



# FiberLink2plus (Broadband 10MHz – 3.2GHz)

...designed for perfect signals



## Dual Channel RF-over-Fiber System

The FiberLink2plus RF-over-Fiber system for non-redundant optical transmission of RF signals is available in sizes of 1RU/19" & 3RU/19" rack mount design.

It is perfectly suited for flexible and high quality optical transmission of up to 32 RF signals (IF, L-Band, extended L-Band and broadband over a distance of up to 20km).

The 1RU/19" chassis variants holds up to 4 dual TX/RX modules (max. 8 optical links) while the 3RU/19" chassis can be populated with up to 16 dual TX/RX modules (max. 32 optical links).

Additionally, this dual RF-over-Fiber 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 5.7" touchscreen while remote configuration is available via its Ethernet-Interface (WebGUI, SNMP).

This professional RF-over-Fiber system stands for perfect RF performance as well as stable signal distribution over optical fiber and is perfectly suited for Teleports, Satellite Earth Stations, Broadcasting and Cable/IPTV operations.



### FEATURES & BENEFITS

- ▶ Versatile and flexible RF-over-Fiber system
- ▶ Max. 10 – 3200MHz frequency coverage
- ▶ 1RU/19" chassis for max. 4 TX or RX modules (8 links)
- ▶ 3RU/19" chassis for max. 16 TX or RX modules (32 links)
- ▶ Hot-swappable TX/RX modules
- ▶ Support of mixed TX/RX population
- ▶ Variable gain control at each TX/RX module

- ▶ Switchable LNB-supply\*
- ▶ RF power monitoring at each TX/RX module
- ▶ 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

### AVAILABLE CHASSIS AND MODULES

- ▶ 1RU/19" chassis for max. 4 dual TX/RX modules: FL2C1140
- ▶ 3RU/19" chassis for max. 16 dual TX/RX modules: FL2C3160
- ▶ 40MHz – 200MHz IF Application: FL2T450/FL2R450

- ▶ 950MHz – 2150MHz L-Band Application: FL2T4250/FL2R4250
- ▶ 850MHz – 2450MHz Extended L-Band Application: FL2T4850/FL2R4850
- ▶ 50MHz – 3200MHz Broadband Application: FL2T6450/FL2R6450

## TECHNICAL SPECIFICATIONS

**1RU/19" Chassis - FL2C1140 carrying 4 cards / 3RU/19" Chassis - FL2C3160 carrying 16 cards**

<b>Dimensions:</b>	1RU/19" rack mount (260mm deep) or 3RU/19" rack mount (300mm deep)
<b>Power Supply:</b>	85 – 265V, 50/60Hz, dual 1:1 redundancy (hot-swappable)
<b>Power Consumption:</b>	<10W (1RU/19"), <600W (3RU/19")
<b>Frequency Range:</b>	10 – 3200MHz
<b>TX/RX Configurations:</b>	See 4 <sup>th</sup> page (order information)
<b>TX/RX Module Capacity:</b>	Max. 4 slots @ 1RU/19" chassis (max. 8 optical links) Max. 16 slots @ 3RU/19" chassis (max. 32 optical links)
<b>Local Configuration:</b>	LC-Display/keypads or 5.7" colored touchscreen display
<b>Remote Configuration:</b>	Ethernet-Interface (WebGUI, SNMPv2c)
<b>Operating Temperature:</b>	0°C to 45°C
<b>Storage Temperature:</b>	-10°C to 70°C
<b>Humidity:</b>	90%, non-condensing
<b>RoHS:</b>	Compliant

