



Key Features

LOW NOISE DESIGN to allow great coverage when used to remote receiving antennas

HIGH INTERFERENCE IMMUNITY thanks to high IIP3 design and a control/compensation of gain

EASY TO USE thanks to integrated RF/optical power meter and optical power compensation

REAL-TIME CLOCK with a backed-up static RAM to monitor and record internal RF levels and service data (i.e. laser life time)

TX UNIT (remote RF reception, i.e. diversity antennas):

MFL units can incorporate a digitally tuned filter (25 MHz bandwidth, center frequency tunable over 404-788 MHz).

It can route RF through an external filter or to additional receiver (redundancy) to easily implement a failsafe configuration that can switch on a redundant receiver or transmitter if any fault is detected

It automatically monitors RF levels and intervenes to avoid fiber saturation

RX UNIT (RF transmission, i.e. single-frequency master/slave areas)

It can route an IFB high power signal to transmit locally and send low power IFB carrier over fiber to slave units

When it is working along with a MTK952MS in slave configuration, the fiber loss is automatically recovered and the units increase the gain so that the transmitter power equals the target level (measured with an SWR meter integrated into the MTK952MS)

REMOTE MONITOR/CONTROL thanks to a data link on Ethernet 10/100 Base Tx

RF INPUT/OUTPUT:

- 4 N connector female 50Ω with switchable 12V boosting power (only on *transmitter modules*)
- 2 BNC-F 50Ω each optical *transmitter module*, failsafe option or external RF filter
- 1 BNC-F 50Ω each optical *receiver module*, failsafe option

OPTICAL INPUT/OUTPUT: 5 connectors SC-APC type

DATA LINK: RJ45: 10/100 Base TX

POWER SUPPLY:

AC INPUT: 90V-264V~, 47-63 Hz, 2A fused, max 60 Watts

DC INPUT: 10-28Vdc (max 5A), [XLR-4M] VDC-pin 4 / GND-pin 1 / NC-pin 2 / NC-pin 3

Description

MFL provides wideband optical link for up to 4 RF channels combined in a single fiber thanks to CWDM technology.

It is designed to allow for a flexible and modular configuration thanks to a mainboard that can be fitted with up to 4 plug-in boards that can be any combination of two types:

- TX: Laser optical transmitter, (CDWM) plug-in board
- RX: Optical-receiver plug-in board

Example: MFL-TTTT is 4 laser transmitter unit that works with a MFL-RRRR with 4 channel receiver. Other configurations are also possible like MFL-RR / MFL-TT or a mixed like a MFL-RRTT with both receiver and transmitter channels.

* The images are purely for information. This represent one of the possible configurations

System Overview

The system is composed by a MFL-BASE (1U rack frame) and some optional/modular boards to build the desired configuration.

MFL-BASE can have up to 4 optical modules that can be either TX or RX (factory installed) to adapt the unit to several configurations.

To simplify the usage we give a name of the final configuration that easy identify the CWDM channels and a color code for the RF connectors (N type).

We use as default 4 laser wavelength although the CWDM standard can allow to use much more with a 20nm wavelength separation:

- Channel 51 short name for wavelength 1510 nm
- Channel 53 short name for wavelength 1530 nm
- Channel 55 short name for wavelength 1550 nm
- Channel 57 short name for wavelength 1570 nm

Wavelength and Color Coding:

Channel	Wavelength	Color Identifier
51	Wavelength 1510 nm laser, single mode	Blue
53	Wavelength 1530 nm laser, single mode	Green
55	Wavelength 1550 nm laser, single mode	Yellow
57	Wavelength 1570 nm laser, single mode	Orange

