FiberLink*plus* Redundant

1:1 redundant RF-over-Fiber System

The 1:1 redundant FiberLink*plus* RF-over-Fiber system is available in 1RU/19" and 4RU/19" rack mount design. It is designed for flexible, high quality, secure and stable optical transmission in a 1:1 redundant configuration for up to 16 RF signals (IF, L-Band, Extended L-Band and Broadband) over a distance of up to 20km.

The 1RU/19" chassis can be populated with 2 TX/RX modules for a single 1:1 redundant or 4 TX/RX modules for a dual x 1:1 redundant operation. The 4RU/19" chassis can hold up to 32 TX/RX modules for max. 16 x 1:1 redundant operation.

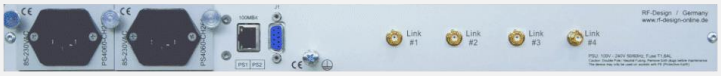
All available chassis are designed to allow mixed population with TX/RX modules within the same chassis, while the chassis are equipped with corresponding RF ports (50Ohm or 75Ohm), which are used either as input or output port as per the individual configuration.

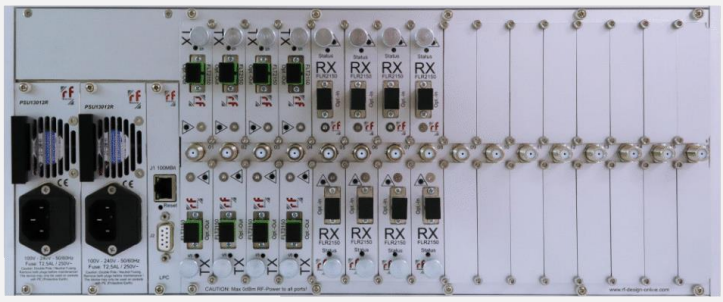
Once an active TX or RX module fails, the corresponding hot-standby TX or RX module becomes active thus ensuring an almost interference-free signal transmission at any time. Additionally, the system comes with beneficial features such as Laser/Link monitoring, status LED´s at any TX/RX module, variable gain control, RF power monitoring, switchable LNB-supply*, hot-swappable TX/RX modules and 1:1 redundant dual power supply.

Configuration and monitoring is possible via the front panel LC-Display or 7" touchscreen while remote configuration is available via its Ethernet-Interface (WebGUI, SNMP).

This professional 1:1 redundant RF-over-Fiber system stands for perfect RF performance, secure signal distribution and is perfectly suited for Teleports, Satellite Earth Stations, Broadcasting and Cable/IPTV operations.

depends on chassis type





FEATURES & BENEFITS

- Versatile 1:1 redundant RF-over-Fiber system
- Supporting IF 40 – 200MHz, L-Band 950 – 2150MHz, Extended L-Band 850 – 2450MHz and Broadband 3,2GHz
- 1RU/19" rack mount chassis for max. 4 TX/RX modules (max. 2 x 1:1 redundant operation)
- 4RU/19" rack mount chassis for max. 32 TX/RX modules (max. 16 x 1:1 redundant operation)
- Manual and automatic redundancy switching
- Hot-swappable TX/RX modules
- Support of mixed TX/RX population
- Variable gain control at each TX/RX module
- RF power monitoring at each TX/RX module
- Switchable LNB-supply
- Status LED´s for each TX/RX module
- Easy local & remote configuration & monitoring
- Laser, link, PSU & access status monitoring
- Excellent quality and superior RF performance
- 1:1 redundant dual power supply

TECHNICAL SPECIFICATIONS

19” Chassis 1RU and 4RU

Dimensions:	1RU/19” (260mm deep) or 4RU/19” (300mm deep)
Power Supply:	85 – 265V, 50/60Hz, 1:1 redundant (hot-swappable)
Power Consumption:	<20W (1RU/19”), <600W (4RU/19”)
Frequency Range:	FLCR1111*plus*, FLCR1211*plus* and FLCR41611*plus* 800 – 2500MHz FLCR1111B*plus*, FLCR1211B*plus* and FLCR41611B*plus* 40 – 3200MHz
Insertion Loss:	-4dB @ all paths
TX/RX Module Capacity:	2 slots for 1 x 1:1 redundant operation @ 1RU/19” chassis 4 slots for max. 2 x 1:1 redundant operation @ 1RU/19” chassis 32 slots for max. 16 x 1:1 redundant operation @ 4RU/19” chassis
RF Connectors @ Chassis:	50Ohm SMA(f) or 75Ohm F(f)
Local Configuration:	LC-Display/keypads or 7” colored touchscreen display
Remote Configuration:	Ethernet (WebGUI, SNMPv2c)
LNB Bypass:	FLCR1111*plus*, FLCR1211*plus* and FLCR41611*plus* = YES (not for broadband operation) FLCR1111B*plus*, FLCR1211B*plus* and FLCR41611B*plus* = NO
Operating Temperature:	0°C to 45°C
Storage Temperature:	-10°C to 70°C
Humidity:	90%, non-condensing
RoHS:	Compliant

