

CMS-16 / CMS-8

Console Management Switches

Firmware Version 4.0 and Higher

User's Guide





Warnings and Cautions:



No Serviceable Parts Inside; Authorized Service Personnel Only

Do not attempt to repair or service this device yourself. Internal components must be serviced by authorized personnel only.

- **Shock Hazard - Do Not Enter**

Nameplate Power Warning

This device should only be operated with the type of power source indicated on the instrument nameplate. If you are not sure of the type of power service available, consult your local power company.

- **Connect unit only to a properly measured supply. Use only three wire cord which is provided with the unit.**

Rack Mount Installation

When installing this device in an instrument rack, the following factors must be accounted for:

1. **Enclosed Racks:** Enclosed racks must provide adequate ventilation. Make certain that the rack is not overly crowded and note that each unit in the rack generates its own heat. An enclosed rack should have louvered sides and a fan to circulate cooling air. The maximum temperature for the equipment in this environment is 45° C.

When mounting the unit in an enclosed rack with a ventilation fan at the top of the rack, note that excessive heat generated by devices at the bottom of the rack can be drawn upward and into the ventilation slots of units located at the top. Make certain to provide adequate ventilation for equipment installed at the bottom of the rack.

2. **Open Racks:** Make certain that the rack frame does not block the ventilation slots on the instrument cover. If the device is installed on sliders, check the unit when seated all the way into the rack to make certain that ventilation slots are not blocked.

Ventilation

Slots in the instrument cover are provided to allow ventilation for heat dissipation. To ensure safe, reliable operation, these openings must not be covered or blocked.

Disconnect Power

If any of the following events are noted, immediately disconnect the unit from the outlet and contact qualified service personnel:

1. If the power cord becomes frayed or damaged.
2. If liquid has been spilled into the device or if the device has been exposed to rain or water.

Table of Contents

1.	Introduction	1-1
2.	Unit Description	2-1
2.1.	Front Panel	2-1
2.2.	Back Panel	2-2
3.	Getting Started	3-1
4.	Hardware Installation	4-1
4.1.	Connecting Power to the CMS Unit	4-1
4.1.1.	AC Powered Units	4-1
4.1.2.	DC Powered Units	4-2
4.2.	Configure Option Switches	4-2
4.2.1.	Default Baud Rate (Sw1, Sw2, Sw3)	4-3
4.2.2.	Default Handshake (Sw4, Sw5)	4-3
4.2.3.	Default Response Message Format (Sw6)	4-4
4.2.4.	Default Command Echo (Sw7)	4-4
4.3.	Initialize Unit to Default Settings	4-4
4.4.	Connecting the Network Cable	4-5
4.5.	Connecting Devices to the CMS	4-5
4.6.	Application Example	4-6
5.	Configuration	5-1
5.1.	Access to the CMS Command Mode	5-1
5.2.	System SetUp Ports	5-2
5.3.	Password Functions	5-3
5.3.1.	The Supervisor Password	5-3
5.3.2.	The Port Passwords	5-4
5.4.	Defining the Site ID and Supervisor Password	5-5
5.5.	Port Configuration	5-6
5.5.1.	Configuration Conventions	5-6
5.5.2.	Port Modes	5-7
5.5.3.	RS232 Port Configuration Menus	5-8
5.5.4.	Network Port Configuration Menu	5-15
5.5.5.	Implementing IP Security	5-19
5.6.	Copying Parameters to Several RS-232 Ports	5-21
5.7.	Save User Selected Parameters	5-23
6.	The Status Screens	6-1
6.1.	The Port Status Screen (/S)	6-1
6.2.	The Port Diagnostics Screen (/SD)	6-3
6.3.	The Network Status Screen (/SN)	6-5
6.4.	The Port Parameters Screens (/W)	6-7

7.	Operation	7-1
7.1.	Any-to-Any Mode	7-1
7.1.1.	Port Connection and Disconnection	7-1
7.1.2.	Defining Hunt Groups	7-6
7.2.	Passive Mode	7-7
7.3.	Buffer Mode	7-8
7.3.1.	Reading Data from Buffer Mode Ports	7-8
7.3.2.	Port Buffers	7-9
7.4.	Modem Mode	7-10
8.	Telnet Capabilities	8-1
8.1.	Network Port Numbers	8-1
8.2.	The Direct Connect Feature	8-2
8.3.	Inbound Telnet Connections	8-6
8.4.	Outbound Telnet Connections	8-7
9.	Saving and Restoring Configuration Parameters	9-1
10.	Upgrading CMS Firmware	10-1
11.	Command Reference Guide	11-1
11.1.	Command Conventions	11-1
11.2.	Command Response	11-2
11.3.	Command Summary	11-3
11.4.	Command Set	11-4

Appendices:

A.	RS232 Port Interface	ApX-1
B.	Specifications	ApX-2
C.	Customer Service	ApX-3

List of Figures

2.1.	Instrument Front Panel (Model CMS-16 Shown)	2-1
2.2.	Instrument Back Panel (Model CMS-16)	2-2
2.3.	Instrument Back Panel (Model CMS-8)	2-2
3.1.	The Port Status Screen (Model CMS-16, Defaults Shown)	3-2
3.2.	The Supervisor Level Help Screen	3-3
4.1.	Terminal Block Assembly (DC Units Only)	4-2
4.2.	CMS Application Example (Model CMS-16 Shown)	4-6
5.1.	Port Configuration Menu (Port 2 Shown)	5-8
5.2.	Port Parameters Menu (Modem Mode)	5-10
5.3.	Network Parameters Menu (Supervisor Mode Only)	5-15
5.4.	IP Security Menu	5-19
5.5.	The Copy Port Parameters Menu	5-21
6.1.	Port Status Screen (Supervisor Mode, Defaults Shown)	6-2
6.2.	Port Diagnostics Screen (Sample Values Shown)	6-3
6.3.	Network Status Screen (CMS-16 Shown)	6-5
6.4.	Port Parameters Screen (RS232 Port Shown)	6-7
6.5.	Port Parameters Screen (Network Port Shown)	6-8
A.1.	RS232 Port Interface	ApX-1

1. Introduction

CMS Series Console Port Management Switches provide secure, in-band and/or out-of-band access to RS232 console ports and maintenance ports on UNIX servers, routers and other network equipment. System Administrators can access remote devices in order to change configuration parameters, connect users to restricted ports, collect buffered data, and perform a variety of other administrative functions.

Versatile Connectivity

Up to 16 different devices can be connected to the CMS-16 without the need to select a common baud rate or parity (the CMS-8 can be connected to up to eight different devices). Each port can be individually configured for specific baud rates, parity, handshaking, and various other parameters and options.

Easy Set-Up and Operation

Configuration of the CMS is simple. A menuing system is used to select parameters, and enable options. The CMS can easily adapt to the requirements of almost any data communications application.

Limited Command Access

The CMS is ideal for situations that require limited access to important command functions. Two security levels allow each port to function as a Supervisor Port or User Port, depending on the password entered at login. Supervisor Ports are allowed to change configuration, display status, and connect to any other port; User ports are only allowed to connect to the ports provided by their password. Each individual port can be assigned its own unique, user-defined password, up to sixteen characters long.

Non-Volatile Memory

If AC power to the unit is lost or interrupted, the CMS's non-volatile memory will retain user-defined parameters and port connections.

Modem and Telnet Communication

The CMS can be controlled by a local PC that communicates with the unit via cable, or controlled remotely via external modem or telnet connection. Your terminal emulation or telnet program is used to send commands to connect ports or display status.

Configuration Backup

Once you have configured the CMS to fit your application, parameters and options can be saved to an ASCII text file on your PC. This allows you to quickly restore user-selected parameters if the unit configuration is accidentally altered or deleted. Saved parameters can also be uploaded to other CMS units. This allows rapid set-up when several units will be configured with identical or similar parameters.

CMS-16 and CMS-8 Units

This User's Guide discusses *both* the CMS-16 and CMS-8 Console Management Switches. Throughout this User's Guide, both units are referred to as "CMS". The CMS-16 includes sixteen RS-232 ports, and the CMS-8 includes eight RS-232 ports. All other features function identically.

Typographic Conventions

- | | |
|----------------------|--|
| ^ (e.g. ^X) | Indicates a control character. For example, the text "^X" (Control X) indicates the [Ctrl] key and the [X] key must be pressed simultaneously. |
| COURIER FONT | Indicates characters typed on the keyboard. For example, /E or /P 02. |
| [Bold Font] | Text set in bold face and enclosed in square brackets, indicates a specific key. For example, [Enter] or [Esc]. |
| < > | Indicates required keyboard entries:
For Example: /P <n>. |
| [] | Indicates optional keyboard entries.
For Example: /W [n]. |

2. Unit Description

2.1. Front Panel

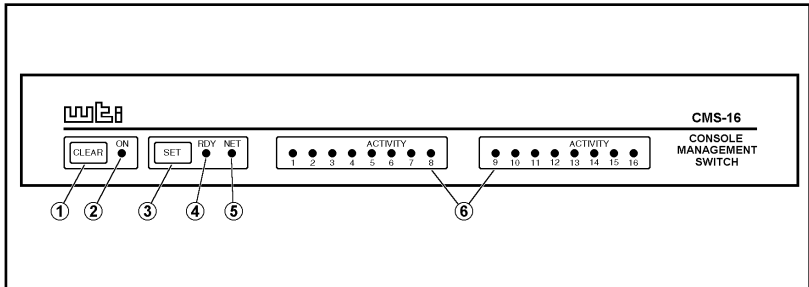


Figure 2.1: Instrument Front Panel (Model CMS-16 Shown)

- ① **CLEAR:** Restarts the CMS operating program without changing user-selected parameter settings or breaking port connections.
- ② **ON:** Lights when AC Power is applied.
- ③ **SET:** Used to Initialize the CMS to defaults specified by the SetUp Switches. To initialize, press and hold both the SET and CLEAR buttons, release only the CLEAR button, wait for the Port LEDs to flash, and then release the SET button.

Notes:

- During initialization, all port LEDs will flash ON three times.
 - During initialization, all command-selected parameters will be cleared, and the CMS will revert to the default parameters specified by the Option Switches.
- ④ **RDY:** (Ready) Flashes to indicate unit is operational.
 - ⑤ **NET:** Lights when a Network Connection is present.
 - ⑥ **ACTIVITY LEDs:** Light to indicate data activity at the corresponding port. The CMS-16 includes sixteen Activity LEDs, and the CMS-8 includes eight Activity LEDs

2.2. Back Panel

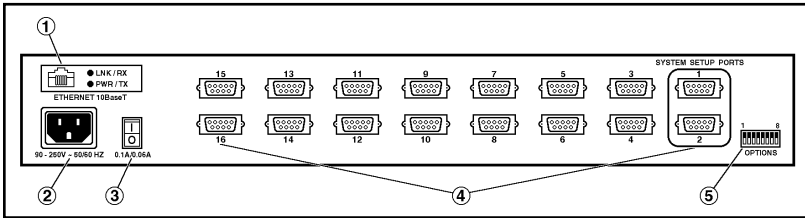


Figure 2.2: Instrument Back Panel (Model CMS-16)

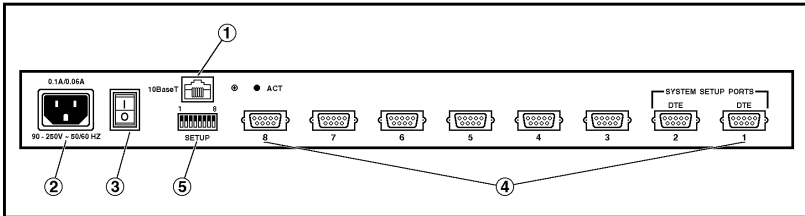


Figure 2.3: Instrument Back Panel (Model CMS-8)

- ① **Network Port:** An RJ45 Ethernet port for connection to your TCP/IP network. When attempting to communicate with the unit via network for the first time, note that the CMS features a default IP address (192.168.168.168). This allows you to connect to the unit without first defining an IP address (providing that the unit is being contacted by another node on the same subnet.) For more information on configuring the Network Port, please refer to Section 5.5.4.

Note: The CMS features a 10BaseT Interface. When connecting the CMS to a 100BaseT interface, note that most router switches will autosense to determine if the device is 100BaseT or 10BaseT, and then configure the network interface accordingly. If your router switch does not autosense, the network interface port must be manually set to 10BaseT.

- ② **Power Cable Receptacle:** Note that DC units include a Terminal Block Assembly in place of the Power Cable Receptacle. For more information on DC units, please refer to Section 4.1.2.

- ③ **Power Switch**
- ④ **RS232 PORTS:** For connection to console ports on target devices. Standard DB9 connectors configured as DTE ports. The RS232 ports are similar to a serial port on a PC. When connecting a modem, use a standard serial cable. When connecting a PC or other DTE device use a null modem cable.
 - Ports 1 and 2 are System Setup Ports. Note that Supervisor Level command access cannot be disabled at these ports.
 - Ports 1 and 2 can either be connected to a PC or modem. Connection to a modem allows control by a remote PC.
- ⑤ **Option/SetUp Switches:** A bank of eight DIP switches, which set the default baud rate, handshake, message type, and duplex mode. Switch functions are described in detail in Section 4.2.

3. Getting Started

This section provides a brief overview of basic CMS capabilities, and describes a simple test that can be performed to determine if the unit is operating properly and demonstrate the unit's basic communication capabilities.

Note that this Quick Start procedure is included only to provide a quick demonstration of basic CMS capabilities. In order to take full advantage of the complete range of features provided by this unit, it is strongly recommended that you should complete the entire Installation and Configuration sections after completing the Quick Start procedure.

1. **Apply Power to the CMS:** Connect the CMS to an appropriate power source. Prior to connecting the unit to your power supply, make certain to review the safety precautions listed at the beginning of this User's Guide, and in Section 4.1.
2. **Connect a PC to the CMS:** Attach a standard null modem cable from your PC COM port to the Port 1 connector on the CMS back panel. For a description of the port interface, please refer to Appendix A.

Note: When the CMS is shipped from the factory, communication parameters are set as follows: 9600 bps, RTS/CTS Handshaking, 8 Data Bits, One Stop Bit, No Parity. Although the CMS allows these parameters to be easily redefined, for this Quick Start procedure, it is recommended that you configure your communications program (e.g. HyperTerminal®) to accept the default parameters.

3. **Access the Command Mode:** Start your communications program and then press [**Enter**]; the CMS Port Status Screen should be displayed (Figure 3.1) and the CMS command prompt should appear. For more information on command mode access, please refer to Section 5.1.
4. **Review Help Menu:** Type **/H** and press [**Enter**] to display a help menu (Figure 3.2), which provides a basic listing of CMS commands.

```

PORT STATUS:   Version 4.00,   Site ID: WESTERN_TELEMATIC_CALIFOR_IRVINE

PORT |      NAME      |      PASSWORD      | STATUS | MODE | BUFFER COUNT
-----|-----|-----|-----|-----|-----
 01 | (undefined) | (undefined) | Free | Any | 0
 02 | (undefined) | (undefined) | Free | Any | 0
 03 | (undefined) | (undefined) | Free | Any | 0
 04 | (undefined) | (undefined) | Free | Any | 0
 05 | (undefined) | (undefined) | Free | Any | 0
 06 | (undefined) | (undefined) | Free | Any | 0
 07 | (undefined) | (undefined) | Free | Any | 0
 08 | (undefined) | (undefined) | Free | Any | 0
    |             |             |     |     |
 09 | (undefined) | (undefined) | Free | Any | 0
 10 | (undefined) | (undefined) | Free | Any | 0
 11 | (undefined) | (undefined) | Free | Any | 0
 12 | (undefined) | (undefined) | Free | Any | 0
 13 | (undefined) | (undefined) | Free | Any | 0
 14 | (undefined) | (undefined) | Free | Any | 0
 15 | (undefined) | (undefined) | Free | Any | 0
 16 | (undefined) | (undefined) | Free | Any | 0

Enter /H for command menu.
CMS>
    
```

Figure 3.1: The Port Status Screen (Model CMS-16, Defaults Shown)

5. **Configure Network Port:** In order to communicate with the CMS via the network port, an IP Address, Subnet Mask, and Gateway Address must be assigned to the unit . At the CMS command prompt, type **/N** and press **[Enter]** to display the Network Port Configuration Menu.
 - a) Note that the CMS features a default IP address (192.168.168.168.) This allows you to initially communicate with the unit via network (providing that you are contacting the CMS from another node on the same subnet), without first accessing the CMS command mode in order to define an IP address. However, when the CMS is installed in a working network environment, it is recommended to define an appropriate IP Address, Subnet Mask, and Gateway Address as described in the steps that follow.
 - b) Settings for network parameters depend on the configuration of your individual network. Please contact your network administrator in order to determine the appropriate settings for the IP Address, Subnet Mask, and Gateway Address.
 - c) To assign network parameters, key in the number for the desired parameter, press **[Enter]** and then follow the instructions in the submenu. For example, to define the IP Address, type **1** and press **[Enter]**.

```

COMMAND MENU:

DISPLAY                                     CONFIGURATION
/S[P]      Port Status                       /F      System Parameters
/SD        Port Diagnostics                 /P [n]  Port Parameters
/W[P] [n]  Port Parameters (Who)           /N      Network Configuration
/J         Site ID                           /I      Default and Test
/SN[P]     Network Status                   /UF     Upgrade Firmware
/H         Command Menu (Help)             /CP     Copy Port Parameters

CONTROL
<Enter>      Enter Command Mode
/X           Exit Command Mode
/C <n> [n]   Connect - Local [Remote]
/D <n | Nn |...| * > Disconnect Port(s)
/E <n | ... | * > Erase Buffer
/U          Send Parameter File
/T         Reset Network Interface

+-----+
| P      Show Passwords |
| n      Port# or name |
| *      "all"         |
|        "or"         |
| <>     Required entry |
| []     Optional entry |
| Nn     Telnet Port#  |
+-----+

/D, /E, /I, /T commands: add /Y to bypass "Sure (y/n)?"
CMS>

```

Figure 3.2: The Supervisor Level Help Screen

6. **Connect Network Cable:** Connect your 10BaseT or 100BaseT network interface to the CMS Network Port. The Network Port is an RJ45, 10BaseT Ethernet jack, for connection to a TCP/IP network.

