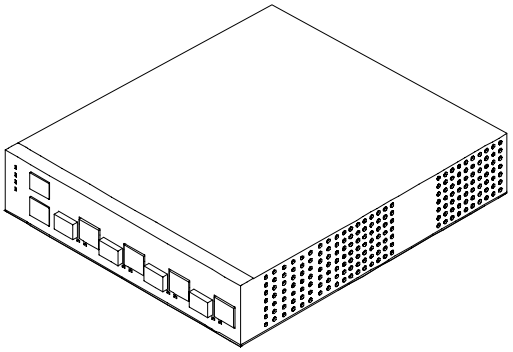
USER GUIDE



CCT100x4-CDM-213SFx-255SFx

10/100BaseT To Single Fiber 100BaseX Ethernet Media Converter With Communications Diagnostics Module

COTS

Champion Optical Technology Services™

Notice

CCT100x4: Optical To Copper Ethernet Installation Guide

First Edition (January 2006)
v1d3

Handling Information

Caution

CCT100x4 uses Class 1 laser devices. You should never stare directly at these devices when they are inserted in the CCT100x module and it is powered on.

Always use a grounded outlet when powering CCT100x4.

Warning

Before you work on any equipment be aware of the hazards involved with electrical circuitry. You should be familiar with standard practices for preventing accidents. Disposal of this product should be handled according to national and local laws and regulations.

Storage

This device should be stored in a –4 to 149º F (-20 to 65º C) environment observing proper electrostatic precautions.

Terms & Conditions

Warranty

Effective January 1, 2006:

Champion Optical Technology Services ("COTS") warrants this product from the date of purchase to the original purchaser for 5 years. The component thereof, but excluding any software incorporated therein (referred to collectively as the "products" or "equipment") will be free from defects in material and workmanship. THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, AND CONSTITUTE THE PURCHASER'S SOLE AND EXCLUSIVE REMEDY WITH RESPECT TO THE EQUIPMENT.

In the event that COTS receives returned equipment with defects in material or workmanship, it will, at its option, repair or replace the equipment to whatever extent it deems necessary to restore the equipment to proper operating condition. All material and labor required for such a restoration will be provided at no charge when equipment with material or workmanship defects is properly returned postage or freight prepaid under the procedure described herein within their applicable warranty period starting from date of purchase. DATED PROOF OF PURCHASE OR COTS RMA NUMBER MUST BE PROVIDED WITH THE RETURNED EQUIPMENT.

Limitations

Not covered under the warranties are: failures due to accident, misuse, abuse, neglect, improper installation, product modification, or unauthorized repair or attempted repair, or shipping damage. COTS HEREBY DISCLAIMS ANY AND ALL EXPRESSED OR IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURCHASE HOWEVER ARISING. IN NO EVENT SHALL COTS BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES OR FOR COMMERCIAL LOSSES FROM ANY CAUSE INCLUDING, BUT NOT LIMITED TO, LOST PROFITS OR REVENUES, REGARDLESS OF NOTICE.

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Return Procedures

No product may be returned for any reason without the prior approval of COTS. Customer is responsible for returning products to COTS at customer's risk and expense. Prior to returning product(s) to COTS for warranty service, customer must obtain a Return Material Authorization (RMA) number from COTS by calling customer service at 440-446-8800. If COTS elects to replace such part pursuant to the applicable Warranty (see above), replacement parts will be shipped at COTS' expense, subject to availability, via a common air delivery service after the RMA number is obtained. Replacement parts may be refurbished or repaired. COTS shall not be responsible for failure of the delivery service to make on-time delivery. Customer must ship the product(s) to COTS in the original packaging, prepaid and insured, with the RMA number clearly identified on the packaging. Returned products should be shipped to the following address: COTS, Attn: RMA Dept.-RMA No. _____, 749 Miner Road, Highland Heights, OH 44143. Any product(s) returned to COTS shall become the property of COTS. If COTS determines that failure of the product(s) was not a result of a defect in materials or workmanship, COTS reserves the right to charge customer for parts and labor at COTS' then current labor rate. COTS will advise customer prior to assessing these charges. Except as explicitly provided herein, customer is not authorized to return product to COTS. If COTS elects to accept unauthorized returns, COTS may, in its sole discretion, charge a restocking fee for parts returned.

Table of Contents

Installation Specifications

Table 1 Technical Specifications

- Multimode or Single Mode optics adhere to industry standard specifications from the MSA for SFF style transceivers reporting Tx/Rx activity and electrical use
- Copper port supports 802.3u specifications including auto-negotiation, 100BaseT speed, MDI-x, Tx/Rx status
- Full test of copper and optical link at startup
- Communications Diagnostic Module reports all transceiver information and chassis activity via HTTP and SNMP
- Rack mountable
- Redundant power with active failover

Table 2 Cabling Specifications

Specification	Description
Copper Connector	RJ-45
Copper Cable	Category 5e or better
Copper Cable Distance (Max)	100 Meters (328')
Fiber Connector	SC or LC
Fiber Cable	Multi- or Single Mode
Fiber Cable Distance (Max)	19+ dB link budget

