Industriefunkuhren

hopf Elektronik GmbH

Technical Manual

Fibre Optic Converter Board

Model 7248/7248RC

ENGLISH

Version: 01.00 – 04.05.2007

hopf Elektronik GmbH
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Symbols and Characters

Operational Reliability

Disregard may cause damages to persons or material.

Functionality

Disregard may impact function of system/device.

Information

Notes and Information.

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Safety regulations

The safety regulations and observance of the technical data serve to ensure trouble-free operation of the device and protection of persons and material. It is therefore of utmost importance to observe and compliance with these regulations.

If these are not complied with, then no claims may be made under the terms of the warranty. No liability will be assumed for any ensuing damage.

Safety of the device

This device has been manufactured in accordance with the latest technological standards and approved safety regulations

The device should only be put into operation by trained and qualified staff. Care must be taken that all cable connections are laid and fixed in position correctly. The device should only be operated with the voltage supply indicated on the identification label.

The device should only be operated by qualified staff or employees who have received specific instruction.

If a device must be opened for repair, this should only be carried out by employees with appropriate qualifications or by ***hopf*** Elektronik GmbH.

Before a device is opened or a fuse is changed all power supplies must be disconnected.

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

The safety may be impaired when the device does not operate properly or if it is obviously damaged.

CE-Conformity

CE

This device fulfils the requirements of the EU directive 89/336/EWG "Electromagnetic compatibility" and 73/23/EWG "Low voltage equipment".

Therefore the device bears the CE identification marking (CE = Communautés Européennes = European communities)

The CE indicates to the controlling bodies that the product complies with the requirements of the EU directive - especially with regard to protection of health and safety for the operator and the user - and may be released for sale within the common markets.

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1 General

The 4-port fibre optic function board for the conversion and output of signals via optical fibres is available in two standard versions suitable for the use in Systems 6000, 7000 and 7001RC.

1.1 Board 7248 – for Systems 6000 and 7001

Unit 7248 is a 4-channel fibre optic converter board in European standard size with a 3U/4HP front panel. The board converts existing signals (serial or pulses) to fibre optic and for read-in of fibre optic signals. While using this board in combination with a system bus a DCF77 pulse and a PPS pulse (configurable length) can be send out. It has been designed for the systems 6000 and 7001.

- **Connection**
  The fibre optic components are in ST design.

- **Status LEDs**
  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**
  Configuration of the board solely via jumpers on board.

- **Signal Input/Output**
  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.

- **Operation of Board**
  The board is directly controlled via the system bus or via the signals connected to the internal VG ledge.

1.1.1 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.

- **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.

- **Inverting Signals**
  Each of the output signals can be inverted on the board via jumper.

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1.1.2 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.

1.1.3 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.

1.2 Board 7248RC – for System 7001RC

Boards 7248RC and 7248 are identical in their features, however board 7248RC is designed for use in System 7001RC by providing supplemental "Hot Plug" functionality.

The board **does not** provide any Remote and Management functionality of System 7001RC:

- The board **is not** mapped by System 7001RC.
- The board **is not** monitored by System 7001RC.
- The board is solely configured via jumper (onboard).

Board 7248RC may also be used in Systems 6000 and 7001 if required.

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2 Design / Configuration of Boards 7248 and 7248RC

