EMCtools

Fiber Optic Switch

EMCtools
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1. Introduction

Functional tests e.g. in test-labs often require insulated switching of Battery Power or Terminal 15 or other inputs to control the device under test. For this purpose EMCtools offers special fiber optic transmitters and receivers.
Our EMCtools FO-Switch has been designed for emission and susceptibility tests. Electromagnetic field levels of 270 V/m and above are allowed. The handy plastic housing allows tests with limited test space and a minimum of impact on the field. The EMCtools FO-Switch is designed as a purely passive device (no internal clocks) and does not add noise during emission tests.
The EMCtools FO-Switch uses standard multimode fiber optic cables and allows galvanic isolated connection to the DUT via standard banana plug cables.

2. EMCtools FO-Switch

The FO-Switch Set consists of two devices: A transmitter unit and a receiver unit.

Both transmitter and receiver are built into a handy, rugged plastic housing (65x66x27mm).

Two versions of transmitter units are available:

- If a switching source is capable to supply 4 - 40V and a current of 25mA then our FO-Switch transmitter (Mod.-No.: 440) can be used. This transceiver does not need an additional power supply.

- If only a digital output is available for the transmitter input (4 - 48V), our FO-Switch transmitter (Mod.-No.: 450) can be used. This transceiver unit can be supplied by battery or the DUT power supply.

The receiver unit provides one galvanic isolated (> 600V) AC/DC (max. 36V peak) switch with a current rating of 4A. Contact resistance is typ. 60mOhm.
It can be supplied by battery or the DUT power supply.

FO-Switch Transmitter (Mod.-No.: 440):

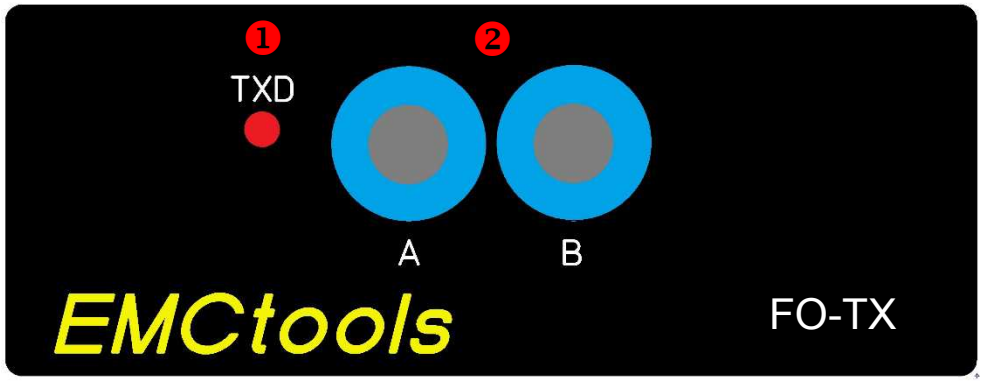


Fig. 1: Front Panel transmitter unit (Mod.-No.: 440)

No. in Fig. 1:	Description
1	Control-LED TXD activity
2	AC/DC Input 5-40V (eff.) - 25mA

An illuminated red LED (Fig.1 – No.2) indicates the status of data transmission.

Two 4mm banana connectors are used to connect the FO-Switch input to a switching output.

Fig.2: Rear panel transmitter unit

No. in Fig.2:	Description
1	Fiber optic connector TXD (Transmitter)

On the rear panel you can find the F-SMA connector „TXD“ for fiber optic data transmission (Fig.2 – No.1). Here the fiber optic cable is connected.
The „TXD“ (= transmit-data) labeled connector is the transmitter.

FO-Switch Digital Transmitter (Mod.-No.: 450):

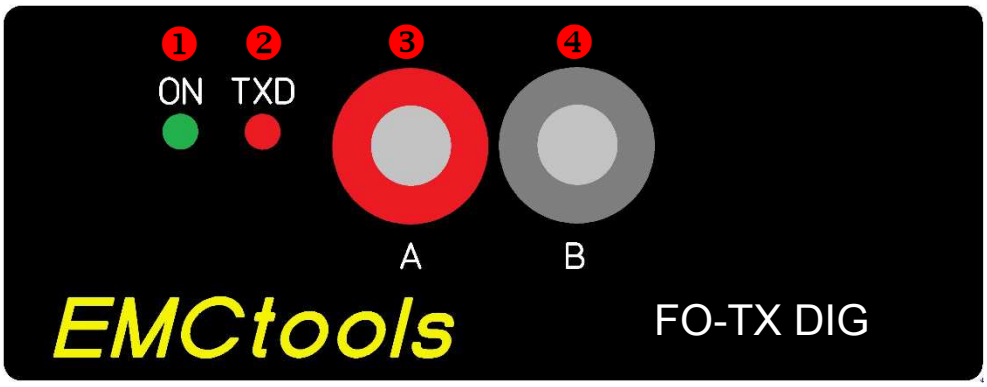


Fig. 1: Front Panel transmitter unit (Mod.-No.: 450)

No. in Fig. 1:	Description
1	Control-LED for Power on/off status and supply voltage: LED off when supply voltage less than 7V
2	Control-LED TXD activity
3	Switch signal input 4-48V DC – positive
4	Switch signal input 4-48V DC – negative

An illuminated green LED (Fig.1 – No.1) indicates the operating status of the FO-Switch

An illuminated red LED (Fig.1 – No.2) indicates the status of data transmission.

