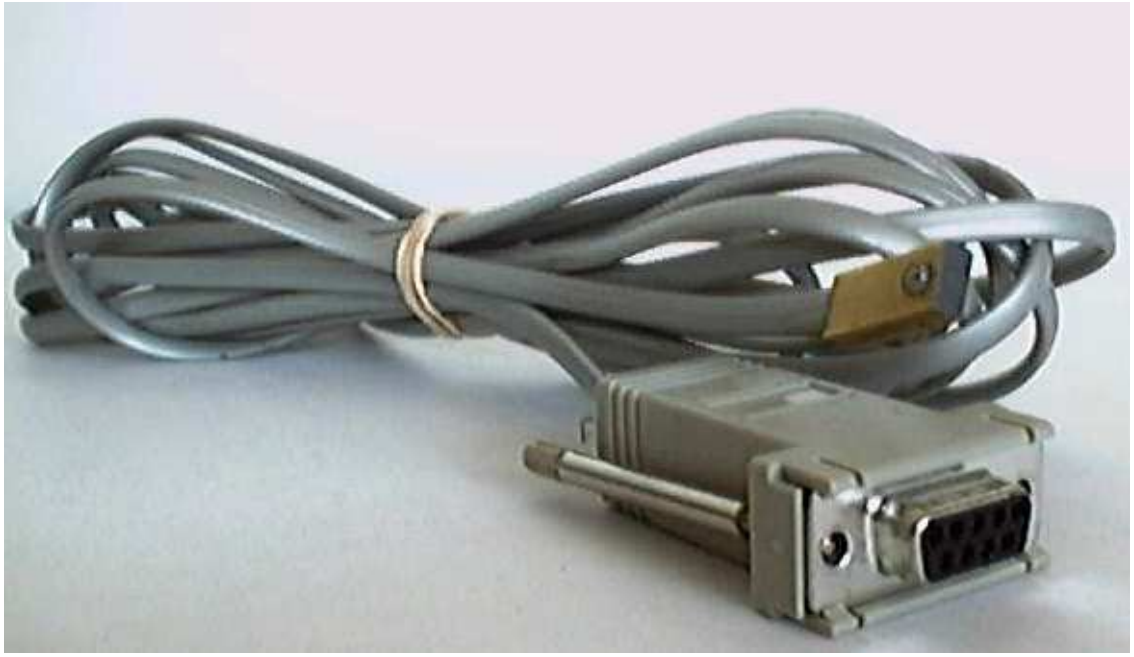
TMS Optical Data Cable
User's Guide

For use with the Peltier Cooled Thermal Management System



Developed and maintained by
CosmoLogic Systems, Inc.

The TMS Optical Data Cable is used to receive information from the Thermal Management System (TMS) to your computer. When the TMS detects a cable connection, it begins transmitting data optically through the LED. The optical data is then converted to a serial RS232 format, so that your computer receives standard ASCII text data. The data consists of CCD sensor temperature, enclosure temperature, the power level being applied to the Peltier modules, the cooling fan status, and some basic instructions. In the unlikely event that a failure occurs, a message describing the nature of the failure would also be displayed.

The TMS Optical Data Cable consists of a standard RJ-11 phone cable with an optical coupler on one end and a 9-pin female "Serial RS232" com port connector plugged onto the other end. The cable length can easily be extended by adding a standard telephone extension cable.

I. TMS Optical Data Cable Connection:

The optical coupler end of the cable simply plugs onto your camera's LED. The other end of the cable plugs into either your computer's com port or into a Serial-to-USB adapter and then to your computer's USB port.

