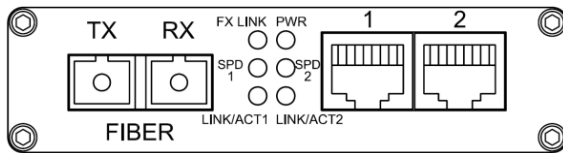




TRANSMISSION SOLUTIONS SPECIALISTS

# Installation and Operation Manual

## ET2212 Series



## Network Switches Series

Industrial 2-port 10/100/1000BASE-TX to 1000BASE-LX Ethernet Switch

## Models covered in this manual

### Standalone units

#### Fiber connector in SC

Multi-Mode (2-Fiber)

ET2212-A-SA

Single-Mode (2-Fiber)

ET2212-B-SA

#### Fiber connector in ST

Multi-Mode (2-Fiber)

ET2212-G-SA

Single-Mode (2-Fiber)

ET2212-H-SA

### Card Modules

#### Fiber connector in SC

Multi-Mode (2-Fiber)

ET2212-A-CM

Single-Mode (2-Fiber)

ET2212-B-CM

#### Fiber connector in ST

Multi-Mode (2-Fiber)

ET2212-G-CM

Single-Mode (2-Fiber)

ET2212-H-CM

## Table of Contents

<b>TABLE OF CONTENTS.....</b>	<b>3</b>
<b>(1) SAFETY INSTRUCTIONS.....</b>	<b>4</b>
<b>(2) PRODUCT OVERVIEW .....</b>	<b>5</b>
2.1 INTRODUCTION.....	5
2.2 PRODUCTS HIGHLIGHTS.....	5
2.3 MODELS SELECTION TABLE .....	6
<b>(3) INSTALLATION.....</b>	<b>7</b>
3.1 GENERAL.....	7
3.2 PACKAGE CONTENTS .....	7
3.3 SELECTING A SITE FOR THE MEDIA CONVERTER.....	8
3.4 CONNECTING TO POWER .....	8
<i>DC Jack Power Input.....</i>	<i>8</i>
<i>DC Power Input.....</i>	<i>8</i>
3.5 INSTALLATION .....	9
<b>(4) CABLE CONNECTIONS &amp; SETUP PROCEDURES .....</b>	<b>11</b>
4.1 SYSTEM CABLE CONNECTIONS .....	11
4.2 CONNECTING TO YOUR NETWORK .....	12
4.2.1 <i>The 10/100/1000Base-TX Connector.....</i>	<i>12</i>
4.2.2 <i>The 1000Base-LX Connectors.....</i>	<i>13</i>
<b>(5) OPERATIONAL GUIDES.....</b>	<b>14</b>
5.1 LEDs STATUS.....	14
5.2 SIGNAL AND POWER PORTS.....	14
<b>(6) SPECIFICATIONS.....</b>	<b>15</b>
<b>(7) DRAWINGS.....</b>	<b>17</b>
<b>(8) WARRANTY INFORMATION .....</b>	<b>17</b>
<b>(9) CONTACT INFORMATION .....</b>	<b>18</b>
<b>APPENDIX A.....</b>	<b>A</b>
<b>1. CONNECTOR PINOUTS.....</b>	<b>A</b>

## (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**

OT Systems' ET2212 media converter offers an easy and affordable solution for network managers to connect 10/100/1000 Fast Ethernet from UTP to fiber optic cabling. The switch uses a high performance auto-sensing exchange chip for full functionality of transfer and exchange, guaranteeing the safety and stability of data transfer. The switches are Standalone Wall-mount and can also operate in ET-C12 rack mount chassis, taking care of different installations. The switches are available in both single-mode and multi-mode fiber.

### **2.2 Products Highlights**

#### **Basic Features**

- Converts 10/100/1000Base-TX to 1000Base-LX
- 10/100/1000Mbps-Full/Half duplex, Auto-Negotiation
- Singlemode or Multimode fiber operation
- Dual-core fiber with SC or ST connectors
- Store and forward switching mechanism
- MDI/MDI-X Auto-Crossover supported
- Plug-and-Play/ Hot-swappable
- -20 °C to 60 °C (-4 °F to 140 °F) operating temperature
- Wall-mount or operate in ET-C12 rack mount chassis.

