

MCN Server 8000™

Remote Comparator Display Software

Version 10.09.xx

For

Motorola Solutions IP Comparators

GCM 8000 Digital Comparators

GRV 8000 Analog or Digital Comparators

&

MLC 8000 Analog Comparators

DDN1290

S2-61600-162



***This manual applies to the software version indicated on the cover page.
Older software versions may not have all the functions and may operate differently.***

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Revision History

- S2-61600-105** - Release for Production.
- S2-61600-106** - Clarified Local Administrator vs. Active Directory Accounts
- S2-61600-107** - Added Server ID Selection in HW Setup (for IP comparators).
- Added information on HIB-IP 8000 units with variable UDP Ports for operation in an ASTRO® 25 7.13 systems and above.
- S2-61600-108** - Added information about installation and re-installation sequences when used with WHK and McAfee Anti-Virus for ASTRO® 25 7.13 systems and later.
- Added information on Default Display Window (Display Screen).
- Added permissible locations for HIB-IP units in an ASTRO® 25 RNI.
- S2-61600-109** - Changed the IP Networking Considerations section to add PC location restrictions for the ASTRO® 25 RNI.
- Added restriction on Dual-NIC operation in ASTRO® 25 RNIs.
- Added details for HIB-IP unit configuration.
- S2-61600-110** - Updated GCM 8000 BR/CM Pairing screen shot.
- Updated valid network locations for Server and HIB-IPs for A7.13 RNIs.
- Other minor updates.
- S2-61600-111** - MCN Server 8000 Version 7.05 (MLC 7.14 Box release)
- Updated Minor updates: on GCM 8000 tools and server limits.
- Updated troubleshooting on MLC Receiver Config Error.
- Updated CSS screen shot for GCM 8000 sub-site configuration.
- Added information on MCN version 7.x Unicast Client support.
- Added ASTRO® / MCN Version compatibility chart.
- Added information on MLC 8000 7.14 Box release (new protocol)
- S2-61600-115** - MCN Server 8000 Version 7.11
- S2-61600-117** - Release for MCN Server 8000 Version 7.20.xx.
- Added support for HIB-IP 8002 Module
- Added Appendix H: IP traffic priority: TOS / QOS / DSCP Settings
- Added: Appendix I: Running on non-WHK PCs – UDP Ports
- S2-61600-118** - Corrections and formatting changes
- S2-61600-120** - Release for MCN Server 8000 Version 7.25 software.
- Added GCM 8000 TDMA and Windows 10 information.
- Added Microsoft EMET information.
- Added overview of CSS configuration of GCM 8000 comparators & BRs.
- Updated various screen shots for MCN and CSS.
- S2-61600-130** - Release for MCN Server 8000 Version 8.01 Software.
- Added GRV 8000 support and Configuration Information.
- Added overview of CSS configuration of GRV 8000 comparators & BRs.
- Updated various screen shots for MCN software & CSS.
- S2-61600-135** - Release for MCN Server 8000 Version 8.10 software (Digital GRV).

Revision History Cont'd

- S2-61600-136**
- Release update for MCN Server 8000 Version 8.2x Software & Manual.
 - Minor manual edits and corrections.
 - Fixed issue to allow multi-line watchdog states.
 - Updated Client protocol for Ver 8 Data-Miner.
- S2-61600-150**
- Covers MCN Server 8000 Version 9.00
 - Software support for Third Party Client Interface.
 - Updated Information Assurance section.
- S2-61600-152**
- Covers MCN Server 8000 Version 9.20
 - Added Group Macro Option
 - Enhanced Receiver I/O Window Sort Option
 - Display Window Layout Enhancements:
 - o Display Window parameters now configured on a per-tab basis.
 - o Number of Rows & Columns.
 - o Column widths (including hidden columns).
 - Display Window formatting saved in an RcdFmt file.
 - Server & Client now use column widths set up in MCN Config.
 - The client now supports the Log / Alarm window.
- S2-61600-153**
- Updated Receivers / I/O Points table
 - Updated with Force Name Column Color
 - Updated screen shots for ClientSetOptions
 - Updated screen shots for new HIB-IP Options (v9.04.14)
 - On McnConfig Receiver list added I/O (Rx Sort) option for better optimization of Display Window design.
 - Enhanced database import option from prior v9.xx to maintain Display Window Row & Column configuration format.
- S2-61600-154**
- Updated Manual Structure
 - Manual Edits and Corrections
 - Updated PC Security requirements
 - Updated Screen shots
 - Added Support for Windows 11(32Bit App)
 - Added License Key Server feature (Version 9.50)
 - Updated Tab settings for Linked Columns
 - Added Tab Menu for Copy Column Settings
- S2-61600-158**
- Removed PCLTA from Appendix
 - Removed Importing DOS Systems from Appendix
 - Added Support for Windows 11(64Bit App)
 - Added Support for BRSC
 - Manual Edits and Corrections
 - Latched and unlatched Composite Alarms
 - Updated Screen shots
 - Updated Manual Version
- S2-61600-161**
- Updated formatting
 - Added GRV & GTR Display Element Properties
 - Updated Manual Version

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MCN Introduction & Orientation

This manual covers the installation, configuration, and operation of the MCN Server 8000 and its Client Software. The MCN systems configuration discussed here ranges from simple to complex applications using various CTI Products and Motorola hardware Modules, whose functions and operations are integrated using the software to produce a single system user interface.

This MCN Server 8000 software allows the user to monitor and control the operation of the following types of IP comparators directly, through an IP network:

- GCM 8000 Digital Comparators in FDMA mode
- GCM 8000 TDMA Digital Comparators in TDMA mode
- GRV 8000 Analog or Digital IP Comparators
- MLC 8000 Analog IP Comparators
- Mixed Mode Mixed Mode Voting Solution
 GCM 8000 & MLC 8000 Analog Comparators
 working together in Mixed Mode systems.

Since the MCN Server 8000 software is an enhanced version of the MCN Advanced Server, it maintains the ability to monitor and control the following types of legacy equipment using components from the MCN Monitoring and Control Network:

- ASTRO-TAC™ 3000 Digital Comparators
- Digitac Comparators
- Spectra-TAC Analog Comparator
- SNV-12 Voter
- I/O and Alarm devices

The MCN Server 8000 will display receiver status indications such as:

- Vote
- Receive
- Disable
- Fail

It will also enable a user to control the following functions for the receivers:

- Force-Vote
- Disable

The Quick Start Guide

The MCN solution is compatible with various radio system hardware devices, including Audio Comparators, Network Interfaces, and I/O devices. The Quick Start Guide seeks to provide a simplified overview of the MCN system configuration process, and how to use the MCN Server software.

Who should Read it?

The flexibility of the MCN solution can make it challenging for anyone to become proficient without the aid of this resource. The Quick Start Guide is meant to assist first-time users building a new system, or experienced Technicians modifying an existing setup.

What's covered!

This section highlights important information that helps with quickly understanding how to use the MCN config server for building MCN server 8000 systems. It covers the following:

It covers the following:

- Gathering information
- Installing Software and License
- Hardware Setup Configuration
- Building systems with MCN Server Config
- Using the MCN Server
- Using the Client

NOTE: This manual covers different options for implementation, but not all may apply to your system.

Suggestion: *It is recommended to install all the hardware (i.e., MCN modules, Comparators, and Radios, etc.) and complete the connections before beginning the software configuration procedure.*



Quick Start System Configuration Overview

The following procedure offers a general overview and step-by-step guide for gathering information and creating a working MCN system:

1. Gather System Information

What you need to know:

- a. The location, type, and quantity of the comparator and/or other I/O equipment that will be monitored.
- b. The type and number of IP comparators in your system, such as are listed below:

<u>Model Name</u>	<u>Class</u>	<u>Type</u>
GRV 8000	IP	Analog or Digital
GCM 8000	IP	Digital FDMA
GCM 8000	IP	Digital TDMA
Mixed Mode	IP	(MLC 8000 Analog & GCM 8000 Digital FDMA)
MLC 8000	IP	Analog

You will also need IP parameters for each IP comparator along with the addition of 'Voter ID' information for each MLC 800 comparator.

- c. The type/s of legacy MCN Network Interface (NI) units used for connection to the Server PC are as follows:

Introduction

<u>Model Name</u>	<u>Class</u>	<u>Type</u>
HIB-IP 8002	IP	Legacy
HIB-IP 8000	IP	Legacy
HIB-IP	IP	Legacy
HIB-232(Rarely used)	RS232	Legacy
PCLTA (Rarely used)	PCI	Legacy

NOTE: You will need to know the IP parameters to use for all of the HIB-IP modules.

- d. The type and quantity of legacy comparators or other I/O devices, and their MCN interfaces expected in the system. For example:

<u>Comparator</u>	<u>MCN Module</u>
Spectra-TAC	CIB Module (1 per chassis)
Digitac	CIB Module
Astrotac	AIB Module *
General Purpose I/O	GPI-xx, GPO-xxx and GPIO-xxxx modules



You'll need to have a unique MCN Group & Module number for each MCN hardware Module.

* For AIB modules, you'll also need to know the number of 8-receiver Banks in use.

2. Installing the Software and License

Use the USB credit-card flash drive provided to install the MCN product suite. This installer includes options to install all required software and USB drivers, and to copy the license key file. You must also connect the physical USB hardware dongle. **Pages 51**

3. Hardware Setup Configuration

If it becomes necessary to reinstall Licenses or NI Hardware, the following is required:

- Run and configure the **HW-Setup Program**
- Load Software Key File **Page 54**
- Add Hardware Setup Options **Page 40**

Based on the system information previously identified, select the correct IP Comparator and/or Network Interface options for your system.

4. Building Systems with MCN Server Config program.

(Run the MCN-Config Program)

Use the MCN Config Program to do the following, based on your actual hardware:

- **Add & configure appropriate IP comparators** (As system requires)
- **Add & Configure Network Interfaces (NIs),** (Always required)
- **Add / Configure Hardware,** (Always required)
- **Add Receiver Names,** (Optional but helpful)
- **Configure the Display window.** (Always required)
- **Save system under a specific name** (Always required)

Network Interface Types:

The following is a list of the network interface devices and IP Comparators that are supported in MCN systems:

- IP Comparator Interface Module See **Page 72** for details.
- HIB-IP family of modules See **Page 80** for details.
- HIB-232 module Not Common/outmoded.
- PCLTA board Not Common/outmoded.

Use the **Network Interface** window: (MENU: **View → Network Interface**)
See **Page: 72**

Adding IP Comparator NI:

Select and configure the appropriate type of IP Comparator Interface(s):

(MLC 8000, GCM 8000 or GRV 8000)

(Note that the parameters gathered from the Motorola CSS or CT software are needed in this step.)

Add Legacy Network Interface Module:

Choose and configure the correct type(s) of Network Interface(s) based on your hardware and requirements:

HIB-IP, HIB-IP 8000, HIB-IP 8002, PCLTA, or HIB-232 modules.

(Note that the basic MCN Server 8000 software package supports only (1) of these Network Interfaces. This may be expanded with license options.)

Add/Configure Hardware Modules:

Use the 'Hardware' window to add MCN hardware modules for the Interface Modules previously created:

(MENU: **View Hardware**) See **Page: 71**

You may need to add and configure the correct hardware types for the previously added MCN interface modules. (IP comparators will also appear in the Hardware window.)

Add Receiver & I/O Point Names & Information:

Use the 'Receivers' window to assign Aliases for channel receivers:

(MENU: **View → Receivers**) See **Pages 71**

Enter data for all receivers in the Receiver Window. Select the proper Display Table Type (Comparator, MLC Tech, etc.) for all receivers.

Specify Channel Numbers and/or Channel Names:

This is optional, but beneficial with logging and for use with System Performance Toolkit software.

Configure 'Channels' windows:

(MENU: **View → Channels**). See **Page: 71**

Add the required channels to either the MCN Modules or IP Comparators within the 'Hardware' window, based on your specific system and needs:

(MENU: **View → Hardware**).

Building Display Windows:

Build '**Display Windows**' to create the Server's User Interface:

(MENU: View → Display Window) **See Page 143**

Create and configure the screen Layout and Appearance of the receivers to be displayed.

Display Tables: (Optional)

Use '**Display Tables Window**' to create or customize Display Tables:

(MENU: View → Display Tables) **See Page 240**

This translates the hardware data into specific states on the status display screen.

Add Client Permissions: (Optional)

Use the '**Client Permissions**' window if you wish to create controlled access to specific Display Windows for different Client users:

(MENU: View → Client Permissions) **See Page 146**

This controls which client PCs can log into the Server and load which screens (Display Windows).

Save the Newly Built MCN System Configuration:

After completing each of the steps required for building resources to create a functional system, you must save the newly configured system with a descriptive file name. The MCN Config software will create several files (around 6 or more), all with the same base name but different extensions. These are the configuration files to load when running the MCN Server 8000 software. **See Page 36**

5. Using the MCN Server 8000 Software:

Run the MCN Server 8000 software and load one of the Display Windows that you built. If there were no errors made in configuring the system files, and the hardware is fully installed and configured, all the IP comparators and the Network Interfaces should be online, and you will see receiver statuses on the Server PCs Display. **See Page 204**

6. Using the Client software:

Run the MCN Client software. If there were no errors made in configuring the network parameters for the Client to Server, and the Server PC is running, the Client Display should connect to the server and load the permitted screens same as the ones on the Server where you should see the receiver statuses for the Server PCs Display.

See Page 223

Manual Structure

Major Manual Sections

<i>MCN Introduction</i>	General discussion of the MCN Monitoring & Control Network, system requirements for the MCN Server software.
<i>*The Quick Start Guide*</i>	This is a small section but can be extremely helpful as a setup guide for first-time users of the MCN Product.
<i>Overall System Specifications & Considerations</i>	General system considerations including networking, Windows accounts, and file locations & permissions.
<i>Installing MCN Server 8000 Software</i>	Installation of the software Covers topics related to the GCM 8000, GRV 8000, MLC 8000 comparators, mixed Mode systems and I/O devices using legacy MCN equipment (HIB-IP, HIB-IP 8000, HIB-IP 8002, CIB, AIB, GPIO Modules).
<i>System Configuration Building Systems with MCN Config Server</i>	This is the largest section of the manual, providing detailed descriptions of all the system configuration features and options.
<i>Network Interface Types:</i>	Covers topics related to connecting interfaces the MCN Server 8000 to the GCM 8000, GRV 8000, and MLC 8000 IP comparators. As well as Legacy comparators (ASTRO-TAC™, Digitac, Spectra-TAC)
<i>Using The MCN Server 8000 Program</i>	This covers the operation of the MCN Server run-time program.
<i>The MCN Client Program</i>	This covers the operation of the MCN Client program.
<i>Windows Event Logging</i>	Description of items logged in Windows Event.
<i>Advanced Configuration Topics – MCN Config Server 8000</i>	Customizing Display Tables, Master-Sub Comparators, Triggered Output Actions.
<i>Appendix A: Error Logging Definitions</i>	Customizing the logging format for the screen, disk, and printer logging.
<i>Appendix B: Backup Procedures</i>	Backup & Restore.
<i>Appendix D: Legacy Equipment Part Numbers</i>	Part numbers for MCN equipment to interface to legacy comparators and I/O devices.

Shorthand Notation

This manual may refer generically to "MCN Server" or "MCN Server Software" or simply "Server software" when referring to the MCN Server 8000 software.

RCD stands for "Remote Comparator Display".

The manual will refer to other programs in short-hand notation:

Program	Shorthand	Executable file name
Hardware Setup	HWSetup	Hardware Setup Server
Configuration Program	MCN Config	McnConfig Server 8000.exe
Server Program	MCN Server	MCN Server 8000.exe
Client Program	MCN Client	ClientRcd.exe

The HIB-IP 8000 and HIB-IP 8002 modules are updated versions of the original HIB-IP module. In general, the term "HIB-IP" will be used throughout the manual to refer to any of these devices unless it is important to distinguish one from the other.

This manual may refer to Motorola Solutions, Inc. as simply "Motorola" or "MSI."

Screen Captures & Example Data Used.

Example screen captures of the various programs are shown throughout this manual to show what to expect during setup, configuration, and operation of the software. Newer versions of the software may include updated windows with slightly different wording or additional fields.

Note:



The data displayed in the screen captures is for illustrative purposes only and may not reflect a functional working system .

Various sections of the manual focus on particular topics. Example screen captures within a section are presented as examples of the topics covered in that section. The example data shown in the screen captures in one section may not apply to screen captures shown or system configuration described in different sections.

Specific data such as IP Addresses, Subnet Masks, Gateway IP Addresses, UDP port numbers, AGU and VGU IDs shown in the manual are intended to show the appropriate linkages between IP Comparators, AGU Receiver Ports, HIB-IP, HIB-IP 8000, and HIB-IP 8002 Units, Clients, and Server PCs. They were taken from lab test systems, for example use only. They do not reflect your required system settings and should not be taken as recommendations.

Since the test system used in preparing this manual did not include the various IP routers used in an ASTRO® 25 7.x system, the example settings do not coincide with the requirements and recommendations of Motorola's IP Plan. Each system is different; refer to the documentation for your system for the proper IP addresses and UDP port numbers.

Example Systems & Diagrams Used.

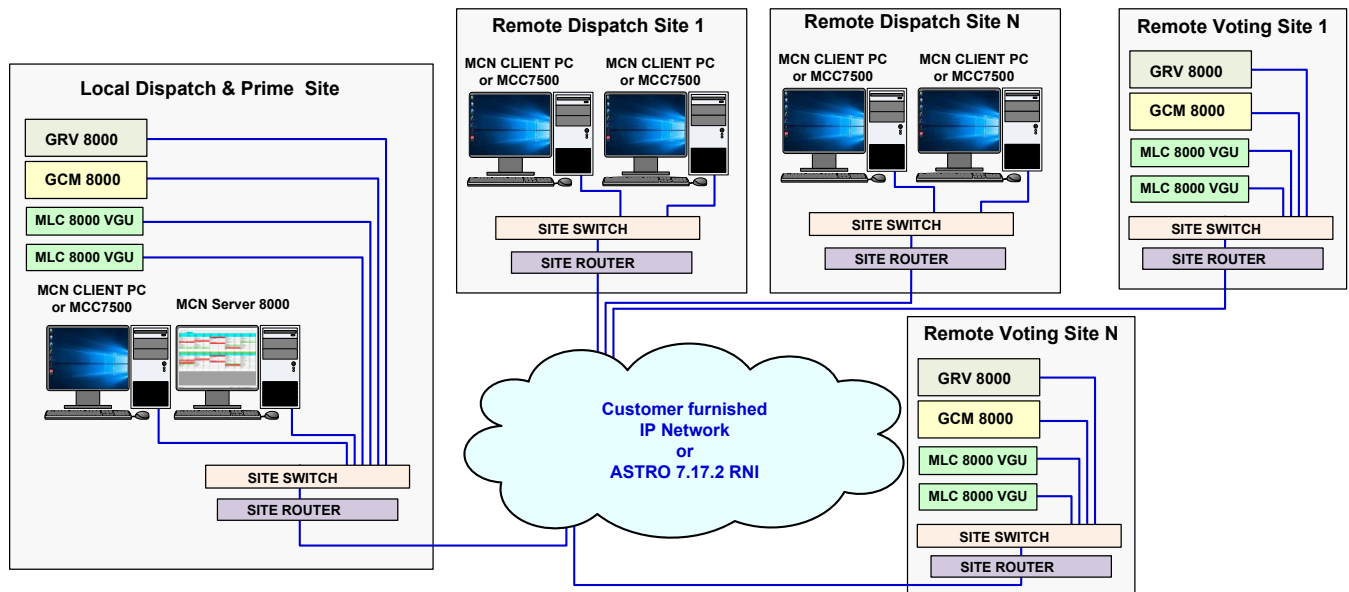
The system diagrams included in this manual are to illustrate base line system examples and principles but are not intended to recommend any definite system configuration. Specifically, the generic and simplified IP infrastructures depicted are for reference only. Actual IP networks, particularly ASTRO® 25 Radio Network Infrastructures (RNIs), may include other network components such as routers, gateways, switches, and additional elements.

MCN Overview & System Requirements

MCN Server 8000 Typical IP Comparator Example

In the figure below a typical MCN Server 8000 PC is shown connected to Motorola IP Comparators. The MCN Server 8000 Remote Comparator Display system consists of three main things:

1. A PC running the MCN Server 8000™ program.
2. One or more Motorola Solutions IP Comparators (GCM 8000, GRV 8000, or MLC 8000).
3. Client PCs that connect to the Server PC over an IP LAN or WAN.



MCN Server 8000 System with IP Comparators

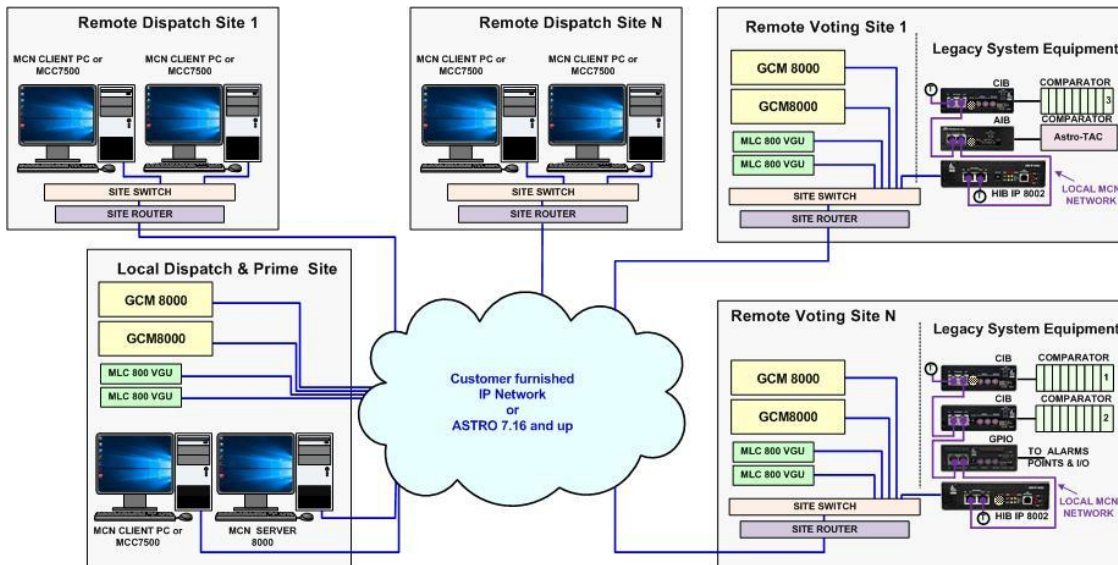
- The diagram includes only IP comparators and not legacy equipment.
- The diagram does not show the BRs (Base Radios), MLC 8000 Subsite Link Converter units (AGUs), or the G-Series Link Converters (GSLC).
- Other IP routers and switches may be involved.
- The GRV 8000 could be configured as analog or digital comparators.
- The GCM 8000 digital and MLC 8000 analog Comparators can be configured in several ways:
 - Stand-alone mode, with 4 digital or 4 analog channels.
 - Mixed Mode Voting Solution, with 4 mixed-mode channels.
 - A combination of stand-alone and mixed-mode channels.
- The MCN Server 8000 PC is a stand-alone PC. It does not need Windows Server software.
- Client PCs can be either stand-alone PCs or MCC 7500 Dispatch PCs, running the MCN Client software.

MCN Server 8000 IP & Legacy Comparator Example

The MCN Server 8000 software extends CTI Products' legacy MCN (Monitoring and Control Network) software packages. It continues to support legacy MCN equipment and comparators. For legacy systems, the following optional items may be used:

- One or more network interfaces for the MCN Server PC; (such as a HIB-IP 8002 module, internal PCLTA, or HIB-232 module).
- One or more Comparator I/O Modules (such as an AIB or CIB module).
- Other interface modules (such as GPIO Modules) to drive auxiliary outputs and alarms.

The following diagram shows a system that supports both the IP comparators and legacy comparators.



MCN Server 8000 System with IP & Legacy Comparators

- This diagram shows the addition of MCN modules to support legacy equipment.
- The HIB-IP units connect to the MCN Network at the remote sites.
- The CIB, AIB, and GPIO modules connect to the legacy comparators and I/O points.
- The IP comparators and legacy equipment can be displayed on the same screens.

List Of Package Contents

A typical MCN Server 8000 software order will include the following:

Software Installation Media

The MCN Server 8000 software package includes:

Installation Program

An Advanced Installer Package program is provided, for installing the software on Windows OS PCs. The Media has both the MCN Server 8000 and the MCN Client software on it.

HWSetup Program

Package Contents

This setup program is used to select and configure the types of Network Interfaces (HIB-IPs, IP comparators, or both) for the MCN System, based on licensing. It is also the recommended way to enter the system's Software Key.

MCNConfig Program (McnConfig Server 8000)

This is the configuration program used by engineers or technicians to create or modify configuration files before initial installation or updates.

MCN Server 8000 Program

The Server program runs on the MCN Server PC and displays the status of various devices in the MCN system, such as comparators, I/O points, and alarms. It allows operators to control receivers and other I/O devices from the server. Additionally, it supports multiple client connections based on licensed permissions. The program transmits status and control data to MCN Client PCs over an IP LAN or WAN.

MCN Client Program (ClientRCD.exe)

The Client program operates on Windows OS PCs to display statuses and control some of the functions for the MCN system. The MCN Client program operates by connecting across an Ethernet LAN / WAN to the MCN Server.

Manuals

The System manual along with various other hardware manuals are available in PDF format on the installation Media provided.

Hardware Key Dongle

A serialized USB HASP Key is included.

Software Key File

The installation Media will contain the Software Key for the system. The Software Key must match the serial number of the Hardware Key. It will contain the capabilities licensed for the software (number of IP comparators, number of clients, etc.)

Software Manual

A soft copy version of the DDN1290A manual is included in the '**manuals**' folder on the installation media.

No PCs Included

PCs with a supported version of the Windows Operating System are required to implement the MCN solution. However, the MCN Server 8000 software package **does not** include any Server PC or Client PC Hardware.

PC Hardware Requirements

MCN Server 8000 software requires a PC with the following **minimum** system configuration and available ports for a typical system setup:

- ✓ **Verified OS:-** Windows 7, 10, 11, Windows Server 2003, 2005, 2008R2.
- ✓ **Processor:-** Intel 3.0 GHz 64-Bit processors (**Xeon E3 5th Gen** or the **i3 15th Gen**).
- ✓ **Memory:-** 4 GB RAM Memory.
- ✓ **Storage:-** 250 GB SSD or larger.

Package Contents

- ✓ **Display:** - Color 800 x 600 resolution. But higher resolutions are recommended.
- ✓ **Pointer:** - Optical or Laser Mouse.
- ✓ **Network:** - 100 Base-T Ethernet Adapter.
- ✓ **Ports:** - HD-15-VGA, USB-3.0 , Serial-232 (For Legacy HIB-232 devices).
- ✓ **Slots:** - PCI (for legacy PCs and Systems still using PCLTA NICs);
(Only compatible with 32-bit operating systems).

Note: Not every PC has the right type of PCI slot available



Check the PC motherboard specifications for compatibility.

Systems with over 50 IP comparators may require a more powerful PC with extra memory and CPU cores. Contact CTI Products for the latest recommendations.

For MCN Client PCs, the requirements are like those for the Server:

- ✓ **Verified OS:-** Windows Vista, 7, 10, 11, Windows Server 2003, 2005, 2008R2.
- ✓ **Processor:-** Intel Pentium D or Core i3 at 2GHz or greater.
- ✓ **Memory:-** 2 GB Memory.
- ✓ **Storage:-** 250 GB SSD or larger.
- ✓ **Display:-** Color 800 x 600 resolution, higher resolution is best.
- ✓ **Pointer:-** Optical or Laser Mouse.
- ✓ **Network:-** 100 Base-T Ethernet port.
- ✓ **Ports:-** HD-15-VGA, USB-3.0.

Reference Documents

The following highlights the official materials available for detailed information and specifications for CTI Products MCN Solution, the Motorola solutions hardware, and software.

Manuals for Motorola Solutions, Inc. Equipment

You can find information on Motorola IP Comparators for your system infrastructure in documents from Motorola Solutions Incorporated. Below is a partial list of manuals that may be relevant to your system, but there may also be other additional manuals available. Please make sure to use the correct version for your system when researching information:

- GCM 8000 Comparator Manual
- MLC 8000 Comparator Manual
- GRV 8000 Comparator Manual
- Quick Guide for Implementing MLC 8000s.
- MLC 8000 Configuration Tool with Analog Display and Control Manual
- Conventional Operations Manual
- GTR 8000 Base Radio Manual
- Information Assurance Features Overview Manual
- MCC 7500 Dispatch Console with VPM manual
- System LAN Switches manual
- System Gateways – GGM 8000 manual
- Authentication Services

Windows® Supplemental Media and the corresponding ASTRO® 25 system Windows Supplemental Configuration manual

Manuals for Legacy CTI Products MCN Equipment

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

S2-60425	Monitoring and Control Network, System Manual
S2-61173	HIB-IP & HIB-IP 8000 Remote Network Interface Hardware Reference Manual
S2-61808	HIB-IP 8002 Remote Network Interface Hardware Reference Manual
S2-60427	HIB-232 Host Computer Interface Module, Hardware Reference Manual
S2-60426	CIB Comparator I/O Module, Hardware Reference Manual
S2-61469	GPIO General Purpose I/O Module Hardware Reference Manual
S2-60399	AIB ASTRO-TAC™ Comparator Interface Module, Hardware Reference Manual

MCN Server 8000 and HIB-IP Part Numbers

The following numbers are for the MCN Server 8000 software and options.
 Legacy MCN equipment part numbers appear in **Appendix D: Legacy Equipment Part Numbers** section on page **313**.

Motorola Part Number	CTI Products Part Number	Description
DDN1289	S1-61594	<i>MCN Server 8000 Software License for 4 Motorola IP Comparators & 4 Clients</i>
DDN1287	S1-61595	<i>MCN Server 8000 Software License Option for 1 Add'l Motorola GCM 8000, MLC 8000, or GRV 8000 Comparator</i>
DDN1288	S1-61596	<i>MCN Server 8000 Software License Option for 4 Add'l Motorola GCM 8000, MLC 8000, or GRV 8000 Comparators</i>
DDN1295	S1-61129	<i>MCN Software License Option Client Expansion for 4 Add'l Clients</i>
DDN1291	S1-61599	<i>MCN Server 8000 License Upgrade Multiple Major Level (ex: 6.x to 8.x) Please furnish Hardware Key ID with the order.</i>
DDN1292	S1-61598	<i>MCN Server 8000 License Upgrade Single Major Level (ex: 6.x to 7.x) Please furnish Hardware Key ID with the order.</i>
DDN1290	S2-61600	<i>MCN Server 8000 Manual</i>
DDN1293	S1-61151	<i>MCN HIB-IP 8000 Unit for Legacy MCN Networks (Obsolete)</i>
DDN2123	S1-61795	<i>MCN HIB-IP 8002 Unit for Legacy MCN Networks</i>
DDN1294	S2-61164	<i>MCN Software License Option Multi-NI-4. Adds support for (4) HIB-IP, HIB-IP 8000, or HIB-IP 8002 Units (Purchase HIB-IP family units separately)</i>
DSS161119	S1-61119	<i>MCN Server Triggered Output Option</i>
DSS161974	S1-61974	<i>MCN Server Group Macros Option (Requires the S1-61119 Triggered Output Option to be ordered.)</i>
DS61254	S1-61254	<i>TPCI Initial Option - Third Party Client Interface Includes support for (2) Third Party Clients</i>
DS61133	S1-61133	<i>TPCI Additional Client Support Adds support for (4) additional Third-Party Clients</i>
DSS161434	S1-61434	<i>MCN System Performance Toolkit Level 1 Max 128 Receivers or I/O Points (Note 1)</i>
DSS161435	S1-61435	<i>MCN System Performance Toolkit Level 2 Max 512 Receivers or I/O Points (Note 1)</i>
DSS161436	S1-61436	<i>MCN System Performance Toolkit Level 3 Unlimited (limited only by MCN Server capacity)</i>

Reference Materials & Technical Specifications

Note 1: Receiver count is the total number of configurable receivers or I/O points, whether or not they are used. The following configured devices count for the following number of receivers:

Device	Receivers / I/O Points
CIB Module 8 Rx	8
GPI-24 Module	24
GPIO-1208 Module	20
MLC 8000 Comparator	64
GCM 8000 Comparator (FDMA)	64
GCM 8000 Comparator (TDMA)	128
GRV 8000 Comparator	96

Supported PC Operating Systems

In a stand-alone system, the MCN Server 8000 software and the Client software can run on:

- Windows 7
- Windows 10
- Windows 11
- Windows Server 2008r2

Note: Although the MCN Server 8000 and Client software can run on the platforms previously mentioned, not all operating systems are supported on a Motorola ASTRO® 25 RNI).

Recommended PDF Viewer Software

You need to install Adobe Acrobat or a similar PDF reader to access the PDF manuals from Windows and the MCN Applications Help menus.

Certification for ASTRO® 25 Release & MCN Versions

MCN Server 8000 and ClientRcd software is certified for use by Motorola in the following Motorola ASTRO® 25 systems:

ASTRO® 25 System Release	MCN Server 8000 & Client Version	Notes
7.12	6.04 up	No HIB-IP module support in MSI RNI
7.13	6.11 up	Added support for HIB-IP modules in MSI RNI
7.14	6.11 up	
MLC 7.14 box release	7.05 up	Supports both old and new protocols for MLC 8000 comparator
7.15	7.12 up	
7.16	7.20 up	Adds support for HIB-IP 8002
7.17	7.25 up	Adds support for Windows 10 & GCM 8000 TDMA mode. Removed support for the old MLC 8000 protocol (pre-MLC 7.14)
7.17.1	8.01 up	Adds support for GRV 8000 Analog IP comparators (limited release)
7.17.2	8.10 up	Adds support for GRV 8000 Digital IP comparators
7.18	9.00 up	Adds enhanced Third-Party Client Interface
7.18	9.50 up	Adds capability to run MCN Server remotely via Windows Remote Desktop (RDP)

For ASTRO® 25 systems, the MCN software requires Windows 7 or later (64-bit). Follow all Motorola's networking, information assurance, hardening, and system requirements or recommendations..

MCC 7500 Console & NM Client Cohabitation

Motorola certifies the MCN Client software to be installed and cohabitate with MCC 7500 consoles and NM Clients. It can also be installed on stand-alone PCs.

The MCN Server 8000 software is not certified to cohabitate on any of the PCs used for dispatch or network management and should be run on a separate PC.

Security and Information Assurance Recommendations

Review these recommendations before installation and follow them during installation and operation:

1. **Software Installation Locations**
Install all software in the default program directory specified by the MCN Installer.
2. Configure the MCN Server 8000 and MCN Client software as described in this manual. If applicable, take into consideration commercially accepted practices, industry standards, and the standards for your organization.
3. Do not save user files or system configuration files in the program directory.
4. Save system configuration files to a directory that requires Administrator rights so that users cannot delete or edit the configuration files. See the **Windows Accounts** section on page **35** for additional information.
5. Always run the software with the lowest permission set possible.
6. Run both the MCN Server 8000 and the MCN Client software with User rights, not Administrator rights. See the **Windows Accounts** section on page **35** for additional information

(**Note:** On the first setup and also when modifying the MCN Server List in the MCN Client software, you **must** run the MCN Client with Administrator rights. However, for normal operation where no editing is needed, you can run it with standard User rights.)
7. When configuring a system, do not enter Sensitive or Confidential information into the system configuration files.
8. Non-repudiation services for application users are not defined as part of the application design.
9. Various configuration settings are stored in the Windows Registry.
 - HKEY_LOCAL_MACHINE\SOFTWARE\WOW6432Node\CTI Products and
 - HKEY_CURRENT_USER\Software\CTI Products.

Restrict access to the HKLM registries and programs such as Regedit as required by your organization. The HKCU registry entries are user-preference items that are set by the application, and no elevated rights should be required to access them.

Reference Materials & Technical Specifications

10. The MCN Server 8000 software, the MCN Client software, and system configuration files are not backed up as part of the ASTRO® 25 Back UP & Restore (BAR) solution. Follow the Backup & Recovery procedures as listed in **Appendix B: Backup Procedures** on page **308** for the MCN Server 8000, MCN Client, and system configuration data. The procedures in the Appendix apply only to this software and do not back up or restore part of the ASTRO® 25 system.
11. Follow the applicable Backup & Recovery procedures for your system, PCs, and operating systems as defined by your organization, the hardware and software vendors, and commercially acceptable practices.
12. Limit access to PCs.
13. Limit access to networks, both physically and through appropriate restrictions of the routers and switches.
14. Use strong passwords.
15. Follow Motorola's and your organization's recommendations on security and Information Assurance.
16. Use the appropriate Windows Hardening Kits for your installation.
17. Use anti-virus and anti-malware packages.
18. Install appropriate security patches for installed software and operating system.
19. The MCN Server is not a Syslog client. Event logging is done locally to the MCN Server. See **Windows Event Logging** and **Appendix A: Error Logging Definitions** sections for details.
20. The Backup & Restore (BAR) procedures in this manual are for the MCN Server 8000 system.
21. The MCN Server 8000 system is designed to run totally within Motorola Solutions, Inc. ASTRO® 7.x Radio Network Infrastructure (RNI) which provides network security. It is not intended for use on an open network. Customers must take appropriate security precautions if any of the applications are run on the side of RNI or non-RNI platforms.
22. Use of multiple NIC cards in Dual-Home systems is not approved by MSI in ASTRO® 25 RNIs due to Information Assurance (IA) security concerns.
23. For logging, no information needs to be retained to expediently bring the application back online. (STIG APSC-DV-002320)
24. For use in a DoD system, the Windows Operating system must display the DoD-approved use notification before granting access to the PC and provide privacy and security notification verbiage used is consistent with applicable federal laws, Executive Orders, directives, policies, regulations, standards, and guidance.

The banner must be formatted in accordance with DTM-08-060. Use the following verbiage for applications that can accommodate banners of 1300 characters:

Reference Materials & Technical Specifications

"You are accessing a U.S. Government (USG) Information System (IS) that is provided for USG-authorized use only.

By using this 'IS' (which includes any device attached to this 'IS'), you consent to the following conditions:

- **The USG routinely intercepts and monitors communications on this 'IS' for purposes including, but not limited to, penetration testing, COMSEC monitoring, network operations and defense, personnel misconduct (PM), law enforcement (LE), and counterintelligence (CI) investigations.**
- **At any time, the USG may inspect and seize data stored on this 'IS.'**
- **Communications using, or data stored on, this 'IS' are not private, are subject to routine monitoring, interception, and search, and may be disclosed or used for any USG-authorized purpose.**
- **This 'IS' includes security measures (e.g., authentication and access controls) to protect USG interests--not for your personal benefit or privacy.**
- **Notwithstanding the above, using this 'IS' does not constitute consent to PM, LE or CI investigative searching or monitoring of the content of privileged communications, or work product, related to personal representation or services by attorneys, psychotherapists, or clergy, and their assistants. Such communications and work products are private and confidential. See User Agreement for details."**

Use the following verbiage for operating systems that have severe limitations on the number of characters that can be displayed in the banner:

- **"I've read & consent to terms in 'IS' user agreement."**
25. If there is a system failure, no system state information needs to be retained to expediently bring the application back online. The application should be restarted. (APSC-DV-002320 V-70223"
 26. If the MCN Server 8000 or ClientRcd software is a mission-critical application, it must not be deployed on the same PC as non-mission critical applications. (APSC-DV-003040 / V-70349)

Local Administrator versus Active Directory Accounts

Some of the operations described in this manual may require Administrator rights.

Log on either as the local Windows administrator or using your Active Directory account that is a member of the group "cti-login" with authority to access this device. The local Windows administrator account set up by Motorola for Windows 7-based devices is "secmoto".

NOTE: Active Directory account login is recommended, if available.

Overall System Specifications & Considerations

ASTRO & MCN System Topology

For ASTRO® 25 systems, it is crucial that all equipment, such as: IP Comparators, HIB-IP units, MCN Server, and Clients be correctly installed in their designated locations. They must be connected to the correct IP switches, in accordance with the Motorola IP Plan relevant to the specific ASTRO® 25 release that is being used.

IP Networking Considerations

Motorola RNI Configuration – TNCT Tool

For ASTRO® 25 systems, the appropriate CTI Products, Inc. equipment must be enabled in the MSI TNCT tool to enable appropriate IP routing for the CTI Products hardware and software that support full system operation on the RNI. The **CTI** flag must be set in the **Security Tab**. The resulting configuration files must then be pushed down to the appropriate RNI network devices.

Network Compatibility

For operation on other systems, the installer should consult with the MSI's or the customer's network engineers for proper settings.

For normal operation, the IP network routers and switches must be configured to pass IP Multicast traffic from the MCN Server to the Clients.

MCN Server 8000 software Version 7.00 and above supports up to 10 Clients using the Unicast streams for special systems. Note that this operating mode will increase IP traffic between the Server and Clients. It is not intended to be used on a standard MSI RNI.

IP network infrastructure equipment (switches, routers, etc.) must be configured properly to allow communication between the IP comparators, the MCN Server 8000, HIB-IP units, and the MCN Clients.

The system requires static IP addresses for the following items:

- ✓ **MCN Server 8000 PC**
- ✓ **ClientRcd PCs**
- ✓ **HIB-IP units**
- ✓ **GRV 8000, GCM 8000, & MLC 8000 IP Comparators**
- ✓ **Multicast IP Address for Server to Client traffic.**

All IP addresses, IP Subnets, and Subnet Masks should be set based on the proper settings for the particular system.

Specifications for Motorola ASTRO 25 System

PCs installed in Motorola Solutions, Inc. (MSI) ASTRO® 25 systems must have (among other things) the following items installed:

- Windows Hardening Kit
- Anti-Virus (For ASTRO® 25™ 7.13 and above systems, the anti-virus system used is:
 - * **McAfee Endpoint Software**

Motorola Solutions, Inc. ASTRO® 25 Systems Installation

The proper order for software installation is:

1. Install the Windows Operating System (if not re-installed). See instructions in the appropriate MSI document.
2. Perform the Operating System Initialization Steps. See instructions in the appropriate MSI document.
3. Install the Motorola Solutions Inc. Windows Hardening Kit. See instructions in the appropriate MSI document.
4. Install MOTOPATCH.
5. Install the MCN Server 8000 and/or Client software as described in the following sections of this manual.
6. Install the McAfee Endpoint Software. See instructions in the appropriate MSI document.
7. Re-Installation of Motorola Solutions, Inc. ASTRO® 25 Systems
8. If you need to re-install or update the software, the proper order for it is:
 - a. To re-install the software without un-installing McAfee Endpoint Software or disabling functions in it. However, that might change with different configurations. If you have difficulty installing the CTI software, try turning off the virus protection. If that fails, try uninstalling McAfee.
 - b. Remove the CTI software.
 - c. Install the MCN Server 8000 and/or Client software as described in the following sections of this manual.
 - d. Re-enable or re-install McAfee Endpoint Software if it was disabled or removed in an earlier step.

Permissible Software Cohabitation & Locations

1. For ASTRO® 25 7.13 & 7.14 systems, MCN Server 8000 software may be installed on:
Stand-Alone PC
2. For ASTRO® 25 7.13 & 7.14 systems, ClientRCD software may be installed on:
Stand-Alone PC
Co-Habbed on an MCC 7500 Console PC
3. For ASTRO® 25 7.13 & 7.14 systems, the various components of an MCN system (MCN Server 8000, Client RCD, HIB-IP units, and IP comparators cannot bridge the RNI-CEN demarcation point. There are two configuration options:
 - All components must be within the RNI or
 - All components must be outside the RNI in the CEN.
4. For ASTRO® 25 7.13 & 7.14 systems, the PCs running MCN Server 8000 and ClientRCD software may be installed only at the following locations:
 - Zone Core (Not on NM Subnet – no Multicast support)
 - K-Core
 - Collocated Vortex / NM Dispatch Site in Zone Core

Note: A Vortex /NM Dispatch Site may not be able to communicate with all the comparators at other sites. Only Zone Core or K-Core or collocated Vortex / NM Dispatch Sites in the Zone Core can see all comparators.

5. For systems not running in an official MSI RNI, some of the above limitations may not apply, but the non-ASTRO® 25 -specific considerations will apply.

Valid locations on the A7.13 RNI are shown below.

	Co-located Vortex Site in Zone Core	Co-located NM Site in Zone Core	IP Simulcast Prime Site	Conventional Hub
MCN Server 8000	Yes	Yes	No	Yes
CTI Client	Yes	Yes	No	Yes
HIB-IP	No	No	Yes	Yes

Installation

Legacy Network Interfaces & Drivers

Three general options of Network Interfaces are available for the MCN Server program to support MCN systems with older legacy interfaces:

- A. HIB-IP External Modules: - For connection to MCN 78K networks over IP networks:
 - Legacy Units: Version 110 - 399
The Legacy HIB-IP unit(s) can be local or remote.
Legacy units are not certified for use with any ASTRO® 25 RNIs.
 - HIB-IP 8000 Version 400 & higher:
These versions are for use across ASTRO® 25 RNIs.
 - HIB-IP 8002 Units: - Enhanced functionality over HIB-IP 8000 units (added Type of Service capability). Newer hardware. Configured via USB port.
- B. HIB-232 External Modules:- Version 200 & Up 78K
(with Rotary address switches on the back) For RS-232 connection
(Although the HIB-232 manual talks about dial-up operation, the MCN Server 8000 program does not support dial-up operation of the HIB-232.)
- C. Internal Boards: - PCLTA-21 Half-Size PCI Board 78K or 1250K versions For direct connection to the MCN Network. (The PCLTA boards also support connections to remote networks using EXB Network Extender Modules)



The PCLTA boards are supported only on 32-bit operating systems.

There are currently no PCLTA drivers available for any 64-Bit OS. So, this NI option will not be supported on Windows 10 and newer Operating systems.

Legacy 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. This driver is only available for 32-bit operating systems.

The HIB-IP, HIB-IP 8000, HIB-IP 8002 and HIB-232 modules **do not** need a system driver for normal operation of the MCN Server program.

USB Drivers for HIB-IP 8002 Modules

The HIB-IP 8002 modules **do** need a USB device driver to allow the configuration of the units with the MCN Config Server 8000 software. See **Appendix E: HIB-IP 8002 USB Driver Installation** for details.

HIB-IP Considerations

- A. Legacy HIB-IP modules (versions below 400) are not intended for operation across an ASTRO® 25 7.X Radio Network Infrastructure (RNI).
- B. HIB-IP 8000 modules (HIB-IP modules version 400 or newer) and HIB-IP 8002 modules support special UDP Ports required to run across an ASTRO® 25 7.13 and higher RNI.
- C. For ASTRO® 25 7.13 and up systems, HIB-IP modules may be installed only in the following locations:
 - Simulcast IP Prime Sites
 - Conventional Hub (C-Sub Hub) Sites

Default MCN Software Compatibility & Settings

1. The defaults in the MCN Server 8000 and the MCN Client are configured to run in an ASTRO® 25 7.12 system and higher.
2. The default UDP ports for the Server and Client are set according to Motorola's IP plan (per specific ASTRO® 25 release). They assume that the software is running on a PC hardened with the applicable release of Motorola's Windows Hardening Kit (WHK). If the PC does not have WHK installed, see **Appendix G: Running on non WHK PCs – UDP Port Settings**
3. The default Multicast IP address for the MCN Server 8000 software is configured for:
MCN Server #1 in Zone 1 at the Main Prime site.
If your system configuration is different, please refer to the Motorola IP Plan (per specific ASTRO® 25 release) for the proper Multicast IP address.

Windows Accounts

In general, the programs should be run with the least privileges necessary for proper program operation. The programs need the following rights:

- | | |
|--|---------------------------------|
| ▪ MCN Server 8000 Install x64 V10_xx_yy.exe (Installation) | Administrator |
| ▪ HWSetup | Administrator |
| ▪ MCN Config Server 8000 | Administrator |
| ▪ MCN Server 8000 | User (Note 1) |
| ▪ ClientRCD | User (Note 2) |

Note 1 Depending on the rights on various files and folders, Administrator rights may be needed when configuring IP settings and changing other system settings.

Note 2 Depending on the rights on various files and folders, Administrator rights may be needed when configuring the IP settings for the Client, and the list of IP addresses for the Server(s).

Default MCN File Locations

The default installation locations for the MCN Server 8000 Server and Client systems (for Windows 7 and 10) are as follows:

MCN Server 8000

Program Files	C:\Program Files\CTI Products Inc\McnServer 8000
Example Files	C:\Program Files\CTI Products Inc\McnServer 8000\Example System
Config Log:	C:\ProgramData\CTI Products Inc\McnConfig McnConfig.log
System Log:	C:\ProgramData\CTI Products Inc\McnRcd McnSystem.log Users must have Read & Write access rights.
Run-Time Log:	C:\ProgramData\CTI Products Inc\McnRcd MCNRCD.log Users must have Read & Write access rights. (The log file name and folder may be changed by modifying the SystemName.RcdLog configuration file.)

Saving System Configuration Files from MCN Config Server:

- Save to a folder in which User accounts have **Read** rights.
- Do not save to the Program folder.

MCN Client

Program Files	C:\Program Files\CTI Products Inc\McnServer 8000
Server List	Registry: Computer\HKEY_LOCAL_MACHINE\SOFTWARE\CTI Products\ClientRcd\Servers
Cache Files :	C:\ProgramData\CTI Products Inc\McnClient\cache*.zip



Note: Users must have Read & **Write** access rights.

Network Management

The MCN software works with different Motorola IP devices across an IP network. This requires everyone involved to work together to maintain the security, reliability, and availability of the devices and the data they handle. This means the solution must work seamlessly with Motorola's hardware to manage and optimize network Connection, Security, and Performance.

Network & Hardware Security

Protecting the PC hardware and software along with other associated networked devices and systems is a significant increasing requirement. As a result, the basic typical PC security should include:

- ✓ User Passwords, with adequate complexity requirements enforced.
- ✓ Antivirus (MCN has been verified as compatible with McAfee MVision 10.7 for Win10 and Win 11).
- ✓ WHK (Motorola's Windows Hardening Kit) through **Version R14.00.31**.
- ✓ Appropriate firewall protection (*if the MacAfee Security suite is not installed*).
- ✓ Moto Patch compatibility through **Version 2021.09.03**

PC Hardware Installation

Before installation, please read the **Overall System Specifications & Considerations** section of this manual starting on page **31**.

If you have legacy MCN equipment and will use a PCLTA network interface see the following Note.

Note: PCLTA Interfaces are not supported with newer 64-bit exclusive Operating Systems i.e., Win 10 and 11, due to the lack of availability of 64-Bit drivers.



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

- 1) **Run** the file **MCNRCD Server 8000 Install x64 V10_xx_yy.exe** from the installation media on the MCN Server PC to install the MCN Server software.

For IP comparators, see the following sections:

- *Error! Reference source not found.* on page **Error! Bookmark not defined.***Error! Bookmark not defined.*
- **Connecting to the GCM 8000 Digital IP Comparator** on page **174**
- **Connecting to the MLC 8000 Analog IP Comparator** on page **184**

For systems with Legacy Comparators or I/O devices, see: **Interfacing to Legacy Devices** on page **199**

2) Run the MCN Config Server program (see page **59**) to build your system resources lists for:

- **Network Interfaces** (Legacy systems)
Legacy: HIB-IP, HIB-IP 8000, HIB-IP 8002, HIB-232 modules.
- **Hardware Modules** (IP & Legacy):
IP: GRV 8000, GCM 8000 (FDMA), GCM 8000 TDMA,
MLC 8000, Mixed Mode
Legacy: CIB, AIB, GPIO modules
- **Channel Names**
- **Receiver Names, I/O Points & other data.**

You may **not** need to edit the Display Tables unless you need to change the display colors and text for the receiver status displays.

3) Use the MCN Config Server program to build your **Display Screen(s)** by:

- Placing receivers & I/O points on screens
- Adding channel labels
- Adding tabs if required

4) Use the MCN Config Server program to build a list of **Client Authorizations** if required to limit access of certain **clients** to certain display screens.

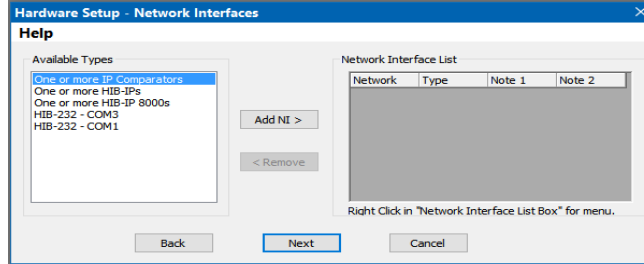
5) If you have Legacy MCN equipment and are using HIB-IP, HIB-IP 8000, or HIB-IP 8002 modules, program them using the MCN Config program. See **Loading Configuration Data into HIB-IP** family units on page **85**.

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

7) Run the MCN Server program on the MCN Server PC.

HW Setup - Network Interface Setup

When HW Setup is run on a PC for the very first time, it will find that there are no Network Interfaces defined on the PC. It will ask you what type of Network Interface (NI) you plan to use.



(The number of options in the "Available Types" list will vary by system. Most systems will not show the PCLTA, LPP or virtual serial port entries.)

Select the type of Network Interface you plan to use from among the available options. See the applicable manual sections for further instructions:

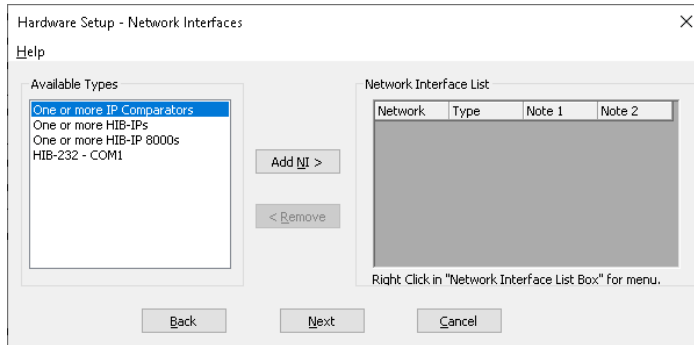
Available Types	Description
<p align="center">IP Comparator(s)</p>	<p>Choose this if you have one or more of the following Motorola Solutions comparators:</p> <ul style="list-style-type: none"> - GCM 8000 or MLC 8000 (either stand-alone or in a Mixed Mode configuration) or - GRV 8000 (Analog or Digital) <p>See the HW Setup – IP Comparator Network Interface section on page 40 for details. (Also see Note 1 below.)</p>
<p align="center">HIB-IP</p> <p>HIB-IP 8000 HIB-IP 8002</p>	<p>Legacy Remote Network Interface that connects to the PC through an IP channel.</p> <ul style="list-style-type: none"> - Select HIB-IP for the original HIB-IP modules. - Select the HIB-IP 8000 option for the newer HIB-IP 8xxx hardware modules. <p>See the HW Setup – HIB-IP Family Legacy Network Interface section on page 42 for details when configuring a system. (Also see Note 1 below.)</p>
<p align="center">HIB-232 – COMx</p>	<p>Legacy non-dial-up HIB-232 units</p> <ul style="list-style-type: none"> - HIB-232 units connect to a COM port directly or through external leased-line modems or equivalent. <p>See HW Setup – Legacy HIB-232 (non-dial-up) section on page 44 for details.</p>

Note 1: You will need to set up parameters for the IP Comparators and/or HIB-IP units in the system configuration files by using the McnConfig Server program. You will also have to download settings to the HIB-IP from the McnConfig Server program.

After you have selected the proper Network Interfaces for your system, go to the **Miscellaneous Installation Considerations** section on Page 46.

HW Setup – IP Comparator Network Interface

If you will be using one or more IP Comparators, select it from the Possible Types list.

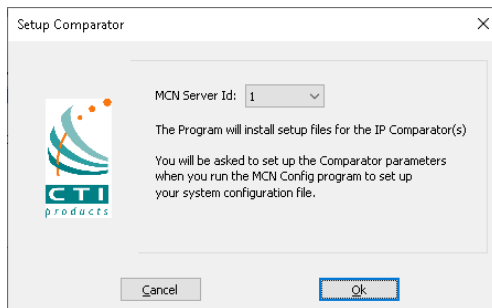


Select the One or more IP Comparators option.

Click the ‘Add NI’ button.

HW Setup – MCN Server ID

After you select IP Comparators, the following window will appear:



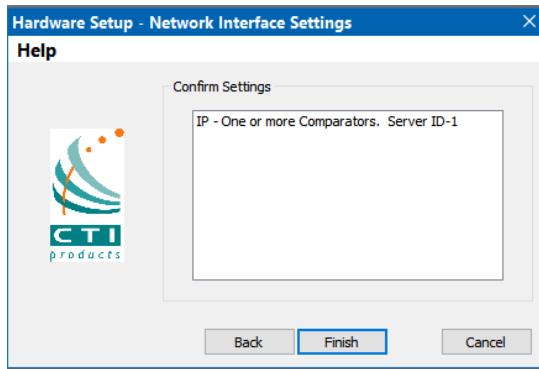
Click the ‘OK’ button.

For the first server in the system, select MCN Server ID 1.

If you have multiple MCN Server 8000 PCs in a system, choose a different ID for each one, ordering them sequentially.

Note that each MCN Server PC will also need to have its own Multicast IP Address. This should be done when you first run the MCN Server 8000 software as described in **MCN Server 8000 IP Settings** on page 201.

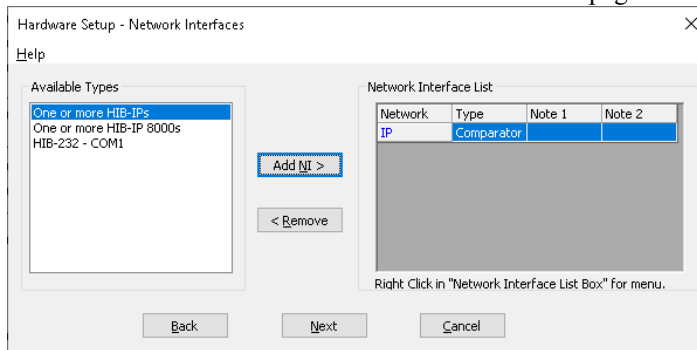
A confirmation summary will be shown, like that below:



Click the Finish button.

"Comparator" will appear in the Network Interface List.

After you have selected the proper Network Interfaces for your system, go to the **Miscellaneous Installation Considerations** section on page 46.

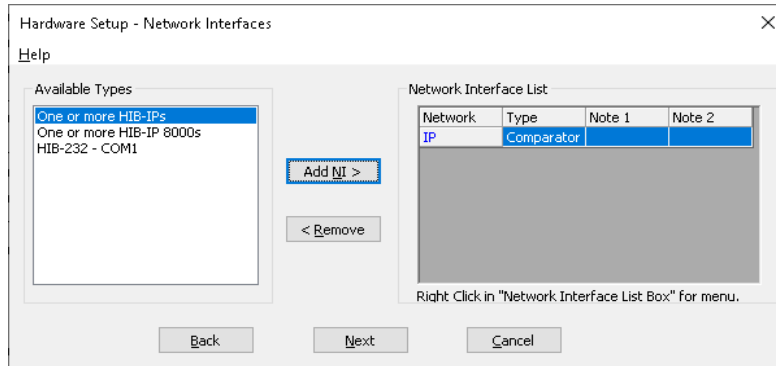


If you need to add additional types of Network Interfaces, do so at this time.

Click the 'Next' button.

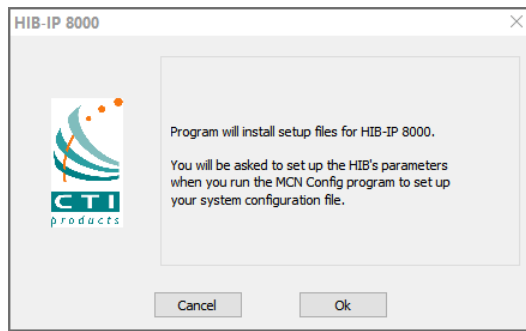
HW Setup – HIB-IP Family Legacy Network Interface

If you will be using any HIB-IP 8000, or HIB-IP 8002 units to connect to a legacy MCN system, select the One or more HIB-IP 8000 option from the list of ‘Available Types’.



Select the option ‘One or more HIB-IP 8000s’ .

Click the ‘Add NI’ button.

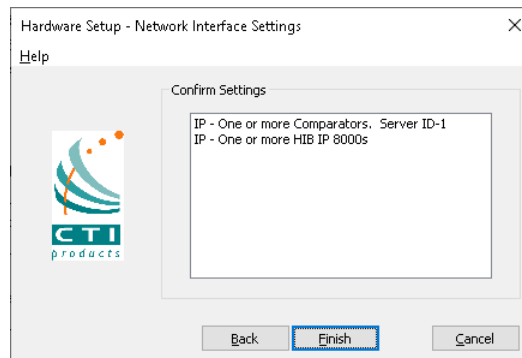


Click the ‘OK’ button.

"HIB-IP" will appear in the Network Interface List.

If you need to add additional Network Interfaces, do so at this point.

Click the ‘Next’ button.

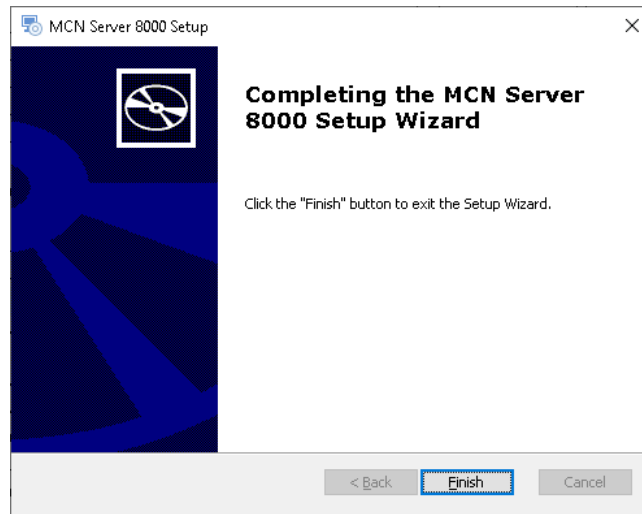


Click the Finish button.



HIB-IP Parameters Note

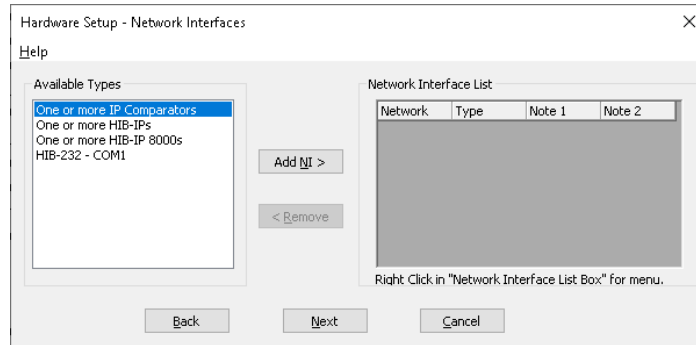
When using a HIB-IP type unit, you will later need to enter the HIB-IP parameters in the system configuration files using the McnConfig program. You will also have to download (write) those parameters to the HIB-IP module using McnConfig.



After you have selected the proper Network Interfaces for your system, go to the ***Miscellaneous Installation Considerations*** section on Page **46**.

HW Setup – Legacy 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 **Available Types** list box:



The program detects all COM ports reported by Windows. However, depending on your PC, not all ports may be available for use due to the following reasons:

- Some COM ports may not be brought out to a connector.
- Some COM ports may be reserved by an internal modem.

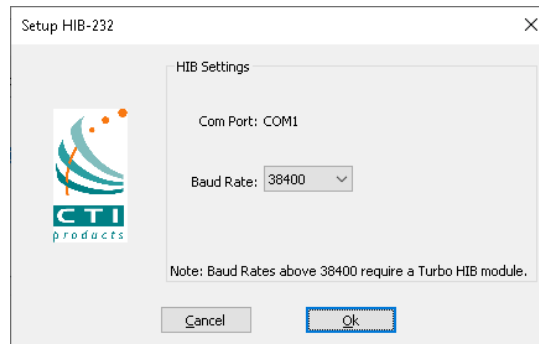
(For example, in the snapshot above, COM3 is an internal modem.)

HIB-232 Units and USB to Serial Adapters

HIB-232 units can be used with some USB to Serial adapters.

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.

1. Select the proper COM Port and Click the Add NI button.



Note:

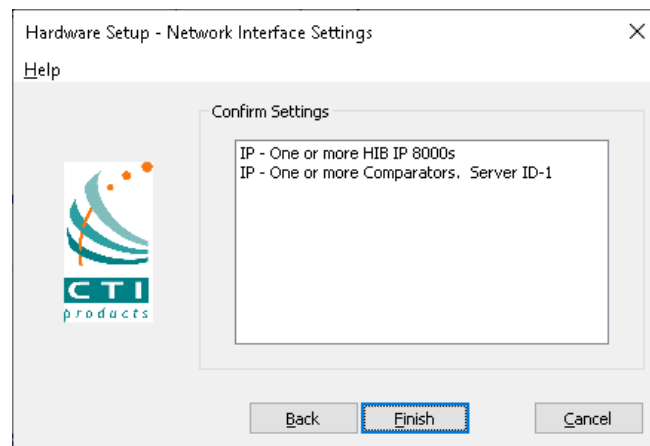
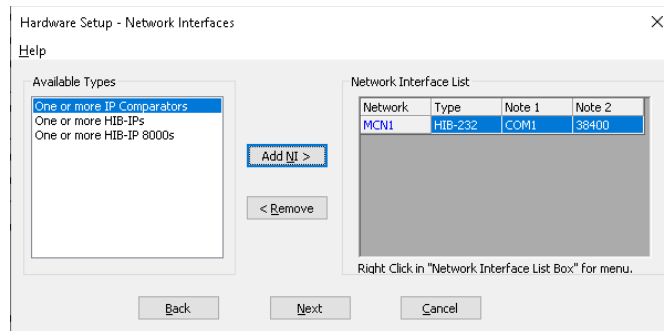
CTI cannot guarantee the compatibility with every marketed adapter, as it is impractical to test all brands.

2. 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 *HW Setup – Legacy HIB-232 (non-dial-up)* on page 44 for more information on MCN addressing.)

3. Click the OK button.
4. The HIB-232 unit will appear in the Network Interface List.
5. If you need to add additional Network Interfaces, do so at this point.



6. Click the Next button.
7. Click the Finish button.

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

This setting will be used by the MCN Server program.

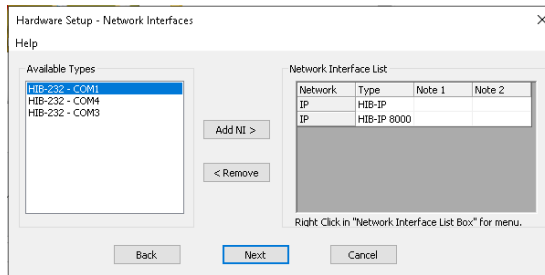
After you have selected the proper Network Interfaces for your system, go to the **Miscellaneous Installation Considerations** section on Page 46.

Miscellaneous Installation Considerations

Changing Settings for your Legacy Network Interface with HWSetup

To change the settings for your network interface, run the HWSetup program. This program allows you to add and manage the following options :

- Type of Network Interface
- 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 prevent the system from working.

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

PC Power Option Requirement

The “Power Options” icon in the Control Panel allows for a wide variety of PC operation parameters. However, the installation of MCN Server software will disable any possibility of the PC going into Standby or Hibernate Mode.

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 Logging

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.”

Installing MCN Server 8000 Software



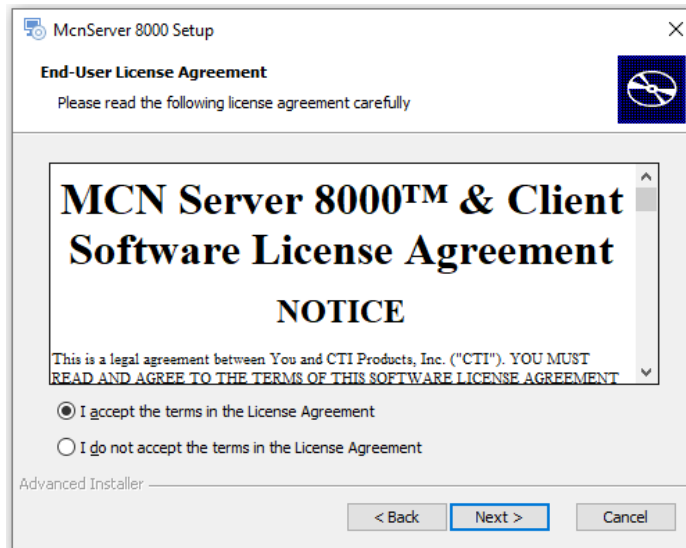
You must have Administrator rights to install the MCN Server 8000 software.

Check for and disable any real-time virus protection that is running (ex: McAfee Antivirus Access Protection & On-Access scanners).

Run the furnished version of **MCN Server 8000 Install.exe**



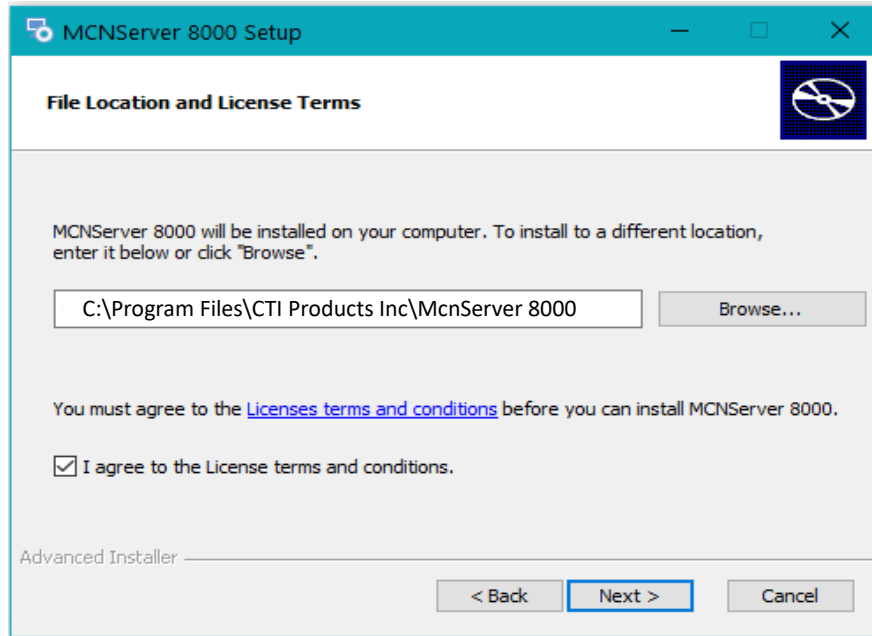
Press the 'Next' button.



File Location and License Terms

The installer will ask for confirmation before copying files.

Make sure to check and confirm that the default installation path is correct before proceeding.



Read the License Agreement.

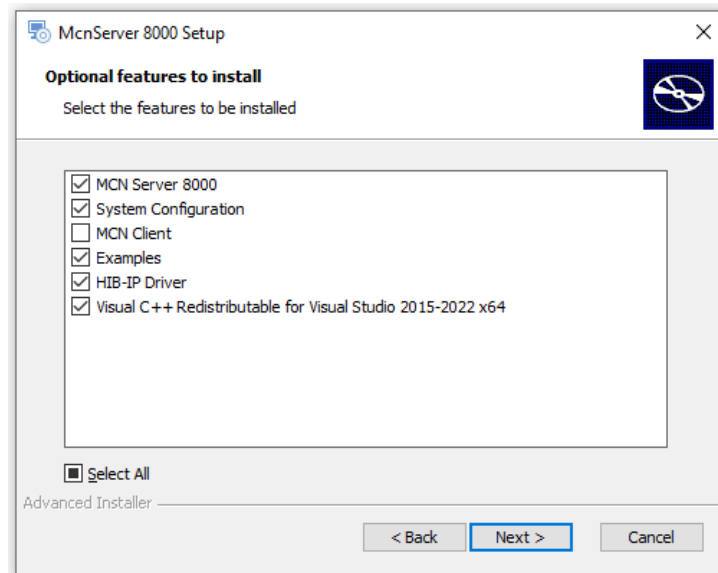
If you agree to the terms, check the box labeled "**I agree...**" and click the "**Next**" button to continue.

The files will then be copied to the location shown in the installation path.

Installation Options

You have the option of installing the Server, the Client, or custom combinations.

1. For Client PCs, use the "MCN Client" option only.
See Pg 55, "Installing the MCN Client Program".
2. For the Server PC, select all installation items **except** for the Client option.
(Occasionally, it may be helpful to install Client on the Server PC to test the Client-Server functionality).



The HIB-IP Driver Option

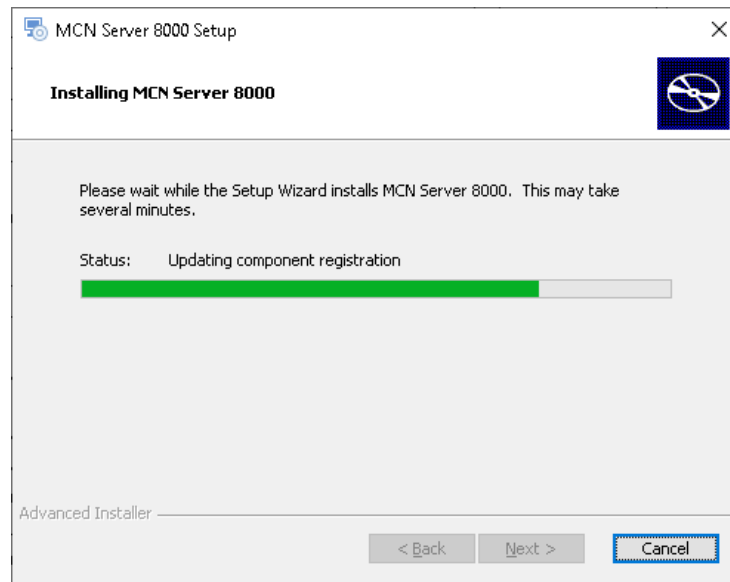
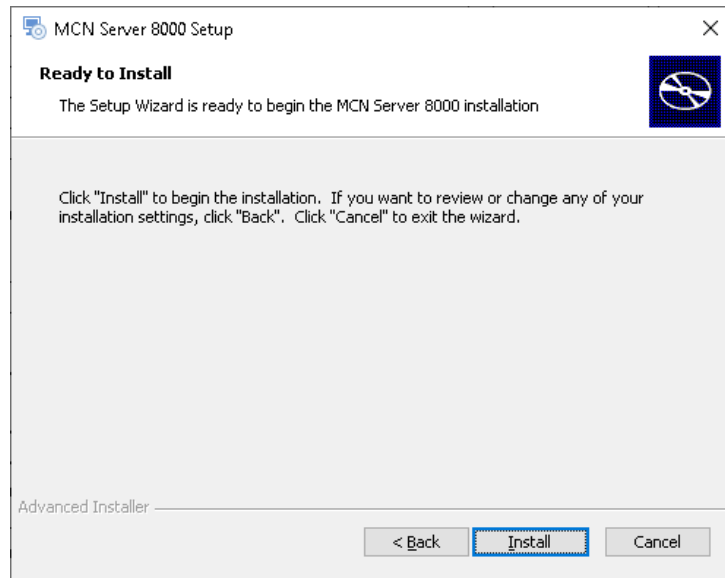
If your system will use HIB-IP 8002 Network Interfaces for legacy MCN networks and I/O modules, you **must** choose the "HIB-IP Driver" as well.