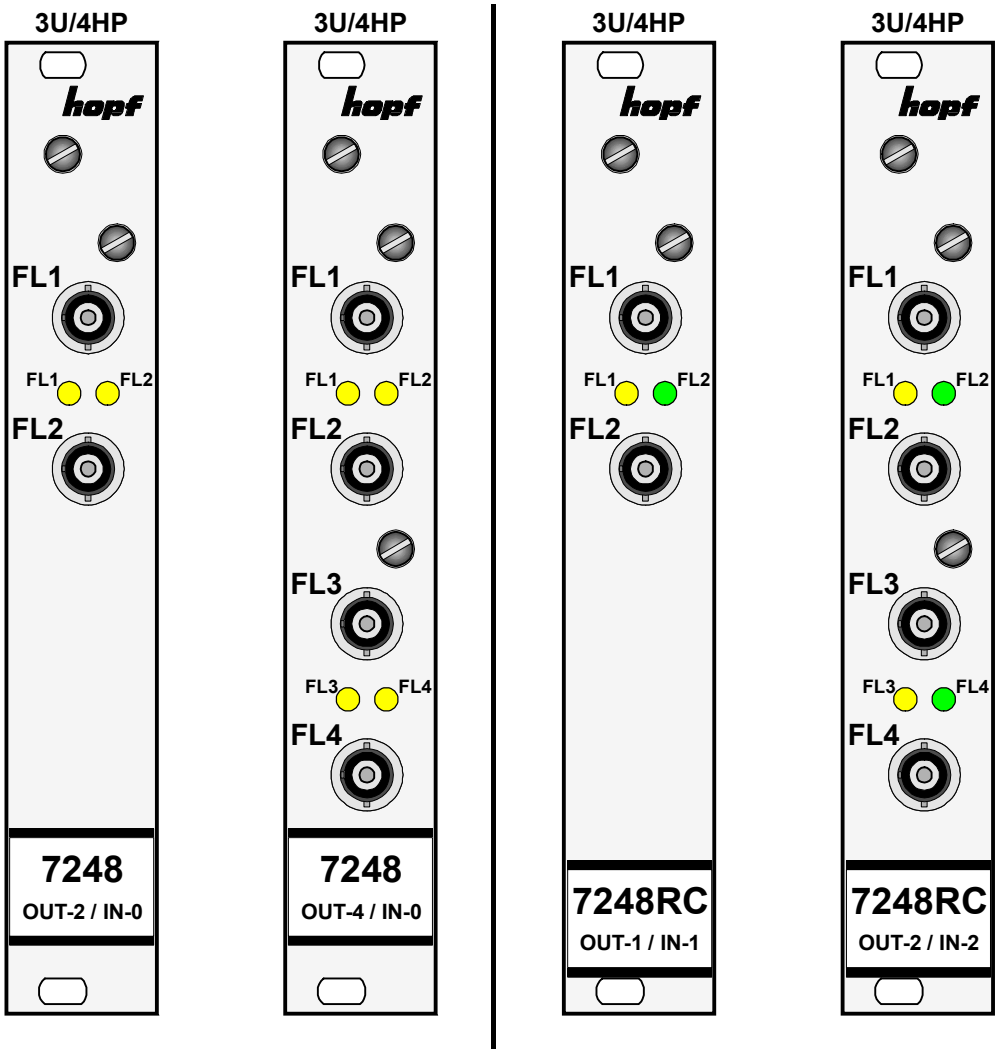
This chapter describes the layout and the configuration of board via jumper.

2.1 Front Panel of Boards 7248 and 7248RC

On the front panel there are up to four (4) fibre optic connectors for the input and output of fibre optic signals. Each of these in- and outputs has a status LED witch displays the actual operating status of the fibre optic connectors.

Status LED	
green	receiver
yellow	transmitter

Examples of Front Panels:



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2.2 Layout of Board / Configurations-Jumper

This chapter describes the position and function of the jumper.

2.2.1 Configuration of Signals

Via the jumper JB1 (A1) to JB4 (B2) the input/output signals can be individually selected for each output/input.

