

TC1912

Telephone to 10/100Base-T Ethernet Extender User's Manual

MODEL: _____

S/N: _____

DATE: _____

Notice!

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TC Communications, Inc. 17881 Cartwright Road - Irvine, CA 92614

Tel: (949) 852-1972 Fax: (949) 852-1948 Web Site: www.tccomm.com Email: info@tccomm.com

MNL-19120-01-12

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User's Manual
Rev. 1.2

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Features

- ☐ **2-Wire Analog Telephone FXS/FXO Interface**
- ☐ **Two or Four Wire Analog 600 Ohm Interface**
- ☐ **Toll Voice Quality with Ringdown Capability**
- ☐ **Master or Slave switchable**
- ☐ **Echo Cancellation**
- ☐ **RJ-45 Female Connector for the 10/100 Base-T Signal**
- ☐ **LEDs Indicate telephone and network status**
- ☐ **Various Power Voltages Available: 12VDC or Optional 24VDC, or 115/230VAC.**
- ☐ **Stand Alone or Rackmount**

Description

The TC1912 Ethernet Telephone Extender enables telephone service over a LAN via 10/100Base-T Ethernet connections. It has a built-in Codec that digitizes voice and converts to packets for transmission between local and remote TC1912s. It is compatible with PBX and Key Systems (POTS).

TC1912 connections can be made by most types of Ethernet devices, including switches, hubs, routers, bridges, transceivers, etc. A Web-based Configuration user interface (most browsers including Microsoft Windows Explorer, etc.) is provided to view network settings or change IP addresses from the factory default.

Phone connection is automatic upon power-up or when network interruption is restored. Depending on network traffic, multiple pairs of TC1912s can be used to set up individual point-to-point telephone links. An extreme temperature version (-20°C to +70°C), Model TC1912T, is available for harsh environments.

The TC1912 provides Toll Quality sound within voice bandwidths from 300Hz to 3.4 KHz. Two types of voice applications are supported: one, connecting to a PBX for outside telephone service; two, setting up a “hot link” point-to-point connection, e.g. between two work stations, within a LAN. Two-wire FXS (foreign exchange subscriber) is provided on the telephone side with ring down capability and FXO (foreign exchange office) on the PBX side.

The TC1912 also supports two or four wire analog interface. The analog interface is for FSK (frequency shift key) applications. The analog interface has a 600 ohm isolation audio transformer. The analog voltage can be 0 to 3 Vpp.

Eighteen LEDs for network status, phone status, power and volume are provided to enhance status monitoring and diagnostics. Dry contacts for external alarm and ringer are standard. The TC1912 is available in standalone (TC1912S) or rackmount (TC1912R) versions. Power is standard 12VDC with optional 24VDC or 115/230VAC with an external power cube. Power redundancy is standard. 100Base-T connectors are RJ-45 Female and Phone connectors are RJ-11 Female

Front Panel

OFHK (Off hook) LED

Solid: Handset is offhook.
Off: Handset is onhook.

RING LED

Solid: Phone is ringing.
Off: No ringing signal detected.

HT-L (Hot Link) LED

Solid: Both TC1910's are set to FXS.
Off: When one side is FXS & the other side is FXO.
Flashing: Both units are set to FXO & the ALARM will turn on.

CH-S (Interface status) LED

On: Under normal status.
Flashing: The FXS/FXO/Analog interface is not working properly.

FXS LED

Solid: Unit is set to FXS. (Otherwise, it's off)

FXO LED

Solid: Unit is set to FXO. (Otherwise, it's off)

If the TC1910's are configured for 600 Ohm analog:
Both FXS and FXO LEDs will be off.

SLVE LED

Solid: Unit is set to slave. (Otherwise, it's off)

MSTR LED

Solid: Unit is set to master. (Otherwise, it's off)

DHCP LED Not used.

ECHO CNCL (Echo cancellation) LED

Solid: Echo Cancellation option is turned on.
Off: Echo Cancellation option is turned off.
Flashing: Modem tone detected. Echo canceller disabled.

16K/32K CP-R LED Not used.

ALARM LED

See next page.

LINK LED

Solid: Ethernet signal detected at RJ-45 port.
Flashing: Ethernet signal is not received.

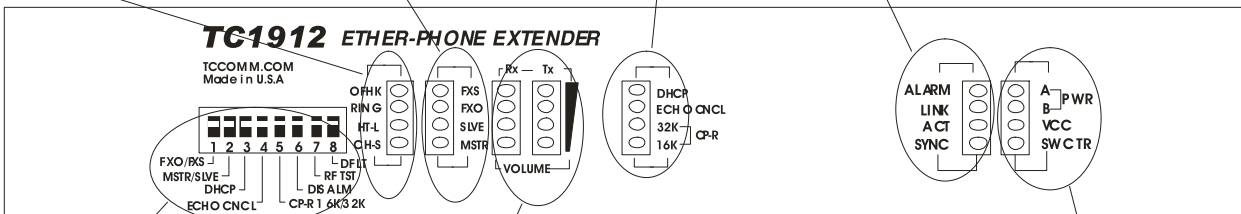
ACT (Activity) LED

Solid: When sending data across the network.
Off: No data is detected.

It's normal that the "ACT" LED will turn on occasionally.

SYNC LED

Solid: Communication link is established.
Flashing: Communication link is lost over 15 secs & will trigger the alarm to be on.



DIP Switches:

1. FXO/FXS

Down (On): Set the unit as FXO.
Up (Off): Set the unit as FXS.

2. MSTR/SLVE

Down (On): Set the unit as Master.
Up (Off): Set the unit as Slave.

3. DHCP

Not used.

4. ECHO CNCL

Down (On): Echo cancellation enabled.
Up (Off): Echo cancellation disabled.

5. CP-R 16K/32K:

Not used.

6. DIS ALM

Down (On): Alarm disabled.
Up (Off): Alarm enabled.

7. RG TST

Down (On): Ring Test enabled.
Up (Off): Ring Test disabled.

8. DFLT:

Down (On): Restore the default IP settings enabled.
Up (Off): Restore the default IP settings disabled.

Tx & Rx Volume LEDs

Solid: When voice levels are detected.
Off: When no voice levels are detected.

PWR (power) A LED

PWR (power) B LED

Solid: Power supplied from PWR A or B is good.
Off: Power supply A or B failed or card fuse is bad.

