

Technical Description

Fibre Optic Converter Board
7247



Safety information

The Safety Instructions and Technical Data serve to ensure trouble-free operation and protection of operating personnel and equipment. Strict compliance with these instructions is therefore necessary.

Failure to comply with these Safety Instructions will VOID the Warranty and any claims made under its terms.

Further no liability will be assumed by **hopf** Elektronik GmbH, for ensuing consequential damages, resulting from non-compliance.

Safety of the Devices

This instrument has been manufactured in accordance with the latest technological standards and acknowledged safety regulations.

The instrument should only be operated and maintained by properly trained and qualified technical personnel.

Please ensure that all cable connections are laid and fixed in position correctly. The instrument should only be operated with the supply voltage indicated on the identification plate. Note that multiple input power options exist (factory installed).

If an instrument must be opened for repair, this should only be carried out by technicians or engineers with corresponding qualifications or by **hopf** Elektronik GmbH company, or its representatives.

If the maintenance work requires the opening of a device or if a fuse needs changing, the device must first be disconnected from all power supplies.

If there are reasons to believe that the operational safety can no longer be guaranteed the device must be taken out of service and labeled accordingly.

The safety may be impaired when the device does not operate properly or if it is obviously damaged. Contact your local **hopf** Elektronik GmbH representative for required action.

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1 General

Unit 7247 is a 4-channel fibre optic converter board in European standard size with a 4HP/3U front panel. The board converts existing signals (serial or pulses) to fibre optic and for read-in of fibre optic signals. It has been designed for the systems 6000 and 7001.

Connection

The fibre optic components are in ST design.

Status Display

Each in- or output has a status LED, which indicates the actual status of operation of the according fibre optic output or fibre optic input.

Configuration

The board has up to 4 fibre optic transmitters (TxD) or fibre optic receivers (RxD) in any configuration (e.g. 2 transmitters and 1 receiver). The required quantity of fibre optic transmitters or fibre optic receivers has to be specified when placing an order. The individual transmitter and receiver configuration can be read off the board.

1.1 Operation with Fibre Optic Transmitters

Outputting Signals

Up to 4 signals can be connected to the system-inherent VG-ledge, which can be distributed onto the existing outputs by an appropriate logic on the board by means of jumper.

Inverting Signals

Each of the output signals can be inverted on the board via jumper.

PPS Pulses and DCF77 Pulse

While operating the board at system bus of systems 6000 and 7001 it can output the DCF77 pulse or a PPS pulse, configurable in duration, without taking any further steps.

1.2 Operation with Fibre Optic Receivers

Signal Output

While operating the board with fibre optic receivers the read in signals can be tapped on the system-inherent VG-ledge in TTL level.

Inverting Signals

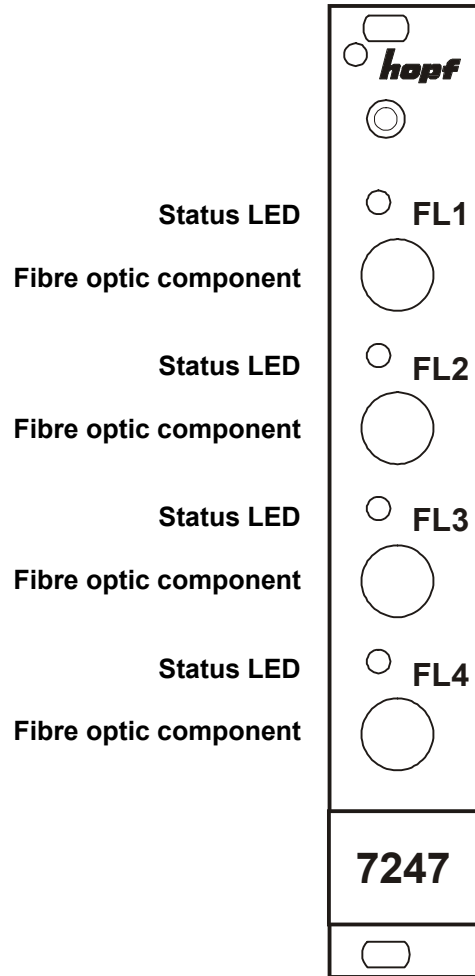
Each of the read-in signals can be inverted on the board via jumper.