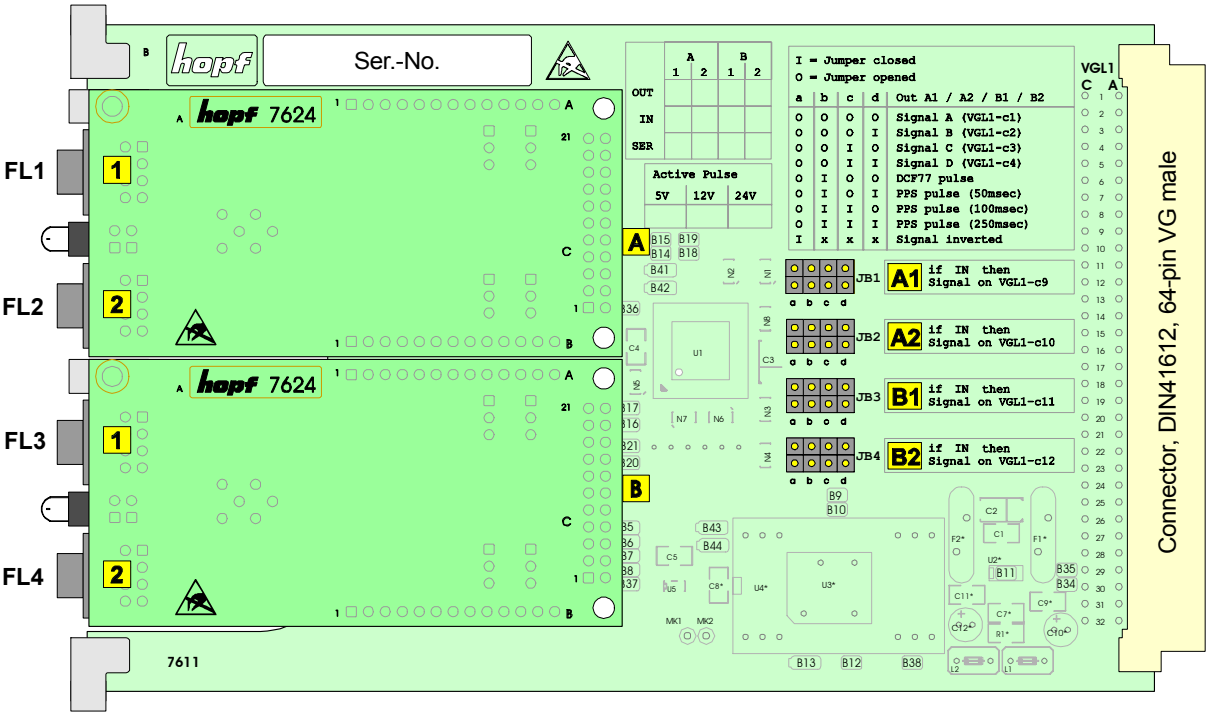
Allocation:

Jumper JB1 (A1) = Input/Output FL1

Jumper JB2 (A2) = Input/Output FL2

Jumper JB3 (B1) = Input/Output FL3

Jumper JB4 (B2) = Input/Output FL4



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FL1-FL4: FO-Transmitter and Receiver designed as ST

Hardware Configuration	A1 / FL1	A2 / FL2	B1 / FL3	B2 / FL4
OUT	☐	☐	☐	☐
IN	☐	☐	☐	☐
not placed	☐	☐	☐	☐

For Transmitter					FL1	FL2	FL3	FL4
Jumper Block JBx				**Signal-Output on FL1-FL4**	**JB1**	**JB2**	**JB3**	**JB4**
a	**b**	**c**	**d**					
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	☐	☐	☐	☐

For 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**
o	Signal not inverted	☐	☐	☐	☐
I	Signal inverted	☐	☐	☐	☐

I = Jumper closed / o = Jumper opened

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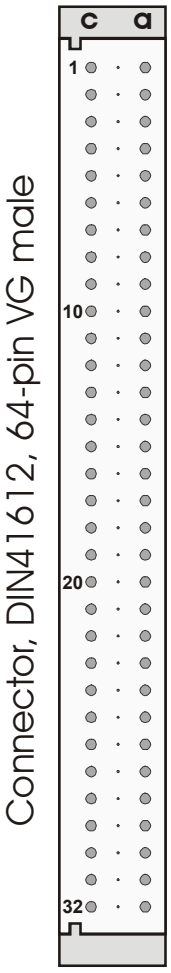
2.3 VG-Ledge 64-pin (DIN 41612)

Assignment of the VG-ledge (Carrier Board 7611):



