

STAR COOPERATION®

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# FlexMedia 100BASE-T1

## Instructions for Use



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Any semiconductor devices have an inherent chance of failure. You have to protect against injury, damage or loss from such failures by incorporating safety design measures into your facility and equipment such as redundancy, fire protection, and prevention of over-current levels and other abnormal operating conditions. The safety and handling instructions in this document have to be followed strictly.

## EC Conformity

The FlexMedia 100BASE-T1 complies with the essential requirements of the following applicable European Community Directive(s) including current amendments, and carries the CE marking accordingly:

- 2014/30/EU EMC Directive

The following standard(s) have been used to assess the product:

- EN 61000-6-4:2011-09 Generic immunity standard for industrial environments
- EN 61000-6-2:2006-03 Basic standard - Emitted interference industrial area
- EN 61000-4-2:2009-12 Immunity test against the discharge of static electricity
- EN 61000-4-3:2011-04 Immunity test against radio-frequency electromagnetic fields
- EN 61000-4-4:2013-04 Immunity test against fast transient electrical disturbances/burst
- EN 61000-4-6:2014-08 Immunity test against conducted disturbances, induced by high frequency fields
- EN 61326-1:2013-07 Electrical equipment, control and laboratory use. EMC requirements

The FlexMedia 100BASE-T1 is designed, intended and authorized for industrial use only. Using the product in domestic environment may lead to electromagnetic disturbances.

This product is compliant with the European Community Directive 2011/65/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS).

## Revision History

Document number: 3-0093-0A01-D04

Version	Date	Description
D1V0-4	25-Jun-2018	Preliminary release
D1V0-F	23-Apr-2019	First release

## Related Hardware / Software Versions

Product	Reference No.	Version	Remarks
FlexMedia 100BASE-T1	3-0093-A01-01	20	

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## 1 General

### 1.1 Intended use

The FlexMedia 100BASE-T1 is solely used to convert “100BASE-TX” into “100BASE-T1” and vice versa.

Only the herein described accessory parts are allowed to be used together with the FlexMedia 100BASE-T1.

The FlexMedia 100BASE-T1 is designed, intended, and authorized only for laboratory applications use. Any other use without the prior written consent of *STAR COOPERATION* prohibited.

The FlexMedia 100BASE-T1 is NOT designed, intended, or authorized for





- use as part of medical systems,
- life support applications,
- aviation, space, nuclear, or military applications,
- use in areas where combustible or explosive gas mixtures are likely to occur,
- other applications in which a mistake or malfunction may result in death, personal injury or severe physical damage.

The product described in this document is an industrial device, i.e. is designed, intended, or authorized for professional use. It is not designed, intended, or authorized for home applications or consumers. For this reason, use by non-professionals is forbidden.

### 1.2 Used Pictograms

The meaning of used pictograms is shortly described below.

Follow the specific instructions in the document where these pictograms are placed.

	<b>NOTICE</b>
	Used to indicate a situation which may result in an operating failure. Damage of the product may occur, but there is no hazard of injury if not avoided.
	<b>Information</b>
	Used to indicate information provided only for purposes of clarification, illustration, and general information.
	<b>Reference</b>
	References to other documents.
	Product marking which shows the compliance of the product with the European Waste Electrical and Electronic Equipment Directive 2012/19/EU.

### 1.3 Safety and Handling Instructions


Please read the instructions for use carefully. To protect the device or the application against damage, or to avoid personal injury the FlexMedia 100BASE-T1 has to be handled as described herein.

Changes or modifications of the FlexMedia 100BASE-T1 are not allowed for safety and warranty reasons!

*STAR COOPERATION* is not liable for any damages arising from non-observance of the product information.

