MCN Server

Standard & Advanced versions

Remote Comparator Display

with

Master-Sub and Multi-Dependency Option

S2-61170-210

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68-11824-210

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Revision History

S2-61170-100	Production Release
S2-61170-101	Corrected miscellaneous minor errata.
S2-61170-102	Corrected miscellaneous minor errata.
S2-61170-205	Added Sections for Master-Sub and Multi-Dependency. Re-organized sections to coincide with MCNRCD Standard Manual.
S2-61170-210	Added Sections for Triggered Output option.

Table of Contents

Introduction

This manual covers the installation, configuration, and operation of the MCN (Monitoring and Control Network) Server software. It covers two versions:

- MCN Standard Server
- MCN Advanced Server

The two versions of the software differ in their capabilities.

Function	Standard Server	Advanced Server
Number of Network Interfaces supported	1	4, expandable to 64 with additional NI Packs
Support for Third Party Clients	No	Yes, with optional TPCI Licenses

The manual will refer generically to "MCN Server" or "MCN Server Software". It will specifically call out the Standard or Advanced versions when describing features that are different between the versions. The Standard and Advanced versions have different executable file names as shown below:

Version	Executable file name
MCN Standard Server	McnRcd Server.exe
MCN Advanced Server	McnRcd Advanced Server.exe

RCD stands for "Remote Comparator Display".

The manual will refer to other programs in a shorthand notation:

Program	Shorthand	Executable file name
Hardware Setup	HWSetup	Hardware Setup Server.exe
Configuration Program	MCNConfig	McnConfig Server.exe
Client Program	MCN Client	ClientRcd.exe

Major sections of the manual include:

Introduction	General discussion of the MCN Monitoring & Control Network, system requirements for the MCN Server software.
Installation	Installation of the software (and the PCLTA Driver Software if used).
MCNConfig Program	This is the largest part of the manual, because it describes all the system configuration options.
MCN Server Program	This covers the operation of the MCN Server run-time program.
MCN Client Program	This covers the operation of the MCN Client program.
Appendices	Troubleshooting, special configuration, etc.

Monitoring & Control Network (MCN) System Overview

A typical MCN Server is shown in the figure below attached to an MCN network. The MCN Client-Server Remote Comparator Display system consists of:

- An MCN Server PC running MCN the Server program
- One or more network interfaces for the MCN Server PC (such as a HIB-IP, internal PCLTA or HIB-232)
- One or more Comparator I/O Modules (such as an AIB or CIB)
- Optionally, other interface modules (such as IOB) to drive auxiliary outputs and alarms
- Client PCs connected to the PC over an IP LAN or WAN.

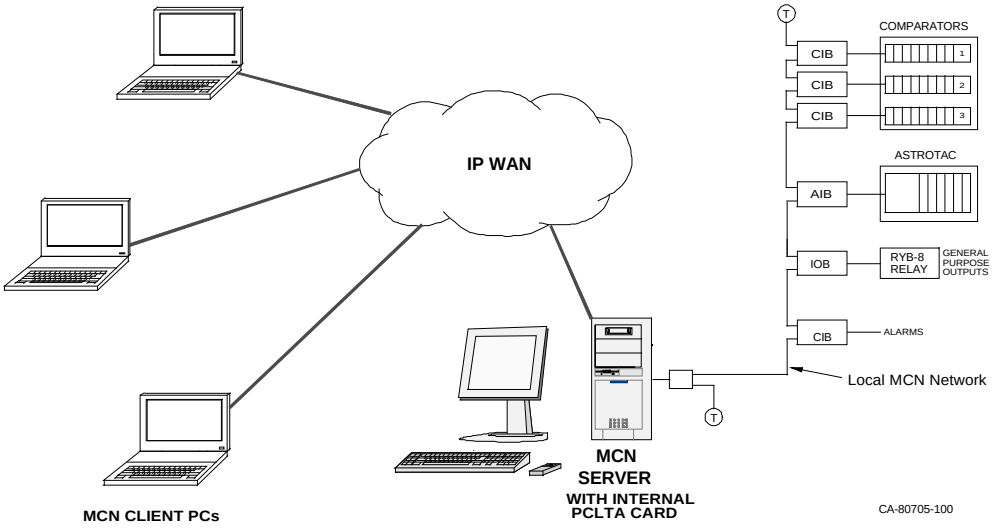


Figure 1 - Simple MCN Client-Server System

The main programs that make up the MCN Client-Server software package:

- **MCNConfig** Program
  (McnConfig Server.EXE)
  This is the configuration program run by an engineer or technician to build the configuration files when the system is installed or changed.
- **MCN Server** Program
  (McnRcd Server.EXE or McnRcd Advanced Server.exe)
  This is the program that runs on the MCN Server PC. It has a local display that displays the status of the devices on the MCN system (Comparators, I/O points, alarms, etc.). It allows the operator to control receivers (with Force-Vote and Disable functions) and other I/O devices (relays, etc.) from the MCN Server PC.

  The MCN Server program also passes the status and control data to MCN Client PCs over an IP LAN or WAN.
- **MCN Client** Program
  (ClientRCD.exe)
  HIThis is Client program that runs on remote PCs to display the status of and control the MCN system. The MCN Client program runs on PCs connected to the MCN Server over an IP network, and thus do not need their own MCN Network Interface.

Reference Documents

Details of other hardware components of the system can be found in the following documents:

- Monitoring and Control Network, System Manual
  Part Number S2-60425
- HIB-IP Remote Network Interface Hardware Reference Manual
  Part Number S2-61173
- HIB-232 Host Computer Interface Module, Hardware Reference Manual
  Part Number S2-60427
- CIB Comparator I/O Module, Hardware Reference Manual
  Part Number S2-60426
- AIB Astro-TAC Comparator Interface Module, Hardware Reference Manual
  Part Number S2-60399
- IOB I/O Control Module, Hardware Reference Manual
  Part Number S2-60630
- EXB-232 and EXB-IM Network Extender Modules, Hardware Reference Manual
  Part Number S2-60596
- EXB-IP and EXB-FI Network Extender Modules, Hardware Reference Manual
  Part Number S2-61089
- Router Modules, Hardware Reference Manual
  Part Number S2-60649

Network Interfaces & Drivers

Three general categories of MCN Network Interfaces are used with MCN Server program:

HIB-IP External Modules	For connection to MCN networks over IP networks
HIB-232 External Modules	For Local RS-232 connection (Although the HIB-232 manual talks about dial-up operation, the MCN Server program is intended to be connected full-time to the MCN network(s) that it serves. It does not support dial-up operation of the HIB-232.)
Internal Boards PCLTA-21	For direct connection to the MCN Network (Also support connection to remote networks using EXB Network Extender Modules)

Supported Network Interfaces

The MCN Server program can use the following versions of HIB modules or the PCLTA cards for the interface between the PC and the MCN network.

HIB-IP Modules	Version 110 & up	78K
HIB-232 Modules	Version 200 & up	78K (with Rotary address switches on back)
PCLTA-21 Boards	Half-Size PCI boards	78K or 1250 versions

Unsupported Network Interfaces

The following older Network Interfaces are not supported with MCN Server

HIB Modules	Version 000-199	(without Rotary address switches on back)
PCLTA (original)	Full-size ISA bus boards	78K or 1250 versions Single or dual interfaces
PCLTA-10	Half-size ISA bus boards	78K or 1250 versions
PCLTA-20	Half-size PCI bus boards	78K or 1250 versions

All HIB-232 modules have a unit number of S2-60081-xxx. If the 'xxx' number is less than 200 you have an early version HIB module that is not supported..

Drivers for MCN Server

- The PCLTA Interface boards need a software driver to run the MCN Server program. This will be included with the PCLTA & software package.
- The HIB-IP and HIB-232 modules do not need a driver for normal operation of the MCN Server program.

PC Hardware Requirements

MCN Server software requires a PC with the following minimum system configuration:

- Windows 2000, XP, or Server 2003
- Pentium 4, 2GHz or above
- 512MB Memory
- Color Monitor with at least 800 x 600 resolution, higher resolution recommended
- Mouse
- 100Base-T Ethernet port
- One open serial port if the local network interface is a HIB-232
- One open PCI slot if the network interface is a PCLTA
- CD ROM Drive
- 3.5” Floppy Drive
- Open USB Port

For MCN Client PCs, requirements are similar to above:

- Win 2000, XP, or Server 2003
- Pentium 4, 2GHz or above
- 512MB Memory
- Color Monitor with at least 800 x 600 resolution, higher resolution recommended
- Mouse
- 100Base-T Ethernet port
- CD ROM Drive

Installation

Installation Overview

The installation of the MCN Server software and network interfaces are done in the following order:

1) If PCLTA network interface will be used, install the PCLTA device drivers and network interface card, then test the interface. See ***PCLTA Network Interface*** Installation (If needed) below.

2) Run setup.exe on the MCN Server PC to install the MCN Server software. See ***Installing MCN Server Software*** on page 20 in this section.

3) Run the MCNConfig program to customize the MCN System Resources and display windows for your system.. See ***MCNConfig Program*** on page 37.

4) If you are using HIB-IP units, program them using MCNConfig program. See ***Programming HIB-IP Units*** *on* page 52.

5) Install the Security Hardware Key in a USB slot on the MCN Server PC.

6) Run the MCN Server program on the MCN Server PC. See ***MCN Server Program*** on page 136. You will be asked to enter the MCN Software Key and IP parameters on the first use.

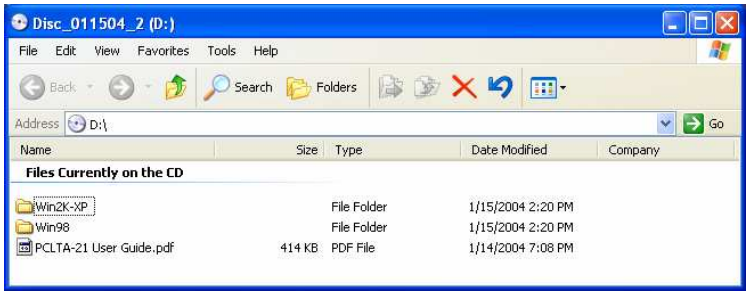
7) Run setup.exe on the MCN Client PCs to install the MCN Client program. See ***Installing MCN Client*** on page 33 for details.

8) Run the MCN Client program on the Client PC(s). See ***MCN Client Program*** on page 151.

PCLTA Network Interface Installation (If needed)

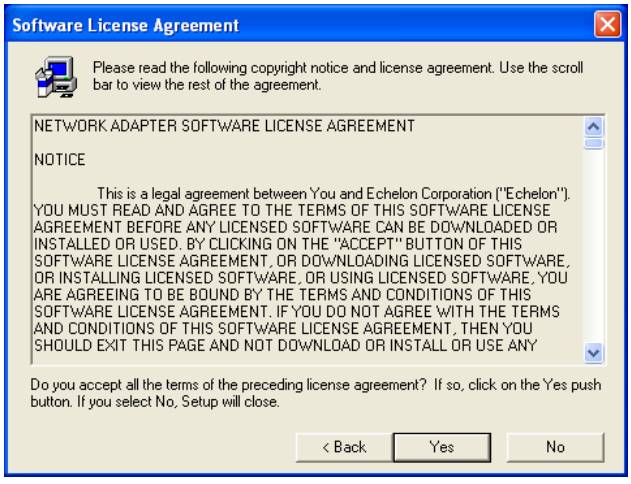
Install PCLTA Device Drivers

Insert the PCLTA driver CD into the CDROM drive. When the CD contents folder is displayed as shown below, double-click on the "Win2K-XP" folder. (Windows 98 is not a supported operating system for MCN Server.) Then double-click on the ***setup.exe*** file to start the installation for PCLTA device drivers.



The PCLTA Install welcome screen will be displayed as shown below. Before continuing, it is recommended that you exit all Windows programs.

Click on the **Next** button to display the "Software License Agreement" window as shown below.



Click on the **Yes** button to display the "Setup Complete" window as shown below.

Click on the **Finish** button. The following window will provide a selection for restarting the computer. Select "NO, I will restart my computer later", then click the **Finish** button.

During the PCLTA device driver installation, the following line is added to the ***config.nt*** file to provide a driver for DOS applications:

```
device=%SystemRoot%\system32\pcltdos.sys /D1
```

Finally, power down the computer so that the PCLTA network interface card can be installed.

Install PCLTA Network Interface Card

The PCLTA device drivers must be installed prior to installing the card. If the drivers have not been installed, complete the previous step.

To install a PCLTA card into your PC, follow these steps:

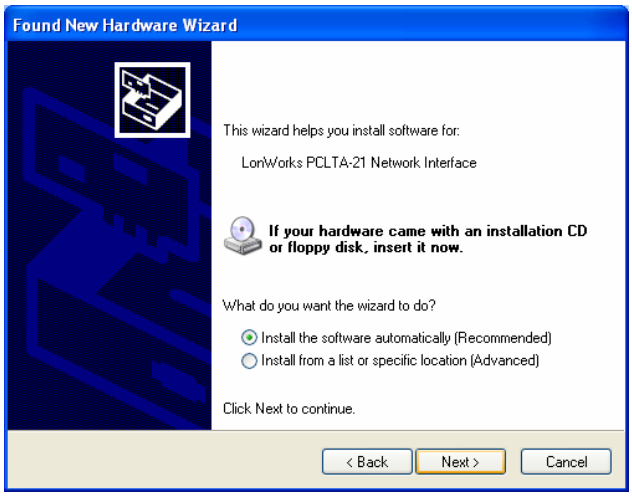
1. Turn off the PC and remove the power cord.
2. Open the PC case and locate an empty slot.
3. Remove the corresponding blank panel from the rear of the PC.
4. Insert the PCLTA card into the slot, ensuring that the edge connectors are fully mated, and the slot in the rear panel-mounting lug of the PCLTA is aligned with the threaded hole in the PC chassis.
5. Replace the screw to hold the PCLTA firmly in place.

6. Reinsert the power cord and then restart the PC.

On power-up, Windows will automatically sense the Plug-n-Play adapter, and associate it with the drivers installed in the previous step.

If the Plug ‘n Play features of the card ***failed***, the following “Found New Hardware Wizard” window may be displayed.

Select “No, not this time”, then click the **Next** button to display the following window.

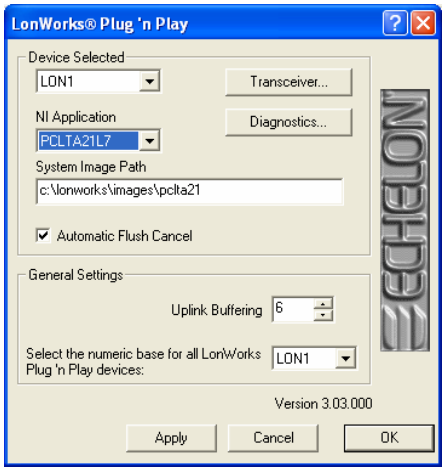


On the above window, select “Install the software automatically”, then click the **Next** button. Click on the **Next** or **Finish** buttons in the remaining windows to complete the installation.

Configure and Test the PCLTA Network Interface

From the **Start** menu button on the Windows desktop, select Control Panel from the list, then double click the "LonWorks Plug 'n Play" icon. (If the "LonWorks Plug 'n Play" icon is not visible, change the Control Panel properties to "Classic View".)

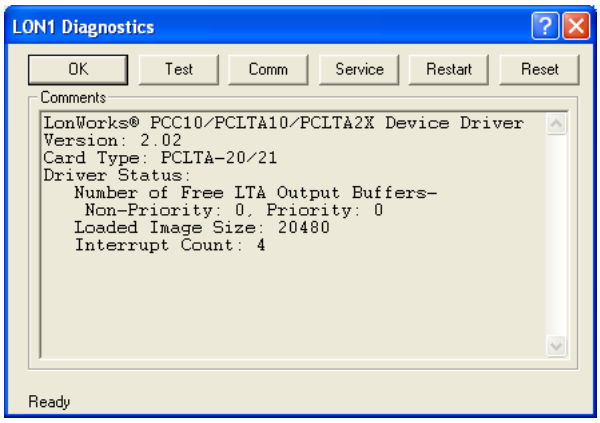
The following "LonWorks Plug 'n Play" window will be displayed.



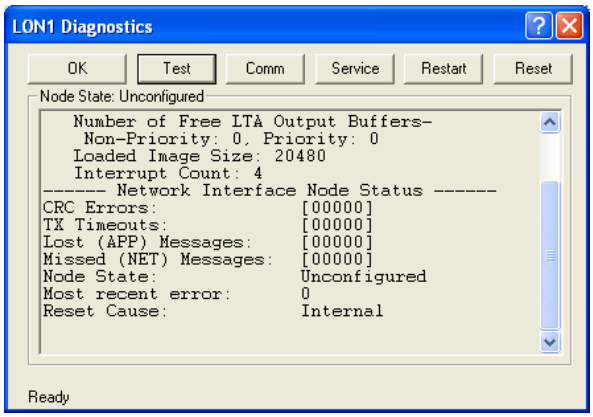
In the NI Application drop-down list, choose an image that is compatible with the MCN Server program from the following table. (For all operating systems, the Image name should end with "L7".) Then click the **Apply** button.

	Windows XP, 2000, or 2003
Images Compatible with MCN Server program	PCLTA21L7
Images that will not work	PCLTA21VNI, PCL10VNI

To check if the PCLTA network interface has been installed correctly, click the **Diagnostics** button to display the following window.



Finally, click the **Test** button to display status information similar to the following window.

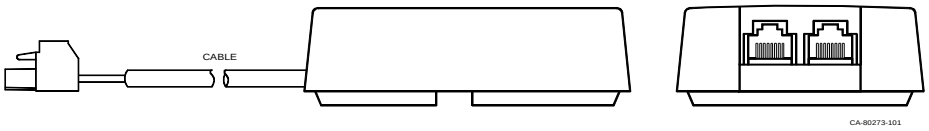


When finished, click the **OK** button on this "LON1 Diagnostics" window, then click the **OK** button on the "LonWorks Plug 'n Play" window.

If the PCLTA network interface card was installed prior to device driver installation, the PCLTA may not function correctly. To correct this situation, see *Error! Reference source not found.* on Page **Error! Bookmark not defined.**.

Cabling and Termination

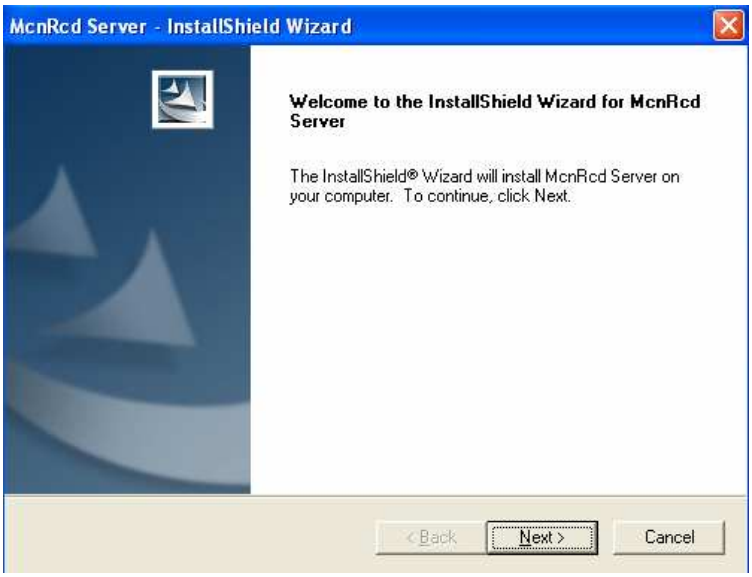
The PCLTA card is different from all other MCN modules in that it does not have an RJ-45 connector for the network cable to plug into. A 'T' Adapter (S2-60617), shown below, must be installed to connect the PCLTA's two-pin connector with the MCN network cable. Use one RJ-45 connector on this adapter for the network cable, and plug a terminator (either TP/XF1250 or TP/FT10) into the other.

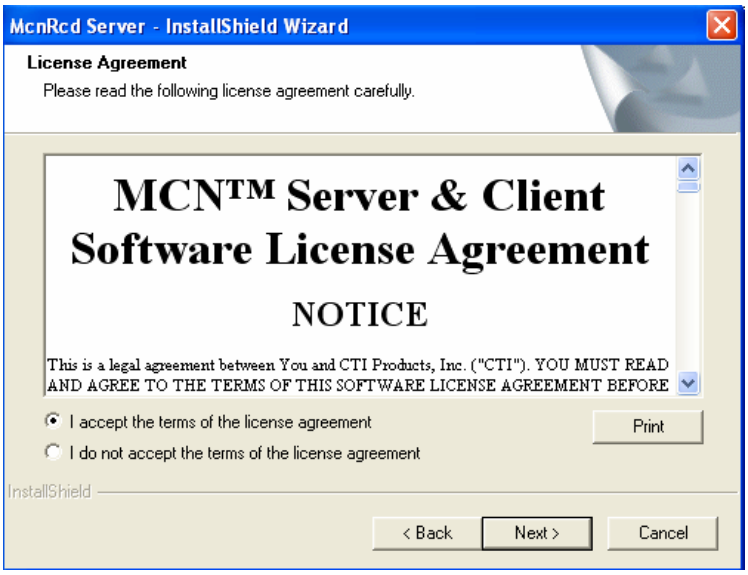


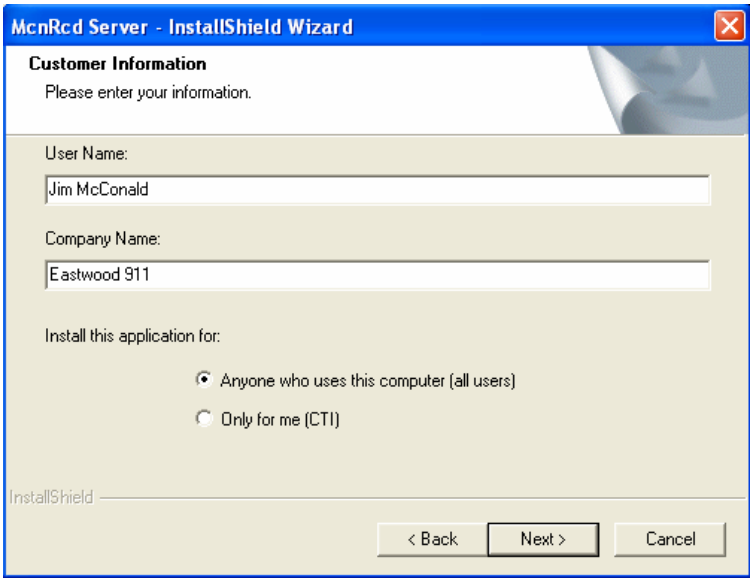
Installing MCN Server Software

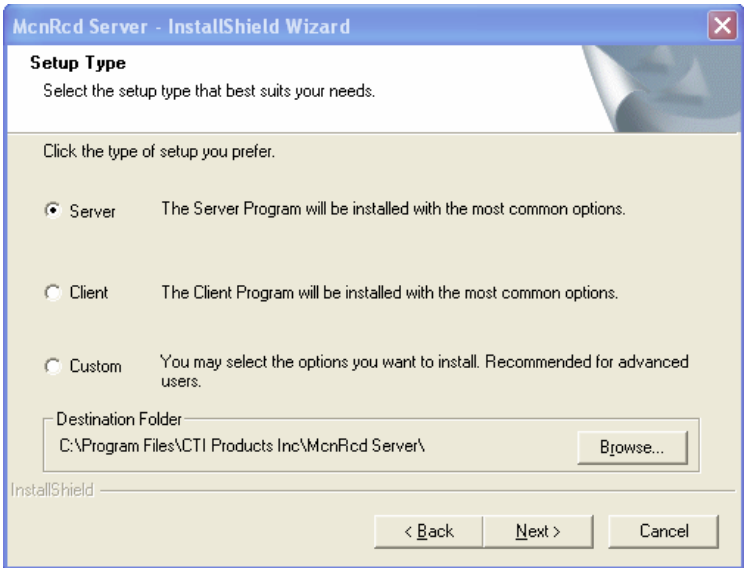
Run Setup.exe from the CD.

You must have Administrator rights to install the MCN Server software.

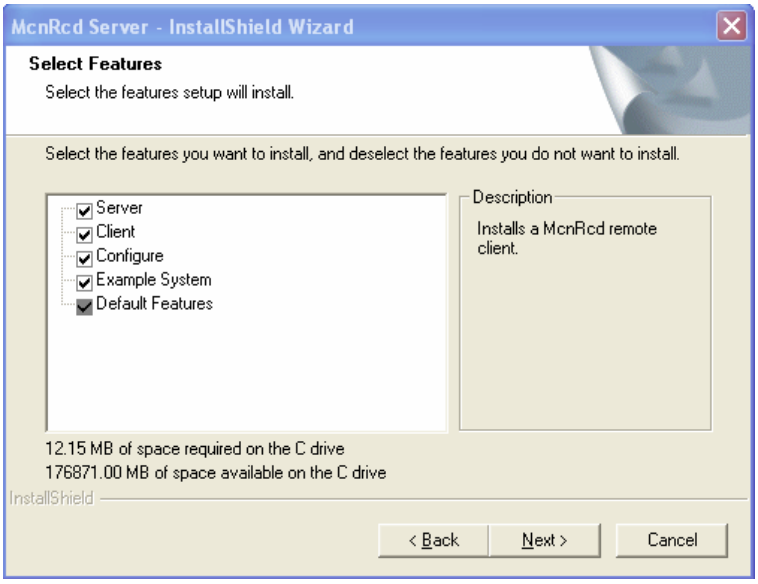




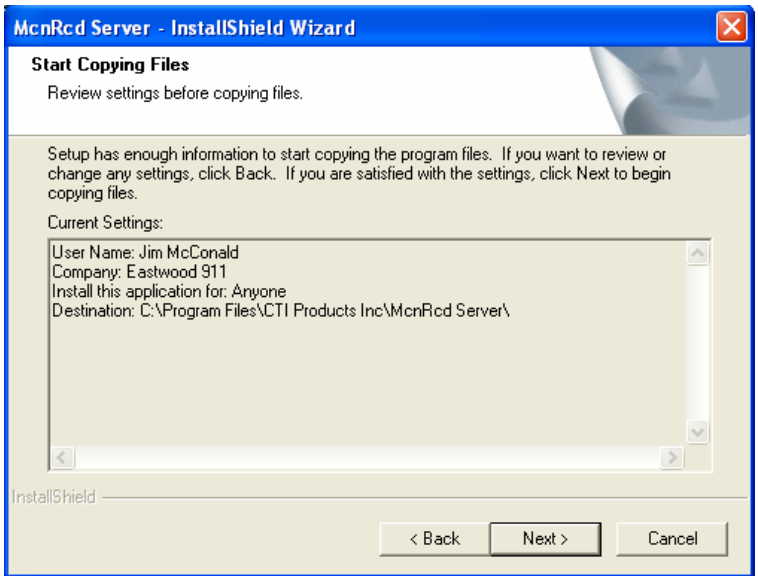


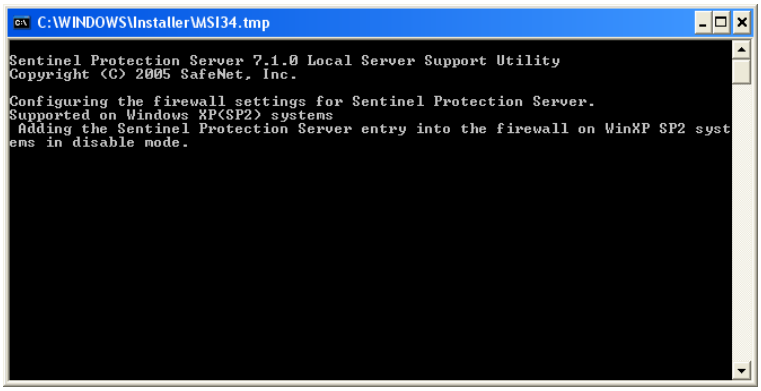


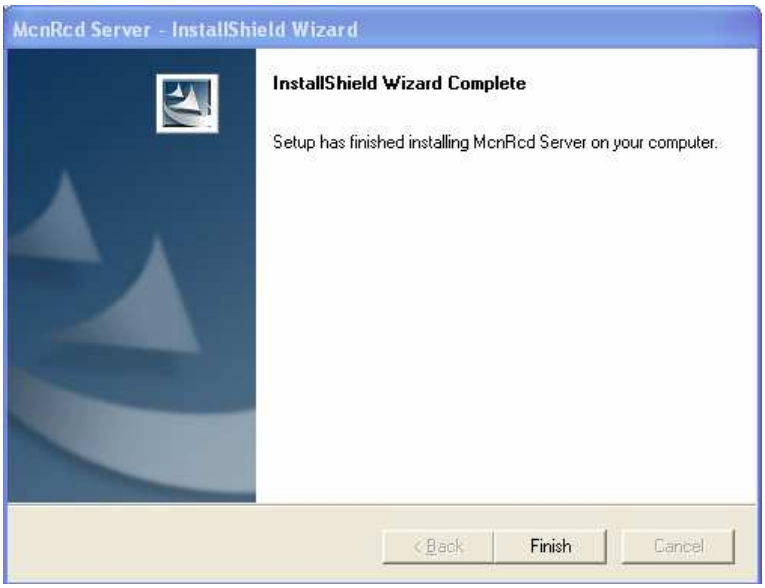
If you choose the custom installation, you can install both the MCN Server and the MCN Client programs on your PC.



But we won't do that here…





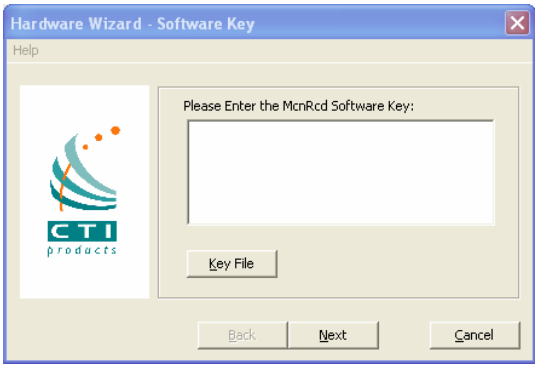

McnRcd Server - InstallShield Wizard
InstallShield Wizard Complete
Setup has finished installing McnRcd Server on your computer.
< Back
Finish
Cancel

Hardware Setup – HWSetup.exe

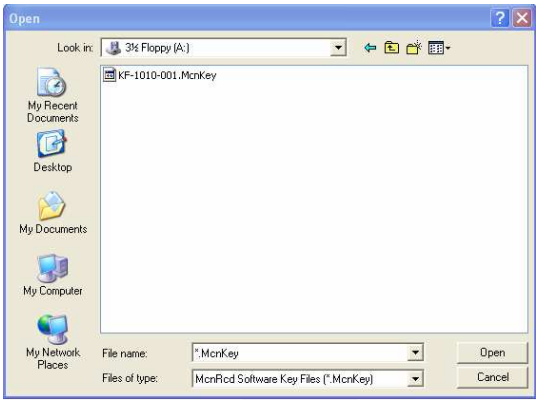
The Hardware Setup program is used to select and set up the Network Interface (PCLTA, Non-Dial-up HIB-232, or HIB-IP) to use in the system.

Software Key

You will be asked to enter your software key.



You can type it in if you want to, but it's easier to hit the Key File button and find your key file. Your software key file will be included on a custom diskette or CD for your system.

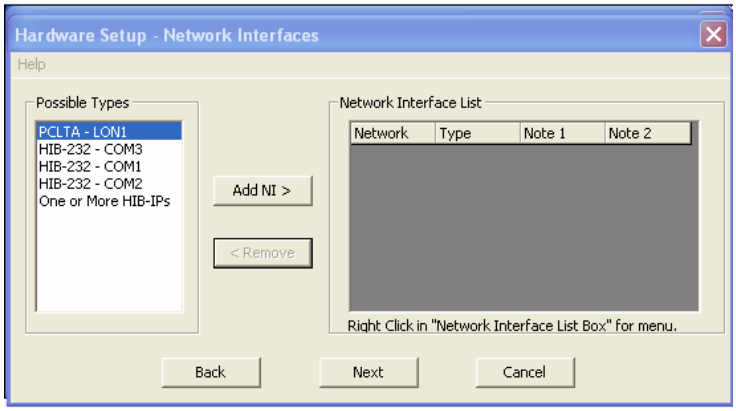


Navigate to find the software key file and click **Open.**

The Software Key will be entered. Click the **Next** key.

HW Setup - Network Interface Setup

The first time HWSetup is run, it sees that there is no Network Interface defined on the PC. It will ask you what type of Network Interface (NI) you plan to use.



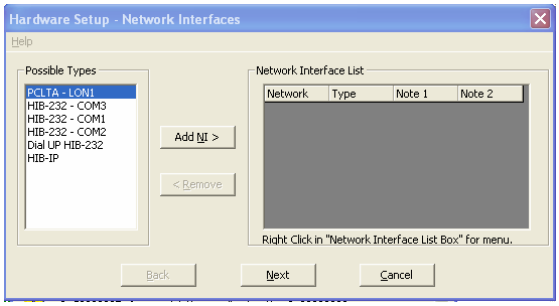
The Standard version of MCN server allows the selection of just one Network Interface from this window. The Advanced version allows the selection of multiple Network Interfaces.

Network Interface Type	Description
PCLTA	Internal board in the PC. The MCN network will connect directly to this board. If there is a PCLTA board that is properly installed, the HW Setup program will list it in the "Possible Types" list. See: ***HW Setup*** - PCLTA Setup
HIB-232 - COMx	Non-Dial-up HIB-232 units - Non-dial-up HIB-232s connect to a COM port directly or through external leased-line modems or equivalent. - The program detects all COM ports reported by Windows. Not all may be available for use, depending on your PC. Some COM ports may not be brought out to a connector. Some COM ports may actually be used for an internal modem. (In the example above, COM3 is actually an internal modem.) See HW ***Setup – HIB-232 (non dial-up)***
HIB-IP	Remote Network Interface that connects to the PC through an IP channel You will set up parameters for the HIB-IP unit in the system database by using McnConfig program. (You will also have to download those settings to the HIB-IP from the McnConfig program.)

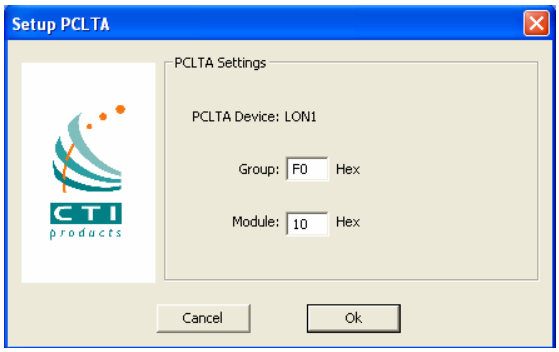
HW Setup - PCLTA Setup

If a PCLTA board (and its driver) is properly installed in your PC, the HW Setup program will detect it and present it in the *Possible Types* list box.

In the unlikely event that you have multiple PCLTA boards installed in your PC, you can select one of them to use. The MCN Standard Server program supports only one Network interface at a time.



- Select the PCLTA and click the *Add NI* button.



The Group/Module address defaults to "F0/10" during installation.

- Change the Group and Module address as required for your system.
- Click the OK button.

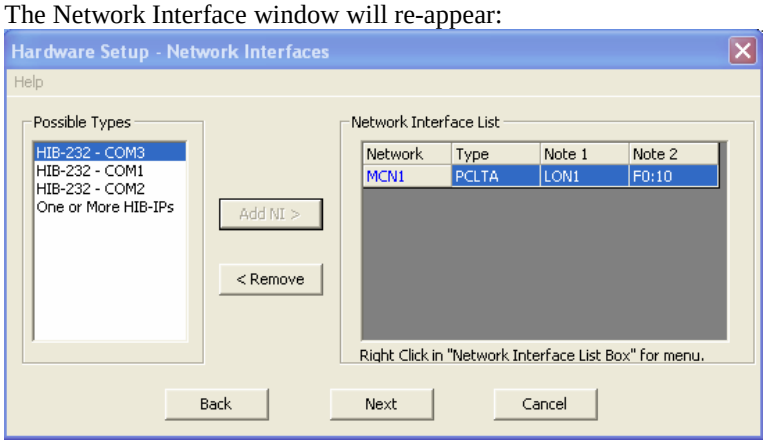
Important: MCN Address Setting

Each PC and each MCN module in the system must have a unique address. If you are setting up multiple PCs, be sure to set up each PCLTA card with its own address.

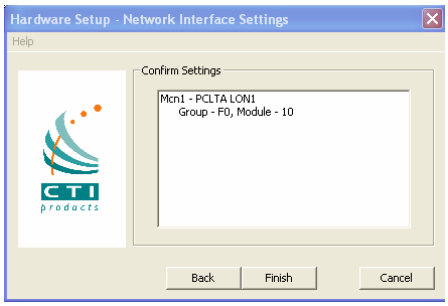
If you have a Custom Engineered System (with custom system documentation part number KA-8xxxx-xxx), be sure to set the PCLTA address to the Group & Module numbers shown in your documentation. Failure to do so may cause the system not to work

- In the above window, click the **OK** button.

The Network Interface window will re-appear:



- Click the Next button.



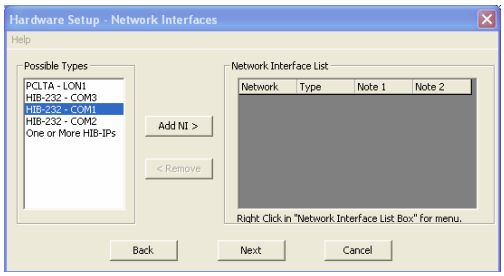
- Press the Finish button in the confirmation window.

The appropriate information for the PCLTA is now stored in the registry and will be available for use by McnConfig and MCN Server programs.

The MCN Group and Module addresses are set up on hex rotary switches on the back of the HIB-232 unit.

HW Setup – HIB-232 (non dial-up)

If you have a HIB-232 module (and are using it directly connected or through leased line modems) select the proper COM port from the **Possible Types** list box:



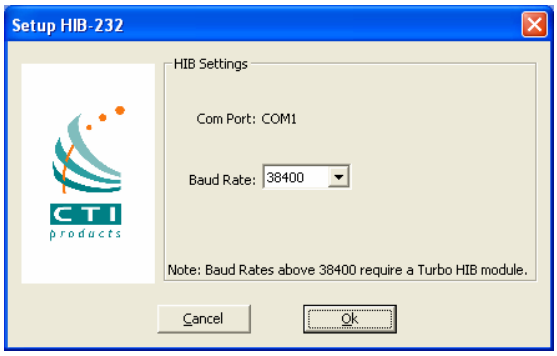
The program detects all COM ports reported by Windows.
Not all may be available for use, depending on your PC.
Some COM ports may not be brought out to a connector.
Some COM ports may actually be used for an internal modem.
(In the example above, COM3 is actually an internal modem.)

USB to Serial Adapters

The MCN Server program will work with some USB to Serial adapters. We cannot guarantee that it will work with all such adapters since we cannot test all brands.

Some USB to Serial adapters will change their COM port number when they are plugged into a different USB connector. If you are using one of these and you change its connection, you will have to re-run the HW Setup program to select the new COM port.

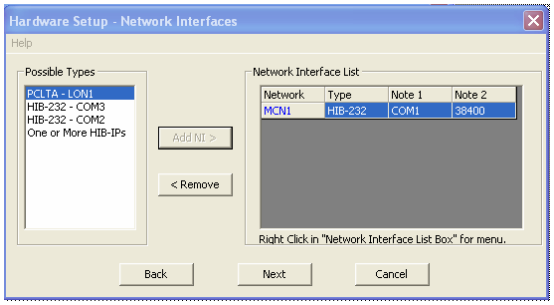
- Select the proper COM Port and Click the Add NI button



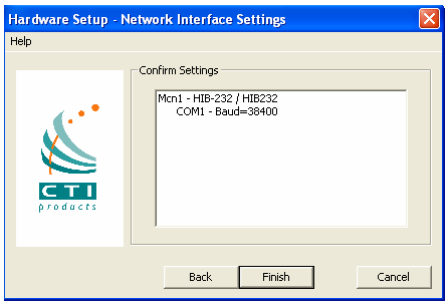
- Select the appropriate baud rate. Be sure that the baud rate matches the Baud rate switches on the HIB-232 module.

  (The Group and Module addresses for the HIB-232 unit are set with rotary switches on the unit. See ***Important: MCN Address Setting*** on Page 26 for more information on MCN addressing.)

- Click the OK button.



- Click the Next button



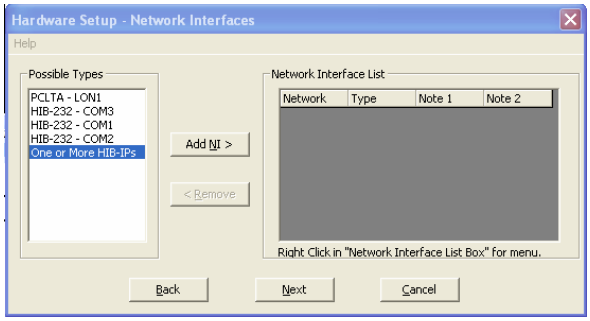
- And hit the Finish button.

The HW Setup program will save the setting in the registry.

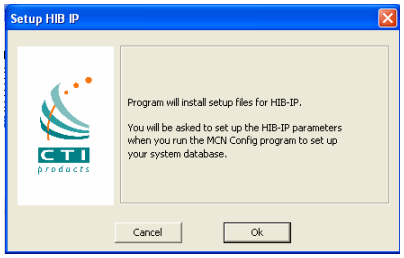
This setting will be used by the MCN Server program.

HW Setup – HIB-IP

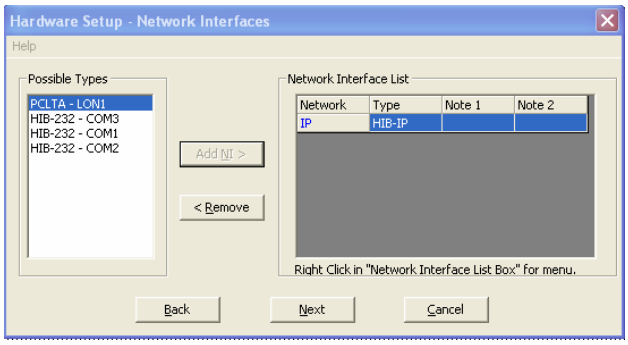
If you will be using a HIB-IP unit, select it from the Possible Types list.



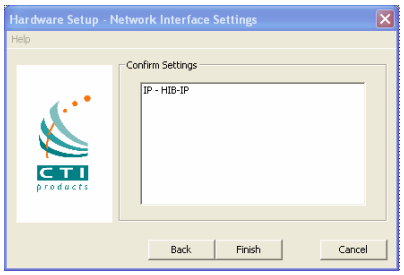
- Select the HIB-IP option. (Although the line says "One or more HIB-IPs", you will be able to use only one HIB-IP with the standard MCN Server program. If you need to connect to multiple HIB-IP units at a time, you'll need the MCN Advanced Server software.
- Click the Add NI button.



- Click the OK button.



- Click the Next button



- Click the Finish button.

HIB-IP Parameters

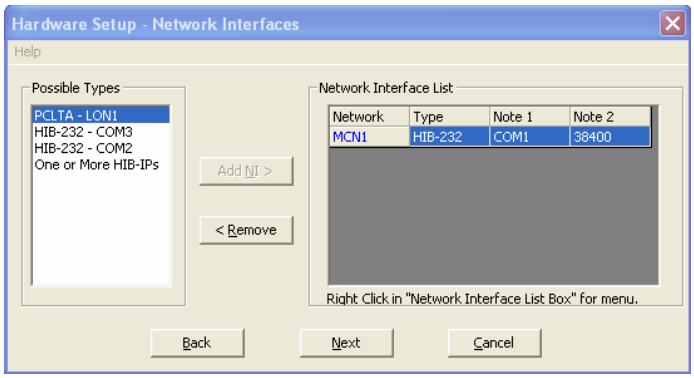
As shown in the "**Setup HIB-IP**" window above, you will later enter the HIB-IP parameters in the system database using the McnConfig program. You will also have to download those parameters to the HIB-IP using McnConfig.

Miscellaneous Installation Considerations

Changing Settings for your Network Interface

If you need to change the settings for your Network interface, re-run the HWSetup program. This program can be used to change the:

- Type of Network Interface
- PCLTA Device or Group & Module address
- HIB-232 COM Port or Baud Rate



To change these items you can either:

- Double click on the Network Interface to edit its parameters or
- Click the Remove button to remove the Network Interface and select a different one.

If you have a Custom Engineered System (with custom system documentation part number KA-8xxxx-xxx), be sure to set the PCLTA address to the Group & Module numbers shown in your documentation. Failure to do so may cause the system not to work

In the above window, click the **Next** button

PC Power Options Setup

The "Power Options" icon in the Control Panel allows for a wide variety of PC operation parameters. However, installation of MCN Server software will disable any possibility of the PC going into a standby or hibernate condition.

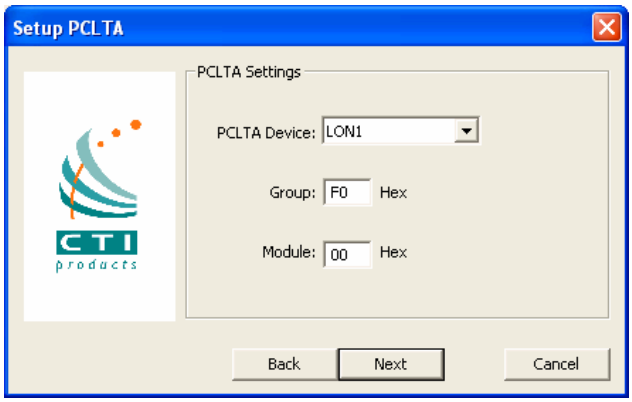
The monitor may be allowed to "sleep" as long as the "Monitor Timeout" is less than the "Standby Time". Otherwise, the monitor will never sleep.

Printer Installation

For printer logging to occur, a printer must be installed from the Windows operating system. From the **Start** menu button on the windows desktop, select "Printers and Faxes" from the list, then select "Add a Printer" from the list of "Printer Tasks".

Changing the PCLTA Group/Module Address

If the Group/Module address for the PCLTA Network Interface needs to be changed (or to query the PCLTA for its current address), simply run the ***hwsetup.exe*** program. This program can be found in the main program working directory (typically c:\Program Files\CTI Products Inc\McnRcd). Then click the **Next** button until the following window is displayed.



The Group/Module address defaults to "F0/00" during installation. However, each PC must have a unique address.

In the above window, click the **Next** button, then the **Finish** button to complete the address change for the PCLTA Network Interface.

Uninstalling MCN Server Software

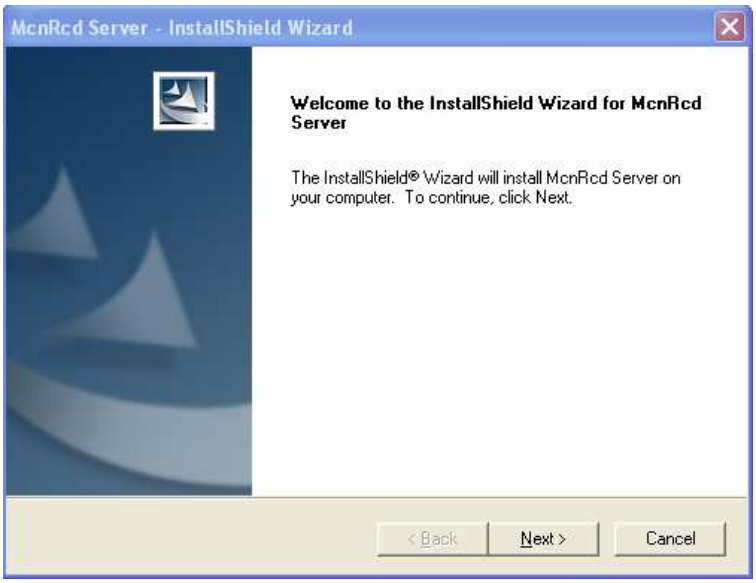
To uninstall MCN Server software, insert the MCN Server distribution CD into the CDROM drive. Click the **Start** menu button on the Windows desktop, then select "Run …" from the list. In the "Run" dialog box, type ***d:setup.exe*** (where d is the drive letter of the CDROM drive), then click the **OK** button. In the "InstallShield Wizard" window, select "Remove", then click the **Next** button. Follow the prompts until the InstallShield Wizard completes the uninstallation.

