TC3420

RS-232/RS-422/RS-485 or Analog 10Base-T Ethernet Converter Multi-Poll

User's Manual

MODEL:_____

S/N: _____

DATE:_____

Notice!

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TC COMMUNICATIONS
FIBER OPTIC CONNECTIVITY

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Description:

The TC3420 is a multi-poll Ethernet converter designed with a capability for a multicast topology. It converts RS-232, (RS-422, RS-485 or Analog (2- or 4-wire)*) asynchronous data to TCP/IP packets for multicast transmission between a Master TC3420 and remote TC3420 Slave units over an Ethernet Network, as shown in Figure 1.

When connected to a SCADA host controller, the Master unit broadcasts poll messages to all the slave units. The Remote Terminal Unit (RTU) connected to the Slave unit will response only to the poll with that RTU's own specified ID (or address), which is embedded in the poll message. The communication between the Master and Slave is transparent to protocol and data rate; transmission can be full duplex provided only one RTU responses at a time.

Compatible with all popular Ethernet Switches and it supports full duplex data rates up to 57.6 Kbps. A Web-based user interface (i.e. browser) is provided to view or change both network and serial settings.

The TC3420 supports RS-232 interfaces (TxD and RxD). Seventeen LEDs are provided on the front panel for all broadcast, response signals, Activity, Power and Link.

Power is 12VDC, optional 24VDC, -48VDC or 115/230VAC with an external power cube. Electrical connectors are DB-9F, 10Base-T connectors are RJ-45F.

***Note:** For future release.

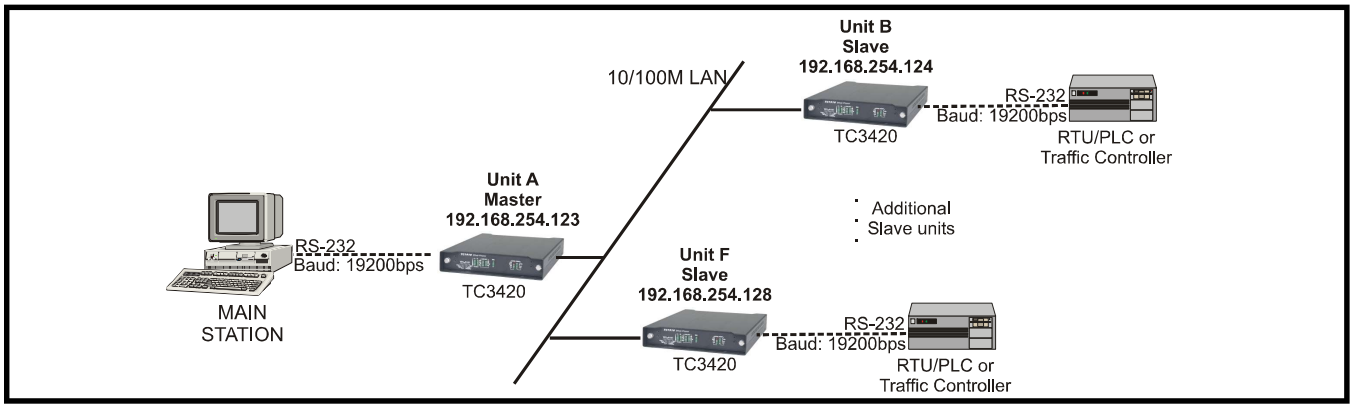


Figure 1. Typical Application Diagram Using the TC3420 Multi-Poll Ethernet Converters

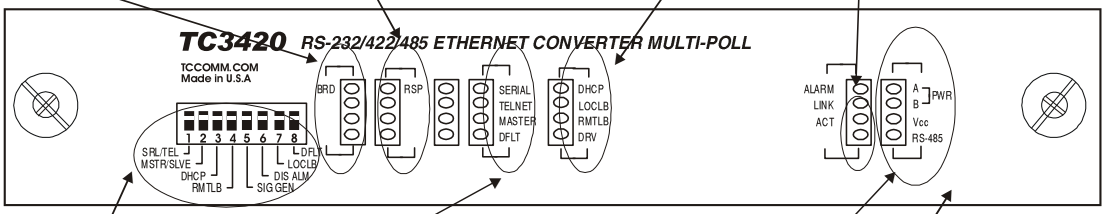
Overview - Front Panel

❹
BRD LED indicator: When lit or flashing;
On the Master unit, it indicates it is receiving messages from the connected device (Host/Polling device) and transmitting the messages to all Slave units. Also, when SIG GEN is enabled on the Master, "BRD" will flash.
On any Slave unit, it indicates it receives messages from the Master.

❷
DHCP* indicator: "On" when the unit gets the network setting from DHCP server.
LOCLB indicator: "Flashes" when the unit is set to local loopback test mode.
RMTLB indicator: "Flashes" when the unit is set to remote loopback test mode.
DRV* indicator; for the RS-485 transceiver status for "OUT" terminals:
When LED is On, "OUT" terminals are in "drive mode.
When LED is Off, "OUT" terrninals are in "receive mode.

❸
RSP LED indicator: When lit or flashing;
On the Master unit, it indicates it is receiving messages from a Slave unit.
On Slave units, it indicates it is receiving messages from the connected devices (RTU/PLC). Also, when SIG GEN is enabled on the Slave, "RSP" will flash.

❶
ALARM indicator: (see next page).



❼
SERIAL indicator: "On" when set to Serial Tunnel mode.
TELNET* indicator: "On" when set to Telnet Gateway/ Reverse Telnet mode.
MASTER (Master/Slave LED indicator): "On" when set as Master.
"Off" when set to Slave.
DFLT indicator: "On" when the unit's settings are the same as the default settings.

❺
Power Input &
Operating Voltage Status:
PWR A: power supply from PWR A jack.
PWR B: power supply from PWR B jack.
VCC: +5 VDC operating voltage power supply.
RS-485* mode indicator:
when On, the TC3400 is set for RS-485.
when Off, the TC3400 is set for RS-422.

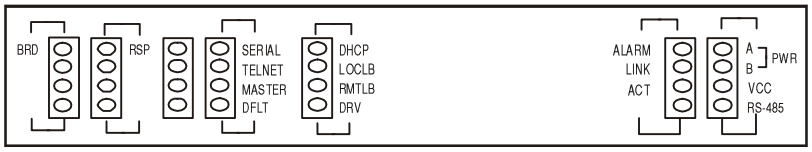
❽
DIP Switches:
1. **SRL/TEL*:** Serial or Telnet mode(Telnet mode is not used, *for future release*).
3. **MSTR/SLVE:** Set the unit as Master or Slave.
2. **DHCP*: (**Slave Only) Turn on the DHCP option.
4. **RMTLB:** Initiates the remote loobback test function.
5. **SIG GEN:** Initiates the signal generator test.
6. **DIS ALM**: Disables the larm buzzer.
6. **LOCLB:** Initiates the local loopback test function.
8. **DFLT:** Restore the default settings on next power cycle.

❻
LINK indicator: "On" when Ethernet signal is detected at the RJ-45 port. "Flashing" when signal is not received.
ACT (Active) indicator: "On" when the converter is sending or receiving data over the network.
Not Used.

***Note:** Not used, for future release.

Figure 2. TC3420's Front Panel

Overview - LEDs



"PWR A/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.

"RS-485" LED:* It is on when the TC3420 is set for RS-485. (Internal SW2-8, On)
It is off when the TC3420 is set for RS-422. (Internal SW2-8, Off)

"Alarm" LED: It will light or flash under the following conditions.

1. Solidly lit when no Ethernet signal is detected. “LNK” LED will also flash.
2. Flashing when either the LOCLB, RMTLB or SIG GEN diagnostic mode is enabled.

“Link” LED: It is on when proper Ethernet signal is detected at the RJ-45 port. Flashing when no Ethernet signal is detected at the RJ-45 port.

“ACT” LED (Activity): It will flash when data traffic is detected at the Ethernet port. It is normal that the "ACT" LED will blink occasionally.

"DHCP" LED:* The DHCP option is available for slave unit only. The LED will flash when the unit is getting the network information from the DHCP server and it is On when the unit gets the information. The LED is Off for the master unit or when DHCP option is not set.

“LOCLB" LED (Local loopback): It flashes when the local loop back function is turn On.

“RMTLB" LED (Remote loopback): It flashes when the remote loop back function is turn On.

"DRV" LED: * It is on when the TC3420 is in “drive mode.
It is off when the TC3420 is in “receive mode.

“SERIAL” LED: It is on when the unit is set to Serial Tunnel mode.

“TELNET” LED: * It is on when the unit is set to Telnet Gateway or Reverse Telnet mode.

***Note:** Not used, for future release.

"MASTER" (Master/Slave) LED:

When "On", it indicates the TC3420 is set as Master.

When “Off", it indicates the TC3420 is set as a Slave.

When "Flashing", it indicates the IP is set to the factory default. Need to power cycle the unit and set the DFLT dip switch back to the up position to make default IP effective.

“DFLT" LED (Default): When lit, it indicates the unit's IP is set to factory default:

Master: IP: 192.168.254.123, Subnet Mask: 255.255.255.0

Slave: IP: 192.168.254.124, Subnet Mask: 255.255.255.0

“BRD” LED indicator: When lit or flashing,

On the Master unit, it indicates it is receiving messages from the connected device (Host/Polling device) and transmitting the messages to all Slave units. Also, when SIG GEN is enabled on the Master, “BRD” will flash.

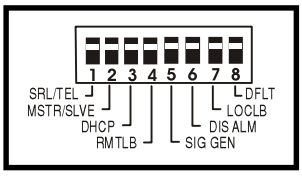
On any Slave unit, it indicates it receives messages from the Master.

“RSP” LED: When lit or flashing;

On the Master unit, it indicates it is receiving messages from a Slave unit.

On Slave units, it indicates it is receiving messages from the connected devices (RTU/PLC). Also, when SIG GEN is enabled on the Slave, “RSP” will flash.

Overview - DIP Switches Functions



1. **SRL/TEL*:** Set the unit to Serial Tunnel mode (up position.)

   Set the unit to Telnet Gateway or Reverse Telnet mode (down position.) The changes apply on the next power cycle.