### 2.3 Models selection table

Models	Descriptions				
	Fiber Options	Wavelengths	Links Budget	Max. Distance	Installation requirements
ET2212-A-SA	Multimode/2-fiber/SC	1310nm	19dB	500m	Horizontally or vertically wall-mounted Standalone unit <sup>1</sup>
ET2212-B-SA	Singlemode/2-fiber/SC	1310nm	19dB	20Km	
ET2212-G-SA	Multimode/2-fiber/ST	1310nm	19dB	500m	
ET2212-H-SA	Singlemode/2-fiber/ST	1310nm	19dB	20Km	
ET2212-A-CM	Multimode/2-fiber/SC	1310nm	19dB	500m	Housed in ET-C12 chassis <sup>2</sup>
ET2212-B-CM	Singlemode/2-fiber/SC	1310nm	19dB	20Km	
ET2212-G-CM	Multimode/2-fiber/ST	1310nm	19dB	500m	
ET2212-H-CM	Singlemode/2-fiber/ST	1310nm	19dB	20Km	

<sup>1</sup> ET-PA/12V 1.25A 12VDC power adapter works under 100 -240VAC, 50/60Hz power supply; DC Jack(US, European, UK or Australian power plug available)

<sup>2</sup> Refer to ET-C12 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.

### 3.2 Package Contents

When you unpack the product package, you shall find the items listed below. Please inspect the contents, and report any apparent damage or missing items immediately to your authorized reseller.

- ✓ Ethernet Switch
- ✓ Quick Installation Guide
- ✓ External 12VDC power adapter & Power Cord (for Standalone Wall-mount type)

The Standalone type ET2212 Series (Fig. 3.1) can be either horizontally or vertically wall-mounted, or fits within the most camera housings, etc. It works with an external 12VDC power supply.



Fig. 3.1 *ET2212*

The Card module can be used as slide-in module to the 19" 3U high converter rack ET-C12. See Fig.3.2(a) for the 12-slot Rack Mount Chassis which can be purchased separately; Fig.3.2(b) for card module.



Fig. 3.2 (a) *ET-C12*



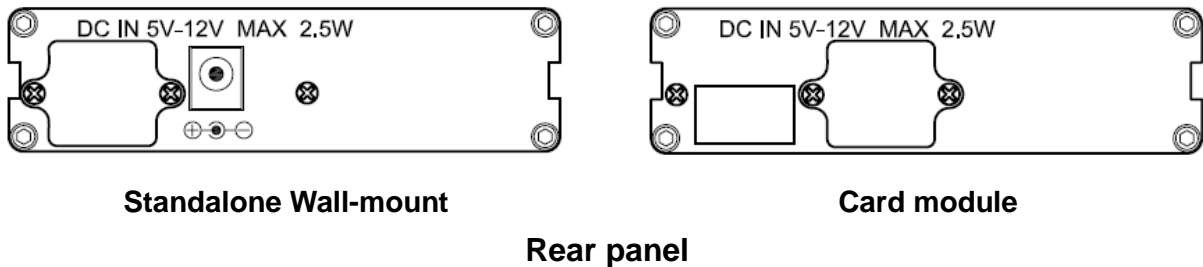
Fig. 3.2 (b) *Card module*

### 3.3 Selecting a site for the Media Converter

As with any electric device, you should place the switch where it will not be subjected to extreme temperatures, humidity, or electromagnetic interference. Specifically, the site you select should meet the following requirements:

- The ambient temperature should be between -20 to +60 degrees Celsius.
- The relative humidity should be less than 95 percent, non-condensing.
- Surrounding electrical devices should not exceed the electromagnetic field (RFC) standards.
- Make sure that the switch receives adequate ventilation.
- The power outlet should be within 1.8 meters of the switch.

### 3.4 Connecting to Power



\* The 5-PIN golden finger should be inside the square space that reserve for power input from the 5-PIN connector at ET-C12. The DC Jack should be covered by the cover panel for power of the card model by using 2 screws.

#### 3.4.1 Standalone Wall-mount

##### Power Input Assignment

DC IN 12V	Inner	12V
	Outer	GND

Size of DC JACK outside diameter (OD): 2.5mm;  
Length of the DC Jack:9.5mm

The tip (i.e. the inner conductor) carries the positive (+) pole.

##### DC Jack Power Input

**Step 1:** Connect the DC power cord to the DC jack on the rear of switch and then plug it into a standard DC outlet.

**Step 2:** Disconnect the power cord if you want to shut down the switch.

#### 3.4.2 Card module

##### DC Power Input

**Step 1:** Connect the DC power cord at the rear of ET-PSU/5V and then turn it on for power up the card modules within the ET-C12.