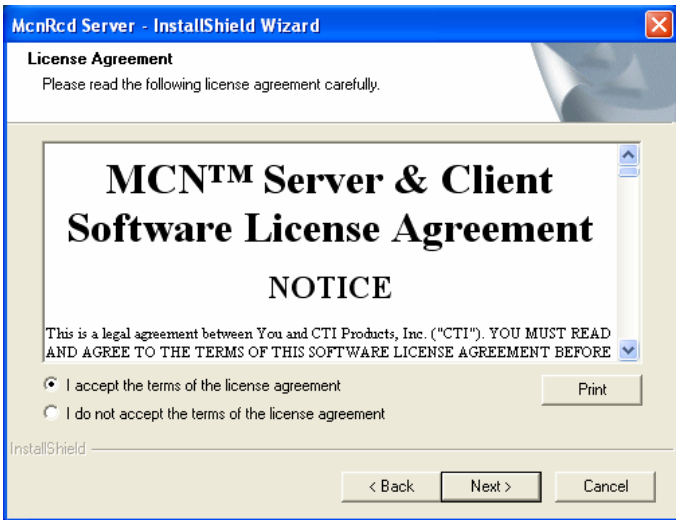
Installing MCN Client Program

You would normally install the MCN Client program on a separate PC from the MCN Server, but you can also install a copy on the MCN Server PC.

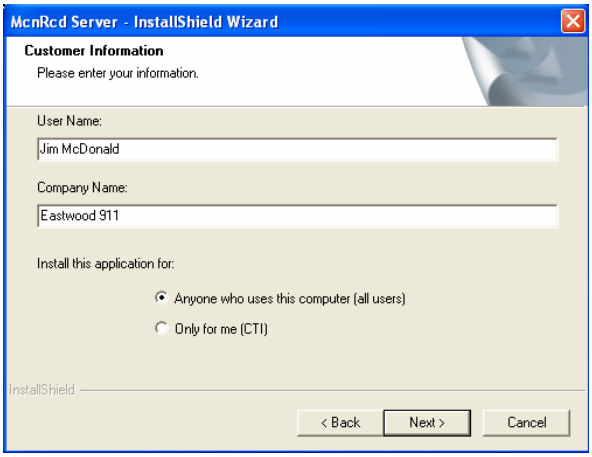
You must have Administrator rights to install the MCN Client program.

The installation steps are shown below.

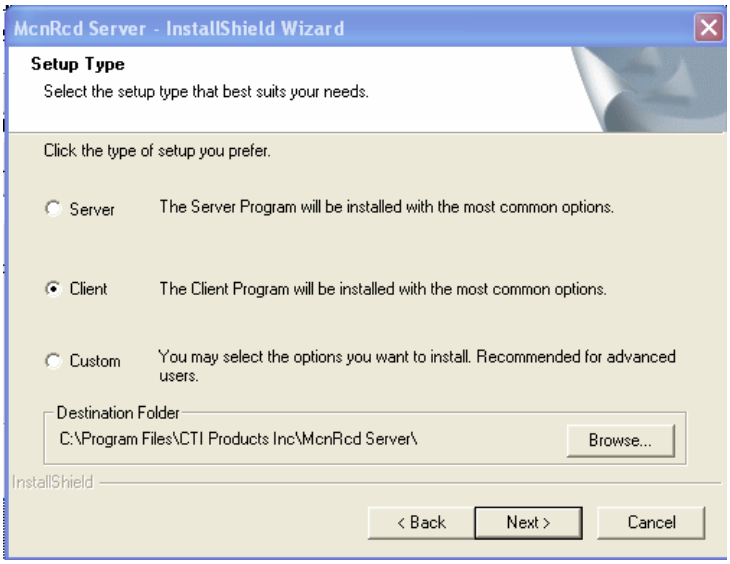




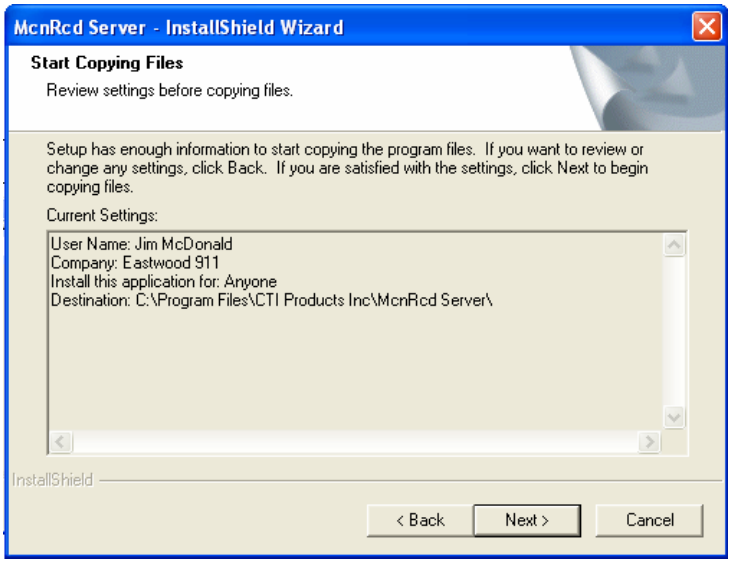
Enter your user information.



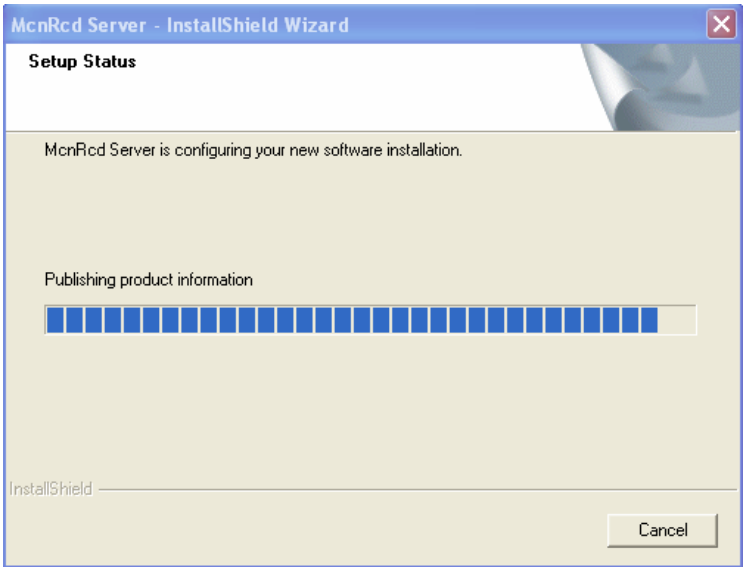
Select the "Setup Type" as "Client".



After you confirm everything is in order, hit **Next**.



The Installshield program will install the files.



Click the **Finish** button to finish.

MCNConfig Program (MCNConfig Server.exe)

The MCNConfig program is used to configure an MCN system. System configuration involves:

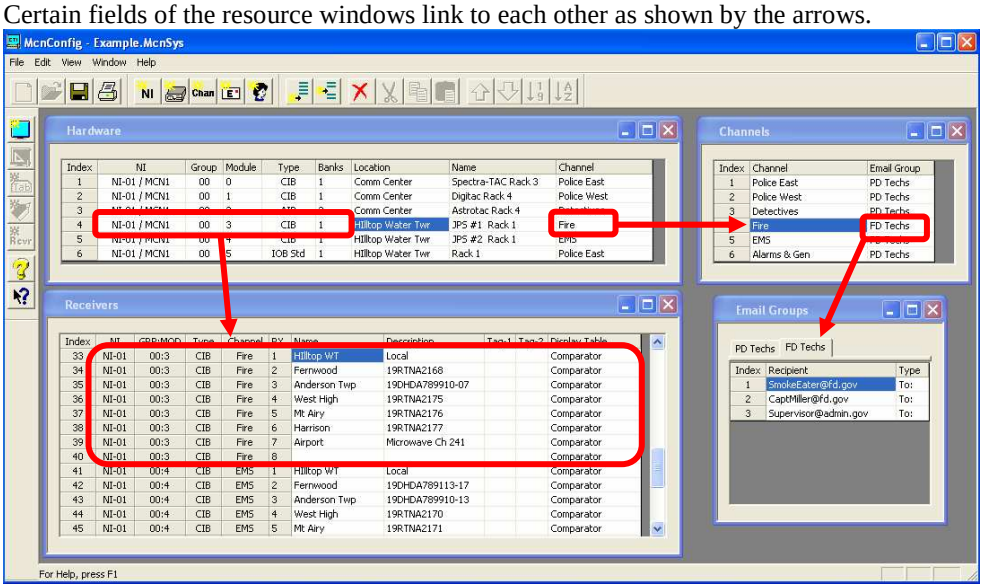
1. Defining system resources in the **Resource Windows**, such as Network Interfaces, Hardware Modules, Receiver Names, Channels, and Email Groups.
2. Designing the **Display Windows** to be displayed for the MCN Server and MCN Client programs.

Resource Windows

The MCNConfig program will be used to define your system by entering data into the following Resource Windows. (There is only one of each type of Resource Window for each system.)

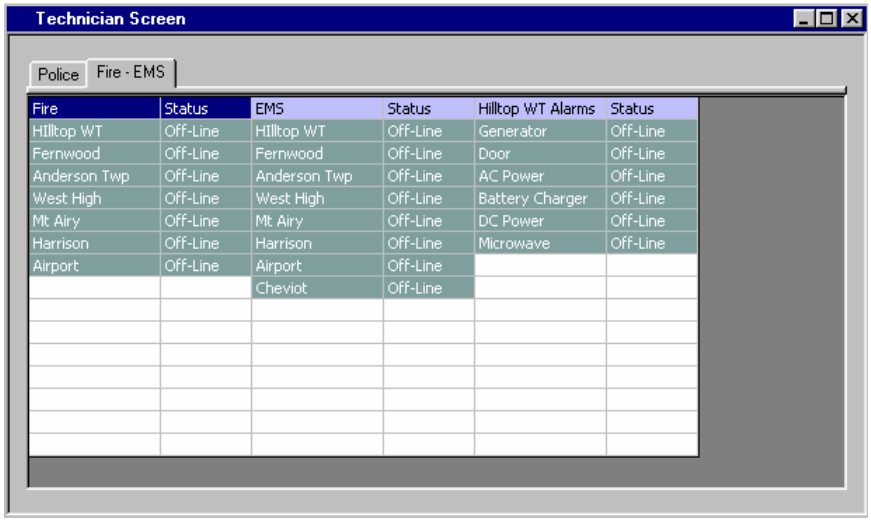
- Network Interface — Indicates which Network Interface is used for this system. If you are using a HIB-IP unit, this is where you will enter the IP and MCN address settings.
- Hardware — Enter the information about the hardware modules (CIBs, AIBs, IOBs, etc.) present in the system.
- Receivers — Enter the site Names and Descriptions for all the receivers in the system.
- Channels — Enter the names of the radio channels used in the system. Each channel can have multiple hardware modules.
- Email Groups — Enter the Email Groups & Recipients for alerts generated by the MCN Server program.
- Display Tables — Each type of device to be monitored and controlled will have a Display Table. The Display Table maps the hardware I/O bits of the device into status indications. The MCN Server software ships with the standard Comparator Display Table and a number of generic I/O Display Tables. A future release of the software will make it possible to create customized status text displays (On/Off, Alarm,, Run/Normal, etc.) for any special control and monitoring devices in your system.

Certain fields of the resource windows link to each other as shown by the arrows.



Display Windows

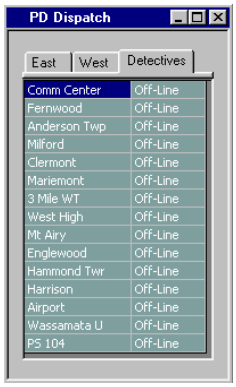
Display Windows are the status screens that you build for the MCN Server and Client programs. Each Display Window can contain multiple Tabs and multiple channels. Multiple Display Windows can be defined for a system.



Typical Technician Display Window

Some examples of Display Windows that can be defined are:

- For Technicians, a large display grid with one tab showing all systems on a single grid.
- For Dispatchers, a small grid with multiple tabs showing only one channel per tab.
- Different Display Windows for different dispatchers with different subsets of channels available. (Police channels for Police dispatcher, Fire & EMS channels for Fire Dispatcher, etc.)



Typical Dispatcher Display Window

Example System

You can load the Example System from the “Example System” directory off the main program directory (typically c:\Program Files\CTI Products Inc\McnRcd\Example System).

MCNConfig Program: Getting Around

The MCNConfig program is a 32-Bit Windows program. Navigation, menus and toolbars are similar to other Windows programs.

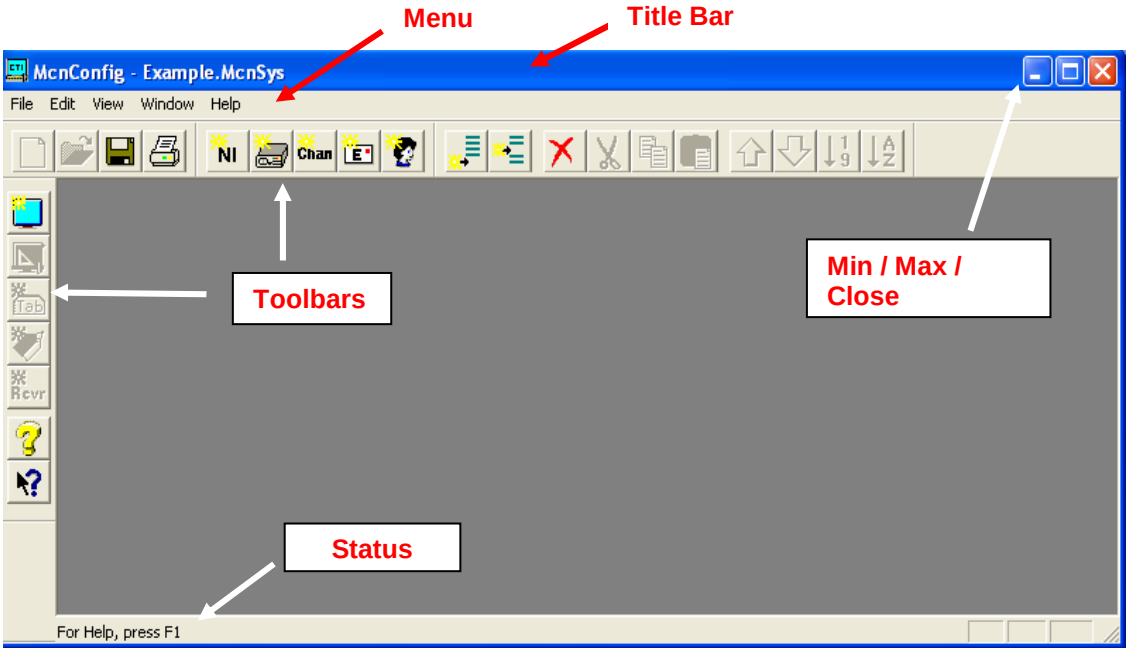
- Standard Windows **Hot-Keys** that can be used with this program include:
  Ctrl-C Copy current selection to clipboard
  Ctrl-V Paste clipboard to current location in selected window.
- **Context Sensitive Menus** are available in different windows by Right-clicking an item.
- **Scroll Bars** are available when the contents of a window (other than the main window) are larger than the size of that window.

Controlling the Windows

You can have multiple windows (resource windows or display windows) open on the workspace at a given time. You can control the windows as follows:

- **View** the Resource Windows (Hardware, Receivers, Channels, Display Tables or Email Groups) or Display Windows with the **View** menu.
- **Select** an open window by clicking the mouse on it or using the **Window** menu.
- **Move** a window by grabbing its title bar and dragging it.
- **Re-size** a window by grabbing an edge or corner and dragging it.
- **Minimize /Restore, Maximize** and **Close** the window using the standard Windows buttons on the top right corner of each window. If you close the last window, you will close the system. If changes have been made, you will have a chance to save the system.
- You can save the sizing and layout of your workspace by using the ***Save Layout*** command in the **Edit** menu.

Screen Elements

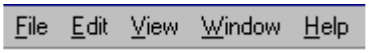


This program has many standard menu functions that are used in other Windows programs. For example, menus can be selected with the mouse or by holding down the ***ALT*** key while pressing the underlined letter on the menu. Note that a menu's appearance may change, and various menu options may be disabled, depending on the current state of the system.

Menu Bar

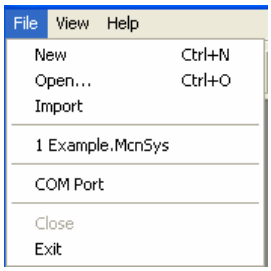
Two versions of the Menu Bar will be displayed. When there is no system opened, a small Initial Menu Bar will be displayed:

When a system is loaded, the standard Menu Bar will be displayed:



Initial File Menu

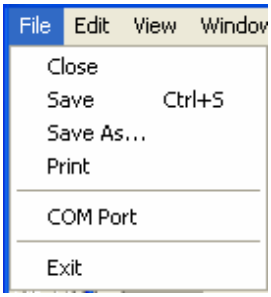
When there is no system loaded, the Initial File Menu is available.



New	Starts a new system from scratch.
Open	Opens an existing system from disk. This will open all the files associated with a particular system. Only one system can be open at a given time. You must close the existing system before starting a new system, importing a system from the DOS version of MCNRCD , or opening another system.
Import	Imports a system from the DOS version of the MCNRCD program.
Recent Files	Allows you to quickly open a recently used system.
COM Port	Selects the COM port used to program HIB-IP units
Exit	Exits the program.

Standard File Menu

Once a system is loaded, the Standard File Menu is available:



Close	Closes the current system. If something has changed, you will be given a chance to save it.
Save	Saves the current system with the current name. This will save all the files associated with a particular system.
Save As	Saves the current system with a new name. This will save all the files associated with a particular system.
Print	Prints the contents of the currently selected window.
COM Port	Selects the COM port used to program HIB-IP units
Exit	Exits the program. If something has changed, you will be given a chance to save it.

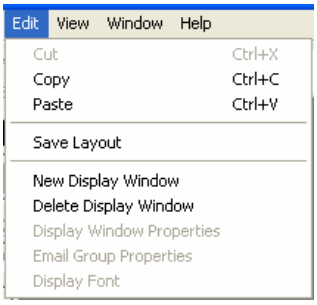
The Standard File Menu does not have the Open, Import, or Recent Files menu items.

Saving Files

We recommend that you save the system in a subdirectory or sub-folder of the main program working directory (typically C:\Program Files\CTI Products Inc\McnRcd Standard). When you first save a system, Windows may default to the My Documents folder. If so, browse to the working directory and add a new directory for your system description files.

Edit Menu

The **Edit** Menu is available whenever a system is loaded. Some menu items may or may not be enabled, depending on what is currently selected.



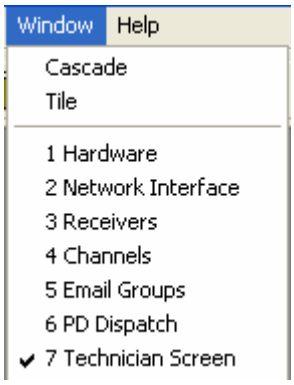
Cut	Cuts the selected item(s) and saves a copy in the clipboard.
Copy	Copies the selected item(s) to the clipboard.

Paste	Pastes the contents of the clipboard to the current cursor location. Some fields are special fields and will only accept certain data (or certain ranges of data) from the clipboard. See ***Restrictions on Using the Clipboard*** on page 90 for more details.
Save Layout	Saves the working screen layout (Window Positions, Column widths) for use when you start the program the next time.
New Display Window	Opens a new MCN Display Window.
Delete Display Window	Deletes an MCN Display Window.
Display Window Properties	Sets the properties (Window Title, Number of Rows & Columns) for the currently selected MCN Display Window.
Email Group Properties	Sets the properties (Group Name, Holdoff Time) for the currently selected Email Group.
Display Font	Sets the font and size for the currently selected Display Window. This is used to simulate the display for the MCN Server program. However, these font settings are used only for the MCNConfig program. The font settings for the MCN Server program (and the MCN Client program) are set by the user from those programs.

View Menu

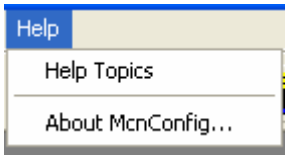
Toolbars	Turns the Toolbars on or off.
Status Bar	Turns the Status Bar (at the bottom of the screen) on or off.
Network Interface	Opens the Network Interface Window and makes it active.
Hardware	Opens the Hardware Resource Window and makes it active
Receivers	Opens the Receiver Resource Window and makes it active.
Channels	Opens the Channel Resource Window and makes it active.
Email Groups	Opens the Email Groups Window and makes it active.
Display Window	Opens an RCD (Remote Comparator Display) Display Window and makes it active.
Display Tables	Opens the Display Tables Window and makes it active.
Layout Mode	Turns on Layout Mode in a Display Window to enable re-sizing of columns (active only when a Display Window is active.)

Window Menu



Cascade	Cascades all open windows
Tile	Tiles all open windows
Window List (1-N)	Indicates currently open windows. Use this list to select a Resource (Network Interface, Hardware, Receivers, Channels, Email Groups, and Display Table) or Display window. The Resource Windows will appear in the order they were opened. Display Windows will be listed as named by the user. (Windows 6 & 7 in this screen shot are Display Windows.)

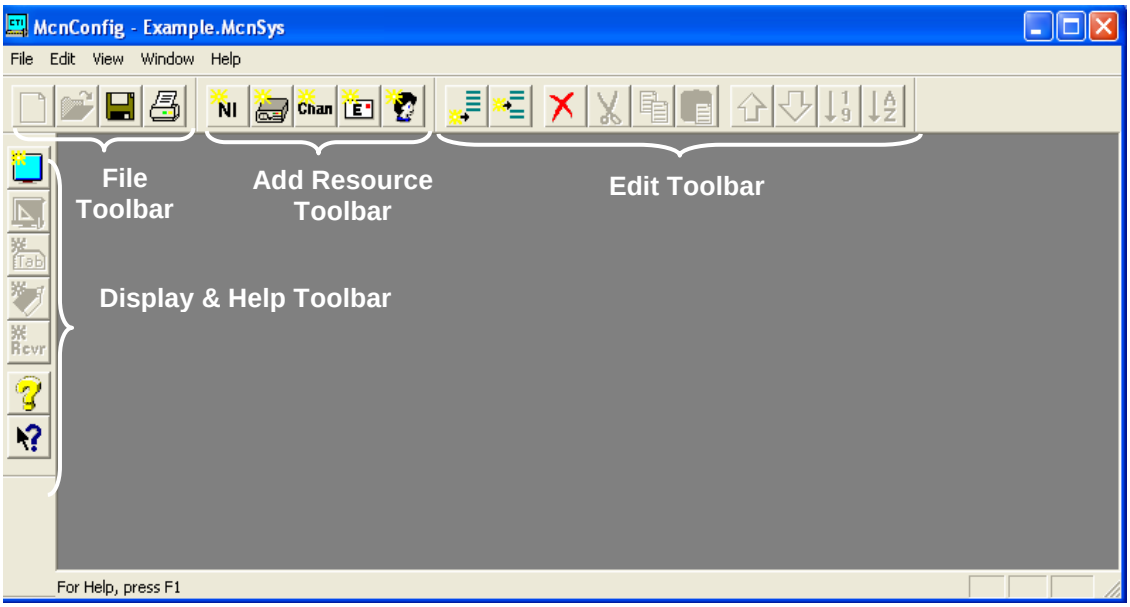
Help Menu



Help Topics	Brings up the standard **Help** menu.
About MCNConfig	Displays information about the program

Toolbars

The MCNConfig program has dockable toolbars indicated in the screen capture below. You can move the toolbars by clicking on the beginning or ending line in the toolbar and dragging it to the desired location.



Each Toolbar button has a Tool Tip that will be displayed when you hover the mouse over it. A more lengthy description of the button will appear in the Status Line at the bottom of the main window.

File Toolbar

	**New**	Opens a new system. Same as **File … New** menu item.
	**Open**	Opens a system from disk. Same as **File … Open** menu item.
	**Save**	Saves the current system to disk. Same as **File … Save** menu item.
	**Print**	Prints the data from the active window. Same as **File … Print** menu item.

Add Resource Toolbar

New Network Interface Module

Adds a new Network Interface module to the Network Interface resource window. (The Standard version of the MCN Server program supports only 1 Network Interface. If you need to support more than one Network Interface, you will need the MCN Advanced Server software.)

New Module Adds a new module to the Hardware List resource window. Adds the appropriate number of Receivers or I/O Blocks in the Receiver window.

New Channel Adds a new channel to the Channel List resource window.

New Email Group

Adds a new Email Group (tab) to the Email Group resource window.

New Email Recipient

Adds a new Email Recipient to the currently selected Email Group. If no Email Group is defined, this will add a new Email Group.

Edit Toolbar

Items in the Edit Toolbar work only in the currently selected window. If a toolbar item is not available in a particular window, it will be grayed out.

Append Adds a new item to the end of a list of items. This item is not available in the Receiver Window or Display Window.

Insert Inserts a new item at the current location in a list of items. This item is not available in the Receiver Window or Display Window.

Delete Deletes the currently selected item(s).

Cut Deletes the currently selected item(s) and copies them to the clipboard.

Copy Copies the currently selected item(s) to the clipboard without deleting them from the selected window.

Paste Pastes the clipboard contents to the current location in the selected window:

Some fields are special fields and will only accept certain

data (or certain ranges of data) from the clipboard. See ***Restrictions on Using the Clipboard*** on page 90 for more details.

Move Up Moves up the currently selected item in the list. This item is not available in the Receiver Window or Display Window.

Move Down Moves down the currently selected item in the list. This item is not available in the Receiver Window or Display Window.

Sort Numeric Sorts the Hardware Module list by MCN Group & Module numbers. This item is available only in the Hardware Window.

Sort Alpha Sorts the list alphabetically. This item is available only in the Channel Window and the Email Window.

Display & Help Toolbar

New Display Adds a new display window.

Display Window Properties
Opens the Grid Properties dialog box. Allows changes to be made to the window Title, and the number of rows and columns for a Display Window. This item is available only when a Display Window is selected.

New Tab Appends a display tab to the selected Display Window. This item is available only when a Display Window is selected.

New Label Adds a Label at the current position in the selected Display Window. This item is available only when a Display Window is selected.

New Receiver Adds Receiver(s) or I/O Group(s) to the current position in the selected Display Window. This item is available only when a Display Window is selected.

Help Displays the Help menu window.

Context Sensitive Help
Displays the context sensitive help system. After this Tool is selected, specific help for an item is available by clicking on that item.

MCNConfig Program: Configuring System Resources

The first step in configuring a system is configuring the Resources in the four Resource Windows:

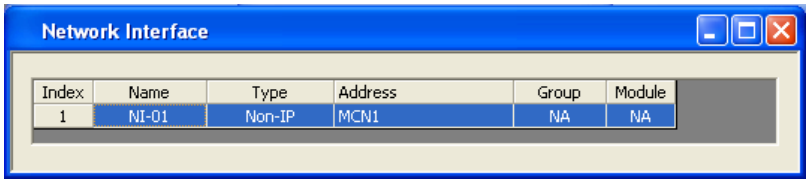
- Network Interface Window — Displays the Network Interface selected for this system. This window also lets you configure the IP settings for a HIB-IP module (if used).
- Hardware Window — Define hardware modules & addresses
- Receiver Window — Define receiver names & I/O group names for all hardware modules
- Channel Window — Enter channel information
- Email Group Window — Enter email information for alerting

File Conversion Note

If you have a DOS based MCNRCD system, you can import the Hardware and Receiver information from that system. This will save a lot of work. See <<<<_____>>>> on page <<<< _____>>>> for more details.

Network Interface Window

This window displays the Network Interface selected for this system.
This window also lets you configure the IP settings for a HIB-IP module (if used).



The Standard version of the MCN Server software supports a single Network Interface. If you need to support multiple Network Interfaces, you'll need to get the MCN Advanced Server software.

The Network Interface Resource Window includes the following fields:

Name
Network Interface Name (as stored in the database for this system)

Type
Type of Network Interface Module:

Non-IP	PCLTA
	HIB-232
IP	HIB-IP

The settings for Non-IP Network Interfaces are set up with the HWSetup program and stored in the PC registry. The MCN Server program will get that information from the registry when it runs.

The settings for the IP Network Interfaces (HIB-IP) are set up in the MCNConfig program and saved in the database for the MCN system. You will also use the settings stored in the system database to program the HIB-IP unit (through a COM port).

Address
This is used only for Non-IP Network Interfaces.
It is a pointer to the Non-IP Network Interface that is set up with the HWSetup program.
It will normally be "MCN1".

Group
MCN Group Number for this module (Hex value 00-FE)
This is shown only for HIB-IP units (which are configured in MCNConfig program).

Module
MCN Module Number for this module (Hex value 0-F)
This is shown only for HIB-IP units (which are configured in MCNConfig program).

MCN Group & Module Settings

All Network Interfaces and MCN modules must have unique addresses.

In addition, in Custom Engineered systems with Routers and EXB Network Extenders, there may be specific Group & Module addresses that must be used with particular Network Interfaces, depending on their location in the MCN network.

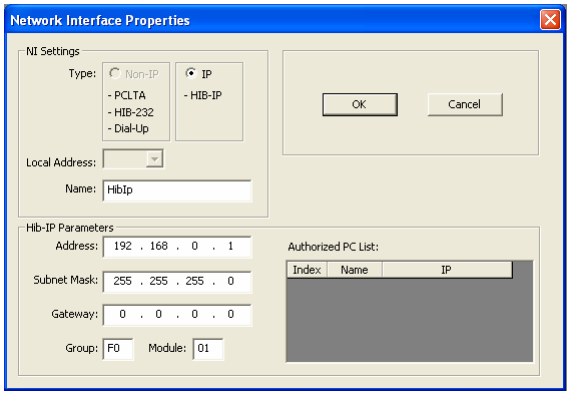
If you have a Custom Engineered System, be sure to consult your custom system configuration documentation for the proper setting for the Group & Module addresses for your Network Interfaces.

Adding a Network Interface – HIB-IP only

(Skip this section if you are using a PCLTA, or non dial-up HIB-232 module.)

When you start to build a new system, the MCNConfig program will look in the registry to determine which Network Interface you have selected. If you have set up a Non-IP Network Interface (such as a PCLTA, or a Non-Dial-Up HIB-232) in the HWSetup program, the MCNConfig program will find it and select it as the Network Interface for this system.

If you have selected a HIB-IP in the HW Setup program, the MCNConfig program will open the Network Interface Properties window.



Enter the appropriate parameters for the HIB-IP unit:

Name

Give a name to the HIB-IP unit. This is the name that you will refer to when you add hardware modules to the system.

Address

Enter a valid Class A, B, or C IP address for this unit.
See details in the HIB-IP Hardware Reference Manual.

Subnet Mask

Enter the Subnet Mask for this IP address.
See details in the HIB-IP Hardware Reference Manual.

The HIB-IP Subnet Mask **cannot be less restrictive** than the following standard IP Class Subnet Masks

Class	First Octet	Standard Subnet Size	Standard Subnet Mask
A	1-127	16,777,214	255.0.0.0
B	128-191	65,543	255.255.0.0
C	192-223	253	255.255.255.0
D	224-239	Multicast – Do not use.	
E	240-255	Experimental – Do not use.	

The HIB-IP units can accept a subnet mask that is more restrictive (more 1's set in the Subnet Mask), but not less restrictive.

Gateway

If the MCN Server PC will be using an IP address that is in a different subnet than the HIB-IP, you must enter a Gateway IP address. This is the IP address of the IP router that the HIB-IP will communicate to in order to talk to a PC that is on a different IP subnet. The Gateway IP address must be on the same subnet as the HIB-IP unit.

If the MCN Server PC and the HIB-IP are on the same subnet, you do not have to enter a Gateway address.

See details in the HIB-IP Hardware Reference Manual.

Group

MCN Group address for the HIB-IP.

Value: 00-FE Hex
See Warning in **Important: MCN Address Setting** on Page 26.

Module

MCN Module address for PCLTAs and HIB-IP units.

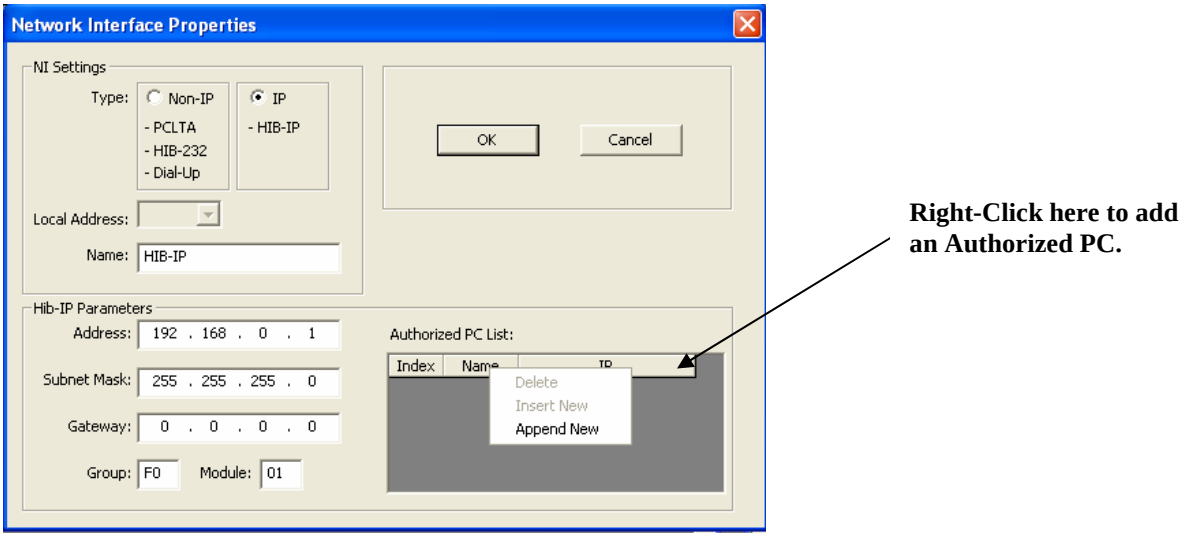
Value: 00-7E Hex Usually a HIB-IP will be set for a module number of 10 hex or above. This leaves room for HIB-232 modules in the system, which are limited to Module Numbers 0-F.

See Warning in **Important: MCN Address Setting** on Page 26.

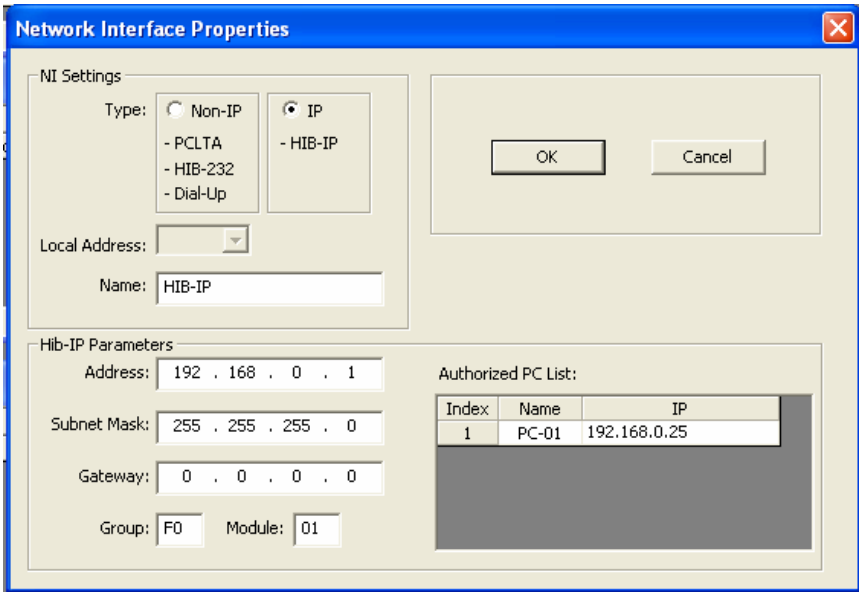
HIB-IP Authorized PCs

For system security purposes, the HIB-IP will communicate only with Authorized PCs Authorized Servers). You may enter multiple IP addresses for Authorized PCs.

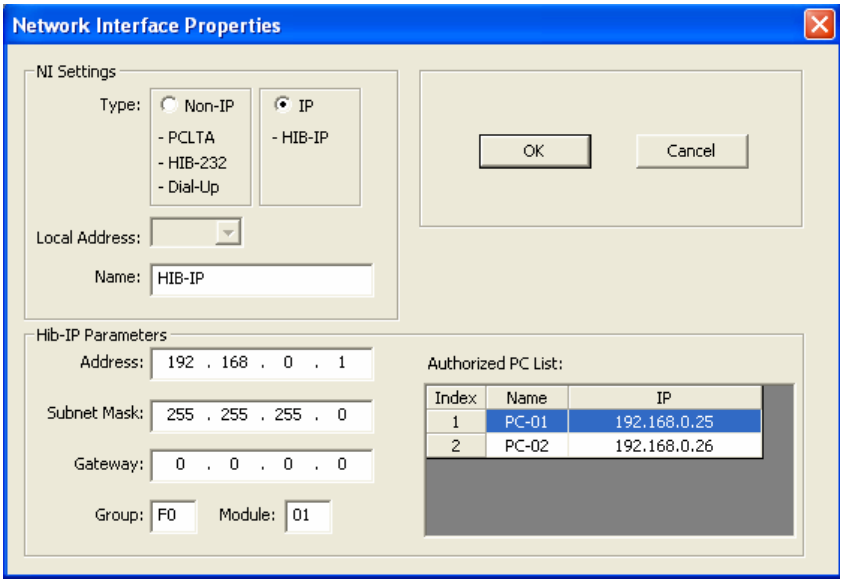
To add an Authorized PC, **Right-Click** on the Authorized PCs list to bring up the menu.



Select **Append New**.



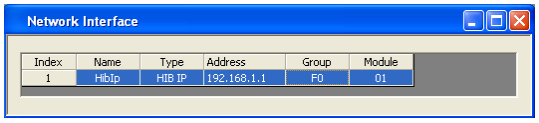
- A new PC will be entered.
- Edit the PC Name (if desired).
- Edit the IP settings to match the PC you plan to use.
- You can add additional Authorized PCs by right-clicking in the Authorized PC list.



- Set up the parameters for the HIB-IP unit.
- When you are finished entering Authorized PCs, click the **OK** button.

Although you can enter multiple Authorized PCs in the HIB-IP database, the HIB-IP can connect to only one PC at a time. If a second PC attempts to connect to a HIB-IP at the same time (even if it is in its Authorized PC list), it will be rejected.

The HIB-IP unit will appear in the Network Interface window.



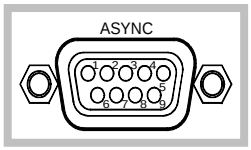
It will then be associated with all the hardware modules (such as CIBs, AIBs, and IOBs).

In the MCNConfig Standard program you will be able to have only one Network Interface per system. (If you need multiple Network Interfaces, like multiple HIB-IP units, you'll need the MCN Advanced Server software.)

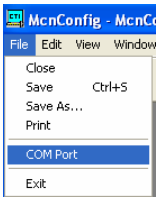
Programming HIB-IP Units

You must use MCNConfig program to download the parameters to the HIB-IP unit before you can use it.

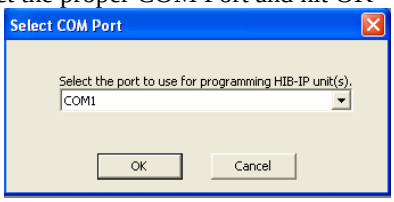
1. Be sure all the HIB-IP and Authorized PC parameters have been entered into the PC database as described above
2. Connect a Null Modem cable (CTI # 89-11314) between the PC and the Async Serial Programming connector on the HIB-IP.



3. Go the File menu and select COM Port:

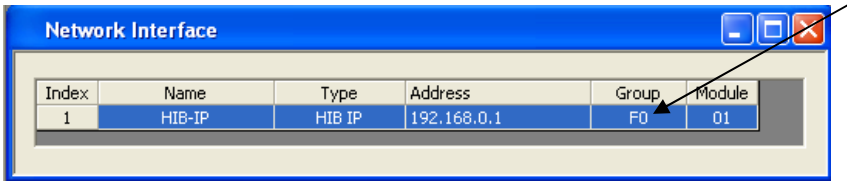


4. Select the proper COM Port and hit OK



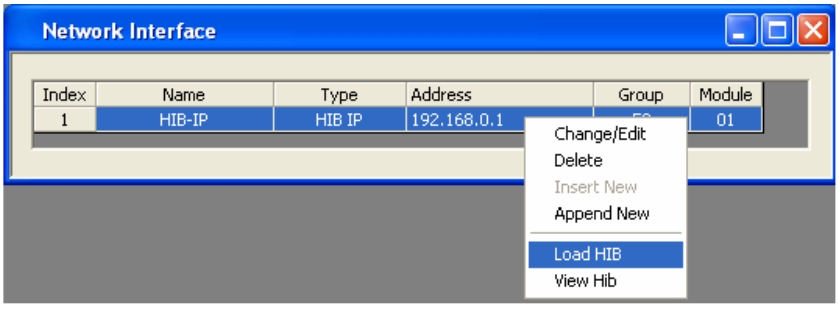
.

5. Go to the Network Interfaces window and select the proper HIB-IP unit.

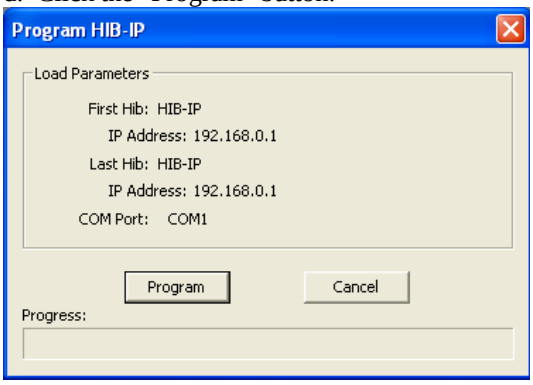


Right-Click on the HIB-IP

6. Right-click on the HIB-IP unit and select "Load HIB" from the pop-up window.



d. Click the "Program" button.



Hardware Resource Window

This is a list of hardware modules in the system.

Index	NI	Group	Module	Type	Banks	Location	Name	Channel
1	Hib IP-01	00	0	CIB	1	Comm Center Rack 1	Spectra-TAC 1	Police East
2	Hib IP-01	00	1	CIB	1	Comm Center Rack 1	Spectra-TAC 2	Police West
3	Hib IP-01	00	2	CIB	3	Comm Center Rack 2	Digitac 1	FD Dispatch
4	Hib IP-02	10	0	AIB	1	Hilltop Water Tank	Astrotac 1	Detectives
5	Hib IP-02	10	1	IOB Std	1	Hilltop Water Tank	Alarm I/O	Alarms

The Hardware Resource Window includes the following fields:

NI

Network Interface to use for this module.
This is a drop-down field that will let you select from the defined Network Interfaces for this system (either PCLTA, HIB-232, or HIB-IP). In the example above, there is a HIB-IP at the Communications Center connecting to the modules there and another at the Hilltop Water Tank.

Group

MCN Group Number for this module (Hex value 00-FE)

Module

MCN Module Number for this module (Hex value 0-F)

Type

Module Type from the following table:

Module Type	Description	Receivers or I/O Blocks
CIB	Comparator Interface	8
AIB	Astrotac Comparator Interface	8, 16, 24, 32, 40, 48, 56, 64 (Depending on Bank setting)
IOB Std (4 bits each)	General I/O Controller	8 I/O Blocks
IOB 2 Bit (2 bits each)	General I/O Controller	16 I/O Blocks
IOB 1 Bit (1 bit each)	General Input Device	32 Input Blocks

Banks

Number of receiver banks (8 receivers per bank). AIB modules can have up to 8 banks. All other modules have only 1 bank. A drop-down list is provided.

Location

Typically refers to site name for this particular module.

Free format text field for customer use.
Not required for program operation.
Can be used in error logging & emails

Name

Typically used to identify a particular module.

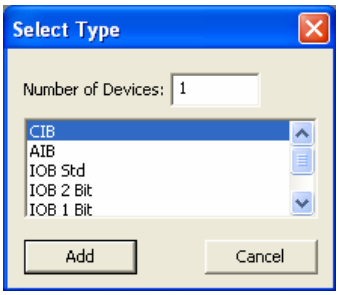
Free format text field for customer use.
Not required for program operation.
Used in error logging & emails.

Channel
The radio channel associated with this module.

Drop-down field.
Select one of the Channels from the Channel resource list.
Can be used in error logging & emails

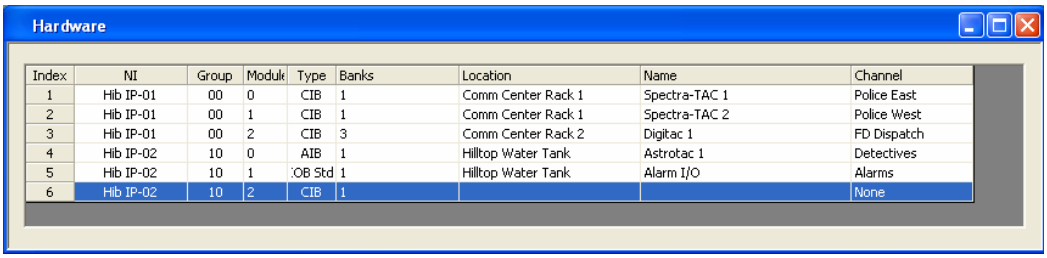
Adding a Hardware Module

- Add new hardware module with the **New Module** button.

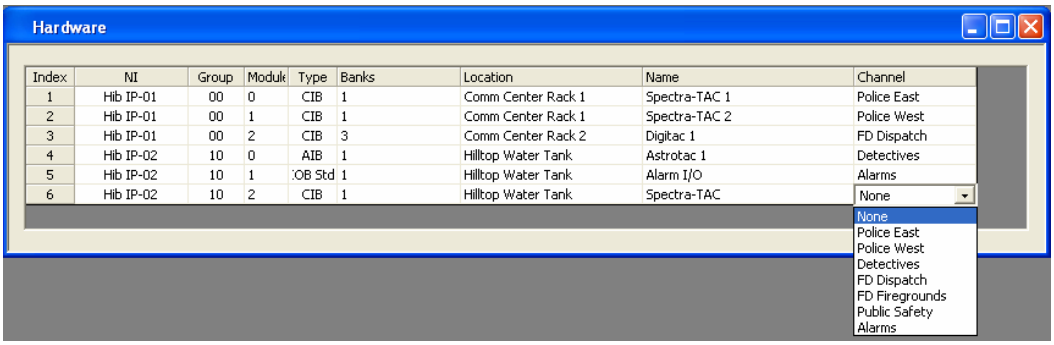


- Select a Hardware Type and hit Add.

  A new hardware module will be added to the bottom of the list. It will have the next Group & Module number.



- If this is an AIB module, enter the proper number of banks.
- Enter the Location and Name.
- Select a Channel from the drop--down menu



TIP Don't see any Channels in the list? See ***Adding a Channel*** on page 57 for instructions on how to create channels.

Group & Module Numbers

The program assigns the first module a Group:Module address of 00:0.
If this is not correct for your system, you can change the Group & Module numbers.

Group numbers are hex values that can be from 00 to FE.
Module numbers are hex values that can be from 0 to F.

The program will automatically increment the Module number from the last used number.
When the Module number rolls over from F to 0, it will increment the Group number.

Group & Module number combinations in any particular MCN system must be unique. The MCN Server can access multiple separate MCN Networks with multiple HIB-IP units. Separate MCN Networks are networks that are not tied together with EXB modules. Separate MCN Networks can have modules with the same MCN Group & Module number combinations.

Automatic Linking to Receiver Window

When you add a new Hardware Module, the program automatically adds the appropriate number of Receivers or I/O Groups in the Receiver window.

When you change the order of hardware modules in the Hardware window, the Receivers & I/O Groups follow in the Receiver Window.

When you select a hardware module, the receiver window scrolls so that the first receiver or I/O group in that module is visible.

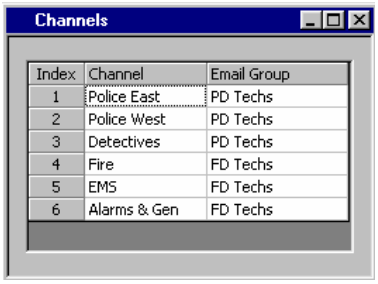
Hardware Window Toolbar Buttons

The following toolbar buttons will also function in the Hardware Window:

See ***Toolbars*** on page 44 for more details.

Channels Resource Window

The Channels Window contains a list of radio channels used in the system. It is used to logically group a number of hardware modules. It can also be used to route email alerts to different email groups for different channels.



