YOKOGAWA

AQ7270 Series

AQ7275 OTDR

Optical Time Domain Reflectometer

Enhanced version of AQ7270 Series

- Improved Waveform Quality
- Increased Dynamic range
- Wider Range of Optional Functions
- Short Dead Zone (0.8 m)

Dead zone **0.8m**

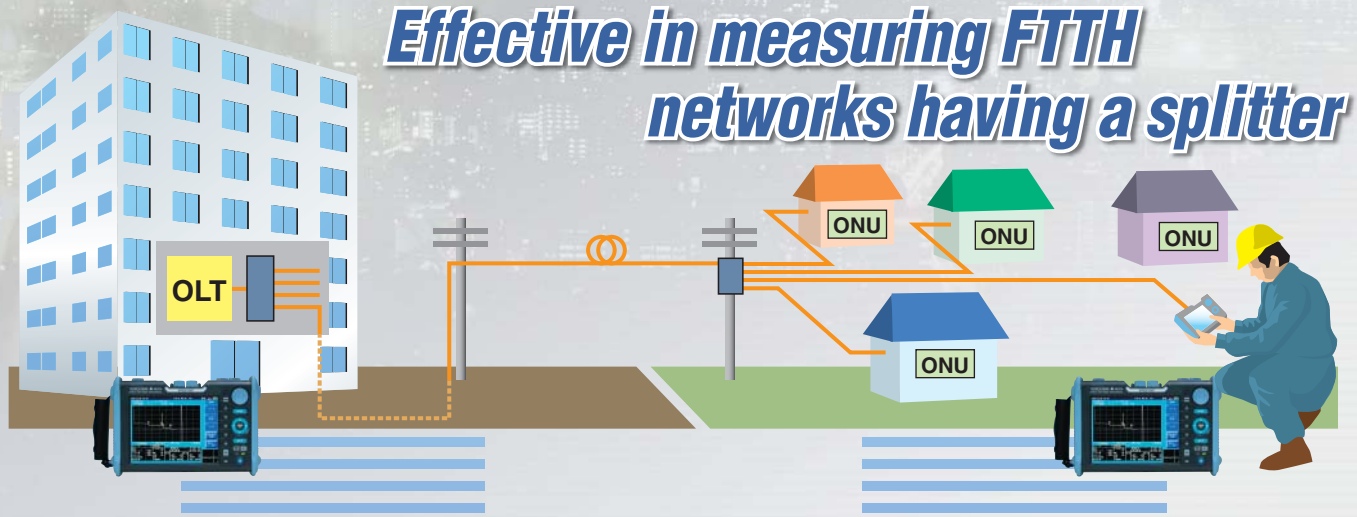
QUALITY ■ INNOVATION ■ FORESIGHT

Bulletin AQ7275-01E

AQ7275

Enhanced Measurement Performance

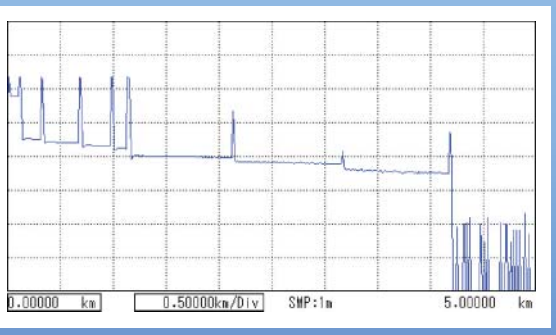
Effective in measuring FTTH networks having a splitter



Improved Wavelength Quality

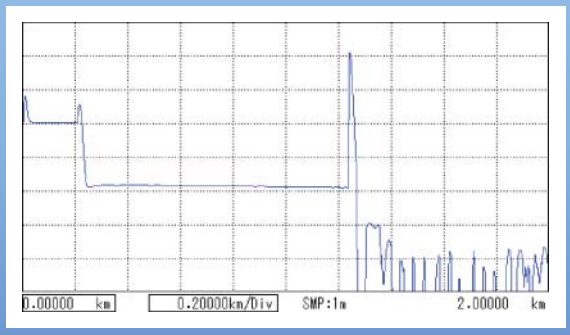
Increase the efficiency of fiber installation & maintenance

