

# Nova Fiber – RTU-2

## OTDR-BASED REMOTE TEST UNIT



Centrally and remotely managed OTDR instrument for auditing, troubleshooting and continuously monitoring FTTx optical fibers.

SPEC SHEET

### KEY FEATURES AND BENEFITS

Smaller, denser and more scalable: OTDR and 1024 ports fit in 3U height

Recognized EXFO quality: FTBx-735C high-end OTDR module

Optional 1x4 FTBx-9160 optical switch module for dual-stage scaling of test ports

MPO connectors: Less connectors, less issues.  
16x less connections than other vendors

Up to 4 switches per RTU (1024 ports)

### APPLICATIONS

Fixed OTDR function for lifecycle testing of point-to-point (P2P) and point-to-multipoint (P2MP) fiber network topologies

End-to-end continuity and loss verification in PONs

Massive FTTx network auditing

Automated troubleshooting of fiber-related issues

Preventive tracking of degradations

### RELATED PRODUCTS



**MEMS Optical switches modules**  
FTBx-9160



**External MEMS optical switch**  
RTUe-9120



**OTDR modules**  
FTBx-735C



**OTDR/traffic coupler**  
Test access module kit

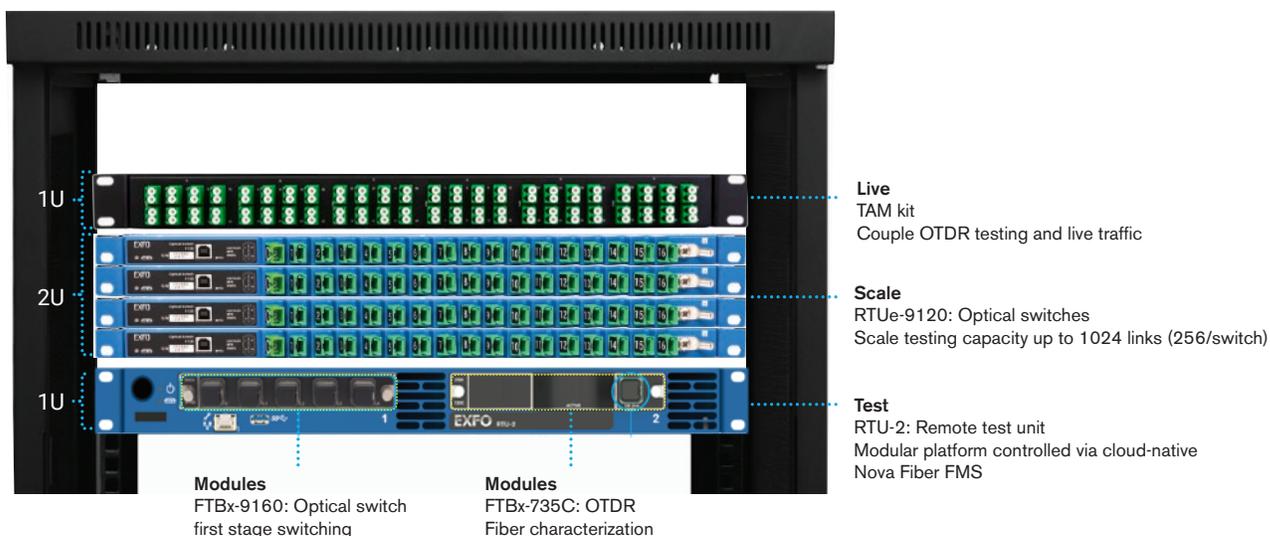
## REMOTE TEST UNIT COMPONENTS

### Overview

The RTU-2 is a test unit that is remotely controlled via our Nova Fiber's central fiber monitoring system (FMS). This is the test solution's central manager and is referred to as Nova Fiber FMS for short. As to the RTU-2, it is a modular unit, hence allowing for flexibility and scalability. OTDR modules and optical switches enable centralized fiber characterization through patented OTDR/iOLM technology. Optical link management can also be scaled up to 1024 ports with external optical switches.

In-service testing and monitoring of P2P and PONs is possible thanks to in-service OTDR port at 1650 nm coupled with a traffic multiplexer (test access module coupler).

Finally, measure PON end-to-end fiber attenuation at 1650 nm with a traceable test method using a high-reflectance demarcation filter.



## MAIN/CONTROLLER UNIT AND MODULES

### RTU-2

The RTU-2 is a 1U modular rackmount platform for remote fiber testing.