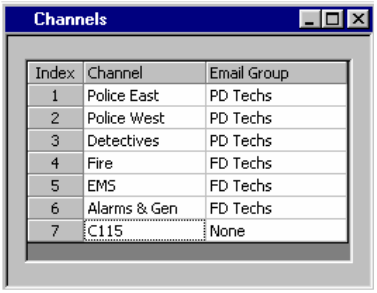
Each channel has the following fields:

Channel
Channel name. (ex: Fire East, Countywide, Command, etc.) Free format text field.
Used in error logging & emails

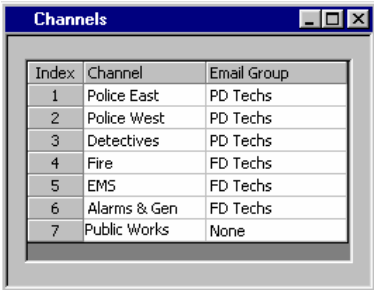
Email Group
This is the group of Emails to send error alerts to for this channel.
Drop-down field. Select one of the Email Groups from the Email Group resource list.

Adding a Channel

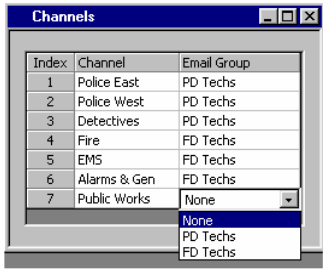
- Add new channel with the **New Channel** button.
  The program will add a new Channel to the end of the list



- Enter the Channel Name.



- Select an Email Group from the drop-down selection



TIP Don't see any Email Groups in the list? See ***Adding an Email Group*** on page 59 for instructions on how to create channels.

Channel Window Context Sensitive (Right Click) Menu

By right-clicking on the Channel list, the following menu appears:

- **Sort** sorts the channels alphabetically.
- **Move Up** and **Move Down** will move the selected channel up or down in the list.
- **Delete** will delete a channel.
- **Copy** copies the current selection to the clipboard.
- **Paste** pastes the clipboard contents to the current location.
- **Insert New Channel** will insert a new channel at the current location in the list.
- **Append New Channel** adds a new channel at the end of the list.

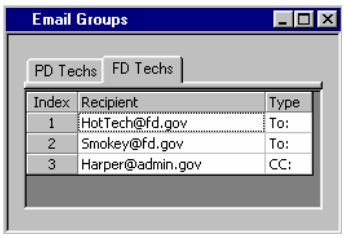
Channel Window Toolbar Buttons

The following toolbar buttons will also function in the Channel Window:

See ***Toolbars*** on page 44 for more details.

Email Groups Resource Window

The MCN Server program can send emails when it detects failures. Emails can be sent to multiple recipients. You can send email alerts to different groups of email recipients based on which channel has a failure. An email window with two email groups is shown below



If the Email Group window is not visible, use the menu command ***View … Email Groups*** to open it. Each Email Group has its own tab. An "Email Group Tab" identifies a group of email addresses with a "Group Name". This is a free format text field. (ex: Police Techs, FD/EMS Techs). Each entry in an Email group has the following fields::

Recipient

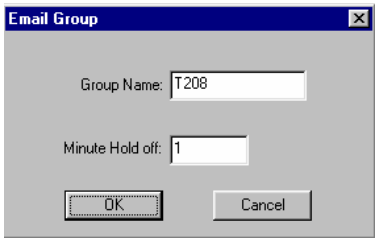
Destination email (ex: JoeJones@aol.com)
There can be multiple recipients in an Email Group.

Type

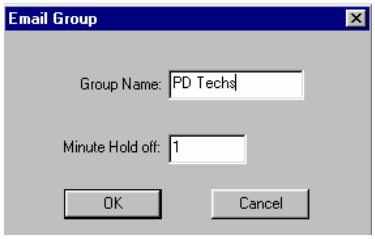
Message type to use for messages to this email address.
Select from: To:, CC:, BCC:

Adding an Email Group

- Add a new Email Group with the **New Email Group** button.
  The Email Group Dialog box appears. It will have a unique Email Group name.



- Enter the desired Email Group Name and the Hold Off Time and click the **OK** button.



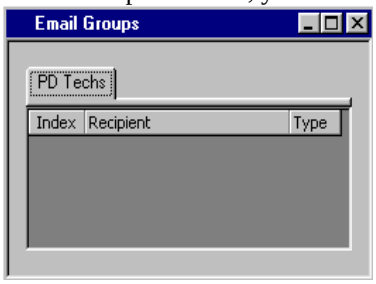
Email Holdoff Time

In normal system operation, multiple failures can happen within a short time of each other.
For instance, a "Stuck Microphone" will eventually cause all the receivers to go into Fail mode.
Typically, all the receivers will fail within about 15 seconds of each other. The system can aggregate these failures into one email instead of sending multiple emails. When the program starts to send an

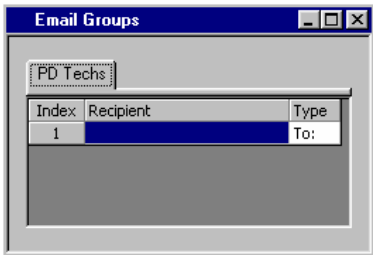
email to an Email group, it will wait for the Email Holdoff Time to expire before sending the email. When the timer times out, the system will send all the collected messages in one email.

Adding Email Recipients

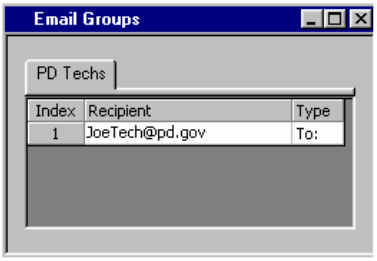
Once an Email Group is created, you can add email recipients.



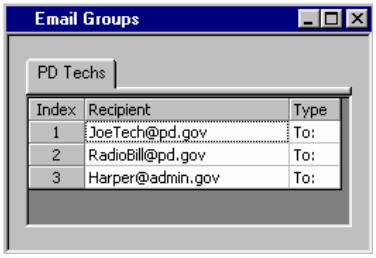
- Add a new Email Recipient with the **New Email Recipient** button
  If no Email Group is defined, this will add a new Email Group.



- Enter the desired email address.

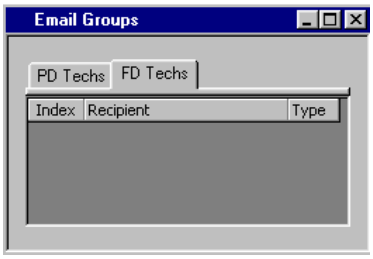


- Continue the process to add more recipients to a group.

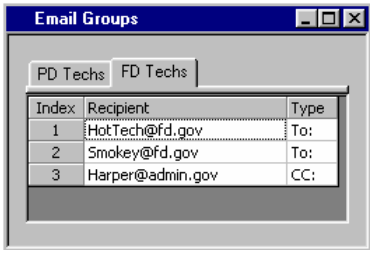


Adding Multiple Email Groups

- Add additional Email Groups by using the **New Email Group** button:



- Add recipients with the **New Recipient** button.

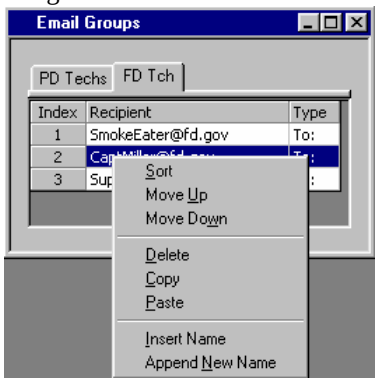


Email Group Context Sensitive (Right Click) Menu

The following menu functions are available with a right click on the Email Group tabs.

Email Recipient Context Sensitive (Right Click) Menu

The following menu functions are available with a right click in the Email Recipient list.



Email Group Window Toolbar Buttons

The following toolbar buttons will also function in the Email Groups Window:

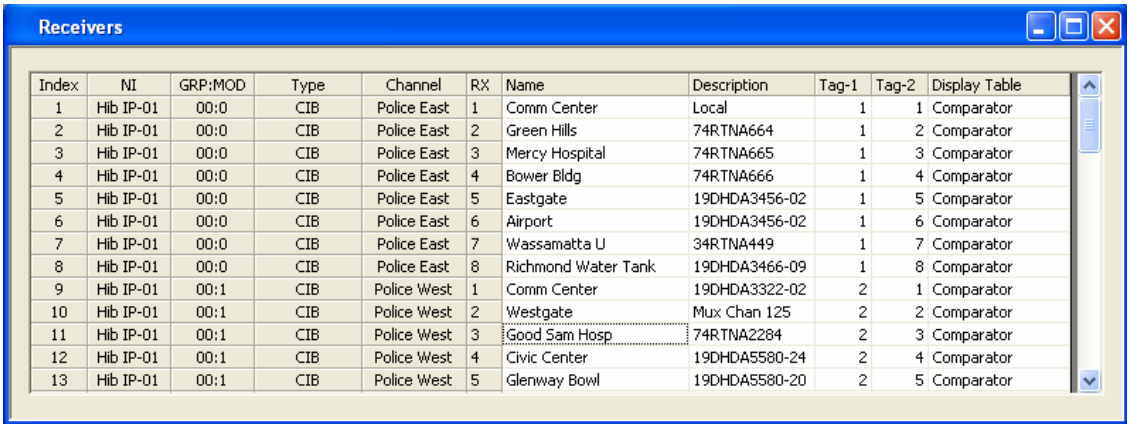
See ***Toolbars*** on page 44 for more details.

Receivers Resource Window

The Receivers Window shows:

- The site names for all the receivers in the system.
- Input/Output groups for I/O modules

It is based on the modules defined in the Hardware Window.



Index	NI	GRP:MOD	Type	Channel	RX	Name	Description	Tag-1	Tag-2	Display Table
1	Hib IP-01	00:0	CIB	Police East	1	Comm Center	Local	1	1	Comparator
2	Hib IP-01	00:0	CIB	Police East	2	Green Hills	74RTNA664	1	2	Comparator
3	Hib IP-01	00:0	CIB	Police East	3	Mercy Hospital	74RTNA665	1	3	Comparator
4	Hib IP-01	00:0	CIB	Police East	4	Bower Bldg	74RTNA666	1	4	Comparator
5	Hib IP-01	00:0	CIB	Police East	5	Eastgate	19DHDA3456-02	1	5	Comparator
6	Hib IP-01	00:0	CIB	Police East	6	Airport	19DHDA3456-02	1	6	Comparator
7	Hib IP-01	00:0	CIB	Police East	7	Wassamatta U	34RTNA449	1	7	Comparator
8	Hib IP-01	00:0	CIB	Police East	8	Richmond Water Tank	19DHDA3466-09	1	8	Comparator
9	Hib IP-01	00:1	CIB	Police West	1	Comm Center	19DHDA3322-02	2	1	Comparator
10	Hib IP-01	00:1	CIB	Police West	2	Westgate	Mux Chan 125	2	2	Comparator
11	Hib IP-01	00:1	CIB	Police West	3	Good Sam Hosp	74RTNA2284	2	3	Comparator
12	Hib IP-01	00:1	CIB	Police West	4	Civic Center	19DHDA5580-24	2	4	Comparator
13	Hib IP-01	00:1	CIB	Police West	5	Glenway Bowl	19DHDA5580-20	2	5	Comparator

TIP

Fast Navigation in Receiver Window

The Receiver Window is linked to the Hardware Window. Clicking on a module in the Hardware Window will bring up the first receiver of that module in the Receiver Window.

Each entry in the Receivers Window has the following fields:

NI

Network Interface for this hardware module. This is a read-only field and is defined in the Hardware window.

Grp:Mod

The MCN Group & Module number for the hardware module. This is a read-only field defined in the Hardware Window. The order of modules follows the module order in the Hardware window.

Type

The Module Type (CIB, AIB, IOB Std, IOB 2 Bit, IOB 1 Bit, etc.) for the hardware module. This is a read-only field that is controlled in the Hardware Window

Channel

The radio channel for the hardware module. Read-only field (defined in Hardware list).

Rx

The Receiver Number for this receiver. This is a sequential number for a particular receiver within its module. Read-only field. The maximum receiver number in a module is based on the Bank number in the Hardware list.

Name

Receiver site name (ex: North Tower, VA Hospital, etc.). Free-format text field. Change the Receiver Name by selecting the cell and typing in the name.

You can also cut & paste descriptions from Excel. See ***Using the Clipboard from other Applications*** on Page 89.

Description

Free format text field for general customer use. Many customers use this field to store an identifier for the leased line, microwave channel, or T1 channel bank and channel number for this receiver. This field is not required for program operation. Can be used in error logging & emails

TIP

You can also cut & paste descriptions from Excel. See ***Using the Clipboard from other Applications*** on Page 89 for more details.

Tag-1

This is a free-format user defined field. It is used with the TPCI option in the Advanced Server software. You can use it as a note field in the Standard Server software.

Tag-2

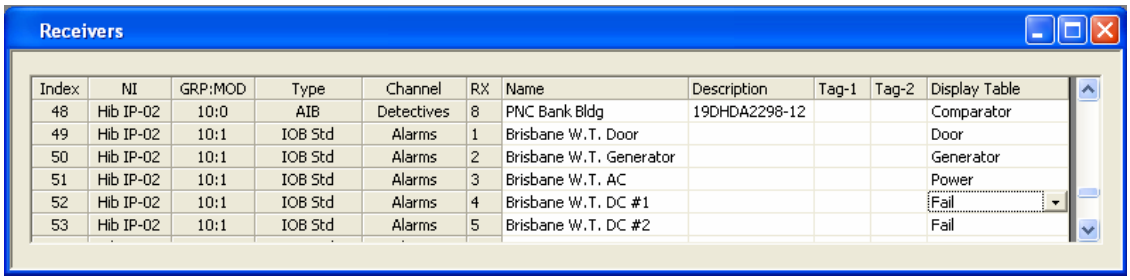
This is a free-format user defined field. It is used with the TPCI option in the Advanced Server software. You can use it as a note field in the Standard Server software.

Display Table

This is the mapping table to use for this receiver (or alarm point). The Display Table determines how the input bits from the hardware modules are mapped to the status display.

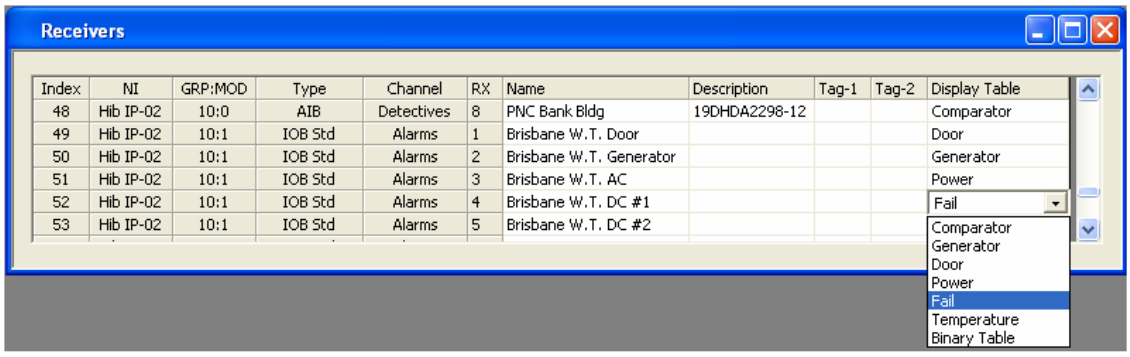
If you have all receivers, you will probably just use the "Comparator" table. This maps the inputs to the standard "Vote", "Rx", "Dis", and "Fail" statuses.

If you have some Input / Output groups that are used for things such as microwave or site alarms, you will need to select a different Display Table (such as "Generator", "Door" or "Power") for those points.



Index	NI	GRP:MOD	Type	Channel	RX	Name	Description	Tag-1	Tag-2	Display Table
48	Hib IP-02	10:0	AIB	Detectives	8	PNC Bank Bldg	19DHDA2298-12			Comparator
49	Hib IP-02	10:1	IOB Std	Alarms	1	Brisbane W.T. Door				Door
50	Hib IP-02	10:1	IOB Std	Alarms	2	Brisbane W.T. Generator				Generator
51	Hib IP-02	10:1	IOB Std	Alarms	3	Brisbane W.T. AC				Power
52	Hib IP-02	10:1	IOB Std	Alarms	4	Brisbane W.T. DC #1				Fail
53	Hib IP-02	10:1	IOB Std	Alarms	5	Brisbane W.T. DC #2				Fail

This is a drop-down field. Select one of the Display Tables from the drop-down list.



Index	NI	GRP:MOD	Type	Channel	RX	Name	Description	Tag-1	Tag-2	Display Table
48	Hib IP-02	10:0	AIB	Detectives	8	PNC Bank Bldg	19DHDA2298-12			Comparator
49	Hib IP-02	10:1	IOB Std	Alarms	1	Brisbane W.T. Door				Door
50	Hib IP-02	10:1	IOB Std	Alarms	2	Brisbane W.T. Generator				Generator
51	Hib IP-02	10:1	IOB Std	Alarms	3	Brisbane W.T. AC				Power
52	Hib IP-02	10:1	IOB Std	Alarms	4	Brisbane W.T. DC #1				Fail
53	Hib IP-02	10:1	IOB Std	Alarms	5	Brisbane W.T. DC #2				

Receiver Window Context Sensitive (Right Click) Menu

The following menu functions are available with a right click in the Receiver list.

Receiver Window Toolbar Buttons

The following toolbar buttons will also function in the Receiver Window:

See ***Toolbars*** on page 44 for more details.

Since the Receiver & I/O Group rows are controlled by the Hardware Window, functions such as Append, Insert, Sort, Up, & Down are not available in this window.

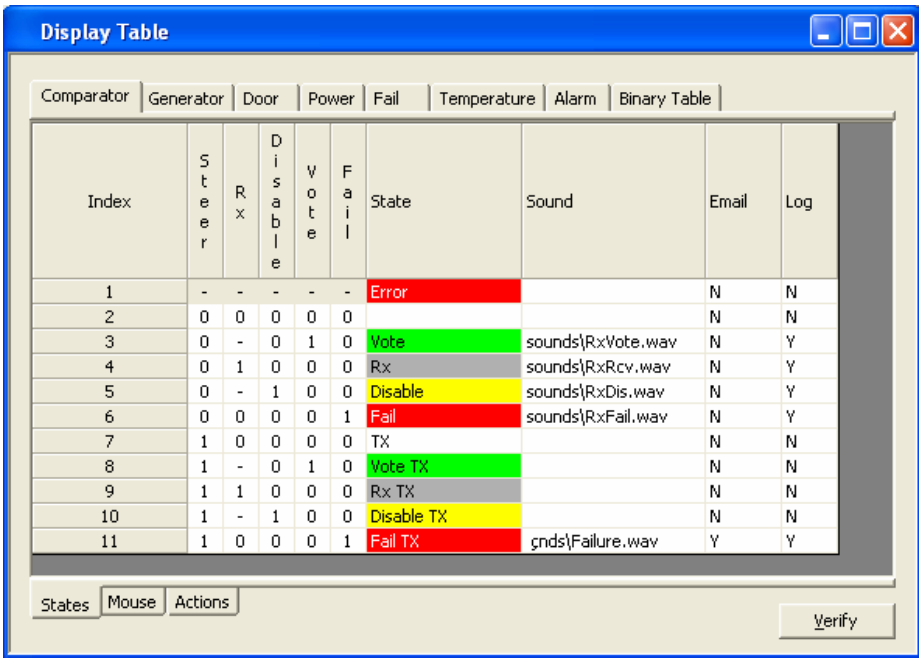
Display Tables Window

The Display Tables window allows you to define various Display Tables for I/O devices. The Display Tables map the input bit values from the devices to the text and colors to be displayed on the screen.

A number of Display Tables are pre-defined:

- Comparator
- Generator
- Door
- Power
- Fail
- Temperature
- Binary

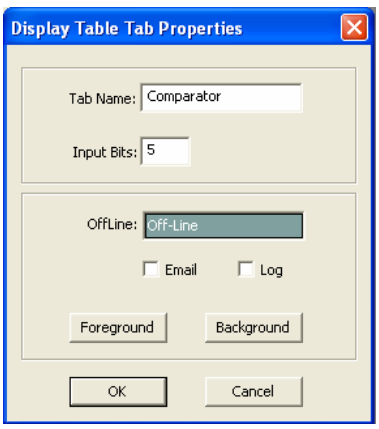
From the menu, select **View / Display Tables**.



Index	Steer	Rx	Disable	Vote	Fail	State	Sound	Email	Log
1	-	-	-	-	-	Error		N	N
2	0	0	0	0	0			N	N
3	0	-	0	1	0	Vote	sounds\RxVote.wav	N	Y
4	0	1	0	0	0	Rx	sounds\RxRcv.wav	N	Y
5	0	-	1	0	0	Disable	sounds\RxDis.wav	N	Y
6	0	0	0	0	1	Fail	sounds\RxFail.wav	N	Y
7	1	0	0	0	0	TX		N	N
8	1	-	0	1	0	Vote TX		N	N
9	1	1	0	0	0	Rx TX		N	N
10	1	-	1	0	0	Disable TX		N	N
11	1	0	0	0	1	Fail TX	cnds\Failure.wav	Y	Y

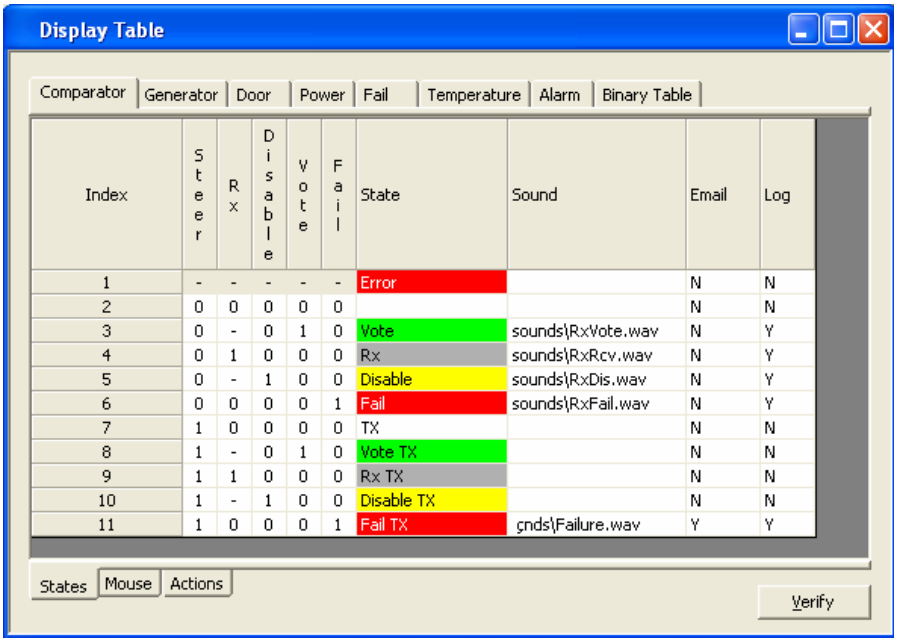
Display Table Tab Properties

To display the overall properties for a Display Table, **Double-Click** on its tab.



From this window you can change the following items for this Display Table:
-Display Table (tab) name
-Number of input bits
-Offline Text & Colors (displayed when a module is offline)
-Overall Email & Logging flags.

States Tab



Index	Steer	Rx	Disable	Vote	Fail	State	Sound	Email	Log
1	-	-	-	-	-	Error		N	N
2	0	0	0	0	0			N	N
3	0	-	0	1	0	Vote	sounds\RxVote.wav	N	Y
4	0	1	0	0	0	Rx	sounds\RxRcv.wav	N	Y
5	0	-	1	0	0	Disable	sounds\RxDis.wav	N	Y
6	0	0	0	0	1	Fail	sounds\RxFail.wav	N	Y
7	1	0	0	0	0	TX		N	N
8	1	-	0	1	0	Vote TX		N	N
9	1	1	0	0	0	Rx TX		N	N
10	1	-	1	0	0	Disable TX		N	N
11	1	0	0	0	1	Fail TX	cnds\Failure.wav	Y	Y

Each Display Table has a series of states based on the values of the input bits. In addition to the specifically defined input states, each Display Table has two special states:

- Offline. This is displayed when a module is offline. It is configured in the Display Tab Properties window.
- Default: This is the first state in the table (with all dashes).
  It is used for any of the conditions not shown in the table.

The fields in the States tab are:

State Bit Names

This field shows the functions of the input bits as received from the hardware. Bit 0 (lsb) is the right-most bit in the State Lines.

Since the comparator modules have fixed bit assignments, the Comparator Display Table has fixed bit names. Bits used by other I/O devices will be user-defined based on their function. The Bit Names in these Display Tables are user-assignable.

State Input Bits

Each Status line has a series of input bits that corresponds to its state. This is a trinary (binary with don't care) field that defines the state.

Trinary Values

0 Not active

1 Active

\- Don't Care

Don't Care bits

A state that has a dash "-" in a bit position will be active whether that bit is either active or inactive. For example, in the standard Comparator Display Table, the Vote state has a Don't Care for the Rx bit. The Vote status will be indicated whether or not the Receive bit is active.

State Priority

The states in the table have the following priority:

1. Off-Line — If the module is off-line.
2. Numbered States — Lowest number has the highest priority.
3. Default State — If no other state is found to match the input bits.

If an input value is covered by two defined states, the lower numbered state will be displayed.

State Text & Color Field

This is free-format text to be displayed when this state is active.

Foreground and background colors can be defined for each state.

Sound Field

This field is the .WAV sound file to be played whenever any input changes to this state. This field is typically used only for alarm conditions.

Sounds are played only if the state is also logged. If you want a sound to play for a state entry, make sure the Log field is set to 1.

Email Field

This is a flag to determine whether or not to log this state to email.

0 = Don't log

1 = Log

If the Logging flag is set to 1, an email log entry will be generated whenever an input goes into or out of this state.

Log Field

This is a flag to determine whether or not to log this state (to screen, printer, or disk).

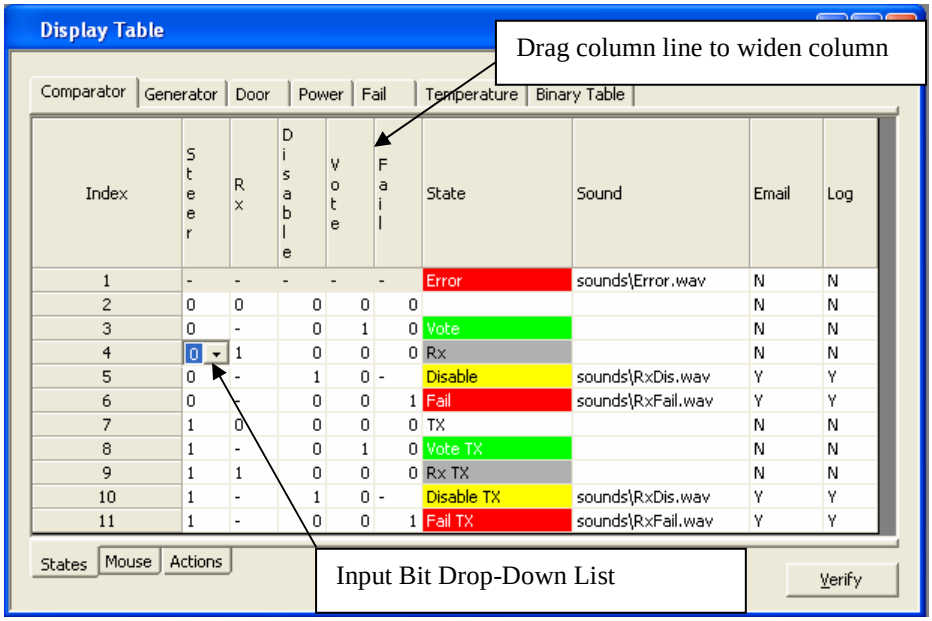
0 = Don't log

1 = Log

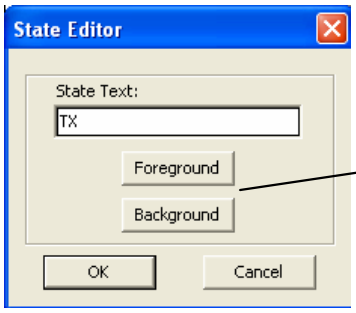
If the Log flag is set to 1, a log entry will be generated whenever an input goes into or out of this state.

Editing the fields

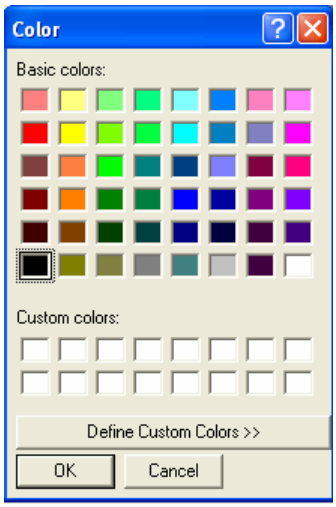
Input Bit Values: Click in the bit value field to edit
You can either enter a value (0,1,-) or use the drop-down list.
You may need to widen the columns to see the drop-down list properly.



State Names Double click on the State name.
A State Editor dialog box will appear.
Enter the appropriate State Text.

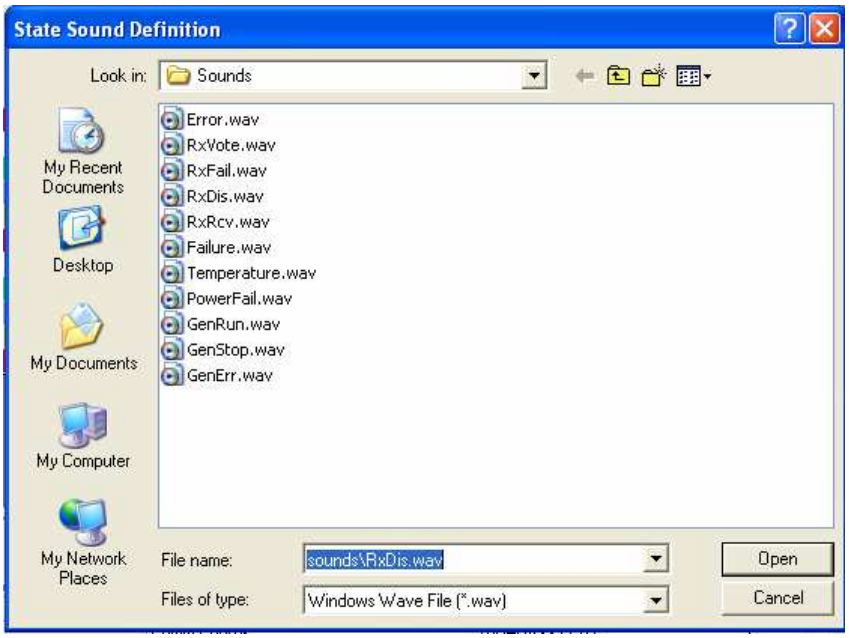


State Color From the State Editor dialog box, hit the Foreground or Background button.
Select the appropriate color.



Sound

To select a sound, double click in the Sound cell.
Select the appropriate WAV file from the State Sound Definition window.



Email Flag

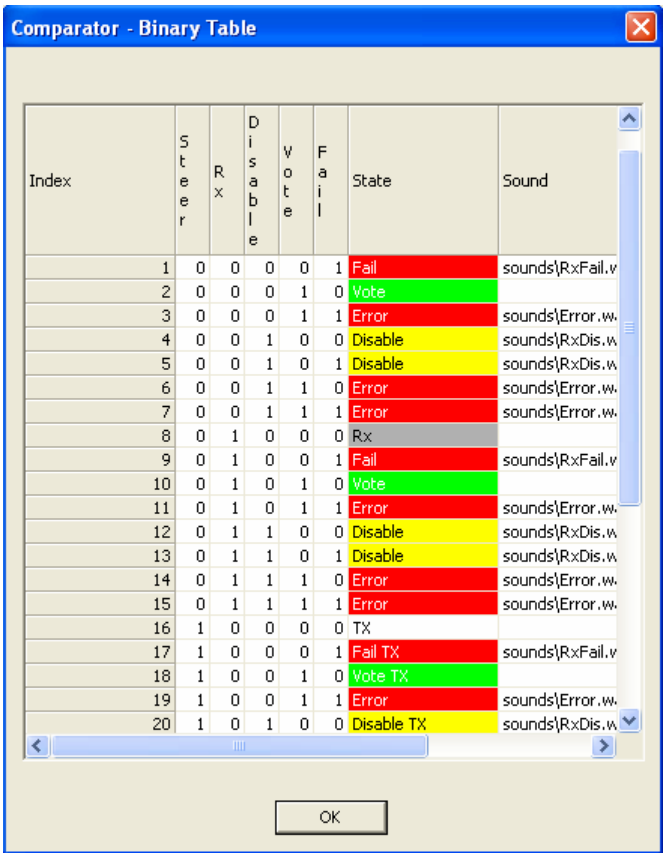
Click in the field.
Type in "Y" or "N" or use the Drop-Down List.

Log Flag

Click in the field.
Type in "Y" or "N" or use the Drop-Down List.

State Table Verify

Since the entries in the Display Table are free-format (and also allow Don't Care bits), it's easy to build a Display table that doesn't work like you thought it would. You can verify how the MCN software will interpret the table by hitting the Verify button on the lower left of the Display Table window. This will bring up a Display Table Verification window. This will show the states that result from each possible binary input value.



Index	Steer	Rx	Disable	Vote	Fail	State	Sound
1	0	0	0	0	1	Fail	sounds\RxFail.v
2	0	0	0	1	0	Vote	
3	0	0	0	1	1	Error	sounds\Error.w
4	0	0	1	0	0	Disable	sounds\RxDis.w
5	0	0	1	0	1	Disable	sounds\RxDis.w
6	0	0	1	1	0	Error	sounds\Error.w
7	0	0	1	1	1	Error	sounds\Error.w
8	0	1	0	0	0	Rx	
9	0	1	0	0	1	Fail	sounds\RxFail.v
10	0	1	0	1	0	Vote	
11	0	1	0	1	1	Error	sounds\Error.w
12	0	1	1	0	0	Disable	sounds\RxDis.w
13	0	1	1	0	1	Disable	sounds\RxDis.w
14	0	1	1	1	0	Error	sounds\Error.w
15	0	1	1	1	1	Error	sounds\Error.w
16	1	0	0	0	0	TX	
17	1	0	0	0	1	Fail TX	sounds\RxFail.v
18	1	0	0	1	0	Vote TX	
19	1	0	0	1	1	Error	sounds\Error.w
20	1	0	1	0	0	Disable TX	sounds\RxDis.w

Display Table Right Mouse Menu

Clicking the right mouse button over a cell will offer the following options:

Move Up
Moves a row up one position

Move Down
Moves a row down one position

Delete Row
Deletes a row

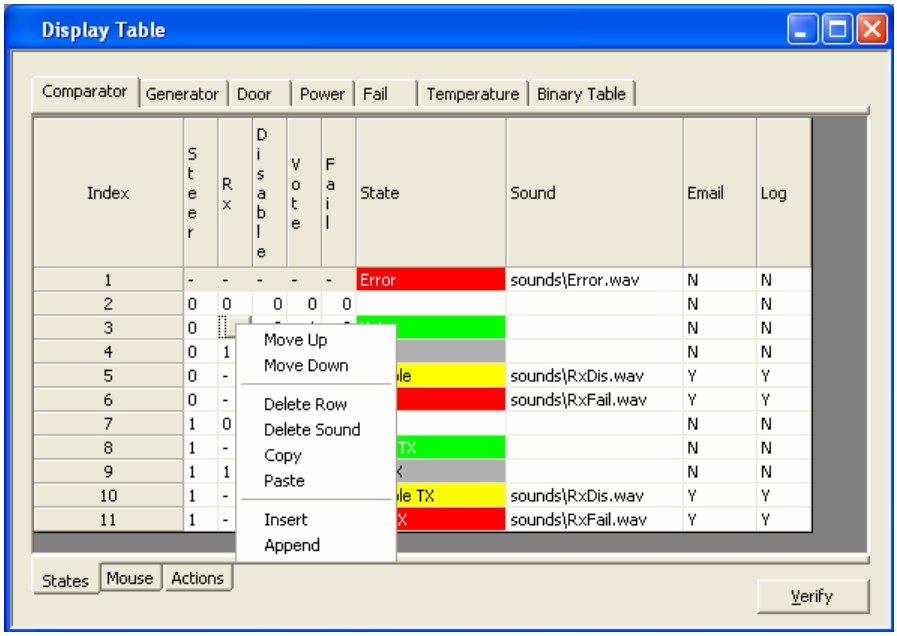
Delete Sound
Deletes the sound entry for the selected row.

Copy
Copies the highlighted cell(s) to the clipboard. Does not work with entire rows.

Paste
Pastes the clipboard to the current cell. If more than one cell is on the clipboard, the additional cells will be pasted to cells to the right.

Insert
Inserts a blank row at the current location

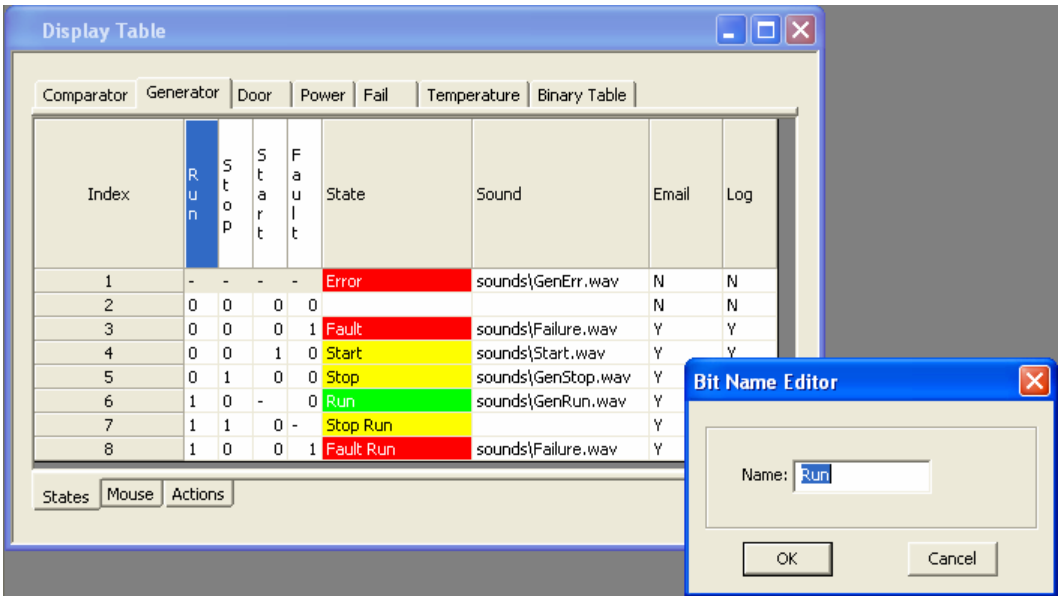
Append
Appends a blank row to the end of the Display Table



Editing Bit Names

To edit the Bit Names for a Display Table, **Double Click** on the Bit Name.

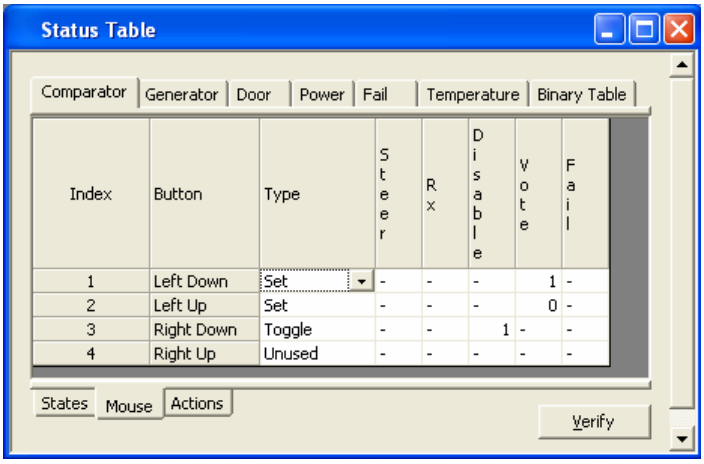
The Bit Names for the Comparator Display Table are fixed and cannot be edited.



Mouse Actions Tab

Four mouse actions are defined for each Display Table:

- Left Mouse Button Down (Press)
- Left Mouse Button Up (Release)
- Right Mouse Button Down (Press)
- Right Mouse Button Up (Release)



Each Mouse Event Line contains the following fields:

Button
Describes the mouse event

Type
This is the action that will be taken when this mouse event occurs.
Choices are:

-Unused — This Mouse Event does not generate an I/O event

-Set — This Mouse Event explicitly sets defined bits to the states shown. ("0"bits are set to 0, "1" bits are set to 1, "-" bits are left alone)

-Toggle — This Mouse Event toggles the state of all the bits marked with a "1".

Bits
The bit names are taken from the States tab. They can be either "0", "1" or "-".
See the Type field for description of how each of these bits is handled.

Note that the bits that appear here may not all be output (control) bits, due to the actual device being controlled. In the example above, the only valid output bits are Vote and Disable.

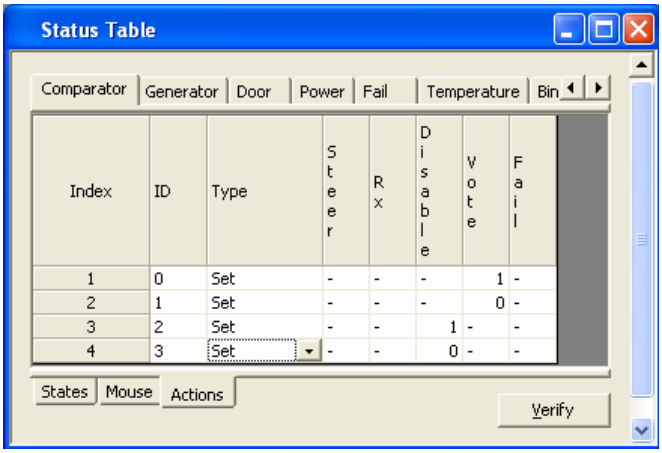
Editing the fields

Type — Click in the field to edit.
Select the type with the Drop-Down menu.

Bits — Click in the bit value field to edit .
You can either enter a value (0,1,-) or use the drop-down list.
You may need to widen the columns to see the drop-down list properly.

Actions Tab – Advanced Server

The Actions Tab controls optional actions for the Display Table. The Actions are used only with the MCN Advanced Server software and Third Party Clients. It is similar to the Mouse tab and provides additional control functions that can be accessed by the Third Party Client. (Although the Actions tab is present on the MCN Config for the Standard Server software, this version of the software does not utilize these items.)



The above Actions table provides a way to explicitly Disable (ID 2) and Enable (ID 3) a receiver (as compared to the toggle action in the Mouse table).

Actions Line contains the following fields:

ID
Numeric ID sent by the Third Party Client to generate this action. The IDs must be unique.

Type
Same as Type in the Mouse Tab.

Bits
Same as the Bits field in the Mouse Tab.

Editing the fields

ID	Click in the field to edit Enter the ID number to use.
Type	Click in the field to edit Select the type with the Drop-Down menu.
Bits	Click in the bit value field to edit You can either enter a value (0,1,-) or use the drop-down list. You may need to widen the columns to see the drop-down list properly.

MCNConfig Program: Display Windows

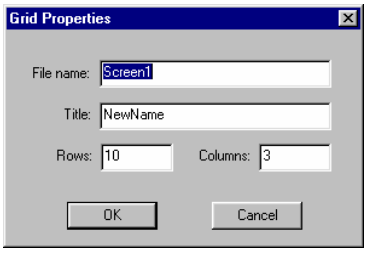
Display windows are the screens that you build for the MCN Server program and MCN Client Remote Comparator Display program. Each Display Window can contain multiple Tabs and multiple channels.

In this section, you will learn how to:

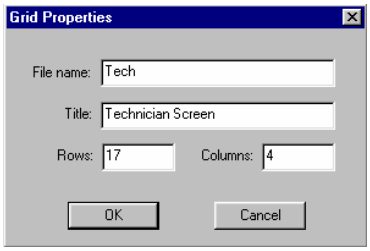
- Add a new Display window
- Add Labels
- Add Receivers (and I/O groups)
- Add Tabs
- Move & Modify Labels & Receivers

Adding a New Display Window

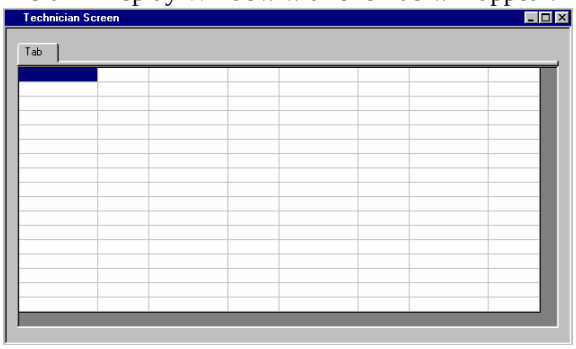
- Add a new Display Window with the **Add Display Window** button.



- Change the File Name, Title, Rows, and Columns as desired and click the **OK** button.



A blank Display Window with one Tab will appear:

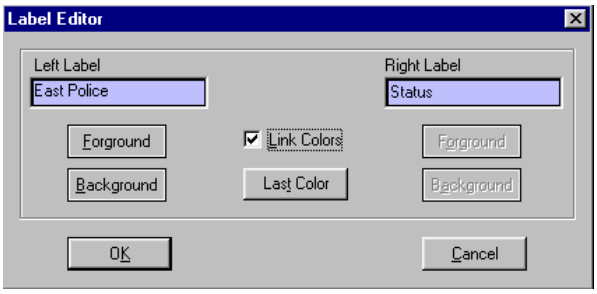


Adding Labels to the Display Window

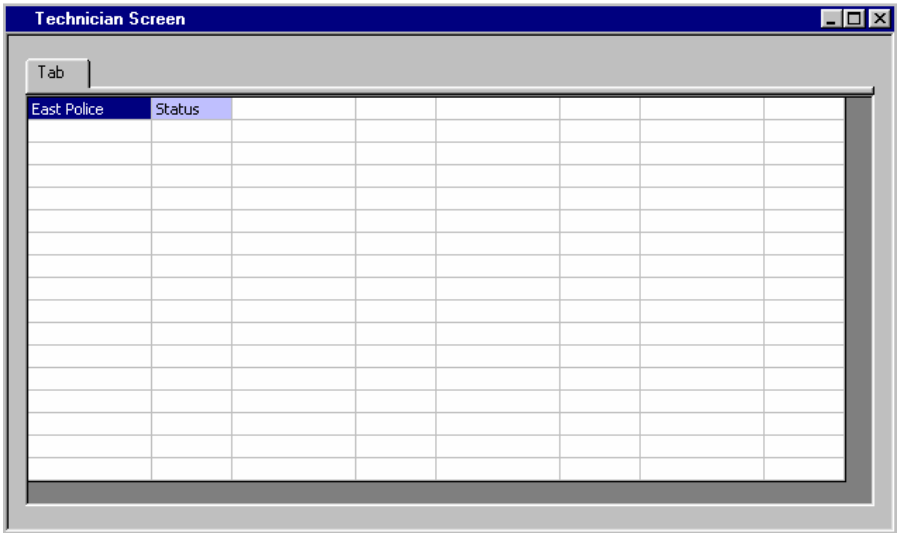
Labels can be used to identify different channels when multiple channels are displayed in one tab.

- Add a new Label in the Display Window with the **Add Label** button.

- In the Label Editor Dialog Box, enter the desired Right & Left Labels.
  The left label will appear over the receiver names.
  The right label will appear over the status column.

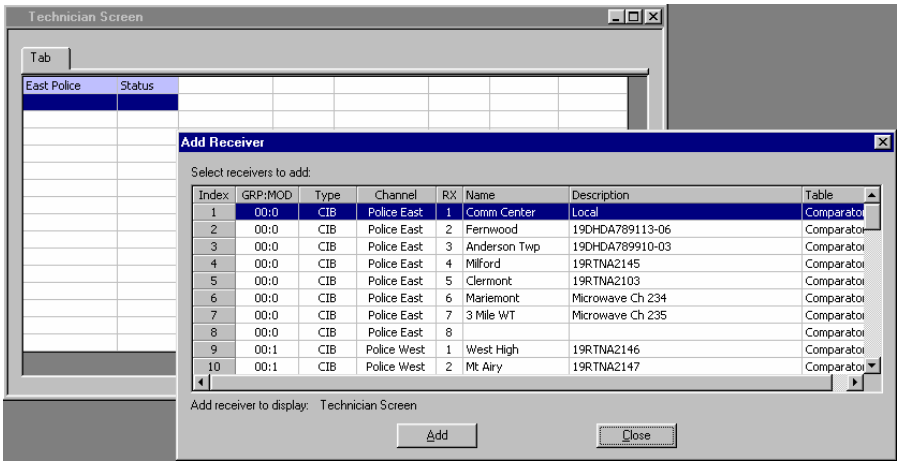


- You can also change the Foreground (text) and Background colors at this time.
  If the Link Colors box is checked, both the left & right labels will have the same color set.
- Hit OK when you are done.
  The label will be placed on the screen.