Improved waveform in Real-time mode



Downstream measurement from central office through a 1x8 splitter.
(Pulse width: 100 ns, Sampling resolution: 1 m)

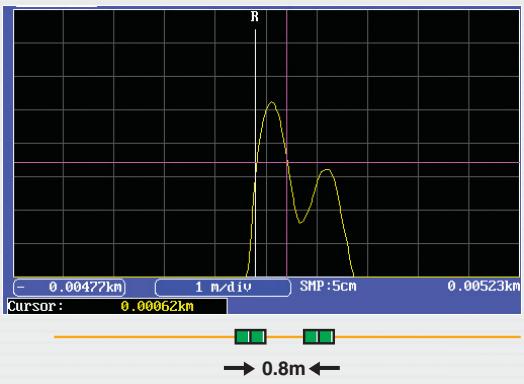
Waveform through splitter with a large loss



Upstream measurement from customer premises through a 1x8 splitter.
(Pulse width: 100 ns, Sampling resolution: 1 m)

Event Dead Zone 0.8 m

Accompanying the rapid proliferation of FTTH is a growing need for detection of reflective events arising from short distance mechanical connections. The AQ7275's short event dead zone enables detection of closely spaced events in cables installed in offices and customer premises.



High Dynamic Range up to 40 dB

The newly added 3-wavelength model (735037) and 4-wavelength model (735040) can achieve the dynamic range of 40 dB. This high dynamic range is effective in measuring a transmission line consisting of long fiber cables and a splitter with a large loss.

Quick Startup within 10 Seconds

Now measurements can be started quickly upon arrival at the site. 10 seconds to power-up from completely OFF to fully ON! With such a fast power-up time, battery life can be extended by turning the power off while not in use at the job site without any concern about the power-up time when the next job is ready. It's ready when you're ready!

More Value Added to OTDR
– Wider Range of Optional Functions

Stabilized Light Source New

This light source option can be used for measuring losses. It can also be used for optical fiber identification, because it is capable of outputting not only continuous wave (CW) light but also a 270-Hz modulated light.

* The stabilized light source option cannot be used for the 735040.

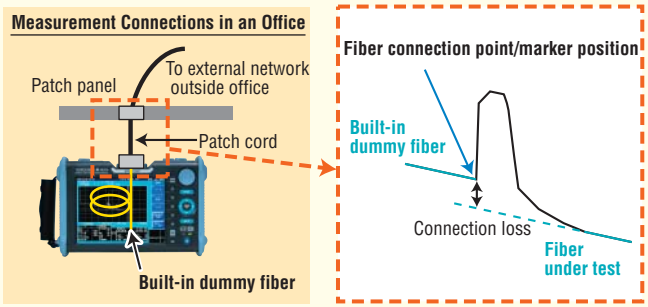
Fiber Identification

Loss Measurement

Built-in Dummy Fiber

You can use the dummy fiber to effectively detect abnormal near-end connection loss.

* The dummy fiber option cannot be used for the 735040.
* The built-in dummy fiber is not attachable and removable.



Angled-PC Connector New

You can connect an optical fiber with an angled-PC connector directly to the OTDR. The angled PC is often used for CATV networks to reduce the influence of reflection.

External Large Capacity Battery New

[Scheduled to be available in February 2008]

A thin board battery attached to the back of the OTDR. The operation time will double that of a standard built-in battery.

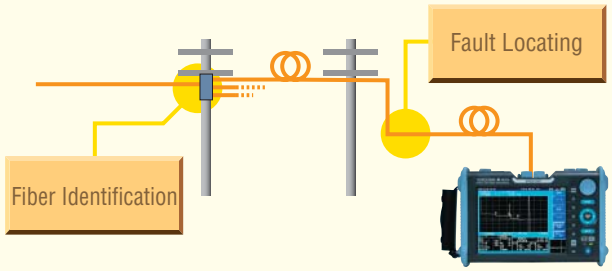
* The large capacity battery cannot be attached in conjunction with the printer/LAN option.