Two 4mm banana connectors (Fig.1 – No.3 and No.4) are used to connect the FO-Switch input to a switching output. The input impedance is > 10kOhm.

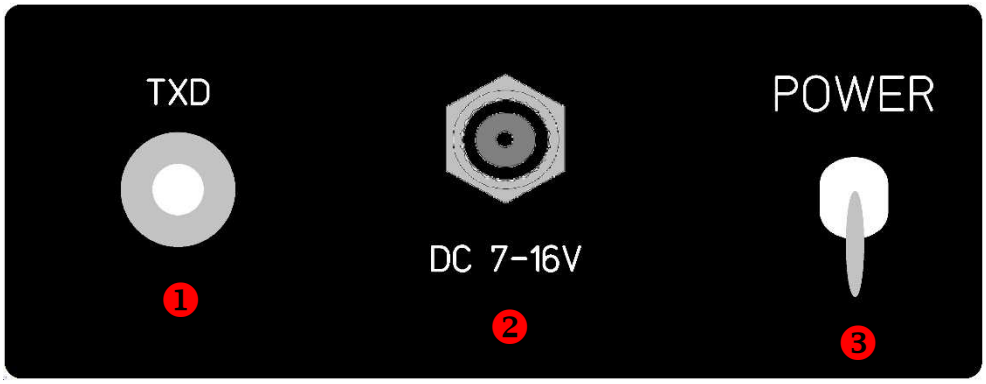


Fig.2: Rear panel transmitter unit

No. in Fig.2:	Description
1	Fiber optic connector TXD (Transmitter)
2	Power supply (DC Power Jack 5.5/2.1mm)
3	Power on/off toggle switch

On the rear panel you can find the F-SMA connector „TXD“ for the fiber optic data transmission (Fig.2 – No.1). Here the fiber optic cable is connected.
The „TXD“ (= transmit-data) labeled connector is the transmitter.

Power is supplied externally e.g. by using an external battery or power-supply (Fig.2 – No.2)

The device is put into and is taken out of operation by using the toggle switch (Fig.2 – No.3).

FO-Switch Receiver (Mod.-No.: 445):

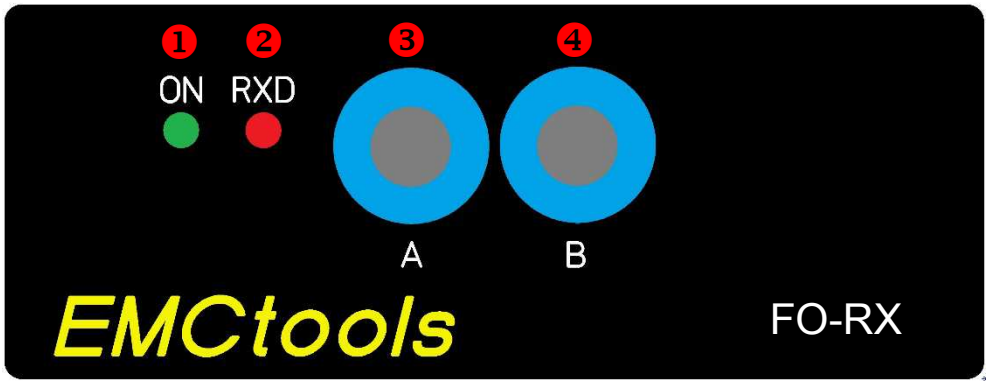


Fig. 1: Front Panel receiver unit (Mod.-No.: 445)

No. in Fig. 1:	Description
1	Control-LED for Power on/off status and supply voltage: LED off when supply voltage less than 7V
2	Control-LED RXD activity
3	Switch output A
4	Switch output B

An illuminated green LED (Fig.1 – No.1) indicates the operating status of the FO-Switch

An illuminated red LED (Fig.1 – No.2) indicates the status of data reception.