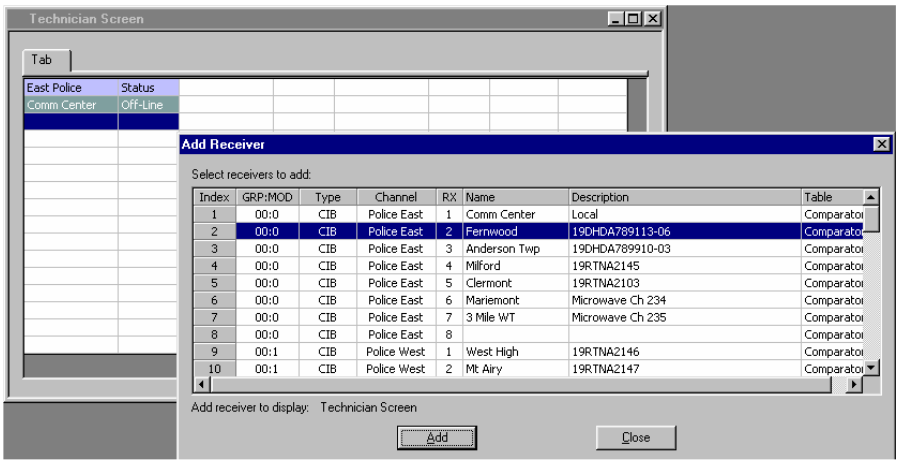


Adding Receivers & I/O Groups to the Display Window

- Add a new Receiver or I/O Group in the Display Window with the **Add Receiver** button.
- An **Add Receiver** dialog box will appear.
  This is similar to the Receiver Window, but it has additional buttons.

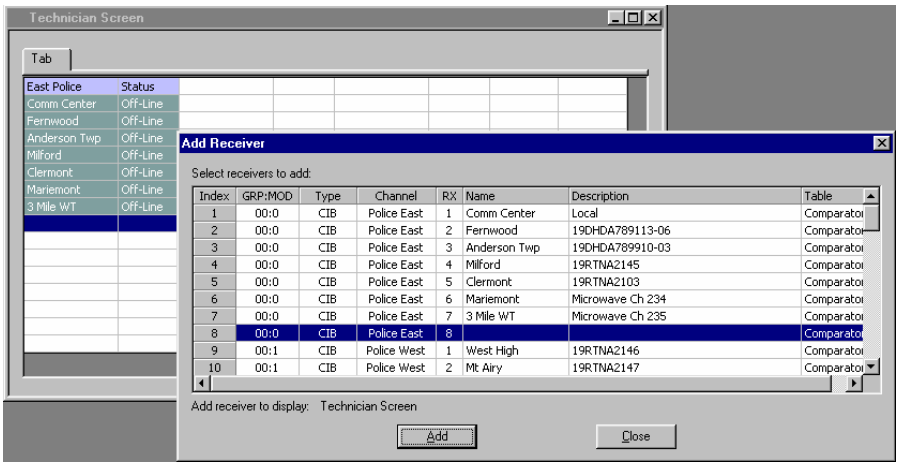


- Select the receiver or I/O group that you what to add, and click the **Add** button.

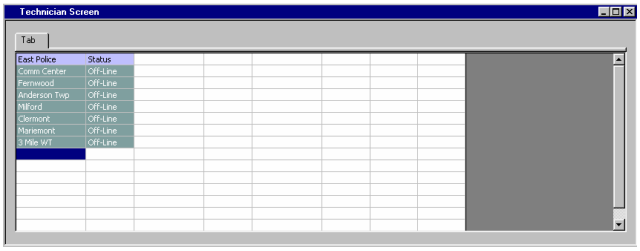


- An **Add Receiver** dialog box will appear.
  This is similar to the Receiver Window, but it has additional buttons.

- Continue pressing the **Add** button to add additional receivers or I/O groups.



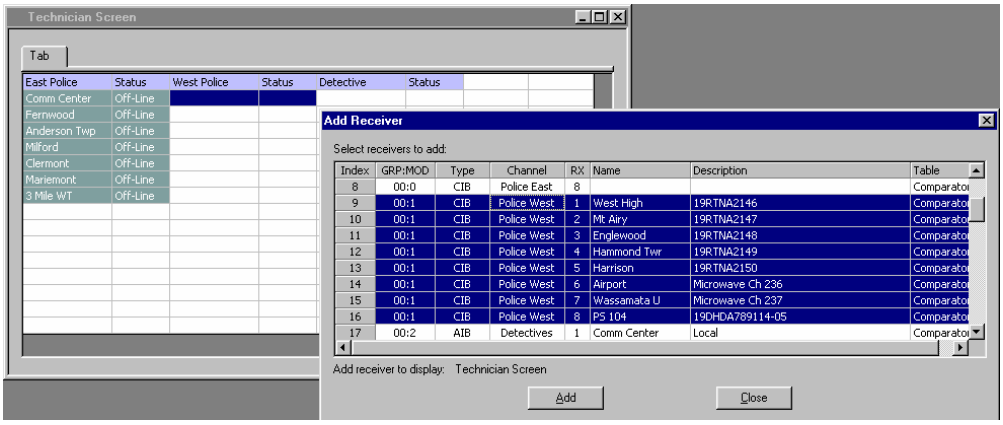
- The program will continue adding receivers to the selected column in the Display Window. If it reaches the bottom of a column, it will wrap to the top of the next column.
- When you are finished adding a range or receivers or I/O groups, click the **Close** button.



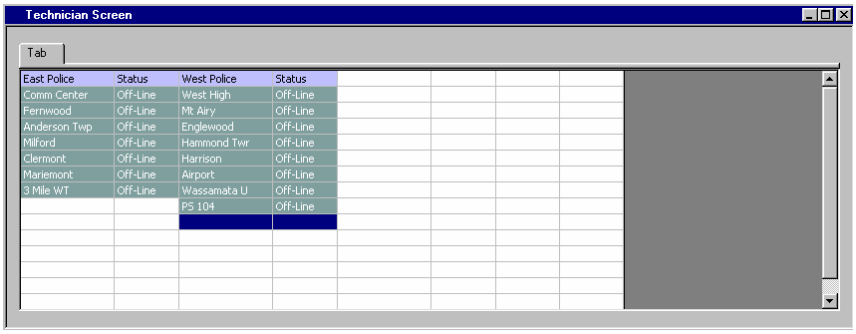
- Move to the position for the next receiver and repeat until you have all the receivers added.

Adding a block of receivers or I/O points to the Display Window

- Press the **Add Receiver** button.
- In the Add Receivers dialog box, select a block of receivers



- Hit the **Add** button.
  This will add the receivers all at once,..



Automatic Linking to Receiver Window

As you select different cells in the Display Window, the receiver window scrolls so that that receiver or I/O group is visible.

Verifying Receiver Placement

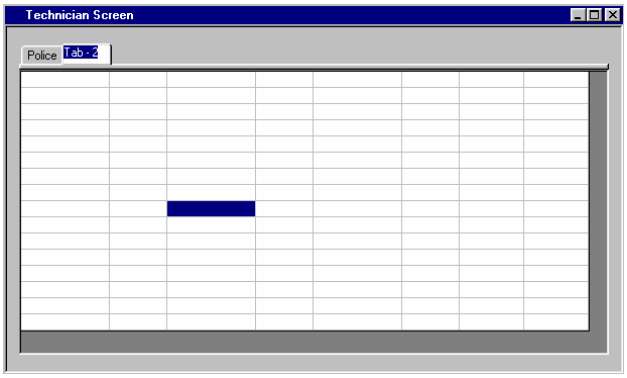
Hint

Many systems have receivers from many channels at each site. Since only a Receiver site name or I/O Group name is present in the Display Window, it is not readily apparent which particular receiver or I/O point is in a particular cell. You can quickly check the contents of the Display Window by doing the following:

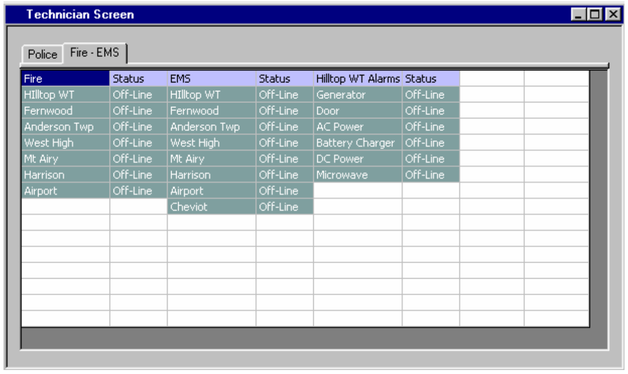
- Open the Display Window
- Open the Receiver Window.
- Select the first Receiver in the Display Window.
- The Receiver Window will show which receiver is at that cell.
- Use the arrow keys to move through all the receivers on the Display Window.
- Repeat for the other tabs in the Display Window.

Adding Display Tabs

- Press the **Add Tab** button.
- Enter the name for the new tab.
  A blank grid will appear.

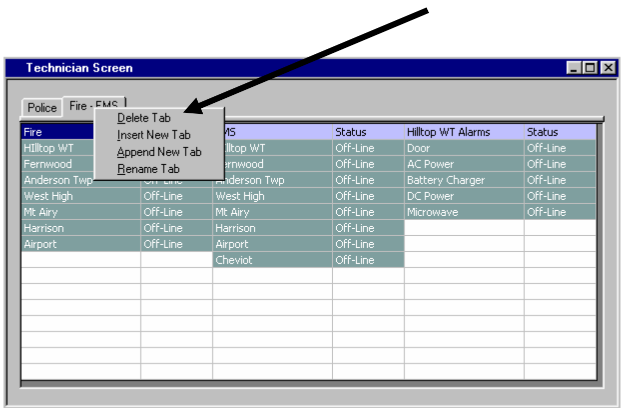


- Add Labels, Receivers, and I/O Groups for that tab.



Deleting Display Tabs

- Right-click on the tab and select ***Delete Tab*** from the pop-up menu.

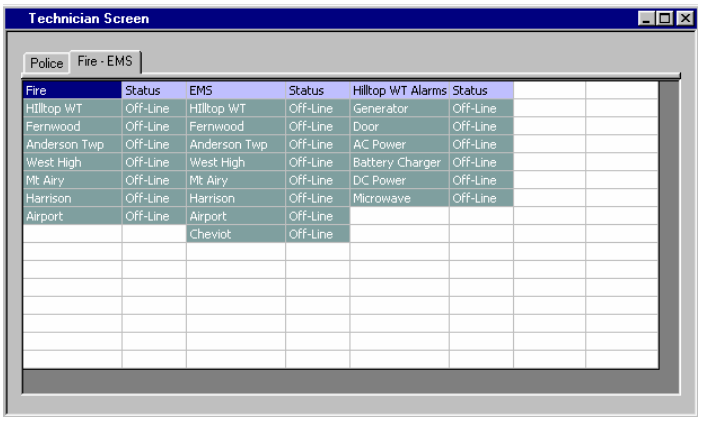


Changing Display Window Parameters

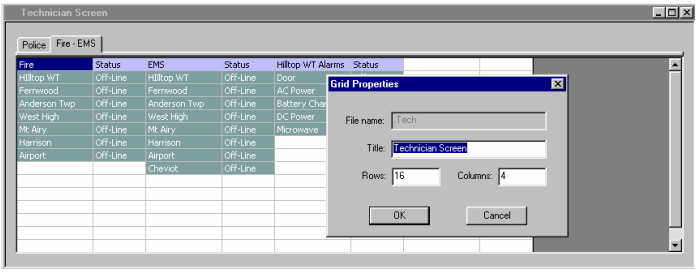
You can change the following properties of a Display Window.

- Display Window Title
- Number of Rows
- Number of Columns

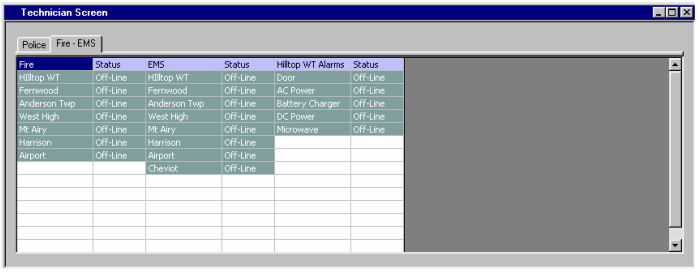
In this example, we want to get rid of the unused fourth column.



- Press the **Display Window Properties** button.



- Change the number of Columns from 4 to 3.
  (You could also change the Title or number of rows at this point.)
- Hit the **OK** button.

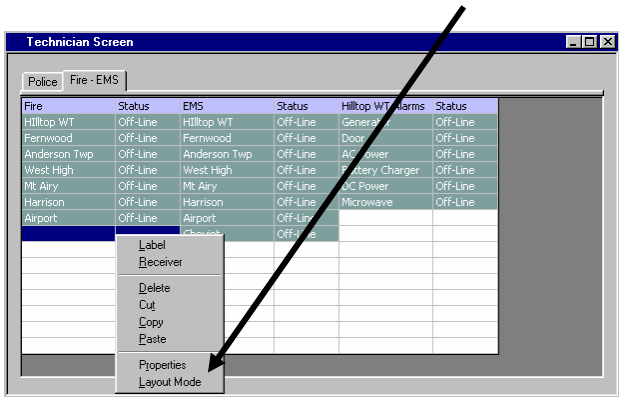


The number of columns is reduced for all tabs. If you reduce the grid size, you may loose receivers or labels that fall outside the new range. Receivers and I/O Groups are still in the Receivers Window; they just disappear from the Display Window.

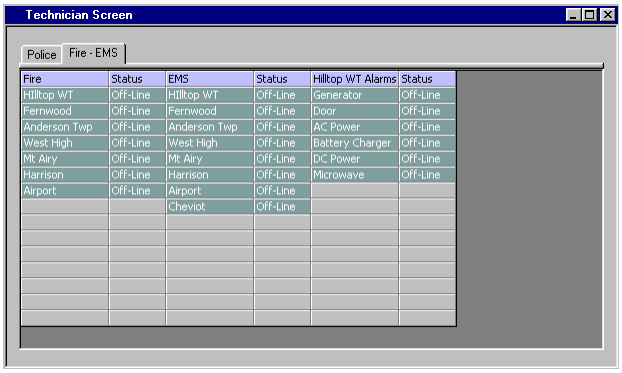
Changing Column Widths in Layout Mode

You can change the column width for the resulting Display Window. To do this, you must go into Layout Mode.

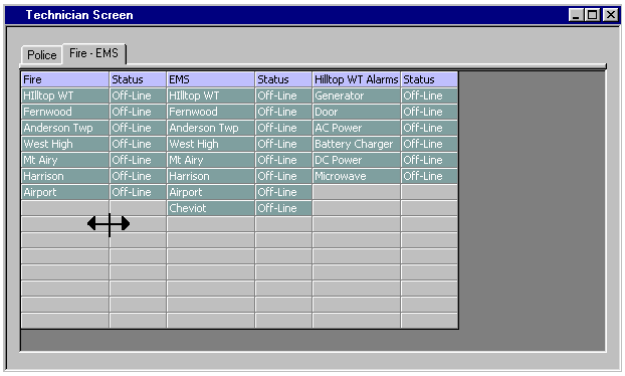
- Right-click in the grid and select ***Layout Mode***.



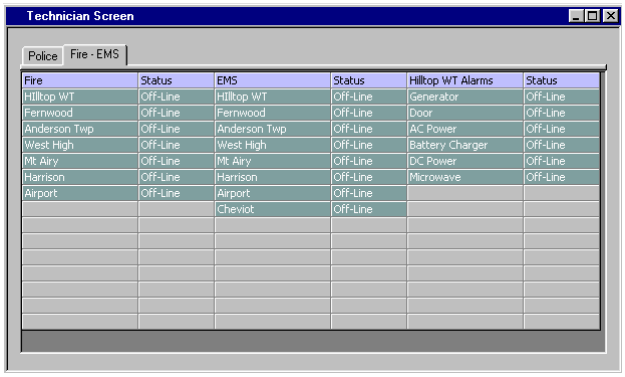
The grid will turn gray, indicating it is in Layout Mode.



- Move the cursor over a column separator line. The cursor will turn into a double-headed arrow.

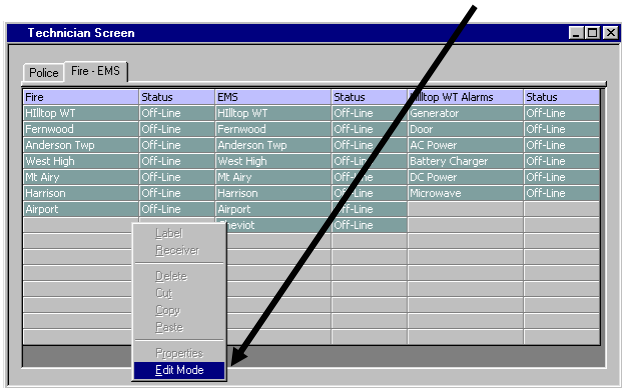


- Press the left mouse button and drag the column to the proper width.
- Repeat with the right column separator for the Status column.

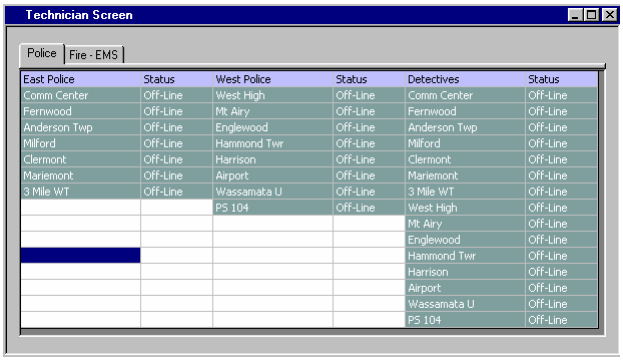


Column Width Note
All the Receiver columns are the same width.
All the Status columns are the same width.
Changing a column width will change the width of all the similar columns on all tabs.

- Right-Click in the grid and select ***Edit Mode***.



The window will return to Edit mode.



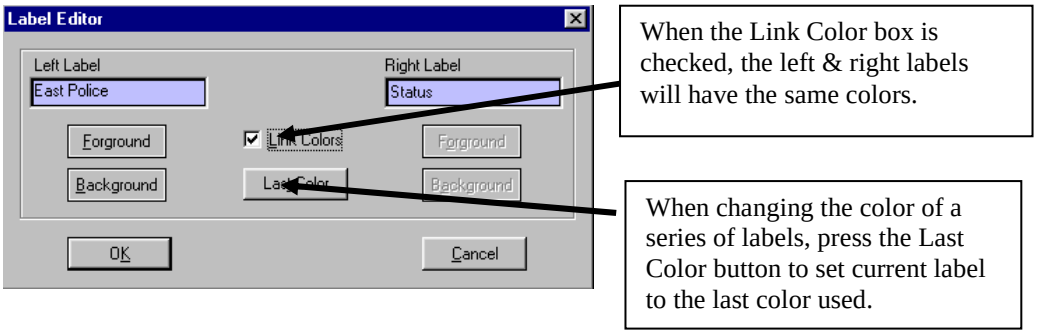
Changing Label Text & Colors

You can change a Label text or color by doing one of the following:

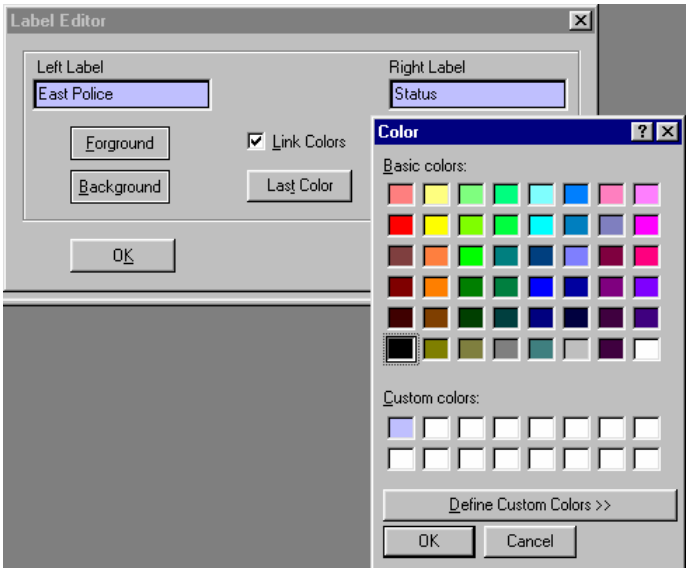
- Double click on a Label.
- Right-Click on the Label and select the ***Label*** menu item.

- Select a Label cell and press the ***New Label*** toolbar button.

The Label Edit dialog box will appear.



- You can edit the left & right text.
- You can change the Foreground or Background color of the labels by hitting the **Foreground** or **Background** button below the label



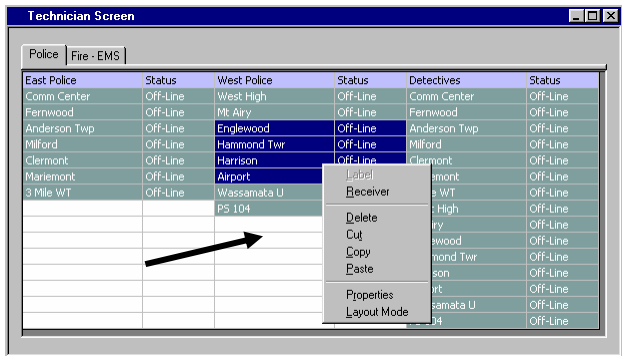
- Select a color and hit **OK**
- If you want a color not shown, hit the **Define Custom Colors** button.

Moving Receivers & Labels in the Display Window

This section covers single column cuts & pastes. See the next section for cutting & pasting multi-column selections

To move Labels, Receivers, or I/O Groups:

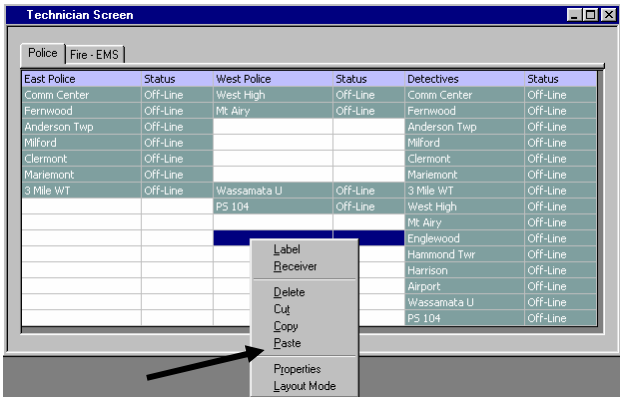
- Select the items to move
- Right click and select the Cut menu item.
  (Alternately, use the ***Cut*** toolbar button)



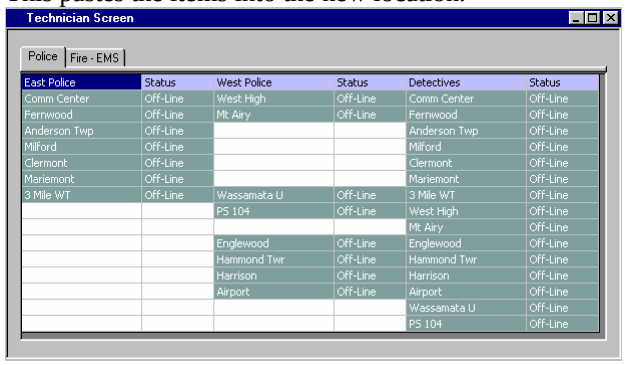
This cuts the selection and places it in the clipboard.

- Move to the desired location

Right click and hit Paste.
(Alternately, use the ***Paste*** toolbar button)



This pastes the items into the new location.



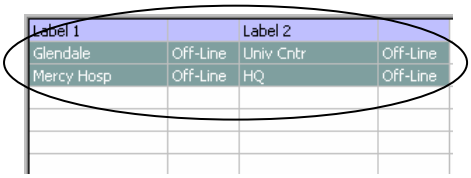
Cutting & Pasting Multiple Columns

Cutting and pasting occur in the following order:

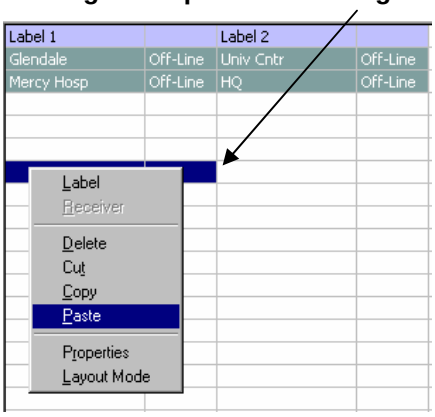
1. Across (left to right)
2. Down

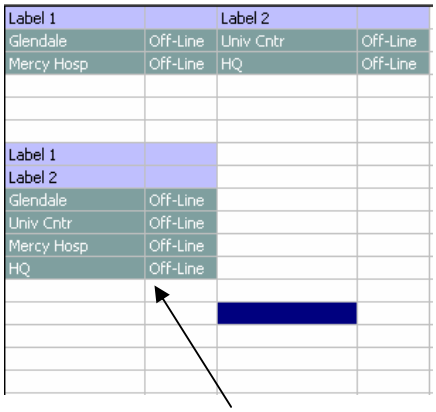
Copying the range shown puts the cells into the clipboard in the following order:

1. Label 1
2. Label 2
3. Glendale Rx
4. Univ Cntr Rx
5. Mercy Hosp Rx
6. HQ Rx



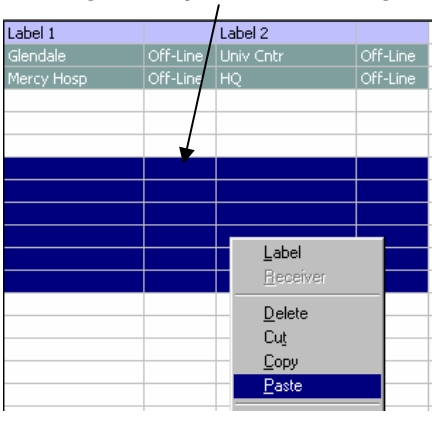
Pasting the clipboard to a single cell or column…

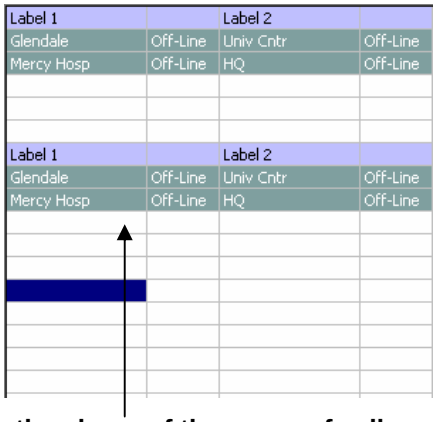




Results in a single column (probably not the result you wanted.)

Pasting the clipboard to a range with the same number of columns …





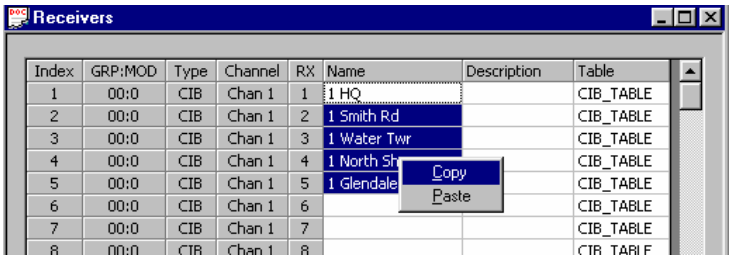
Preserves the shape of the range of cells.

Pasting a Row of Receivers Directly from the Receiver Window

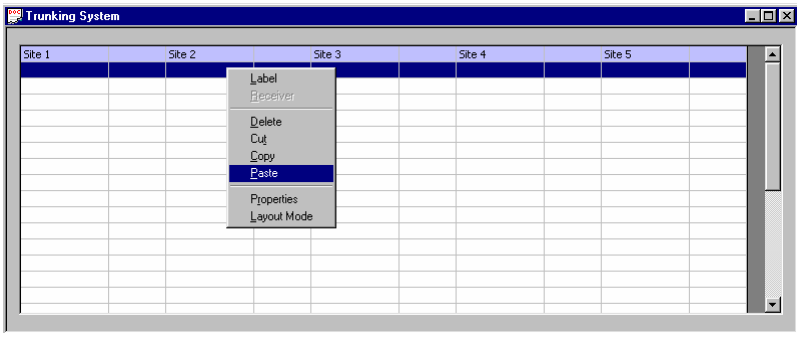
All the examples shown assume you have a system with many receiver sites and want to look at the sites in a column arrangement. If you have a trunking system with many channels but just a few sites, you may want to display each channel as a row with the sites going across from left to right.

You can do this by cutting and pasting a group of receivers directly from the Receiver Window into the Display Window.

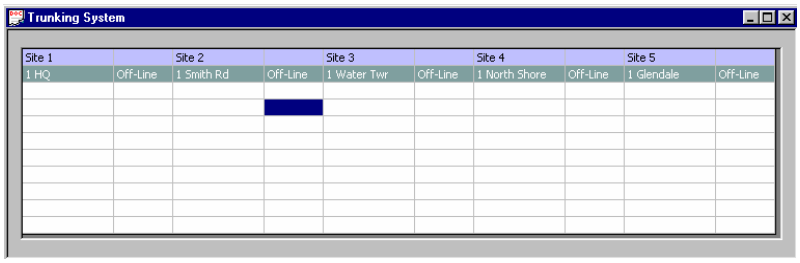
1. From the Receiver Window, highlight a group of receivers and Copy to clipboard.



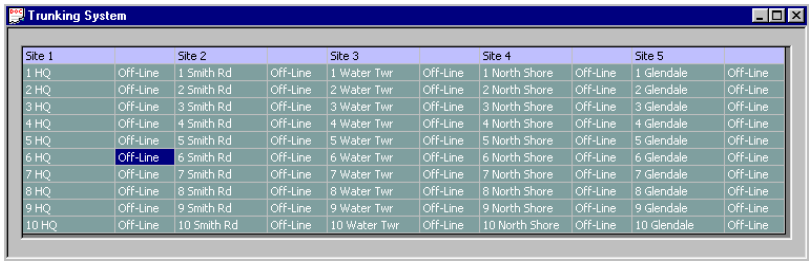
2 Go to the Display Window.
Move the cursor to the starting position for the row of receivers.
Highlight the row and Paste the clipboard to the screen.



3 The receivers are pasted into the Display Window in a horizontal row:



4. A 10-Channel 5-Site System



Display Window Tools

Display Window Tab Context Sensitive (Right Click) Menu

The following menu functions are available with a right click on a Display Window Tab.

Display Window Context Sensitive (Right Click) Menu

The following menu functions are available with a right click in the Display Window Grid.

Hint

Quick Receiver & Label Changes

You can double-click on a Receiver or Label cell to change it. The "Add Receiver" or "Add Label" dialog box will open, allowing you to make changes to the cell.

Display Window Toolbar Buttons

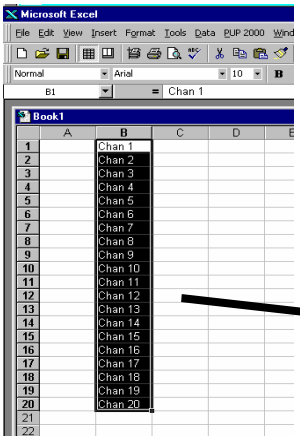
The following toolbar buttons will also function in the Receiver Window:

Since the Display Window uses a fixed grid, functions such as Append, Insert, Sort, Up, & Down are not available in this window.

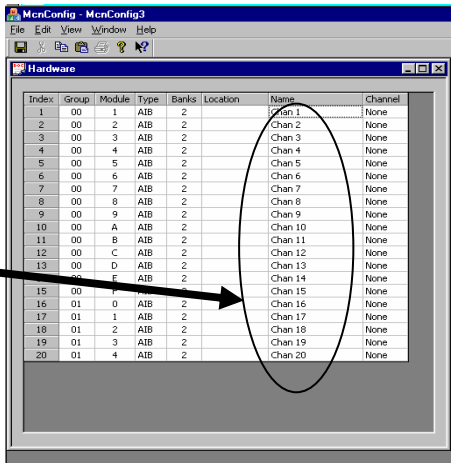
Using the Clipboard from other Applications

Many people keep system data in other applications, such as Excel. You can cut and paste some of this data from the other application into the MCNConfig program to save typing time.

Various fields in the MCNConfig database have special properties and thus have restrictions as to whether or not you can paste data from other applications or other windows. See the following section for restrictions.

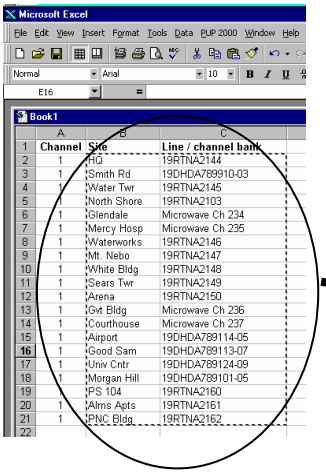


Copy (Ctrl-C) a column of Names in Excel

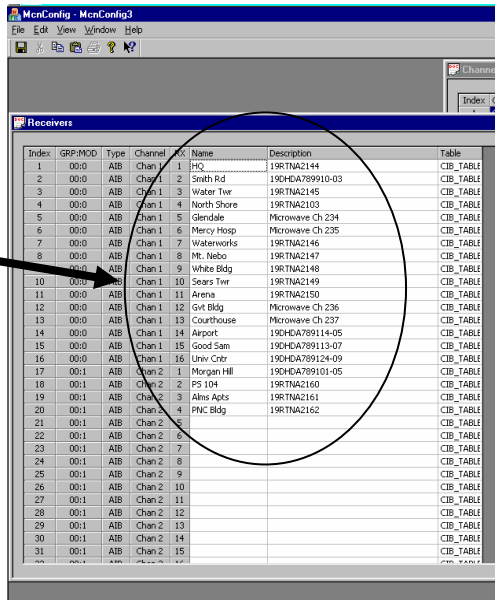


And Paste (Ctrl-V) them into the MCNConfig Hardware List

Or ….



Copy Receiver Site Names and Line Numbers from Excel



Into the MCNConfig Receiver List

Restrictions on Using the Clipboard

Various fields in the MCNConfig database have special properties and thus have restrictions as to whether or not you can paste data from other applications or other windows.

In all List Windows, any column that is highlighted in gray is a static column and cannot be changed in that window.

You cannot copy items into a drop-down field, except items from an identical drop-down field.

Module List Window:

Group Field	This field accepts only hex data from 00 to FE. You can paste data from the clipboard, but it must be hex data in this range. For every non-valid entry, you will see an error dialog box.
Module Field	This field accepts only hex data from 0 to F. You can paste data from the clipboard, but it must be hex data in this range. For every non-valid entry, you will see an error dialog box.
Type	This is a drop-down entry that limits the data to pre-defined hardware types. You cannot paste into this column.
Banks	Bank numbers are limited by the Module Type used. CIBs can have only 1 bank. AIBs can have up to 8. You can paste into this column for AIB modules. Each entry must be between 1 & 8. You will get a warning if you try to reduce the number of banks in an AIB.
Location	This is a free-format text field. You can paste text into this column.
Name	This is a free-format text field. You can paste text into this column.
Channel	This field allows entry of only channels defined in the Channel List window. You can cut & paste from one part of this column to another part. You cannot paste other types of data into this column.

Receiver List Window

Name	This is a free-format text field. You can paste text into this column.
Description	This is a free-format text field. You can paste text into this column.
Table	This field allows entry of only display tables defined in the Display Table window. You can cut & paste from one part of this column to another part. You cannot paste other types of data into this column.

Channel List

Channel	This is a free-format text field. You can paste text into this column.
Email Group	This field allows entry of only Email Groups defined in the Email Groups window. You can cut & paste from one part of this column to another part. You cannot paste other types of data into this column.

Email Group

Recipient	This is a free-format text field. You can paste text into this column.
Type	This field allows entry of only Email Types (To: & CC:). You cannot cut & paste from one part of this column to another part. You cannot paste other types of data into this column.

Display Window (Screen Layout)

All Cells — The cells require either:

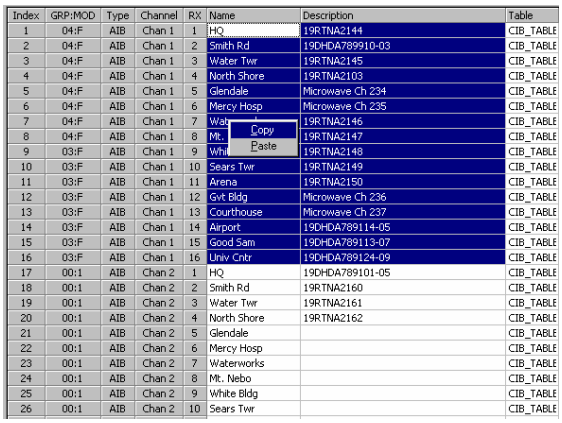
- -Left & Right Labels or
- -Valid Receiver or other I/O Function Block References.

You can paste receivers from Receiver List window.
You can cut & paste a range of labels & receivers from a Display Window.
You cannot paste other types of data into these cells.

Pasting a Column of Receivers from the Receiver Window into the Display Window:

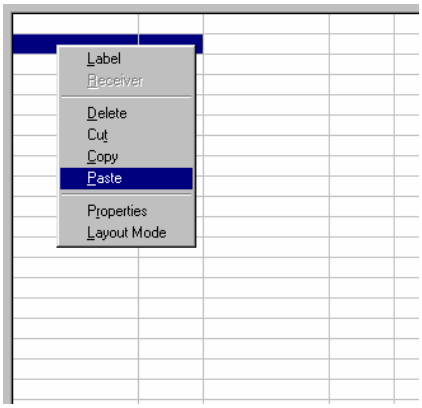
(Channels with a large number of sites)

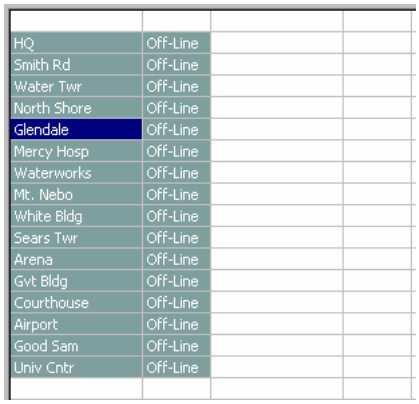
1. From the Receiver Window, highlight a group of receivers and Copy to clipboard.



Index	GRP:MOD	Type	Channel	RX	Name	Description	Table
1	04:F	AIB	Chan 1	1	HQ	19RTNA2144	CIB_TABLE
2	04:F	AIB	Chan 1	2	Smith Rd	19DHDA789910-03	CIB_TABLE
3	04:F	AIB	Chan 1	3	Water Twr	19RTNA2145	CIB_TABLE
4	04:F	AIB	Chan 1	4	North Shore	19RTNA2103	CIB_TABLE
5	04:F	AIB	Chan 1	5	Glendale	Microwave Ch 234	CIB_TABLE
6	04:F	AIB	Chan 1	6	Mercy Hosp	Microwave Ch 235	CIB_TABLE
7	04:F	AIB	Chan 1	7	Wat	19RTNA2146	CIB_TABLE
8	04:F	AIB	Chan 1	8	Mt.	19RTNA2147	CIB_TABLE
9	03:F	AIB	Chan 1	9	Whi	19RTNA2148	CIB_TABLE
10	03:F	AIB	Chan 1	10	Sears Twr	19RTNA2149	CIB_TABLE
11	03:F	AIB	Chan 1	11	Arena	19RTNA2150	CIB_TABLE
12	03:F	AIB	Chan 1	12	Gvt Bldg	Microwave Ch 236	CIB_TABLE
13	03:F	AIB	Chan 1	13	Courthouse	Microwave Ch 237	CIB_TABLE
14	03:F	AIB	Chan 1	14	Airport	19DHDA789114-05	CIB_TABLE
15	03:F	AIB	Chan 1	15	Good Sam	19DHDA789113-07	CIB_TABLE
16	03:F	AIB	Chan 1	16	Univ Cntr	19DHDA789124-09	CIB_TABLE
17	00:1	AIB	Chan 2	1	HQ	19DHDA789101-05	CIB_TABLE
18	00:1	AIB	Chan 2	2	Smith Rd	19RTNA2160	CIB_TABLE
19	00:1	AIB	Chan 2	3	Water Twr	19RTNA2161	CIB_TABLE
20	00:1	AIB	Chan 2	4	North Shore	19RTNA2162	CIB_TABLE
21	00:1	AIB	Chan 2	5	Glendale		CIB_TABLE
22	00:1	AIB	Chan 2	6	Mercy Hosp		CIB_TABLE
23	00:1	AIB	Chan 2	7	Waterworks		CIB_TABLE
24	00:1	AIB	Chan 2	8	Mt. Nebo		CIB_TABLE
25	00:1	AIB	Chan 2	9	White Bldg		CIB_TABLE
26	00:1	AIB	Chan 2	10	Sears Twr		CIB_TABLE

2 Go to the Display Window.
Move the cursor to the starting position for the column of receivers.
Paste the clipboard to the screen.



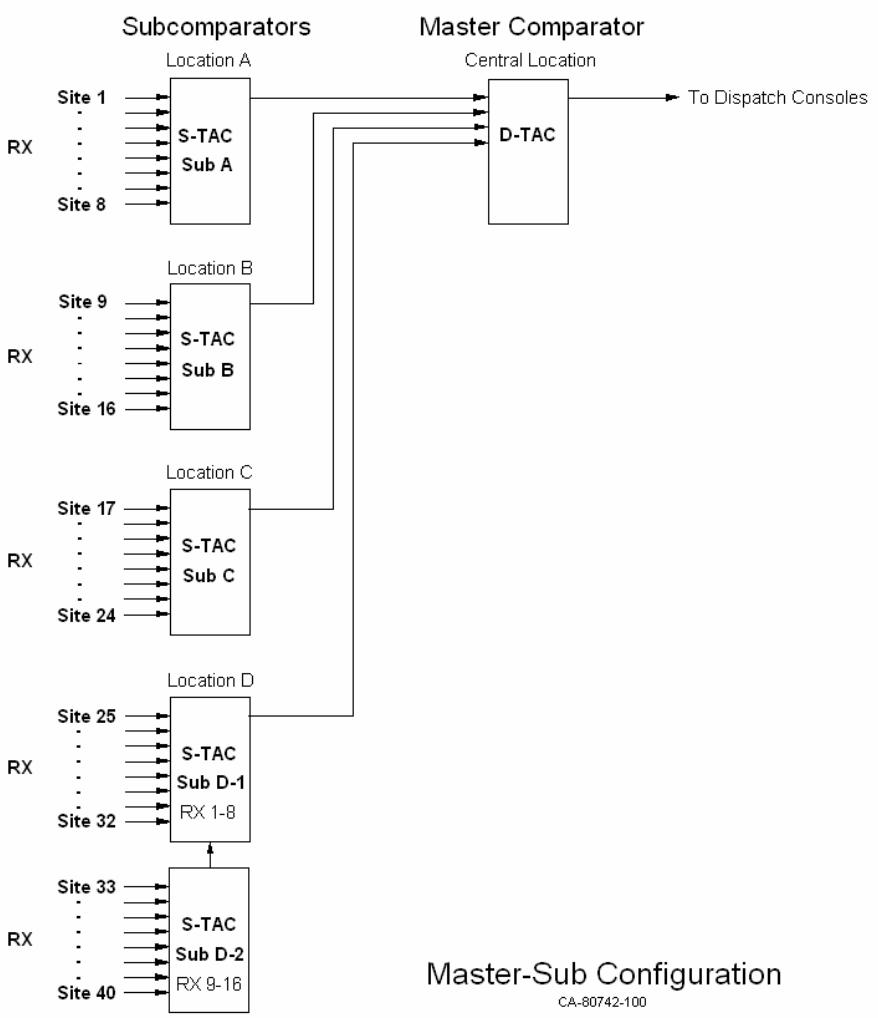


HQ	Off-Line
Smith Rd	Off-Line
Water Twr	Off-Line
North Shore	Off-Line
Glendale	Off-Line
Mercy Hosp	Off-Line
Waterworks	Off-Line
Mt. Nebo	Off-Line
White Bldg	Off-Line
Sears Twr	Off-Line
Arena	Off-Line
Gvt Bldg	Off-Line
Courthouse	Off-Line
Airport	Off-Line
Good Sam	Off-Line
Univ Cntr	Off-Line

The receivers are pasted to the Display Window in a column.

MCNConfig Program: Master-Sub Comparator Configuration

MCNRCD for Windows can handle systems in which comparators are arranged as Master Comparators and Sub Comparators. A group of comparators that are in a Master-Sub configuration can be depicted as in the following diagram.



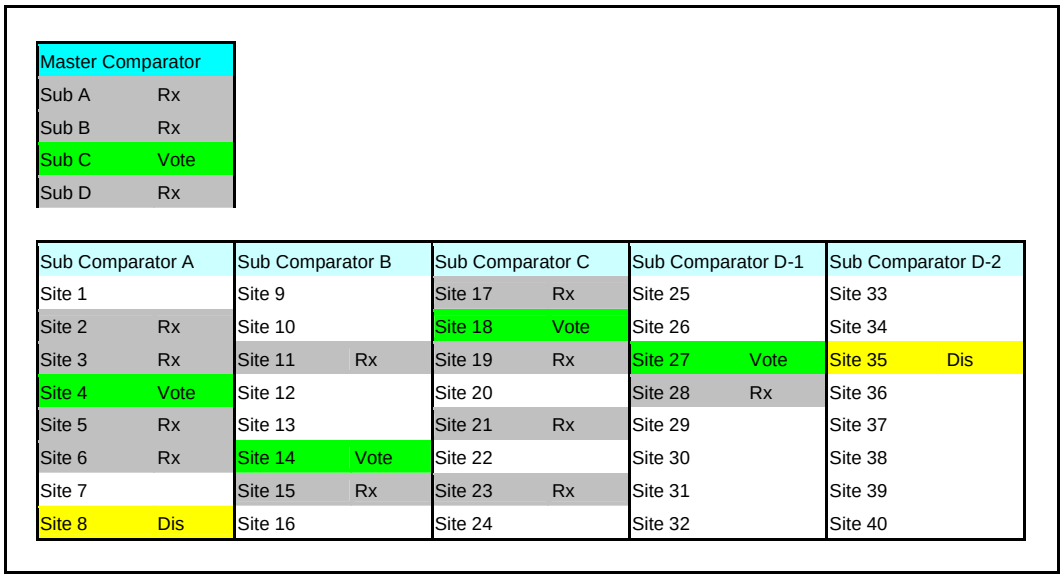
In this case, eight receivers at Location A are fed into Sub Comparator A. Likewise, eight receivers at Location B are fed into Sub Comparator B, and additional locations may have comparators with their own receivers. The selected audio from each of these locations is fed to the Master Comparator at the Central Location. Finally, the selected audio from the Master Comparator is sent to the Dispatch Consoles. Each one of the comparator chassis would have a CIB module connected to it.

Equipment-Centric View

The following diagram shows an equipment-centric view of the system described above. It has the following:

- A display for each receiver for each Sub Comparator
- A display for the Master comparator, showing each of the Sub Comparators feeding it.

It does not use the special Master-Sub Comparator features in MCNRCD (discussed below).



The above display indicates:

- The Master Comparator is voting Sub Comparator C.
- There are other Vote indications on Sub A, Sub B, Sub C, and Sub D.

Each comparator is shown as an independent comparator (although they are actually physically connected in a Master-Sub configuration).

To determine which audio is being heard by a dispatcher, you would have to go through a two-stage process:

1. Determine that the Master Comparator is voting Sub Comparator C
2. Sub Comparator C is voting Site 18

In other words, there is no immediate direct indication of which site's audio is being heard by the dispatcher. The Votes on Sites 4, 14, and 27 from Sub Comparators A, B, & D are not the signal being used by the Master Comparator at the moment, even though they have a "Vote" indication. This can be very confusing to a dispatcher

However, the equipment-centric display could be useful for a technician who is troubleshooting the system. If, for example, a Vote is stuck on a Sub Comparator, it would be readily apparent on this screen.