Follow the

- a) specific safety and handling instructions placed at dedicated document positions
- b) general safety and handling instructions below:

NOTICE	
	<p>To prevent damage to the FlexMedia 100BASE-T1, or consequential damages:</p> <p style="text-align: center;">Do not open the FlexMedia 100BASE-T1.</p> <p>Do not connect any other signals to the interfaces as described in the chapter “Interfaces”. Ensure that all signals are within the specified range.</p> <p>High temperatures can damage the FlexMedia 100BASE-T1. Keep the FlexMedia 100BASE-T1 away from heaters, stoves, fireplaces, and other sources of heat.</p> <p style="text-align: center;">Do not expose the FlexMedia 100BASE-T1 to rain or use it near water.</p> <p style="text-align: center;">Do not use the FlexMedia 100BASE-T1 in areas of explosion hazard.</p> <p style="text-align: center;">The maximum allowed length of the power cable is 3m.</p> <p style="text-align: center;">Do not use the FlexMedia 100BASE-T1 in DC power supply networks.</p>

## 1.4 User Group

This document is written for expert technicians who are familiar with electronic components and systems.

Each person involved with assembly, line-up, operation, maintenance, or disposal of the FlexMedia 100BASE-T1 has to

- be a qualified technician, or electrician, or engineer
- strictly adhere to this manual
- receive a briefing by an authorized person

## 1.5 Meaning of Text Styles

In this document *filenames*, are marked with a different text format.

## 2 Product Description

### 2.1 FlexMedia 100BASE-T1 at a glance

The FlexMedia 100BASE-T1 is a bidirectional 100 Mbit Ethernet converter between the 2-wire standard 100BASE-T1 and the 4-wire standard 100BASE-Tx.

The Broadcom BCM89810 transceiver is used for the 100BASE-T1 conversion.


- Master and slave feature selectable with DIP-switch
- RJ45 connector for Ethernet
- D-Sub 9 pin for 2 wire Ethernet
- Power supply range: 8 – 48 V

#### Field of application

- Testing
- Diagnostics

### 2.2 Accessory Parts

For further information about accessories for the FlexMedia 100BASE-T1 see chapter 7.2 Accessory Parts.

	<b>NOTICE</b>
	Use only accessory parts from <i>STAR COOPERATION</i> listed in chapter 7.2 Accessory Parts to ensure proper function and for warranty reasons! Other accessories without prior written consent of <i>STAR COOPERATION</i> must not be used.

## 3 Technical Data

### 3.1 Electrical Characteristics

Supply voltage	Min.	Typ.	Max.
Operating	+8.0 V	-	+48.0 V
Absolute maximum (non-operating)	-60.0 V	-	+60.0 V
Supply current - operating	typ: 80 mA		

Table 1: Electrical characteristics

### 3.2 Physical Characteristics

Connectors	RJ45, D-Sub 9
Weight approx.	145 g
Dimensions approx. L x W x H	92 * 65 * 28 mm <sup>3</sup>

Table 2: Physical characteristics

### 3.3 Environmental Conditions

Temperature	Operating:	-40°C - +85°C
	Non-operating:	-40°C - +85°C
	Storage:	-40°C - +85°C
Relative Humidity	0% - 90% r. H., non-condensing	

Table 3: Environmental conditions

### 3.4 Interfaces

The FlexMedia 100BASE-T1 has a power cable, two connectors, a 2 pin DIP-switch and some LED's. The following figures show the position of each interface.

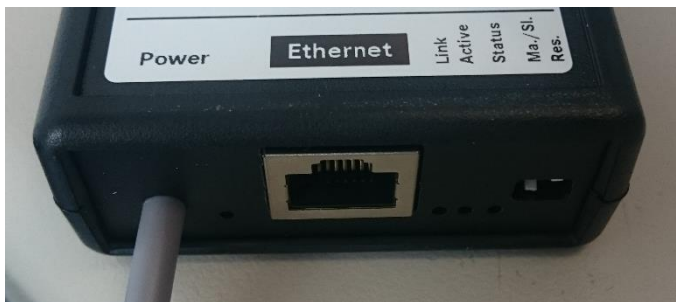


Figure 1: Side with Power and Ethernet




Figure 2: Side with 100BASE-T1



### 3.4.1 Power

The valid range of the power supply for the FlexMedia 100BASE-T1 is within 8 - 48 V DC. The power supply input of the FlexMedia 100BASE-T1 is EMC and reverse protected.