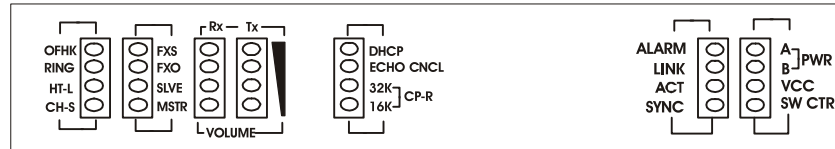
VCC (Voltage) LED

Solid: 5V DC is good.
Off: No 5V DC is supplied to this card.

SW CTR LED

Solid: When Saved Settings equal Default Settings.
Off: When Saved Settings are not equal to Default Settings.

Figure 1. TC1912's Front Panel



"PWRA/B" LED: It is on when power is present at PWR A/B connector on rear panel.

"VCC" LED: It is on when adequate power is being derived from the power source.

"SW CTR" LED: It is on when the Saved Settings equal the Default Settings. Otherwise, it will be Off.

"ALARM" LED: It will flash under the following conditions.

1. No Ethernet signal is detected. "LNK" LED will flash.
2. Communication link between Master and Slave is lost. "Sync" LED will flash.
3. Interface (FXS/FXO/Analog) is not working properly. "CH-S" LED will flash.
4. Both Master and Slave are set to FXO. "HT-L" LED will flash.
5. "DFLT" switch is on. "MSTR" or "SLVE" LED will flash.

"LINK" LED: It is on when proper Ethernet signal is detected and flashing when it is not.

"ACT" LED (Activity): It is on when data traffic is detected at the Ethernet port. It is normal that the LED will turn on occasionally.

"SYNC" LED: It is on when the communication link is established between the TC1912 pair (master and slave.) It will flash and the alarm will turn on if the communication link is lost for more than 15 secs. The TC1912 pair will automatically re-establish the link after any power or network disruption.

"DHCP" LED: Not used.

"ECHO CNCL" LED (Echo Cancellation): It is on when the Echo Cancellation option is turn on. It will be off when echo cancellation option is off. It will flash when modem tone is detected. Echo canceller disabled.

"32K/16K CP-R" LEDs: Future release.

"TX / RX VOLUME" LEDs: The LEDs indicate the volume levels on both outgoing and incoming voice signals.

“FXS” LED: It is on when the unit is set to FXS.

“FXO” LED: It is on when the unit is set to FXO.

NOTE: If the TC1912 is configured for 600 Ohm analog: Both "FXS" and "FXO" LEDs will be Off.

"SLVE" LED (slave): It is on when the unit is set to slave. It will flash when "DFLT" is on.

"MSTR" LED (master): It is on when the unit is set to master. It will flash when "DFLT" is on.

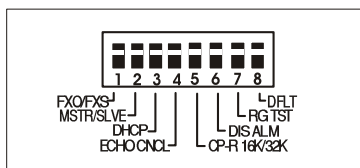
“OFHK” LED (off hook): It will turn on when the user picks up the handset.

“RING” LED: It will turn on when the phone is ringing.

“HT-L” LED (hot link): It is on when both TC1912 are set to FXS. It is off when one side is FXS and the other side is FXO. It will flash when both units are set to FXO and the alarm will turn on.

“CH-S” LED (Interface status): It will flash when the Interface (FXS/FXO/Analog) is not setting up properly. It is on normally.

Dip-Switch Functions



1. **FXO/FXS:** Sets up the unit as FXO (down position) or FXS (up position). These DIP switches will be preset by Factory. Do not change.

NOTE: If the TC1912 is configured for 600 Ohm analog: This DIP switch is ignored.
2. **MSTR/SLVE:** Set the unit as Master (down position) or Slave (up position).
3. **DHCP:** Not used.
4. **ECHO CNCL:** Turn on (down position) the Echo Cancellation option.
5. **CP-R 16K/32K:** For future release.
6. **DISALM:** Disable (down position) the Alarm. "Alarm" LED will still flash during the "alarm on" condition. However, the buzzer will be off and the dry contact will be open.
7. **RG TST:** Ring Test. Ring the phone when the unit is setup as FXS
8. **DFLT:** Default. When set (down position,) the unit will restore the default IP address, Subnet Mask, username and password after the power is reset. It is used during the initial setup or the IP address is lost.

If the Saved Settings equal the Default Settings, "SW CTR" LED will be on.

To properly restore the default IP settings, please follow the following steps:

For Master:

1. Power off the unit.
2. Set the "DFLT" and "MASTER" switches to On (down) position.
3. Power up the unit and wait for 2 seconds.
4. Set the "DFLT" switch back to Off (up) position.

Master IP: 192.168.254.123 Subnet Mask: 255.255.255.0

Username: user Password: password

For Slave:

1. Power off the unit.
2. Set the "DFLT" to On (down) position and "MASTER" to Off (up) position.
3. Power up the unit and wait for 2 seconds.
4. Set the "DFLT" switch back to Off (up) position.

Slave IP: 192.168.254.124 Subnet Mask: 255.255.255.0

Username: user Password: password

Rear Panel

RJ-11 Connector for "Phone/Line" or Analog Signal:

For FXO, use a regular phone wire to connect to the local phone network such as phone line from Telco or PBX phone line.

For FXS, use a regular phone wire to connect to a conventional (2-wire) telephone.

Use this RJ-11 port to connect the two or four wire 600 Ohm analog signal.

RJ-45 Connector for "10/100 Base-T Ethernet":

Connect this port using a twisted pair Ethernet cable to the local network.

Dry Contact Relay Terminal Blocks:

The Dry Contact Relay is normally in "Open" position. It will force the relay to "Close" position under the following conditions:

1. Major Alarm is on (e.g. Ethernet signal lost). This function can be disabled by setting the front panel "DISALM" switch to on (down) position.
2. Ringing signal is received. This function can be disabled by an internal DIP switch.
3. The dry contact relay will close during power up.