Visible Light Source New

[Scheduled to be available in February 2008]

This option can be used for identifying the multicore fiber cable and visually checking for a failure. The adopting the connector connection method enables the visible light to reach greater distances with less light leakage.

* The visible light source option cannot be used for the 735037 and 735040.



Optical Power Monitor

This is useful for simply checking optical power when performing link loss testing or troubleshooting.

Fiber Identification

Power Check

Printer/LAN

Measured results can be printed on site. It makes it easy to attach waveforms and results to your report. Remote control and FTP (file transfer) via LAN is also possible.

File transfer

Remote control

Powerful Lineup

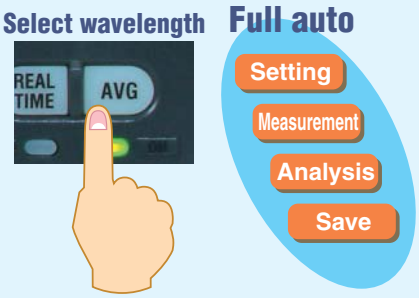
Applicable fiber	Number of Wavelengths	Wavelength	Dynamic Range	Model	Descriptions
SMF	2	1310/1550 nm	34/32 dB	735032	Standard model for installation and maintenance of FTTH
			40/38 dB	735033	Standard model for installation and maintenance of metro networks and access networks
	3	1310/1550/1650 nm	40/38/30 dB	705037	3-wavelength model compliant with maintenance wavelength 1650 nm. 1310/1550 nm high dynamic type complies with metro networks and access networks
MMF/SMF	4	850/1300 nm 1310/1550 nm	22.5/24 dB 40/38 dB	735040	4-wavelength model for installation and maintenance of LAN and FTTH with support for both multi-mode and single-mode fibers

Easy to Operate for Beginners and Experts

Setup mode can be selected according to the skill level of technicians.

Full Auto Mode

Simply select the measured wavelength and the AQ7275 takes care of the rest by automatically setting the optimal measurement conditions and by performing measurement and event analysis, and fully automated data saving.

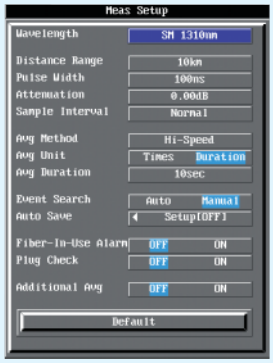


Wizard Mode

Display the guidelines for the setup items from the Setup menu. Follow the step-by-step instructions to complete the setup.

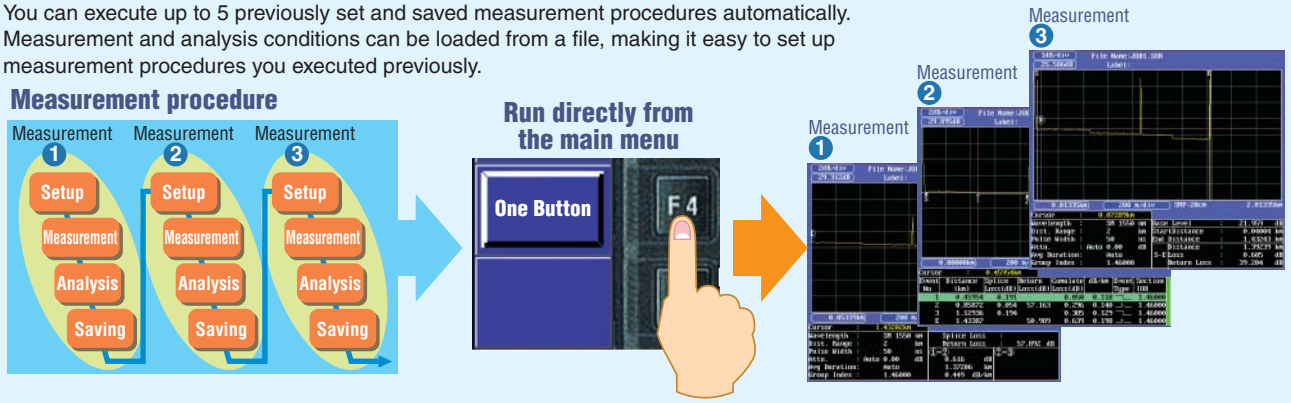
Detail Mode

This mode allows you to set all the detailed settings, not only the measurement and analysis settings but also the screen display and system settings.