   *Note: (*Telnet is Not used, for future release*)

2. **MSTR/SLVE:** Set the unit as Master (up position) or Slave (down position.) The changes apply on the next power cycle, reset needed.

3. **DHCP*:** Turn on (down position) the DHCP option. (Slave only.) The changes apply on the next power cycle, reset needed. Please refer to the "DHCP" section for details.

4. **RMTLB:** Turns on the Remote Loop back test function.

5. **SIG GEN:** Signal Generator. Turns on the signal generator test function.

6. **DISALM:** Disable Alarm. It will disable the on board alarm buzzer (down position). It will not clear the “alarm" condition and the "ALARM" LED will still be solid or flashing during the “alarm” condition. However, the buzzer will be off and the dry contact will be open.

7. **LOCLB:** Turns on the Local Loop back test function. Loop back the RS-232/422*/485*/ Analog* signal.

8. **DFLT:** Default. When set to the "On" (down position,) the unit will restore the default settings on the next power cycle for either Master or Slave unit. It is used during the initial setup or the IP address is lost.

   If the “DFLT” switch is On, “MASTER” LED will flash.

   Please refer to Chapter 3 on the manual for detail instructions.

***Note:** Not used, for future release.

DB-9 Connector:

For Stand Alone units, connect this port for RS-232 connection.

Terminal Block Connector:

Connect this port for RS-232, RS-422*, RS-485* or Analog* connection.

NOTE: For RS-232 connections, use the IN(-) pin for RxD, OUT(-) pin for TxD and G pin for signal ground.

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

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

Dry Contact Relay:

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

1. Alarm is on (e.g. 10 Base-T signal lost).
   Note: This function can be disabled by setting the front panel "DISALM" switch to on (down) position.
2. The dry contact relay will close during power up for a few seconds.

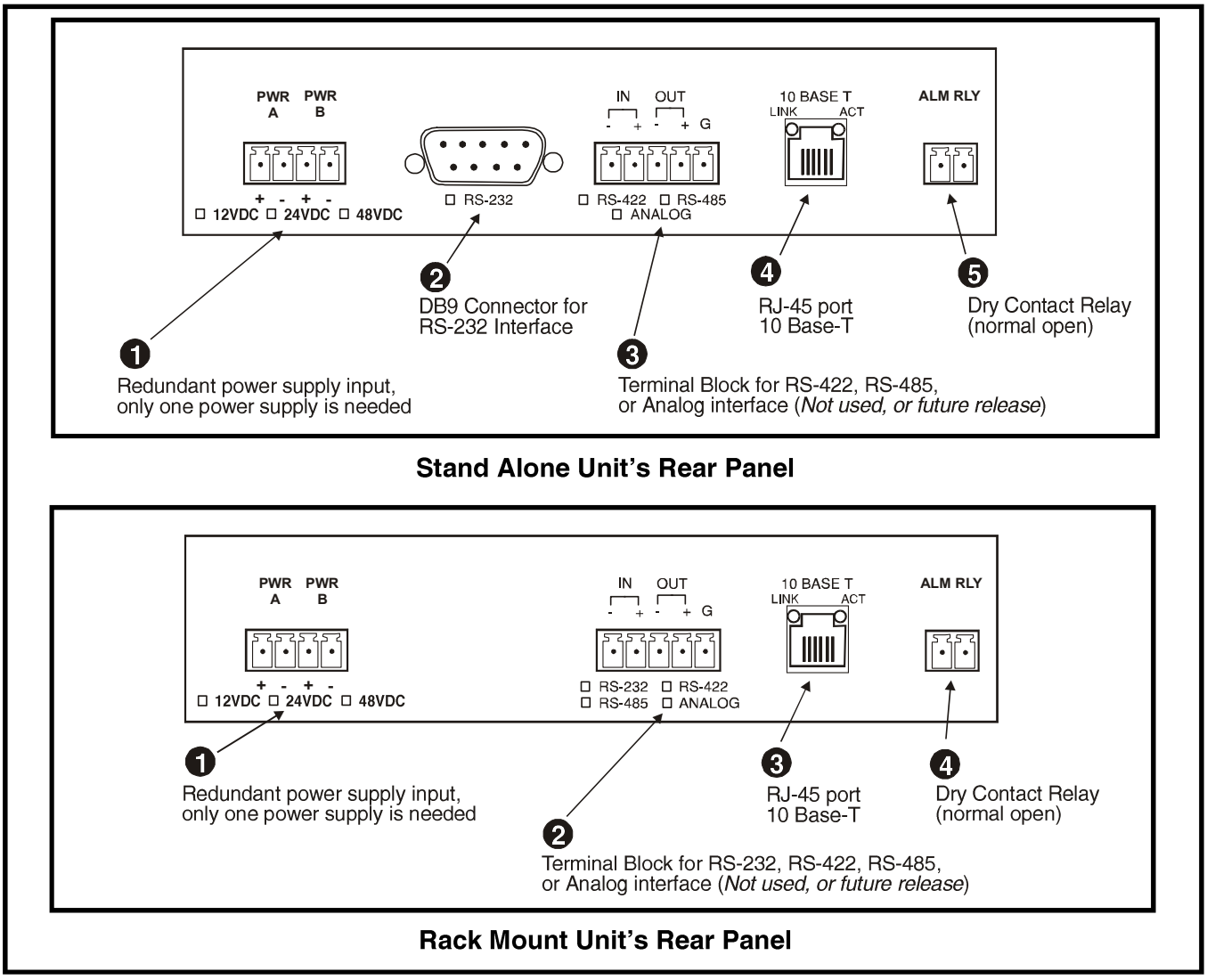


Figure 2. TC3420 ’s Stand Alone and Rack Mount Rear Panels

***Note:** Not used, for future release.

Chapter 2 - Installation

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 TC3420 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 TC3420 is powered by an external DC power adapter rated 12VDC @1.2A. The actual power consumption is approximately 600mA.

Either a power adapter or power card can be utilized to supply the power to the TC3420. The power terminal block connector can be plugged into any power jack on the rear panel. Since each TC3420 unit is equipped with a power redundancy capability, the power LEDs on the front panel will light according to which power jack it is connected to.

Chapter 3 - Initial Setup

Restore Default Settings:

All units come with either Default Master or Default Slave settings. To properly restore the default settings, please follow the following steps.

For Master:

1. Power off the unit.
2. Set the "DFLT" to on (down) position.
3. Set the unit as Master. "MSTR/SLVE" to up position.
4. Power up the unit and wait for 2 seconds.
5. Set the "DFLT" switch back to off (up) position.

Master IP: 192.168.254.123 Subnet: 255.255.255.0

For Slaves:

1. Power off the unit.
2. Set the "DFLT" to on (down) position.
3. Set the unit as Slave. "MSTR/SLVE" to down 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: 255.255.255.0

The "DFLT" LED on the front panel will turn on if the saved settings are the same as the default settings.

Configure TC3420

In order to configure the TC3420 that is, set to default, the user needs to use a PC with a web browser installed Furthermore, the PC's IP address must be set within the range of 192.168.254.1 to 192.168.254.254, and with a Network Mask of 255.255.255.0. If your PC does not have a compatible IP Address and Network Mask ,or you are not sure about the settings, please refer to the "PC Configuration" section for more detail.

To configure the TC3420, simply enter the IP address of the TC3420 in the Web browser's address box. For Example, if the unit is set as Default Master, enter the following

http://192.168.254.123

(**Attention**: Contact your local area network administrator if you are unsure about the settings. Improper settings may result in disruption of the existing network.)

Initial Setup - Static IP

Static IP:

Master unit's IP address must be Static. The IP address should be entered at the "IP address" field on the "Settings" page.

Slave unit's IP address can be Static or Dynamic. For static IP setting, the IP address should be entered at the "IP address" field on the "Settings" page.

Master Example:

TC3420: (Master)

NETWORK SETTINGS	
Local Description:	e.g. Local location
IP Address:	192.168.254.123
Subnet Mask:	255.255.255.0
Multicast IP Address:	239.192.0.1
UDP Port Number One:	TC3400
UDP Port Number Two:	TC3401
Gateway Address:	0.0.0.0
DNS Address:	0.0.0.0
SERIAL SETTINGS	
Data Format:	8-N-1
Baud Rate:	19200
Delay Setting:	10
Transmit Filter Enable:	Not Check
Telnet Timeout Enable:	Checked
Telnet Timeout:	30

Slaves Example:

TC3420: (Slaves)

NETWORK SETTINGS	
Local Description:	e.g. Local location
IP Address:	192.168.254.(123+N)
Subnet Mask:	255.255.255.0
Master Description:	e.g. Remote locations
Master IP Address:	192.168.254.123
Multicast IP Address:	239.192.0.1
UDP Port Number One:	TC3400
UDP Port Number Two:	TC3401
Gateway Address:	0.0.0.0
DNS Address:	0.0.0.0
SERIAL SETTINGS	
Data Format:	8-N-1
Baud Rate:	19200
Delay Setting:	10
Transmit Filter Enable:	Not Check
Telnet Timeout Enable:	Checked
Telnet Timeout:	30

Initial Setup - Dynamic IP*

Dynamic IP (DHCP)*:

DHCP (Dynamic Host Configuration Protocol) option is for Slave unit only. It enables the Slave unit to get a temporary or permanent IP addresses (out of a pool) from a DHCP server.

In order to use the DHCP function, there should be a DHCP server residing at the user's local area network. If DHCP server is not available, the Slave unit's IP address must be Static. Please refer to the "Static IP" section for more information.

Before you turn on the DHCP option, you need to enter the Master's IP address at the "Remote IP" field on the "Settings" page for the Slave Unit.

Example:

TC3420: (Slaves)

NETWORK SETTINGS

Local Description:	e.g. Local location
IP Address:	
Subnet Mask:	
Master Description:	
Master IP Address:	192.168.254.123
Multicast IP Address:	239.192.0.1
UDP Port Number One:	TC3400
UDP Port Number Two:	TC3401
Gateway Address:	0.0.0.0
DNS Address:	0.0.0.0

SERIAL SETTINGS

Data Format:	8-N-1
Baud Rate:	19200
Delay Setting:	10
Transmit Filter Enable:	Not Check
Telnet Timeout Enable:	Checked
Telnet Timeout:	30

Please do the following after the "Master IP" has been set on the Slave units.