Table 3 Environmental Ranges

Operating Temp.	32 to 113 F (0 to 70C)
Storage Temp.	-4 to 149 F (-20 to 65C)
Operating Humidity	10 to 85% (non-condensing)
Storage Humidity	5 to 95% (non-condensing)
Operating Altitude	Up to 10,000' (3000M)
Storage Altitude	Up to 15000' (4570M)
Power Consumption	15 Watts
Physical Dimensions	(H x W x L) 1.5" x 7.5" x 10"
Weight	5 Lbs (0.05 Kg)
Rated Voltage	100-240V AC, External 5V DC

Description

CCT100x4-CDM-213SFx-255SFx is a media converter designed to convert optical to copper media running 100Base Ethernet. There are two 1310Tx single fiber transceivers and two 1550Tx single fiber transceivers installed. **CCT100x4** accommodates any of COTS' 100Base optical transceivers. Use CCT100x4 for network debug or network management and transport.

The optical to copper connection is wired in silicon and is totally transparent to the devices it is connected to. Network managers can set the copper port parameters and know that it will be passed on to the optical link because CCT100x4 will not link if either of the connections are down.

With the Communications Diagnostic Module (CDM), status and performance of the CCT100x4 system and each optical to copper link is reported, logged, and managed. The CDM controls the 3rd LED light beneath the Ports and an optional 3 LEDs on the left side of CCT100x4 under the Power LED.

An optional redundant power supply is available via an external power adapter.

CCT100x4 is a 4 converter configuration designed to fit in an appliance form factor which can also be rack mounted. A 24-port version is available in a rack mounted unit.

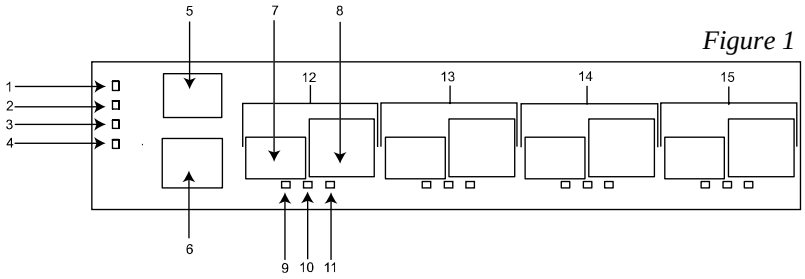
CCT100x4 can be rack mounted using L brackets or two CCT100x units can be mounted in one rack unit using L brackets and a U bracket made by COTS.

Installation Notes

Identifying parts of the CCT100x4 with CDM:

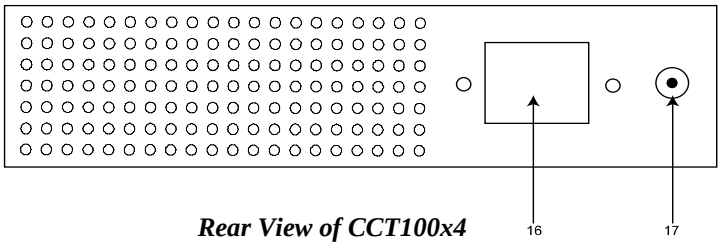
1. Power Light
2. Redundant Power Supply (RPS) Light
3. CDM Tx Light
4. CDM Alarm Light
5. CDM Network Port
6. CDM Console Port
7. SFF Transceiver port (single fiber)
8. 100 Base-T Port
9. GO or Link Light indicating copper & optical links are operating.
10. Tx/Rx Light
11. Port Alarm
12. Port 1, Optical wired directly to Copper
13. Port 2, Optical wired directly to Copper
14. Port 3, Optical wired directly to Copper
15. Port 4, Optical wired directly to Copper
16. Main Power
17. Redundant Power

