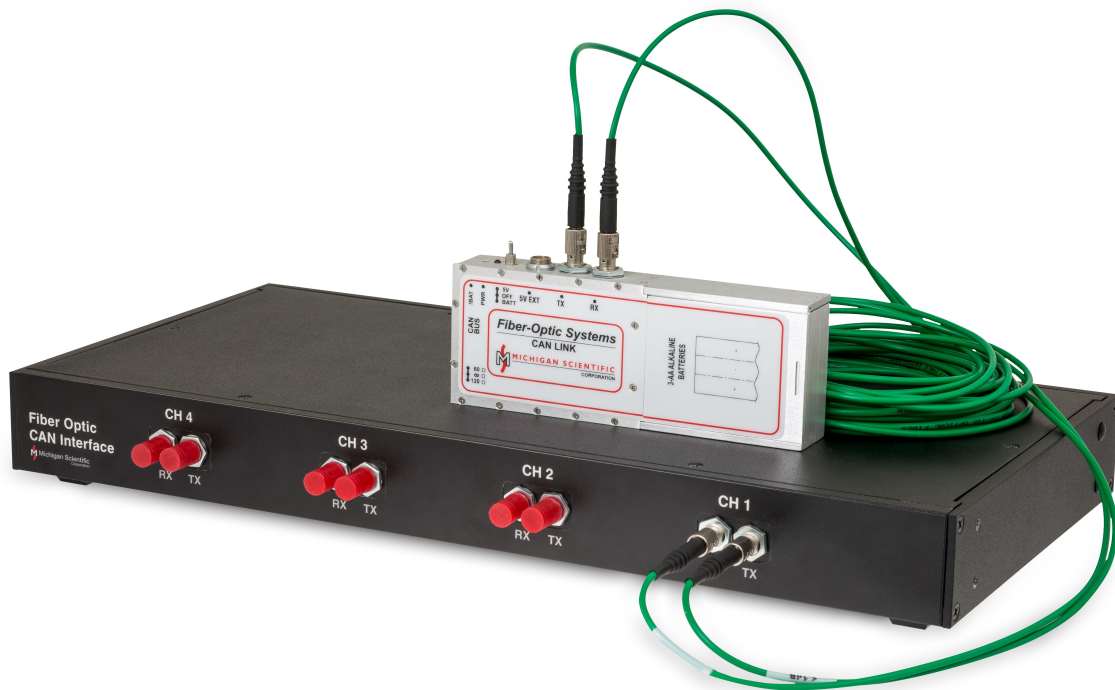


Fiber-Optic Systems

User Manual



Model: FO-CAN & FO-CAN-R

EM Hardened Differential CAN Transceiver Link



1. Description

2 FO-CAN modules combine to create a robust and versatile differential CAN link. In addition up to 4 FO-CAN modules can be used with a FO-CAN-R for an economical, multi-channel solution. Custom circuitry was specifically engineered to reduce latency providing a bi-directional link even at rates of 1 Mbit/s with 20 m of fiber-optic cable. The modules are inherently compatible with most differential CAN protocols.

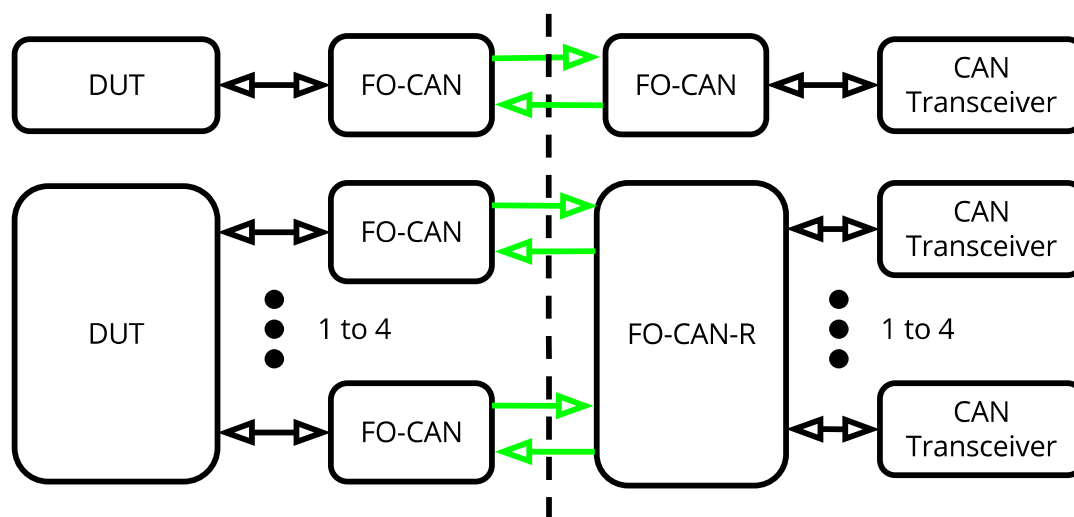


Figure 1: Possible setup configurations

Designed with the tester in mind the FO-CAN modules have easily selectable termination values of $60\ \Omega$, $120\ \Omega$, and ∞ by the flick of a switch as seen in Figure 5.