1. Power off the unit.
2. At the front panel, set "DHCP" DIP switch to on (down) position.
3. Power up the unit.

The following fields will be replaced by the data getting from DHCP server automatically, and user's data will be ignored.

IP Address:
Subnet Mask:
Gateway Address:
DNS Address:

The "DHCP" LED will flash when the unit is obtaining the network settings from the DHCP server and the LED turns solid after the unit gets the settings.

***Note:** Not used, for future release.

Initial Setup - RS-232 Virtual Connections

DB9 Female or Terminal Block RS-232 Virtual Pin Connections

The DB9 or Terminal Block RS-232 pin connections for the Master and Slave units are the same as depicted on the diagrams below.

DB9 connector:

Pin 3, receives the transmitted data from the user's RS-232 device. Pin 2, transmits the data back to the user's RS-232 device. Pin 5, is used for the signal ground.

Terminal block connector:

For RS-232 connections, use the IN(-) pin for RxD, OUT(-) pin for TxD and G pin for signal ground.

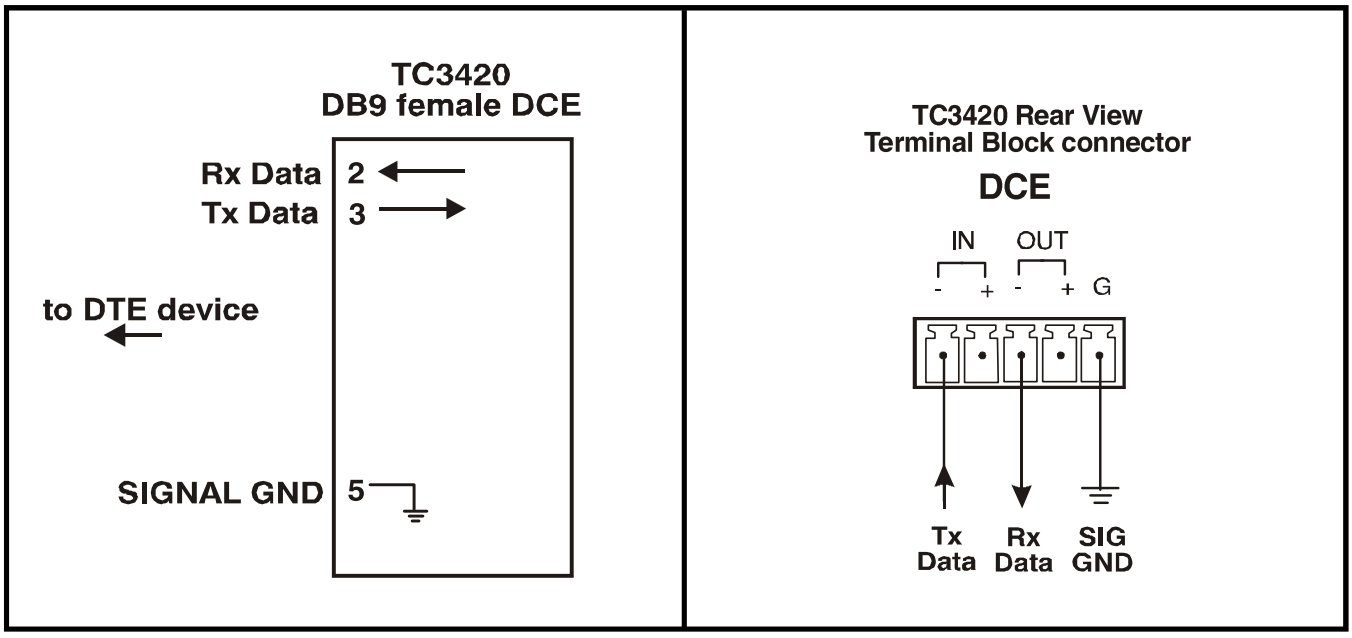


Figure 3. RS-232 Virtual Pin Connections Diagrams

Theory of Two and Four Wire RS-485 Operation*

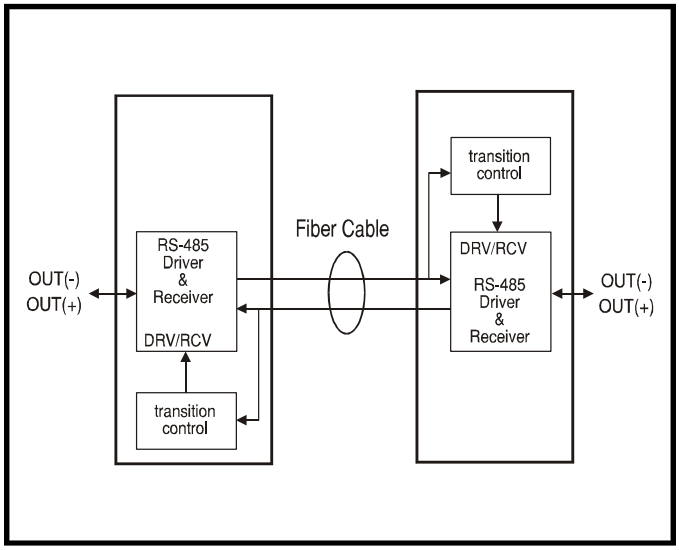


Figure 4. Two-Wire RS-485 Logic Diagram

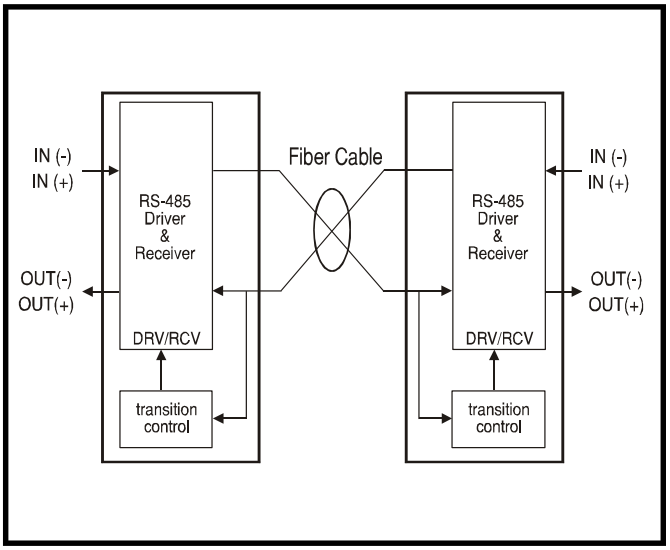


Figure 5. Four-Wire RS-485 Logic Diagram

Two-wire RS-485 is a half-duplex operation, which means transmit and receive operations take turns; they do not operate concurrently. From the user's point-of-view, the channel is in receiving mode when no data is transmitted from the remote unit. The local RS-485 transceiver will change to transmitting mode (Tx mode) upon receiving the first bit of data from remote unit. The local RS-485 transceiver will stay in Tx mode until a predetermined period (transition time; generally used by the customer's device) elapses after the last bit is received from the remote unit. The TC3420 automatically adjusts internally for that specific transition time. (See figure 4)

Four-wire RS-485 is a full-duplex operation, which means transmit and receive operations function concurrently. From the user's point-of-view, both channels are in the receiving or transmitting mode at all times. (See figure 5)

The RS-485 Driver/Receiver transition time is determined automatically by the TC3420 unit internally. The local unit's RS-485 transceiver changes to transmit (Tx) mode upon receiving the first bit of data from the remote unit. The transition time is the amount of time before the local unit's RS-485 transceiver will revert to the high-impedance receiver mode after the last bit is received from the remote unit. The RS-485 transition time automatically adjusts internally by the unit, according to the user's device timing.

***Note:** Not used, for future release.

Four Wire RS-422/RS-485 Pin Assignments and Connection*

Terminal block connectors are provided on rear panel of the TC3420 for the RS-422*/RS-485* signal connections. The pin assignments are illustrated below. Pins IN(-) & IN(+) are inputs and Pins OUT(-) & OUT(+) are outputs.

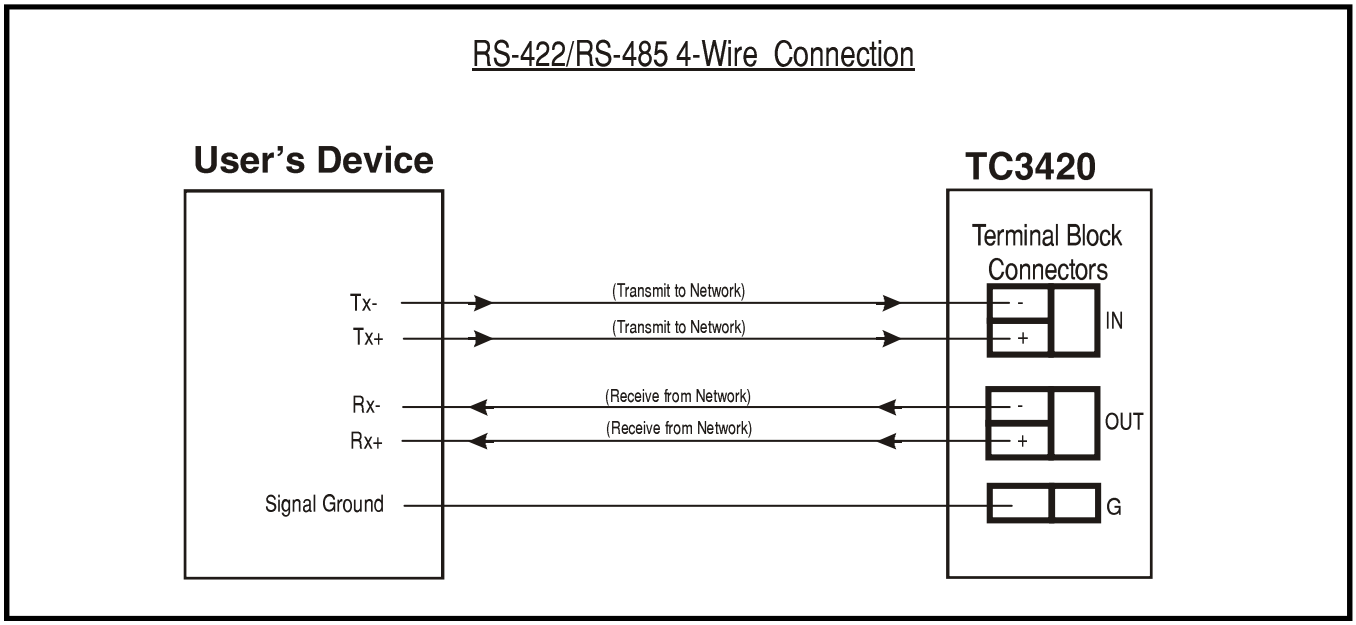


Figure 6. 4-wire RS-422/RS-485 Connection Diagram

Two Wire RS-485 Pin Assignments and Connection*

Terminal block connectors are provided on rear panel of the TC3420 for the 2 wire RS-485 signal connections. The pin assignments are illustrated below. Pins OUT(-) & OUT(+) are inputs/outputs.