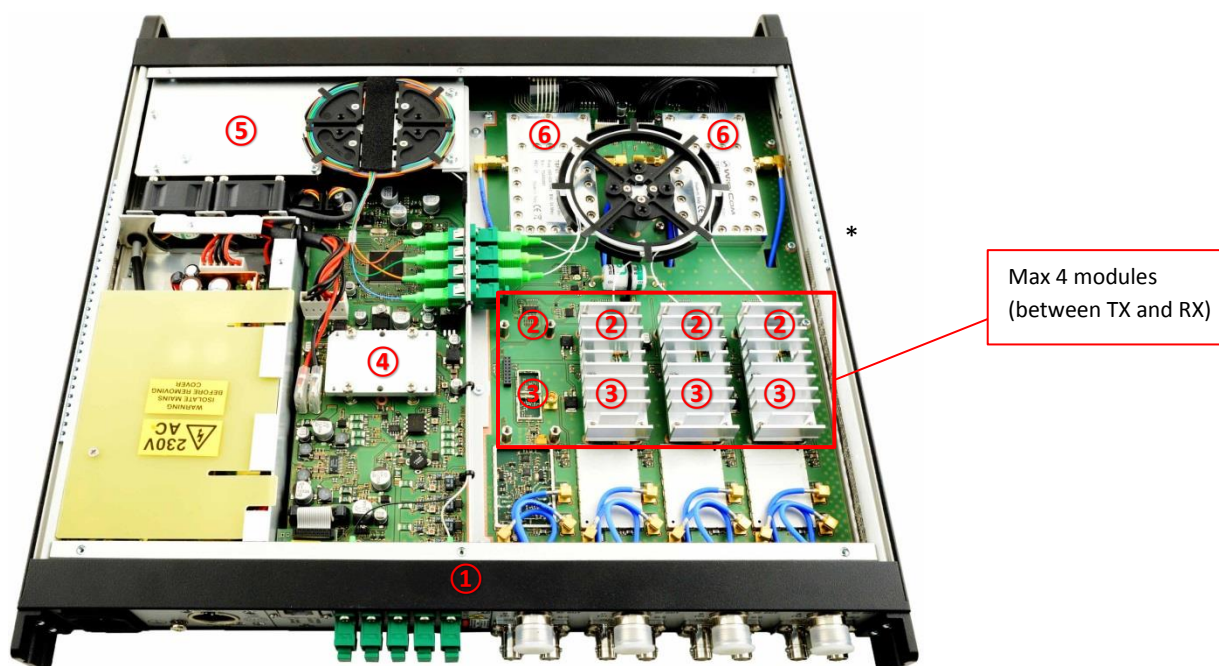
For example:

- MFL-TTRR has 2 Tx on ch.51/53 and 2 Rx on ch 55/57
- MFL-RRTT has 2 Rx on ch.51/53 & and 2 Tx on ch 55/57
- MFL-TT-- has 2 Tx on ch.51/53 and no module on ch 55/57
- MFL-RR-- has 2 Rx on ch.51/53 and no module on ch 55/57