Figure 1



Front View of CCT100x4

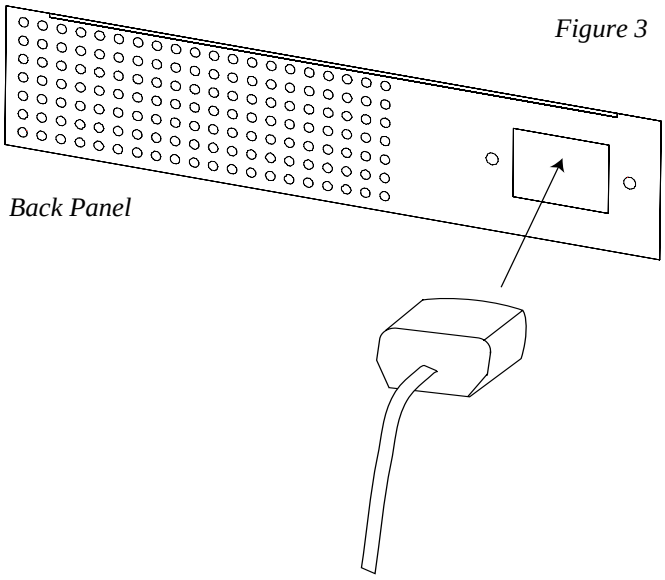
Figure 2



Rear View of CCT100x4

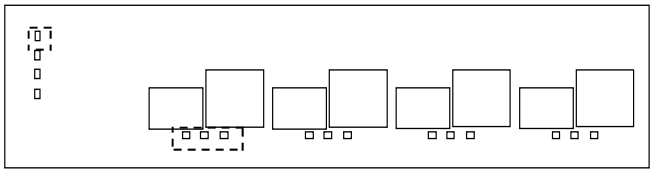
Initial Power Up

Figure 3



Back Panel

Figure 4

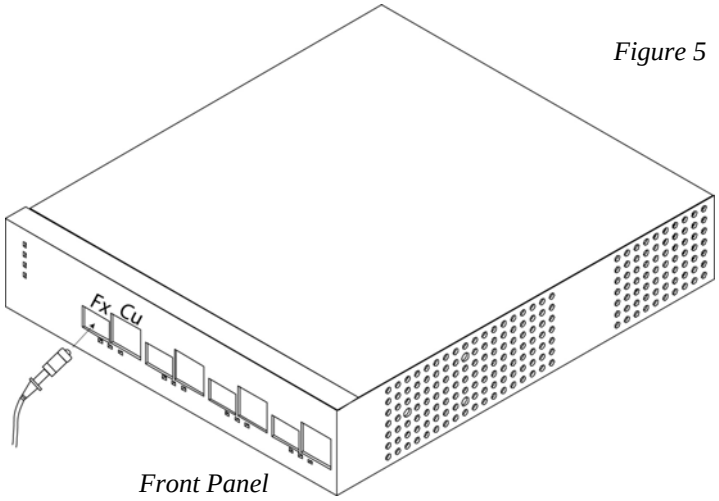


Front View

1. Plug a grounded power cord into CCT100x4.
2. Upon power up, the power LED will illuminate.
3. Each LED will blink as the CCT100x4 goes through diagnostics.

Connecting Fiber Optic Cables

Figure 5

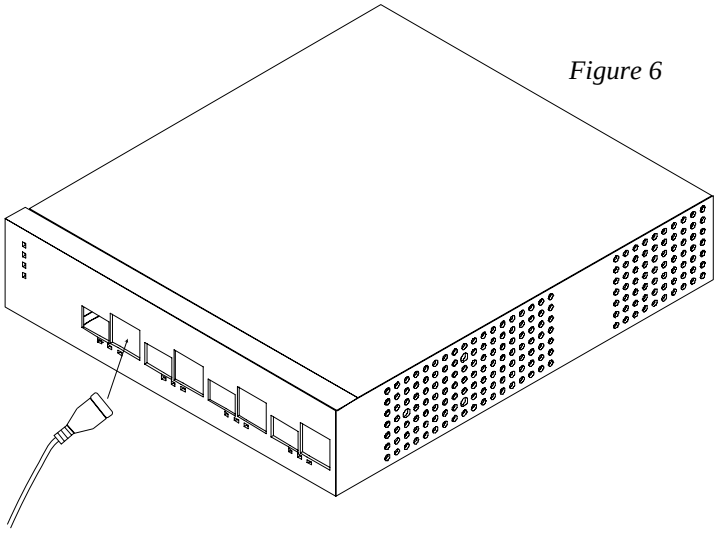


Front Panel

1. Insert the connector of the fiber optic cable into the receptacle of the transceiver in CCT100x4. This type of transceiver is a soldered down module called an SFF. The mechanical characteristics of this module are converted by a Multi-Source Agreement. A copy of this agreement can be found on the Internet or from COTS.
2. The connector, SC or LC, should snap into place. This connector is plastic and not spring loaded; be careful to insert the connector with a steady even force. DO NOT PULL THE CABLE WITHOUT RELEASING THE CONNECTOR.
3. Be sure to handle the fiber optic cables carefully. Typically, there should be no more than a 1.5” bend radius in the cable segment.

Connecting Ethernet Cables

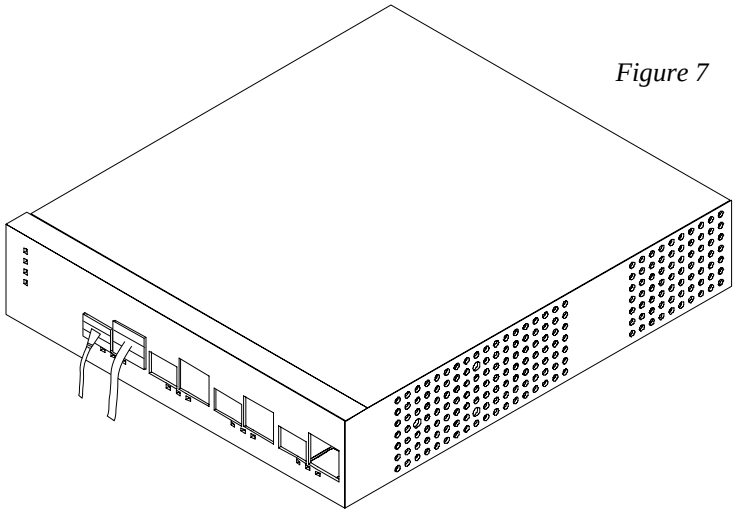
Figure 6



1. The copper cable should be inserted into the RJ45 port making sure the plastic tab snaps into place.
2. Use only Cat5e or higher cabling.
3. Observe industry standards for cable bend radius precautions.