1.3 Mixed Operation with Fibre Optic transmitters and Fibre Optic Receivers

Repeater Function

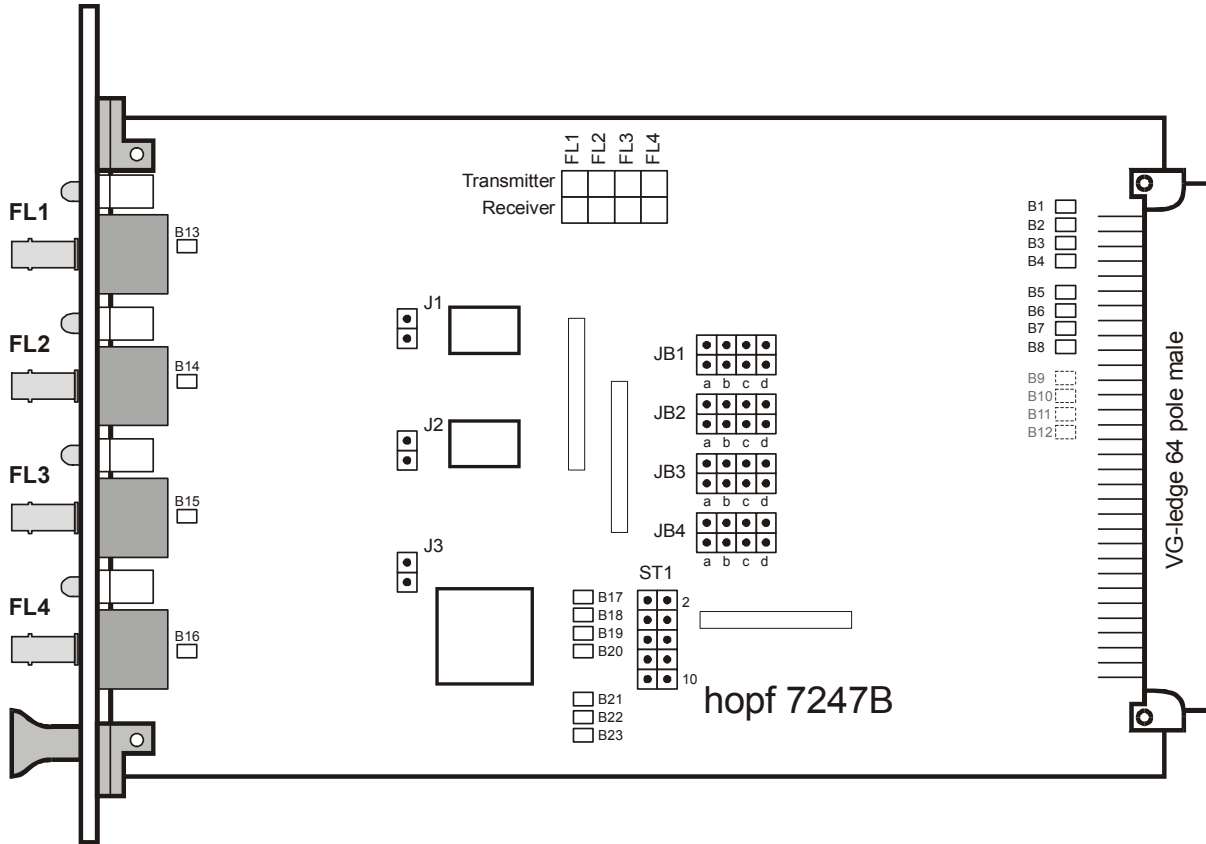
The on board existing fibre optic transmitters and fibre optic receivers can be interconnected to a fibre optic repeater by the appropriate logic, available on board. It is possible to tap the received signal at the system-inherent VG-ledge and to output it via a fibre optic transmitter at the same time.