NAME (i.e.)	Ch. 51	Ch. 53	Ch. 55	Ch. 57
MFL-TTRR	T	T	R	R
MFL-RRTT	R	R	T	T
MFL-TT--	T	T	-	-
MFL-RR--	R	R	-	-

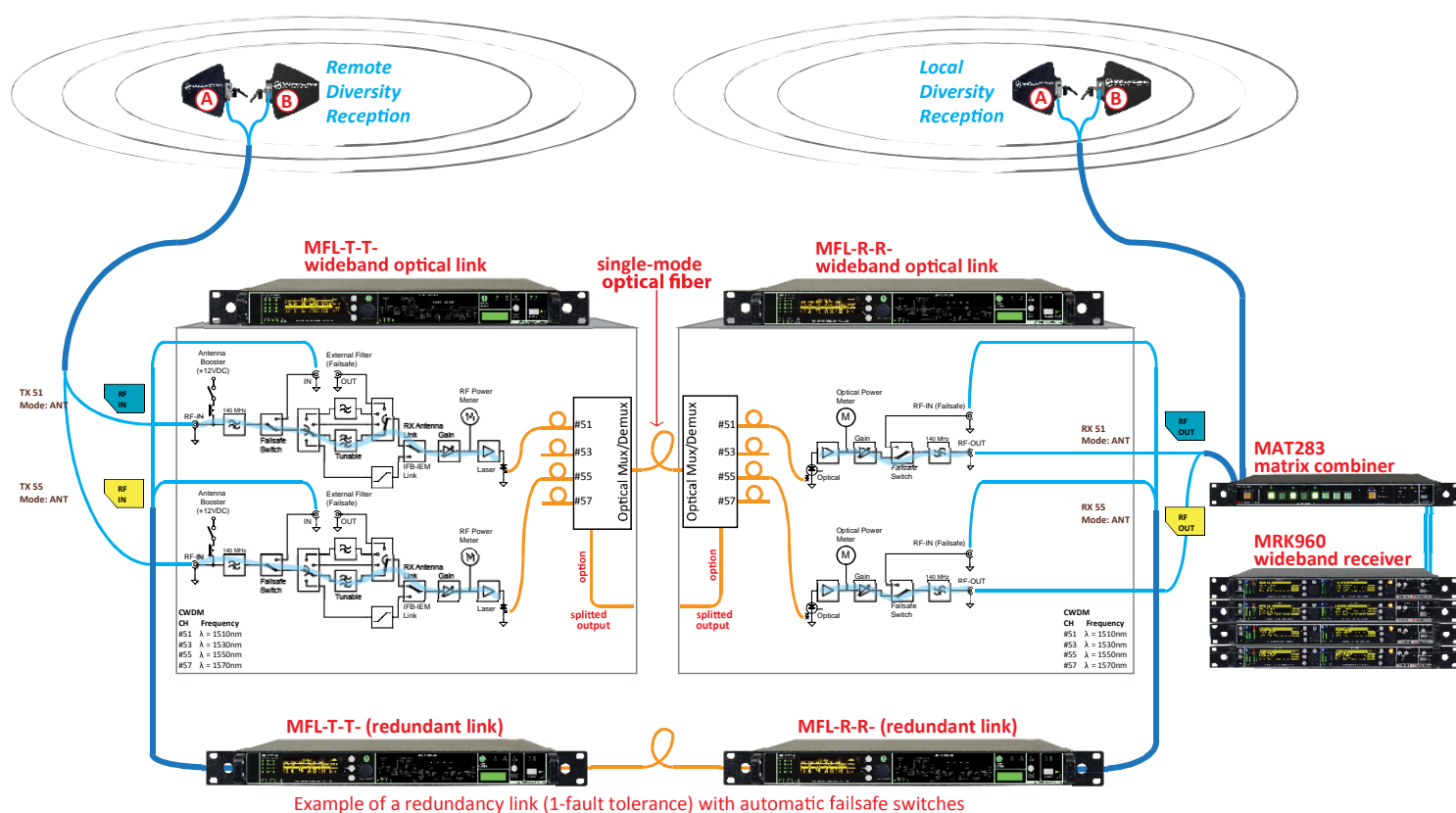
Following the main code and option that can build up a MFL system:

	#	Code	Description
	1	MFL-BASE	WIDEBAND RF OVER FIBER MAINBOARD 19' 1U Rack units , aluminium frame Oled display - Ethernet - failsafe switch - realtime clock AC Powered 230V
	2	MFL-RX	Optical RX module for MFL (CWDM)
	3	MFL-TX	Laser TX module for MFL (CWDM)
	4	MFL-DC	Insulated DC power with battery monitor (10÷28Vdc)
	5	MFL-OMX	Module Mux/Demux for 1:4 CWDM
	6	MFL-BF1	RF filter 25MHz tuning range over 404÷788 MHz
Optional			



