statistics display	Displayed items	Bit error rate, bit error frame, bit error count, sync loss, checked byte, bit error (bps), bit error frame (frames/s), sync loss/s, checked bytes/s, bit error insert, and bit error insert frame

AE5522 10GBASE-X Unit

Item	Specifications		
Transmit	Transmission mode	Rate	Constant rate: %, µs, ns, bit (72 bits minimum), frames/s, or bps
		Transmission mode	Continuous, single shot (specify the number of transmission frames), time designation (in unit of s)
	Transmitted data (fixed)	Defined no. Of frames	1 frame/port (64 to 9999 bytes)
		Frame length	64–9999 bytes (fixed frame length)
		Test pattern (payload)	PN15
Receive	Statistics display	Displayed items	Bit error rate, bit error frame, bit error count, sync loss, checked byte, bit error (bps), bit error frame (frames/s), sync loss/s, checked bytes/s, bit error insert, and bit error insert frame

AE5523 1000BASE-T Unit

Item	Specifications		
Transmit	Transmission mode	Rate	Constant rate: %, µs, ns, bit (48 bits minimum), frames/s, or bps
		Transmission mode	Continuous, single shot (specify the number of transmission frames), time designation (in unit of s)
	Transmitted data (fixed)	Defined no. Of frames	1 frame/port (64 to 9999 bytes)
		Frame length	64–9999 bytes (fixed frame length)
		Test pattern (payload)	PN15
Receive	Statistics display	Displayed items	Bit error rate, bit error frame, bit error count, sync loss, checked byte, bit error (bps), bit error frame (frames/s), sync loss/s, checked bytes/s, bit error insert, and bit error insert frame

AE5524 1000BASE-X Unit

Item	Specifications		
Transmit	Transmission mode	Rate	Constant rate: %, µs, ns, bit (48 bits minimum), frames/s, or bps
		Transmission mode	Continuous, single shot (specify the number of transmission frames), time designation (in unit of s)
	Transmitted data (fixed)	Defined no. Of frames	1 frame/port (64 to 9999 bytes)
		Frame length	64–9999 bytes (fixed frame length)
		Test pattern (payload)	PN15
Receive	Statistics display	Displayed items	Bit error rate, bit error frame, bit error count, sync loss, checked byte, bit error (bps), bit error frame (frames/s), sync loss/s, checked bytes/s, bit error insert, and bit error insert frame

10.5 CAPTURE Function

AE5522 10GBASE-X Unit

Item	Specifications
Capture size	2048 frames maximum, 128 KB for each port
Frame slice function	Select from four types: 64, 256, 2048, or 16384 bytes
Filter function	• Pattern filter Comparison pattern: 6 bytes × 2, mask pattern: 6 bytes × 2 Offset: 0 to 58 bytes • Capture only normal frames, error frames, layer 1 state change, or Ethernet frames
Trigger function	• Normal frame pattern Comparison pattern: 6 bytes × 2, mask pattern: 6 bytes × 2 Offset: 0 to 58 bytes • Completion of the insert frame transmission • Error frames CRC error, undersize, oversize, symbol error, bit error, all error frame, link up, link down, and LF/RF
	Trigger position (select from three types) Top, center, or end
Displayed items	Frame No., time stamp, frame status, frame length, destination MAC address, source MAC address, payload data (hexadecimal display)
File type	TTP, PCAP, and CSV formats

AE5523 1000BASE-T Unit

Item	Specifications
Capture size	16384 frames maximum, 1 MB for each port
Frame slice function	Select from four types: 64, 256, 2048, or 9999 bytes
Filter function	• Pattern filter Comparison pattern: 6 bytes × 2, mask pattern: 6 bytes × 2 Offset: 0 to 58 bytes • Capture only normal frames, error frames, layer 1 state change, or Ethernet frames
Trigger function	• Normal frame pattern Comparison pattern: 6 bytes × 2, mask pattern: 6 bytes × 2 Offset: 0 to 58 bytes • Completion of the insert frame transmission • Error frames CRC error, undersize, oversize, symbol error, alignment error, sequence error, bit error, all error frame, link up, link down, and late collision detection
	Trigger position (select from three types) Top, center, or end
Displayed items	Frame No., time stamp, frame status, frame length, destination MAC address, source MAC address, payload data (hexadecimal display)
File type	TTP, PCAP, and CSV formats

