Anybus ComBricks PROFIBUS Fiber Optic Module

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The Anybus PROFIBUS Fiber Optic module is a unique product that allows long cable distances and a galvanic isolation between devices and segments. This module is perfect suitable for point-to-point-, bus-, star- and hub topologies. Because busmonitor data is directly available in the web server, the Fiber Optic module allows technicians to optimal maintenance a PROFIBUS installation.

The Fiber Optic modules can be placed side by side with repeater modules. Just like any other communication module, the channels are connected directly to the ProfiTrace OE core in the Head Station.

ComBricks can also easily be transformed to a fully dedicated fiber optic hub mixed with copper segments. The hub topology delivers an optimized delay time and enables live expansion. The advanced 12 Mbps core of the fiber optic module can be cascaded unlimitedly with other fiber modules. It contains diagnostic LEDs and supports the redundancy feature.

Distinctive features
- Suitable for up to 3 km multimode cable.
- Long cable distances
- Galvanic isolation between devices and segments
- Suitable for point-to-point, star and bus topologies.
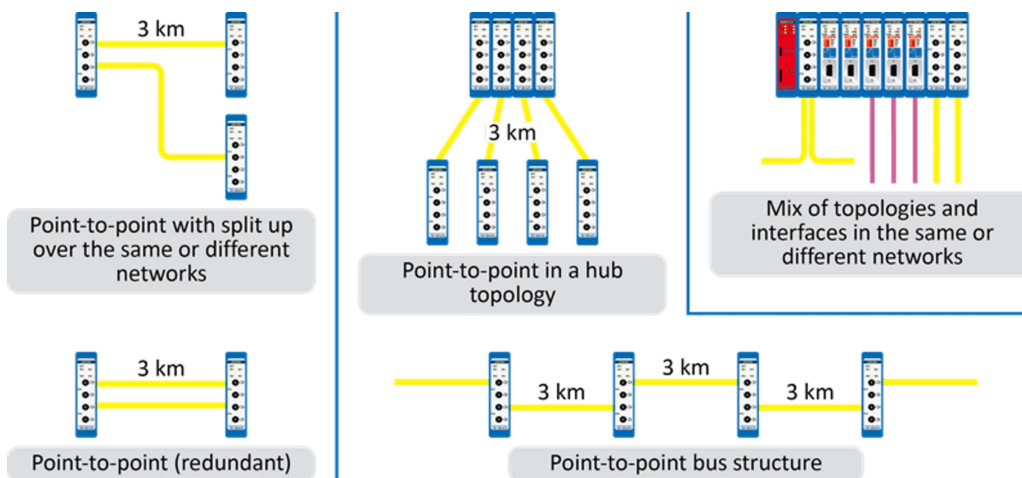- NOT COMPATIBLE WITH RING MODULE

ure 2 – Fiber optic topologies

Dimensions

L x W x H:	146 x 25 x 101 mm (including backplane)
Weight:	121 g (excluding plug-able fiber optic connector and packing material)
Mounting DIN-rail type	35mm × 7,5mm (EN 50022, BS 5584, DIN 46277-3)

Ambient conditions

Operating temperature range	0° to $+60^\circ$ Celsius (for mounting position see manual) 32° to $+140^\circ$ Fahrenheit
Isolation class	IP 20 (IEC/EN 60529, DIN 40050)

Backplane

PROFIBUS networks	4 (set by dipswitches or web server)
Modules	Max. 10 (positioned in the first 10 slots)
Power supply	Provided through the backplane
Typical backplane current at 5.75 VDC	360 mA (at 5.72 VDC)
Max. backplane current at 5.75 VDC	510 mA (at 5.72 VDC) At this current consumption the module is switched OFF from backplane. Occurs when module is faulty, e.g. internal short circuit.
Compatible backplane units	101-200011, 101-200022, 101-200023, 101-200024, 101-200027
Head Station firmware	1.264 and higher

Protocol specifications

Supported Protocols	DP-V0, DP- V1, DP-V2, FDL, MPI, FMS, PROFIsafe, PROFIdrive and any other FDL based protocol
Address	No bus address required
Transmission speed	9.6 kbps ... 12 Mbps (including 45.45 kbps)
Transmission speed detection time	Auto detect (< 10 s detection and 50 s baudrate switchover time)
Total delay ring structure	$T_{SLOT} \geq Max_{TSDR} + ((FO_{length}$ FO_{length} = Total length of fiber optic cable in the ring in km FO_{delay} = Delay of fiber optic cable per km in bit times (see table) $N_{FO-modules}$ = Number of fiber optic modules in the ring N_{delay} = Delay of one fiber optic module (see table) The delay time is multiplied by 2 for a request and response message.