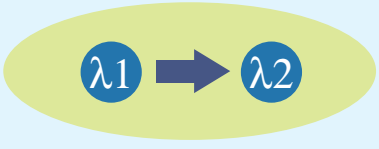
Macro's with Predefined Procedures –One-button Measurement

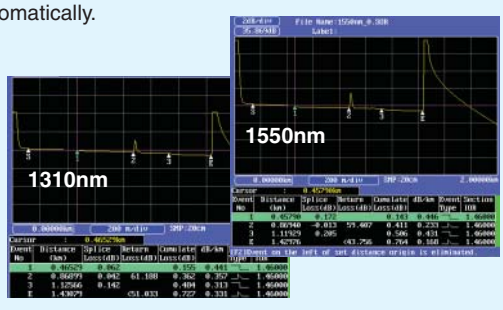
Simply select previously set measurement procedures and then push a button.
You can execute up to 5 previously set and saved measurement procedures automatically.
Measurement and analysis conditions can be loaded from a file, making it easy to set up measurement procedures you executed previously.



Measurement with Auto Wavelength Switching –Multi Wavelength Measurement

Just push one button to switch multiple wavelengths and perform measurement automatically.
Measured waveforms for multiple wavelengths are displayed on a single screen, so it is easy to compare the waveforms. The measured data is saved to memory.





Useful Support Functions

Checking the Connection with the OTDR –Plug Check Function

You can detect poor connections and dirty plugs

The plug check function monitors the condition of the optical connectors and displays an alarm if the connection is not properly made. This function is useful for checking for damage, dirt, or other problems with optical plugs at the OTDR or on the fiber under test. It is also useful for helping technicians to remember to connect the fiber under test.

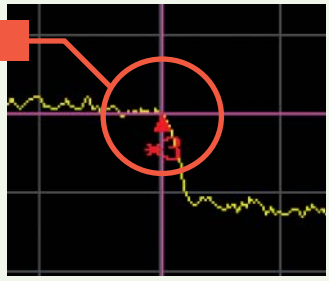
Detecting Fault Events –Fault Event Display Function

The fault event display function detects and displays abnormal connection or reflection points. Of the events detected by this function, abnormal events that cross a specified threshold value are highlighted in the event table and waveform display.

Fault event

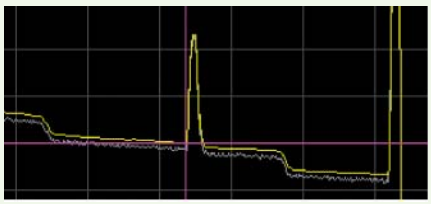
Event No	Distance (km)	Splice Loss(dB)	Return Loss(dB)	Cumulate Loss(dB)	dB/km	Event Type	Section IOR
1	0.44564	-0.072		0.783	2.067		1.48000
2	0.84975	0.049	56.511	0.892	0.449		1.48000
*3	1.11207	0.206		1.037	0.366		1.48000
E	1.41085		<46.858	1.340	0.324		1.48000

Fault event



Measurement with Comparison to Reference Waveform –Trace Fix Function

This function enables you to freeze the display of one waveform and overlap it on real-time or averaged waveforms. This is useful for creating a template when installing multicore fiber, or for checking aged deterioration during maintenance on existing fiber networks. In addition to the last measured waveform, a waveform can be loaded from a file for use as a reference waveform.



USB Function

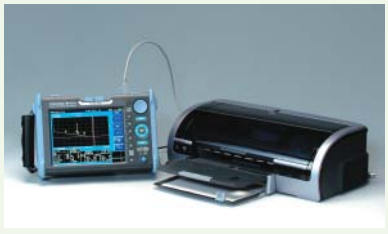
This function is useful because it can be used for external memory, printing, and communications. The AQ7275 comes standard with 2 USB1.1 compliant connector ports (types A and B).