Note: The CMS features a 10BaseT Interface. When connecting to a 100BaseT interface, note that most router switches will autosense to determine if the device is 100BaseT or 10BaseT, and then configure the network interface accordingly. If your router switch does not autosense, the network interface port must be manually set to 10BaseT.

7. **Network Access:** Telnet to the CMS's IP address. For example, if the IP address is "1.2.3.4", on a UNIX system, the Telnet command would be invoked as follows:

```
$ telnet 1.2.3.4 [Enter]
```

After the telnet connection is established, the CMS should display the Port Status Menu, and the CMS command prompt should appear, indicating that you have successfully accessed the CMS command mode via the Network Port.

This completes the introductory overview of the CMS. Please proceed to Sections 4 and 5 for complete installation and configuration procedures.

4. Hardware Installation

4.1. Connecting Power to the CMS Unit

The CMS is available in both AC and DC powered versions. When connecting AC or DC power to the CMS, proceed as follows:



CAUTIONS:



- **This device should only be operated with the type of power source indicated on the instrument nameplate. If you are not sure of the type of power service available, please contact your local power company.**
- **Reliable earthing (grounding) of this unit must be maintained. Particular attention should be given to supply connections when connecting to power strips, rather than directly to the branch circuit.**

4.1.1. AC Powered Units

Plug the supplied power cable into the receptacle on the CMS back panel, and then connect the power cable to an appropriate grounded AC outlet. The CMS features a self adjusting power supply that automatically adapts to power supplies between 90 and 250 VAC. Press the Power Switch ON. The ON LED should light and the RDY LED should begin to flash.

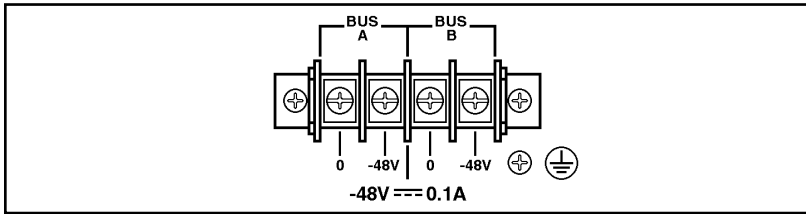


Figure 4.1: Terminal Block Assembly (DC Units Only)

4.1.2. DC Powered Units

The DC terminal block features two bus inputs as shown in Figure 4.1. This allows the user to connect only one DC power source, or connect two DC power sources where the second source functions as a backup. When connecting the CMS to your DC power source, first remove the protective cover from the terminal block, attach the wires from the -48V DC power source to the screw terminals, connect your ground line to the labeled ground screw, and then replace the protective cover.

4.2. Configure Option Switches

When the CMS is shipped from the factory, the Option Switches are configured for 9600 baud, 8 Bits-No Parity, RTS/CTS handshaking, verbose command response, and command echo ON (all switches Down). These settings are compatible with most applications. If the default settings are *not* compatible with your application, change the switch settings as follows.

The Option Switches should be configured to match the parameters your control device will use when communicating with the CMS. This will ensure access to command functions, even if the unit is initialized to default parameters.

Notes:

- If the Option Switch configuration is changed, new parameters will not take effect until the unit is initialized as described in Section 4.3.
- Operating parameters (baud rate, parity, etc.) can be selected for each port using the /P command as described in Section 5.5. The /P command can select different parameters for each CMS port.
- When the CMS is initialized, parameters will return to settings specified by the Option Switches.

4.2.1. Default Baud Rate (Sw1, Sw2, Sw3)

Option Switches one through three select the *default* baud rate for all CMS RS232 Ports. The default baud rate must match the rate your control device will use when communicating with the CMS. If the control device will communicate via modem, select a default baud rate that is compatible with the modem.

SW			Default Baud Rate
1	2	3	
D	D	D	9600*
U	D	D	300
D	U	D	1200
U	U	D	2400
D	D	U	19.2K
U	D	U	38.4K
D	U	U	57.6K
U	U	U	115.2K

* = Factory Setting

4.2.2. Default Handshake (Sw4, Sw5)

The default handshake format must match the format your control device will use when communicating with the CMS. Option Switches 4 and 5 can select RTS/CTS (hardware), XON/XOFF, Both or None.

Switch		Default Handshake
4	5	
D	D	RTS/CTS *
U	D	XON/XOFF
D	U	Both
U	U	None

* = Factory Setting

4.2.3. Default Response Message Format (Sw6)

When commands are invoked, the CMS can respond with either verbose (English text) or terse (numeric / abbreviated) messages. Response messages are summarized in Section 11.2. After installation, the /P command can also set the response format to "none" (Quiet Mode). When Quiet Mode is selected, the unit will not send response messages.

Switch 6	Default Response Message Type
D	Verbose (English Text) *
U	Terse (abbreviated / numeric)

* = Factory Setting

4.2.4. Default Command Echo (Sw7)

Switch Seven enables or disables the Command Echo. When enabled, characters sent to the CMS will be echoed back to the control device.

Switch 7	Default Command Echo
D	Enable*
U	Disable

* = Factory Setting

4.3. Initialize Unit to Default Settings

If Option Switch settings are changed, new parameters will not take effect until the CMS is initialized.

CAUTION: After initialization, the CMS will revert to the parameters specified by the Option Switches. Any command-selected parameters will be lost.

1. Simultaneously press the SET and CLEAR buttons, located on the face of the CMS.
2. Release the CLEAR button, wait for the Port LEDs to flash, and then release the SET button.

4.4. Connecting the Network Cable

The CMS Network Port is an RJ45, 10BaseT Ethernet Jack, for connection to a TCP/IP network. Connect your 10BaseT or 100BaseT network interface to the CMS-32 Network Port.

The CMS features a default IP Address (192.168.168.168.) Providing that you are communicating with the unit from a node on the same subnet, this allows you to initially contact the CMS without first accessing the CMS command mode to define an IP address.

Note however, that when installing the CMS in a working network environment, it is strongly recommended to assign the IP Address, Gateway Address, and Subnet Mask as described in Section 5.5.4.

Note: The CMS features a 10BaseT Interface. When connecting the CMS to a 100BaseT interface, note that most router switches will autosense to determine if the device is 100BaseT or 10BaseT, and then configure the network interface accordingly. If your router switch does not autosense, the network interface port must be manually set to 10BaseT.

4.5. Connecting Devices to the CMS

1. Determine which CMS port will be used for connection to the new device (e.g. Port 3).
2. Use an appropriate DB9 cable to connect the RS232 serial port on the device to a DB9 port on the CMS.
 - a) **External Modems and other DCE Devices:** Use a standard serial modem cable.
 - b) **PCs and other DTE Devices:** Use a standard null modem cable.
3. Access the CMS command mode and then select communication parameters for each CMS port as described in Section 5.5.

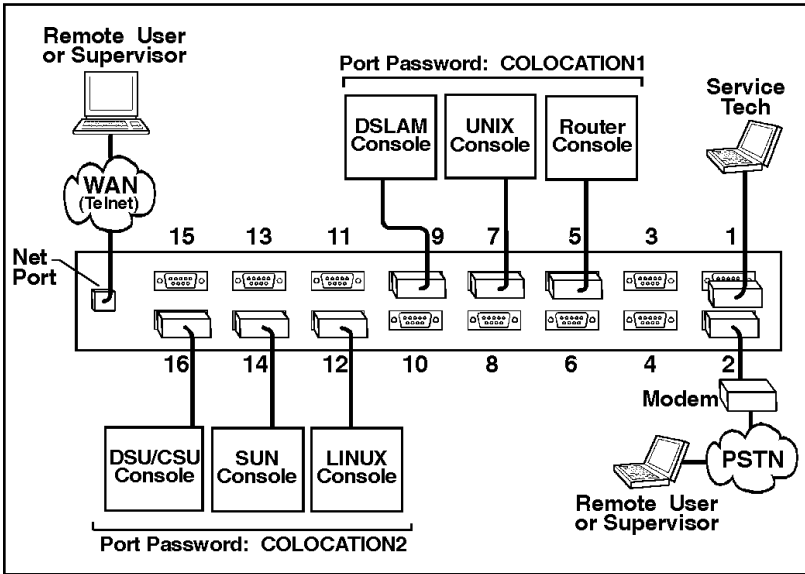


Figure 4.2: CMS Application Example (Model CMS-16 Shown)

4.6. Application Example

The example in Figure 4.2 shows one of many possible installation configurations for the CMS. In this example, CMS-16 ports have been configured as follows:

- Network Port:** The Network Port allows telnet access by remote Supervisors and/or Users. When a telnet connection is established, the CMS will prompt the caller to enter a password. If the Supervisor Password is entered, the CMS will recognize Supervisor Level Commands; if a Port password is entered, the CMS will only recognize User Level Commands. Supervisors are allowed to adjust port configuration, connect to any port, or review unit status. Users are only permitted to review status and connect to ports that are allowed by their Port password.
- Port 1 (System SetUp Port):** This port has been left open in order to permit on-site service personnel to access the Command Mode without disrupting other ports. Since Port 1 is a System SetUp Port, the service tech is allowed password protected access to Supervisor Level commands, and is able to connect to any port, change configuration, or display unit status.

- **Port 2 (Modem Port):** An external modem has been installed at Port 2. This port has also been configured for Modem Mode, which allows definition of a modem reset string, initialization string, and hang-up string. When a caller contacts the CMS unit via modem, a password prompt will be displayed. If the Supervisor Password is entered, the CMS will permit access to Supervisor Level Commands; if a Port password is entered, the CMS will only recognize User Level Commands. Supervisors are allowed to adjust port configuration, connect to any port, or review unit status. Users are only allowed to review status and connect to the ports allowed by their Port Password.
- **Ports 5, 7, and 9 (User Ports):** The Port Password “COLOCATION1” has been assigned to these three ports. If the CMS is contacted via the Network Port or Modem Port, and this password is entered at log in, User’s will only be able to review status and connect to the devices attached to Ports 5, 7, and 9.
- **Ports 12, 14, and 16 (User Ports):** The Port Password “COLOCATION2” has been assigned to these three ports. If the CMS is contacted via the Network Port or Modem Port, and this password is entered at log in, User’s will only be able to review status and connect to the devices attached to Ports 12, 14, and 16.

Note that in this example, Ports 3 through 16 could also be a mixture of ports connected to external modems, and ports connected to devices such as file servers or archives. This would allow remote users to dial in and access a specific file server or archive after entering a valid Port Password at log in.

5. Configuration

5.1. Access to the CMS Command Mode

When the CMS Command Mode is active, commands can be invoked to select parameters, and connect or disconnect ports.

Note: Command Mode *cannot* be accessed from a Buffer Mode Port, Passive Mode Port, or any port that is currently connected to another CMS port.

1. Start your communications program (e.g. HyperTerminal). Make certain the CMS and your communications program are set for the same parameters (e.g. baud, parity, etc.).
2. Access the Command Mode.
 - a) **Local Access:** To access command mode from a local PC connected to the CMS via cable, press **[Enter]**.
 - i. If you have already hit other keys, press **[Enter]** twice. There must be no other characters preceding **[Enter]**.
 - ii. If the Supervisor Password has been defined, the password prompt will be displayed. Key in your Supervisor or Port password and press **[Enter]**. The "CMS>" prompt will appear.
 - b) **Modem Access:** To access the command mode via modem, proceed as follows:
 - i. Dial the number for the external modem connected to the CMS.
 - ii. If you have defined the Supervisor Password, a prompt will be displayed. Key in your Supervisor or Port password and press **[Enter]**. If the Supervisor Password has *not* been defined, just press **[Enter]**. The "CMS>" prompt will appear.

- c) **Network Access:** The CMS includes a default IP Address (192.168.168.168), which allows you to contact the unit from any network node on the same subnet. When the CMS is installed in a working network environment, it is recommended that you redefine the IP Address, Subnet Mask and Gateway Address as described in Section 5.5.4. To contact the CMS via network, proceed as follows:
- i. Telnet to the CMS's IP Address. For example, if the IP Address is "1.2.3.4", on a UNIX system, the Telnet command would be invoked as follows:

```
$ telnet 1.2.3.4 [Enter]
```
 - ii. Note that if the Telnet connection is refused, this may mean that either the IP Security feature (see Section 5.5.5) has denied the connection, or the unit is operating on a 100BaseT network that does not autosense for 10BaseT devices (see Section 4.4).
 - iii. If the Supervisor Password has been defined, the password prompt will be displayed. Key in your Supervisor or Port password and press **[Enter]**. The CMS will display the Port Status Screen, and then the "CMS>" prompt will appear.

Note: In addition to standard telnet connections to ports 23, 2001, and 3001, the CMS also allows telnet users to specify an optional telnet port number in order to connect to a specific RS-232 port. Telnet users can also connect using either standard telnet protocol, or "raw socket mode". For more information regarding other telnet port numbers, please refer to Section 8.2.

5.2. System Setup Ports

Ports 1 and 2 are designated as System Setup Ports, and will always permit password protected access to Supervisor Level commands, even if the unit is reset to default parameters.

In order to ensure that access to command functions is always available, Ports 1 and 2 *cannot* be configured as Buffer Mode or Passive Mode Ports. Buffer and Passive Mode Ports are not able to access the Command Mode. In addition, Ports 1 and 2 always permit password protected access to Supervisor commands; the Supervisor Mode *cannot* be disabled at these two ports.

5.3. Password Functions

The CMS features three different types of passwords; the Supervisor Password, the Port (User) Passwords, and the Outbound Telnet Passwords. The Outbound Telnet Password is discussed in Section 8.4, and the Supervisor Password and User Passwords are discussed in the sections that follow.

The Supervisor Password allows access to configuration commands, and Port Passwords allow users to create connections between specific ports or view port configuration parameters.

5.3.1. The Supervisor Password

The Supervisor Password allows access to higher level CMS configuration commands, which administrators can use to select communication parameters, set up IP Security, assign port access rights, and perform other system management tasks.

Notes:

- If the Supervisor Password is *not* defined, then Supervisor Level commands will be available to all ports, and port access and configuration functions will not be password protected. If you wish to prevent user ports from changing unit configuration, or connecting to restricted ports, the Supervisor Password must be defined.
- If the Supervisor Password is defined, the CMS will display a password prompt when you attempt to access command mode. Any RS232 port that has *not* been assigned a Port Password, can then only be accessed using the Supervisor Password.
- If the CMS is reset to default parameters, all ports will revert to the default state, where Supervisor Level commands are available to all ports, without password protection.
- When defining a Supervisor Password, it is strongly recommended that you record the password for future use. If you forget or lose your Supervisor Password, you will not be able to access Supervisor Level Commands. In this case, the only way to access the Supervisor Mode, is to reinitialize the CMS to default values as described in Section 4.3.

After the Supervisor Password has been defined, the CMS will display a password prompt whenever you attempt to access the command mode. If the correct Supervisor Password is entered, the CMS then starts up in Supervisor Mode. Supervisor Level commands are summarized in Section 11.3 of this User's Guide.

Normally, the Supervisor Password can be entered at any port in order to gain access to Supervisor Level commands. If you wish to completely deny a port's access to Supervisor Mode (even *with* the Supervisor Password), the Port Parameters menus (/P and /N) can disable the Supervisor Mode at ports 3 and above, and the Network Port. The Supervisor Mode *cannot* be disabled at System SetUp Ports 1 and 2, or at the one inbound Network Port which always allows access to Supervisor Level commands, as described in Section 8.1.

5.3.2. The Port Passwords

The Port Passwords (or User Passwords) allow administrators to restrict access to a specific port or group of ports. When the command mode is accessed with a Port Password, users may only connect to the RS232 Ports to which they have been granted access, and review configuration parameters for those ports. Port Passwords do *not* grant access to CMS configuration commands.

