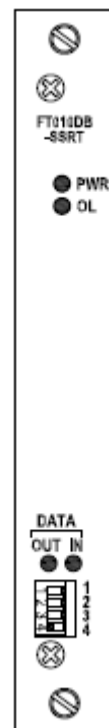




All Digital Fiber Optic Manufacturing Specialists

Installation and Operation Manual

FT010DB Series



8-bit Digital Series
1-ch Bi-directional Data
Fiber Optic Converter

Models covered in this manual

Standalone Units

Single-Mode Transmitters

FT010DB-SSTRSA

FT010DB-SSTRLSA

Single-Mode Receivers

FT010DB-SSRTSA

FT010DB-SSRTLSA

Multi-Mode Transmitter

FT010DB-SMTRSA

Multi-Mode Receiver

FT010DB-SMRTSA

Card Modules

Single-Mode Transmitters

FT010DB-SSTR

FT010DB-SSTRL

Single-Mode Receivers

FT010DB-SSRT

FT010DB-SSRTL

Multi-Mode Transmitter

FT010DB-SMTR

Multi-Mode Receiver

FT010DB-SMRT

Remark:

If the optical connector is FC type, the suffix in the model number will be “-*FXX*”. Eg.

FT010DB-FSTR

Table of Contents

(1)	SAFETY INSTRUCTIONS.....	3
(2)	PRODUCT OVERVIEW	4
2.1	Introduction.....	4
2.2	Models selection table	5
(3)	INSTALLATION	6
3.1	General.....	6
3.2	Standalone unit installation.....	6
3.3	Card module installation	7
(4)	CABLE CONNECTIONS & SETUP PROCEDURES	7
4.1	System Cable Connections	7
4.2	Data, Audio & Contact Closure ports assignments and pin connections	9
4.3	Dip switch setting procedures.....	10
4.4	Ground connection	12
(5)	OPERATIONAL GUIDES.....	13
5.1	FT010DB Series Transmitter.....	13
5.2	FT010DB Series Receiver.....	13
(6)	SPECIFICATIONS.....	14
(7)	DRAWINGS.....	15
(8)	WARRANTY INFORMATION	15
(9)	CONTACT INFORMATION.....	15

(1) Safety Instructions

Please be familiar with all information in this manual prior to installation and operation.

Note 1: The products described contain a Class 1 laser or LED fiber optic emitter. The following safety precautions apply.

Warning: Do not disconnect the fiber optic connector while the unit is powered up. Exposure to Class I invisible optical radiation is possible when the internal fiber optic connector is disconnected while the unit is powered up.

Caution: Any access to the controls, adjustments, or performing operations, which are other than those specified may result in hazardous radiation exposure. Permanent eye damage or other bodily injuries may be resulted from such exposure even for only seconds.

Note 2: This assembly contains parts sensitive to damage by electrostatic discharge (ESD). ESD precautionary procedures should be applied in the course of touching, removing or inserting parts or assemblies.

(2) Product Overview

2.1 Introduction

The FT010DB Series products comprise of either single-mode or multi-mode fiber optic transmitters and receivers for the optical transmission of ONE bi-directional (Tx ↔ Rx) data signals on one fiber. The products work at wavelengths of 1310nm and 1550nm with either a 9/125um or 62.5/125um fiber for single-mode or multi-mode transmission respectively.

Transparent data transmission is accomplished in RS232, RS422 and RS485 formats regardless of the type of communication protocol implemented within the system. Time Division Multiplex (TDM) technology is employed for digital transmission of forward video and data; whereas optical Wavelength Division Multiplex (WDM) technology is employed for simultaneous reverse data transmission as well as bi-directional data transmission.

For single-mode transmission, we also offer specifically designed products for long-haul transmissions up to 60km. These models include the letter “L” in the suffix, e.g. FT010DB-SSTR \overline{L} for Tx, FT010DB-SSRTL for Rx, etc.

The FT010DB Series units are available as standalone units, which can be mounted horizontally or vertically wall-mounted on any fixture. The standalone unit comes with an external power supply FT-PA/12V, which can be powered by local 110/220V power.

The FT010DB Series units are also available as plug-in card modules installed in a 19” rack-mount chassis. Each plug-in card occupies one slot in the rack-mount chassis. The rack mount chassis has to be ordered separately, and comes with its own power supply for powering the installed card modules.