You will not have to interrupt tests to recharge equipment because a battery run time of more than 30 hours will exceed even the longest tests. The FO-CAN modules are compatible with 'AA' sized alkaline batteries for easy replacement, or for a more cost effective option rechargeable batteries may be used. The CAN bus pin-out is standard to most equipment avoiding custom cables.

FO-CAN modules have integrated filtering to ensure signal integrity. In addition the FO-CAN module shielding provides high immunity from electromagnetic interference (EMI) and electromagnetic pulse (EMP), while providing low radiated emissions. This allows for uncompromising electromagnetic compatibility (EMC) testing/engineering. The FO-CAN modules are validated for EMC up to $200\ \text{V/m}$ ($46\ \text{dBV/m}$) at 500 kHz to 18 GHz, and $600\ \text{V/m}$ (pulsed 5 % duty-cycle, $5\ \mu\text{s}$ rise-time) 1 GHz to 2.55 GHz.

2. Setup

Connect the FO-CAN to the DUT. Connect the FO-CAN module to either a FO-CAN-R or another FO-CAN module with ST multimode fiber-optic cables. The module connected to the DUT must be battery powered. The remote module may be powered by batteries or the external power adapter.

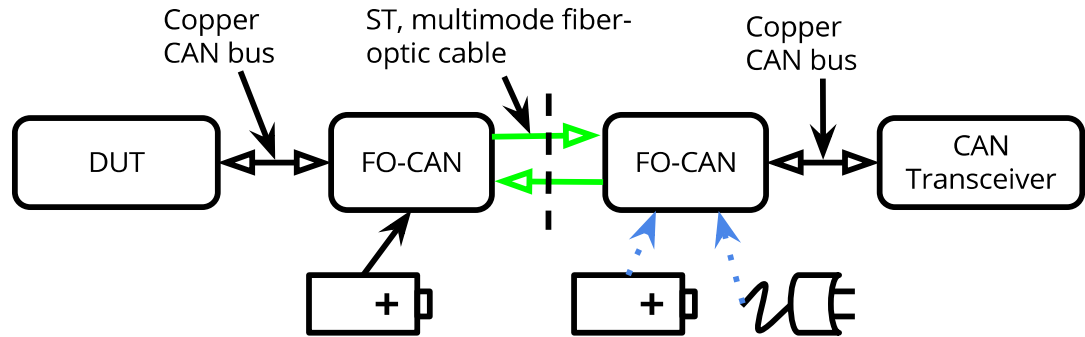


Figure 2: Setup Connections

Note: Fiber-optic cables must be cross connected as shown in Figure 3.

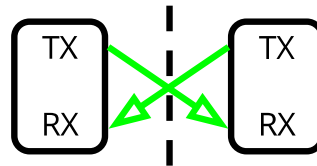


Figure 3: Cross connected modules

WARNING: The module connected to the DUT must be separated from the ground plane on a 50 mm thick foam block. The module enclosure cannot be touching any other piece of testing equipment (another module, cable harness, etc.).

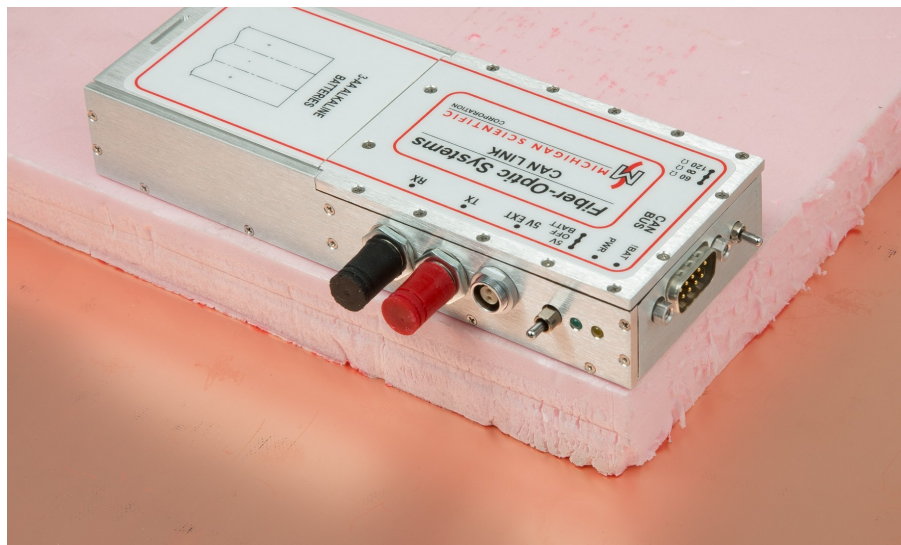


Figure 4: FO-CAN on 50 mm of foam

2.1. CAN Bus Termination

The selectable termination is easily adjusted by moving the switch located next to the CAN bus connector to the desired resistance as indicated on the label.