Internal voltage regulators generate the operating voltages out of this supply voltage.

	NOTICE
	<p>The maximum allowed length of the power cable is 3m.</p> <p>Do <b>not</b> use the FlexMedia 100BASE-T1 in DC power supply networks.</p>

The green LED near the power cable shows the power supply status, if the LED is on, the power is OK.




Figure 3: Power cable and green power LED

Power cable		
Pin	Signal Name	Description
1	GND	Ground signal
2	Uin	Power in allowed in the range from 8 - 48 V

Table 4: Power cable

### 3.4.2 Ethernet (RJ45)

The FlexMedia 100BASE-T1 support a 100BASE-TX (100 Mbit/s Ethernet) interface at the power connector side. This connector supports only "100MBit/s full-duplex" mode.

	NOTICE
	<p>The maximum allowed length of the Ethernet cable is 30m.</p>

There are two LEDs near the RJ45 connector, a green LED and a yellow LED. The yellow LED shows the link state. The green LED shows traffic.

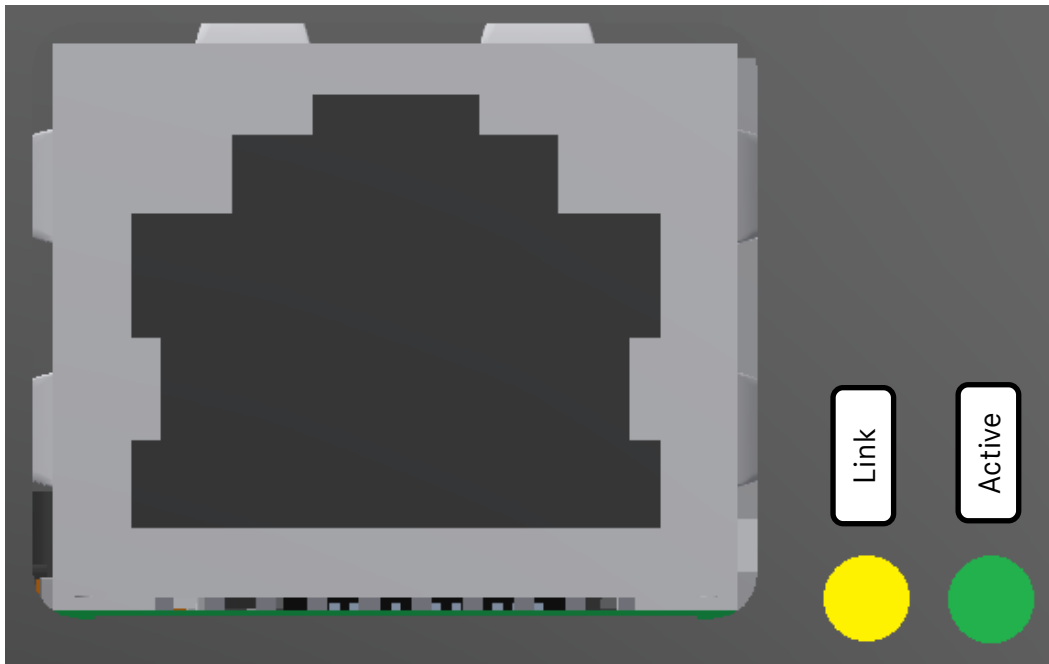


Figure 4: Ethernet connector with yellow and green LED

Connector RJ45 (Ethernet)		
Pin	Signal Name	Description
1	TP0+	Ethernet signal plus 0.
2	TP0-	Ethernet signal minus 0.
3	TP1+	Ethernet signal plus 2.
4	TP2+	Not needed (100 Mbit/s only)
5	TP2-	Not needed (100 Mbit/s only)
6	TP1-	Ethernet signal minus 1.
7	TP3+	Not needed (100 Mbit/s only)
8	TP3-	Not needed (100 Mbit/s only)

Table 5: Ethernet (RJ45) Connector

### 3.4.3 Status LED and DIP-switch

The FlexMedia 100BASE-T1 has a yellow Status LED at the power connector side.