Link Established

Figure 7



1. When both cables are plugged in, a link light will be established on the devices that each cable is plugged into.
2. Tx/Rx activity will be shown on the middle LED under each Port.

NOTE: A Port is defined as an optical and copper connection, they are wired together. You can not use the optical connection on Port 1 with the copper connection on Port 2.

Link Established Part II

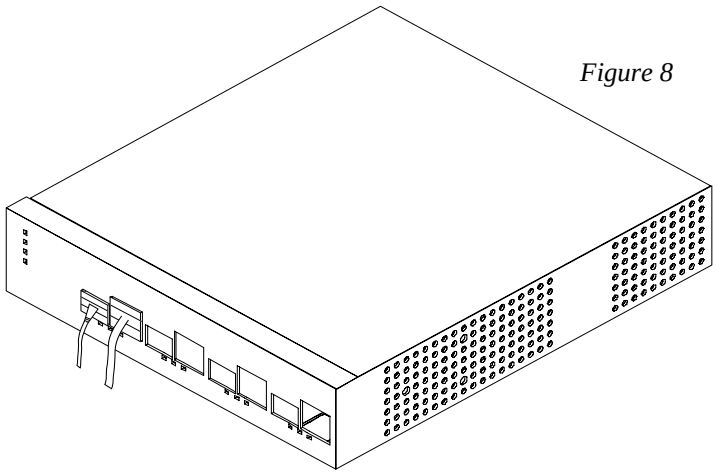
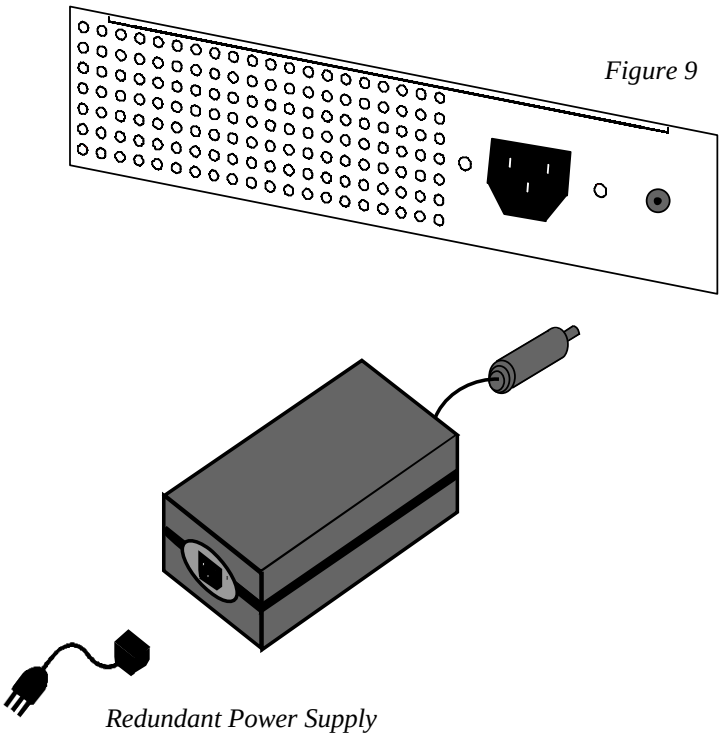


Figure 8

Using the diagnostic software, the link setup can be established to allow the optical link to stay active even if the copper port is disconnected. This can be helpful when using the CCT100x4 as a media converter to a packet analyzer.

Redundant Power

Figure 9

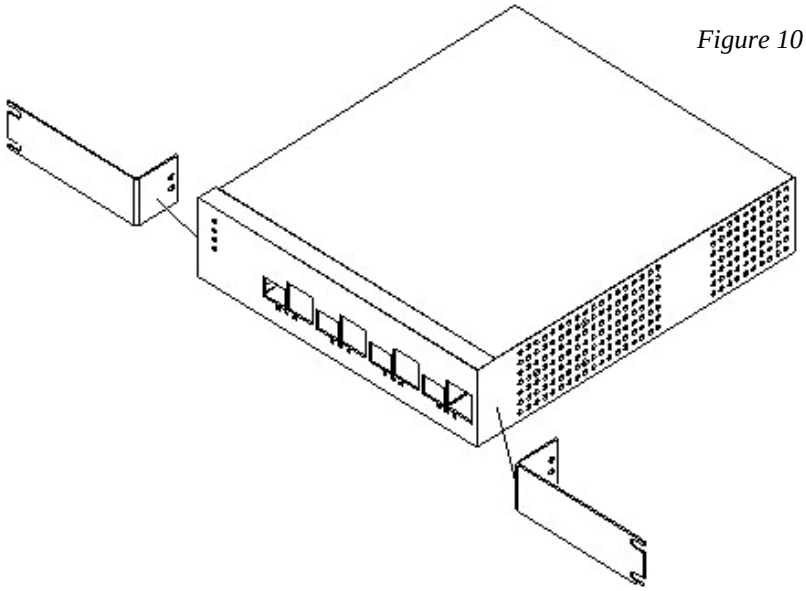


Redundant Power Supply

1. Plug power cord into power supply
2. Plug the redundant power supply into the CCT100x4
3. Plug the redundant power supply into an AC outlet. It is a hot swappable supply and system; as long as one unit is connected, the CCT100x4 will remain powered. The diagnostics log tracks power connectivity.
4. The redundant power LED on the front lights up when the power adapter is plugged in.