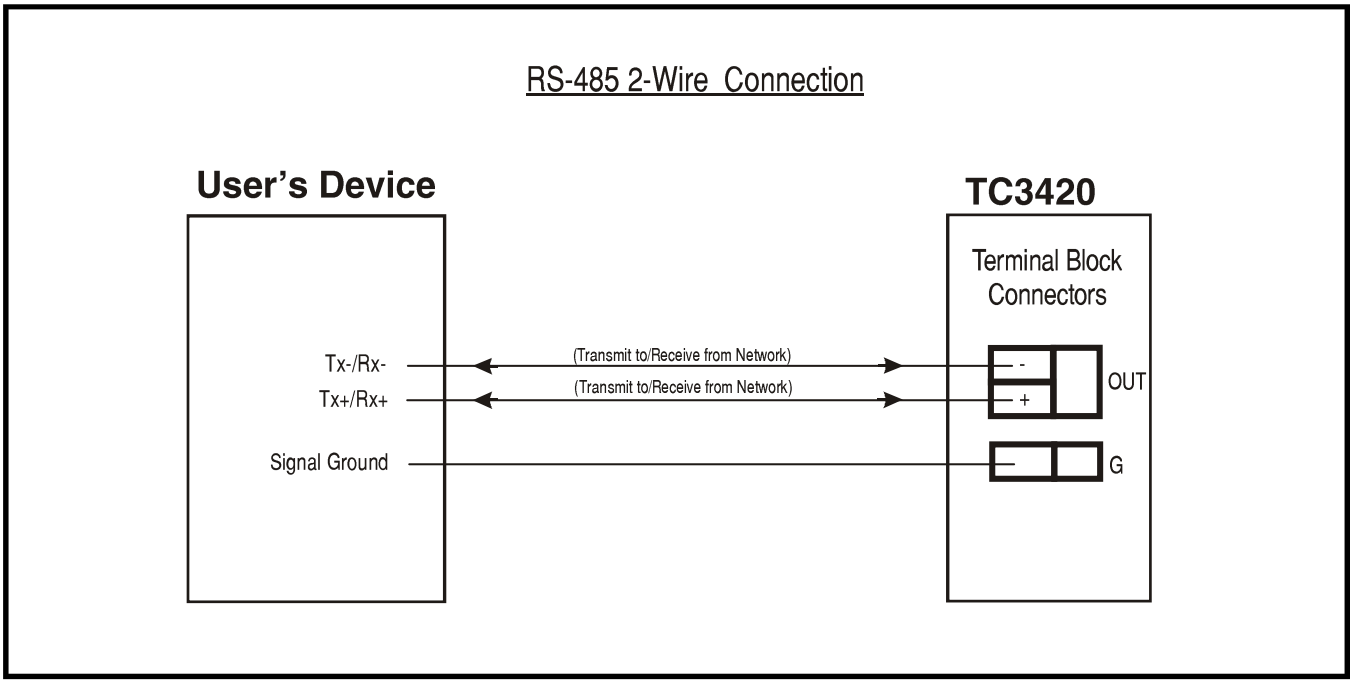


Figure 7. 2-wire RS-485 Connection Diagram

***Note:** Not used, for future release.

SW2 Internal PCB Switches for RS-485 Applications*

There are other eight DIP switches located at the PC board and can not be accessed from front panel. These switches are usually only used during installation.

SW2-1: Not used.

SW2-2: Not used.

SW2-3: Not used.

SW2-4: Not used.

SW2-5: Not used.

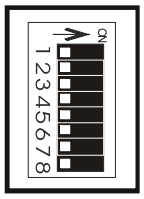
SW2-6: Not used.

SW2-7: Not used.

SW2-8: Off: The TC3420 is setup for an RS-422* application.

On: The TC3420 is setup for an RS-485*, 2/4 wire application.

Internal SW2



The ground connector should connect to the user's device's signal ground.

RS-485 Transition Time*

For an RS-485 application, the transition time is set automatically by the TC3420 once a baud rate is selected from the pull-down field on figure 16 on page 23. The baud rate is set according to the customer's application needs and the TC3420 will adjust accordingly. For example, if you know the async data baud rate of your application is for a 9600 baud, then the TC3420 will adjust automatically.

RS-422 & RS-485 Termination Resistor*

A termination resistor is usually necessary for RS-422 and RS-485 applications. Without proper termination, the error rate of data transmission may be high due to an “echo” effect on the electrical connection. With the addition of a termination resistor at the beginning or end of the electrical bus, this echo effect is greatly reduced. The termination resistors are 100 to 130 ohm resistors located on the interface module inside the TC3420. Two jumpers, identified as board locations “W1” & “W5” control the termination resistance on each unit. “W5” controls the resistance for the unit’s receiver, while “W1” controls the transmitter’s resistance. Proper line termination is usually accomplished by leaving the “W5” jumper intact at both ends of the link. There is no termination resistor required for RS-232 applications.

***Note:** Not used, for future release.

Chapter 4 - Application Example

Mode Setting

TC3420 can be used in three different modes (Serial Tunnel, Telnet Gateway* or Reverse Telnet*) depending on the user's application.

Serial Tunnel Mode:

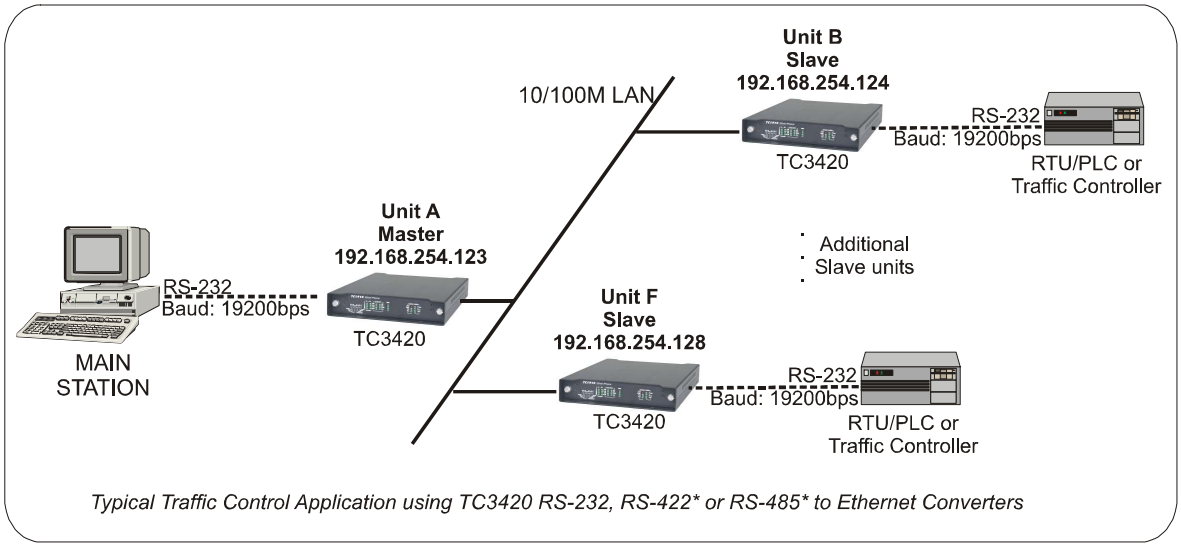


Figure 8. Serial Tunnel Mode Example

In this mode, one Master TC3420 and (N) Slave units are used, and all of them are connected to serial RS-232 devices.

1. Set one unit as a Master, and the others as Slaves using the front panel DIP switches. (Restart Require)
2. Set all units to Serial (SRL) mode using the front panel DIP switches. (Restart Require)
3. Use the **Web Configuration Interface** to enter the appropriate network and serial settings.

Example:

Slave TC3420s (Units B, C, D, etc)	
NETWORK SETTINGS	
Local Description:	e.g. Local location
IP Address:	192.168.254.(123+N)
Subnet Mask:	255.255.255.0
Master Description:	e.g. Remote locations
Master IP Address:	192.168.254.123
Multicast IP Address:	239.192.0.1
UDP Port Number One:	TC3400
UDP Port Number Two:	TC3401
Gateway Address:	0.0.0.0
DNS Address:	0.0.0.0
SERIAL SETTINGS	
Data Format:	8-N-1
Baud Rate:	19200
Delay Setting:	10
Transmit Filter Enable:	Not Check
Telnet Timeout Enable:	Checked
Telnet Timeout:	30

Master TC3420 (Unit A)	
NETWORK SETTINGS	
Local Description:	e.g. Local location
IP Address:	192.168.254.123
Subnet Mask:	255.255.255.0
Multicast IP Address:	239.192.0.1
UDP Port Number One:	TC3400
UDP Port Number Two:	TC3401
Gateway Address:	0.0.0.0
DNS Address:	0.0.0.0
SERIAL SETTINGS	
Data Format:	8-N-1
Baud Rate:	19200
Delay Setting:	10
Transmit Filter Enable:	Not Check
Telnet Timeout Enable:	Checked
Telnet Timeout:	30

***Note:** Not used, for future release.

1. Connect a computer and TC3420 on the same network.
2. Power up the TC3420 and the “LINK” LED should be on. (You can disable the alarm by setting the "DISALM" to the down (on) position.)
3. Start your Web browser.
4. In the Address box, enter the IP address of the TC3420. For example, if the unit is set to default Master, enter: http://192.168.254.123
   If the unit is set to default Slave, enter: http://192.168.254.124
5. Once connected, you should see a dialog box as in figure 10, next page. Enter the username & password and click enter, then you will see the following figure 9.
6. Click the links at the left of the page to navigate to the desired section.