2.2 Models selection table

Type	Mode	Models ¹	Descriptions	Installation requirements	Remarks
Standalone Units	Single-Mode	FT010DB-SSTRSA	Single-mode 1 bi-directional Data Transmitter Standalone unit	Horizontally or vertically wall-mounted Standalone unit	FT-PA/12V external power supply is included for the Standalone unit ²
		FT010DB-SSTRLSA	Single-mode Long-haul 1 bi-directional Data Transmitter Standalone unit		
		FT010DB-SSRTSA	Single-mode 1 bi-directional Data Receiver Standalone unit		
		FT010DB-SSRTLSA	Single-mode Long-haul 1 bi-directional Data Receiver Standalone unit		
	Multi-Mode	FT010DB-SMTRSA	Multi-mode 1 bi-directional Data Receiver Standalone unit		
		FT010DB-SMRTSA	Multi-mode Long-haul 1 bi-directional Data Receiver Standalone unit		
Card Modules	Single-Mode	FT010DB-SSTR	Single-mode 1 bi-directional Data Transmitter Card Module	Housed in FT-C18 chassis ³	FT-C18 chassis has to be ordered separately
		FT010DB-SSTRL	Single-mode Long-haul 1 bi-directional Data Transmitter Card Module		
		FT010DB-SSRT	Single-mode 1 bi-directional Data Receiver Card Module		
		FT010DB-SSRTL	Single-mode Long-haul 1 bi-directional Data Receiver Card Module		
	Multi-Mode	FT010DB-SMTR	Multi-mode 1 bi-directional Data Transmitter Card Module		
		FT010DB-SMRT	Multi-mode 1 bi-directional Data Receiver Card Module		

¹ If the optical connector is FC type, the suffix in the model number will be “-FXX”. Eg. FT010DB-FSTR

² FT-PA/12V works under 100 -240VAC, 50/60Hz power supply

³ Refer to FT-C18 product manual for specifications

(3) Installation

3.1 General

All OT Systems products are thoroughly inspected, tested and securely packaged before delivery to ensure a stable, intact and trouble-free service. Please check the equipment upon receipt for any visible damage which may have been caused during shipping.

The FT010DB Series standalone units (Fig.3.1) can be either horizontally or vertically wall-mounted, or mounted on any fixture. The Standalone unit works with an external power supply FT-PA/12V powered by local 110/220V power.

The FT010DB Series card modules are housed inside the FT-C18 rack-mount chassis (Fig. 3.2) with an included power supply unit. The whole chassis is powered by local 110/220V power. FT-C18 is a standard 19" (483mm) rack-mount chassis which occupies 4 rack units (177.8mm) in height. Each FT010DB card module occupies one slot and a total of 18 cards can be housed inside the chassis.



Fig. 3.1 Standalone unit



Fig. 3.2 FT-C18 chassis

3.2 Standalone unit installation

- a) Mount the standalone unit onto a fixture, (either on the wall or on a flat surface) with four screws through the holes on the mounting frame to secure it in position.
- b) The provided power supply should also be mounted on the same fixture or in the proximity for connection of the supply cables to the unit, provided that an AC power supply socket is nearby for powering the adaptor.
- c) Connect all the signal inputs and outputs at the back of the unit with appropriate cables: fiber optic cable for optical link, and UTP cables for data input/output (Tx/Rx).
- d) Once the unit is powered up, check that the red POWER LED on the unit is lit. If not, check the power supply cable connections between the unit and the power supply socket.
- e) With all the signals available at the input and output ports, check the status of LEDs located on the unit. With correct status of each LED, installation is now completed [for LEDs status, see **Operational Guides** on this manual's section (5)].

3.3 Card module installation

- a) Insert the card module into the FT-C18 chassis along the top and bottom card guides of an empty slot and push the card into the multi-pin socket at the rear firmly. Secure with the provided thumb screws.
- b) Repeat the above procedure for all the rest card modules. Unused slots must be covered with blank panels provided.
- c) Connect all the signal inputs and outputs at the back of the unit with appropriate cables: fiber optic cable for optical link, and UTP cables for data input/output (Tx/Rx).
- d) Once the chassis is powered up, check that the red POWER LED on the front and back panels of the card modules are lit. If not, check the power supply cable connections between the chassis and the power supply socket. For failures of individual card's POWER LEDs, check the corresponding card modules, whether they have been inserted properly.
- e) With all the signals available at the input and output ports, check the status of LEDs located on the unit. With correct status of each LED, installation is now completed [for LEDs status, see **Operational Guides** on this manual's section (5)].