Virtual Comparator View

A dispatcher is not necessarily concerned with the details of master and sub comparators. He or she wants to know which receiver is the one that is providing the audio. A System view or Virtual Comparator view is shown below.

Sub Comparator A		Sub Comparator B		Sub Comparator C		Sub Comparator D-1		Sub Comparator D-2	
Site 1		Site 9		Site 17	Rx	Site 25		Site 33	
Site 2	Rx	Site 10		Site 18	Vote	Site 26		Site 34	
Site 3	Rx	Site 11	Rx	Site 19	Rx	Site 27	Rx	Site 35	Dis
Site 4	Rx	Site 12		Site 20		Site 28	Rx	Site 36	
Site 5	Rx	Site 13		Site 21	Rx	Site 29		Site 37	
Site 6	Rx	Site 14	Rx	Site 22		Site 30		Site 38	
Site 7		Site 15	Rx	Site 23	Rx	Site 31		Site 39	
Site 8	Dis	Site 16		Site 24		Site 32		Site 40	

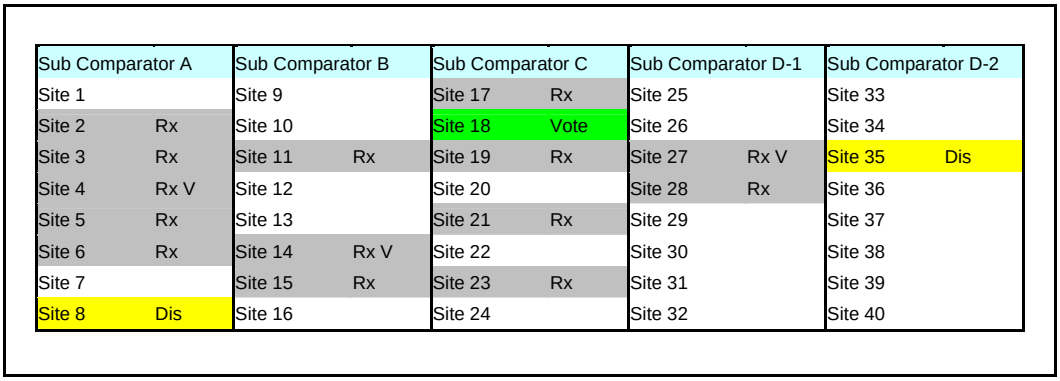
This view shows:

- A display for each receiver for each Sub Comparator
- No indication for the Master comparator
- A Virtual Comparator with 40 inputs.
- A single green "Vote" indication, showing the receiver being heard by the dispatcher.
- "Rx" indications for the receivers that are voted in the Sub Comparators but are not voted in the master.

The Virtual Comparator view uses a special Master-Sub Comparator feature of the MCNRCD software, and allows the use of a special Sub-Comparator display table. The Master-Sub feature in the MCNRCD software allows votes on sub comparators that are not being used by the Master Comparator to be modified to display “Rx” instead of “Vote”. They will be modified to display “Rx” since their sub comparators are not the voted audio at the Master Comparator. In this display, there is an immediate direct indication of which site’s audio (Site 18) is being heard by the dispatcher.

Enhanced Virtual Comparator View

An alternate Enhanced Virtual Comparator view is shown below:



Sub Comparator A		Sub Comparator B		Sub Comparator C		Sub Comparator D-1		Sub Comparator D-2	
Site 1		Site 9		Site 17	Rx	Site 25		Site 33	
Site 2	Rx	Site 10		Site 18	Vote	Site 26		Site 34	
Site 3	Rx	Site 11	Rx	Site 19	Rx	Site 27	Rx V	Site 35	Dis
Site 4	Rx V	Site 12		Site 20		Site 28	Rx	Site 36	
Site 5	Rx	Site 13		Site 21	Rx	Site 29		Site 37	
Site 6	Rx	Site 14	Rx V	Site 22		Site 30		Site 38	
Site 7		Site 15	Rx	Site 23	Rx	Site 31		Site 39	
Site 8	Dis	Site 16		Site 24		Site 32		Site 40	

This view:

- Is similar to the Virtual Comparator View
- Shows only one green "Vote" indication (the receiver whose audio is being used)
- Shows an "Rx V" indication for the sites that are voted in the Sub Comparators but are not voted in the master. The "Rx V" indication is shown in gray, so as not to be confused with the green "Vote" indication.

This provides a bit more information than the standard Virtual Comparator view. It also provides feedback to the user when he tries to Force-Vote a receiver. He will get an indication that the CIB received his command (by the "Rx V" status) even if the master comparator does not vote the receiver's Sub Comparator.

The Virtual Comparator and Enhanced Virtual Comparator views can be implemented with standard Display Tables that are shipped with the Master-Sub Comparator option. You may modify those display tables or create your own display tables to suit your system's needs.

Implementing the Virtual Comparators

To implement either of the above "Virtual Comparator" displays, the following steps should be taken:

1. **Enable Master-Sub features** of the MCNRCD for Windows software.
2. **Setup the Network Interface, Channels, Hardware, and Receivers windows** as instructed earlier in this manual
3. **Assign Display Tables** for the Master and Sub Comparator receivers and **Define the SubDevices** for each channel of a Master Comparator.
4. **Design the Display Window** for the Virtual Comparator.

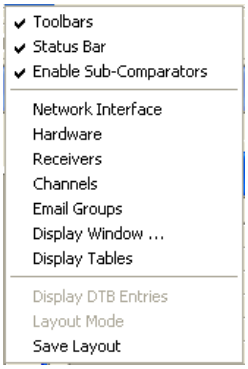
Optionally, if you want to customize the Master or Sub-Comparator display tables:

5. **Customizing Display Tables** for Master and Sub Comparators.

Each of these steps will be explained in detail in the following sections.

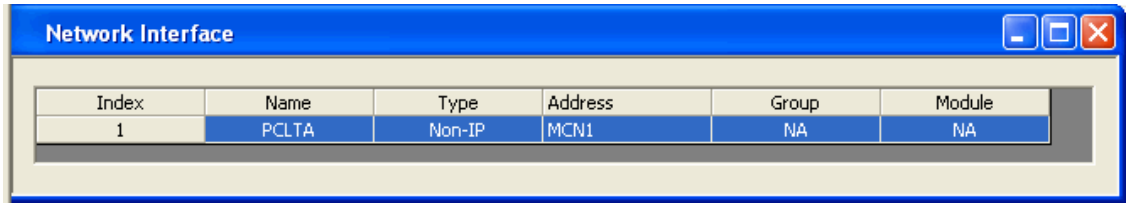
1. Enable Master-Sub features

From the **View** menu, click on ***Enable Sub-Comparators*** to display a "check mark" next to this menu item as shown below. This provides access to Master-Sub features of the MCNRCD for Windows software.

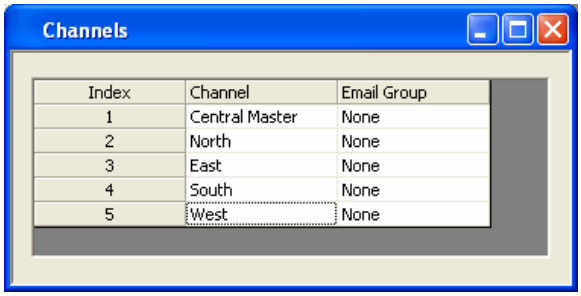


2. Setup Network Interface, Channels, Hardware and Receiver windows

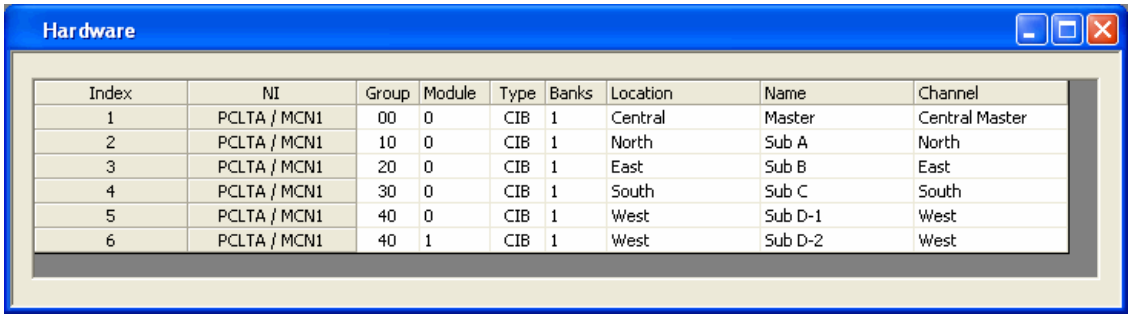
The Network Interface, Channels and Hardware windows for this example system should look like the following. The generation of these tables has been explained in previous sections of this manual, and will not be discussed in detail here.



Index	Name	Type	Address	Group	Module
1	PCLTA	Non-IP	MCN1	NA	NA



Index	Channel	Email Group
1	Central Master	None
2	North	None
3	East	None
4	South	None
5	West	None



Index	NI	Group	Module	Type	Banks	Location	Name	Channel
1	PCLTA / MCN1	00	0	CIB	1	Central	Master	Central Master
2	PCLTA / MCN1	10	0	CIB	1	North	Sub A	North
3	PCLTA / MCN1	20	0	CIB	1	East	Sub B	East
4	PCLTA / MCN1	30	0	CIB	1	South	Sub C	South
5	PCLTA / MCN1	40	0	CIB	1	West	Sub D-1	West
6	PCLTA / MCN1	40	1	CIB	1	West	Sub D-2	West

The Receivers window will be discussed in the next section.

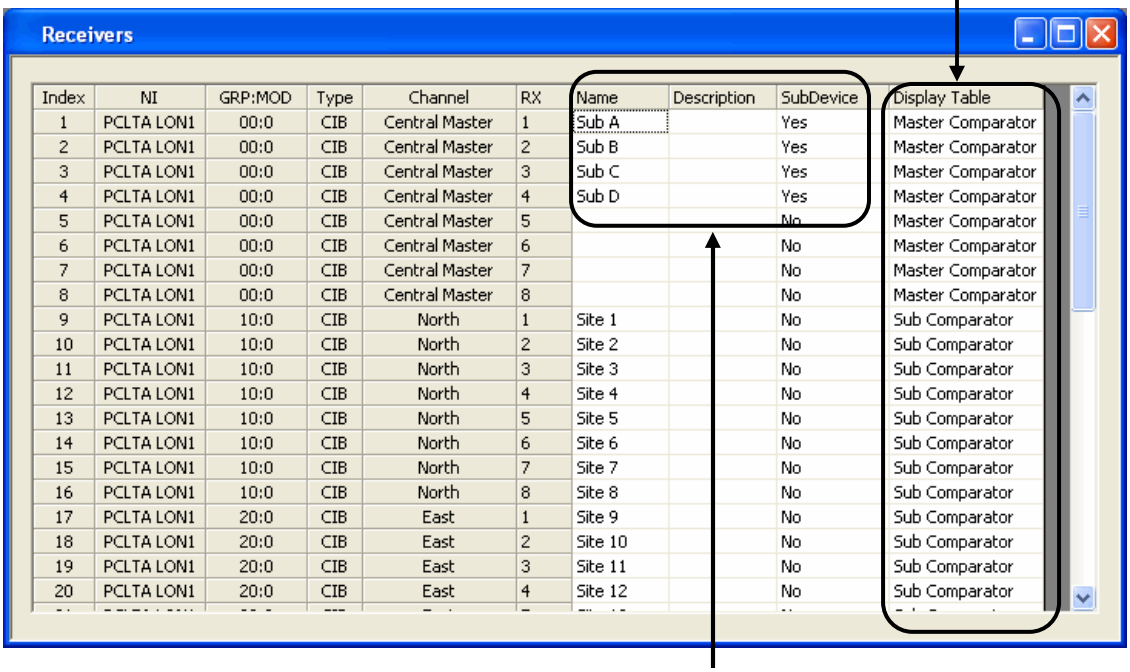
3. Assign Display Tables and Define the SubDevices

A. Assign Display Tables

For each receiver in the "Receivers" window, double-click in the Display Table field and select the proper Display Table Entry as from the following table:

Receivers	**Display Table**
Master Comparator	"Master Comparator"
Sub Comparator	"Sub Comparator" (for Virtual Comparator) "Sub Comparator Enhanced" (for Enhanced Virtual Comparator)

3 A: Assign Display Tables for Master & Subs



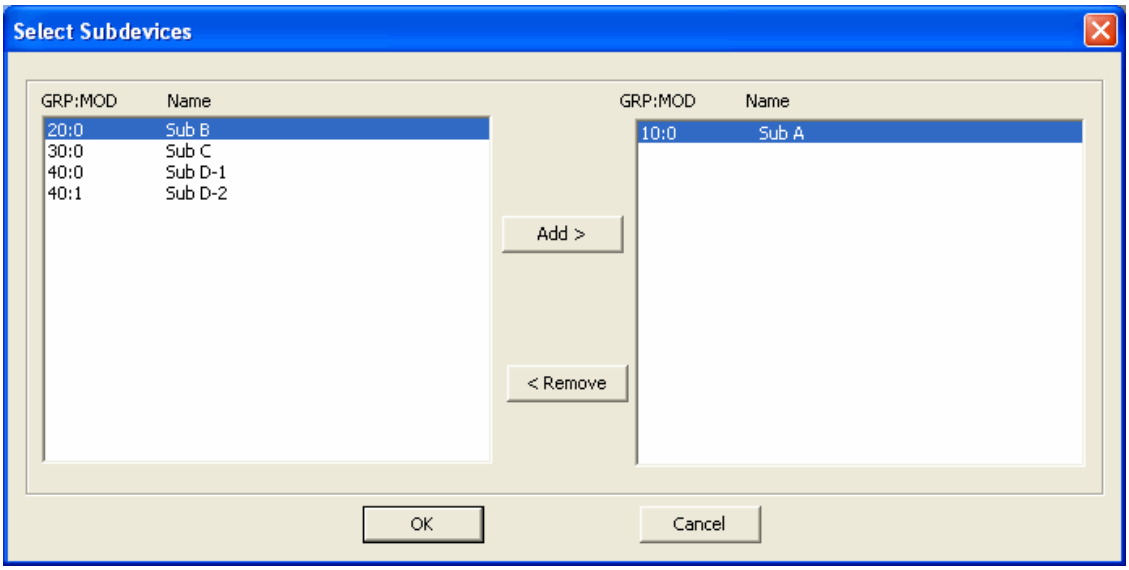
3 B: Define SubDevices for each receiver in Master comparator

B. Assign Sub Devices for each receiver in the Master Comparator

In the "Receivers" window, a "SubDevice" column will be displayed as shown below (only with Master-Sub features enabled as indicated above).

1. For each receiver of a Master Comparator, double-click its cell in the "SubDevice" column to display the following "Select SubDevices" window.
2. From the list of available SubDevices on the left side, "Add" the appropriate receivers to the right side of this window.

For the first Master Comparator receiver that is fed from Sub Comparator A, the "Select SubDevices" window should look like the following.

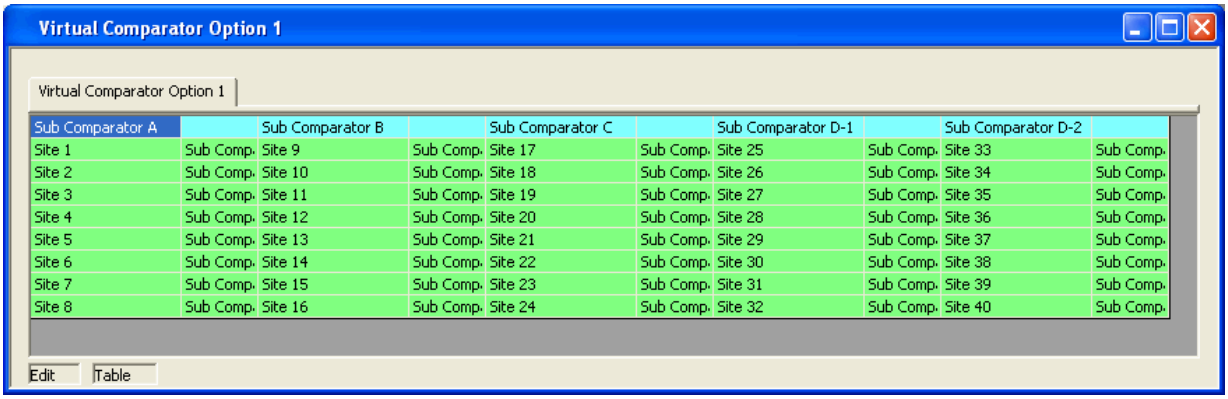


Click the **OK** button to close this window.

Notice that the cell in the "SubDevice" column of the "Receivers" window for this receiver is now set to "Yes".

4. Design the Display Window for the Virtual Comparator

As shown in the following Display Window, all 40 site receivers of the Sub Comparators are included in the display. Note that the Master Comparator is not shown in this Virtual Comparator view.



5. Customizing Display Tables

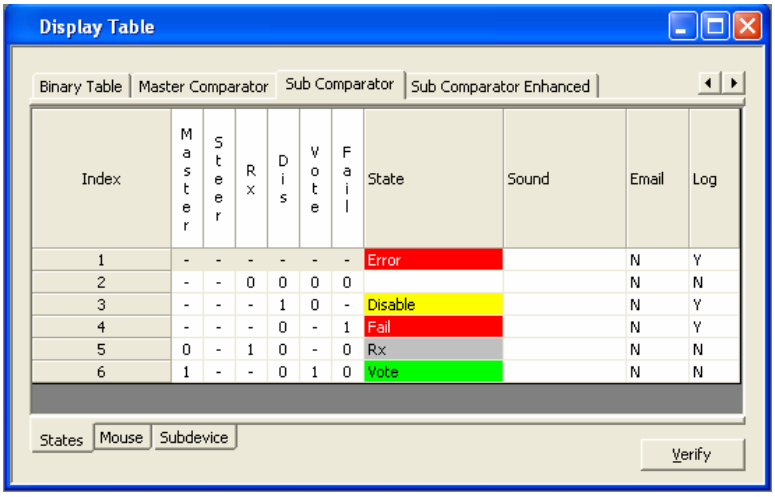
In the "Display Table" window, several types of devices have been predefined, including Comparator, Generator, Door, and others. Each device type has its own tab across the top of this window. The Master-Sub Comparator Option adds the following Display Tables:

- Master Comparator
- Sub Comparator
- Sub Comparator Enhanced

If these display tables suit your application, you can skip this section. If you need to modify them, read on.

Sub Comparator Display Table

The Sub Comparator display table **States** tab is shown below:



Index	Master	Steer	Rx	Dis	Vote	Fail	State	Sound	Email	Log
1	-	-	-	-	-	-	Error		N	Y
2	-	-	0	0	0	0			N	N
3	-	-	-	1	0	-	Disable		N	Y
4	-	-	-	0	-	1	Fail		N	Y
5	0	-	1	0	-	0	Rx		N	N
6	1	-	-	0	1	0	Vote		N	N

This Sub Comparator **States** table has several basic differences from the basic Comparator display table:

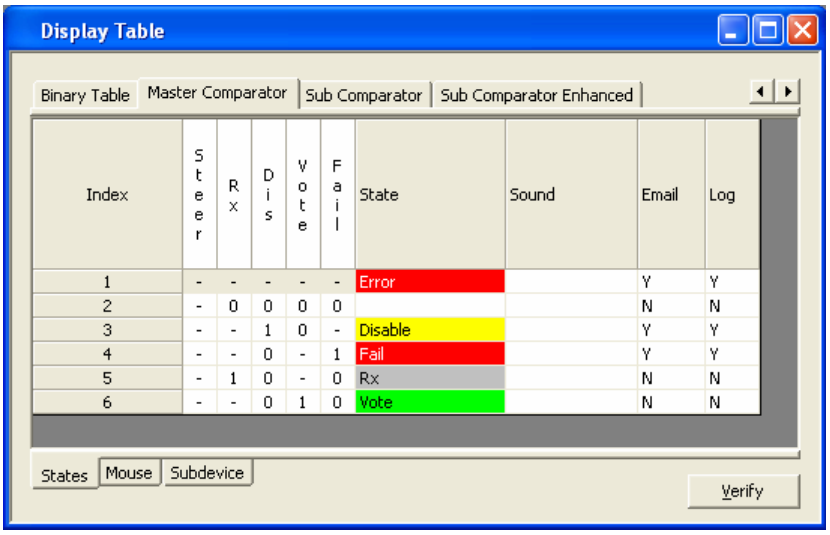
- The Steer bit is a Don't Care (we're not using Transmitter Steering in this system)
- An additional Master (Master Vote) bit has been added (leftmost bit).
- The Vote state requires the Master bit (Master Vote) bit to be set (State 6)
- If the Rx bit is set and the Master (Master Vote) bit is not set, the display will show "Rx", even if the Vote bit (Sub Comparator Vote) is set (State 5)

The Master (Master Vote) bit is inherited from the Master comparator. It is only set when the Sub Comparator is voted in the Master Comparator.

Master Comparator Display Table

States Tab

The Master Comparator display table **States** tab is shown below:

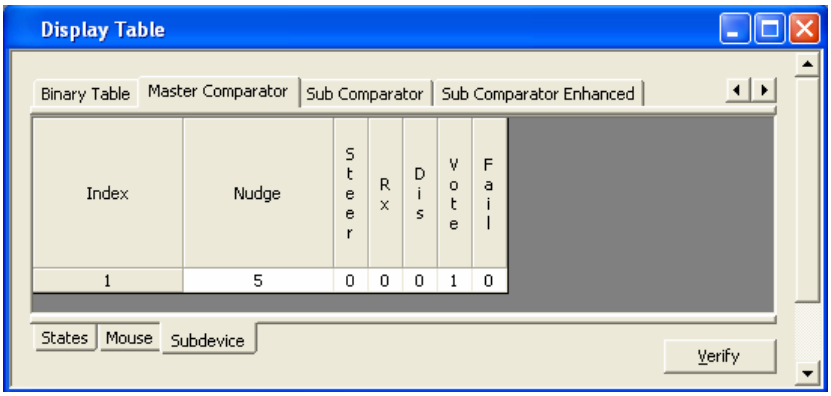


This Master Comparator **States** table has a basic difference from the basic Comparator display table:

- The Steer bit is a Don't Care (we're not using Transmitter Steering in this system)

SubDevice Tab

The **SubDevice** tab has been added in the Master-Sub Comparator option. The Master Comparator display table **SubDevice** tab is shown below:



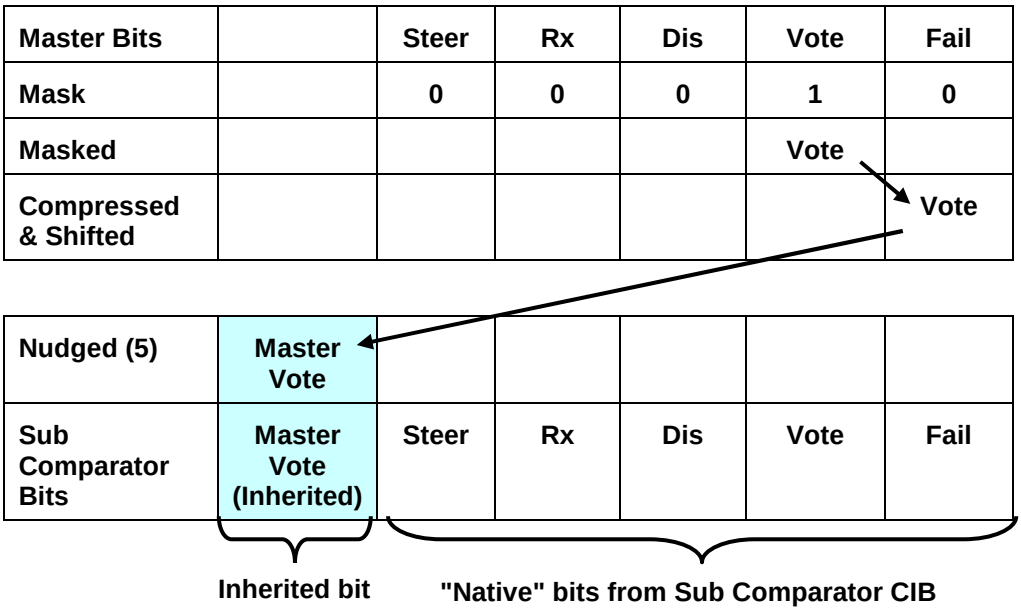
The **SubDevice** tab for the Master Comparator has the following items that are used to pass the Master Vote down to the Sub Comparator:

- Bit Mask for the Vote bit is a 1. This is the bit that will be passed on to the Sub Comparator devices.
- The Nudge field is set to 5. This tells the program how far to move the inherited bit(s) in the SubDevice. This number will depend on the SubDevice.

Bit Mask and Nudge Fields

The Bit Mask fields indicate which bit(s) is (are) used to pass to the SubDevice.

In general, the "Nudge" field should be the number of native bits in the destination SubDevice Table. (If there are Mulitdependencies – multiple Master Comparators for each Sub Comparator – you will need to specify special nudge values.)



The best way to understand how to set the Bit Mask and Nudge fields is to consider how the MCNRCD program processes the bits from the Master comparator as shown above:

1. The program masks out all bits that have a "0" in the mask field.
   It passes only those bits that have a "1" in the Bit Mask field (Vote in this case)
2. All the bits with a "1" in the bit mask field are compressed and shifted to the right to fill the Least Significant Bits (right hand bits). In the above example, there is no compression going on – only shifting. The compression comes in when there are multiple non-contiguous mask bits set to "1". In that case, the program compresses the bit field by deleting all the unused bits. This is shown in the ***Multi-Bit Mask*** section on the next page.
3. The Compressed & Shifted Bits will be nudged to the left by the number specified in the "Nudge" field (5 in this case).
4. The Nudged bit will be passed to all the receivers in the Sub Comparators.
5. The resultant bits (the inherited bit plus the "native" Sub Comparator bits) will be used in the Sub Comparator Display Table to determine the status to display.

Multi-Bit Mask

There may be times in which you need multiple bits from a master device to be passed to a sub device. The following table illustrates how to do this.

If, for example, you wanted to pass the "Rx" and the "Vote" bits from the Master comparator to the Sub Comparator, you would set the mask as shown:

Master Bits			**Steer**	**Rx**	**Dis**	**Vote**	**Fail**
Mask			**0**	**1**	**0**	**1**	**0**
Masked				**Rx**		**Vote**	
Compressed & Shifted						**Rx**	**Vote**
Nudged (5)	**Master Rx**	**Master Vote**					
Sub Comparator Bits	**Master Rx**	**Master Vote**	**Steer**	**Rx**	**Dis**	**Vote**	**Fail**

Inherited bits **"Native" bits from Sub Comparator CIB**

For Multi-Bit Master-Sub Comparator, the MCNRCD program processes the bits from the Master comparator as shown above:

1. Both the "Rx" and "Vote bits have a "1" bit set.
2. The "Rx" & "Vote" bits are compressed (unused bits are deleted) and shifted to the right to fill the Least Significant Bits (right hand bits)
3. The Compressed & Shifted Bits will be nudged to the left by the number specified in the "Nudge" field. (5 in this case)
4. The Nudged bits are passed to all the receivers in the Sub Comparators.

(Note that this is just an example of what could be done with multiple bits to show how multiple bits are handled.)

Multi-Level Inheritance – Sub-Sub Comparators

The Master – Sub Comparator feature allows you to pass bits down from a master device to a sub device as shown above. You can create multi-level systems as shown below:

Master Comparator

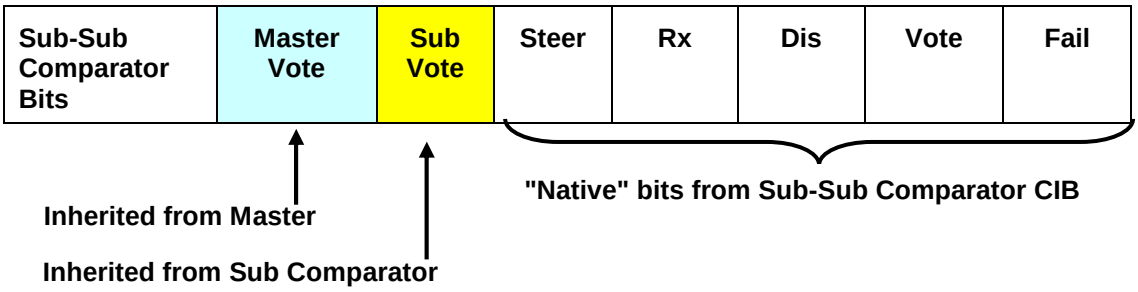
Sub Comparator

Sub-Sub Comparator

You can only pass down native bits, not inherited bits. In the example above:

- The Sub Comparator could pass its own Vote bit down to the Sub-Sub Comparator.
- It could not pass down the Master Vote bit that it inherited from the Master Comparator.

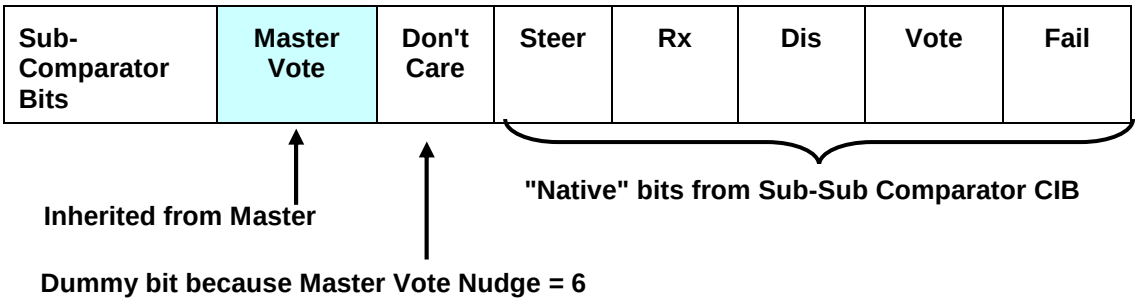
You might need a Master Vote and Sub Vote bit in the Sub-Sub Comparator as shown below:



To accomplish this, set up the following parameters:

- Master Vote Bit Nudge = 6
- Master Comparator Sub Devices: Sub Comparator & Sub-Sub Comparator
  (This passes the Master Vote bit directly down to both sub-levels)
- Sub Comparator Vote Bit Nudge = 5
- Sub Comparator Sub Device: Sub-Sub Comparator
  (This passes the Sub Vote bit down.)

Since the Master Vote bit is nudged 6 bits, it will be nudged the same amount in each of its SubDevices. Thus, the bits for the Sub Comparator Display Table for this example should be set up as follows:



When you fill out the States in this table, just make the Don't Care bit a "-" in all states.

*In this example, we were able to pass the Master Vote bit down two levels, but it was not passed through the Sub Comparator. It was passed **directly** from the Master comparator to the Sub Sub Comparator.*

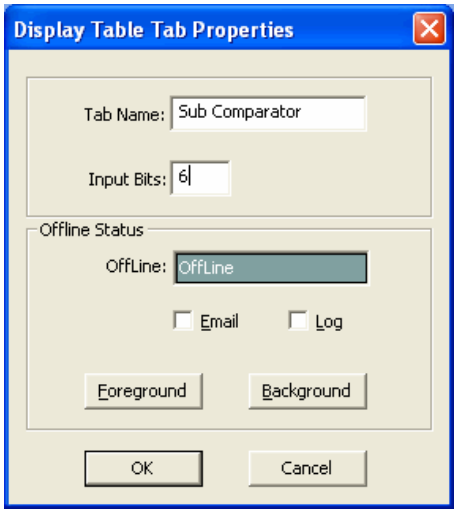
Creating New Display Tables for Master and Sub Comparators

This section shows how to add new display tables for Master or Sub Comparators. It assumes that you are familiar with the Master and Sub device bit interaction as described in the previous section.

Sub Comparator Display Table

To add a tab for a new device to properly display the four Sub Comparators in our "Virtual Comparator" example system from Page 94,

- Right-click on one of the existing tabs at the top of the Display Table window
- Click on ***Append New Table***. The following window will be displayed.



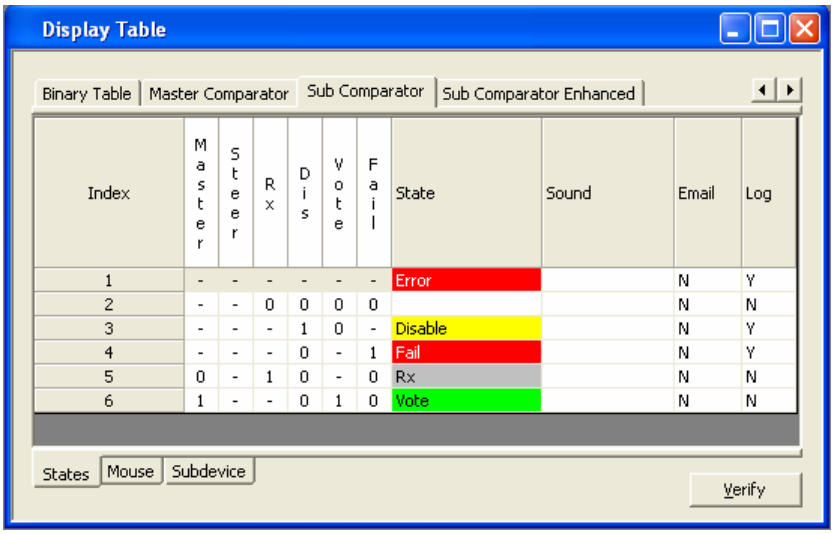
- Type in a new **Tab Name** such as "Sub Comparator ".
- Select the number of status **Input Bits** that this new device will possess.

  In addition to the 5 Input Bits of the predefined Comparator device, we will use an additional status bit to hold the Vote bit that will be inherited from the Master Comparator. So in this case, the number of **Input Bits** should be set to 6.
- Click on **OK** to close this window. A new blank display table will be entered with 6 bits.

States Tab

- Right-click anywhere on the States Table for this new "Sub Comparator" device, then click on ***Append*** to add lines for additional states.
- Modify each state line in the States Table to satisfy the display requirements for this system's "Virtual Comparator. As shown in the following, a bright Green "Vote" will be displayed only when the Sub Comparator has voted (the Vote bit is set) and the Master Comparator has voted (the Master bit is set).

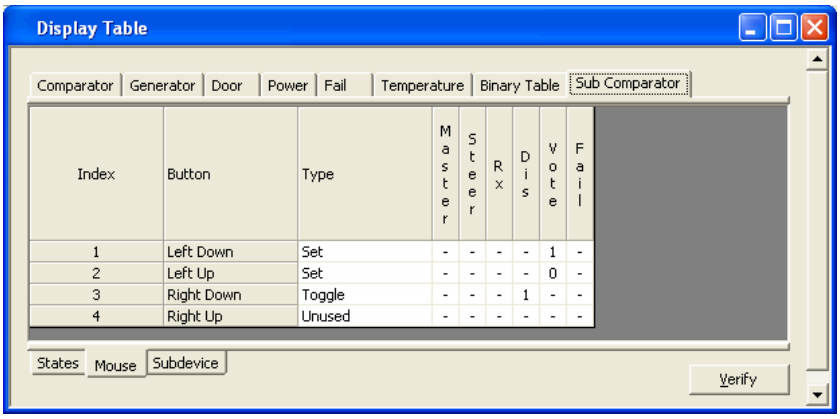
For our example of four Sub Comparators feeding into a Master Comparator, the **States** tab for a new "Sub Comparator" device may look like the following.



Index	Master	Steer	Rx	Dis	Vote	Fail	State	Sound	Email	Log
1	-	-	-	-	-	-	Error		N	Y
2	-	-	0	0	0	0			N	N
3	-	-	-	1	0	-	Disable		N	Y
4	-	-	-	0	-	1	Fail		N	Y
5	0	-	1	0	-	0	Rx		N	N
6	1	-	-	0	1	0	Vote		N	N

Mouse Tab

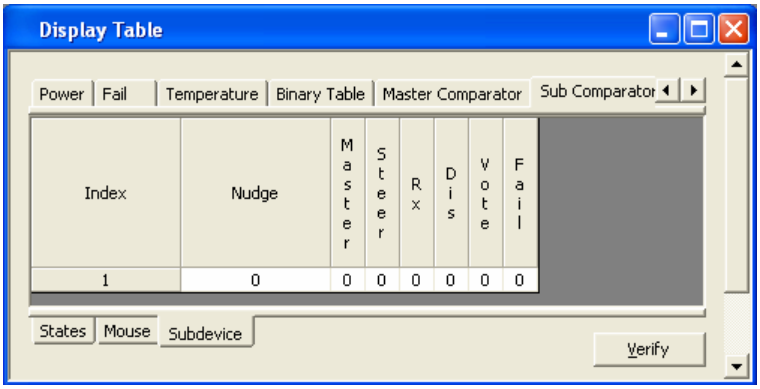
Next, the **Mouse** tab for this "Sub Comparator" display table should be modified to appear as follows.



Index	Button	Type	Master	Steer	Rx	Dis	Vote	Fail
1	Left Down	Set	-	-	-	-	1	-
2	Left Up	Set	-	-	-	-	0	-
3	Right Down	Toggle	-	-	-	1	-	-
4	Right Up	Unused	-	-	-	-	-	-

SubDevice Tab

The Sub Comparator display table should have all bits set to "0" since we are not passing bits down from the Sub Comparator to a lower level device.

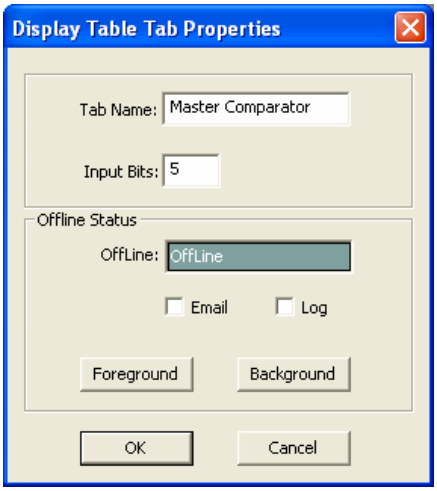


Index	Nudge	Master	Steer	Rx	Dis	Vote	Fail
1	0	0	0	0	0	0	0

Master Comparator Display Table

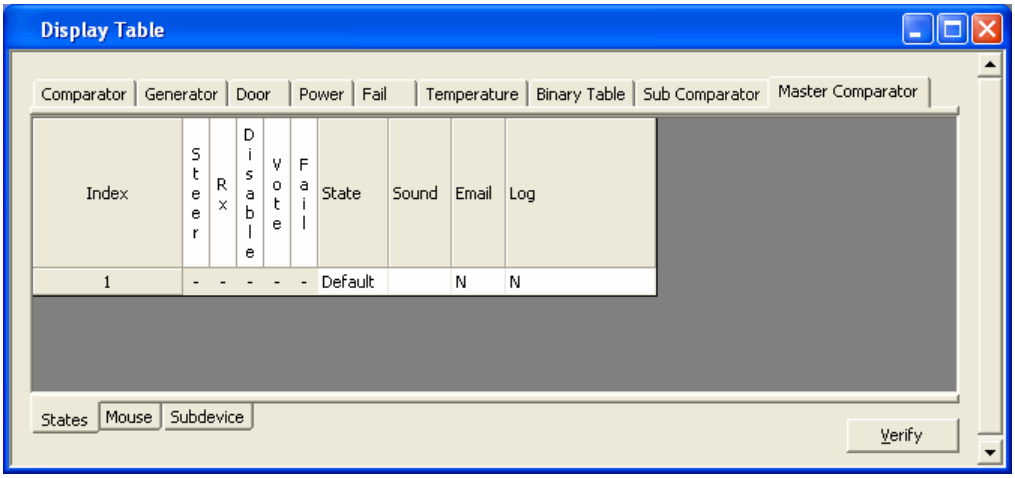
To add a tab for a new device to properly handle information from the Master Comparator in our example system, right-click on one of the existing tabs, then click on ***Append New Table***. The following window will be displayed. Type in a new **Tab Name,** such as "Master Comparator".

Then select the number of status **Input Bits** that this new device will possess. This Master Comparator display table will have nearly the same function as the predefined "Comparator" display table, so in this case, the number of **Input Bits** should be set to 5. Click on **OK** to close this window.



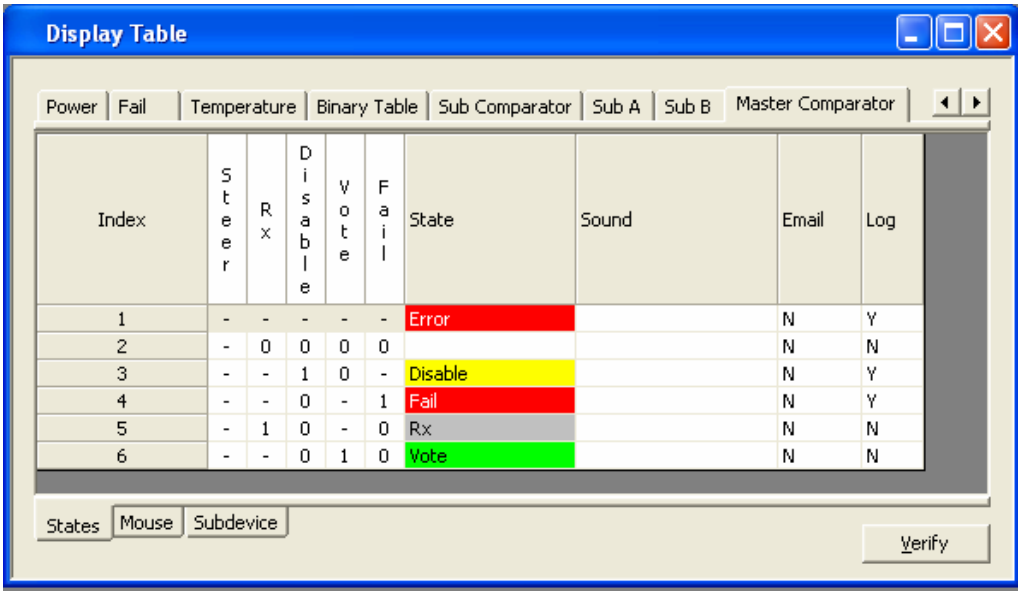
States Tab

After the table is shown, we have to add the bit names as shown below. Note that the bit order is not random; it must match the bits as they are received from the CIB modules.



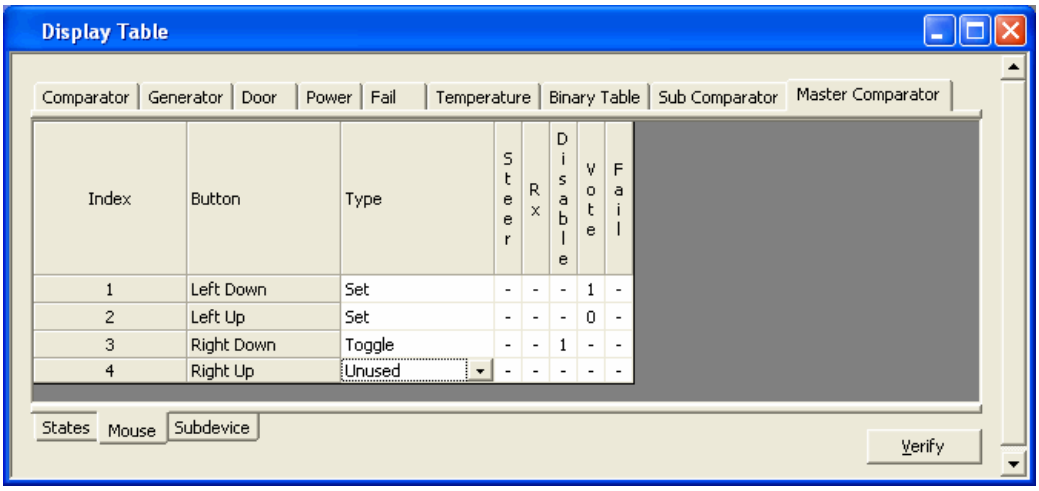
If the Master Comparators will never be displayed in an Equipment-Centric view, we could live with a minimalistic state table as shown above. No additional lines would need to be added to define states,

However, we've filled out the Master Comparator table as shown below so that a Master Comparator can be displayed in an equipment-centric view.



Mouse Tab

Next, the **Mouse** tab for this "Master Comparator" display table should be modified to appear as follows.



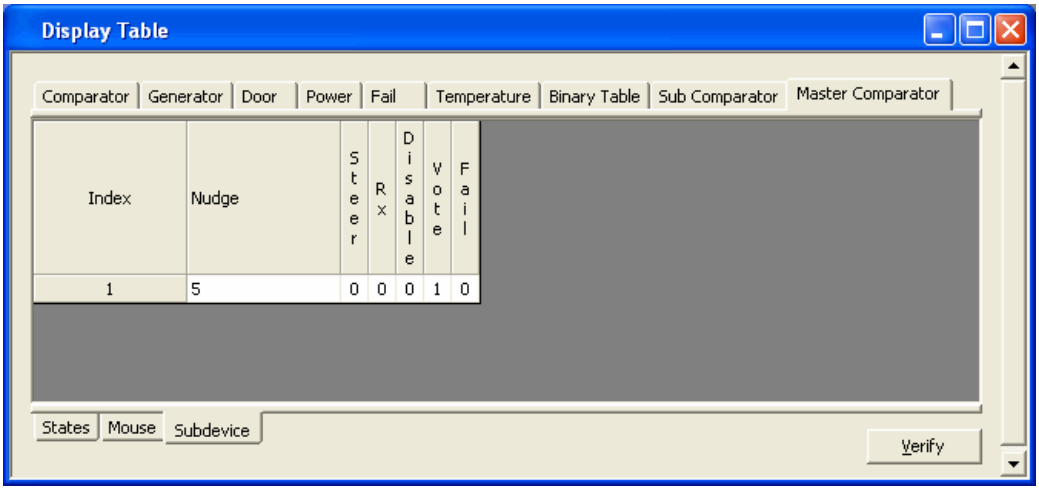
SubDevice Tab

Finally, the **SubDevice** tab for this "Master Comparator" display table must be altered to correctly pass its "Vote" bit to the Sub Comparator display table created earlier. Since the "Vote" of the Master Comparator must be passed to properly display status of the "Virtual Comparator", that bit should be masked by setting it to "1" as in the following window.

Before the Master Comparator status information is sent to the Sub Comparator status information for proper display of a "Virtual Comparator", this Master Comparator data is altered in two ways.

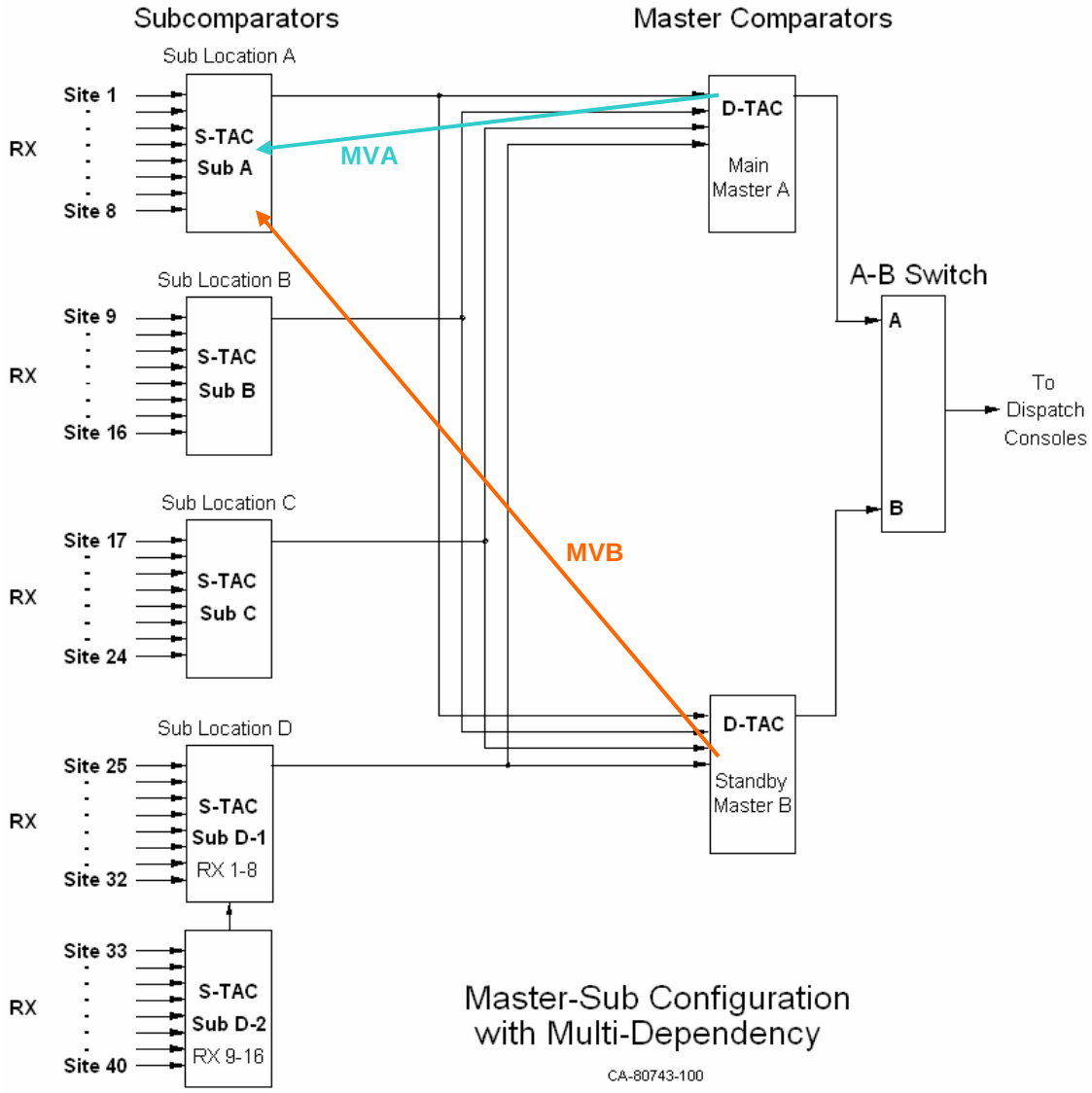
- First, the data for any single status bit that is masked in the "SubDevice" tab will be promoted to the least significant (right-most) bit of the status word.
- Second, the data in that least significant bit (Bit 0) will be "Nudged" a number of places to the left (specified in the "Nudge" column) so that it appears in the correct bit location for the Sub Comparator status.