AE5524 1000BASE-X Unit

Item	Specifications
Capture size	16384 frames maximum, 1 MB for each port
Frame slice function	Select from four types: 64, 256, 2048, or 9999 bytes
Filter function	• Pattern filter Comparison pattern: 6 bytes × 2, mask pattern: 6 bytes × 2 Offset: 0 to 58 bytes • Capture only normal frames, error frames, layer 1 state change, or Ethernet frames
Trigger function	• Normal frame pattern Comparison pattern: 6 bytes × 2, mask pattern: 6 bytes × 2 Offset: 0 to 58 bytes • Completion of the insert frame transmission • Error frames CRC error, undersize, oversize, symbol error, sequence error, bit error, all error frame, link up, and link down
	Trigger position (select from three types) Top, center, or end
Displayed items	Frame No., time stamp, frame status, frame length, destination MAC address, source MAC address, payload data (hexadecimal display)
File type	TTP, PCAP, and CSV formats

10.6 Other Functions

AE5520 10/100BASE-T Unit, AE5521 1000BASE-X Unit, and AE5522 10GBASE-X Unit

Item	Specifications	
Emulation	IPv4	ARP reply, Ping reply, and MAC address auto learn

AE5523 1000BASE-T Unit

Item	Specifications	
PoE measurement	PD emulation	Sequence emulation conforming to IEEE802.3af
	Class declaration	Declare default class or arbitrary class
	Line power detection	Line power ON/OFF state
Sequence check	Types of errors detected	Packet loss, max. burst packet loss, reordered packets, and duplicate packets
Emulation	IPv4	ARP reply, Ping reply, and MAC address auto learn
	IPv6	NDP address resolution function, PING6 reply, and auto address generation
Alarm log	Alarm items	Packet error, reception rate error, packet delay error, IFG error, and layer 1 state change
	No. of recorded logs	Up to 1000 events (log recorded at 1-s intervals min.)
Variable transmit clock		Range: ±100 ppm. Resolution: 1 ppm. Accuracy: 5 ppm ± 1 digit

AE5524 1000BASE-X Unit

Item	Specifications	
Sequence check	Types of errors detected	Packet loss, max. burst packet loss, reordered packets, and duplicate packets
Emulation	IPv4	ARP reply, Ping reply, and MAC address auto learn
	IPv6	NDP address resolution function, PING6 reply, and auto address generation
Alarm log	Alarm items	Packet error, reception rate error, packet delay error, IFG error, and layer 1 state change
	No. of recorded logs	Up to 1000 events (log recorded at 1-s intervals min.)
Variable transmit clock		Range: ±100 ppm. Resolution: 1 ppm. Accuracy: 5 ppm ± 1 digit

10.7 General Specifications

AE5511 TrafficTesterPro

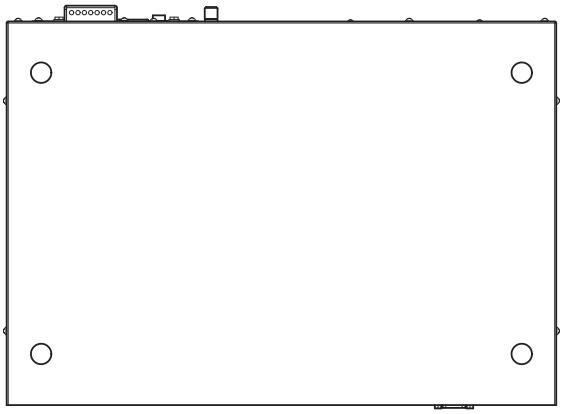
Item	Specifications	
Power supply	Voltage	90 to 264 VAC
	Frequency	48 to 63 Hz
	Power consumption	200 VA or less (when units are installed in full)
Dimensions and weight	Dimensions	H88 × W430 × D300 [mm] (projections excluded)
	Weight	Approx. 7 kg (AE5511 only)
Operating environment	Temperature	5 to 40°C
	Humidity	35 to 85%

AE5520 10/100BASE-T Unit, AE5521 1000BASE-X Unit, AE5522 10GBASE-X Unit, AE5523 1000BASE-T Unit, and AE5524 1000BASE-X Unit

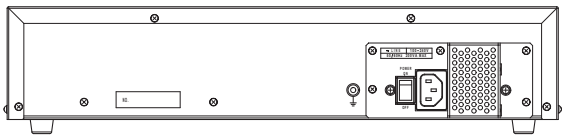
Item	Specifications	
Dimensions and weight	Dimensions	H40 × W200 × D260 [mm] (projections excluded)
	Weight	1 kg or less
Operating environment	Temperature	5 to 40°C
	Humidity	35 to 85%