Note: The Web Configuration Interface will not be accessible while the TC3420's are transmitting or receiving serial data. Otherwise, it is accessible. (Such as when the units are idle)

(Please refer to "Testing & Trouble shooting" section, if not connected)

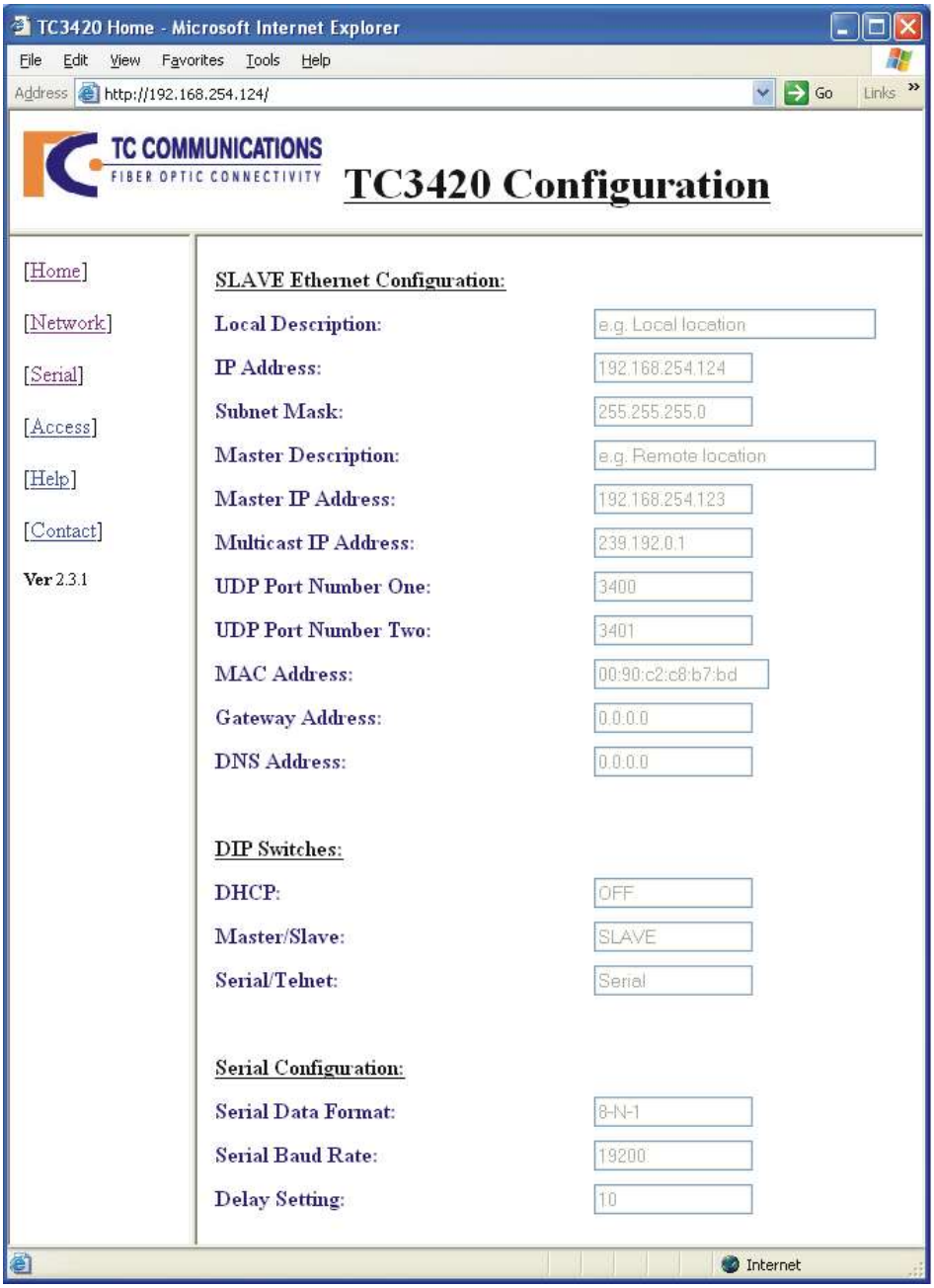


Figure 9. TC3420 Home Page

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 10. TC3420 Password Dialog

Access Settings

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

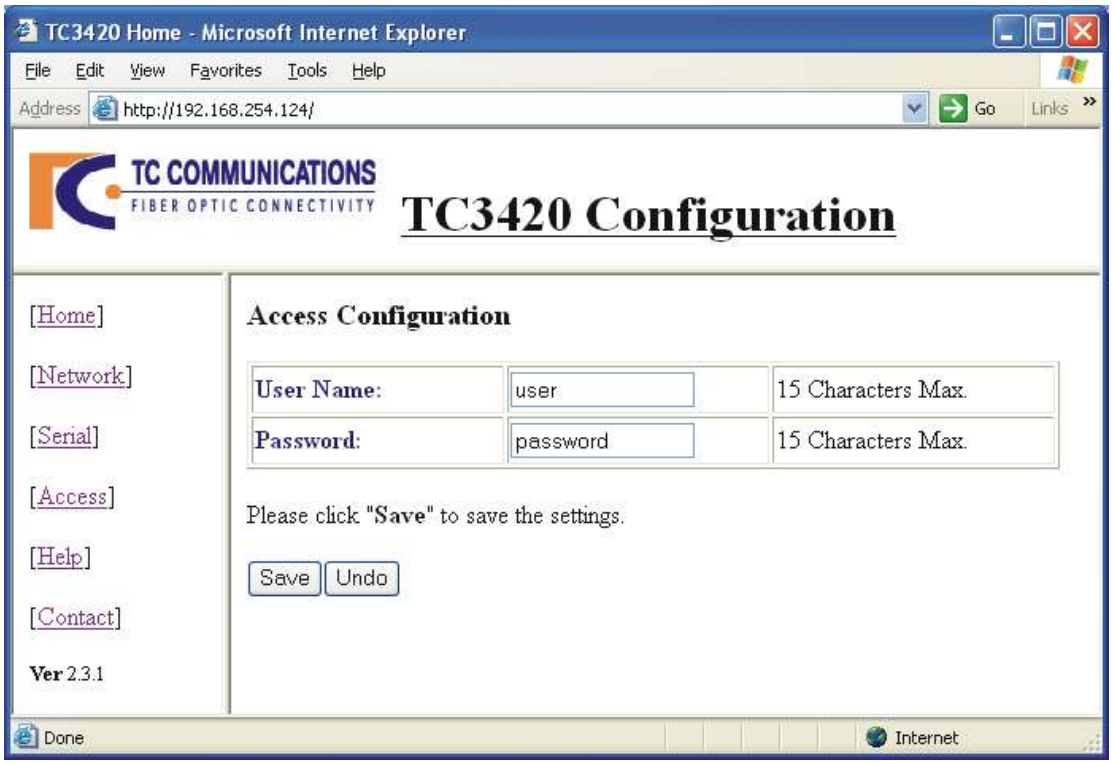


Figure 11. TC3420 Access Setting Page

Click the Browser's "Back" button to cancel all the changes.

Click the "Save" button to save the changes.

Click the "Reset" link to apply the new access setting at the "Access Configuration" page.

Web Configuration Interface - Settings

Click on the "Network" link at the home page and you should see the following "LAN Configuration" page.

Note: If the unit being configured is a Master, then the web pages will display "MASTER LAN Configuration" and will be slightly different than those of the Slave units.

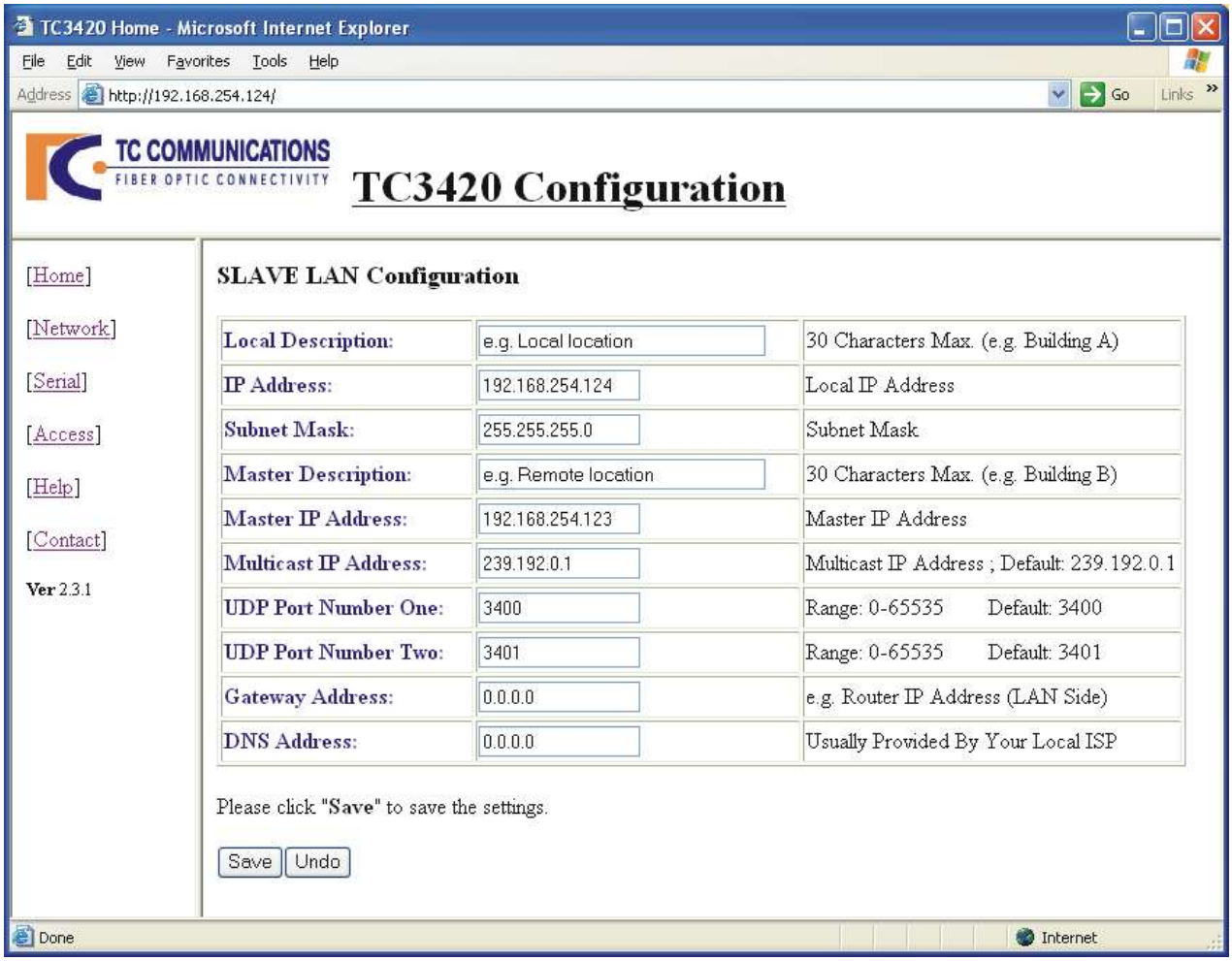


Figure 12. TC3420 Network Settings Page

Web Configuration Interface - Settings

Click on the "Serial" link at the home page and you should see the following "Serial Configuration" page.