Optical coupler connected to LED on camera

To properly connect the cable, the following steps should be performed:

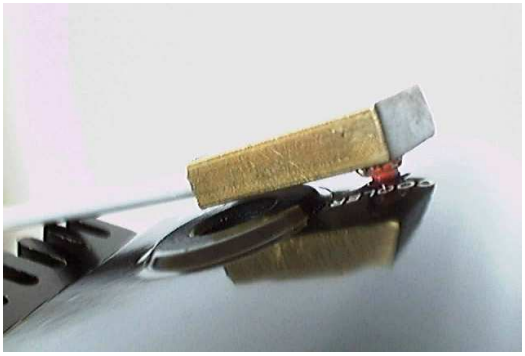
1. Connect the 9-pin connector end of the cable to your computer (or to a Serial-to-USB adapter, then to your computer's USB port). Your computer may be on before or after the connection.
2. On your computer, invoke a communications program such as HyperTerminal.
3. Apply power to your camera.
4. Plug the optical coupler end onto the LED of your camera.

The optical coupler contains a detector interface consisting of a small plastic ring with an inner diameter that matches the outer diameter of the LED. The ring is placed over the LED on the camera.

When the optical coupler is brought near to the LED, the TMS senses a magnetic field within the coupler that causes the LED to stop emitting light. The TMS then waits for a "cable connection" which occurs when the LED switch is asserted. The LED switch gets asserted when the optical coupler is pressed down against the LED. You will feel the switch "click" when this occurs. You will also see data appear on your computer screen when the "cable connection" is made.

When connecting the optical coupler to the LED, we suggest that you press firmly so that the switch gets asserted, insuring that a "cable connection" occurs and that the LED is properly inserted into the detector ring. When properly inserted, about half of the LED will be inside the detector ring.

Optical coupler with detector "ring"

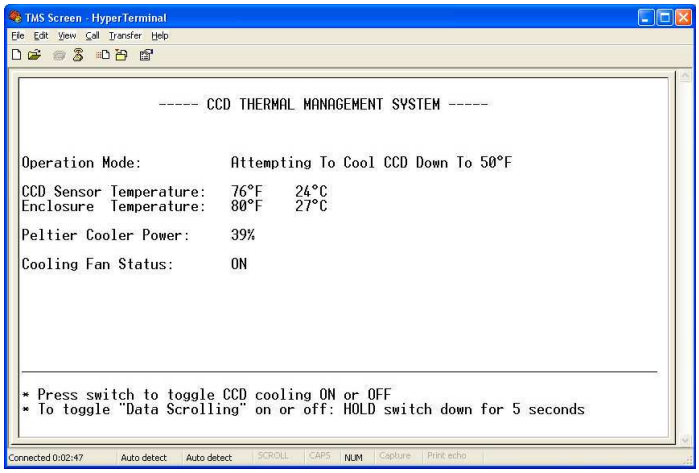


Properly connected optical coupler
(LED inserted in detector ring)

The optical coupler is sensitive in the infrared region of the spectrum with peak sensitivity at 800nm wavelength. Because of this the data interface will work fine under most light conditions, however if you experience problems using it in daylight, you may have to shield the coupler from excessive light. Tape works well for this.

II. Computer Interface Using HyperTerminal:

To view the TMS data on your computer, you need to run a communications program such as Procomm or HyperTerminal. HyperTerminal is a standard communications accessory that comes with all Windows operating systems. With Hyperterminal running, you will get a display showing all of the Thermal Management System parameters.