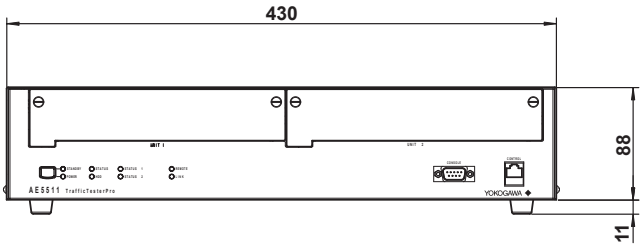
10.8 External Dimensions

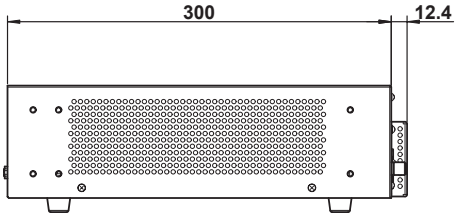
Unit: mm



Rear View







Unless otherwise specified, tolerance is ±3%.

11.1 Initial Settings (Factory Default Settings)

- **Settings**

AE5511 TrafficTesterPro

Item		Initial Setting	Notes
Time zone		Asia/Tokyo	Not changed with the initialize command.
Password	Enable/Disable	Disable	
	Password	None (blank)	
Login timeout value		20 minutes	Can be changes with a TELNET command (admin privileges). For details, see sytimeout in section 3.3 in the *Remote Command Manual (IM417322900-17E)*.
Equipment Name		None (blank)	
Next Boot	Use the current unit settings in the next boot	Off	
DiskCheck Setup	DiskCheck Movement	Not check	Not changed with the initialize command. Always reset to the initial setting at every boot.
AE5511 Network Settings	DHCP	Off	
	IP address	192.168.0.1	Takes effect at the next boot
	Netmask	255.255.255.0	
	Default gateway	192.168.0.254	
PORT Maintenance Condition Setting		Port Reserve	
Clock Adjust		0 ppm	Not changed with the initialize command. Always reset to the initial setting at every boot.

AE5520 10/100BASE-T Unit

Item			Initial Setting		
UNIT					
Port Info	Unit Information	Unit Testmode	TRAFFIC		
Common Setup	IFG (Inter Frame Gap)	IFG	96	bit	
		Link Speed On	100 M		
	Auto Negotiation	Enable Auto Negotiation			
		MDI/MDI-X	AUTO		
		Advertisement	10M-HALF, 10M-FULL, 100M-HALF, 100M-FULL, FLOW (Symmetric), and FLOW (Asymmetric)		
PORT (1 to 16)					
Layer1 Setup	Auto Negotiation	Enable Auto Negotiation			
		MDI/MDI-X	AUTO		
		Advertisement	10M-HALF, 10M-FULL, 100M-HALF, 100M-FULL, FLOW (Symmetric), and FLOW (Asymmetric)		
	Link UP/DOWN	Link Down Generation	Disable		
Transmit Setup	Transmit Setup	Traffic Mode	Constant		
		Link Speed On	100 M		
		IFG	96	bit	
	End By	End By	Manual		
	(Variable Field)	#1	(Not selected)		
		Special Setup	Insert Time Stamp		
	Variable Frame Length	Fixed			
	Transmission Mode	Variable			
		Frame Builder			
		Frame Structure	Format List	Format	IPv4
			Tag	L2	(Not selected)
				L3	None
			Frame Length		64
		MAC	Destination Address (DA)	00 00 00 00 00 00	
			Source Address (SA)	Refer to own port address of the network emulation setting.	
		IPv4	Multicast		(Not selected)
			Version		4
			Internet Header Length (IHL)		5
			Type Of Service (TOS)		00
			Fragments	ID	0
				Flags	0
				Offset	0
			Total Length		Auto
			TTL		64
			Protocol		0
			Checksum		Auto
			Refer to own port address of the network emulation setting.		
			Destination Address (DA)	0 0 0 0	
		Payload	User Data	Data Length	0
			Padding Data	Fill Pattern Size	Byte
				Fill Pattern	FF
		FCS	Error Frame Setting	Correct	
		Frame Pattern		Insert Time Stamp	

Item		Initial Setting		
Insert Frame	Insert Mode Setup	Insert Mode	Disable	
Statistics	Common Setup	Oversize	Oversize Threshold	1519
		Base Filter Setup	Filter Type	Disable
Network Setup	Own Port Address Setup	MAC Address	00 00 00 00 00 01	
		IPv4 Address	192 168 0 1	
		IPv6 Address	0000 0000 0000 0000 0000 0000 0000 0001	
	Reply to ARP/Ping Requests		(Not selected)	
	Auto Learn DUT MAC Address		(Not selected)	
	IPv6		(Not selected)	