(4) Cable Connections & Setup Procedures

4.1 System Cable Connections

Signal Type	Cable Type	Connector
Optical	Single-mode or Multi-mode fiber	ST (or FC) Connector
Data	Twisted-pair Cable	Screw Terminal Block

Typical System Cable Connections Diagrams:

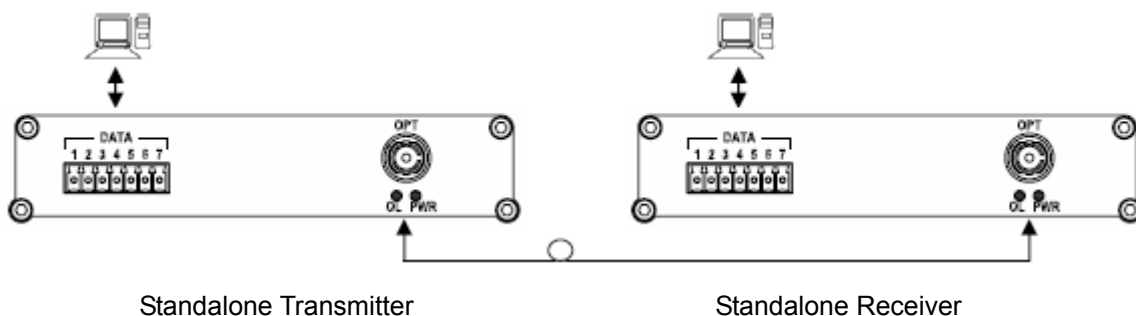
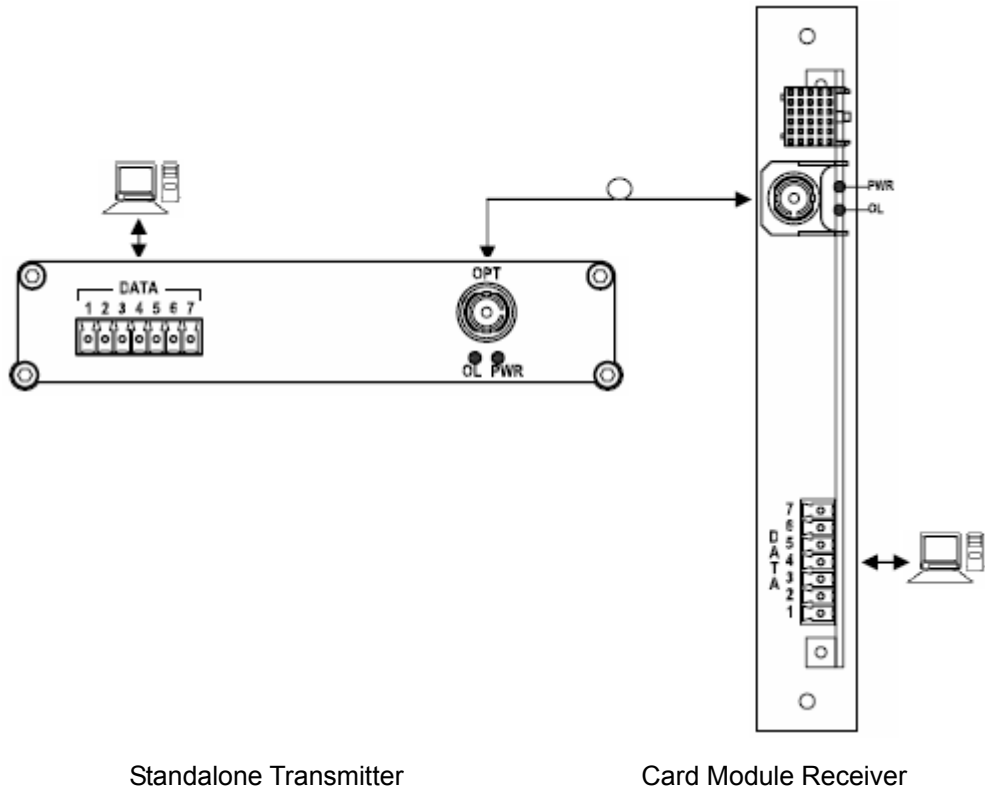