For this example, the **States** tab for the "Sub Comparator" was modified earlier to specify that Bit 5 will hold the "Vote" status from the Master Comparator. So the bit must be "Nudged" from Bit 0 to Bit 5. Since the Bit is being nudged 5 places to the left, the "Nudge" parameter in the following display is set to 5.



MCNConfig Program:
Master-Sub Comparator Configuration with Multi-Dependency

The features described in the previous "Master-Sub Comparator Configuration" section can be used in a more complex arrangement which adds "Multi-Dependency". Multi-Dependency can be defined as the ability of a Sub Comparator to inherit status bits from multiple Master Comparators. This arrangement provides a level of redundancy and is depicted in the following diagram.



With multiple masters as in this example, Sub Comparator status bits will be inherited from both Master Comparators. The above diagram illustrates this for the first Sub Comparator with Master Vote A (MVA) and Master Vote B (MVB) vectors. Likewise, the other Sub Comparators in this system will also inherit status bits from both Master Comparators.

Multidependency will let you display this system as two virtual comparators:

- Virtual Comparator A using the Sub Comparators and Master A and
- Virtual Comparator B using the Sub Comparators and Master B.

The previous discussion under the section ***Multi-Bit Mask*** on page 103 will be used to build the Display Tables for this system.

First we need to get the Vote bits from Master A and Master B passed down to the Sub Comparators. The diagram below shows that the Master Vote bit will be masked and passed to the SubDevice. The Master A Vote will be nudged 5 bits, and the Master B Vote will be nudged 6 bits.

Master Comparator B

Master B Bits			Steer	Rx	Dis	Vote	Fail
Mask			0	0	0	1	0
Masked						Vote	
Compressed & Shifted							Vote

Master Comparator A

Master A Bits			Steer	Rx	Dis	Vote	Fail
Mask			0	0	0	1	0
Masked						Vote	
Compressed & Shifted							Vote

Sub Comparators

Master A Nudged (5) Master B Nudged (6)	Master B Vote	Master A Vote					
Sub Comparator Bits	Master B Vote (Inherited)	Master A Vote (Inherited)	Steer	Rx	Dis	Vote	Fail

Inherited bits

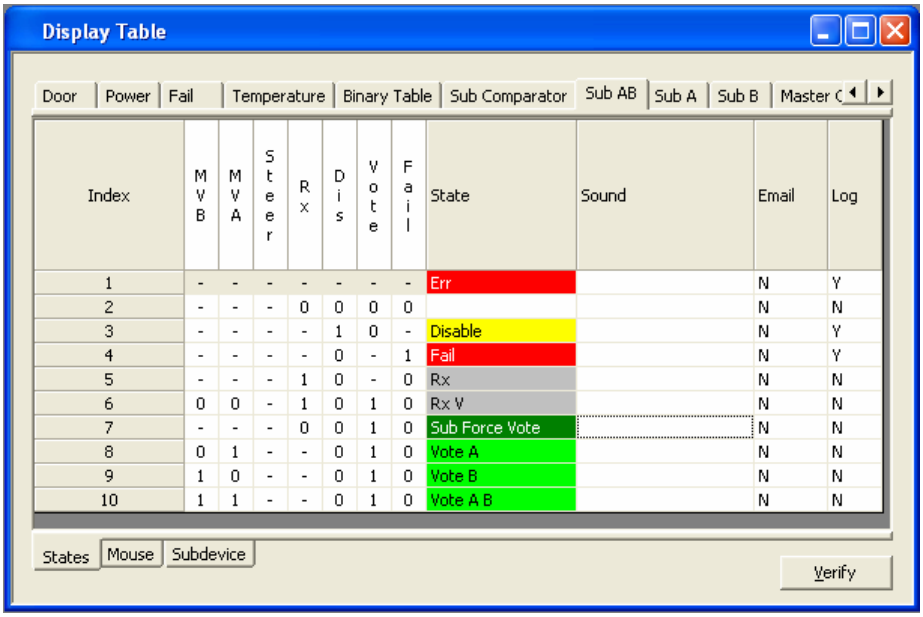
"Native" bits from Sub Comparator CIB

To accomplish the above, set up the following parameters:

- Sub Comparator Display Table(s) with slots for Master Vote A & B
- Master A Display Table with Vote Bit Nudge = 5
- Master B Display Table with Vote Bit Nudge = 6
- Master A Comparator Receiver slot Sub Devices: Sub Comparators
- Master B Comparator Receiver slot Sub Devices: Sub Comparators

Composite Sub Comparator Display Table

A Composite Sub Comparator display table can be built as shown below:



This can be used for somewhat of an equipment-centric view, but with added information about whether or not this sub comparator is also voted by the master comparator(s). This display might be useful for a technician.

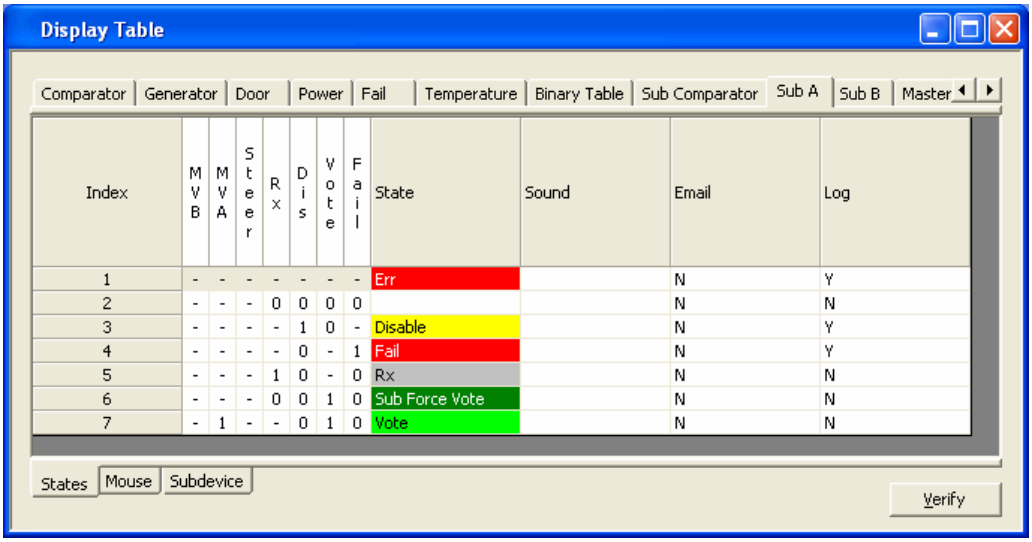
Multiple Views of the Virtual Comparators

For a dispatcher, it is helpful to be able to display the example system as two virtual somparators:

- Virtual Comparator A using the sub comparators and Master A and
- Virtual Comparator B using the sub comparators and Master B.

To do this, we need a Sub Comparator Display Table for both virtual comparators as shown below:

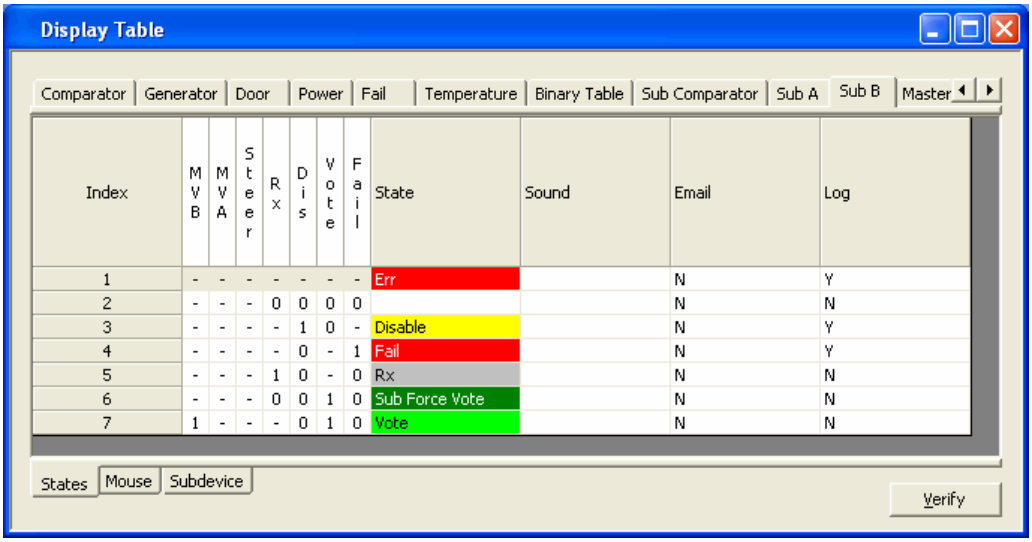
For Virtual Comparator A:



Index	MVB	MVA	Steer	Rx	Dis	Vote	Fail	State	Sound	Email	Log
1	-	-	-	-	-	-	-	Err		N	Y
2	-	-	-	0	0	0	0			N	N
3	-	-	-	-	1	0	-	Disable		N	Y
4	-	-	-	-	0	-	1	Fail		N	Y
5	-	-	-	1	0	-	0	Rx		N	N
6	-	-	-	0	0	1	0	Sub Force Vote		N	N
7	-	1	-	-	0	1	0	Vote		N	N

For this view, the dispatcher is interested only in what receiver is being used through the Master A comparator. This Display table shows a "Vote" only when the Master A comparator has selected the sub comparator. It ignores what the Master B comparator is doing.

For Virtual Comparator B:

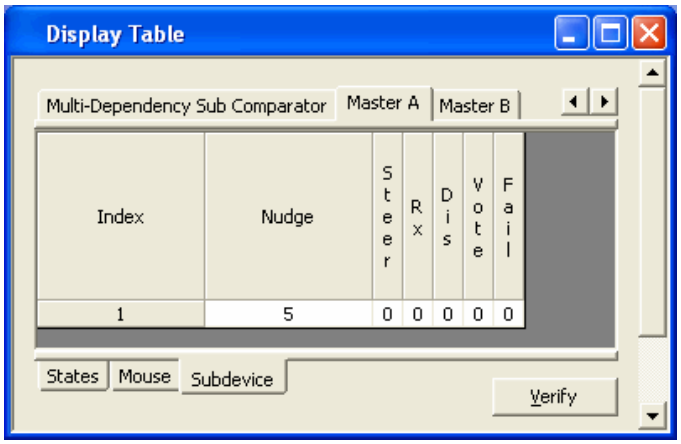


Index	MVB	MVA	Steer	Rx	Dis	Vote	Fail	State	Sound	Email	Log
1	-	-	-	-	-	-	-	Err		N	Y
2	-	-	-	0	0	0	0			N	N
3	-	-	-	-	1	0	-	Disable		N	Y
4	-	-	-	-	0	-	1	Fail		N	Y
5	-	-	-	1	0	-	0	Rx		N	N
6	-	-	-	0	0	1	0	Sub Force Vote		N	N
7	1	-	-	-	0	1	0	Vote		N	N

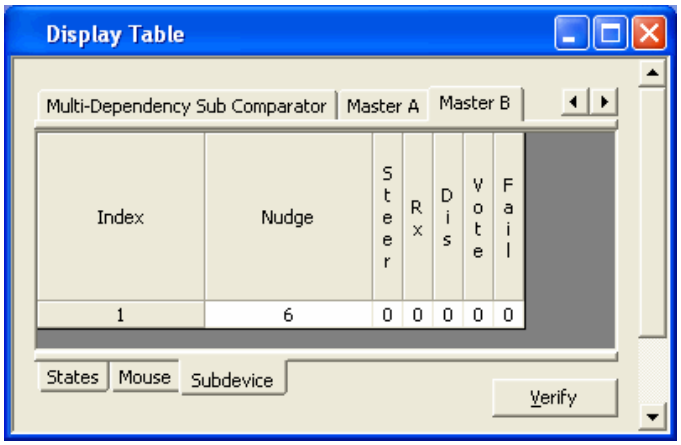
For this view, the dispatcher is interested only in what receiver is being used through the Master B comparator. This Display table shows a "Vote" only when the Master B comparator has selected the sub comparator. It ignores what the Master A comparator is doing.

Master Comparators

For the Master A Comparator, the SubDevices Tab of the Display Table should appear as in the following.



And for the Master B Comparator, the SubDevices tab of the Display Table should appear as in the following.

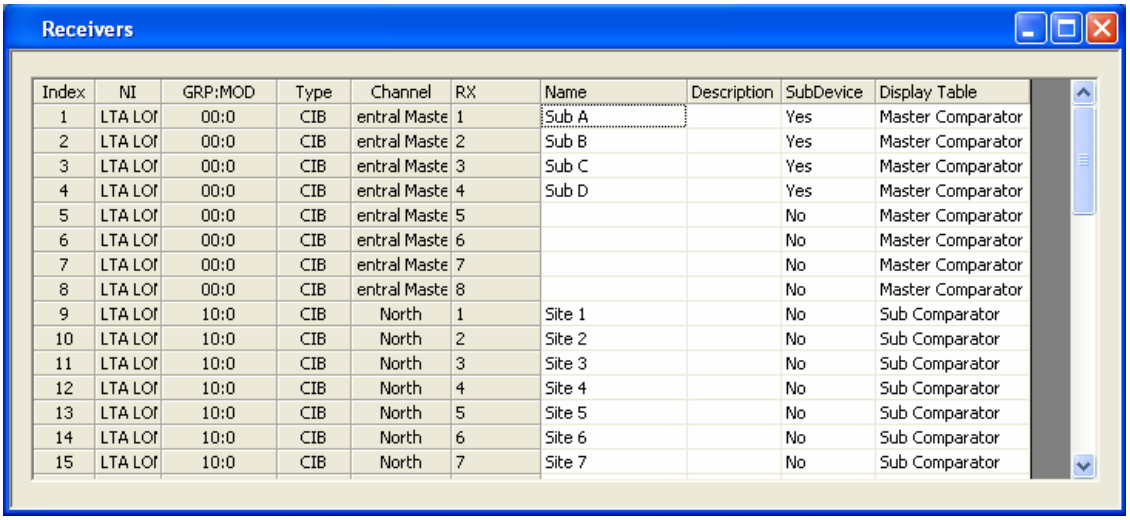


Multiple Views: Display Table Override

So we may have a number of Display Tables set up to view a master or sub comparator, for example:

- Equipment-Centric
- Virtual Comparator
- Enhanced Virtual Comparator
- Composite Sub Comparator
- Sub A
- Sub B

Looking at the Receiver window below, you'll see only one value for Display Table for each receiver.



Index	NI	GRP:MOD	Type	Channel	RX	Name	Description	SubDevice	Display Table
1	LTA LOf	00:0	CIB	entral Maste	1	Sub A		Yes	Master Comparator
2	LTA LOf	00:0	CIB	entral Maste	2	Sub B		Yes	Master Comparator
3	LTA LOf	00:0	CIB	entral Maste	3	Sub C		Yes	Master Comparator
4	LTA LOf	00:0	CIB	entral Maste	4	Sub D		Yes	Master Comparator
5	LTA LOf	00:0	CIB	entral Maste	5			No	Master Comparator
6	LTA LOf	00:0	CIB	entral Maste	6			No	Master Comparator
7	LTA LOf	00:0	CIB	entral Maste	7			No	Master Comparator
8	LTA LOf	00:0	CIB	entral Maste	8			No	Master Comparator
9	LTA LOf	10:0	CIB	North	1	Site 1		No	Sub Comparator
10	LTA LOf	10:0	CIB	North	2	Site 2		No	Sub Comparator
11	LTA LOf	10:0	CIB	North	3	Site 3		No	Sub Comparator
12	LTA LOf	10:0	CIB	North	4	Site 4		No	Sub Comparator
13	LTA LOf	10:0	CIB	North	5	Site 5		No	Sub Comparator
14	LTA LOf	10:0	CIB	North	6	Site 6		No	Sub Comparator
15	LTA LOf	10:0	CIB	North	7	Site 7		No	Sub Comparator

How do we use all these different Display Tables to take a different view of the comparators?

The secret is to use the **Display Table Override** in the **Display Windows**.

When a receiver is placed in a Display Window, you can use a special Display Table *for that instance* of the receiver by using the Display Table Override.

For example, if you want to display a system in two ways:

- Virtual Comparator A (using Master A comparator)
- Virtual Comparator B (using Master B comparator)

You would set up a one tab for each Virtual Comparator as shown below:

Virtual Comparator A

Sub Comparator A		Sub Comparator B		Sub Comparator C		Sub Comparator D-1		Sub Comparator D-2	
Site 1		Site 9		Site 17	Rx	Site 25		Site 33	
Site 2	Rx	Site 10		Site 18	Vote	Site 26		Site 34	
Site 3	Rx	Site 11	Rx	Site 19	Rx	Site 27	Rx	Site 35	Dis
Site 4	Rx	Site 12		Site 20		Site 28	Rx	Site 36	
Site 5	Rx	Site 13		Site 21	Rx	Site 29		Site 37	
Site 6	Rx	Site 14	Rx	Site 22		Site 30		Site 38	
Site 7		Site 15	Rx	Site 23	Rx	Site 31		Site 39	
Site 8	Dis	Site 16		Site 24		Site 32		Site 40	

Virtual Comparator B

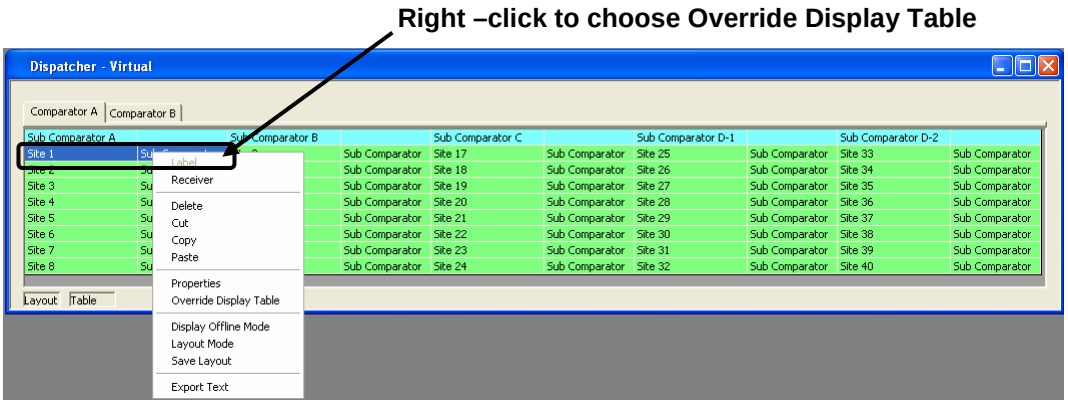
Sub Comparator A		Sub Comparator B		Sub Comparator C		Sub Comparator D-1		Sub Comparator D-2	
Site 1		Site 9		Site 17	Rx	Site 25		Site 33	
Site 2	Rx	Site 10		Site 18	Rx	Site 26		Site 34	
Site 3	Rx	Site 11	Rx	Site 19	Rx	Site 27	Rx	Site 35	Dis
Site 4	Vote	Site 12		Site 20		Site 28	Rx	Site 36	
Site 5	Rx	Site 13		Site 21	Rx	Site 29		Site 37	
Site 6	Rx	Site 14	Rx	Site 22		Site 30		Site 38	
Site 7		Site 15	Rx	Site 23	Rx	Site 31		Site 39	
Site 8	Dis	Site 16		Site 24		Site 32		Site 40	

The Display Windows are similar, with the following differences:

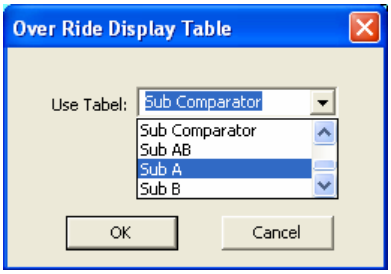
- Master Comparator A is voting Sub Comparator C and using Rx 18.
- Master Comparator B is voting Sub Comparator A and using Rx 4.

If the Dispatcher had the A-B switch in position "A", he would hear audio from Rx 18. If he had it in the "B" position, he would be hearing Rx 4.

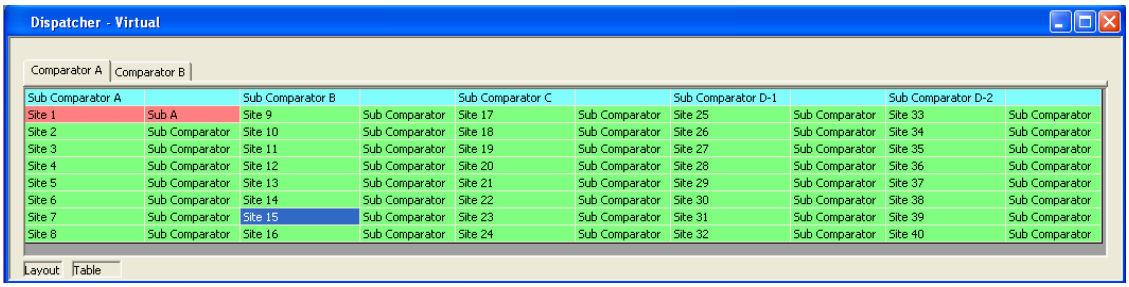
To build this display we us the Display Table Override feature. For each receiver in a Display Window that will use a different Display Table than chosen in the Receivers Window, right-click its cell in the Display Window as shown below.



Then click the **Override Display Table** menu item to display the following window.



Choose Sub A, and then click **OK**. The Display Window will indicate receivers with Display Table Overrides with a Reddish background as shown below. The cells for other receivers using their default Display Table will have a green background.

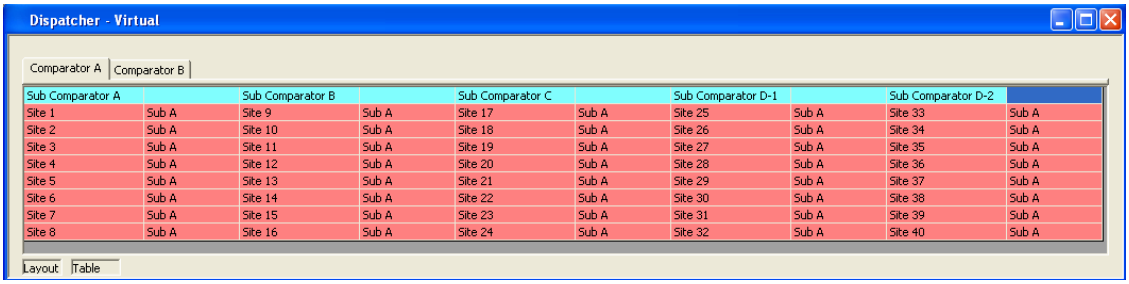


Repeat this procedure for each receiver that should have an override for the default Display Table.

The Display Table for all receivers of a comparator can be overridden. And taking it a step further, the Display Table for all receivers in a Display Window can be overridden. To make Display Table Overrides to many receivers at once, perform the following steps:

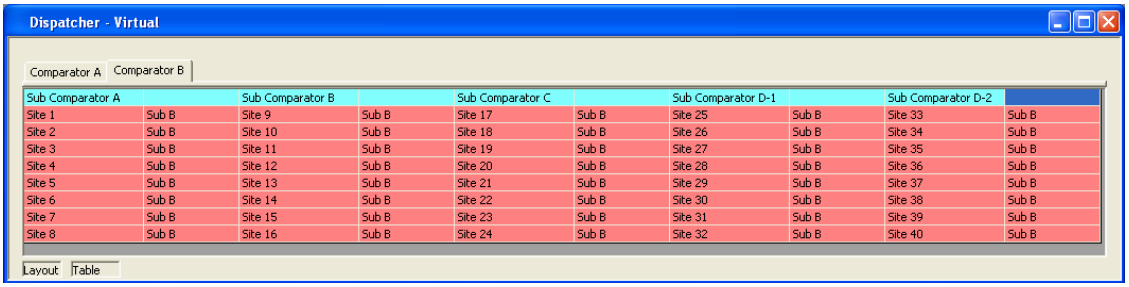
- Select all receivers that you wish to override with a type of Display Table.
- Right-click the selection, then click the **Override Display Table** menu item to display the Override Display Table window.
- Select the proper Display Table from the list, then click **OK**.

If all receivers in the above Display Window were selected to be overridden with Sub A Display Table, the Display Window would appear as follows.



Sub Comparator A		Sub Comparator B		Sub Comparator C		Sub Comparator D-1		Sub Comparator D-2	
Site 1	Sub A	Site 9	Sub A	Site 17	Sub A	Site 25	Sub A	Site 33	Sub A
Site 2	Sub A	Site 10	Sub A	Site 18	Sub A	Site 26	Sub A	Site 34	Sub A
Site 3	Sub A	Site 11	Sub A	Site 19	Sub A	Site 27	Sub A	Site 35	Sub A
Site 4	Sub A	Site 12	Sub A	Site 20	Sub A	Site 28	Sub A	Site 36	Sub A
Site 5	Sub A	Site 13	Sub A	Site 21	Sub A	Site 29	Sub A	Site 37	Sub A
Site 6	Sub A	Site 14	Sub A	Site 22	Sub A	Site 30	Sub A	Site 38	Sub A
Site 7	Sub A	Site 15	Sub A	Site 23	Sub A	Site 31	Sub A	Site 39	Sub A
Site 8	Sub A	Site 16	Sub A	Site 24	Sub A	Site 32	Sub A	Site 40	Sub A

Likewise, for Comparator B, the result would look like:



Sub Comparator A		Sub Comparator B		Sub Comparator C		Sub Comparator D-1		Sub Comparator D-2	
Site 1	Sub B	Site 9	Sub B	Site 17	Sub B	Site 25	Sub B	Site 33	Sub B
Site 2	Sub B	Site 10	Sub B	Site 18	Sub B	Site 26	Sub B	Site 34	Sub B
Site 3	Sub B	Site 11	Sub B	Site 19	Sub B	Site 27	Sub B	Site 35	Sub B
Site 4	Sub B	Site 12	Sub B	Site 20	Sub B	Site 28	Sub B	Site 36	Sub B
Site 5	Sub B	Site 13	Sub B	Site 21	Sub B	Site 29	Sub B	Site 37	Sub B
Site 6	Sub B	Site 14	Sub B	Site 22	Sub B	Site 30	Sub B	Site 38	Sub B
Site 7	Sub B	Site 15	Sub B	Site 23	Sub B	Site 31	Sub B	Site 39	Sub B
Site 8	Sub B	Site 16	Sub B	Site 24	Sub B	Site 32	Sub B	Site 40	Sub B

Note that in this system, the default Display table for these sub comparators was "Subcomparator". We would probably use the default for an equipment-centric view. For this dispatcher display, however, both views use Display Table Overrides.

Note: Default Display Tables

The MCNRCD program passes bits downstream from a Master device to sub devices using the Display table that is in the Receiver window. You must use the proper Display Table (the one with the Sub Device Bit Mask & Nudge) as the default Display Table in the Receiver window.

MCNConfig Program: Triggered Output Actions Option

The Triggered Output Actions option in the MCN Server software provides the means for an Input Event to trigger an Output Action. This option can be used, for example, to provide alarm outputs (from a CIB or GPIO module) to an external device when a failure on one or more input devices occurs.

Typical uses would include:

Input Events	Output Action
Failed receivers on a channel	Turn on Channel Failure Alarm Output
Microwave Alarm	Turn on Microwave Failure Alarm Output
Any abnormal condition at a site	Turn on composite Site Alarm Output
Alarm Acknowledgement input	Turn off Alarm Relay

An output can be triggered by one or many input events, but an input event can trigger only one output action.

Setting up Triggered Output Actions involves configuring the following items:

- Triggered Output Types
- Triggers
- Output Function Blocks (the specific physical outputs on a CIB or GPIO module)
- Linkages between specific inputs and specific output function blocks.

Triggered Output Types

Set up the Triggered Output Types in the Display Table window. Each Triggered Output Type is defined in its own Display Table tab. Normally, only one or two Triggered Output Types are defined. You will use the Triggered Output Type as the Display Table for the specific Output Function Blocks. Things to define for Triggered Output Types are:

- Triggered Output Type Name (Display Table Name)
- Number of Bits
  Usually just a single bit is used for alarm outputs, but you could implement multi-bit alarms such as Major and Minor alarms or Fail and Disable alarms for comparators.
- Bit Names
  Typically "Alarm" in a one-bit Output Type
  In a multi-bit output type, the bits could be named "Major" and "Minor", etc.
- States to display on the PC (ex: "Normal" & "Alarm") and their colors
- Mouse Functions (typically to reset or acknowledge an alarm)
- Actions for the Input Event to trigger
  ex: Set Alarm or Reset Alarm
  Set Major, Set Minor, Reset Major, Reset Minor, Reset All

In most systems, one Triggered Output Type can be used for all the alarm Output Function Blocks. You would need to make multiple Triggered Output Types if:

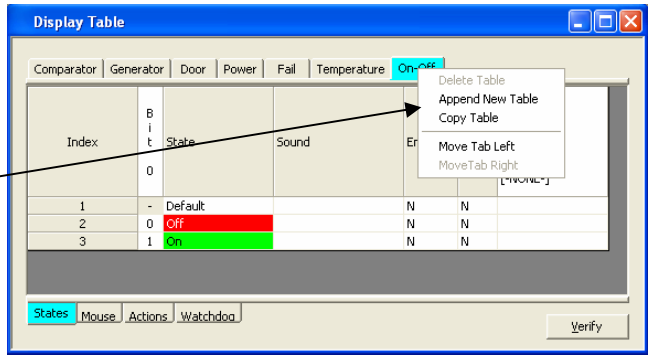
- You needed different status texts or colors to be displayed for different Output Types or
- You need both single bit and multi bit Triggered Output Types

Building a New Triggered Output Type

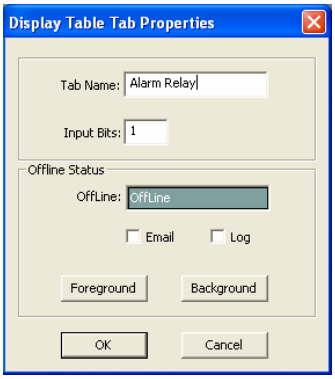
New Triggered Output Types are built just like normal Display Tables.

1. Start in the Display Table Window.

2. Right-Click on the top Display Table tabs and select ***Append New Table***.



3. Enter the Triggered Output Type (Display Table) in the ***Tab Name*** field.
   Set up the number of bits in the ***Input Bits*** field.
   Hit ***OK***.



4. Select the ***States*** tab on the bottom of the window.

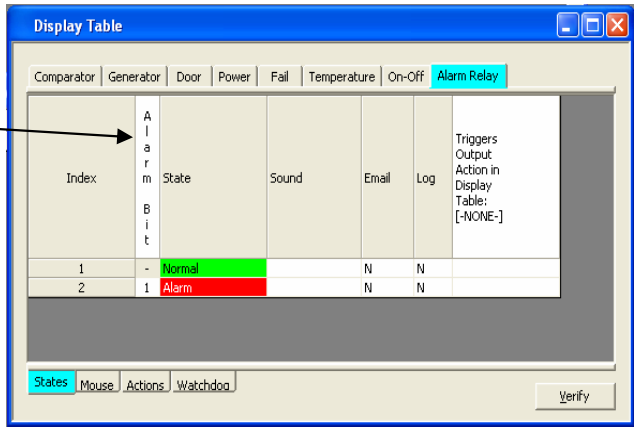
   Enter the Bit Names

   Enter the State values, texts and colors

   (Add new states by right-clicking and selecting ***Append***.)

   Enable logging if desired.

   Do not enter anything in the ***Triggers Output Action*** column. (This is an output that *receives* a trigger.)

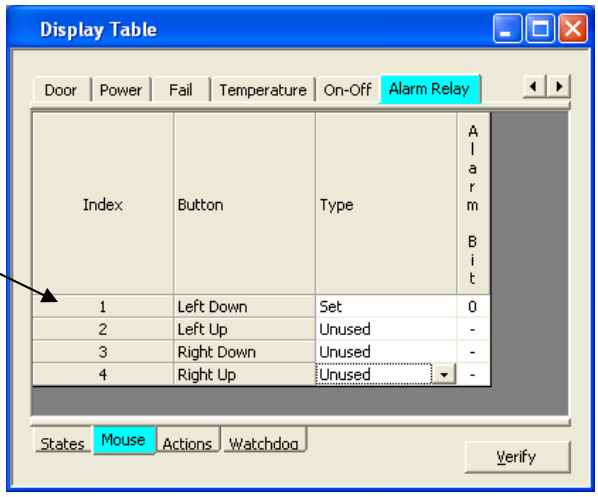


5. Select the ***Mouse*** tab at the bottom of the window.

Enter appropriate Mouse function(s)

We have added the ability to reset the alarm relay with the left mouse button (**Set** the state to **0**).

You could also set up a mouse function to set the alarm (Set to 1) if you desire.



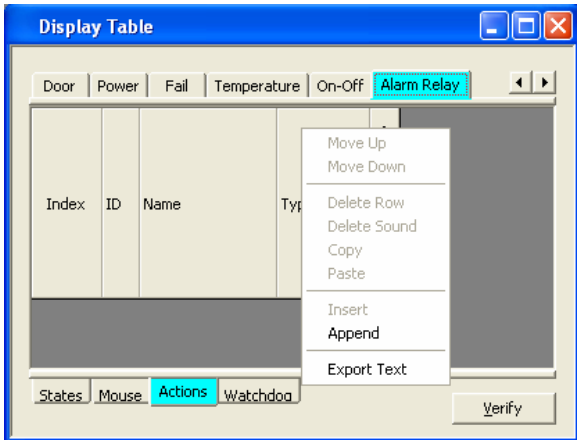
At this stage, we've set up a standard single-bit Display Table entry.

We'll now add the Output Actions that make a standard Display Table a Triggered Output Type.

6. Select the Actions tab on the bottom of the window. This is where we enter the Output Actions.

A new Display Table starts out with no Output Actions.

Right-Click on the header row and select Append from the menu.



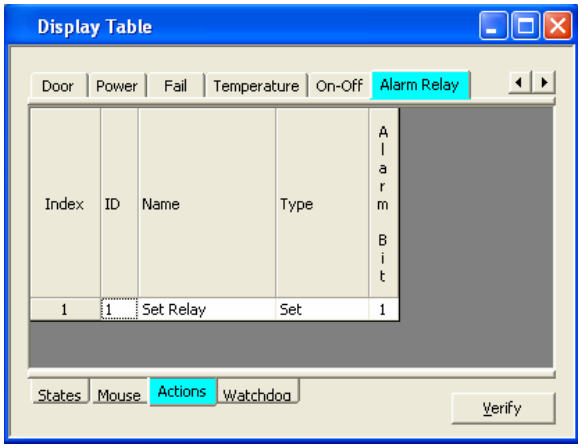
7. Enter an ID number, and a descriptive Name

The Output Actions are very similar to the Mouse functions. You can Set a bit to a 1 or 0, Toggle a bit, or ignore a bit.

Select an Action type
(Set, Toggle, or Unused).

Select a bit Value
(1, 0, or Don't Care)

The Set action type sets a bit to either a 1 or 0 as selected in the bit field.

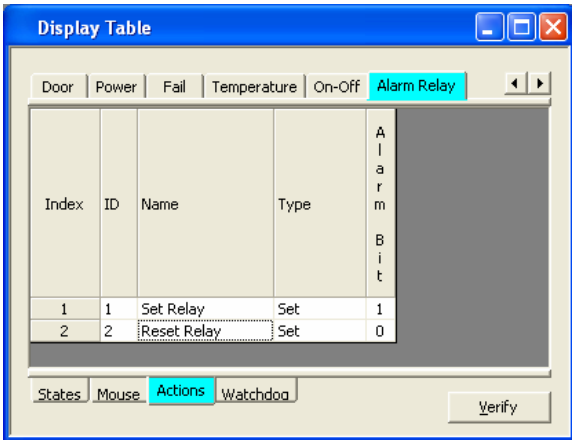


8. Repeat the above to add any additional actions required.

   Normally when using Triggered Outputs, you would only Set (to 1) outputs when an input event occurs. You'll normally reset the alarm bit manually.

   You can, however, set up both a Set and Reset action that can be used with input events as shown to the right.

   To reset a bit, select **Set** and a bit value of 0.



This completes the definition of a Triggered Output Type.

Triggers

Triggers are set up in the State tab of the Input Display Table for the inputs that will be generating the trigger events. You will normally just be adding triggers to existing input Display Tables. For each Input Display Table you'll need to:

- Select an Output Device Type to associate the Input Display Table with and
- Select an Output Action to trigger for various input states.

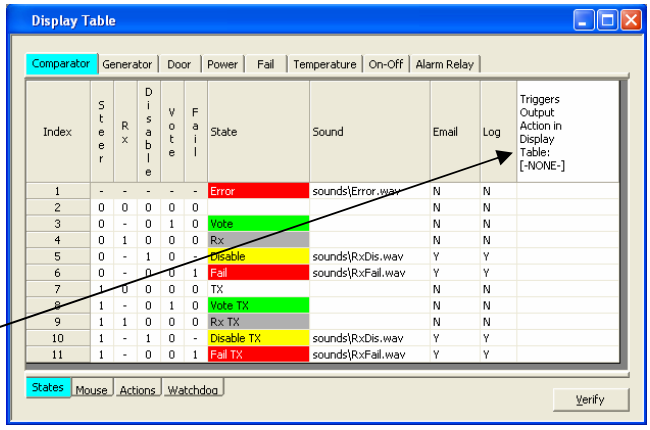
Setting up Triggers

1. Start in the ***Display Table*** window.

   Select the ***States*** tab on the bottom tabs.

   Select the desired Input Display Table on the top tabs.

   Double click on ***Triggers Output Action Display Table*** cell.

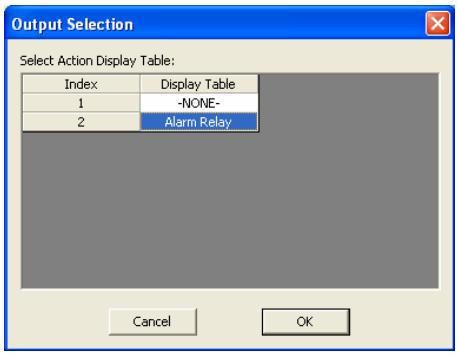


2. The ***Output Selection*** window will open.

   The Output Device Types you have configured with Actions will show up in the list of Display Tables.

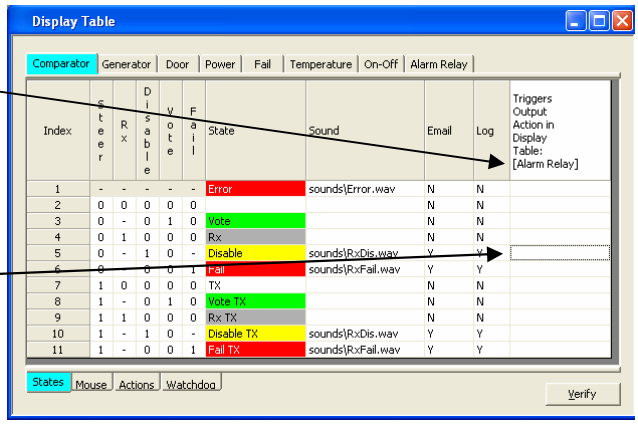
   Select the appropriate ***Display Table*** for your Output Device type.

   Hit ***OK***



3. The selected Output Device Type will be displayed in the ***Triggers Output Action Display Table*** cell.

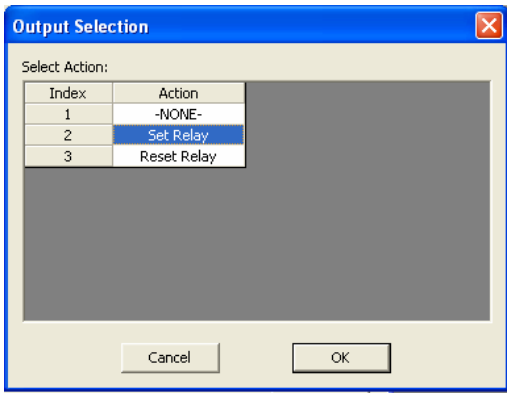
   Select a Trigger State and double-click in the far right column



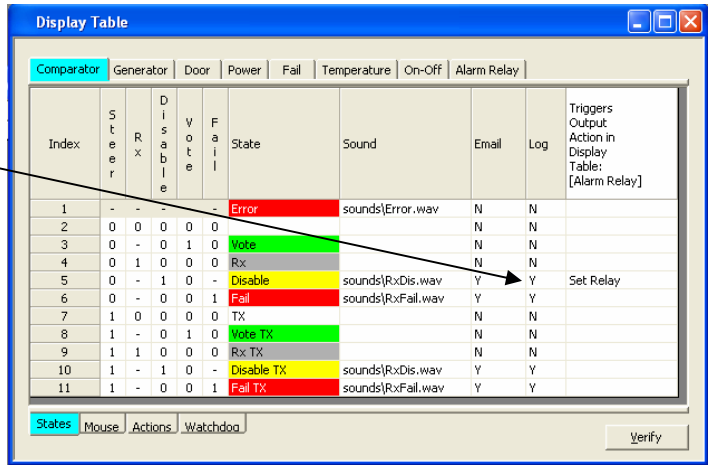
4. The Actions from the selected Output Display Table will be displayed.

   Select the desired Output Action

   Hit **OK**.



5. The Output Action will be displayed in the far right column

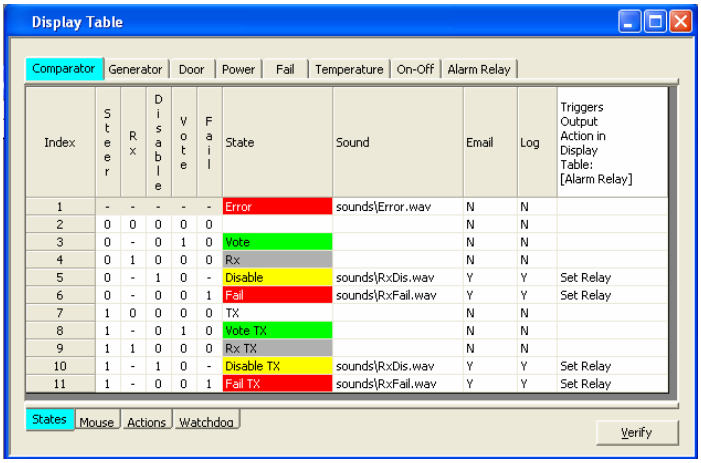


.

6. Repeat the above steps for each of the states in the Input Device Table that you want to trigger an Output Action.

   In this example we just set up triggers for the **Set Relay** output action. (We will manually reset the alarm relay.)

   You could use one or more input states to trigger the **Reset Relay** action if required.



This completes the definition of a Trigger.

You can add triggers to other Input Display Tables as required.

Linking Inputs to Outputs

In the previous steps we've set up Output Types and Trigger types. We now need to link actual inputs to actual outputs. To link an input to an output, we need to do the following:

1. Set up the actual Alarm Output Points on a device that supports outputs (CIB, GPIO module). Each Alarm Output Point must use an Output Display Table (that has an Action set in it).
2. Set up the actual input points (receivers, alarm input points, etc.) that will trigger the Output Actions. Each Input Point must use an Input Display Table that has one or more Triggers in it.
3. Link the actual input point to the actual output point.

The Input Display Table in step 2 must point to the Output Display Table in step 1.

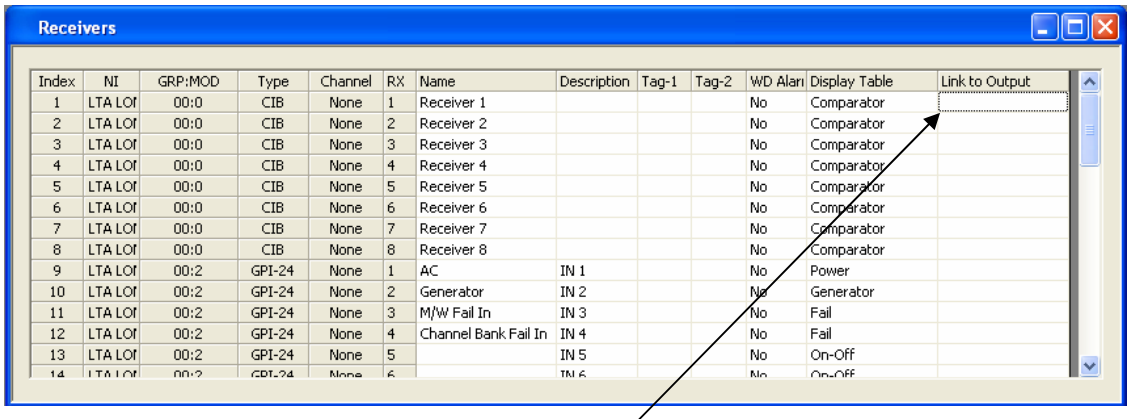
(Although we refer to Input Display Tables and Output Display Tables, they are not specifically identified as such in the program – they are all Display Tables. The difference is that Input Display Tables have Triggers and Output Display Tables have Actions.)

Setting up the Links

In this section, it is assumed that you have already:

- Set up the appropriate Input Modules (CIBs, AIBs, GPIO modules) in the Hardware window,
- Named the input points (receivers, alarm inputs, etc.) in the Receiver window,
- Selected an appropriate Input Display Table for each of the Input Points,
- Set up the appropriate Output Modules (CIBs, GPIO Modules, etc.) in the Hardware window,
- Named the Output Points (Alarm relays, etc..) in the Receiver window,
- Selected an appropriate Output Display Table for each of the Output Points

1. Start in the ***Receiver*** window.



Double click in ***Link To Output*** field for an input point.

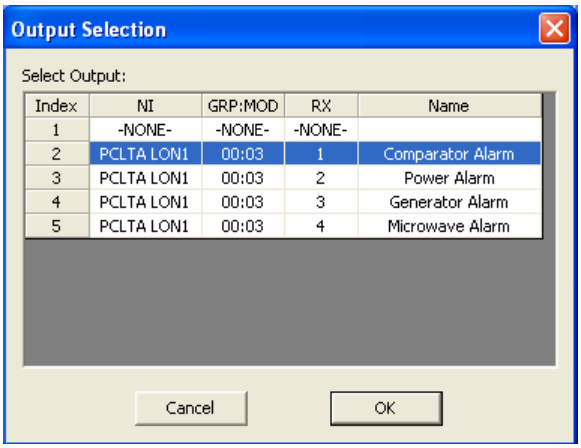
2. An Output Selection window will appear.

   In this system we have 4 output alarms set up.