AE5521 1000BASE-X Unit

Item					
UNIT					
Port Info	Unit Information	Unit Testmode	TRAFFIC		
Common Setup	IFG (Inter Frame Gap)	IFG	96 bit		
		Link Speed On	1000 M (fixed)		
	Auto Negotiation	Enable Auto Negotiation			
		Advertisement	FLOW (Symmetric) and FLOW (Asymmetric)		
PORT (1 to 4)					
Layer1 Setup	Auto Negotiation	Enable Auto Negotiation			
		Advertisement	FLOW (Symmetric) and FLOW (Asymmetric)		
	Link UP/DOWN	Link Down Generation	Disable		
Transmit Setup	Transmit Setup	Traffic Mode	Constant		
		Link Speed On	1000 M (fixed)		
		IFG	96 bit		
	End By	End By	Manual		
	(Variable Field)	#1	(Not selected)		
		Special Setup	Insert Time Stamp		
	Variable Frame Length	Fixed			
	Transmission Mode	Variable			
		Frame Builder			
		Frame Structure	Format List	Format	IPv4
			Tag	L2	(Not selected)
				L3	None
			Frame Length		64
		MAC	Destination Address (DA)	00 00 00 00 00 00	
			Source Address (SA)	Refer to own port address of the network emulation setting.	
		IPv4	Multicast		(Not selected)
			Version		4
			Internet Header Length (IHL)		5
			Type Of Service (TOS)		00
			Fragments	ID	0
				Flags	0
				Offset	0
			Total Length		Auto
			TTL		64
			Protocol		0
			Checksum		Auto

Item		Initial Setting			
Transmit Setup	Transmission Mode	IPv4	Refer to own port address of the network emulation setting.		
			Destination Address (DA)		0 0 0 0
		Payload	User Data	Data Length	0
			Padding Data	Fill Pattern Size	Byte
				Fill Pattern	FF
		FCS	Error Frame Setting	Correct	
		Frame Pattern		Insert Time Stamp	
Insert Frame	Insert Mode Setup	Insert Mode		Disable	
Statistics	Common Setup	Oversize		Oversize Threshold	1519
		Base Filter Setup		Filter Type	Disable
Network Setup	Own Port Address Setup	MAC Address	00 00 00 00 00 01		
		IPv4 Address	192 168 0 1		
		IPv6 Address	0000 0000 0000 0000 0000 0000 0000 0001		
	Reply to ARP/Ping Requests		(Not selected)		
	Auto Learn DUT MAC Address		(Not selected)		
	IPv6		(Not selected)		

AE5522 10GBASE-X Unit

Item		Initial Setting				
UNIT						
Port Info	Unit Information	Unit Testmode	TRAFFIC			
Common Setup	IFG (Inter Frame Gap)	IFG	96 bit			
		Link Speed On	10 G (fixed)			
PORT (1 and 2)						
Layer1 Setup	Link UP/DOWN	Link Down Generation	Disable			
Transmit Setup	Transmit Setup	Traffic Mode	Constant			
		Link Speed On	10 G (fixed)			
		IFG	96 bit			
	End By	End By	Manual			
	(Variable Field)	#1	(Not selected)			
		Special Setup	Insert Time Stamp			
	Variable Frame Length	Fixed				
	Transmission Mode	Variable				
		Frame Builder				
		Frame Structure	Format List	Format	IPv4	
			Tag	L2	(Not selected)	
				L3	None	
			Frame Length		64	
		MAC	Destination Address (DA)	00 00 00 00 00 00		
			Source Address (SA)	Refer to own port address of the network emulation setting.		
		IPv4	Multicast		(Not selected)	
			Version		4	
			Internet Header Length (IHL)		5	
			Type Of Service (TOS)		00	
			Fragments	ID	0	
				Flags	0	
				Offset	0	
			Total Length		Auto	
			TTL		64	
			Protocol		0	
			Checksum		Auto	
			Refer to own port address of the network emulation setting.			
			Destination Address (DA)		0 0 0 0	
		Payload	User Data	Data Length	0	
			Padding Data	Fill Pattern Size	Byte	
				Fill Pattern	FF	
		FCS	Error Frame Setting	Correct		
		Frame Pattern		Insert Time Stamp		
Insert Frame	Insert Mode Setup	Insert Mode		Disable		
Statistics	Common Setup	Oversize	Oversize Threshold	1519		
		Base Filter Setup	Filter Type	Disable		
Network Setup	Own Port Address Setup	MAC Address	00 00 00 00 00 01			
		IPv4 Address	192 168 0 1			
		IPv6 Address	0000 0000 0000 0000 0000 0000 0000 0001			
	Reply to ARP/Ping Requests		(Not selected)			
	Auto Learn DUT MAC Address		(Not selected)			
	IPv6		(Not selected)			