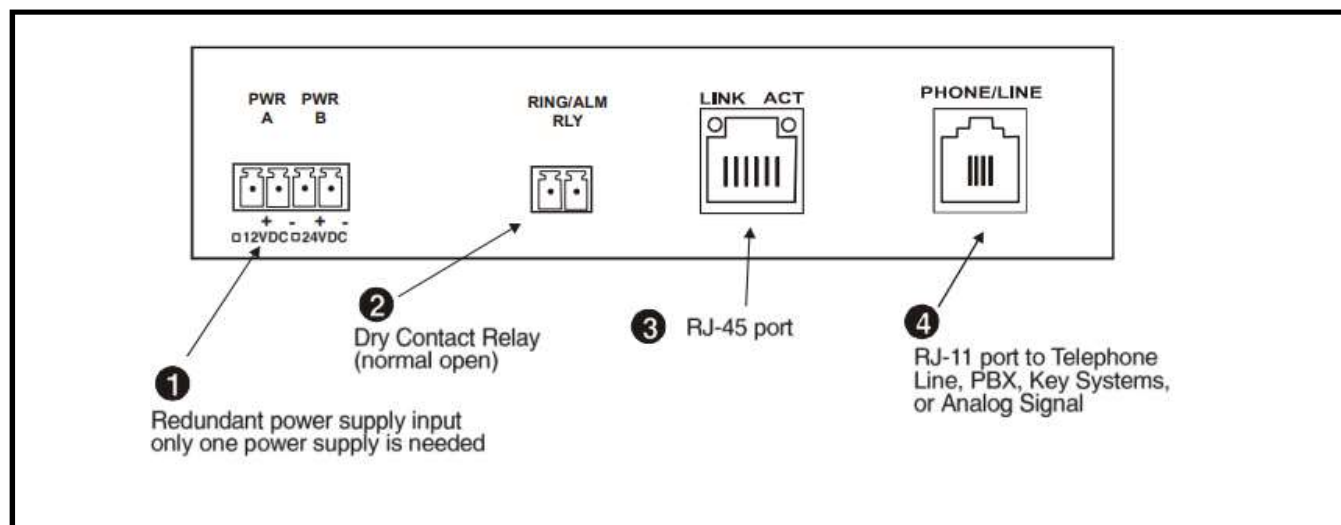


Figure 2. TC1912's Rear Panel

Application Example 1: Hotlink Phone via Ethernet

The TC1912 is intended to provide flexible point-to-point telephone service via Ethernet Networks. It is often used by maintenance or service personnel in Campus, Traffic Control, or Utility Substation Networks. By connecting two TC1912's as shown below and using regular telephone sets, the users at both sides of the Ethernet link can have a hotlink phone line setup. When one user lifts up the handset, the remote side phone will start to ring. When remote side user picks up the handset, the phone will stop ringing and the conversation begins. When conversation is over, any user can terminate the phone link.

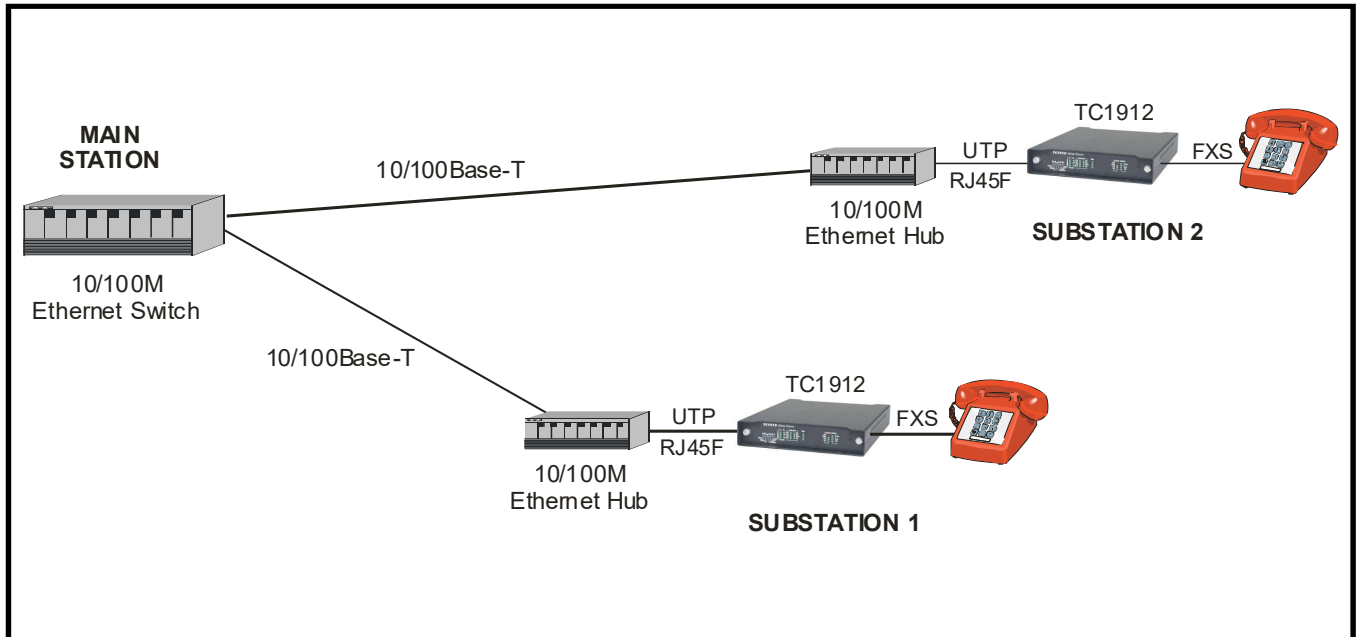


Figure 3. Typical Application Using TC1912s to Provide a Hotlink Phone Service in a Substation Environment.

Application Example 2: Phone line Extension via Ethernet

This application is to extend a dial-up phone line via existing Ethernet as shown in the following diagram. By connecting a TC1912 to a regular dial-up phone line, the users at the remote end can dial to the outside phone network just like regular telephone line extended.