Figure 5: Switch selectable termination

WARNING: The FO-CAN must never terminate the CAN bus during BCI testing.

3. Operation

3.1. FO-CAN

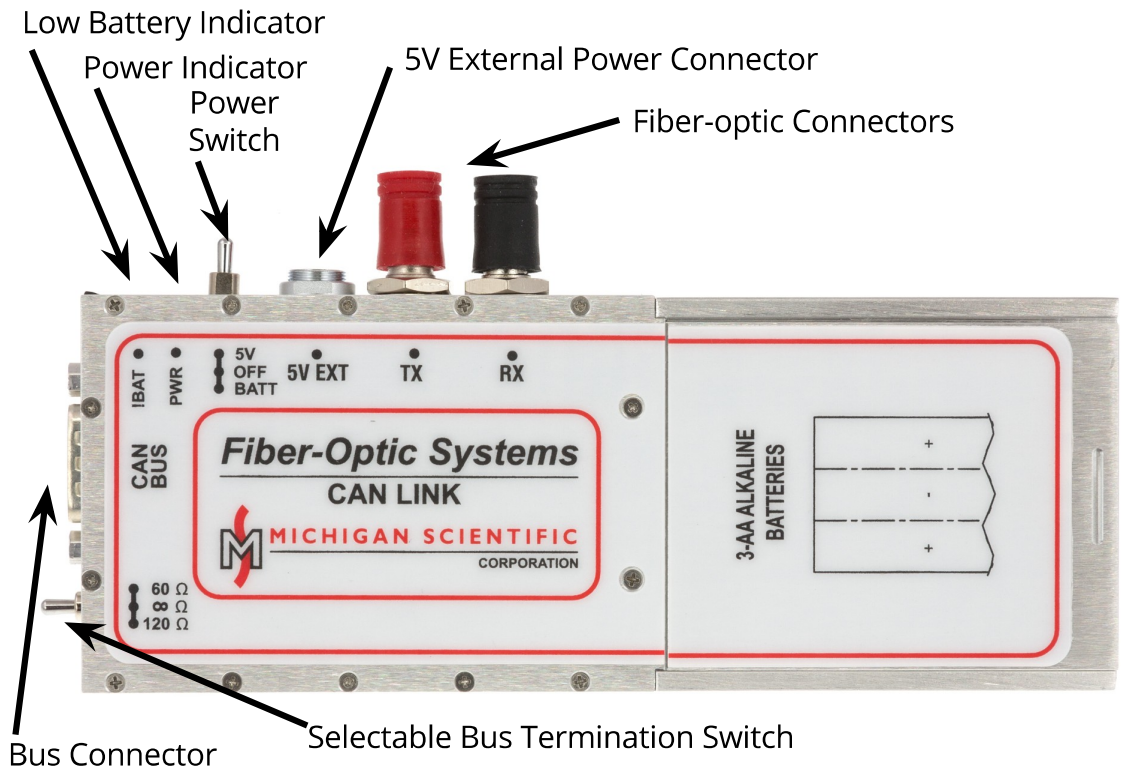


Figure 6: FO-CAN point out

The FO-CAN was designed for use with alkaline batteries. The red **!BAT** indicator illuminates when the alkaline batteries need replacement. NiMH may be used but the low-battery indicator will not work as intended. To power the unit select **BATT** for internal batteries, **5V** for the external power adapter, or **OFF** to turn off. Only the manufacturer supplied power adapter may be used.