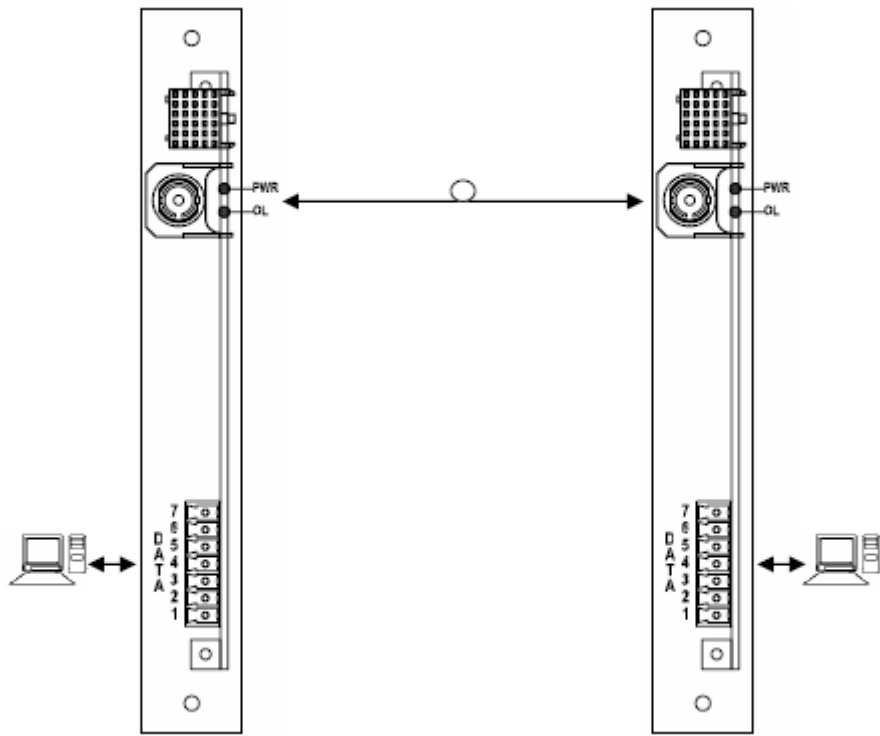
Fig. 4.1 Standalone unit to Standalone unit connection diagram



Standalone Transmitter

Card Module Receiver

Fig. 4.2 Standalone unit to Card Module connection diagram



Card Module Transmitter

Card Module Receiver

Fig. 4.3 Card Module to Card Module connection diagram

4.2 Data, Audio & Contact Closure ports assignments and pin connections

4.2.1 Data connections

For data input and output connections, please note the following pin assignment:

Pin Assignment (Screw Terminal Block)	1	2	3	4	5	6	7
Data format							
RS422/485 (4-Wire)	IN(+)	IN(-)	OUT(+)	OUT(-)	N/A	N/A	N/A
RS485 (2-Wire)	IN/OUT (+)	IN/OUT (-)	N/A	N/A	N/A	N/A	N/A
RS232	N/A	N/A	N/A	N/A	IN	OUT	Sig. COM

4-Wire RS422/485 Full Duplex Data communication connection diagram:

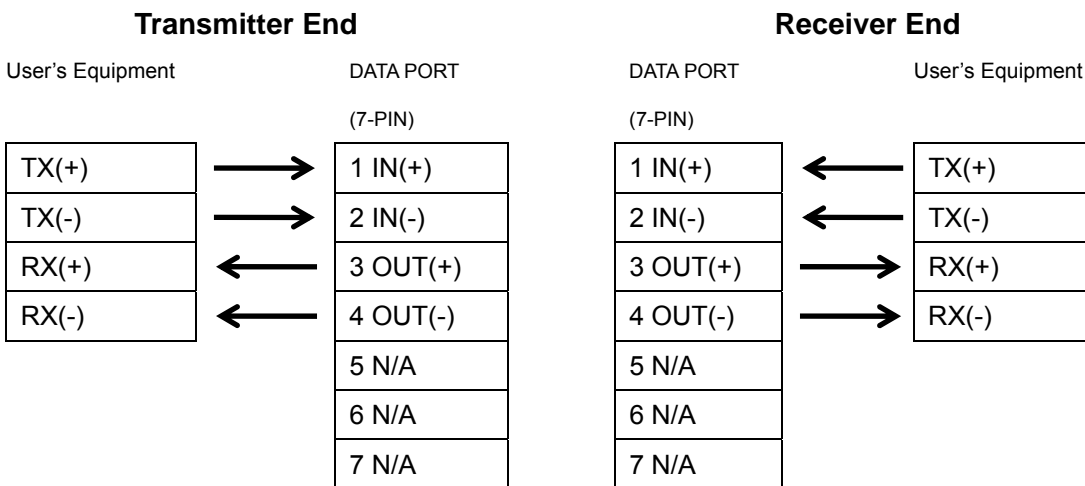


Fig. 4.4.1 Connector Pin Assignments for 4-wire RS422/485 data format at Data port

2-Wire RS485 Half Duplex Data communication connection diagram:

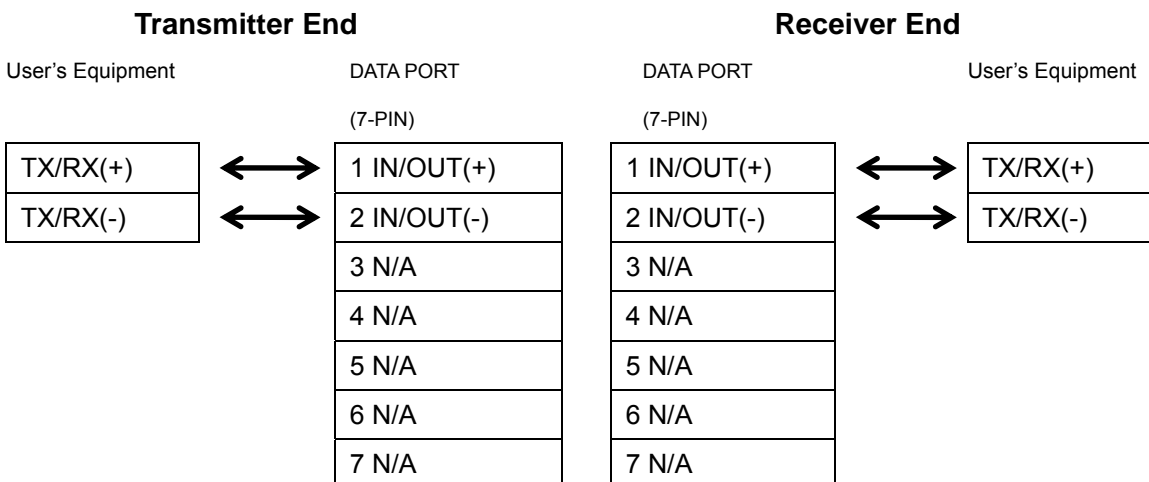


Fig. 4.4.2 Connector Pin Assignments for 2-wire RS485 data format at Data port.

RS232 Data communication connection diagram:

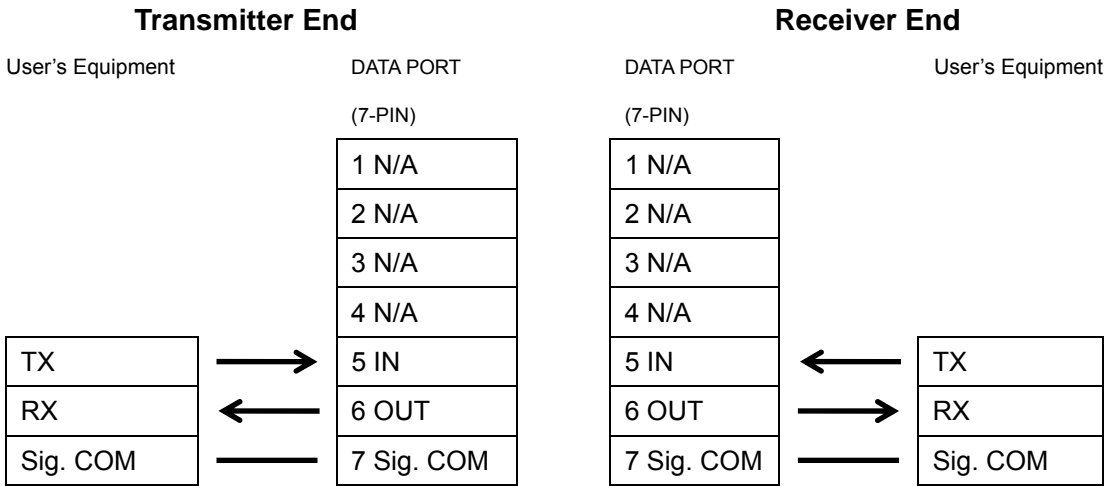


Fig. 4.4.3 Connector Pin Assignments for RS232 data format at Data port

4.3 Dip switch setting procedures

The only setup procedure is to select the appropriate line terminations and data transmission formats. Selections must be made by setting the dip switches through the access on the front panel (see Fig. 4.5).