The Visual C++ Redistributable option

You will need to select the Visual C++ Redistributable package for install, because you are deploying a C++ application compiled with Visual Studio 2015–2022. All users will need this redistributable installed to run the app on the PC.

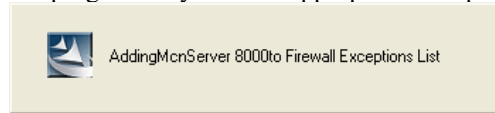
Choose the "Optional features" you want to install and hit "Next".

Ready to Install



Firewall Exceptions

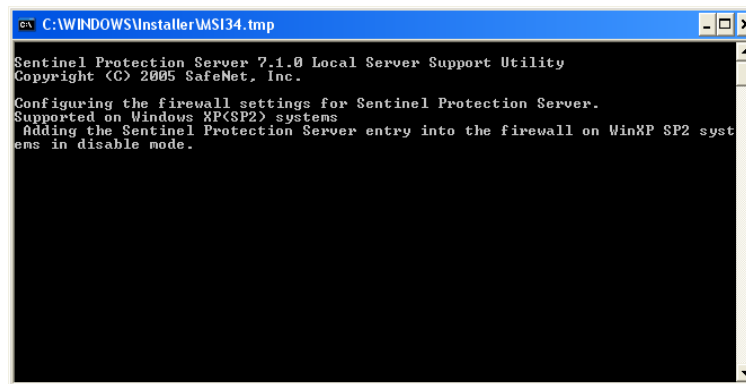
The installation program may then set appropriate exceptions to the Windows Firewall.



(May not be required for newer versions of Windows OS)

Hardware Key Driver Installation

The driver software for the Hardware Key will be installed automatically. However, the execution may be so quick that you might not even notice this process.



License Key Server

The MCN Server 8000 version 9 and later comes with a feature called an automatic embedded license key server. This built-in service is responsible for managing the Hardware Key (dongle), which is vital for controlling access to the software and its licensed features.

By guaranteeing hardware key detection during remote startups, the License Server ensures that users can consistently access all licensed features, even when operating the software from remote locations. This improvement leads to:

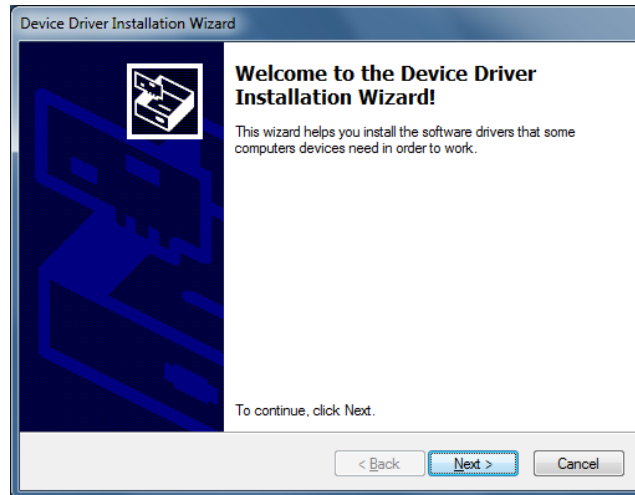
- **Seamless Operation:** Users can start the software remotely without encountering issues related to hardware key detection.
- **Improved Reliability:** The system becomes more dependable, minimizing disruptions in access to features.
- **Improved User Experience and Application Efficiency:** With more reliable license operations, users can work effectively without interruptions, which creates a smoother overall experience with the software.

Windows Driver Installation

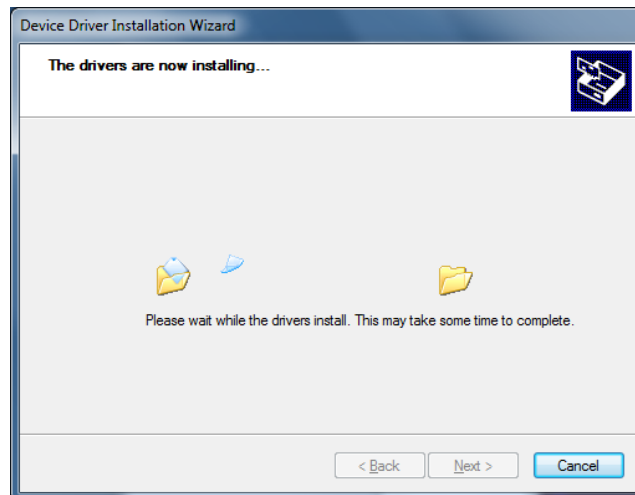
Windows 7 & 10 Driver Installation

Typical steps for Windows 7 installation will now be addressed.

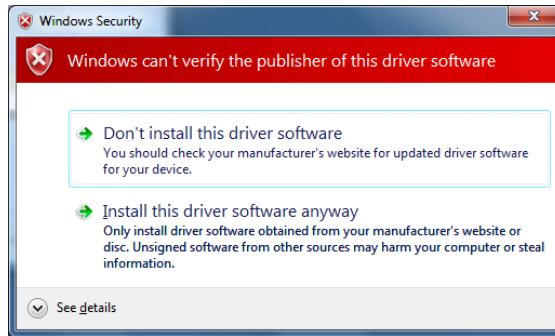
The Windows 7 installation will install the driver so that it is ready when the HIB-IP 8002 unit is connected.



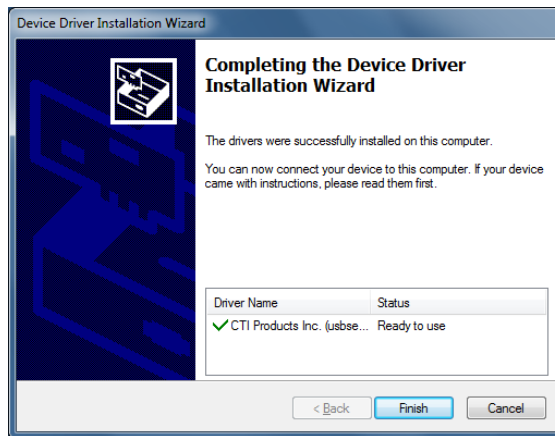
Pressing "Next" will start the file copy process.



Some PCs, particularly those running the Windows Hardening Kit (WHK) running on Motorola ASTRO® 25 networks, have tighter security restrictions that do not recognize all signed driver installation files. On such PCs, a Windows Security screen will be presented during the installation.

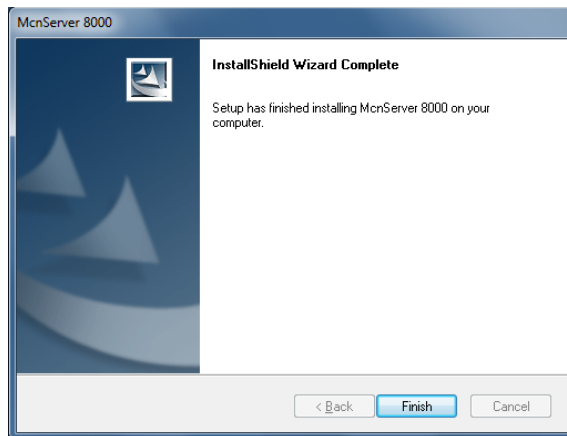


If you wish to continue installing the drivers, select the second option.



The above window indicates that the driver has been installed and will be ready for use when the HIB-IP 8002 module is connected to the USB port on the PC.

Completing the Installation



Click **'Finish.'**

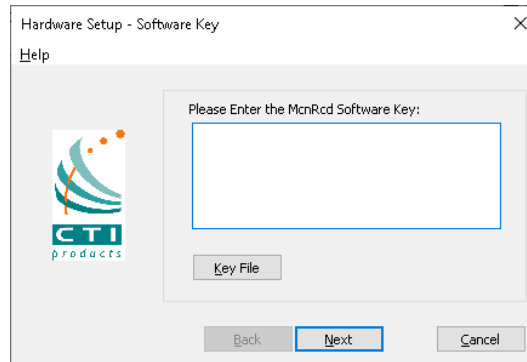
This will complete the software installation, but you will still need to set up the hardware using the HWSetup program.

Hardware Setup – HWSetup.exe

The installation program will launch the Hardware Setup program. It is used to enter the Software Key and inform the programs which types of Network Interfaces (IP Comparators, HIB-IP units, or Non-Dial-up HIB-232 units) will be used in the system.

Software Key

You will be asked to enter your software key.

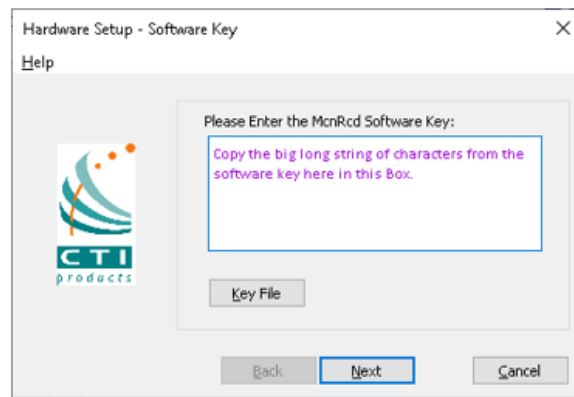


You can type in the software key, but it is easier to hit the Key File button and find your key file.

Your software key file is also included on the USB Flash Drive Card provided with for your system.

Locate the Software Key File on the Flash Drive.

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



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

Installing the MCN Client Program

Typically, you would install the MCN Client program on a separate PC from the MCN Server PC. However, for testing purposes or to verify configuration and operation, you can also install the MCN Client program on the MCN Server PC.



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

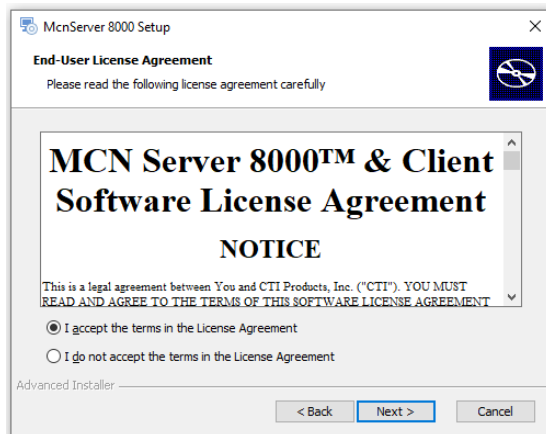
Check for and disable any real-time virus protection that may be running (ex: McAfee Antivirus Access Protection & On-Access scanners).

Run the appropriate version of **MCN Server 8000 Install.exe** from the Installation Media

The installation steps are shown below.

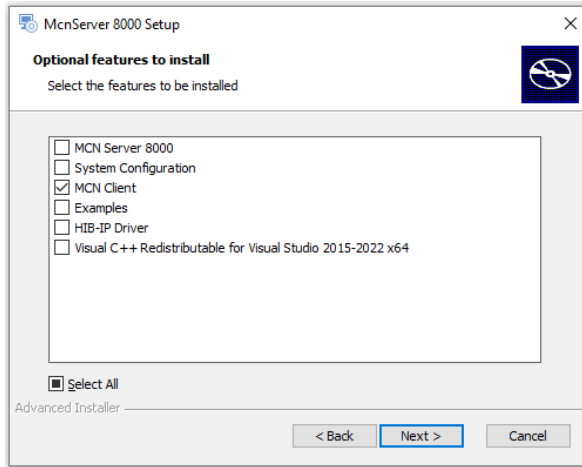


Click **Next**.



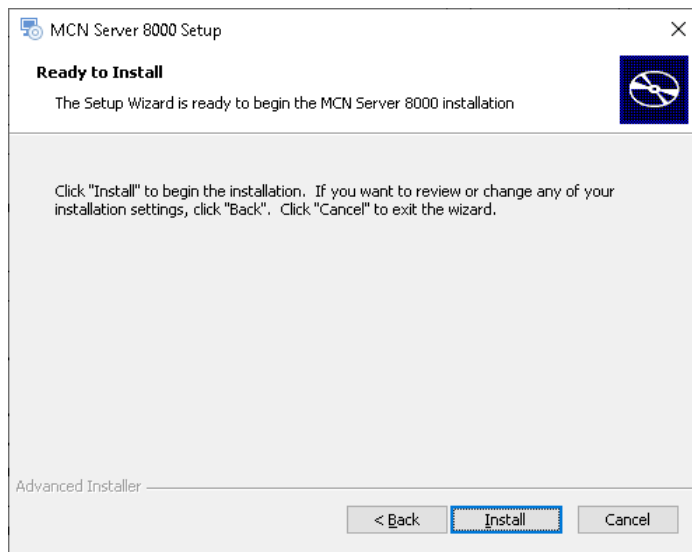
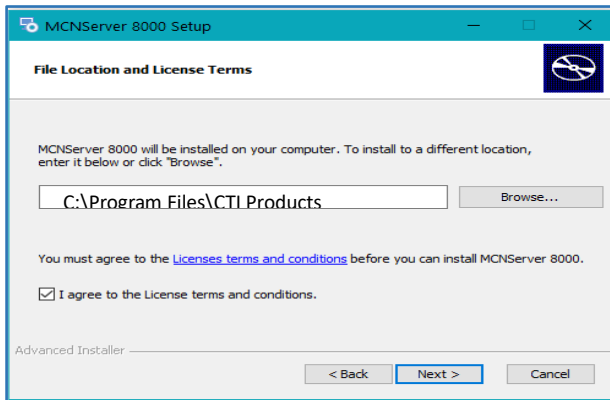
Read the License Agreement.

If you agree to the terms, check the box "I agree..." as shown above, and then hit the **Next** button to continue the installation. The files will be copied to the PC.



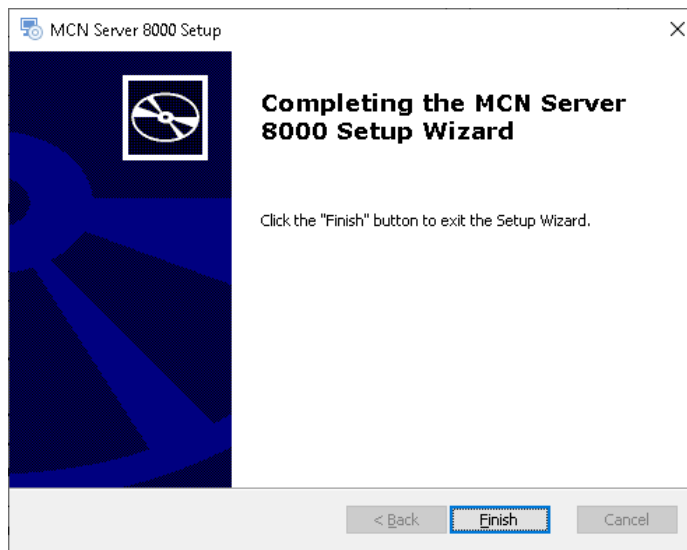
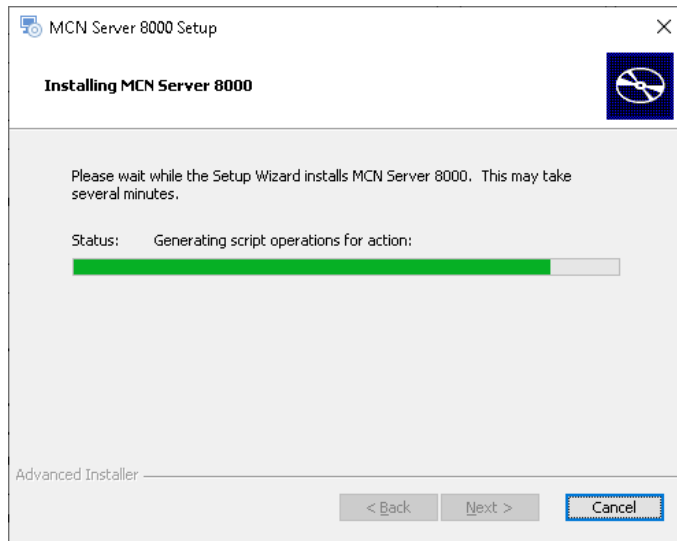
Select the “MCN Client” (only) and click **Next**.

The installation program asks for confirmation before copying the appropriate files.



Click the **‘Install’** button

The Installer program will install the files.



Click the **'Finish'** button to complete the installation.


Uninstalling MCN Software

Uninstalling the MCN software involves a few straightforward steps to ensure that the program is completely removed from your system.

Uninstall Using Distribution Media

Insert the MCN Installation Media that comes with the MCN solution. Find the file named **MCNRCD Server 8000 x64 Install v10_xx_yy.exe**. Run this file and select the option to “Remove”.

Uninstall Using Windows Application Wizard

Click the **Windows** Start Icon  located at the bottom left of the Taskbar.

Type “**appwiz.cpl**” and select ‘appwiz.cpl’ from the list of best matches.

After the ‘**Program and Features**’ window appears, locate, and right click on the ‘**MCN Server 8000**’ from the list of installed programs in the window.

Choose the **Uninstall** option. When the uninstall confirmation window appears click the ‘**Yes**’ button. Follow the prompts until the Application Wizard Uninstaller completes the removal.

NOTE: The MCN uninstallation process may remove the MCN software license key, the USB HASP dongle driver, and the HIB-IP drivers in MCN Server versions prior to 10.4.X.



System Configuration

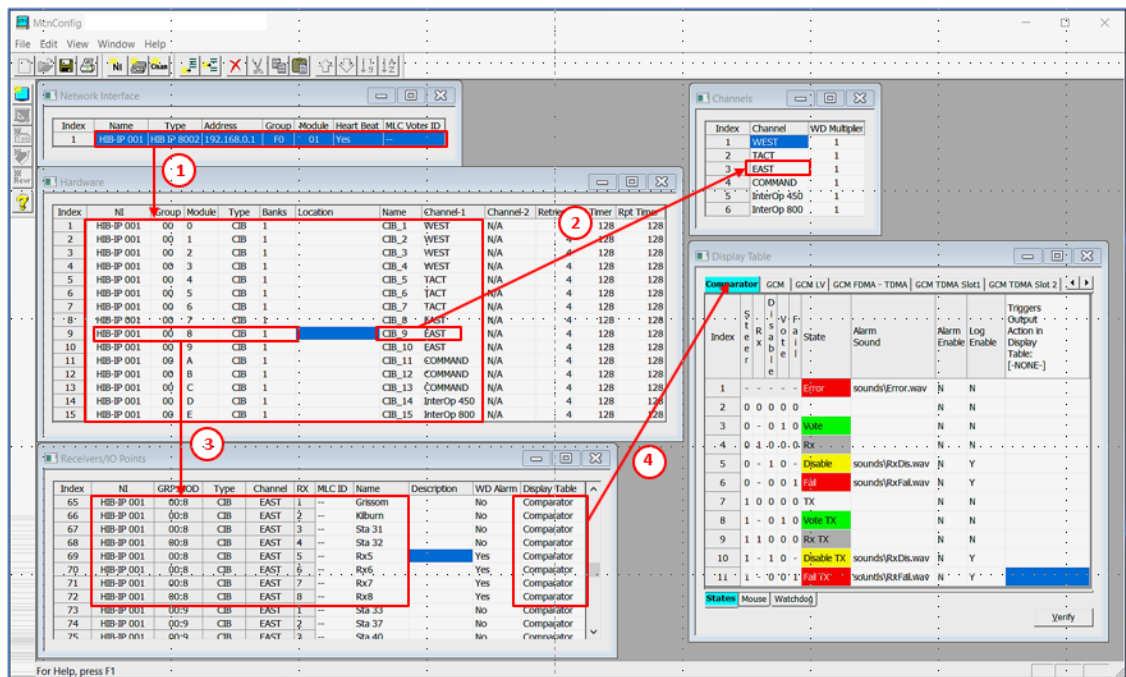
Building Systems with MCN Config Server

The MCN Config Server 8000 program is used to configure an MCN system. System configuration involves:

- a. Defining system resources, such as Network Interfaces, Hardware Modules, Receiver Names and Channels in the **Resource Windows**.
- b. Adding and configuring the appropriate hardware interfaces and modules for the system.
- c. Designing the **Display Windows** to be displayed by the MCN Server and MCN Client programs.
- d. Building a list of Display Windows (screens) as needed for availability by the various Client PCs.

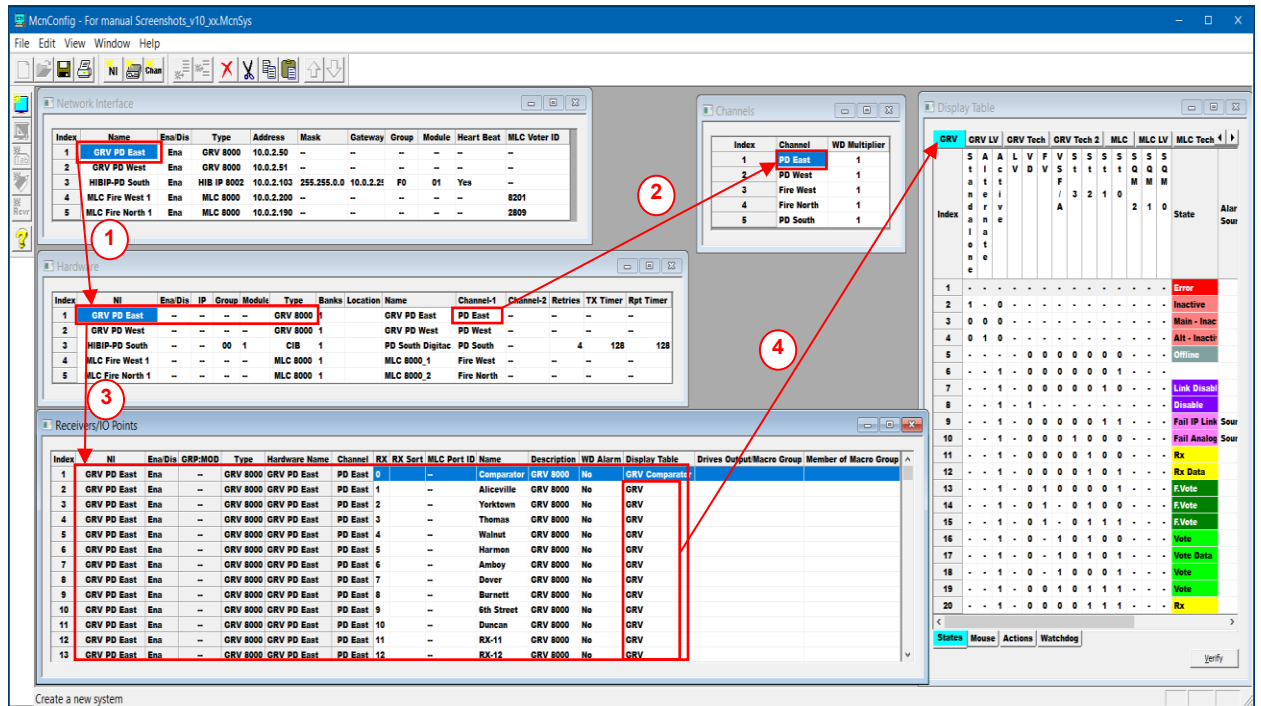
Resource Table Links

It's important to note that some fields in the resource windows of the MCN Config program are interconnected. This relationship is shown by the arrows in the screenshot below.



1. The Network Interface links to the devices which are assigned to it. Those hardware devices are shown in the Hardware window. In the previous screen shot; the HIB-IP 001 Network Interface has a single MCN legacy module connected to it:
(1) CIB module.

2. Each Module in the Hardware Window can be linked to a specific Channel listed in the Channel window.
3. In the Hardware Window, each Module is associated with all the Receivers (Subsites) or I/O points linked to it. For example,
 - A CIB module would be tied to its eight receivers.
 - An IP Comparator Module is tied to (96) receivers.
4. In the Receivers window, each Receiver or I/O Point is linked to a Display Table tab. This tab controls how the status information from the comparator or I/O module is presented.
7. The GRV 8000 Network Interface is connected only to the GRV 8000 comparator, as shown in item 1 below.



Navigating through MCNConfig Server

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

Standard Windows **Hot-Keys** that can be used with this program include:

Ctrl-C Copies current selection to the clipboard
Ctrl-V Paste clipboard contents to current location in the 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, or Display Tables) or Display Windows with the **View** menu.

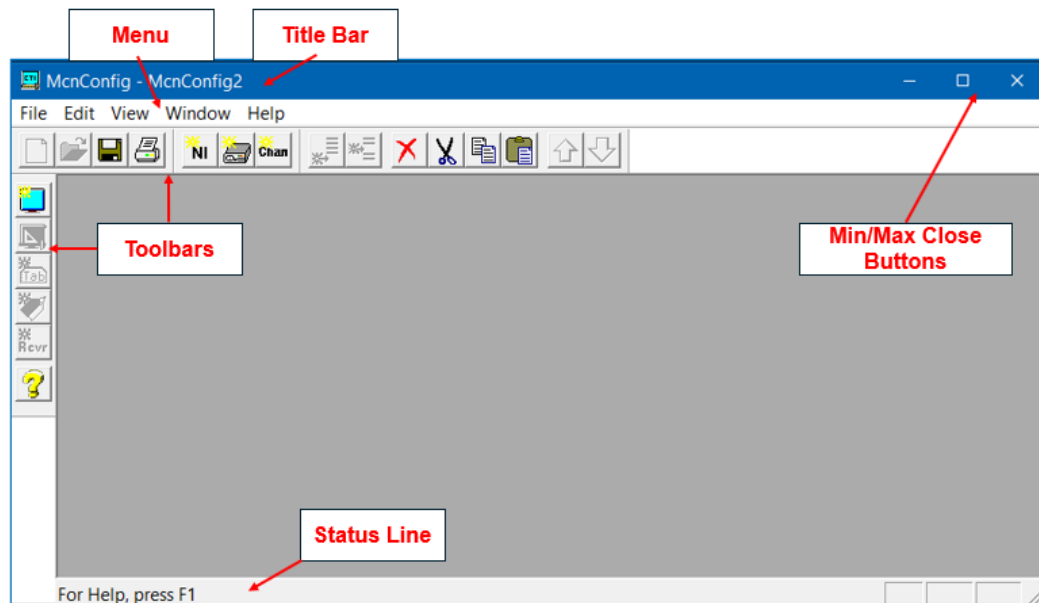
Select an open window by clicking the mouse on it or using the **Window** menu.

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 any 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.



This program honors several menu functions that are commonly 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.

Screen Elements

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:

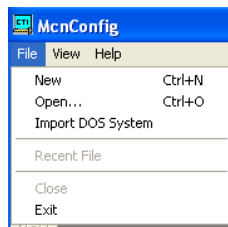
File View Help

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

File Edit View Window Help

Initial File Menu

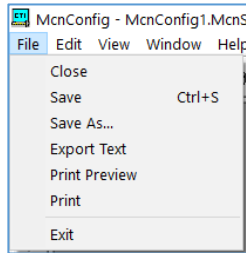
When there is no system loaded, the Initial File Menu is available.



- | | |
|---------------------|---|
| 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. |
| 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.
Export Text	Exports text values of currently selected table (Not available for Display Windows)
Print Preview	Previews printout.
Print	Prints the contents of the currently selected window.
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

To comply with security & information assurance Policies:

- Do not save the system configuration files in the ‘Program’ or ‘Document’ directory.
- Do not give Users the right to modify or delete them.

You will have to determine (most likely create) an appropriate directory in which to save your system configuration files. The access rights for the system configuration files will need to be:

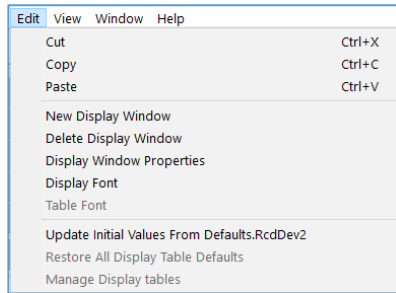
- Admin Full control
- User Read access.



When you save a system for the first time, Windows may default to the ‘My Documents’ folder. If needed, create or browse to a different folder to store your system configuration files.

Edit Menu

The **Edit** Menu is available whenever a system is loaded. Certain menu items may not be enabled, depending on the currently active window.



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. Certain fields are special fields that accept only specific data types (or ranges of data) from the clipboard. See **Restrictions on Using the Clipboard** on page 141 for more details.

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.

Display Font

Only available to set the font and size of the text within the Display Window; Used to simulate the display for the MCN Server program.

Table Font

Sets the font and size of the text within currently opened active windows. This is not active in the Display Window

Any font settings made from here are only effective within MCN Config program. The font settings for the MCN Server programs (and the MCN Client program) are set by the user from within those programs.

Update Initial Values from Defaults.RcdDev2

Updates the initial state values in a Display Table in an existing set of MCN configuration files from a newly released Defaults file. Use only when CTI ships a new Defaults file with instructions to update the initial values.

Restore All Display Table Defaults

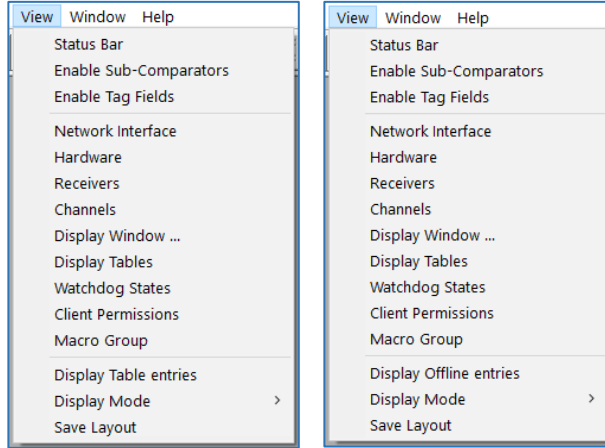
Restores all the Display Tables in an existing set of MCN configuration files to the settings in the Defaults.RcdDtb2 file. Use this if the system's Display Tables have been hopelessly mangled. Available only when the Display Table window has focus.

Manage Display Tables

When a system is built in the MCN Config program, all the default Display Tables are included in that system's Display Table file. This menu option lets a user delete unused Display Tables or add Display Tables back to simplify the system files. Available only when the Display Table window has focus.

View Menu

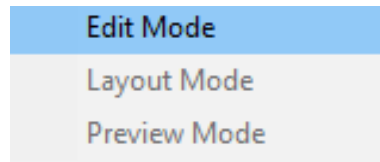
The **View** Menu is used to display a list of available windows, from which you may quickly select and make it active for use. Some items will only appear when certain options are purchased with the License.



- Status Bar** Turns the Status Bar (at the bottom of the screen) on or off.
- Enable Sub-Comparators** Displays a tab for Sub-comparator fields and options in the Display Table and Receiver Window. Sub-comparator features are normally not used with IP comparators. Turn this off for a less cluttered screen view if sub-comparators are not used.
- Enable Tag Fields** Displays a column of Tag fields in the Receiver Window. Tag fields may be used to store general-purpose information.
- 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.
- 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.
- Watchdog States** Opens the Watchdog States window and makes it active. (This is to support the System Performance Toolkit option that is not currently offered.)
- Client Permissions** Opens the Client Permission Window and makes it active.
- Macro Groups** Opens the Macro Groups window and makes it active. (Licensed feature)
- Display Table Entries** Switches the Display Window to view Display Table names in the Status columns. This is the normal mode when configuring a system. Active only when Display Window is open and active.
- Display Offline Entries** Switches Display Window to Display Offline in the Status columns to simulate MCN Server running. Active only when Display Window is open and active.

Display Mode

Selects a Display Mode for a Display Window. The three mode choices are available only when the Display Window is active and has focus.



Edit Mode is the mode that is used for building screens. In this mode the selected Display Window is just one window within the overall MCN Config Server program window with the standard editing toolbars present. It allows you to place receivers and labels and add or edit tabs. Since the toolbars are present, this mode will not render the Display Window in the final size that it would appear in MCN the Server program. To reflect the size and layout of the Display Window more accurately when it is being displayed in the MCN Server program, use either the Layout or Preview mode.

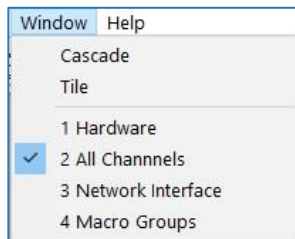
Layout Mode Makes the Display Window full screen within the program frame and turns off the toolbars to simulate the layout in the MCN Server program. Layout Mode allows you to more accurately re-size the columns for use with the MCN Server program. Unused cells in the Display Window are highlighted in yellow to indicate that the Display Window is in a special mode. For accurate representation, the screen resolution and multiplier for the MCN Server PC should be the same as that of the MCN Config PC.

Preview Mode is similar to Layout Mode, but the column sizing function is turned off, and the unused cells are displayed in their normal color. This mode can be used to capture screen shots of the Display Windows without having to run the MCN Server program. You can switch between Offline and Display Table display using the **View / Display Table entries** and **View / Display Offline entries** menu commands.

Save Layout

This command saves the current working screen layout (Window Positions, Column widths) for the Edit display mode. This layout will be used the next time the program is started.

Window Menu



Cascade

Cascades all open windows.

Tile

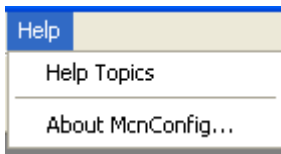
Tiles all open windows.

Window List (1-N)

Indicates currently open windows. Use this list to select and open a Resource (Network Interface, Hardware, Receivers, Channels, Display Table, and Macro Groups) or Display window. The Resource Windows will appear in the order they were opened.

Display Windows will be listed as named by the user.
(Window 2 in this screen shot is the Display Windows.)

Help Menu



Help Topics

Brings up the software manual.

Adobe Reader must be installed to support this option.

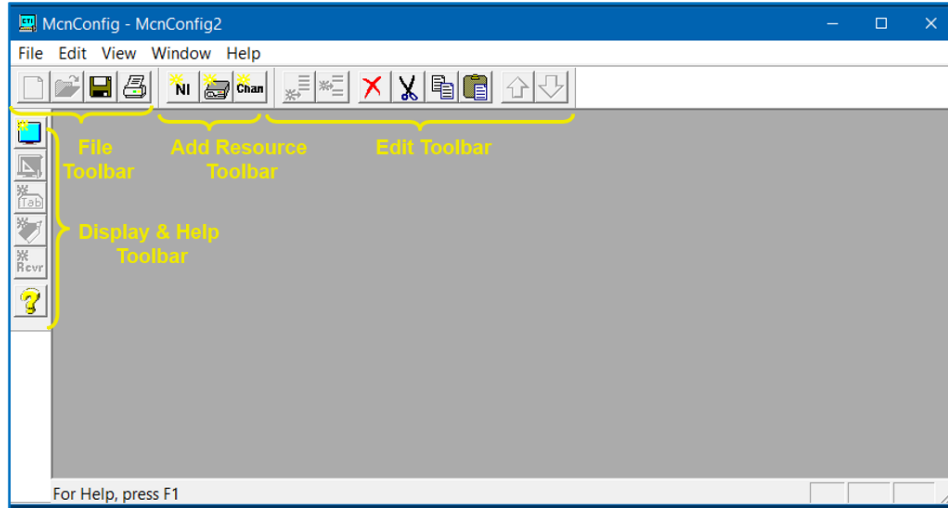
About MCNConfig

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 is displayed when you move the mouse over it. A lengthier 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 or IP Comparator to the Network Interface resource window. The quantity of Network Interfaces or IP comparators that can be used with the system will be limited by the Software License File.



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.

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 Copies the currently selected item(s) to the clipboard and deletes them from the selected window.



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: See preceding info on **Cut** and **Copy**.



Move Up Moves up the currently selected item in the list. This item is only available in the Channel Window.



Move Down Moves down the currently selected item in the list. This item is only available in the Channel 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.

Creating an MCN System

System Resource Windows - Overview

The best approach to building a working system is to add and configure all the fundamental system resources that support the system hardware you will be using. Each available 'Resource Window' is individually discussed in this section with greater priority being placed on the compulsory or most important windows listed below:

Network Interface Window

You will need to add one or more of the following NI types as determined by the hardware in your system infrastructure and your MCN hardware & software License:

- Add **IP Comparators** and configure their IP parameters, if applicable.
- Add **HIB-IP, HIB-IP 8000, or HIB-IP 8002 Network Interfaces**, if applicable; (for legacy MCN systems), configure their parameters, and program the HIB-IP units, (HIB-IP 8000 entry also covers HIB-IP 8002 units.)
- Display other MCN Legacy Network Interface(s), if applicable; (**PCLTA**, or **HIB-232** modules if used).

Hardware Window

Enter additional information about IP Comparators, if applicable.

- Add HIB-IP 8002 NIs, if applicable.
- Add and assign modules for Legacy MCN comparator (e.g., CIB or AIB) modules, I/O Modules (e.g., GPIOs) and configure their MCN Group & Module addresses appropriately.

Receiver Window

Enter the receiver names, I/O group names, and other differentiating data for all hardware modules. (Optional)

Channel Window(Optional)

Enter radio channel names.

The individual resource windows and configuration instructions are in the following sections.

Macro Groups Window

The Group Macro feature is a licensed option. Enter the name of each of the Macro Groups to be configured in the Macro Groups window. (Ex: Channel 1 Alarm, Channel 2 Alarm, etc.) The Macro Groups names will then be used to assign Receivers or Output Points to a particular Macro Group in the Receiver / I/O Points window. See the page **291** section on **Creating Macro Groups** for details. If the Group Macro option not licensed, The Macro Groups Window will not show or will be grayed out in the View menu list.

Adding IP Comparator NI

The IP comparators appear in two windows:

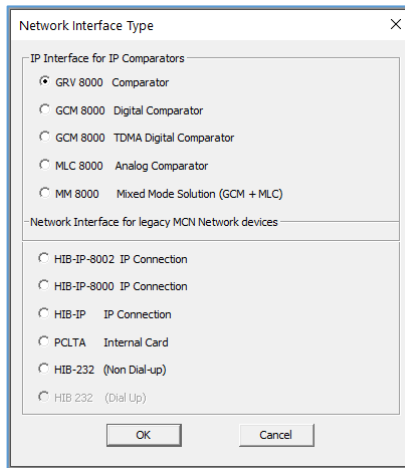
1. Network Interface Window and
2. Hardware Window.



IP comparators can be added from either window using the right-click menu or the toolbar.

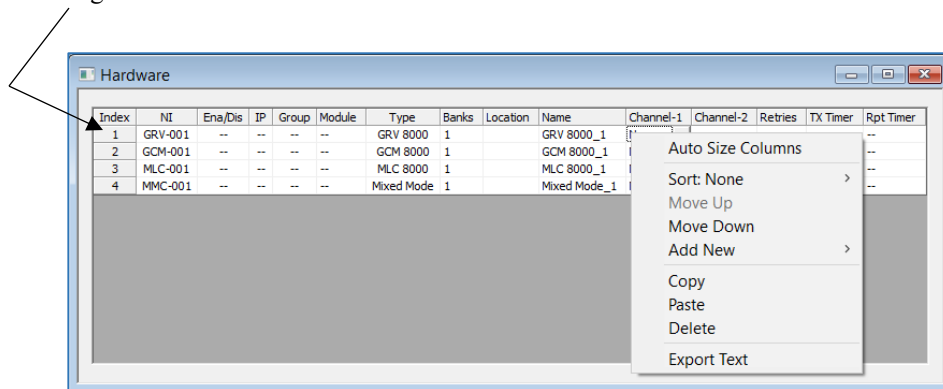
Method 1: From the **Network Interface window**, you can either:

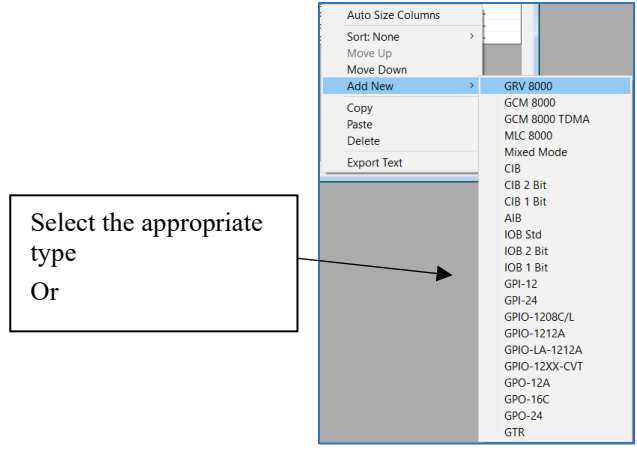
- a. Right-click in the list and select "Add New" or
- b. Select the **Add NI or IP Comparator** icon from the toolbar:



Method 2: From the **Hardware window**, either:

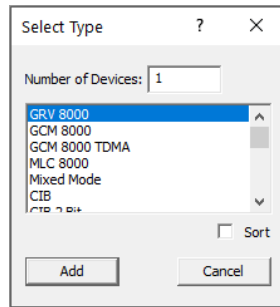
Right-click in the list and select "Add New."





Select the **Add Module** icon from the toolbar.
Either of the above steps will open the Select Type list:

- Select the appropriate type and hit "Add".

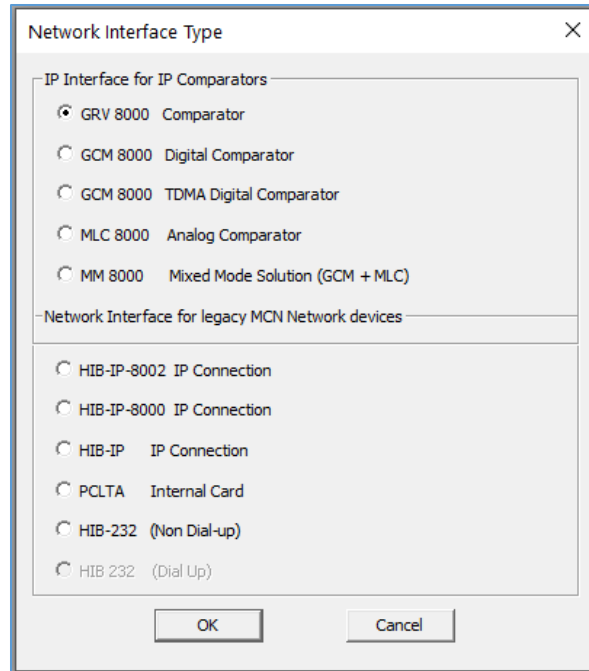


Selecting a GRV 8000 IP Comparator

The IP comparators are available under two MCN software windows:

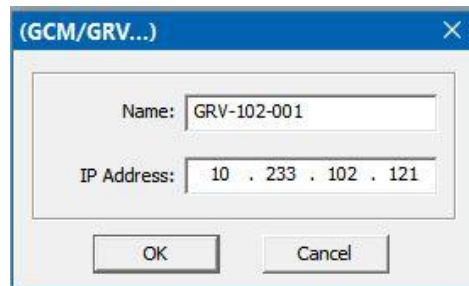
- a. Network Interface Type Window and
- b. Hardware Window.

The GRV 8000 Network Interface is used for GRV 8000 Comparators for either Analog or Digital mode.



Select the GRV 8000 Comparator and hit OK.

The GRV 8000 Comparator configuration window is open.



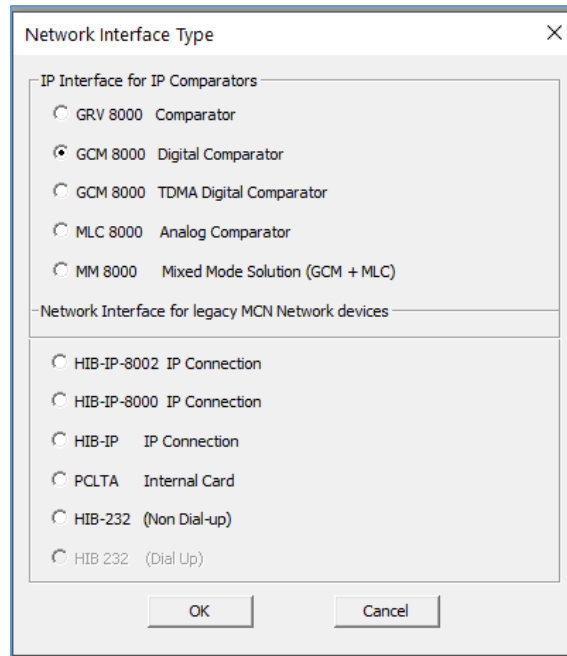
Enter the GRV 8000 name and IP address and hit OK.

The MCN Server 8000 communicates over IP only with GRV 8000 Comparator. It does not need to know the IP address of any GSLC or IP BR.

The program will add one entry for the overall Comparator Status and 96 entries for receivers (subsites) in the Receiver Window.

Selecting a GCM 8000 Comparator

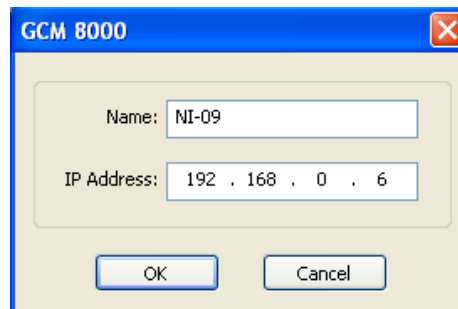
Either of the previous methods will open the following Network Interface Type window:



Select the appropriate type of GCM comparator and hit OK.

- GCM Digital Comparator (FDMA) – One timeslot
- GCM TCMA Comparator – Two timeslots

When you have selected a GCM 8000 comparator by one of the above methods, the GCM 8000 configuration window is opened.



This configuration is the Network Interface portion of the GCM 8000 comparator.

- The program will automatically assign a sequential name starting with the prefix NI (Network Interface). You can change it to whatever you want.
- The program will pick an IP address in the 192.168.x.x. range.
Edit the IP Address for the proper address of the GCM 8000 comparator.

Receiver (subsite) list:

Adding a GCM Digital Comparator (FDMA) will add 64 receiver positions to the Receiver Window.

Adding a GCM TDMA Comparator (Two timeslots) will add 128 receiver positions to the Receiver Window:

- Positions 1-64 for Timeslot 1 and
- Positions 65-128 for Timeslot 2.
- Positions 1 & TS2-01 correspond to Timeslots 1 & 2 respectively for the subsite 1.
- Positions 2 & TS2-02 correspond to Timeslots 1 & 2 respectively for the subsite 2.etc.

Suggestion: You should use the same subsite name for all timeslots numbered within the same subsite.



Ex:

- 1 Greenhills-1
 - 2 Airport 1
 - 3 University 1
- TS2-01 Greenhills
 - TS2-02 Airport 2
 - TS2-03 University 2

...

Adding an MLC 8000 Analog Comparator

When you have selected an MLC 8000 Analog Comparator by one of the above methods, the MLC 8000 configuration window is opened.

This configuration is the Network Interface and Voter ID portion of the MLC 8000 Analog Comparator.

- The program will automatically assign a sequential name starting with the prefix NI (Network Interface). You can change it to whatever you want.
- The program will pick an IP address in the 192.168.x.x. range. Edit the IP Address for the proper address of the MLC 8000 Analog Comparator.
- Add the proper MLC Voter ID. The Voter ID can be found in the MMC_config.csv file and the MLC 8000 Analog Comparator CT software. See the **Connecting to the MLC 8000 Analog IP Comparator** section starting on page **184** for details.

Adding a Mixed Mode comparator system

Mixed-Mode comparator solutions use a GCM 8000 digital comparator and an MLC 8000 Analog Comparator working together. The MCN Server 8000 takes data from each and consolidates it into a composite device.

When you add a Mixed Mode comparator, the Mixed Mode configuration window is opened. This window has parameters for the composite Network Interface entry and the two comparators:

1. The program will automatically assign a sequential Name starting with the prefix NI (Network Interface) for the consolidated Network Interface. You can change it as appropriate.
2. The program assigns an MLC-8000 comparator **Name**. This name will be seen in the Hardware window. You can change it as appropriate.
3. The program will pick an IP address in the 192.168.x.x. range for the MLC 8000 Analog Comparator. Edit the IP Address for the proper address of the MLC 8000 Analog Comparator.
4. Add the proper MLC Voter ID. The Voter ID can be found in the MMC_config.csv file and the MLC 8000 Analog Comparator CT software. See the **Connecting to the MLC 8000 Analog IP Comparator** section starting on page **184** for details.
5. The program assigns a GCM-8000 comparator Name. This name will be seen in the Hardware window. You can change it as appropriate.
6. The program will pick an IP address in the 192.168.x.x. range for the GCM 8000 comparator.
Edit the IP Address for the proper address of the GCM 8000 comparator.

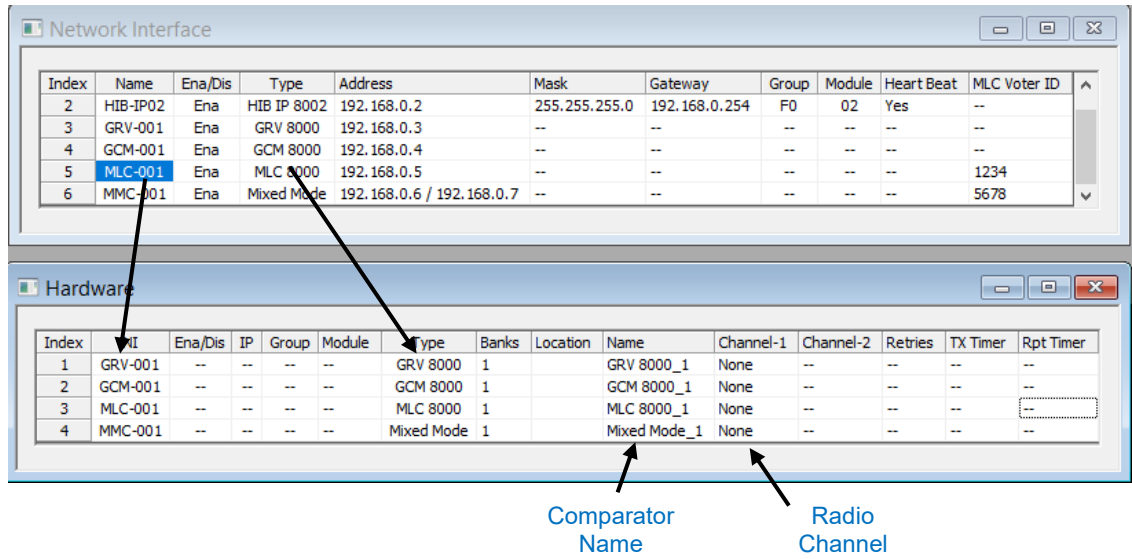
IP Comparator Representation in the NI and Hardware Windows

The configuration information for all IP comparators is displayed in the NI Network Interface window and the Hardware window as shown below.

Each NI will have a default Name automatically generated by the MCN Config software as it is created. The MCN Config's NI counter will add a number starting from "001" to the end of the generated name that increments with each NI that is added, to differentiate between Identical NI type. See the following example of a HIB-IP and an MLC's default name.

The List of NI's can be sorted if desired by right clicking on it. However, by default, the sort is set to **None** in both the NI and Hardware windows, so devices will appear in the order they were initially added.

The NI Name and Type fields from the Network Interface window as shown by the arrows.



The above system has the following comparators defined:

- (GRV-001) GRV 8000 Stand-alone
- (GCM-001) GCM 8000 Stand-alone
- (MLC-001) MLC 8000 Analog Comparator Stand-alone
- (MMC-001) MM Mixed Mode (MLC 8000 Analog Comparator & GCM 8000)

The system will be connected to (5) physical comparators:

- a. GRV 8000 comparator,
- b. (2) GCM 8000 comparators and
- c. (2) MLC 8000 Analog Comparators.

However, we see only (4) comparators are shown in the Hardware window:

- Each of the stand-alone comparators has its own line.
- The Mixed Mode system appears as one line in the hardware window.

The Mixed Mode entry in the Network Interface window links the two comparators used in the Mixed Mode system (with dual IP addresses and the MLC ID). The MCN Server 8000 software communicates with both and treats them as a single Mixed Mode comparator.

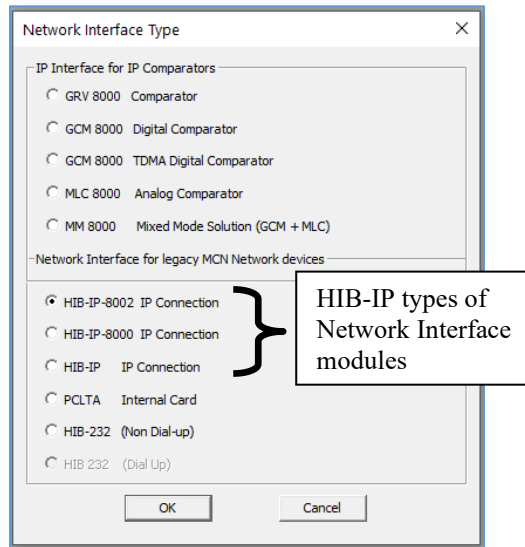
In the Receivers window (see the section **Receivers Resource Window - Configuration** on page 98 for details), each of the three comparators in the Hardware window gets 64 receiver slots. For the Mixed Mode solution, status data from both the digital GCM 8000 and the analog MLC 8000 comparators will be combined and shown on a single receiver display for each Receiver/BR in the system.

Adding a Legacy HIB-IP NI

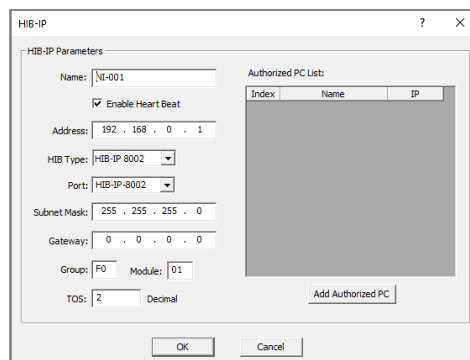


Note: *If your system doesn't have any HIB-IPs, skip this section and go to **Configuring Hardware Resources Page 91**.*

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 one of the HIB-IP module types of in the HW Setup program, the MCNConfig program will open the Network Interface Properties window.



Note: *The HIB-IP 8002 window is shown above. The other versions of HIB-IP units will have slightly different windows:*



- HIB-IP module** *No Port or TOS field*
- HIB-IP 8000 module** *No TOS field.*

Enter the appropriate parameters for the HIB-IP unit:

Name

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

Enable Heartbeat

This enables the heartbeat sent to the legacy MCN modules. If you have multiple PCs communicating with the MCN network, only one should have the Enable Heartbeat flag checked.

Address

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

HIB-IP Types

Select from the following HIB types:

- HIB-IP
- HIB-IP 8000
- HIB-IP 8002

Port (HIB-IP 8000 & HIB-IP 8002 only)

Select from the following types of UDP ports:

- HIB-IP (legacy port)
Not for use in MSI ASTRO® 25 systems
- HIB-IP 8000 or HIB-IP 8002 Port (newer port number)
Use with MSI ASTRO® 25 RNI Version 7.13 and up.
- The port number is used to control network access and packet routing in MSI ASTRO® 25 Radio Networks (RNI). If the legacy HIB-IP port is used on the RNI, the MCN Server PC may be unable to communicate with the HIB-IP 8000 or 8002 modules.

Subnet Mask

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

By convention, 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.	

Both the HIB-IP and HIB-IP 8000 units can accept a subnet mask that is more restrictive (more 1's set in the Subnet Mask), but not less restrictive. However, the HIB-IP 8002 units can accept a more restrictive or less restrictive subnet mask (with either more or less 1's set, in the Subnet Mask).

Gateway Address

If the MCN Server PC is on a different subnet than the HIB-IP, you need to enter the Gateway IP address (the router's IP) that the HIB-IP uses to communicate with the PC.



Note: The Gateway IP **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 Module.

Value: 00-FE Hex

See Warning under:

HW Setup – Legacy HIB-232 (non-dial-up) on Page .

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.

MCN Group & Module Settings

Caution:



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.

TOS (Type of Service (HIB-IP 8002 only))

The HIB-IP 8002 modules support a configurable Type of Service value, which can be used by network routers to give priority to the IP packets from the HIB-IP 8002 unit. Contact your Network Administrator to see if TOS (alternately named QOS or DHCP) is active in your system and what is the value required to be used.

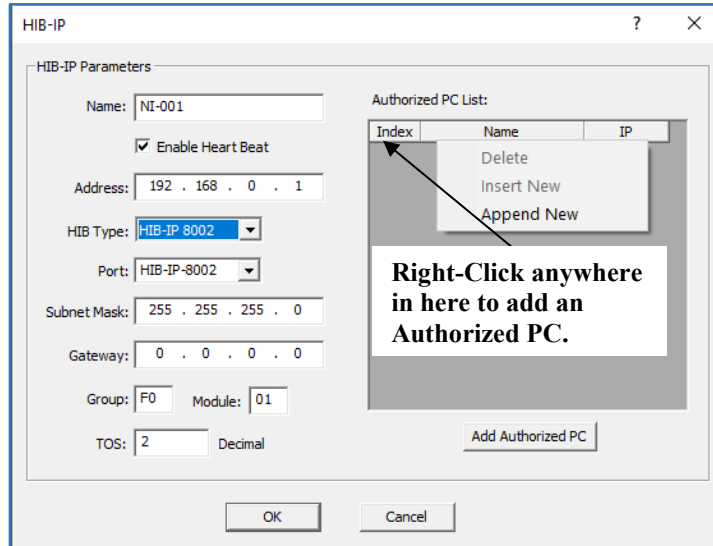
Value: 0-255

Default for MSI ASTRO® 25 systems: 2

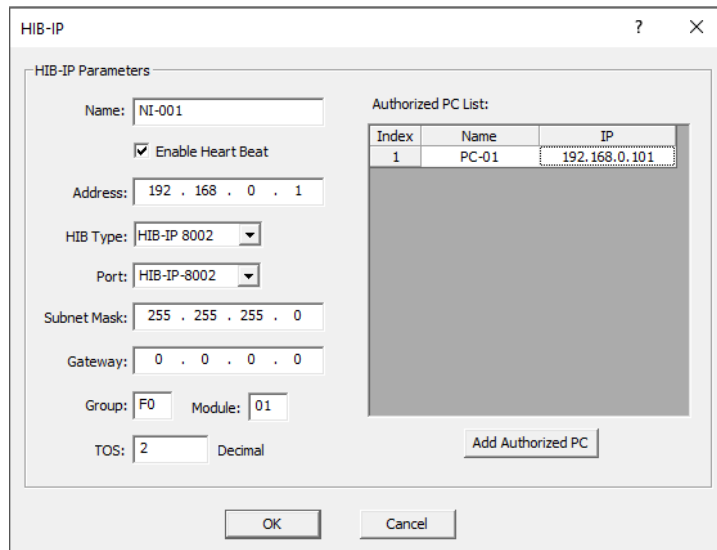
HIB-IP Authorized PCs

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

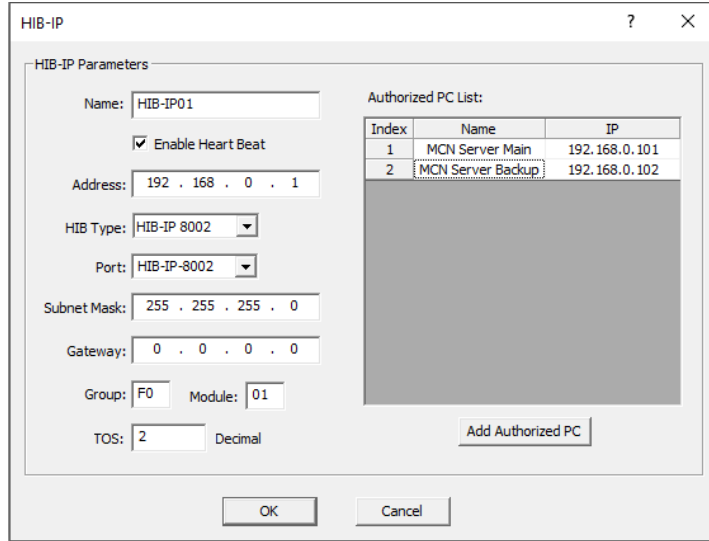
To add an Authorized PC, **Right-Click** on the Authorized PCs list to bring up the menu.



- Select **Append New**.



- An entry for a new PC will be added to the list.
- 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.

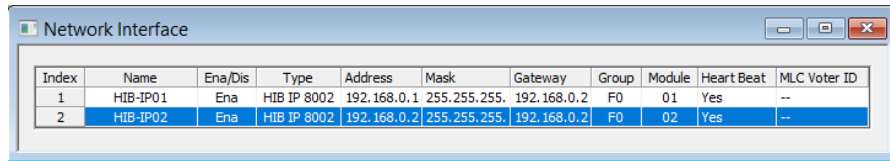


- Set up the parameters for the HIB-IP unit.
- When you are finished entering Authorized PCs, click the **OK** button.



Although you can enter multiple Authorized PCs in the HIB-IP configuration window, the HIB-IP can only connect to 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).

The standard MCN Server 8000 software supports (4) IP comparators and (1) HIB-IP. (Support for additional IP Comparators or HIB-IP Network Interfaces, may be added with additional license expansion options.)

Loading Configuration Data into HIB-IP family units

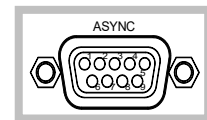
You must use MCNConfig program to download the parameters to the HIB-IP unit before you can use it.

- “HIB-IP” and “HIB-IP 8000” units are configured using a Serial COM port.
- “HIB-IP 8002” units are configured using a USB port.

1. Be sure all the HIB-IP and Authorized PC parameters have been entered into the PC system configuration files as described above.
2. IP traffic can interrupt programming or viewing the data on a HIB-IP unit. Remove IP traffic by disconnecting the Ethernet cable from the rear of the unit.

3. For HIB-IP and HIB-IP 8000 units:

Connect a Null Modem cable (CTI # 89-11314) between the PC and the Async Serial Programming connector on the HIB-IP. Use of incompatible cables may result in inconsistent or improper programming and viewing of HIB-IP data. See the HIB-IP manual for the cable pinouts.



4. For HIB-IP 8002 units:

Connect a standard USB A Male to B Male cable (CTI # 89-12368) between the PC and the USB connector on the front of the HIB-IP 8002 module.



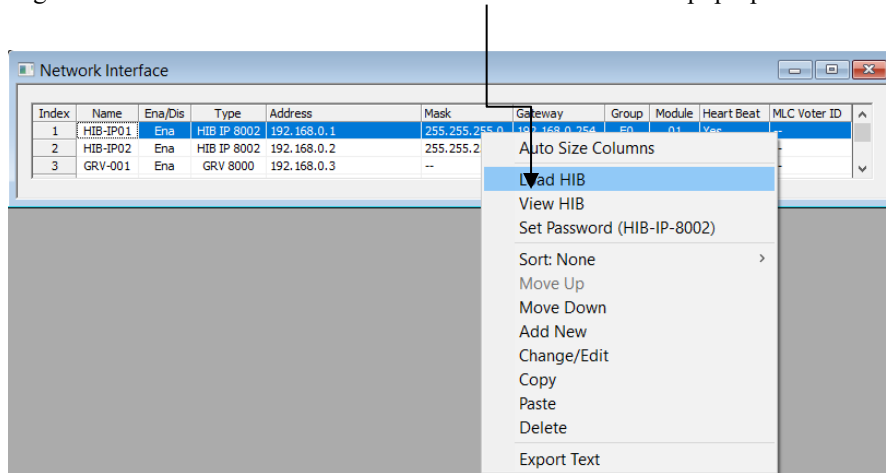
The first time you connect the PC to the USB port of a HIB-IP 8002, the USB Driver for the HIB-IP 8002 will need to be installed. You may need the MCN server 800 software CD for this. See **Appendix E: HIB-IP 8002 USB Driver Installation** UDP Port Settings.

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

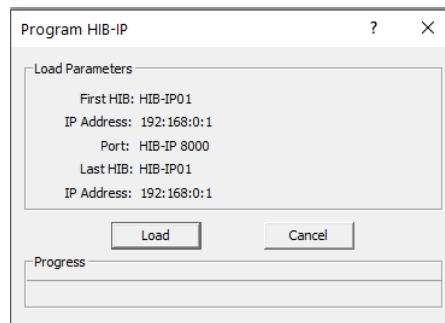
Right-Click here
on the HIB-IP

Index	Name	Ena/Dis	Type	Address	Mask	Gateway	Group	Module	Heart Beat	MLC Voter ID
1	HIB-IP01	Ena	HIB IP 8002	192.168.0.1	255.255.255.0	192.168.0.254	F0	01	Yes	--
2	HIB-IP02	Ena	HIB IP 8002	192.168.0.2	255.255.255.0	192.168.0.254	F0	02	Yes	--
3	GRV-001	Ena	GRV 8000	192.168.0.3	--	--	--	--	--	--

- Right-click on the desired unit and select “Load HIB” from the pop-up window.

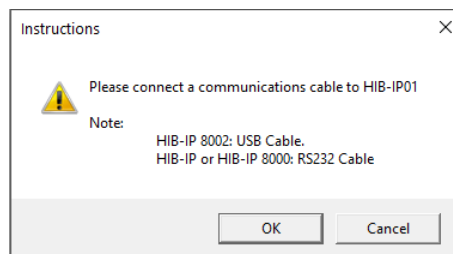


- From the Program HIB-IP window, click the “Load” button.



You can also read or verify the information in the HIB-IP by selecting the “View HIB” menu item from the previous pop-up window. This will read and display the configuration data within the HIB-IP unit.

- You will be instructed to connect the cable.

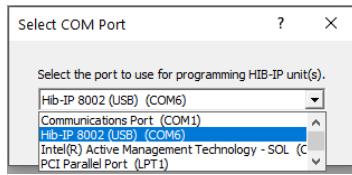


- After you have connected the cable, press the “OK” button.
- The program will then scan for COM Ports and HIB-IP 8002 USB Ports in your system.

HIB-IP and HIB-IP 8000 Units: Select the proper COM port.
HIB-IP 8000 Units: Select the proper HIB-IP Virtual COM Port.

The program may list all the serial COM ports in the system, whether or not you have a cable connected to a HIB-IP or HIB-IP 8000 unit. Make sure you choose the proper one.

11. If you are trying to configure a HIB-IP 8002 you should see a HIB-IP 8002 (USB) COM port:



(COM Port numbers may be different in your system):

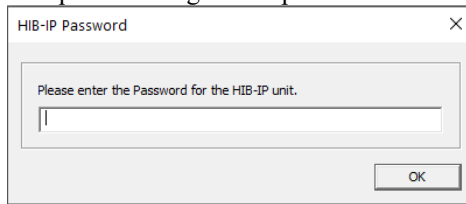
If you don't see the Virtual Com Port, you could have one of the following problems:

- HIB-IP 8002 is not connected
- HIB-IP 8002 USB Driver is not installed.

If the driver is not installed, see **Appendix E: HIB-IP 8002 USB Driver Installation** for details.

12. HIB-IP 8002 Only: Entering Password:

HIB-IP units require a configuration password to view or load the configuration.



Enter the password and hit "OK".

The factory default password can be found in the HIB-IP 8002 manual.

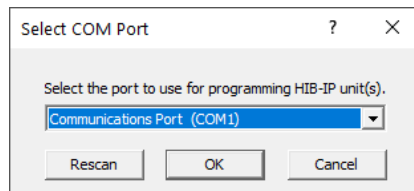
13. The unit will then be programmed.
14. Re-connect the Ethernet cable to the port on the rear of the unit.

HIB-IP 8002 Notes

The HIB-IP 8002 differs from the other HIB-IP family modules in multiple ways. It:

- Is configured using the USB port,
- Accepts power from the USB and can be programmed without external power,
- Requires a USB driver to be installed, for its configuration,
- Requires a password for loading and viewing of its configuration,
- Resets after it is re-configured.

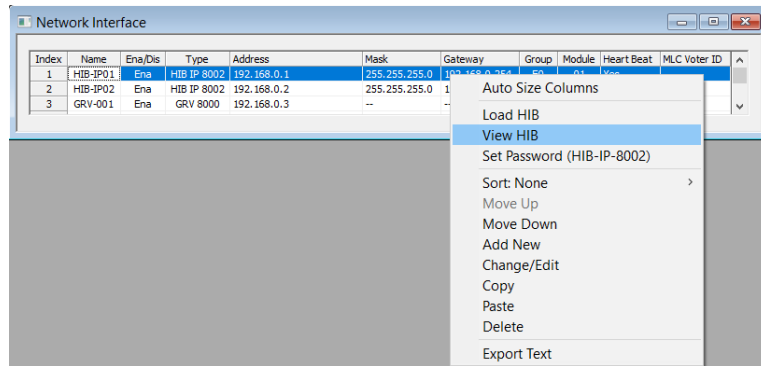
When the HIB-IP 8002-unit resets, the USB port will cycle offline and back on again. This could take up to 10 seconds. The MCN Config program should detect the Virtual Com port after the unit resets. If it doesn't, click the "Rescan" button in the Select Com Port window.



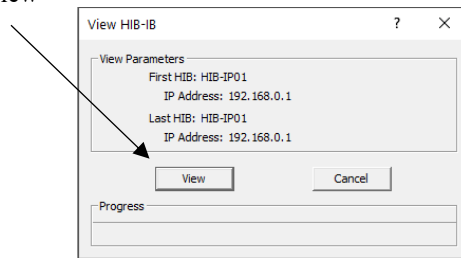
Viewing Configuration Data in HIB-IP family units

You can view the configuration data in the HIB-IP units with the MCNConfig program.

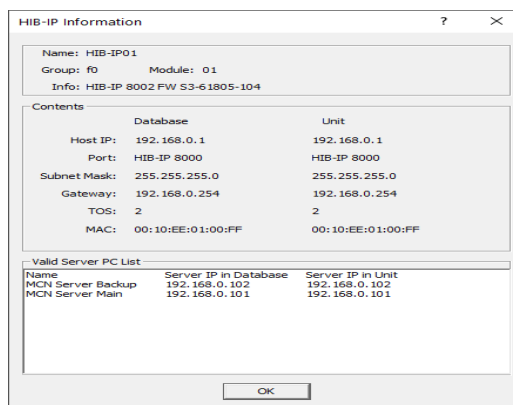
1. Connect the serial COM port cable or USB cable to the device as per the Loading section above.
2. From the Network Interface window, Right-Click on the desired unit. Select View HIB from the menu.



3. Select View



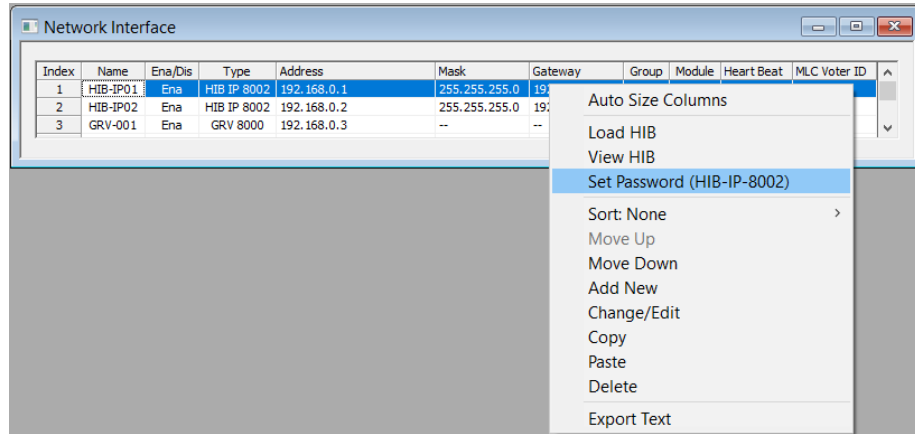
4. Connect the Select the COM or Virtual COM port as in the Loading section.
5. The HIB-IP Information window will be displayed. The system configuration file information is on the left. The data in the HIB-IP unit is on the right.



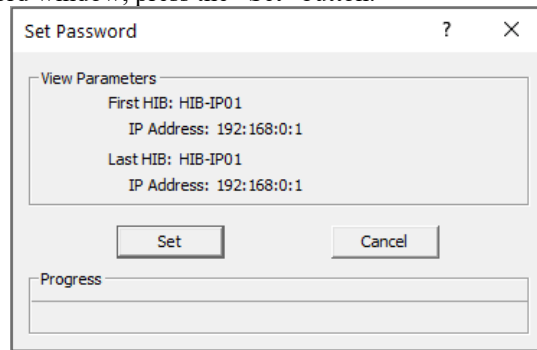
Password Setup on the HIB-IP 8002 unit

To set the password on the HIB-IP 8002 unit:

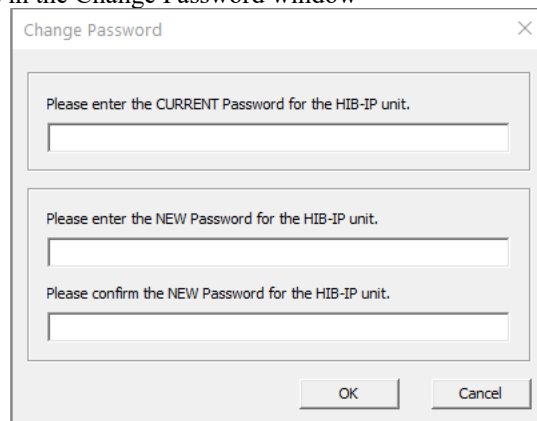
- a. Connect the USB cable to the device as per the Loading section above.
- b. From the Network Interface window, Right-Click on the desired unit. Select “View HIB” from the menu.



- c. Select Set Password (HIB-IP 8002):
- d. In the Set Password window, press the “Set” button.



- e. Select the Virtual COM port as in the Loading section.
- f. Fill out the fields in the Change Password window

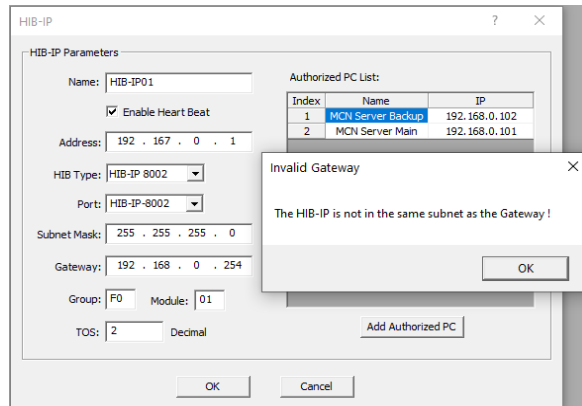


Click ‘OK.’