Saving Files to USB Memory -Type A

Using a USB memory stick and USB hard disk allows you to save large amounts of data. Also, you can easily transfer the saved data to a PC.

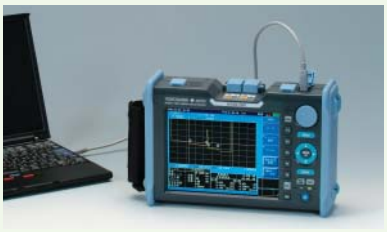
Printing on an External Printer -Type A

You can print screen images and measured data on USB printers.



Remote Control -Type B

The AQ7275 can be remotely controlled from an external PC by connecting a USB cable from one to the other.



Accessing the Internal Memory -Type B

You can easily access the AQ7275 internal memory with USB cable from an external PC.

Specifications

Common Specifications

Horizontal Axis Parameters

Sampling resolution	5 cm, 10 cm, 20 cm, 50 cm, 1 m, 2 m, 4 m, 8 m, 16 m, 32 m
Readout resolution	1 cm (Min.)
Number of sampled data	Up to 50,000 points
Group refractive index	1.30000 to 1.79999 (in 0.00001 steps)
Unit of distance	km, kf or miles
Distance measurement accuracy	Sum of the following 3 errors Offset error: ±1 m Scale error: Measurement distance × 2 ×10^{-5} Sampling error: ±1 sampling resolution

Vertical Axis Parameters

Vertical axis scale	0.2 dB/div, 0.5 dB/div, 1 dB/div, 2 dB/div, 5 dB/div, 7.5 dB/div
Readout resolution	0.001 dB (Min.)
Loss measurement accuracy*	±0.05 dB/dB

*When the measuring loss is 1 dB or less, the accuracy is within ±0.05 dB.

OTDR Measurement Function

Distance measurement	Displays up to eight digits of the relative one-way direction between two arbitrary points on the trace.
Loss measurement	Displays one-way loss in steps of 0.001 dB to a maximum of 5 digits. Displays the one-way loss, loss per unit length, and splice loss between any arbitrary points on the trace.
Return loss measurement	Measures return loss and total return loss of a fiber cable or between two arbitrary points on the trace.

OTDR Analysis Functions

Analysis functions	Multi trace analysis, 2 way trace analysis, differential trace analysis, section analysis

Internal Memory

Memory capacity	1000 waveforms or more Can store measured waveforms and measurement conditions

Display

Display	8.4-inch color TFT LCD, semi-transparent
Total number of displayed pixels*	640 (horizontal) × 480 (vertical) pixels

*The LCD may contain some pixels that are always ON or OFF (0.002% or fewer of all displayed pixels including RGB), but this is not indicative of a general malfunction.

External Interface

USB	USB1.1 Type A and Type B, one each Type A: For external memory or external printer Type B: For connecting to an external PC for remote control or access to the OTDR's internal memory.

File Formats

File formats	Read: SOR, TRD, TRB, SET (AQ7270/75) Write: SOR (Telcordia), SET, CSV, BMP, JPG, PNG

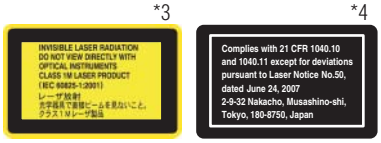
General Specifications

Operating environment	Temperature 0 to 45°C (0 to 35°C when charging the battery) Humidity 85% RH or less (no condensation)
Storage temperature	-20 to 60°C
Battery	Operation time 6 hours *1 Recharge time 5 hours *2
Rated power voltage	100 to 240 VAC
Rated supply frequency	50 to 60 Hz
Power consumption	Max 70 W (when charging battery and printing with optional printer)
Dimensions	(W) 287 × (H) 197 × (D) 85 mm (excluding projections or options)
Weight	Approx. 2.8 kg (excluding options)
Laser safety standards	Class 1 M (IEC 60825-1:1993 + A2:2001)*3 21CFR1040.10*4
Safety standard	EN61010-1
Emission	EN61326 Class A
Immunity	EN61326 Annex A