Baudrate	Max_{TSDR} [Tbit]	FO_{delay} [Tbit/km]	N_{delay} [Tbit]
12 Mbps	800	60	47
6 Mbps	450	30	25
3 Mbps	250	15	14.5
1.5 Mbps	150	7.5	9
500 kbps	100	2.5	5
187.5 kbps	60	0.94	4.5
93.75 kbps	60	0.47	4.5
45.45 kbps	400	0.23	4.5
19.2 kbps	60	0.1	4
9.6 kbps	60	0.05	4

Note

$FO_{delay} = (FO_{cable\_length} / FO_{cable\ latency}) / Bit_{time}$

example FO_{delay}, 1km, 1.5Mbps:

(1000 m / 200 µsec/m) / 0.666 µsec = 7.5 Tbit/km

Example 1: 1.5 Mbps, 5 km FO cable (total ring length), 6 FO ring modules

$T_{SLOT} \geq Max_{TSDR} + ((FO_{length} \times FO_{delay}) + (N_{FO\text{-}modules} \times N_{delay})) \times 2$

$T_{SLOT} \geq 150 + ((5 \times 7.5) + (6 \times 9)) \times 2 \geq 333$ bit times

Example 2: 6 Mbps, 25 km FO cable (total ring length), 10 FO ring modules

$T_{SLOT} \geq Max_{TSDR} + ((FO_{length} \times FO_{delay}) + (N_{FO\text{-}modules} \times N_{delay})) \times 2$

$T_{SLOT} \geq 450 + ((25 \times 30) + (10 \times 25)) \times 2 \geq 2450$ bit times

Jitter per message frame	0.0625 Tbit at 9.6 Kbps - 3 Mbps 0.125 Tbit at 6 Mbps 0.25 Tbit at 12 Mbps
Deviation	2 Tbit times for received messages is allowed and is corrected to nominal speed when transmitted (over the complete message)

Fiber optic specifications

Fiber Optic wavelength	Multimode 850 nm (Compatible with most other vendors in 3rd party compatibility mode)
Cable type	Multimode Fiber G62.5 / 125 µm (OM1 compatible) Multimode Fiber G50 / 125 µm (OM2, OM3, OM4, OM5 compatible)
Cable length	Max. 3 km (baudrate independent)
Connectors	4 x ST/BFOC (2 channels)
Topologies	Point-to-point, Star and Bus
Cascading depth	No limit, only busparameter limitation of the master
Redundancy	Maximum 10 cables activated by Dip-Switch

Dipswitches

NW0	NW1		PROFIBUS Network
LEFT	**LEFT**		1
RIGHT	**LEFT**		2
LEFT	**RIGHT**		3
RIGHT	**RIGHT**		4
RED			Redundancy
LEFT			OFF
RIGHT			ON
H/S			Settings
LEFT			Hardware
RIGHT			Software

LEDs

	OFF	Blinking	ON
RDY	Module has NOT been powered / initialized yet.	Head Station is initializing or updating the module.	Module has been initialized and is operational
RX1 / RX2	NO signal, or NO valid telegrams detected on this channel, or channel is off.	1 or more devices are communicating on this channel.	A fiber optic cable is connected and link is established correctly
LV1 / LV2	Signal quality is good, or channel is off.	Not possible	Low signal, received messages can still be decoded
ER1 / ER2	No errors, or channel is off.	Not possible	No baudrate detected or no connection/signal

Standard and approvals

CE	EMC Directive 2014/30/EU, class B Digital Device
	RoHs Directive 2011/65/EU
FCC	47 CFR 15, Unintentional Radiator, class B Digital Device.
UL	Report reference: E468970
	Standards for safety: UL 508 - Industrial Control Equipment CSA C22.2 No. 142-M1987 - Industrial Control Equipment
	Complies with 21 CFR 1040.10 and 1040.11, Class 1 (I) except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007

File	Version	Size	Read online

Ordering Information

Order Codes	101-201510
Included Components	Anybus ComBricks, backplane socket
Warranty	1 year