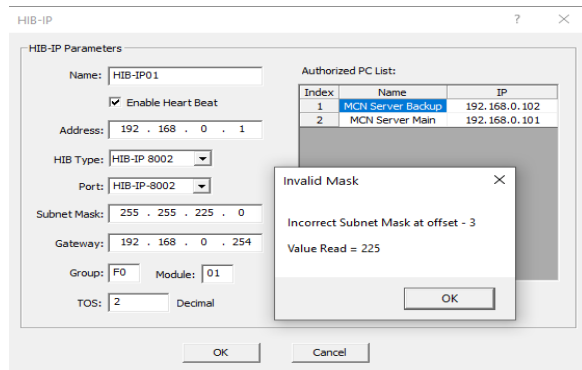
Follow the appropriate password guidelines for your system or site.

Errors when configuring HIB-IP 8002 NI

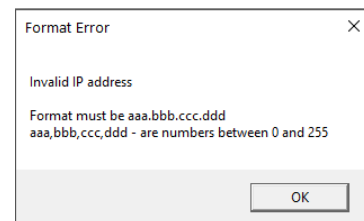
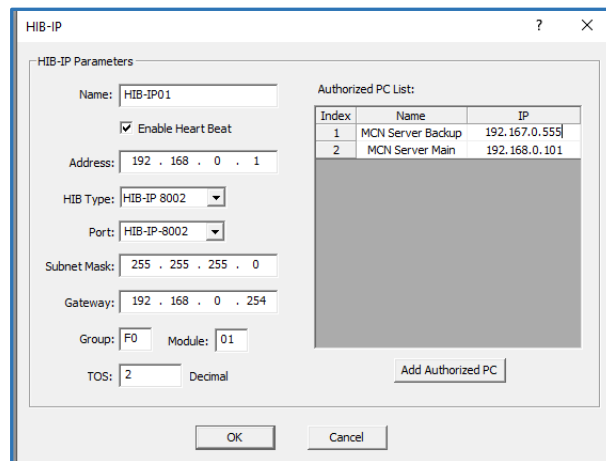
Wrong Gateway or HIB-IP 8002 Address



Wrong Subnet Mask



Invalid IP Address



Configuring Hardware Resources

After you have added the appropriate Network Interfaces, go to the Hardware resource window to add, and edit the data for various ‘Hardware Modules.’

To get to the Hardware window, select **View / Hardware** from the program menu.

The Hardware window may show a list of IP Comparators and/or legacy MCN hardware I/O modules depending on what has been configured for your system.

Index	NI	Ena/Dis	IP	Group	Module	Type	Banks	Location	Name	Channel-1	Channel-2	Retries	TX Timer	Rpt Timer
1	GRV-001	--	--	--	--	GRV 8000	1		GRV 8000_1	None	--	--	--	--
2	GCM-001	--	--	--	--	GCM 8000	1		GCM 8000_1	None	--	--	--	--
3	MLC-001	--	--	--	--	MLC 8000	1		MLC 8000_1	None	--	--	--	--
4	MMC-001	--	--	--	--	Mixed Mode	1		Mixed Mode_1	None	--	--	--	--
5	HIB-IP01	--	--	00	1	AIB	1		AIB_1	None	--	--	4	128
6	HIB-IP01	--	--	00	2	CIB	1		CIB_1	None	--	--	4	128
7	HIB-IP01	--	--	00	3	GPIO-1208C/L	1		GPIO-1208C/L_1	None	--	--	4	128

From this window, you can:

- Add legacy MCN hardware I/O modules (CIB, AIB, GPIO modules, etc.)
- Edit the configuration data for either IP comparators or the legacy MCN hardware modules.

The Hardware Resource Window includes the following fields:

NI

Network Interface to use for this module.

IP Comparators: This is a fixed field derived from the Network Interface window.

Legacy MCN Modules: This drop-down field lets you select from the defined Network Interfaces for this system (PCLTA, HIB-232, or HIB-IP) to use for this MCN hardware module.

Ena/Dis

Indication of Enabled Network Interface element NI (--) or Disabled NI (Dis in NI)

Group

IP Comparators: Not applicable

Legacy MCN Modules: MCN Group Number for this module (Hex value 00-FE)
This corresponds to the Group switch setting on the module.

Module

IP Comparators: Not applicable

Legacy MCN Modules: MCN Module Number for this module (Hex value 0-F).
This corresponds to the Module switch setting on the module.

Type

Module Type from the following table:

Module Type	Description	Receivers or I/O Blocks
GRV 8000	GRV 8000 Analog or Digital Comparator	1 Comparator Status 96 Receivers
GCM 8000	GCM 8000 Digital Comparator in FDMA Mode	64 Receivers
GCM 8000 TDMA	GCM 8000 Digital Comparator in TDMA Mode	32 Receivers (BRs) on each of its 2 Time Slots.
MLC 8000	MLC 8000 Analog Comparator	64 Receivers
Mixed Mode	Mixed Mode Comparator system (MLC & GCM)	32 Receivers
CIB	Comparator Interface	8
AIB	ASTRO-TAC™ Comparator Interface	8, 16, 24, 32, 40, 48, 56, 64 (Depending on Bank setting)
GPIO	General Purpose I/O Module	8, 12, 16, 20, or 24, depending on exact module type
IOB Std (4 bits each)	I/O Controller for relays	8 I/O Blocks
IOB 2 Bit (2 bits each)	I/O Controller for relays	16 I/O Blocks
IOB 1 Bit (1 bit each)	I/O Controller for relays	32 Input Blocks

Other Device Types may be added in newer software versions. Additionally, CTI may develop custom templates for devices for special applications. Those devices would be included in special Template files to be installed in the Program folder. Filenames are of the form:

Template.CustomName.RcdDev2 and

Template.CustomName.RcdDTB.

Instructions will be sent with the custom template files.

Banks

For AIB modules, this indicates the 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 for the number of banks is provided for AIB modules.

Location

Typically refers to site name for this particular module.

Free format text field for customer use.

This field is not required for program operation.

May be useful with error logging.

Name

Typically used to identify a particular module.

Free format text field for customer use.

This field is not required for program operation.

Used in error logging.

Channel -1

The radio channel associated with this module.

Drop-down field.

Select one of the Channels from the Channel resource list.

May be useful with error logging.

Channel -2

The channel associated with Timeslot 2 for GCM 8000 Comparators in TDMA mode.

Drop-down field.

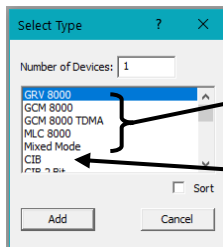
Select one of the Channels from the Channel resource lists.

Can be used in error logging. Use a different channel than the main channel to differentiate between Timeslots 1 & 2.



Adding a Hardware Module

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



The first five (5) entries are IP comparators. You can select and add any module from here too. The program will then create the necessary entries for both the Network Interface and the Hardware at the same time.

The legacy MCN modules appear in the list below the IP comparators.

- Select a **Hardware Type** and click ‘Add.’

A new hardware module will be presented at the bottom of the list; and when applicable as with legacy modules, will display the next in sequence Group & Module number.

Index	NI	Ena/Dis	IP	Group	Module	Type	Banks	Location	Name	Channel-1	Channel-2	Retries	TX Timer	Rpt Timer
2	GCM-001	--	--	--	--	GCM 8000	1		GCM 8000_1	None	--	--	--	--
3	MLC-001	--	--	--	--	MLC 8000	1		MLC 8000_1	None	--	--	--	--
4	MMC-001	--	--	--	--	Mixed Mode	1		Mixed Mode_1	None	--	--	--	--
5	HIB-IP01	--	--	00	1	AIB	1		AIB_1	None	--	4	128	128
6	HIB-IP01	--	--	00	2	CIB	1		CIB_1	None	--	4	128	128
7	HIB-IP01	--	--	00	3	GPIO-1208C/L	1		GPIO-1208C/L_1	None	--	4	128	128
8	HIB-IP01	--	--	00	4	CIB	1		CIB_2	None	--	4	128	128

For legacy MCN modules, you would select the appropriate option for your module if you have more than one legacy Network Interface.



Note: For AIB legacy modules, remember to enter the correct number of banks.

- Enter the Location and Name.
Select the channel from the drop--down menu, to which the module will be associated.

NI	Group	Module	Type	Banks	Location	Name	Channel-1	Channel-2	Retries
NI-02	--	--	GCM 8000 TDMA	1		GCM 8000 TDMA_1	None	None	--
NI-03	10	1	CIB	1		CIB_1	None	N/A	
NI-03	10	2	GPIO-1208C/L	1		GPIO-1208C/L_1	None	N/A	
NI-04	--	--	GCM 8000	1		GCM 8000_1	None	N/A	--

Note: For GCM 8000 Comparators in TDMA mode, you also be able to associate a Channel name for channel 2 (Timeslot 2)

Index	NI	Group	Module	Type	Banks	Location	Name	Channel-1	Channel-2	Retries	TX Time
1	NI-02	--	--	GCM 8000 TDMA	1		GCM 8000 TDMA_1	None	None	--	--
2	NI-03	10	1	CIB	1		CIB_1	None	None	4	
3	NI-03	10	2	GPIO-1208C/L	1		GPIO-1208C/L_1	None	None	4	
4	NI-04	--	--	GCM 8000	1		GCM 8000_1	None	None	--	--



If you don't see any channels to select from the channel list? See **Adding a Channel** on page 95 for instructions on how to create channels.

Legacy MCN Modules - 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 on page 68 for more details.

Channels Resource Window - Configuration

The Channels Window contains a list of radio channels used in the system. Channels can be used to group multiple hardware modules. The Channel name can also be included in error log lines.

Index	Channel	WD Multiplier
1	Police East	1
2	Police West	1
3	Fire	1

Each channel has the following fields:

Channel

Channel name. (e.g.: Fire East, Countywide, Command, etc.) Free format text field. Used to make Identification and associations in error logging.



For GCM 8000 Comparators in FDMA mode, make two channel names: one for each timeslot. WD Multiplier

Watchdog Time Multiplier. Drop-down field: Select a multiplier value from the list. The Watch Dog Multiplier is used only for the System Performance Toolkit Option. This is a licensed feature. It is not currently supported by the MCN Server 8000 system.

Adding a Channel

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



Index	Channel	WD Multiplier
1	Police East	1
2	Police West	1
3	Fire	1
4		1

- Enter the Channel Name.

Index	Channel	WD Multiplier
1	Police East	1
2	Police West	1
3	Fire	1
4	Admin	1

Receivers Resource Window - Configuration

When you build, or modify your system, use the Receivers window to enter or edit:

- ✓ The site name for each of the receivers in the system.
- ✓ Input/Output point names for I/O modules.
- ✓ Additional other useful information for receivers or I/O points such as location, T1 or leased line information, site number.
- ✓ Select the Display Table to use.
- ✓ Advanced systems: Select Subcomparator devices.
- ✓ Future System Performance Toolkit: Enable/disable Watchdog Alarms
- ✓ Output Redirect Option: Link this input to an output.

This window is based on the modules defined in the Hardware Window.

IP Comparators in the Receiver Window:

When IP Comparators are added to the system configuration as described in the previous sections, the Name field is populated with the names "RX-0" through "RX-64" as shown below.

Index	NI	Ena/Dis	GRP:MOD	Type	Hardware Name	Channel	RX	RX Sort	MLC Port ID	Name	Description	WD Alarm	Display Table	Drives Output/Macro Group	Member of Macro Group
333	MLC-003	Ena	--	MLC 8000	MLC 8000_3	PD South	0		Unused	RX-0	MLC 8000	No	MLC		
334	MLC-003	Ena	--	MLC 8000	MLC 8000_3	PD South	1		Unused	RX-1	MLC 8000	No	MLC		
335	MLC-003	Ena	--	MLC 8000	MLC 8000_3	PD South	2		Unused	RX-2	MLC 8000	No	MLC		
336	MLC-003	Ena	--	MLC 8000	MLC 8000_3	PD South	3		Unused	RX-3	MLC 8000	No	MLC		
337	MLC-003	Ena	--	MLC 8000	MLC 8000_3	PD South	4		Unused	RX-4	MLC 8000	No	MLC		
338	MLC-003	Ena	--	MLC 8000	MLC 8000_3	PD South	5		Unused	RX-5	MLC 8000	No	MLC		
339	MLC-003	Ena	--	MLC 8000	MLC 8000_3	PD South	6		Unused	RX-6	MLC 8000	No	MLC		
340	MLC-003	Ena	--	MLC 8000	MLC 8000_3	PD South	7		Unused	RX-7	MLC 8000	No	MLC		
341	MLC-003	Ena	--	MLC 8000	MLC 8000_3	PD South	8		Unused	RX-8	MLC 8000	No	MLC		
342	MLC-003	Ena	--	MLC 8000	MLC 8000_3	PD South	9		Unused	RX-9	MLC 8000	No	MLC		
343	MLC-003	Ena	--	MLC 8000	MLC 8000_3	PD South	10		Unused	RX-10	MLC 8000	No	MLC		
344	MLC-003	Ena	--	MLC 8000	MLC 8000_3	PD South	11		Unused	RX-11	MLC 8000	No	MLC		
345	MLC-003	Ena	--	MLC 8000	MLC 8000_3	PD South	12		Unused	RX-12	MLC 8000	No	MLC		
346	MLC-003	Ena	--	MLC 8000	MLC 8000_3	PD South	13		Unused	RX-13	MLC 8000	No	MLC		
347	MLC-003	Ena	--	MLC 8000	MLC 8000_3	PD South	14		Unused	RX-14	MLC 8000	No	MLC		
348	MLC-003	Ena	--	MLC 8000	MLC 8000_3	PD South	15		Unused	RX-15	MLC 8000	No	MLC		

GCM 8000 Comparator Shortcut:

If you would like to get your system configured quickly, you can build a screen with the default receiver names and then change the names later. To do this, jump ahead to the **BUILDING SCREENS -- Display Windows** section on page 108 to start building display screens.



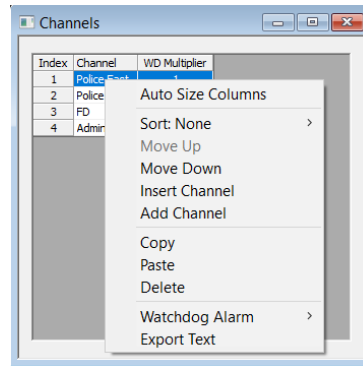
Caution: MLC 8000 Analog Comparator & Mixed Mode System:

DON'T JUMP AHEAD if you have MLC 8000 Analog Comparators or Mixed Mode systems. You must enter the **MLC ID** for each active receiver on those systems.

Channel Window Context Sensitive (Right Click) Menu

The ‘**Channel Window**’ is used for creating and managing the list of channels in a monitored radio system. This helps organize communication and makes it easier to identify traffic by clearly showing which channels are active during monitoring. Here’s how to view the configuration options:

Right-click on the Channel list, and the following menu appears:



Auto Size Columns: adjusts all columns width automatically, based on maximum text length per column. It is used in windows that are list-based.

Sort: organizes the channels alphabetically.

Move Up: will move selected row up.

Move Down: will move selected row down.

Insert Channel: will insert a new channel in between.

Add Channel: will add a new channel at the end of the list.

Delete: will erase a channel.

Copy: will record the current selection to the clipboard.

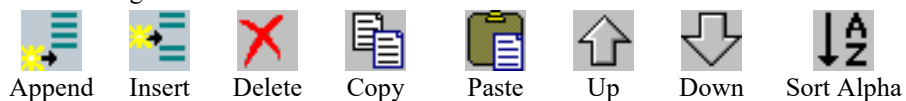
Paste: will write the clipboard contents to a specified location.

Watch Dog Alarm: enables or Disable Watchdog flags for all receivers, and points, in the channel. (Used only with the System Performance Toolkit ‘SPT’ Option.)

Export Text: will export a text file copy of the contents for this window.

Channel Window Toolbar Buttons

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



See *Window Menu* on page 67 for more details.



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.

Receiver Window Fields

Entries in the Receivers Window have the fields shown below. Some fields may not be visible in the window depending on (a) the options licensed in the system and (b) the settings in the **View** menu item.

NI

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

Ena/Dis

Indication of Enabled Network Interface element NI (--) or Disabled NI (Dis in NI)

Grp:Mod

The MCN Group & Module number for legacy MCN devices. 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 IP Comparator Type (GCM 8000, MLC 8000 Analog Comparator, Mixed Mode) or legacy MCN 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 of the receiver. This is a sequential number for a particular receiver within its module or comparator. Read-only field. The maximum receiver number in a module is based on the Bank number in the Hardware list.

For GPIO modules, this is a point number within the module.

Rx Sort

(Added in V9.02.) This is an additional field that can be used for sorting the entries Receiver I/O window. It is helpful especially with GRV 8000 and GCM 8000 comparators when the desired receiver display order on the screen does not match the Subsite ID. The receivers can then be sorted by Channel and Rx Sort fields to make it easier to copy the receivers in the desired order to the Display window.

MLC ID (MLC 8000 Analog Comparators and Mixed Mode Systems only)

This is the identifier for the MLC 8000 Analog Comparator port associated with this receiver or BR. **It must be entered for all active receivers in these types of systems.**

This field is found in the MMC_Cfg.csv file generated by the MLC 8000 Analog Comparator CT program. See **Connecting to the MLC 8000 Analog IP Comparator** section starting on page **184** for details.

Name

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

Description

Free format text field for general customer use. Customers typically 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. The Description field can be used for additional information in error logging detail lines.



You can also cut & paste descriptions from Excel. See **Using the Clipboard from other Applications** on Page **140** for more details.

Tag-1

This is a free-format user defined field. It is used with the TPCI option. You can use it as a note field if you are not using the TPCI Option.

Tag-2

This is just another free-format user defined field. It is used with the TPCI option. You can use it as a note field if you are not using the TPCI Option.

SubDevice

This is an advanced field and is normally not used on standard MCN Server 8000 systems.

This field will not be present on the screen unless the "Enable Sub Comparators" is enabled under the View Menu. This field indicates if this receiver or I/O point feeds a sub-device. This can be used for passing a Master Vote or a Main/Standby select to other devices. See the **Configuring Master-Sub Comparator Systems** section on page **250** for more details.

WD-Alarm (for System Performance Toolkit -- Licensed Option)

This is used with an upcoming System Performance Toolkit (SPT) option. It can be enabled for each receiver by selecting yes in the Receiver Window under WD Alarm.

It allows the SPT to generate an alarm if No vote or No Receive is detected.

Display Table (Default Display Table Selection)

The Display Table field in this window holds the default mapping table to use for this receiver (or alarm point). The Display Table determines what status text is displayed for different combinations of input bits from the hardware modules.

Comparator Display Tables

For comparator applications, the MCN Config Server program will automatically pre-populate this field based upon the Comparator Module that is used:

Module	Default Display Table	Optional Display Table	
CIB or AIB	Comparator	None	
GCM 8000	GCM 8000	GCM LV	
MLC 8000	MLC 8000	MLC LV	MLC Tech
Mixed Mode	Mixed Mode	MM LV	MM Tech
GRV 8000	GRV 8000	GRV LV	GRV Tech

The IP comparators' Display Table with "LV" indicates Last Vote. They will display the last voted receiver when the system is idle.

The "Tech" Display tables have more details of interest to a technician.

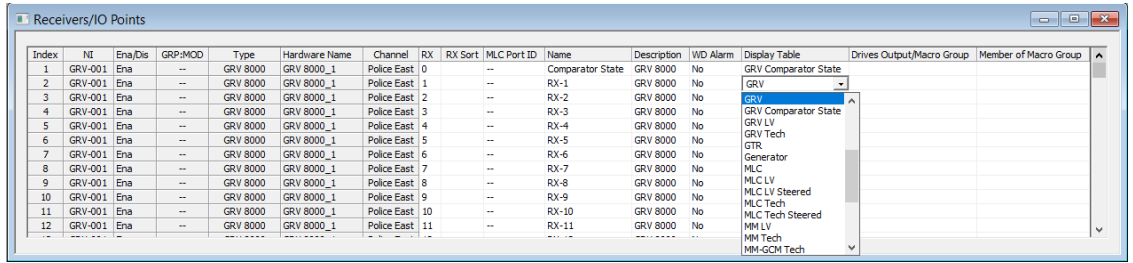
- The MLC Tech Display Table has signal quality bars that are shown on Receive and Vote activity.
- The MM Tech Display Table has more details on the operation of the individual comparators that make up the Mixed Mode system.
- The GRV Tech Display Table has signal quality bars that are shown on Receive and Vote activity.

The Display Table selected in the Receivers window will be the default Display Table that will be used when the receiver is placed on a screen. It is recommended that you select the non-Tech Display tables as the default. You can then make additional Tech Screens (Display Windows) and use the Display Table Override procedure to select the Tech Display Table for just the Tech screens. See *Using Alternate Display Tables – Override Display Tables* page 137 for details.

All the above Display Tables map the inputs from the comparators to the standard "Vote", "Rx", "Dis", and "Fail" statuses. For more information on the states shown in the Display Tables for IP comparators, see the appropriate sections:

- **GCM 8000 (FDMA) Conventional & Trunking Comparator. (p 174)**
- **GCM 8000 TDMA Receiver List & Display Tables (p 182)**
- **GRV Comparator State Display Table (p 169)**
- **GRV Tech Display Table (p 171)**
- **MLC 8000 and MLC LV Display Tables (p 193) or**
- **Mixed Mode Status Display (p 196).**

You can change the default Display Table in the Receivers window by selecting different options from the drop-down list.

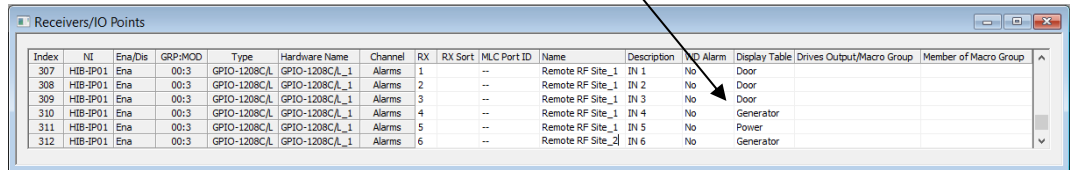


Caution:

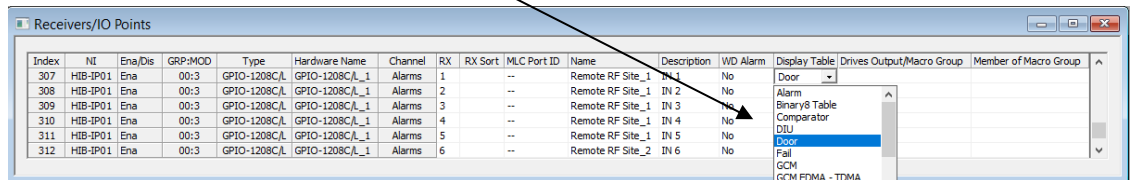
Be sure to select an appropriate Display Table to use. Selecting an inappropriate Display Table will result in nonsensical status displays.

I/O Display Tables

If you have any Input / Output groups that can be 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 as shown in the next screen shot.



Below is a drop-down field. Select one of the Displays from the drop-down list.



Alarms and Display Tables

You can configure "sticky" alarms in the system through the Display Tables. Alarms will be displayed in the Alarm tab of the System events (Log) Window. They will remain in that window until acknowledged and reset. Alarms can also generate sounds when they go into an active state. See the **Alarm Display – Log Window / Alarms Tab** section on page 208 for details on Alarm operations and the **States Tab** section starting on page 240 for instructions on how to enable alarms in the Display Tables.

Customizing Display Tables

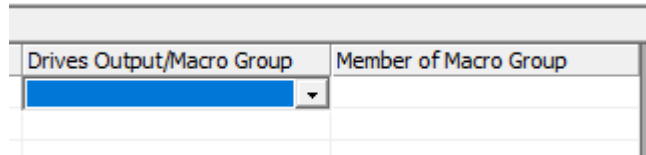
If you need custom Display Tables, or need to edit the standard Display tables, see the **Working with Display Tables** section on page 237 for an in-depth discussion.

Drives Output/Macro Group (for Triggered Outputs & Group Macros)

(Added in V9.02.)

This is an advanced field that is used with the following two licensed options:

- Triggered Outputs and
- Group Macros.

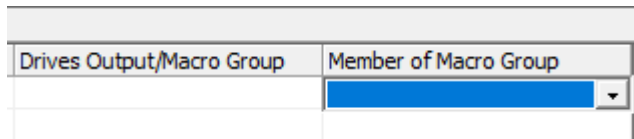


This field is used for a Receiver or I/O that triggers a target Output action or a Group Macro action. Use the drop-down list to link to a Triggered Output or a Macro Group as appropriate. See the **Configuring Triggered Outputs** or **Configuring Triggered Outputs** or **Configuring Group Macros** section in this manual for details.

Member of Macro Group

(Added in V9.02.)

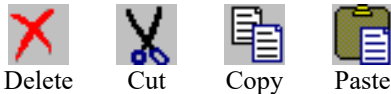
This is another advanced field that is used with the Group Macro licensed options.



This field is used for a receiver or I/O that is a member of a Macro Group and is used to define which Macro Group it belongs to. Use the drop-down list to select the appropriate Macro Group. See the **Configuring Group Macros** section in this manual for details.

Receiver Window Toolbar Buttons

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

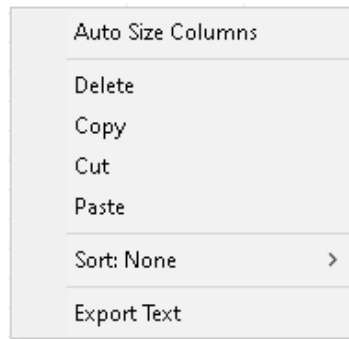


See **Toolbars** on page 68 for more details.

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.

Receiver Window Context Sensitive (Right Click) Menu

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

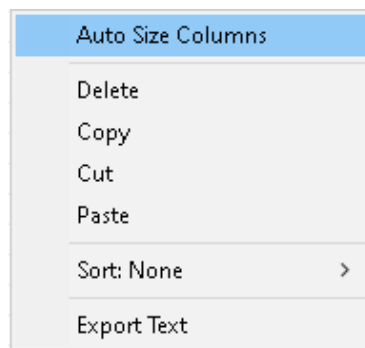


Auto Size Columns

This feature is new with the V9.02 and later revision of the MCN Server 8000, it will allow adjusting of all column's width automatically, based on maximum text length per column. It is used in windows that are list-based.

It works for the following resource windows:

- Network Interface (NI)
- Hardware
- Receiver I/O
- Channels
- Display Tables
- Watchdog States and Macro Groups.



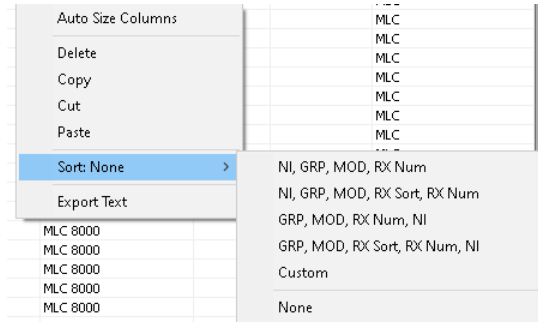
If desired, individual column size can be adjusted manually.

Sort Function

This feature is new with the V9.02 and later revision of the MCN Server 8000, it will allow the sorting of entries in a list by pre-defined settings or a customized sort order.

It works for the following list-based resource windows:

- Network Interface (NI)
- Hardware
- Receiver I/O
- Channels.



Pre-Defined Sort orders

NI, GRP, MOD, RX Num

This is the standard order that the program uses.

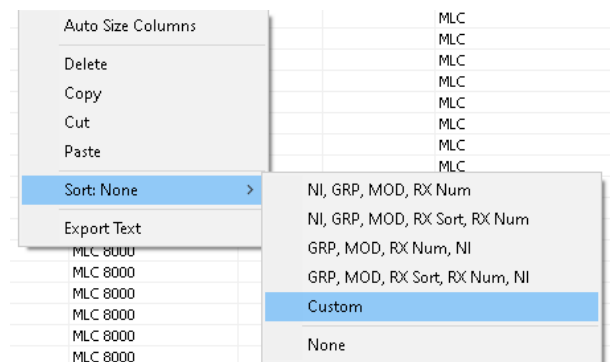
NI, Grp, MOD, Rx Sort, RX Num

This can be used to sort based upon the RX Sort field within a comparator.

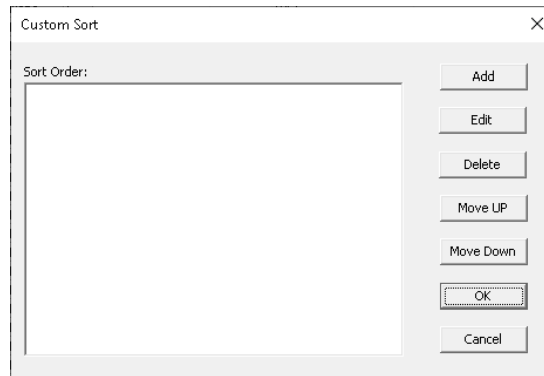
In IP comparators, the GRP and MOD fields are “**don’t care.**”

Custom Sort

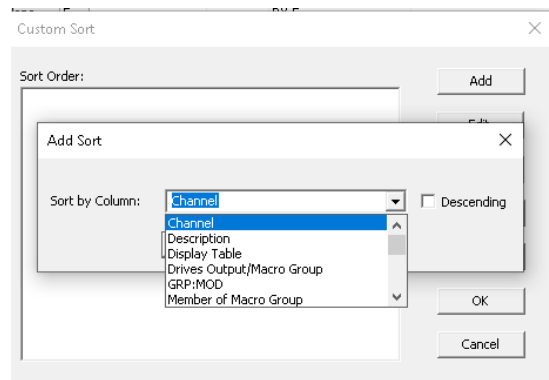
1. To run a Custom Sort on the current window, select **Sort / Custom** from the drop-down menu as shown:



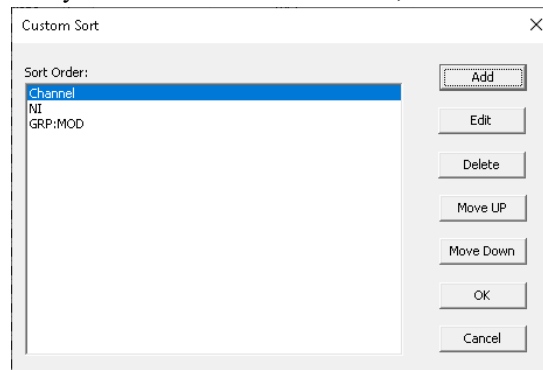
2. If a Custom Sort has already been used, the last Custom Sort will be displayed. The first time that Custom Sort is used, a blank Custom Sort will be opened as shown below.



3. Select the fields to sort on in the order that you want them to be evaluated. They are normally sorted in ascending order. Click the Descending checkbox if you want a field to be sorted in reverse order.



4. Once you have the sort fields entered, hit the OK button to sort.



Display Windows (Status Screens)

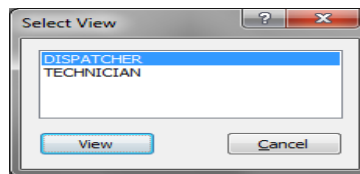
To have a functional system, a Display Window must be created and configured. Display Windows are the screens that will be used to display the system status in the MCN Server and Client programs.



You **must** build at least one Display Window in order for the MCN Server and Client programs to display your system.

- a. Each screen can have multiple rows and columns for the Receiver and I/O points.
- b. Each status screen can contain multiple Tabs and multiple channels.
- c. Multiple Screens can be defined within the Display window for the system.

If there are multiple screens built within the Display window, you will have to click the “**View**” tab and select “**Display Window**” and choose which specific screen you want to view.



The following is an example of the Display Windows configurability:

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

Fire	Status	EMS	Status	Hilltop WT Alarms	Status
Hilltop WT	Off-Line	Hilltop WT	Off-Line	Generator	Off-Line
Ferrwood	Off-Line	Ferrwood	Off-Line	Door	Off-Line
Anderson Twp	Off-Line	Anderson Twp	Off-Line	AC Power	Off-Line
West High	Off-Line	West High	Off-Line	Battery Charger	Off-Line
Mt Airy	Off-Line	Mt Airy	Off-Line	DC Power	Off-Line
Harrison	Off-Line	Harrison	Off-Line	Microwave	Off-Line
Airport	Off-Line	Airport	Off-Line		
		Cheviot	Off-Line		

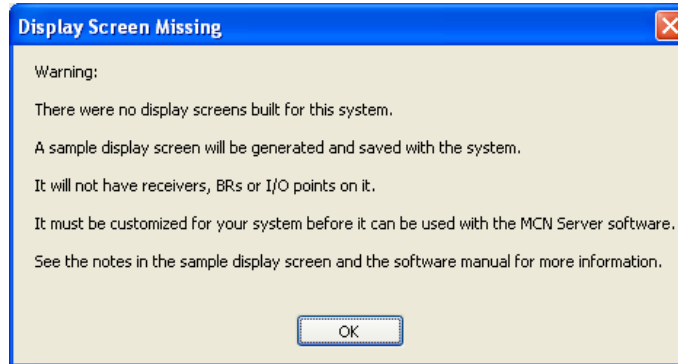
Typical Technician Display Window

East	West	Detectives
Comm Center	Off-Line	
Ferrwood	Off-Line	
Anderson Twp	Off-Line	
Milford	Off-Line	
Clermont	Off-Line	
Marionmont	Off-Line	
3 Mile WT	Off-Line	
West High	Off-Line	
Mt Airy	Off-Line	
Englewood	Off-Line	
Hammond Twp	Off-Line	
Harrison	Off-Line	
Airport	Off-Line	
Wassamata U	Off-Line	
PS 104	Off-Line	

Typical Dispatcher Display Window

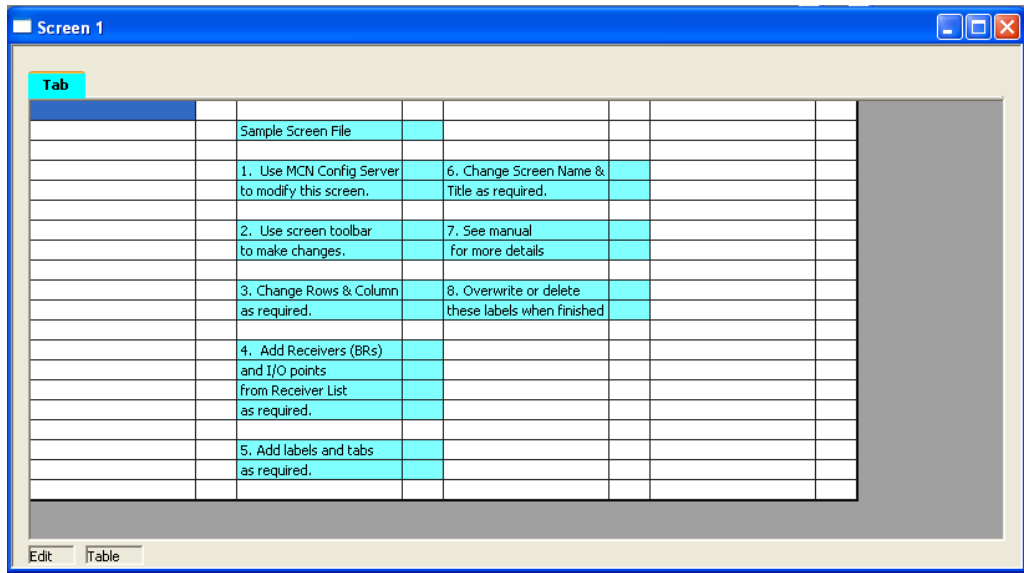
Default Display Window

If you forget to build a Display Window for your system, the MCN Config Server software will generate a warning.



Missing Display Window Warning

The program will also generate a default Display Window. However, this will be unconfigured without any receivers on it but will prompt you with instructions about what needs to be done as shown below.



Default Display Screen

BUILDING SCREENS -- 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

Display Window Changes starting in V9.2

Changes have been made to software Version 9.2 to enhance the flexibility of Display Windows:

New Per-Tab Settings

Prior to Version 9.2, the following parameters were set on a per-display Window basis and applied to all tabs in the Display Window:

- Numbers of Rows & Columns in the grid
- Column Setting (Linked / Unlinked Columns, Column Width and Hidden Columns)

In Version 9.2, these settings are set on a per-tab basis.

Column Settings now saved with system configuration files

Prior to Version 9.2, the MCN Config program did not have the ability to show an accurate representation of the layout in MCN Server or ClientRcd. As a result, the screen column settings were done separately in the MCN Config, MCN Server and ClientRcd programs. The parameters were saved in the HKCU settings on those PCs. Column settings could not be passed from Config to Server or from Server to Client. Client settings could be manually passed to other Clients by exporting the appropriate registry settings and importing them to the other Clients.

Starting in Version 9.2, the MCN Config software has the ability to display an accurate representation of the layout in MCN Server and Client RCD (using the **Layout** and **Preview** modes). This allows a user to set the desired layout in MCN Config. The settings are saved in the new RedFmt configuration files. The MCN Server software uses those settings for its local screen configuration and will also pass the settings to the Client PCs for their use.

For accurate results, the screen resolution and multiplication factor must be the same between the MCN Config PC, the Server PC, and the Client PCs.

If tweaking needs to be done on the Server or Clients, it can still be done locally and will override the settings saved by the MCN Config program.

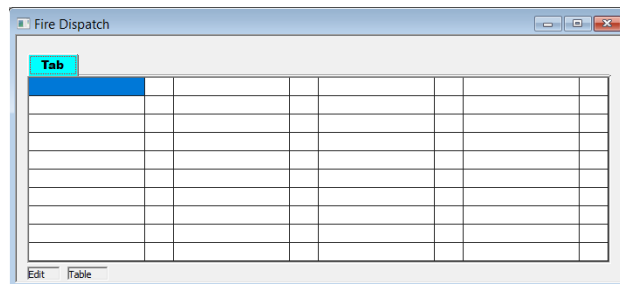
Adding a New Display Window



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

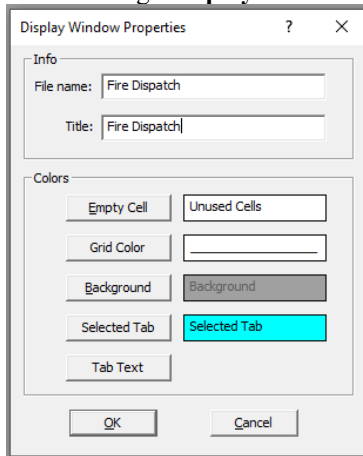
Change the File Name and Title. Customize default colors if desired.

A blank Display Window with one Tab will appear.



Renaming a Screen (Display Window Properties)

You can rename existing screens later if desired by opening the specific screen, clicking the “Edit” tab and selecting “Display Window Properties.”



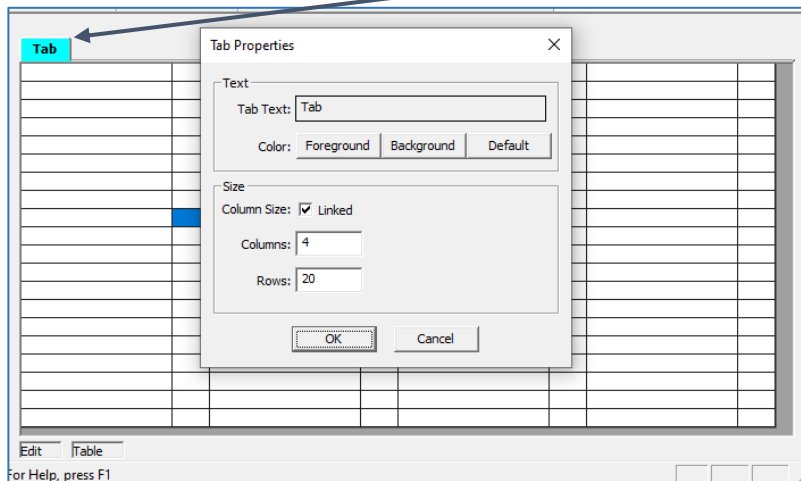
Tab Properties – Including number of Rows & Columns

Starting in Version 9.2 of the program, the number of Rows and Columns are now configured in the Tab Properties window.

The Tab Properties window has the configuration settings for:

- Tab Name & Color
- Linked or Unlinked Columns and
- Number of Rows & Columns

To open the Tab Properties window, double-click on the desired tab:



Edit the settings as appropriate and hit the **OK** button.

Linked Columns

The "Linked Columns" setting governs how the columns behave in tabular or table format. There are two modes of operation for the Linked Columns: **Linked** and **Independent**.

With the Linked Columns setting checked/enabled, Linked Mode is active:

- All columns designated as "Name columns" (odd columns) will automatically adjust to have the same width.
- All columns designated as "Status columns" (even columns) will automatically adjust to have the same width.
- Adjusting the width of any one Name column will automatically adjust the widths of all Name columns to be the same.
- Similarly, adjusting the width of any one Status column will adjust the widths of all Status columns to be the same.

When the Linked Columns setting is unchecked/disabled, Independent Mode active:

- You can adjust the width of each column independently of the others.
- There is no synchronization of widths between columns. Each column's width can be customized individually based on your preferences or requirements.

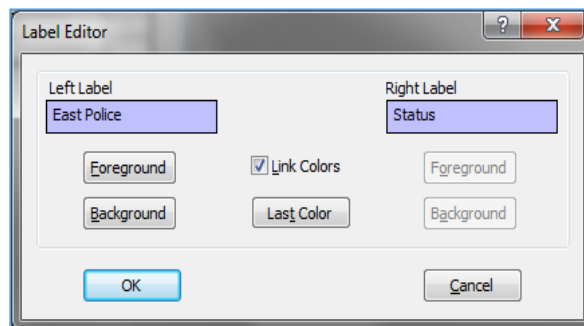
Adding Labels to the Display Window

Labels are used to identify and differentiate between multiple channels, if displayed in one tab.



Add a new Label to the Display Window with the **Add Label** button.

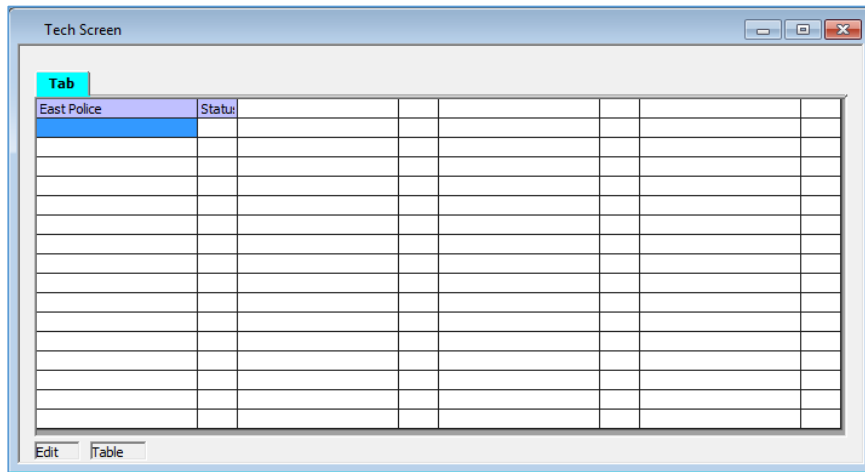
In the Label Editor Dialog Box, enter the desired Right & Left Labels. The left label will appear over the receiver names. The right label will appear over the status column.



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.



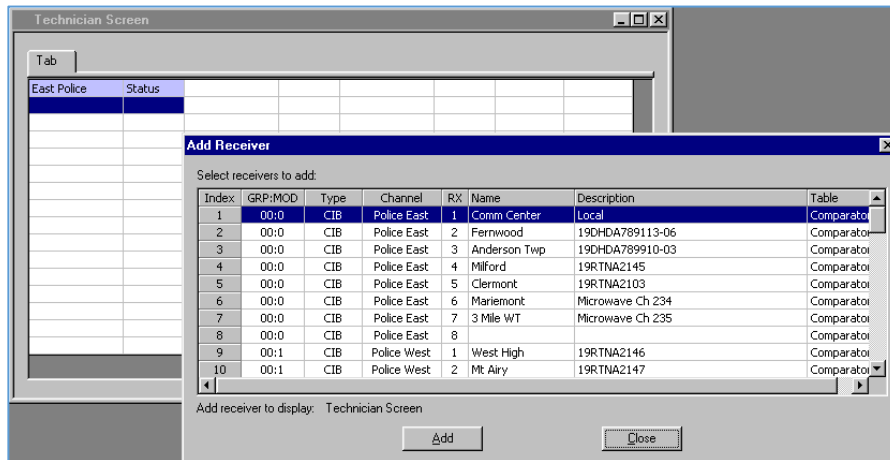
Adding Receivers & I/O Groups to the Display Window



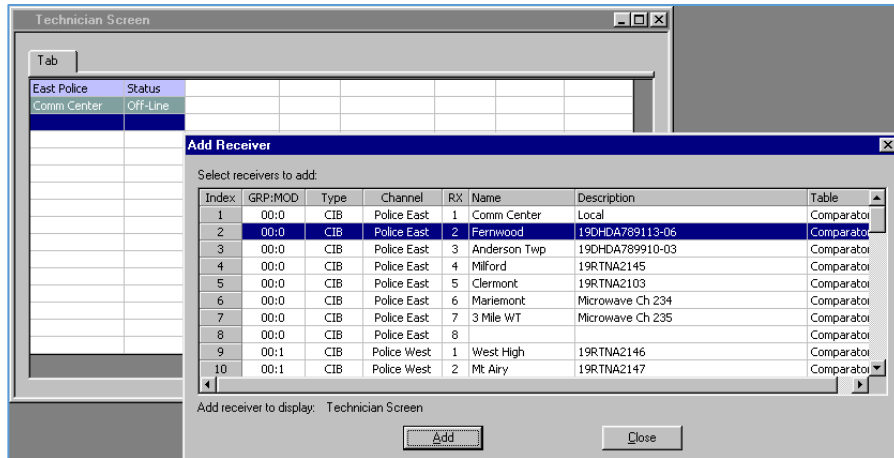
Add new Receivers or I/O Groups in the Display Window using the **Add Receiver** button from the Toolbar on the left.

An **Add Receiver** dialog box will appear.

This is similar to the Receiver Window, but it has additional buttons.



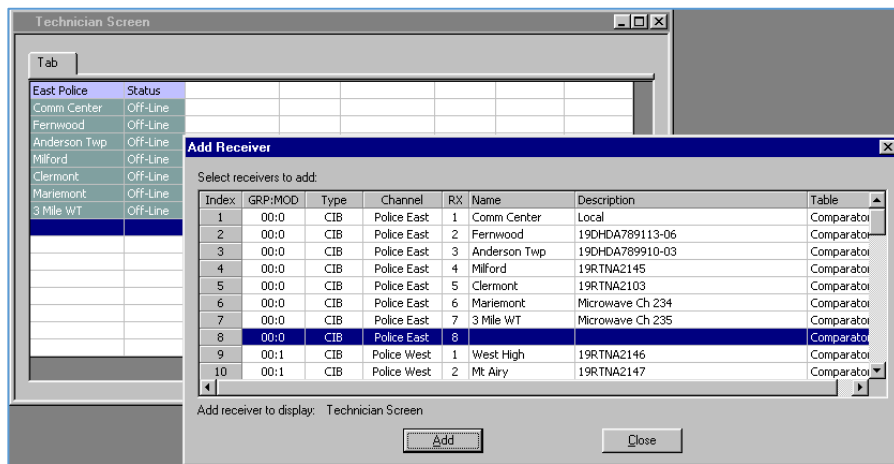
Select the receiver or I/O group that you want to add and click the **Add** button.



An **Add Receiver** dialog box will appear.

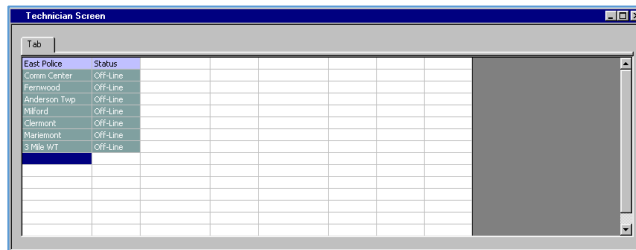
This is similar to the Receiver Window, but it has additional buttons.

Press the **Add** button for each additional receiver or I/O groups you wish to add.



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 of receivers or I/O groups, click the **Close** button.



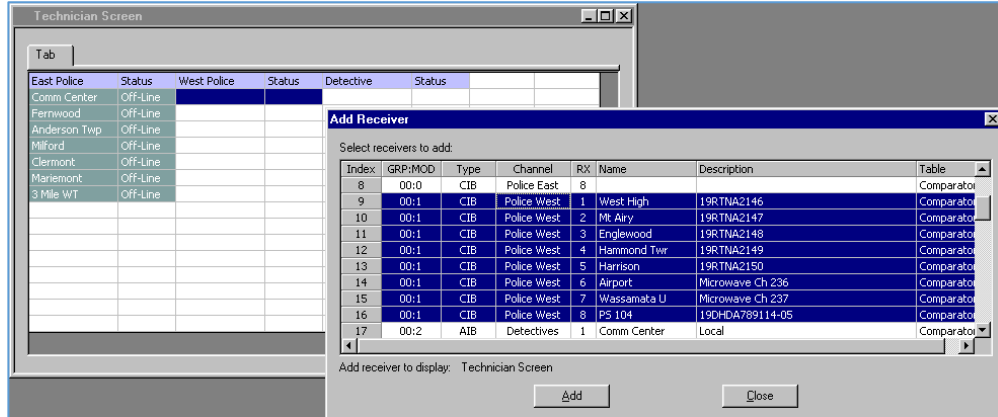
Move to the position for the next receiver and repeat until you have all the receivers added.

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



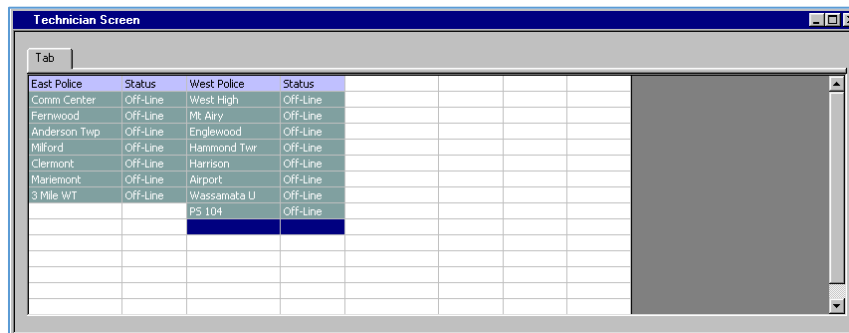
Press the **Add Receiver** button.

In the Add Receivers dialog box, select a block of receivers.



Hit the **Add** button.

This will add all the selected receivers at once,



The order of the receivers shown in the Receiver List will be determined by the Receiver I/O Window Sort order. See the **Sort Function** section of this manual for more details.

Automatic Linking to Receiver Window

When you select different cells in the “**Display Window**,” the “**Receiver Window**” automatically scrolls to show the corresponding receiver or I/O group. .

Verify Receiver Cells in the Display Window

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

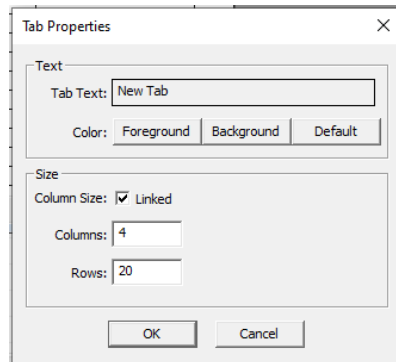
- a. Open the Display Window
- b. Open the Receiver Window.
- c. Select the first Receiver in the Display Window.
- d. The Receiver Window will show which receiver is at that cell.
- e. Use the arrow keys to move through all the receivers on the Display Window.
- f. Repeat for the other tabs in the Display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

Adding Tabs to the Display Window



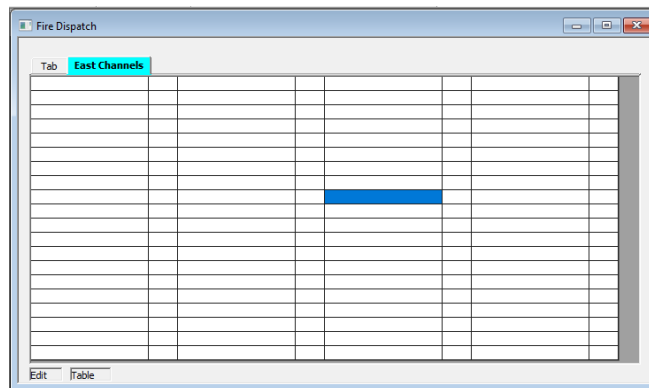
Press the **Add Tab** button.

The Tab Properties window will appear:

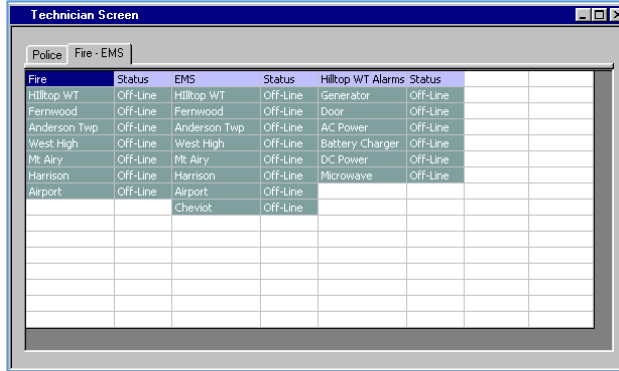


Starting in Version 9.2 of the software, the number of rows & columns is set on a per-tab basis. Each tab can have a different number of rows & columns. In previous versions of the software, the Rows & Columns setting were on a Display Window basis with a fixed number of rows and columns for all tabs in that Display Window.

Enter the desired data.
A blank grid will appear.



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

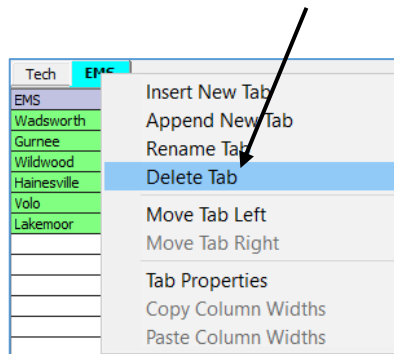


New Tab Inherited Settings

When a new tab is added, it will inherit the Row & Column configuration along with the Column settings (Linked / Unlinked, Widths and Hidden status) from the active 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.

1. File Name
2. Screen Title
3. Default Color settings.



Press the Display **Window Properties** button. The Display Windows Properties will be displayed.

Change the settings as desired and hit the OK button.

Changing Tab Properties

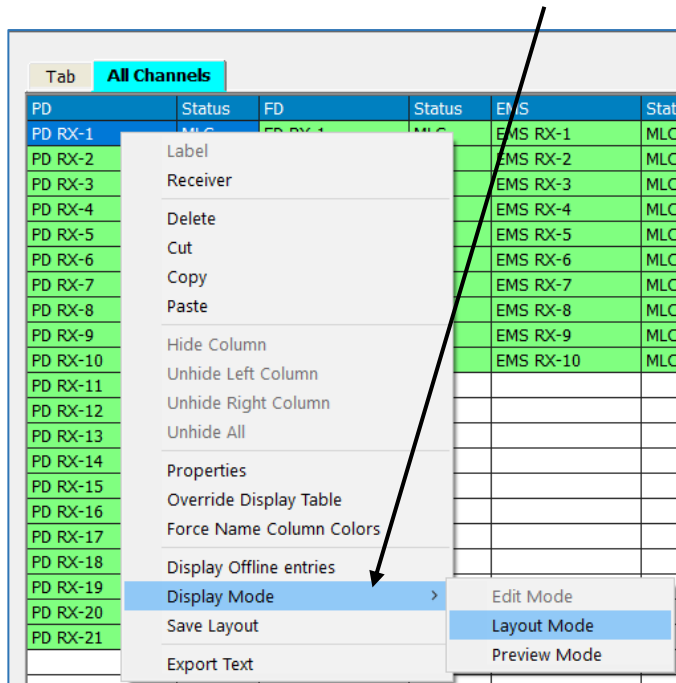
To change the properties for a tab, Double click on Tab.

Make the appropriate changes and hit the **OK** button.

Changing Column Widths - Layout Mode

To change the width of the columns, you must go into Layout Mode.

- 1) Right-click in the grid and select **Display Mode/Layout Mode**.



Entering **Layout Mode** does the following:

- The Column Width Setting is enabled, allowing you to drag the column dividers in the top row.
- The MCN Config toolbars are turned off so that the Display Window sizing will be the same as the sizing that will be used in the MCN Server and ClientRCD programs.
- The unused cells of the grid will turn yellow, indicating it is in Layout Mode.

PD	Status	FD	Status	EMS	Status
PD RX-1	MLC	FD RX-1	MLC	EMS RX-1	MLC
PD RX-2	MLC	FD RX-2	MLC	EMS RX-2	MLC
PD RX-3	MLC	FD RX-3	MLC	EMS RX-3	MLC
PD RX-4	MLC	FD RX-4	MLC	EMS RX-4	MLC
PD RX-5	MLC	FD RX-5	MLC	EMS RX-5	MLC
PD RX-6	MLC	FD RX-6	MLC	EMS RX-6	MLC
PD RX-7	MLC	FD RX-7	MLC	EMS RX-7	MLC
PD RX-8	MLC	FD RX-8	MLC	EMS RX-8	MLC
PD RX-9	MLC	FD RX-9	MLC	EMS RX-9	MLC
PD RX-10	MLC	FD RX-10	MLC	EMS RX-10	MLC
PD RX-11	MLC				
PD RX-12	MLC				
PD RX-13	MLC				

- 2) Move the cursor over a column separator line on the first row. The cursor will turn into a double-headed arrow.

Tab All Channels					
PD	Status	FD	Status	EMS	Status
PD RX-1	MLC	FD RX-1	MLC	EMS RX-1	MLC
PD RX-2	MLC	FD RX-2	MLC	EMS RX-2	MLC
PD RX-3	MLC	FD RX-3	MLC	EMS RX-3	MLC
PD RX-4	MLC	FD RX-4	MLC	EMS RX-4	MLC
PD RX-5	MLC	FD RX-5	MLC	EMS RX-5	MLC
PD RX-6	MLC	FD RX-6	MLC	EMS RX-6	MLC
PD RX-7	MLC	FD RX-7	MLC	EMS RX-7	MLC
PD RX-8	MLC	FD RX-8	MLC	EMS RX-8	MLC
PD RX-9	MLC	FD RX-9	MLC	EMS RX-9	MLC
PD RX-10	MLC	FD RX-10	MLC	EMS RX-10	MLC
PD RX-11	MLC				
PD RX-12	MLC				
PD RX-13	MLC				

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

Tab All Channels					
PD	Status	FD	Status	EMS	Status
PD RX-1	MLC	FD RX-1	MLC	EMS RX-1	MLC
PD RX-2	MLC	FD RX-2	MLC	EMS RX-2	MLC
PD RX-3	MLC	FD RX-3	MLC	EMS RX-3	MLC
PD RX-4	MLC	FD RX-4	MLC	EMS RX-4	MLC
PD RX-5	MLC	FD RX-5	MLC	EMS RX-5	MLC
PD RX-6	MLC	FD RX-6	MLC	EMS RX-6	MLC
PD RX-7	MLC	FD RX-7	MLC	EMS RX-7	MLC
PD RX-8	MLC	FD RX-8	MLC	EMS RX-8	MLC
PD RX-9	MLC	FD RX-9	MLC	EMS RX-9	MLC
PD RX-10	MLC	FD RX-10	MLC	EMS RX-10	MLC
PD RX-11	MLC				
PD RX-12	MLC				
PD RX-13	MLC				

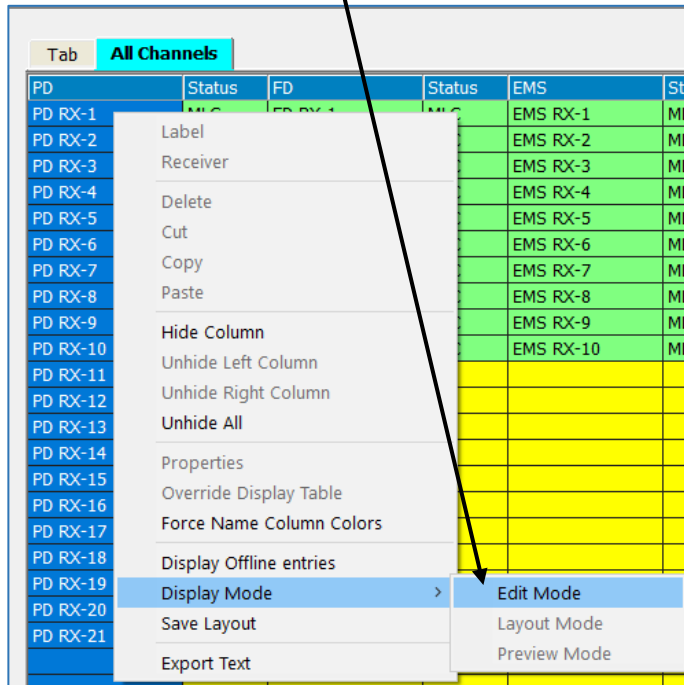


Linked Mode Column Width Note (Per-Tab setting)

If **Column Size: Linked** is checked in the **Tab Properties** window, All the Receiver Name columns will be the same width. All the Status columns are the same width. Changing a Receiver Name column width will change all the Receiver Name columns. Likewise, changing a Status column width will change all of the Status columns.

In the unlinked mode, all columns can be independently adjusted.

- 5) To return to Edit mode, Right-Click in the grid and select **Display Mode/Edit Mode**.



The window will return to Edit mode.

PD	Status	FD	Status	EMS	Status
PD RX-1	MLC	FD RX-1	MLC	EMS RX-1	MLC
PD RX-2	MLC	FD RX-2	MLC	EMS RX-2	MLC
PD RX-3	MLC	FD RX-3	MLC	EMS RX-3	MLC
PD RX-4	MLC	FD RX-4	MLC	EMS RX-4	MLC
PD RX-5	MLC	FD RX-5	MLC	EMS RX-5	MLC
PD RX-6	MLC	FD RX-6	MLC	EMS RX-6	MLC
PD RX-7	MLC	FD RX-7	MLC	EMS RX-7	MLC
PD RX-8	MLC	FD RX-8	MLC	EMS RX-8	MLC
PD RX-9	MLC	FD RX-9	MLC	EMS RX-9	MLC
PD RX-10	MLC	FD RX-10	MLC	EMS RX-10	MLC
PD RX-11	MLC				
PD RX-12	MLC				
PD RX-13	MLC				

- 6) Repeat the above as needed for the other tabs in this Display Window.

You can change the column width (Linked) for the resulting Display Window. Double click on Tab. Make sure that Linked box is checked.

When done with column width adjustments, right-Click in the grid and select: **Display Mode/Edit Mode** (See Step 5 above).

The window will return to Edit mode with newly adjusted columns width.

Tab All Channels					
PD	Status	FD	Status	EMS	Status
PD RX-1	MLC	FD RX-1	MLC	EMS RX-1	MLC
PD RX-2	MLC	FD RX-2	MLC	EMS RX-2	MLC
PD RX-3	MLC	FD RX-3	MLC	EMS RX-3	MLC
PD RX-4	MLC	FD RX-4	MLC	EMS RX-4	MLC
PD RX-5	MLC	FD RX-5	MLC	EMS RX-5	MLC
PD RX-6	MLC	FD RX-6	MLC	EMS RX-6	MLC
PD RX-7	MLC	FD RX-7	MLC	EMS RX-7	MLC
PD RX-8	MLC	FD RX-8	MLC	EMS RX-8	MLC
PD RX-9	MLC	FD RX-9	MLC	EMS RX-9	MLC
PD RX-10	MLC	FD RX-10	MLC	EMS RX-10	MLC

Hiding / Unhiding Columns – Unlinked Columns Mode

Columns can be hidden in tabs in the Display Window to allow more information to be shown. Three specific examples come to mind:

1. Trunking Systems
2. Systems with multiple functions for the same site and
3. Accentuated separation between columns (vertical borders).

For all the following examples, the tab must be configured for Un-linked columns.

Example: Trunking Systems

Trunking systems will typically have multiple radio channels with Base Radios (BRs) located at the same sites. Using the standard displays that have been discussed up to this point, the first three channels of a 7-channel trunking display might look like this:

Channel 1		Channel 2		Channel 3	
Site Name	Status	Site Name	Status	Site Name	Status
Greenhill		Greenhill		Greenhill	
FP WT		FP WT		FP WT	
City Hall		City Hall		City Hall	
Airport		Airport		Airport	

All of the Site Name columns after the first present redundant information, wasting screen space. Using Hidden Columns, we can hide the site names for Channels 2-7, thus providing a much more compact display as shown below:

	Channel 1	Channel 2	Channel 3	Channel 4	Channel 2	Channel 3
Site Name	Status	Status	Status	Status	Status	Status
Greenhill						
FP WT						
City Hall						
Airport						

Example: Multiple functions for the same site

Some systems may have multiple functions for the same site name, for example, several radio channels, each with the following three functions for all the sites:

- Receiver on a comparator.
- Transmitter Enable/Disable control at the RF Site.
- Transmitter In Cabinet Repeat (ICR) control at the RF Site.

A standard display for a single RF channel might look like this:

Site Name	Status	Site Name	Status	Site Name	Status
Greenhill		Greenhill		Greenhill	
FP WT		FP WT		FP WT	
City Hall		City Hall		City Hall	
Airport		Airport		Airport	

Again, there is a lot of redundant site name information. Using Hidden Columns, we can hide the site name for the Tx and ICR controls to make a more compact display as shown below:

Channel 1				Channel 2			
Site Name	Status	Status	Status	Site Name	Status	Status	Status
Greenhill				WW HS			
FP WT				East Fork			
City Hall				DPW			
Airport				Mt Hope			

Header labels are then used to differentiate between the Rx, Tx, and ICR functions. This allows us to double the display capability by eliminating the redundant site names.

Example: Accentuated column separators (vertical borders)

It may be desired to separate channels with dark vertical bars. Although the program does not have the ability to set up borders for the cells, dark vertical bars can be generated by:

- Adding blank column pairs between channels,
- Filling the blank column pairs with labels with a dark background,
- Hiding the Name column of each of the blank column pairs and
- Setting the width of the Status columns of the blank pairs to the desired width.

An example is shown below:

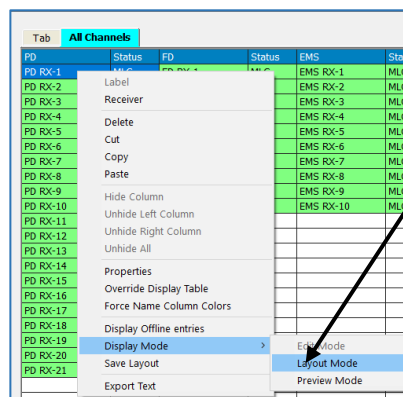
Sites	PD Status	Sites	FD Status	Sites	EMS Status
PD RX-1	MLC	FD RX-1	MLC	EMS RX-1	MLC
PD RX-2	MLC	FD RX-2	MLC	EMS RX-2	MLC
PD RX-3	MLC	FD RX-3	MLC	EMS RX-3	MLC
PD RX-4	MLC	FD RX-4	MLC	EMS RX-4	MLC
PD RX-5	MLC	FD RX-5	MLC	EMS RX-5	MLC

A better example of enhanced vertical separation is shown below. It is for a system with three functions (Rx, Tx, and ICR) for the same site on multiple channels. The redundant site information is hidden, and the enhanced vertical bars are used between each channel.

PD	Voting	Tx State	ICR	FD	Voting	Tx State	ICR	EMS	Voting	Tx State	ICR
Repeat	Repeat			Repeat	Repeat			Repeat	Repeat		
Enable	Chan En	Chan Ena		Enable	Chan En	Chan Ena		Enable	Chan En	Chan Ena	
Disable	Chan Dis	Chan Dis		Disable	Chan Dis	Chan Dis		Disable	Chan Dis	Chan Dis	
Morris	MLC	BR Tx	BR ICR	Morris	MLC	BR Tx	BR ICR	Morris	MLC	BR Tx	BR ICR
Oldenburg	MLC	BR Tx	BR ICR	Oldenburg	MLC	BR Tx	BR ICR	Oldenburg	MLC	BR Tx	BR ICR
Weisburg	MLC	BR Tx	BR ICR	Weisburg	MLC	BR Tx	BR ICR	Weisburg	MLC	BR Tx	BR ICR
Rockdale	MLC	BR Tx	BR ICR	Rockdale	MLC	BR Tx	BR ICR	Rockdale	MLC	BR Tx	BR ICR
Slabtown	MLC	BR Tx	BR ICR	Slabtown	MLC	BR Tx	BR ICR	Slabtown	MLC	BR Tx	BR ICR
Ballstown	MLC	BR Tx	BR ICR	Ballstown	MLC	BR Tx	BR ICR	Ballstown	MLC	BR Tx	BR ICR
Penntown	MLC	BR Tx	BR ICR	Penntown	MLC	BR Tx	BR ICR	Penntown	MLC	BR Tx	BR ICR
Avonburg	MLC	BR Tx	BR ICR	Avonburg	MLC	BR Tx	BR ICR	Avonburg	MLC	BR Tx	BR ICR
Chesterville	MLC	BR Tx	BR ICR	Chesterville	MLC	BR Tx	BR ICR	Chesterville	MLC	BR Tx	BR ICR

Managing Hidden Columns

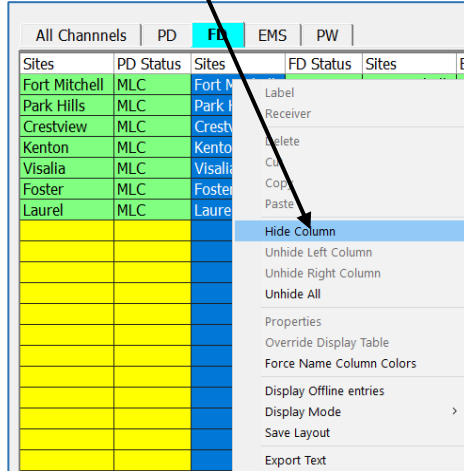
To manage Hidden Columns, first put the display into Layout Mode. Right-click in the grid and select **Display Mode/Layout Mode**.



Hiding Columns

1. Select the column you want to hide and right-click on the grid within selected column.

Click on **Hide Column**

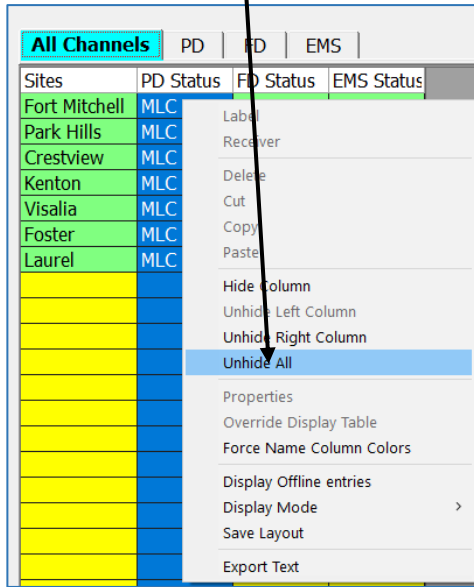


2. When done with hiding all unnecessary columns, right-Click in the grid and select **Display Mode/Edit Mode**.

All Channels				
	PD	FD	EMS	
Sites	PD Status	FD Status	EMS Status	
Fort Mitchell	MLC	MLC	MLC	
Park Hills	MLC	MLC	MLC	
Crestview	MLC	MLC	MLC	
Kenton	MLC	MLC	MLC	
Visalia	MLC	MLC	MLC	
Foster	MLC	MLC	MLC	
Laurel	MLC	MLC	MLC	

Unhiding All Columns

To show all hidden columns, right click in the grid at any place and select **Unhide All**.



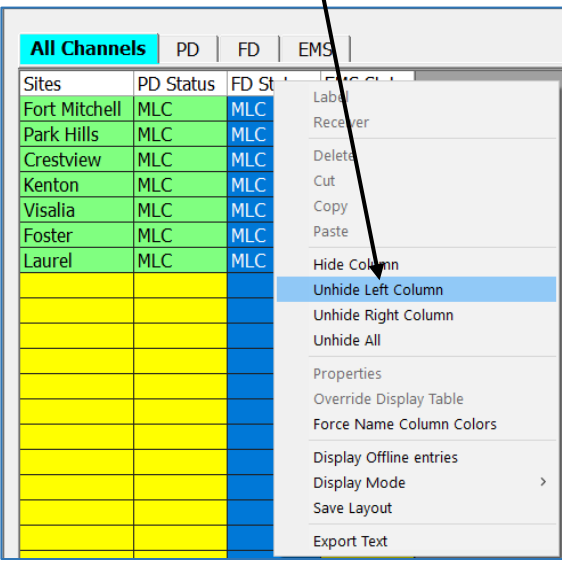
All hidden columns will be displayed.

Unhiding Individual Columns

To unhide an individual column:

- Right click on the neighboring column.
- Select **Unhide Left Column** or **Unhide Right Column**.

We will *unhide the left column* in our example.



The left column next to FD Status Column will be displayed.

All Channels	PD	FD	EMS
Sites	PD Status	Sites	PD Status EMS Status
Fort Mitchell	MLC	Fort Mitchell	MLC MLC
Park Hills	MLC	Park Hills	MLC MLC
Crestview	MLC	Crestview	MLC MLC
Kenton	MLC	Kentc?!	MLC MLC
Visalia	MLC	Visalia	MLC MLC
Foster	MLC	Foster	MLC MLC
Laurel	MLC	Laurel	MLC MLC

- c. When done with unhiding the selected column(s), right-Click in the grid and select **Display Mode/Edit Mode**.

Changing Label Text & Colors



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

- o Double click on a Label.
- o Right-Click on the Label and select the **Label** menu item or
- o Select a Label cell and press the **New Label** toolbar button.