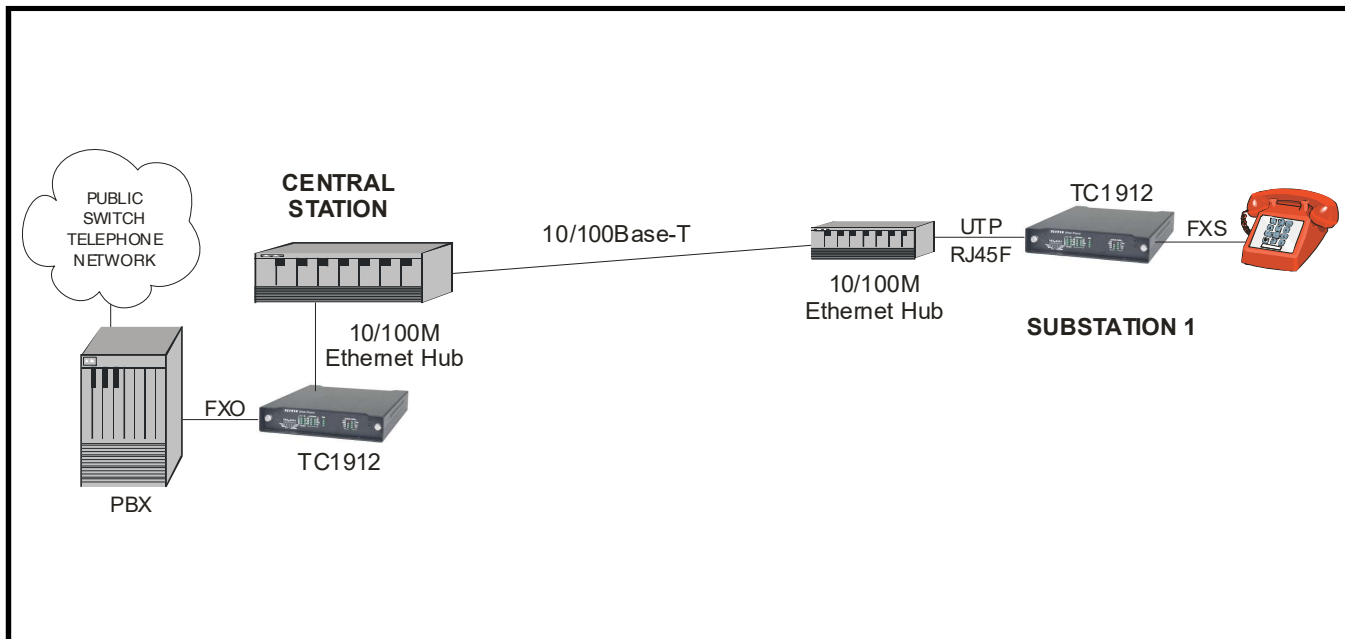


Figure 4. Typical application using TC1912s to extend a telephone line via an Ethernet LAN.

Unpacking the Unit

Before unpacking any equipment, inspect all shipping containers for evidence of external damage caused during transportation. The equipment should also be inspected for damage after it is removed from the container(s). Claims concerning shipping damage should be made directly to the pertinent shipping agencies. Any discrepancies should be reported immediately to TC Communications' Customer Service Department.

Equipment Location

The TC1912 should be located in an area that provides adequate light, work space, and ventilation. Avoid locating it next to any equipment that may produce electrical interference or strong magnetic fields, such as elevator shafts or heavy duty power supplies. As with any electronic equipment, keep the unit from excessive moisture, heat, vibration, and freezing temperatures.

Power Supply

Each TC1912 unit is powered via a rear panel's terminal block connector. There are two pairs of terminal block connectors ("PWR A" and "PWR B") for power redundancy, the power LEDs on the front panel will light according to which power jack(s) is/are connected. The power is 12 VDC @500mA, (24 VDC and AC 90 VAC to 240 VAC are optional).

Electrical Signal Connection

The RJ-45 & RJ-11 female connectors for the electrical signals are located on the rear panel.

TC1912 Configuration

TC1912's need to work in pairs in an Ethernet network. One unit needs to be set to Master "MSTR" and the other one needs to be set to Slave "SLVE" using the front panel DIP switch. If the TC1912 pair is separated by a firewall, the Master unit should be the one sitting outside of the firewall. (Please refer to pg. 7 "Dip-Switch Functions" for setting the unit to default setting.)

All units come with default Slave settings, please refer to the "Quick Start/Test" section on pg. 17 for simple setup examples.

***Note:** The TC1912 FXS configured unit(s) will ring the phone channel during initialization, and the phone set connected on the FXS channel should ring within 10 seconds after power up.*

For Slave:

Default IP: 192.168.254.124

Default Netmask: 255.255.255.0

Default Username: user

Default Password: password

For Master:

Default IP: 192.168.254.123

Default Netmask: 255.255.255.0

Default Username: user

Default Password: password

Web-based Interface Connection

1. Connect the computer and TC1912 on the same Ethernet switch.
2. Power up the unit and the "LINK" LED should be on. (You can disable the alarm by setting the "DISALM" to down(on) position.)
3. Start your Web browser.
4. In the Address box, enter the IP address of the TC1912. For example, if the unit is set to default Slave, enter: http://192.168.254.124
If the unit is set to default Master, enter: http://192.168.254.123

If you are being asked for a username and password on any of the pages, use the following:

Default user name: **user**

Default password: **password**



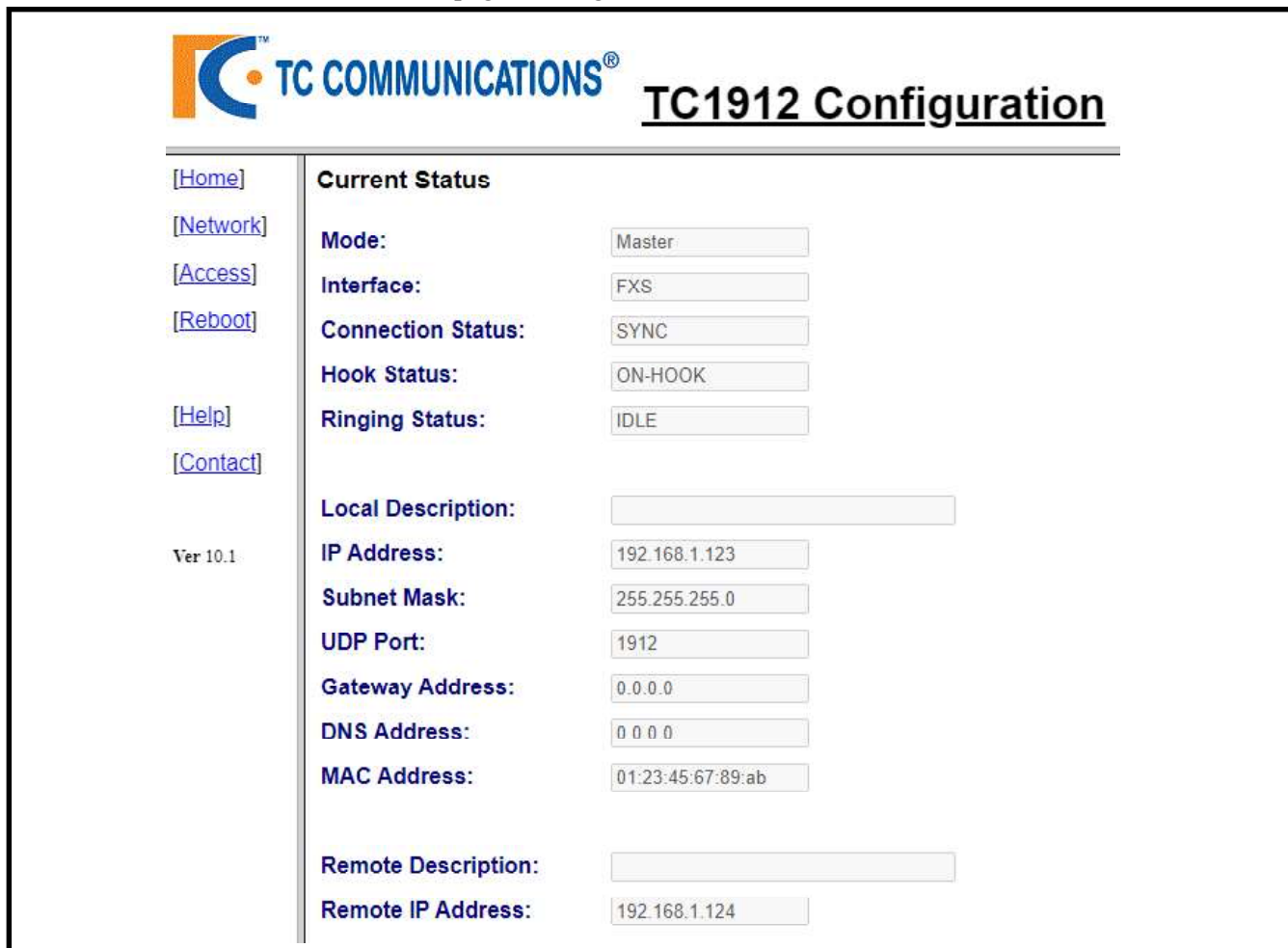
Figure 5. TC1912 Password Dialog

TC1912 Configuration Continue

Home Page

Once connected, you should see the "Current Status" screen, as on Figure 6. (Please refer to "Testing & Trouble shooting" section, if not connected).

Click the links at the left of the page to navigate to the desired section.



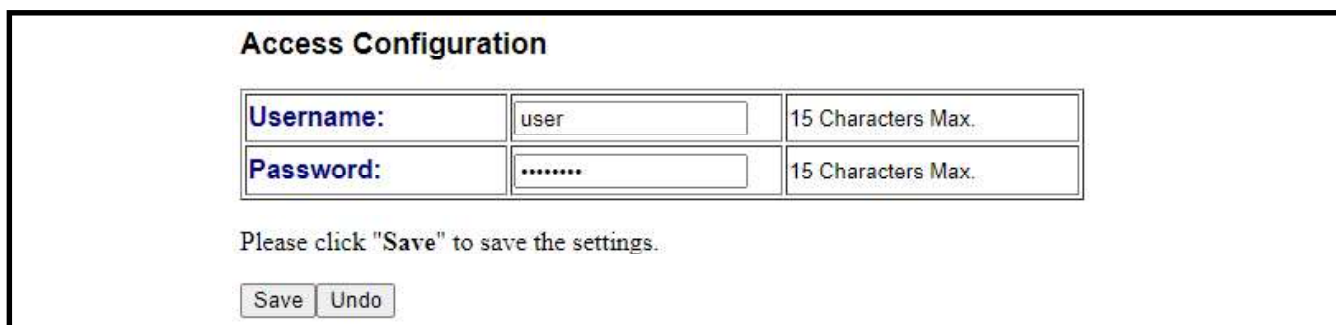
The screenshot shows the TC1912 Configuration Home Page. On the left is a navigation menu with links: [Home], [Network], [Access], [Reboot], [Help], and [Contact]. Below the links is the text 'Ver 10.1'. The main content area is titled 'Current Status' and contains the following fields:

Mode:	Master
Interface:	FXS
Connection Status:	SYNC
Hook Status:	ON-HOOK
Ringing Status:	IDLE
Local Description:	
IP Address:	192.168.1.123
Subnet Mask:	255.255.255.0
UDP Port:	1912
Gateway Address:	0.0.0.0
DNS Address:	0.0.0.0
MAC Address:	01:23:45:67:89:ab
Remote Description:	
Remote IP Address:	192.168.1.124

Figure 6. TC1912 Home Page

Access Setting

You can change the user name and password by clicking on the link "Access" at the home page.



The screenshot shows the 'Access Configuration' page. It contains two input fields:

Username:	user	15 Characters Max.
Password:	*****	15 Characters Max.

Below the fields is the text: 'Please click "Save" to save the settings.'

At the bottom are two buttons: 'Save' and 'Undo'.

Figure 7. TC1912 Access Setting Page

Click the "Undo" button or browser's "Back" button to cancel all the changes.

Click the "Save" button to save the changes.

TC1912 Configuration Continue

Network Settings

Click on the "Network" Link at the home page and you should see the following screen.

Network Configuration

Local Description:	<input type="text"/>	30 Characters Max. (e.g. Building A)
IP Address:	<input type="text" value="192.168.1.123"/>	IP Address. (e.g. 192.168.1.123)
Subnet Mask:	<input type="text" value="255.255.255.0"/>	Subnet Mask. (e.g. 255.255.255.0)
UDP Port:	<input type="text" value="1912"/>	UDP Port Number: 1-65535 (Default: 1912)
Gateway Address:	<input type="text" value="0.0.0.0"/>	Default Gateway Address
DNS Address:	<input type="text" value="0.0.0.0"/>	Domain Name Service Address
Remote Description:	<input type="text"/>	30 Characters Max. (e.g. Building B)
Remote IP Address:	<input type="text" value="192.168.1.124"/>	Remote IP Address. (e.g. 192.168.1.124)

Please click "Save" to save the settings.