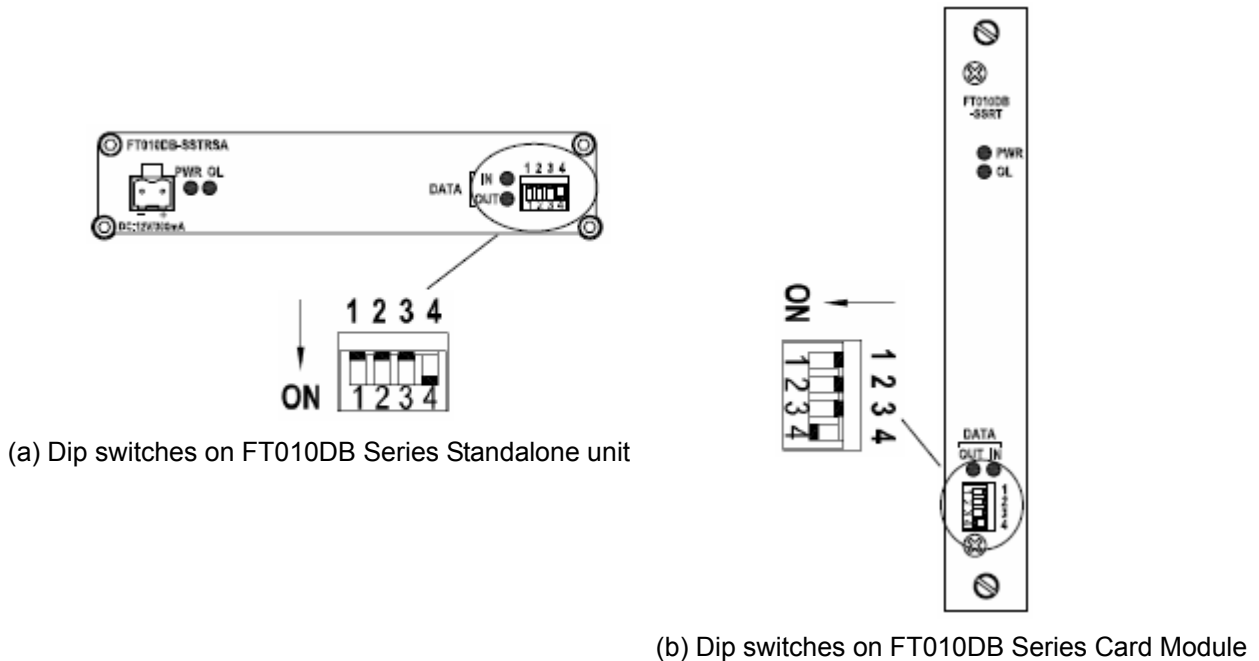


Fig. 4.5 Location of Dip Switches

Dip switch settings for various types of data transmissions

Function / Switch No.	Sw. 3	Sw. 4
RS485 (2-Wire)	OFF	OFF
RS422/485 (4-Wire)*	OFF	ON
RS232	ON	OFF

* **Factory setting [RS422/485 (4-Wire)]**

Dip switch settings for line terminations

Line Output Termination

Function / Switch No.	Sw. 1
Line Output Terminated	ON
Line Output Underminated*	OFF

Line Input Termination

Function / Switch No.	Sw. 2
Line Input Terminated	ON
Line Input Underminated*	OFF

* **Factory setting (Line Output and Line Input "Underminated")**

Industrial practice for line terminations

For RS422 4-wire communication, it is suggested to keep the input and output lines terminated in the ONE Tx to ONE Rx configuration.

For RS485 2/4-wire communication, the RS485 device can be disabled to stay in a Hi-Z state. It is very important that the data lines have to be terminated with a resistor being connected across the pair wires so as to eliminate the residual standing signal waves on the lines in the Hi-Z line condition. So, it is recommended that the lines should be terminated with the appropriate resistance. When more than one RS485 device are connected in a daisy-chain configuration, only the farthest device on the loop, i.e. the device located at the end of the line, should be terminated; whereas the middle ones are set to "Underminated" status. See the figure 4.6 below for reference.