The port configuration menus are used to assign a Port Password to each individual port. In order to allow a Port Password to grant access to *several* CMS ports, the same password is assigned to each port to which the user will be allowed access.

For example, if the Port Password "test" is assigned to ports 3, 4, and 6, then when "test" is entered at the Password Prompt, the user will only be able to connect to ports 3, 4, and 6, and will only be able to view parameters for ports 3, 4, and 6.

If desired, all CMS ports can function as either a Supervisor Port or a User Port, depending on which password is entered at login. However, if you wish to prevent a port from being able to access the Supervisor Mode at all (even *with* the Supervisor Password), the Supervisor Mode can be disabled at the RS232 Ports and the Network Port using the Port Configuration menus as described in Section 5.5. Note however, that the Supervisor Mode *cannot* be disabled at RS232 Ports 1 and 2, or at the one network port that always allows access to Supervisor Level commands (see Section 8.1.)

5.4. Defining the Site ID and Supervisor Password

Before configuring individual ports, the Site ID and Supervisor Password should be defined. The Site ID is used to denote the location or name of the CMS unit, and the Supervisor Password is used to restrict access to sensitive commands. Both the Site ID and Supervisor Password are defined via the System Parameters menu (/F).

Notes:

- The Site ID cannot include double quotes.
 - The Supervisor Password cannot include an asterisk, forward slash, spaces, or double quotes.
 - Both the Site ID and Supervisor Password will be cleared if the CMS is initialized to default settings.
 - The Supervisor Password cannot be the same as an existing Port Password.
 - The System Parameters Menu is only available in Supervisor Mode.
 - The Supervisor Password is case sensitive. Make certain to note the exact password entered, including the case of each letter. It is also strongly recommended to write down your Supervisor Password. If the password is lost or forgotten, you will not be able to access Supervisor Level commands unless you initialize the unit and clear all parameters as described in Section 4.3.
1. Access the command mode. When the “CMS>” prompt appears, type **/F [Enter]** to display the System Parameters Menu.
 2. **Site ID Message:** (Up to 32 characters; Default = undefined) Type **1** and press **[Enter]**, the Site I.D. Prompt will appear. Key in the desired text and press **[Enter]** .
 3. **Supervisor Password:** (Up to 32 characters; Default = undefined) Type **2** and press **[Enter]**, a prompt will appear. Key in the desired password then press **[Enter]**. The CMS will prompt you to confirm spelling and capitalization. Key in the password a second time, and then press **[Enter]**.

5.5. Port Configuration

5.5.1. Configuration Conventions

When responding to prompts, invoking commands, and selecting items from the port configuration menus, note the following:

- To select an item from a Port Configuration menu, key in the number for the item and press **[Enter]**.
- To clear an item in a Port Configuration menu, enter the number for the desired item and press **[Enter]**. When the prompt appears, press **[Space]** and then press **[Enter]**.
- The Port Name cannot include the forward slash character (/), double quotes ("), the asterisk character (*), or blank spaces.
- Port Names must begin with an alphabetic character; Port Names *cannot* begin with a number, punctuation character or symbol.
- A Port cannot be named "N1" through "N19", these names are reserved for the logical Network Ports.
- Refer to the instructions in each screen for additional functions available under that screen.
- To exit a menu or prompt without changing its current value, press **[Esc]**.
- Passwords and port names are case sensitive. When defining passwords and port names, note the exact text, including the case of each character.
- The "Who" command (/W) can be used to display currently selected parameters for your resident port. Note that when the Network port has been accessed using a Port Password (User Mode), the /W command will only display the settings for the Sequence Disconnect, the selected Logoff Character and the current status of the "Accept Break" feature and the "Discard <LF> After <CR>" option.
- If you are configuring the CMS unit via modem, modem communication parameters will not be changed until after you exit from command mode and disconnect from the CMS unit.
- If you are configuring the CMS via network, network communication parameters will not be changed until all telnet connections to the CMS have been terminated (including the connection that was used to enter the new parameters.)

5.5.2. Port Modes

The CMS offers four different port operation modes; Any-to-Any Mode, Passive Mode, Buffer Mode, and Modem Mode. The Port Modes function as follows:

- **Any-to-Any Mode:** Allows communication between connected ports. Any-to-Any Mode Ports can be connected to other Any-to-Any Mode, Passive Mode, Buffer Mode, or Modem Mode Ports by accessing the Command Mode and invoking the /C command (see Section 7.1.1). The Any-to-Any Mode is available to all ports.
- **Passive Mode:** Allows communication between connected ports, but does *not* allow access to the Command Mode. Passive Mode Ports can be connected by accessing the Command Mode from a free Any-to-Any or Modem Mode port and invoking the /C command (see Section 7.1.1). The Passive Mode is not available to Ports 1 or 2 or the Network Port.
- **Buffer Mode:** Allows collection and storage of data received from connected devices. Collected data can be retrieved by accessing the Command Mode from a free Any-to-Any or Modem Mode Port, and issuing the Connect (/C) Command. Note that the Buffer Mode also allows pass-through communication with the connected device. The Buffer Mode is not available to Ports 1 or 2 or the Network Port.
- **Modem Mode:** Allows communication between connected ports and simplifies connection to an external modem. A port configured for the Modem Mode can perform all functions normally available in Any-to-Any Mode. The Modem Mode also allows definition of a Hang-Up String, Reset String, and Initialization String. Any CMS RS232 port can be configured for the Modem Mode. The Modem Mode is not available at the Network Port.

For more information on Port Modes, please refer to Section 7.

```
PORT PARAMETERS #02:

 1. Port Name:          PORT_02          15. Direct Connect: On - Password
 2. Password:          (defined)        Telnet Port:      2102
 3. Baud Rate:         9600             Raw Port:         3102
 4. Bits/Parity:       8-None
 5. Stop Bits:         1
 6. Handshake Mode:    RTS/CTS
 7. Port Mode:         Any-to-Any
 74. DTR Output:       Pulse
 8. Supervisor Mode:   Permit
 9. Logoff Character:  ^X
10. Sequence Disconnect: One Character
11. Timeout Disconnect: Off
12. Response Type:     Verbose
13. Command Echo:     On
14. Accept Break:     On

Enter: "<" previous port,
      ">" next port,
      <ESC> exit ...
```

Figure 5.1: Port Configuration Menu (Port 2 Shown)

5.5.3. RS232 Port Configuration Menus

The Port Configuration Menus are used to select options for each of the CMS RS232 ports. Parameters selected via these menus will stay in effect until the unit is initialized or the /P command is used to reconfigure the port. After initialization, parameters will revert to the defaults specified by the Option Switches.

To select port parameters, proceed as follows:

1. Access the Command Mode. If the password prompt is displayed, key in your Supervisor Level Password.
2. Type /P, followed by the number of the port to be configured, and press [Enter]. For example, to configure Port 2, type /P 2 [Enter]. The Port Configuration menu will appear (Figure 5.1).
 - a) If the /P Command is entered at an RS232 port without including the port number in the command line (e.g. /P [Enter]), the configuration menu for your resident port will be displayed.
 - b) If the /P Command is entered at the Network port, without including the port number in the command line, this will produce an "Invalid Parameter" response.
 - c) The /P command is only available in Supervisor Mode.

The Port Configuration menu offers the following options:

1. **Port Name:** (Up to 16 characters, Default = undefined).

Notes:

- The Port Name cannot include the forward slash character (/), double quotes ("), the asterisk character (*), or blank spaces.
- Port Names must begin with an alphabetic character; Port Names *cannot* begin with a number, punctuation character or symbol.
- A Port cannot be named "N1" through "N19", these names are reserved for the logical Network Ports.

2. **Password:** (Up to 16 characters) Defines the Port Password for this port. Note that identical Port Passwords are generally assigned to several ports. When this password is entered at the login prompt, the user will then have access to all ports that share this password. (Default = undefined).

Notes:

- The Port Password is *not* displayed by the Port Parameters menu. When the Port Password has been defined, the field for this item will read "defined". To display Port Passwords, invoke the /SP or /WP commands as described in Section 6.
- The CMS will not allow you to define a Port Password that is the same as the existing Supervisor Password.

3. **Baud Rate:** Selects the baud rate for the port. Can be set to any standard rate from 300 bps to 115.2K bps. (Default = Selected By Option Switches 1, 2, and 3)
4. **Bits/Parity:** (Default = 8-None).
5. **Stop Bits:** (Default = 1).
6. **Handshake Mode:** Selects the handshake format for this port; XON/XOFF, RTS/CTS (hardware), Both, or None. (Default = RTS/CTS).


```

PORT PARAMETERS #02:

1. Port Name:          PORT_02          15. Direct Connect:  On - Password
2. Password:          (defined)        Telnet Port:       2102
3. Baud Rate:         9600             Raw Port:          3102
4. Bits/Parity:       8-None
5. Stop Bits:         1
6. Handshake Mode:    RTS/CTS
7. Port Mode:         Modem
   71. Reset String:   ATZ
   72. Init String:    AT&C1&D2S0=1
   73. Hang-Up String: (undefined)
8. Supervisor Mode:   Permit
9. Logoff Character:  ^X
10. Sequence Disconnect: One Character
11. Timeout Disconnect: 15 Min
12. Response Type:    Verbose
13. Command Echo:     On
14. Accept Break:     On

Enter: "<" previous port,
      ">" next port,
      <ESC> exit ...

```

Figure 5.2: Port Parameters Menu (Modem Mode)

7. **Port Mode:** Defines the operation mode for this port. Note that Ports 1 and 2 *cannot* be configured for Passive Mode or Buffer Mode. (Default = Any-to-Any Mode).

When Any-to-Any, Passive, or Buffer Mode is selected, the unit will display the DTR Output prompt (Figure 5.1). This prompt is *not* displayed when Modem Mode is selected.

74. **DTR Output:** Determines how the DTR line will react when this port disconnects. The DTR line can be held low, high, or pulsed for 0.5 seconds and then held high. In the default state, the DTR line will pulse for 0.5 seconds and then remain high. For more information, please refer to Appendix A. (Default = Pulse).

When Port Mode (menu Item 7) is set to Modem Mode, the menu will include additional prompts (see Figure 5.2), which are used to define the following:

71. **Reset String:** If necessary, this prompt can be used to re-define the modem reset string. The Reset String is sent prior to the Initialization string. (Default = **ATZ**).
72. **Initialization String:** Defines a command string that is sent to initialize a modem to settings required by your application. (Default = **AT&C1\$D2S0=1**).

73. **Hang-Up String:** Although the CMS will pulse the DTR line in order to hang-up an attached modem, the Hang-Up string is often useful for controlling modems that do not use the DTR line. (Default = undefined).

Note: When communicating with the CMS unit via modem, parameters will not be changed until after you have exited from command mode and discontinued the modem connection to the unit.

8. **Supervisor Mode:** Permits or denies port access to Supervisor Mode. When enabled (Permit), and the valid Supervisor Password is entered, the port will be allowed to invoke Supervisor Level commands. If disabled (Deny), the port may *not* enter Supervisor Mode, even when the Supervisor Password is entered. (Default = Permit).
9. **Logoff Character:** Defines the Logoff Character for this port. The Logoff Character determines the command(s) or character(s) that must be issued at this port in order to disconnect from a second port (Resident Disconnect). (Default = **^X** ([Ctrl] plus [X]))

Note:

- When redefining the Logoff Character, make certain to select a character that does not normally occur in your data. This will prevent the unit from accidentally disconnecting ports in the middle of a data transfer. For example, if the Logoff Character is defined as "s", then the ports will disconnect whenever the letter "s" is detected.
- The Logoff Character *cannot* be used to terminate a telnet "Direct Connection" or an outbound Telnet connection. Direct Connections are terminated using the telnet program's disconnect command. And outbound Telnet connections are terminated as described in Section 8.4.3. For more information, please refer to Section 8.

10. **Sequence Disconnect:** Enables/Disables and configures the Resident Disconnect command. This prompt offers the option to either disable the Sequence Disconnect, select a one character format, or select a three character format. (Default = One Character). Note the following:

- When a Resident Connection is initiated, the CMS will send a message which lists the connected ports, and displays the one character or three character disconnect command required in order to terminate the connection.
- The One Character Disconnect sequence is intended for situations where the destination port should *not* receive the disconnect command. When the Three Character format is selected, the disconnect sequence *will* pass through to the destination port prior to breaking the connection.
- When the Three Character format is selected, the Resident Disconnect Sequence will use the format "[Enter]LLL[Enter]", where **L** is the selected Logoff Character.
- When the One Character format is selected, resident connections are terminated by entering the selected Logoff Character only. There is no need to press **[Enter]** before and after the Logoff Character when the One Character format is selected.

-
11. **Timeout Disconnect:** Enables and selects the Timeout Period for this port. If enabled, and the port does not receive or transmit data for the specified Timeout Period, the port will disconnect. When the port is set for Any-to-Any Mode, Passive Mode, or Buffer Mode, the default setting for this item is “OFF”. When the port is set for Modem Mode, the default setting for this item is 15 minutes.

Notes:

- The Timeout Disconnect value is also applied to telnet Direct Connections and outbound Telnet connections. For more information, please refer to Section 8.
 - The Timeout Disconnect is also applied to non-connected ports that are left in Command Mode. If the timeout feature is enabled, and no additional data activity is detected, an unconnected port will exit from command mode when the Timeout Disconnect value expires.
 - When two connected ports time out and are disconnected, both ports will also exit from Command Mode.
12. **Response Type:** Selects the type of messages that this port will send in response to commands. The user can select Verbose (English Text), Terse (Numeric / Abbreviation), or Quiet Mode (No Response). (Default = Verbose).
13. **Command Echo:** Enables or Disables the command echo for this port. (Default = On).
14. **Accept Break:** Determines whether the port will accept breaks received from the attached device, and pass them along to a connected port. When enabled, breaks received at this port will be passed to any port that this port is connected to, and sent along to the device connected to the other port. When disabled, breaks will be refused at this port, and hence, not sent to the other port or connected device. (Default = Yes)

15. **Direct Connect:** Enables/Disables and configures the telnet Direct Connect feature at this port. Direct Connect allows users to access the CMS unit and automatically create a connection between the Network Port and a specific CMS RS232 port by including the appropriate telnet port number in the telnet connect command (e.g. Port 5 = 2105). For more information on the Direct Connect feature, please refer to Section 8.2. (Default = Off)

To configure the Direct Connect feature at this port, type **15** and press **[Enter]**. A submenu will be displayed, which offers three different Direct Connect options: "Off", "On - No Password" and "On - Password".

- **Off:** Telnet users will *not* be able to employ the Direct Connect feature to connect to this port.
- **On - No Password:** Telnet users will be able to employ the Direct Connect feature to connect to this port *without* entering a password.
- **On - Password:** Telnet users will be able to employ the Direct Connect feature to connect to this port, but they will be required to enter a password before the connection is established.

Notes:

- If "On - Password" is selected and the Supervisor Mode is disabled (Deny) at the Network Port, then the Port Password must be entered in order to establish a direct connection with this port.
- If "On - Password" is selected and the Supervisor Mode is enabled (Permit) at the Network Port, then either the Supervisor Password or the Port Password may be entered in order to connect to establish a direct connection with this port.

In addition to enabling, disabling, and configuring the Direct Connect feature, Item 15 also lists both Direct Connect port numbers for this port.

- a) **Telnet Port:** The telnet port number that is used to create a Direct Connection to this port using standard telnet protocol.
- b) **Raw Port:** The telnet port number that is used to create a Direct Connection to this port using "Raw Socket" protocol.

```

NETWORK CONFIGURATION:

NETWORK PARAMETERS
1. IP Address:          65.106.93.107
2. Subnet Mask:        255.255.255.0
3. Gateway Address:    65.106.93.97
4. IP Security         Off

TELNET PORT PARAMETERS
11. Supervisor Mode (except 2001):   Permit
12. Logoff Character:                ^X
13. Sequence Disconnect:             One Character
14. Timeout Disconnect:              Off
15. Response Type:                   Verbose
16. Command Echo:                    On
17. Accept Break:                     On
18. Discard <LF> after <CR>:         Off
19. Password:                         (undefined)

*: These parameters are installed when all Telnet connections are inactive.

Enter: #<CR> to change,
      <ESC> exit ...

```

Figure 5.3: Network Parameters Menu (Supervisor Mode Only)

5.5.4. Network Port Configuration Menu

In order to communicate with the CMS via network, the IP Address, Subnet Mask, and Gateway Address must first be defined using the Network Parameters Menu. If desired, this menu also allows you to implement IP Security features, which can restrict access based on the user's IP Address. Settings for network parameters depend on the configuration of your individual network. Please contact your network administrator for appropriate settings. To select network parameters, access the CMS Command Mode, type **/N** and press **[Enter]**. The Network Parameters Menu (Figure 5.3) will be displayed.