Status LED	Description
blinking	The device tries to establish a link at the 100BASE-TX connector.
permanently ON	A link is established at the 100BASE-TX connector.

The DIP-Switch '1' configures the 100BASE-T1 interface - it changes between Master or Slave function. If the switch is up the transceiver is configured as Slave, if the switch is down it is configured as Master.

The DIP-Switch '2' has no function (reserved).

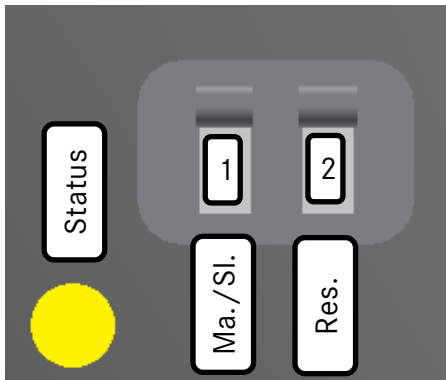


Figure 5: Yellow status LED and DIP-switch

### 3.4.4 2-Wire Ethernet (D-Sub)

The FlexMedia 100BASE-T1 support a 100BASE-T1 interface.

There are two LEDs near the D-Sub connector: a green LED and a yellow LED. The yellow LED shows the link state. The green LED shows traffic.

The following LED states are shown:

State	Link LED	Active LED	Description
No Link	cyclically switching between ON and OFF (period 2s)	permanently ON	The device tries to establish a link.
Link	permanently ON	toggles between ON and OFF	The active LED has inverted logic. If no communication is present, the LED is ON. Any communication switches the LED OFF.

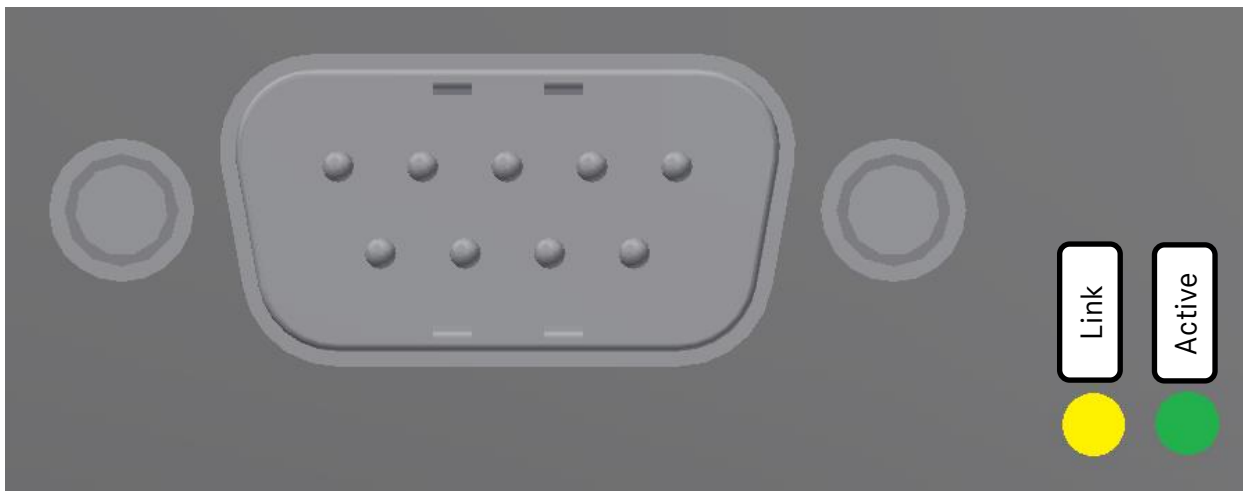


Figure 6: 100BASE-T1 D-Sub connector with yellow and green LED


Connector DSub (100BASE-T1 2-wire ethernet)		
Pin	Signal Name	Description
1, 2, 6 - 9	NC	Not connected
3	ETH-GND	Ground for ethernet, connect over an inductor to internal ground.
4	ETH_BP	100BASE-T1 bus plus signal.
5	ETH_BM	100BASE-T1 bus minus signal