*1 Measurement for 30 seconds in every 10 minutes without any options and in power save mode (Auto Power OFF 1 minute)

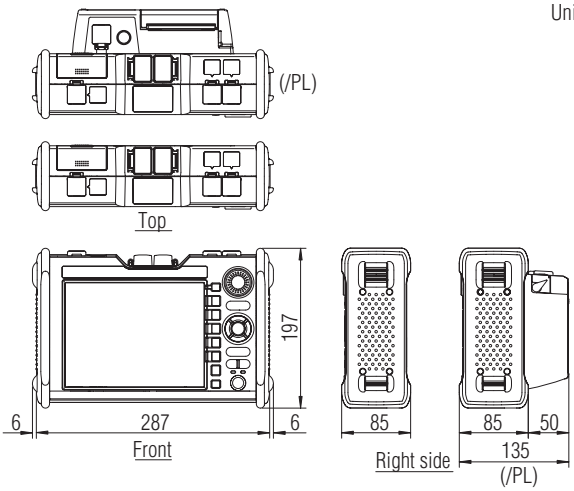
*2: Ambient temperature of 23°C, power OFF

*3 *4



IEC60285-1 21CFR1040.10

External Dimensions



Specifications by Model

Model	735032	735033	735037*12	735040	
Wavelength	1310/1550±25 nm	1310/1550±25 nm	1310/1550±25 nm 1650±5 nm *1, ±10 nm *2	130/1550±25nm	850/1300±30nm
Applicable fiber	SM (ITU-T G.652)				GI (50/125, 62.5/125 µm)
Distance range	500 m, 1 km, 2 km, 5 km, 10 km, 20 km, 50 km, 100 km, 200 km, 300 km, 400 km				500 m, 1 km, 2 km, 5 km, 10 km, 20 km, 50 km, 100 km
Pulse width *3	3 ns, 10 ns, 20 ns, 50 ns, 100 ns, 200 ns, 500 ns, 1µs, 2 µs, 5 µs, 10 µs, 20 µs				10 ns, 20 ns, 50 ns, 100 ns, 200 ns, 500 ns, 1 µs, 2 µs, 5 µs *7
Dynamic range	34/32 dB *4	40/38 dB *4	40/38/30 dB *4	40/38 dB *4	22.5/24 dB *8, 10
Event dead zone *11	0.8m *5	0.8m *5	0.8m *5	0.8m *5	2 m *9, 10
Attenuation dead zone *6.11	7/8 m (typ)	7/8 m (typ)	7/8/12 m (typ)	7/8 m (typ)	7/10 m (typ) *10

*1 At a point -20 dB from the pulse light output peak value (measured 30 minutes or more after power-on at an ambient temperature of 23°C)

*2 At a point -60 dB from the pulse light output peak value (measured 30 minutes or more after power-on at an ambient temperature of 23°C)

*3 Pulse width setting range depends on the distance range.

*4 SNR:1, pulse width: 20 µs, distance range: 200 km, sampling resolution: 8 m, measurement time: 3 minutes. When built-in dummy fiber and angled-PC connector are used, each dynamic range decreases by 0.5 dB.

*5 Pulse width of 3 ns, return loss of 45 dB or more at a point 1.5 dB below the peak value (not saturated)

*6 Pulse width of 10 ns and return loss of 45 dB or more at a point where the backscatter level is within ±0.5 dB of the normal value

*7 Pulse width of 2 or 5 µs when the measured wavelength is 1300 nm.

*8 SNR = 1 at pulse width of 500 ns (850 nm) and 1 µs (1300 nm), sampling resolution of 8 m, and measurement time of 3 minutes

*9 Pulse width of 10 ns and return loss of 45 dB or more at a point 1.5 dB below the peak value (not saturated)

*10 GI (62.5/125 µm) is measured.

*11 At group reflective index 1.5

*12 Pulse light output power at 1650 nm, 15 dBm or less.