Link Specifications (IF 200MHz, L-Band 950 – 2150MHz & Extended L-Band 850 – 2450MHz)

Modulation Type:	Direct
F/O Diff. EFF:	0,15 to 0.17 W/A
Dynamic Range:	-50dBm to 0dBm
Max. Link Gain:	24dB (±1,0dB)
Gain Stability:	< ±0,3dB
Group Delay Distortion:	<2ns
Nominal RF Input Level:	0dBm
Noise Figure:	< 24dB
SFDR:	-107dB Hz typ.
RF Output Power:	+13dBm max.
IMA3 @ -10dBm:	< -60dBc

Link Specifications Broadband (50 – 3200MHz)

Modulation Type:	Direct
F/O Diff. EFF:	0,15 to 0.17 W/A
Max. Link Gain:	26dB (±1,0dB)
Gain Stability:	< ±0,3dB
Group Delay Distortion:	<2ns
Nominal RF Input Level:	0dBm
Noise Figure:	< 24dB
SFDR:	-101dB Hz typ.
IMA3 @ -10dBm:	< -50dBc
Input Power Dyn. Range:	1310nm ±5nm
Output IP3:	+30dBm
Output IP1:	+5dBm

40MHz – 200MHz Application

TX Module IF 40 – 200MHz FLT251*plus*

Frequency Range:	40 – 200MHz (IF)
RF Input Connector:	Via Chassis RF I/O ports, Chassis Type FLCR41611B*plus*
Measurement Port:	Frontside -20dB
Optical Output Connector:	SC/APC
Fiber Type:	Single mode 9/125
RF Input Power Level:	+16dBm max. (damage level)
Frequency Response:	±0,5dB max.
Return Loss:	25dB typ.
OIP3:	+28dBm
SFDR:	< -105dB/Hz
Noise Figure:	12dB
Laser Type:	DFB with Isolator, 35dB Isolation
Laser Class:	1M
Operating Wavelength:	1310nm ±5nm
Optical Output Power:	+3dBm min.
Variable Gain Control:	-12dB to +12dB (1dB steps); -16 to +8dB in 1:1 Configuration; -13 to +11dB in N+M Configuration
RF Power Monitoring:	70dB dynamic range
Status LED´s:	OK, Fail, Stand-By
Operating Temperature:	0°C to 45°C
Storage Temperature:	-10°C to 70°C
Humidity:	90%, non-condensing
RoHS:	Compliant

RX Module IF 40 – 200MHz FLR251*plus*

Frequency Range:	40 – 200MHz (IF)
Optical Input Connector:	SC/APC
Measurement Port:	Frontside -20dB
Fiber Type:	Single mode 9/125
RF Output Connector:	Via Chassis RF I/O ports, Chassis Type FLCR41611B*plus*
Optical Input Power Level:	-10dBm (min. optical sensitivity)
Frequency Response:	±0,5dB max.
Return Loss:	20dB typ.
OIP3:	+28dBm
SFDR:	< -105dB/Hz
Noise Figure:	12dB
Operating Wavelength:	1310nm – 1560nm
RF Output Power:	+10dBm max.
Variable Gain Control:	0dB to +20dB (1dB steps) ; 0 to +16dB in 1:1 Configuration ; 0 to +19dB in N+M Configuration
RF Power Monitoring:	70dB dynamic range
Status LED´s:	OK, Fail, Stand-By
Operating Temperature:	0°C to 45°C
Storage Temperature:	-10°C to 70°C
Humidity:	90%, non-condensing
RoHS:	Compliant

L-Band and Extended L-Band Application

TX Module (L-Band 950 – 2150MHz & Extended L-Band 850 – 2450MHz), FLT2150, FLT2151, FLT2450, FLT2451