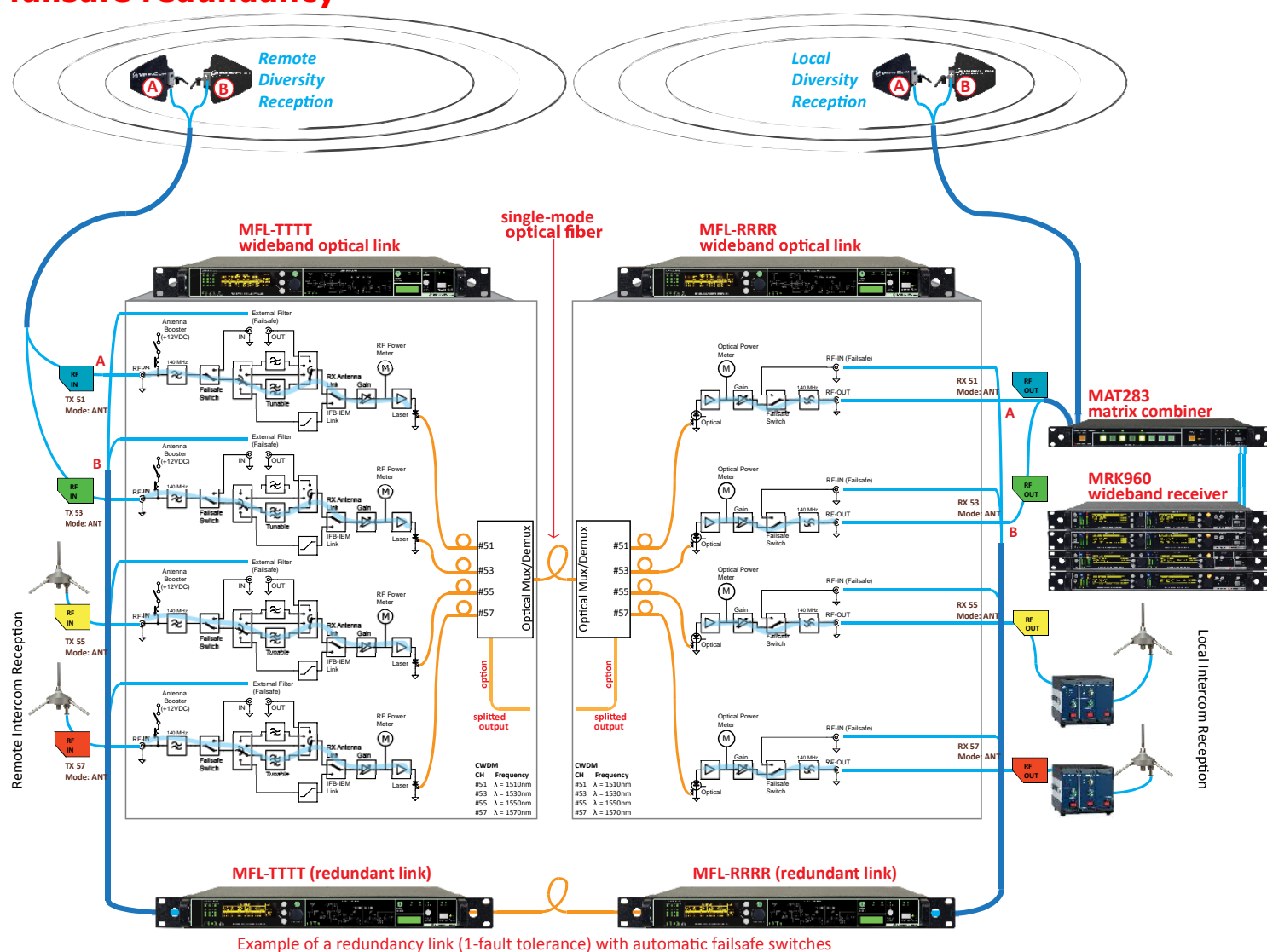
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Configuration example: Remote Diversity with double failsafe redundancy



Above an example of remote diversity reception with MFL-T-T- in the remote site and MFL-R-R- in local site (i.e. OB van or main studio facility). RF signal on remote site are received by a couple of antennas (MFL can provide booster power if needed). The signal is filtered using the internal wide-band tunable filter (25 MHz over 400-800 switching-bandwidth), optimized with a gain control and modulated using the LASERS. Thanks to CWDM (Coarse Wavelength Division Multiplexing) technology all optical signals are combined in a single fiber. In this way we can optimize the fiber but also it makes very easy to have a system totally redundant. Failsafe switches (both in MFL-T-T- and MFL-R-R-) allow RF re-routing if a fault happens (i.e. no power supply, no RF power or no optical power). All RF and optical signals are then re-routed on the redundant links automatically (in this case a redundant fiber and 2 redundant MFLs)!