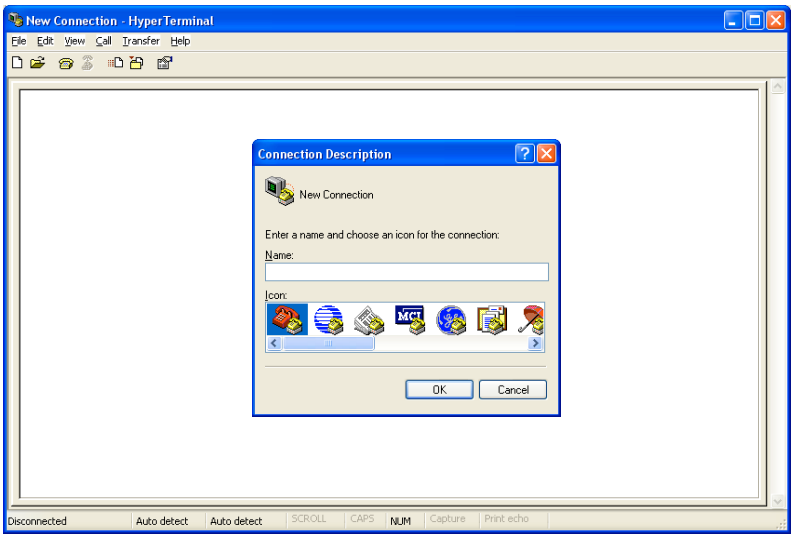


Thermal Management System display using HyperTerminal

To invoke HyperTerminal*, click “Start” (lower left of your computer screen), then go through the following menus:

Programs > Accessories > Communications > HyperTerminal

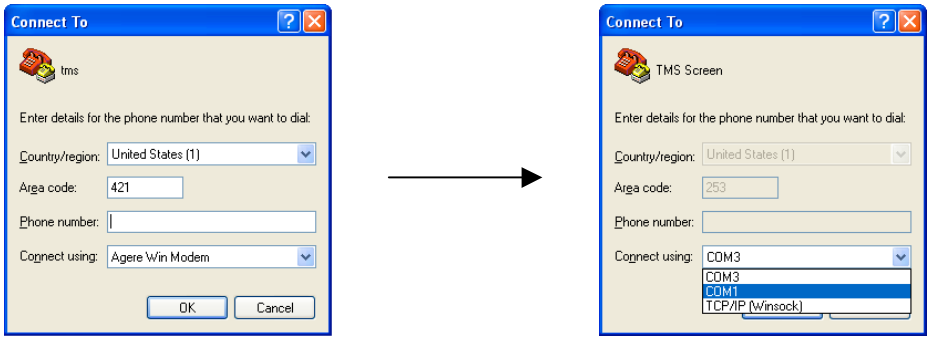
When HyperTerminal is invoked, the following screen will appear:



* If HyperTerminal is not on your system, then you will need to insert your Windows CD and install it.

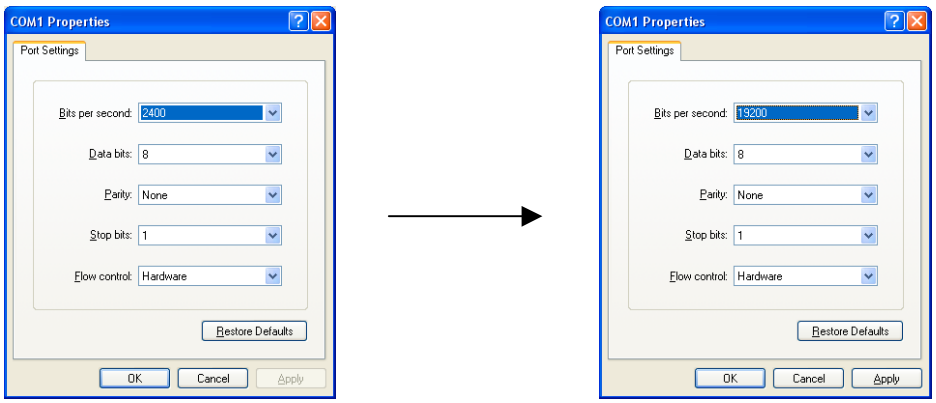
Type in a connection name (such as “ TMS Screen”) and click OK.

Now the following “Connect To” screen appears:



Click on the “Connect using” pull-down menu and select a com port. If you are connected to your computer’s com port then choose COM1. If you are using a Serial-to-USB adapter, then choose the com port number assigned to your adapter.* Click OK.