Frequency Range:	950 – 2150MHz (L-Band) & 850 – 2450MHz (extended L-Band)
RF Input Connector:	Via Chassis RF I/O ports
Measurement Port:	Frontside -20dB (only FLT2151 and FLT2451)
Optical Output Connector:	SC/APC
Fiber Type:	Single mode 9/125
RF Input Power Level:	+15dBm max. (damage level)
Frequency Response:	±0,5dB typ., ±1,0dB max.
Return Loss:	15dB typ.
OIP3:	+26dBm
SFDR:	< -102dB/Hz
Noise Figure:	12dB
Laser Type:	DFB with Isolator
Laser Class:	1M
Operating Wavelength:	1310nm ±5nm
Optical Output Power:	+3dBm min.
Variable Gain Control:	-12dB to +12dB (1dB steps); -16 to +8dB in 1:1 Configuration; -13 to +11dB in N+M Configuration
Switchable LNB-Supply:	13/15/18VDC, 22kHz tone, 450mA max (current monitoring)
RF Power Monitoring:	70dB dynamic range
Status LED´s:	OK, Fail, Stand-By
Operating Temperature:	0°C to 45°C
Storage Temperature:	-10°C to 70°C
Humidity:	90%, non-condensing
RoHS:	Compliant

RX Module (L-Band 950 – 2150MHz & Extended L-Band 850 – 2450MHz), FLR2150, FLR2151, FLR2450, FLR2451

Frequency Range:	950 – 2150MHz (L-Band) & 850 – 2450MHz (extended L-Band)
Optical Input Connector:	SC/APC
Measurement Port:	Frontside -20dB (only FLR2151 and FLR2451)
Fiber Type:	Single mode 9/125
RF Output Connector:	Via Chassis RF I/O ports, Chassis Type FLCR41611*plus* or FLCR41611B*plus*
Optical Input Power Level:	-5dBm (min. optical sensitivity)
Frequency Response:	±0,5dB typ., ±1,0dB max.
Return Loss:	16dB typ.
OIP3:	+29dBm
SFDR:	< -102dB/Hz
Noise Figure:	12dB
Operating Wavelength:	1310nm – 1560nm
RF Output Power:	+10dBm max.
Variable Gain Control:	0dB to +24dB (1dB steps) ; 0 to +20dB in 1:1 Configuration ; 0 to +23dB in N+M Configuration
RF Power Monitoring:	70dB dynamic range
Status LED´s:	OK, Fail, Stand-By
Operating Temperature:	0°C to 45°C
Storage Temperature:	-10°C to 70°C
Humidity:	90%, non-condensing
RoHS:	Compliant

Broadband Application

TX Module Broadband (50 – 3200MHz), FLT3251

Frequency Range:	50 – 3200MHz
RF Input Connector:	Via Chassis RF I/O ports, only with FLCR41611B*plus* Chassis
Measurement Port:	Frontside -20dB
Optical Output Connector:	SC/APC
Fiber Type:	Single mode 9/125
RF Input Power Level:	+10dBm max. (damage level)
Frequency Response:	50MHz – 850MHz ±0,5dB typ., ±1,0dB max. 850MHz – 2450MHz ±1,0dB typ., ±1,5dB max. 2450MHz – 3200MHz ±1,5dB typ., ±2,0dB max.
Return Loss:	14dB typ.
OIP3:	+25dBm
SFDR:	< -101dB/Hz
Noise Figure:	12dB
Laser Type:	DFB with Isolator
Laser Class:	1M
Operating Wavelength:	1310nm ±5nm
Optical Output power:	+3dBm min.
Variable Gain Control:	-12dB to +12dB (1dB steps); -16 to +8dB in 1:1 Configuration; -13 to +11dB in N+M Configuration
RF Power Monitoring:	70dB dynamic range
Status LED´s:	OK, Fail, Stand-By
Operating Temperature:	0°C to 45°C
Storage Temperature:	-10°C to 70°C
Humidity:	90%, non-condensing
RoHS:	Compliant