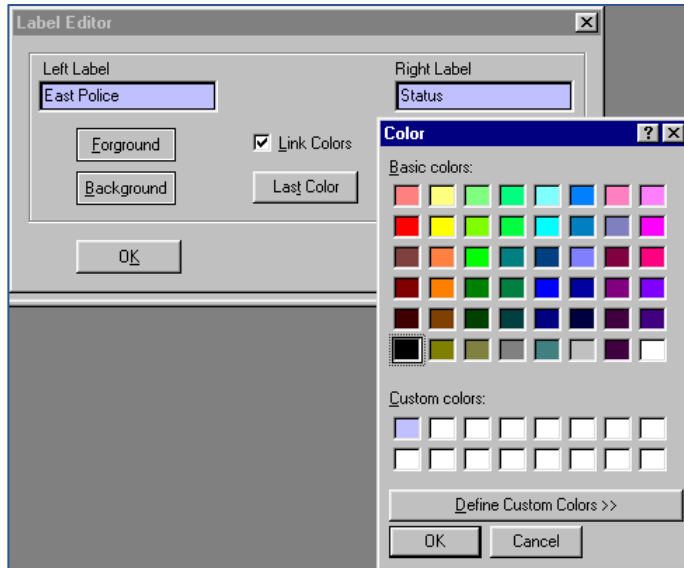
The Label Edit dialog box will appear.

When the Link Color box is checked, the left & right labels will have the same colors.

When changing the color of a series of labels, press the Last Color button to set current label to the last color used.

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**.

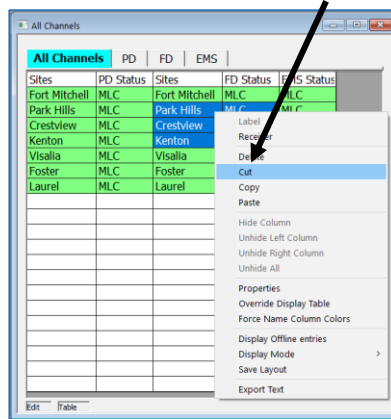
If you want a color not shown, hit the **Define Custom Colors** button.

Moving Receivers & Labels (Cells) in the Display Window

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

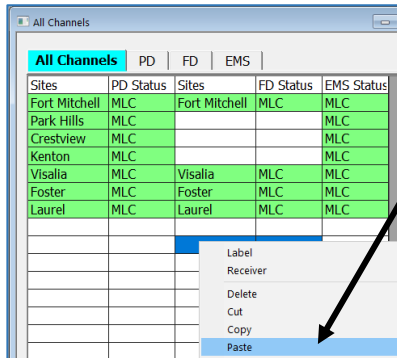
To move Labels, Receivers, or I/O Groups:

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

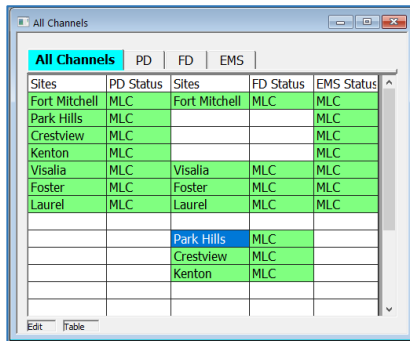


This cuts the selection and places it in the clipboard.

- Move to the desired location, right-click and select **Paste** (or use the **Ctrl-V** keyboard shortcut.)



(Alternately, use the *Paste* toolbar button)
This pastes the items into the new location.



Copying & Pasting Cells

Copying cells (labels, receivers, I/O points) is similar, except the Copy command is used instead of the Cut command. The Copy & Paste procedure makes a copy while leaving the original data intact. Cells can be copied to the same tab or to a different tab.

Cutting and pasting occur in the following order:

1. Click & drag the mouse to select the area to copy.
2. Right-Click to bring up the menu and select **Copy**.
(Alternately, use the *Copy* toolbar button or the **Ctrl-C** keyboard shortcut).



All Channels				
	PD	FD	EMS	
Sites	PD Status	Sites	FD Status	EMS Status
Fort Mitchell	MLC	Fort Mitchell	MLC	MLC
Park Hills	MLC	Park Hills	MLC	MLC
Crestview	MLC	Crestview	MLC	MLC
Kenton	MLC	Kenton	MLC	MLC
Visalia	MLC	Visalia	MLC	MLC
Foster	MLC	Foster	MLC	MLC
Laurel	MLC	Laurel	MLC	MLC

3. Move to the desired location, right-click and select **Paste** (or use the **Ctrl-V** keyboard shortcut.)

All Channels				
	PD	FD	EMS	
Sites	PD Status	Sites	FD Status	EMS Status
Fort Mitchell	MLC	Fort Mitchell	MLC	MLC
Park Hills	MLC	Park Hills	MLC	MLC
Crestview	MLC	Crestview	MLC	MLC
Kenton	MLC	Kenton	MLC	MLC
Visalia	MLC	Visalia	MLC	MLC
Foster	MLC	Foster	MLC	MLC
Laurel	MLC	Laurel	MLC	MLC

All Channels				
	PD	FD	EMS	
Sites	PD Status	Sites	FD Status	EMS Status
Fort Mitchell	MLC	Fort Mitchell	MLC	MLC
Park Hills	MLC	Park Hills	MLC	MLC
Crestview	MLC	Crestview	MLC	MLC
Kenton	MLC	Kenton	MLC	MLC
Visalia	MLC	Visalia	MLC	MLC
Foster	MLC	Foster	MLC	MLC
Laurel	MLC	Laurel	MLC	MLC



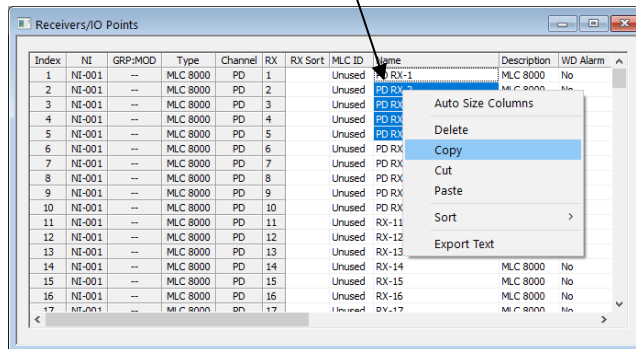
(Alternately, use the *Paste* toolbar button)
This pastes the items into the new location.

Pasting a Row of Receivers Directly from the Receiver Window

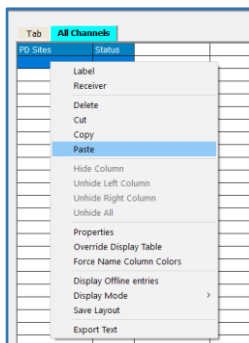
All the examples shown assume you have a system with multiple receiver sites and want to look at the sites in a column arrangement. If you have a trunking system with many channels but just a few sites, you may want to display each channel as a row with the sites going across from left to right.

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

- A. From the Receiver Window, highlight a group of receivers, right-click and copy to clipboard (or use the **Ctrl-C** keyboard shortcut).



- B. Go to the Display Window.
- C. Move the cursor to the starting position for the row of receivers. Highlight the row, right-click and paste the clipboard to the screen (or use the **Ctrl-V** keyboard shortcut).



- D. The receivers are pasted into the Display Window in a vertical row:

Tab All Channels		PD Sites	Status		
		PD RX-1	MLC		
		PD RX-2	MLC		
		PD RX-3	MLC		
		PD RX-4	MLC		
		PD RX-5	MLC		

Forced Name Column Colors

Overview

This feature is helpful when using the MCN Server software to represent Trunking systems that have multiple sites with mutual channel aliases. It is configured with the MCN Config Server program for operation in the MCN Server 8000 Program.

Typical System Operation

On a typical MCN Display Screen, each vertical column will represent different Channels, and each horizontal row will represent different Sites. In a typical Trunking System, there will be one or more site working harmoniously to manages multiple common channels. But when representing a trunking system with mutual channels across multiple Sites, the screens can become challenging to layout and hard follow, and the goal is to display all of the statuses for each Channel's activity at each site on a limited display.

How it works

The *Force Name Column Color* feature allows the MCN Server Program to independently assign static colors to site names, which are common to the mutual channels of a designated site within the Trunking system. The assigned color will then persist to lock and prevent that Site names from changing to indicate Channel status activity, thus forcing the designated name to be more of a label, by remaining static regardless of Site channel activity.

Benefit

The benefit of this feature is to allow ease and clarity in displaying mutual channel activity across multiple Sites, without duplicating common Site names on the same display screen and consuming valuable screen real estate. So, the user can then look at the screen and quickly determine the channel's activity for the entire Trunking system.

Configuration

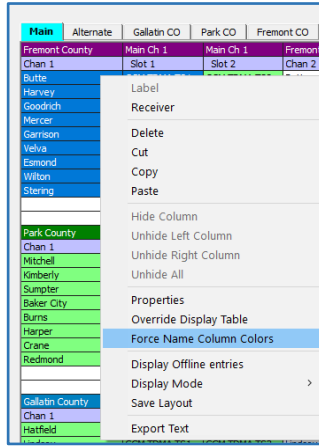
This is best accomplished by placing both the lists of *channel names* and *statuses* on the first column of the Display window screen and forcing only the list of site names to have a static color on the MCN screen. For all the subsequent *channels* Sites, the *name* column is hidden and only the status column for all the sites of each channel is displayed. See the section on

Managing Hidden Columns page **123** for further details on using this function.

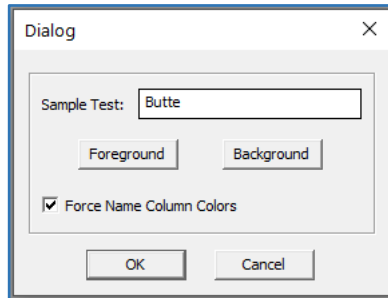
Setup of the Force Name Column Color can be done immediately after the process of building the Display Window as discussed in the earlier Section of this manual '***Adding a New Display Window***' page **109**.

See the following screen shots below

From the desired 'Display Window' screen select all the site names. Then right click and choose 'Force Name Column color.'



When the following window is opened, check the box for 'Force Name Column colors.'



NOTE:
The Name in the Sample Test area is only to provide a preview sample before you commit to clicking 'OK'

After Clicking OK the Color, you selected will persist on all the names that were selected, and those names will no longer reflect any Channel Rx statuses. The Screen shot below shows a TDMA system. However, this is just a single application example.

Main	Alternate	Gallatin CO	Park CO	Fremont
Fremont County				
Chan 1	Slot 1	Slot 2		
Butte	GCM TDMA TS1	GCM TDMA TS2		
Harvey	GCM TDMA TS1	GCM TDMA TS2		
Goodrich	GCM TDMA TS1	GCM TDMA TS2		
Mercer	GCM TDMA TS1	GCM TDMA TS2		
Garrison	GCM TDMA TS1	GCM TDMA TS2		
Velva	GCM TDMA TS1	GCM TDMA TS2		
Esmond	GCM TDMA TS1	GCM TDMA TS2		
Wilton	GCM TDMA TS1	GCM TDMA TS2		
Stering	GCM TDMA TS1	GCM TDMA TS2		
Park County				
Chan 1	Slot 1	Slot 2		
Mitchell	GCM TDMA TS1	GCM TDMA TS2		
Kimberly	GCM TDMA TS1	GCM TDMA TS2		
Sumpter	GCM TDMA TS1	GCM TDMA TS2		
Baker City	GCM TDMA TS1	GCM TDMA TS2		
Burns	GCM TDMA TS1	GCM TDMA TS2		
Harper	GCM TDMA TS1	GCM TDMA TS2		
Crane	GCM TDMA TS1	GCM TDMA TS2		
Redmond	GCM TDMA TS1	GCM TDMA TS2		

This Screen shot shows a completed system where multiple sites are configured with Force Name Color Columns

The screenshot displays the McnConfig application window with a menu bar (File, Edit, View, Window, Help) and a toolbar. The main area shows a multi-tabbed configuration table. The tabs are labeled 'Main', 'Alternate', 'Gallatin CO', 'Park CO', and 'Fremont CO'. The 'Main' tab is active, showing a table with columns for County, Channel, Slot, and TDMA parameters. The table is organized into sections for Fremont County, Park County, and Gallatin County. Each section has a 'Main Ch' header and a 'Chan' header. The 'Main Ch' columns are highlighted in blue, indicating force name color columns. The 'Chan' columns are highlighted in purple. The TDMA parameters are highlighted in green. Red arrows point from the text above to the 'Main' column headers in the software window.

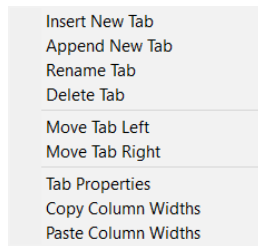
Main	Alternate	Gallatin CO	Park CO	Fremont CO
Fremont County				
Chan 1	Slot 1	Slot 2	Chan 2	Slot 1
Butte	GCM TDMA TS1	GCM TDMA TS2	Butte	GCM TDMA TS1
Harvey	GCM TDMA TS1	GCM TDMA TS2	Harvey	GCM TDMA TS1
Goodrich	GCM TDMA TS1	GCM TDMA TS2	Goodrich	GCM TDMA TS1
Mercer	GCM TDMA TS1	GCM TDMA TS2	Mercer	GCM TDMA TS1
Garrison	GCM TDMA TS1	GCM TDMA TS2	Garrison	GCM TDMA TS1
Velva	GCM TDMA TS1	GCM TDMA TS2	Velva	GCM TDMA TS1
Esmond	GCM TDMA TS1	GCM TDMA TS2	Esmond	GCM TDMA TS1
Wilton	GCM TDMA TS1	GCM TDMA TS2	Wilton	GCM TDMA TS1
Stering	GCM TDMA TS1	GCM TDMA TS2	Stering	GCM TDMA TS1
Park County				
Chan 1	Slot 1	Slot 2	Chan 2	Slot 1
Mitchell	GCM TDMA TS1	GCM TDMA TS2	Mitchell	GCM TDMA TS1
Kimberly	GCM TDMA TS1	GCM TDMA TS2	Kimberly	GCM TDMA TS1
Sumpter	GCM TDMA TS1	GCM TDMA TS2	Sumpter	GCM TDMA TS1
Baker City	GCM TDMA TS1	GCM TDMA TS2	Baker City	GCM TDMA TS1
Burns	GCM TDMA TS1	GCM TDMA TS2	Burns	GCM TDMA TS1
Harper	GCM TDMA TS1	GCM TDMA TS2	Harper	GCM TDMA TS1
Crane	GCM TDMA TS1	GCM TDMA TS2	Crane	GCM TDMA TS1
Redmond	GCM TDMA TS1	GCM TDMA TS2	Redmond	GCM TDMA TS1
Gallatin County				
Chan 1	Slot 1	Slot 2	Chan 2	Slot 1
Hatfield	GCM TDMA TS1	GCM TDMA TS2	Hatfield	GCM TDMA TS1
Lindsey	GCM TDMA TS1	GCM TDMA TS2	Lindsey	GCM TDMA TS1
Spaulding	GCM TDMA TS1	GCM TDMA TS2	Spaulding	GCM TDMA TS1
Pittsville	GCM TDMA TS1	GCM TDMA TS2	Pittsville	GCM TDMA TS1
Dexterville	GCM TDMA TS1	GCM TDMA TS2	Dexterville	GCM TDMA TS1
Millstone	GCM TDMA TS1	GCM TDMA TS2	Millstone	GCM TDMA TS1
Humbird	GCM TDMA TS1	GCM TDMA TS2	Humbird	GCM TDMA TS1
Melrose	GCM TDMA TS1	GCM TDMA TS2	Melrose	GCM TDMA TS1

Display Window Tab Menu

Right-click on a Display Window tab to bring up the context sensitive menu for the Display Window Tab.

The menu options provide a shortcut to get to the listed functions.

Delete Tab	Delete the current tab.
Insert New Tab	Insert a new tab before the current tab.
Append New Tab	Adds a new tab after the last tab.
Rename Tab	Rename the current tab.
Move Tab Left	Move Tab Left
Move Tab Right	Move Tab Right
Tab Properties	Open the Tab Properties window.
Copy Column Widths	Copy the column widths and Linked / Unlinked Column setting of current tab to clipboard.
Paste Column Widths	Paste the column widths and Linked / Unlinked Column setting from the clipboard to the selected tab.



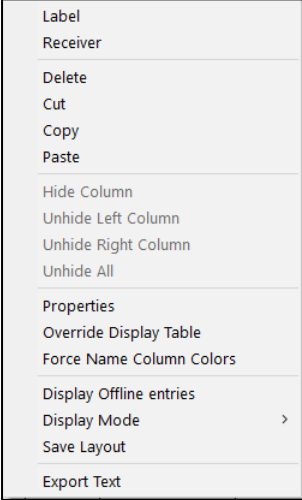
The **Copy** and **Paste Column Widths** functions allow you to easily format the column widths of a number of tabs identically.



Note: The Tab settings must be the same, for copy and paste to work correctly.

Display Window Menu

Right-click in the Display Window to bring up the context sensitive menu for the Display Window. The following menu functions are available:

Label	Add a label to this cell.	
Receiver	Add a receiver or I/O point at this cell.	
Delete	Erases the contents of the selected cell(s) (Shortcut: Delete)	
Cut	Moves the contents from selected cell(s) to the clipboard, for pasting elsewhere (also Ctrl-X).	
Copy	Copies the contents of selected cell(s) to the clipboard, for pasting elsewhere (also Ctrl-C).	
Paste	Transfers contents from the clipboard to the selected cell and others if needed) (also Ctrl-V.)	
Hide Column	Hides selected Column (for Unlinked Columns). (Active only in Layout Mode.)	
Unhide Left Column	Unhides the column to the left of the current cell. (Active only in Layout Mode.)	
Unhide Right Column	Unhides the column to the left of the current cell. (Active only in Layout Mode.)	
Unhide All	Unhides all columns on the tab. (Active only in Layout Mode.)	
Properties	Display the properties of the contents of this cell.	
Override Display Table	Use a special Display Table for receiver(s) in the selected cell(s). This allows you to use an alternate (ex: MLC Tech) Display Table on a particular screen. See below for details.)	
Force Name Column Colors	Allows Independent assignment of colors for the individual receivers.	
Display Table Mode	Changes the display to show Display Table mode in the cells instead of selected Offline Mode.	
Display Offline Mode	Forces the display to show Offline in the cells rather than the state of the currently selected Display Table.	

Offline device simulation that is only used for backwards compatibility.

- Display Mode** Changes between the following three modes:
 - Edit** Normal display configuration
 - Layout** Setting column widths
 - Preview** Simulates display in the MCN Server software.
- Save Layout** Saves the current screen column width and window position.
- Export Text** Exports a text version of the screen layout.

Large Systems - Navigating & Selecting Display Tabs

Most systems will have only a few Display Tabs. But, for large systems, the tabs may scroll off the edge of the window.

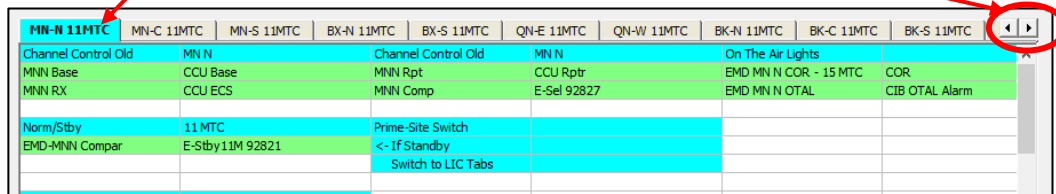
There are two ways to navigate and select a Display Tab to work on:

- a. Left/Right Arrows
- b. Middle Mouse Button – Display Table List

Navigating with Left & Right Mouse Buttons

You can select a display tab to work with by using the Left & Right Arrows on the top-right portion of the Display window.

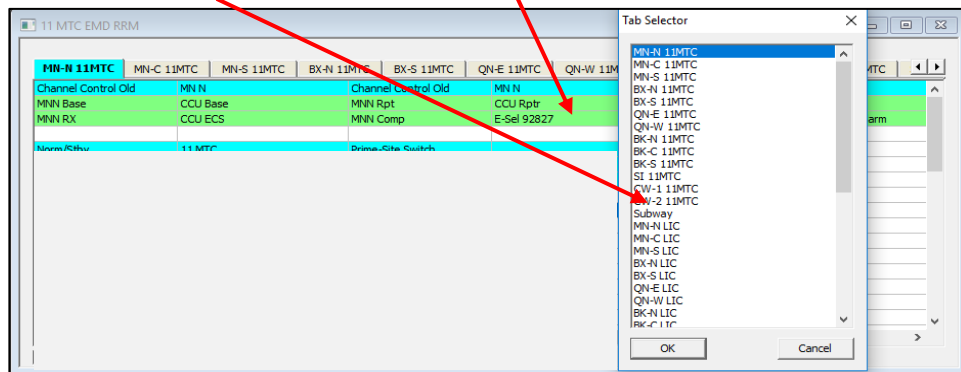
- a. Use the arrows to scroll left & right.
- b. Click on the desired Display tab.



Navigating with Tab Selector – Middle Mouse Button / Mouse Wheel

If there are a lot of Display Tabs, it's faster to navigate using the Tab Selector tool.

- a. Press the middle mouse button in the Display Table window.
- b. Scroll & Select the Tab to use from the list & Hit "OK":

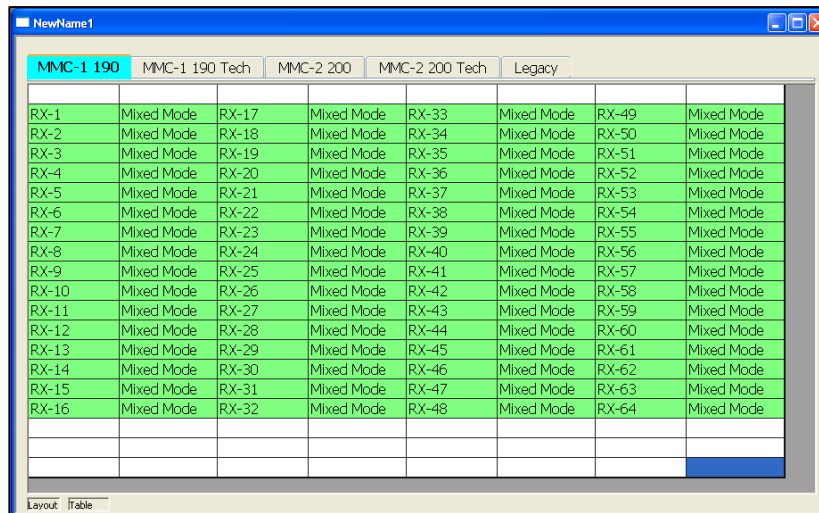


The middle mouse button may be on the mouse scroll wheel.

Using Alternate Display Tables – Override Display Tables

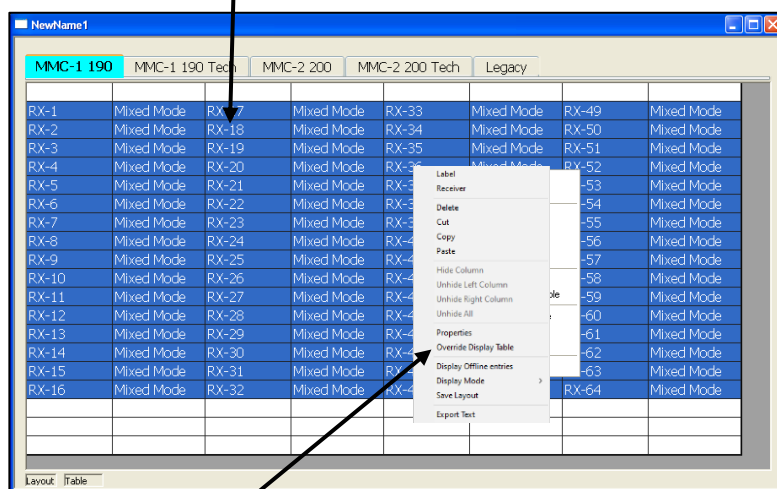
Multiple Display Tables can be used with IP comparators. Each comparator has a standard Display Table and a *Last Vote* Display Table. The MLC 8000 and GRV 8000 Analog Comparators and the Mixed Mode systems also have *Tech* Display Tables. You can build screens using the default (or Last Vote) Display Tables for your users and separate Tech screens that use the *Tech* Display Tables using the following technique:

1. Build the standard User screen (Display Windows)
2. Build new Tech screens (Display Windows)
3. Copy the Labels & Receivers from the standard User screen to the Tech screen. Be sure to highlight the proper number of columns when you paste the data to the Tech screen.



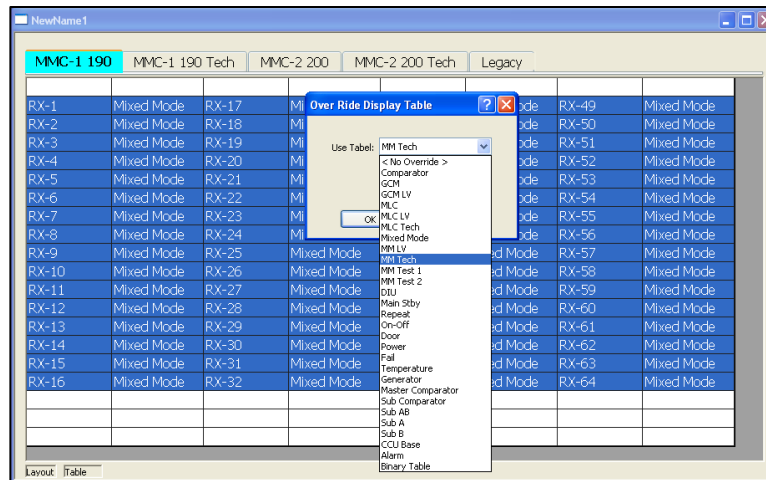
Default Display Tables will appear in green.

4. Highlight all the appropriate receivers on the Tech screen.

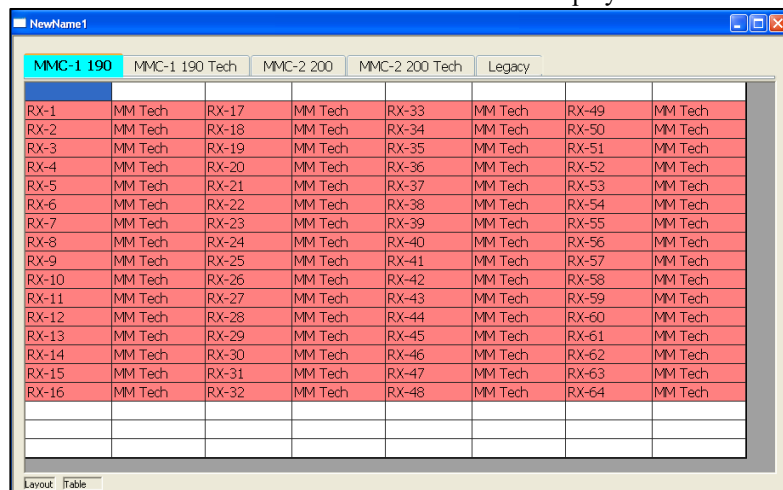


5. Right-Click and select "Override Display Table."

6. Select the appropriate Display Table to use.



7. The cells in the screen will show the name of the Display Table in use.



The Alternate Display Tables will be displayed in a salmon color.

8. Save the system.

Results:

- You will see the system displayed using the default display tables on the User screen.
- You will see the system displayed with the alternate Display Table on the Tech screen.
- Your users can use the User screen on their client PC, and you can use the Tech Screen on the Server or your Client PC.

Using the Last Vote Display Tables as defaults

You can use the Last Vote Display Tables as your default Display Tables by selecting them in the Receivers window. Then any new screen you build will use the Last Vote Display Tables by default.



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 modify the cell.

Display Window Toolbar Buttons

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



Delete



Cut



Copy



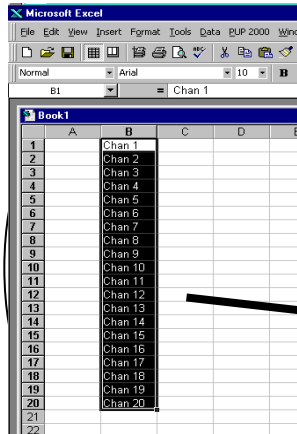
Paste

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

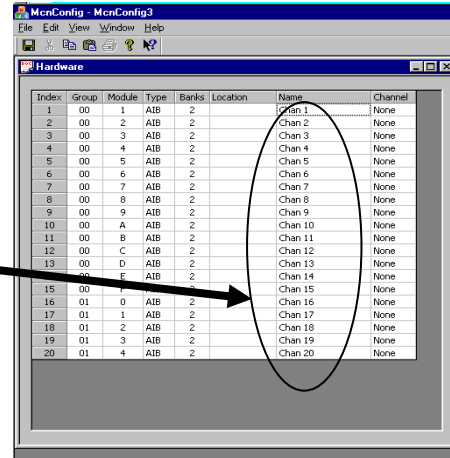
Using the Clipboard from other Applications

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 system configuration files 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.

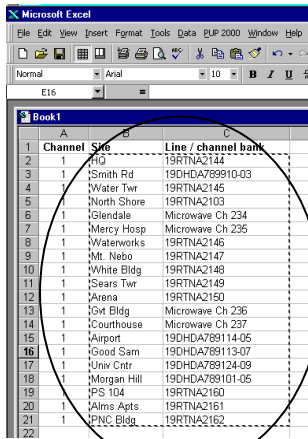


Copy (Ctrl-C) a column of Names in Excel

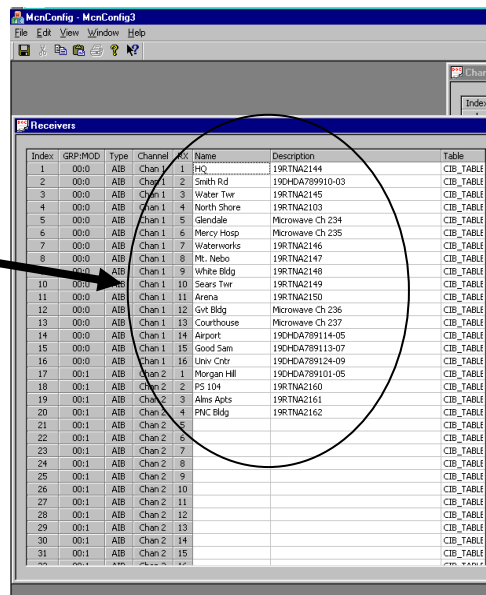


And Paste (Ctrl-V) them into the MCNConfig Hardware List

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 system configuration files 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 Fields

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 drop-down entry 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 Fields

Rx Sort	This is a numeric field. You can paste into this column.
MLC ID	This is a numeric field. You can paste into this column.
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.
Display 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.
Description	This is a free-format text field. You can paste text into this column.
Drives Output / Macro Group	You can cut & paste from one part of this column to another part.
Member of Macro Group	You can cut & paste from one part of this column to another part. Channel List.
Channel	This is a free-format text field. You can paste text into this column. Entries must be unique.
WD Multiplier	This is a numeric field with restricted values. You can cut & paste from one part of this column to another part.

Watchdog States

Name	This is a free-format text field. You can paste text into this column.
Time Out	This is a 2-digit numeric field displayed with an “hours” suffix. You can cut & paste from one part of this column to another part.

Use Multiplier This is a single character Y/ N field.
You can cut & paste from one part of this column to another part.

Macro Groups

Name This is a free-format text field. You can paste text into this column.
Each entry must be unique.

Comment This is a free-format text field. You can paste text into this column.

Display Window (Screen Layout)

All Cells The cells require either:

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

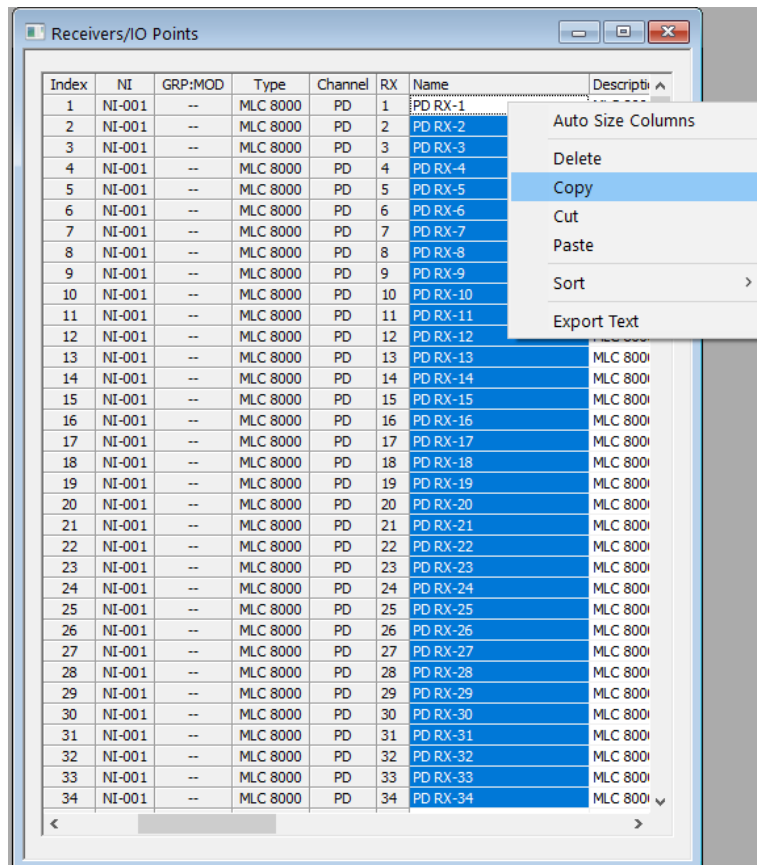
Display Window Copy& Paste Limitations

- You can copy & paste receivers from the Receiver List window.
- You can copy & paste (or 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:

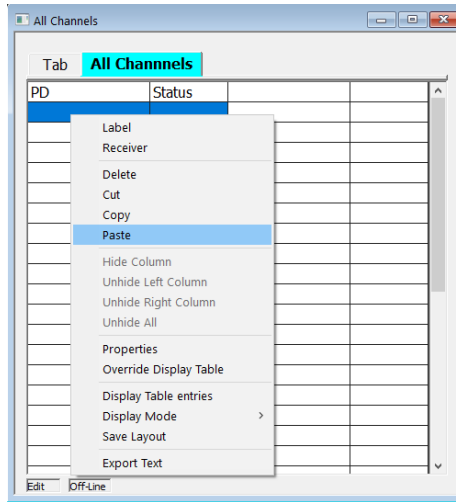
(Channels with a large number of sites)

- **From the Receiver Window, highlight a group of receivers and copy it to clipboard.**



- **Go to the Display Window.**

Move the cursor to the starting position for the column of receivers.
 Paste the clipboard to the screen.



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

Sites	PD Status		
PD RX-1	MLC		
PD RX-2	MLC		
PD RX-3	MLC		
PD RX-4	MLC		
PD RX-5	MLC		
PD RX-6	MLC		
PD RX-7	MLC		
PD RX-8	MLC		
PD RX-9	MLC		
PD RX-10	MLC		
PD RX-11	MLC		
PD RX-12	MLC		
PD RX-13	MLC		
PD RX-14	MLC		
PD RX-15	MLC		
PD RX-16	MLC		
PD RX-17	MLC		
PD RX-18	MLC		
PD RX-19	MLC		
PD RX-20	MLC		
PD RX-21	MLC		
PD RX-22	MLC		
PD RX-23	MLC		
PD RX-24	MLC		
PD RX-25	MLC		
PD RX-26	MLC		
PD RX-27	MLC		
PD RX-28	MLC		
PD RX-29	MLC		
PD RX-30	MLC		
PD RX-31	MLC		
PD RX-32	MLC		
PD RX-33	MLC		
PD RX-34	MLC		

MCNConfig Program: Client Permissions

If you have multiple client PCs and users, you can select which screens they will be able to use with the Client Permissions configuration. For example, you could set up the following restrictions:

User	Screens Allowed
PD Dispatch	Police East Police Central Police West
FD Dispatch	FD EMS
Supervisor	All the PD & FD Dispatch screens
Technician	All the above screens plus special Technician screens

The following shows the Client Permissions window for the above example.

The screenshot shows the 'Client Permissions' window with a tree view structure. The tree is organized as follows:

- Grant Access**
 - Police Dispatch (192.168.1.10 - 192.168.1.19)**
 - Police East
 - Police Central
 - Police West
 - FD Dispatch (192.168.1.20 - 192.168.1.29)**
 - FD
 - EMS
 - Joe Administrator**
 - Police East
 - Police Central
 - Police West
 - FD
 - EMS
 - Radio Technician**
 - Technician Screen
 - Police East
 - Police Central
 - Police West
 - FD
 - EMS

Annotations on the right side of the window provide the following details:

- An arrow points to the 'Police Dispatch' group: "10 Police Dispatch PCs. All PCs in this IP range have the same 3 screens." (Police East, Police Central, Police West)
- An arrow points to the 'FD Dispatch' group: "10 FD Dispatch PCs. All PCs in this IP range have the same 2 screens." (FD, EMS)
- A bracket groups the 'Joe Administrator' and 'Radio Technician' users: "Supervisor has all 5 Dispatch screens. He can log on from any PC." (Police East, Police Central, Police West, FD, EMS)
- A bracket groups the 'Radio Technician' user's screens: "Tech has Tech screens plus all the above. He can log on from any PC." (Technician Screen, Police East, Police Central, Police West, FD, EMS)

Screens can be restricted based on:

- User Name
- PC IP Address Range
- A combination of both User Name & PC IP Address Range

The above example shows a simple system. You can develop even more complex Client Permissions.

FEATURES

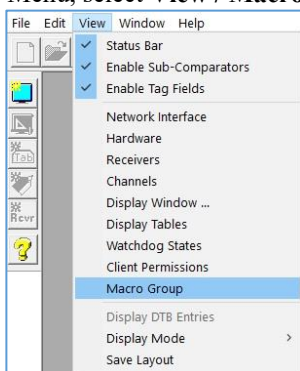
Macro Groups

The Macro Group /Group Macro feature was added as a licensed option in Version 9.2. Group Macros are an enhanced expansion of the Triggered Outputs functionality.

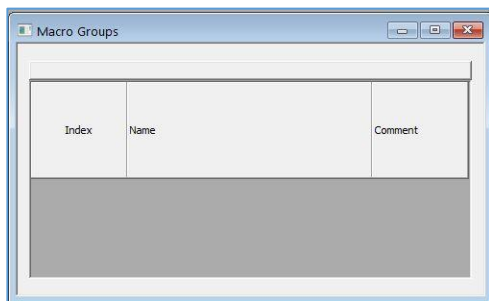
While Triggered Outputs allow state changes of a device on one or more inputs, to trigger an action on a single output of the same or some other single device. Group Macros allow input state changes to perform an action for multiple device outputs on devices in a Macro Group. The output actions are aggregated into a single operation called a Macro Group.

To build the Macro Groups:

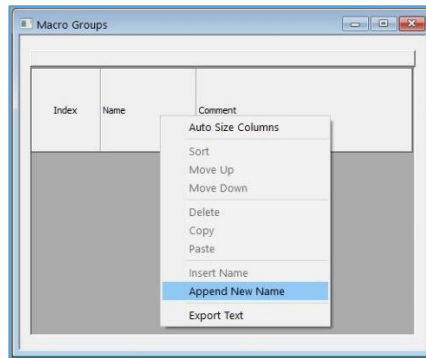
1. From the Menu, select **View / Macro Group**.



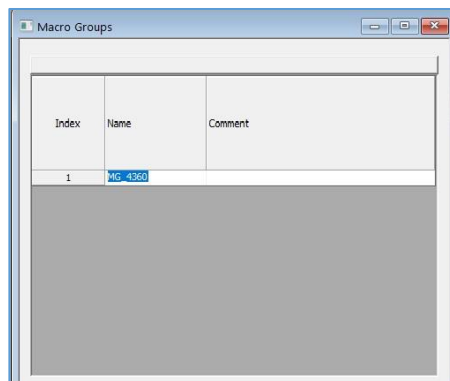
The Macro Groups window will be displayed as shown here.



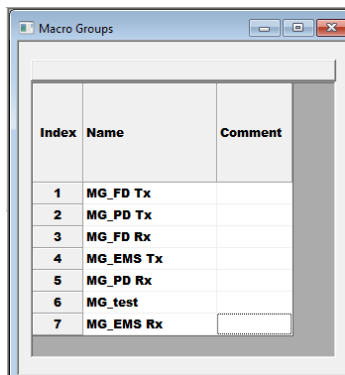
- Right-click in the header to display the Macro Groups drop-down menu:



- Select **Append New Name**.
- A Macro Group is added with a name MG_4360.



- Replace the number (xxxx) with the appropriate name for the Macro Group. It is recommended that you keep the MG_ prefix. This will help you differentiate Macro Group Outputs from Triggered Outputs later.
- Repeat the above for the rest of the desired Macro Groups.



To continue configuration of Group Macros, see the **Group Macro Overview** section of this manual.

Client Access & Restriction Options

Normally, in an MCN Client-Server system, all clients can access all screens. The Client Permission function works by taking away rights. The following are the rules for Client Permissions:

Default Client Permissions – Unrestricted Display Screens

When building a new system or loading older system configuration files without permissions, Unrestricted Client Permissions will take effect. The top key icon will have a label saying "Unrestricted Access" on it. If you don't want to restrict the screens available to specific users or PCs, you don't have to modify the Client Permissions. Unrestricted Client Permissions means:

- a. Users can log on from any PC at any IP address that can access the server over IP.
- b. All user names will be accepted.
- c. All users on all PCs can access all screens.

PC Configuration

- If a PC (or range of PCs) is not listed with restrictions, it will be able to access all screens.
- PCs can be added at the first level (root) of the tree.
- Each PC icon can have a range of IP addresses. The screens authorized under that PC icon will pertain to all PCs in that IP address range.
- Each PC icon must have a unique IP address range. It cannot overlap with the IP address range of any other PC icon.
- When a PC icon has no screens or users under it, it has access to all screens. The label for the PC will show "All Screens".
- A PC icon with screens or users below it will have restricted access.
- When a PC icon is first added, it will show "All Screens" access.

User configuration

- Master Users are added at the first (root) level.
- Sub Users can be added under one or more PC icons.
- Master Users can also be added as Sub Users under PC icons.
- When a User icon has no screens under it, it has access to all screens. The label for the User will show "All Screens".
- A User icon with screens below it will have restricted access.
- When a User icon is added (either as a Master User or a Sub User), it will have All Screen access.

Screens

1. Screens can be entered under either:
 - Master User icons
 - PC icons
 - Sub User Icons
2. Screens may be entered under more than one icon.

Client Access Rights

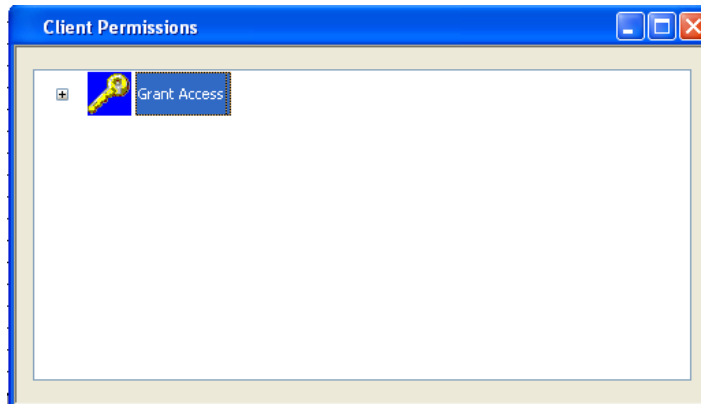
- a. Master Users can access the system from a PC with any IP address (not just the address ranges associated with the PC icons).
- b. If a user logs on to a PC that has either All Screens access or screens directly under its icon, that user can access those screens.
- c. Sub Users can access the system only from PCs under which they appear.
- d. The Server program will reject any unauthorized log-on attempt.

Client Screen Rights

- Screens listed under Master User icons will be available to that user, no matter what PC he uses to log on. If a Master User has "All Screens access," he can access all screens from any PC.
- Screens listed under PC icons will be available to any user logged on through that range of PCs.
- Screens listed under a Sub User icon will be available to that user logged on to that range of PCs.
- Screen rights are cumulative:
A Sub User will have access to any screens under his icon plus any screens authorized for his parent PC icon.

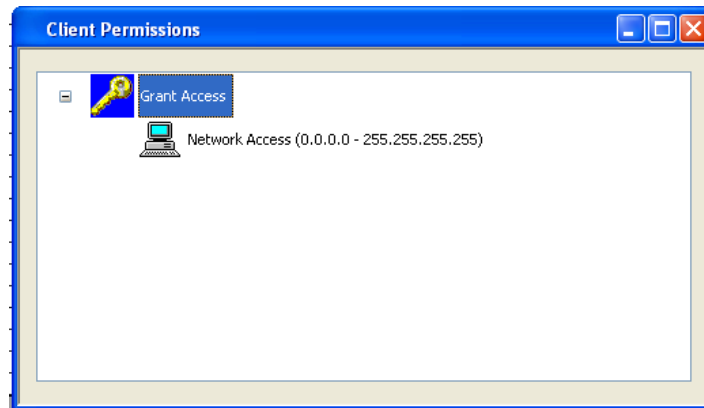
If a Master User logs in from a PC within the IP range of one of the PC icons, he will have access to all screens under his Master User icon plus all screens authorized to that PC icon.

From the **View** menu, select *View Client Permissions*.

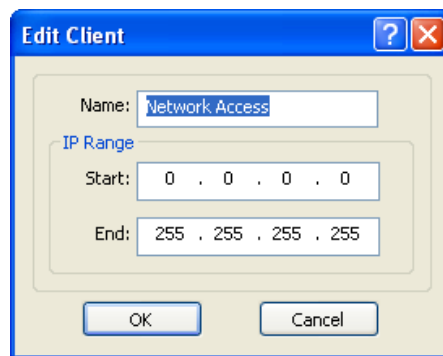


The initial Client Permissions screen is blank, with no restrictions for any users or PCs.

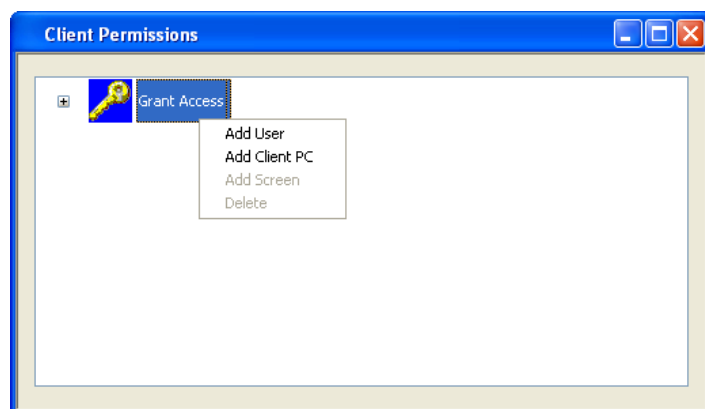
Pressing the "+" gives you:



When you first build the system, access rights are granted to all PCs in the system as represented by the Network Access icon above. If you want to restrict access by IP address, click on the

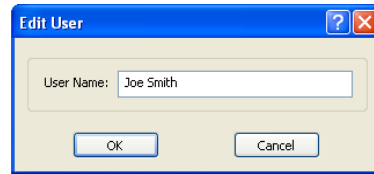


To add a User or Client PC, Right-Click on the Grant Access icon. Select **Add User** or **Add Client PC** from the menu.

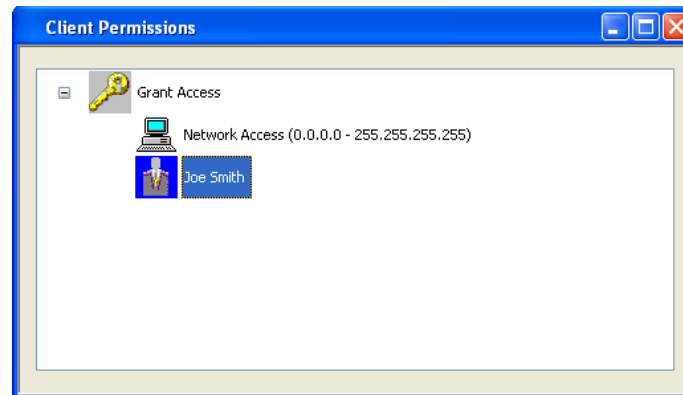


Add User

The **Add User** function lets you add an authorized user.



Enter the User Name and hit OK.



The user will be added in the Permissions Tree under the icon you first selected.

In the case above, the user is added under the root. This makes him a Global User. He will be allowed to access the Server from any IP address that can reach the server.

Users can also be added as local users under specific PCs.

Add PC(s)

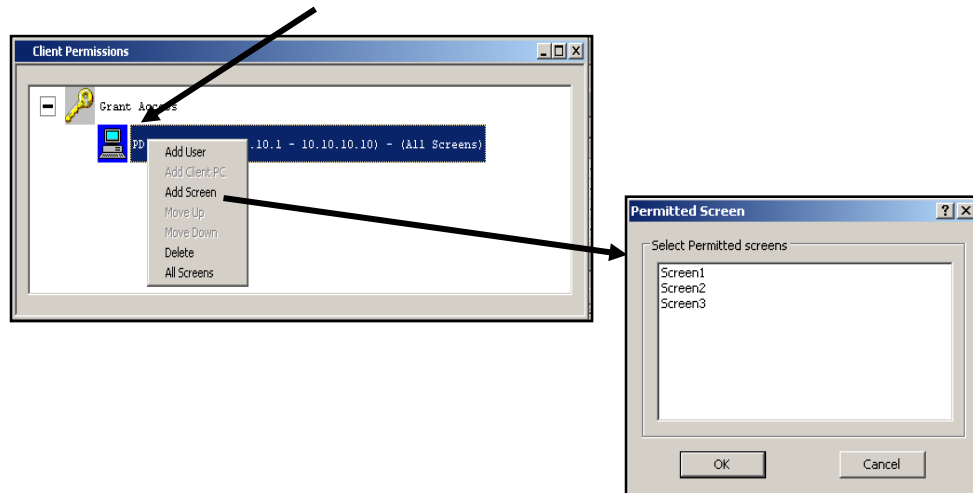
The **Add PCs** function lets you add a series of authorized Client PCs by using an IP address range. This allows you to assign the same rights to all PCs in the range. For example, you could set up two ranges, one for Police Dispatch and one for FD Dispatch:



Add Screen

Screens can be added under PCs or Users.

Right Click on a PC or User icon and select "Add Screen".



Select a screen from the list.

Windows User Names Note



Note that 'User Name' is the 'Windows User Name' that was originally established for an account. If the User Name is changed, Windows still reports the original User Name to the MCNRCD Server program.

Network and System Security Note

The Client Permission feature of the MCNRCD Server is intended to help organize screens for clients on a closed network. It is intended to be used in large systems with multiple screens to limit the screens available to dispatchers to the actual screens that pertain to that dispatcher, thus eliminating confusion.



The Client Permission feature is not intended to provide any network or system security. To prevent access to the Client and Server PCs by unauthorized users, additional network and system security options must be acquired by the customer.

Since screen selection is based on the Client PC's IP address and the Windows Username, users should be configured without administrative rights. This will prevent them from adding user accounts or changing their IP addresses.

NEW (BRSC) Base Radio Status Concentrator Overview

The Base Radio Status Concentrator (BRSC) is an auxiliary software option that is New in the MCN Server 8K software version 10.02.xx. Earlier versions of the MCN software and systems must be upgraded to add and support the operations of this feature.

The BRSC software package must be installed and run on a separately devoted BRSC PC, which can then allow connections to GTR 8000 Base Radios (**BR**)s across an MSI Radio Network Infrastructure (RNI).

The BRSC's primary function is to gather Transmitter Status Information from each of the Connected Base Radios(BRs). After being installed it operates as a virtual Network Interface, which will connect and support up to 240 GTR 8000 BRs. It uses the Transmitter Statuses gathered from each BR to detect and indicate whether or not the BR is transmitting.

The BRSC can also send the collected status information of GTR transmitters to other applications such as the MCN Server 8000 and the RF-Monitoring software which are run remotely on dedicated PCs. These applications connect as clients to the BRSC and facilitate the remote monitoring of Base Radio Transmitter Statuses and activity.

The BRSC depends on two main components for it to operate.

1. The BRSC Server

The main application is specifically designed to operate as a server, which communicates with GTR 8000 Base Radios to gather status information. The following are the key attributes of the BRSC Server:

- a. **Functions as a Network Interface:** This means the application acts as a transitional bridge across the MSI network.
- b. **Connects solely to GTR 8000 Base Radios:** It exclusively interfaces with GTR 8000 Base Radios, and it does not connect to other types of radios.
- c. **Display BR Status Information:** It gathers and locally displays the transmitter statuses of the connected BRs.
- d. **Sends Radio operational statuses to its clients:** It can forward the transmitter status of the GTR 8000 Base Radios to designated clients, which are other CTI applications that can receive and display the status information.
- e. **Is not a client to any other application:** This means that the device or system does not interact with or rely on other applications or systems for its own operation.

2. The BRSC Clients

Both the RFM software and the MCN Server 8000 software can connect as clients to the BRSC server. They can both receive and display the base radio transmitter status updates from the BRSC server. The following, highlights the differences between the two:

- a. **The RFM Software:** The RF-Monitor connects to the BRSC server to retrieve and display the status information of BR transmitters. A signal indicating the status of each Base Radio (BR), such as transmitting (Tx), idle, offline, or error, is sent to the RFM software. By integrating information from both the Carrier Operated Relay (COR) and the BRSC, the RFM system can provide a comprehensive analysis of the simulcast radio channel.
- b. **The MCN Server 8000 software:** The MCN Server 8000 is by itself a standalone server for comparator monitor and control, but it can also connect as a client to the BRSC server, where it receives Base Radio(BR) transmitter status information, which it then can be displayed as a GTR status in the "Display Window."


Configuring the BRSC in MCN Config Server

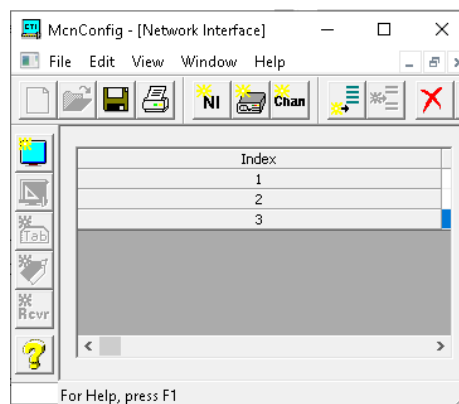
The BRSC feature involves setting up and configuring both the MCN Configuration System (via MCN Config server software) and the BRSC Server (via BRSC HW Setup Application).

Additionally, it will require the following to authorize its operation:

- a. A USB dongle for license authorization.
- b. A license key file to enable its operation.

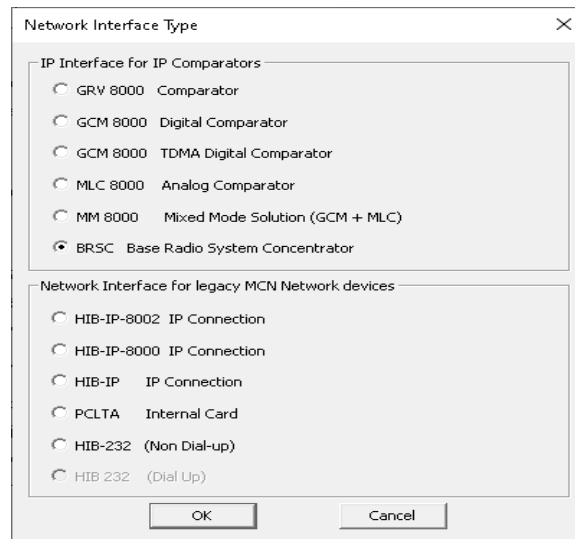
The setup and combined use of all the previous steps will ensure that the BRSC feature is properly configured, authorized, and ready to perform its special operation.

The BRSC Network Interface can only be added and configured with MCNConfig Server Version 10.xx Application. To configure, begin by clicking  on the Icon from the Menu



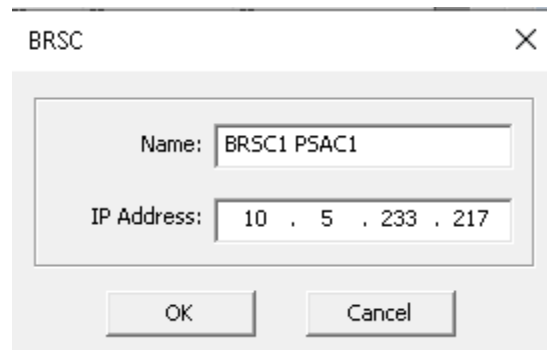
Network Interface types:

From the Network Interface Type window that is presented, select the BRSC option from the list of Radio Buttons shown



Click **'OK'** to confirm the selection

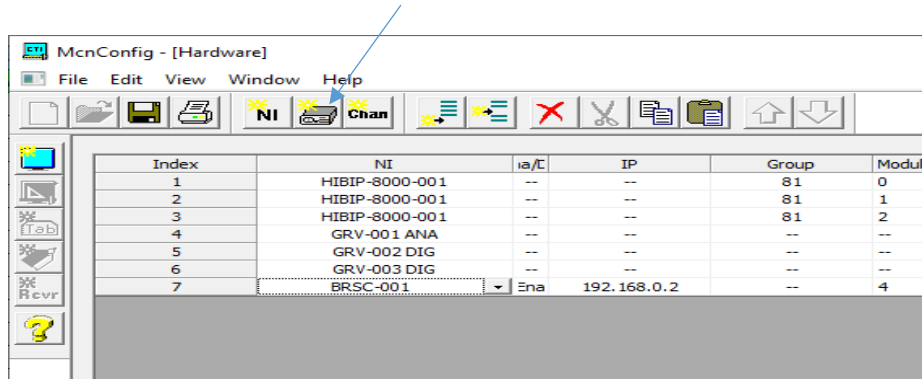
Change or verify the IP Address to match that of the BRSC Server PC as appropriate for your system, then you may edit the Name entry to a more suitable Alias if desired.



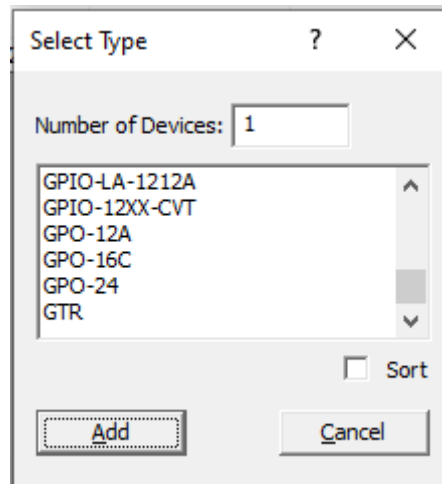
Click **'OK'** to accept the changes.

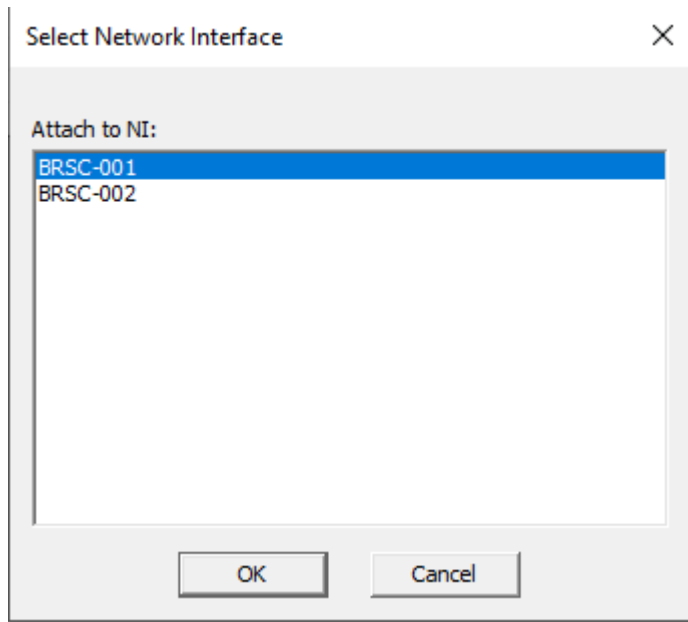
The new NI device will be visible in the Network Interface window as shown below:

Use the MCNConfig Server’s “Add Hardware” button or click “View”-> “Hardware”.

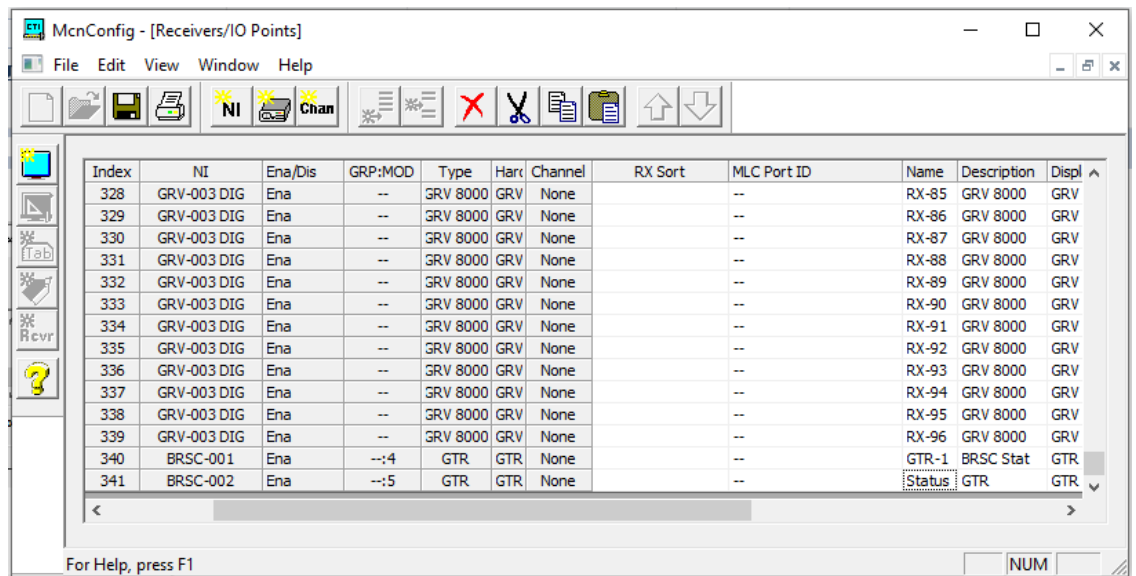


Right click “Add New”->“GTR”; to add a GTR Transmitter Module. Entry in the MCN system configuration.

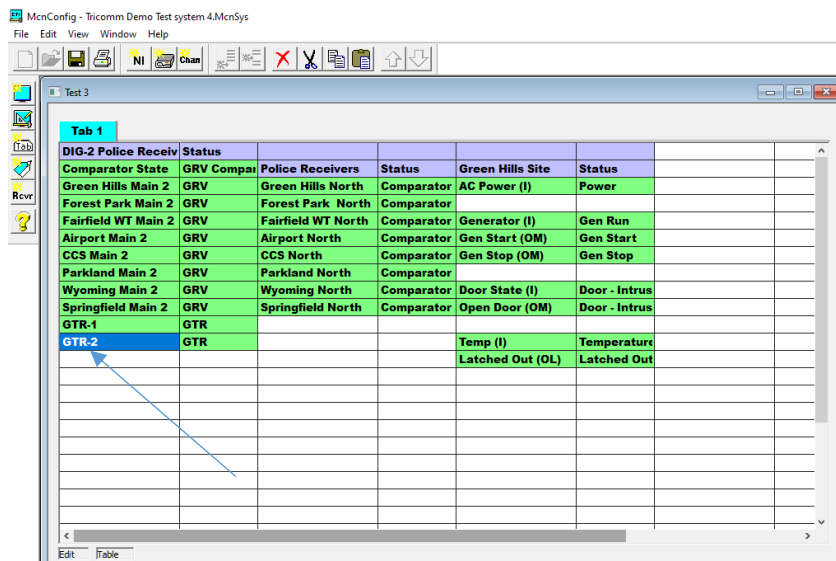
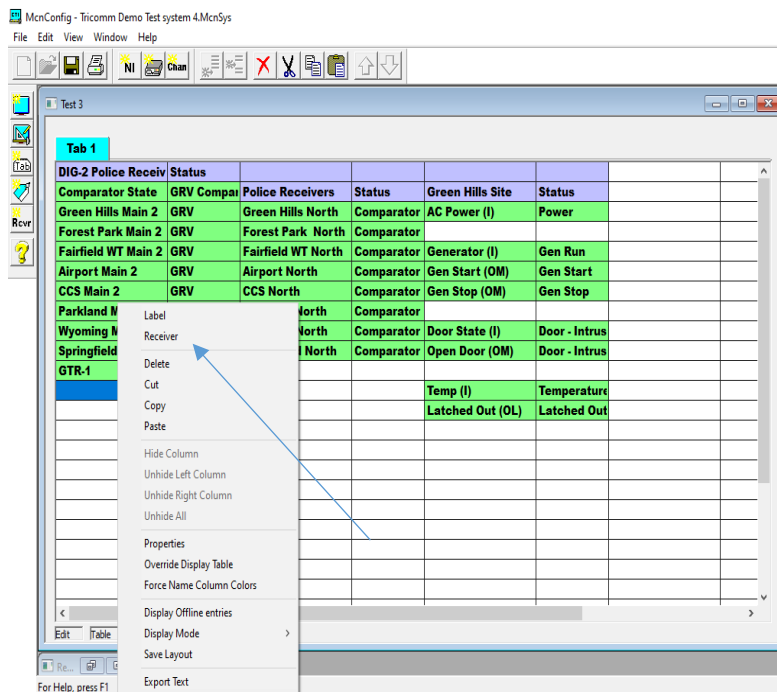


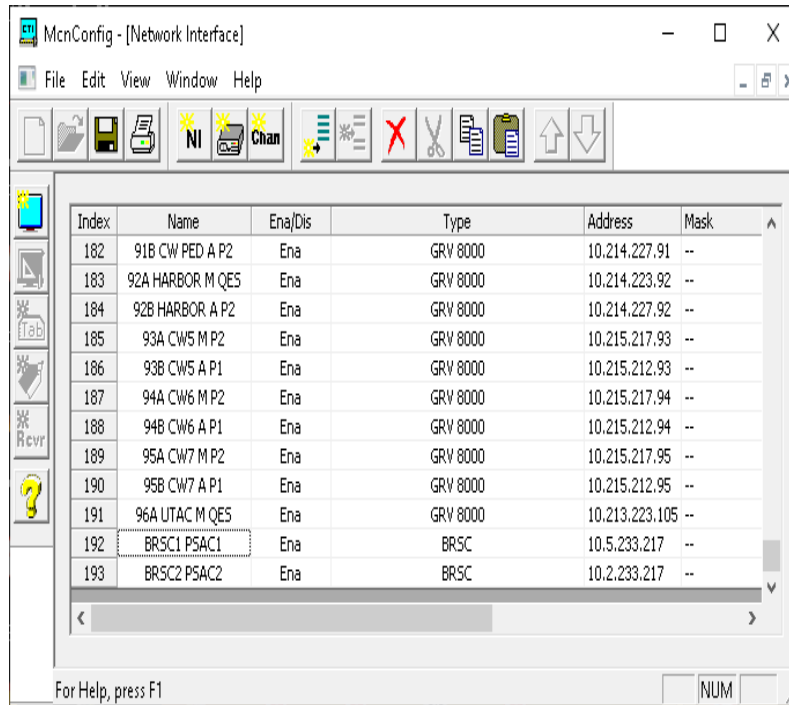


Click “View”-> “Receiver” in the MCNConfig Server to view the entry for the GTR Transmitter module/s. Edit the Alias and description as appropriate.



Click “View”-> “Display Window”. When the Display Windows opens locate the position where you want the Transmitter status indication to be located then Right click and choose “ Receiver” within that point on the grid.





Then Click 'File' -> 'Save' to update and save all changes to the MCN system files.

The MCN Server 8K application must be restarted to run the newly updated system.

How BRSC runs in the MCN Server

The BRSC Status information will only be downloaded from the BRSC Server, after the MCN Server application connects to the BRSC server as a client, while running with a valid License that authorizes connection to the BRSC Server, as determined by the Authorized IP address list.

Configuring the BRSC Server

The BRSC program **must** be installed and run on its own separate PC, where it operates as a service on the windows OS Platform. However, there are some configuration parameters which must be configured correctly to get things working; i.e., IP addresses and Port Numbers.

Note: See the BRSC manual **S2-61952** for help and guidance with installing configuring the BRSC server.

Composite Alarms

Introduction

A composite alarm is an alerting feature that combines multiple inputs and triggers one output alarm. This means that it will alert when the specified input condition/s are met.

Latched Composite Alarms

Remain active even after the triggering condition clears.

Require manual acknowledgment or a specific reset condition to deactivate.

Example: A RX failed alarm would stay active until manually reset, even if the dispatcher acknowledges it, unless the Radio System Tech resets it on their end.

Use Case

Useful for ensuring critical events are reviewed before the alarm is dismissed.

Unlatched Composite Alarms

Automatically resets when the triggering condition clears.

Example: If a receiver loses power and restarts, the alarm will automatically reset once it's back online and normal.

Use Case

This is useful for real-time monitoring where immediate device status is required.

Functional Differences

Feature	Latched Alarm	Unlatched Alarm
Auto-reset?	No	Yes
Manual action needed?	Yes	No
Use case	Critical events needing acknowledgment	Real-time status updates

Application Consideration Contrast

- Choose latched alarms for serious, high-risk conditions requiring human intervention.
- Choose unlatched alarms for temporary, self-resolving issues where auto-reset is permissible or preferred.

Contact CTI Systems support for help with this feature.

Support@CTIProducts.com

MCN Network Interfaces

Network Interface Options

The MCN Server 8000 will connect directly to IP comparators through an IP network but can also connect to non-IP comparators and I/O devices on the MCN networks through a discrete Network Interface. The following list shows the possible types of NI (Network Interface) options:

Network Interface	Type	MCN Network Speed
HIB-IP family	IP Module	78 Kbps
HIB-232	RS-232 Serial	78 Kbps
PCLTA-21-78K	PCI Board	78 Kbps
PCLTA-21-1250K	PCI Board	1.25 Mbps

The MCN Server **8000 will communicate** using any of the previous NI options, to one of the following Legacy Equipment (Non-IP comparators and I/O) devices:

Device	MCN Module Type
ASTRO-TAC™ 3000 Comparators	AIB Modules
Digitac Comparators	CIB Modules
Spectra-TAC Comparators	CIB Modules
Competitive Comparators	CIB Modules
I/O & Alarm Points	GPIO Modules

All the MCN modules shown above establish their connection via Network Interface modules linked back to the MCN Monitoring and Control Network and communicate on a 78 Kbit wired network, Larger systems may include a 1.25 Mbps high-speed backbone network that connects to the MCN modules through MCN Routers and EXB Network Extender Modules.

The standard MCN Server 8000 software can support a single Network Interface (usually a HIB-IP unit). Additional Network Interfaces can be supported by purchasing expansion options. When interfacing legacy equipment using MCN modules, you will need to know:

Network Interface Information (entered in Network Interface window):

- Network Interface Type
- Network Interface Parameters
- MCN Group & Module addresses
- IP parameters (for HIB-IP units)

MCN Module Information (entered in Hardware window)

Module Type
MCN Group & Module addresses

Receiver & I/O Point Information (entered in Receiver window)

Receiver and/or I/O Point Name
Type of Display Table to use (Comparator, Alarm, Door, etc.)

The MCN Config Server section of this manual has references to the above items throughout.

More information on the MCN modules, and the MCN network can be found in the appropriate manuals. See the Reference Documents section of this manual for a list of manuals.

1) Run the MCN Config Server program (see page **59**) to build your system resources lists for:

- **Network Interfaces** (Legacy systems)
Legacy: HIB-IP, HIB-IP 8000, HIB-IP 8002, HIB-232 modules.
- **Hardware Modules** (IP & Legacy):
IP: GRV 8000, GCM 8000 (FDMA), GCM 8000 TDMA,
MLC 8000, Mixed Mode
Legacy: CIB, AIB, GPIO modules
- **Channel Names**
- **Receiver Names, I/O Points & other data.**

You may **not** need to edit the Display Tables unless you need to change the display colors and text for the receiver status displays.

2) Use the MCN Config Server program to build your **Display Screen(s)** by:

- Placing receivers & I/O points on screens
- Adding channel labels
- Adding tabs if required

3) Use the MCN Config Server program to build a list of **Client Authorizations** if required to limit access of specific **clients** to certain display screens.

4) If you have Legacy MCN equipment and are using HIB-IP, HIB-IP 8000, or HIB-IP 8002 modules, program them using the MCN Config program. See **Loading Configuration Data into HIB-IP** family units on page **85**.

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.

Configuring Network Hardware Interfaces

This section provides guidance on adding and configuring each of the possible Network Interface (NI) types that are available. It will begin by looking at the newer IP comparator types such as GCM 8000, GRV 8000, and MLC 8000. Then work backwards to discuss the older legacy NI options such as HIB-IP's.

Analog GRV 8000 Comparator.

The GRV 8000 Analog Comparator family is comprised of two types of units:

- **GRV 8000 comparator** (G-Series Comparator)
- **G-Series Link Converter** (GSLC) (for interface to 4-Wire radios)

The Analog GRV 8000 comparator works in three different scenarios:

- **P Only:** Analog RF transmission with IP connectivity to all BRs "G" Series BRs (GTR 8000) and Receivers (GPW 8000) and/or
- **4-Wire Only:** Analog RF transmission with Quantar or similar BRs with 4-wire connectivity GSLC modules
- **IP GTR 8000 and 4-Wire Radios:** A mixture of IP BRs and 4-Wire BRs.

Digital GRV 8000 Comparator.

Digital GRV 8000 Comparator talks directly to BRs over IP and provides the following:

1. Frame-Level Digital Voting;

- Selects the best audio by comparing individual P25 digital voice frames from multiple receivers.

2. P25 Phase 1 & Phase 2 Support;

Fully supports **Project 25 (P25)** digital radio communications:

- **FDMA (Phase 1)** and **TDMA (Phase 2)** signaling.

3. Error Detection & Correction;

Evaluates **bit error rate (BER)** and **signal integrity** instead of just audio clarity:

- Applies advanced error checking on each incoming signal to determine which one to pass through.

4. IP-Based Operation;

Works over IP networks, allowing multiple digital receivers (e.g., Quantar, GTR8000, or APX) to send audio frames for centralized voting:

- Uses **RTP (Real-Time Protocol)** streams to transport digital voice/data.

5. Simulcast Ready;

It's tightly integrated with **digital simulcast systems**, where timing is critical:

- Supports **precise timestamping and alignment of digital audio**, which is essential to simulcast systems to prevent destructive interference.

6. Digital Diagnostic & Monitoring Tools;

- Provides real-time metrics: signal quality, RSSI, packet loss, timing drift, etc.
- Accessible remotely via browser or Motorola's **Unified Event Manager (UEM)**.

Connecting to the GRV 8000 IP Comparator

The MCN Server 8000 software (version 8.10 and newer) can work with digital comparators, such as the Motorola GRV8000.

Adding the GRV IP Comparator to MCN system

To add the Motorola GRV 8000 comparator to your MCN Server 8000, just create a new virtual Network Interface using the MCN Config Server Software. The process is the same for all IP comparators, so it's straightforward and consistent.