Figure 8. TC1912 Network Settings Page

(Note: Please contact your local network administrator for your network settings.)

Local Unit Description (optional): Enter the description for the local unit.

IP Address: Unit's IP Address. The default IP Address for master is 192.168.254.123, and the default IP Address for slave is 192.168.254.124.

If you change the IP Address, you must reconnect using the new IP Address. If you are using the DHCP option, this value will be set automatically.

Subnet Mask: This indicates the TCP/IP network class you are using.

The default Subnet Mask is 255.255.255.0. If you are using the DHCP option, this value will be set automatically.

UDP Port: This is the UDP port number which the TC1912 units will attempt connections.

Default value is 1912. (Range: 1-65535).

Note: (Some of the well known port numbers such as 1, 23, 80, 546, and 547 cannot be used as communication ports because they are already used internally by the unit itself.)

Gateway IP Address: If your connection contain a router, enter the IP Address of the Router (LAN side.)

Default value is 0.0.0.0

DNS IP Address: If you need to connect outside of your LAN, enter the DNS IP address here.

Default value is 0.0.0.0

Click the "Undo" button or browser's "Back" button to cancel all the changes

Click the "Save" button to save the changes

Remote Unit Description (optional): Enter the description for the remote unit.

Remote IP Address: (not required for master unit.) For Slave unit, this is the IP Address of the remote Master. (It is recommended that user enter the remote Slave IP address here for the master unit for future reference.)

The default remote IP Address for master is 192.168.254.124, and the default remote IP Address for slave is 192.168.254.123.

Electrical Analog Signal Interface Connections & Pin Assignments for 2/4 Wire

The RJ-11 connector is located at the rear panel of the TC1912.

For four wire analog signals:

Pin 5 is transmit TIP & pin 2 is transmit RING.

Pin 4 is receive TIP & pin 3 is receive RING.

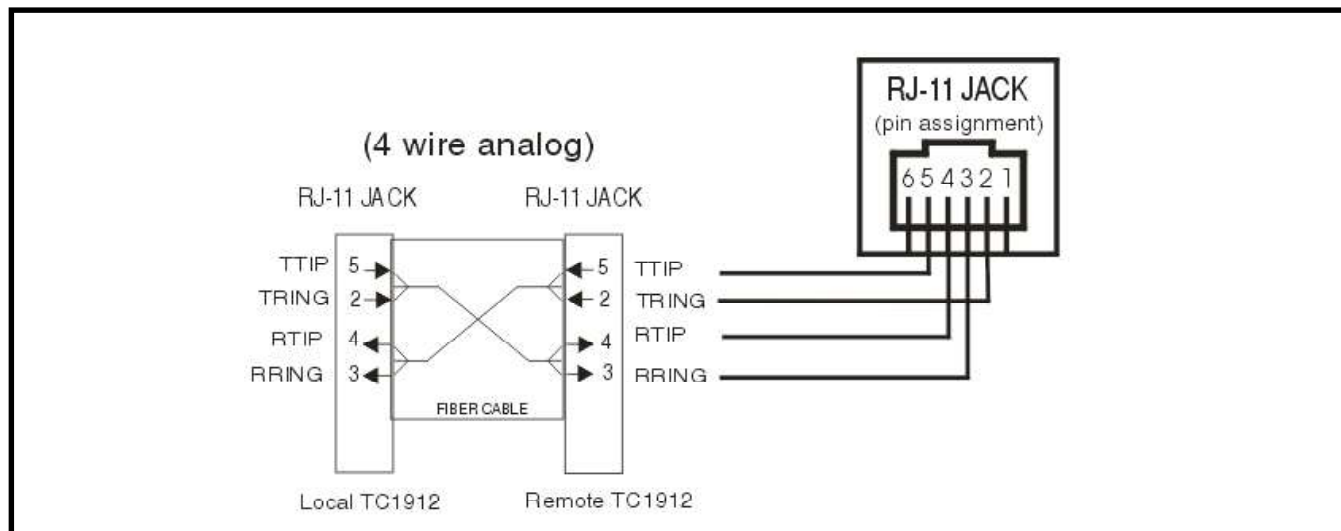


Figure 9. Four Wire Analog Pin Assignments & Connection Diagram.

For two wire analog signals:

Pin 4 is the TIP & pin 3 is the RING.

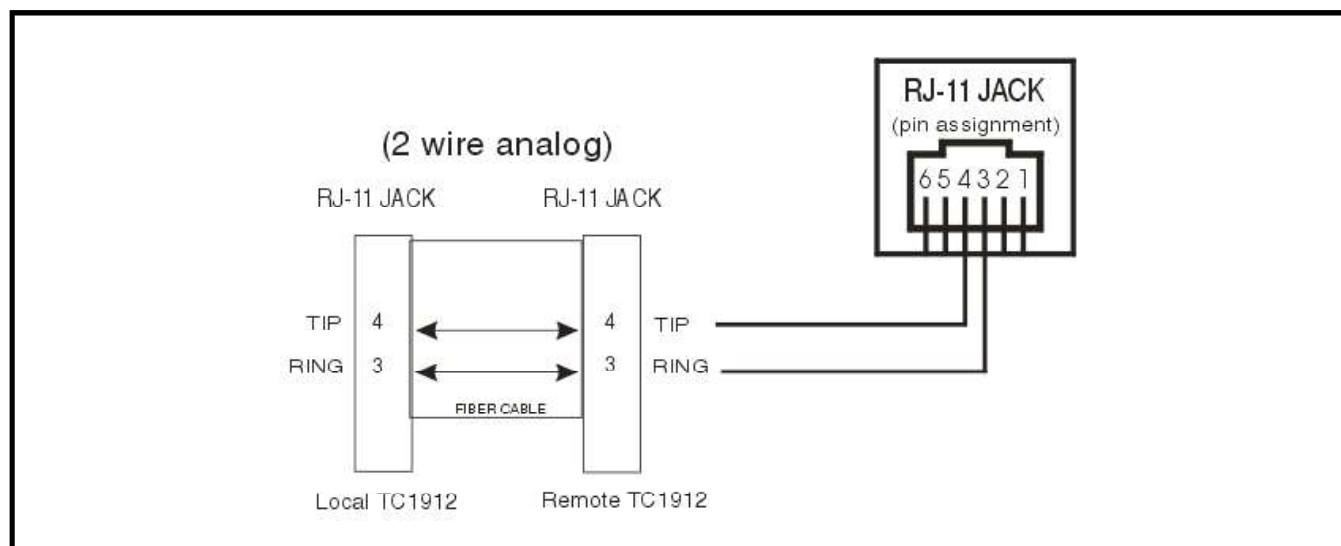


Figure 10. Two Wire Analog Pin Assignments & Connection Diagram.