**Step 2:** The Card Module can be removed as slide-out module form the ET-C12 (12-slot Rack Mount Chassis). “Hot-swap” allows any module to be removed and restored without affecting the operation of any other. Or switch off the ET-PSU/5V to shut down all switches in the ET-C12.



### 3.5 Installation

This chapter gives step-by-step instructions about how to install the switch:

#### 3.5.1 Standalone wall mount type

- a) Mount the ET2212 onto a fixture or camera housings, e.g. a plank, (either on the wall or on a flat surface) with four screws through the holes on the mounting frame to secure it in position.

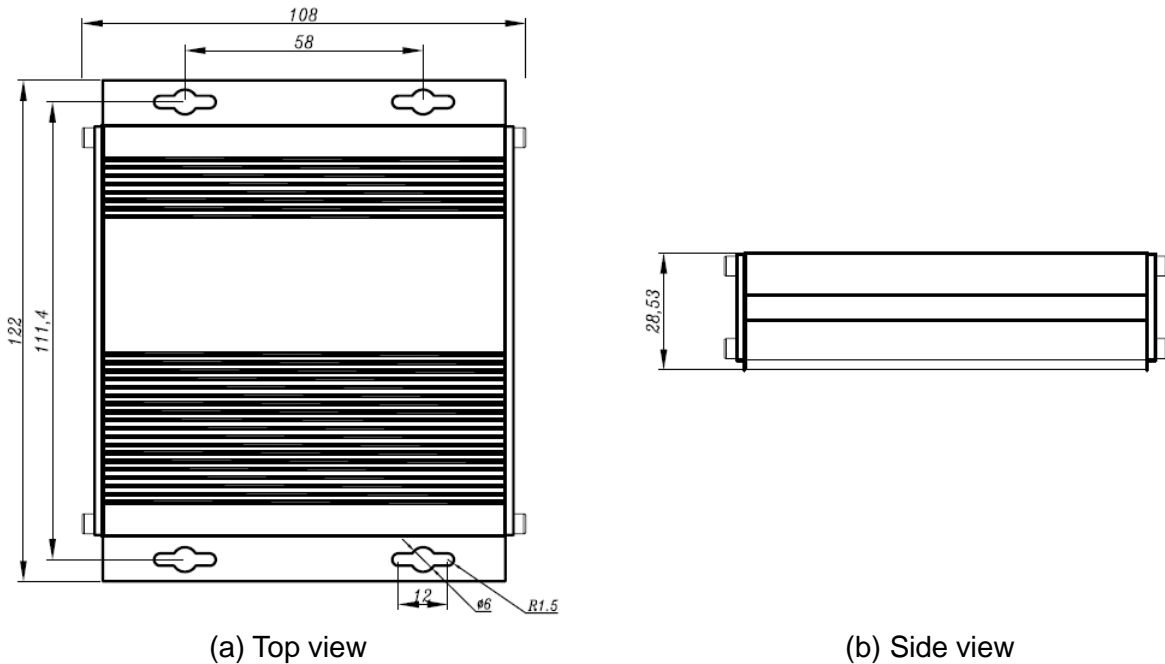


Fig. 3.5 Dimension of Micro type units

- b) The 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 unit with appropriate cables: fiber optic cable for optical link and UTP/STP Cat 5 cable for Ethernet. Please refer to Section 4.1 for the details.
- d) Once the unit is powered up, check that the 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 physical 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)].

### 3.5.2 Card Module

- a) Insert the card module into the ET-C12 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 unit with appropriate cables: fiber optic cable for optical link and UTP/STP Cat 5 cable for Ethernet. Please refer to Section 4.1 for the details.
- d) Once the unit is powered up by ET-PSU/5V, check that the POWER LED on the unit is lit. If not, check the power supply cable connections between the chassis and the power supply socket and the connections between the card module and ET-C12.
- e) With all the signals available at the physical 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	For details, please refer to
Optical	Single-mode or Multi-mode fiber	SC or ST Connector	Section 4.2.2
Ethernet	Twisted-pair Cable 10BASE-T: UTP/STP Cat3, 4, 5 100/1000BASE-TX: UTP/STP Cat 5	RJ45 Connector	Section 4.2.1
12VDC	Power cord	DC JACK or Golder finger within the ET-C12	Section 3.4