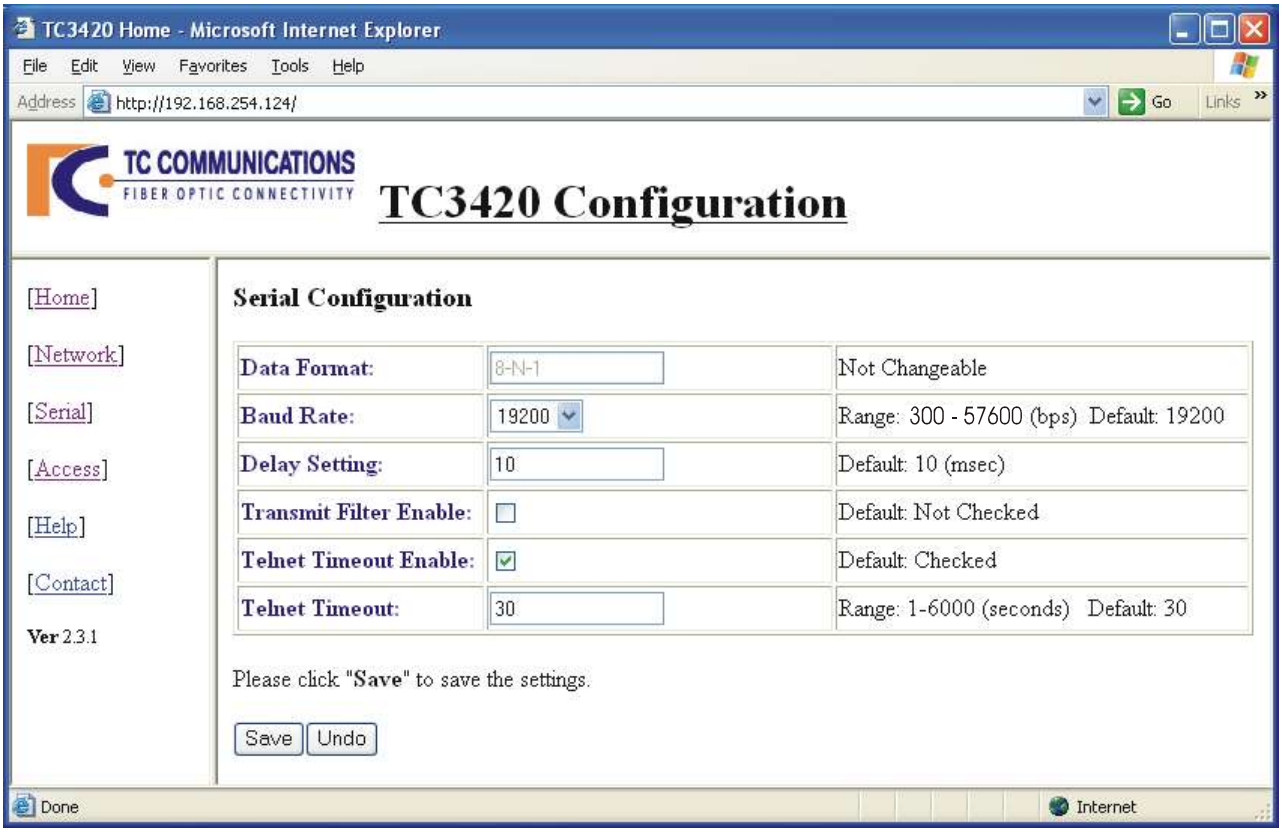


Figure 13. TC3420 Serial Settings Page

LAN Configuration

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

Local Description (not require): 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 Slaves 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.

Master Description: Enter the description for the remote unit.

Master IP Address: (not require for Master unit.) For Slave units, this is the IP Address of the remote Master. Logical name is also supported if DNS is setup.

Important: This Master IP address on the Slave units must match to the IP address of the Master unit.

Multicast IP Address: The IPv4 networking standard defines Class D addresses as reserved for multicast.

Multicast IP addresses are in the range of 224.0.0.0 through 239.255.255.255.

The Default value for Multicast IP Address is 239.192.0.1

(Note: Please contact your local network administrator for your network. Master and slaves' multicast IP Address setting must be the same.)

***UDP Port Number*:** Two UDP Ports are used by TC3420 communication. (Note: Master and slaves' UDP port settings must be the same.)

UDP Port Number One: The Master unit uses UDP Port One to transmit (Multicast).

The Slave units use UDP Port Ont to receive.

UDP Port Number Two: The Master unit uses UDP Port Two to receive.

Slave units use UDP Port Two to transmit.

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

Default value is 0.0.0.0 If you are using the DHCP* option, this value will be set automatically.

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

Default value is 0.0.0.0 If you are using the DHCP* option, this value will be set automatically.

***Note:** Not used, for future release.

Serial Configuration

Data Format (not changeable):

8-N-1. 8 bit data, no parity, 1 stop bit.

Baud Rate: (select it from the pull-down field on page 21)

300bps, 2.4K, 4.8K, 9.6K, 19.2K, 38.4K, 48K, or 57.6K can be selected.

19.2K is the default setting.

Delay Setting: 10msec (default)

User Options: 1. The user can leave the default delay setting of 10msec for any baud rate setting. Or

2. If the user chooses to change the delay setting, then the following minimum delay settings apply to the given baud rates as shown on Table 1, below.

Baud Rate	300 bps	2.4Kbps	4.8Kbps	9.6Kbps	19.2Kbps & Up
Minimum Delay Setting (msec)	10 msec	5 msec	4 msec	3 msec	2 msec

Table 1. Minimum Delay Settings

Transmit Filter Enable (Telnet Mode only)*:

Change CR/LF(Carriage Return and Line Feed) character pairs into a single CR.

Default Value: Unchecked

Telnet Timeout Enable (Telnet, Gateway, or Reverse Telnet Mode only)*:

Enable the Telnet Timeout option.

In Telnet Gateway Mode, the TC3420 will disconnect the link between itself and the remote telnet client if there is no data being send by the TC3420 for 30 seconds or the time specified in the Telnet Timeout field below.

In Reverse Telnet Mode, the TC3420 will disconnect and reconnect the link between itself and the remote telnet server if there is no data being send by the TC3420 for 30 seconds or the time specified in the Telnet Timeout field below.

Default Value: Checked

Telnet Timeout (Telnet Mode only)*:

1 - 6000 seconds.

Default Value: 30

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

Click the "Submit" button to save the changes.

***Note:** Not used, for future release.

Web Configuration Interface - Settings Summary

You will see the following screen after the settings are saved.