2 Front Panel 4HP / 3U



3 Settings

BOARD (Karte):



FL1-FL4: FO-Transmitter and Receiver designed as ST (LWL-Sender und -Empfänger in Bauform ST)

Hardware Configuration	FL1	FL2	FL3	FL4
Transmitter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Receiver	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
not placed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Transmitter				FL1	FL2	FL3	FL4	
Jumper Block JBx				Signal-Output on FL1-FL4	JB1	JB2	JB3	JB4
a	b	c	d	Signal A (VGL1-c1)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Signal B (VGL1-c2)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Signal C (VGL1-c3)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Signal D (VGL1-c4)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	DCF77 pulse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	PPS pulse (50 msec)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	PPS pulse (100 msec)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	PPS pulse (250 msec)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Signal inverted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Receiver				FL1	FL2	FL3	FL4	
Jumper Bank JBx				Signal-Input on FL1-FL4	JB1	JB2	JB3	JB4
a				Output on VGL1-	c9	c10	c11	c12
<input type="radio"/>				Signal not inverted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="radio"/>				Signal inverted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

I = Jumper closed / o = Jumper opened

			def.	user
Jumper J1	closed (zu)	only for factory use (nur für werksinterne Einstellungen)	<input type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	only for factory use (nur für werksinterne Einstellungen)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Jumper J2	closed (zu)	only for factory use (nur für werksinterne Einstellungen)	<input type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	only for factory use (nur für werksinterne Einstellungen)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Jumper J3	closed (zu)	only for factory use (nur für werksinterne Einstellungen)	<input type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	only for factory use (nur für werksinterne Einstellungen)	<input checked="" type="checkbox"/>	<input type="checkbox"/>

			def.	user
B1	closed (zu)	only for factory use (nur für werksinterne Einstellungen)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	only for factory use (nur für werksinterne Einstellungen)	<input type="checkbox"/>	<input type="checkbox"/>
B2	closed (zu)	only for factory use (nur für werksinterne Einstellungen)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	only for factory use (nur für werksinterne Einstellungen)	<input type="checkbox"/>	<input type="checkbox"/>
B3	closed (zu)	only for factory use (nur für werksinterne Einstellungen)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	only for factory use (nur für werksinterne Einstellungen)	<input type="checkbox"/>	<input type="checkbox"/>
B4	closed (zu)	only for factory use (nur für werksinterne Einstellungen)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	only for factory use (nur für werksinterne Einstellungen)	<input type="checkbox"/>	<input type="checkbox"/>
B5	closed (zu)	only for factory use (nur für werksinterne Einstellungen)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	only for factory use (nur für werksinterne Einstellungen)	<input type="checkbox"/>	<input type="checkbox"/>
B6	closed (zu)	only for factory use (nur für werksinterne Einstellungen)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	only for factory use (nur für werksinterne Einstellungen)	<input type="checkbox"/>	<input type="checkbox"/>
B7	closed (zu)	only for factory use (nur für werksinterne Einstellungen)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	only for factory use (nur für werksinterne Einstellungen)	<input type="checkbox"/>	<input type="checkbox"/>
B8	closed (zu)	only for factory use (nur für werksinterne Einstellungen)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	only for factory use (nur für werksinterne Einstellungen)	<input type="checkbox"/>	<input type="checkbox"/>