**Wiring Diagram**

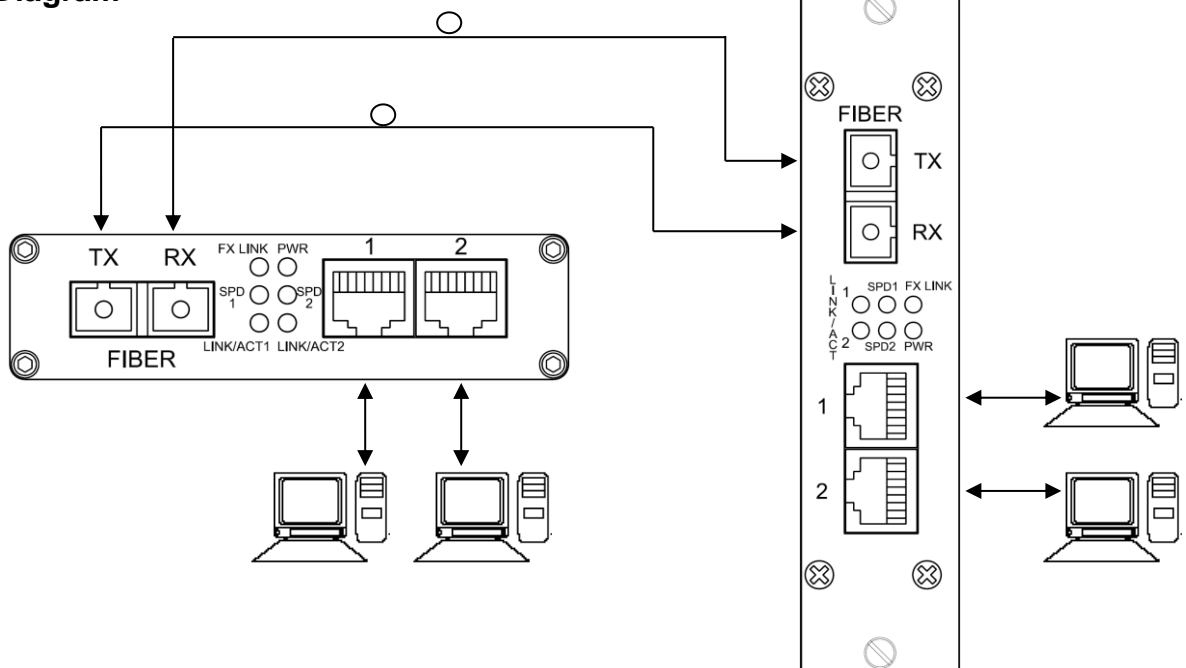


Fig 4.1 Switches connection diagram

## 4.2 Connecting to Your Network

### Cable Type & Length

It is necessary to follow the cable specifications below when connecting the switch to your network. Use appropriate cables that meet your speed and cabling requirements.

#### Cable Specifications

Speed	Connector	Port Speed Half/Full Duplex	Cable	Max. Distance
10Base-T	RJ-45	10/20 Mbps	2-pair UTP/STP Cat. 3, 4, 5	100 m
100Base-TX	RJ-45	100/200 Mbps	2-pair UTP/STP Cat.5 or above	100 m
1000Base-TX	RJ-45	1000/2000 Mbps	2-pair UTP/STP Cat.5 or above	100 m
1000Base-LX	SC, ST	1000/2000 Mbps	MMF (62.5µm)	500m
1000Base-LX	SC, ST	1000/2000 Mbps	SMF (9 or 10µm)	20km

### Cabling

**Step 1:** First, ensure the power of the Switch and end devices are turned off.

**<Note>** Always ensure that the power is off before any installation.

**Step 2:** Prepare cable with corresponding connectors for each type of port in use.

**Step 3:** Consult the previous section for cabling requirements based on connectors and speed.

**Step 4:** Connect one end of the cable to the Switch and the other end to a desired device.

**Step 5:** Once the connections between two end devices are made successfully, turn on the power and the Switch is operational.

#### 4.2.1 The 10/100/1000Base-TX Connector

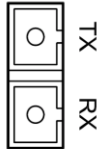
A standard straight through cable is used for the connection between the Ethernet switch and device. The products feature an auto-MDIX capability. For the details, Please see Appendix A for your reference.

## 4.2.2 The 1000Base-LX Connectors

### The 100Base-LX Connections

The fiber port pinouts

The **TX** (transmit) port of device I is connected to the **RX** (receive) port of device II, and the **RX** (receive) port of device I to the **TX** (transmit) port of device II.