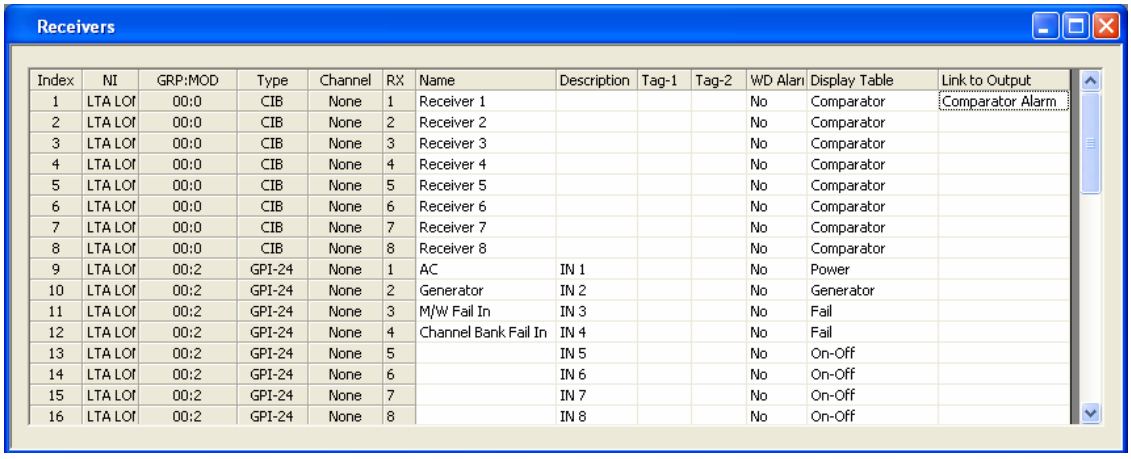
   Select the proper Output Point.

   (This is a receiver input to a comparator, so we will choose "Comparator Alarm".

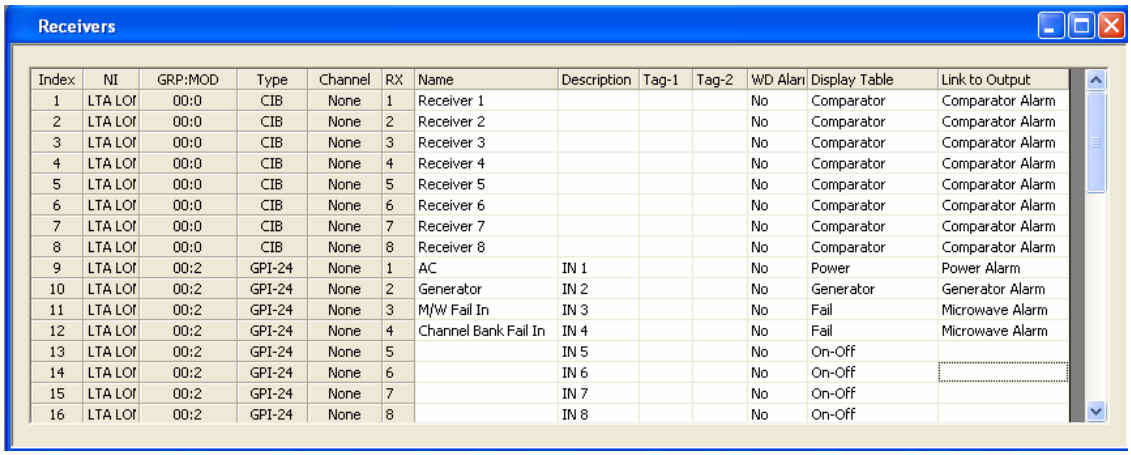
   Hit ***OK***



3. The Output Point will appear in the ***Link To Output*** field



4. Repeat the above to select the appropriate Output Points for the remaining Input Points.



Note that we have a number of Receivers in the comparator feeding the Comparator Alarm. Likewise, both the Microwave Fail and Channel Bank Fail feed the Microwave Alarm.

We have now configured the Input to Output Link.

Triggered Output Notes

Things to remember about Triggered Outputs are:

- Any input (Receiver, General Purpose I/O, etc.) device type that needs to trigger an output must use a Display Table that has Triggers in it.

  For example, if a comparator needs to trigger an alarm relay, you must add Triggers to its Display Table (typically the Comparator Display Table).

  If a generator device needs to trigger an alarm relay, you must add one or more Triggers to its Display Table (typically the Generator Display Table).

- Different input device types (Comparators, Generators, Microwave Alarms, etc.) can trigger the same type of Triggered Output Type (typically an Alarm Relay). They can trigger different explicit Alarm Points, but you may need only one Output Device Type. In our example above, all alarm outputs shared the same Output Device Type.

- Each input Display Table can trigger only one Output Device Type

- Multiple states in the Input Display Table can trigger the same Output Action.
  (ex: Disable and Fail on a receiver can both trigger a Set Alarm action.)

- Different states in the Input Display Table can trigger different actions in the Output Device Type.

  ex: Set Alarm, Reset Alarm in a single-bit Output Device Type
  Set Major Alarm, Set Minor Alarm, or Reset Alarms in a multi-bit types.

- Even if you've set up multiple Output Actions in the Output Device Type, you don't need to use all of them in any particular input Display Table. (In our example we defined a Reset action, but never triggered it from any of the Input Display Tables.)

- Each Input Display Table can point to only Output Device Type. If you have a multi-bit Input Display Table and you need to trigger multiple alarm relays from different states in that Display Table, you must set up a multi-bit Output Device Type to receive those triggers.

- If you need to have the same type of input trigger actions in different Output Device Types (ex: one set of comparators triggering a single-bit Output Device Type and another set of comparators triggering a multi-bit Output Device Type), you will need to set up two similar Input Display Tables (like Comparator1 and Comparator 2), each pointing to the different Output Device Types.

MCNConfig Program: Importing a System from MCNRCD for DOS

The MCNConfig program can import the following configuration files from the older DOS version MCNRCD program:

- ****.GCF*** Group Configuration Files (Receiver Names & Notes)
- ****.MCF*** Module Configuration Files (Module Names & Status Table pointers)
- ***MCNRCD.CFG*** Custom Status Tables

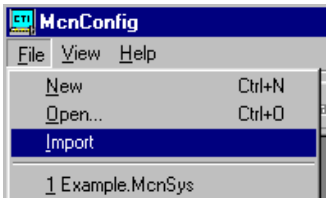
This saves the majority of the work required to re-build a system for the MCN Server.

Since there is a significant difference in screen files between the two programs, the Import command will not import the *.MSF screen files. It's easy to create the Display Window Screens. We didn't want to take all the fun out of the import process! Some of the new configuration features in the Windows program that you'll want to look at are:

- Selectable numbers of Rows & Columns
- Variable length Receiver Names & Descriptions
- Cutting & Pasting from Excel
  (especially good for receiver names and phone line / T1 Line information)
- User adjustable column widths
- Multi-tabbed display screens for faster switching between systems
- Selectable colors for labels
- Better support of alarms & general purpose I/Os
- Support of more than 8 receivers in AIBs for Astrotac comparators
- Channel grouping
- Email logging

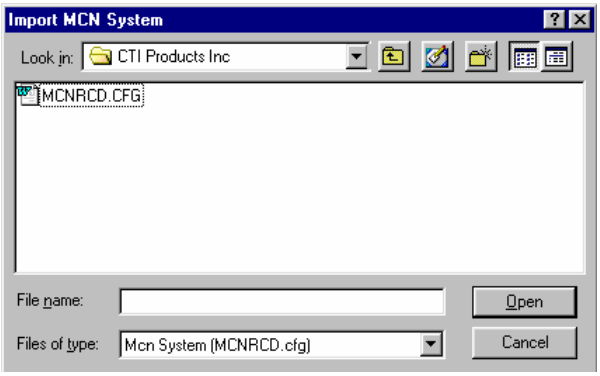
Importing the System

- Start the Config program or close the current system.
- From the File Menu, select ***Import***.

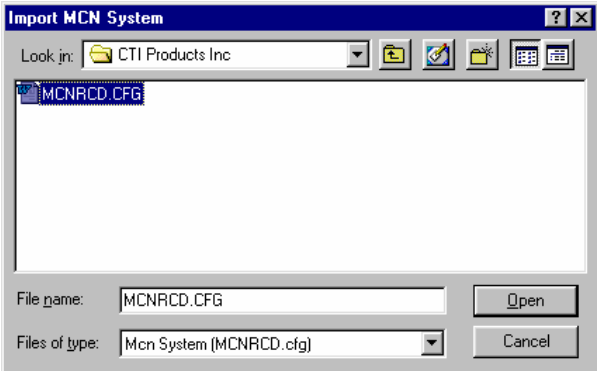


- Navigate to the proper program directory for your DOS version of MCNRCD.
  This is typically either:
  ```
  c:\CTI\
  c:\MCN\ or
  c:\Program Files\CTI Products Inc\
  ```

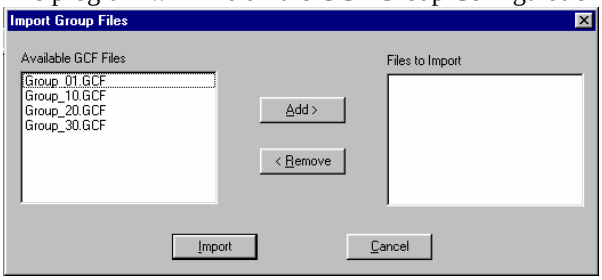
  This window will display only files named ***MCNRCD.CFG*** as shown below:



- Select the ***MCNRCD.CFG*** file and click the **Open** button.



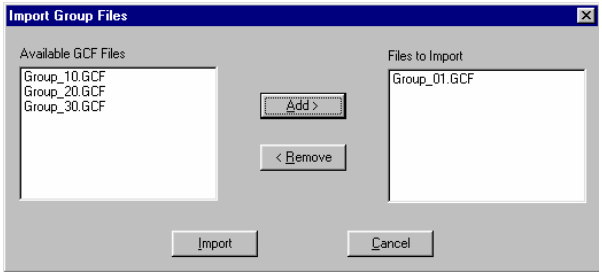
  The program will find all the GCF Group Configuration files.



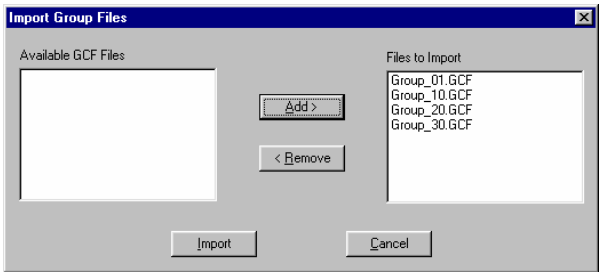
- Note that there may be stray example files in the working directory, such as the MCNGRP0.GCF and MCNGRP1.GCF files that were shipped with the system.

  You will want to import only the files that contain your current system data.

- Select the first Group File to load and click the **Add** button.
  Or, **Double Click** on an GCF File on the left side to add.



- Repeat until you have added all the Group files that you want to import.



- Click the **Import** button.
  The program will build a Hardware Window and a Receivers Window.

Saving Imported Systems

Save Now or Save Later?

The import function will convert any special Display Table (Custom Status) information and colors from your old DOS system.

The DOS program used a blue background, whereas the Windows program uses a White background.
The MCNConfig program gives you the ability to use either the imported Display Table information or the Default Windows Display Table information.

If you DO NOT nave custom status table data in the MCNRCD.CFG file:
You will probably want to use the new Default Windows Display Table.

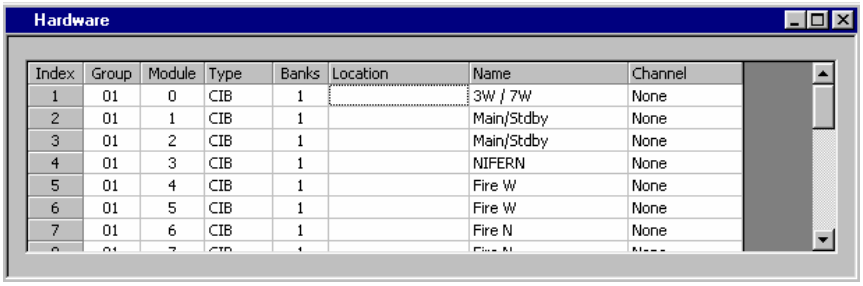
1. Save the system now (before you make a Display Window).
2. Close the system.
3. Re-open the system. The program will use the default Display Table.
4. Build your Display Windows.
5. Re-save the system.

If you DO HAVE custom status table data in the MCNRCD.CFG file:
You will probably want to use the converted Display Table.

1. Build a Display Window before you save the system
2. The system will use the converted Custom Status information.
3. Save the System
4. If you want to change the status colors (this can be done later),
   - Save the system
   - View the Display Table Window.
   - Edit the appropriate Display Table entries.

Imported Hardware Window

The program gets the Hardware information from the .GCF and .MCF files.



Index	Group	Module	Type	Banks	Location	Name	Channel
1	01	0	CIB	1		3W / 7W	None
2	01	1	CIB	1		Main/Stdby	None
3	01	2	CIB	1		Main/Stdby	None
4	01	3	CIB	1		NIFERN	None
5	01	4	CIB	1		Fire W	None
6	01	5	CIB	1		Fire W	None
7	01	6	CIB	1		Fire N	None

Type — All modules are imported as CIBs.
Change as required if the old modules are AIBs or IOBs.
If you have IOBs, select IOB STD, since this was the only IOB supported in the old program.

Banks — The DOS version of the program supported only 1 bank.
For AIB modules, if you upgrade the Astrotac comparator to more than 8 receivers, change this field.

Location — There was no Location field in the old program. Add a location description if desired.

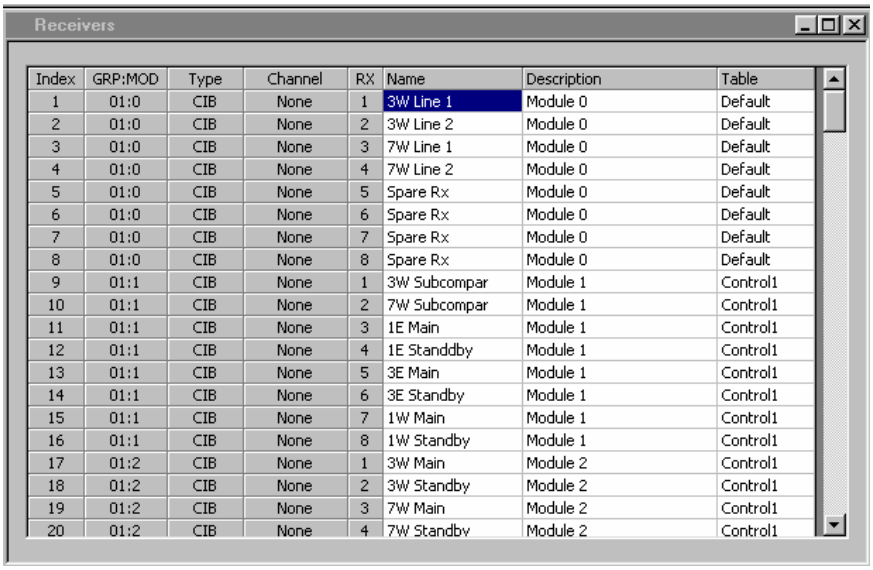
Name — The module Name was part of the ***xxx.MCF*** file. You probably won't see a name unless you have hand-edited that file. Enter a name for this module if you desire.

Channel — The DOS program did not support an explicit Channel field. Many people put Channel information in the Receiver Description field in the DOS version.

-Open the Channel Window and add channels as appropriate.
-Select the appropriate channel for each module.

Imported Receivers Window

The program gets the Receivers information from the .GCF and .MCF files.



Index	GRP:MOD	Type	Channel	RX	Name	Description	Table
1	01:0	CIB	None	1	3W Line 1	Module 0	Default
2	01:0	CIB	None	2	3W Line 2	Module 0	Default
3	01:0	CIB	None	3	7W Line 1	Module 0	Default
4	01:0	CIB	None	4	7W Line 2	Module 0	Default
5	01:0	CIB	None	5	Spare Rx	Module 0	Default
6	01:0	CIB	None	6	Spare Rx	Module 0	Default
7	01:0	CIB	None	7	Spare Rx	Module 0	Default
8	01:0	CIB	None	8	Spare Rx	Module 0	Default
9	01:1	CIB	None	1	3W Subcompar	Module 1	Control1
10	01:1	CIB	None	2	7W Subcompar	Module 1	Control1
11	01:1	CIB	None	3	1E Main	Module 1	Control1
12	01:1	CIB	None	4	1E Standdby	Module 1	Control1
13	01:1	CIB	None	5	3E Main	Module 1	Control1
14	01:1	CIB	None	6	3E Standby	Module 1	Control1
15	01:1	CIB	None	7	1W Main	Module 1	Control1
16	01:1	CIB	None	8	1W Standby	Module 1	Control1
17	01:2	CIB	None	1	3W Main	Module 2	Control1
18	01:2	CIB	None	2	3W Standby	Module 2	Control1
19	01:2	CIB	None	3	7W Main	Module 2	Control1
20	01:2	CIB	None	4	7W Standby	Module 2	Control1

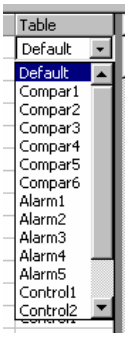
Name — This is taken from the *Receiver Name* from the ***.GCF*** file.

Description — This is taken from the *Corresponding Channel Name / Notes* field in the ***.GCF*** file.

Table — This is the Status Table used by the old DOS program. It is based on the entry in the ***.MCF*** file. In the DOS program, Status Tables were assigned on a module (CIB, IOB, etc.) basis. In the new Windows program, the Status Tables are assigned per receiver (or I/O Block).

Imported Status Tables

The program gets the Status Tables from the ***MCNRCD.CFG*** file. Normally, you will just have the Default entry. If you have a specially modified ***MCNRCD.CFG*** file, you may see additional entries in the Status Table drop-down list in the Receivers Window.



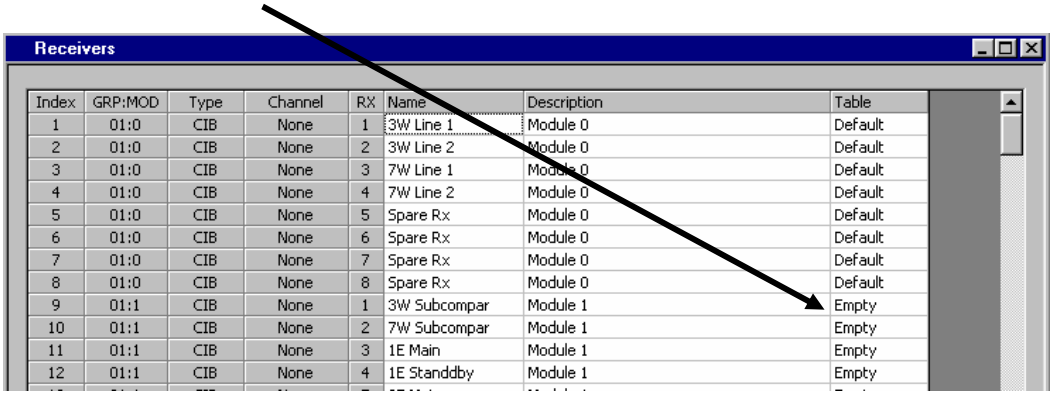
The above example is from a customer who uses a lot of alarms & controls in his system.
He has 17 custom Status Tables! (Thanks, John!)

Missing MCF Files

If there is no MCF file to match a GCF file, the program sets the Status Table to the first Status Table in the ***MCNRCD.CFG*** file (typically "Default"). This matches how the MCNRCD for DOS program handles a missing MCF file.

Empty Status Table Entries

If the .MCF file points to a non-existent Status Table in ***MCNRCD.CFG***, the Table entry will be "Empty" as shown below.



Index	GRP:MOD	Type	Channel	RX	Name	Description	Table
1	01:0	CIB	None	1	3W Line 1	Module 0	Default
2	01:0	CIB	None	2	3W Line 2	Module 0	Default
3	01:0	CIB	None	3	7W Line 1	Module 0	Default
4	01:0	CIB	None	4	7W Line 2	Module 0	Default
5	01:0	CIB	None	5	Spare Rx	Module 0	Default
6	01:0	CIB	None	6	Spare Rx	Module 0	Default
7	01:0	CIB	None	7	Spare Rx	Module 0	Default
8	01:0	CIB	None	8	Spare Rx	Module 0	Default
9	01:1	CIB	None	1	3W Subcompar	Module 1	Empty
10	01:1	CIB	None	2	7W Subcompar	Module 1	Empty
11	01:1	CIB	None	3	1E Main	Module 1	Empty
12	01:1	CIB	None	4	1E Standdby	Module 1	Empty

This will normally not occur, since the DOS version of MCNRCD will exit if it sees this condition.

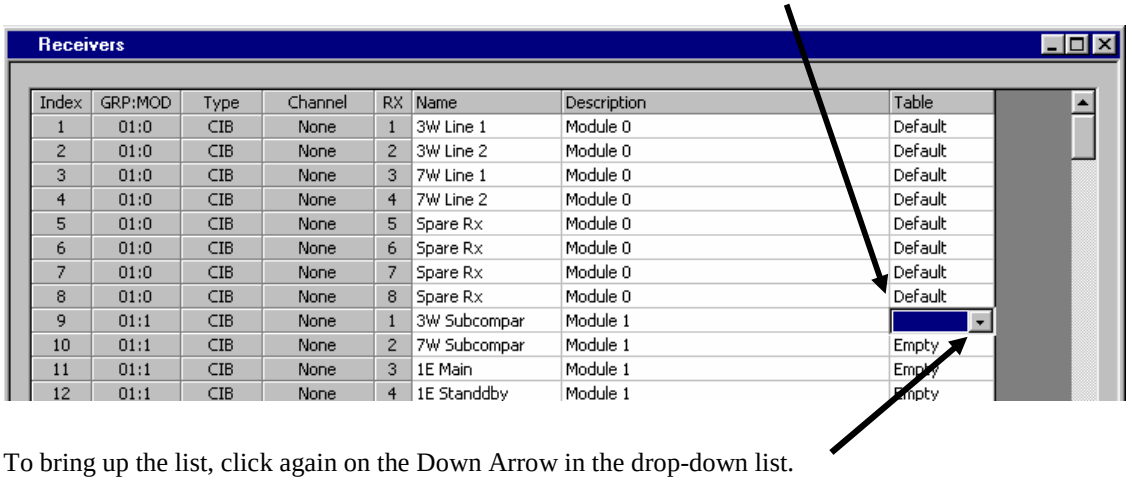
If you see "Empty" in the Table column, it usually means:

- You have imported a GCF file that is not normally used in your system
- You have modified the MCF or ***MCNRCD.CFG*** file so that the Status Tables (custom categories) don't match.

To correct the "Empty" problem, either:

- Close the current system and re-import without the extra GCF file or
- Modify the MCF or MCNRCD file so that all the Status Table entries are valid or
- For the receivers showing "Empty", select an appropriate Status Table from the drop-down list. (To speed this up, after you have changed a few entries, use the Copy & Paste commands to copy a range of entries.)

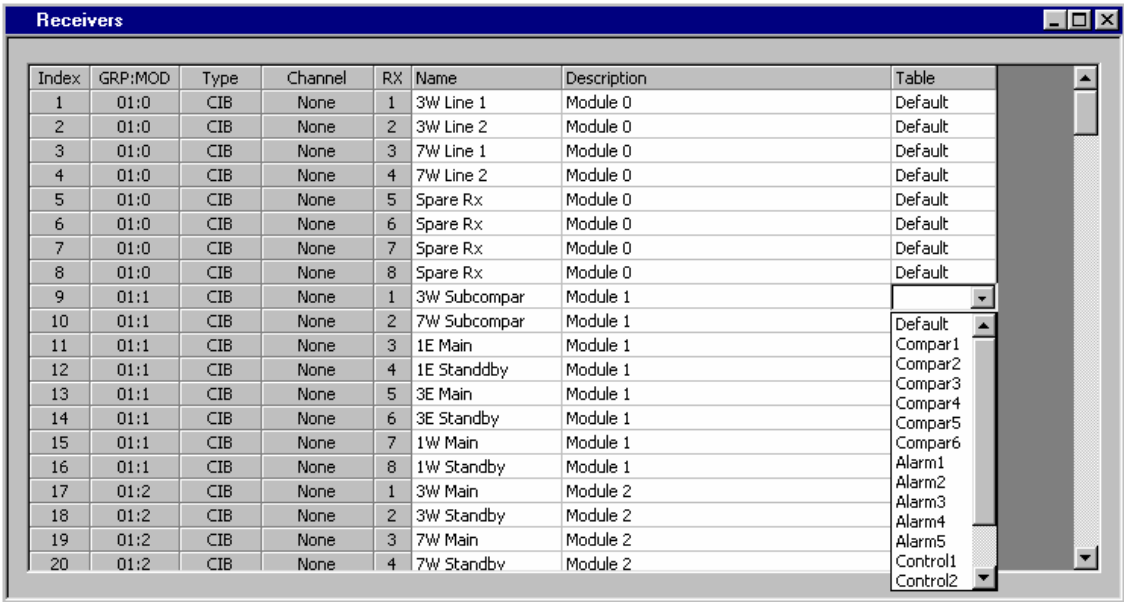
When there is an "Empty" entry, the drop-down list will initially show a blank.



Index	GRP:MOD	Type	Channel	RX	Name	Description	Table
1	01:0	CIB	None	1	3W Line 1	Module 0	Default
2	01:0	CIB	None	2	3W Line 2	Module 0	Default
3	01:0	CIB	None	3	7W Line 1	Module 0	Default
4	01:0	CIB	None	4	7W Line 2	Module 0	Default
5	01:0	CIB	None	5	Spare Rx	Module 0	Default
6	01:0	CIB	None	6	Spare Rx	Module 0	Default
7	01:0	CIB	None	7	Spare Rx	Module 0	Default
8	01:0	CIB	None	8	Spare Rx	Module 0	Default
9	01:1	CIB	None	1	3W Subcompar	Module 1	
10	01:1	CIB	None	2	7W Subcompar	Module 1	Empty
11	01:1	CIB	None	3	1E Main	Module 1	Empty
12	01:1	CIB	None	4	1E Standdby	Module 1	Empty

To bring up the list, click again on the Down Arrow in the drop-down list.

This will bring up the full list of available Status Tables.



Finishing up the Import

After you have imported data and cleaned up various fields as described above, you'll need to do the following:

- Save the data (File Save)
- Add Email Groups & Email Recipients if desired
- Link Channels to Email Groups if desired
- Add new Display Window
- Place Receivers & Labels in Display Window
- Add Tabs in the Display Window if desired
- Save the data (File Save)
- Set up Sound Files if desired
  The MCN Server program plays .WAV files for alarms. Various alarm sounds are included in the \sounds directory under the working directory (typically c:\Program Files\CTI Products Inc\McnRcd\sounds). The Import function will not convert the alert tones from your ***MCNRCD.CFG*** file. (See ***Editing the fields*** on page 68 for details on editing the sounds to play for alarm conditions.)

Display Window differences between the DOS and Windows programs

Display Grid

- The old MCNRCD for DOS program used a fixed grid of 22 rows x 4 columns.
  The new MCN Server program has user-settable grid size.
- You can now fit more receivers in one Display Window.
  Alternately, you can make the Display Window smaller if you wish.

Tabs vs. Screens

- To see a new screen in the old program, you would load a new screen file.
  The Display Window in the new program lets you switch between "screens" quicker.

- In the new Config program you can also create multiple Display Windows for use by different users.
- For Technicians, build all your desired screens as tabs in one Display Window.
- For Dispatchers, build Display Windows with tabs as required depending on which channels they need to see. You can build different Display Windows for different dispatchers.

MCN Server Program

This is the software run on the MCN Server PC. It has a local display that displays the status of the devices on the MCN system (Comparators, I/O points, alarms, etc.). It allows the operator to control receivers (with Force-Vote and Disable functions) and other I/O devices (relays, etc.) from the MCN Server PC.

The MCN Server program also passes the status and control data to MCN Client PCs over an IP LAN or WAN.

Warning: Do not run the DOS version of MCNRCD and the MCN Server program at the same time on the same Network Interface!

This will cause sluggish operation. You may notice modules going off-line, responding very slowly, or even not responding at all to mouse presses.

First Time Setup

The MCN Server program needs to set up a number of parameters before it can function. When you run the software for the first time, it will ask you to enter some values.

Software Key

A Software Key is furnished with each MCN Server software package. It is entered in the HW Setup program. It includes the licensed feature set for the system and some identifying information that helps us provide product support. Each Software Key is locked to the Security Hardware Key that was shipped with the system.

The following features are encoded into the Software Key:

- Expiration Date
- Maximum number of Clients that can be active at one time (Overall)

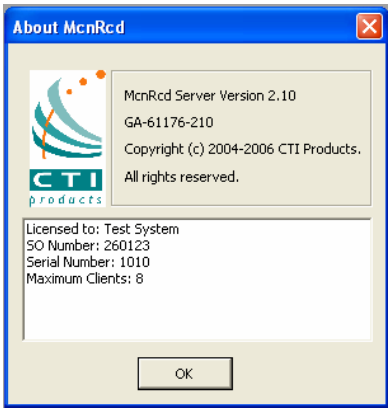
If you have entered an invalid software key (or it doesn't match the Security Hardware Key), the MCN Server software will bring up an error window when it starts up.

Re-Entering a Software Key

If you have made a mistake in entering the Software Key, you can re-enter it using the HW Setup program.

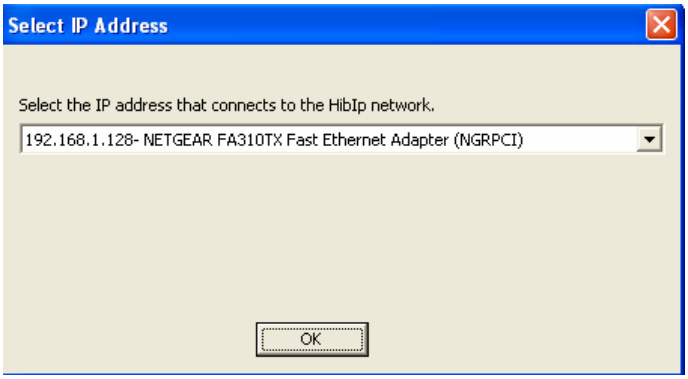
Viewing the Licensed Features

After the program is running, you can use the **Help About** menu item to check which features are enabled in your system.



Selecting an Ethernet NIC to talk to the HIB-IP units

Next, the program needs to know which Ethernet NIC card will be used to talk to the HIB-IP units. The Select IP Address window appears and asks you to select an IP address (associated with a NIC card in your PC) that you will use to talk to the HIB-IP units.

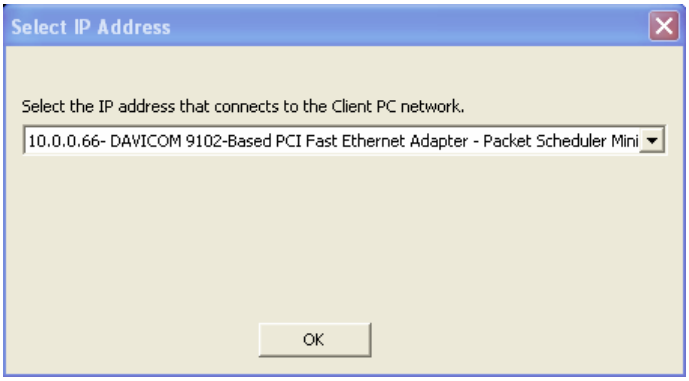


Select an IP address and NIC card using the drop-down list. There will be an entry for each combination of IP addresses and NIC cards in your PC. If you have only one NIC card, you will probably have only one entry.

The program will ask for this information even if you don't have any HIB-IP units in your system. Humor the program and select an IP address and NIC card anyway.

Selecting an Ethernet NIC to talk to the MCN Client PCs

The program then needs to know which Ethernet NIC card will be used to talk to the MCN Client PCs. The Select IP Address window appears and asks you to select an IP address (associated with a NIC card in your PC) that you will use to talk to the Client PCs.



Again, select an IP address and NIC card from the drop-down list.

Windows Firewall

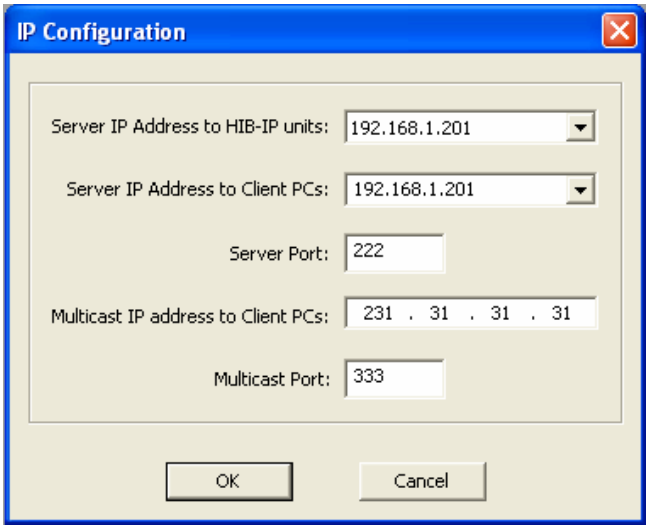
The MCN Server application needs to access the LAN/WAN. If you have the Windows Firewall enabled, you will need to give the MCN Server program access.

Select the **Unblock** option.

Resetting IP Parameters

Hint

If you need to change the IP settings later, use the Options / IP Settings menu item. The IP Configuration window will appear.



The screen has the following fields:

Server IP Address to HIB-IP units
This is the IP address of the NIC (in the PC) that you want to use to talk to the HIB-IP units.

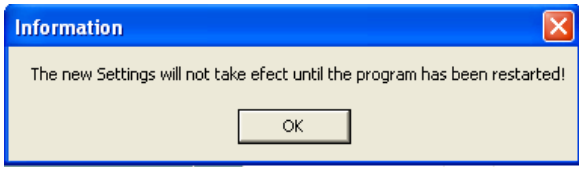
Server IP Address to Client PCs
This is the IP address of the NIC (in the PC) that you want to use to talk to the MCN Client PCs.

Server Port
This is the Port number in the MCN Server PC that the MCN Clients connect to.

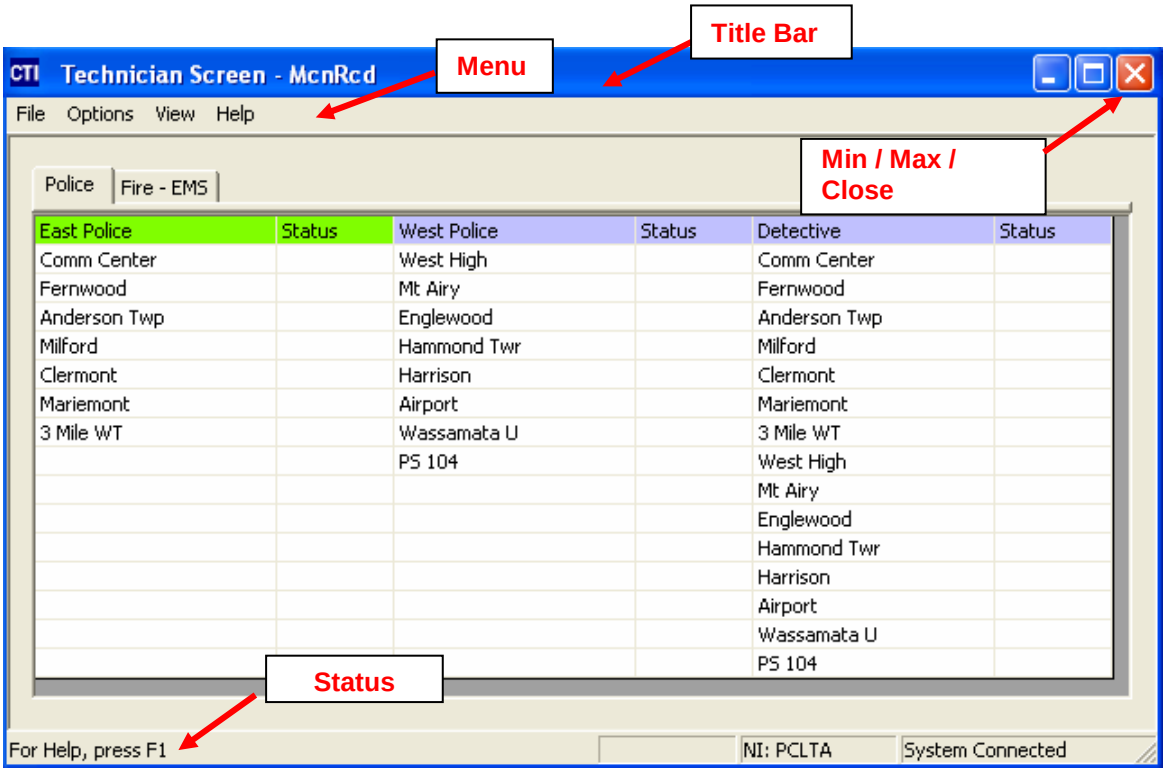
Multicast IP to Client PCs
This is the Multicast IP address that the MCN Server PC uses to send the real-time status data.

Multicast Port
This is the Port number that the MCN Server PC uses to send the real-time status data.

You must re-start the MCN Server program after you change IP parameters.



Screen Elements



Controlling the MCN Server Window

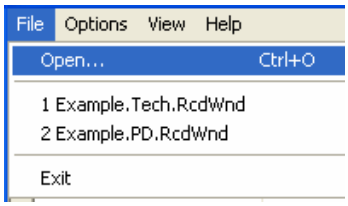
You can control the MCN Server window as follows:

- **Move** the window by grabbing its title bar and dragging it.
- **Re-size** the window by grabbing an edge or corner and dragging it.
- **Minimize /Restore, Maximize** and **Close** the window using the standard Windows buttons on the top right corner of each window.

Menus

This program has many standard menu functions that are used in other Windows programs. For example, menus can be selected with the mouse or by hitting the ***ALT*** key & the underlined letter on the menu. Note that a menu's appearance may change, and various menu options may be disabled, depending on the current state of the system.

File Menu

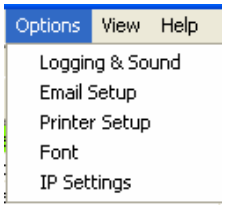


Open — Opens a Display Window created in the MCNConfig program.

Recent Files — Allows you to quickly open a recently used Display Window.

Exit — Exits the program.

Options Menu



Logging & Sound — Alerts can be sent to the PC screen, printer, file, or email recipients. Alert sounds can also be enabled.

Email Setup — Email parameters must be entered before email alerts can be generated. See ***Email Setup*** on page 143 for other requirements for email alerts.

Printer Setup — Printer parameters must be entered before alerts are sent to a printer.

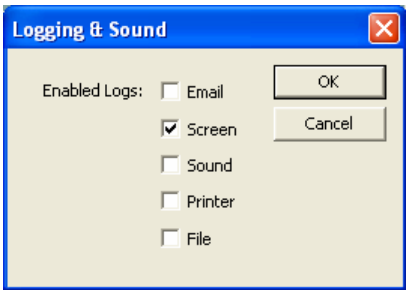
Font — Used to change the Font type or size for the display grid.

IP Settings — Lets you select the appropriate IP address to communicate with a HIB-IP unit (if you are using a HIB-IP for your Network Interface).

Logging & Sound

Alerts generated by the MCN Server program can be sent to the PC screen, printer, file, or via email to selected recipients. Alert sounds can also be enabled.

The following window will be displayed when ***Logging & Sound*** is selected from the Options Menu.



Select the types of logging required, then click the **OK** button.

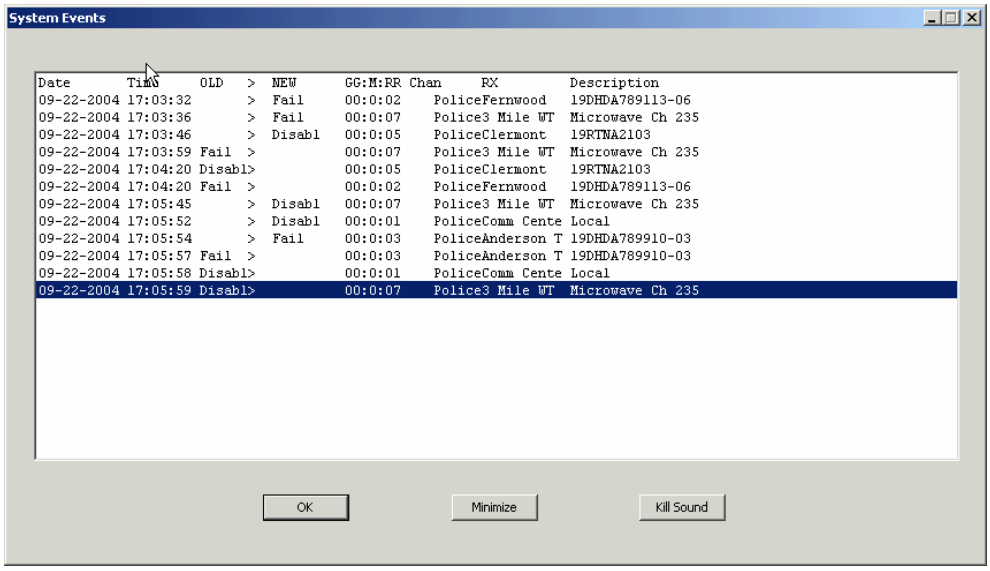
If ***Sounds*** are selected, then ***Screen*** is also automatically selected.

If logging to ***File*** is enabled, the file is named ***MCNRCD.log*** and is located in the MCN Server system directory. This is normally at:

For Standard Server: `C:\Program Files\CTI Products Inc\McnRcd Server\`

For Advanced Server: `C:\Program Files\CTI Products Inc\McnRcd Advanced Server\`

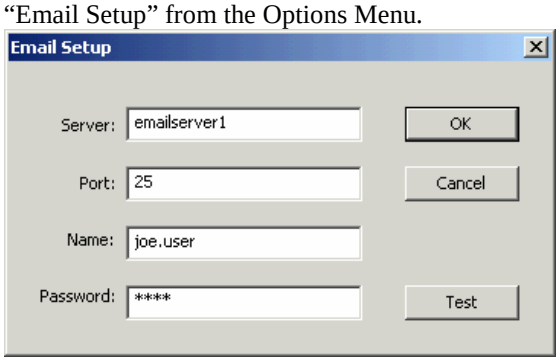
When Screen Logging is enabled, status changes will be listed on the screen as shown below.



Email Setup

For Email logging to occur, the following setup requirements must be met:

1. In the MCNConfig program, email groups and recipients must be specified in the "Email Groups Resource Window" on Page 59 for more information.
2. In the MCNConfig program, the "Email Group" must be specified for each Channel in the "Channels Resource Window" on Page 57 for more information.
3. In the MCNConfig program, the "Email" log flag must be set to "Y" in the Display Table States tab for those statuses you wish to be sent to the email. See page 66 for more information.
4. Enable Email alerts in the "Logging & Sound" window. To navigate to this window, select "Logging & Sound" from the Options Menu. See page 142 for more information.
5. Email parameters must be provided in the following window. To display this window, choose "Email Setup" from the Options Menu.

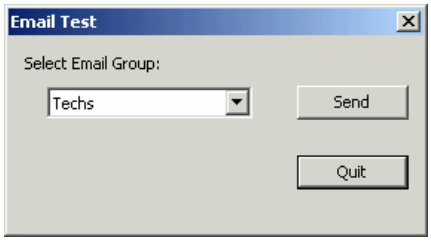


Parameters in the above window should be obtained from the email administrator at your facility.

Server	IP address or name of the email server at this facility. This can be either numeric address (such as 10.0.0.41) or a name that points to the email server through a Domain Name Server (DNS), as shown above.
Port	Email server port for accepting incoming mail messages, referred to as the "Listen Port"
Name	A valid email address that the above server services. MCN email alerts will be "From" this email address. The domain name (the portion of an email address after the "@" symbol) should not be included in this field.
Password	A valid password for the email address used in the "Name" field above.

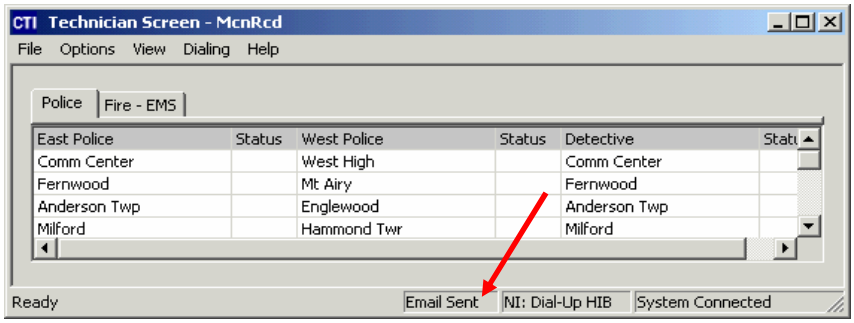
Email Setup Verification

A “Test” button is provided in the “Email Setup” window to verify if all email parameters are set correctly. Click on this **Test** button to display the “Email Test” window shown below:



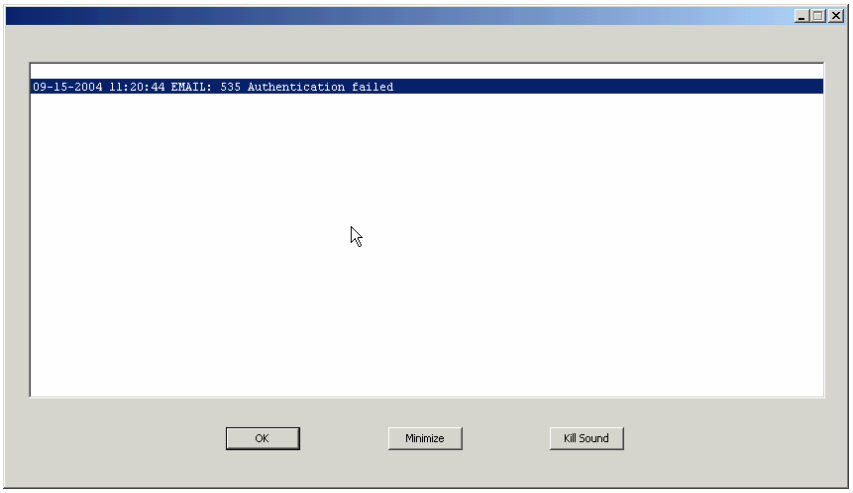
To send a test email, select an Email Group from the drop-down list, then click **Send**. If successful, the following “Test Passed” window will be displayed.

Another way to verify that the MCN Server program has successfully logged into the email server in the window above (and an email has been submitted for transmission), is to notice the Status Bar at the bottom of the MCN Server display window. If successful, the "Email Sent" status message will be displayed as shown below.



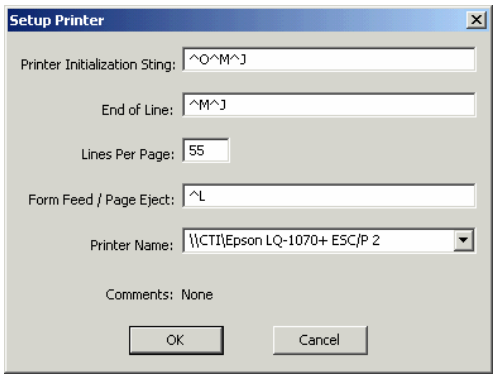
This email message will be delayed until the "Holdoff Time" specified in the "Email Group" properties window has expired. Navigate to this parameter in the MCNConfig program by right-clicking on a tab of the "Email Groups" Resource Window, then select **Email Group Properties**. See ***Email Holdoff Time*** on page 59 for more information. This message will be visible for approximately 15 seconds.

If the MCN Server program was unsuccessful at logging into the email server, an error indication will be logged to screen as shown below. Screen logging does not have to be enabled for this type of screen log to occur.



Printer Setup

For alerts to be printed, printer parameters must be provided in the following screen. To display this window, choose “Printer Setup” from the Options Menu.

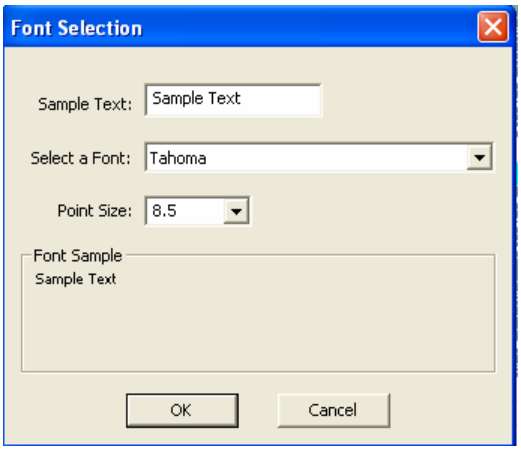


Parameters in the above window can be obtained from the specific printer documentation.

