Agilent 53000 Series
Hardware Overview
Remote Fiber Test Unit

Meeting the Challenges of the Modern Telecommunications Age

Technological developments and global economic changes are impacting every aspect of our lives. As with other industries, the telecommunication companies cannot escape unchanged. This puts many new demands on telecommunication companies if they are to survive and grow.

A telecommunication company must ensure that its core business processes operate efficiently and take full advantage of the latest technology. The demand for more complex optical fiber networks and flexible IP-traffic will increase exponentially as the demand for network services grows.

Your customers increasingly demand services tailored to their needs.

The optical fiber network must be flexible enough to respond quickly to the changing business conditions and allow gradual improvements towards an overall solutions strategy.

How does your current network system measure up to the challenges ahead? With Agilent 53000 Series - the breakthrough in optical fiber network monitoring - you can:

- Use our new four layer architecture - Information access, Analysis tools, Information structuring, and Automation tools - to create a monitoring system that is tailored to your needs.
- Purchase single point solutions that are addressing specific problems, but they operate as an overall system.
- Integrate and monitor information from other network elements and management systems.
- Do all this from one single workbench. Therefore, the need for training will minimize.
- Reduce the time to repair fiber breaks by about 50%.
- Reduce your operating and maintenance costs.
- Reach a new stage of reliability - with fewer mechanical components and internal connectors, no hard disk, and no backbone.

To summarize the key advantage, you are about to experience a fast return of investment (ROI).

Therefore, Agilent 53000 Series with the Remote Fiber Test Unit (RFTU) as a central component allows you to meet the challenges of the new telecommunications age, to continually adjust your business activities to reflect the constant shifts in market focus.

The Components of the RFTU

The Agilent 53000 Series functionality based on open standards is now integrated in a one-height unit device that consists of:

Optical Time Domain Reflectometer (OTDR)
You use an OTDR to determine the state of an optical fiber. To carry out test measurements, the OTDR is equipped with one or two built-in laser sources.
To determine the state of an optical fiber, the OTDR continuously launches an optical pulse into the fiber to measure the energy level of the backscatter that the fiber creates.

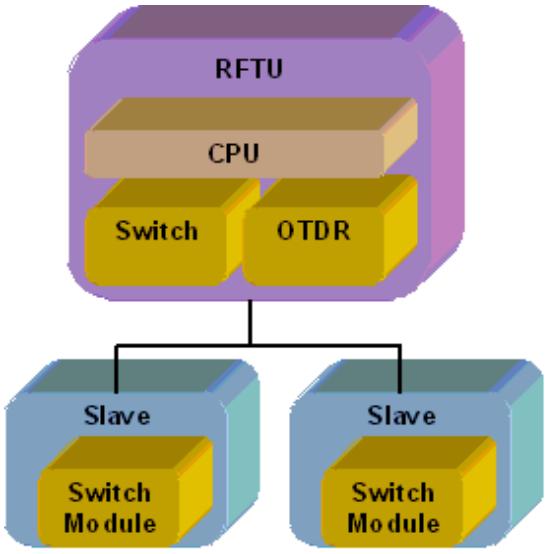
Optical Switch Module
An optical switch module is a software-controlled optical multiplexer that you must use if you want to monitor more than one optical fiber. An optical switch module has one input channel for the optical pulses that are generated by the optical time domain reflectometer (OTDR), and several output channels to which you attach the optical fibers you want to monitor.

Communication and Control Unit

The communication and control unit is the distribution and processing device of your RFTU. The software sends inquiries to the communication and control unit. The unit then transfers the inquiries through internal interfaces to the optical modules that are actually processing the measurement.

Figure 1 gives you an example of the embedded structure of the RFTU.

Figure 1 - Embedded RFTU Architecture



You can create an individual Remote Fiber Test Unit, by tailoring it to your needs. The following list will help you to select the components suitable for your network.

Agilent Product Number N5330*XX*[a]	
OTDR	Switch
OTDR 1550 Medium Range	No switch
OTDR 1550 High Range	4 port switch
OTDR 1625 Medium Range	8 port switch
OTDR 1550/1625 Medium Range	16 port switch
	32 port switch
	48 port switch

a. *XX* denotes the type of OTDR and Switch.