Connector, DIN41612, 64-pin VG male

Connector, DIN 41612, 64-pin VG male				
Pin	**c**		**a**	**Pin**
1	Signal A		GND	**1**
2	Signal B		GND	**2**
3	Signal C		GND	**3**
4	Signal D		GND	**4**
5				**5**
6				**6**
7			GND	**7**
8				**8**
9	Signal A1/FL1 IN		GND	**9**
10	Signal A2/FL2 IN			**10**
11	Signal B1/FL3 IN		GND	**11**
12	Signal B2/FL4 IN			**12**
13				**13**
14				**14**
15				**15**
16				**16**
17				**17**
18	o--	---	--o	**18**
19	o--	---	--o	**19**
20				**20**
21	RESB (System Reset)			**21**
22	DCFT (DCF77 Pulse)			**22**
23	SERD		CLKB	**23**
24	KHZ1		PPS	**24**
25	o--	---	--o	**25**
26	o--	---	--o	**26**
27	o--	---	--o	**27**
28	o--	---	--o	**28**
29	o--	---	--o	**29**
30	o--	---	--o	**30**
31	GND		GND	**31**
32	+5V DC		+5V DC	**32**

o-- --- --o ⇨ Connection between **c** and **a** ledge

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3 Configuration Example

In this chapter some examples are given for the configuration of the board 7248/7248RC.

3.1 Configuration Table

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

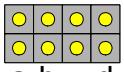
```
I = Jumper closed
o = Jumper opened

 a    b    c    d     Out A1 / A2 / B1 / B2
-----------------------------------------
 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
```

3.2 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**.

JB2

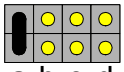


3.3 Example 2: Fibre Optic Receiver

FL3 Receiver

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

JB3



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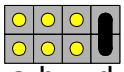
3.4 Example 3: Repeater

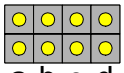
FL1 Transmitter; FL2 Receiver

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

JB1



JB2



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**

4 Maintenance

Boards 7248 and 7248RC are completely maintenance free.

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5 Technical Data

General Data	
Operation:	Via jumper on board
Protection Class:	None
Power Supply:	5V DC ± 5% via system bus
Current Consumption:	min. 0.2A (1x FO-transmitter/FO-receiver) max. 0.6A (4x FO-transmitter)
Dimensions:	Euro card 100mm x 160mm, 3U/4HP
MTBF:	> 300,000 hours
Weight:	Approx. 0.18kg

Optical General	
Supports multi-mode optical fibre cables:	50/125µm, 62.5/125µm, 100/140µm or 200µm HCS ® Fibre

Optical Output: λ = 820nm, Type of Connector: **ST** (Bajonett) – for T=+25°C	
Optical output power P_{OUT} [dBm] at multi-mode optical fibre cable **(length = 1m, 50/125µm)**:	P_{OUT} [dBm] = -15 dBm (± 0.2 dBm) ⇨ P_{OUT} [µW] = 32 µW (± 0.7 µW)
Optical output power P_{OUT} [dBm] at multi-mode optical fibre cable **(length = 2.5m, 62.5/125µm)**:	P_{OUT} [dBm] = -11 dBm (± 0.2 dBm) ⇨ P_{OUT} [µW] = 80 µW (± 0.7 µW)
Optical output power P_{OUT} [dBm] at multi-mode optical fibre cable **(length= 2000m, 62.5/125µm)**:	P_{OUT} [dBm] = -18 dBm (± 0.2 dBm) ⇨ P_{OUT} [µW] = 16 µW (± 0.7 µW)
max. Transmit frequency:	<= 10MHz
Switch on / switch off delay:	< 10nsec.

Optical Input: λ = 820nm, Type of Connector: **ST** (Bajonett) – for T=+25°C	
min. optical receive power:	P_{IN} [dBm] = -25dBm (± 0.2dBm) ⇨ P_{IN} [µW] = 3.2µW (± 0.7µW)
max. optical receive power (overdrive):	P_{IN} [dBm] = -9dBm (± 0.2dBm) ⇨ P_{IN} [µW] = 126µW (± 6µW)
max. receive frequency	<= 5MHz
Signal delay:	< 75nsec. (at -21dBm)

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Environmental Conditions		
Temperature Range:	Operation:	0°C to +55°C
	Storage:	-20°C to +75°C
Humidity:		max. 95%, non condensed

Signals at VG-ledge	
Electrical Properties of Inputs / Outputs (at VG-ledge):	TTL compatible

Special production:

Modifications can be made to hardware and software in accordance with customer specifications.

The ***hopf*** company reserves the right to modify hardware and software at any time.

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