Notes:

- The Network Parameters Menu selects parameters for all CMS logical Network Port Ports (the CMS-16 provides 19 logical Network Ports, and the CMS-8 provides 9 logical Network Ports.) The only exception is Item 11 (Supervisor Mode), which will not be applied to Network Port N9 on the CMS-8, and Network Port N17 on the CMS-16 (for more information, please see Section 8.1.)
- Although new parameters can be specified via network connection, new parameters will not be applied until all telnet connections to the CMS (including the connection that was used to enter the parameters) are terminated.
- The Network Parameters menu is only available in Supervisor Mode.

The Network Parameters menu offers the following options:

1. **IP Address:** Defines the IP Address for the CMS unit. Type **1** press **[Enter]**, and follow the instructions in the submenu. (Default = 192.168.168.168).
2. **Subnet Mask:** Defines the Subnet Mask for the CMS unit. Type **2** press **[Enter]**, and follow the instructions in the submenu. (Default = undefined)
3. **Gateway Address:** Defines the Gateway Address for the CMS unit. Type **3** press **[Enter]**, and follow the instructions in the submenu. (Default = undefined).
4. **IP Security:** Sets up the IP Security feature as described in Section 5.5.5.
11. **Supervisor Mode (Port 23):** Permits or denies access to the Supervisor Mode. When enabled (Permit), and the valid Supervisor Password is entered, this port may then issue Supervisor level commands. If disabled (Deny), the port may *not* enter Supervisor Mode, even when the Supervisor Password is entered. (Default = Permit).

Note: In order to ensure that remote administrators will always be able to access Supervisor Level commands via network, the Supervisor Mode will not be disabled at Port N17 on the CMS-16, and Port N9 on the CMS-8 (for more information, please refer to Section 8.1.)

12. **Logoff Character:** Defines the Logoff Character for the Network Port. The Logoff Character determines the command(s) or character(s) that must be issued at this port in order to disconnect from a second port (Resident Disconnect). (Default = **^x ([Ctrl] plus [X])**).

Note: The Logoff Character cannot be used to terminate a telnet "Direct Connection" or outbound Telnet connection. For more information, please refer to Section 8.

-
13. **Sequence Disconnect:** Enables/Disables and configures the Resident Disconnect command. This prompt offers the option to either disable the Sequence Disconnect, select a one character format, or a three character format. (Default = One Character). Note the following:
- When a Resident Connection is initiated, the CMS will send a message which lists connected ports, and displays the one character or three character disconnect command that will be required in order to terminate the connection.
 - The One Character Disconnect is intended for situations where the destination port should *not* receive the disconnect command. When the Three Character format is selected, the disconnect sequence *will* pass through to the destination port prior to breaking the connection.
 - When Three Character format is selected, the Resident Disconnect uses the format “[**Enter**]**L**L**L**[**Enter**]”, where **L** is the selected Logoff Character.
 - When the One Character format is selected, resident connections are terminated by entering the selected Logoff Character only. There is no need to press [**Enter**] before and after the Logoff Character when the One Character format is selected.
14. **Timeout Disconnect:** Enables and selects the Timeout Disconnect for the Network Port. If enabled, and the port does not receive or transmit data for the specified time period, the port will disconnect. (Default = 5 Minutes).
- Note:** The Timeout Disconnect value is also applied to Telnet Direct Connections and outbound Telnet connections. For more information, please refer to Section 8.
15. **Response Type:** Selects the type of messages that the port will send in response to commands. The user can select Verbose (English Text), Terse (Numeric / Abbreviation), or Quiet Mode (No Response). (Default = Verbose).
16. **Command Echo:** Enables or Disables the command echo for the Network Port. (Default = On).
-

17. **Accept Break:** Determines whether the port will accept breaks received from the attached device, and pass them along to a connected port. When enabled, breaks received at this port will be passed to any port that this port is connected to, and sent along to the device connected to the other port. When disabled, breaks will be refused at this port. (Default = Yes)
18. **Discard <LF> after <CR>:** If desired, this option can be used to discard the Line Feed character that is often produced by telnet software. When this parameter is enabled, the <LF> character sent after the <CR> will *not* be forwarded to the serial port that the telnet connection is in session with. When the status of this parameter is changed the new setting will take effect immediately, thus changing all current, active connections. This parameter applies to *all* CMS telnet connections. (Default = Off)
19. **Password:** Defines the optional password for outbound Telnet connections. Note that if this password is not defined, then only the Supervisor Mode be able to initiate an outbound Telnet connection. For more information on outbound telnet connections, please refer to Section 8.4. (Default = undefined).

Notes:

- The outbound Telnet password can either be set to match any User Mode password, or it can be different from existing User Mode Passwords.
- If the outbound Telnet password is the same as a User Mode password, then only that user may initiate an outbound Telnet connection.
- If the outbound Telnet password is different from all User Mode passwords, then any user can initiate an outbound Telnet connection, but they must first logoff from the CMS command mode, and then re-login using the currently defined outbound Telnet password.

```
IP SECURITY:

1. Security Mask #1: (undefined)
2. Mask #1 Action: Permit
3. Security Mask #2: (undefined)
4. Mask #2 Action: Permit
5. Security Mask #3: (undefined)
6. Mask #3 Action: Permit
7. Security Mask #4: (undefined)
8. Mask #4 Action: Permit
9. Security Mask #5: (undefined)
10. Mask #5 Action: Permit

Enter: #<CR> to Select Menu,
       <ESC> for Previous Menu ...
```

Figure 5.4: IP Security Menu

5.5.5. Implementing IP Security

The CMS can be configured to restrict unauthorized IP addresses from establishing an inbound telnet connection to the unit. This allows the user to grant Telnet access to only a specific group of IP addresses, or block a particular IP address. In the default state, the CMS accepts incoming IP connections from all hosts. To configure the IP Security feature, proceed as follows:

1. Access the Network Parameters menu as described in Section 5.5.4. Note that the Network Parameters menu is only available in Supervisor Mode.
2. When the Network Parameters menu appears, type **4** and press **[Enter]** to access the IP Security menu (Figure 5.4).
3. The IP Security Menu lists five IP Security “masks” along with the selected permit/deny action for each mask.
 - a) Each Security Mask prompt defines a specific IP address or range of IP addresses. Each Mask Action prompt selects the permit/deny action for the corresponding mask.
 - b) Masks are listed in order of ascending priority; Mask 1 has the lowest priority, and Mask 5 has the highest.
 - c) Masks have a cumulative effect; high priority masks supersede the effect of lower priority masks.
 - d) Each IP Address consists of a series of four eight bit numbers. The number 255 is used as a wild card.

Example 1: Deny access to all hosts except 192.1.1.5:

Security Mask #1: 255.255.255.255	Mask #1 Action: Deny
Security Mask #2: 192.1.1.5	Mask #2 Action: Permit

Since 255 is a wild card, Mask #1 blocks all IP Addresses. Mask #2 then specifically grants access to 192.1.1.5 only.

Example 2: Allow access only by addresses that begin with 192:

Security Mask #1: 255.255.255.255	Mask #1 Action: Deny
Security Mask #2: 192.255.255.255	Mask #2 Action: Permit

Since 255 is a wild card, Mask #1 blocks all IP addresses. Mask #2 then grants access to all addresses that begin with 192.

Example 3: Allow access only by addresses that begin with 192, deny access to 192.1.1.5.

Security Mask #1: 255.255.255.255	Mask #1 Action: Deny
Security Mask #2: 192.255.255.255	Mask #2 Action: Permit
Security Mask #3: 192.1.1.5	Mask #3 Action: Deny

Since 255 is a wild card, Mask #1 blocks all IP addresses. Mask #2 then grants access to all addresses that begin with 192. Finally, Mask #3 specifically blocks access by 192.1.1.5.

Note:

- Mask #5 has priority over the four other masks. If Mask #5 is set to deny access by “255.255.255.255” (all wild cards), all IP addresses will be blocked, and you will not be able to access the CMS Command Mode via network. Access will only be allowed via the Console Port or Modem Port.
- When using the wild card address “255.255.255.255” to block access by all IP addresses, make certain that at least one higher priority mask permits access by *your* IP address.

```

COPY PORT PARAMETERS:

1. Port Name:
2. Password:
3. Baud Rate:
4. Bits/Parity:
5. Stop Bits:
6. Handshake Mode:
7. Port Mode:
   74. DTR Output:
8. Supervisor Mode:
9. Logoff Character:
10. Sequence Disconnect:
11. Timeout Disconnect:
12. Response Type:
13. Command Echo:
14. Accept Break:
15. Direct Connect:

(note: ports 1 & 2 will NOT have restricted values changed.)
Enter: parameter # <CR> to define parameter value to copy to all ports,
      -<CR> to remove all values set,      X<CR> to exit WITHOUT copy,
      <ESC> to copy to ports and exit ...

```

Figure 5.5: The Copy Port Parameters Menu

5.6. Copying Parameters to Several RS-232 Ports

The /CP command (Copy Port Parameters) provides a convenient means for selecting similar parameters for all or several CMS RS-232 ports.

When the /CP command is invoked, the unit will display a menu which allows you to select parameters, and then copy them to all or several CMS RS-232 ports. The Copy Port Parameters menu can be used to set *all* parameters for the specified port(s), or define only a select group of parameters for the desired ports.

Notes:

- The /CP command will *not* copy parameters to the Network Port.
- The /CP command is only available in Supervisor Mode.
- The Copy Port Parameters Menu will not display the Port Password. This field will read either “undefined” or “defined”, depending upon whether or not the Port Password has been specified.
- The /CP command cannot be used to set Ports 1 and 2 to Passive Mode or Buffer Mode (Port Mode, Item 7).
- The /CP command cannot be used to disable the Supervisor Mode at Ports 1 and 2 (Supervisor Mode, Item 8).

To select common parameters for all or several CMS RS-232 ports, proceed as follows:

1. Access the CMS command mode. If the password prompt is displayed, key in your Supervisor Level Password.
2. At the CMS command prompt, invoke the **/CP** command, the menu shown in Figure 5.5 will be displayed.
 - a) **All Ports:** To copy parameters to all CMS ports, type **/CP [Enter]**.
 - b) **Range of Ports:** To copy parameters to a range of CMS ports, type **/CP m-n [Enter]**. Where **m** and **n** are CMS port numbers that specify the desired range. For example, to copy parameters to ports 3 through 7, type **/CP 3-7** and press **[Enter]**.
 - c) **Several Ports:** To copy parameters to several CMS ports, type **/CP m,n,x [Enter]**. Where **m**, **n** and **x** are the numbers for the desired ports. For example to copy parameters to ports 3, 5, and 7, type **/CP 3,5,7 [Enter]**.
 - d) **Combination:** To invoke the **/CP** command in a manner where a range of CMS ports is specified, along with several other ports outside the range, type **/CP m,n,x-z [Enter]**. Where **m**, **n**, **x**, and **z** are CMS port numbers. For example to copy parameters to CMS ports 3 and 5 *plus* CMS ports 7 through 9, type **/CP 3,5,7-9 [Enter]**.
3. **Selecting Parameters:** To select parameters to be copied, key in the number for the desired parameter, press **[Enter]**, and then follow the instructions in the submenu. Note that it is not necessary to define *all* port parameters; for example, the **/CP** command could be used to select only the Baud Rate for all specified ports.

Note: The **/CP** command will only copy the parameters currently displayed by the Copy Port Parameters menu. Although the Port Password is not displayed, the selected password will be copied if the field for this item reads “defined”.

4. **Clear Menu:** After defining several parameters, if you wish to clear the /CP menu and start again, type - (dash) and press **[Enter]**, the menu will be reset.
5. **Exit Without Copy:** To exit from the Copy Parameters menu *without* copying selected parameters to all RS232 ports, type **X** and then press **[Enter]**. The CMS will exit from the Copy Parameters menu and return to the command prompt.
6. **Copy Parameters:** When you have finished selecting parameters, press **[Esc]** to copy the selected parameters to all CMS RS-232 Ports and exit from the Copy Port Parameters menu.

5.7. Save User Selected Parameters

Although this step is optional, it is strongly recommended to save all user-defined parameters to an ASCII file. This will allow quick recovery in the event of accidental deletion or reconfiguration of port parameters. Section 9 describes the procedure for saving configuration parameters to an ASCII file.

6. The Status Screens

The Status Screens display the connection status and communication parameters for the CMS RS-232 ports and the Network Port. There are four different types of status screens; The Port Status Screen (/S), the Port Diagnostics Screen (/SD), the Network Status Screen (/SN), and the Port Parameters Screens (/W).

6.1. The Port Status Screen (/S)

The Port Status Screen lists the general status of the CMS's RS-232 ports. To display the Port Status Screen, access the command mode and type **/S [Enter]**, the screen will appear as shown in Figure 6.1.

Although both Supervisors and Users can display the Port Status Screen, the screen will appear slightly different, depending upon whether the command mode was accessed with the Supervisor Password or a Port Password. When a Port Password (User Mode) is entered at login, the Port Status Screen will only display the status of those ports that share the same Port Password that was entered at login.

When the Supervisor Mode is active, the Port Status Screen offers the option to either display or suppress Port Passwords. Normally, when the /S command is invoked, the Password column will read either "defined" or "undefined", depending upon whether or not the password for each port has been specified. To display the Port Status Screen *with* Port Passwords included, type **/SP** and then press **[Enter]**.

Notes:

- When the /SP command is invoked, passwords will be displayed in place of port names.
- The /SP command option is not available in User Mode.


```

PORT STATUS:  Version 4.00,  Site ID: WESTERN_TELEMATIC_CALIFOR_IRVINE

```

PORT	NAME	PASSWORD	STATUS	MODE	BUFFER	COUNT
01	(undefined)	(undefined)	Free	Any		0
02	(undefined)	(undefined)	Free	Any		0
03	(undefined)	(undefined)	Free	Any		0
04	(undefined)	(undefined)	Free	Any		0
05	(undefined)	(undefined)	Free	Any		0
06	(undefined)	(undefined)	Free	Any		0
07	(undefined)	(undefined)	Free	Any		0
08	(undefined)	(undefined)	Free	Any		0
09	(undefined)	(undefined)	Free	Any		0
10	(undefined)	(undefined)	Free	Any		0
11	(undefined)	(undefined)	Free	Any		0
12	(undefined)	(undefined)	Free	Any		0
13	(undefined)	(undefined)	Free	Any		0
14	(undefined)	(undefined)	Free	Any		0
15	(undefined)	(undefined)	Free	Any		0
16	(undefined)	(undefined)	Free	Any		0

Enter /H for command menu.

Figure 6.1: Port Status Screen (Supervisor Mode, Defaults Shown)

As shown in Figure 6.1, the Port Status Screen lists the following items. Note that the CMS-8 will show only eight ports.

- **Port:** The Port Number.
- **Name:** The user-defined name for each port.
- **Password:** The user-defined password for each port. Note that actual passwords are not displayed; this column will read either “undefined” or “defined”. To display Port Passwords, type **/SP [Enter]** (Supervisor Mode Only).
- **Status:** The connect status of each port.
 - ▶ If the port is connected, this column will list the number of the other CMS port connected to this port.
 - ▶ If the connected port is listed as "**Nn**" (where "**n**" is a number), this indicates that the RS232 port is connected to the CMS Network port. The numbers indicate which of the available telnet sessions is being used. For more information on Network Port Numbers, please refer to Section 8.1.
- **Mode:** The user-selected Port Mode. This column will read Any (Any-to-Any), Modem, Passive, or Buffer, depending on the configuration selected for the port.
- **Count:** Lists the amount of data (in bytes) stored in the buffer for this port.

PORT DIAGNOSTICS: Version 4.00, Site ID: WESTERN TELEMATIC INC.								
PORT	NAME	STATUS	BAUD	COM	HS	MODE	BUF	CTS
01+	SUPER	*C-N1	19.2K	8N1	RTS	Any	32536	H
02+	DSLAM 1	Free	57.6K	8N1	RTS	Any	0	L
03+	DSLAM 2	Free	9600	8N1	RTS	Any	0	L
04+	DSLAM 3	C-15	9600	8N1	RTS	Any	0	L
05+	SUN 1	Free	9600	8N1	RTS	Any	0	L
06+	SUN 2	Free	115.2K	8N1	RTS	Any	0	L
07	SUN 3	Free	9600	8N1	RTS	Any	0	L
08+	ROUTER CONS 1	Free	9600	8N1	RTS	Any	0	L
09+	ROUTER CONS 2	C-16	9600	8N1	RTS	Any	0	L
10+	ROUTER CONS 3	Free	9600	8N1	RTS	Any	0	L
11	LINUX 1	Free	9600	8N1	RTS	Any	0	L
12	LINUX 2	Free	9600	8N1	RTS	Any	0	L
13+	DSU/CSU 1	Free	9600	8N1	RTS	Any	0	L
14+	DSU/CSU 2	Free	9600	8N1	RTS	Any	0	L
15	TERM SERVER	C-04	9600	8N1	RTS	Any	0	L
16	MODEM	C-08	9600	8N1	RTS	Modem	0	H

Enter /H for command menu.