Rack Mount Installation, Single Mount

Figure 10



For single mount installation screw one bracket into each side of the CCT100x4 as shown in figure 10.

Rack Mount Installation, Dual Mount

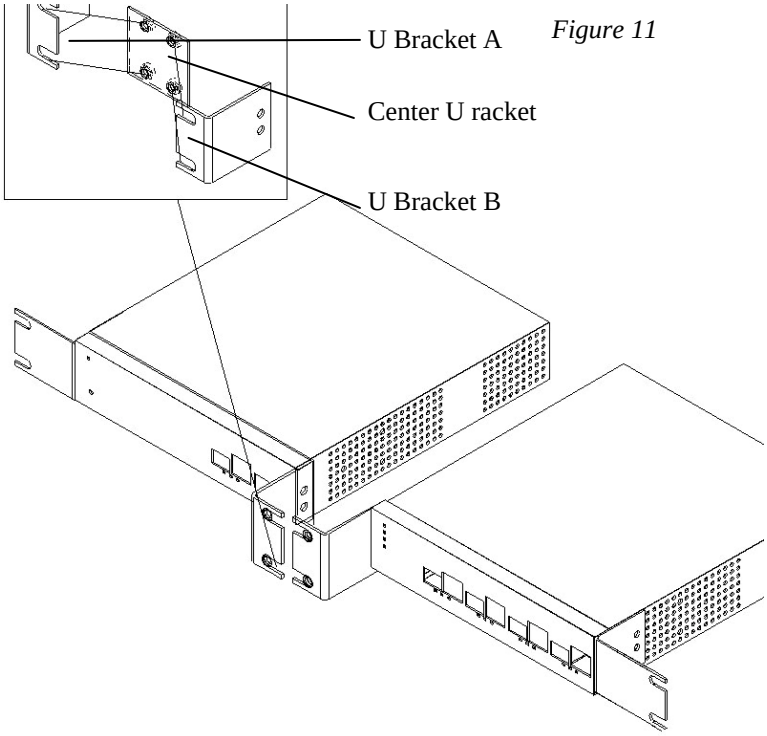


Figure 11

For dual mount, attach side brackets through center brackets. Screw piece one into piece three, screw piece two into piece three as shown in figure 11.

CDM Software Setup

1. Connect console cable. The RJ-45 connector plugs into the black RJ-45 console port on the front of the CCT100x4.
2. Connect to the console port using the included RJ45 serial cable and open a connection with a program such as Hyper-Terminal. The port settings should be:
    A. Bits per second = 9600
    B. Data bits = 8
    C. Parity = None
    D. Stop bits = 1
    E. Flow control = Hardware
3. Press enter. If the connection is successful, you will be at a prompt (>).
4. Setup the network settings for your network.
    To set up a static IP address type:

    A. net ipaddr *ip_address*
    B. net mask *subnet_mask*
    C. net gateway *default_gateway*
    D. save
    E. net restart

    To use DHCP, type:
    A. net dhcp
    B. save
    C. net restart

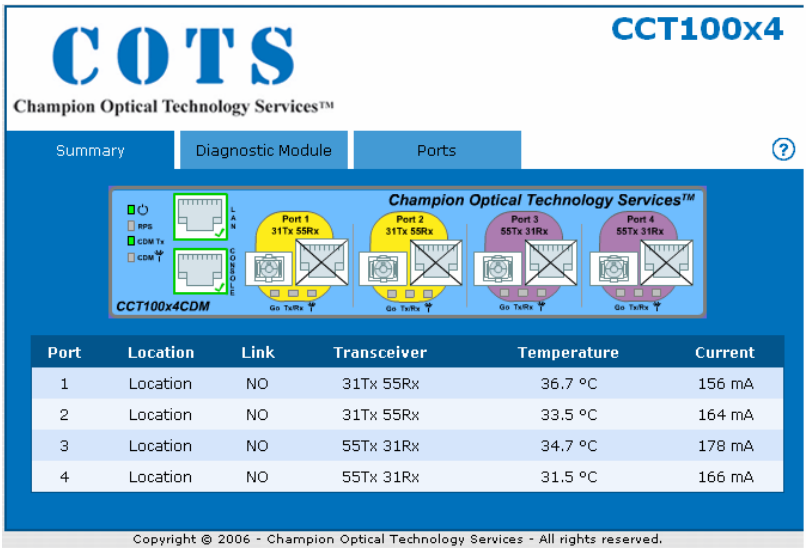
5. Your CCT100x4 is now configured for your network. If you are using DHCP, type “net” to see the configuration and make note of the IP address. You can now log into the web console to finish configuring your CCT100x4.