Technical Specifications of the OTDR Module

Optical Performance[1]

Agilent Product Number		**N5350A*X***[2]	**N5350B*X***	**N5350C*X***	**N5350D*X***	
Central Wavelength [nm] Tolerance		1550 ± 25	1550 ± 25	1625 ± 15	1550 ± 25	1625 ± 15
Attenuation Deadzone [3]		12 m	12 m	14 m	12 m	14 m
Event Deadzone[4]		3 m				
Fiber Type		Single mode				
		Dynamic Range [dB][5]				
Pulse width	10 ns	17	22	18	22	18
	100 ns	22	27	24	27	24
	1 μs	29	34	30	34	30
	10 μs	37	41	37	41	37
	20 μs	39	43	40	43	40

Loss/ Reflectance Accuracy

Offset Error	**Scale Error**	**Sampling Error**
± 1 m	± 10^{-4} * distance	± 0.5 sampling spacing

Horizontal Parameters	
Start	0 to 400 km
Span	0.1 to 400 km
Readout Resolution	0.1 m
Min. Sample Spacing	0.08 m
Refractive Index	1.00000 to 2.00000
Length Units	km, feet, miles

Vertical Parameters	
Vertical Scale	0.1 to 10.0 dB/div.
Readout Resolution	0.001 dB
Backscatter Coefficient	14 to 70 dB at 1μs
Reflectance Range	-14 to -70 dB

Scan Trace Events	
Max. Number	100
Types	Reflective and non-reflective events
Reflective Event Threshold	-14.0 to -65.0 dB and 0.00 dB (disabled) Selectable in 0.1 dB steps
Non-Reflective Event Threshold	0.0 to 5.0 dB Selectable in 0.01 dB steps
Fiber Break Threshold	0.1 to 10 dB and 0.00 (disabled) Selectable in 0.1 dB steps

Technical Specifications of the Optical Switch Module

Product Number	Number of Channels
N5350*X*B[7]	4 SC
N5350*X*C	8 SC
N5350*X*A	16 SC
N5350*XE*	32 SC
N5350*X*F	48 SC

Optical Specifications	
Insertion Loss	2 dB max., typically 1 dB at 25 °C
Return Loss	40 dB (typical)
Life Time	10^7 switch cycles, adjacent port to port
Isolation	> -80 dB
Optical Connector Types	Output SC

[1] Guaranteed specifications measured at 22°C ± 3°C.

[2] *X* denotes the type of optical switch module.

[3] Typical specification @ Reflectance< -50 dB at a pulse width of 30 ns, span $\leq$ 4 km.
Guaranteed specification @ Reflectance $\leq$ -35 dB at a pulsewidth of 30 ns, and with a span of $\leq$ 4 km.
Resolution:
25m @ 1550 nm
28m @ 1625 nm

[4] Reflectance $\leq$ -35 dB at 10 ns pulse width, and with span $\leq$ 4 m at 8 cm sampling spacing.

[5] Measured with a standard single-mode fiber at SNR = 1 noise level and with 3 minutes averaging time.

[6] Distance accuracy: offset error + scale error * distance + sampling error.

[7] *X* denotes the type of OTDR.

System Specifications

General Parameters	
Operating Temperature	0°C to +55°C
Storage Temperature	-40°C to +70°C
Humidity	<= 95% RH 0 - 40°C
Input Voltage	-48 VDC

How to Calculate the Dynamic Range of the RFTU

To calculate the dynamic range of the RFTU, subtract the insertion loss of your switch from the dynamic range of the OTDR in your RFTU. You need a reference environment to test all other optical parameters.

Safety Information

All laser sources specified by this data sheet are classified as class 1M or class 2 according to IEC 60825-1 (2001)

All laser sources comply with FDA 21 CFR 1040.10 except for deviations pursuant to Laser notice No. 50, dated 2001-July-26.

The class 1M laser sources bear the laser label.

You must return malfunctioning laser modules to an Agilent Technologies Service Center for repair and calibration.

Agilent Technologies Test and Measurement Support, Services, and Assistance

Agilent Technologies aims to maximize the value you receive. We strive to ensure that you get the test and measurement capabilities you paid for and obtain the support you need. Our extensive support resources and services can help you to choose the right Agilent product for your application and apply them successfully. Every instrument and system we sell has a global warranty for at least five years beyond the production life of the product. Two concepts underlie Agilent's overall support policy: "Our Promise" and "Your Advantage".

Our Promise

Our Promise means your Agilent test and measurement equipment will meet its advertised

performance and functionality. When you are choosing new equipment, we will help you with product information, including realistic performance specifications and practical recommendations from experienced test engineer. When you use Agilent equipment, we can verify that it works properly, help with product operation, and provide basic measurement assistance for the use of specified capabilities, at no extra cost upon request. Many self-help tools are available.

Your Advantage
Your Advantage means that Agilent offers a wide range of additional expert test and measurement services, which you can purchase according to your unique technical and business need. Solve problems efficiently and gain a competitive edge by contracting with use for calibration, extra-cost upgrades, out-of-warranty repairs, and on-site training and education, as well as design, system integration, project management and other professional engineering services. Experienced Agilent engineers and technicians worldwide can help you maximize your productivity, optimize the return of investment of your Agilent instruments and settings, and obtain the dependable measurement accuracy for the life of those products.
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Product specifications and descriptions in this document subject to change without notice.

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