Figure 6.2: Port Diagnostics Screen (Sample Values Shown)

6.2. The Port Diagnostics Screen (/SD)

The Port Diagnostics Screen provides more detailed information about each port, including the port name and communication parameters. To display the Port Diagnostics Screen, access the command mode and type `/SD [Enter]`, the screen will appear as shown in Figure 6.2. Note that the CMS-8 Port Diagnostics Screen will show only eight ports.

Like the Port Status Screen, the Port Diagnostics Screen is also available to both Supervisors and Users, and will appear slightly differently, depending upon whether the command mode was accessed with the Supervisor Password or a Port Password (User Mode).

In User Mode, the Port Diagnostics Screen will display only the status of those ports that share the same Port Password entered at login. Ports that are protected by other passwords will not be displayed.

Note: The `/SD` command does not offer the option to display passwords.

As shown in Figure 6.2, the Port Diagnostics Screen lists the following items:

- **Port:** The Port Number. Note that if this column contains a plus sign (+), this indicates that the port will be allowed to access the Supervisor Mode if the appropriate Supervisor Password is entered at login.
- **Name:** The user-defined name for each port.
- **Status:** The connect status for each port.
 - ▶ When the port is connected, this column will list the number of the other port that is connected to this port. If this column contains an asterisk, this indicates that the port has accessed the Command Mode.
 - ▶ If the connected port is listed as "**Nn**" (where "**n**" is a number), this indicates that the RS232 port is connected to the CMS Network port. The numbers indicate which of the available telnet sessions is being used. For more information on Network Port Numbers, please refer to Section 8.1.
- **Baud:** The baud rate selected for each port.
- **COM:** The Data Bits, Parity, and Stop Bits selected for each port. For example, "8N1" indicates Eight data bits, No parity, and One stop bit.
- **HS:** The handshaking (flow control) mode for each port.
- **Mode:** The user-selected Port Mode. This column will read Any (Any-to-Any), Modem, Passive, or Buffer, depending on the configuration selected for each port.
- **BUF:** Lists the amount of data (in bytes) currently stored in the buffer for this port.
- **CTS:** The High/Low status of the CTS line at the RS232 interface.

NETWORK STATUS:					NIC Installed: Yes						
					MAC Address: 00-40-05-70-96-ae						
PORT	TCP	PORT	STATUS	PASSWORD	USED	PORT	TCP	PORT	STATUS	PASSWORD	USED
N 1		23	Active	*****		N11		(none)	Free		
N 2		(none)	Free			N12		(none)	Free		
N 3		(none)	Free			N13		(none)	Free		
N 4		(none)	Free			N14		(none)	Free		
N 5		(none)	Free			N15		(none)	Free		
N 6		(none)	Free			N16		(none)	Free		
N 7		(none)	Free			N17		(none)	Free		
N 8		(none)	Free			N18		(none)	Free		
N 9		(none)	Free			N19		(none)	Free		
N10		(none)	Free								

CMS>

Figure 6.3: Network Status Screen (CMS-16 Shown)

6.3. The Network Status Screen (/SN)

This screen lists parameters for the Network Port. To display the Network Status Screen, type `/SN` and press **[Enter]**. The Network Status Screen is only available in Supervisor Mode. Note that the CMS-16 will allow up to seventeen simultaneous inbound Telnet connections plus two outbound connections, and the CMS-8 will allow up to nine simultaneous inbound Telnet connections, plus two outbound connections.

Normally, the `/SN` command will *not* display passwords that were entered in order to initiate each telnet session, and the Telnet Connection column will read "Active" or "Free" for each of the available logical TCP ports. However, if the `/SN` command line includes the "P" option (e.g. `/SNP`), the Network Status screen will also list the login password entered for each telnet session. When the `/SNP` command is invoked, the Supervisor Password will not be displayed; the Telnet Connection column will read "Supervisor" instead of listing the actual Password.

As shown in Figure 6.3, the Network Status Screen lists the following information:

- **NIC Installed:** If your CMS unit includes a Network Card, this item will read "Yes".
- **MAC Address:** The permanent physical address assigned to the Network Card.
- **Port:** The Network Port Number for each logical TCP Port. For more information on Network Port Numbers, please refer to Section 8.1.

- **TCP Port:** The logical TCP port number to which each telnet session is connected.
 - ▶ Normally, when a telnet session has been established, this field will list port number 23, 2001, or 3001.
 - ▶ If the telnet Direct Connect function has been employed to connect to a CMS port using normal telnet protocol, this column will list the virtual TCP port number. For CMS-16 units, this number will range from 2101 to 2116. For CMS-8 units, this number will range from 2101 to 2108. For more information on the Direct Connect function, please refer to Section 8.
 - ▶ If the telnet Direct Connect function has been employed to connect to a CMS port using raw socket mode, this column will list the virtual TCP port number. For CMS-16 units, this number will range from 3101 to 3116. For CMS-8 units, this number will range from 3101 to 3108. For more information on the Direct Connect function, please refer to Section 8.
- **Status:** The status for each TCP port.
 - ▶ If the Status Column reads "Active", this indicates that the corresponding port has accessed the CMS command mode.
 - ▶ If this telnet session is connected to a CMS RS232 Port, this column will read "C-*nn*", where "*nn*" indicates the connected RS232 Port for each Telnet session. For CMS-16 units, "*nn*" will be a number between 01 and 16. For CMS-8 units, "*nn*" will be a number between 01 and 08.
- **Password Used:** The password that was used to log-on to each Telnet session. Normally, this column will display a series of asterisks in place of each password. However, if the /SNP command option is used, this command will display the actual Port Password used for each session. Note that Supervisor Passwords are never displayed; when the /SNP option is used, this column will display "Supervisor" in place of the actual password.

```

PORT PARAMETERS #05:

 1. Port Name:          PORT_05          15. Direct Connect:  On - Password
 2. Password:          (defined)        Telnet Port:       2105
 3. Baud Rate:         9600              Raw Port:          3105
 4. Bits/Parity:      8-None
 5. Stop Bits:         1
 6. Handshake Mode:   RTS/CTS
 7. Port Mode:        Any-to-Any
 74. DTR Output:      Pulse
 8. Supervisor Mode:  Permit
 9. Logoff Character: ^X
10. Sequence Disconnect: One Character
11. Timeout Disconnect: Off
12. Response Type:    Verbose
13. Command Echo:     On
14. Accept Break:     On

```

Figure 6.4: Port Parameters Screen (RS232 Port Shown)

6.4. The Port Parameters Screens (/W)

The /W (Who) command displays more detailed information about an individual CMS port. Rather than listing connection information for all ports like the Port Status Screens, the Port Parameters screen lists all defined parameters for a specific port.

The /W command is available in both Supervisor Mode and Port (User) Mode. Note however, that when you log in with a Port password, the CMS will only display information for ports that are "owned" by the password entered at login.

The /W command can be applied to either an RS232 Port or the CMS Network Port. Figure 6.4 shows the screen that is displayed when the /W command is applied to an RS232 Port, and Figure 6.5 shows the screen displayed when the command is applied to the Network Port.

If Supervisor Mode is active, the /W command offers the option to display the Port Password for each RS232 port. Normally, the Password field will read either "defined" or "undefined", depending upon whether or not the password for that port has been specified. To display the Port Parameters Screen *with* the Port Password, type **/WP**, followed by the desired RS232 port number, and then press **[Enter]**. Note that the /WP command option is *not* available in User Mode, and will *not* display the Supervisor Password.

```

NETWORK CONFIGURATION:

NETWORK PARAMETERS
1. IP Address:          65.106.93.117
2. Subnet Mask:        255.255.255.0
3. Gateway Address:    65.106.93.97
4. IP Security         Off

TELNET PORT PARAMETERS
11. Supervisor Mode (except 2001):    Permit
12. Logoff Character:                  ^X
13. Sequence Disconnect:              One Character
14. Timeout Disconnect:               5 Min
15. Response Type:                    Verbose
16. Command Echo:                     On
17. Accept Break:                     On
18. Discard <LF> after <CR>:          Off

CMS>

```

Figure 6.5: Port Parameters Screen (Network Port Shown)

The /W command uses the following format:

/W[P] xx [Enter]

Where:

- P** Is the command option to display port passwords. Note that when this option is included (e.g. **/WP 5**), the Port Parameters Screen will display the Port Password, if defined. (Supervisor Mode Only).
- xx** is the desired port number. If the letter “N” is entered in place of a port number, the /W command will display parameters for the Network Port.

Note: When the command mode is accessed via the Network Port using a Port (User) password, the /W command will only display the Sequence Disconnect, Logoff Character, and the status of the Accept Break item.

7. Operation

7.1. Any-to-Any Mode

Any-to-Any Mode Ports can be connected to other Any-to-Any, Passive, Buffer, or Modem Mode Ports by accessing Command Mode and issuing the /C Command. All ports can be configured for the Any-to-Any Mode. Note that the Network Port is always configured for Any-to-Any Mode.

7.1.1. Port Connection and Disconnection

The CMS provides communication between devices without the requirement that both devices use the same communication parameters. This allows you to connect devices that use dissimilar baud rates, parity, handshake, and etc.. The CMS converts data rates and other parameters, eliminating the need to select common parameters for all connected devices.

7.1.1.1. Connecting Ports

Two different types of connections can be made between CMS ports; Resident Connections and Third Party Connections.

- **Resident Connections:** Your resident port issues a /C command to connect to a second port. For example, Port 4 issues the /C command to connect to Port 5.
- **Third Party Connections:** (Supervisor Mode Only) Your resident port issues a /C command to create a connection between two *other* ports. For example, Port 1 is your resident port, and Port 1 issues a command to connect Port 2 to Port 3.

Notes:

- Third Party Connections can only be initiated from a port with Supervisor Level command capability.
- The RS232 Ports cannot employ the /C command to initiate a connection to the Network Port.
- If a port has accessed Command Mode using the Port Password (User Mode), then that port will only be able to connect to other ports that share the same port password.

To Connect ports, proceed as follows:

1. Access the Command Mode.
2. Invoke the `/C` command to connect the desired ports.
 - a) **Resident Connect:** To connect your resident port to another port, type `/C xx [Enter]`. Where **xx** is the number or name of the port you want to connect. The CMS will display the numbers of the connected ports, along with the command sequence that will be required in order to disconnect the two ports.

Example: To connect your resident port to Port 8, type `/C 8 [Enter]`.

- b) **Third Party Connect:** (Supervisor Mode Only) To connect any two ports (other than your resident port), type `/C xx XX [Enter]`. Where **xx** and **XX** are two port names or numbers. The CMS will display the numbers of the two connected ports.

Example: To connect Port 5 to Port 6, invoke the following command at a port with Supervisor Level command capability: `/C 5 6 [Enter]`.

Notes:

- **Resident Connections:** RS232 Ports are *not* allowed to initiate a Resident Connection to the Network Port.
- **Third Party Connections:** RS232 Ports are not allowed to connect another port to the network port. For example, Port 1 is not allowed to connect Port 3 to the Network Port.

When the `/C` command specifies the port name, it is only necessary to enter enough letters to differentiate the desired port from other ports. Type an asterisk (*) to represent the remaining characters in the port name. For example, to connect your resident port to a port named "SALES", the connect command can be invoked as `/C S*`, providing no other port names begin with the letter "S".

7.1.1.2. Disconnecting Ports

There are three different methods for disconnecting ports, the Resident Disconnect, the Third Party Disconnect, and the No Activity Timeout. Providing the Timeout feature is enabled, a No Activity Timeout will disconnect resident ports *or* third party ports.

Note: Option 74 in the Port Parameters Menu determines how the DTR signal will react when the port disconnects. The DTR signal can either be held low, held high, or pulsed and then held high.

1. **Resident Disconnect:** Disconnects your resident port from another port. For example, if you are communicating via Port 3, and Port 3 is connected to Port 4, a Resident Disconnect would be used to disassociate the two ports. The CMS offers two different Resident Disconnect command formats; the One Character Format and the Three Character Format (for more information, please refer to Section 5.5.3.):

Note: The Resident Disconnect methods discussed here *cannot* be used to terminate a Telnet "Direct Connection" or an outbound Telnet connection. Direct Connections are terminated using the Telnet program's disconnect command, and outbound connections are terminated by invoking the ^] (Control plus Right Bracket) command. For more information, please refer to Sections 8.2 and 8.4.

- a) **One Character (Default):** When the One Character Disconnect Sequence is selected, simply enter the selected Logoff Character once (Default = ^X ([Ctrl] plus [X])). Note that it is *not* necessary to enter a carriage return before or after the Logoff Character.
- b) **Three Characters:** Uses the format “[Enter]LLL[Enter]”, where **L** is the selected Logoff Character. For example, if the Logoff Character is defined as "+", then the three character disconnect sequence would be [Enter]+++[Enter].
- c) If the default Resident Disconnect Sequence is not compatible with your application, both the command format and Logoff Character can be redefined via the Port Configuration menus, as described in Section 5.5.

2. **Third Party Disconnect:** (Supervisor Mode Only) The /D command is issued from your resident port to disconnect two third party ports. For example, if your Resident Port is Port 1, a Third Party Disconnect would be used to disconnect Port 3 from Port 4.

Note: The Third Party Disconnect method *can* be used to terminate a Telnet "Direct Connection" or an outbound Telnet connection. For more information, please refer to Section 8.2 and Section 8.4.

- a) The /D command uses the format: /D **xx** **XX** [Enter], where **xx** and **XX** are the numbers of the ports that you wish to disconnect.
- b) The /D (Disconnect) command can only be invoked by a port with access to Supervisor Level commands.
- c) The /D command can specify both connected ports, or either of the two ports. For example, if Port 1 is your resident port, any of the following commands can be used to disconnect Port 3 from Port 4:

/D 3 4 [Enter]

or

/D 3 [Enter]

or

/D 4 [Enter]

- d) The /D command can also be used to disconnect a remote user from the Network Port. This is useful in cases where a remote user has unsuccessfully disconnected via telnet, and you do not wish to wait for the CMS to timeout in order to free up the TCP port for other users. To disconnect a TCP port, type /D **Nn** and then press [Enter]. Where **Nn** is one of the CMS's available logical TCP ports (e.g. /D **N2** [Enter]). For more information, please refer to Section 8.1

-
3. **No Activity Timeout:** Providing the Timeout feature is enabled at either connected port, the No Activity Timeout can disconnect Resident Ports, *or* Third Party Ports.

Note: The No Activity Timeout also applies to Telnet "Direct Connections" and outbound Telnet connections. For more information regarding, please refer to Section 8.2 and Section 8.4.

- a) **RS232 Ports:** To configure the Timeout Feature for the RS232 Ports, invoke the /P command to display the Port Configuration Menu for the desired port as described in Section 5.5.3. Option 11 enables and defines the Timeout Feature.
- b) **Network Port:** To configure the Timeout Feature for the Network Port, invoke the /N command to display the Network Port Configuration Menu as described in Section 5.5.4. Option 15 enables and defines the Timeout Feature
- c) When the Timeout Feature is enabled, the port will automatically disconnect if no data is received for the defined Timeout Period.

Notes:

- When two connected ports time out, both ports will exit command mode after disconnecting.
- The Timeout value also applies to unconnected ports that are left in Command Mode. When an unconnected port is left in Command Mode, and no additional data activity is detected, the port will automatically exit Command Mode when its defined timeout value elapses.

7.1.2. Defining Hunt Groups

A Hunt Group creates a situation where the CMS will scan a group of ports and connect to the first available port in the group. Hunt Groups are created by assigning identical or similar names to two or more ports. Hunt Groups can be defined using Any-to-Any, Passive, Buffer, or Modem Mode Ports. Note that the Network Port *cannot* be included in Hunt Groups.

1. Access the Command Mode. If the password prompt is displayed, enter the Supervisor Password.
2. Invoke the /P command to access the Port Configuration Menu for the desired Port(s) as described in Section 5.5.3. For example, to configure Port 4, type **/P 4 [Enter]**.
3. From the Port Configuration Menu, select item 1 to define the Port Name.
4. Repeat steps 2 and 3 above to assign identical names to the other ports in the Hunt Group. For example, a series of ports in a group could all be named "SERVER".
5. To connect to the next available port in the hunt group, invoke the /C command using the port name to specify the desired group. For example, **/C SERVER [Enter]**.
6. Your port will be connected to the first available port in the group. If all ports are presently connected, the CMS will respond with the "BUSY" message.
7. It is only necessary to enter enough letters of the port name to differentiate the Hunt Group ports from other ports. Type an asterisk (*) to represent the remaining characters in the port name. For example, to connect your resident port to the first available port in a group of ports named "SALES1", "SALES2", and "SALES3", the connect command can be invoked as **/C S* [Enter]**, providing no other port names begin with the letter "S".

Hunt Group port names must be unique. Otherwise, ports with similar names will also be included in the Hunt Group.

Hunt Group Example 1:

1. Ports 1 and 2 are Modem Mode ports, and modems are installed at both ports. Port 1 is named "MODEM1" and Port 2 is named "MODEM2".
2. Your resident port is Port 4. To connect to the first available Modem, access the Command Mode and type `/C MODEM* [Enter]`.