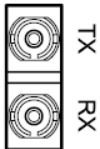


X value:

**A** for Multimode fiber

**B** for Singlemode fiber

FIBER	Connector
TX	SC Optical Connector
RX	SC Optical Connector



X value:

**G** for Multimode fiber

**H** for Singlemode fiber

FIBER	Connector
TX	ST Optical Connector
RX	ST Optical Connector

## (5) Operational Guides

### 5.1 LEDs Status

LED	State	Indication
PWR	Green	Power on.
	Off	Power off.
FX LINK	Green	1000Base-LX
SPD1, 2	Green	1000Base-TX
	Amber	100Base-TX
	Off	10Base-TX
LINK/ ACT 1, 2	Steady	A valid network connection established
	Flashing	Transmitting or receiving data. ACT Stands for Activity.

### 5.2 Signal and Power Ports

FIBER -	SC or ST Optical Connector(s) for 1000BASE-LX fiber cable connection.
NETWORK -	RJ45 with Cat. 5 for 10/100/1000BASE-TX Ethernet connection.
DC IN-	DC Jack for 5V-12VDC power connection.

## (6) Specifications

### Ethernet

<b>Standards</b>	IEEE 802.3 10BASE-T IEEE 802.3u 100BASE-TX IEEE 802.3ab 1000BASE-TX IEEE 802.3z 1000BASE-LX IEEE 802.3x
<b>Processing Type</b>	Store-and-Forward Half-duplex back-pressure and IEEE802.3x Full-duplex flow control
<b>Forward and Filter Rate</b>	
10Base-TX	14,881pps (10Mbps)
100Base-TX	148,810pps (100Mbps)
1000Base-TX/LX	1,488,100pps (1000Mbps)
<b>Cabling</b>	
10BASE-T	UTP/STP Cat. 3, 4, 5 or above
100BASE-TX	UTP/STP Cat. 5 or above
1000BASE-TX	UTP/STP Cat. 5 or above
<b>Maximum Distance</b>	
Cat5 UTP	Up to 100m
<b>Connector</b>	
10/100/1000BASE-TX	2 X RJ45
<b>Address table size:</b>	2048MAC addresses

### Optical

<b>Cabling</b>	62.5/125µm (Multi-mode) 9/125µm (Single-mode)
<b>Maximum Distance</b>	
Multi-mode fiber	500m
Single-mode fiber	20Km
<b>Wavelength(s)</b>	1310nm
<b>Connector</b>	SC or ST

### Electrical and Mechanical

<b>Input Power</b>	12VDC (DC Jack by power adapter for standalone units) 5VDC (from ET-PSU/5V for card module)
<b>Power Consumption</b>	2.4W Max.
<b>Operating Voltage &amp; Max. Current Consumption</b>	0.2A @ 12VDC

### LED Indicators

<b>Power</b>	<b>Power Status</b>
10/100/1000 TX (Per Port)	Link/Activity, <i>Speed</i>
1000LX (Per Port)	Link/Activity
<b>Dimensions</b>	SA: 122 X 30 X 103mm CM: 130 X 31 X 111mm
<b>Net Weight</b>	SA: 0.33Kg (0.43kg including PA) CM: 0.33Kg
<b>Casing</b>	Aluminum case
<b>Mounting Options</b>	Wall-Mount Card Module (in ET-C12 rack mount chassis)
<b>Environmental</b>	
<b>Operating Temperature</b>	-20°C to 60°C (-4°F to 140°F)
<b>Storage Temperature</b>	-40°C to 85°C (-40°F to 185°F)
<b>Humidity</b>	0% - 95% non-condensing
<b>Regulatory Approvals</b>	
ISO9001	
FCC Part 15, Class A	
EN55022: 2006 Class A	
EN55024: 1998 +A1:2001+A2:2003	