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

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

### Link Specifications Broadband (50 – 3200MHz)

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

### 40MHz – 200MHz Application

#### TX Module IF 40 – 200MHz FL2T450plus

<b>Frequency Range:</b>	40 – 200MHz (IF)
<b>RF Input Connector:</b>	50Ohm SMA
<b>Optical Output Connector:</b>	SC/APC
<b>Fiber Type:</b>	Single mode 9/125
<b>RF Input Power Level:</b>	+16dBm max. (damage level)
<b>Frequency Response:</b>	±0,2dB max.
<b>Return Loss:</b>	20dB min.
<b>OIP3:</b>	>+30dBm
<b>SFDR:</b>	< -103dB/Hz
<b>Noise Figure:</b>	12dB
<b>Laser Type:</b>	DFB with Isolator, 35dB Isolation min.
<b>Laser Class:</b>	1M
<b>Operating Wavelength:</b>	1310nm ±5nm
<b>Optical Output Power:</b>	+3dBm min.
<b>Variable Gain Control:</b>	-15dB to +15dB (1dB steps)
<b>RF Power Monitoring:</b>	70dB dynamic range
<b>Status LED´s:</b>	OK, Fail, Stand-By
<b>Operating Temperature:</b>	0°C to 45°C
<b>Storage Temperature:</b>	-10°C to 70°C
<b>Humidity:</b>	90%, non-condensing
<b>RoHS:</b>	Compliant

#### RX Module IF 40 – 200MHz FL2R450plus

<b>Frequency Range:</b>	40 – 200MHz (IF)
<b>Optical Input Connector:</b>	SC/APC
<b>Fiber Type:</b>	Single mode 9/125
<b>RF Output Connector:</b>	50Ohm SMA
<b>Optical Input Power Level:</b>	-10dBm (min. optical sensitivity)
<b>Frequency Response:</b>	±0,2dB max.
<b>Return Loss:</b>	20dB min.
<b>OIP3:</b>	+30dBm
<b>SFDR:</b>	< -103dB/Hz
<b>Noise Figure:</b>	12dB
<b>Operating Wavelength:</b>	1310nm – 1560nm
<b>RF Output Power:</b>	+10dBm max.
<b>Variable Gain Control:</b>	-20dB to +40dB (1dB steps)
<b>RF Power Monitoring:</b>	70dB dynamic range
<b>Status LED´s:</b>	OK, Fail, Stand-By
<b>Operating Temperature:</b>	0°C to 45°C
<b>Storage Temperature:</b>	-10°C to 70°C
<b>Humidity:</b>	90%, non-condensing
<b>RoHS:</b>	Compliant



### L-Band and Extended L-Band Application

#### TX Module (L-Band 950 – 2150MHz & Extended L-Band 850 – 2450MHz) FL2T4250plus, FL2T4850plus

<b>Frequency Range:</b>	950 – 2150MHz (L-Band) & 850 – 2450MHz (extended L-Band)
<b>RF Input Connector:</b>	50Ohm SMA(f), 50Ohm BNC(f)*, 75Ohm F(f)* or 75Ohm BNC(f)*
<b>Optical Output Connector:</b>	SC/APC
<b>Fiber Type:</b>	Single mode 9/125
<b>RF Input Power Level:</b>	+15dBm max. (damage level)
<b>Frequency Response:</b>	±0,5dB typ., ±1,0dB max.
<b>Return Loss:</b>	15dB min.
<b>OIP3:</b>	+26dBm
<b>SFDR:</b>	< -102dB/Hz
<b>Noise Figure:</b>	12dB
<b>Laser Type:</b>	DFB with Isolator
<b>Laser Class:</b>	1M
<b>Operating Wavelength:</b>	1310nm ±5nm
<b>Optical Output Power:</b>	+3dBm min.
<b>Variable Gain Control:</b>	-12dB to +12dB (1dB steps)
<b>Switchable LNB-Supply:</b>	13/15/18VDC, 22kHz tone, 450mA max (current monitoring)
<b>RF Power Monitoring:</b>	70dB dynamic range
<b>Status LED's:</b>	OK, Fail, Stand-By
<b>Operating Temperature:</b>	0°C to 45°C
<b>Storage Temperature:</b>	-10°C to 70°C
<b>Humidity:</b>	90%, non-condensing
<b>RoHS:</b>	Compliant