AE5523 1000BASE-T Unit

Item		Initial Setting			
UNIT					
Port Info	Unit Information	Unit Testmode	TRAFFIC		
	Port Info	Test Mode	TRAFFIC		
Common Setup	IFG (Inter Frame Gap)	IFG	96	bit	
		Link Speed On	1000 M		
	Auto Negotiation	Enable Auto Negotiation			
		MDI/MDI-X	AUTO		
		Advertisement	1000M-FULL FLOW (Symmetric) and FLOW (Asymmetric)		
PORT (1 to 12)					
Layer1 Setup	Auto Negotiation	Enable Auto Negotiation			
		MDI/MDI-X	AUTO		
		Advertisement	10M-HALF, 10M-FULL, 100M-HALF, 100M-FULL, 1000M-FULL FLOW (Symmetric), and FLOW (Asymmetric)		
	Link UP/DOWN	Link Down Generation	Disable		
	PoE Setup	(Not selected)			
Transmit Setup	Transmit Setup	Traffic Mode	Constant		
		Link Speed On	1000 M		
		IFG	96	bit	
	End By	End By	Manual		
	(Variable Field)	#1	(Not selected)		
		#2	(Not selected)		
		#3	(Not selected)		
		#4	(Not selected)		
		Special Setup	Insert Time Stamp and Insert Sequence Counter		
	Variable Frame Length	Fixed			
	Transmission Mode	Variable			
		Frame Builder			
		Frame Structure	Format List	Format	IPv4
			Tag	L2	(Not selected)
				L3	None
			Frame Length		64
		MAC	Destination Address (DA)	00 00 00 00 00 00	
			Source Address (SA)	Refer to own port address of the network emulation setting.	
		IPv4	Multicast		(Not selected)
			Version		4
			Internet Header Length (IHL)		5
			Type Of Service (TOS)		00
			Fragments	ID	0
				Flags	0
				Offset	0
			Total Length		Auto
			TTL		64
			Protocol		0
			Checksum		Auto

Item		Initial Setting			
Transmit Setup	Transmission Mode	IPv4	Refer to own port address of the network emulation setting.		
			Destination Address (DA)		0 0 0 0
		Payload	User Data	Data Length	0
			Padding Data	Fill Pattern Size	Byte
				Fill Pattern	FF
		FCS	Error Frame Setting	Correct	
		Frame Pattern		Insert Time Stamp and Insert Sequence Counter	
Insert Frame	Insert Mode Setup	Insert Mode		Disable	
Statistics	Common Setup	Oversize		Oversize Threshold	1519
		Base Filter Setup		Filter Type	Disable
	Sequence Error Check	Only Frame Passed Base Filter			
QoS	Frame Setup	Frame Builder			
		Frame Structure		Format List	Format IPv4
				Tag	L2 (Not selected)
					L3 None
				Frame Length	64
		MAC	Destination Address (DA)	00 00 00 00 00 00	
			Source Address (SA)	Refer to own port address of the network emulation setting.	
		IPv4	Multicast		(Not selected)
			Version		4
			Internet Header Length (IHL)		5
			Type Of Service (TOS)		00
			Fragments	ID	0
				Flags	0
				Offset	0
			Total Length		Auto
			TTL		64
			Protocol		0
			Checksum		Auto
			Refer to own port address of the network emulation setting.		
			Destination Address (DA)		0 0 0 0
		Payload	User Data	Data Length	0
			Padding Data	Fill Pattern Size	Byte
				Fill Pattern	FF
		FCS	Error Frame Setting	Correct	
		Frame Pattern		Insert Time Stamp and Insert Sequence Counter	
	QoS Setup	(Not selected)			
Alarm Setup	Alarm Type	(Not selected)			
	Detect Abnormal Rx Rate	(Not selected)			
	Detect Abnormal Delay	(Not selected)			
Network Setup	Own Port Address Setup	MAC Address	00 00 00 00 00 01		
		VLAN Setup	VLAN Stacks	0	
		IPv4 Address	192 168 0 1		
		IPv6 Address	0000 0000 0000 0000 0000 0000 0000 0001		