Hunt Group Example 2:

1. Ports 3, 4, and 5 are Any-to-Any Mode ports. All three ports are named "SERVER".
2. Your resident port is Port 1, and you want to connect Port 2 to the first available server, access the Command Mode and type `/C 2 SERVER [Enter]`.

7.2. Passive Mode

Passive Mode Ports function the same as Any-to-Any Mode Ports, but do not allow access to Command Mode. A Passive Mode Port can communicate with other ports, but *cannot* enter Command Mode, and therefore cannot invoke commands to redefine port parameters, display status, and etc.

Passive Mode Ports can be connected by accessing the Command Mode from a free Any-to-Any Mode or Modem Mode Port, and invoking the Third Party Connect or Resident Connect Command as described in Section 7.1.1.2. Passive Mode ports will not buffer data, except during baud rate conversion.

Notes:

- A Passive Mode Port is not allowed to access the Command Mode.
- In order to ensure supervisor access to important command functions, the Passive Mode is not available to Ports 1 and 2 (SetUp Ports).
- The Passive Mode is not available at the Network Port.

7.3. Buffer Mode

Ports configured as Buffer Mode ports will collect data from the connected device and store it in the CMS's statically allocated memory. Each CMS port features a fixed length, fixed position data buffer.

The Buffer Mode allows collection of data from various devices without the requirement that all devices use the same communication parameters (e.g. baud rate, parity, etc.).

Notes:

- Buffer Mode Ports cannot access the Command Mode.
- In order to ensure supervisor access to important command functions, the Buffer Mode is not available to Ports 1 and 2 (SetUp Ports).
- The Buffer Mode is not available at the Network Port.

7.3.1. Reading Data from Buffer Mode Ports

To retrieve data from Buffer Mode Ports, you must first determine which port buffers contain data. To check port buffers for stored data, access the Command Mode and type `/S [Enter]` to display the Port Status Screen.

To retrieve data from buffer memory, go to a free Any-to-Any or Modem Mode Port, access the Command Mode (Supervisor Level), and issue the `/C` command using the following format:

`/C xx [Enter]`

Where **xx** is the number or name of the port buffer to be read.

If the port's buffer is empty, the CMS will send a message which reads "Connected xx, Buffer Empty"; where "xx" is the port number. If the buffer contains data, the CMS will display a prompt that offers four options:

- **Next Screen:** To scroll through data one screen at a time, press the **[Space]** bar. Each time the space bar is pressed, the next full screen of data will be sent.
- **Scroll All:** To send all data without pausing, press **[1]**.
- **Skip/Connect:** To connect to the buffer port without sending stored data, press **[2]**.
- **Erase/Connect:** To connect to the buffer port and erase stored data, press **[3]**. Note that buffered data will be erased immediately and will not be sent.

Note: All four of these options also allow pass-through communication with the device connected to the Buffer Mode port.

To clear data from the buffer, use the Erase/Connect option, or go to a free Any-to-Any or Modem Mode Port with Supervisor Level command capability, and issue the /E (Erase Buffer) command using the following format:

/E xx [Enter]

Where **xx** is the number or name of the port buffer to be cleared.

7.3.2. Port Buffers

The Status Screen lists the amount of Buffer Memory currently used by each port. The CMS uses buffer memory in two different ways, depending on the user-selected port mode.

- **Any-to-Any, Passive, and Modem Mode Ports:** When two ports are communicating at dissimilar baud rates, the buffer memory prevents data overflow at the slower port.
- **Buffer Mode Ports:** Stores data received from connected devices. The user issues a connect command (/C) from an Any-to-Any Mode or Modem Mode port to retrieve data.

If the Status Screen indicates an accumulation of data, the /E (Erase Buffer) command can be invoked to clear the buffer.

7.4. Modem Mode

In addition to allowing data transfer, the Modem Mode also provides additional functions specifically related to modem communication. A Modem Mode Port can perform all functions normally available in Any-to-Any Mode. The Modem Mode is available to all CMS ports except the Network Port.

When the Modem Mode is selected, the port configuration menu (command /P) will display three additional prompts, which allow the user to re-define the modem reset string, initialization string, and hang-up string.

When the Modem Mode is selected for a port with Supervisor Level command access, the Supervisor Password should be defined. This will discourage unauthorized access to higher command functions.

When a call is received, the unit will prompt the caller to enter a password. The CMS allows three attempts to enter a valid password. If the correct password is not entered in three attempts, or if the user does not respond to the password prompt within 30 seconds, the modem will disconnect.

The password can be defined and enabled by invoking the /P command as described in Section 5.5.

Notes:

- When a Modem Mode Port exits Command Mode, or the DCD line is lost while the Command Mode is active, the CMS will pulse the DTR line to the modem. The unit will then send the user-defined modem command strings to make certain the modem is properly disconnected and reinitialized.
- When an external modem is installed at a CMS port, other ports can use the modem for calling out. To call out, invoke the /C command to connect to the port, and then access the modem as you normally would.

8. Telnet Capabilities

8.1. Network Port Numbers

Whenever an inbound Telnet session connects to a CMS RS232 Port, or an outbound Telnet connection is initiated *from* a CMS RS232 Port, the Port Status Screen and Port Diagnostics Screen will indicate that the RS232 port is presently connected to Port "Nn" (where "N" indicates a network connection, and "n" is a number that lists the logical Network Port being used.) This "Nn" number is referred to as the logical Network Port Number.

The CMS-16 will list Network Port Numbers one through nineteen (seventeen ports reserved for inbound Telnet connections, plus two ports reserved for outbound Telnet) and the CMS-8 will list Network Port Numbers one through eleven (nine ports reserved for inbound Telnet connections, plus two ports reserved for outbound Telnet.)

In addition, both the CMS-8 and the CMS-16 include one inbound logical Network Port, where Supervisor Level commands cannot be disabled. This ensures that, providing the Supervisor Password is entered, remote administrators will always be able to access Supervisor Level commands via Telnet.

Logical Network Port Numbers for both CMS units are summarized in the tables below:

CMS-16

Network Port No.	Description
N1 - N16	Inbound Telnet Connections.
N17	Inbound Telnet Connection; Supervisor Level Command Access cannot be disabled.
N18 - N19	Outbound Telnet Connections.

CMS-8

Network Port No.	Description
N1 - N8	Inbound Telnet Connections.
N9	Inbound Telnet Connection; Supervisor Level Command Access cannot be disabled.
N10 - N11	Outbound Telnet Connections.

8.2. The Direct Connect Feature

The Direct Connect feature allows you to initiate a Telnet session with the CMS and make an immediate connection to a specific RS232 Serial Port of the users' choice, without first being presented with the command interface. This allows you to connect to a discrete TCP port mapped directly to one of the CMS RS232 Ports.

Direct Connect employs unique, pre-assigned TCP port numbers for each RS232 Port. The user connects to the RS232 Port of choice by including the associated TCP port number in the Telnet connect command line.

The Direct Connect feature can be individually configured at each CMS RS232 Port. In addition, Direct Connect allows you to communicate with the CMS using either Standard Telnet protocol, or Raw Socket Mode. Direct Connect can be used with any of the available RS232 Port modes (Any to Any, Buffer, Modem, and Passive).

8.2.1. Standard Telnet Protocol and Raw Socket Mode

The Direct Connect feature offers the option to communicate with the CMS unit using either Standard Telnet Protocol or Raw Socket Mode. The TCP Port number included in the Telnet connect command line determines which protocol is used.

When Standard Telnet Protocol is used, the CMS will respond to all IACs. When Raw Socket Mode is used, data is always sent "As Is", and command echo is always enabled.

Note: Telnet ports 23, 2001, and 3001 allow normal access to the CMS command mode. However, port 3001 will transfer data using raw socket mode.

8.2.2. Configuration

The Direct Connect Function is configured on a per port basis using the RS232 Port Configuration Menus (**/P nn**), item 15, "Direct Connect". The following options are available:

1. **Direct Connect OFF:** Direct Connect disabled at this RS232 Port. (Default)
2. **Direct Connect ON - NO PASSWORD:** The Direct Connect feature is enabled at this port, but no password is required in order to connect to the port.
 - a) When the Telnet connection is established, the user is immediately connected directly to the specified port, and the client is notified at the TCP level.
 - b) This option is intended for situations where security is provided by the attached device.
3. **Direct Connect ON - PASSWORD:** The Direct Connect feature is enabled at this port, but the user must enter a password before a Direct Connection is established with this port.
 - a) Upon login, the CMS will send a message which lists the Site ID Message, the number and name of this port, and the TCP Port number that was entered in order to initiate the connection.
 - b) The CMS will prompt the user to enter a password. If a valid User password or Supervisor password is entered, the CMS will then return a message that confirms the connection and again lists the name and number of this port.
 - c) If a valid User password or Supervisor password is not entered in 30 seconds or three attempts, the port will then timeout and disconnect.

Notes:

- Password protection for the Direct Connect feature will only function if the Supervisor Level Password has been defined (see Section 5.4.)
- If the Supervisor Mode has been disabled at the Network Port (Network Configuration Menu, Item 11 = "Deny"), then the Port Password must be entered in order to establish a connection to this port. If the Port Password is not defined, the connection will be refused.
- If the Supervisor Mode is enabled at the Network Port (Network Configuration Menu, Item 11 = "Permit"), then either the Supervisor Password or the Port Password may be entered in order to establish the direct connection.

8.2.3. Connecting to an RS232 Port using Direct Connect

The Direct Connect TCP port numbers are as follows:

1. **Standard Telnet Connections:** When standard Telnet Protocol is used, the CMS will respond to all IACs.
 - a) **CMS-8 Units:** TCP port numbers 2101 through 2108 correspond to RS232 Ports 1 through 8 respectively.
 - b) **CMS-16 Units:** TCP port number 2101 through 2116 correspond to RS232 Ports 1 through 16 respectively.
2. **Raw Socket Mode Connections:** When Raw Socket Mode is used, data is always sent "As Is", and command echo is always enabled.
 - a) **CMS-8 Units:** TCP port numbers 3101 through 3108 correspond to RS232 Ports 1 through 8 respectively.
 - b) **CMS-16 Units:** TCP port numbers 3101 through 3116 correspond to RS232 Ports 1 through 16 respectively.

When establishing a Direct Connection to RS232 Port "x", the corresponding TCP port number must be used. If conditions are acceptable (e.g. Target RS232 Port must be free and properly configured), an immediate connection will be made, with one possible exception; password entry may first be required depending on current password configuration settings.

Note: When a Direct Connect attempt fails because the RS232 Port is busy, the call is immediately rejected at the TCP level.

Connection Example

1. Assume that Port 8 has been configured as described in Section 8.2. If the IP address for the CMS unit is "1.2.3.4", and you wish to establish a standard Telnet protocol connection with CMS port 8 (TCP Port Number 2108), then on a UNIX system, the connect command would be invoked as follows:

```
$ telnet 1.2.3.4 2108 [Enter]
```

2. When the Telnet connect command is sent, the CMS will respond as follows:
 - a) The CMS will send the site ID, RS232 Port Number and Name, Telnet Port number and the Password Prompt (if required) as shown below:

```
CMS: [site id]
```

```
Port: [RS232 Port number and name]
```

```
Telnet Port: 21XX or 31XX (Where XX = the  
RS232 Port No.)
```

```
Enter Password: (if required)
```

- b) Once a connection is established, the "Connected" message is sent, and the cursor returns to the left hand side of the screen.

8.2.4. Terminating a Direct Connect Session

To terminate a Direct Connect session, use the client Telnet program's "disconnect" feature. The following will occur immediately upon a client initiated disconnect:

1. The Network port is disconnected from the RS232 Port.
2. The Network session is terminated.
3. The RS232 Port is put to sleep.

Notes:

- The Sequence Disconnect Command, which is defined via the Port Configuration menus (CMS User's Guide, Section 5.5) *cannot* be used to terminate a Direct Connection.
- Any CMS port that has accessed the Command Mode using the Supervisor Level Password *can* terminate a direct connection at another port by issuing the /D command as described in Section 7.1.1.2.
- Acknowledgment of data received by the CMS network port does not indicate that the data has been completely sent out the serial port. Data may still be queued in the CMS buffers. Any data queued in the CMS at the time of a client initiated disconnect is discarded, and is not passed through to the attached device.

8.3. Inbound Telnet Connections

The CMS-16 will support up to seventeen simultaneous inbound Telnet connections; the CMS-8 will support up to nine simultaneous inbound Telnet connections.

8.4. Outbound Telnet Connections

The CMS allows you to initiate a maximum of two simultaneous outbound Telnet sessions from the CMS Command Mode. This feature is available in both the Supervisor Mode and User Mode.

8.4.1. Password Protection

In order to restrict User level access to the outbound Telnet function, a password can be defined via the Network Port Configuration Menu (/N), Item 19. Note that if this password is not defined, then only the Supervisor Mode will be able to initiate an outbound Telnet connection.

The outbound Telnet password can either be set to match a User Mode password, or it can be different from existing User Mode passwords.

- If the outbound Telnet password is the same as a User Mode password, then only that user (and the Supervisor) will be allowed to initiate an outbound Telnet connection.
- If the outbound Telnet password is different from all User Mode passwords, then any user can initiate an outbound Telnet connection, but they must first logoff from the CMS command mode, and then re-login using the currently defined Outbound Telnet password.

Note also, that there is no separate prompt for the Outbound Telnet Password; the Outbound Telnet function is only available when either the Supervisor Password or Outbound Telnet Password is entered when you login to the CMS Command Mode.

8.4.2. Command Syntax

When an outbound Telnet session is initiated, the following command syntax is used:

```
/TELNET <ip_address> [port] [RAW]
```

Where:

ip_address is the desired IP address (required.)
port is the desired port number
(optional, default = 23.)
RAW initiates the Telnet connection in Raw
Socket Mode (optional, default = standard
Telnet mode.)

Notes:

- The outbound Telnet command is always available when you have accessed the CMS command mode using the Supervisor level password.
- An outbound Telnet connection cannot be initiated by a user who has accessed the CMS command mode via an inbound Telnet connection.
- Outbound Telnet connections do not reduce the number of available inbound network connections.

8.4.3. Terminating an Outbound Telnet Session

The CMS offers three different ways to terminate an outbound Telnet session: the "^]" command, the "/D" command, and the network port timeout disconnect feature.

1. **The ^] Command:** (User Mode and Supervisor Mode) To terminate an outbound Telnet connection that you initiated at your network node, type ^] (press the Control Key plus the right bracket key) and then press [Enter].
2. **The /D Command:** (Supervisor Mode Only) To terminate an outbound Telnet connection that was initiated at another CMS RS232 port, access the CMS command mode using the Supervisor Level password (either from another CMS RS232 port, or via the Network Port), and then type:

```
/D [/Y] <x> [x] [Enter]
```

Where:

- /Y (Optional) suppresses the "Sure?" prompt.
 - x Is the number or name of the desired CMS port(s) or the "Nn" format Network Port Number (see Section 8.1) for the Telnet session that you wish to terminate.
3. **Timeout Disconnect:** The CMS Network Port's timeout disconnect feature will also terminate an outbound Telnet session. Providing that the Timeout Disconnect feature is enabled, outbound Telnet sessions will be automatically terminated If the CMS determines that no data has been transferred for the duration of the currently defined timeout period. The timeout disconnect feature is configured and enabled via the Network Port Configuration Menu (N) as described in Section 5.5.4.

Note: Although this feature can only be configured and enabled from the Supervisor mode, the Timeout Disconnect will be applied to outbound Telnet sessions that were initiated from the Supervisor Mode, and outbound Telnet sessions that were initiated from the User Mode.

9. Saving and Restoring Configuration Parameters

After the CMS has been properly configured, parameters can be downloaded and saved as an ASCII text file. Later, if the configuration is accidentally altered, the file with the saved parameters can be uploaded to automatically reconfigure the unit without the need to manually assign each parameter.

Saved parameters can also be uploaded to other CMS units. This allows rapid set-up when several units will be configured with the same parameters.

The “Save Parameters” procedure can be performed from any terminal emulation program (e.g. HyperTerminal, ProComm, etc.), that allows downloading of ASCII files.

9.1. Sending Parameters to a File

1. Start your terminal emulation program (e.g. HyperTerminal) and access the CMS Command Mode. If the password prompt is displayed, enter the Supervisor Password.
2. When the CMS command prompt appears, type **/U** and press **[Enter]**. The CMS will prompt you to configure your terminal emulation program to receive an ASCII download.
 - a) Set your terminal emulation program to receive an ASCII format download, and specify a name for a file that will receive the saved parameters (e.g. CMS.PAR).
 - b) Disable the Line Wrap function for your terminal emulation program. This will prevent command lines from being broken in two during transmission.
3. When the terminal emulation program is ready to receive the file, return to the CMS Save Parameter File menu, and press **[Enter]** to proceed with the download. CMS parameters will be saved on your hard drive in the file specified in Step 2 above.

4. The CMS will send a series of ASCII command lines which specify the currently selected CMS parameters. The last line of the file should end with a “/G-00” command. When the download is complete, press [Enter] to return to the "CMS>" command prompt.