#### RX Module (L-Band 950 – 2150MHz & Extended L-Band 850 – 2450MHz) FL2R4250plus, FL2R4850plus

<b>Frequency Range:</b>	950 – 2150MHz (L-Band) & 850 – 2450MHz (extended L-Band)
<b>Optical Input Connector:</b>	SC/APC
<b>Fiber Type:</b>	Single mode 9/125
<b>RF Output Connector:</b>	50Ohm SMA(f), 50Ohm BNC(f)*, 75Ohm F(f)* or 75Ohm BNC(f)*
<b>Optical Input Power Level:</b>	-5dBm (min. optical sensitivity)
<b>Frequency Response:</b>	±0,5dB typ., ±1,0dB max.
<b>Return Loss:</b>	16dB min.
<b>OIP3:</b>	+29dBm
<b>SFDR:</b>	< -102dB/Hz
<b>Noise Figure:</b>	12dB
<b>Operating Wavelength:</b>	1310nm – 1560nm
<b>RF Output Power:</b>	+10dBm max.
<b>Variable Gain Control:</b>	-12dB to +12dB (1dB steps)
<b>RF Power Monitoring:</b>	70dB dynamic range
<b>Status LED's:</b>	OK, Fail, Stand-By
<b>Operating Temperature:</b>	0°C to 45°C
<b>Storage Temperature:</b>	-10°C to 70°C
<b>Humidity:</b>	90%, non-condensing
<b>RoHS:</b>	Compliant



## Broadband Application

### TX Module Broadband (50 – 3200MHz) FL2T6450plus

<b>Frequency Range:</b>	50 – 3200MHz
<b>RF Input Connector:</b>	50Ohm SMA(f), others connector types available on request
<b>Optical Output Connector:</b>	SC/APC
<b>Fiber Type:</b>	Single mode 9/125
<b>RF Input Power Level:</b>	+10dBm max. (damage level)
<b>Frequency Response:</b>	50MHz – 850MHz $\pm 0,5$ dB typ., $\pm 1,0$ dB max. 850MHz – 2450MHz $\pm 1,0$ dB typ., $\pm 1,5$ dB max. 2450MHz – 3200MHz $\pm 1,5$ dB typ., $\pm 2,0$ dB max.
<b>Return Loss:</b>	14dB min.
<b>OIP3:</b>	+25dBm
<b>SFDR:</b>	< -101dB/Hz
<b>Noise Figure:</b>	12dB
<b>Laser Type:</b>	DFB with Isolator
<b>Laser Class:</b>	1M
<b>Operating Wavelength:</b>	1310nm $\pm 5$ nm
<b>Optical Output Power:</b>	+3dBm min.
<b>Variable Gain Control:</b>	-10dB to +10dB (1dB steps)
<b>RF Power Monitoring:</b>	70dB dynamic range
<b>Status LED's:</b>	OK, Fail, Stand-By
<b>Operating Temperature:</b>	0°C to 45°C
<b>Storage Temperature:</b>	-10°C to 70°C
<b>Humidity:</b>	90%, non-condensing
<b>RoHS:</b>	Compliant