Item		Initial Setting					
Network Setup	Reply to ARP/Ping Requests	(Not selected)					
	Auto Learn DUT MAC Address	(Not selected)					
	IPv6	(Not selected)					
PORT (13)							
Layer1 Setup	Auto Negotiation	Enable Auto Negotiation					
		Advertisement	FLOW (Symmetric) and FLOW (Asymmetric)				
	Link UP/DOWN	Link Down Generation	Disable				
Transmit Setup	Transmit Setup	Traffic Mode	Constant				
		Link Speed On	1000 M (fixed)				
		IFG	96 bit				
	End By	End By	Manual				
	(Variable Field)	#1	(Not selected)				
		#2	(Not selected)				
		#3	(Not selected)				
		#4	(Not selected)				
		Special Setup	Insert Time Stamp and Insert Sequence Counter				
	Variable Frame Length	Fixed					
	Transmission Mode	Variable					
		Frame Builder					
		Frame Structure	Format List	Format	IPv4		
			Tag	L2	(Not selected)		
				L3	None		
			Frame Length		64		
		MAC	Destination Address (DA)	00 00 00 00 00 00			
			Source Address (SA)	Refer to own port address of the network emulation setting.			
		IPv4	Multicast	(Not selected)			
			Version	4			
			Internet Header Length (IHL)	5			
			Type Of Service (TOS)	00			
			Fragments	ID	0		
				Flags	0		
				Offset	0		
			Total Length	Auto			
			TTL	64			
			Protocol	0			
			Checksum	Auto			
			Refer to own port address of the network emulation setting.				
			Destination Address (DA)	0 0 0 0			
		Payload	User Data	Data Length	0		
			Padding Data	Fill Pattern Size	Byte		
				Fill Pattern	FF		
		FCS	Error Frame Setting	Correct			
		Frame Pattern		Insert Time Stamp and Insert Sequence Counter			
Insert Frame	Insert Mode Setup	Insert Mode		Disable			
Statistics	Common Setup	Oversize		Oversize Threshold	1519		
		Base Filter Setup		Filter Type	Disable		

Item		Initial Setting			
Statistics	Sequence Error Check	Only Frame Passed Base Filter			
QoS	Frame Setup	Frame Builder			
		Frame Structure	Format List	Format	IPv4
			Tag	L2	(Not selected)
				L3	None
			Frame Length		64
		MAC	Destination Address (DA)	00 00 00 00 00 00	
			Source Address (SA)	Refer to own port address of the network emulation setting.	
		IPv4	Multicast		(Not selected)
			Version		4
			Internet Header Length (IHL)		5
			Type Of Service (TOS)		00
			Fragments	ID	0
				Flags	0
				Offset	0
			Total Length		Auto
			TTL		64
			Protocol		0
			Checksum		Auto
			Refer to own port address of the network emulation setting.		
			Destination Address (DA)		0 0 0 0
		Payload	User Data	Data Length	0
			Padding Data	Fill Pattern Size	Byte
				Fill Pattern	FF
		FCS	Error Frame Setting	Correct	
		Frame Pattern		Insert Time Stamp and Insert Sequence Counter	
	QoS Setup	(Not selected)			
Alarm Setup	Alarm Type	(Not selected)			
	Detect Abnormal Rx Rate	(Not selected)			
	Detect Abnormal Delay	(Not selected)			
Network Setup	Own Port Address Setup	MAC Address	00 00 00 00 00 01		
		VLAN Setup	VLAN Stacks	0	
		IPv4 Address	192 168 0 1		
		IPv6 Address	0000 0000 0000 0000 0000 0000 0000 0001		
	Reply to ARP/Ping Requests	(Not selected)			
	Auto Learn DUT MAC Address	(Not selected)			
	IPv6	(Not selected)			