CLI Command Reference

Command	Description
?	Lists the console commands
defaults	Sets CCT100x4 back to defaults
help	Lists the console commands
location *port_number name*	Sets port location description
mfg	Shows assembly information
net	Shows saved network settings
net dhcp	Toggles DHCP setting on or off
net gateway *default_gateway*	Sets CCT100x4 default gateway
net ipaddr *ip_address*	Sets CCT100x4 IP address
net mask *subnet_mask*	Sets CCT100x4 subnet mask
net restart	Stops and restarts networking
net start	Starts the networking
net stop	Stops the networking
save	Saves the network configuration
snmp	Displays SNMP info
snmp on/off	Turns SNMP on or off
snmp private	Sets the read/write password
snmp public	Sets the read-only password
snmp trapdest	Sets the SNMP trap destination
programall	Updates CCT100x Controller firmware

CCT100x CDM Web Console Software

1. Connect the CCT100x4 to your network using the CDM Network port (silver port above the console port on the front of the unit)
2. Open a browser and type the IP address of the CCT100x4 into the Location bar. Press Enter.
3. You will be prompted to log into the unit. The default settings are: username, admin; password, champion.
4. When you have successfully logged in, you will see the CCT100x4 Summary screen:



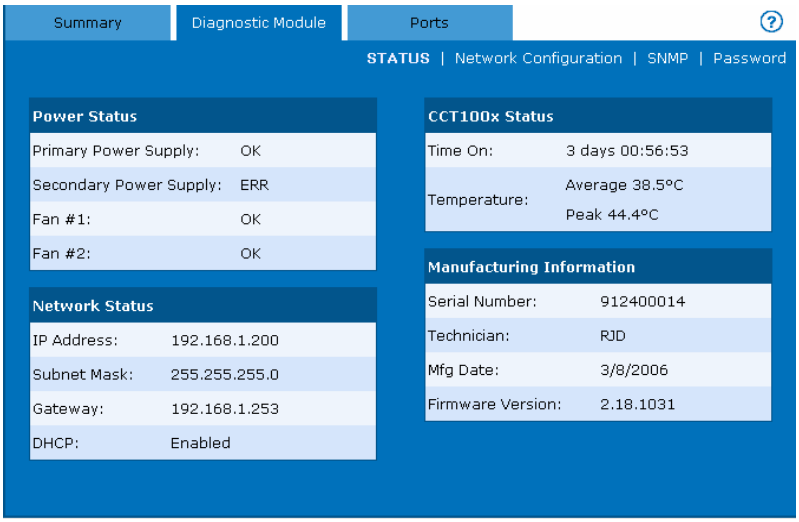
The summary screen shows a graphical representation of the front of the CCT100x4 and basic information about the status of the conversions. The single port picture is representation; CCT100x4 comes in both SC and LC transceiver style configurations.

The green boxes around the port artwork show a live link. The black X marks show an inactive link.

The LED boxes correspond to the status of the physical LED actions.

CCT100x CDM Web Console Software *Cont.*

The Diagnostic Module tab shows information about the CCT100x4 Communications Diagnostic Module (CDM) and basic system information.

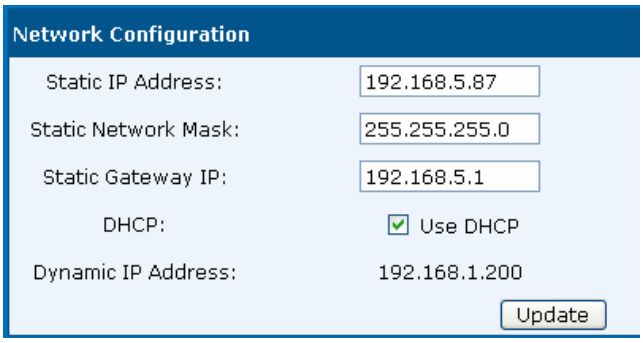


- Power Status lists the status of the power supplies and fans, if installed.
- Network Information lists the network configuration.
- CCT100x4 Status lists the current uptime since the last power-off or reboot of the system and the peak and average temperatures of the unit.
- Manufacturing Information lists the Serial Number, Technician Initials, Manufacturing Date, and Firmware Version of the unit.

From the Diagnostic Module screen, you can access the Network Configuration, SNMP, or Password screens, explained on the next page.

CCT100x CDM Web Console Software *Cont.*

Go to **Network Configuration** to change the network settings of the unit. Note: If you make any changes, you need to log into the web console again.

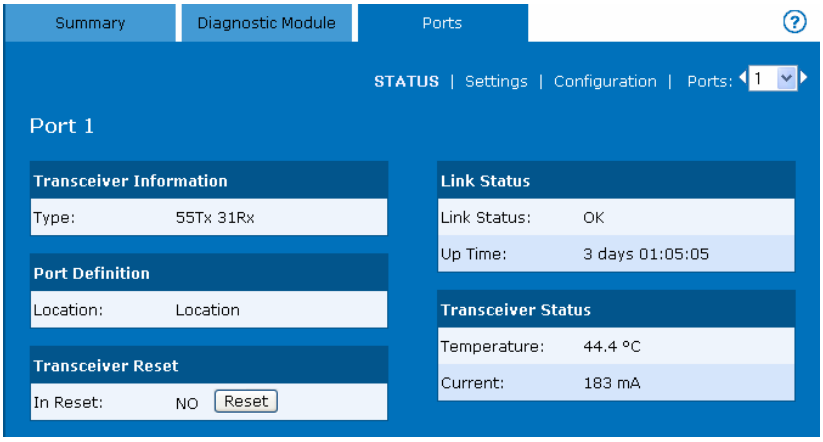


You can setup the destination and network parameters for SNMP reporting by clicking on the SNMP tab.