When paired with the FTBx-735C OTDR module and the FTBx-9160 optical switch, the RTU-2 can handle in-service testing and monitoring of P2P and PONs.



## OTDR MODULE

### FTBx-735C-SM7R

The FTBx-735C high-resolution OTDR is designed for metro/PON networks testing and splitter characterization in PON FTTx applications.

Its capabilities are diverse:

- › Reflectometry: characterizes, evaluates or audits fiber quality
- › Tone generation identifies the fiber, whether it is in-service or not
- › HRD testing certifies the link end to end for PON architectures



## KEY OTDR-iOLM CAPABILITIES

### End-to-end loss (EEL) measurement

A practical function of the iOLM is its ability to measure end-to-end loss or optical attenuation between the OTDR's location, in this case the central office, and any connector port downstream—even when a port is beyond a series of splitters. By simply splicing or inserting a **high-reflectance demarcation (HRD)** filter and using a mobile smart app, link characterization can be done within 10 seconds.

Key information and values:

- › Confirmation of proper upstream connectivity
- › Loss and expected loss budget (dB) at the measured point of the network
- › Optical fiber length-correlation with network documentation

In Figure 2, the attenuation is measured from the node to any connection terminal using the RTU-2 OTDR and HRD filter. This is performed by a field technician who is testing on one or every port of a second-stage splitter during network installation or when certifying a contractor's work.

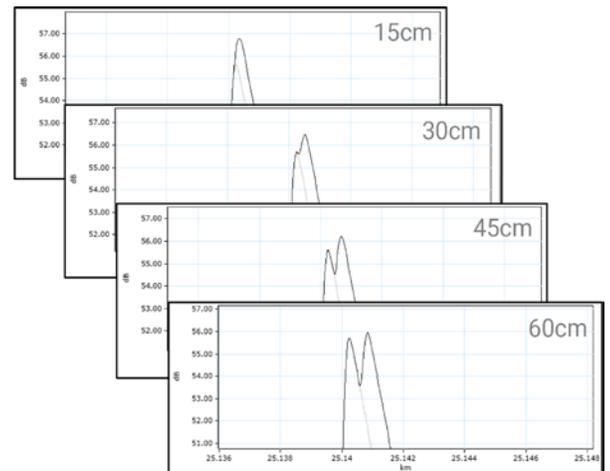


Figure 1. High-resolution demarcation of PON termination ports capability using HRDs down to 60 cm.

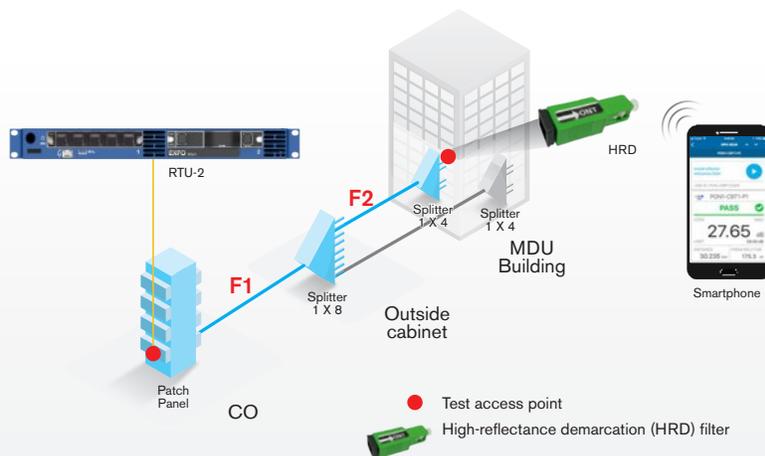


Figure 2. Link certification in a PON architecture with end-to-end connectivity.