Note: Specifications without any special remarks are assured at 23°C±2°C

Factory Installed Optional Specifications

Stabilized Light Source Function (/SLS option)

Optical connector	Shared with the OTDR (at the same port)
Center wavelength	OTDR's center wavelengths
Light output level	-5 dBm or more (at 23°C±2°C)
Output level stability (Constant temperature for 5 minutes)	±0.1 dB (±0.15 dB for 1650 nm)
Modulation frequency	CW, 270 Hz

* Unavailable for the 735040

Built-in Printer/LAN Function (/PL option)

Printing method	Thermal line-dot
Dot density	576 dots/line
Paper width	80 mm
Operating environment	Temperature 0 to 40°C Humidity 10 to 80% RH (no condensation)
Storage temperature	-20 to 60°C
LAN function	10BASE-T/100BASE-TX (RJ-45) x1

Optical Fiber Identification Light Source Function (/LS option)

Optical connector	Shared with the OTDR (1310/1550 nm port only)
Center wavelength	OTDR's center wavelengths
Light output level	-5 dBm or more (at 23°C±2°C)
Output level time stability	±1 dB (for 5 minutes at constant temperature)
Modulation frequency	CW, 270 Hz

* Only available for the 735040 SM

Model and Suffix Code

AQ7275 OTDR

Model	Option availability							Remark
	Optical power monitor	Stabilized light source	Identification light source	Visible light source	Printer/ LAN *1	Dummy fiber	Shoulder belt	
735032	√	√	—	√	√	√	√	1 port, SM1310/1550 nm
735033	√	√	—	√	√	√	√	1 port, SM1310/1550 nm, high DR
735037	√	√	—	—	√	√	√	2 ports, SM1310/1550/1650 nm
735040	√ *2	—	√ *2	—	√	—	√	2 ports, MM850/1300 nm, SM1310/1550 nm

*1: The large capacity battery cannot be used in conjunction with the built-in printer/LAN function.
*2: MMF is not supported.
√ : Available.

	Suffix Codes	Description
Optical Connector	-SCC	SC type connector
	-FCC	FC type connector
	-NON	No universal adapter
	-USC	Universal adapter (SC)
	-UFC	Universal adapter (FC)
	-ASC	Angled-PC connector (SC) *1
Language	-HE	English
	-HC	Chinese/English
	-HK	Korean/English
	-HR	Russian/English
Power Cord	-D	UL/CSA standard
	-F	VDE standard
	-R	AS standard
	-Q	BS/Singapore standard
	-H	GB standard, Complied with CCC
	-P	Korean standard
Options	/PM	Optical power monitor
	/SLS	Stabilized light source
	/LS	Optical fiber identification light source
	/VLS	Visible light source
	/PL	Built-in printer, LAN
	/DF	Dummy fiber (SMF)
	/SB	Shoulder belt

*1: An angled-PC connector cannot be used in the MM port of the 735040. -USC needs to be attached.

Example: 735033-USC-HE-D/PM/SLS
AQ7275 OTDR 1310/1550nm, high dynamic range, with SC universal adapter, English version, with a UL/CSA standard power cord, with optical power monitor function and with stabilized light source function.

Standard Accessories

Power cord, AC adapter, battery pack, hand belt, user's manual (CD-ROM), operation guide

Visible Light Source (/VLS option)

Optical connector	Port is not shared with the OTDR
Center wavelength	650 nm ± 20 nm
Light output level	Peak value -3 dBm or more
Modulation frequency	2 Hz
Laser safety standard	Class 3R

*Unavailable for the 735037 and 735040

Power Monitor Function (/PM option)

Optical connector	Shared with the OTDR (at the same port)
Measurement range*1	-50 to -5 dBm
Measurement accuracy*2	± 0.5 dB

*1 CW light, wavelength 1310 nm, absolute maximum input level 0 dBm (1 mW)
*2 CW light, wavelength 1310 nm, -10 dBm for input, 23°C±2°C

Dummy Fiber (/DF option)