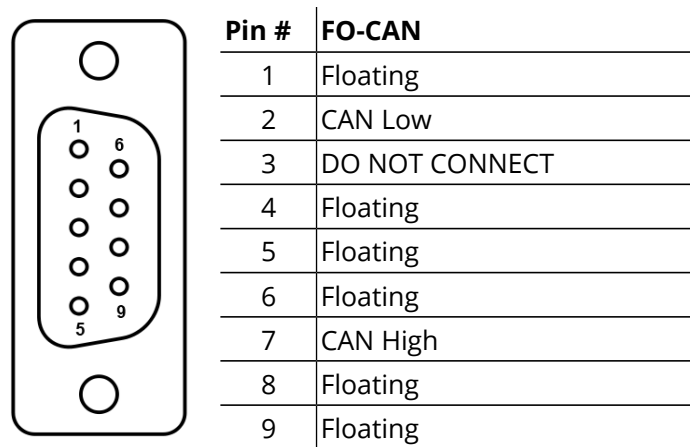


Figure 7: FO-CAN D-sub 9 pin male pin-out

3.2. FO-CAN-R

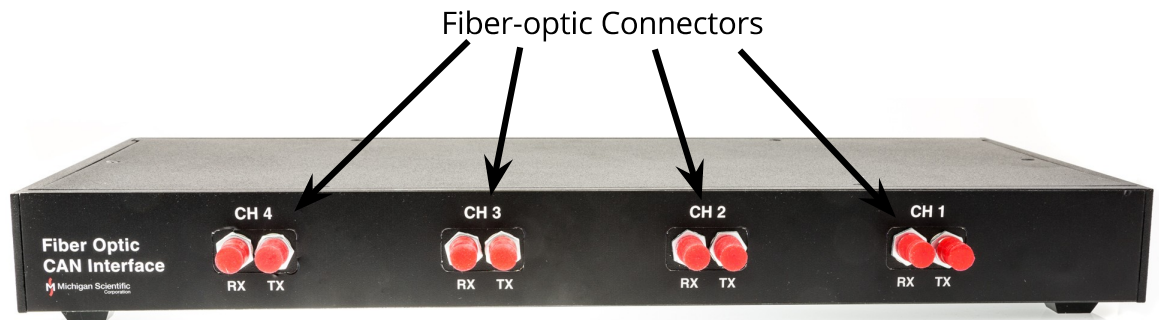


Figure 8: FO-CAN-R front point out

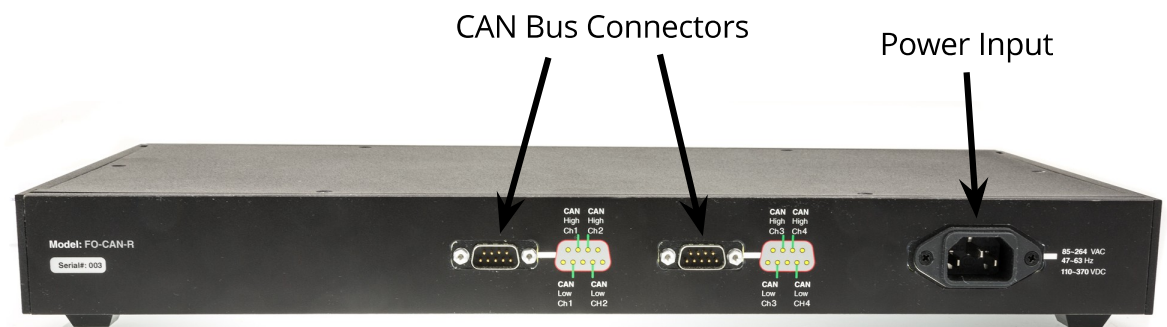
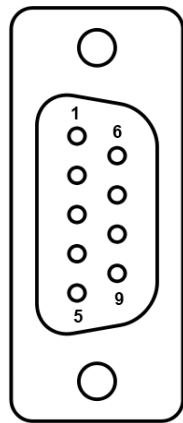


Figure 9: FO-CAN-R back point out

The FO-CAN-R is always on when the power cord is attached. Termination can be adjusted by removing the top cover plate and changing the position of the termination jumpers.



Pin #	D-sub 1	D-sub 2
1	Floating	Floating
2	Channel 1 CAN Low	Channel 3 CAN Low
3	Floating	Floating
4	Channel 2 CAN Low	Channel 4 CAN Low
5	Floating	Floating
6	Floating	Floating
7	Channel 1 CAN High	Channel 3 CAN High
8	Channel 2 CAN High	Channel 4 CAN High
9	Floating	Floating

Figure 10: FO-CAN-R D-sub 9 pin male pin-out

4. Technical Support

For technical support please contact:

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5. Specifications

FO-CAN	
Signal connector	D-sub 9 pin male
Operating temperature	-18 °C to 85 °C
Battery life	30 h
Power requirement	3-AA alkaline batteries or external adapter
Dimension (L x W x H)	155 mm x 60 mm x 25 mm
Weight	300 g
EMC	300 V/m 500 kHz to 1 GHz 200 V/m 1 GHz to 18 GHz 600 V/m pulsed 1 GHz to 2.5 GHz

FO-CAN-R	
Signal connector	2x D-sub 9 pin male
Operating temperature	0 °C to 50 °C
Power requirement	universal AC input
Dimension (L x W x H)	205 mm x 425 mm x 45 mm
Weight	1750 g

System General	
Signal Type	differential CAN
Data Rate	up to 1 Mbit/s
Copper length equivalent of both modules	19.7 m (without delay of additional cable)
Termination resistance	60 Ω / 120 Ω / ∞
Optical connector	ST
Optical cable	multimode
Optical cable length	up to 20 m @ 1 Mbit/s up to 80 m @ 500 kbit/s