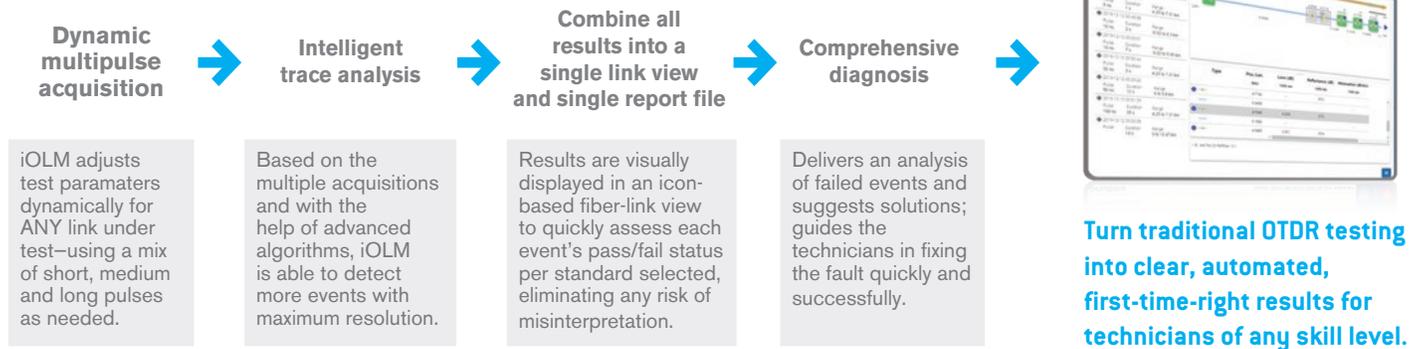
## MERGING OTDR AND iOLM CAPABILITIES

### Link-Aware™ technology: simplify OTDR tests

Simplify and optimize the test run. In one click, the test unit automatically performs link recognition, sets the optimal parameters and launches multiple acquisitions. It then consolidates the results for every link event, section and splitter (if any). The iOLM software removes front-end events, like optical switches, that are part of the test setup to only keep and report the relevant part of the test.

The unit provides accurate data such as position, loss and reflectance on all elements and displays an easy-to-read result for any NOC or field technicians. The smart iOLM software yields N single OTDR traces that can be verified and compared with their respective baseline, allowing second and third-tier support to analyze further into these acquisitions.

### HOW DOES IT WORK?



### Three ways to benefit from the OTDR-iOLM

- 1** No calibration needed for end-to-end loss measurements
- 2** Accuracy of single-ended end to end loss similar to light source–power meter technique
- 3** Long-term stability of the end-to-end (to HRDs) measurement in monitoring

### Tone generator

It can be daunting to pinpoint a specific live fiber, untangle fiber mislabeling or deal with poor record-keeping.

The FTBx-735C can generate a tone signal to work in conjunction with the live fiber detector in the field. The tone signal is triggered via a smartphone-based application. It communicates with the Nova Fiber FMS server to request the tone generated signal to enable the fiber identification process for a time period that can be set.

This avoids costly downtime/network outages and minimizes the need to access the network, thus avoiding errors.

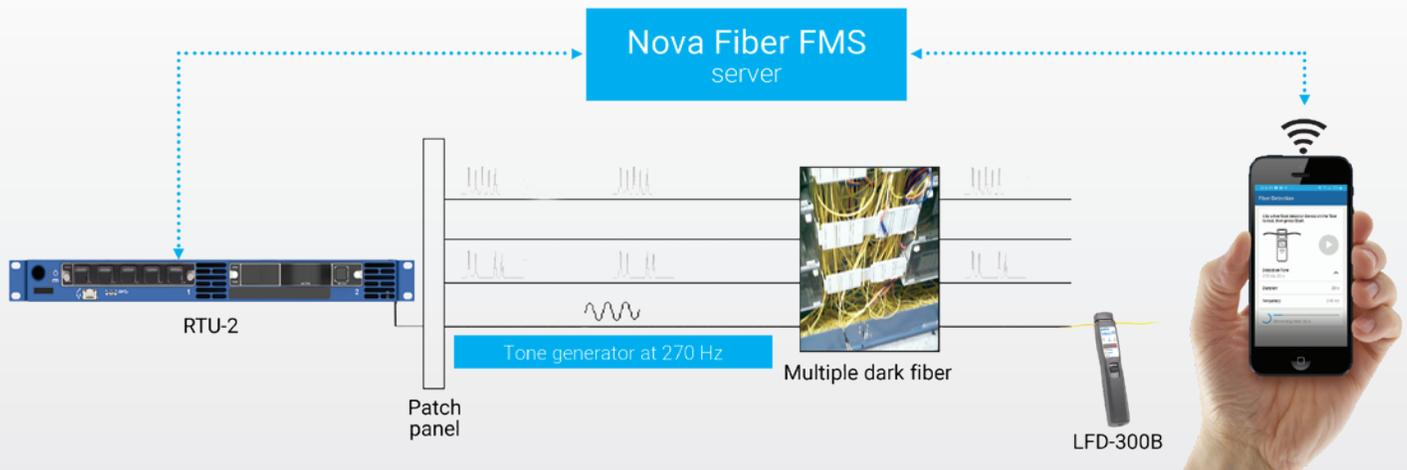


Figure 3. Source/tone mode for fibre identification.