See Section "**Adding IP Comparator NI**" on page 72

The requirements to gather and configure the GRV 8000 parameters and provide some general info on using Motorola CSS software with the comparator, BRs, and receivers. It's not a full tutorial, so please refer to Motorola's documentation for detailed instructions.

Note 2: Some of the GRV 8000 parameters configured in CSS will be required for the MCN Config server to build the GRV 8000 Network Interface.

Motorola CSS Software

The Motorola CSS program is needed to connect to and configure the GRV 8000 comparator. The CSS version used at the time of this document's compilation was Release A.7.17.2; Version 030.00.007. Other versions may look and work differently.

Note: The CSS A7.17.2 and higher can configure the GRV 8000 (G-Series) IP comparator as an analog or digital comparator that supports up to 96 receivers or BRs.

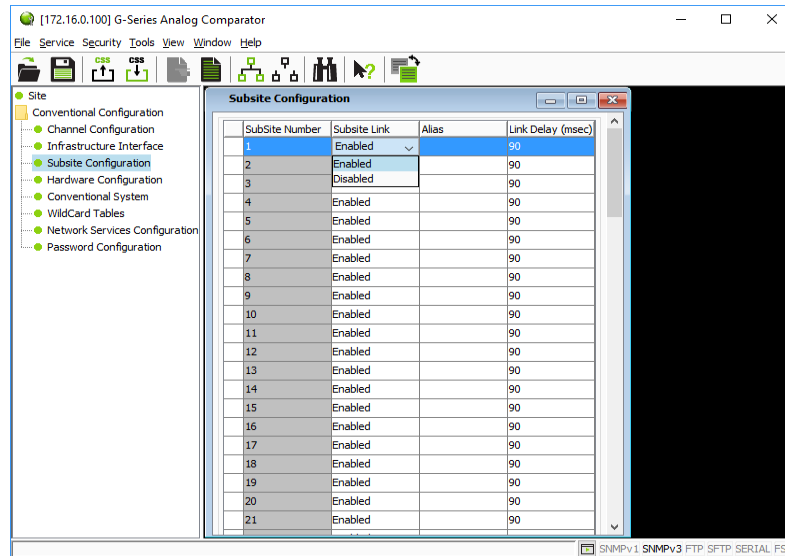
Information Required to Configure GRV 8000 IP Comparator

The information required to configure the MCNConfig Program for the GRV 8000 Comparator module when building the MCN System Files is as follows:

- | | |
|-----------------------------------|--|
| a. GRV 8000 IP Address: | (Entered in the Hardware Configuration window for GRV 8000.) |
| b. Subsite Number: | (Matches the Receiver Number in the Receiver Window) |
| c. Receiver/Subsite Name: | (Entered in the Receiver Window) |
| d. Description (Optional): | (Entered in the Receiver Window) |

Subsite Aliases in the GRV 8000 Comparator

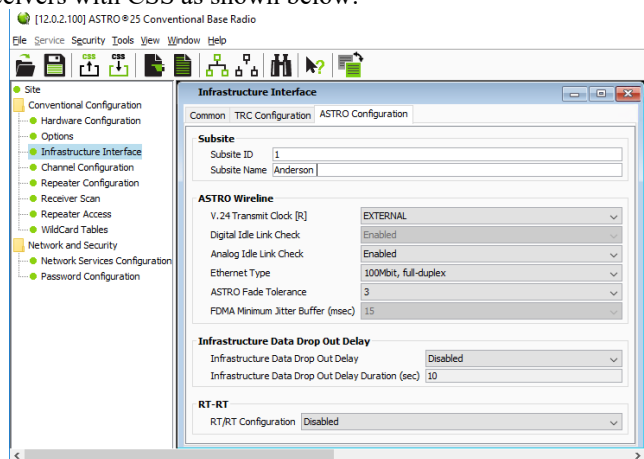
In many cases, the receiver subsite names to be displayed in the MCN Server 8000 software will be different (typically more “user-friendly”) than the aliases used in the GRV 8000 CSS software. Unfortunately, the GRV 8000 CSS does not support the Windows Copy command, so you will have to manually enter the Aliases for each Sub-site (BRs or Receivers) into the MCN Config Server program Receiver Window individually. The Subsite Configuration windows look the same for Digital and Analog GRV 8000.



Configuring Subsite Number and Name in BR

Subsite ID Assignment (Programmed in BR)

Although the Subsites (BRs and receivers) are shown in the list for the comparator Configuration window in CSS, the Subsite number is configured in each of the GTR 8000 BRs and the GPW 8000 Satellite Receivers with CSS as shown below:

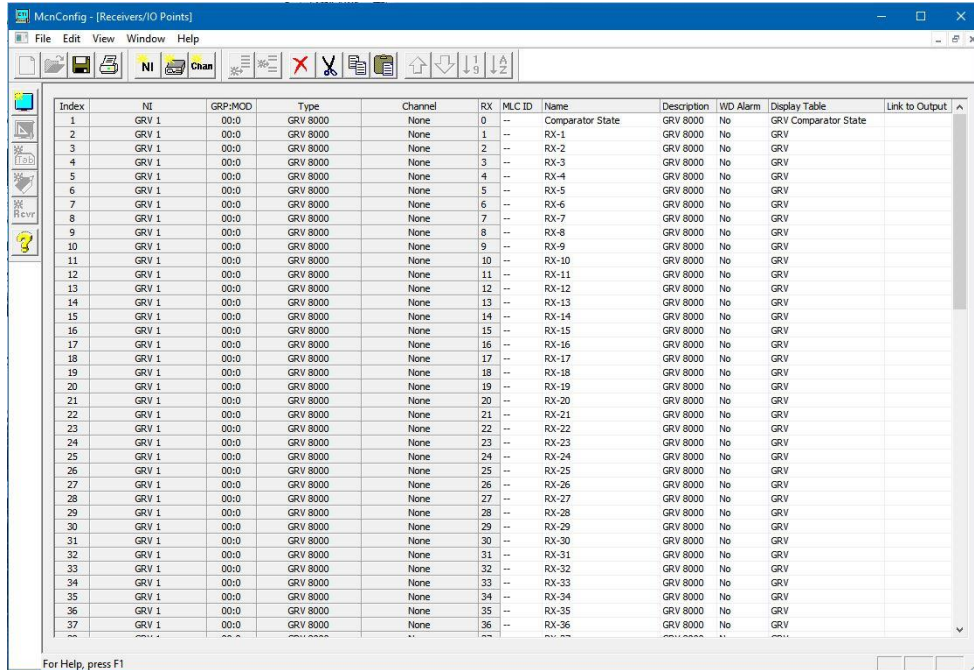


Configuring Subsite Number and Name in BR

For 4-Wire receivers and BRs, the Subsite Number is configured in its GSLC.

GRV 8000 Receiver List

When a GRV 8000 comparator is added to the system, the MCN Config Server program automatically allocates 96 receiver entries, numbered 1-96 in the Receiver Window which map to the 96 possible subsites in GRV 8000 comparator (as seen in the CSS software).



Screen shot of GRV 8000 Receiver list.

The receiver names (aliases) and other information can be changed in the **Receivers Resource Window - Configuration**; See page 96 for instructions.

GRV 8000 Comparator Redundancy State

Version A7.17.2 and up of the GRV 8000 comparators include a Redundancy feature. The comparator can be configured for any of three Redundancy Modes:

1. Stand-alone Non-redundant
2. Main Main redundant comparator
3. Alternate Alternate redundant comparator

The Astro Zone Controller selects one of the redundant comparators (Main or Alternate) to the Active state. It sets the other to an Inactive state. Wildcard inputs can also be used to force a comparator to the Active or Inactive state. The comparator sends the comparator redundancy state to the MCN Server.

Version 8.10 of MCN Server 8000 software supports the GRV 8000 Comparator Redundancy state. When the GRV 8000 comparator is added to the system configuration, a special “Comparator State” is added as “Receiver” number 0. It uses the “GRV Comparator State” Display Table

GRV Comparator State Display Table

The GRV Comparator State Display Table was added in MCN Server 8000 version 8.10 to show the overall comparator status (Receiver 0) for version A7.17.2 and later GRV 8000 comparators. The possible states for the GRV 8000 IP Comparator using this Display Table are:

Displayed State	Meaning
Error	Invalid state
Active	Stand-Alone Comparator Active
Main Inactive	Main Comparator Inactive
Main Active	Main Comparator Active
Alt Inactive	Alternate Comparator Inactive
Alt Active	Alternate Comparator Active

The “Main” and “Alt” wording could be eliminated in the Inactive states if desired.

The Comparator Status bits that drive the above states also factor into the display for all the receivers in the comparator. If a comparator’s status is **Inactive**, all the receivers will also show **Inactive**. This may have to be disabled in comparators before A7.17.2. It may also be disabled if you desire to see which subsites are Disabled or Failed on an Inactive comparator. See *Removing Receiver Inactive States* for details.

GRV and GRV LV Display Tables

The GRV and GRV LV Display Tables map the information from the comparators to the status text and colors to be displayed. The two standard Display Tables for the GRV 8000 comparator are:

1. GRV and
2. GRV LV (Last Vote).

The following Screen shot shows the possible states for those Display Tables:

Displayed State	Meaning
Error	Undefined Status
Inactive	Comparator is Inactive (Stand-Alone comparator) (Note 4)
Main - Inactive	Main Redundant Comparator is Inactive (Note 4)
Alt - Inactive	Alternate Redundant Comparator is Inactive (Note 4)
Offline	The server cannot talk to the GRV 8000 comparator (Note1)
	Idle - No Activity
Link Disable (or "DISABLE")	Subsite is permanently disabled in CSS by disabling the IP Link to the BR/Receiver or GSLC
Disable	Disabled via MCN Server 8000, MCN Client or CSS Local Status Panel
Fail IP Link	Subsite Failed - Comparator cannot talk to BR (Note 2)
Fail Analog	Subsite Failed - Comparator cannot talk to BR (Note 2)
Rx	Voice Receive activity
Rx Data	Data Receive activity
Forced Vote	Force Vote (but not yet Voted)
Vote	Voted
Vote Data	Voted for Data
Last Vote	Last Subsite voted (GRV LV Display Tables only) (Note 3)

GRV 8000 Display States table

The above states are predefined in the GRV and the GRV LV Display Tables.

- Note 1:** The Offline state could be caused by any of the following:
- MCN server cannot talk to the GRV 8000 comparator (Bad comparator, loss of power, network problem)
 - GRV 8000 IP address in the MCN System Configuration Files is incorrect.
 - If the MCN server has multiple NIC cards, the wrong one may be selected.

- Note 2:** The Fail state could be caused by any of the following:
- The GRV 8000 Comparator cannot communicate to an IP BR.
 - The GRV 8000 Comparator cannot communicate over IP to a GSLC.
 - The 4-wire audio link between the Analog BR and the GSLC is disconnected.
 - A BR or GSLC has lost power.

- Note 3:** The Last Vote indication (using the GRV LV Display table) will only be displayed when that Subsite is otherwise in the Idle state.

- Note 4:** If a comparator is Inactive, all its receivers will also show Inactive. Comparators before Version A7.17.2 do not support status indication. So, this feature should be disabled for those comparators. It can also be disabled if you desire to see which subsites are Disabled or Failed on an Inactive comparator.

GRV Tech Display Table

The GRV Tech Display Table is provided to help technicians troubleshoot GRV 8000 IP Comparator systems. Separate screens or tabs can be set up using this Display Table for Technician use.

The GRV Tech Display Table adds more technical indicators to the display including Signal Quality indication. (The Signal Quality Metrics are audio quality indications, not RF strength or RSSI indications.) The possible states for the GRV 8000 IP Comparator Subsites (receivers) using this Display Table are:

Displayed State	Meaning
Error	Undefined Status
Inactive	Comparator is Inactive (Stand-Alone comparator)
Main - Inactive	Main Redundant Comparator is Inactive
Alt - Inactive	Alternate Redundant Comparator is Inactive
Offline	The server cannot talk to the GRV 8000 comparator (Note1)
Link Disable (or "DISABLE")	Subsite is permanently disabled in CSS by disabling the IP Link to the BR/Receiver or GSLC
Disable	Disabled via MCN Server 8000, MCN Client or CSS Local Status Panel
Fail IP Link	Subsite Failed – Comparator cannot talk to BR (Note 2)
Fail Analog	Subsite Failed – Comparator cannot talk to BR (Note 2)
Rx	Receive Signal Quality 0 (Analog GRV 8000 only)
Rx □	Receive Signal Quality 1 (Analog GRV 8000 only)
Rx □□	Receive Signal Quality 2 (Analog GRV 8000 only)
Rx □□□	Receive Signal Quality 3 (Analog GRV 8000 only)
Rx □□□□	Receive Signal Quality 4 (Analog GRV 8000 only)
Rx □□□□□	Receive Signal Quality 5 (Analog GRV 8000 only)
Rx Data	
Forced Vote	Forced Vote
Vote	Voted
Vote Data	Voted for Data
Vote	Voted (Digital)
Vote	Vote Signal Quality 0 (Analog GRV 8000 only)
Vote □	Vote Signal Quality 1 (Analog GRV 8000 only)
Vote □□	Vote Signal Quality 2 (Analog GRV 8000 only)
Vote □□□	Vote Signal Quality 3 (Analog GRV 8000 only)
Vote □□□□	Vote Signal Quality 4 (Analog GRV 8000 only)
Vote □□□□□	Vote Signal Quality 5 (Analog GRV 8000 only)
Last Vote	Last Subsite voted (Note3)

Notes 1-3: Same as for the previous table.

Note 1: If a comparator is Inactive, all the receivers in that comparator will also show **Inactive**. Since comparators before Version A7.17.2 do not support the comparator status indication, this feature may have to be disabled for those comparators. It may also be disabled if you desire to see which subsites are **Disabled** or **Failed** on an Inactive comparator. See Removing Receiver Inactive States for details.

Note 2: This table is best used with a fixed width font (such as Courier New) so that the signal bars align. Older GRV Tech Display Tables used the vertical bar symbol (|) for SQM levels. They have been replaced by square bracket pairs ([]) for better visibility.

Note 3: This Display Table is normally not used for dispatchers. It will be too cluttered. The signal quality bars may also cause unwanted inquiries to the technical staff since the bars are audio quality indications rather than RF signal strength.

Removing Receiver Inactive States

As described in previous sections, the Comparator Status bits factor into the display for all the receivers in the GRV 8000 comparator. They appear as the first three bits in the partial GRV Display Table below. If the Active bit is 0, the normal receiver states will be over-riden and one of the Inactive States will be displayed. This function may not be desired in the following two situations:

- A. If an older (before Version A7.17.2) GRV 8000 comparator is being used it may display all the receivers as Inactive since it does not provide the Comparator status bits or
- B. If the user desires to see Fail and Disable states on an Inactive comparator. This will indicate to the user how many subsites have problems and will help the user to decide whether or not to switch to the currently **Inactive** comparator.

Comparator	GCM	GCM LV	GCM FDMA - TDMA	GCM TDMA Slot1	GCM TDMA Slot 2	GRV Comparator State	GRV	GRV LV											
Index	S t a n d a l i o n e	A l t e r n a t e	A c t i v e	L V	V D	F V	V S F / A	S t 3	S t 2	S t 1	S t 0	S Q M 2	S Q M 1	S Q M 0	State	Alarm Sound	Alarm Enable	Log Enable	Triggers Output Action in Display Table: [-NONE-]
1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Error		N	Y	
2	1	-	0	-	-	-	-	-	-	-	-	-	-	-	Inactive		N	N	
3	0	0	0	-	-	-	-	-	-	-	-	-	-	-	Main - Inactiv		N	N	
4	0	1	0	-	-	-	-	-	-	-	-	-	-	-	Alt - Inactive		N	N	
5	-	-	-	-	0	0	0	0	0	0	0	-	-	-	Offline		N	Y	
6	-	-	1	-	0	0	0	0	0	0	1	-	-	-			N	N	
7	-	-	1	-	0	0	0	0	0	1	0	-	-	-	DISABLE		N	Y	

In the Display Table above, normal comparator states start at Index 6. They all have a “1” in the Active column. To prevent the Inactive states from being displayed:

- From the Menu, select View / Display Table.
- Select the GRV tab as shown above.
- In the GRV Display Table, change the Active field in index lines 6 from “1” to “-”. (“-” means don’t care.)
- Repeat for Indexes line 7 and following.
- Do not delete Index Lines 2-4.
- Repeat this for the GRV LV and GRV Tech Display Table if used.
- Save the system files.

Warning: To prevent incorrect Displaying of the Receiver states.
Do not attempt to edit or change the following items.



- Entry order or
- Bit values in the display table.

Connecting to the GCM 8000 Digital IP Comparator

The MCN Server 8000 software (version 8.10 and newer) can work with digital comparators, such as the Motorola GCM 8000.

Adding GCM IP Comparator to MCN system

To add the Motorola GCM 8000 comparator to your MCN Server 8000, just ADD a new virtual Network Interface using the MCN Config Server Software and select the GCM comparator type. The process is very similar for all IP comparators, so it should be easy and intuitive to follow the process.

See Section “*Adding IP Comparator NI*” on page 72.

Motorola CSS Software

This section will cover the requirements for gathering and configuring the GCM 8000 parameters, along with general information about using the Motorola CSS software with comparators, BRs, and receivers. However, it is not a complete tutorial on configuring these devices; readers should refer to the relevant Motorola documentation for detailed guidance.

Note: Some of the GCM 8000 Parameters configured in CSS will be required for the MCN Config server to build the GCM 8000 Network Interface.

The Motorola CSS program is required to connect, read, and configure parameters from the GCM 8000 comparator. The CSS version used at the time of releasing the compilation of this document was A2019.2 Ver 33.33.015. Other versions whether newer or older may look and function differently.

Note: Some CSS versions after A7.16 appear to not function correctly when configuring GCM 8000 Comparators.

GCM 8000 Comparator Considerations

There are two options available in the MCN Config for GCM 8000 comparators:

1. GCM 8000 (FDMA) Digital comparator
2. GCM 8000 TDMA Digital comparator

GCM 8000 (FDMA) Conventional & Trunking Comparator

The GCM 8000 (FDMA) comparator was designed to support BRs meeting the Phase1 FCC Narrowband requirement for 12.5 kHz bandwidth. The conventional version of the GCM 8000 accommodates up to 64 receivers. The trunking version accommodates fewer receivers, depending on the ASTRO® 25 system in use. These comparators will be added to the MCN system configuration by selecting option 1 from the previous list under the **GCM 8000 (FDMA) Conventional & Trunking Comparator** window in the MCN Config Server program.

GCM 8000 TDMA Trunking Comparator

The TDMA GCM 8000 was designed to support BRs that meet the Phase2 FCC Narrowband requirement of 6.25 kHz bandwidth, while giving the added benefit of doubled capacity through its utilization of dual Time slots on each Radio Channel. The current version of this comparator (at the time of this manual revision) can control up to 32 BRs or receivers. To add a GCM 8000 TDMA comparator to the MCN system configuration, select the GCM 8000 TDMA option from the 'Network Interface Type' window in the MCN Config Server program.

Required Information for GCM 8000 Interfacing

You will need the following information for each IP comparator and any associated receivers to successfully configure and interface the comparators to the MCN system.

- ✓ Comparator IP Address
- ✓ Receiver/Subsite ID
- ✓ Receiver Name
- ✓ Site Name / Number
- ✓ MLC Comparator IP Address (for Mixed Mode systems)
- ✓ MLC Voter ID (for Mixed Mode systems)
- ✓ Receiver ID (for Mixed Mode systems)

You will need to use the appropriate parameters to configure the MCN system for each comparator. You will also need to know and understand the differences between information specific to the GCM 8000 digital comparator versus MLC 8000 Analog Comparator as described in the next sections.

Note: For Mixed Mode Voting Solution, you will need the data on both the GCM 8000 and MLC 8000 Analog Comparators.

Subsites Supported in MCN Server 8000

The MCN Server 8000 program has the capability of handling up to 64 Base Radios (BRs) or receivers in either FDMA or TDMA mode. In TDMA mode the program supports two-time slots per BR. The maximum number of usable BRs or receivers in a Motorola ASTRO® 25 system varies depending on the version of the ASTRO® 25 system and is identified in the table below.

ASTRO® 25 System Version	Max Supported RXs	Digital Channel Type	Time Slots
A7.12	15	TDMA	2
A7.13	32	TDMA	2
A7.14	32	TDMA	2
A7.15	32	TDMA	2
A7.16	32	TDMA	2

ASTRO® 25 System TDMA Channel Support

(The MCN Server 8000 software has not been evaluated with systems prior to A7.12.)

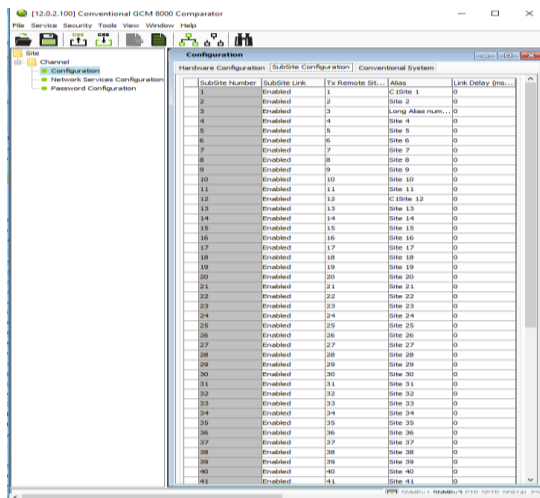
Note: Configure your system with only the Receiver/subsites names and IDs that are activated in that system, up to the maximum supported by the comparator for the ASTRO® 25 system in use. For TDMA systems, be sure to enter the receiver subsite names for each of the two timeslots.

CSS differences between FDMA & TDMA GCM 8000 Comparators

There will be significant differences in the options offered under the system tab in CSS when connected to an FDMA comparator versus a TDMA comparator as described below.

The CSS Configuration Page

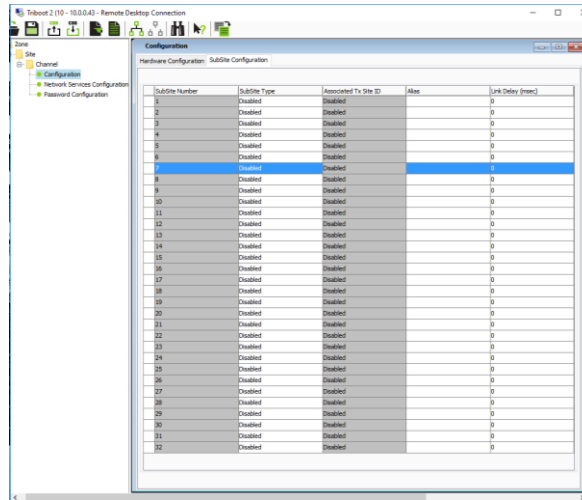
The FDMA configuration page in the CSS program provides 64 available subsite positions, allowing for connection of up to 64 receiver subsites as indicated in the screen shot below:



FDMA Conventional Comparator

When a GCM 8000 (conventional) comparator is added in MCN Config Server software, the program allocates entries for 64 receivers in the Receiver Window. These receivers map directly to Subsite Numbers 1-64 in the GCM 8000 comparator as shown in the CSS screen shot above.

The Configuration window in CSS is different for a TDMA comparator. In the current ASTRO® 25 system, there are only 32 allocated subsite positions as shown in the screenshot below (earlier versions may have fewer subsites.):



TDMA Trunking Comparator

The Aliases in the CSS software are used for the technician’s convenience to keep track of the BRs connected to the GCM 8000. Subsite aliases are not automatically transferred to the MCN Config Server software or the MCN Server 8000 software. A subsite alias can also be configured in the BR or receiver, but the subsite aliases are not linked between the comparator and the BR. It is important to make sure that the aliases in the comparator and those in the BRs match based on the Subsite Number that is configured in the BR.

In many cases, the receiver subsite names to be displayed in the MCN Server 8000 software will be different (possibly more “user-friendly”) than the aliases used in the GCM 8000 CSS software. The receiver names must be entered in the MCN Config Server software. Unfortunately, the GCM 8000 CSS does not support the Windows Copy command, so you will have to enter the Aliases for the Sub-sites (BRs or Receivers) into the MCN Config Server program Receiver Window by hand.

IP Addresses for the GCM Comparator and BRs / Receivers

The proper IP Scheme including the addresses, subnet masks, and IP gateways must be configured for both the comparator and the BR / receiver. The IP address scheme will typically be pre-assigned by a Systems Engineer, to be compatible with the appropriate IP plan for the system.

Prerequisite: Obtain the required credentials information (local service account password and elevated privileges password) to configure the site devices before proceeding. The user credentials information includes both the current and new credentials. Without the current credentials, access to the device or the user credentials is denied.

The IP parameters on all devices are configured through CSS using an RS-232 serial port with the following steps:

- 1) Connect to the device using Configuration/Service Software (CSS) through an Ethernet port link.
- 2) Click Read information from an infrastructure device
- 3) From the menu, select Tools → Set IP Address/BR_CM Pairing Number.
Note: If the device is not in voting or simulcast IP-only topology, the menu item is shown as Set IP Address/Box Number. The Set IP Address and Base Radio/Comparator Pairing Number dialog box appears, or the Set IP Address and Box Number dialog box appears.
- 4) In the Device IP Address field, enter the device IP address. Click Set Device IP Address.
- 5) **(Optional)** In voting or simulcast IP-only topology, you may also enter the device pairing number. Click Set BR/CM Pairing Number.
Also see the following Section “**BR Pairing Numbers & IP Addresses for the GCM Comparator**” on page 179.
- 6) Click OK to close the dialog box.
- 7) Click Reset to initiate a hardware restart. SNMPv3 user credentials reset to their factory default values.
- 8) Click Close to close the dialog box.

BR Pairing Numbers & IP Addresses for the GCM Comparator

To establish a voting system, a comparator must be paired to base radios/receivers in the radio channel using the BR Pairing Number (similar to a channel number). The Pairing Number is designated by the systems engineer during the design phase. Each radio channel must have a unique Pairing Number.

The BR Pairing Number for both the base radio/receiver and comparator is used to create an IP multicast group that allows the base radio/receiver and comparator to talk to each other. For more details, see the comparator manual.

Configuring the BR Pairing Number through Ethernet.

Set the BR Pairing number for the base radios, receivers, and the comparator (either TDMA or FDMA) with the Configuration/Service Software (CSS) using an Ethernet connection according to the following steps:

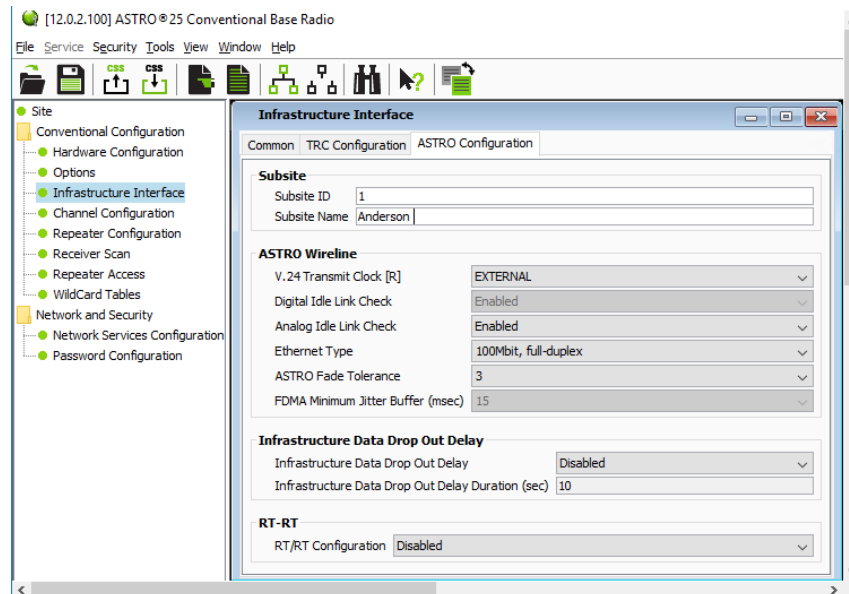
1. Connect to the device using Configuration/Service Software (CSS) through an Ethernet port link.
2. Click Read information from an infrastructure device.
3. From the menu, select **Service** → **BR/CM Pairing Number**.
4. Enter the pairing number. Click **OK**.

Note: The valid range for the pairing numbers is from **1-200**

When the pairing number changes, the change operation will require a 'Device Reset.' After the comparator reboots the Pairing Number will be set.

Subsite ID Assignment Programmed in BR

Although the Subsites (BRs and receivers) are shown in a list in the comparator Configuration window in CSS, the Sub-site number is configured in each of the GTR 8000 BRs and the GPW 8000 Satellite Receivers with CSS as shown below:



Configuring Subsite Number and Name in BR

Comparator GCM 8000 Characteristics & Limitations.

Understanding GCM 8000 characteristics and limitations helps in making informed decisions for MCN software usage and hardware configuration. The GCM 8000 comparator has the following limitations:

Maximum of 3 Simultaneous MCN Servers or CSS Sessions

The GCM 8000 supports only three simultaneous connections for real-time sessions. These sessions include:

- CTI MCN Server 8000 Software
- CSS Software

From a practical standpoint, this means that you should limit the number of MCN Servers talking to a GCM 8000 comparator to two. This will allow an open session for the CSS software.

MCN Server & CSS cannot run simultaneously on the same PC

A single PC cannot run both the MCN Server 8000 software and the CSS software simultaneously.

- To correctly run CSS on the Server PC, you will have to make sure that the MCN Server software is not running.
- To run the MCN Server software, you must make sure that the CSS software is not running on the MCN Server PC.
- If you try to run both at the same time, you will have to close both programs and re-start the one you want to use.

GCM 8000 Comparator Can't Disable a Failed Sub-site (Pre A7.17.2)

The legacy ASTRO-TACT™ 3000 and GCM 8000 comparators will not allow the user to disable a receiver (Subsite) if it is in Fail mode. This applies to both the MCN Server 8000 application and the Real-Time portion of the Motorola CSS software.

This problem was fixed in GCM 8000 software starting in Motorola's A7.17.2 release.)

GCM 8000 Disable States are Reset on Fail Condition (Pre A7.17.2)

The GCM 8000 comparator will reset the 'Disable' condition if a receiver (Subsite) goes into Fail mode. This applies to both the MCN Server 8000 application and the Real-Time portion of the Motorola CSS software.

This problem was fixed in GCM 8000 software starting in Motorola's A7.17.2 release.)

GCM 8000 CSS Software latches Votes

If a receiver (Subsite) is Force-Voted from the CSS Local Status Screen, it will:

- Latch in the Force Vote state.
- Not allow other receivers to be voted in the GCM 8000.

Note: *The latched Force Vote can be unlatched from the MCN Server 8000 by pressing and releasing the left mouse button.*

GCM 8000 TDMA Comparator Characteristics & Limitations

When a system is running in TDMA mode, one BR has two timeslots. When the GCM 8000 comparator is used in a TDMA system, the following additional considerations apply:

- **Force-Vote command:**
The CCM 8000 comparator in TDMA mode cannot independently force-vote one timeslot; it will attempt to Vote both timeslots. Be careful when you Force-Vote a subsite because it may affect the comparator’s operation on the alternate timeslot.
- **Disable command:**
The Disable command on the GCM 8000 comparator will disable the entire BR. It will disable both timeslots...
- **Fail state:**
The Fail indication applies to the entire BR. Both timeslots will show Fail.

GCM 8000 (FDMA) Status Display

The possible states for the GCM 8000 Subsites (receivers) in FDMA mode include:

Displayed State	Meaning
Error	Undefined Status
Offline	The server cannot talk to the GCM 8000 comparator (Note1)
(Blank)	No Activity
DISABLE	Permanently Disabled by CSS (note the capital letters)
Disable	Disabled via MCN Server 8000 or MCN Client
Fail	Subsite Failed - Comparator cannot talk to BR
Rx	Voice Receive activity
Rx Data	Data Receive activity
Forced Vote	Force Vote (but not yet Voted)
Vote	Voted
Vote Data	Voted for Data
Last Vote	Last Subsite voted (GCM LV Display Tables only)

The above states are defined in the GCM 8000 and the GCM LV Display Tables.

Note 1: The Offline state could be caused by the following:

- GCM 8000 IP address in the MCN System Configuration Files is wrong.
- MCN Server cannot talk to the GCM 8000 comparator (potential network problem)
- If the MCN server has multiple NIC cards, the wrong one may be selected.

Note 2: The Last Vote indication will only be displayed when that Subsite is otherwise in the Idle state.

Permanently Disabled (Unconfigured) Subsites

Permanently Disabled sites (Unconfigured) will show up as DISABLE or DIS (in capitals) to distinguish them from the Subsites that are disabled from MCN Server 8000 or the CSS Local Status Screen.

GCM 8000 TDMA Receiver List & Display Tables

The status display for the TDMA comparator is similar to the FDMA status display shown above, but there are two Display tables used for the TDMA comparators. When a TDMA GCM comparator is added to the MCN Config program, the program automatically sets up 64 available receiver entries from the Display Tables for each time slot:

- **GCM TDMA Slot 1** (Receivers 1-64 in Receiver Window)
- **GCM TDMA Slot 2** (Receivers 1-64 in Receiver Window)

See the two following screen shots, which show the available TDMA receives for the first time slot and then the second time slot along with the appropriate Display Table selected.

Index	NI	GRP:MOD	Type	Channel	RX	MLC ID	Name	Description	Display Table
65	NI-02	--	GCM 8000 TDMA	None	TS1-01	--	RX-1a	GCM 8000	GCM TDMA Slot1
66	NI-02	--	GCM 8000 TDMA	None	TS1-02	--	RX-2a	GCM 8000	GCM TDMA Slot1
67	NI-02	--	GCM 8000 TDMA	None	TS1-03	--	RX-3a	GCM 8000	GCM TDMA Slot1
68	NI-02	--	GCM 8000 TDMA	None	TS1-04	--	RX-4a	GCM 8000	GCM TDMA Slot1
69	NI-02	--	GCM 8000 TDMA	None	TS1-05	--	RX-5a	GCM 8000	GCM TDMA Slot1
70	NI-02	--	GCM 8000 TDMA	None	TS1-06	--	RX-6a	GCM 8000	GCM TDMA Slot1
71	NI-02	--	GCM 8000 TDMA	None	TS1-07	--	RX-7a	GCM 8000	GCM TDMA Slot1
72	NI-02	--	GCM 8000 TDMA	None	TS1-08	--	RX-8a	GCM 8000	GCM TDMA Slot1
73	NI-02	--	GCM 8000 TDMA	None	TS1-09	--	RX-9a	GCM 8000	GCM TDMA Slot1
74	NI-02	--	GCM 8000 TDMA	None	TS1-10	--	RX-10a	GCM 8000	GCM TDMA Slot1
75	NI-02	--	GCM 8000 TDMA	None	TS1-11	--	RX-11a	GCM 8000	GCM TDMA Slot1
76	NI-02	--	GCM 8000 TDMA	None	TS1-12	--	RX-12a	GCM 8000	GCM TDMA Slot1
77	NI-02	--	GCM 8000 TDMA	None	TS1-13	--	RX-13a	GCM 8000	GCM TDMA Slot1
78	NI-02	--	GCM 8000 TDMA	None	TS1-14	--	RX-14a	GCM 8000	GCM TDMA Slot1
79	NI-02	--	GCM 8000 TDMA	None	TS1-15	--	RX-15a	GCM 8000	GCM TDMA Slot1
80	NI-02	--	GCM 8000 TDMA	None	TS1-16	--	RX-16a	GCM 8000	GCM TDMA Slot1
81	NI-02	--	GCM 8000 TDMA	None	TS1-17	--	RX-17a	GCM 8000	GCM TDMA Slot1
82	NI-02	--	GCM 8000 TDMA	None	TS1-18	--	RX-18a	GCM 8000	GCM TDMA Slot1
83	NI-02	--	GCM 8000 TDMA	None	TS1-19	--	RX-19a	GCM 8000	GCM TDMA Slot1
84	NI-02	--	GCM 8000 TDMA	None	TS1-20	--	RX-20a	GCM 8000	GCM TDMA Slot1
85	NI-02	--	GCM 8000 TDMA	None	TS1-21	--	RX-21a	GCM 8000	GCM TDMA Slot1
86	NI-02	--	GCM 8000 TDMA	None	TS1-22	--	RX-22a	GCM 8000	GCM TDMA Slot1
87	NI-02	--	GCM 8000 TDMA	None	TS1-23	--	RX-23a	GCM 8000	GCM TDMA Slot1
88	NI-02	--	GCM 8000 TDMA	None	TS1-24	--	RX-24a	GCM 8000	GCM TDMA Slot1
89	NI-02	--	GCM 8000 TDMA	None	TS1-25	--	RX-25a	GCM 8000	GCM TDMA Slot1
90	NI-02	--	GCM 8000 TDMA	None	TS1-26	--	RX-26a	GCM 8000	GCM TDMA Slot1
91	NI-02	--	GCM 8000 TDMA	None	TS1-27	--	RX-27a	GCM 8000	GCM TDMA Slot1
92	NI-02	--	GCM 8000 TDMA	None	TS1-28	--	RX-28a	GCM 8000	GCM TDMA Slot1
93	NI-02	--	GCM 8000 TDMA	None	TS1-29	--	RX-29a	GCM 8000	GCM TDMA Slot1
94	NI-02	--	GCM 8000 TDMA	None	TS1-30	--	RX-30a	GCM 8000	GCM TDMA Slot1
95	NI-02	--	GCM 8000 TDMA	None	TS1-31	--	RX-31a	GCM 8000	GCM TDMA Slot1
96	NI-02	--	GCM 8000 TDMA	None	TS1-32	--	RX-32a	GCM 8000	GCM TDMA Slot1

Screen shot of Timeslot 1 (Receivers 1a through 32a).

Index	NI	GRP:MOD	Type	Channel	RX	MLC ID	Name	Description	Display Table
129	NI-02	--	GCM 8000 TDMA	None	TS2-01	--	RX-1b	GCM 8000	GCM TDMA Slot 2
130	NI-02	--	GCM 8000 TDMA	None	TS2-02	--	RX-2b	GCM 8000	GCM TDMA Slot 2
131	NI-02	--	GCM 8000 TDMA	None	TS2-03	--	RX-3b	GCM 8000	GCM TDMA Slot 2
132	NI-02	--	GCM 8000 TDMA	None	TS2-04	--	RX-4b	GCM 8000	GCM TDMA Slot 2
133	NI-02	--	GCM 8000 TDMA	None	TS2-05	--	RX-5b	GCM 8000	GCM TDMA Slot 2
134	NI-02	--	GCM 8000 TDMA	None	TS2-06	--	RX-6b	GCM 8000	GCM TDMA Slot 2
135	NI-02	--	GCM 8000 TDMA	None	TS2-07	--	RX-7b	GCM 8000	GCM TDMA Slot 2
136	NI-02	--	GCM 8000 TDMA	None	TS2-08	--	RX-8b	GCM 8000	GCM TDMA Slot 2
137	NI-02	--	GCM 8000 TDMA	None	TS2-09	--	RX-9b	GCM 8000	GCM TDMA Slot 2
138	NI-02	--	GCM 8000 TDMA	None	TS2-10	--	RX-10b	GCM 8000	GCM TDMA Slot 2
139	NI-02	--	GCM 8000 TDMA	None	TS2-11	--	RX-11b	GCM 8000	GCM TDMA Slot 2
140	NI-02	--	GCM 8000 TDMA	None	TS2-12	--	RX-12b	GCM 8000	GCM TDMA Slot 2
141	NI-02	--	GCM 8000 TDMA	None	TS2-13	--	RX-13b	GCM 8000	GCM TDMA Slot 2
142	NI-02	--	GCM 8000 TDMA	None	TS2-14	--	RX-14b	GCM 8000	GCM TDMA Slot 2
143	NI-02	--	GCM 8000 TDMA	None	TS2-15	--	RX-15b	GCM 8000	GCM TDMA Slot 2
144	NI-02	--	GCM 8000 TDMA	None	TS2-16	--	RX-16b	GCM 8000	GCM TDMA Slot 2
145	NI-02	--	GCM 8000 TDMA	None	TS2-17	--	RX-17b	GCM 8000	GCM TDMA Slot 2
146	NI-02	--	GCM 8000 TDMA	None	TS2-18	--	RX-18b	GCM 8000	GCM TDMA Slot 2
147	NI-02	--	GCM 8000 TDMA	None	TS2-19	--	RX-19b	GCM 8000	GCM TDMA Slot 2
148	NI-02	--	GCM 8000 TDMA	None	TS2-20	--	RX-20b	GCM 8000	GCM TDMA Slot 2
149	NI-02	--	GCM 8000 TDMA	None	TS2-21	--	RX-21b	GCM 8000	GCM TDMA Slot 2
150	NI-02	--	GCM 8000 TDMA	None	TS2-22	--	RX-22b	GCM 8000	GCM TDMA Slot 2
151	NI-02	--	GCM 8000 TDMA	None	TS2-23	--	RX-23b	GCM 8000	GCM TDMA Slot 2
152	NI-02	--	GCM 8000 TDMA	None	TS2-24	--	RX-24b	GCM 8000	GCM TDMA Slot 2
153	NI-02	--	GCM 8000 TDMA	None	TS2-25	--	RX-25b	GCM 8000	GCM TDMA Slot 2
154	NI-02	--	GCM 8000 TDMA	None	TS2-26	--	RX-26b	GCM 8000	GCM TDMA Slot 2
155	NI-02	--	GCM 8000 TDMA	None	TS2-27	--	RX-27b	GCM 8000	GCM TDMA Slot 2
156	NI-02	--	GCM 8000 TDMA	None	TS2-28	--	RX-28b	GCM 8000	GCM TDMA Slot 2
157	NI-02	--	GCM 8000 TDMA	None	TS2-29	--	RX-29b	GCM 8000	GCM TDMA Slot 2
158	NI-02	--	GCM 8000 TDMA	None	TS2-30	--	RX-30b	GCM 8000	GCM TDMA Slot 2
159	NI-02	--	GCM 8000 TDMA	None	TS2-31	--	RX-31b	GCM 8000	GCM TDMA Slot 2
160	NI-02	--	GCM 8000 TDMA	None	TS2-32	--	RX-32b	GCM 8000	GCM TDMA Slot 2

Screen shot of Timeslot 2 (Receivers 1b through 32b).

GCM 8000 TDMA Dual Channels

In the MCN system, each comparator can have a Channel assigned to it. That channel is used for error logging purposes. The GCM 8000 in TDMA mode has a spot for two-channel assignments; one for each timeslot. The two Channel fields can be used to differentiate the timeslots in the error logs (ex: “CH 1A” and “CH 1B”).

Index	NI	Group	Module	Type	Banks	Location	Name	Channel-1	Channel-2	Retries	TX Timer	Rpt Timer
1	NI-01	--	--	GCM 8000	1		GCM 8000_1	None	N/A	--	--	--
2	NI-02	--	--	GCM 8000 TDMA	1		GCM 8000 TDMA_1_CFD	SQD				

Connecting to the MLC 8000 Analog IP Comparator

The MCN Server 8000 software (version 7.xx and newer) can work with analog IP comparators, like the Motorola MLC 8000 and digital IP comparators such as the Motorola GCM 8000. Additionally, this means the software can interface with and manage data from either or both types of comparators at the same time.

Adding MLC 8000 IP Comparator to MCN system

To add the Motorola MLC 8000 comparator to your MCN Server 8000, just ADD a new virtual Network Interface using the MCN Config Server Software and select the GCM comparator type. The process is very similar for all IP comparators, so it should be easy and intuitive to follow the process.

See Section “*Adding IP Comparator NI*” on page 72

Motorola CT Software

The Motorola MLC 80000 CT software is used to program the MLC 8000 conventional analog AGU/ VGU comparator modules. This section doesn't cover all the details of configuring parameters of the modules. For more information, refer to the Motorola documentation.

Note: Some of the MLC 8000 Parameters configured in CT will be required for the MCN Config server to build the MLC 8000 Network Interface.

The Motorola CT version used at the time of adding initial support for the MLC hardware was version 4.16. A7.14. Other versions whether newer or older may look and function differently.

MLC8000 Comparator details

The MLC 8000 Analog Comparator can support up to 64 receivers connected via IP.

The MLC 8000 Analog Comparator is made up of two types of units:

1. **VGU** MLC 8000 Analog Comparator (which connects to the console)
2. **AGU** MLC 8000 Subsite Link Converter (which connects to the BRs)

Note 1: Physically, the units appear identical, but the different operations are determined by their programming. You will need to know the unique IP addresses and ID numbers for each type of unit. It is crucial not to mix up or confuse this information between units, especially when they are configured to perform different functions.

Note 2: The Motorola MLC 8000 CT Program is the preferred means to Connect, Read and Configure the MLC 8000 Unit. It provides a way to initially configure the device from the Internal IP port which is defaulted on (10.0.0.1). It can also be used to reconfigure parameters that are changed to or left in an unknown state. The External ethernet port (10.98.66.88) is the port reserved for network connectivity, but you may also opt to use it for initial or post configurations if the IP address is known.

Information Required for the MLC 8000 Analog Comparator

The MLC 8000 information required by MCN Config Server to configure the MCN Server 8000 System Data Files is as follows:

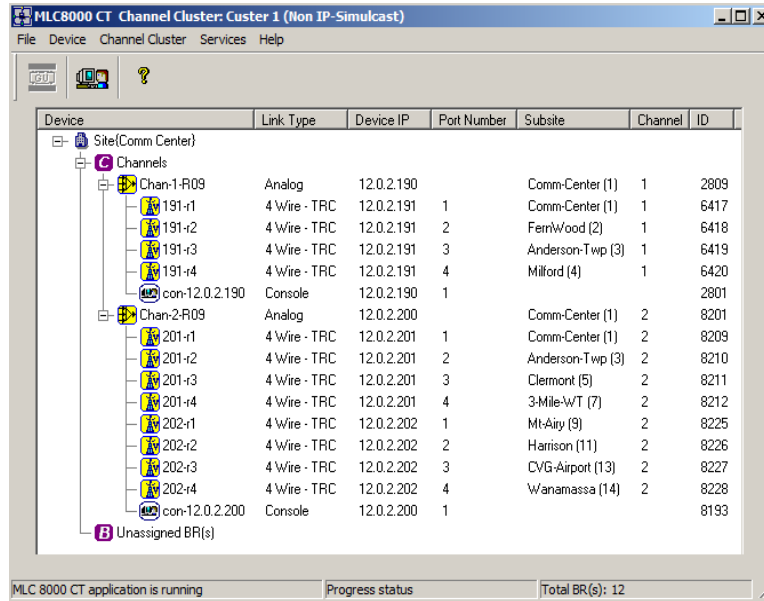
- **VGU IP Address:** Entered into the MLC 8000 Hardware Configuration window.
- **Voter ID:** Entered into the MLC 8000 Hardware Configuration window. This is the ID for the Voter, not the port for the console port.
- **AGU BR Port ID:** For each of the BRs in the system Entered in the MLC ID field for the receiver in the Receiver window.
- **AGU BR Name:** Receiver name for each BR in the system. Entered in the Name field for the receiver in the Receiver window.

MLC 8000 Channel Cluster Tree

The next screen shot shows the Channel Cluster Tree in the MLC 8000 CT (Configuration Tool) software.

Hidden ID Column

The ID column on the right is normally hidden. You must drag the right separator bar in the header to the right to see this column as shown below.
 (Older versions of CT have the ID field hidden in a different column.)



MMC Channel Cluster Tree in the MLC 8000 CT Software

The Channel Cluster shown above in screen shot includes two comparators:

- Channel 1: 4 BRs (Receivers)
- Channel 2: 8 BRs (Receivers)

We recommend NOT re-saving the file to the CSV format until you first make a copy with a different name.

MMC_Config.csv File – MLC 8000 Analog Comparator Data

When a Channel Cluster is saved from the MLC 8000 CT (Configuration Tool) software, the software generates a file with data that is needed for MCN Config Server software. One file is generated for each cluster (up to 4 channels). The file is typically stored at:

C:\Motorola\MLC 8000 CT\ClusterName\MMC_Config.csv
 (Where *ClusterName* is the name of the Cluster to use)

The MMC_Config file can be opened in WordPad or Excel.

channel cluster name	Type	Site	Site ID	Port ID	Device IP	Device type	BR Port	BR name	BR Type	Channel Id	Channel Name	BR Subsite	BR Subsite Num
Custer 1	Non IP-Simulcast	Comm Center	2012										
				8193	12.0.2.200	AGU-Port	1	con-12.0.2.200	4 Wire Console	0	Unknown(0)	Comm-Center	1
				8201	12.0.2.200	VGU		Chan-2-R09			Chan-2-R09	Comm-Center	
				6417	12.0.2.191	AGU-Port	1	191-r1	4 Wire - TRC	2809	Chan-1-R09	Comm-Center	1
				8209	12.0.2.201	AGU-Port	1	201-r1	4 Wire - TRC	8201	Chan-2-R09	Comm-Center	1
				6418	12.0.2.191	AGU-Port	2	191-r2	4 Wire - TRC	2809	Chan-1-R09	FernWood	2
				8210	12.0.2.201	AGU-Port	2	201-r2	4 Wire - TRC	8201	Chan-2-R09	Anderson-Twp	3
				6419	12.0.2.191	AGU-Port	3	191-r3	4 Wire - TRC	2809	Chan-1-R09	Anderson-Twp	3
				8211	12.0.2.201	AGU-Port	3	201-r3	4 Wire - TRC	8201	Chan-2-R09	Clermont	5
				6420	12.0.2.191	AGU-Port	4	191-r4	4 Wire - TRC	2809	Chan-1-R09	Milford	4
				8212	12.0.2.201	AGU-Port	4	201-r4	4 Wire - TRC	8201	Chan-2-R09	3-Mile-WT	7
				8225	12.0.2.202	AGU-Port	1	202-r1	4 Wire - TRC	8201	Chan-2-R09	Mt-Airy	9
				8226	12.0.2.202	AGU-Port	2	202-r2	4 Wire - TRC	8201	Chan-2-R09	Harrison	11
				8227	12.0.2.202	AGU-Port	3	202-r3	4 Wire - TRC	8201	Chan-2-R09	CVG-Airport	13
				8228	12.0.2.202	AGU-Port	4	202-r4	4 Wire - TRC	8201	Chan-2-R09	Wanamassa	14
				2801	12.0.2.190	AGU-Port	1	con-12.0.2.190	4 Wire Console	0	Unknown(0)	Add Sub Site	0
				2809	12.0.2.190	VGU		Chan-1-R09			Chan-1-R09	Comm-Center	

MMC_Config File – Formatted in Excel

The above screen-shot shows an MMC Config file opened in Excel with some formatting added. The format of the file may change from version to version of the MLC 8000 CT software.

Sorting the MMC_Config File

The MMC Config file may not always have the items ordered as one would expect. Channels 1 & 2 in the previous screen shot are intermixed. If this is a problem (especially with larger systems), it is recommended that you sort the portion of the file relating to the AGUs and VGUs.

- a. Open the file in Excel.
- b. Save the file as an XLS file.
- c. Add formatting as required.
- d. Sort the Devices portion of the file (with the AGU & VGU information.). Sort By:
 - Channel Name
 - Device IP
 - BR Port
- e. Re-save the file.

Warning: *It is easy to corrupt a file and make it unusable for the CT program.*



It is recommended NOT re-saving the file to the CSV format until you make a copy with a different name.

The Sort process is shown below:

Sorted Results

The sorted result would be as shown in the screen shot below.

Sorted MMC Config file with additional formatting:

After the sort:

- The Channels will be together.
- However, the BRs (AGU Ports) will not necessarily be in BR List Order

The sorted result shows two radio channels, each with their own voters and BRs. For each of the channels:

1. The top horizontal rectangles show the:
 - a) Voter ID (Device Id field)
 - b) VGU IP Address (Device IP field)
 - c) Channel Name (Channel Name field)
2. The vertical rectangles show the:
 - a. AGU Port IDs (Device ID Field)
 - b. Receiver Names (BR Subsite field)

Note that the Channel IDs (2809 & 8201) correspond to the VGU IDs.

Copying and Pasting from the MMC_Config file

There is no automatic import of the data from the MMC_Config.csv file into the MCN Server 8000 system configuration files. You can, however, open the MMC_Config.csv file in Excel and copy & paste the information into the fields in the Receiver Window in MCN Config Server:

MMC_Config Field	Receiver Window Field
Device ID (for BRs / Receivers)	MLC ID
BR Subsite	Name
BR Name	Description (for general reference)

Here are some considerations when copying the data into the system configuration files in MCN Config:

- Be sure that the Subsites are in the right order. If they are not, you can copy the Subsite values and names one at a time.
- If you have a Mixed Mode system, make sure that the Subsites are in the order that matches the BR Subsite order in the GCM 8000 comparator. If they are not, you can copy the Subsite values and names one at a time.
- The Subsite Names in the MMC_Config.csv file might not be in the format that you want to be displayed. You may have to edit these values for the user in MCNConfig Server.
- You can include the AGU IP Address and Port number in the Description field in the Receiver Window. This can be helpful for error logging and troubleshooting.

MLC 8000 Analog Comparator Data for multiple radio channels

The MLC 8000 Analog Comparator CT software can store data for up to 4 channels in a Channel Cluster.

If your system has more than 4 radio channels using MLC 8000 Analog Comparators, you will need to save the system data in groups of 4 radio channels. You will need to open separate MMC_cfg.csv files for each channel cluster.

MLC 8000 Analog Comparator CT Software Examples

The following sections show where the MLC 8000 Analog Comparator information is configured. The screen captures are based on CT Version 2.24. Screens for newer versions may be different.

MLC 8000 Analog Comparator (VGU) Configuration

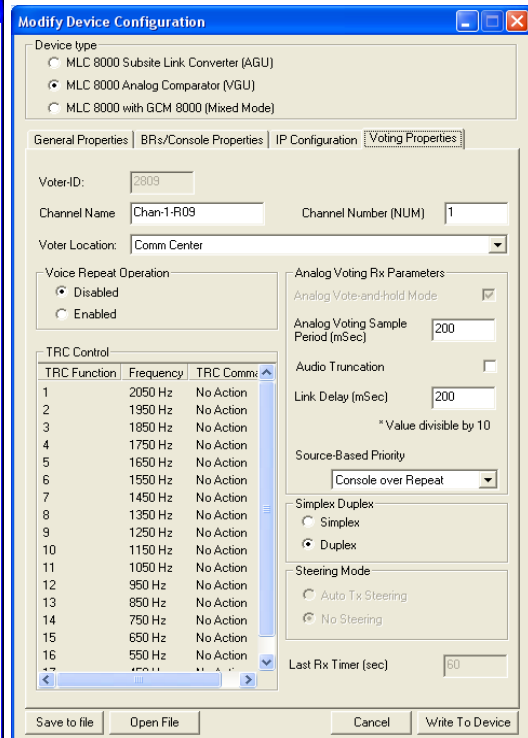
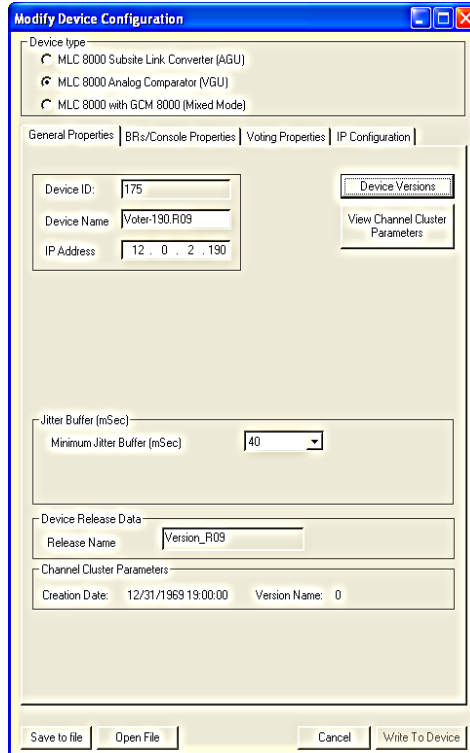
Right-Click on an MLC 8000 Analog Comparator (VGU) from the main device tree and select **Configure Device**.

The **General Properties** tab has the

The **Voter Properties** tab has the

VGU IP Address

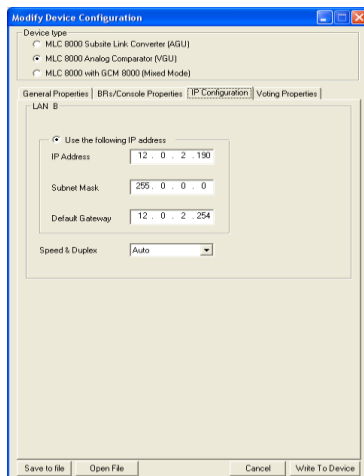
VGU Voter ID



Note: The Device ID in the General Properties.

The **Voter ID** is shown in the **Voting Properties** tab above (2809)

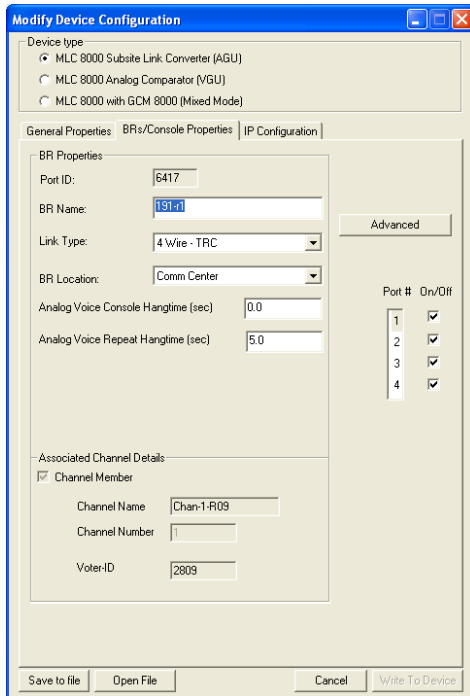
The **IP configuration** tab has more detailed IP parameters.



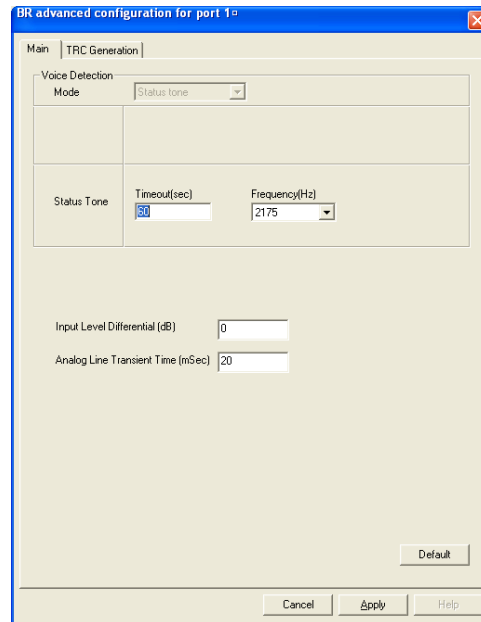
MLC 8000 Subsite Link Converter (AGU) Configuration

Right-Click on an MLC 8000 Subsite Link Converter (AGU) Port (BR) from the main device tree and select **Configure Device**.

The **BR/Console Properties** tab has the BR Name, and AGU Port ID (MLC ID)



The **Advanced Properties** window has the **Status Tone Timeout**



Subsite

The **Port** box selects which port to display from the AGU.

The **Status Tone Timeout** will determine the length of time from loss of Status Tone to a Fail indication. Default is 60 Seconds.

The **General Properties** tab has the Device Name and IP Address

The **IP Configuration** tab has the Detailed IP information

The MCN System does not need to know the AGU IP Address, but it can be helpful in troubleshooting.

BR List

Highlight the Voter and select the **Edit BR List** button.

The window shows the lineup of BRs for the channel.

MLC 8000 Analog Comparator Limitations

The MLC 8000 Analog Comparator has the following limitations.

Maximum of 15 Simultaneous MCN Servers or DA Sessions

The MLC 8000 Analog Comparator supports 15 simultaneous connections for real-time sessions. These sessions include:

- CTI MCN Server 8000 Software
- MLC 8000 CT / DA Software

From a practical standpoint, this should not pose a problem since systems will normally not have more than 1 or 2 MCN Server PCs.

MCN Server & CT / DA software cannot run simultaneously on the same PC

The MLC 8000 Analog Comparator cannot talk to the MCN Server software and the MLC 8000 CT / DA software running *on the same PC* simultaneously.

- If you have to run CT software on the Server PC, you will have to exit the MCN Server software.
- If you have the CT software running on the Server PC and try to start the MCN Server software, it will not communicate to the MLC 8000 Analog Comparator. You will have to close the CT software first.
- MLC 8000 Comparator Versions and Protocol Support

There has been a protocol change starting with MLC 8000 comparators with firmware version R04.xx.xx. Compatibility is shown below:

MLC Release	MLC Firmware	MLC Protocol	Supported in MCN Version
25 System Release A7.12	R01.xx.xx	0	6.04 through 7.25 (see note)
ASTRO® 25 System Release A7.13	R02.xx.xx	0	6.04 through 7.25 (see note)
ASTRO® 25 System Release A7.14	R03.xx.xx	0	6.04 through 7.25 (see note)
MLC 7.14 Box Release *	R04.xx.xx	0 1	6.11 – 7.25 – partial support – see note. 7.05 & up

*MLC 7.14 Box Release is an incremental maintenance release on the 7.14 system platform.

Note: The MCN Server 8000 software versions 7.05 through 7.25 support both MLC Protocols 0 & 1. R4.xx.xx FP MLC 8000 firmware supports both the old and new protocol. However, it will automatically switch to the new protocol if the DA software is run. If this happens, it will break communications with version 6.xx MCN Server 8000 PC.

Therefore, if the MLC 8000 firmware R04.xx.xx is installed, it is highly recommended to upgrade to MCN Server 8000 version 7.xx.

MCN Server 8000 version 7.26 **terminated** support for Protocol 0 – Firmware R03.xx.xx.

MLC 8000 Analog Comparator Status Display Tables

MLC 8000 and MLC LV Display Tables

The possible states for the MLC 8000 Analog Comparator Subsites (receivers) include:

Displayed State	Meaning
Error	Undefined Status
Offline	Server cannot communicate with MLC 8000 Comparator (Note 1)
Config Err	(Note 2)
(Blank)	No Activity
Disable	Disabled via MCN Server 8000 or MCN Client
Fail	Subsite Failed - Comparator cannot communicate to BR (Note 3)
Rx	Voice Receive activity
Forced Vote	Force Vote (but not yet Voted)
Vote	Voted
Last Vote	Last Subsite voted (LV Display Tables only)

The above states are defined in the **MLC 8000** and the **MLC LV** Display Tables.

Note 1: The Offline state could be caused by the following:

- a. GCM 8000 IP address in the MCN System Configuration Files is wrong.
- b. GCM 8000 Voter ID in the MCN System Configuration Files is wrong. (See the Network Interface window.)
- c. MCN Server cannot talk to the MLC 8000 Comparator (Potential network problem).
- d. If the MCN Server has multiple NIC cards, the wrong one may be selected.

Note 2: The Config Err state could be caused by the following:

- a. The MLC ID in the MCN System Configuration Files (Receiver window) is wrong.
- b. The MLC 8000 Analog Comparator BR is configured in the MCN System Configuration Files (Receiver window), but it is not configured in the MLC 8000 Comparator BR List.
- c. The MLC 8000 Analog Comparator is online, but sent status update for this BR.
- d. The wrong MLC Voter ID might have been entered for the MLC 8000 in the Hardware window in the MCN Config program. This has been seen to happen if the Console Port ID in the VGU is mistakenly entered instead of the MLC 8000 Voter ID. (Typically, the Voter ID value is 8 higher than the Console port ID.) In this case, all the receivers for the MLC 8000 will have a **Config Err** status. The status for the MLC 8000 in the *View / Network Interface* window may show On-Line even though the wrong MLC 8000 Voter ID has been entered.

Note 3: The Fail state could be caused by the following:

- a. The BR analog port is disconnected from the MLC 8000 Subsite Link Converter (AGU).
- b. The BR has lost power.
- c. There is no status tone from the BR.
- d. The Radio Port for this MLC 8000 Subsite Link Converter (AGU) is not calibrated properly (See the CT software for calibration)
- e. The MLC 8000 Analog Comparator (VGU) cannot communicate with the appropriate MLC 8000 Subsite Link Converter (AGU). In this case, all the BRs associated with this MLC 8000 Subsite Link Converter (AGU) will be in the Fail state.

Note 4: The Last Vote indication will only be displayed when that Subsite is otherwise in the Idle state.

WARNING: DO NOT ATTEMPT TO CHANGE THE BIT VALUES OR ENTRY ORDER IN THE DISPLAY TABLE.



MM - Mixed Mode Voting Solution

The Mixed Mode Voting Solution is a combination of a GCM 8000 Comparator and an MLC 8000 Analog Comparator. When interfacing to a Mixed Mode system, you will need the information from both of those comparators:

GCM 8000 Information:

- GCM 8000 IP Address Entered into the Mixed Mode Configuration window.
- List of Receivers 1-32 Entered into the Receiver Window – for Receivers (Subsites) 1-32.

MLC 8000 Analog Comparator Information:

- VGU IP Address:- Entered into the Mixed Mode Configuration window.
- Voter ID :- Entered into the Mixed Mode Configuration window.
- AGU BR Port ID:- For each of the BRs in the system entered in the MLC ID field for the receiver in the Receiver window.
- AGU BR Name:- Receiver name for each BR in the system Entered in the Name field for the receiver in the Receiver window.

Order for Mixed Mode System (Subsite) Receivers -- Very Important!

Since a Mixed Mode system uses both a GCM 8000 Digital and an MLC 8000 Analog Comparator, it is **especially important** to make sure that the receiver (Subsite) information is entered into the MCN Config Server program in the proper order. The following principles determine the receivers' order:

1. Each radio channel may have different receiver (Subsite) orders.
2. If there are multiple radio channels with the same complement of Subsite locations, it is recommended that the Subsites on all channels be configured in the same order.
3. The Subsite numbers configured in the GTR 8000 BRs and GPW 8000 Satellite Receivers for a particular radio channel control the Subsite order on that channel's GCM 8000 comparator.
4. Since the Subsite name can be hand-entered in the GCM 8000 comparator CSS, it is possible to enter the wrong Subsite name. Make sure that the list of Subsite names in the GCM 8000 CSS matches the actual order of the GTR 8000 and GPW 8000 units.
5. The Subsite order (1-64) in the GCM 8000 comparator controls the receiver order (1-64) in the Receiver Window in the MCN Config Server software.
6. Enter the proper Receiver Names (as determined by the GCM 8000 Subsite order) in the MCN Config Server Software Receiver Window.
7. The Subsites listed in the MLC 8000 Analog Comparator CT software (and the resulting MMC_Config.csv file) are listed in the order that they were entered when the system was configured in the CT software. **This order might not be the same as the order in the GCM 8000 comparator.** It is recommended that the order is kept the same, but it doesn't need to be.
8. After the receiver Subsite information from the GCM 8000 is entered into the MCN Config Server software, enter the proper AGU Port ID in the MLC ID field for that Subsite.

Mixed Mode System Limitations

Mixed Mode systems will have the same limitations as the GCM 8000 and MLC 8000 Analog Comparators from which they are built. This is described in the CGM 8000 and MLC 8000 Analog Comparator Limitations sections:

- Maximum of 3 MCN Servers connected to the GCM 8000 comparators. If the MCN Servers are in an ASTRO® 25 RNI, the RNI infrastructure supports only 2 MCN Server 8000 PCs.
- Neither the GCM 8000 CSS software nor the MLC 8000 Analog Comparator CT / DA software can run simultaneously on the same PC as the MCN Server.
- The GCM 8000 comparator cannot disable Subsites that have failed.
- The GCM 8000 comparator will reset the Disable status if a Subsite goes into Fail.

Mixed Mode Status Display

The possible states for Mixed Mode comparator systems using the **Mixed Mode** and the **MM LV** Display Tables are:

Displayed State	Meaning
Error	Undefined Status
(Blank)	No Activity
Offline D	Offline GCM
Offline A	Offline MLC
Fail A	Fail MLC
Fail D	Fail GCM
Fail D / Cfg Err A	Fail GCM & Config MLC
Fail D + A	Fail Both
Dis A	Disable MLC
Dis D	Disable GCM
Dis D + A	Disable both
DIS D + A	Permanently Disable GCM & Disable MLC
Dis A / Fail D	Disable MLC & Fail GCM
Dis D / Fail A	Disable GCM & Fail MLC
DIS D / Fail A	Permanent Disable GCM & Fail MLC
Dis D / Cfg Err A	Disable GCM & Config Err MLC
DIS D / Cfg Err A	Permanent Disable GCM & Config Err MLC
Offline D / Fail A	Offline GCM & Fail MLC
Offline D / Dis A	Offline GCM & Fail MLC
Offline A / Fail D	Offline MLC & Fail GCM
Offline A / Dis D	Offline MLC & Disable GCM
Offline A / DIS D	Offline MLC & Permanently Disable GCM
Offline A + D	Offline both
Rx	Voice Receive activity
Rx Data	Data Receive activity
Forced Vote	Force Vote (but not yet Voted)
Vote	Voted
Vote Data	Voted for Data
Last Vote	Last Subsite voted (LV Display Tables only)

The previous states are defined in the Mixed Mode and the MM LV Display Tables.

Note 1 The notes from the other IP Comparator Display Tables apply as appropriate.

Note 2: "A" = Analog (MLC 8000 Analog Comparator); "D" = Digital (GCM 8000)

Note 3: In normal operation, only a few of these states will be displayed.

Note 4: Active Call states (Vote, Rx) will take priority over background states (Idle, Dis, Fail, Offline)

Note 5: Active Call states for Digital (GCM 8000) will have priority over Analog calls.

Note 6: The implementation of this Display Table is extremely complicated. The above states are not in the same order as they appear in the real Display Table.

WARNING: DO NOT ATTEMPT TO CHANGE THE BIT VALUES OR ENTRY ORDER IN THE DISPLAY TABLE.



Mixed Mode Tech Status Displays

The MM Tech Display Tables are provided to help technicians troubleshoot Mixed Mode systems. Separate screens or tabs can be set up using these Display Tables for Technician use.

MM Tech Display Table

The MM Tech Display Table is similar to the MM LV Display table, except it adds more detail in the cases of both Digital and Analog Activity at the same time. It has the following modifications:

- Added "D" or "A" suffix for Rx & Vote states.
- When there is both Digital & Analog activity, both are shown.
- Analog Rx is changed to a brownish color.
- Analog Vote is changed to a violet color.

You can look at this Display Table in the Display Table window in MCN Config Server software.

MM-GCM Tech Display Table

This Display Table is for Mixed Mode systems, but it looks at only the GCM 8000 (Digital) signals, plus the Last Vote. It is somewhat similar to the **GCM LV** Display Table. It can be used for troubleshooting a Mixed Mode system if you want to look just at the GCM 8000 data.

You can look at this Display Table in the Display Table window in MCN Config Server software.

Note 1: The Last Vote indication will be set on either digital or analog activity.

MM-MLC Tech Display Table

This Display Table is for Mixed Mode systems, but it looks at only the signals from the MLC 8000 Analog Comparator, plus the Last Vote. It is somewhat similar to the MLC LV Display Table. It can be used for troubleshooting a Mixed Mode system if you want to look at just the data from the MLC 8000 Analog Comparator.

You can look at this Display Table in the Display Table window in MCN Config Server software.

Note 1: The Last Vote indication will be set on either digital or analog activity.

Note 2: If there is both analog and digital activity, you will not see a Vote indication using this table since the MLC 8000 Analog Comparator Vote bit is suppressed in the program whenever there is a Vote in the GCM 8000.

Interfacing to Legacy Devices

The MCN Server 8000 will connect directly to IP comparators through an IP network but can also connect to non-IP comparators and I/O devices on the MCN networks through a discrete Network Interface. The following list shows the possible types of NI (Network Interface) options:

<u>Network Interface</u>	<u>Type</u>	<u>MCN Network Speed</u>
HIB-IP family	IP Module	78 Kbps
HIB-232	RS-232 Serial	78 Kbps
PCLTA-21-78K	PCI Board	78 Kbps
PCLTA-21-1250K	PCI Board	1.25 Mbps

The MCN Server **8000 will communicate** using any of the previous NI options, to one of the following Legacy Equipment (Non-IP comparators and I/O) devices:

<u>Device</u>	<u>MCN Module Type</u>
ASTRO-TAC™ 3000 Comparators	AIB Modules
Digitac Comparators	CIB Modules
Spectra-TAC Comparators	CIB Modules
Competitive Comparators	CIB Modules
I/O & Alarm Points	GPIO Modules



All the MCN modules shown above establish their connection via Network Interface modules linked back to the MCN Monitoring and Control Network and communicate on a 78 Kbit wired network,

Larger systems may include a 1.25 Mbps high-speed backbone network that connects to the MCN modules through MCN Routers and EXB Network Extender Modules.

The standard MCN Server 8000 software can support a single Network Interface (usually a HIB-IP unit).

Additional Network Interfaces can be supported by purchasing expansion options.

When interfacing legacy equipment using MCN modules, you will need to know:

Network Interface Information (entered in Network Interface window):

- Network Interface Type
- Network Interface Parameters
- MCN Group & Module addresses
- IP parameters (for HIB-IP units)

MCN Module Information (entered in Hardware window)

- Module Type
- MCN Group & Module addresses

Receiver & I/O Point Information (entered in Receiver window)

- Receiver and/or I/O Point Name
- Type of Display Table to use (Comparator, Alarm, Door, etc.)

The MCN Config Server section of this manual has references to the above items throughout.

More information on the MCN modules, and the MCN network can be found in the appropriate manuals. See the Reference Documents section of this manual for a list of manuals.

Using The MCN Server 8000 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.

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 into 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
- Authorized software major version numbers
- Maximum number of Clients that can be active at one time (Overall)
- Maximum number of legacy Network Interfaces (HIB-IP modules, PCLTAs, etc.)
- Maximum number of IP Comparators (GRV 8000, GCM 8000 or MLC 8000 Analog Comparator)
- Maximum number of Third-Party Clients supported.

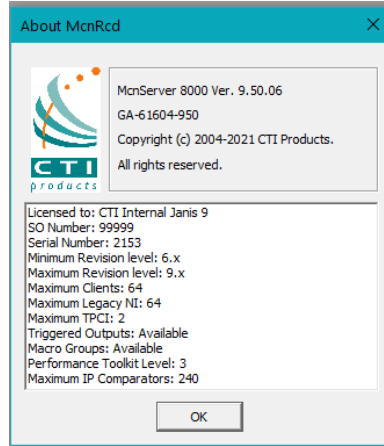
If you have entered an invalid software key (or it doesn't match the Security Hardware Key), the MCN Server software will bring up an error window when it starts up.