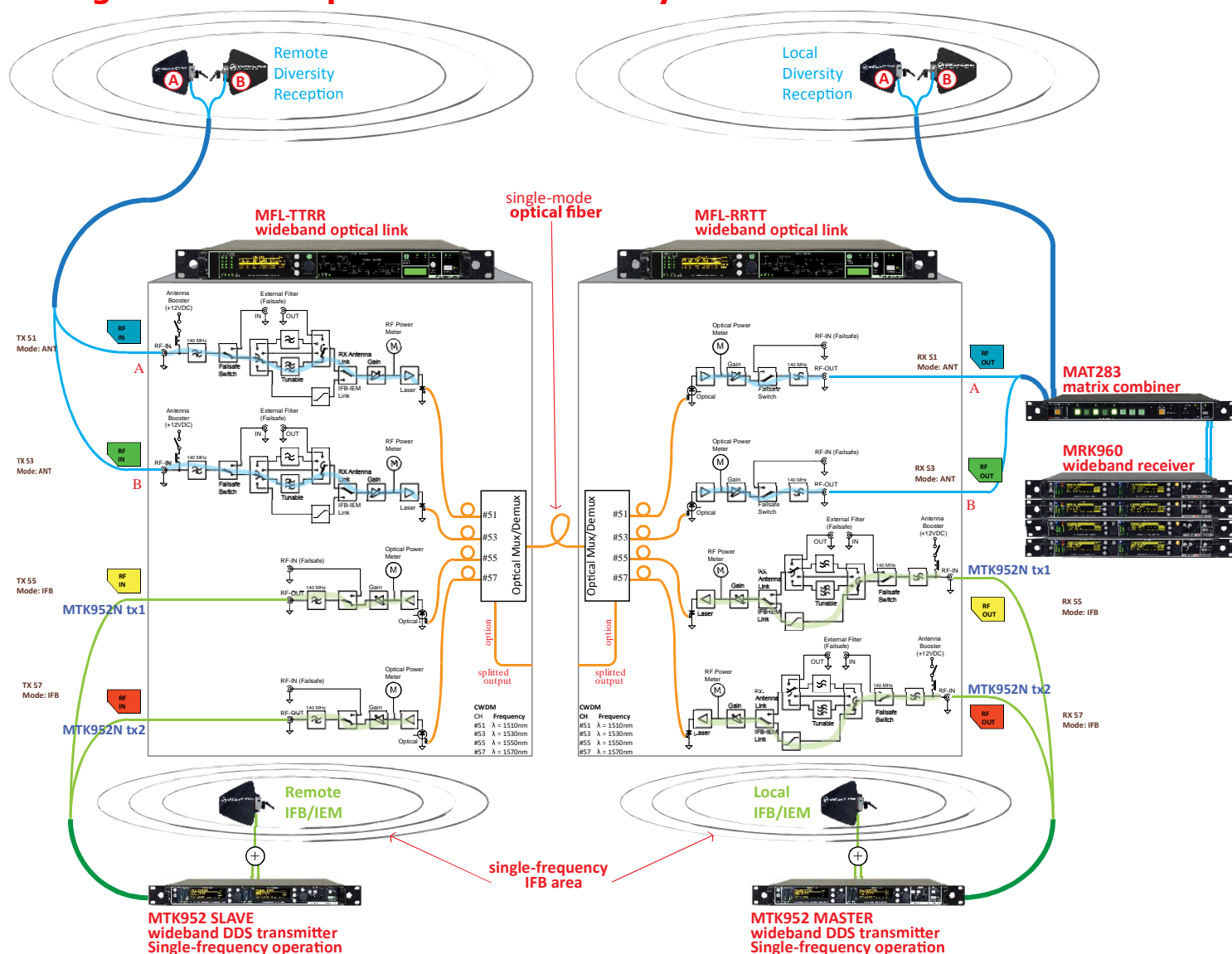
Configuration example: Remote Diversity and Intercom Area with double failsafe redundancy



Above an example of remote diversity reception using all of 4 plug-in modules available: MFL-TTTT in the remote site and MFL-RRRR in local site (i.e. OB van or main studio facility).

In this example a remote reception for Microphones and Intercoms: one single mode fiber carries 4 RF channels and another one provides 1-fault tolerance on all active parts if needed!