- Trap Destination should be set to the IP address of the host system
- SNMP is enabled by default. To turn SNMP off, check the Disable box
- You can download MIB files in Zip format by clicking “download”

To Change the password, go to the password tab. Note: If you change the password, you will need to log into the unit again using the new password.

The **Ports** tab shows information about each port on the CCT100x24. Using the pull-down menu or arrows, you can switch between the available ports.



CCT100x CDM Web Console Software *Cont.*

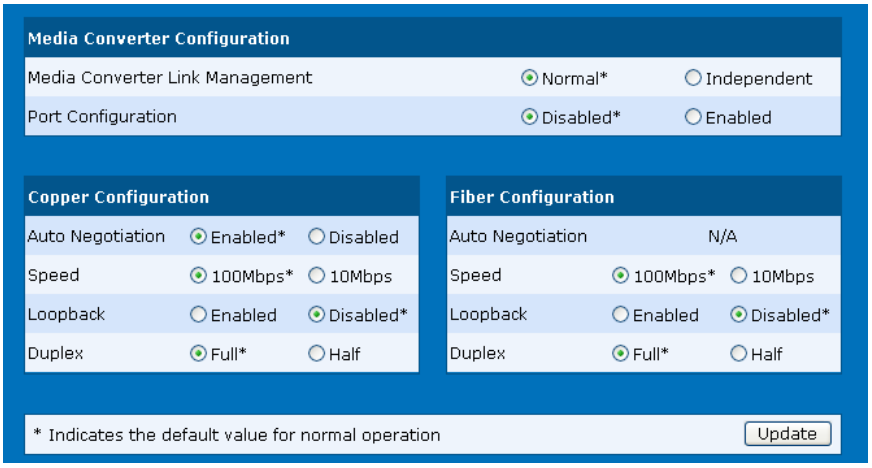
Port Tab *continued*

- Transceiver Information identifies the transceiver installed at MFR.
- Port Definition displays the name of the port from the Settings tab
- Transceiver Reset forces a restart of the transceiver to clear link problem
- Link Status shows the status and time up of the link
- Transceiver Status shows the ambient temperature near the transceiver. This number varies. Typical numbers are 30 to 50 degrees C.
- Current shows the electrical draw of the transceiver. This number should be between 170 and 200 MA. If it varies, check the optical output power of the transceiver with a power meter.

The **Configuration** menu under the Ports tab shows information about each port on the CCT100x24. Using the pull-down menu on the right, you can switch between the available ports. CCT100x can be configured to keep an optical link active only if the copper side is connected as well (*Normal*) OR set to keep the optical link active on signal detect only and the copper side acts independently (*Independent*).

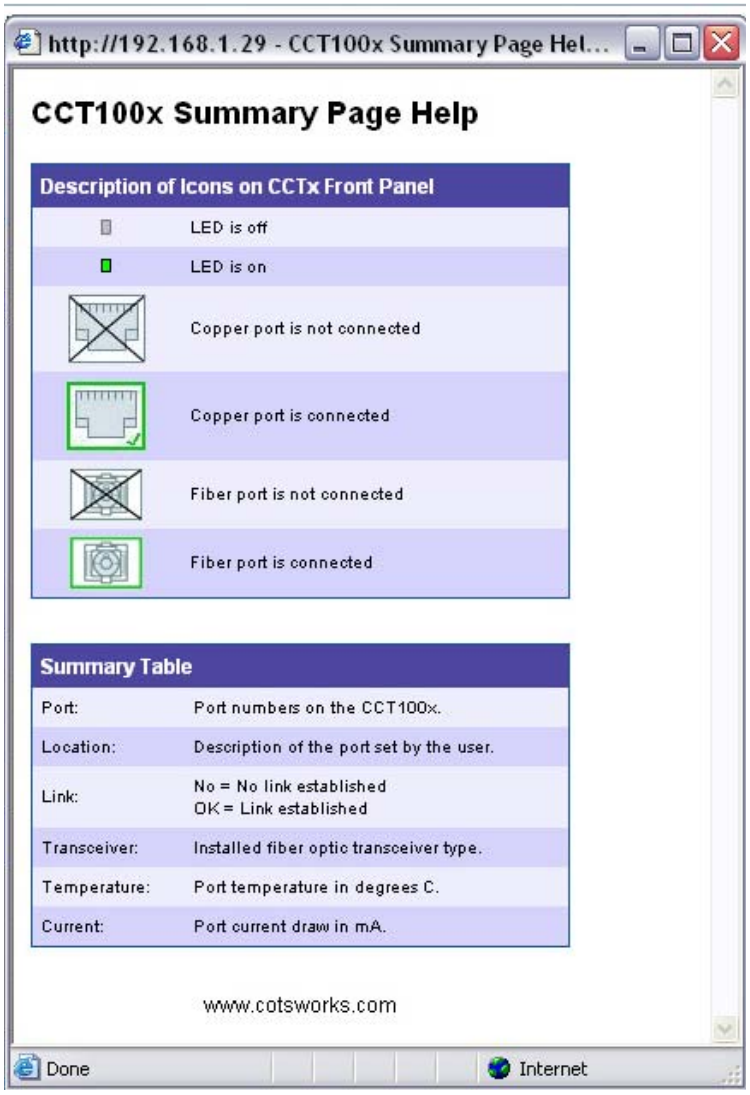
Port Configuration sets the conversion to the default settings. **NOTE: When set to Disabled, none of the bottom settings below can be modified**