Quick Start/Test

Typically, most problems encountered with the TC1912 are related to network settings. To ensure the units are working properly, the following section will show you how to test the functionality of a TC1912 pair without any network settings.

Equipment:

1. One 100/1000 Ethernet Switch/Hub or use the supplied Cross Over Cable(for testing purpose only), see next page.
2. Two TC1912 units.

For "Hotlink" tests, both of the units must be configured as FXS.

For "Phone Line Extension" tests, one unit must be configured as an FXO and the other as FXS.

3. Two regular analog telephone sets.
4. Two telephone wires and two Ethernet cables.

Connect both TC1912 units to the Ethernet Switch and connect a phone to both units. Make sure the Ethernet switch is not connected to anything except the power and the TC1912s.

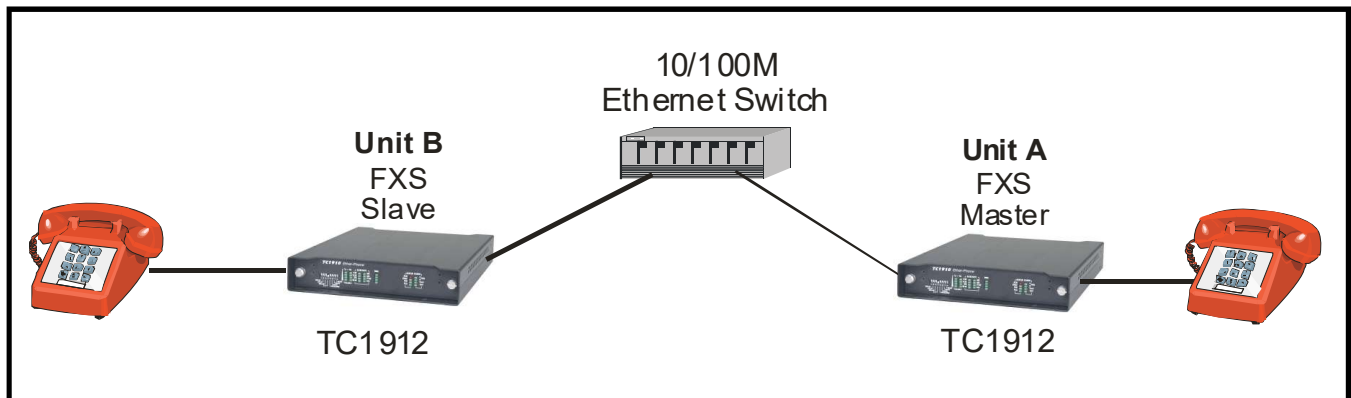


Figure 11. TC1912 Quick Test (Hot Link using an Ethernet Switch/Hub)

Unit A (Master)

Make sure the power of the unit is off. Set the "MSTR" and "DFLT" DIP switches on the front panel to the on (down) position. (All other switches are set to off (up) position.)

Unit B (Slave)

Make sure the power of the unit is off. Set the "DFLT" DIP switch on the front panel to the on (down) position. (All other switches are set to off (up) position.)

Power up and set the "DFLT" DIP switch back to off (up) position on both units.

The communication link between the master and slave should establish automatically within 15 secs, and no LEDs should be flashing (it is normal for the "ACT" LED to turn on occasionally.)

When one side picks up the handset, the other side should ring. When both of the handsets are offhook, the voice should go through in both directions and can be heard on either end of the handsets.

Testing & Troubleshooting continue

If an Ethernet Switch is not available, you can replace the Switch with the supplied cross over cable as shown below. Follow the same procedures as shown on page 17, Quick Start/Test for Unit A (Master) and Unit B (Slave).

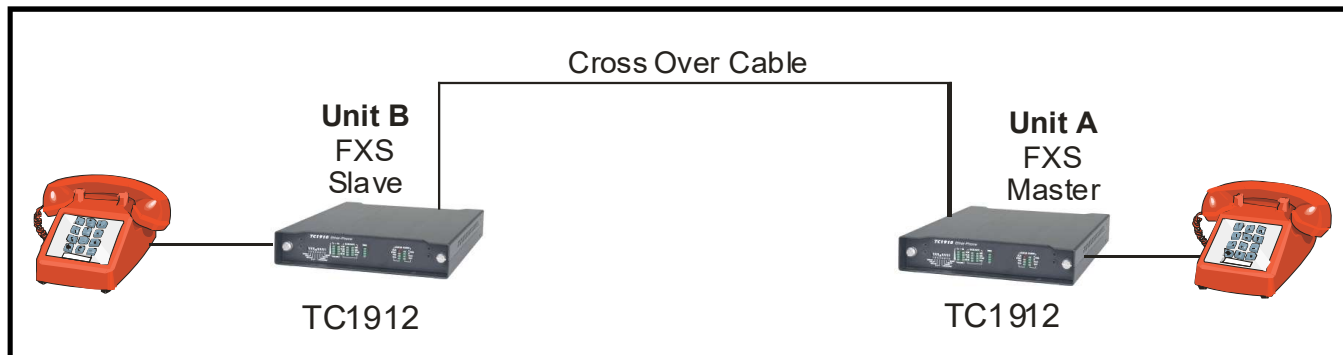


Figure 12. TC1912 Quick Test (Hot Link using a Cross Over Cable)

Testing & Troubleshooting continue

To test the Phone line Extension function, Simply do the following: (Power off is not needed)

Unit A: (Assuming FXO unit is ordered).

Set the "FXO" DIP Switch to on (down) position.

Connect a phone line between the TC1912 and the wall jack.