Optical fiber	SM (ITU-T G.652)
Optical fiber length	Approx. 100 m

* Dynamic range declines by 0.5 dB as a result of the addition of the fiber option.
* Unavailable for the 735040

Accessories (Sold Separately)

Name	Model	Specifications
Soft carrying case	739860	
Battery pack	739880	
Universal adapter (SC)	SU2005A-SCC	SC type
Universal adapter (FC)	SU2005A-FCC	FC type
Printer roll paper	A9010ZP	80 mm x 25 m
Shoulder belt	B8070CY	
AC adapter	739870-D	UL/CSA standard
	739870-F	VDE standard
	739870-R	AS standard
	739870-Q	BS/Singapore standard
	739870-H	GB standard, Complied with CCC
	739870-P	Korean standard
External large capacity battery	—	The large capacity battery cannot be used in conjunction with the built-in printer/LAN function

Application Software

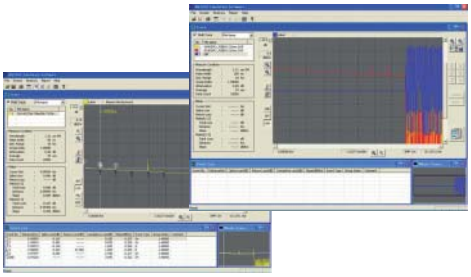
Model	Suffix Codes	Specifications
735070		AQ7932 Emulation Software (Ver3.0 or later)
	-EN	English

Optical Time Domain Reflectometer AQ7275 OTDR

AQ7932 OTDR Emulation Software (Sold Separately)

Measured Data Analysis and Report Creation Tool

AQ7932 is application software that performs analysis of trace data measured by AQ7270 and AQ7275 OTDR on a PC, and creates reports. The report creation wizard function makes this task simple. AQ7270 and AQ7275 OTDR data can be easily loaded onto a PC using USB memory or storage function.

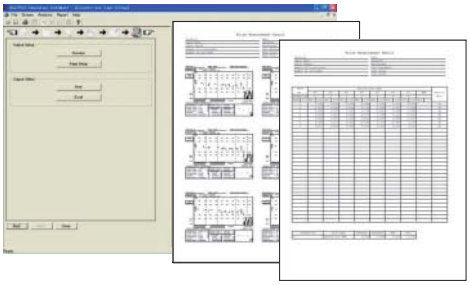


Trace Analysis

You can edit event search conditions, approximate curve line settings, and other analysis conditions, and repeat the analysis. Operation is also easy. Simply click the function icon.

Variety of Analysis Functions

Display up to eight traces on screen, and perform a variety of analyses including multi-trace analysis and differential trace analysis for comparing recent waveforms with old ones, and use the 2 way trace analysis function for analyzing average values of data measured from both directions in the optical fiber.



Creating Reports

You can compile trace and measured values from trace files and creates a report. Reports can also be created in Excel and CSV formats. Reports can be created easily by just following the step-by-step instructions in the report wizard.

Specifications

Functionality

File format: .SOR (Bellcore), .SOR (Telcordia [AQ7275, AQ7270, AQ7260]), .TRD (AQ7260), .TRB (AQ7250), .BMP (BMP), .CSV (Data CSV), .CSV (Event List CSV)
Report output format: Print output, CSV file, XLS file

Recommended Operating Environment (Software and Hardware)

OS: Microsoft Windows 2000, Microsoft Windows XP, Microsoft Windows Vista *
Excel: Microsoft Excel 2000 or later (when the XLS file output function is used)
PC: Clock speed: Environment in which the OS operates smoothly.
HD capacity: 20 MB or more space required at the time of installation
Memory capacity: 128 MB or more (256 MB or more recommended)
Display: Resolution of 1024×768 pixels or better
Disc drive: CD-ROM drive

(*) Microsoft Windows Vista is to be supported in Ver3.03 and later.

Caution

When you export this product out of Japan, permission from the Japanese government may be required in accordance with the regulations of the foreign exchange and foreign trade laws.
The information contained herein is subject to change without prior notice in order to improve performance and quality.

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