- Copper Configuration contains applicable copper port settings



CCT100x CDM Web Console Software *Cont.*

For more information about the items on any page, click the help icon: Below is the CCT100x4 Port help window.



Troubleshooting

How can I use the LED indicators to troubleshoot my connections?
A table is provided on the next page.

Why is the copper port that CCT100x4 is plugged into on my switch resetting?
When a copper port is connected, CCT100x will attempt to initiate a link. The port will turn on and off at intervals from 4 seconds on/3 seconds off to 20 seconds on/3 seconds off. It will continue to do this until a fiber link is established. If you have a fiber cable installed and the copper port continues to reset, there may be a problem with the fiber cable.

Can all 10/100/1000 ports in a network switch run at 100Base-T at the same time?
Almost every switch shipped today can run simultaneous 100 Base transport. 100FX is a loose standard and may require the use of the port reset feature in CCT100x Consult your switch's technical manual for more information.

Will the copper port on CCT100x4 run at 10BaseT or 100BaseT?
It runs at 100BaseT and converts to 100BaseX.

Can I run 1000FX transceivers in CCT100x4?
No.

What should the electrical power be and why does it vary for each transceiver?
The electrical current is a real time reading of current draw. The feature allows you to see the health of the transceivers since the electrical draw is related to the optical output. Consult the COTS data sheet for exact electrical readout.

Can I troubleshoot my copper and optical links without the other media shutting down when one side fails?
Yes. The GO Link feature in the software only allows links when both sides are active. This is a very good indication that data will pass. In the future, you will be able to bring the copper side up and down without dropping the optical side. You can also force a transceiver to reset which will reset the PHY in the CCT100x and force a reset along the MAC layer of your network path. This is a Layer 2 of the OSI model reset.

I have a link light, but no data is passing, why?
The CCT100x4 uses a silicon IC to convert the copper port to the optical port. If the devices connecting are looking for direct MAC (Media Access Control) connections, the CCT100x4 could initially stop data passing. To avoid this, setup the devices on either side of the CCT100x4 to operate in what is usually called "network mode" or "intelligent" instead of "direct."

When does the CDM Tx light illuminate on the front panel?
The CDM Tx light illuminates when the CDM is transmitting data via the console port or LAN port. It goes off after a brief period of inactivity.

When does the Error light illuminate on the front panel?
CCT100x does a system check at startup. If a hardware or firmware fault is found it illuminates. This is a system level error only and has nothing to do with data transmission.

Troubleshooting Using LEDs

One CCT100x connected to fiber port on a switch

LEDs			What It Means	Possible Causes
GO	Tx/Rx	Alarm		
⩾□⩽	⩾□⩽	⩾□⩽	CCT100x in self test	• Unit recently powered on
Above LEDs blink in succession, then turn off.				
■	■	■	Port is off	• No copper cable installed • Copper cable is faulty
⩾■⩽	■	⩾□⩽	Link attempt initiated	• Copper and fiber cables connected and link initiated • No fiber cable connected • Fiber cable is faulty • Problem with connection to fiber port on switch
□	⩾□⩽	■	Link established	• Copper and fiber cables connected successfully

Two CCT100x units connected to each other, then connected to one 100BaseT port on ends

Unit 1			Unit 2			What It Means	Possible Causes
GO	Tx/Rx	Alarm	GO	Tx/Rx	Alarm		
■	■	■	■	■	■	• Copper cable not connected on both ends	• No copper cables installed • Copper cables are faulty
⩾■⩽	■	⩾□⩽	■	■	■	• No copper connection on Unit 2 to switch	• No copper cable installed • Copper cable is fault
⩾■⩽	■	⩾□⩽	⩾■⩽	■	⩾□⩽	• Link attempt initiated or fiber cable fault	• Copper and fiber cables connected and link initiated • No fiber cable connected between Unit 1 and Unit 2 • Fiber cable is faulty
□	⩾□⩽	■	□	⩾□⩽	■	• Link established	• Copper and fiber cables connected successfully

KEY

- ■ LED is off
- □ LED is on
- ⩾■⩽ LED is blinking slow
- ⩾□⩽ LED is blinking fast

Obtaining Technical Assistance

Contact Tech Support	
Phone: 440-446-8800	Fax: 440-815-2204
	Info@cotsworks.com
Hours of Operation	
9am-6pm, EST	Monday - Friday

Regulatory Approval

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