9.2. Restoring Saved Parameters

This section describes the procedure for using your terminal emulation program to send stored parameters to the CMS.

1. Start your terminal emulation program and access the CMS Command Mode; if the password prompt is displayed, enter the Supervisor Password.
2. Configure your terminal emulation program to upload an ASCII text file.
3. Upload the ASCII text file with the saved CMS parameters. If necessary, key in the file name and directory path.
4. Your terminal emulation program will send the ASCII text file to the CMS. When the terminal program is finished with the upload, make certain to terminate the Upload mode.

Notes:

- If the CMS detects an error in the parameters file, it will respond with the “Invalid Parameter” message. If an error message is received, carefully check the contents of the parameters file, correct the problem, and then repeat the Upload procedure.
 - When the configuration file is sent to the CMS via Telnet, the IP Address, Subnet Mask, and Gateway Address will not be changed until all Telnet connections to the unit are terminated (including the connection that was used to send the saved parameters file.)
5. If the parameter upload procedure is successful, the CMS will send a confirmation message, and then return to the "CMS>" command prompt. Type /S and press [Enter], the CMS Status Screen will be displayed. Check the Status Screen to make certain the unit has been configured with the saved parameters.

10. Upgrading CMS Firmware

When new, improved versions of the CMS operating firmware become available, the “Upgrade Firmware” function can be used to update the CMS unit. Updates can be uploaded via Setup Ports One and Two, or via the Network Port.

Note:

- All other ports will be disabled during the firmware upgrade procedure.
 - If the upgrade includes new parameters or features which were not included in the previous firmware version, these new parameters will be set to their default values.
1. Obtain the update file. Firmware modifications can either be mailed to the customer on a 3.5" diskette, or downloaded from WTI via modem. Place the diskette in your diskette drive and/or copy the file to your hard drive.
 2. Access the CMS command mode. If the password prompt is displayed, key in the Supervisor Password. The Upgrade Firmware feature is only available in Supervisor Mode.
 3. When the CMS command prompt appears, type **/UF** and then press **[Enter]**. The CMS will display a screen which offers the following options:
 - a) **Continue Upload and Keep Current Parameters:** To proceed with the upgrade, while retaining current, user-defined parameters, type **1** and press **[Enter]**. All parameter settings will be restored when the upgrade is complete.
 - b) **Continue Upload and Default System:** To proceed with the upgrade, and reset parameters to default settings, type **2** and press **[Enter]**. When the upgrade is complete, all parameters will be set to default values.

Note: When the upgrade is performed via the Network Port, the CMS will *not* default the IP Address, Subnet Mask, or Gateway Address. This allows the telnet connection to be reestablished after the upgrade procedure is complete.

- c) **Abort Upload:** To cancel the upgrade and return to the command prompt, type **3** and press **[Enter]**.
4. Use your communication program's (e.g. HyperTerminal's) upload function to transfer the upgrade firmware to the CMS unit. Select ASCII file format, and then specify the filename and directory location where the firmware upgrade file resides.

Note: The Upload function will time-out after one minute of inactivity. If the function times out, type **1** and press **[Enter]** to continue, or press **[Esc]** to abort.
5. If the upload is successful, the CMS will prompt the user to continue the upgrade or abort.
 - a) **Upgrade:** To continue with the upgrade, type **1** and press **[Enter]**. CMS will erase the previous firmware, move new firmware from data flash to program flash memory, calculate and store the new checksum, and reboot. Do not attempt to reconnect to the CMS until the RDY indicator blinks to indicate the process is complete.
 - b) **Abort:** To abort the procedure, type **2** and press **[Enter]**.
6. **Incomplete Upload:** If the upload is interrupted, times-out, or if the file is corrupted during transfer, the CMS will display a screen which asks for user confirmation before proceeding. To proceed, type **1** and press **[Enter]**, then return to Step 4 above.
7. **Emergency Recovery:** In the rare event that the CMS operating system becomes corrupted during installation, front panel indicators will blink five times and the unit will automatically switch to Emergency Recovery Mode. Please contact WTI Customer Service for further instructions.

When firmware upgrades are available, WTI will provide the necessary files via modem or mailed diskette. At that time, an updated Users Guide or addendum will also be available.

11. Command Reference Guide

11.1. Command Conventions

The commands described in this section conform to the following conventions:

- **Slash Character:** Most CMS commands begin with the Slash Character (/).
- **Apply Command to All Ports:** When the asterisk character is entered as the argument of the /D command (Disconnect Port), or the /E command (Erase Buffer) the command will be applied to all ports. For example, to erase all port buffers, type /E * [Enter].
- **Port Name Wild Card:** It is not always necessary to enter the entire port name. Port names can be abbreviated in command lines by entering the first character(s) of the name followed by an asterisk (*). For example, a port named "SERVER" can be specified as "S*". Note however, that this command would also be applied to any other port name that begins with the letter "S".
- **Suppress "Sure?" Prompt:** When the /D (Disconnect Port), /E (Erase Buffer), or /I (Default and Test Unit) commands are invoked, the /Y option can be included in the command line to override the "Are you Sure (y/n)?" prompt. For example, to disconnect Port 8 without displaying the "Sure?" prompt, type /D/Y 8 [Enter].
- **Enter Key:** All commands are invoked by pressing [Enter].
- **Command Mode:** CMS Ports will only recognize commands when the Command Mode has been activated. The Command Mode can be accessed from a free Any-to-Any or Modem Mode Port. To access the Command Mode, proceed as described in Section 5.1.
- **Connected Ports:** When two ports are connected, most CMS commands will not be recognized by either of the connected ports. The only exception is the Resident Disconnect Sequence (Default = ^X ([Ctrl] plus [X])).
- **Configuration Menus:** To exit from a configuration menu, you must press [Esc].

11.2. Command Response

When commands are sent to the CMS, the unit can respond with either verbose (English Text) or terse messages (numeric / abbreviated). The default message type for all ports can be set to either terse or verbose using Option Switch Six.

After the unit is installed and configured, the port configuration commands (/P and /N) can specify an individual response format for each port. In addition to the Terse and Verbose response modes, the port configuration commands can also select the Quiet Mode. When the Quiet Mode is selected, the port will *not* send messages in response to commands.

The table below summarizes the various response messages for both the Terse and Verbose modes.

Terse	Verbose
0	OK
0	RAM Test Passed
1	Connected *
2	Busy
3	Disconnected
4	Invalid Command
5	Are You Sure (Y/N) ?
6	Invalid Parameter
7	Invalid Syntax
8	Invalid Access
9	Enter Site ID:
A	Aborted
B	Enter Password:
C	Invalid Password
D	RAM Test Failed at *
E	Inactivity Timeout, Disconnected
F	Data in Buffer from Previous Connection ... Re-Enter Logoff Sequence to Purge Buffer.
G	Asleep

* These verbose Response Messages include additional information not provided by terse Response Messages.

11.3. Command Summary

Function	Command Syntax	Command Availability	
		Supervisor	User
Exit Command Mode	/X [Enter]	X	X
Help Menu	/H [Enter]	X	X
Display Site ID	/J [Enter]	X	X
Display Port Status	/S[P] [Enter]	X ^❶ ^❷	X ^❶
Display Port Diagnostics	/SD [Enter]	X ^❶	X ^❶
Display Network Status	/SN[P] [Enter]	X ^❸	
Display Port Parameters (Who)	/W[P] [n] [Enter]	X	X ^❹
Set System Parameters	/F [Enter]	X	
Set Network Port Parameters	/N [Enter]	X	
Set RS232 Port Parameters	/P <x> [Enter]	X	
Copy RS232 Port Parameters	/CP [Enter] /CP [x,y,z] [Enter] /CP [x-z] [Enter]	X	
Connect	/C <x> [x] [Enter]	X	X ^❺
Resident Disconnect ^❻	^X	X	X
Third Party Disconnect ^❼	/D[/Y] <x> [x] [Enter] /D[/Y] * [Enter] /D Nn [Enter] ^❸	X	
Erase Buffer	/E[/Y] <x> [x] [Enter] /E[/Y] * [Enter]	X	
Reset Network Port	/T [Enter]	X	
Default & Test	/I[/Y] [Enter]	X	
Outbound Telnet	/TELNET <IP> [port] [raw] [Enter]	X	X ^❾
Save Parameters	/U [Enter]	X	
Upgrade Firmware	/UF [Enter]	X	

- ❶ Supervisor Mode displays parameters for all ports; User Mode only displays parameters for ports allowed by the Port Password.
- ❷ To display Port Passwords, include the "P" Option. (Supervisor Only).
- ❸ For the /SN command only, the "P" Option will display the passwords that were used to login to the CMS Network Port.
- ❹ A port with "User" command capability can only view its own parameters. A User Port *cannot* view parameters for other ports.
- ❺ A User Port *cannot* perform a Third Party Connect.
- ❻ Resident Disconnect: Disconnects your resident port from another port. The disconnect sequence can be redefined via the Port Configuration Menus.
- ❼ Third Party Disconnect: Disconnects two or more nonresident ports. Must be issued from a third port with Supervisor command capability.
- ❸ Disconnects a TCP Port, where Nn is the desired CMS TCP Port.
- ❾ Only available in User Mode if the User (port) password matches the Outbound Telnet Password, or if the User logs in using the Outbound Telnet Password.

11.4. Command Set

This Section provides more detailed information on all CMS commands, sorted alphabetically by command.

[Enter] Enter Command Mode

In order to set parameters or connect ports, you must first access the command mode as described in Section 5.1. When the Command Mode is inactive (port asleep), the port will only respond when the **[Enter]** key is pressed without any characters preceding it. If the Supervisor Password (command /F) has been defined, the unit will require a password before allowing access to Command Mode.

Availability: Supervisor / User

Format: **[Enter]** (Press **[Enter]** twice if other characters have already been typed).

Response: The Port Status Screen will be displayed, followed by the "CMS>" command prompt.

^X Resident Disconnect Sequence

The Resident Disconnect Sequence is issued to disconnect your resident port from another port. For example, if you are communicating via Port 3, and Port 3 is connected to Port 4, the Resident Disconnect Sequence would be used to disconnect Port 3 from Port 4. Although the default Resident Disconnect Sequence is **^X** (**[Ctrl]** plus **[X]**), the command format and Logoff Character can also be redefined via the Port Configuration Menus as described in Section 5.5.3. Note that a three character disconnect command can also be selected.

Note: The Resident Disconnect Sequence *cannot* be used to terminate a telnet "Direct Connection" or outbound Telnet connection. For more information, please refer to Section 8.

Availability: Supervisor / User

Format (Default): **^X**

Response:

Verbose: The CMS will send the "Disconnected" message, followed by the Port Status Screen.

Terse: 3

/C Connect

Establishes a bi-directional connection between two ports. For more information and command line examples, please refer to Section 7.1. There are two different types of port connections:

- **Resident Connect:** If the /C command specifies one port name or number, your resident port will be connected to the specified port.
- **Third Party Connect:** If the /C command specifies two port names or numbers, the unit will connect the two ports indicated. A Third Party Connect command must be issued from a third port with “Supervisor” command capability. “User” ports *cannot* initiate a Third Party Connect.

Notes:

- Ports with “User” command capability can only connect to ports that share the same Port Password.
- Ports with “Supervisor” command capability are allowed to connect to all other ports.
- RS232 Ports are not allowed to create a Third Party connection to the Network Port. For example, Port 1 *cannot* connect Port 3 to the Network Port.

Availability: Supervisor / User

Format: /C <x> [x] [Enter]

Where **x** is the number or name of the port(s) to be connected.

Response:

Verbose: Connected **xx**, when a Resident Connection is initiated, the CMS will also display the currently selected Resident Disconnect Sequence for your port.

Terse: 1

/CP Copy RS232 Port Parameters

Allows quick set-up when all or several CMS RS232 ports will be configured with similar parameters. When the /CP command is invoked, the CMS will display a menu that is used to select common port parameters, which can then be copied to all CMS RS232 ports. For more information and other command options, please refer to Section 5.6.

Availability: Supervisor Only

Format: /CP [Enter]

Response: Displays Copy Parameters Menu

/D Third Party Disconnect

Invoke the /D command at your resident port to disconnect two other ports. The /D command cannot be used to disconnect your resident port. To disconnect your resident port, issue the Resident Disconnect Sequence.

Availability: Supervisor Only

Format: /D [/Y] <x> [x] [Enter]

Where:

/Y (Optional) suppresses the "Sure?" prompt.

x Is the number or name of the port(s) to be disconnected. To Disconnect all ports, enter an asterisk. To disconnect a Telnet session, enter the "Nn" format Network Port Number (see Section 8.1).

Response:

Verbose: "Are you Sure (y/n)?", if Y, unit will respond with "Disconnected".

Terse: 5, if Y, unit will respond with 3.

Example: To disconnect Port 2 from Port 3 without the "Sure?" prompt, access the Command Mode from a third port with "All" command capability and type one of the following commands:

/D/Y 2 [Enter] or /D/Y 3 [Enter]

/E Erase Buffer

Erases data from the buffer for a specified port or several ports. Note that erased data *cannot* be recovered.

Availability: Supervisor Only

Format: /E [/Y] <x> [x] [Enter]

Where:

x is the number or name of the port buffer(s) to be cleared. To erase buffers for all ports, enter an asterisk.

/Y (Optional) Suppresses the "SURE? (Y/N)" prompt.

Response:

Verbose: "Are You Sure (y/n)?", if Y, the unit will respond with "OK".

Terse: 5, if Y, the unit will respond with 0.

Example: To clear the buffer for Port 3, access the Command Mode from a port with "All" command capability, and type /E 3 [Enter].

/F Set System Parameters

Displays a menu which is used to define the Site ID message and Supervisor Password. When the Supervisor Password is defined, the CMS will display a password prompt before allowing access to command mode. For more information, refer to Section 5.4.

Note: Make certain to record your Supervisor Password for future reference. If the Supervisor Password is lost or forgotten, you will not be able to access Supervisor Level commands.

Availability: Supervisor Only

Format: /F [Enter]

Response: Displays System Parameters Menu

/H Help

Displays a Help Screen, which lists all CMS commands along with a brief description of each command.

Availability: Supervisor / User

Format: /H [Enter]

Response: Displays Help Screen. Note that the User Level Help Screen does not include Supervisor Level Commands.

/I Default and Test

Tests internal memory and initializes the unit with the default parameters specified by the Option Switches.

CAUTION: When /I is invoked, the CMS will revert to the parameters specified by the Option Switches. Command selected parameters will be lost.

Availability: Supervisor Only

Format: /I [/Y] [Enter]

Where /Y is a command option used to suppress the "Sure?" prompt.

Response:

Verbose: "Are You Sure (y/n)?", if Y, memory test and initialization begins.

Terse: 5, if Y, memory test and initialization begins.

/J Display Site ID

Displays the user-defined Site I.D. message.

Availability: Supervisor / User

Format: /J [Enter]

Response: Displays Site I.D. Message

/N Set Network Port Parameters

Displays a menu which is used to define communication parameters for the Network Port. Also allows access to the IP Security function, which can be used to restrict network access by unauthorized IP addresses. For more information on selecting network parameters, please refer to Section 5.5.4.

Availability: Supervisor Only

Format: /N [Enter]

Response: Displays Network Parameters Menu

/P Set RS232 Port Parameters

Displays a menu which allows the user to select options and parameters for the selected RS232 port. Section 5.5.3 describes the procedure for defining port parameters.

Availability: Supervisor Only

Format: /P [x] [Enter]

Where **x** is the number or name of the port to be configured. If the port number or name is not specified, the CMS will display the configuration menu for your resident port.

Response: The Port Parameters Menu is displayed.

/S Display Port Status

Displays the Port Status Screen, which lists current conditions and parameters for all ports. Normally, the Port Status Screen will not display Port Passwords; the Password column will read either “defined” or “undefined”, depending upon whether or not the password for each port has been specified. When the Supervisor Mode is active, the /SP command offers the option to either display or suppress Port Passwords. For more information on the Port Status Screen, please refer to Section 6.1.

Availability: Supervisor / User

Format: /S[P] [Enter]

When the “P” option is included (e.g. /SP), the Port Status Screen will list the password for each port, if defined.
(Supervisor Mode Only).

Response: Displays Port Status Screen

/SD Display Port Diagnostics

Provides more detailed information regarding the operational status of each port. Note that in User Mode, this screen will only display parameters for the ports that are allowed by the Port Password that was entered at log in. For More information on the Port Diagnostics Screen, please refer to Section 6.2.

Availability: Supervisor / User

Format: /SD [Enter]

Response: Displays Port Diagnostics Screen

/SN Display Network Status

Displays the Network Status Screen, which lists current conditions and parameters for the Network Port. For more information on the Network Status Screen, please refer to Section 6.3.

Availability: Supervisor Only

Format: /SN[P] [Enter]

When the “P” option is included (e.g. /SNP), the Network Status Screen will list the passwords that were entered by each telnet connection when they logged in to the Network Port.