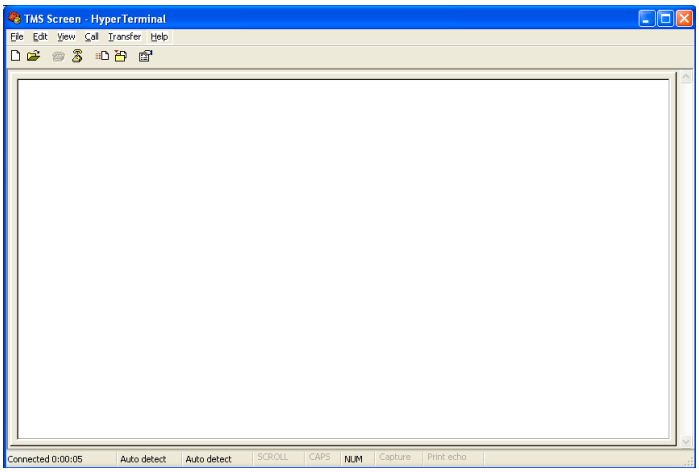
Now the following “COM Properties” screen appears:



Change the “Bits per second” to 19200 and make sure the other parameters are as shown above. Click OK.

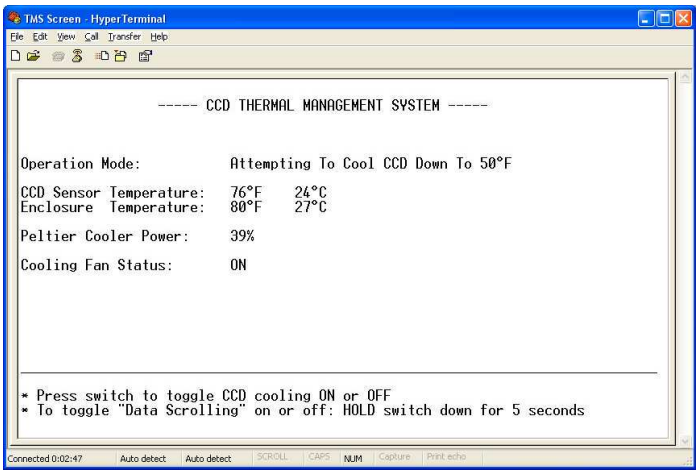
* To identify your adapter’s com port assignment, look in the Device Manager under “ports” (Control Panel>System>Hardware>Device Manager). It will show your adapter with the assigned com port in parenthesis.

You will now have the HyperTerminal screen running as shown:



At the lower left of the screen, a clock should be running showing the elapsed time since the connection was started.

If your camera is powered up, connect the optical coupler to the LED as described previously. You should now see the TMS status screen:



With the optical coupler inserted, you can still toggle the cooler on or off by pressing on the coupler, which “clicks” the LED switch.

If you press and hold the coupler/switch down for five seconds, the display will enter the “Data Scrolling” mode. Data Scrolling causes the temperature and Peltier power data to scroll vertically up the screen. This mode comes in handy if you are interested in plotting the data on a graph. With HyperTerminal, you can capture the data into a file (Transfer>Capture Text>Start/Stop) and then import the text file into Excel. With Excel you can plot the data with each row representing one second of elapsed time. Pressing and holding the coupler/switch for five seconds again, brings the display back to the normal “TMS Status” screen.

When exiting HyperTerminal, it will ask you if you want to save the connection. If you select YES, a HyperTerminal setup file (TMS Screen.ht) will be created. The file will be located in the HyperTerminal Folder (Programs > Accessories > Communications > HyperTerminal [folder]). So the next time you want to display the TMS status using HyperTerminal, just click on “TMS Screen.ht”. For convenience, you may want to create a link to “TMS Screen.ht” and save it to your Windows desktop.

III. TMS Optical Data Cable Specifications

Operating Temperature Range:	-40 °F to +145 °F
Cable Length:	14 feet (expandable with phone extension cable)
Cable Type:	Standard RJ-11 phone cable, 4-conductor
Optical Coupler:	Infrared - 800nm peak wavelength
Serial RS232 Com Port:	
Connector:	D-Sub, 9-pin, female
Baud Rate:	19200 bit per second
Data Bits:	8 bits
Parity:	None
Stop Bits:	1, 1.5 or 2
Flow Control:	Hardware
Terminal Emulation:	Auto Detect

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