AE5524 1000BASE-X Unit

Item		Initial Setting			
UNIT					
Port Info	Unit Information	Unit Testmode	TRAFFIC		
	Port Info	Test Mode	TRAFFIC		
Common Setup	IFG (Inter Frame Gap)	IFG	96 bit		
		Link Speed On	1000 M (fixed)		
	Auto Negotiation	Enable Auto Negotiation			
		MDI/MDI-X	AUTO		
		Advertisement	FLOW (Symmetric) and FLOW (Asymmetric)		
PORT (1 to 12)					
Layer1 Setup	Auto Negotiation	Enable Auto Negotiation			
		Advertisement	FLOW (Symmetric) and FLOW (Asymmetric)		
	Link UP/DOWN	Link Down Generation	Disable		
Transmit Setup	Transmit Setup	Traffic Mode	Constant		
		Link Speed On	1000 M (fixed)		
		IFG	96 bit		
	End By	End By	Manual		
	(Variable Field)	#1	(Not selected)		
		#2	(Not selected)		
		#3	(Not selected)		
		#4	(Not selected)		
		Special Setup	Insert Time Stamp and Insert Sequence Counter		
	Variable Frame Length	Fixed			
	Transmission Mode	Variable			
		Frame Builder			
		Frame Structure	Format List	Format	IPv4
			Tag	L2	(Not selected)
				L3	None
			Frame Length		64
		MAC	Destination Address (DA)	00 00 00 00 00 00	
			Source Address (SA)	Refer to own port address of the network emulation setting.	
		IPv4	Multicast		(Not selected)
			Version		4
			Internet Header Length (IHL)		5
			Type Of Service (TOS)		00
			Fragments	ID	0
				Flags	0
				Offset	0
			Total Length		Auto
			TTL		64
			Protocol		0
			Checksum		Auto
			Refer to own port address of the network emulation setting.		
			Destination Address (DA)		0 0 0 0
		Payload	User Data	Data Length	0
			Padding Data	Fill Pattern Size	Byte
				Fill Pattern	FF
		FCS	Error Frame Setting	Correct	

Item		Initial Setting			
Transmit Setup	Transmission Mode	Frame Pattern		Insert Time Stamp and Insert Sequence Counter	
Insert Frame	Insert Mode Setup	Insert Mode		Disable	
Statistics	Common Setup	Oversize	Oversize Threshold	1519	
		Base Filter Setup	Filter Type	Disable	
	Sequence Error Check	Only Frame Passed Base Filter			
QoS	Frame Setup	Frame Builder			
		Frame Structure	Format List	Format	IPv4
			Tag	L2	(Not selected)
				L3	None
			Frame Length		64
		MAC	Destination Address (DA)	00 00 00 00 00 00	
			Source Address (SA)	Refer to own port address of the network emulation setting.	
		IPv4	Multicast		(Not selected)
			Version		4
			Internet Header Length (IHL)		5
			Type Of Service (TOS)		00
			Fragments	ID	0
				Flags	0
				Offset	0
			Total Length		Auto
			TTL		64
			Protocol		0
			Checksum		Auto
			Refer to own port address of the network emulation setting.		
			Destination Address (DA)	0 0 0 0	
		Payload	User Data	Data Length	0
			Padding Data	Fill Pattern Size	Byte
				Fill Pattern	FF
		FCS	Error Frame Setting	Correct	
		Frame Pattern		Insert Time Stamp and Insert Sequence Counter	
	QoS Setup	(Not selected)			
Alarm Setup	Alarm Type	(Not selected)			
	Detect Abnormal Rx Rate	(Not selected)			
	Detect Abnormal Delay	(Not selected)			
Network Setup	Own Port Address Setup	MAC Address	00 00 00 00 00 01		
		VLAN Setup	VLAN Stacks	0	
		IPv4 Address	192 168 0 1		
		IPv6 Address	0000 0000 0000 0000 0000 0000 0000 0001		
	Reply to ARP/Ping Requests	(Not selected)			
	Auto Learn DUT MAC Address	(Not selected)			
	IPv6	(Not selected)			