B9-B12 on the bottom layer (B9-B12 auf der Bestückungsseite)

			def.	user
B9	closed (zu)	only for factory use (nur für werksinterne Einstellungen)	<input type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	only for factory use (nur für werksinterne Einstellungen)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
B10	closed (zu)	only for factory use (nur für werksinterne Einstellungen)	<input type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	only for factory use (nur für werksinterne Einstellungen)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
B11	closed (zu)	only for factory use (nur für werksinterne Einstellungen)	<input type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	only for factory use (nur für werksinterne Einstellungen)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
B12	closed (zu)	only for factory use (nur für werksinterne Einstellungen)	<input type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	only for factory use (nur für werksinterne Einstellungen)	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Settings for B13-B20 adjusted by hopf (Einstellungen für B13-B20 von hopf voreingestellt)

			def.	user
B13 / B17	closed (zu)	FL1 = Receiver (Empfänger)	<input type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	FL1 = Transmitter (Sender)	<input type="checkbox"/>	<input type="checkbox"/>
B14 / B18	closed (zu)	FL2 = Receiver (Empfänger)	<input type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	FL2 = Transmitter (Sender)	<input type="checkbox"/>	<input type="checkbox"/>
B15 / B19	closed (zu)	FL3 = Receiver (Empfänger)	<input type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	FL3 = Transmitter (Sender)	<input type="checkbox"/>	<input type="checkbox"/>
B16 / B20	closed (zu)	FL4 = Receiver (Empfänger)	<input type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	FL4 = Transmitter (Sender)	<input type="checkbox"/>	<input type="checkbox"/>

Settings for B21-B23 adjusted by hopf (Einstellungen für B21-B23 von hopf voreingestellt)

			def.	user
B21	closed (zu)	only for factory use (nur für werksinterne Einstellungen)	<input type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	only for factory use (nur für werksinterne Einstellungen)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
B22	closed (zu)	only for factory use (nur für werksinterne Einstellungen)	<input type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	only for factory use (nur für werksinterne Einstellungen)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
B23	closed (zu)	only for factory use (nur für werksinterne Einstellungen)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	opened (offen)	only for factory use (nur für werksinterne Einstellungen)	<input type="checkbox"/>	<input type="checkbox"/>

Settings for ST1 adjusted by hopf (Einstellungen für ST1 von hopf voreingestellt)

ST1		only for factory use (nur für werksinternen Gebrauch)		
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4 Configuration Example

4.1 Configuration Table

This table can be found on the position print of the board.

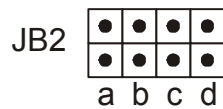
I = Jumper closed
o = Jumper opened

a	b	c	d	Output FL
o	o	o	o	Signal A (VGL1-c1)
o	o	o	I	Signal B (VGL1-c2)
o	o	I	o	Signal C (VGL1-c3)
o	o	I	I	Signal D (VGL1-c4)
o	I	o	o	DCF77 pulse
o	I	o	I	PPS pulse (50 msec)
o	I	I	o	PPS pulse (100 msec)
o	I	I	I	PPS pulse (250 msec)
I	x	x	x	Signal inverted

4.2 Example 1: Fibre Optic Transmitter

FL2 Transmitter

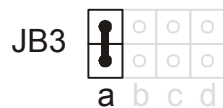
Output of a serial signal connected at the internal **VG ledge Pin c1** by the fibre optic transmitter **FL2**.



4.3 Example 2: Fibre Optic Receiver

FL3 Receiver

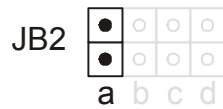
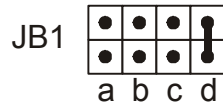
The received signal at **FL3** shall be inverted at the internal **VG ledge Pin c11**.



4.4 Example 3: Repeater

FL1 Transmitter; FL2 Receiver

The signal received at **FL2** has to be outputted at **VG ledge Pin c10** and at once forwarded by **FL1**.