Response: Displays Network Status Screen

/T Reset Network Port

Resets the NIC card, and breaks the network connection to the unit. Note that when this command is invoked, the network connection will be reset without warning, and must then be reestablished in order to communicate with the unit via Network.

Availability: Supervisor Only

Format: **/T [Enter]**

Response: None (NIC Card is reset, Network Connection is broken)

/TELNET Outbound Telnet

Initiates an outbound telnet session from the CMS command mode. For more information on outbound Telnet connections, please refer to Section 8.4.

Availability: Supervisor/User

Format: **/TELNET <ip> [port] [raw] [Enter]**

Where:

- ip** is the target IP address (required.)
- port** is the desired TCP port number (optional, default = 23.)
- raw** initiates the Telnet connection in Raw Socket Mode (optional, default = standard Telnet mode.)

Example: To establish an outbound Telnet connection to a device at the IP address "1.2.3.4", port 2001, using raw socket mode, access the CMS command mode using either the Supervisor password or currently defined outbound Telnet password, and type **/TELNET 1.2.3.4 2001 raw [Enter]**.

/U Save Parameters

Sends CMS configuration parameters to an ASCII text file as described in Section 9.

Availability: Supervisor Only

Format: **/U [Enter]**

Response: The CMS will send a series of command lines.

/UF Upgrade Firmware

When new versions of the CMS operating firmware become available, this command is used to update the existing firmware as described in Section 10. Note that this command will only function at the Network Port and at Setup Ports One and Two.

Availability: Supervisor Only

Format: **/UF [Enter]**

Response: The CMS will display a menu which offers the options to retain existing CMS parameters, default parameters, or abort the upgrade procedure.

/W Display Port Parameters (Who)

Displays configuration of an individual port, but does not allow the user to change parameters. Ports with User Level command capability cannot display parameters for other ports. Normally, the Port Parameters screen will not include the Port Password. Note however, that when the Supervisor Mode is active, the **/WP** option can be used to display the password for the target port. For more information, please refer to Section 6.4.

Availability: Supervisor / User

Format: **/W[P] [x] [Enter]**

Where:

- P** When the “**P**” option is included (e.g. **/WP 5**), the Port Parameters screen will list the password for each port, if defined. Note that the Supervisor Password will not be displayed. (Supervisor Mode Only).
- x** Is the port number or name. To display parameters for the Network Port, enter an “**N**”. If the “**x**” argument is omitted, parameters for your resident port will be displayed.

Note: In Port (User) Mode only, if the **/W** command is applied to the Network Port, the Port Parameters Screen will only list the setting for the Sequence Disconnect, the selected Logoff Character, and the status of the Accept Break option.

Response: Displays port parameters.

Example: To display parameters for a port named "SERVER", access the Command Mode from a port with Supervisor Level command capability, and type **/W SERVER [Enter]**.

/X Exit Command Mode

Exits Command Mode, When issued at the Net Port, also ends the telnet session. Note that exiting from Command Mode will not terminate port connections.

- **Any-to-Any Mode:** Exits Command Mode.
- **Modem Mode:** Disconnects and resets modem, hang-up message is sent, hardware line to modem drops for 500 ms, and reset message is sent.

Availability: Supervisor / User

Format: /X [Enter]

Response: Disconnected

A. RS232 Port Interface

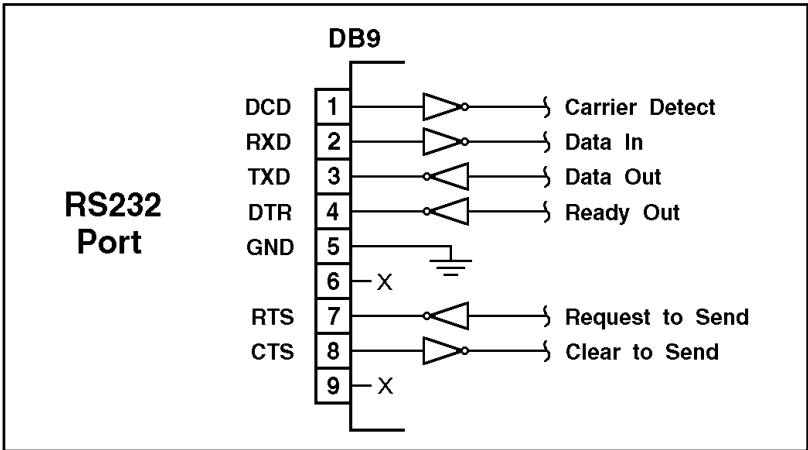


Figure A.1: RS232 Port Interface

DCD and DTR hardware lines function as follows:

1. When connected:
 - a) If either port is set for Modem Mode, the DTR output at either port reflects the DCD input at the other end.
 - b) If *neither* port is set for Modem Mode, DTR output is held high (active).
2. When not connected:
 - a) If the port is set for Modem Mode, upon disconnect DTR output is pulsed for 0.5 seconds and then held high.
 - b) If the port is *not* set for Modem Mode, DTR output is controlled by the DTR Output option (Parameters Menu, Option 74). Upon disconnect, Option 74 allows DTR output to be held low, held high, or pulsed for 0.5 seconds and then held high.

B. Specifications

Network Interface: 10Base-T Ethernet, RJ45,
multi-session telnet.

RS232 Port Interface:

Model CMS-16: 16 RS232 serial inputs use DB9 connectors configured as DTE ports.

Model CMS-8: 8 RS232 serial inputs use DB9 connectors configured as DTE ports.

Data Rate: 300 to 115.2K bps (all standard rates).

Coding: Asynchronous, 7/8 bits ASCII, Even, Odd, No Parity, 1, 2 Stop Bits.

Flow Control: XON/XOFF, RTS/CTS, Both, or None.

Timeout: No activity timeout disconnects port. 1, 5, 10, 15, 30 seconds, 1, 5, 15, 30, 90 minutes.

Memory: Stores Parameters and captured data. Non-volatile 512K SRAM buffer memory. Statically allocated.

Break: Send or Inhibit Break

Option Switch: 8 position DIP switch, selects default settings for baud rate, flow control, response message format, and command echo .

LEDs: Power On, Ready, Net, Data Activity for Ports 1-16 (CMS-16) or Ports 1 - 8 (CMS-8).

Operating Temperature: 0°C to 45°C (32°F to 113°F)

Power:

AC Version: IEC-32 Inlet, 115/230 VAC, 50/60 Hz, 5 watts

DC Version: Terminal Strip (#6-32), -48 VDC, 0.2 Amp Max.

Size:

Model CMS-16: 2.8" (7.1 cm) x 17" (43.2 cm) x 6.8" (17.3 cm) (H x W x D)

Model CMS-8: 1.75" (4.4 cm) x 17" (43.2 cm) x 6.8" (17.3 cm) (H x W x D)

Weight: 8 lbs. shipping weight

Humidity: 10 to 90% RH, Non-Condensing

Venting: Side vents are used to dissipate heat generated within the unit. When mounting the unit in an equipment rack, make certain to allow adequate clearance for venting.

C. Customer Service

Customer Service hours are from 8:00 AM to 5:00 PM, PST, Monday through Friday. When calling, please be prepared to give the name and make of the unit, its serial number and a description of its symptoms. If the unit should need to be returned for factory repair it must be accompanied by a Return Authorization number from Customer Service.

WTI Customer Service
5 Sterling
Irvine, California 92618

Local Phone: (949) 586-9950
Toll Free Service Line: 1-888-280-7227
Service Fax: (949) 457-8138

Email: service@wti.com

Trademark and Copyright Information

WTI and Western Telematic are trademarks of Western Telematic Inc.. All other product names mentioned in this publication are trademarks or registered trademarks of their respective companies.

Information and descriptions contained herein are the property of Western Telematic Inc.. Such information and descriptions may not be copied, disseminated, or distributed without the express written consent of Western Telematic Inc..

© Copyright Western Telematic Inc. 2002.
Printed in the United States of America.

April, 2002
Part Number: 13027, Revision: F

Trademarks Used in this Manual

HyperTerminal is a registered trademark of Hilgraeve, Inc.
ProComm and ProComm Plus are registered trademarks of
Datastorm Technologies, Inc.

Index

#			
100BaseT Networks	2-2, 4-5		
A			
Accept Break	5-13, 5-18		
ACTIVITY Indicator	2-1		
Any-to-Any Mode	5-7, 5-10, 7-1 to 7-6		
Application Example	4-6 to 4-7		
Asterisk Character	11-1		
B			
Back Panel Components	2-2		
Baud Rate			
Default	4-3		
Port	5-9		
Bits / Parity	5-9		
Breaks	5-13, 5-18		
Buffer Memory	7-8		
Buffer Mode	5-7, 5-10, 7-8 to 7-9		
Buffered Data	7-8 to 7-9, 11-6		
C			
Cables	4-5		
Carriage Returns	5-18		
Clear Buffer	7-9, 11-6		
CLEAR Button	2-1, 4-4		
Command Conventions	11-1		
Command Echo	5-13, 5-17		
Default	4-4		
Command Help	11-7		
Command Mode	11-1 to 11-7		
Access	5-1		
Exit	11-12		
Local Access	5-1		
Modem Access	5-1		
Network Access	5-2		
Command Response	5-13, 11-2		
Default	4-4		
Configuration	5-1 to 5-23		
Restore	9-2		
Save	9-1		
Connect			
Resident	7-2		
Third Party	7-2		
Connect Command		11-5	
Connecting Devices		4-5	
Connecting Ports	7-1 to 7-2, 11-5		
Copy Parameters	5-21 to 5-23, 11-5		
Customer Service		Apx-3	
D			
DC Power Input		4-2	
DCD Signal		Apx-1	
DCE Devices			
Installation		4-5	
Default			
Baud Rate		4-3	
Command Echo		4-4	
Handshake		4-3	
Response Message		4-4	
Default and Test		11-7	
Default Parameters		2-3	
DIP Switches		2-3	
Direct Connect	5-14, 8-2 to 8-6		
Configuration		8-3	
Password		5-14	
Terminating		8-6	
Disconnect			
Resident		7-3	
Third Party		7-4	
Disconnect Sequence	5-11 to 5-12, 7-3, 11-6		
One Character		5-12	
Three Character		5-12	
Disconnecting Ports	7-3, 7-5, 11-4, 11-6		
Telnet Port		7-4	
Discrete TCP Port	5-14, 8-2 to 8-6		
Display Port Parameters		11-11	
Displaying Port Passwords	6-2, 6-7, 11-9, 11-11		
Download Parameters		9-1 to 9-2	
DTE Devices			
Installation		4-5	
DTR Output	5-10, 7-3, Apx-1		
Duplex Mode	4-4, 5-13, 5-17		

E		N	
Emergency Recovery Mode	10-2	NET Indicator	2-1
Erase / Connect	7-9	Network Port	2-2, 5-2, 7-1 to 7-2, 11-8
Erase Buffer	7-9, 11-6	Accept Break	5-18
Exit Command Mode	11-12	Command Echo	5-17
Exit Without Copy	5-23	Configuration	5-15
F		Gateway Address	5-16
Firmware Upgrade	10-1 to 10-2, 11-11	IP Address	5-16
Flow Control	4-3, 5-9	IP Security	5-16
Front Panel Components	2-1	Logoff Character	5-16
G		Reset	11-10
Gateway Address	5-16, 11-8	Response Type	5-17
H		Sequence Disconnect	5-17
Handshake	5-9	Status	11-9
Default	4-3	Subnet Mask	5-16
Hang-Up String	5-11	Supervisor Mode	5-16
Help Screen	11-7	Timeout Disconnect	5-17
Hunt Groups	7-6	Network Port Numbers	8-1
I		Network Status Screen	6-5
Inbound Telnet Connection	8-6	Next Screen	7-9
Initialization	2-1, 4-4	No-Activity Timeout	7-5
Initialization String (Modem)	5-10	O	
Installation	4-1 to 4-7	ON Indicator	2-1
Interface	Apx-1	One Character Logoff	5-12, 5-17, 7-3
IP Address	5-16, 11-8	Operation	7-1 to 7-10
Default	2-2	Option Switches	2-3, 4-2 to 4-4
IP Security	5-16, 5-19 to 5-20	Outbound Telnet	8-7 to 8-8, 11-10
L		Password	5-18, 8-7
Line Feed	5-18	Overview	3-1 to 3-3
Local Access	5-1	P	
Logical Port Numbers	8-1	Parameters	
Logical TCP Ports	5-15 to 5-16, 6-2 to 6-5, 7-4, 11-8	Restore	9-2
Logoff Character	5-11 to 5-12, 5-16	Save	9-1
Logoff Sequence	5-11 to 5-12, 7-3, 11-6	Passive Mode	5-7, 5-10, 7-7
M		Password	
Modem		Direct Connect	5-14
Hang-Up String	5-11	Outbound Telnet	5-18
Initialization String	5-10	Port	5-3
Installation	4-5	Supervisor	5-3
Reset String	5-10	Port Buffers	7-9
Modem Access	5-1	Port Configuration	5-6 to 5-23
Modem Mode	5-7, 5-10, 7-10, Apx-1	Port Connection	7-1 to 7-2, 11-5
		Port Diagnostics Screen	6-3 to 6-4, 11-9
		Port Disconnection	7-3, 7-5, 11-4, 11-6
		Port Groups	7-6

Port Interface	ApX-1	RS232 Ports (<i>Continued</i>)	
Port Modes	5-7, 5-10	Sequence Disconnect	5-12
Port Name	5-6, 5-9, 7-6, 11-1	Stop Bits	5-9
Port Parameters		Supervisor Mode	5-11
Copy	5-21	Timeout Disconnect	5-13
Display	11-11	RTS / CTS Handshake	4-3, 5-9
Network Port	11-8		
RS232 Ports	11-8	S	
Save	11-10	Saving Parameters	9-1 to 9-2, 11-10
Port Parameters Screen	6-7	Scroll Mode	7-9
Port Password	5-3 to 5-11, 6-2, 6-7, 11-9, 11-11	Sequence Disconnect	5-11 to 5-17
Port Status Screen	6-1 to 6-2, 11-9	SET Button	2-1, 4-4
Power Cable Receptacle	2-2	Set Up Switches	4-2
Power Switch	2-3	Site I.D. Message	5-5
		Define	11-7
Q		Display	11-8
Quick Set Up	3-1 to 3-3	Site ID Message	5-5
Quiet Mode	5-13	Skip / Connect	7-9
		Specifications	ApX-2
R		Standard Telnet Protocol	8-2
Raw Socket Mode	5-14, 8-2	Status Screens	6-1 to 6-8
RDY Indicator	2-1	Stop Bits	5-9
Reset Network Port	11-10	Subnet Mask	5-16, 11-8
Reset String	5-10	Supervisor Mode	5-11, 5-16, 7-1
Resident Connect	7-1 to 7-2	Supervisor Password	5-3, 5-5, 5-11, 11-7
Resident Disconnect	5-11 to 5-12, 7-3, 11-4	Sure? Prompt	11-1
Response Message Format	5-13	System Parameters Menu	5-5, 11-7
Default	4-4	System SetUp Ports	2-3, 5-2, 5-4
Response Messages	11-2		
Response Type	5-13, 5-17	T	
Restart	2-1	TCP Ports	5-15 to 5-16, 6-2 to 6-5, 7-4, 11-8
RS232 Ports	2-3, 5-8 to 5-11, 11-8	Technical Support	ApX-3
Accept Break	5-13	Telnet	8-1 to 8-8, 11-10
Baud Rate	5-9	Inbound	8-6
Bits and Parity	5-9	Outbound	5-18
Command Echo	5-13	Password	5-18
DCD and DTR Signals	5-10, ApX-1	Telnet Access	5-2, 5-19 to 5-20
DTR Output	5-10	Telnet Command	8-7 to 8-8, 11-10
Handshake Mode	5-9	Telnet Direct Connect	5-14, 8-2 to 8-6
Interface	ApX-1	Telnet Port Numbers	5-14, 8-1
Logoff Character	5-11	Telnet Ports	5-15 to 5-16, 6-2 to 6-5, 7-4, 11-8
Modem Hang-Up String	5-11	Disconnect	7-4, 8-6
Modem Init. String	5-10	Terminal Block Assembly	4-2
Modem Reset String	5-10	Terse Response	4-4, 5-13, 11-2
Port Mode	5-10	Third Party Connect	7-1 to 7-2
Port Name	5-9	Third Party Disconnect	7-4, 11-6
Port Password	5-9		
Response Type	5-13		

Three Character Logoff 5-12, 5-17,
7-3
Timeout Disconnect 5-13, 5-17, 7-5

U

Upgrade Firmware 10-1 to 10-2,
11-11
Upload Parameters 9-1 to 9-2
User Mode 7-1
User Password 5-3 to 5-4

V
Verbose Response 4-4, 5-13, 11-2

W
Who Command 6-7, 11-11
Wild Card 11-1

X
XON / XOFF Handshake 4-3, 5-9



5 Sterling Irvine California 92618
(949) 586-9950 Toll Free: 1-800-854-7226
Fax: (949) 583-9514 <http://www.wti.com>