Re-Entering a Software Key

If an error is made when entering the Software Key, you can re-enter it using the HW Setup program, or you can change it from within the MCN Server Program by clicking Software Key under the Help Menu.

Viewing the Licensed Features:

After the MCN Server 8000 program is running, you can use the **Help / About** menu item to check which features are enabled in your system.



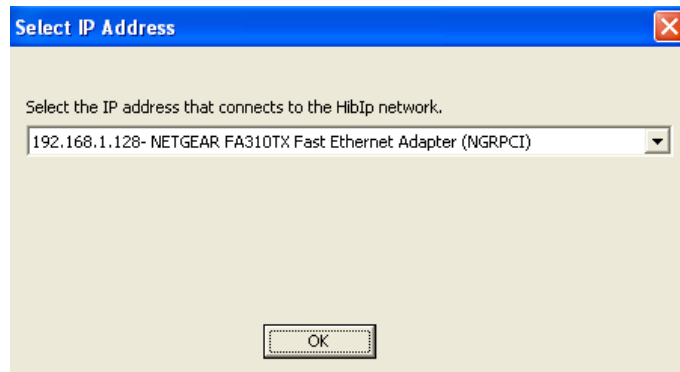
MCN Server 8000 IP Settings

Selecting an Ethernet NIC to talk to the IP Comparator Interface Modules, HIB-IP (and HIB-IP 8002) units.

Note: It is expected that proper IP provisioning principles are known and followed in setting up the PC's NIC and Subnet

The MCN Server 8000 software **IP Settings** must always be configured on a compatible Subnet that is able to connect to the IP Comparator Interface Module and/or the HIB-IP units. The NIC is automatically selectable on first initial run or after any parameter changes to the NIC adapter.

At the initial program startup, the 'Select IP Address' window appears, requiring you to select an IP address (associated with a NIC card in your PC) which should be compatible with all the interface modules to which intend to connect.



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 may have only one entry.

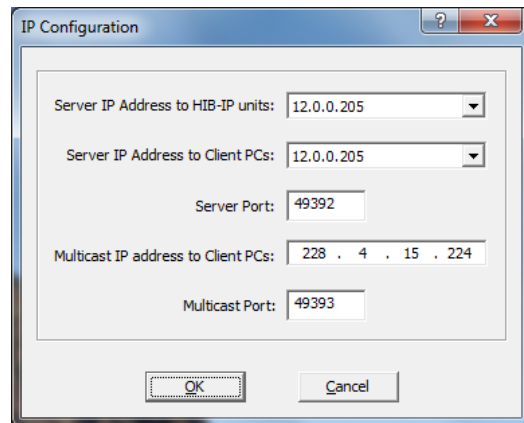
The program will ask for this information even if you don't have any HIB-IP units in your system. Humor the program and select an IP address and NIC card anyway.

If there are multiple NICs in the PC, then choose the appropriate NIC that will connect to the IP Comparator Interface Module and/or the HIB-IP units. Also, you may verify or change the selected IP address from the Server 8000 Program menu at any time by Clicking:

'Options' → 'IP Settings'.

Setting IP Configurations

The program will open the IP Configuration window.



If you need to change these IP settings later, use the **Options / IP Settings** menu item to open this window.

Typically, you should use the default settings for the last three fields. Enter the different parameters only in exceptional cases for custom network configurations.

This window has the following fields:

Server IP Address to HIB-IP units

The IP address of the NIC (in the PC) used to communicate with the HIB-IP units. It is also used to communicate with IP comparators.

Server IP Address to Client PCs

The IP address of the NIC (in the PC) that will be used to communicate with the MCN Client PCs.

Server Port

This is the Port number in the MCN Server PC to which the MCN Clients connects. Use the default value for ASTRO® 25 7.12 (and up) systems.

Multicast IP to Client PCs

This is the Multicast IP address that the MCN Server PC uses to send the real-time status data to the Client PCs. Use the default value for ASTRO® 25 7.12 and up systems for:

- Server 1, Zone 1, Main Prime site.

If your system configuration is different, please refer to the Motorola IP Plan document for the proper Multicast IP address.

Multicast Port

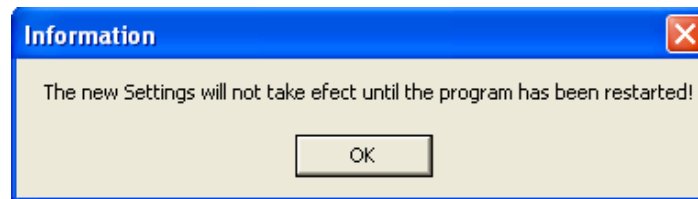
This is the destination UDP Port number for the real-time Multicast traffic from the MCN Server PC to the Clients. Use the default value for ASTRO® 25 7.12 and up systems.

Microsoft Windows IP Address Restrictions – Server to Client

Because of operating systems in Windows Vista and above, the MCN Server 8000 software will not support multiple IP addresses on the NIC card that communicates to the Client. The link to the clients must use a NIC card that has only one IP address programmed.



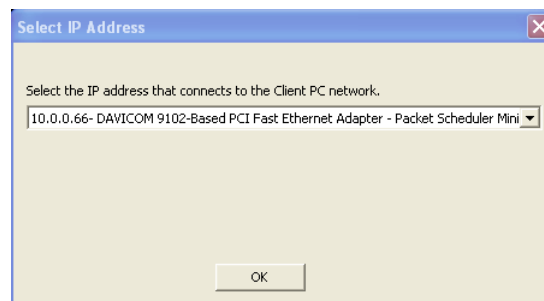
You must re-start the MCN Server program after you change IP parameters.



MCN Client PC NIC Selection

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 the appropriate IP address and NIC card from the drop-down list.

Dual NIC Restrictions in ASTRO® 25 RNIs

Use of multiple NIC cards (Dual-Home systems) is not approved by MSI in ASTRO® 25 RNIs due to Information Assurance (IA) security concerns.

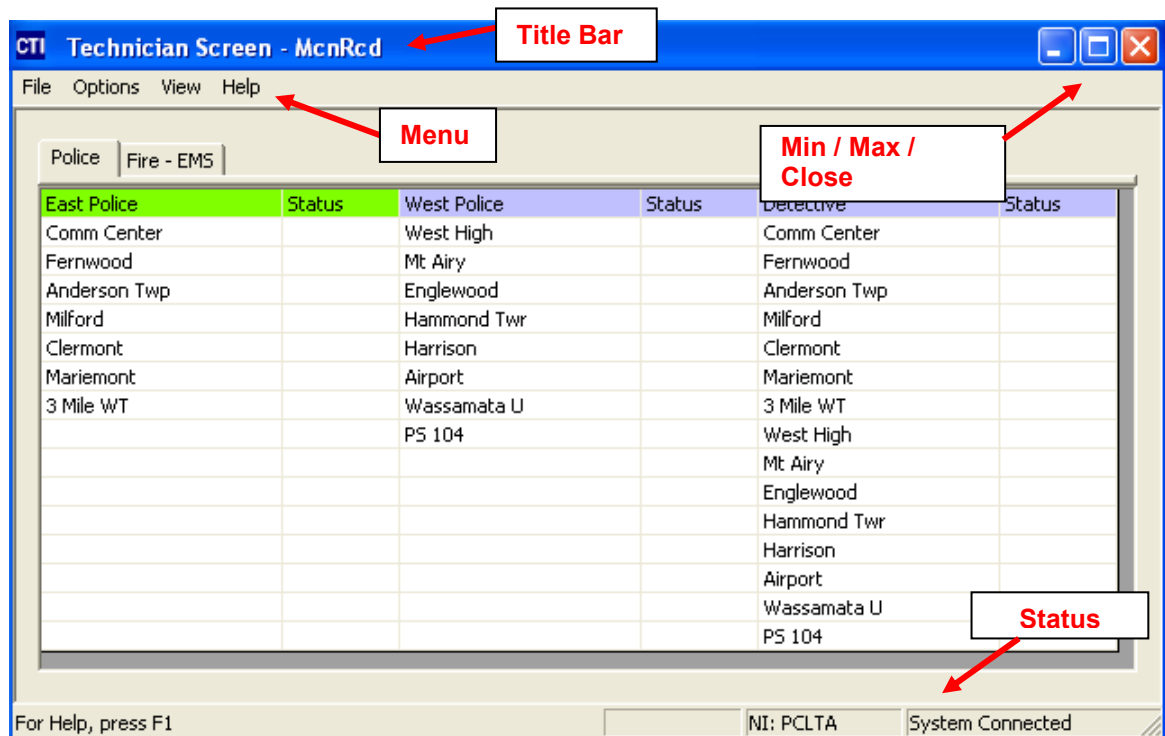
Windows Firewall

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.

Screen Elements



The screen shot above shows one example of what a correctly configured working MCN system might look like. Notice at the bottom right that the Status indicates the system is connected, with all the different location names are white which indicates that they are in Active and in the standby mode.

Controlling the MCN Server Window

You can control the MCN Server window using standard Windows techniques as follows:

Move the window by grabbing its title bar and dragging it.

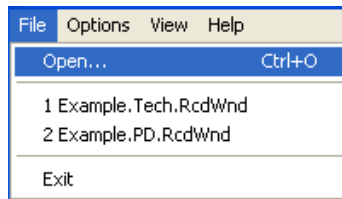
Re-size the window by grabbing an edge or corner and dragging it.

Minimize /Restore, Maximize and **Close** the window using the standard Windows buttons on the top right corner of each window.

Menus

The menu functions for this program are pretty standard and similar to those of other Windows applications. For example, menus can be selected using 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 not be available, depending on the current state of the system.

File Menu



Open

Opens a Display Window created in the MCNConfig program.

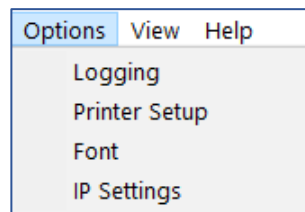
Recent Files

Allows you to open a recently used Display Window.

Exit

Exits the program.

Options Menu



Logging & Sound

Allows the user to control which logging methods are active.

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

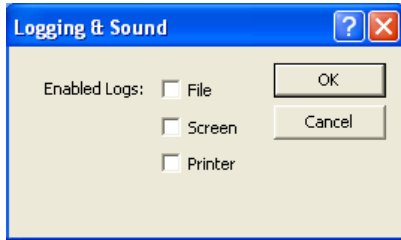
Lets you select the appropriate NIC card IP address to use to communicate with HIB-IP modules, IP comparators, and Client PCs. It also lets you select the appropriate UDP Port numbers for the MCN Server.

See the **Setting IP** section on page **202** for details.

Enabling & Disabling Logging

Alerts generated by the MCN Server program can be sent to the PC screen, printer or logged to a log file. 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 logging to **File** is enabled, the file is named **MCNRCD.log** and is located in the MCN Server system directory. This is normally at:

c:\ProgramData\CTI Products Inc\McnRcd

Server Log / Alarm Window Visibility Control

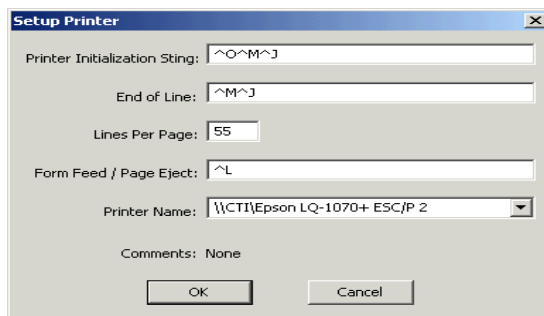
By default, the visibility of the Log and Alarm tabs are enabled on the Server. The visibility can be permanently disabled by separate registry entries. The following exported registry entries have been exported and are present on the MCN Server 8000 CD:

- ServerEnableScreenLogging.reg
- ServerDisableScreenLogging.reg
- ServerEnableScreenAlarms.reg
- ServerDisableScreenAlarms.reg

You may have to run these using Admin mode. They take effect when the Client program is restarted.

Printer Setup

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

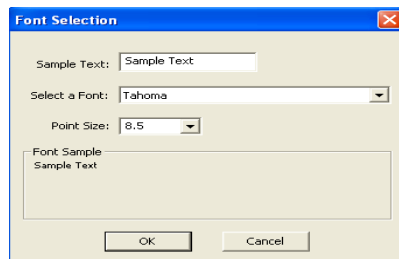


Parameters in the above window are located on your printer specific documentation.

- Printer Initialization String** This is the 'Escape character' sequence sent to the printer at the start of a new print job. The example above:
 - ^O instructs the printer to print without a bottom margin, to accommodate using continuous feed fan-fold paper.
 - ^M selects 10.5 points for the font height and 12 characters per inch horizontally.
 - ^J specifies the line feed distance.
- End of Line** This is the 'Escape character' sequence sent to the printer after each printed line, typically consisting of escape characters for "line feed" and "carriage return."
- Lines per Page** Specifies the number of lines printed on each page.
- Form Feed/Page Eject** This is the 'Escape character' sequence sent to the printer after the number specified in "Lines per Page" is completed.
- Printer Name** Drop-down list of installed printers on this PC.

Font

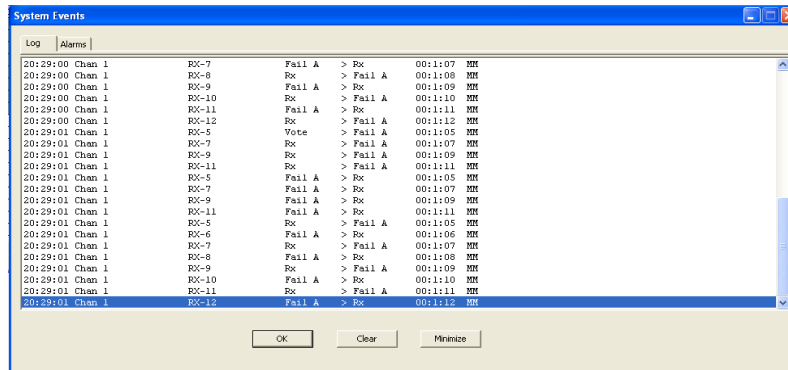
The Font Selection window allows selection of the font and the font size of the Receivers and Function Blocks in the Display Window.



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

Screen Logging – Log Window / Log Tab

When Screen Logging is enabled, status changes will be listed on the System Events window in the Log tab as shown below.

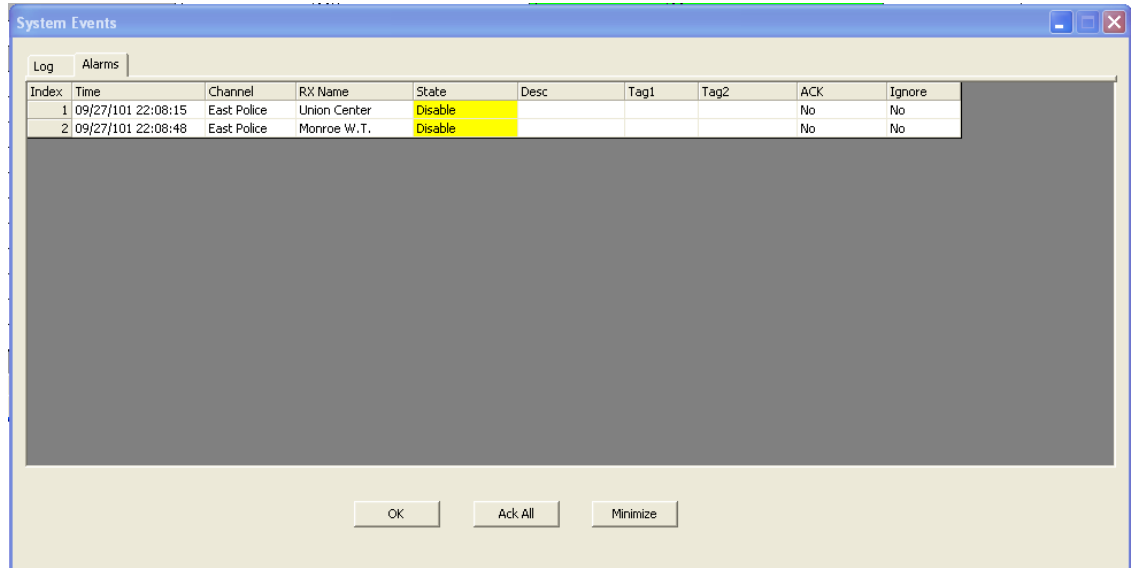


- Note : 1** Hitting the OK button will close the window but keep the log entries.
- Note : 2** Hitting Clear will delete the log entries.

You can view the Log & Alarm window later by selecting **View / Log Window** from the menu.

Alarm Display – Log Window / Alarms Tab

If a Receiver or I/O point is configured for Alarm operation, it will be displayed on the Alarms tab of the Log window when it goes into an Alarm state.



This tab shows all alarms which are:

- a. Active and/or
- b. Unacknowledged.

The state shown is the captured state that was prevailing at the time the alarm became active. It typically will not be the same status as the current state.

If an alarm state has a sound configured with it, that sound will be heard when the condition for the alarm state is detected. For multiple consecutive alarms, the alarm sound will not be repeated unless 2 or more seconds have elapsed between alarms.

To clear an Alarm, it must first be acknowledged. An acknowledgement is made with either:

- a. The **Ack All** button or
- b. The Ack drop-down field in the individual alarm line.

Alarms can only be cleared from the window after:

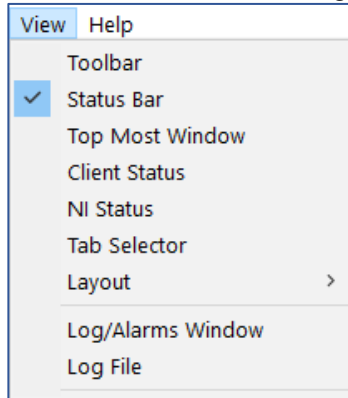
- a. The alarm is acknowledged and
- b. The state returns to normal.

Nuisance alarms can be set to an ignore status, in the Ignore field.

Receivers and I/O points are configurable for Alarm operation by selecting an appropriate Display Table. Alarm activity can also be enabled for an existing Display Table. See the **States Tab** section starting on page **240** for instructions on how to enable alarms and sounds in the Display Tables.

View Menu

The View menu controls the following features:



Toolbar

When checked, this enables the Toolbar.
The Toolbar should normally be turned off to save space.

Status Bar

When checked, this enables the Status Bar (at the bottom of the MCN Server display window). The Status Bar should normally be turned on.

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 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.

Tab Selector

Opens the Tab list window to select appropriate tab.

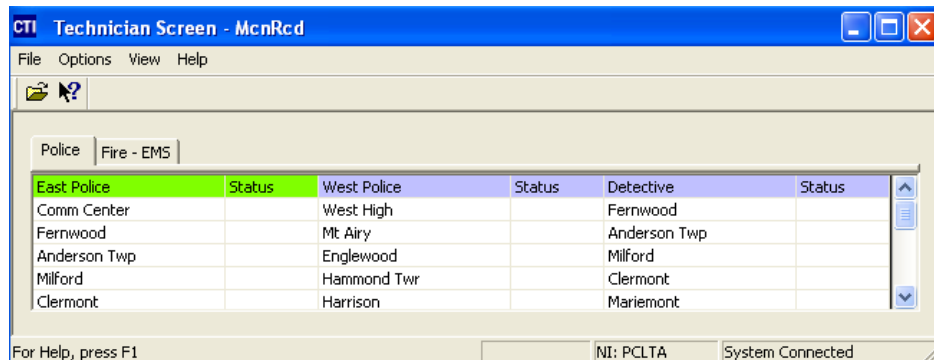
Layout / Layout Mode

When checked, this allows editing of the column widths. "Layout Mode" will show in the Status Bar (at the bottom of the MCN Server display window).

Layout / Save Layout

Use this command to save column width changes and window location performed when in Layout Mode.

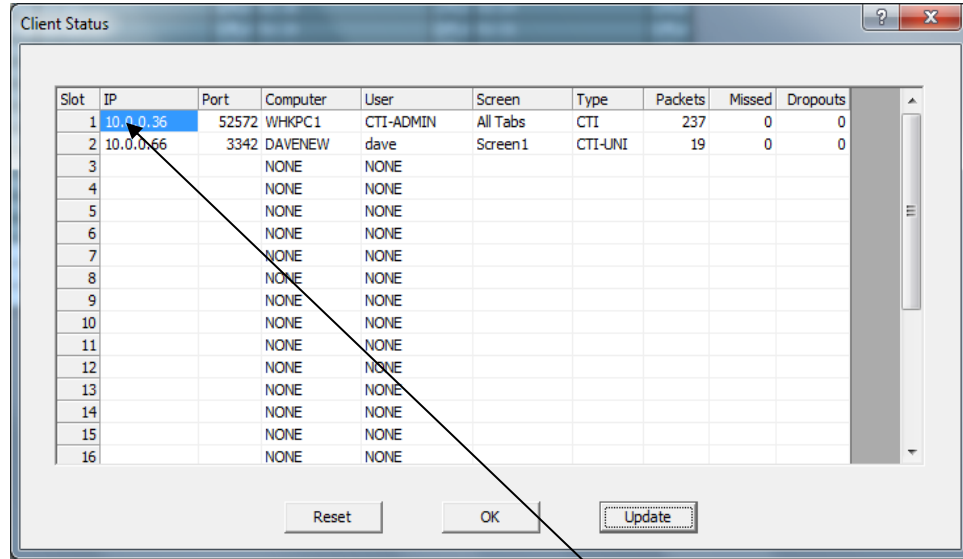
The following screen shot shows the Toolbar and Status Bar enabled.



Client Status Window

The 'Client Status' window shows which clients are logged into the MCN Server program. It will also indicate what types of clients they are:

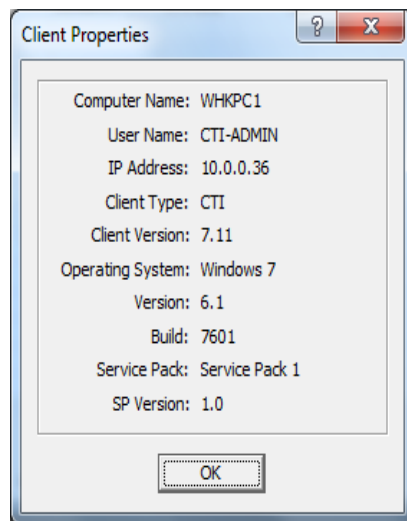
- CTI Standard CTI Multicast Clients
- CTI-Uni CTI Unicast Clients
- TPCI Third Party Clients
(TPCI is supported in MCN Server 8000 software Version 9.0 when the appropriate license options are purchased.)



To get more detail on a Client, double-click on one of the Client lines to bring up the Client Properties Window.

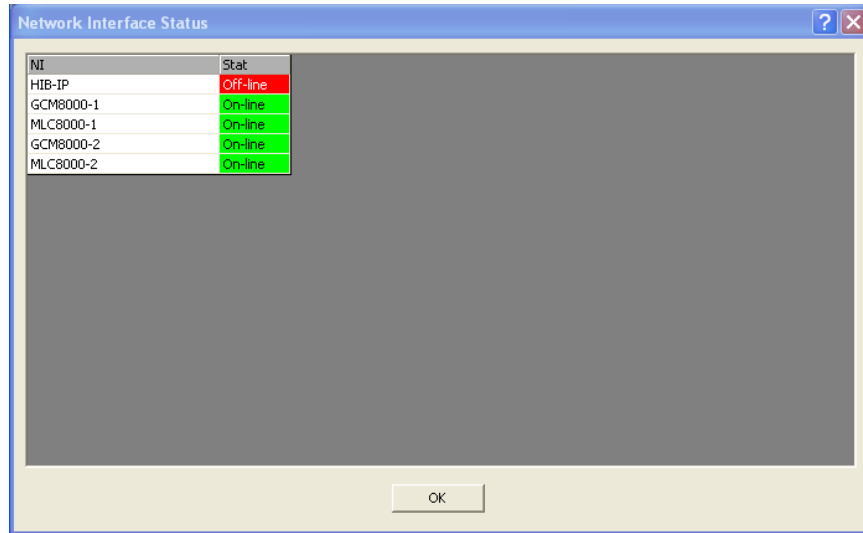
Client Properties Window

The Client Properties window displays detailed information on the selected client.



NI Status Window

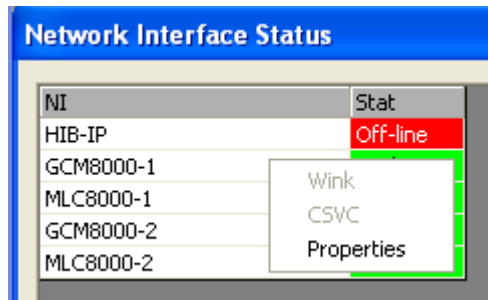
The NI Status Window shows the status of the Network Interfaces associated with this system.



For Mixed Mode systems, there will be individual entries for the GCM 8000 and the MLC 8000 Analog Comparators.

Network Interface Properties Display

For more detailed information about 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.

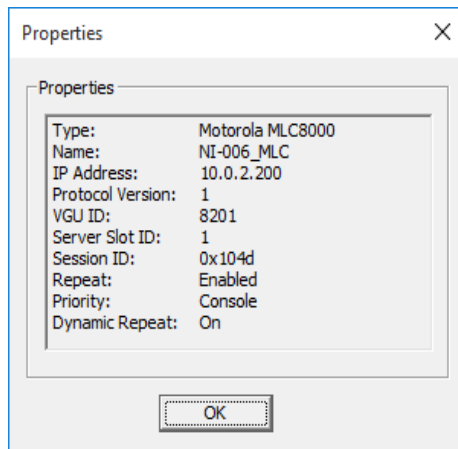
MLC 8000 Network Interface On-Line Status and MLC VGU ID

An MLC 8000 NI (Network Interface) Status showing "On-Line", indicates that the MCN Server 8000 software is correctly configured and communicating with the MLC 8000 VGU. This also means that the MLC Voter ID entered at the MCN system configuration is correct.

If the MLC RX ID is incorrect in the configuration, then the associated MLC 8000 receiver may show a "Config Error" as its Receiver status. However, the MLC 8000 NI will remain and show as "On-Line".

MLC 8000 Comparator Properties window

The Properties window for the MLC 8000 comparators is shown below:

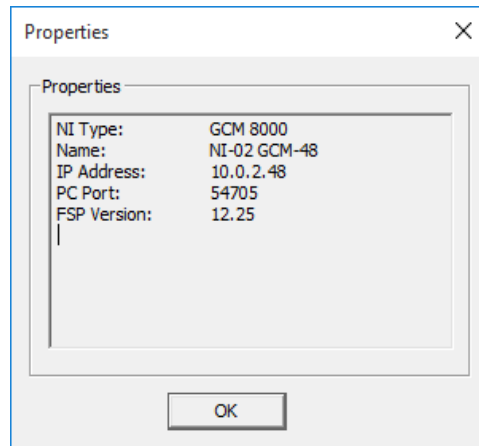


MLC 8000 Comparator Properties

MLC 8000 comparators running firmware prior to A7.14 FP firmware will be missing the following fields:

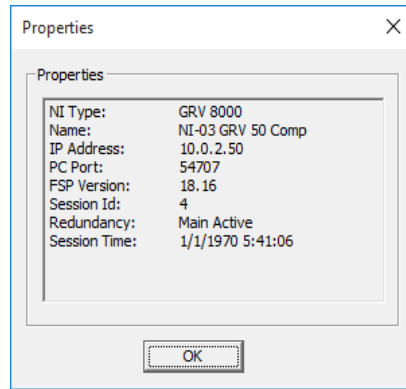
- Repeat
- Priority
- Dynamic Repeat

GCM 8000 Comparator Properties window



GCM 8000 Properties Window

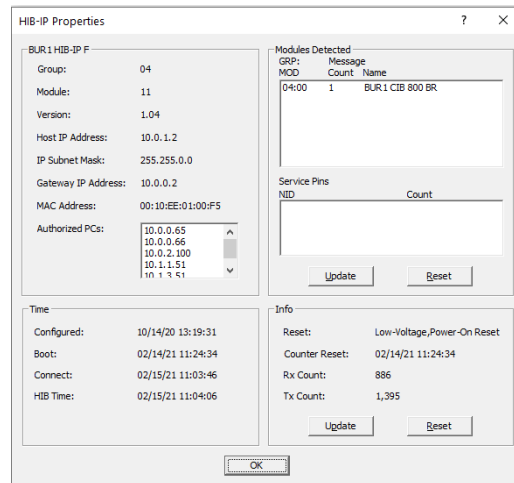
GRV 8000 Comparator Properties window



GRV 8000 Properties Window

HIB-IP Properties Windows

The HIB-IP 8002 Properties window shows enhanced diagnostic information. The earlier HIB-IP and HIB-IP 8000 units will have more limited information.



HIB-IP 8002 Properties

The **Modules Detected** window shows various MCN modules such as CIB, AIB, and GPIO modules that are generating traffic on the MCN network. If the modules are in the MCN system configuration filed, the module name will be listed as shown above. This is an effective way to help troubleshoot MCN network problems.

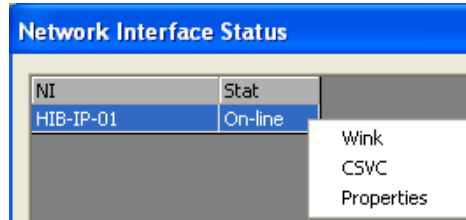
- If a module is missing from the list, the module may not be powered up, there may be a break in the network, the module may be mis-addressed, or there may be a problem with the module.
- If a module appears with question marks in the Name field, the module (as identified by the Group & Module address shown) is not in the system configuration files. This may be because the Group and Module rotary address switches on the modules are not set properly.

The Service Pins window is not normally used, but it can help identify a specific module when the **Svc** switch is pressed. Svc switches are available on CIB modules version 200, AIB modules, GPIO type modules, and some old EXB modules.

Additional HIB-IP Diagnostic Functions

When you Right-Click on a HIB-IP Network Interface, there are two additional diagnostic options:

- **Wink**
- **CSVC.**

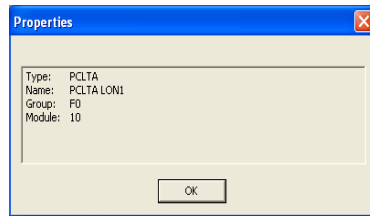


Wink This will flash the RED "Wink" LED on the front of the HIB-IP unit. This feature may be useful to identify a specific HIB-IP unit if you are using a system where there are multiple HIB-IP units.

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

PCLTA Properties Windows

The PCLTA Properties Window shows information about the PCLTA unit in use:

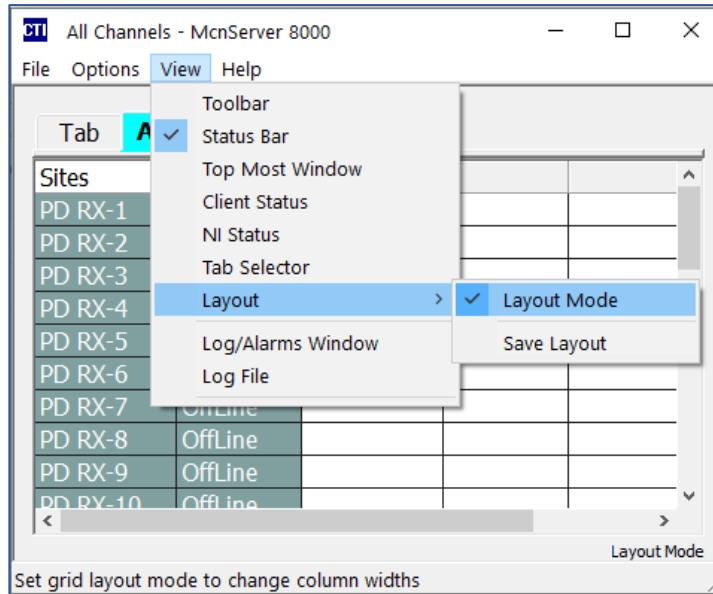


PCLTA Properties

Layout Mode

Starting in Version 9.2 of the program, column widths would normally be configured in the MCN Config Server program. The settings are saved in the system configuration files. When MCN Server is run, it will normally use the settings saved in the system configuration files. The Layout Mode is provided in the Server software to allow a user to tweak the settings if needed.

To enter Layout Mode, select **View / Layout / Layout Mode** from the Menu.



In Layout mode, you can adjust column widths by moving the column separator bars in the top row (similar to the method used in the MCN Config Server program).

To save the column widths and exit Layout Mode, select **View / Layout / Save Layout** from the Menu. The settings are saved in the following folder:

- C:\Users**USERNAME**\AppData\Local\CTI Products Inc\McnRcd.

The file name will be of the form:

- SystemName.ScreenName.RcdFmt

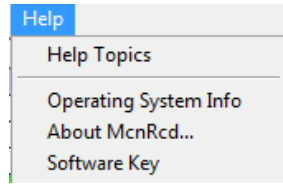
When a system is opened in the MCN Server 8000 program, the software will look for a matching RcdFmt file in the above folder. If it finds the file, the settings from the file are used instead of the settings in the MCN System Configuration files.

To delete the custom formatting and use the screen formatting from the MCN System Configuration files:

1. Close the MCN Server 8000 program.
2. Delete the file described above.
3. Re-start the program.

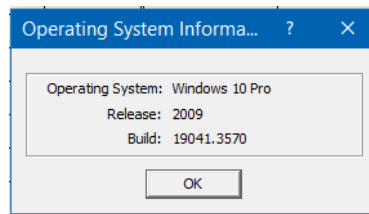
Even if the Server has a custom RcdFmt file, it will still pass the standard formatting to the clients connected to it.

Help Menu



Operating System Info

The operating system info will display relevant details about the OS on which the MCN Program is installed.



About McnRcd...

The *About McnRcd* menu item will display relevant details about the currently installed license options for the McnServer 8000 Program.



Caution Note that Each GCM 8000 and MLC 8000 Analog Comparator counts as one IP comparator, even if they are operating in a Mixed Mode system.



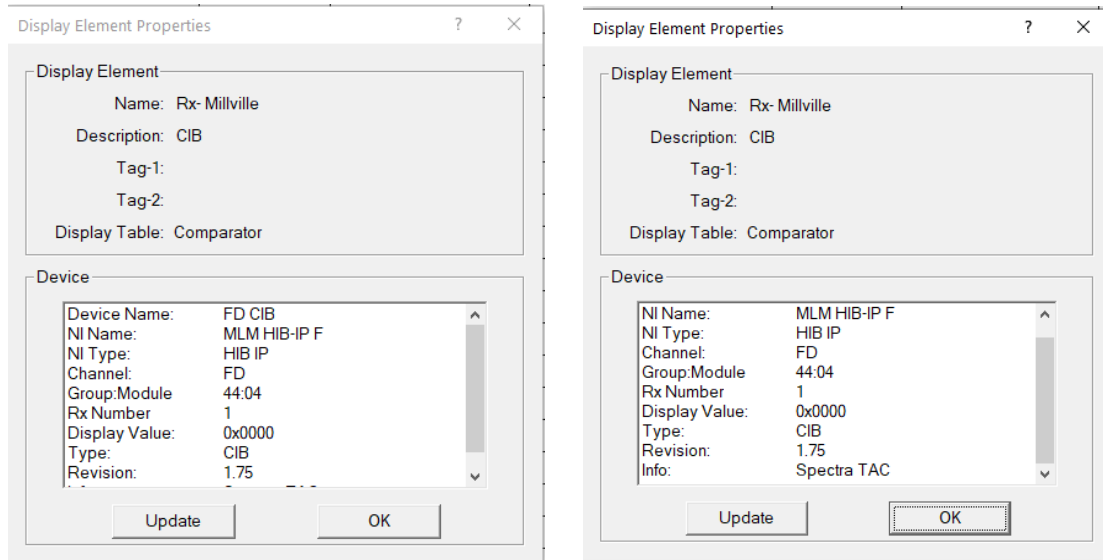
Software Key Menu Item

The *Software Key* menu item opens the Software Key dialog box to allow you to load a new Software Key. See the **Software Key** section on page 54 for details.

Display Element Properties

More information can be obtained about each specific receiver by performing a **Shift - Left Click** over the particular screen element and bringing up the Display Element Window.

Legacy Comparator Display Element Properties



The fields shown are as follows:

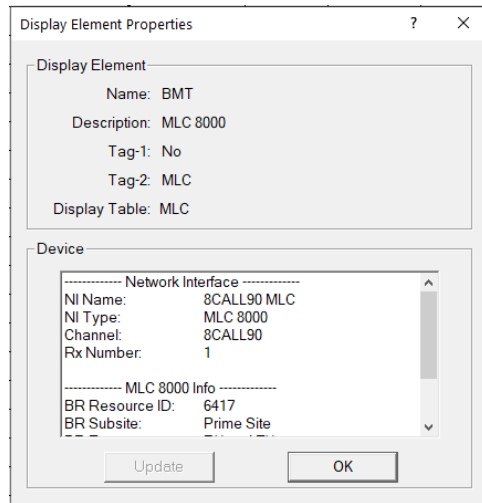
Display Element:

- **Name** Receiver or I/O point name from MCN Configuration files.
- **Description** Field from MCN Configuration files.
- **Tag1, Tag2** Fields from MCN Configuration files.
- **Display Table** Field from MCN Configuration files.

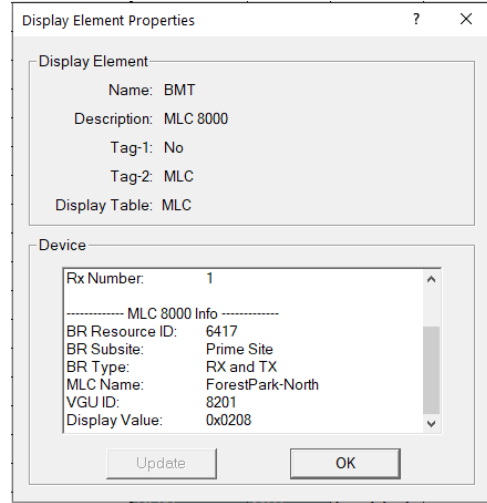
Device:

- **Name** Module name from MCN Configuration files.
- **NI Name** Network Interface which manages this device from MCN Configuration files.
- **Channel** Channel name associated with this device from MCN Configuration files.
- **Group** MCN Group number configured for this device from MCN Configuration files. (Device Group switches must be set to this value.)
- **Module** MCN Module number configured for this device from MCN Configuration files. (Device Module switch must be set to this value.)
- **Type** Generic Module Type
- **Rev** Module firmware version number
- **Info** Optional additional information based on switch settings.

MLC 8000 Display Element Expanded Properties



Network Interface (VGU) Portion



Device Portion

In MCN Server 8000 version 7.x and up, the Display Element Properties window for a receiver in an MLC 8000 comparator will provide information about the comparator and receiver. Most of the data in the window is taken from the MCN system configuration files. The following fields are displayed:

Display Element:

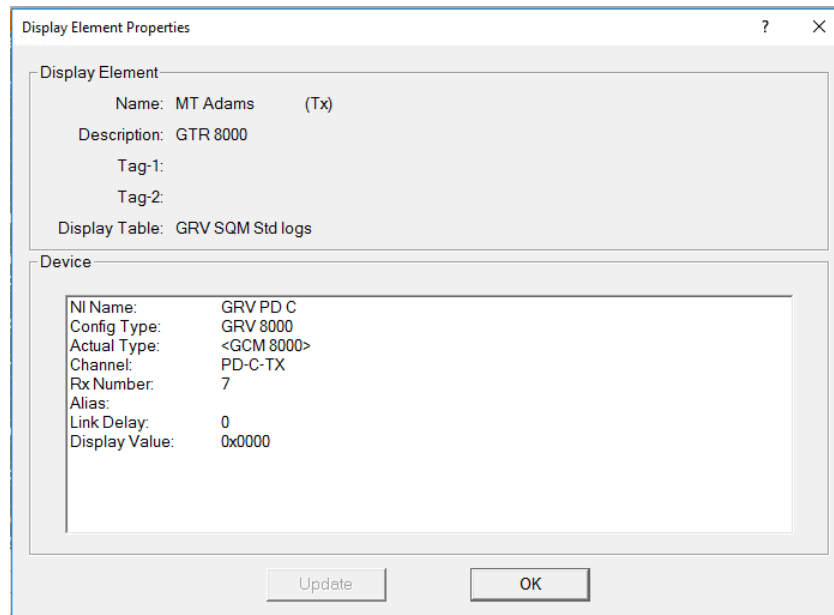
- **Name** BR / Receiver name from MCN Configuration files.
- **Description** Field from MCN Configuration files.
- **Tag1, Tag2** Fields from MCN Configuration files.
- **Display Table** Field from MCN Configuration files.

Device:

- **NI Name** Network Interface name for this comparator from MCN Configuration files.
- **NI Type** Comparator Type from MCN Configuration files.
- **Channel** Channel name associated with this comparator from MCN Configuration files.
- **Rx Number** Receiver subsite number in this comparator from MCN Configuration files.
- **BR Resource ID** MLC ID for this receiver configured in the MCN Configuration files. (Must match the MLC ID for the BR port in the AGU unit.)
- **BR Subsite** Subsite alias from the MLC 8000 (Configured by the MLC 8000 CT software).
- **BR Type** **Rx, Tx or Rx and Tx** (Configured by the MLC 8000 CT software).
- **MLC Name** Alias for Comparator (Configured by the MLC 8000 CT software).
- **VGU ID** MLC ID for the VGU (Must match the MLC ID of the VGU unit from the MLC 8000 CT software)
- **Display Value** Raw status value that is processed through the Display Table.

If the MLC 8000 comparator is running Protocol 1, expanded data is reported such as: MLC (Subsite) Name and MLC Subsite Number. If a comparator is running Protocol 0, some fields will show "Not received" to indicate that the expanded information is not received from the comparator.

GRV/GCM 8000 Display Element Expanded Properties



Note: Rx Number 0 represents the comparator state rather than an individual receiver.

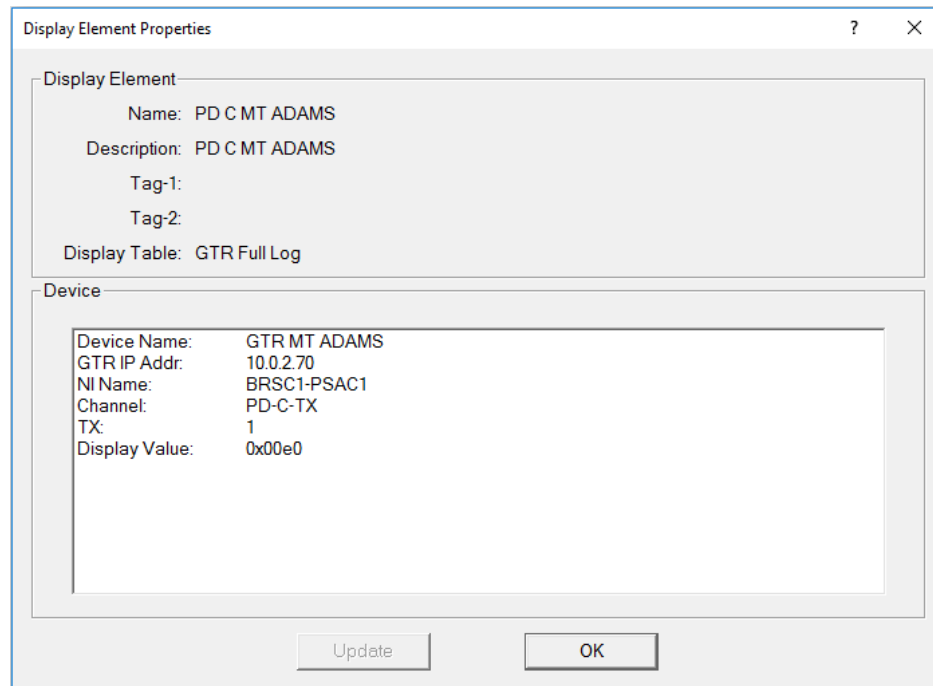
Display Element:

- **Name** BR / Receiver name from MCN Configuration files.
- **Description** Field from MCN Configuration files.
- **Tag1, Tag2** Fields from MCN Configuration files.
- **Display Table** Field from MCN Configuration files.

Device:

- **NI Name** Network Interface name for this comparator from MCN Configuration files.
- **Config Type** Comparator configuration Type from MCN Configuration files.
- **Actual Type** Comparator base Type from MCN Configuration files.
- **Channel** Channel name associated with this comparator from MCN Configuration files.
- **Rx Number** Receiver subsite number in this comparator from MCN Configuration files.
- **Alias** Read only data received from GCM or GRV.
- **Link Delay** Read only data received from GCM.
- **Display Value** Raw status value that is processed through the Display Table

GTR 8000 Display Element Expanded Properties



Display Element:

- **Name** BR / Receiver name from MCN Configuration files.
- **Description** Field from MCN Configuration files.
- **Tag1, Tag2** Fields from MCN Configuration files.
- **Display Table** Field from MCN Configuration files.

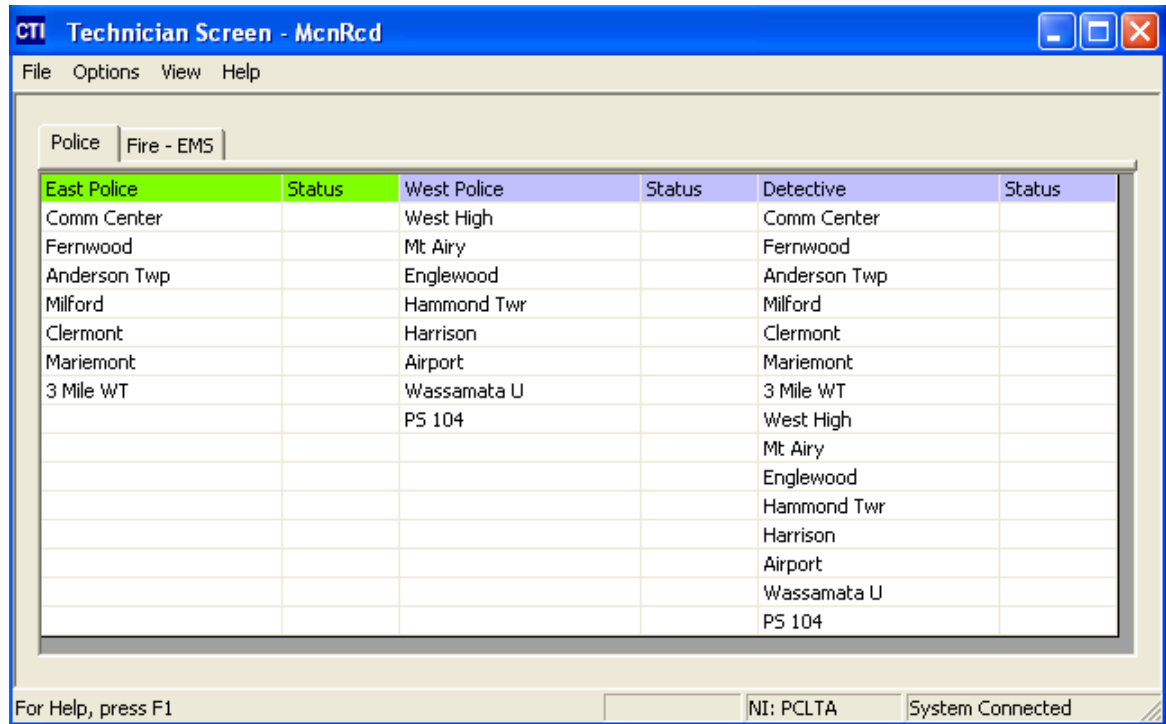
Device:

- **Device Name** Device name for the GTR from MCN Configuration files.
- **GTR IP Addr** IP Address of the GTR on the network from MCN Configuration files.
- **NI Name** Network Interface name for the BRSC from MCN Configuration files.
- **Channel** Channel name associated with this GTR from MCN Configuration files.
- **Tx** GTR index\subsite number in the BRSC from MCN Configuration files.
- **Display Value** Raw status value that is processed through the Display Table

The Display Window

This window provides the user with an interface, that is loaded by the MCN Server 8000 program, based on those files configured in the MCNConfig Server Program, see page **59**. The Display Window may be made up of one or more tabs. A tab is made of one or more Receiver or I/O points. Each tab will present a grid made up by rows and columns of cells, each of which may be populated with a single Receiver

Name/Alias that is linked to the operation of a modules individual Receiver or I/O function.



Screen Tabs

Tabs may be created during the configuration of an MCN system, using the MCNConfig server program. Tabs are typically used to manage how systems are viewed, that comprise of more receivers or I/O, than may be manageable on one viewable screen.

ScreenTab selection for Small Systems

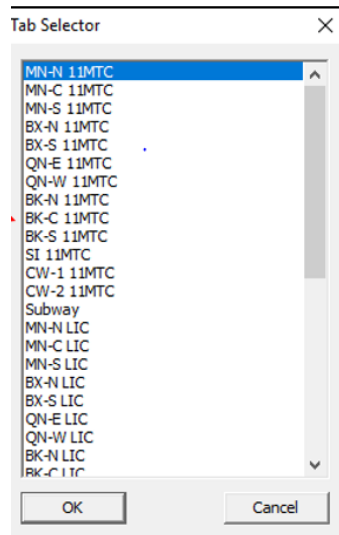
To view and monitor the Receiver or I/Os configured on different tabs, simply click on the available tabs at the top of the screen to switch and open that Tab.

Tab Selector for Large Multi-Tab Systems (List View)

Most systems have at most a few tabs on the Display Windows. On large systems, the tabs may scroll off the edge of the Display Window.

For quick navigation in large systems, do the following, within the Tab Selector feature:

- a. Use the PC mouse and click the center button anywhere on the receiver screen.
- b. The Tab Selector scroll box appears with a list of tabs available.
- c. Double-Click on the desired tab or
- d. Scroll and select the desired tab and hit "OK".



The MCN Client Program

The MCN Client program is designed for remote PCs to monitor and control the MCN system. Client PCs connect to the MCN Server over an IP network, so they don't need their own MCN Network Interface; they use the NIC of their host PCs instead..

Note: Run the Client Program with administrator rights the first time you use it.

Client Program Notes

This section provides key information on configuring the MCN Client application for better performance and a stable system connection across the Network.

Data Loading & Cache Files

The Client program gets its data from the MCN Server. The first time a client connects to a server, it loads the system configuration files from the Server. Once it loads the data, it will save a copy of the data in a local data cache.

When the Client connects to a Server, it will check to see if its local cache is current. If so, it will use the local cache to speed up the connection. If the cache is not current, it will re-load the data from the server.

It may take a bit longer to load the data file the first time or after it has changed. This is normally not too noticeable unless the system is large, has large Display Tables and the Client to Server connection has significant latency.

Backup MCN Servers

The Client program can be configured with a list of servers, where the first server in the list is prioritized as the Main Server. If this Main Server becomes unreachable, the program will sequentially attempt to connect to each backup MCN Server in the list, one by one, until it successfully connects to one of them. This configuration ensures that the program can maintain service continuity by switching to a backup server if the primary connection fails.

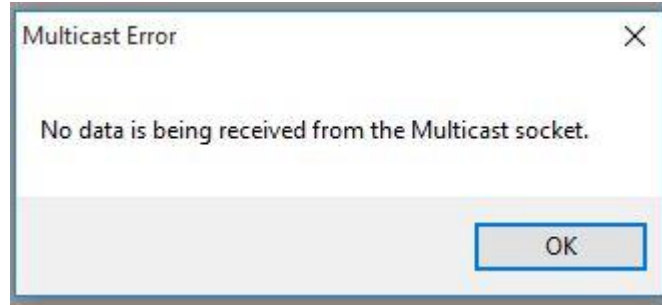
IP Multicast

By default, the MCN Server sends real-time data to the Client software via IP Multicast, allowing it to transmit data to multiple clients at once over the network. For this to function correctly, the routers and switches in the network that connect the Server and Client must support IP Multicast. Additionally, these network devices need to be set up to permit traffic for the specific IP Multicast Group and Port used by the MCN Server. If the routers and switches do not support or are not correctly configured for IP Multicast, the Client may not receive the real-time data from the Server, leading to disruptions in communication.

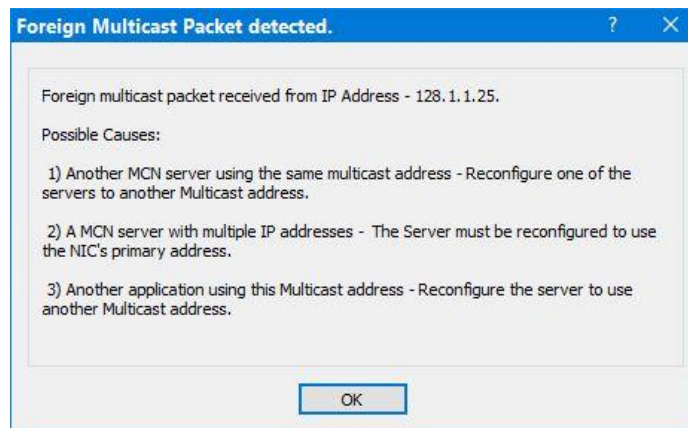
IP Multicast Error Windows

Error windows will be generated and displayed for the following IP Multicast errors:

- a. If the network is blocking the IP Multicast traffic, the Client will display an error message indicating that it is not receiving Multicast traffic.



- b. If the Client detects IP Multicast traffic from a different Server on the configured IP Multicast address, it will display a "Foreign Multicast" error window. (Each MCN Server must have its own Multicast IP address.)



Unicast Client Support (Version 7.x up)

The MCN Server 8000 and Mcnclient Version 7.00 and newer can communicate using Unicasted IP, for real-time transmissions. This means the Client can be set up for one-to-one communication with the MCN Server, allowing exclusive data transmission between them. This option is easier to deploy since it doesn't need any special network configuration. However, it is less efficient in bandwidth usage because the Server must send duplicate copies of the same data stream to each connected client.



NOTE 1: The number of simultaneous Unicast clients should be limited to 10.

NOTE 2: Both Unicast and Multicast clients can work on the same system.

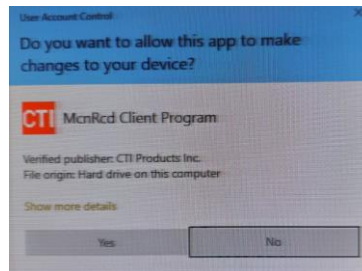
Configuring the MCN Client

The Client program uses a configured list for the MCN Servers to which it can connect. This is typically set up only once, the first time the Client program is run.



*For security purposes, it is recommended that normal users have only read-only access to the Server List. If the system is set up that way, you **must** have Administrator rights to run the Client program the first time (to configure the Server List).*

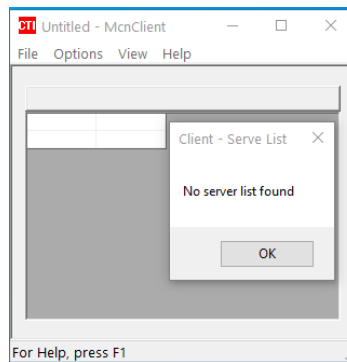
Initially you **must** start the Client Program with Administrator rights, by right clicking and choosing 'Run as Administrator.' The following UAC screen is presented to confirm your privilege elevation.



After this if users have proper Read-only rights, they can then run the Client program with just User permissions.

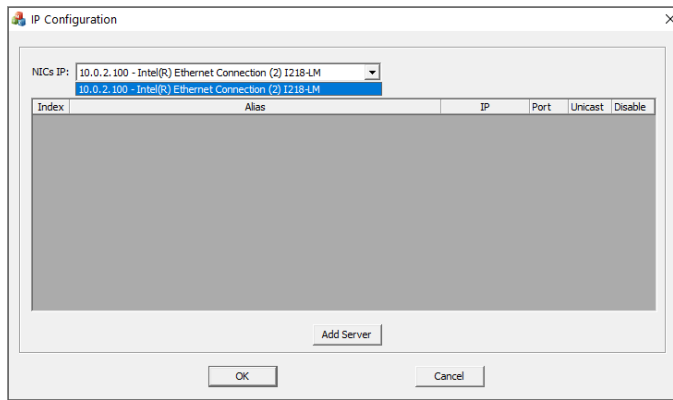
Selecting NIC

When you run the MCN Client program for the first time, it will need the NIC card to be selected which it will use for its Network connection.



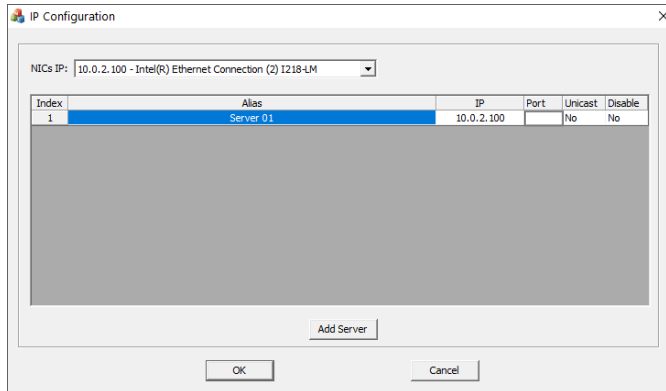
Also, it will try to load its 'Server List File' which it uses to get the IP parameters required for connecting to the MCN Server. The Parameters for this file must be configured through the next process.

Building Server List

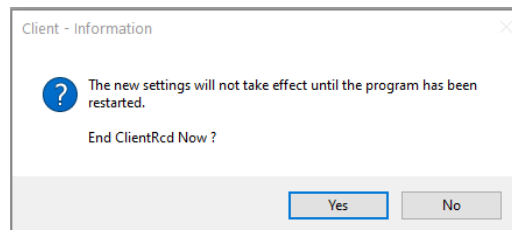


1. In the NICs IP drop-down box, select the IP address of the Client's NIC to use to connect to the MCN Server. (Typically, there will be only one NIC card and one IP address on a PC.)

2. Hit "Add Server".



3. Enter an Alias for the Server, its IP address, and MCN UDP port number. Use the IP address and Port that were assigned and set up on the MCN Server. For normal operation, set the Unicast field to "No". For Unicast operation, set it to "Yes". Make sure **Disable** field is set to "No".
4. If you have backup servers, add them by repeating the above steps.
5. Hit OK.



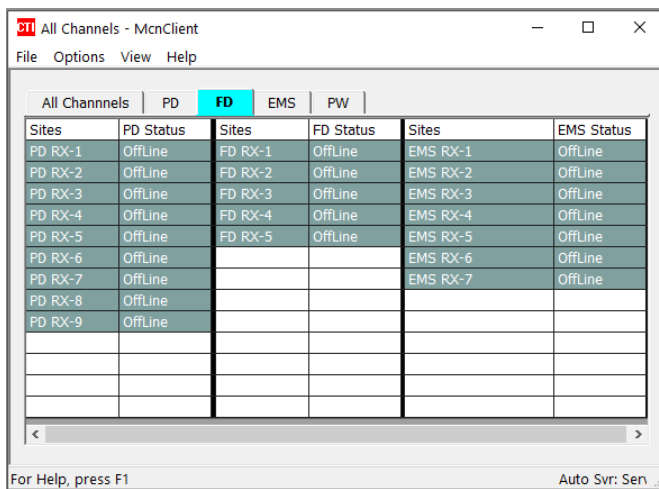
6. The list of clients will be saved in a file: ServerList.RcdCli and will be loaded each time the Client is started.

Making Connection with the Server

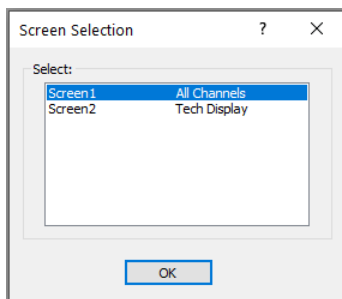
After the MCN Client program starts, it will try to contact the *first* MCN Server in its list.



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

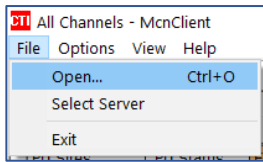


If it is the first time the MCN Client program is run, it will contact the MCN Server PC to get a list of available screens. Select from one of the screens.

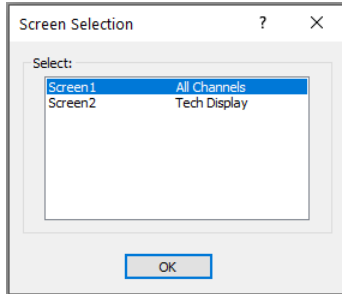


Selecting Screens

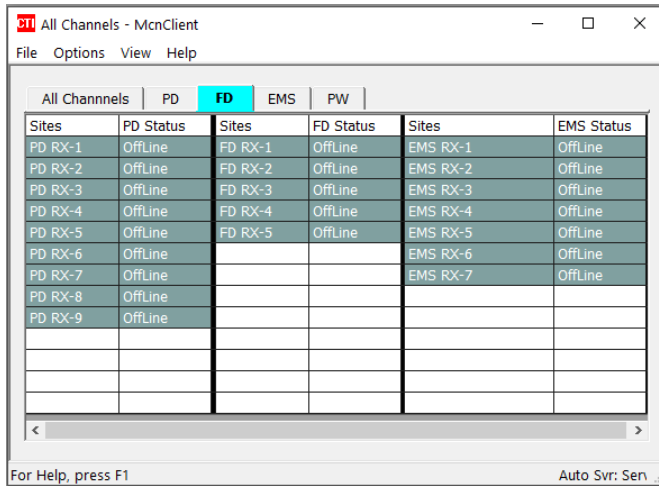
To load a different Display Window (screen), go to the File ... Open menu item.



A list of available screens will be displayed.



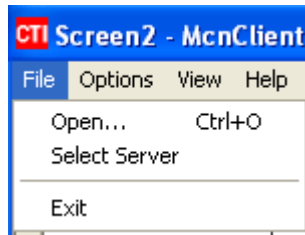
Select the desired screen from the list and it will be opened:



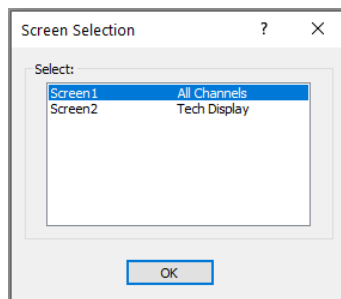
File Menu

The File menu has the following menu items:

- Open** Allows you to select a new screen on the current server.
- Select Server** Allows you to select a different server (if there is one)
- Exit** Allows you to exit the program.

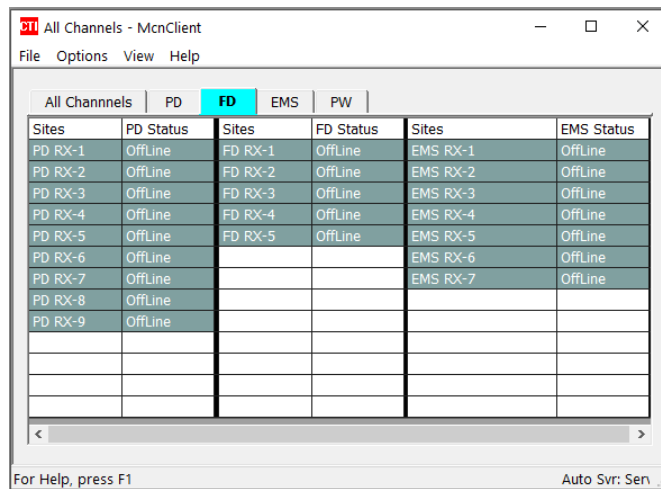


Open



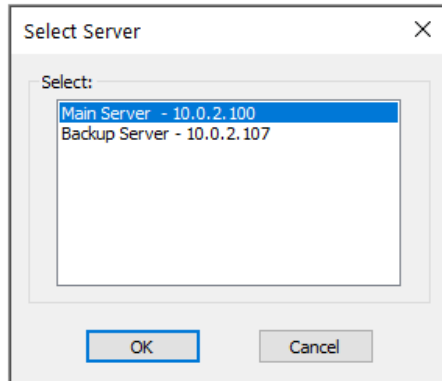
The Open window presents a list of screens present on the current MCN Server.

- Select the appropriate screen from the list presented and hit OK.



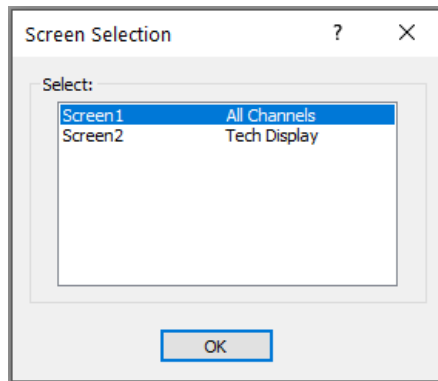
- The new screen will appear:

Select Server



The Select Server menu item presents a list of servers from which to select:

1. Select the appropriate server from the list presented and hit OK.
2. If the last screen you opened is present on the new server, it will be loaded automatically.
3. If the last screen is not present, a list of available screens on the new server will be shown:

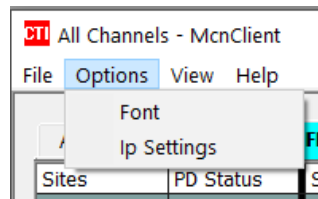


4. Select the desired screen and hit OK.

Options Menu

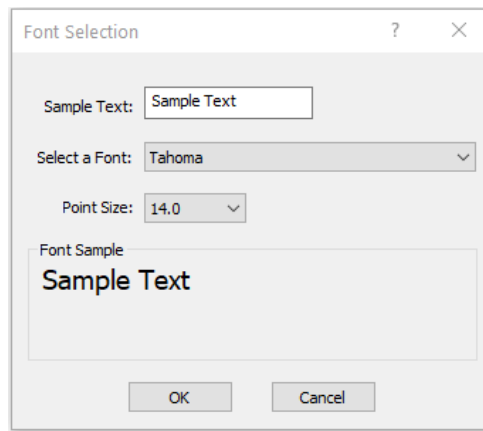
The Options menu has the following menu items:

- 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

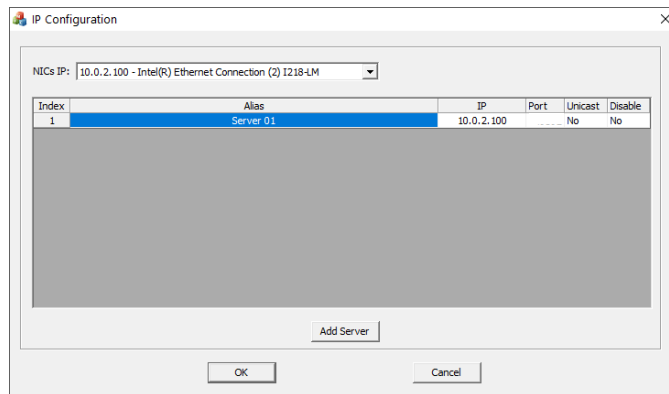
The Font Selection window is used to select a font and a font size for the Receivers and Function Blocks in the Display Window.



The row sizes will automatically stretch or shrink in response to font size changes. You may have to change the column widths manually after you make a change. See page 232 for directions for setting column widths.

IP Settings

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

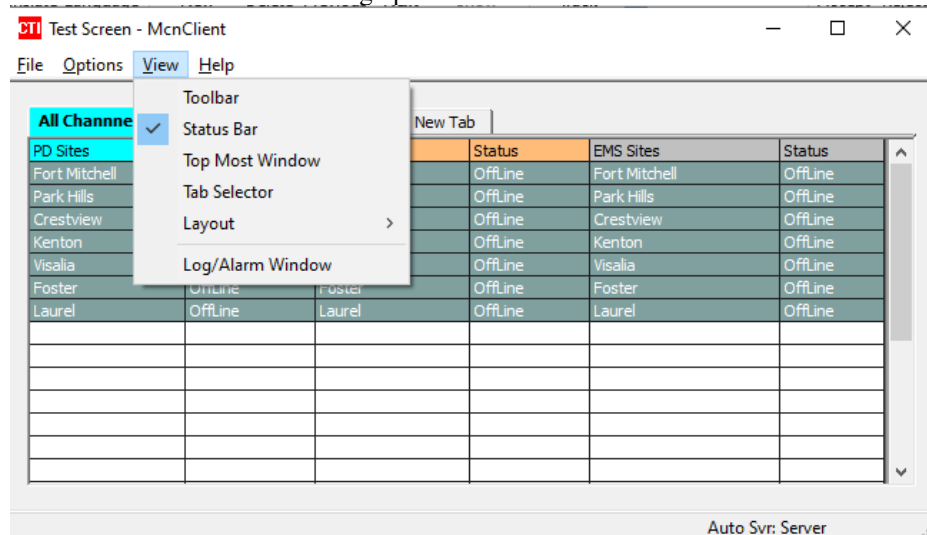


Enter the proper Port Number for the MCN Servers in your system.

If your system is set up with user account restrictions, you will not be able to save the settings from this window if you have only User Account rights.

View Menu

The View menu item has the following options:



- Toolbar** Turns the Toolbars on or off.
- Status Bar** Turns the Status Bar (at the bottom of the screen) on or off.
- Topmost Window** Allows MCN Client window to stay on the top of other programs that are running.
- Tab Selector** Opens the Tab list window to select appropriate tab,
- Layout Mode** This allows you to edit the column widths.
- Save Layout** Saves the column widths and Display Window position.
- Log/Alarm Window** Displays the Log / Alarm window,

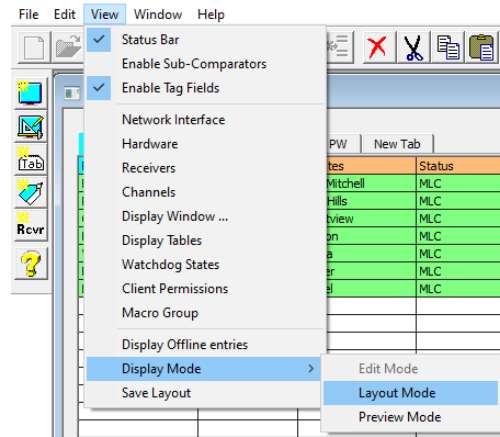
Layout Mode

Starting with program version 9.2, the column layout is done in the MCN Config Server program. The column settings are saved in the system configuration files and are loaded into the MCN Server 8000 software when the system is loaded. Those settings are sent to the Client when it opens the screen. The Layout Mode is provided in the Server software to allow a user to tweak the settings if needed.

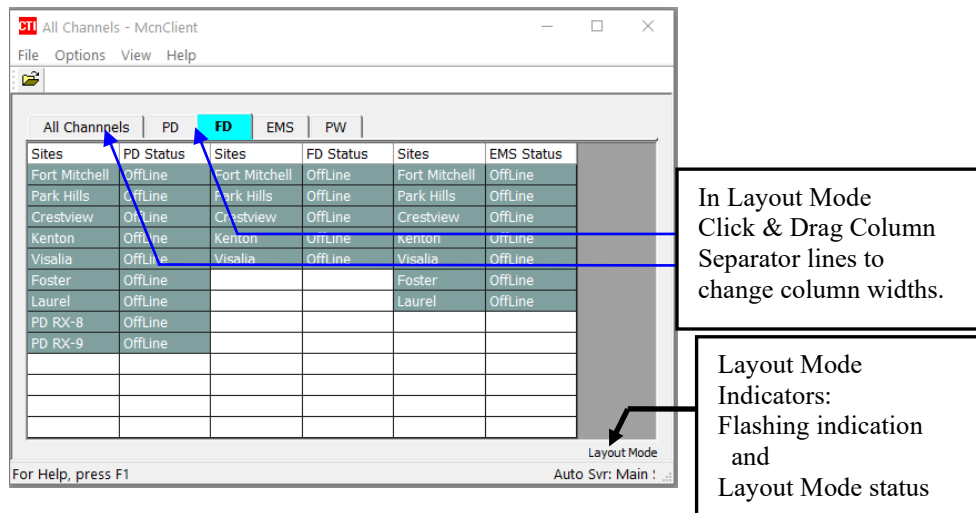
The Layout Mode is provided in the Server software to allow a user to tweak the settings if needed. You will normally not need to use Layout Mode in the Client software if the column settings are properly configured in the MCN Config software, and the PCs screens have the same resolution and multiplication factor.

To enter Layout Mode:

1. Select the appropriate Display Window and
2. Select **View / Display Mode / Layout Mode** from the Menu.



In Layout mode, you can adjust column widths by moving the column separator bars in the top row (similar to the method used in the MCN Config Server program).



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

To configure the position of the overall Client window on the desktop, move the entire program window to the appropriate point on the desktop. You may also adjust the program's window size.

To exit Layout Mode and save the column widths, window position and size, select **View / Layout / Save Layout** from the Menu. The settings are saved in the following folder:

C:\Users\USERNAME\AppData\Local\CTI Products Inc\McnClient.

The file name will be of the form:
SystemName_ScreenName.RcdFmt.

When a screen is opened in the Client software, the software will look for a matching *RcdFmt* file in the Mcnclient folder just mentioned. If it finds the file, the settings from the file are used instead of the settings from the MCN System Configuration files which were sent by the Server.

To delete the custom formatting and use the screen formatting from the MCN System Configuration files:

1. Close the Client software.
2. Delete the file described above.
3. Re-start the program.

Client Normal Run-Time Operation

Status Display

When the Client is running and getting information from the Server, it will provide a Status Display for the individual receivers and I/O devices in the loaded system.

Control

The Client can control the receivers in the comparators and the generic Outputs if the system is configured for Control operation. On Comparators, the typical control features are:

- **Force-Vote** Left Mouse Click (momentary)
- **Disable / Enable** Right Mouse Click (latched)

Certain systems may have the Control functions disabled for some clients. See your system administrator if you have questions.

See your system administrator about controls for other output devices.

Multiple Tab Systems

Some systems have multiple tabs. Use the mouse to select the tab you desire to view.

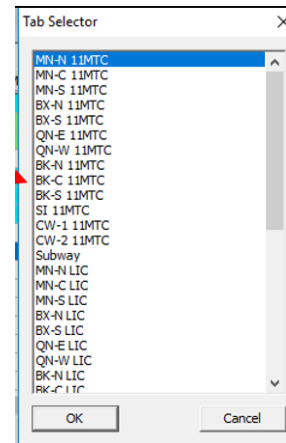
ScreenTab selection for Small Systems

To view and monitor the Receiver or I/Os configured on different tabs, simply click on the available tabs at the top of the screen to switch and open that Tab.

Tab Selector for Large Multi-Tab Systems (List View)

On large systems, the tabs may scroll off the edge of the Display Window. For quick navigation in large systems, use the Tab Selector feature.

- 1) Use the PC mouse and click the center button anywhere on the receiver screen.
- 2) The Tab Selector scroll box appears with a list of tabs available.
- 3) Double-Click on the desired tab or
- 4) Scroll and select the desired tab and hit "OK".