### RX Module Broadband (50 – 3200MHz) FL2R6450plus

<b>Frequency Range:</b>	50 – 3200MHz
<b>Optical Input Connector:</b>	SC/APC
<b>Fiber Type:</b>	Single mode 9/125
<b>RF Output Connector:</b>	50Ohm SMA(f), others connector types available on request
<b>Optical Input Power Level:</b>	~ -10dBm (min. optical sensitivity)
<b>Frequency Response:</b>	50MHz – 850MHz $\pm 0,5$ dB typ., $\pm 1,0$ dB max. 850MHz – 2450MHz $\pm 1,0$ dB typ., $\pm 1,5$ dB max. 2450MHz – 3200MHz $\pm 1,5$ dB typ., $\pm 2,0$ dB max.
<b>Return Loss:</b>	16dB min.
<b>OIP3:</b>	+27dBm
<b>SFDR:</b>	< -101dB/Hz
<b>Noise Figure:</b>	12dB
<b>Operating Wavelength:</b>	1310nm – 1560nm
<b>RF Output Power:</b>	+10dBm max.
<b>Variable Gain Control:</b>	0dB to +16dB (1dB steps)
<b>RF Power Monitoring:</b>	70dB dynamic range
<b>Status LED's:</b>	OK, Fail
<b>Operating Temperature:</b>	0°C to 45°C
<b>Storage Temperature:</b>	-10°C to 70°C
<b>Humidity:</b>	90%, non-condensing
<b>RoHS:</b>	Compliant



**ORDER INFORMATION**

Chassis					
Type	Type-No.:	Short Description	Chassis Size	Capacity TX/RX Slots	Max. Links
FL2C1140plus	9001108	1RU/19" modular TX/RX chassis, 4 slots for dual TX/RX modules, local configuration via LC-Display/keypads, remote configuration via Ethernet-Interface (WebGUI, SNMP), 1:1 redundant dual power supply	1RU/19"	4	8
FL2C3160plus	9001107	3RU/19" modular TX/RX chassis, 16 slots for dual TX/RX modules, local configuration via touchscreen display, remote configuration via Ethernet-Interface (WebGUI, SNMP), 1:1 redundant dual power supply	3RU/19"	16	32

TX & RX Module IF 40 – 200MHz					
Type	Type-No.:	Short Description	Optical I/O Connector	Frequency Range	
FL2T450plus	9001109	Twin-Card Optical Transmitter TX-Module, 40 - 200MHz, Optical Output SC/APC, variable gain-control, RF power monitoring	SC/APC	40 – 200MHz	
FL2R450plus	9001110	Optical Receiver RX-Module, 40 - 200MHz, Optical Input SC/APC, variable gain-control, RF power monitoring	SC/APC	40 – 200MHz	

TX & RX Module L-Band 950 – 2150MHz					
Type	Type-No.:	Short Description	Optical I/O Connector	Frequency Range	
FL2T4250plus	9001114	Dual Optical Transmitter TX-Module, 950 - 2150MHz, Optical Output SC/APC, variable gain-control, switchable LNB-supply, RF power monitoring	SC/APC	950 – 2150MHz	
FL2R4250plus	9001115	Dual Optical Receiver RX-Module, 950 - 2150MHz, Optical Input SC/APC, variable gain-control, RF power monitoring	SC/APC	950 – 2150MHz	

TX & RX Module Extended L-Band 850 – 2450MHz					
Type	Type-No.:	Short Description	Optical I/O Connector	Frequency Range	
FL2T4850plus	9001116	Dual Optical Transmitter TX-Module, 850 - 2450MHz, Optical Output SC/APC, variable gain-control, switchable LNB-supply, RF power monitoring	SC/APC	850 – 2450MHz	
FL2R4850plus	9001117	Dual Optical Receiver RX-Module, 850 - 2450MHz, Optical Input SC/APC, variable gain-control, RF power monitoring	SC/APC	850 – 2450MHz	

TX & RX Module Broadband 50MHz – 3200MHz					
Type	Type-No.:	Short Description	Optical I/O Connector	Frequency Range	
FL2T6450plus	9001112	Dual Optical Transmitter TX-Module, 50 - 3200MHz, Optical Output SC/APC, variable gain-control, RF power monitoring	SC/APC	50 – 3200MHz	
FL2R6450plus	9001113	Dual Optical Receiver RX-Module, 50 - 3200MHz, Optical Input SC/APC, variable gain-control, RF power monitoring	SC/APC	50 – 3200MHz	