- **Statistics**

Common to All Units

Items with an “x” mark are shown in the initial setting

Statistical Item	Initial Display	Statistical Item	Initial Display
[Common] Measured Time	x	[Rx] Under Size Error (frame/s)	
[Link] Link Status	x	[Rx] Over Size Error (frame/s)	
[Link] Link Down	x	[Rx] Alignment Error (frame/s)	
[Link] Tx Frequency Deviation (ppm)		[Rx] Symbol Error (frame/s)	
[Link] Rx Frequency Deviation (ppm)		[Latency] Max IFG (μs)	x
[Link] 1000BASE-T Clock Mode		[Latency] Min IFG (μs)	x
[Link] PoE Line Power Detect		[Latency] Avg IFG (μs)	
[Link] LF Detect		[Latency] Max Packet Latency (μs)	x
[Link] RF Detect		[Latency] Min Packet Latency (μs)	x
[Tx] Normal Frame	x	[Latency] Avg Packet Latency (μs)	x
[Tx] Byte	x	[Seq] Loss Packet	
[Tx] Rate (%)	x	[Seq] Reorder Packet	
[Tx] Rate (frame/s)	x	[Seq] Duplicate Packet	
[Tx] Rate (byte/s)		[Seq] Max Burst Packet Loss	
[Tx] Rate (bps)	x	[CH1] Frame	
[Tx] Insert Frame	x	[CH1] Byte	
[Tx] Reply Frame	x	[CH1] Rate (%)	
[Tx] Error Frame		[CH1] Rate (frame/s)	
[Tx] CRC Error	x	[CH1] Rate (bps)	
[Tx] Under Size Error	x	[CH2] Frame	
[Tx] Over Size Error	x	[CH2] Byte	
[Tx] Symbol Error	x	[CH2] Rate (%)	
[Tx] Error Frame (frame/s)		[CH2] Rate (frame/s)	
[Tx] CRC Error (frame/s)		[CH2] Rate (bps)	
[Tx] Under Size Error (frame/s)		[CH3] Frame	
[Tx] Over Size Error (frame/s)		[CH3] Byte	
[Tx] Symbol Error (frame/s)		[CH3] Rate (%)	
[Rx] Normal Frame	x	[CH3] Rate (frame/s)	
[Rx] Byte	x	[CH3] Rate (bps)	
[Rx] Rate (%)	x	[CH4] Frame	
[Rx] Rate (frame/s)	x	[CH4] Byte	
[Rx] Rate (byte/s)		[CH4] Rate (%)	
[Rx] Rate (bps	x	[CH4] Rate (frame/s)	
[Rx] Pause Frame	x	[CH4] Rate (bps)	
[Rx] Collision Detect	x	[CH5] Frame	
[Rx] Late Collision Detect		[CH5] Byte	
[Rx] Error Frame		[CH5] Rate (%)	
[Rx] CRC Error	x	[CH5] Rate (frame/s)	
[Rx] Under Size Error	x	[CH5] Rate (bps)	
[Rx] Over Size Error	x	[CH6] Frame	
[Rx] Alignment Error	x	[CH6] Byte	
[Rx] Symbol Error	x	[CH6] Rate (%)	
[Rx] Error Frame (frame/s)		[CH6] Rate (frame/s)	
[Rx] CRC Error (frame/s)		[CH6] Rate (bps)	

Statistical Item	Initial Display
[CH7] Frame	
[CH7] Byte	
[CH7] Rate (%)	
[CH7] Rate (frame/s)	
[CH7] Rate (bps)	
[CH8] Frame	
[CH8] Byte	
[CH8] Rate (%)	
[CH8] Rate (frame/s)	
[CH8] Rate (bps)	
[CH1] Max Packet Latency (us)	
[CH1] Min Packet Latency (us)	
[CH1] Avg Packet Latency (us)	
[CH2] Max Packet Latency (us)	
[CH2] Min Packet Latency (us)	
[CH2] Avg Packet Latency (us)	
[CH3] Max Packet Latency (us)	
[CH3] Min Packet Latency (us)	
[CH3] Avg Packet Latency (us)	
[CH4] Max Packet Latency (us)	
[CH4] Min Packet Latency (us)	
[CH4] Avg Packet Latency (us)	
[CH5] Max Packet Latency (us)	
[CH5] Min Packet Latency (us)	
[CH5] Avg Packet Latency (us)	
[CH6] Max Packet Latency (us)	
[CH6] Min Packet Latency (us)	
[CH6] Avg Packet Latency (us)	
[CH7] Max Packet Latency (us)	
[CH7] Min Packet Latency (us)	
[CH7] Avg Packet Latency (us)	
[CH8] Max Packet Latency (us)	
[CH8] Min Packet Latency (us)	
[CH8] Avg Packet Latency (us)	
[BERT] Bit Error Rate (E-12)	x
[BERT] Bit Error Count	x
[BERT] Bit Error Frame	x
[BERT] Sync Loss	x
[BERT] BERT Checked Byte	x
[BERT] Bit Error (bps)	
[BERT] Bit Error Frame (frame/s)	
[BERT] Sync Loss /sec	
[BERT] BERT Checked Byte/s	
[BERT] Bit Error Insert	x
[BERT] Bit Error Insert Frame	

- **Capture**

AE5522 10GBASE-X Unit (PORT 1 and 2)
AE5523 1000BASE-T (PORT 1 and 13)
AE5524 1000BASE-X Unit (PORT 1 and 12)

Item		Initial Setting		
Filter Setup	Capture Type	Normal Frames, Error Frames, L1 Events, and Insert Frames		
	Normal Frame Filter	(Not selected)		
Trigger Setup		Disable Trigger		
			Record Mode	LOOP
Buffer Setup	Size (Byte)	256		
	Event Count	512		