Two 4mm banana connectors (Fig.1 – No.3 and No.4) are the FO-Switch Output

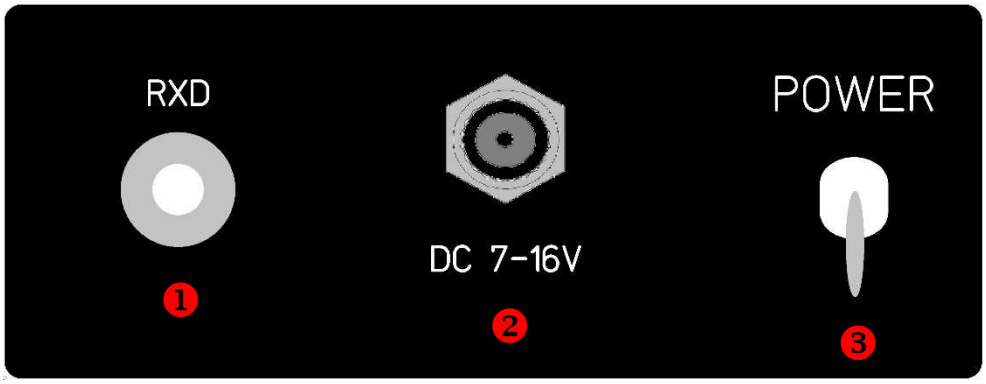


Fig.2: Rear panel receiver unit

No. in Fig.2:	Description
1	Fiber optic connector RXD (Receiver)
2	Power supply (DC Power Jack 5.5/2.1mm)
3	Power on/off toggle switch

On the rear panel you can find the F-SMA connector „RXD“ for the fiber optic data reception (Fig.2 – No.1). Here the fiber optic cable is connected.
The „RXD“ (= transmit-data) labeled connector is the receiver.

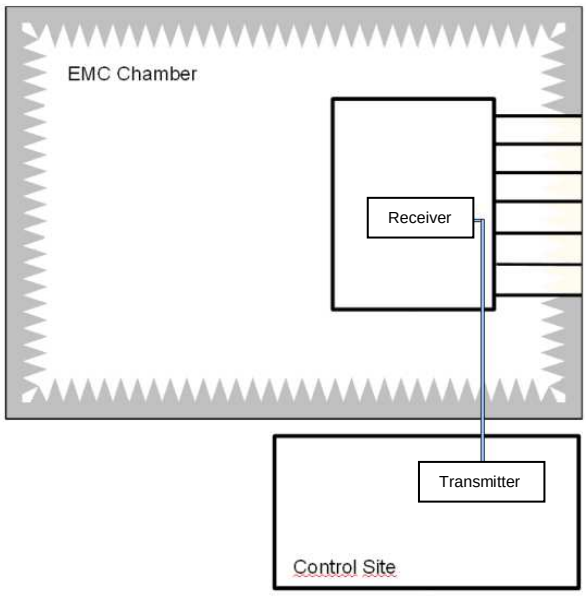
Power is supplied externally e.g. by using an external battery or power-supply (Fig.2 – No.2)

The device is put into and is taken out of operation by using the toggle switch (Fig.2 – No.3).

3. Setup of FO-Switch

1. Connect FO-Switch Transmitter „TXD“ and Receiver „RXD“ with a simplex fiber optic cable.
2. Plug in the power cables with attached cable ferrites acc. Photo 1 and connect power
3. Switch on FO-Switch (only Mod.-No.: 445 and 450).

Photo 1: Cable connection and application of cable ferrites



FO-Switch Receiver is put into the test environment.

It is connected to a FO-Switch Transmitter at the control site using a simplex fiber optic cable

Fig.3: FO-Switch setup in test environment

Alternative Setup:
Receiver unit outside the EMC chamber and Transmitter unit inside the EMC chamber.

5. Receiver Front-End

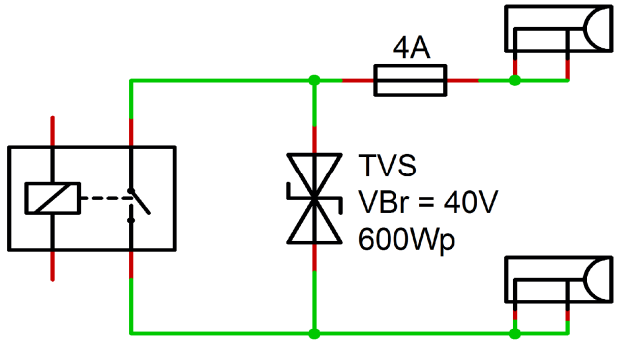


Fig.4: FO-Switch RX schematic

6. Replacing FO-Switch Receiver FUSE

The FO-Switch Receiver is protected against overcurrent by a fuse. It can be replaced:

1. Open the FO-Switch Receiver by removing the 2 screws on the bottom of the plastic housing.
2. Replace FUSE – replacement type: Littlefuse 0453004 – Mouser 576-0453004.MR