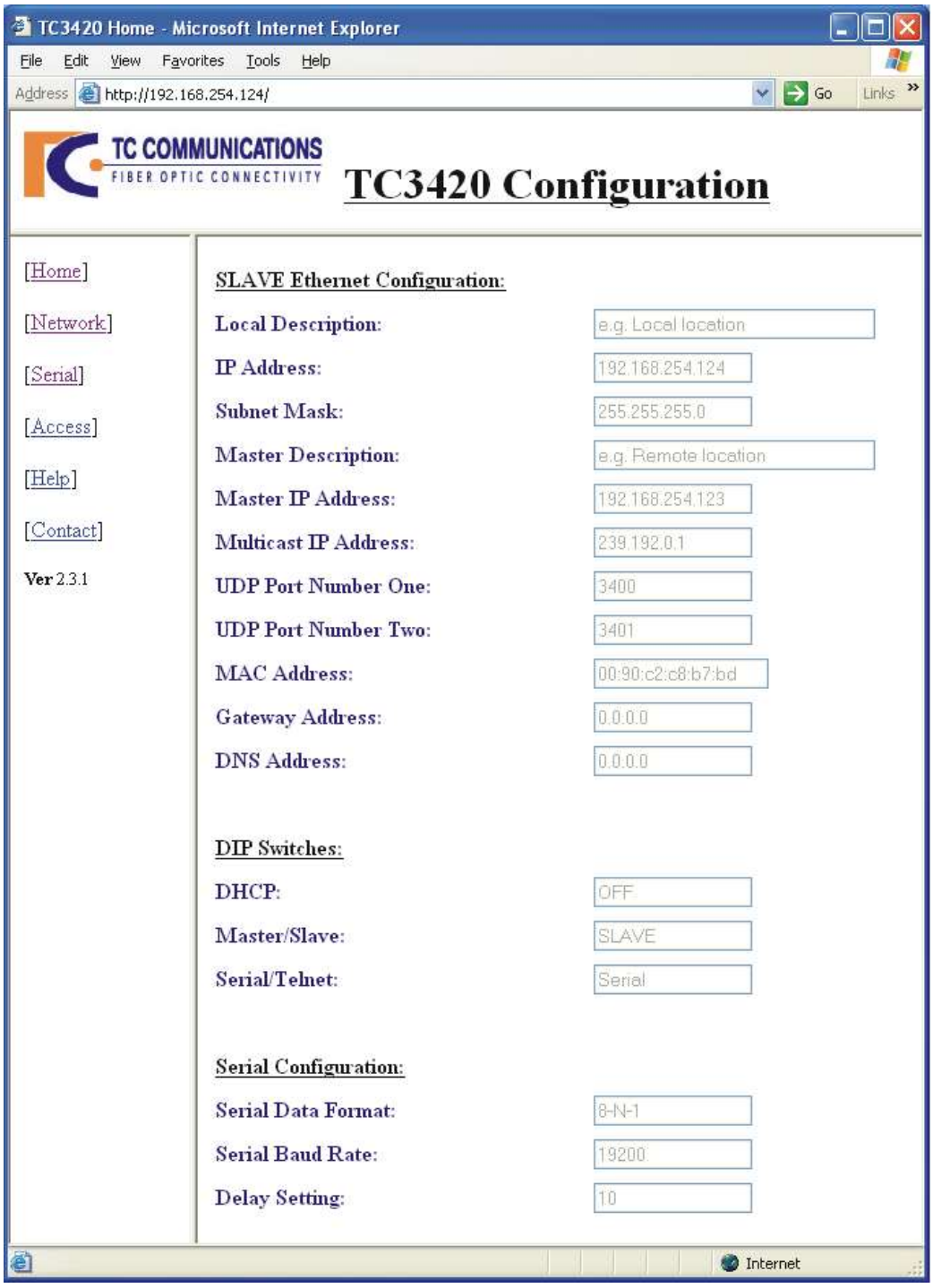


Figure 14. TC3420 Settings Summary Page

You need to Reset the unit to apply the new settings:

1. By clicking the "Reset" button at the bottom of the page. Or,
2. By resetting the power of the unit.

To check your PC's IP Address and Network Mask. (Windows 98/ME)

1. Open “Control Panel”
2. Open “Network”
3. Click on the TCP/IP for the network card
4. Click “Properties”

(**Attention**: Please copy down the existing setting before making any changes. Contact your local area network administrator if you are unsure about the settings. Improper settings may result in disruption of the existing network.)

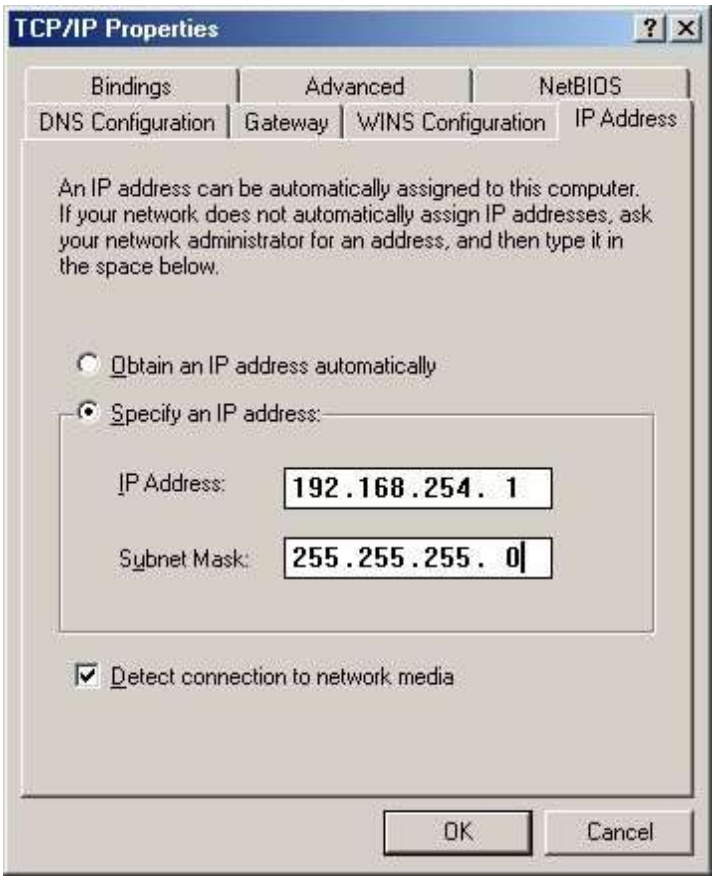


Figure 15. TCP/IP Properties

Under the TCP/IP Properties

Select the “Specify an IP address” option and type in the following

IP Address: 192.168.254.1 (Please make sure no other network device are using the same IP address.)

Subnet Mask: 255.255.255.0

Click OK and reboot the computer.

Chapter 7 - Bench Tests

General

It is highly recommended to conduct a bench test before actual installation. A bench test will allow the user to get familiar with all the functions and features of the TC3420 in a controlled environment. Knowledge of the TC3420's functions and features will ease installation and troubleshooting efforts later on.

Signal Generator Bench Tests

The TC3420 (Master) and TC3420 (Slaves) have built-in signal generators to simulate broadcast and response messages from a SCADA host or RTU. The built-in signal generator is a pulse signal indicated by a blinking LED. The flash rate is intentionally reduced for easy visual confirmation.

1. Set up the bench test as shown in Figure 16. At the Master unit, turn On the "SIG-GEN" switch by sliding the front panel SW5 to the down (On) position. The "BRD" LEDs on the TC3420 (Master) should start flashing. The "BRD" LEDs on all of the TC3420's (Slaves) should also flash, indicating receipt of the Master's broadcast signal. Once verified, turn Off the Signal Generator on the Master unit.

2. At any of the Slave units, turn on the "SIG GEN" switch by sliding the front panel SW5 to the down (On) position. The "RSP" LEDs on the TC3420 (Slave) should start flashing. The "RSP" LEDs on the TC3420 (Master) should also flash, indicating receipt of the Slave's response signal. Once verified, turn Off the Signal Generators on the Slave.

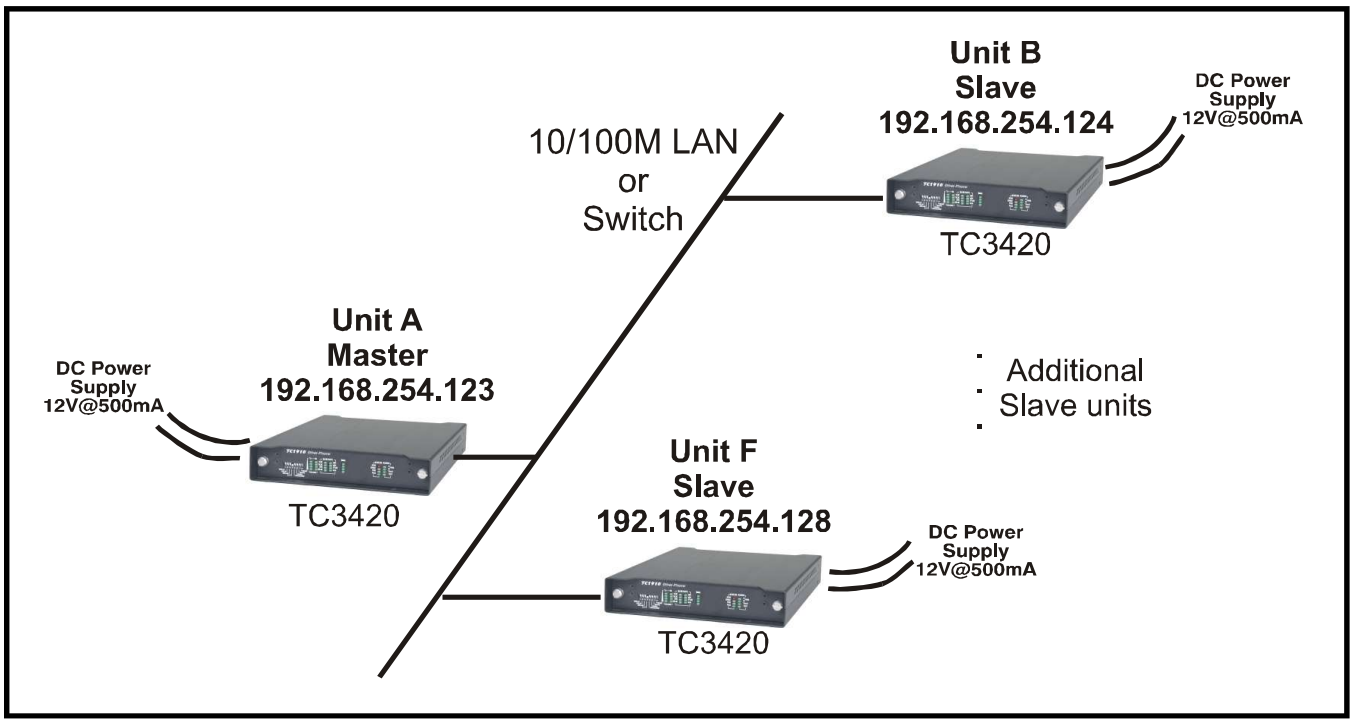


Figure 16. TC3420 Signal Generator Bench Tests

Local Electrical Loopback Bench Test

Purpose: To verify cable connections, the electrical interface driver, and the receiver's Integrated Circuitry.

Equipment Requirements: One (1) Bit Error Rate Tester (BERT) Set with appropriate interface module.
One (1) DB25 to DB9 Serial Cable.

Procedure: Set up the bench test as shown in Figure 17. Set front DIP switch #7 (LOCLB) to the down (On) position. Set the BERT tester to DTE. Connect the DB25 to DB9 serial cable to the tester. Connect the other end of serial cable "male" side to the DB9 "Female" port of the Stand Alone unit to be tested. On rackmount units, when using the terminal block connector for RS-232, make the proper connections according to the terminal block connections shown below as reference.

The "BRD" and "RSP" LEDs should be On indicating good signal is received by the TC3420 and transmitted back to the tester. The BERT tester should indicate a "SYNC" signal. This test can be performed on each Master or Slave units

Note: It is normal for the LOCLB and ALARM LEDs to flash on the Master or Slave units since the unit is in diagnostic mode.