Table 6: Connector for DSub (2-wire ethernet)

## 4 Getting Started

### 4.1 Assembly and Line-up

Read and follow these instructions when connecting and using the FlexMedia 100BASE-T1:

NOTICE	
	<p>Ensure that all signal lines connected to the FlexMedia 100BASE-T1 are in the allowed range.</p> <p>Be sure to connect all cables as described in this manual.</p> <p>Never insert anything metallic into the openings of the FlexMedia 100BASE-T1.</p> <p>Ensure to grasp the plug and not the cable when disconnecting the FlexMedia 100BASE-T1.</p>

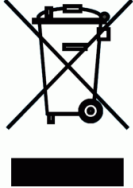
### 4.2 Configuration and Operation

Use the power cable of the FlexMedia 100BASE-T1 to connect with a power-supply within the correct voltage range.

Connect the 100BASE-T1 and 100BASE-Tx with their networks. Check the pinouts.

Check the state of the LEDs. Adjust the DIP-Switch if necessary.

## 5 Shipping, Maintenance and Disposal

	<p>Dispose off properly per regulations of the country where end-of-life occurs.</p>
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## 6 Troubleshooting

This chapter contains some frequently asked questions about the FlexMedia 100BASE-T1.

<b>1</b>	Effect	No LINK at the 100BASE-T1 connector.
	Solution	Check the DIP-Switch for correct Master/Slave configuration. A 100BASE-T1 communication is a Point-to-Point- Connection where on communication partner acts as 'Master' and one communication partner acts as 'Slave'.

<b>2</b>	Effect	No LINK at the Ethernet connector.
	Solution	Check the "Link Speed & Duplex" settings of the connected network adapter. See chapter 3.4.2 for supported configurations.

## 7 Ordering Information

### 7.1 FlexMedia 100BASE-T1

Product	Description	Ordering number
FlexMedia BASE100-T1	FlexMedia BASE100-T1	3-V0930A01

### 7.2 Accessory Parts

Product	Description	Ordering number
Customer specific parts		Please contact <i>STAR COOPERATION</i>

### 7.3 Related Documents

Document	Description	Ordering number
[1]		
[2]		
[3]		

## 8 Appendix

### 8.1 Appendix A: Guideline for handling ESD sensitive Products

- Any tester, equipment, or tool used at any production step or for any manipulation of semi-conductor devices must have its shield connected to ground.
- The product itself and the carrier system of the product respectively must be placed on a conductive table top or covered by an antistatic surface (superficial resistivity equal to or higher than  $0.5M\Omega/cm^2$ ), grounded through a ground cable (conductive cable from protected equipment to ground isolated through a  $1M\Omega$  resistor placed in series).
- All manipulation of finished goods has to be made at such a grounded worktable.
- The worktable must be free of all non-antistatic objects.
- An antistatic floor covering grounded through a conductive ground cable (with serial resistor between  $0.9M\Omega$  and  $1.5M\Omega$ ) should be used.
- It is recommended that you wear an antistatic wrist or ankle strap, connected to the antistatic floor covering or to the grounded equipment.
- If no antistatic wrist or ankle strap is worn, touch the surface of the grounded worktable before each manipulation of the ESD sensitive product.
- It is recommended that antistatic gloves or finger coats be worn.
- It is recommended that nylon clothing be avoided while performing any manipulation of parts.

### 8.2 Appendix B:

#### 8.2.1 Acronyms and Abbreviations

Item	Definition
BD	Bus driver
BP	Bus plus
BM	Bus minus
ECU	Electronic Control Unit
EMC	Electromagnetic Compatibility
ESD	Electro Static Discharge
NC	Not Connected
PCB	Printed Circuit Board
PL	Physical Layer

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Figure 6: 100BASE-T1 D-Sub connector with yellow and green LED ..... 11

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