Configuration example: Remote Diversity and IFB Area



Above an example of remote diversity reception using all of 4 plug-in modules available:

- MFL-RRTT in the remote site and MFL-TTRR in local site (i.e. OB van or main studio facility).

The remote antenna reception mode is similar to the one already described before. Again the tunable filter and variable gain allow a complete power control, in this way fiber always works at best condition without any risk of saturation!

All RF and optical power can be remotely monitored through Ethernet but also can be recorded with the real - time clock for later check!

Using MAT283 matrix combiner the remote and the local area can be integrate in a very safe way: areas which are not needed or noisy can be disabled in real time!

Simply setting up the MFL mode from "ANT" (antenna) to "IFB", it commutes on an internal RF path designed to best modulate a reference IFB signals. On local site a MTK952MS in master configuration generates an IFB signal and a reference out that feeds the optical transmitter (in mode "IFB").

On the remote site, the reference signal is received and amplified through a MTK952MS in slave configuration: This way we can create a single-frequency IFB area!

The system is able to compensate optical and RF power:

- MFL monitors (through an optical power meter) and compensates automatically the loss of fiber!
- MTK952 monitors the transmitted level (with and internal power/SWR meter) to reach desired output power!

TECHNICAL SPECIFICATION

Mainframe

RF to Optical modules (TX module)	: 1 to 4
Optical to RF modules (RX module)	: 1 to 4
Maximum number of modules	: 4
RF to fiber link working modes	: 2 ("ANT" mode or "IFB" mode)
Rear optical connectors	: 5 SC/APC, other type on request
Internal optical CWDM MUX/DEMUX	: 2 max (option MFL-OMX)

"ANT" mode RF TX characteristics

Typical application	: RX antenna remoting
Frequency ranges (front panel selectable)	: - 140 to 840 MHz (flat) - 470 to 840 MHz - 25MHz BW tunable band-pass filter (opt*) (center freq. in 1MHz step, from 404 to 788 MHz) - External user band-pass filter
External filter loss compensation	: 0 to 6 dB
TX Gain	: 0dB (user adjustable +6 to -20dB typ.)
Input IP3	: > 16 dBm typ.
Noise figure	: < 20dB typ. (*)
SFDR	: > 116 dB/Hz ^{2/3} typ.
RF input connector	: N female 50 Ω
Antenna booster supply	: 12Vdc 200mA max
External filter connectors	: BNC female 50 Ω

"ANT" mode RF RX characteristics

RX Gain	: 0dB (user adjustable ± 14dB typ.)
Failsafe option	: yes, standard option
RF output connector	: N female 50 Ω
Failsafe connector	: BNC female 50 Ω

"IFB" mode RF TX characteristics

Typical application	: "IFB" signal remoting (isofrequency systems)
Frequency range	: 140 to 840 MHz
RF input level	: - 6 to 10 dBm
RF input level for 0dBm out (@ 0dB gain)	: from -3dBm to + 10dBm
RF input connector	: N female 50 Ω

"IFB" mode RF RX characteristics

RX output level	: 0 dBm (user adjustable +6 to -20dB typ.)
Failsafe option	: yes, standard option
RF output connector	: N female 50 Ω
Failsafe connector	: BNC female 50 Ω

Optical TX module (option MFL-TX module OTB001)

Optical power	: 3dBm (6dBm optional)
Wavelengths	: 1511 or 1531 or 1551 or 1571 nm
Laser	: low noise, low distortion DFB laser

Optical RX module (option MFL-RX module ORB001)

Input optical power range	: -5 dBm to 5 dBm
Wavelengths	: 1490 to 1610 nm

Temperature

Operating temperature	: -20 to +55 °C
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Powering

AC mains	: 90 to 240 Vac, 60VA max
DC (option MFL-DC)	: 10-28Vdc 3A frame floating

Dimensions and weight

Dimensions	: 19"/1U, 430x44x370mm (Width x Height x Depth)
Weight	: 4,5 kg

(*) Measured with "Ant" mode and 0 dB gain (standard "factory preset") at 25 °C