- Printer Initialization String — This Escape character sequence is sent to the printer at the start of a new print job. In the example above, ^O instructs the printer to print without using a bottom margin, since continuous paper will be used. ^M selects 10.5 points for the font height and 12 characters per inch horizontally. And ^J specifies the line feed distance.
- End of Line — This Escape character sequence is sent to the printer after each line of print. Normally, this should consist of escape characters for “line feed” and “carriage return”.
- Lines per Page — Enter the number of lines to be printed on each page.
- Form Feed/Page Eject — This Escape character sequence is sent to the printer after the number specified in “Lines per Page” above have been printed on a page.
- Printer Name — A drop-down list is provided to select from the installed printers on this PC.

Font

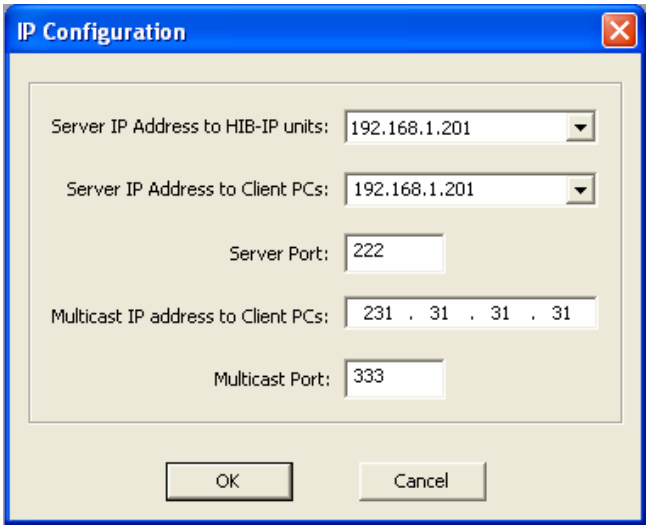
The Font Selection window is used to select a font and a font size for the Receivers and Function Blocks in the Display Window.



The row sizes will automatically stretch or shrink in response to font size changes. You may have to manually change the column widths after you make a change.

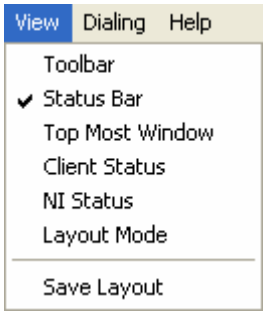
IP Settings

The window below is used to re-set the appropriate IP addresses on your PC to use to communicate with the HIB-IP unit(s) (if used) and the Client PCs.



See page 139 for details on the fields.

View Menu



Toolbar — When checked, enables the Toolbar.

Status Bar — When checked, enables the Status Bar (at the bottom of the MCN Server display window).

Top Most Window — When checked, ensures that the MCN Server display window is always the Top Most Window.

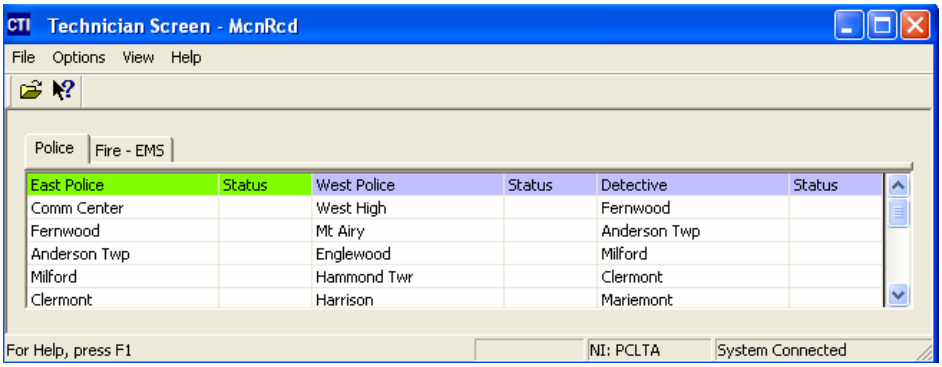
Client Status — Opens the Client Status window to display the status of all the client PCs currently logged into the MCN Server.

NI Status — Opens the Network Interface Status window to display the status of all Network Interfaces in use by the MCN Server.

Layout Mode — When checked, allows column widths to be adjusted, "Layout Mode" will be indicated in the Status Bar (at the bottom of the MCN Server display window).

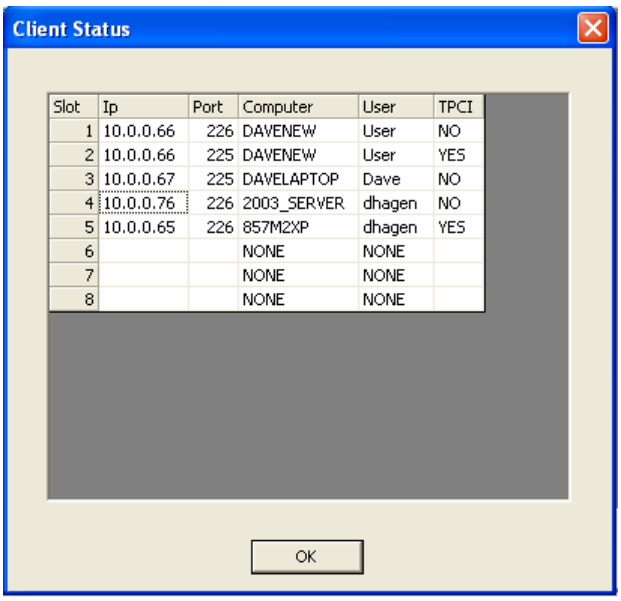
Save Layout — Use this command to save column width changes performed when in Layout Mode.

The following figure shows the Toolbar and Status Bar enabled.



Client Status Window

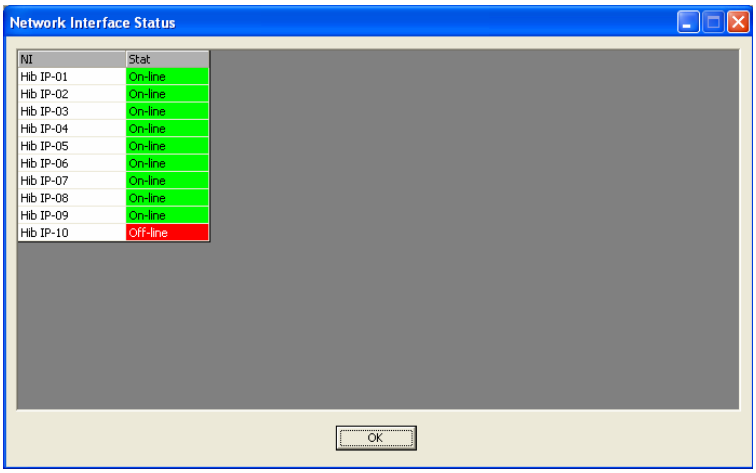
The Client Status window will show which clients are logged into the MCN Server program. It will also indicate whether they are TPCI clients or not. (TPCI is supported in the Advanced Server software only.)



NI Status Window

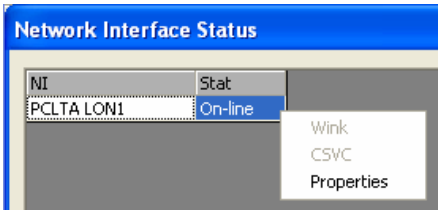
The NI Status Window shows the status of the Network Interfaces associated with this system.

The Standard Server software supports only a single Network Interface. The Advanced Server software supports multiple Network Interfaces.



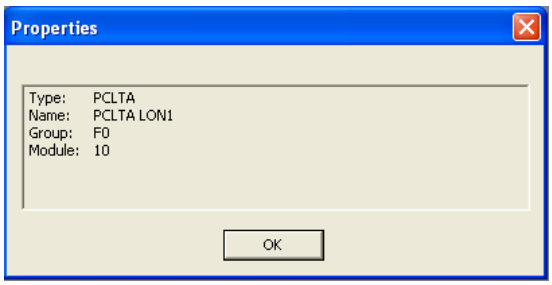
Network Interface Properties Display

For additional information on the Network Interface, right-click on the selected Network interface and select the Properties menu item.

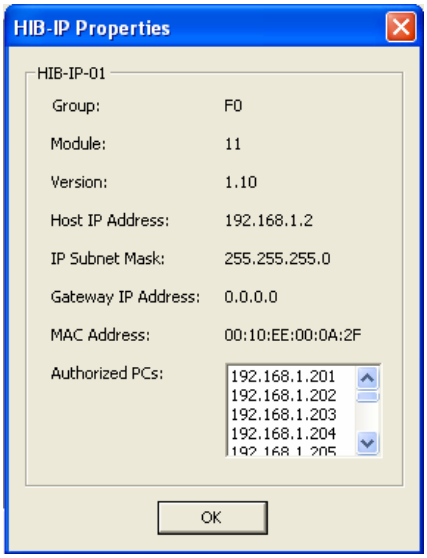


The Properties will vary, depending on what type of Network Interface is in use.

PCLTA Properties

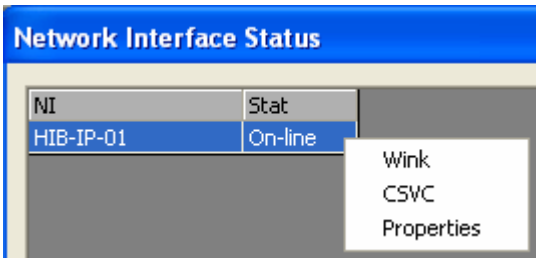


HIB-IP Properties



Additional HIB-IP Diagnostic Functions

When you Right-Click on a HIB-IP Network Interface, you have two additional diagnostic options: Wink and CSVC.

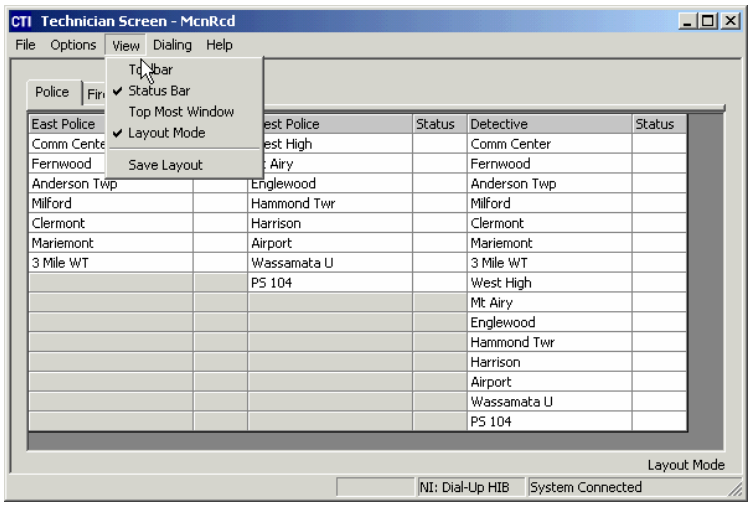


Wink This will blink the "Wink" LED on the front of the HIB-IP unit.
This can be helpful to identify a HIB-IP unit when you are using Advanced Server software with multiple HIB-IP units.

CSVC This is the equivalent of pressing the CSVC button on the front of the HIB-IP unit.
In special instances a CTI engineer may instruct you to click on the CSVC function.

Layout Mode

The following figure shows the MCN Server Display Window in Layout Mode.

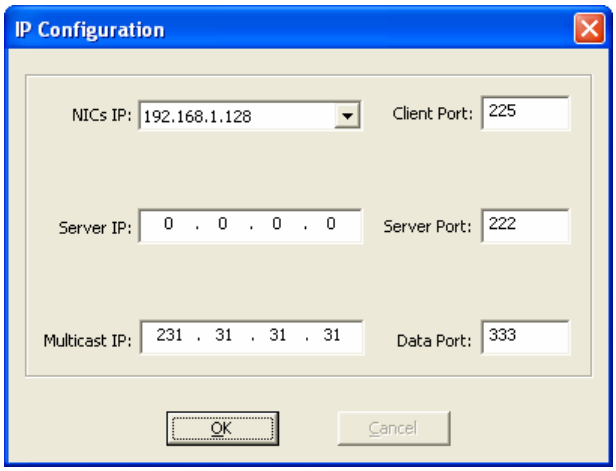


MCN Client Program

This is the Client program that runs on remote PCs to display the status of and control the MCN system. The MCN Client program runs on PCs connected to the MCN Server over an IP network, and thus do not need their own MCN Network Interface.

Selecting IP Parameters

When you start the MCN Client program for the first time, it will ask for the IP parameters to use to connect to the MCN Server.



The screen has the following fields:

NICs IP
This is the IP address of the NIC in the Client PC that will talk to the MCN Server PC.

Client Port
This is the IP port on the Client PC that the MCN Server will communicate with.

Server IP
This is the IP address of the MCN Server PC.

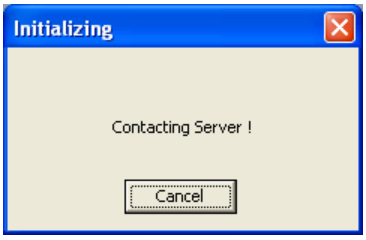
Server Port
This is the Port number in the MCN Server PC that the MCN Clients connect to.

Multicast IP
This is the Multicast IP address that the MCN Server PC uses to send the real-time status data.

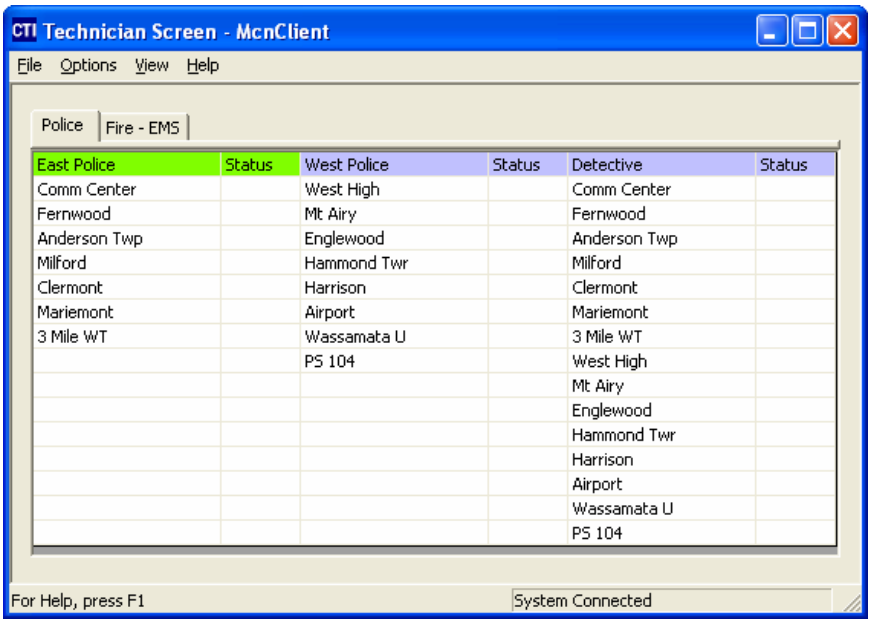
Data Port
This is the Port number that the MCN Server PC uses to send the real-time status data.

Making Connection with the Server

As the MCN Client program starts, it will try to contact the MCN Server.

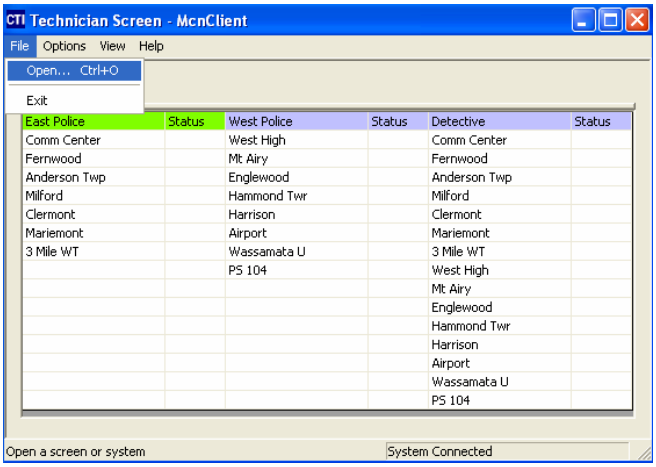


If the MCN Client program has been run on this PC before, it will load and display the last loaded screen.

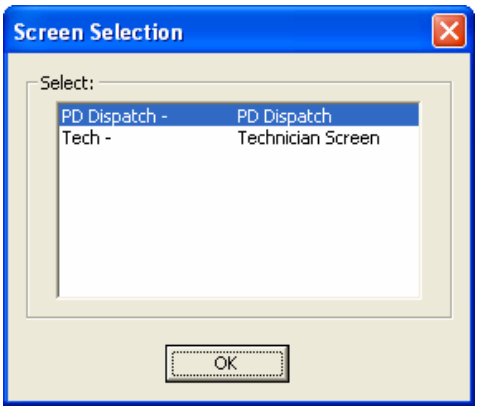


Selecting Screens

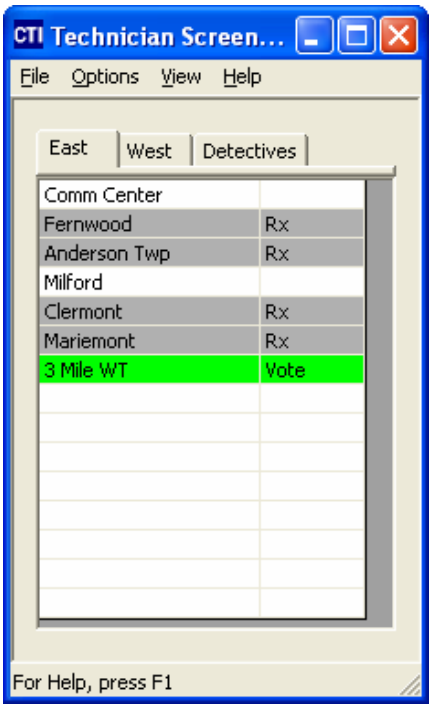
To load a different Display Window (screen), go to the ***File ... Open*** menu item.



If it is the first time the MCN Client program is run, it will contact the MCN Server PC to get a list of available screens. Select from one of the screens.



The new screen is then loaded.

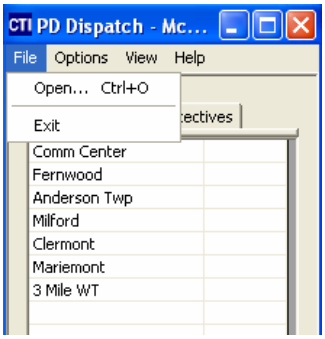


Different clients can display different screens.

File Menu

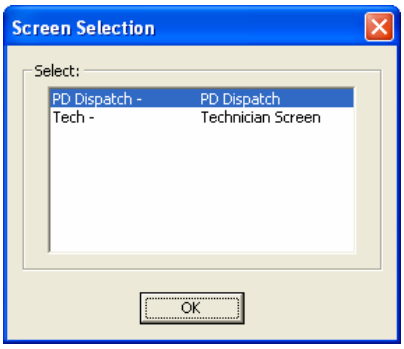
The File menu has the following menu items:

- Open — Allows you to select a new screen
- Exit — Allows you to exit the program

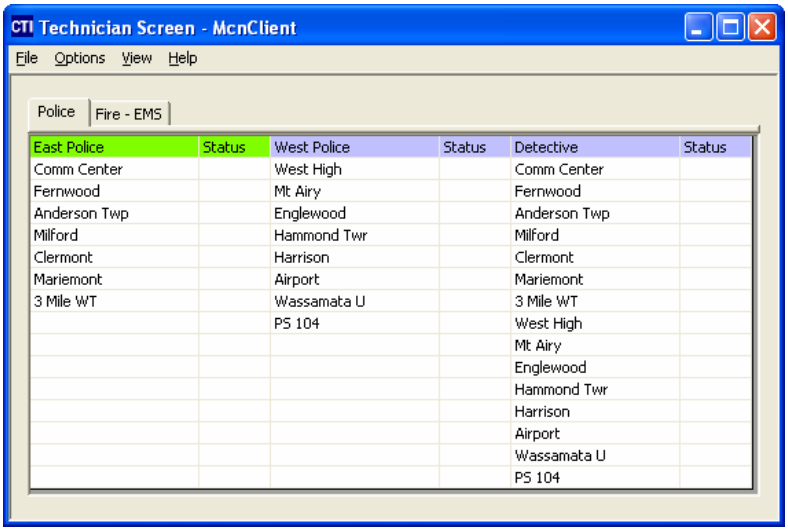


Open

The Open window presents a list of screens present on the MCN Server.



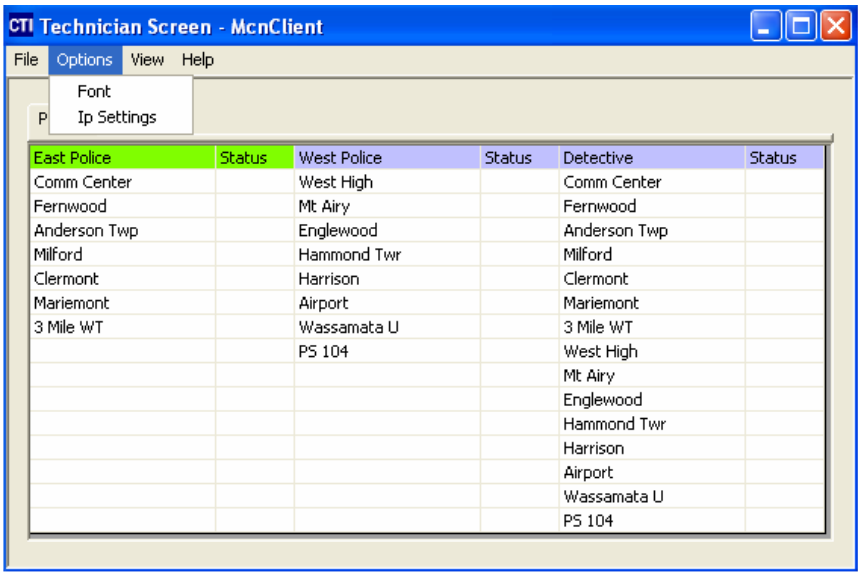
- Select the appropriate screen from the list presented and hit OK.
- The new screen will appear:



Options Menu

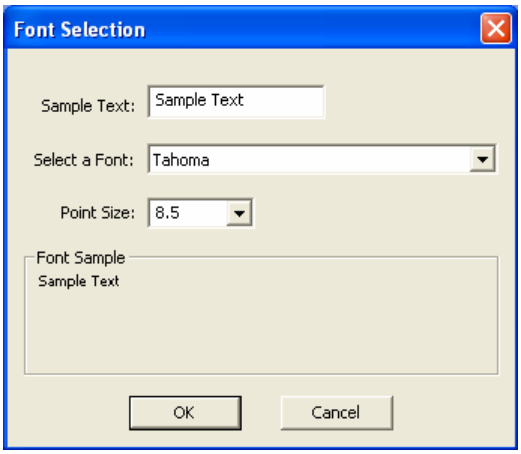
The Options menu has the following menu items:

- Font — Allows you to adjust the font type and size for this screen.
- IP Settings — Allows you to change the IP settings (as described earlier)



Font Window

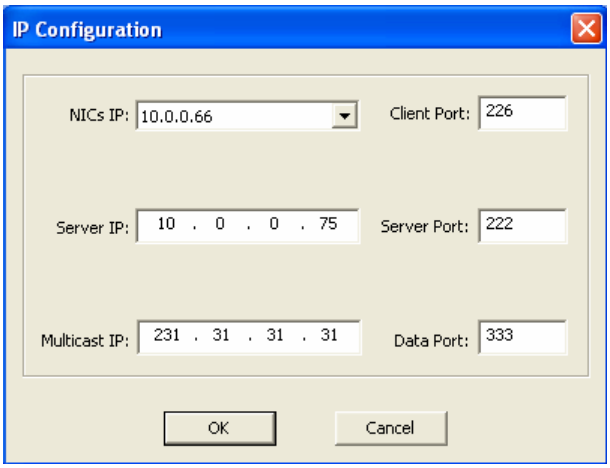
The Font Selection window is used to select a font and a font size for the Receivers and Function Blocks in the Display Window.



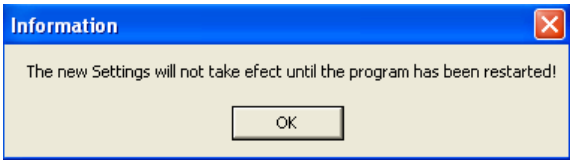
The row sizes will automatically stretch or shrink in response to font size changes. You may have to manually change the column widths after you make a change. See page 157 for directions for setting column widths.

IP Settings

The IP Settings window is the same window that appears when the MCN Client program is run for the first time.

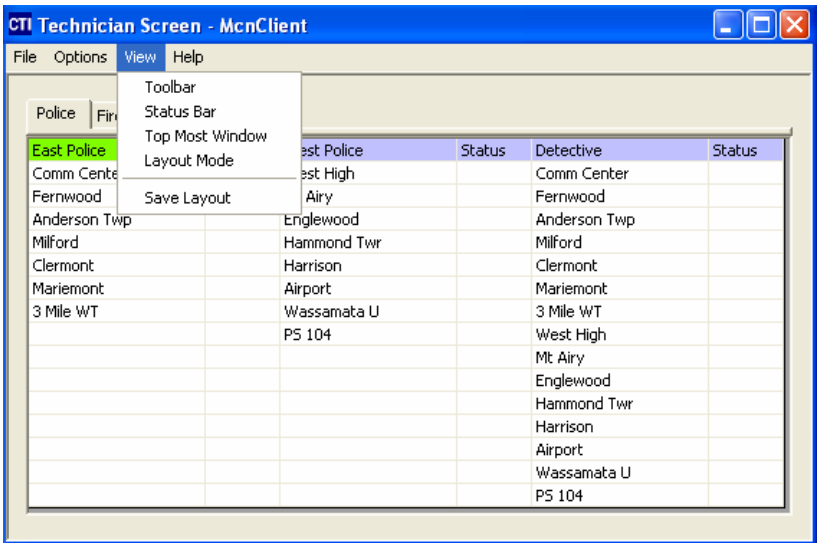


If you change any of the settings, they will not take effect until you re-start the MCN Client program.



View Menu

The View menu is similar to that on the MCN Server.

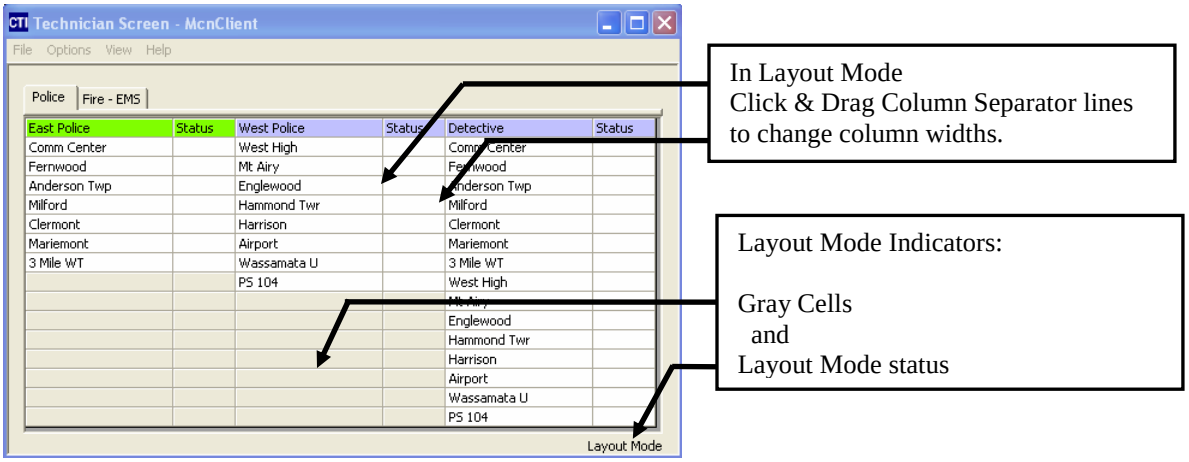


Toolbar	Turns the Toolbars on or off.
Status Bar	Turns the Status Bar (at the bottom of the screen) on or off.
Top Most Window	Allows MCN Client window to stay on the top of other programs that are running.
Layout Mode	This allows you to edit the column widths.
Save Layout	Saves the column widths and Display Window position.

Layout Mode

When this is on, you can drag the vertical column bars. The unused cells turn gray to indicate you are in Layout mode.

All the Receiver columns have the same size and all the Status columns have the same size.



When in Layout Mode, the program will not send mouse clicks to the MCN Server.
Turn off Layout Mode to enable normal program operation.

Differences between the Client and Server Programs

The Client program differs from the Server program in a number of ways:

- **MCN Network Connection**
  The Server connects to the MCN Network directly (or through a HIB-IP) unit.
  The Client connects to the MCN network through the Server.

- **Logging**
  The Error Logging function (to the screen, printer, disk, and email) is a Server function only.

- **Sounds**
  The Sounds (on specific status conditions) are supported only on the Server.

- **Client-Server Connections**
  The Server can have multiple Clients connected to it at a time (up to the limit of the license).
  The Client can connect to only one Server at a time.

- **Configuration**
  The system configuration database is stored on the Server (and edited with MCNConfig).
  The Client will retrieve the appropriate configuration data from the Server when it logs in.

Appendix: Accessory DOS Programs

HIB Configure

If there is a requirement for an MCN system to be monitored and controlled from a remote PC, then the system may be installed with a dial-up modem and a HIB-232 module that will provide an interface between the PC and MCN system. For this to work, the HIB-232 must be programmed with specific information to communicate with the modem. The HIB-232 Configuration program, ***HIBCNFG.exe***, is used to program this setup "AT" command string into the HIB-232 module for the dial-up modem. This is normally run once when you set up the system. (If the HIB-232 and modem were shipped together from the factory, then the HIB-232 programming is probably already complete.) Before the ***HIBCNFG.EXE*** program can be used, , the DOS driver for the HIB-232 must be installed in the PC.

LonScrpt

The Engineered System Custom Configuration Programming tool, ***LONSCRPT.EXE***, is used to program replacement routers or EXB modules with address forwarding tables. Before the ***LONSCRPT.EXE*** program can be used, the DOS driver for the MCN network interface must be installed in the PC.

Installing DOS Drivers for HIB Configure and LonScrpt

During installation of the MCNRCD Windows program, the DOS drivers for the HIB module (CTIHIB.SYS) and LonScrpt (PCLTDOS.SYS) will be placed under the MCNRCD working directory, normally at:

```
C:\Program Files\CTI Products Inc\McnRcd Standard\DOS Utilities\Hib
```

Now the activation of these device drivers must be included in the ***CONFIG.NT*** file as follows:

1. Start the Notepad program (***Start …. All Programs …. Accessories …. Notepad***). Open the ***CONFIG.NT*** file. The location of this file varies as shown in the table below:

Operating System	**File Location**
Windows XP	c:\windows\system32\config.nt
Windows 2000, NT	c:\winnt\system32\config.nt

2. Add the following line for the HIB configure driver at the end of the ***CONFIG.NT*** file:

   ```
   device=C:\Progra~1\CTIPro~1\McnRcd~1\dosuti~1\hib\ctihib.sys /p1
   ```

   "P1" at the end of this line indicates serial Port 1 (COM1) will be used to connect to the HIB module. If a different serial port is required, change this parameter to match the correct port number.

3. Add the following line for the DOS Virtual-Mode Device Driver at the end of the ***CONFIG.NT*** file:

   ```
   device=%systemroot%\system32\pcltdos.sys /d1
   ```

   "d1" at the end of this line indicates Device 1 (LON1) will be used as the Network Interface to connect the PC to the MCN system. If a different Network Interface is required, change this parameter to match the correct interface number. (Installing a PCLTA may have performed this step already.)

4. Save this file and close the Notepad program.

Running HIB Configure

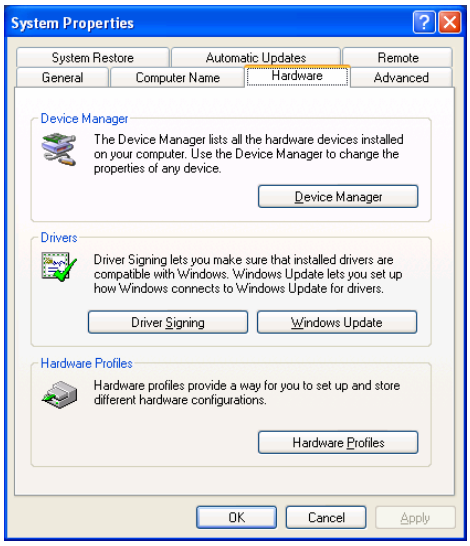
Perform the following steps to program a HIB-232 module with the modem "AT" command string:

1. Connect the HIB-232 module to the serial port specified above for the ***ctihib.sys*** driver in the ***CONFIG.NT*** file.
2. Ensure that **OPTION A** Switches 1 and 3 are UP, all others DOWN **OPTION B** switches should all be DOWN. SER MODE switches should all be UP.
3. Apply power to the HIB-232.
4. Open a DOS window (click the **Start** button, select "***Run…***", type "**`command`**" in the text box, then click **OK**).
5. In the DOS window, navigate to the MCNRCD directory for DOS Utilities with the following command:
   ```
   cd C:\Program Files\CTI Products Inc\McnRcd Standard\Dos Utilities\Hib
   ```
6. Type the following
   ```
   hibcnfg /38400 usrspvi
   ```
   then press the **Enter** key. "usrspvi" is the name of the file that contains the initialization string for a generic V.34 US Robotics modem. If your modem is different, check with CTI Products to select the most appropriate file.Placeholder for Section Header.

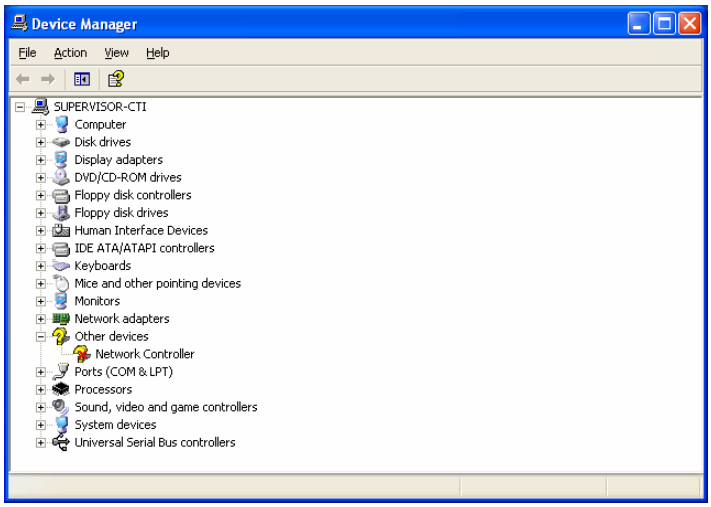
Appendix: Fixing a Botched PCLTA Installation

The PCLTA drivers must be loaded prior to installing the PCLTA card. If the PCLTA card was installed first, and an attempt was made by the Windows operating system to load the drivers, follow these steps to re-install the drivers correctly:

Navigate to the Control Panel from the **Start** Menu, then double-click the "System" icon to display the "System Properties" window as shown below. (If the "System" icon is not visible, change the Control Panel properties to "Classic View".)



On the "Hardware" tab, click on the **Device Manager** button to display the "Device Manager" window. If the driver for PCLTA network interface is not installed correctly, "Other Devices" will be listed (instead of "LonWorks Network Interface"). Expand the "Other Devices" icon so that "Network Controller" is listed as shown below.



Select "Network Controller" with an "X" through its icon, then from the ***Action*** Menu, select "Disable". Follow any additional prompts, and restart the PC.

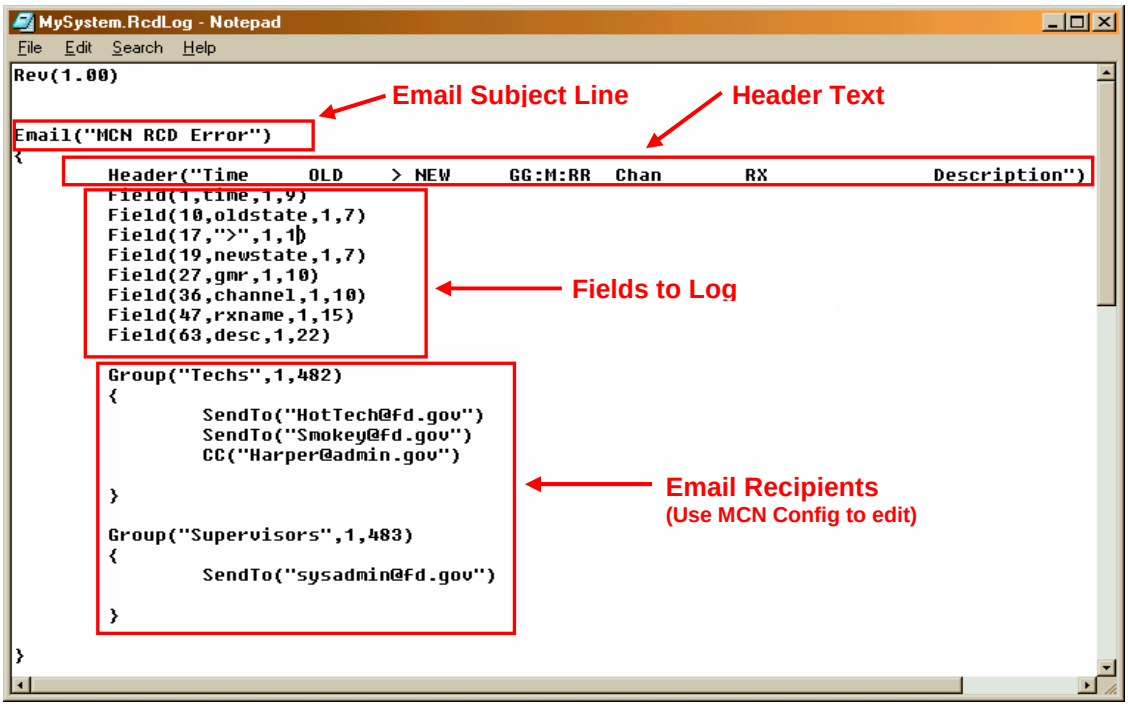
The PCLTA driver can now be reinstalled from the distribution CD (S2-61093).

Appendix: Error Logging Definitions

The formatting of messages to be logged to screen, printer, file, or email is defined in file ***SystemName.RcdLog***. (Where SystemName is the system name you defined in the MCNConfig program.). This file is automatically created from the MCNConfig program when a new system is defined, and updated when a system is edited. If the format of resulting error logs is not suitable, a text editor can be used to edit the ***SystemName.RcdLog*** file to produce a customized format.

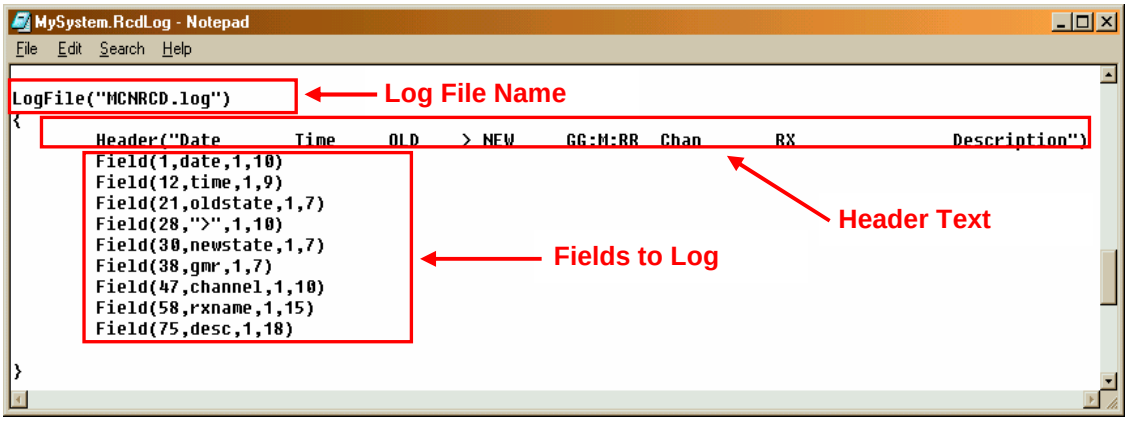
Logging to Email

The typical logging definitions for email are shown in the example below.



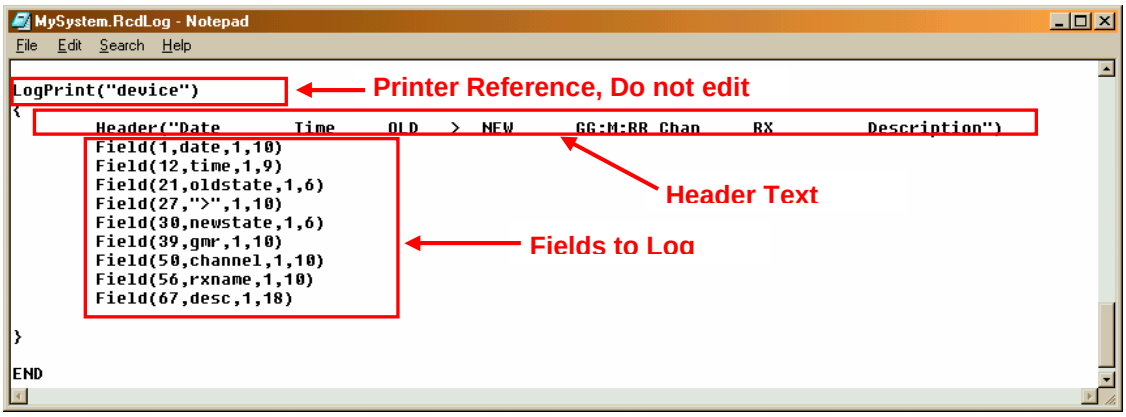
Logging to a File

The typical logging definitions for a file are shown in the example below.



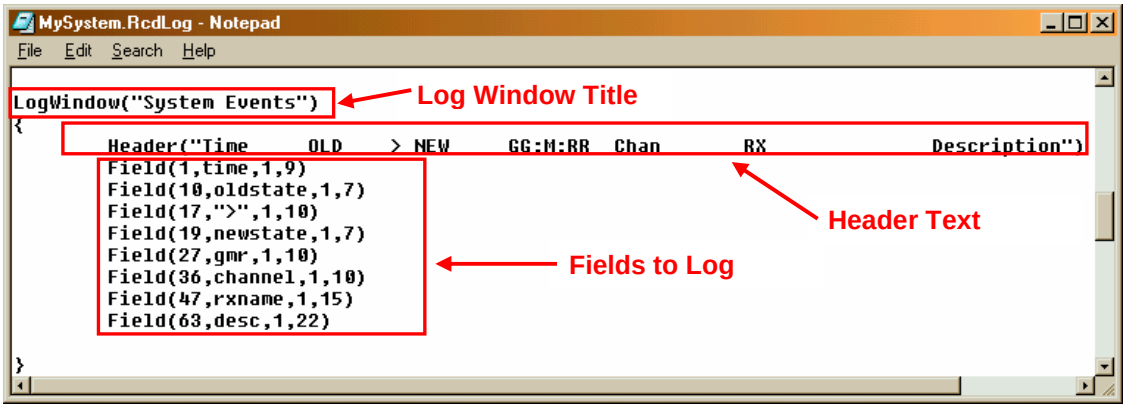
Logging to a Printer

The typical logging definitions for printing are shown in the example below.



Logging to the PC Screen

The typical logging definitions for screen are shown in the example below.



Error Logging Definition File Parameters

Email Subject Line	The text between quotes on this line will appear in the subject line of email alerts.
Email Recipients	Information in this section includes the “Email Groups” specified in the MCNConfig program and should not be edited.
Log File Name	The text between quotes is the file name that logs will be saved to.
Printer Device Name	The text between quotes is the default printer device name “device”. This should not be edited
Log Window Title	The text between quotes on this line will appear in the title block of the displayed log window.
Header Text (column titles)	The text between quotes on this line will be the first line in the body of the email, file, printout, or screen.

Fields to Log

For each field to be logged, the following four parameters must be specified:

- Column for start of field
- Field Name, or text enclosed in quotes (see Field NameTable below)
- Beginning character position to be printed for field
- Ending character position to be printed for field

Field names are defined below.

Field Name	**Description**
Date	Date of state change. Format is mm-dd-yyyy
Time	Time of state change. Format is hh:mm:ss
Oldstate	State of signal prior to change
Newstate	Current state of signal
Gmr	Group, Module, Receiver address of signal. Format is gg:m:rr
Channel	Channel name
Rxname	Receiver name
Desc	Description of Receiver name
“text”	Text between quotes will be logged as written

Glossary

1250	1.25mbps high speed backbone Network Rate
78K	78kbps standard network rate for CIB, HIB, AIB, IIB, and IOB modules.
AIB	ASTRO-TAC™ Comparator Interface Module connects a Motorola ASTRO-TAC™ comparator to the MCN Network. It extends the comparator lights and switches over the network to a remote display position (either a PC or console display).
CIB	Comparator Interface Module connects a voting system comparator to the MCN Network. It extends the comparator lights and switches over the network to a remote display position (either a PC or console display).
CTI	Shorthand for our full company name, "CTI Products, Inc." The initials "CTI" come from our parent company - Combined Technologies, Inc. "CTI" is used in some circles -- **but not in this manual**-- to mean "Computer Telephony Integration", but we had the acronym first!
EXB	System Extender Module is used in pairs to connect two MCN networks together or the extend the length of an MCN network beyond 4000 feet. Allows control and monitoring of multiple remote comparators from a central site.
Group	Equivalent to the Subnet portion of the network address, less one. Valid values are from 00 to FE (hexadecimal).
HIB-232	This Host Computer Interface Module connects a PC to the MCN Network over an RS-232 connection. It can be local to the PC or connected through leased-line modems or an equivalent full-time RS-232 channel.
HIB-IP	This Host Computer Interface Module connects a PC to the MCN Network over an IP network.
IIB	Input/Output Interface Module connects a parallel operator display device (such as a console) to the MCN Network. Can be used with AIB ASTRO-TAC™ Comparator Interface Modules to provide voting status indications (Vote, Receive, Disable, and Fail) to a console. Also can be used with CIB Comparator Interface Modules to extend the comparator display and control for other comparators over a long distance.
IOB	Input/Output Control Module connects I/O devices such as relays to the MCN Network. Used with a HIB to create an I/O control system.
IP	Internet Protocol
IP Address	Any node connected to an IP (Internet Protocol) network must be identified with a unique 32-bit address. These 32-bit addresses are commonly written *in dotted decimal* notation as four decimal numbers (referred to as octets because each decimal number represents 8 bits) separated by decimal points. Each octet can be a number from 1 to 255. For example, 131.9.1.2 is a valid IP address.
IP Subnet	A portion of an IP network that encompasses a specific range of IP addresses (ex: from 10.1.1.0 to 10.1.1.255). All IP devices on the same subnet talk to each other directly (or through hubs or switches). They do not need a router between them. (See also Subnet Mask.)
MCN	Monitoring and Control Network

Module	Equivalent to the Node portion of the network address, less one. Valid values are from 00 to 7E (hexadecimal) for MCN modules.
Multicast	An IP protocol that sends a single IP packet to a number of IP units at the same time. All receiving devices must be members of a Class D IP Multicast Group (224.x.x.x – 239.x.x.x) IP Multicast protocol is used between the MCN Server and the Clients.
NIC	Network Interface Card – Interface card between the PC and the Ethernet network.
PBX	Private Branch Exchange (In-house telephone system switch)
PCLTA	Internal MCN Network Interface for PC
Port (IP)	A number indicating a logical connection within an IP device. Ports allow multiple types of messages (email, HTTP, FTP, etc.) to be sent to the same IP address. The IP device decides what to do with each message depending on which port it is addressed to.
PSTN	Public Switched Telephone Network (Dial-Up phone system)
RCD	Remote Comparator Display
Subnet Mask	The bits that define the Subnet range. A portion of the IP Address Bits (normally the upper bits) are used to define the subnet range. The subnet mask identifies the "NetID" and "HostID" portions of the IP address in a bitwise fashion. The mask is constructed by placing a "1" in any bit that is part of a subnet (NetID) address. So subnet mask bits that are SET define the NetID, and CLEARED subnet mask bits define the HostID. A subnet mask of 255.255.255.0 defines the NetID as the first three octets, and the HostID as the last octet. For example, for the address 192.47.73.111 and the subnet mask of 255.255.255.0, the subnet can be identified as 192.47.73.0.

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