Log/Alarm Window

The ClientRCD software supports the Log/Alarm Window starting in version 9.2. It is similar to the Server Alarm/Log window with the following exception:

- ClientRCD does not have user control to control logging to the screen. This is done only through a registry entry.

See the **Screen Logging – Log Window / Log Tab** and **Alarm Display – Log Window / Alarms Tab** Sections for more details.

When an alarm is acknowledged by any user, the alarm point shows as Acknowledged in the Alarm tab for all users.

The logging format for the Clients is configured in the **SystemName.RcdLog** configuration file. All Clients share the same formatting. See **Appendix A: Error Logging Definitions** for details.

Client Log / Alarm Window Visibility Control

By default, the visibility of the Alarm tab is enabled on the Client. The visibility of the Alarm and Log tabs can be controlled by separate registry entries. The following exported registry entries have been exported and are present on the MCN Server 8000 INSTALLATION MEDIA:

- ClientEnableScreenLogging.reg
- ClientDisableScreenLogging.reg
- ClientEnableScreenAlarms.reg
- ClientDisableScreenAlarms.reg

You may have to run these using Admin mode. They take effect when the Client program is restarted.

Entries in the Alarm and Log tabs are only displayed for receiver & I/O points that are present on the screen that the Client software has loaded.

Windows Event Logging

In addition to the logging described in **Appendix A: Error Logging Definitions**, the MCN Server 8000 system logs significant events to the Windows Event Log, including:

MCN Config Server

Program start and stop.

System Load

Saving a System

MCN Server 8000

Program start and stop.

System Load

File Open Errors

Connection to and disconnection from IP Comparators

Connection to and disconnection from HIB-IP units

Connections & Disconnections of MCN Client PCs

Unauthorized Client log-on attempts

Mouse actions (ex: Force-Vote & Disable) for MCN Server 8000 & Clients

Log events as defined in xxxx.RcdLog (typically Disables & Fails for receivers)

Changes made to registry (HKLM)

ClientRCD

Program start and stop.

Connection to and disconnection from Server PC

Connection rejected by MCN Server

Changes in Server List

Changes made to registry (HKLM)

Advanced Configuration Topics – MCN Config Server 8000

Working with Display Tables

Display Tables map the input bit values from the devices to the text and colors, to be displayed on the screen. If there is a standard Display Table for your receivers or I/O types, you may not need to modify the data in the Display Tables window.

The Display Tables window allows you to:

1. Define new Display Tables for I/O devices and
2. Modify the text and colors displayed for the default Display Tables provided with the software.

There is at least 1 Display Table pre-defined for each type of comparator. The Display Tables names and association are shown below:

Display Tables	For use with
Comparator	ASTRO-TAC™, Digitac, Spectra-TAC, SNV-12, etc.
GRV GRV LV GRV Tech	GRV 8000 IP Comparators
GCM GCM LV	GCM 8000 IP comparators
MLC, MLC LV, MLC Tech	MLC 8000 Analog IP Comparators
Mixed Mode MM LV, MM Tech	Mixed Mode GCM 8000 & MLC 8000 Analog IP Comparator systems
DIU	ASTRO-TAC™ 3000 DIU ports

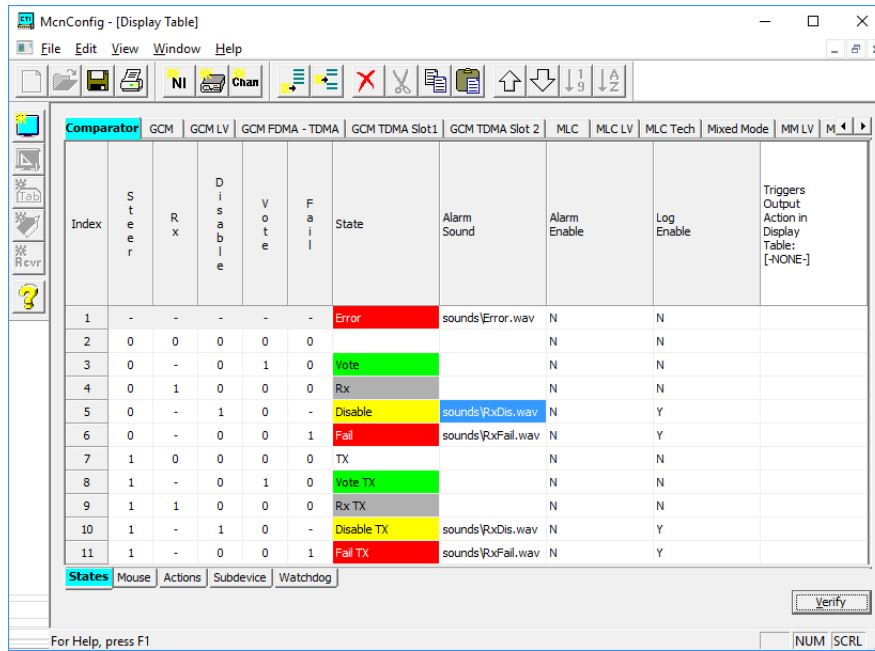
Note: In special cases, there are multiple different display tables pre-defined and available for use with the same comparator.

Other Display Tables are also available, but are pre-defined for I/O purposes or system control:

- Main Standby
- Repeat
- Master and Sub-Comparator Display tables
- On-Off
- Generator
- Door
- Power
- Fail
- Temperature
- Binary

If you don't need to add or change any Display Tables, jump ahead to the **BUILDING SCREENS -- Display Windows** section on page **108** to start building display screens.

To view the Display Table window, select **View / Display Tables** from the menu.




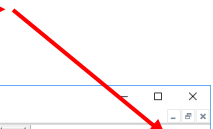
Navigating & Selecting the Display Tables

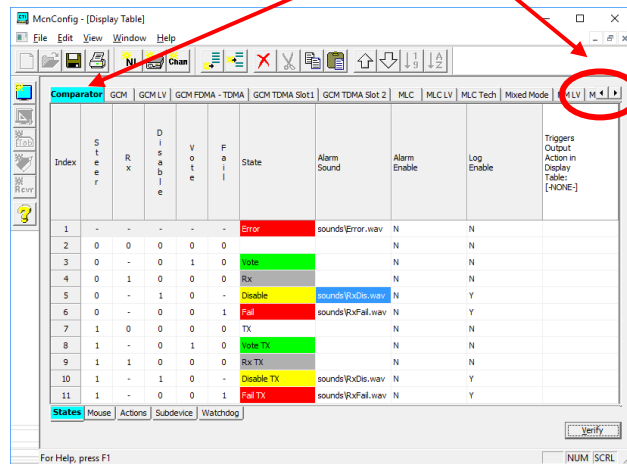
There are two ways to select a Display Table to work on:

- a. Left/Right Arrows
- b. Middle Mouse Button – Display Table List

Navigating with Left & Right Mouse Buttons


You can select a display table to work with by using the Left & Right Arrows on the top-right portion of the Display Table window.

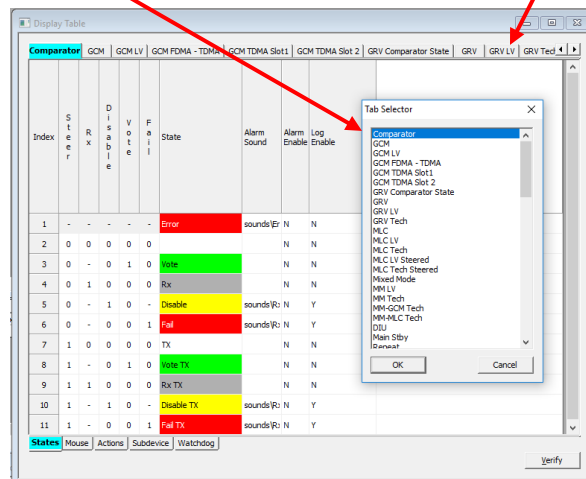
- a. Use the arrows to scroll left & right. 
- b. Select the Display Table by clicking its tab. 



Navigating with Display Table List – Middle Mouse Button

If there are a large number of Display Tables, it's faster to navigate using the Display Table List.

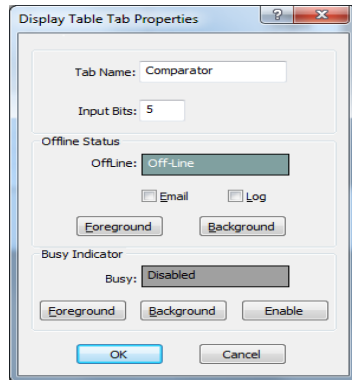
- a. Press the middle mouse button in the Display Table window. 
- b. Scroll & Select the Display Table to use from the list & Hit “OK”:



The middle mouse button may be on the mouse scroll wheel.

Display Table Properties Window

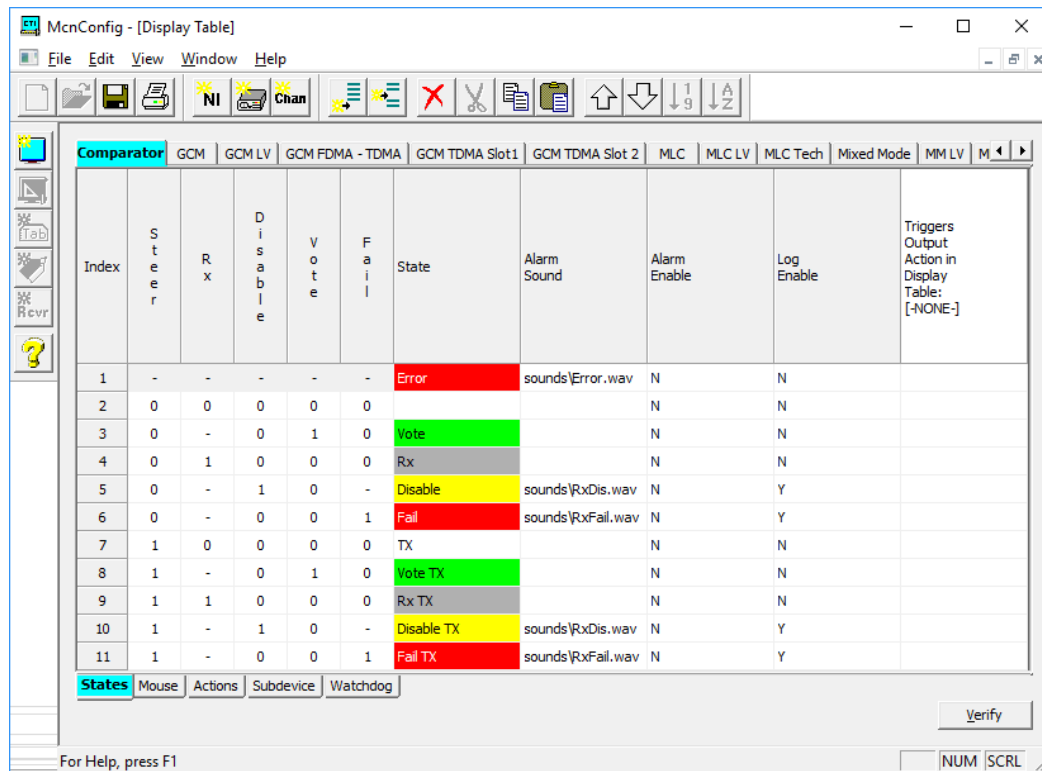
To display the overall properties for a Display Table, **Double-Click** on its **tab** at the top of the window.



From the Display Table 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)
- Logging flag for the Off-Line state.
- Busy State indicator (for legacy modules)

States Tab



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 on 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 if the input has the Alarm bit enabled. It will be played whenever any input changes to this state.

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.

Alarm Field

This is a flag to determine whether or not to show this bit in the Alarm window (and play a sound associated with it) when it is active.

- 0 = Don't use Alarm Window
- 1 = Use Alarm Window

If the Alarm flag is set to 1, the input will appear in the Alarm Window (and an optional sound will be played) whenever an input goes into this state.

Log Field

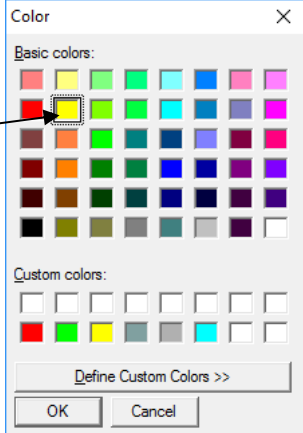
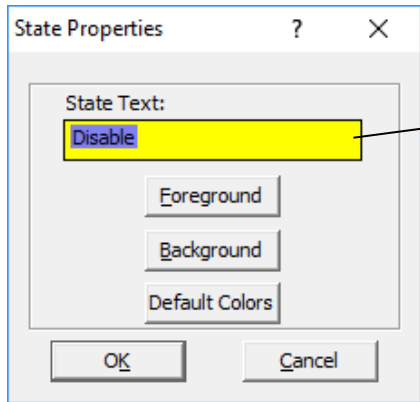
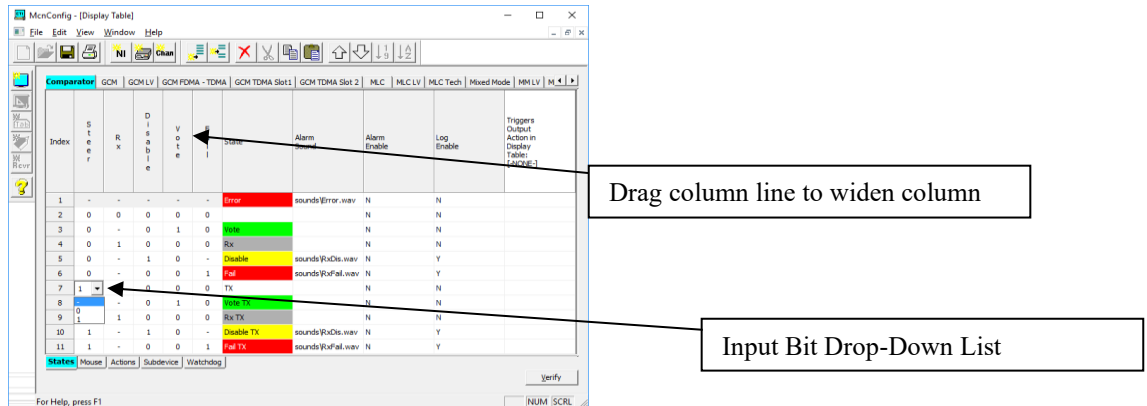
This is a flag to determine whether or not to log this state (to screen, printer, or disk).

- 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** Sounds are used for Alarms only. When an Alarm goes active, the server program can play a WAV file. To select a sound, double click in the Alarm Sound cell as shown below.

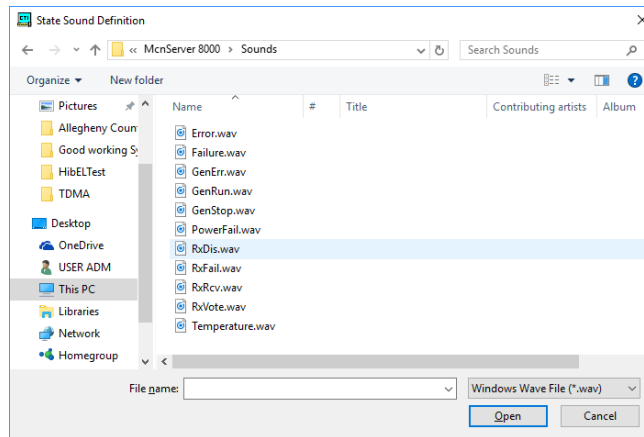
1	-	-	-	-	-	Error	sounds\Error.wav	N	N
2	0	0	0	0	0			N	N
3	0	-	0	1	0	Vote		N	N
4	0	1	0	0	0	Rx		N	N
5	0	-	1	0	-	Disable	sounds\RxDIs.wav	N	Y
6	0	-	0	0	1	Fail	sounds\RxFail.wav	N	Y
7	1	0	0	0	0	TX		N	N
8	1	-	0	1	0	Vote TX		N	N
9	1	1	0	0	0	Rx TX		N	N
10	1	-	1	0	-	Disable TX	sounds\RxDIs.wav	N	Y
11	1	-	0	0	1	Fail TX	sounds\RxFail.wav	N	Y

States Mouse Actions Subdevice Watchdog

r Help, press F1

NUM SCRL

Select the appropriate WAV file from the State Sound Definition window.



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

1	-	-	-	-	-	Error	sounds\Error.wav	N	N
2	0	0	0	0	0			N	N
3	0	-	0	1	0	Vote		N	N
4	0	1	0	0	0	Rx		N	N
5	0	-	1	0	-	Disable	sounds\RxDIS.wav	N	Y
6	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	-	Disable TX	sounds\RxDIS.wav	N	Y
11	1	-	0	0	1	Fail TX	sounds\RxFail.wav	N	Y

States Mouse Actions Subdevice Watchdog

Verify

For Help, press F1

NUM SCRL

State Table Verify

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

Index	St e e r	R x	D i s a b l e	V o t e	F a i l	State	Alarm Sound	Alarm Enable	Log Enable	Triggers Output Action in Display Table: [-NONE-]
1	-	-	-	-	-	Error	sounds\Error.wav	N	N	
2	0	0	0	0	0			N	N	
3	0	-	0	1	0	Vote		N	N	
4	0	1	0	0	0	Rx		N	N	
5	0	-	1	0	-	Disable	sounds\RxDIS.wav	N	Y	
6	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	-	Disable TX	sounds\RxDIS.wav	N	Y	
11	1	-	0	0	1	Fail TX	sounds\RxFail.wav	N	Y	

States Mouse Actions Subdevice Watchdog

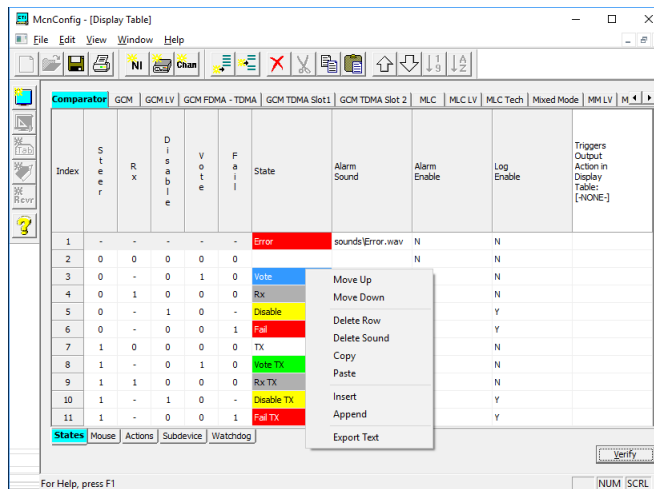
Verify

For Help, press F1

NUM SCRL

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

Will paste the clipboard contents to the current cell. If more than one cell is on the clipboard, the additional cells will be pasted to cells on the right.

Insert

Inserts a blank row at the current location.

Append

Appends a blank row to the end of the Display Table

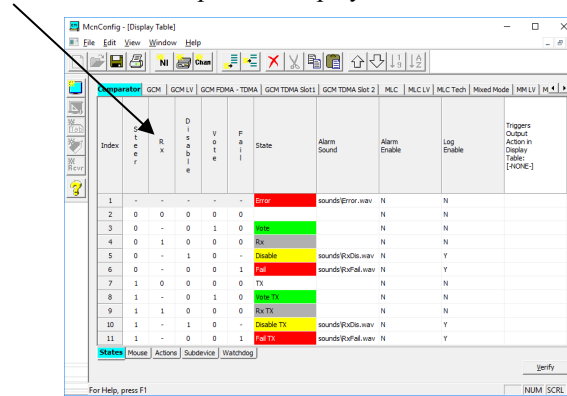
Export Text

Exports a text file copy of the contents for this window.

Viewing Bit Names

To view the Bit Names for a particular Display Table, **Click** on the specific table name and that display table will be shown with its Bit names and configuration.

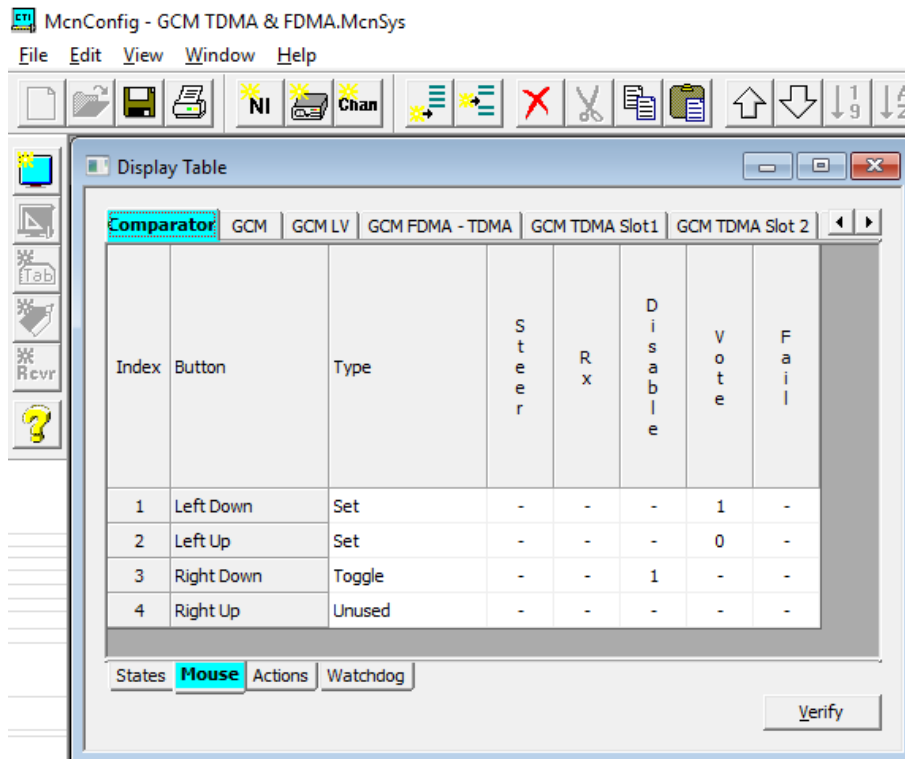
Note: The Bit Names for the Comparator Display Table are fixed and cannot be edited.



Mouse Actions Tab

Four (4) mouse button 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 of the Mouse Event Lines on the previous screen contains the following fields:

Button

Describes the mouse event.

Type

This action 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 managed.

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.

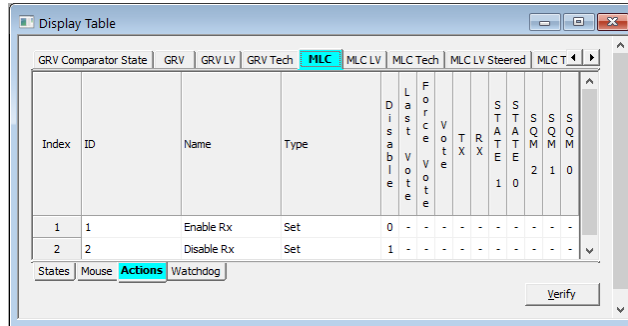
Editing the fields

- Type** To edit, click in the field.
Select the type with the Drop-Down menu.
- Bits** To edit, click in the bit value field.
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 for Triggered Action, Group Macros and TPCI functions

The Actions Tab controls optional output action types in the Display Table. The Actions Tab is similar to the Mouse tab and provides additional control functions that can be accessed by following licensed options:

- Triggered Actions
- Group Macros and
- Third Party Client Interface (TPCI).



The above Actions table provides a way to explicitly Disable (ID 2) and Enable (ID 1) 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. It is also used for Triggered Outputs and Group Macros. The IDs must be unique.

Name

This field is for a descriptive name for the action it identifies. This name must be unique within a particular Display Table.

Type

Type of action to perform (Unused, Set, Toggle). Same as Type in the Mouse Tab.

Bits

Same as the Bits field in the Mouse Tab.

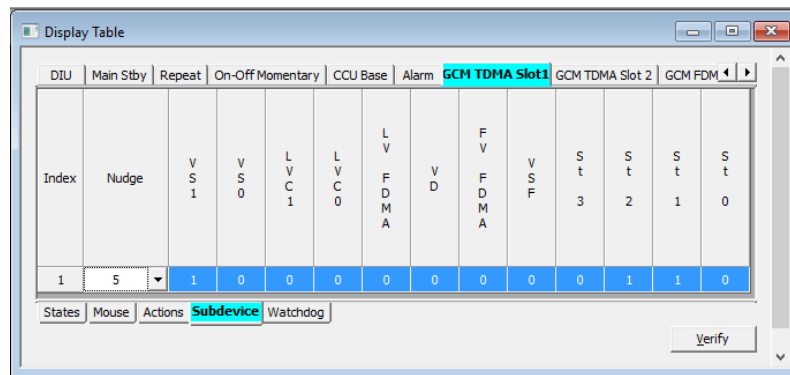
Editing the fields

- ID** To edit, click in the field.
Enter the ID number to use.
- Type** To edit, click in the field.
Select the type from the Drop-Down menu.
- Bits** To edit, click in the bit value field.
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.

SubDevice Tab

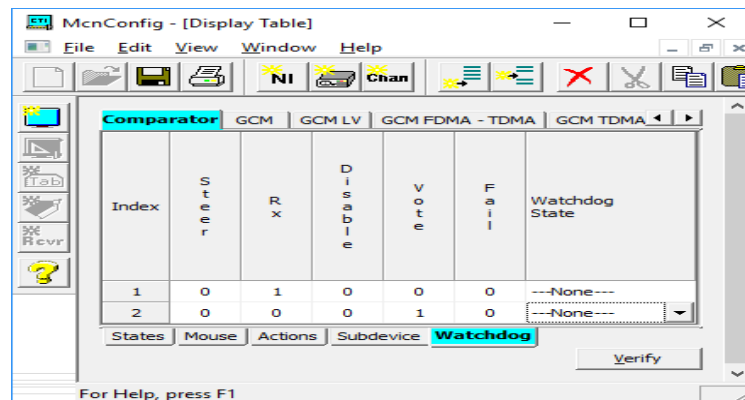
This is an advanced tab and is normally not used in basic MCN Server 8000 systems with IP comparators. It is typically employed with more complex systems that use legacy Master and Sub comparators.

This tab will not be present on the Display Table screen unless the “Enable Sub Comparators” is selected under the View Menu. The entry in this table tells the system which bit(s) should be passed down to subdevices and how many bits they should be shifted (Nudge). For specific details about this Tab's functions and options see Page 259. For a deeper understanding about the application, configuration and implementation of Master-Sub Comparators, refer to the **Configuring Master-Sub Comparator Systems** section on Page 250.



Watchdog Tab – used with System Performance Toolkit (Licensed Option)

This tab controls parameters for the future System Performance Toolkit option. For more details, see the manuals for the System performance Toolkit software.



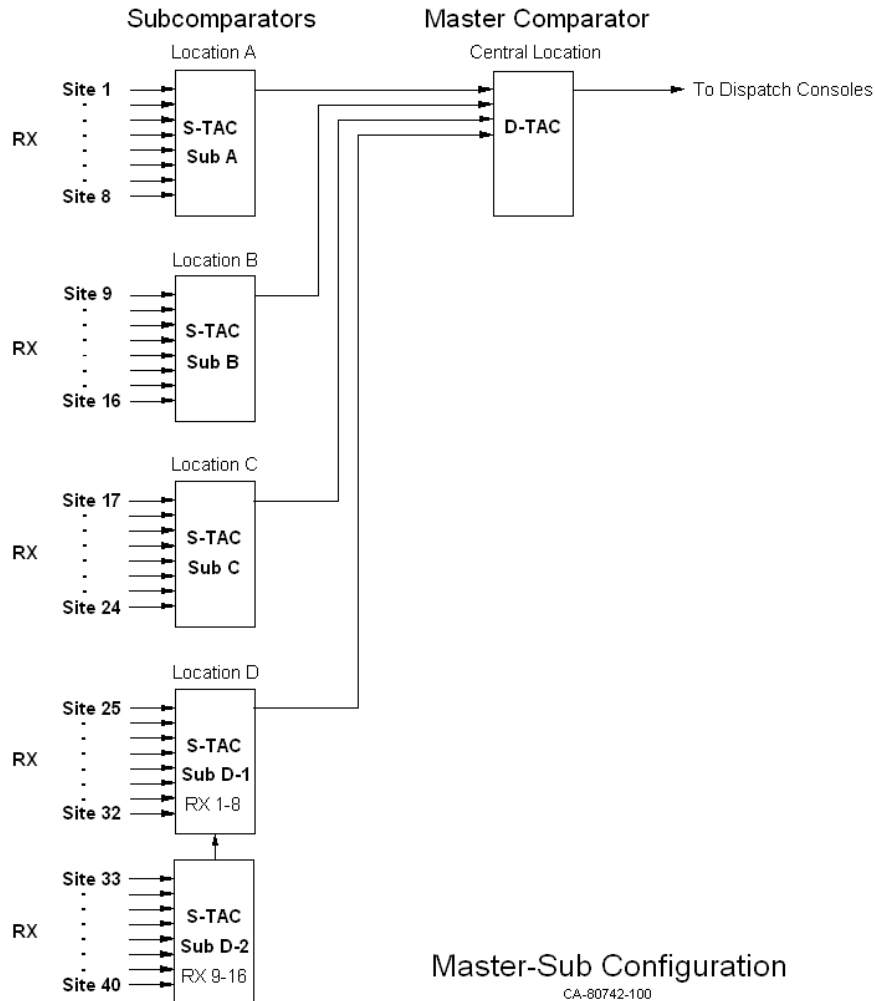
There will normally not be any lines entered in this table unless the System Performance Toolkit is used. For the above screen shot, Watchdog States Rx and Vote would typically be used for Index 1 and 2, respectively.

For more complicated Display Tables like the IP comparators, use the appropriate bit values in the States tab as a starting point for the Watchdog State bits. Multiple lines can be configured to point to the same Watchdog state if needed.

Configuring Master-Sub Comparator Systems

Configuration Overview

MCNRCD for Windows can support 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) A display for each receiver for each Sub Comparator
- b) 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).

Master Comparator	
Sub A	Rx
Sub B	Rx
Sub C	Vote
Sub D	Rx

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 Vote	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 Vote	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 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 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 direct indication of which site's audio is being heard. The Votes on Sites 4, 14, and 27 from Sub Comparators A, B, & D are not the signal being used by the Master Comparator, 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) A display for each receiver for each Sub Comparator
- b) No indication for the Master comparator
- c) A Virtual Comparator with 40 inputs.
- d) A single green "Vote" indication, showing the receiver being heard by the dispatcher.
- e) "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:

1. Is similar to the Virtual Comparator View.
2. Shows only one green "Vote" indication (the receiver whose audio is being used)
3. 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 the 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:

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

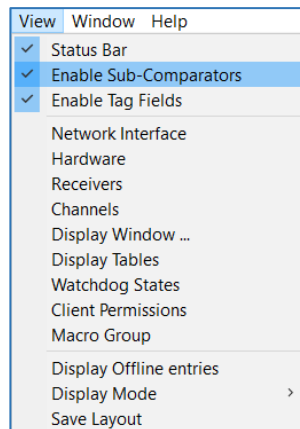
Optionally, if you want to customize the Master or Sub-Comparator display tables:

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

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

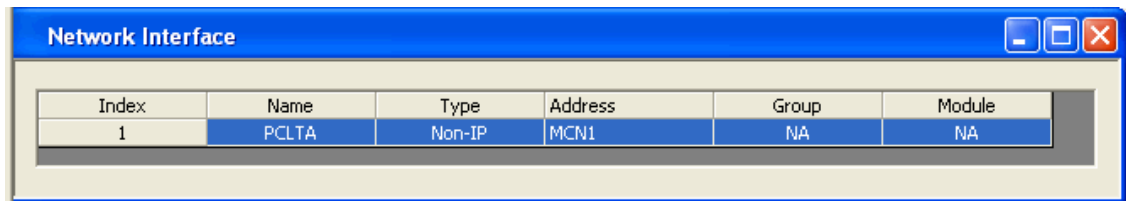
Enable Master-Sub features

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.



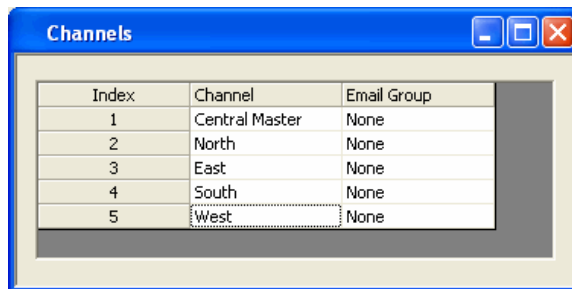
Setup Network Interface, Channels, Hardware and Receiver windows

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.

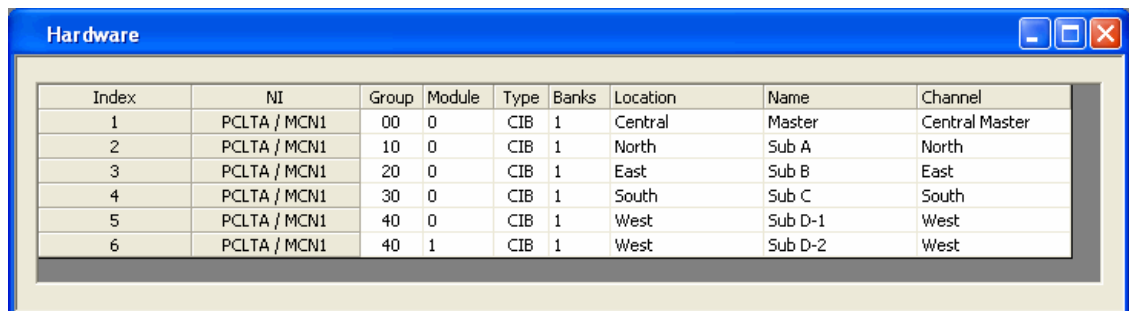


Index	Name	Type	Address	Group	Module
1	PCLTA	Non-IP	MCN1	NA	NA

The PCLTA is an old Network Interface. For new systems, HIB-IP 8002 modules would be used. If the Subcomparator(s) are remote from the Master, multiple HIB-IP 8002 units would be used.



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.

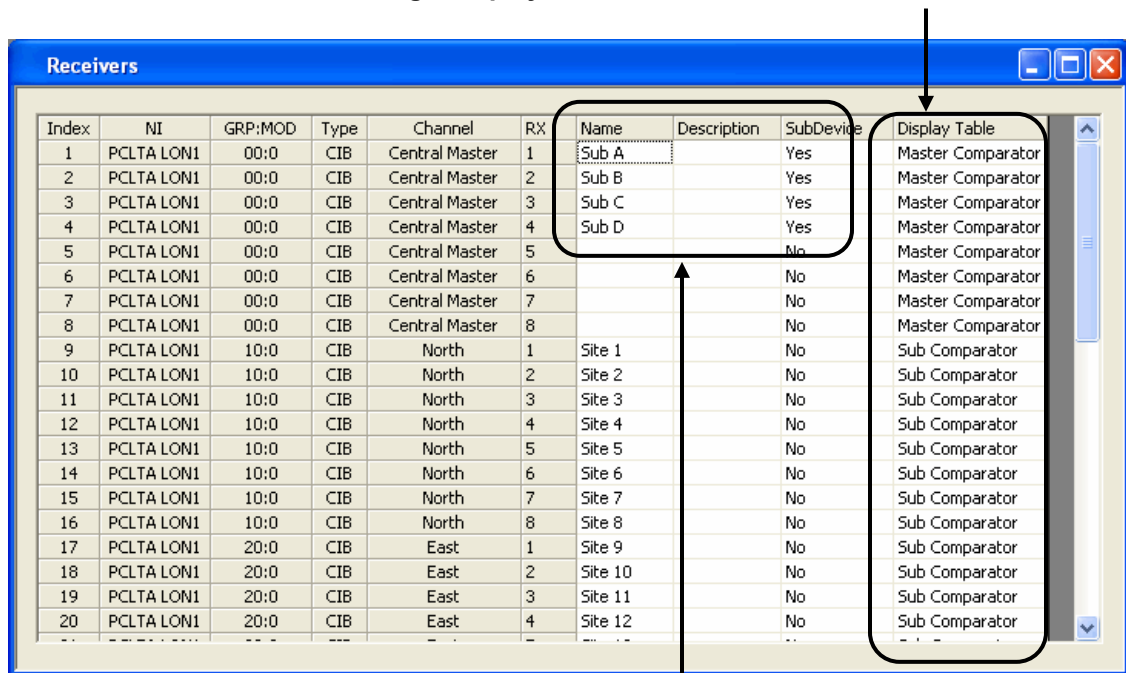
Assign Display Tables and Define the SubDevices

Assign Display Tables

In the “Receivers” window, double-click in the Display Table column and select the proper Display in the cell for each receiver as illustrated by the following Table Entry.

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

Assign Display Tables for Master & Subs



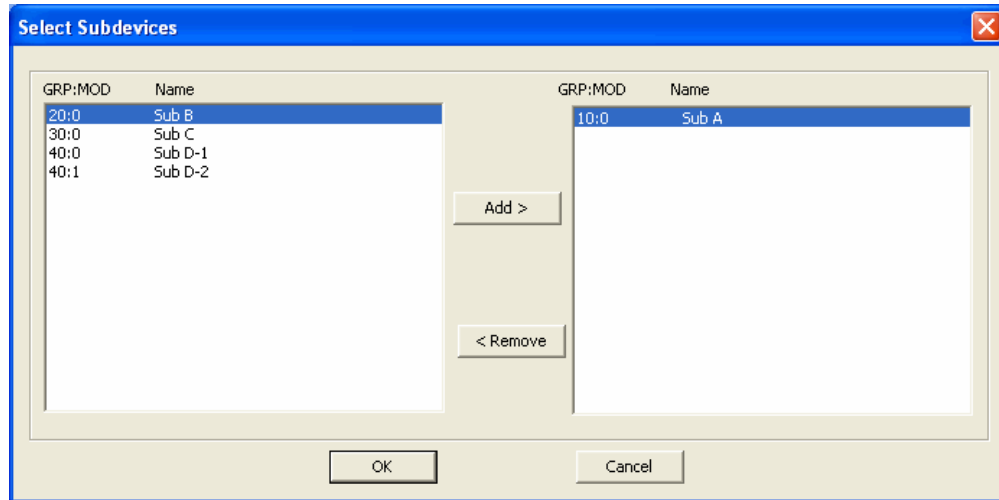
3 B: Define SubDevices for each receiver in Master comparator

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.

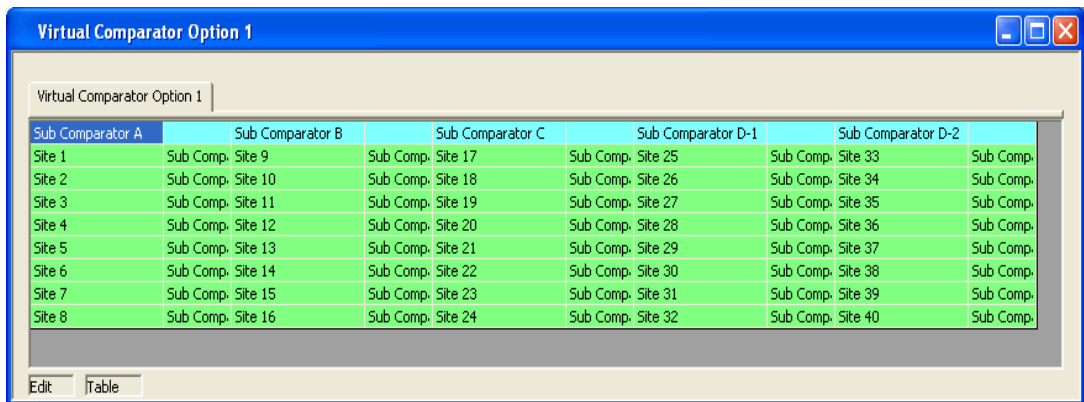


Click the **OK** button to close this window.

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

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.



Customizing Display Tables

In the “Display Table” window, multiple 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	M a s t e r	S t e e r	R x	D i s	V o t e	F a i l	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 are 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:

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

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

- The Steer bit is a Don't Care (we are 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:

Index	Nudge	Steer	Rx	Dis	Vote	Fail
1	5	0	0	0	1	0

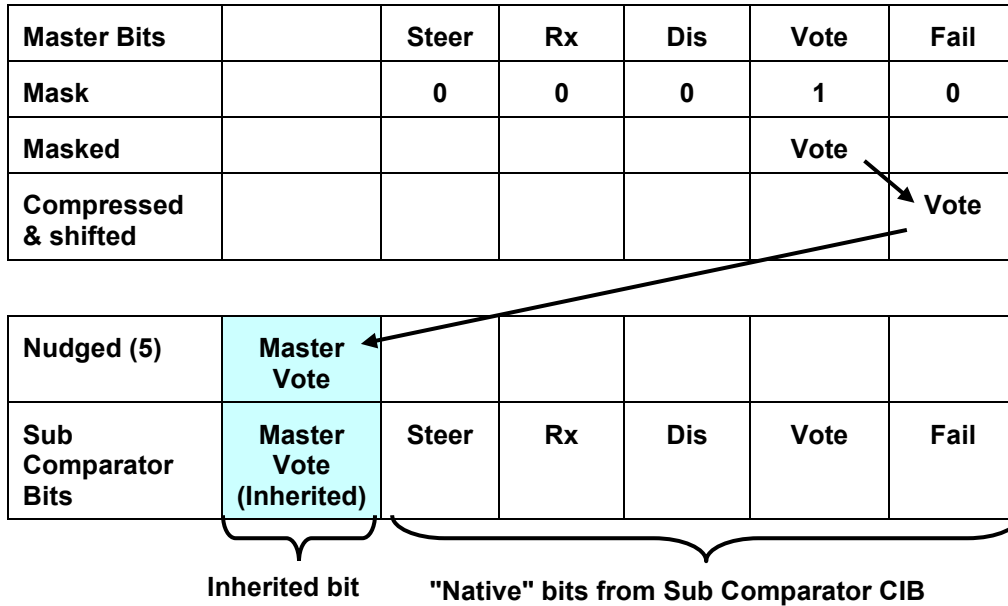
The **SubDevice** tab for the Master Comparator has the following items that are used to pass the Master Vote down to the Sub Comparator:

- Bit Mask for the Vote bit is a 1. This bit 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 multi-dependencies – 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 Primary/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

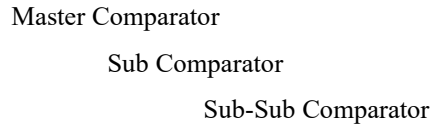
For Multi-Bit Master-Sub Comparator, the MCNRCD program processes the bits from the Master comparator as shown above:

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 managed.)

Multi-Level Inheritance – Sub-Sub Comparators

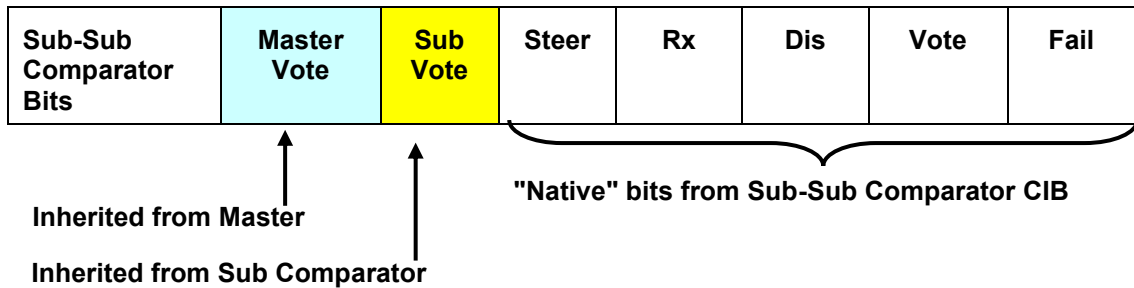
The Master – Sub Comparator feature allows you to pass bits down from a master device to a sub device as shown above. You can create multi-level systems as shown below:



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.

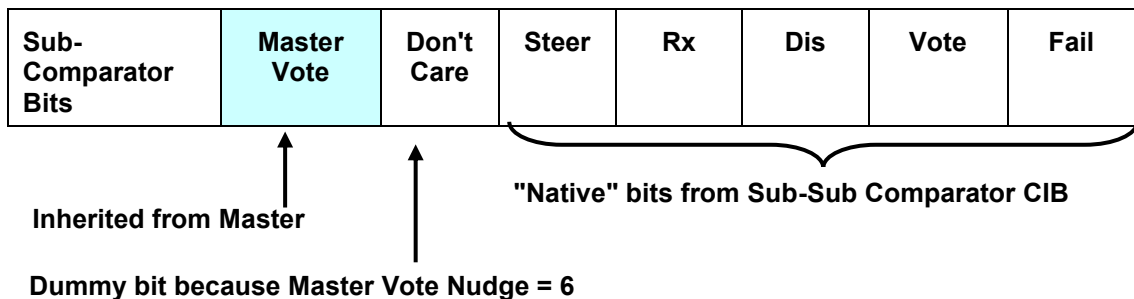
You might need a Master Vote and Sub Vote bit in the Sub-Sub Comparator as shown below:



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.

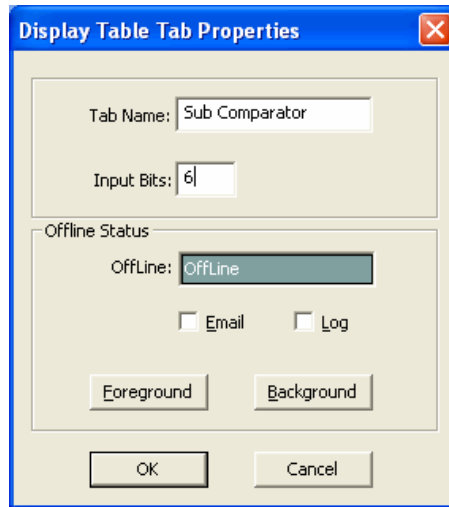
*In this example, we were able to pass the Master Vote bit down two levels, but it was not passed through the Sub Comparator. It was passed **directly** from the Master comparator to the Sub Comparator.*

Creating New Sub-Comparator Display Tables

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.

To add a tab for a new device to properly display the four Sub Comparators in our "Virtual Comparator" example system from Page 252,

- 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. Therefore, 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	M a s t e r	S t a t e r	R x	D i s	V o t e	F a i l	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

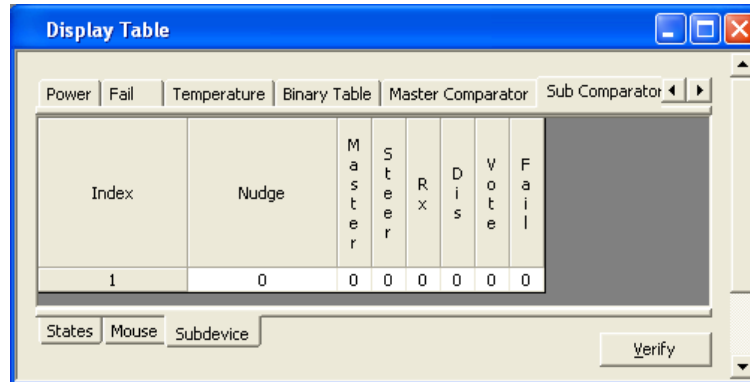
Mouse Tab

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

Index	Button	Type	M a s t e r	S t a t e r	R x	D i s	V o t e	F a i l
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.

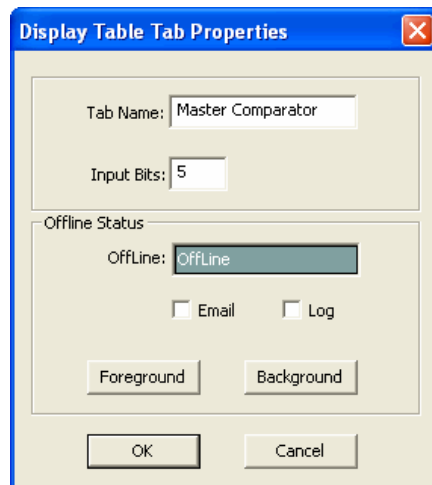


Creating a Master Comparator Display Table

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

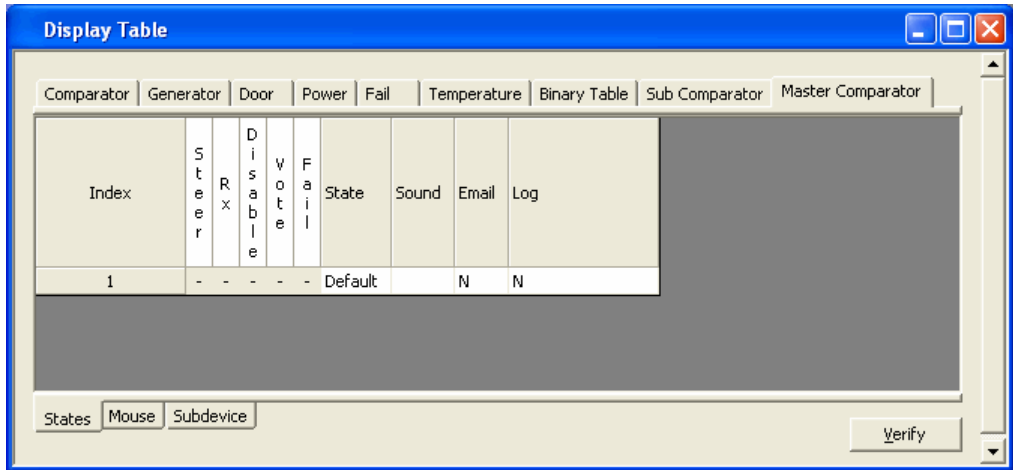
To add a tab for a new device to properly manage information from the Master Comparator in our example system, right-click on one of the existing tabs, then click on *Append New Table*. The following window will be displayed. Type in a new **Tab Name**, such as “Master Comparator.”

Next, Choose the number of status **Input Bits** for the new device. This Master Comparator display table will function similarly to the predefined “Comparator” Display Table, so you should set the number of **Input Bits** to 5. Click on **OK** to close this window.



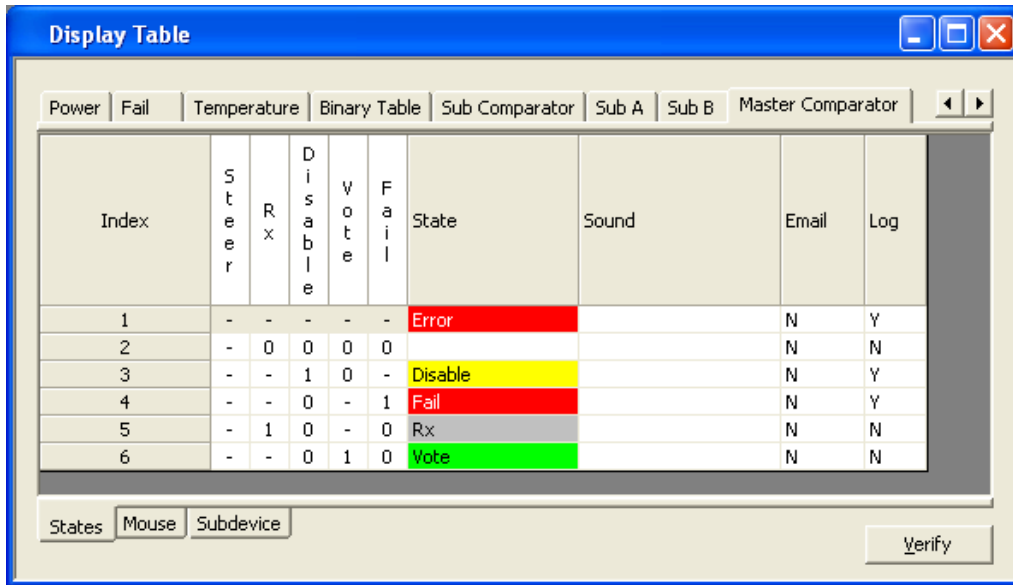
States Tab

After the table is shown, you must 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.



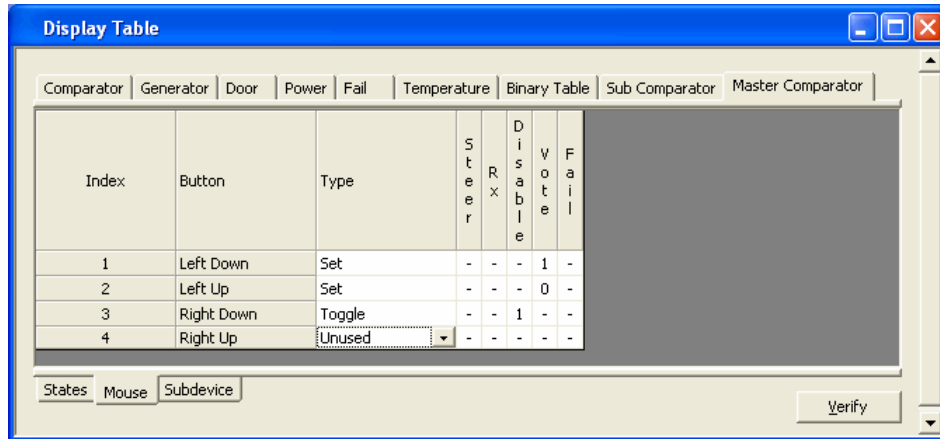
If the Master Comparators will never be displayed in an Equipment-Centric view, we could live with a minimalistic state table as shown above. No additional lines would need to be added to define states,

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.



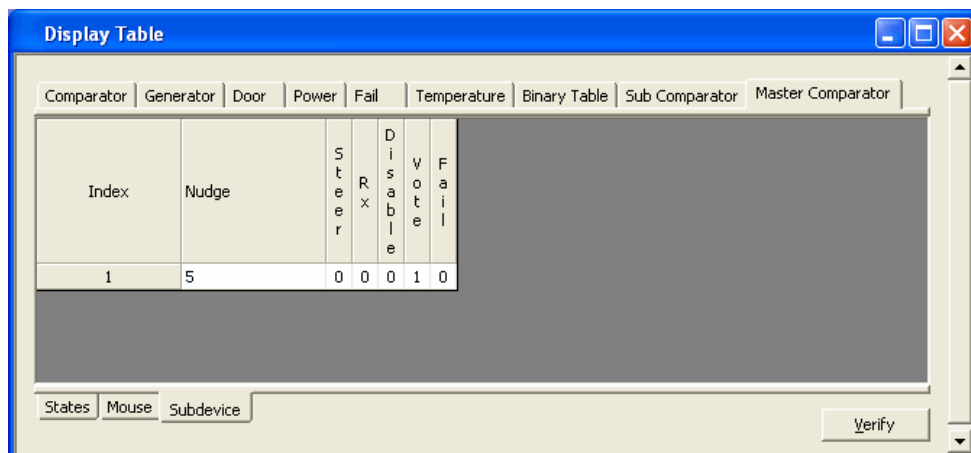
SubDevice Tab

Finally, the **SubDevice** tab for this “Master Comparator” display table must be altered to pass its “Vote” bit correctly to the Sub Comparator display table created earlier. Since the “Vote” of the Master Comparator must be passed to display the proper 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.

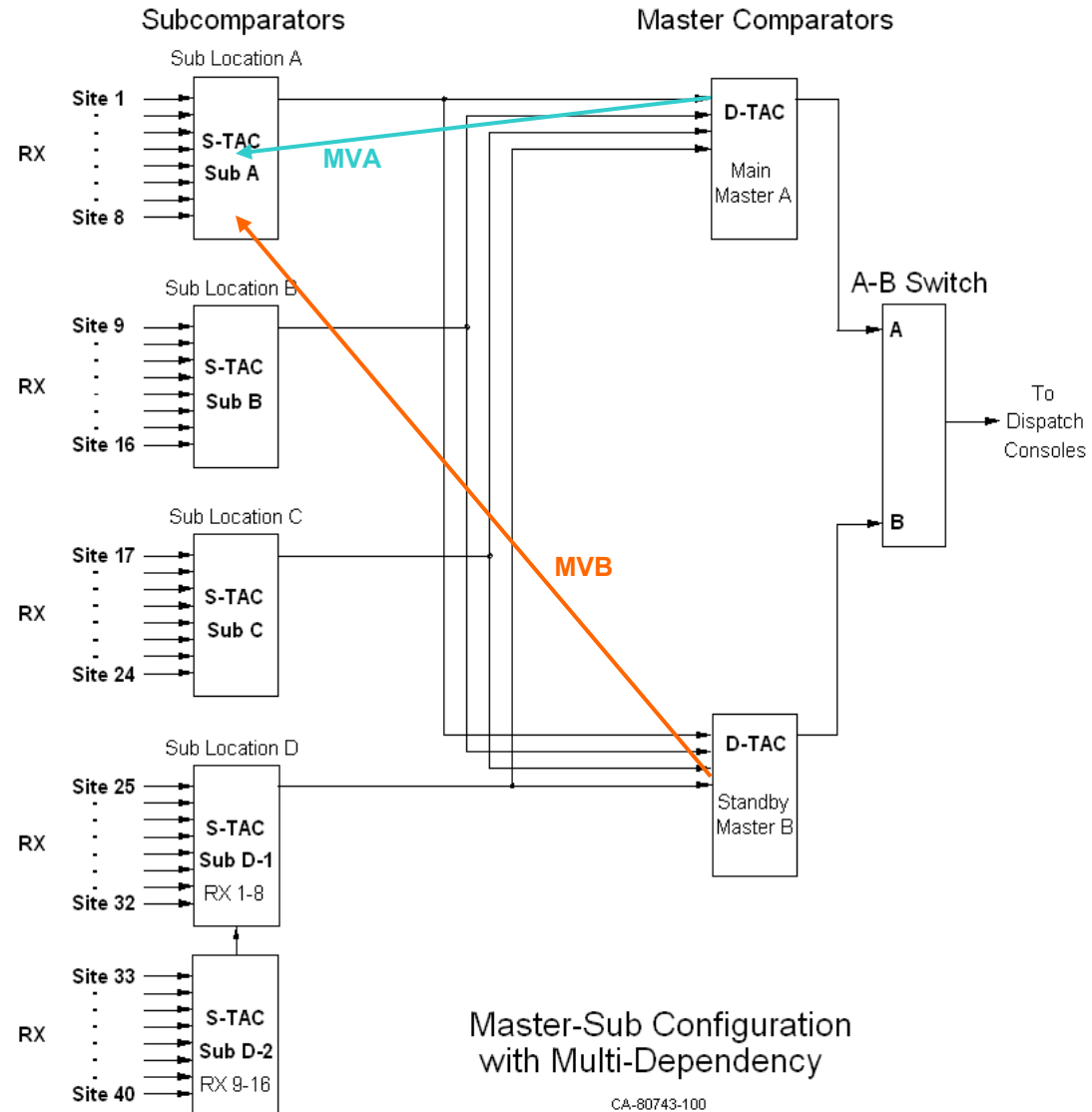
- First, the data for any single status bit that is masked in the “SubDevice” tab will be promoted to the least significant (right-most) bit of the status word.
- Second, the data in that least significant bit (Bit 0) will be “Nudged” a number of places to the left (specified in the “Nudge” column) so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



Configuring Master-Sub Comparator with Multi-Dependency

The features described in the previous “Master-Sub Comparator Configuration” section can be used in a more complex arrangement that 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. It 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.

Multi-dependency 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 **Multi-Bit Mask** section on page 261 will be used to build the Display Tables for this system.

First, we need to transfer the Vote bits from Master A and Master B to the Sub Comparators. The diagram below illustrates that the Master Vote bits will be masked and then sent to the SubDevice. Specifically, the Vote bit from Master Comparator A will be shifted 5 bits, while the Vote bit from Master Comparator B will be shifted 6 bits.

Master Comparator B

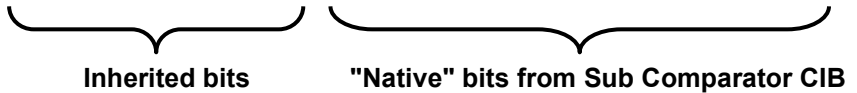
Master B Bits			Steer	Rx	Dis	Vote	Fail
Mask			0	0	0	1	0
Masked						Vote	
Compressed & shifted							Vote

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



To accomplish the above, set up the following parameters:

1. Sub Comparator Display Table(s) with slots for Master Vote A & B
2. Master A Display Table with Vote Bit Nudge = 5
3. Master B Display Table with Vote Bit Nudge = 6
4. Master A Comparator Receiver Slot Sub Devices: Sub Comparators
5. 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:

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	1	0	Rx V		N	N
7	-	-	-	0	0	1	0	Sub Force Vote		N	N
8	0	1	-	-	0	1	0	Vote A		N	N
9	1	0	-	-	0	1	0	Vote B		N	N
10	1	1	-	-	0	1	0	Vote A B		N	N

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 comparators:

- 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.

Index	Nudge	Steer	Rx	Dis	Vote	Fail
1	5	0	0	0	0	0

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

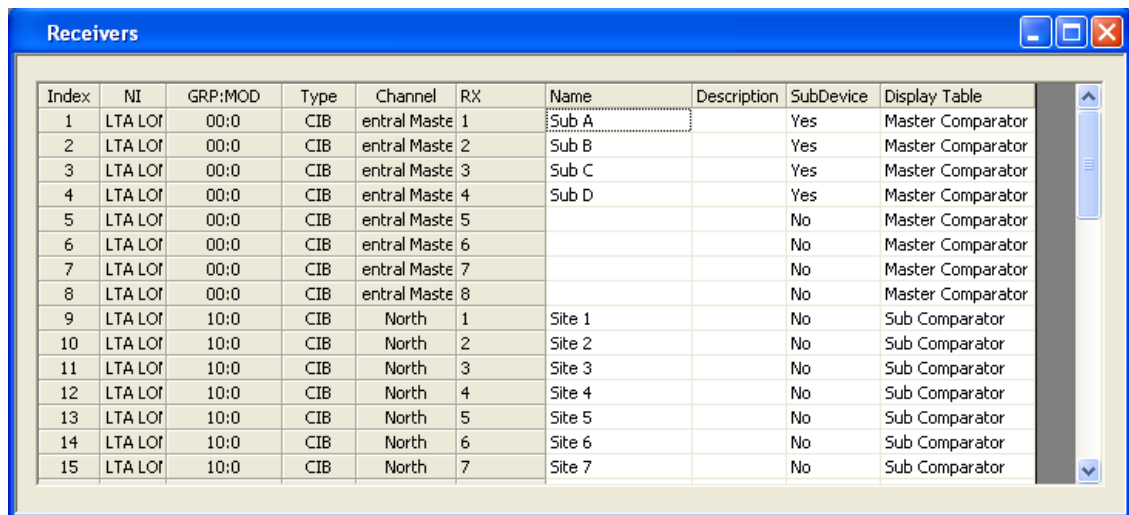
Index	Nudge	Steer	Rx	Dis	Vote	Fail
1	6	0	0	0	0	0

Multiple Views: Display Table Override

There may be multiple 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:

1. Virtual Comparator A (using Master A comparator)
2. 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

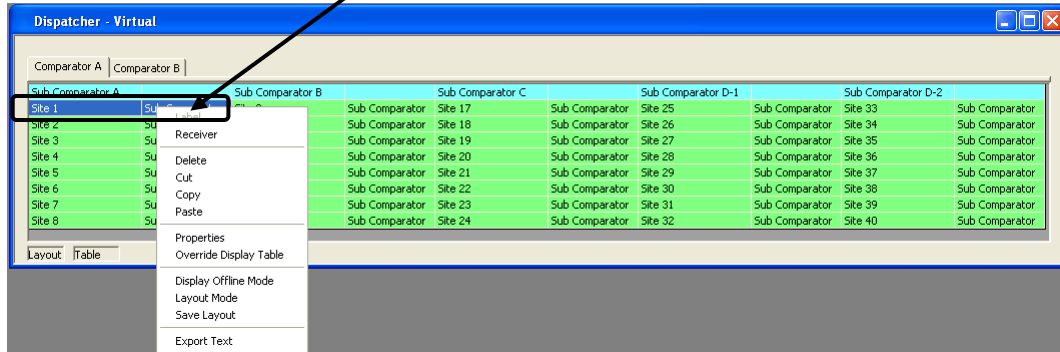
The Display Windows are similar, with the following differences:

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

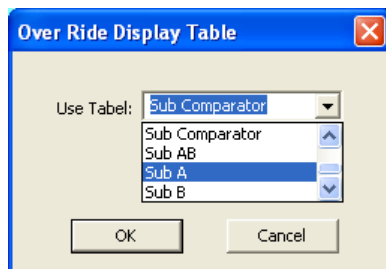
If the Dispatcher sets the A-B switch to position "A", they will hear audio from Rx 18. If the switch is set to position "B", they will hear audio from Rx 4..

To build this display we use 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.

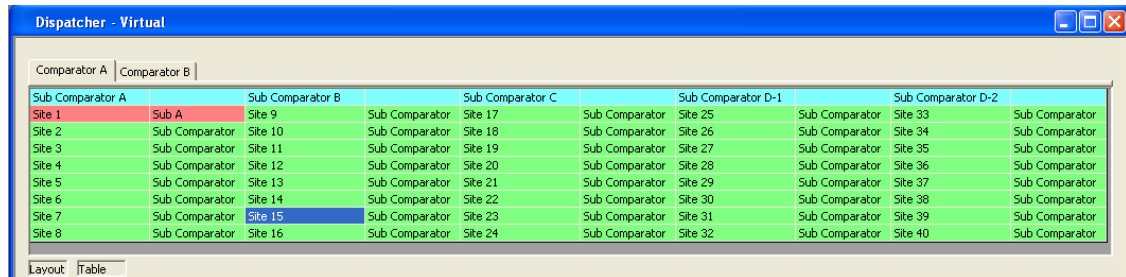
Right –click to choose Override Display Table



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. Taking it a step further, the Display Table for all receivers in a Display Window can be overridden. To apply 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	Site 9	Site 17	Site 25	Site 33
Site 2	Site 10	Site 18	Site 26	Site 34
Site 3	Site 11	Site 19	Site 27	Site 35
Site 4	Site 12	Site 20	Site 28	Site 36
Site 5	Site 13	Site 21	Site 29	Site 37
Site 6	Site 14	Site 22	Site 30	Site 38
Site 7	Site 15	Site 23	Site 31	Site 39
Site 8	Site 16	Site 24	Site 32	Site 40

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

Note: In this system, the default Display table for these sub comparators was "Subcomparator". This default is typically used for an equipment-centric view. However, for the dispatcher display, 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.

Configuring Triggered Outputs

Triggered Output Actions is an optional licensed feature in the MCN Server software that provides the means for an Input Event to trigger/cause another Output Action to happen. This option can be used, for example, to provide alarm outputs (from a CIB or GPIO module) that activate external 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

Using this function one or more input events can trigger the same output action. However, each input event can only trigger one output action. If you need one input to trigger multiple actions, refer to Group Macros on Page 290.

Setting up Triggered Output Actions requires configuration of the following items:

- A. Triggered Output Types,
- B. Trigger Input Types,
- C. Triggered Output Function Blocks (the specific physical outputs on a CIB or GPIO module) which use the Triggered Output Types,
- D. Trigger Input Function Blocks (the specific physical inputs on a CIB or GPIO module) which use the Trigger Input Types and
- E. Linkages between specific Trigger Input Function Blocks and Triggered Output Function Blocks.

Those steps are described below.

Triggered Output Types

The Triggered Output Type refers to the kind of action or results that happens when certain conditions or triggers are met in the MCN system.

Triggered Output Tables Defined

Triggered outputs are a **special type** of output that must be configured in the **MCN System's Display Tables** by the MCN Config Server application.

To configure triggered outputs using the **McnConfig Server** application, follow these steps:

- Create a **Display Table window** with **separate special tabs** for each **Triggered Output Type**.
- Make sure you select the **correct number of bits** when building the output table.
- Verify the number of bits in the output table **match the number of bits used in the triggering input table**. (*Matching the bit count ensures the output is generated correctly when triggered.*)

Typically, you only need one or two types of Triggered Outputs. For example, if you require a Triggered Output Type for Channel Failure Alarms, there can be multiple alarm outputs in the system (one per channel), but usually, only one Triggered Output Type is used. Each unique alarm output shares the same Triggered Alarm Type but has specific inputs and outputs.

You must then use the Triggered Output Type as the Display Table for the specific Output Function Blocks. Here are the things to define for Triggered Output Types:

1. Triggered Output Type Name (Display Table Name)
2. 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.)
3. Bit Names: These are the actual output bits. ex: "Alarm," "Major Alarm," "Minor Alarm"
4. States to display on the PC (ex: "Normal" & "Alarm") and their colors.
5. Mouse Functions (typically to reset or acknowledge an alarm)
6. Actions that the Input Event uses 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:

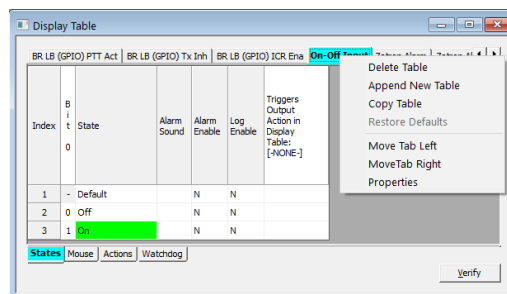
- a. You needed different status texts or colors to be displayed for different Output Types or,
- b. You need both single bit and multi bit Triggered Output Types.

Building a New Triggered Output Type

Triggered Output Types are set up in a **special Display Table**. They are similar to regular Display Tables, but they also **require entries** in the **Actions tab** to define which output actions can be Triggered for each Output Type.

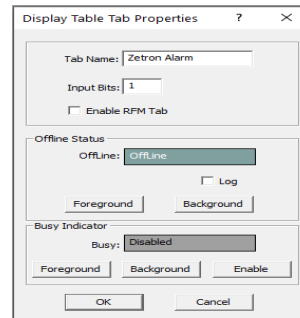
The following is an example of how to create a **Triggered Output Display Table** from scratch:

1. You can either copy an existing Display Table (if it already has the correct number of Bits) or create a new one from the Display Table window.



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

- Enter a name for the Triggered Output Type (Display Table) in the **Tab Name** field.
- Define the number of bits in the **Input Bits** field.
Hit **OK**.



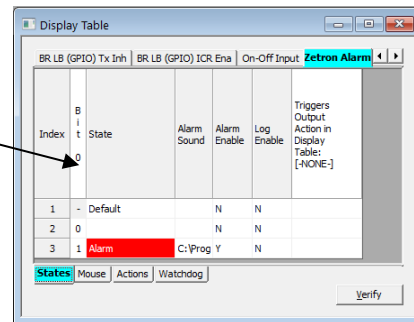
- Select the **States** tab on the bottom of the window.

Enter the Bit Names

Enter the State values, texts and colors

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

Enable logging if desired.



NOTE: You typically *do not enter* anything in the **Triggers Output Actions** column of a triggered output type table, since this table is meant to receive triggers and not send them.

However, there can be unusual cases in which an I/O point would both receive a trigger and also generate a trigger. If that is the case, you must be extremely careful not to generate loops.

Contact CTI Products for advice if you need to do this.

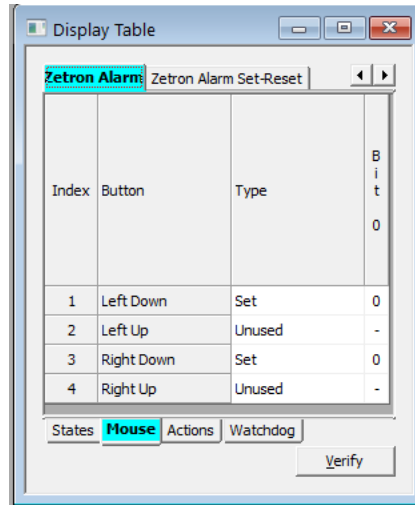
4. Select the **Mouse** tab at the bottom of the window.

Enter appropriate Mouse function(s)

In this example, the Alarm would be triggered (turned on) by an input and would be turned off with a mouse press.

We have added the ability to reset the Zetron Alarm with either the left or right mouse buttons (**Set** the state to **0**).

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

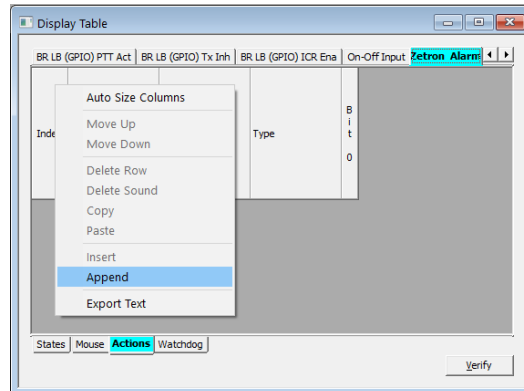


5. We now need to add the Action(s) that the input will trigger.

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.



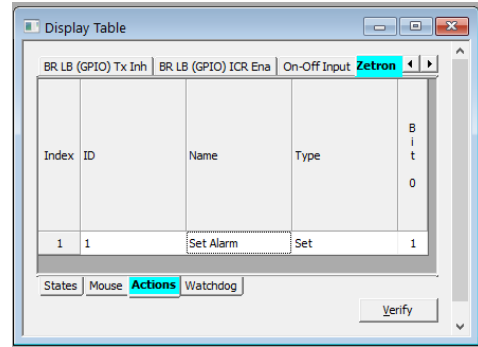
6. Enter an ID number, and a descriptive Name

Output Actions work much like Mouse functions, and you can set the bit to 1 or 0, toggle it, or leave it unchanged.

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

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

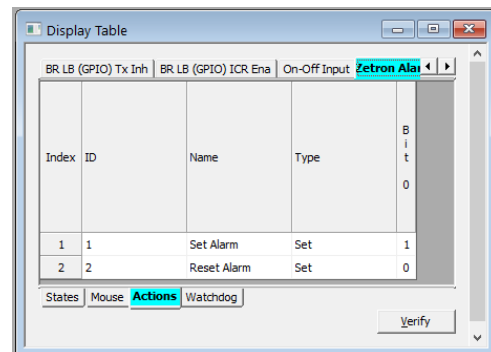
The *Set* action type changes a bit to either 1 or 0, based on your selection in the bit field.



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

When using Triggered Outputs, you typically only *Set* the output (to 1) in response to an input event. The alarm bit is usually reset manually, such as with a mouse press.

If you need inputs to both *Set* and *Reset* an output, you can configure separate Set and Reset actions, as shown on the right.



This completes the definition of a Triggered Output Type.

Trigger Input Types

Trigger Input Types are set up in the State tab of the Input Display Table for the inputs that will generate trigger events. You will normally just be adding triggers to existing input Display Tables. To configure a Trigger Input Type, follow these steps:

- a. Select the appropriate Display Table for the Trigger Input Type,
- b. Select an Output Device Type to associate the Input Display Table with and
- c. Select an Output Action to trigger for various input states.