RX Module Broadband (50 – 3200MHz), FLR3251

Frequency Range:	50 – 3200MHz
Optical Input Connector:	SC/APC
Measurement Port:	Frontside -20dB
Fiber Type:	Single mode 9/125
RF Output Connector:	Via Chassis RF I/O ports, only with FLCR41611B*plus* Chassis
Optical Input Power Level:	~ -10dBm (min. optical sensitivity)
Frequency Response:	50MHz – 850MHz ±0,5dB typ., ±1,0dB max. 850MHz – 2450MHz ±1,0dB typ., ±1,5dB max. 2450MHz – 3200MHz ±1,5dB typ., ±2,0dB max.
Return Loss:	16dB typ.
OIP3:	+27dBm
SFDR:	< -101dB/Hz
Noise Figure:	12dB
Operating Wavelength:	1310nm – 1560nm
RF Output Power:	+10dBm max.
Variable Gain Control:	0dB to +16dB (1dB steps); 0 to +12dB in 1:1 Configuration; 0 to +15dB in N+M Configuration
RF Power Monitoring:	70dB dynamic range
Status LED´s:	OK, Fail
Operating Temperature:	0°C to 45°C
Storage Temperature:	-10°C to 70°C
Humidity:	90%, non-condensing
RoHS:	Compliant

ORDER INFORMATION

Chassis

Type	Type-No.:	Short Description	Chassis Size	Capacity TX/RX Slots	Max. Links	RF Coax I/O Connectors
FLCR1111*plus*-50S FLCR1111*plus*-75F	9000918 on request	1RU/19" modular TX/RX rack mount chassis, 2 TX/RX slots, 1 x 1:1 TX/RX redundancy, 1 RF coax I/O, local configuration via LC-Display/keypad, remote configuration via Ethernet-Interface (WebGUI, SNMP), 1:1 redundant dual power supply	1RU/19”	1 x 1:1 redundancy	1	2 x 50Ohm SMA(f) 2 x 75Ohm F(f)
FLCR1111B*plus*-50S	on request	1RU/19" modular TX/RX rack mount chassis, Broadband 40 – 3200MHz, no LNB Bypass, 2 TX/RX slots, 1 x 1:1 TX/RX redundancy, 1 RF coax I/O, local configuration via LC-Display/keypad, remote configuration via Ethernet-Interface (WebGUI, SNMP), 1:1 redundant dual power supply	1RU/19”	1 x 1:1 redundancy	1	2 x 50Ohm SMA(f)
FLCR1211*plus*-50S FLCR1211*plus*-75F	9000939 9000986	1RU/19" modular TX/RX rack mount chassis, 4 TX/RX slots, 2 x 1:1 TX/RX redundancy, 2 RF coax I/O´s, local configuration via LC-Display/keypad, remote configuration via Ethernet-Interface (WebGUI, SNMP), 1:1 redundant dual power supply	1RU/19”	2 x 1:1 redundancy	2	4 x 50Ohm SMA(f) 4 x 75Ohm F(f)
FLCR1211B*plus*-50S	9001007	1RU/19" modular TX/RX rack mount chassis, Broadband 40 – 3200MHz, no LNB Bypass, 4 TX/RX slots, 2 x 1:1 TX/RX redundancy, 2 RF coax I/O´s, local configuration via LC-Display/keypad, remote configuration via Ethernet-Interface (WebGUI, SNMP), 1:1 redundant dual power supply	1RU/19”	2 x 1:1 redundancy	2	4 x 50Ohm SMA(f)
FLCR41611*plus*-50S FLCR41611*plus*-75F	9000889 9000987	4RU/19" modular TX/RX rack mount chassis, 32 TX/RX slots, 16 x 1:1 TX/RX redundancy, 16 RF coax I/O´s, local configuration via touchscreen, remote configuration via Ethernet-Interface (WebGUI, SNMP), 1:1 redundant dual power supply	4RU/19”	16 x 1:1 redundancy	16	16 x 50Ohm SMA(f) 16 x 75Ohm F(f)
FLCR41611B*plus*-50S	9001004	4RU/19" modular TX/RX rack mount chassis Broadband 40 – 3200MHz, no LNB Bypass, 32 TX/RX slots, 16 x 1:1 TX/RX redundancy, 16 RF coax I/O´s, local configuration via touchscreen, remote configuration via Ethernet-Interface (WebGUI, SNMP), 1:1 redundant dual power supply	4RU/19”	16 x 1:1 redundancy	16	16 x 50Ohm SMA(f)