Unit B:

No Change

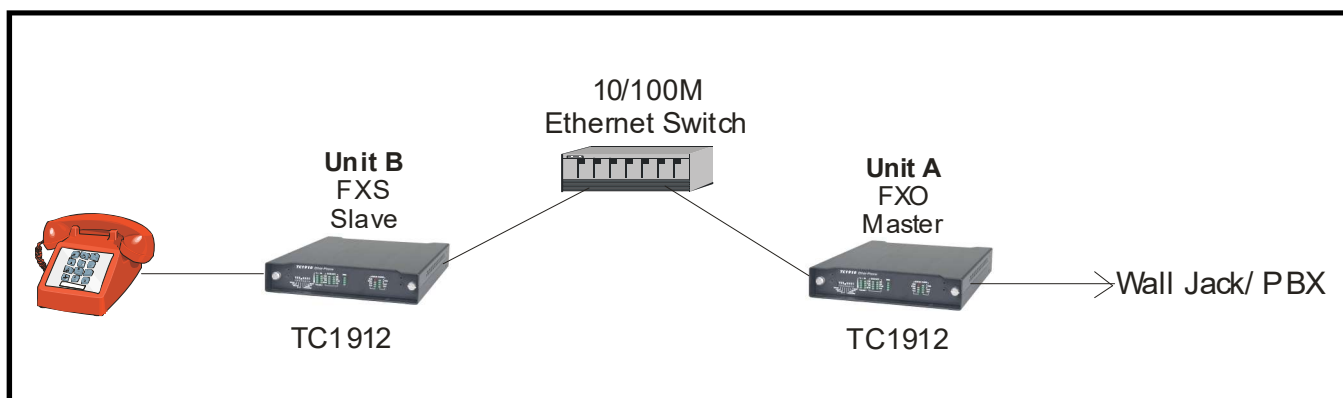


Figure 13. TC1912 Quick Test (Phone line Extension)

When handset at Unit B is picked up, the user should hear the dial tone and be able to dial to the outside phone network just like regular telephone line extended.

Audio Bandwidth

Telephone and Analog300Hz to 3.4Khz

Ethernet Bandwidth

..... 113K bps

Electrical

Phone Connector RJ-11 Female (2-wire)

Ring voltage80Vrms at 20Hz

FXO Input Impedance600 Ohm

FXS output Impedance600 Ohm

Ethernet RJ-45 Female

Ethernet speed 10/100Mbps

Alarm/Ring

Dry Contact..... Normal OPEN

Indicators

System status..... ALARM, PWR A, PWR B, VccA, VccB

Telephone Signal Status Tx and Rx Volume, Off-hook, FXO, FXS, Ring, Hot Link

Ethernet Signal Status Sync, Link Status, Activity, Master/Slave

Power Source

Standard 12VDC @500mA

Optional24VDC, or 115/230VAC with an external power cube

Temperature

Operating0°C to 50°C

Hi-Temp Version (optional) -20°C to 70°C

Storage -40°C to 90°C

Humidity 95% non-condensing

Physical (Standalone/Wallmount unit)

Height (3.53 cm) 1.4"

Width (18.14 cm) 7.1"

Depth (24.89 cm) 9.8"

Weight (835 gm) 1.85 Lbs

Return Policy

To return a product, you must first obtain a Return Material Authorization number from the Customer Service Department. If the product's warranty has expired, you will need to provide a purchase order to authorize the repair. When returning a product for a suspected failure, please provide a description of the problem and any results of diagnostic tests that have been conducted.

Warranty

Damages by lightning or power surges are not covered under this warranty.

All products manufactured by TC Communications, Inc. come with a five year (beginning 1-1-02) warranty. TC Communications, Inc. warrants to the Buyer that all goods sold will perform in accordance with the applicable data sheets, drawings or written specifications. It also warrants that, at the time of sale, the goods will be free from defects in material or workmanship. This warranty shall apply for a period of five years from the date of shipment, unless goods have been subject to misuse, neglect, altered or destroyed serial number labels, accidents (damages caused in whole or in part to accident, lightning, power surge, floods, fires, earthquakes, natural disasters, or Acts of God.), improper installation or maintenance, or alteration or repair by anyone other than Seller or its authorized representative.

Buyer should notify TC Communications, Inc. promptly in writing of any claim based upon warranty, and TC Communications, Inc., at its option, may first inspect such goods at the premises of the Buyer, or may give written authorization to Buyer to return the goods to TC Communications, Inc., transportation charges prepaid, for examination by TC Communications, Inc. Buyer shall bear the risk of loss until all goods authorized to be returned are delivered to TC Communications, Inc. TC Communications, Inc. shall not be liable for any inspection, packing or labor costs in connection with the return of goods.

In the event that TC Communications, Inc. breaches its obligation of warranty, the sole and exclusive remedy of the Buyer is limited to replacement, repair or credit of the purchase price, at TC Communications, Inc.'s option.

To return a product, you must first obtain a Return Material Authorization (RMA) number and RMA form from the Customer Service Department. If the product's warranty has expired, you will need to provide a purchase order to authorize the repair. When returning a product for a suspected failure, please fill out RMA form provided with a description of the problem(s) and any results of diagnostic tests that have been conducted. The shipping expense to TC Communications should be prepaid. The product should be properly packaged and insured. After the product is repaired, TC Communications will ship the product back to the shipper at TC's cost to U.S. domestic destinations. (Foreign customers are responsible for all shipping costs, duties and taxes [both ways]. We will reject any packages with airway bill indicating TC communications is responsible for Duties and Taxes. To avoid Customs Duties and Taxes, please include proper documents indicating the product(s) are returned for repair/retest).

Limitation of Liability

In no event shall the total liability of TC Communications, Inc. to purchaser and/or end user for all damages including but not limited to compensatory, consequential and punitive damages, exceed the total amount paid to TC Communications, Inc. by purchaser for the goods from which the claim arose, in no event shall TC Communications, Inc. be responsible for indirect and consequential damages.

Continue on next page.

Limitation of Liability (Cont.)

In no event shall liability attached to TC Communications, Inc. unless notice in writing is given to TC Communications, Inc. within ten days of the occurrence of the event giving rise to such claim.

TC Communications, Inc. shall not be responsible for delays or non-deliveries directly or indirectly resulting from or contributed to by foreign or domestic embargoes, seizure, fire, flood, explosion, strike, act of God, vandalism, insurrection, riot, war, or the adoption or enactment of any law, ordinances, regulation, or ruling or order or any other cause beyond the control of TC Communications, Inc.

TC Communications, Inc. shall not be responsible for loss or damage in transit and any claims for such loss or damage shall be filed by the purchaser with the carrier.