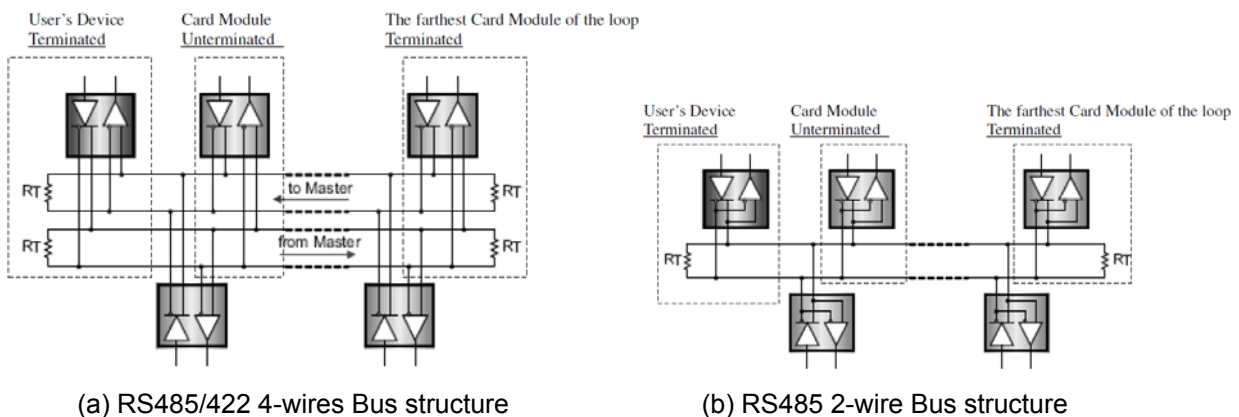


Fig. 4.6 Termination of different Bus structures

4.4 Ground connection

For enhanced safety to reduce the risks of electrical shock and physical damage, caused by lightning and other power surges, as well as a connection to the surge suppression devices in the product, a screw terminal is provided on the Standalone cabinets (Fig. 4.7). It is highly recommended that the Standalone unit have good ground connections to the buildings ground in accordance with the local codes.

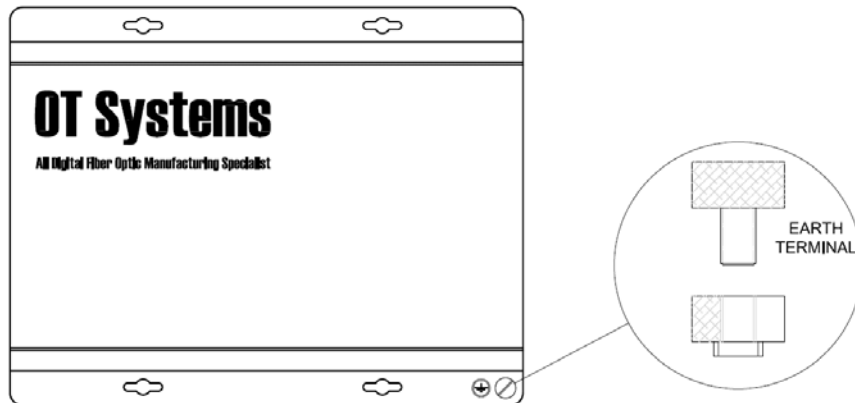


Fig. 4.7 Standalone unit earth ground terminal location

(5) Operational Guides

5.1 FT010DB Series Transmitter

LED Indicators

Indicator	Color	Description
PWR	Red	Lit when power is supplied to the Transmitter.
OL	Yellow	Lit when optical signal from receiver to transmitter is active.
DATA	IN	Blinks when input data is available at Tx.
	OUT	Blinks when output data is available at Tx.

Signal Ports

OPT -	ST (or FC) Optical Connector for fiber cable connection.
DATA -	7-pin Screw Terminal Block for data signal.

5.2 FT010DB Series Receiver

LED Indicators

Indicator	Color	Description
PWR	Red	Lit when power is supplied to the Receiver.
OL	Yellow	Lit when optical signal from transmitter to receiver is active.
DATA	IN	Blinks when input data is available at Rx.
	OUT	Blinks when output data is available at Rx.

Signal Ports

OPT -	ST (or FC) Optical Connector for fiber cable connection.
DATA -	7-pin Screw Terminal Block for data signal.

(6) Specifications

PARAMETERS	MODELS*	FT010DB-SSTR(RT)SA FT010DB-SSTR(RT) (Single-Mode)	FT010DB-SSTR(RT)LSA FT010DB-SSTR(RT)L (Single-Mode)	FT010DB-SMTR(RT)SA FT010DB-SMTR(RT) (Multi-Mode)
	OPTICAL			
No. of Fiber / Connector		1 / ST (or FC)	1 / ST (or FC)	1 / ST (or FC)
Wavelength		1310/1550 nm	1550/1310 nm	1310/1550 nm
Optical Power Budget		17 dB	24 dB	23 dB
Max Distance (km)		40 km	60 km	4 km
DATA				
Channel / Connector		1 / 7-pin Screw Terminal		
Direction		Bi-directional (Duplex)		
Electrical Format		RS232, RS422, RS485 (2-wire, 4-wire) Tri-state		
Transmission Rate		0~256 Kbps		
POWER				
Power consumption		12VDC @ 3.6W		
Power Supply		Standalone unit: FT/PA12V DC Adaptor Card module: Powered by FT-C18 chassis		
Connector (Standalone unit)		2-pin Screw Terminal		
PHYSICAL				
Weight		Standalone unit: 0.6 kg Card module: 0.16 kg		
Dimensions (W x H x D)		Standalone unit: 156 x 30.5 x 223 mm (MAX) Card module: 148 x 20.4 x 213 mm (MAX)		
ENVIRONMENTAL				
Operating Temperature		-40°C ~ +75°C		
Storage Temperature		-40°C ~ +85°C		
Relative Humidity		0 ~ 95% non-condensing		
MTBF		>100'000 Hours		