TX & RX Module IF 40 – 200MHz

Type	Type-No.:	Short Description	Optical I/O Connector	Frequency Range
FLT251*plus*	9000914	Optical Transmitter TX-Module, 40 – 200MHz, RF coax Input via FLC(R) chassis RF coax I/O panel, Optical Output SC/APC, variable gain control, switchable LNB-supply, RF power monitoring, frontside measurement port -20dB	SC/APC	40 – 200MHz
FLR251*plus*	9000915	Optical Receiver RX-Module, 40 – 200MHz, Optical Input SC/APC, RF coax Output via FLC(R) chassis RF coax I/O panel, variable gain control, RF power monitoring, frontside measurement port -20dB	SC/APC	40 – 200MHz

TX & RX Module L-Band 950 – 2150MHz

Type	Type-No.:	Short Description	Optical I/O Connector	Frequency Range
FLT2150*plus*	9000887	Optical Transmitter TX-Module, 950 – 2150MHz, RF coax Input via FLC(R) chassis RF coax I/O panel, Optical Output SC/APC, variable gain control, switchable LNB-supply, RF power monitoring	SC/APC	950 – 2150MHz
FLR2150*plus*	9000888	Optical Receiver RX-Module, 950 – 2150MHz, Optical Input SC/APC, RF coax Output via FLC(R) chassis RF coax I/O panel, variable gain control, RF power monitoring	SC/APC	950 – 2150MHz

TX & RX Module L-Band 950 – 2150MHz with frontside measurement port -20dB

Type	Type-No.:	Short Description	Optical I/O Connector	Frequency Range
FLT2151*plus*	9001077	Optical Transmitter TX-Module, 950 – 2150MHz, RF coax Input via FLC(R) chassis RF coax I/O panel, Optical Output SC/APC, variable gain control, switchable LNB-supply, RF power monitoring, frontside measurement port -20dB	SC/APC	950 – 2150MHz
FLR2151*plus*	9001078	Optical Receiver RX-Module, 950 – 2150MHz, Optical Input SC/APC, RF coax Output via FLC(R) chassis RF coax I/O panel, variable gain control, RF power monitoring, frontside measurement port -20dB	SC/APC	950 – 2150MHz

TX & RX Module Extended L-Band 850 – 2450MHz

Type	Type-No.:	Short Description	Optical I/O Connector	Frequency Range
FLT2450*plus*	9000886	Optical Transmitter TX-Module, 850 – 2450MHz, RF coax Input via FLC(R) chassis RF coax I/O panel, Optical Output SC/APC, variable gain control, switchable LNB-supply, RF power monitoring	SC/APC	850 – 2450MHz
FLR2450*plus*	9000885	Optical Receiver RX-Module, 850 – 2450MHz, Optical Input SC/APC, RF coax Output via FLC(R) chassis RF coax I/O panel, variable gain control, RF power monitoring	SC/APC	850 – 2450MHz

TX & RX Module Extended L-Band 850 – 2450MHz with frontside measurement port -20dB

Type	Type-No.:	Short Description	Optical I/O Connector	Frequency Range
FLT2451*plus*	9001080	Optical Transmitter TX-Module, 850 – 2450MHz, RF coax Input via FLC(R) chassis RF coax I/O panel, Optical Output SC/APC, variable gain control, switchable LNB-supply, RF power monitoring, frontside measurement port -20dB	SC/APC	850 – 2450MHz
FLR2451*plus*	9001085	Optical Receiver RX-Module, 850 – 2450MHz, Optical Input SC/APC, RF coax Output via FLC(R) chassis RF coax I/O panel, variable gain control, RF power monitoring, frontside measurement port -20dB	SC/APC	850 – 2450MHz

TX & RX Module Broadband 50MHz – 3200MHz

Type	Type-No.:	Short Description	Optical I/O Connector	Frequency Range
FLT3251*plus*	9001098	Optical Transmitter TX-Module, 50 – 3200MHz, RF coax Input via FLC(R) chassis RF coax I/O panel, Optical Output SC/APC, variable gain control, RF power monitoring, frontside measurement port -20dB	SC/APC	50 – 3200MHz
FLR3251*plus*	9001097	Optical Receiver RX-Module, 50 – 3200MHz, Optical Input SC/APC, RF coax Output via FLC(R) chassis RF coax I/O panel, variable gain control, RF power monitoring, frontside measurement port -20dB	SC/APC	50 – 3200MHz

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