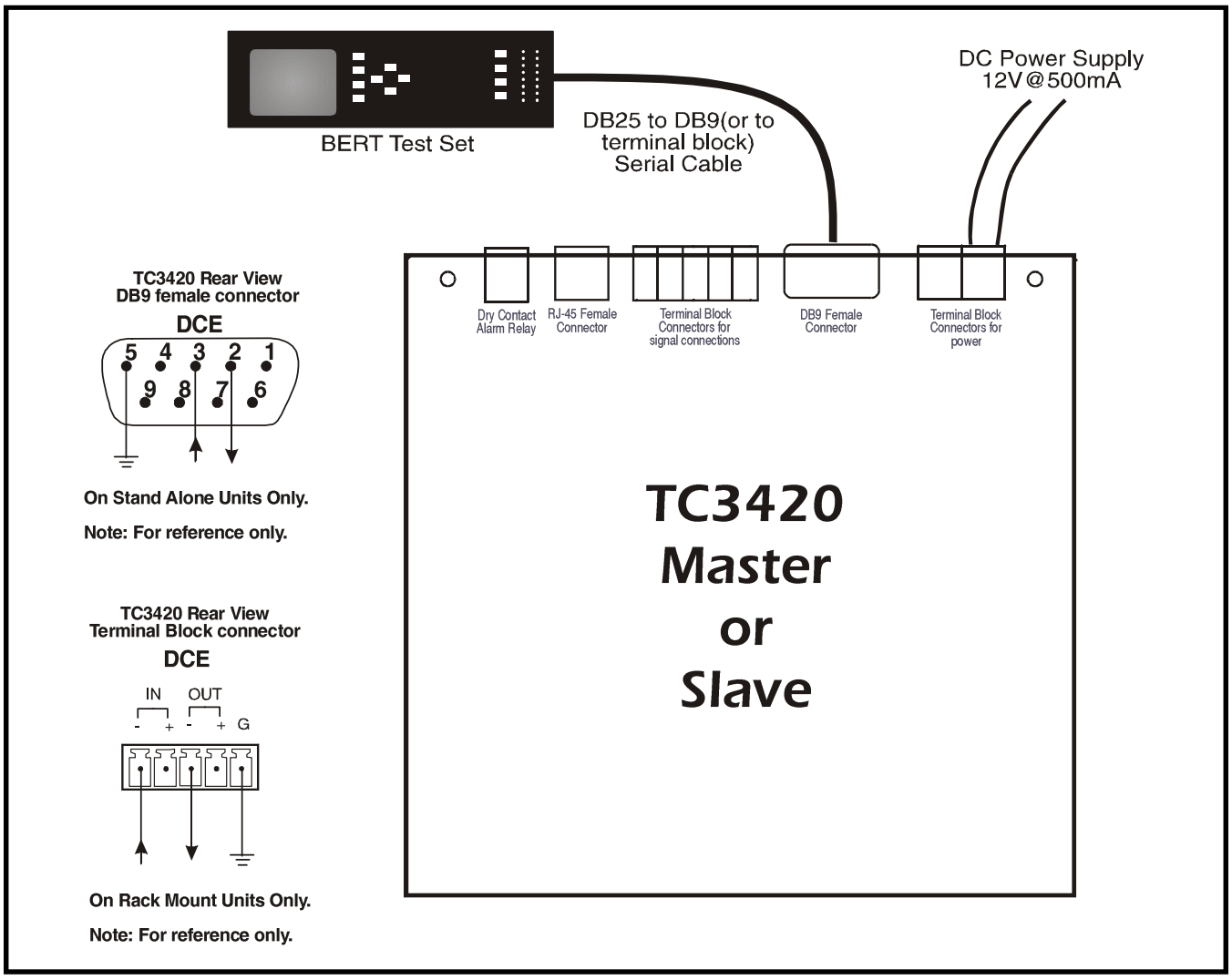


Figure 17. TC3420 Local Electrical Loopback Bench Test

Remote Loopback Bench Test

Purpose: To verify the integrity of all RS-232 electrical cable connections between the Master unit and Slave units over a LAN. It also enables the user to become familiar with the functions of the TC3420. When installing new Slave units into a network, this test should be performed between each individual Slave and the Master unit.

Note: the BERT tester should only be connected to the TC3420 (Master).

Equipment Requirements: One (1) Bit Error Rate Tester (BERT) Set with appropriate interface module.
One (1) DB9 Serial Cable.

Procedure:

1. Set up the bench test as shown in Figure 18. Connect the Master unit and Slave units to an Ethernet switch. Connect the BERT tester to the Master unit.

2. Make sure all DIP switches are in the appropriate positions for all units being tested.

3. The "BRD" LED on the Master's front panel should be on, indicating the transmission of a broadcast message; the "BRD" LED on each Slave's front panel should be on, indicating receipt of the broadcast message.

4. Set SW4 (RMTLB) to down "On" position, on the Slave unit to be tested.

   Note: It is normal for the RMTLB and ALARM LEDs to flash on the Slave unit being tested since the unit is in diagnostic mode.

5. The "BRD" and "RSP" LEDs should be "on" on both the Master unit and Slave unit being tested, indicating good signal is received by the TC3420s and transmitted back to the tester. The BERT tester should indicate a "SYNC" signal. This test can be performed on each Slave unit connected to the Switch.

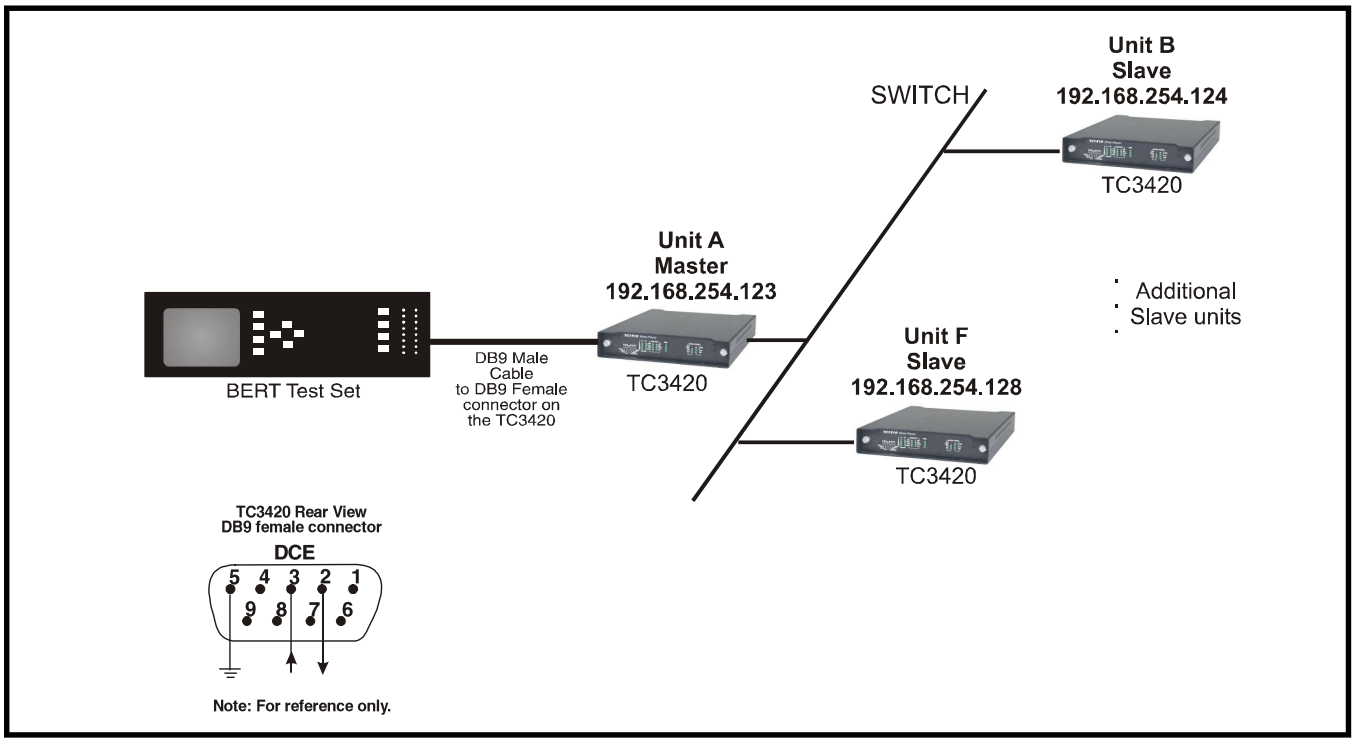


Figure 18. TC3420 Remote Electrical Loopback Bench Test

Chapter 8 - Troubleshooting

General

Alarm condition will occur whenever there is no Ethernet signal detected at the RJ-45 port on the rear panel of the unit. A second alarm condition will occur whenever the unit is in a diagnostic mode. Under normal operation, the red Alarm LEDs should be off.

All LEDs are "Off"

If no LEDs are lit on the unit, check the DC power supply, connector plug, and/or power source. If the "PWRA" or "PWRB" LEDs still do not light, check the fuses on the suspect board. The TC3420s each have a pair of fuses on the boards. These fuses are designated as "F1" and "F2". The user may verify the fuse status by disconnecting power from the unit and performing a simple continuity check for each fuse on the suspect board(s).

If the problem still persists, contact the Technical Support Department at TC Communications, Inc. at (949) 852-1973.

Chapter 9 - Specifications

Electrical

RS-232 ..... DB9 Female
RS-232 /RS-422/ RS-485 ..... Terminal Block
Serial Baud Rate ..... Up to 57.6Kbps
Ethernet (10Base-T) ..... RJ-45 Female
Rate 10Base-T

Visual Indicators

System status ..... ALARM, PWR A, PWR B, VCC
Signal Status ..... BRD, RSP
Ethernet Signal Status ..... LINK, ACT, DHCP
Diagnostic Signal Status ..... RMTLB, LOCLB, DFLT

Alarm

Dry Contact ..... Normal Open

Power Source

Standard ..... 12VDC @500mA
Optional ..... 24VDC, -48VDC or 115/230VAC with an external power cube

Temperature

Operating ..... 10°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) 1.39"
Width ..... (18.13 cm) 7.14"
Depth ..... (16.59 cm) 6.53"
Weight ..... (887 gm) 1.96 Lbs

Appendix A

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).