*If the optical connector is FC type, the suffix in the model number will be "-FXX". Eg. FT010DB-FSTR

(7) Drawings

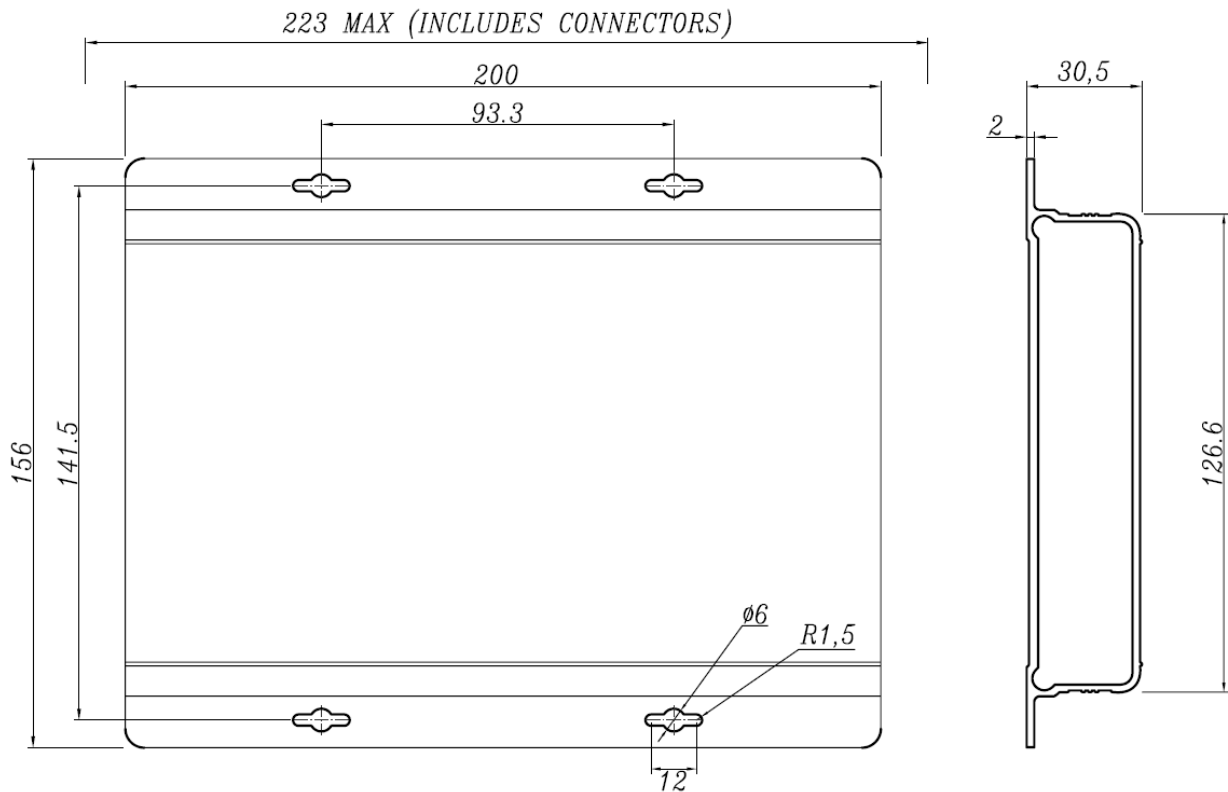


Fig. 7.1 Dimensional drawings of Standalone unit (mm)

(8) Warranty Information

All OT Systems products are subject to a limited life-time warranty offered by the company in normal circumstances. Please refer to the OT Systems Products Warranty Statement for details. Access to the statement is available in our company website at www.ot-systems.com.

(9) Contact Information

OT Systems Ltd. (Hong Kong)

Unit 1023, 10/F Landmark North
 39 Lung Sum Avenue
 Sheung Shui, N.T., Hong Kong
 Tel. +852 2672 5153
 Fax. +852 2679 0756
sales@ot-systems.com

OT Systems Ltd. (USA)

River Heights Business Park
 5375 US Highway 34
 Oswego, IL 60543, USA
 Tel. +1 630 554 9178
 Fax. +1 630 554 9179
sales.usa@ot-systems.com