## OPTICAL SWITCHES: SCALING REMOTE TESTING CAPABILITIES

### Module: 1xN optical switch FTBx-9160

With its MEMS-based design, the FTBx-9160 delivers durable performance in a compact package. Fast switching time and a 1-billion-cycle lifetime expectancy make it ideal for the demanding needs of production testing and monitoring applications. The FTBx-9160 MEMS optical switch is available for singlemode fibers with a choice of 1 x 4 and 1 x 12 modules (note: for RTU-2 in Nova Fiber context).

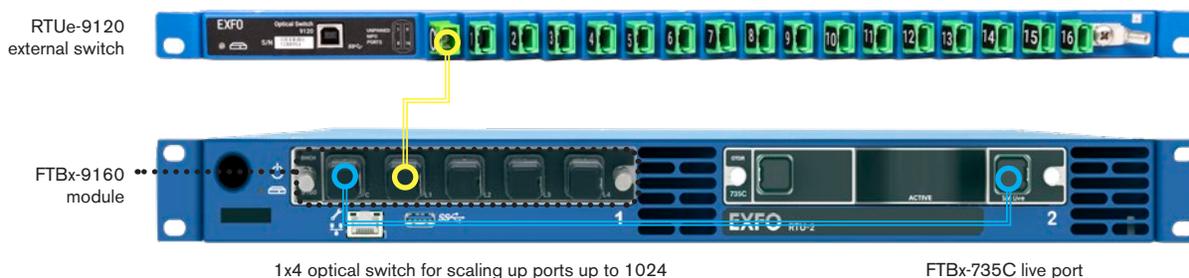


As a first stage switching of the RTUe-9120 external switch, the setup can provide 1024 different optical paths to test.

## OPTICAL SWITCHES: SCALING REMOTE TESTING CAPABILITIES

### Expansion unit: External 1xN optical switch RTUe-9120

Connect the OTDR module live port directly to the common port of RTUe-9120 external optical switch unit or add up to four units by first connecting the OTDR port to the common port of the 1x4 optical switch module, allowing up to 1024 ports.



## TEST ACCESS MODULE (TAM) KITS: TESTING LIVE NETWORKS

### TAM couples OTDR to line

TAM is the optical coupling element, which is used in remote testing and monitoring applications to combine the OTDR signal with traffic.

The device used to perform this function is typically a coupler. Some are broadband-type, others are WDM-type or wavelength-division multiplexers, which are spectrally sensitive combiners.



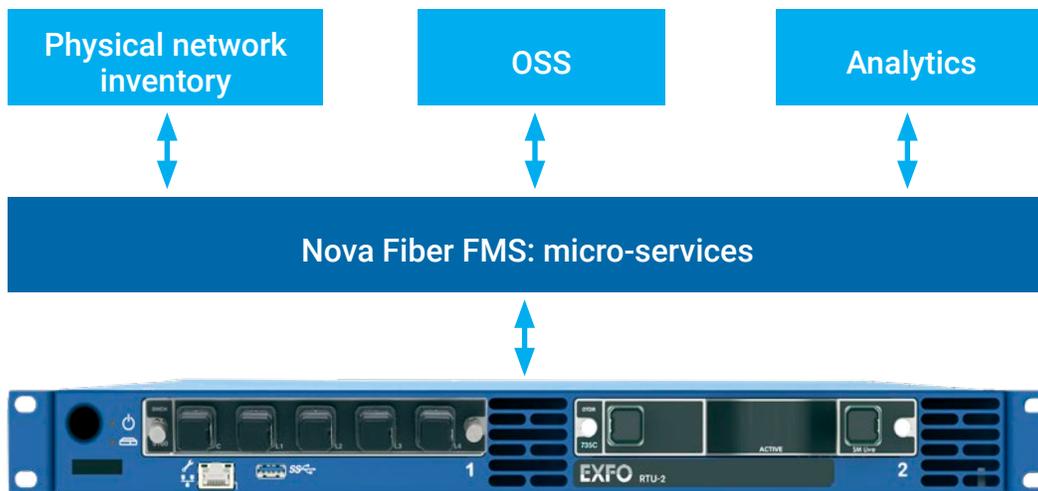
## HOW IS THE RTU-2 INTEGRATED?