Please Note: VIA THE INTERNAL LOGIC FIBRE OPTIC SIGNALS ARE VALID AT THE PINS C9-C12 AND ALSO FOR A FURTHER DISTRIBUTION:

- A SIGNAL RECEIVED BY **FL1** CAN BE DISTRIBUTED TO ALL EXISTING FIBRE OPTIC OUTPUTS AS **SIGNAL A**
- A SIGNAL RECEIVED BY **FL2** CAN BE DISTRIBUTED TO ALL EXISTING FIBRE OPTIC OUTPUTS AS **SIGNAL B**
- A SIGNAL RECEIVED BY **FL3** CAN BE DISTRIBUTED TO ALL EXISTING FIBRE OPTIC OUTPUTS AS **SIGNAL C**
- A SIGNAL RECEIVED BY **FL4** CAN BE DISTRIBUTED TO ALL EXISTING FIBRE OPTIC OUTPUTS AS **SIGNAL D**

5 VG-Ledge 64 pole male (Row B not placed)

Pin no.	ROW A		ROW B		ROW C	
	Signal	Connection	Signal	Connection	Signal	Connection
1	GND				Signal A	
2	GND				Signal B	
3	GND				Signal C	
4	GND				Signal D	
5						
6						
7						
8						
9	GND				Received Signal FL1	
10	GND				Received Signal FL2	
11	GND				Received Signal FL3	
12	GND				Received Signal FL4	
13						
14						
15						
16						
17						
18						
19						
20						
21					RESB	
22					DCFT	
23	CLKB				SERD	
24	PPSB				KHZ1	
25	BREQ				BREQ	
26	SEDA				SEDA	
27	ARES				ARES	
28	CSDA				CSDA	
29						
30						
31	GND				GND	
32	VCC				VCC	

6 Technical Data of Board 7247

Size	Euocard 100 x 160, 4 HP / 3 U
Power supply	5V DC \pm 5%
Current consumption (max. with 4 x opt. transmitters)	500 mA
Temperature range storage/ operation	- 30... + 85 °C / 0... + 70 °C
Humidity	95 %, non condensing
Standards	CE
Protection	none
MTBF	> 300.000 hours
Electrical characteristics (at VG-ledge): Inputs / Outputs	TTL compatible
Technical Data of Optical Outputs:	$\lambda = 820 \text{ nm}$, connector type: ST (bayonet)
Opt. output power P_{out} [dBm] at multi-mode optical fiber cable: length = 1 m, 50/125 μm	P_{out} [dBm] = -15 dBm (\pm 0,2 dBm) \Rightarrow P_{out} [μW] = 32 μW (\pm 0,7 μW)
Opt. Output power P_{out} [dBm] at multi-mode optical fiber cable: length = 2,5 m, 62,5/125 μm	P_{out} [dBm] = -11 dBm (\pm 0,2 dBm) \Rightarrow P_{out} [μW] = 80 μW (\pm 0,7 μW)
Opt. Output power P_{out} [dBm] at multi-mode optical fiber cable: length= 2000 m, 62,5/125 μm	P_{out} [dBm] = -18 dBm (\pm 0,2 dBm) \Rightarrow P_{out} [μW] = 16 μW (\pm 0,7 μW)
Transmit frequency	\leq 10 MHz
Technical Data of Optical Inputs:	$\lambda = 820 \text{ nm}$, connector type: ST (bayonet)
min. optical receive power	P_{in} [dBm] = -18,3 dBm (\pm 0,2 dBm) \Rightarrow P_{in} [μW] = 14,8 μW (\pm 0,7 μW)
max. optical receive power (overdrive)	P_{in} [dBm] = -10 dBm (\pm 0,2 dBm) \Rightarrow P_{in} [μW] = 100 μW (\pm 0,7 μW)
max. receive frequency	\leq 10 MHz
Supported multi-mode types of optical fiber cable	50/125 μm , 62.5/125 μm , 100/140 μm or 200 μm HCS ® Fiber

Please Note: MAX. MULTI-MODE LENGTH OF OPTICAL FIBER CABLE 62,5/125 μm IS 2000 M. USING OTHER OPTICAL FIBER TYPES PAY ATTENTION TO THE OPTICAL OUTPUT POWER OR RATHER INPUT POWER.