## (7) Drawings

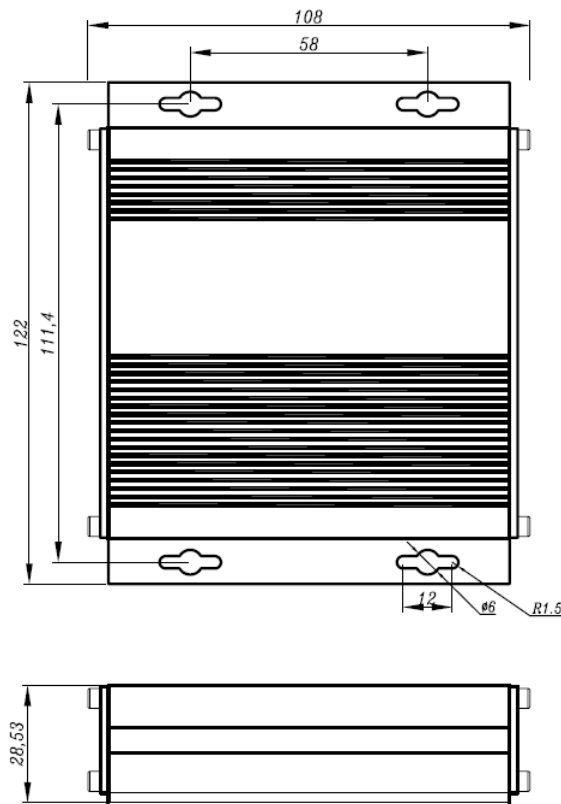


Fig. 7.1 Dimensional drawings of standalone wall-mount ET2212 (mm)

## (8) Warranty Information

All OT Systems ET Series products are subject to a three-year limited 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](http://www.ot-systems.com).

## **(9) Contact Information**

### **APAC Operation**

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IL 60545, U.S.A.

Tel: (1) 630 554 9178

Fax: (1) 630 554 9179

Sales Inquiries

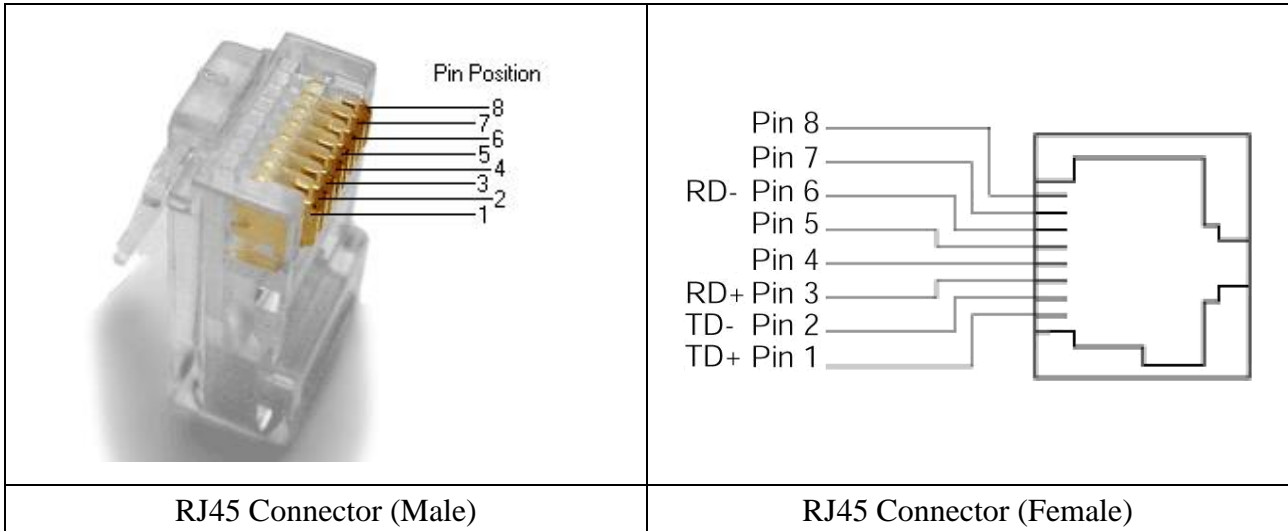
[sales.usa@ot-systems.com](mailto:sales.usa@ot-systems.com)

Technical Support

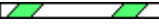
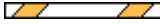








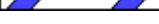
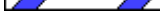




[techsupport.usa@ot-systems.com](mailto:techsupport.usa@ot-systems.com)

## Appendix A

### 1. Connector Pinouts



### 2. TIA/EIA-568 Cabling

RJ45 Pin #	T568A			T568B		
	Wire Diagram	Wire Color	10Base-T Signal 100Base-TX Signal	Wire Diagram	Wire Color	10Base-T Signal 100Base-TX Signal
1		White/Green	Transmit+		White/Orange	Transmit+
2		Green	Transmit-		Orange	Transmit-
3		White/Orange	Receive+		White/Green	Receive+
4		Blue	Unused		Blue	Unused
5		White/Blue	Unused		White/Blue	Unused
6		Orange	Receive-		Green	Receive-
7		White/Brown	Unused		White/Brown	Unused
8		Brown	Unused		Brown	Unused

### 3. Standard, Straight-Through Wiring Diagram(both ends are the same):

The Straight-Through wiring (or called “*regular*” Ethernet cable), both ends should be use the same pin out on of RJ45 port.