- › RTU-2 platform is handled by Nova Fiber FMS, which is a scalable system that can control and manage up to 1000 units with horizontal scaling capabilities
- › RTU-2 platform is a true client requiring minimal outbound firewall to be opened for messaging-based communication using encrypted protocol
- › Integration by third-parties can be done from Nova Fiber FMS micro-services APIs offering the exact functional capability than Nova Fiber web and mobile clients (UIs)

## ILLUSTRATION OF RTU-2 INTEGRATION

### Key benefits

- › Everything from every measurement is captured to feed analytics platform
- › Support the usual OSS interfaces, alarms via SNMP and inventory connection via RESTful APIs
- › Qualified for 1000+ probes under a single “EMS” instance
- › API-ready backend unlocking system capabilities and how it can integrate



## SPECIFICATIONS



- |                              |                            |                                 |                           |
|------------------------------|----------------------------|---------------------------------|---------------------------|
| 1 Power button               | 5 Ethernet management port | 9 Removable rack mount brackets | 13 Ground lug             |
| 2 Power LED                  | 6 USB 3.0 port             | 10 -48V input circuit fuses     | 14 Dry contact relays (3) |
| 3 System information display | 7 Module-Slot 1            | 11 Main power switch            | 15 Ethernet ports         |
| 4 System LED                 | 8 Module-Slot 2            | 12 -48V dual feed input         | 16 USB 3.0 (5)            |

### RTU-2 PLATFORM SPECIFICATIONS

Mainframe	Quad-core Intel i7 processor / 8 GB / Windows 10 IoT OS
Front interfaces	1 x RJ45 10/100/1000 Mbit/s (management port) 1 x USB 3.0
Rear interfaces	2 x RJ45 10/100/1000 Mbit/s (management + Ethernet ports) 5 x USB 3.0 Relay contact: 3 (power, system and user configurable)
Storage	128 GB SSD internal memory
Power supply	-48VDC DC, 10A (ordering option: external AC-DC adapter for AC operation)
Power consumption	Idle state 25 W OTDR measuring 40 W (typical)
Dimensions (H x W x D) (includes brackets)	44 mm (1 U) x 482 mm x 262 mm (1 3/4 in x 19 in x 10 5/16 in)
Weight (includes brackets)	5.1 kg (11.2 lb)
Temperature	Operating -5 °C to 50 °C (23 °F to 122 °F) Storage -40 °C to 70 °C (-40 °F to 158 °F)

All specifications valid at 23 °C ± 2 °C.

**OTDR FTBx-735C-SM7R**

Wavelength (nm)	1650
Internal filter for in-service testing	Yes
Dynamic range at 20 $\mu$ s (dB) <sup>a</sup>	41
PON dead zone (m) <sup>b</sup>	30
Sampling resolution - minimum value (m)	0.04
Sampling points	Up to 256 000
HRD measurement time (s) <sup>c</sup>	4
HRD measurement loss range (dB)	18 to 35
HRD minimum distance separation (m) <sup>d</sup>	0.6
First splitter to HRD maximum distance (km)	8
Source mode tone frequencies (kHz)	0.27, 0.33, 1, 2

**FTBx-9160 MEMS OPTICAL SWITCH**

Number of output ports	4
Operation wavelength range (nm)	1290-1650
Insertion loss at 1530 nm - 1650 nm (dB) <sup>e</sup>	0.7
Lifetime in cycles	>1 billion (10 <sup>9</sup> )

**LASER SAFETY**

a. Typical dynamic range with three-minute averaging at SNR=1.

b. Non-reflective FUT, non-reflective splitter, 13-dB loss, 50-ns pulse, typical value.

c. Excluding networking latency - for a PON F2/distribution range of 4 km with nominal loss of 20 dB.

d. Typical, for similar level of attenuation between both.

e. Typical, including loss of one connector.

## ACCESSORIES

GP-2256	FTBx module slot blank cover
GP-3122	External AC-DC 48 V power supply with power cord
GP-3123	19-inch rackmount brackets (kit of 2)
GP-2016	RJ45 LAN cable (10 feet/3 m)
GP-3170	19-inch to ETSI rack extenders
GP-3162	USB 3.0 client cable, 6 feet (2 m), right-angle connector

## ORDERING INFORMATION

**RTU-2-XX**

**Power input** ■

DC = Internal DC 48V power supply

AC = External 48V DC dual input feed with power cord

Example: RTU-2-DC

**FTBx-735C-SM7R-EA-EUI-91**

**Model** ■

FTBx-735C-SM7R-EA-EUI-91

**FTBx-9160-01-04-B-88**

**Model** ■

FTBx-9160-01-04-B-88

Including a 1.5 m SC-APC/SC-APC FLEX-boot type jumper cable is included to connect OTDR module live port to optical switch module common port.

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