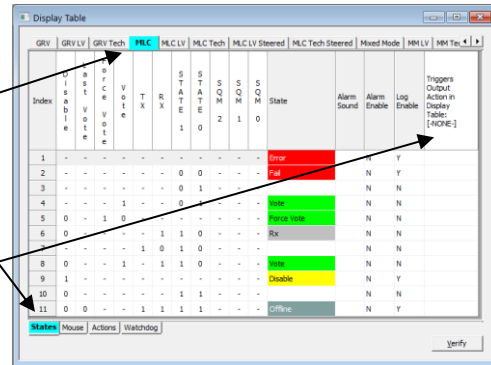
Setting up Triggered Input Types

1. Start in the proper **Display Table** window for the desired Trigger Input Type (the MLC Display Table in this example),

Select the desired Triggered Input Type Display Table on the top tabs.

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

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

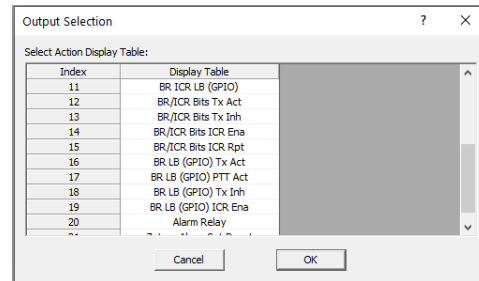


2. The **Output Selection** window will open.

The drop-down list will show all Triggered Output Device Types you've defined (those Display Tables with Actions configured).

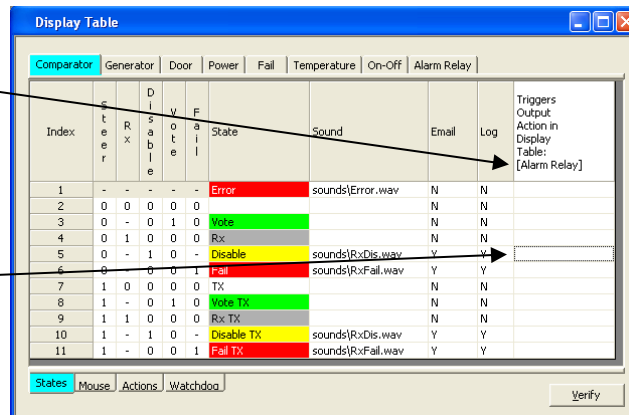
Select the appropriate **Display Table** for the proper Triggered Output Type.

Hit **OK**



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

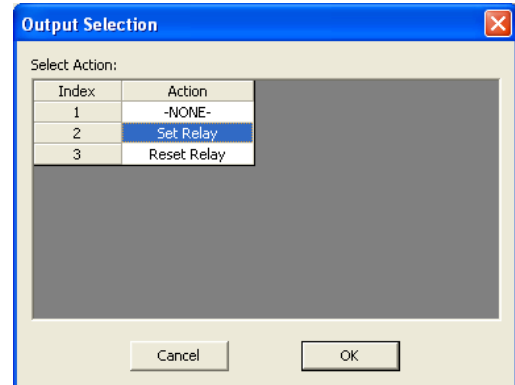
Select a Trigger State and double-click in the far-right column



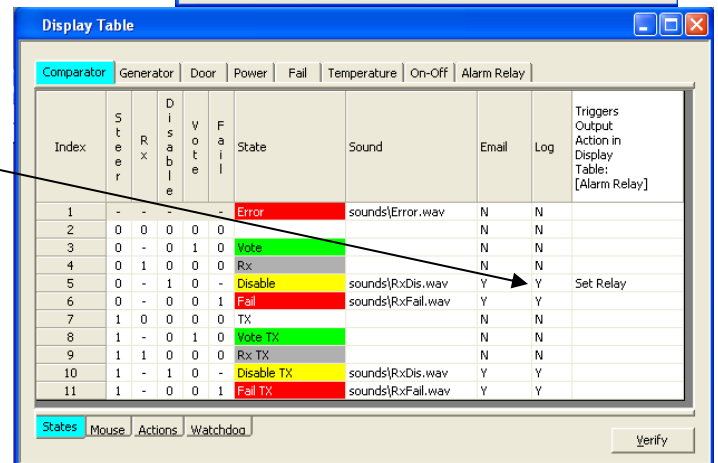
- A list of available Actions from the selected Output Display Table will be displayed.

Select the desired Output Action

Hit **OK**.



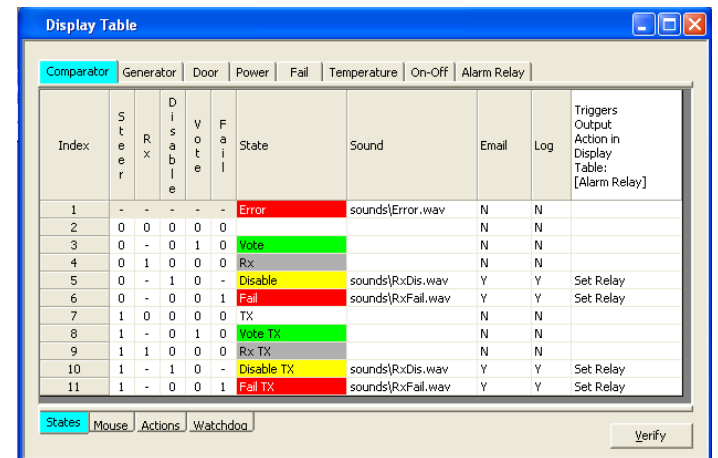
- The Output Action will be displayed in the far-right column



- 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 set up multiple triggers all driving 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 Input Type.

You can build other Trigger Input Types with other Input Display Tables as required.

Linking Inputs to Outputs

Once the previous steps are correctly completed, you will have set up **Input Trigger Types** and **Triggered Output Types**. These define how the **inputs** trigger events and which **outputs** will respond, allowing control over which tables are can be used for each action.

You then need to link the actual inputs to the actual outputs by doing the following:

1. Set up the actual Triggered Output Points on a device that support outputs (CIB, GPIO module). Each Alarm Output Point must use a Triggered 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 a Trigger 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 Trigger Input Display Tables and Triggered Output Display Tables, they are not specifically identified as such in the program – they are all Display Tables:

- Trigger Input Display Tables have Triggers and,
- Triggered Output Display Tables have Actions.

For the following sections, 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,
- ✓ Set up the appropriate Output Modules (CIBs, GPIO Modules, etc.) in the Hardware window and
- ✓ Named the Output Points (Alarm relays, etc..) in the Receiver window,

Setting Up the Triggered Output and Trigger Input Points

- A.** For each of the Triggered Inputs in your system, go to the Receiver I/O window Display Table field and select the appropriate Triggered Input Display Table to use.

If you have modified the default standard Display Table used with the input device, (like the MLC Display Table in the example above), the proper Display Table will already be set.

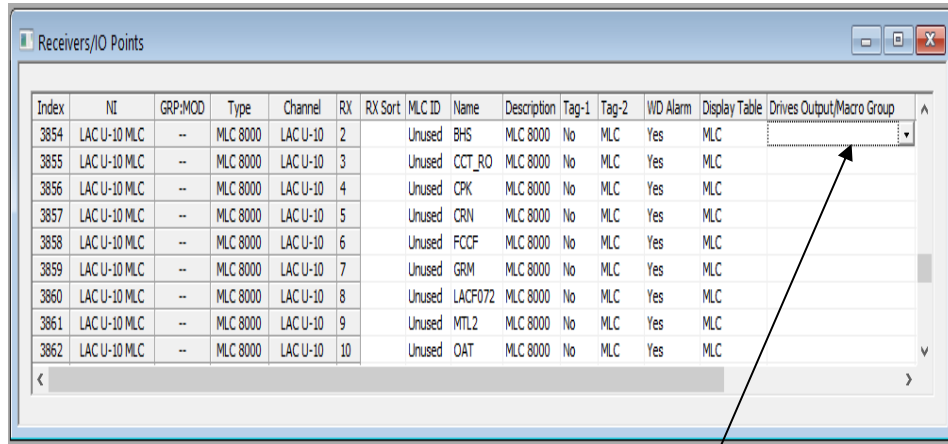
- B.** For each of the Triggered Outputs in your system, go to the Receiver I/O window Display Table field and select the appropriate Triggered Output Display Table to use.

If you have modified the default standard Display Table used for the device, the proper Display Table will already be set.

Setting up the Links

Now that all the inputs and outputs are defined, the next step is to link the inputs to the proper outputs:

1. Start in the **Receiver** window.
Select the appropriate Input Point.



Double click in **Drives Output/Macro Group**.

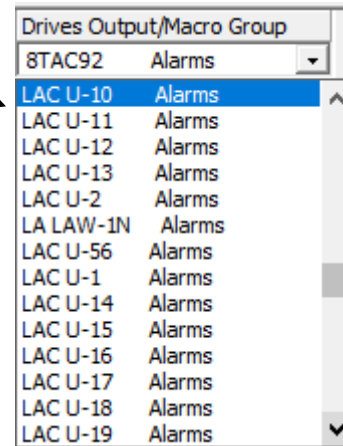
2. An Output Selection window will appear.

In this system, we have x output alarms set up.

Select the proper Output Point.

(This is a receiver input to the LAC U-10 comparator, so we will choose "LAC U-10 Alarms")

Hit **OK**



- The Output Point will appear in the *Drives Output/Macro Group* field.

Index	NI	GRP:MOD	Type	Channel	RX	RX Sort	MLC ID	Name	Description	Tag-1	Tag-2	WD Alarm	Display Table	Drives Output/Macro Group
3853	LAC U-10 MLC	--	MLC 8000	LAC U-10	1		Unused	AGH	MLC 8000	No	MLC	Yes	MLC	LAC U-10 Alarms
3854	LAC U-10 MLC	--	MLC 8000	LAC U-10	2		Unused	BHS	MLC 8000	No	MLC	Yes	MLC	
3855	LAC U-10 MLC	--	MLC 8000	LAC U-10	3		Unused	CCT_RO	MLC 8000	No	MLC	Yes	MLC	
3856	LAC U-10 MLC	--	MLC 8000	LAC U-10	4		Unused	CPK	MLC 8000	No	MLC	Yes	MLC	
3857	LAC U-10 MLC	--	MLC 8000	LAC U-10	5		Unused	CRN	MLC 8000	No	MLC	Yes	MLC	
3858	LAC U-10 MLC	--	MLC 8000	LAC U-10	6		Unused	FCCF	MLC 8000	No	MLC	Yes	MLC	
3859	LAC U-10 MLC	--	MLC 8000	LAC U-10	7		Unused	GRM	MLC 8000	No	MLC	Yes	MLC	
3860	LAC U-10 MLC	--	MLC 8000	LAC U-10	8		Unused	LACF072	MLC 8000	No	MLC	Yes	MLC	
3861	LAC U-10 MLC	--	MLC 8000	LAC U-10	9		Unused	MTL2	MLC 8000	No	MLC	Yes	MLC	

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

Index	NI	GRP:MOD	Type	Channel	RX	RX Sort	MLC ID	Name	Description	Tag-1	Tag-2	WD Alarm	Display Table	Drives Output/Macro Group
3853	LAC U-10 MLC	--	MLC 8000	LAC U-10	1		Unused	AGH	MLC 8000	No	MLC	Yes	MLC	LAC U-10 Alarms
3854	LAC U-10 MLC	--	MLC 8000	LAC U-10	2		Unused	BHS	MLC 8000	No	MLC	Yes	MLC	LAC U-10 Alarms
3855	LAC U-10 MLC	--	MLC 8000	LAC U-10	3		Unused	CCT_RO	MLC 8000	No	MLC	Yes	MLC	LAC U-10 Alarms
3856	LAC U-10 MLC	--	MLC 8000	LAC U-10	4		Unused	CPK	MLC 8000	No	MLC	Yes	MLC	LAC U-10 Alarms
3857	LAC U-10 MLC	--	MLC 8000	LAC U-10	5		Unused	CRN	MLC 8000	No	MLC	Yes	MLC	LAC U-10 Alarms
3858	LAC U-10 MLC	--	MLC 8000	LAC U-10	6		Unused	FCCF	MLC 8000	No	MLC	Yes	MLC	LAC U-10 Alarms
3859	LAC U-10 MLC	--	MLC 8000	LAC U-10	7		Unused	GRM	MLC 8000	No	MLC	Yes	MLC	LAC U-10 Alarms
3860	LAC U-10 MLC	--	MLC 8000	LAC U-10	8		Unused	LACF072	MLC 8000	No	MLC	Yes	MLC	LAC U-10 Alarms
3861	LAC U-10 MLC	--	MLC 8000	LAC U-10	9		Unused	MTL2	MLC 8000	No	MLC	Yes	MLC	LAC U-10 Alarms

We have now configured the Input to Output Links.

Multiple Input Points feeding the same alarm output.

The system shown had a requirement for a single alarm output for each radio channel. The customer required that the channel alarm be activated whenever any of the receivers on that channel went into Fail mode. All of the receivers in the LAC U-10 comparator drive the same alarm output for the LAC U-10 channel.

Triggered Output Notes

Things to remember about Triggered Outputs are:

1. 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 (Comparator Display Table for legacy comparators or comparator-specific Display Tables like GRV, GCM or MLC for IP comparators).

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).

2. 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 (as defined in the linking, but you may need only one Triggered Output Device Type. In our example above, all alarm outputs shared the same Output Device Type.
3. Each input Display Table can trigger only one Output Device Type.
4. 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.)
5. 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 multi-bit types.

6. 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.)
7. 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.
8. If you need to have the same type of triggered input actions for 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.

Group Macro Overview

The **Group Macro** feature is a licensed option of the MCN Server 8000 software, which provides the ability for an Input Event to trigger multiple Output Actions. It is an expansion of the Triggered Output feature and requires that the **Triggered Output** option has been licensed .

This option can be used along with remote CIB or GPO modules, for example, to do things like:

- Disable all transmitters in the field and
- Enable all transmitters in the field.

The following table shows the differences between the Triggered Outputs and Group Macros.

Function	Triggered Outputs	Group Macros
Single Input to Single Output	Yes	Group Macros not needed for a Single Output.
Multiple Inputs to Single Output	Yes	Group Macros not needed for a Single Output.
Single Input to Multiple Outputs	No	Yes
Multiple Inputs to Multiple Outputs	No	Yes
Input links to	Single Output	Macro Group

With Group Macros, the following configuration items must be added:

- ✓ **Macro Group** List,
- ✓ **Member of Macro Group** field in the Receiver I/O list to select which Macro Group (if any) the output belongs to.
- ✓ **Display Table for Output Points**; including specific control functions defined in the Action tab, which are used by the Group Macros.
- ✓ **Display Table for Macro Triggers** includes the selected function (action) to perform on all Output Points that are members of the Macro Group.



Group Macros execute the same function for all Output Points in the Macro Group. Group Macros **do not** have the following capabilities:

- Scripting
- Conditional (If-Then-Else) capabilities
- User alarms or warnings or
- Interlocks

Configuring Group Macros

This section covers the steps required to configure the Group Macros function. It includes the standard process for MCN system configuration as well as an additional process specific to Group-Macro configuration.

The full procedure is detailed below and must include both steps, as described:

Standard System configuration process:

1. Configure channels.
2. Configure IP Comparators
3. Configure HIB-IP 8002 units.
4. Configure CIB, AIB, GPI, GPO, GPIO Modules
5. Define and configure I/O point functionality for Group Macro Input and Output Points
6. Configure Receiver and I/O Point names.
7. Build Display Screen

The procedures for the various Standard Configuration steps were covered earlier in this manual.

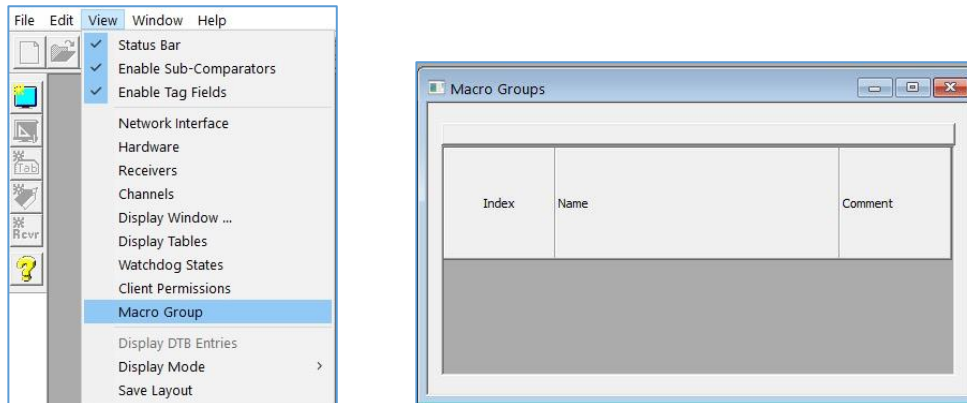
Macro-Specific configuration process:

- 1) Create Macro Groups
- 2) Build or modify a Display Table for the Group Macro Outputs.
Build appropriate Display States and Mouse actions.
Build appropriate Macro functions in Actions tab.
- 3) Build or modify a Display Table for the Group Macro Inputs.
Build appropriate Display States and Mouse actions.
Select proper Output Display Table to drive in the States tab..
Select proper Macro Actions to generate in the States tab.
- 4) Edit the Group Macro Output Points in the Receiver I/O Window.
Select the proper Macro Output Display Table to use.
Select the proper Macro Group that each output belongs to.
- 5) Edit the Group Macro Input Points in the Receiver I/O Window.
Select the proper Macro Input Display Table to use.
Select the proper Macro Group that this input will drive.

The procedures for the various Macro configuration processes are discussed in the following sections.

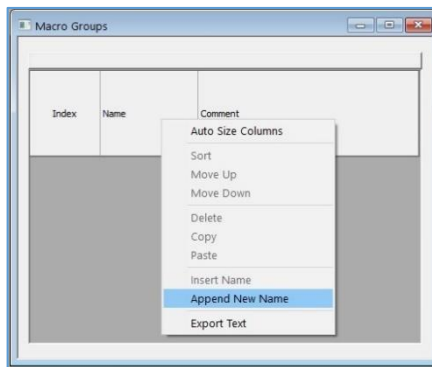
Creating Macro Groups

To create a Macro Group, and you have the proper license for this option, go to the Menu, and select **View / Macro Group**.



This will open the Macro Groups window.

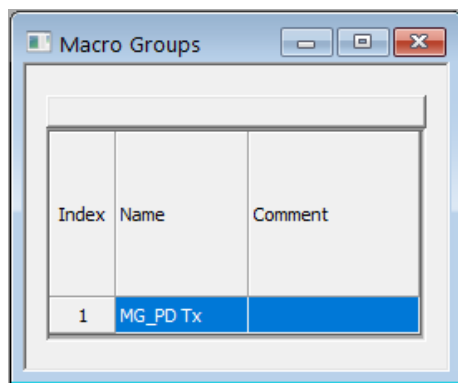
Right-click on the grid and Select **Append New Name** from the drop-down menu.



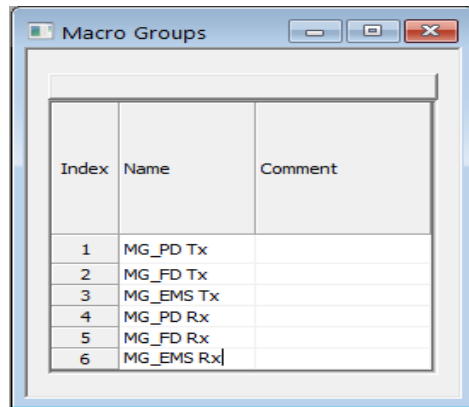
An entry with prefix MG_xxxx will be created. Replace the xxxx with the name you want to use for this Macro Group.



It is advisable to keep the MG_ prefix in the name. This will help differentiate between Macro Groups and Triggered Outputs when doing the linking between the Trigger Inputs and the Triggered Outputs or Macro Groups.



Continue with **Append New Name** to create Macro Group you need for the system.



Index	Name	Comment
1	MG_PD Tx	
2	MG_FD Tx	
3	MG_EMS Tx	
4	MG_PD Rx	
5	MG_FD Rx	
6	MG_EMS Rx	

Add descriptive comments in the Comment field if desired.

Building a Group Macro Output Display Table

To build a Group Macro Output Display Table, you need two main things: :

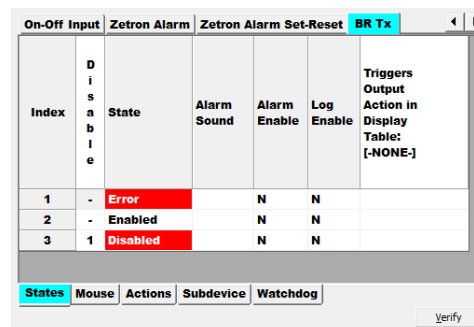
1. Building appropriate Basic Display Tables and
2. Adding Group Macro Actions in the Actions tab.

Building Basic Display Tables

The general steps for configuring a Group Macro Output Display Table are presented here. See the section “*Working with Display Tables*” if needed for details on editing Display Tables.

The Display Table for Macro Output Points begin as a basic Display Table as shown below.

1. Create or copy a new Display Table
 2. Define the correct number of bits and give each a descriptive name.
 3. In the State Tab:
 - a) Generate the appropriate number of entries in the Truth Table.
 - b) Fill in the State field with the descriptive text and distinctive colors.
 - c) Configure Alarm Sound, Alarm Enable and Log Enable as desired.
- ❖ The State tab of the control BR Transmitter Display Table is configured as shown below:



Index	State	Alarm Sound	Alarm Enable	Log Enable	Triggers Output Action in Display Table: [-NONE-]
1	Error		N	N	
2	Enabled		N	N	
3	Disabled		N	N	

BR TX Display Table / **States** Tab

4. In the Mouse Tab:
 - Enter the appropriate mouse actions
 - The Mouse actions will be used when controlling the output an individual basis.
- ❖ The Mouse tab of the Control BR Transmitter Display Table is configured as shown below:

Index	Button	Type	Disable
1	Left Down	Toggle	1
2	Left Up	Unused	-
3	Right Down	Toggle	1
4	Right Up	Unused	-

BR TX Display Table / **Mouse** Tab

The ‘Disable output’ is configured so that it can be toggled with either the Left or Right mouse button.

Adding Group Macro Actions in Action Tab

Add the appropriate **Group Macro Actions** you wish to occur when there is a states change.

Note: *Actions must be added in the Action Tab, to enable a Display Table to be used as a Macro Output,. Those Actions will be triggered from the Macro Inputs.*

In our example system, **Enable Tx** and **Disable Tx** Macro Actions are required.

- 1) Use the mouse Right-Click to Append new action lines.
- 2) Add an ID and Name for each Action. IDs must be unique and are normally equal to the Index field.
- 3) Select the appropriate Action Type and the bits to be controlled for each Action.

Index	ID	Name	Type	Disable
1	1	Enable Tx	Set	0
2	2	Disable Tx	Set	1

BR TX Display Table / **Actions** Tab



Use Set Action Type for Group Macro Output Display Table Actions

Group Macros are meant to perform the same actions for all outputs in the Macro Group. Therefore, the actions in the ‘**Actions tab**’ should use a **Set** type to set the output bit values to a known state as shown above. (Using a **Toggle** type will give random results, toggling the outputs between On and Off depending on their prior state.)

Building a Group Macro Input Display Table

Build appropriate Display States and Mouse actions.
 Select proper Output Display Table to drive in the States tab.
 Select proper Macro Actions to generate in the States tab.

To build a Group Macro Input Display Table:

- Build appropriate Basic Display Tables and
- Add entries in the **Triggers Output Actions** column of the State tab.

Build Basic Macro Input Display Tables

The general steps for configuring a Group Macro Output Display Table are presented here. See the *Working with Display Tables* section if needed for details on editing Display Tables.

The Display Table for Macro Input Points start out as a normal Display Table as shown below.

1. Create or Copy a new Display Table
2. Set up the correct number of bits and name each one appropriately
3. Go to the States Tab:
 - Generate the appropriate number of entries in the Truth Table.
 - Fill in the States field with descriptive text and distinctive colors.
 - Configure Alarm Sound, Alarm Enable and Log Enable as desired.

The example system requires two Display Tables for the Macro Inputs; **Ena All Tx** and **Dis All Tx**.

The basic State tab for each is shown below:

Index	State	Alarm Sound	Alarm Enable	Log Enable	Triggers Output Action in Display Table: [-NONE-]
1	- Error		N	N	
2	0 All Tx		N	N	
3	1 Enable All		N	N	

Chan Ena All Tx Display Table

Index	State	Alarm Sound	Alarm Enable	Log Enable	Triggers Output Action in Display Table: [-NONE-]
1	- Error		N	N	
2	0 All Tx		N	N	
3	1 Disable All		N	N	

Chan Dis All Tx Display Table

4. In the Mouse Tab:
Enter the appropriate mouse actions.
5. The Mouse tab for each example basic Display Tables are configured as shown below:

Index	Button	Type	Bit
1	Left Down	Set	1
2	Left Up	Set	0
3	Right Down	Set	1
4	Right Up	Set	0

Chan Ena All Tx Mouse Control

Index	Button	Type	Bit
1	Left Down	Set	1
2	Left Up	Set	0
3	Right Down	Set	1
4	Right Up	Set	0

Chan Dis All Tx Mouse Control

Both outputs are configured as Momentary outputs and can be controlled by either mouse button.

Add Trigger Actions

Display Tables gain the ability to be used as Triggers for Group Macro functions by adding the appropriate entries in the "Triggers Output Actions" column of the State tab. This works similarly to how Trigger Inputs are set up for Triggered Outputs.

In general, the procedure is:

- 1) In the State tab,
 - a. Double-click on the following field in the header line:
Triggers Output Action: [-NONE-] and
 - b. Select the appropriate Output Display Table from the drop-down list.
- 2) On the line for the state that you want to generate the Macro Action
 - a. Double Click in the far-right field. A list of Actions will be displayed.
 - b. Select the proper Action from the list.
- 3) Repeat #2 for any additional actions needed.

For the example system, two Macro Input (Trigger) Display Tables are configured as shown below.

1. The destination Display Table (**BR Tx**) is selected for both Display Table (as highlighted in the top red box) and
2. The **Enable Tx** or **Disable Tx** Output Action is selected as appropriate (as highlighted in the bottom red box).

Chan Ena All Tx	Chan Dis All Tx	BR Tx	BR ICR	BR Tx LB (GPIO)		
Index	Bit	State	Alarm Sound	Alarm Enable	Log Enable	Triggers Output Action in Display Table: [BR Tx]
1	-	Error	N	N		
2	0	All Tx	N	N		
3	1	Enable All	N	N		Enable Tx

Chan Ena All Tx Display Table

Chan Ena All Tx	Chan Dis All Tx	BR Tx	BR ICR	BR Tx LB (GPIO)		
Index	Bit	State	Alarm Sound	Alarm Enable	Log Enable	Triggers Output Action in Display Table: [BR Tx]
1	-	Error	N	N		
2	0	All Tx	N	N		
3	1	Disable All	N	N		Disable Tx

Chan Dis All Tx Display Table

In the example system, the configuration above defines the following two Group Macro Prototypes (or Classes) by using the Group Macro Input and Output Display Tables:

Group Macro Prototype	Input Display Table	Output Display Table
Enable Tx	Chan Ena All Tx	BR Tx
Disable Tx	Chan Dis All Tx	BR Tx

These prototypes don't do anything on their own. To create a functioning Group Macro, the following items are still needed:



- A Macro Group that will be used for all the outputs to be controlled.
- Inputs (physical or logical) which use the Input Display Table.
- Outputs (physical or logical) which use the Output Display Table and are members of the Macro Group.

The Next Section will describe how to link all these together.

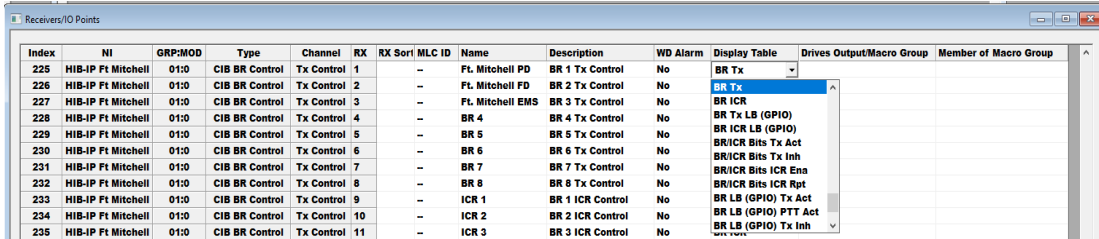
Editing the Group Macro Output Points in the Receiver I/O Window

To configure the Group Macro Output Points:

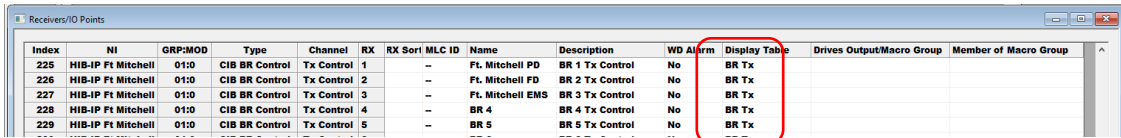
- 1) Select the proper Macro Output Display Table to use.
- 2) Select the proper Macro Group that each output belongs to.

Select the Macro Output Display Table for Macro Output Points

1. In the Receiver I/O Points window, select the appropriate Macro Output Display Table for the Group Macro Output Points from the drop-down list as shown below.

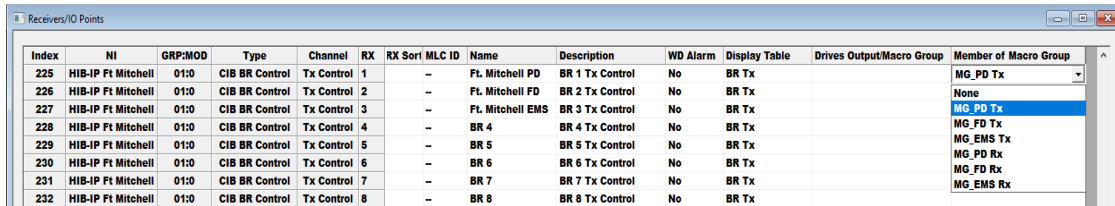


2. Repeat for all Group Macro Output Points in the output CIB (or other) module. (In our example system, the above is only one of the Tx Control CIB modules.)

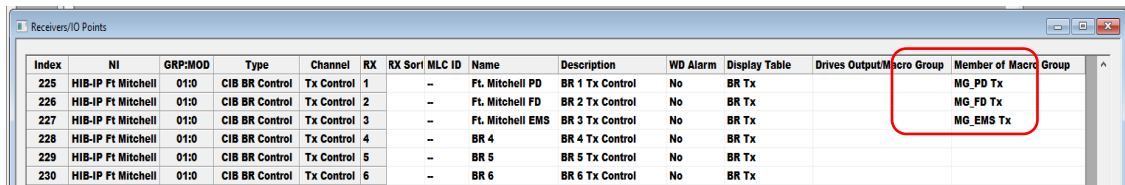


Select the Macro Group for Macro Output Points

- 1) In the Receiver I/O Points window, select the appropriate Macro Group from the drop-down list as shown below.



- 2) Repeat all Macro Output Points in the in the output CIB (or other) module.



In the example system there are transmitters for 3 different RF channels at each location, each being a member of a different Macro Group.

Repeat above 2 sections for all Macro Output Points

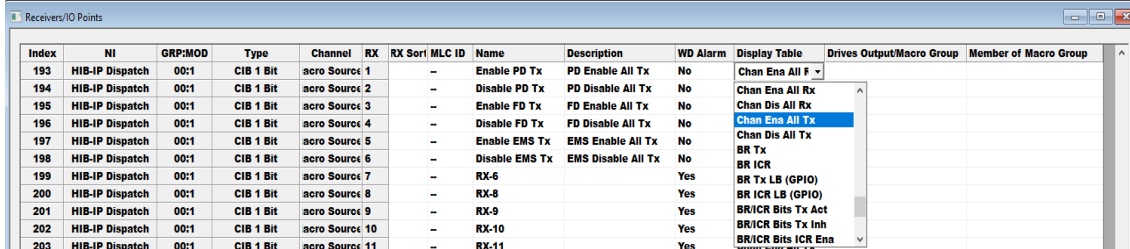
Editing the Group Macro Inputs in the Receiver I/O Window

To configure the Group Macro Inputs:

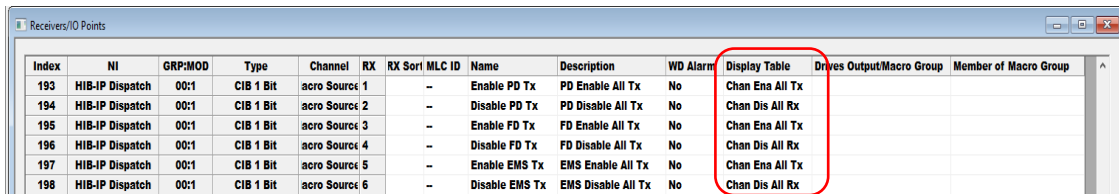
1. Select the proper Macro Input Display Table to use.
2. Select the proper Macro Group that this input will drive.

Select the Macro Input Display Table for Macro Inputs

- 1) In the Receiver I/O Points window, select the appropriate Macro Input Display Table for the Group Macro Input from the drop-down list as shown below.



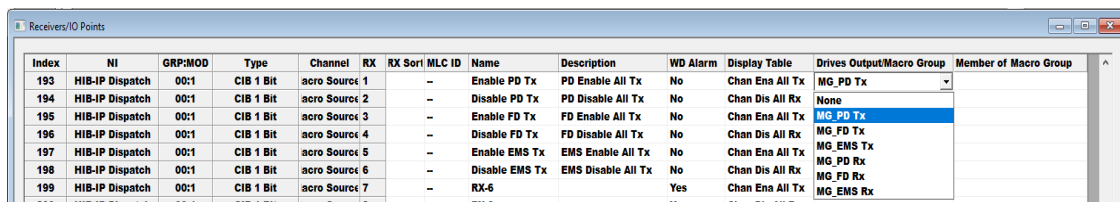
- 2) Repeat for all Group Macro Inputs.
(In our example system, the above is only one of the Tx Control CIB modules.)



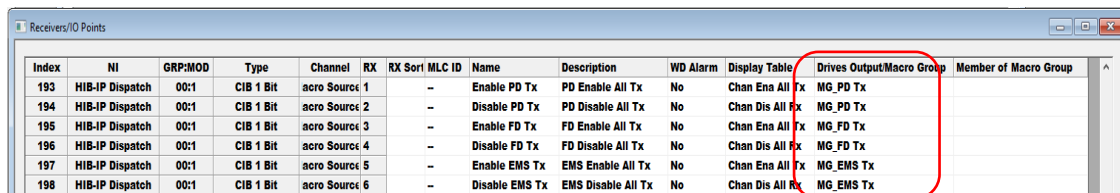
Note that the Display Tables in this system alternate between **Chan Ena All Tx** and **Chan Dis All Tx** to match the actions for those input names.

Select the Macro Group to Drive

1. In the Receiver I/O Points window, select the appropriate Macro Group to drive from the drop-down list in the **Drives Output/MacroGroup** field as shown below.



2. Repeat for all Macro Inputs

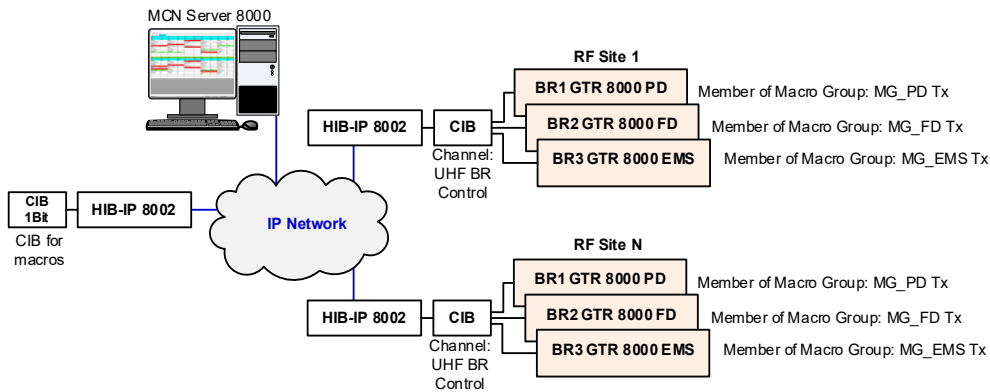


In this example, there are three Macro Groups (for **PD**, **FD**, and **EMS**) each driven by two inputs (**Enable Tx** and **Disable Tx**).

The unique **Group Macro name** would be identified by the Macro Input Name.
(Ex: **Enable PD Tx** above).

Example System with Macro Groups

An effective way to cover the major pieces of Group Macros is through a configured example system. The following diagram illustrates a system that is configured with Group Macro functions to Enable or Disable all transmitters on an RF channel.



The system has the following:

- 3 RF Channels (PD, FD, and EMS) with transmitters at N RF sites
- One CIB module at each RF site to control the transmitters (Each CIB module will control all transmitters at the RF Site.)
- CIB Module at Dispatch for Macro Triggers for the specific Macro functions (PD Enable All Tx, PD Disable All Tx, FD Enable All Tx, FD Disable All Tx, etc.)

Transmitter Control CIB Modules

Each RF site (1-N) will have a CIB Module configured (along with a supporting HIB-IP 8002 module). They will be configured as follows:

- One-Bit CIB Device (with 32 Outputs)
- Three Output Points are assigned and named. For the Fort Mitchell RF Site, these would be:

Ft Mitchel PD
Ft Mitchel FD
Ft Mitchel EMS

Each of these Output Points controls a transmitter and would be connected to the appropriate input on the transmitter to enable or disable its operation. Each of these Output points would be placed on an MCN Screen to allow individual transmitter control.

- The Output Points use the **BR Tx** Display Table. This Display Table is a Macro Output type which includes Disable and Enable functions in the Actions tab that are used by the Group Macro.
- Each Output Point is a member of a Macro Group associated with its radio channel.

MG_PD Tx
MG_FD Tx
MG_EMS Tx

An example of the Receiver I/O Point list for the Fort Mitchel RF Site CIB module is shown below:

Index	NI	GRP:MOD	Type	Channel	RX	RX Sorl	MLC ID	Name	Description	WD Alarm	Display Table	Drives Output/Macro Group	Member of Macro Group
225	HIB-IP Ft Mitchell	01:0	CIB BR Control	Tx Control 1	1	--	--	Ft. Mitchell PD	BR 1 Tx Control	No	BR Tx		MG_PD Tx
226	HIB-IP Ft Mitchell	01:0	CIB BR Control	Tx Control 2	2	--	--	Ft. Mitchell FD	BR 2 Tx Control	No	BR Tx		MG_FD Tx
227	HIB-IP Ft Mitchell	01:0	CIB BR Control	Tx Control 3	3	--	--	Ft. Mitchell EMS	BR 3 Tx Control	No	BR Tx		MG_EMS Tx
228	HIB-IP Ft Mitchell	01:0	CIB BR Control	Tx Control 4	4	--	--	BR 4	BR 4 Tx Control	No	BR Tx		

The other RF Sites would be similar but would connect to different HIB-IP 8002 units and would have different Site names. For example, the configuration for the Laurel RF Site would be configured as follows:

Index	NI	GRP:MOD	Type	Channel	RX	RX Sorl	MLC ID	Name	Description	WD Alarm	Display Table	Drives Output/Macro Group	Member of Macro Group
321	HIB-IP Laurel	08:0	CIB BR Control	Tx Control 1	1	--	--	Laurel PD	BR 1 Tx Control	No	BR Tx		MG_PD Tx
322	HIB-IP Laurel	08:0	CIB BR Control	Tx Control 2	2	--	--	Laurel FD	BR 2 Tx Control	No	BR Tx		MG_FD Tx
323	HIB-IP Laurel	08:0	CIB BR Control	Tx Control 3	3	--	--	Laurel EMS	BR 3 Tx Control	No	BR Tx		MG_EMS Tx
324	HIB-IP Laurel	08:0	CIB BR Control	Tx Control 4	4	--	--	BR 4	BR 4 Tx Control	No	BR Tx		

When a Group Macro function is initiated, it will perform the same function on all the output points that are members of that Macro Group. For example, when the **PD Enable All Tx** or **PD Disable All Tx** macro is initiated, the first output of all the RF Site CIB Modules will be turned on or off as appropriate.

Macro-Initiating CIB Module

The system has a single CIB module at the dispatch site used to initiate the Group Macro actions. It is configured as follows:

- One-Bit CIB Device (with 32 Outputs)
- Six Output Points (two for each channel):

Enable PD Tx
 Disable PD Tx
 Enable FD Tx
 Disable FD Tx
 Enable EMS Tx
 Disable EMS Tx

Each of these Output Points would be placed on an MCN Screen. Clicking on the Output Point with a mouse will initiate the appropriate action for that channel.

- Each Output Point drives a Macro Group associated with its radio channel:

MG_PD Tx
 MG_FD Tx
 MG_EMS Tx

- Each Output Point is configured for the appropriate Display Table, either
 Chan Ena All Tx or
 Chan Dis All Tx.

The Display Table includes a specific function to perform (either Enable or Disable) on the Output Points that are members of the Macro Group.

The following is an example of the Receiver I/O Point list configuration for the Macro-Initiating CIB module:

Index	NI	GRP:MOD	Type	Channel	RX	RX Sorl	MLC ID	Name	Description	WD Alarm	Display Table	Drives Output/Macro Group	Member of Macro Group
193	HIB-IP Dispatch	00:1	CIB 1 Bit	acro Source 1	1	--	--	Enable PD Tx	PD Enable All Tx	No	Chan Ena All Rx	MG_PD Tx	
194	HIB-IP Dispatch	00:1	CIB 1 Bit	acro Source 2	2	--	--	Disable PD Tx	PD Disable All Tx	No	Chan Dis All Rx	MG_PD Tx	
195	HIB-IP Dispatch	00:1	CIB 1 Bit	acro Source 3	3	--	--	Enable FD Tx	FD Enable All Tx	No	Chan Ena All Tx	MG_FD Tx	
196	HIB-IP Dispatch	00:1	CIB 1 Bit	acro Source 4	4	--	--	Disable FD Tx	FD Disable All Tx	No	Chan Dis All Tx	MG_FD Tx	
197	HIB-IP Dispatch	00:1	CIB 1 Bit	acro Source 5	5	--	--	Enable EMS Tx	EMS Enable All Tx	No	Chan Ena All Rx	MG_EMS Tx	
198	HIB-IP Dispatch	00:1	CIB 1 Bit	acro Source 6	6	--	--	Disable EMS Tx	EMS Disable All Tx	No	Chan Dis All Rx	MG_EMS Tx	

For this system, the physical outputs from the Macro-Initiating CIB module do not need to be connected to anything. The CIB module provides I/O points for the Group Macro functions that are placed on an MCN Screen. When a user clicks on one of the output points, the system initiates the Group Macro function for all Output Points in the Macro Group.

Linking between Group Macro Inputs and Outputs

The Group Macro Initiating (Triggering) Output Points are linked to the Transmitter Control Output Points in the Macro Group Members as shown in the Receiver I/O examples below:

Macro Initiating (Triggering) CIB I/O Points

Index	NI	GRP:MOD	Type	Channel	RX	RX Sorl	MLC ID	Name	Description	WD Alarm	Display Table	Drives Output/Macro Group	Member of Macro Group
193	HIB-IP Dispatch	00:1	CIB 1 Bit	Macro Sources	1	-	-	Enable PD Tx	PD Enable All Tx	No	Chan Ena All Rx	MG_PD Tx	
194	HIB-IP Dispatch	00:1	CIB 1 Bit	Macro Sources	2	-	-	Disable PD Tx	PD Disable All Tx	No	Chan Dis All Rx	MG_PD Tx	
195	HIB-IP Dispatch	00:1	CIB 1 Bit	Macro Sources	3	-	-	Enable FD Tx	FD Enable All Tx	No	Chan Ena All Tx	MG_FD Tx	
196	HIB-IP Dispatch	00:1	CIB 1 Bit	Macro Sources	4	-	-	Disable FD Tx	FD Disable All Tx	No	Chan Dis All Tx	MG_FD Tx	
197	HIB-IP Dispatch	00:1	CIB 1 Bit	Macro Sources	5	-	-	Enable EMS Tx	EMS Enable All Tx	No	Chan Ena All Rx	MG_EMS Tx	
198	HIB-IP Dispatch	00:1	CIB 1 Bit	Macro Sources	6	-	-	Disable EMS Tx	EMS Disable All Tx	No	Chan Dis All Rx	MG_EMS Tx	

Ft. Mitchell Tx Control CIB Outputs (Remote Tx Site 1)

Index	NI	GRP:MOD	Type	Channel	RX	RX Sorl	MLC ID	Name	Description	WD Alarm	Display Table	Drives Output/Macro Group	Member of Macro Group
225	HIB-IP Ft Mitchell	01:0	CIB BR Control	Tx Control	1	-	-	Ft. Mitchell PD	BR 1 Tx Control	No	BR Tx		MG_PD Tx
226	HIB-IP Ft Mitchell	01:0	CIB BR Control	Tx Control	2	-	-	Ft. Mitchell FD	BR 2 Tx Control	No	BR Tx		MG_FD Tx
227	HIB-IP Ft Mitchell	01:0	CIB BR Control	Tx Control	3	-	-	Ft. Mitchell EMS	BR 3 Tx Control	No	BR Tx		MG_EMS Tx
228	HIB-IP Ft Mitchell	01:0	CIB BR Control	Tx Control	4	-	-	BR 4	BR 4 Tx Control	No	BR Tx		

Remote Tx Sites 2-6 omitted ●●●

Laurel Tx Control CIB Outputs (Remote Tx Site 7)

Index	NI	GRP:MOD	Type	Channel	RX	RX Sorl	MLC ID	Name	Description	WD Alarm	Display Table	Drives Output/Macro Group	Member of Macro Group
321	HIB-IP Laurel	08:0	CIB BR Control	Tx Control	1	-	-	Laurel PD	BR 1 Tx Control	No	BR Tx		MG_PD Tx
322	HIB-IP Laurel	08:0	CIB BR Control	Tx Control	2	-	-	Laurel FD	BR 2 Tx Control	No	BR Tx		MG_FD Tx
323	HIB-IP Laurel	08:0	CIB BR Control	Tx Control	3	-	-	Laurel EMS	BR 3 Tx Control	No	BR Tx		MG_EMS Tx
324	HIB-IP Laurel	08:0	CIB BR Control	Tx Control	4	-	-	BR 4	BR 4 Tx Control	No	BR Tx		

To link the Group Macro Inputs to Outputs:

1. The Group Macro Inputs (from the Initiating CIB module) need the destination Macro Group selected in the **Drives Output/Macro Group** field in the Receiver I/O list.
2. The Group Macro Outputs (the Output Points on the CIB modules in the field) need the appropriate Macro Group selected in the **Member of Macro Group** field in the Receiver I/O list.



Note: In the example above, there are two Group Macro Initiating (Triggering) Output Points that control the same Macro Group. One point enables the transmitters, while the other point disables them. The function that is executed is determined by the active triggering point:

- (a) The Control Functions defined in the Macro Output Display Table and
- (b) The Output Action selected in the Macro Input (Triggering) Display Table.

Details on the Group Macro Input and Output Display Tables will be provided in the following sections.

Group Macro Q & A

Q 1. What is the difference between Group Macros and Triggered Outputs?

They are remarkably similar. The Group Macro capability is an extension of the Triggered Output capability. Group Macros control multiple Receiver or I/O outputs whereas Triggered Outputs control only one Receiver or I/O output.

The Display Tables for the Group Macro Inputs are identical to Triggered Output Function Input Display Tables. Likewise, the Output Display Tables are identical.

The differences in configuration are:

1. **Macro Groups** must be built for Group Macros and,
2. Group Macro Output Receivers or I/O Points must be configured as **Members of a Macro Group** whereas Triggered Outputs are not.
3. In the **Drives Output / Macro Group** field in the Receiver I/O window, select:
An individual output for Triggered Outputs or,
A Macro group for Group Macros. (Macro Groups are listed first.)

Q 2. In my Receiver I/O window, how do I tell if I'm dealing with a Triggered Output or a Group Macro?

There is no flag defining whether to use one or the other. The only difference is in the triggering input. Look at the **Drives Output / Macro Group** field. If the entry is an individual Receiver or I/O point, a Triggered Output is in use. If the entry is a Macro Group, a Group Macro is in use. This is why we suggested keeping the "MG_" prefix in the Macro Group names.

Q 3. Can external inputs be used to trigger Group Macros?

Yes. Although the examples above show Group Macros that are initiated from outputs controlled from an MCN screen, external inputs can be used to trigger Group Macros. Group Macros are triggered when an input transitions into a state that has an entry in the Triggers Output Action in its Display Table.

In fact, when a Group Macro is initiated by a mouse press on the screen, the mouse press drives an output on the Macro-Initiating module (typically a CIB, GPO, or GPIO module). The output transition is then fed back to the MCN Server as an input transition to the I/O point and is displayed on the screen. It is the input transition that actually triggers the Group Macro.

Q 4. How many bits can be in a Group Macro Input Display Table?

Any valid Display Table can be used as an Input Display Table. Display Tables can have a maximum of 16 bits. The length must match the number of bits used for the Receiver or I/O device in the Receiver I/O list.

Q 5. How many bits can be in a Group Macro Output Display Table?

Any valid Display Table can be used as an Output Display Table. Display Tables can have a maximum of 16 bits. The length must match the number of bits used for the Receiver or I/O device in the Receiver I/O list.

Q 6. What types of devices can be used as Group Macro Trigger Inputs and Outputs?

The following can be used as Group Macro Trigger Inputs & Outputs:

- CIB Modules in 1-, 2-, or 4-bit configuration
- GPI, GPO, and GPIO Modules
- AIB modules
- MLC 8000 Comparators (Note 1)
- GCM 8000 Comparators (Notes 1 & 2)
- GRV 8000 Comparators (Notes 1 & 3)



Note 1: Care must be taken with multi-bit receivers found in IP comparators. Contact CTI Products if you have questions.

Note 2: You need to be especially careful with the display tables for Trunking systems and TDMA comparators.

Note 3: You need to pay close attention to differentiate between Analog and Digital traffic in trunking systems and other types of data systems.

Q 7. The example in the manual shows the use of physical input & outputs for Group Macros. What are examples of the use of logical inputs and outputs with Group Macros?

The Fail state in an IP comparator (GRV, GCM or MLC) could be used as **Logical Input** for a Group Macro. You would configure the Fail state(s) in the comparator's Display Table to drive the appropriate Macro Action in the proper Output Display Table (typically some sort of Alarm output). In this scenario, the Group Macro would be driven by a receiver going into **Fail** state rather than from a mouse press on the display screen and a CIB module (that was described in the manual).

Group Macros can be configured so that a mouse press would Disable and/or Enable all the receivers in an IP comparator (although disabling all receivers would leave the system deaf to all incoming traffic). For this, you would set up a physical CIB module output as the Input Trigger. You would then configure the Display Table for the comparator (Macro Output Display Table) with a **Disable** and/or **Enable** action. The receiver controls in the comparator would be the Logical Outputs for the Group Macro.

Q 8. Can the pre-built Display Tables be used for Group Macro Trigger Inputs?

Yes. You will need to add appropriate entries in the **Triggers Output Action** field in the State tab. An example would be using a pre-built Display Table for a comparator with the Fail state driving an Alarm Group Macro. If you do this, it is advised that you make a copy of the pre-built Display Table (with an appropriate change in the name) and modify it.

Q 9. Can the pre-built Display Tables be used for Group Macro Outputs?

Yes. You will need to add appropriate control functions in the Actions tab. An example would be using a pre-built Display Table for a comparator and driving the receiver Disable state from an Alarm Group Macro. If you do this, it is advised that you make a copy of the pre-built Display Table (with an appropriate change in the name) and modify it.

Q 10. Can an output be a member of more than one Macro Group?

No. Outputs on a single line of the Receiver I/O table can be members of only one Macro Group.

Q 11. Can multiple Macro Inputs drive the same Macro Output?

Yes. This is shown in the example system in the manual. An Enable and Disable Macro Input both drive the same Macro Group (all the transmitter in an RF channel).

Q 12. Can one output be used as a Macro Group output and a Triggered Output?

Yes. It must be a Member of a Macro Group. One triggering input could drive the Macro Group (and thus, the output in question) and a different triggering input could drive the output as an individual Triggered Output.

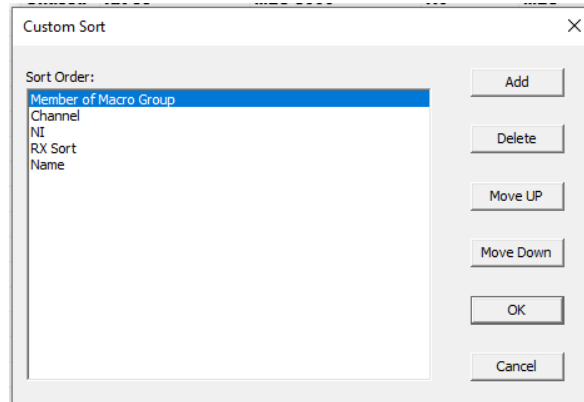
Q 13. Can I use the Display Table Override feature to allow an input to trigger multiple Group Macro actions?

No. The Display Table Override feature affects only the screen display. The Group Macros use only the native Display tables which are selected in the Receiver I/O list.

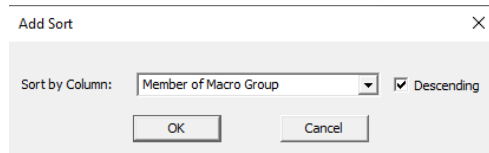
Q 14. Where can I find a list of all the outputs in my Macro Group?

There is no separate list of all the members of Macro Groups. You can, however, sort the Receiver I/O to group all the members of Macro Groups together.

1. In the Receiver window, right-click and select **Sort** from the drop-down menu.
2. Select Custom Sort and build a custom sort with Member of Macro Group as the first item as shown below. This will group all Macro Group members at the bottom of the list.



3. If you check the 'Descending' box when adding members to the Macro Group sort list, the Macro Group members will appear at the top of the Receiver I/O list in reverse alphabetical order, as shown below.

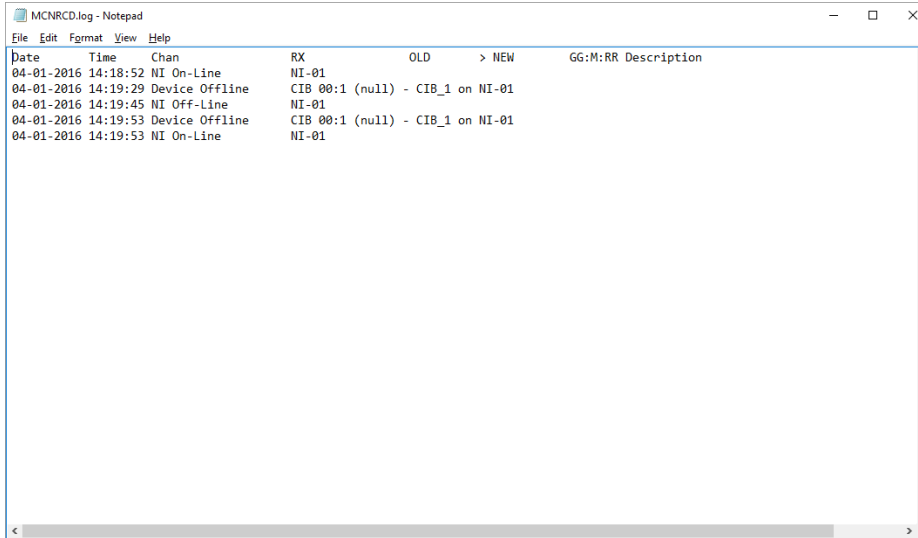


Since Macro Groups can get complex, this is generally a good way to help you to cross-check your configuration.

Alternately, you could use **File / Export Text** from the menu and then load the file into Excel.

Appendix A: Error Logging Definitions

Logging is a feature of the MCN and the RCD Programs to assist with System Hardware Status, trouble shooting, and Diagnostics. The logged messages are formatted for general text output.



The format of messages logged to the screen, printer, or file is defined in a system configuration file named similar to:

SystemName.RcdLog

where System Name is the name you used to save your system files in MCN Config Server.

You can edit this file with a text editor to change which items are logged.

Logging to a File

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

```
LogFile ("MCNRCD.log")
{
    StartDly(10)
    Header("Date      Time      Chan      RX
    OLD      > NEW      GG:M:RR Description")
    Field(0,date,1,10)
    Field(11,time,1,9)
    Field(20,channel,1,15)
    Field(40,rxname,1,15)
    Field(57,oldstate,1,10)
    Field(67,">",1,10)
    Field(69,newstate,1,10)
    Field(80,gmr,1,7)
    Field(88,desc,1,20)

    FlField(0,date,1,10)
    FlField(11,time,1,9)
    FlField(20,flstatus,1,30)
    FlField(40,fldesc,1,100)
}
```

Log File Location & Size

If the Log File parameter above does not include an explicit path reference, the log file will be stored in

C:\ProgramData\CTI Products Inc\McnRcd (for Windows 7 and up.)

Default Log File size is 16 MB.

When a log file reaches its limits, it is re-named with an "Old" extension, and a new log file is created.

If a different log file size is required, use Regedit to go to the following key in the registry (for Windows 7):

HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\CTI Products\MCNRCd\Logs

Enter the following DWord entry: **MaxLogSize**

Enter the value (in Decimal bytes) for the maximum log size. Restart MCN Server 8000 for the change to take effect.

Logging to a Printer

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

```
LogPrint("device")
{
    StartDly(0)
    Header("Date          Time      Chan          RX
OLD      > NEW          GG:M:RR Description")
    Field(0,date,1,10)
    Field(10,time,1,9)
    Field(19,channel,1,15)
    Field(39,rxname,1,15)
    Field(56,oldstate,1,10)
    Field(66,">",1,10)
    Field(68,newstate,1,10)
    Field(80,gmr,1,7)
    Field(88,desc,1,20)

    FlField(0,date,1,10)
    FlField(10,time,1,9)
    FlField(19,flstatus,1,30)
    FlField(39,fldesc,1,40)
}
```

Logging to the Server Screen

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

```
LogWindow("System Events")
{
    StartDly(10)
    Header("Time          Chan          RX
OLD      > NEW          GG:M:RR Description")
    Field(0,time,1,9)
    Field(9,channel,1,15)
    Field(29,rxname,1,15)
    Field(46,oldstate,1,10)
    Field(56,">",1,10)
    Field(58,newstate,1,10)
    Field(69,gmr,1,7)
    Field(78,desc,1,20)

    FlField(0,time,1,12)
    FlField(9,flstatus,1,30)
    FlField(29,fldesc,1,100)
}
```

Logging to the Client Screens

The typical logging definitions for Client screens are shown in the example below. The Client logging formatting is shared among all clients. Client logs do not support Forced Log fields..

```
LogClient("")
{
    StartDly(10)
    Header("Date      Time      Chan      RX      OLD      > NEW      GG:M:RR Description")
    Field(0,date,1,10)
    Field(11,time,1,9)
    Field(20,channel,1,15)
    Field(40,rxname,1,15)
    Field(57,oldstate,1,10)
    Field(67,">",1,10)
    Field(69,newstate,1,10)
    Field(80,gmr,1,7)
    Field(88,desc,1,20)
}
}
```

Error Logging Definition File Parameters

Log File Name	The text between quotes is the file name that will be used for logs.
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 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 Name table below) Beginning character position to be printed for field. Ending character position to be printed for field.

Field Names

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
Old state	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
NI_Name	Network Interface Name
NI_GMR	Network Interface Group Module Receiver
Tag 1	User configurable descriptor used by TPCI to pass along details.
Tag 2	User configurable descriptor used by TPCI to pass along details.

Force Log Subsections

Each of the above sections includes a Force Log subsection as shown below:

```

LogWindow("System Events")
{
    StartDly(0)
    Header("Time OLD > NEW GG:M:RR Chan RX Description")
    Field(0,time,1,9)
    Field(9,oldstate,1,7)
    Field(16,">",1,10)
    Field(18,newstate,1,7)
    Field(26,gmr,1,10)
    Field(35,channel,1,16)
    Field(52,rxname,1,15)
    Field(68,desc,1,22)

    FlField(0,time,1,12)
    FlField(9,flstatus,1,30)
    FlField(26,fldesc,1,100)
}
    
```

The Force Log section is for events related to Network Interfaces, link On-Line and Off-Line.

The Force Log Fields are:

- **flstatus** Force Log Status (Online, Offline, etc.)
- **fldesc** Force Log Description (NI information)

Appendix B: Backup Procedures

This section covers the following standard Backup & Restore operations:

- The MCN Server 8000 and MCN Client software
- The MCN Server Software Key File
- The Custom MCN Server 8000 System Configuration files
- HIB-IP settings
- MCN Server 8000 IP Configuration settings
- MCN Client IP Configuration settings.

The backup and restoration instructions for the following items are beyond the scope of this manual. The appropriate documentation should be consulted for those procedures:

- Server and Client PC Operating Systems
- Server and Client PC User Accounts
- Server and Client PC OS Hardening
- Other (non- MCN Server 8000) user files on the Server & Client PC
- IP Comparators
- IP Network infrastructure
- Legacy MCN equipment
- Other non-related hardware or software

MCN Server and Client Software Backup

1. If needed, use a commercially available method to make a backup copy of the MCN Server 8000 distribution media (up to the limit of copies allowed by the license).

This media includes the MCN Server 8000 software, the MCN Config Server software, and the MCN Client software.

2. Store the original distribution media and the backup media in safe places.

MCN Server Software Key Backup

- 1) If needed, use a commercially available method to make a backup copy of the MCN Server 8000 Software Key File MEDIA or Software Key File itself. The Key file will have the form: KF-xxxx-yyy zzzzzzzzzzzz.MCNKey

Where: xxxx is a number that matches the Hardware Key Serial Number
yyy is the Key File Version number and
zzzzzz is an optional descriptive text string.

- 2) Store the original distribution media and the backup media in safe places.

Custom MCN Server 8000 System Configuration Files Backup

The Custom MCN Server 8000 System Configuration Files are the files that have been configured to describe your system. They include files with the following types of file names:

- *SystemName.McnSys*
- *SystemName.RcdDtb*
- *SystemName.RcdHrd*
- *SystemName.RcdLog*
- *SystemName.RcdSec*
- *SystemName.ScreenName1.RcdWnd*
- *SystemName.ScreenName1.RcdFmt*

Where:

SystemName is the name, you used when you saved your system and
ScreenName1 is the name you used for your first Display Window (Screen).

Note 1: Each system has a minimum of the above 7 file types.

Note 2: If you have more Display Windows (Screens) you will have more RcdWnd and RcdFmt files; one for each screen.

Backup Instructions

1. Use Windows Explorer to find the current set of files that you are using for your system.
2. Use Windows Explorer or a commercially available method to make a backup copy of the files.
(It may be helpful to use a program to Zip them up into a single file.)
3. Store the backup copy in safe places.

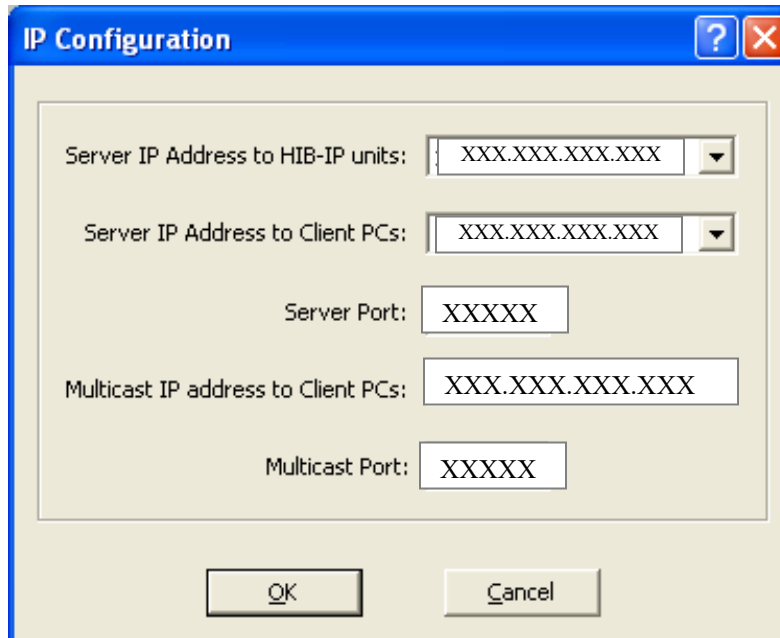
HIB-IP Settings Backup

The HIB-IP settings (if your system uses a HIB-IP unit) are stored in the Custom MCN Server 8000 System Configuration Files and will be backed up with the previous step.

MCN Server 8000 IP Configuration Backup

The IP Configuration parameters for the MCN Server 8000 software will have to be re-entered when the system is restored. Make a backup of those values:

- 1) Run **MCN Server 8000**.
From the menu, select **Options / IP Settings**.
- 2) The IP Configuration window will open like the one below:



The screenshot shows a dialog box titled "IP Configuration". It has a blue title bar with a question mark icon and a close button. The dialog contains five input fields:

- Server IP Address to HIB-IP units: [XXX.XXX.XXX.XXX]
- Server IP Address to Client PCs: [XXX.XXX.XXX.XXX]
- Server Port: [XXXXXX]
- Multicast IP address to Client PCs: [XXX.XXX.XXX.XXX]
- Multicast Port: [XXXXXX]

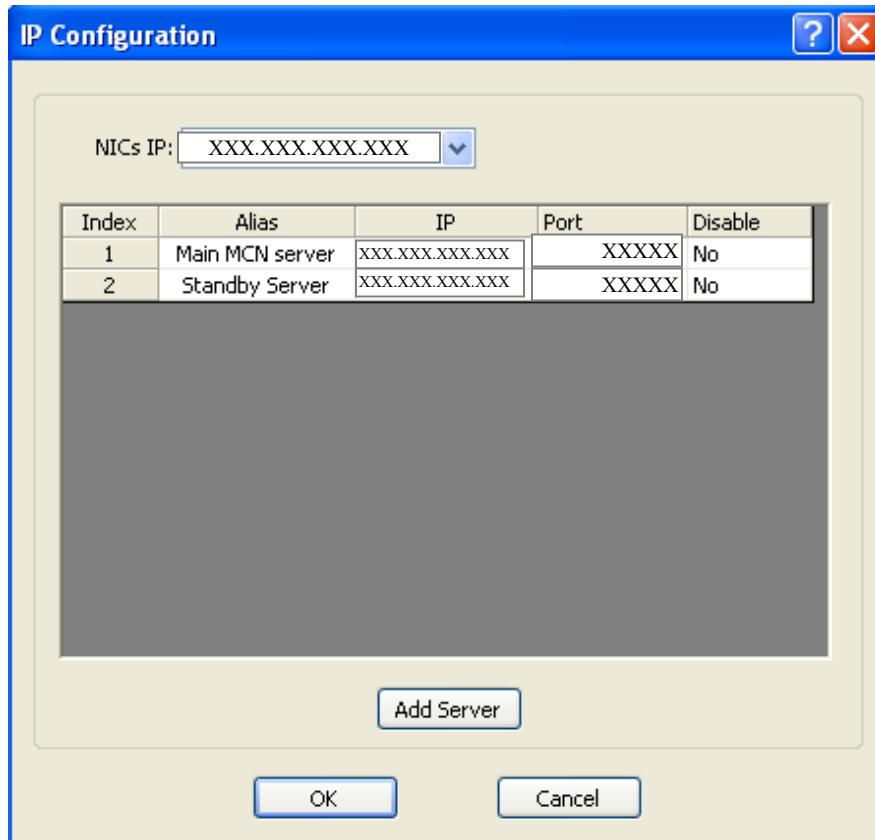
At the bottom of the dialog are two buttons: "OK" and "Cancel".

- 3) Make a backup copy of the information found in the IP Configuration window.
This can be on paper, or in a text file, or a screen capture of the IP Configuration window.
- 4) Store the backup copy in safe places.

MCN Client IP Configuration Backup

The IP Configuration parameters for the MCN Client software will have to be re-entered when the system is restored. Make a backup of those values:

1. Run **ClientRCD**.
From the menu, select **Options / IP Settings**.
2. The IP Configuration window will open like the one below:



There will be a line for each MCN Server that the Client can use.

3. Make a backup copy of the information found in the IP Configuration window.
This can be on paper, or in a text file, or a screen capture of the IP Configuration window.
4. Store the backup copy in safe places.

Appendix C: Restore Procedures

Restoring the MCN Server 8000 Software & IP Settings

- 1) Use the original or backup MCN Server 8000 software distribution media.
- 2) Install the MCN Server 8000 software by following the step in **MCN Server 8000 section** starting on **page 36** of this manual. Select the **Server** installation option.
- 3) When prompted for the Key File, use the original or backup Key File or Key File Media.
- 4) When prompted to enter IP parameters, enter the parameters saved in the MCN Server 8000 IP Configuration Backup procedure.

Restoring the Custom System Configuration Files

1. Use the backup copy of the Custom MCN Server 8000 System Configuration Files
2. Using Windows Explorer, copy the backup files into a folder that has the following access levels:

Administrator	Read & Write
User	Read (and Write if desired)
3. If the files were previously Zipped, un-Zip them.

Restoring the HIB-IP Configuration

The Custom System Configuration Files restored above will have the configuration information for the HIB-IP unit(s) (if used). If the HIB-IP needs to be restored (for example, if the HIB-IP unit is replaced), follow this procedure:

- 1) Run MCN Config Server 8000 software.
- 2) Load the system that was restored above.
- 3) Program the HIB-IP Unit(s) as per the *Loading Configuration Data into HIB-IP* family units section on page **85** of this manual.

Restoring the Client Software & IP Settings

1. Use the original or backup MCN Server 8000 software distribution media.
2. Install the MCN Server 8000 software by following the step in **section Error! Reference source not found.** starting on page **Error! Bookmark not defined.** of this manual.
3. Select the **Client** installation option.
4. When prompted to enter IP parameters, enter the parameters saved in the MCN Client IP Configuration Backup procedure.

Appendix D: Legacy Equipment Part Numbers

MOTOROLA PART#	CTI Products PART#	Description
DDN2123A	S1-61795	MCN Server 8000 Legacy Comparator & I/O Support HIB-IP 8002 Unit To connect to legacy MCN networks and GPIO modules <i>Release to coincide with ASTRO® 25 7.13 release</i>
CDN6119A		Comparator Interface Modules AIB ASTRO-TAC™ Interface Module
CDN6121A	S2-60442	CIB Comparator Interface Module
		General Purpose I/O Modules
DQS261281	S2-61281	MCN GPI-12 Input Module 12 Opto Inputs
DQS261282	S2-61282	MCN GPI-24 Input Module 24 Opto Inputs
	S2-61283	MCN GPO-12A Output Module 12 SSR Outputs (Form A)
DQS261284	S2-61284	MCN GPO-24A Output Module 24 SSR Outputs (Form A)
DQS261285	S2-61285	MCN GPIO-1212A Input / Output Module 12 Opto Inputs, 12 SSR Outputs (Form A)
DDN1385	S2-61299	MCN GPIO-1208C Input / Output Module 12 Opto Inputs, 8 Mech Relay Outputs (Form C)
DSS61363	S2-61363	MCN GPO-16C Output Module 16 Mech Relay Outputs (Form C)
	S2-61426	MCN GPIO-1208L Input / Output Module 12 Opto Inputs, 8 Magnetically Latched Mech Relay Outputs (Form C)
DQS261418	S2-61418	MCN GPIO-1212-CVT Converter Module 12 Opto Inputs, 12 SSR Outputs (Form A)
		Network Extenders and Routers
DQS160655	S1-60655	MCN EXB-232 System Extender, 78K Requires Async Serial Channel <i>(For use with Digital Channel Banks)</i>
DQS160656	S1-60656	MCN EXB-232 System Extender, 1250K Requires Async Serial Channel <i>(For use with Digital Channel Banks)</i>
DQS160962	S1-60962	MCN EXB-IP System Extender, 78K (For 10Base-T Ethernet)
DQS160963	S1-60963	MCN EXB-IP System Extender, 1250K (For 10Base-T Ethernet)
DQS260825	S2-60825	Custom System Configuration / Test <i>(Required for each EXB or Router Module)</i>
		Mounting
CDN6112A	S2-60435	Rack Mount Quad Size A
DDN1387	S2-60443	Triple Rack Mount (2) Size A, (1) Size B
DQS260472	S2-60472	Triple Rack Mount (3) Size B

MOTOROLA PART#	CTI Products PART#	Description
CDN6114A	S2-60437	Mounting Bracket CIB-DIGITAC
NETWORK CABLES:		
CDN6123A	S2-60438	Cable Assy Network 9"
CDN6124A	89-10732	Cable Assy Network 3'
CDN6125A	89-10712	Cable Assy Network 10'
CDN6126A	89-10835	Cable Assy Network 25'
25-Pair I/O Cables & Punch Blocks:		
CDN6130A	89-10837	Cable Assy 25 Pr Male-Male 25'
CDN6135A	89-10843	Cable Assy 25 Pr Male-Blunt 25'
CDN6118A	31-10354	Punch Block Dual / 25 PR
Serial Cables:		
CDN6131A	S2-60440	Cable Assy AIB-Comparator 10'
CDN6132A	S2-60441	Cable Kit HIB-232->PC AT/XT 6'
CDN6149A	S2-60445	Cable Assy HIB-232 ->Modem 3'
DQS260450	S2-60450	Cable Kit PC-> Modem or EXB-Ser to Modem 6'
Power Supplies & Cables		
CDN6116A	81-12112	Power Supply MCN 120VAC US/CAN
CDN6117A	81-10728	Power Supply MCN 230VAC Europe
DQ8910917	89-10917	Power Cable MCN DC 6' Must be externally fused at 1A.
MISC:		
CDN6115A	S2-60318	Network terminator (Standard 78K Systems)
DQS261088	S2-61088	Terminator Assy 1250K RJ Block
DQS260605	S2-60605	Terminator Assy 1250K RJ Block with 1' cable for PCLTA
DQS260617	S2-60617	WON NCB Adaptor WD (PCLTA) to Dual RJ
DQS160601	S1-60601	CIB-T CIB Test Board
USER GUIDES:		
CDN6134A	S2-60425	MCN System Manual
CDN6107A	S2-60399	AIB Hardware Guide
CDN6109A	S2-60426	CIB Hardware Guide
DQS261286	S2-61286	GPIO Hardware Guide
	S2-61469	GPIO-CVT Manual
CDN6110A	S2-60427	HIB-232 Hardware Guide
DQS261173	S2-61173	HIB-IP User Manual
DQS260596	S2-60596	EXB-IM & EXB-232 Hardware Guide
DQS261089	S2-61089	EXB (IP & FI) Hardware Guide

Appendix E: HIB-IP 8002 USB Driver Installation

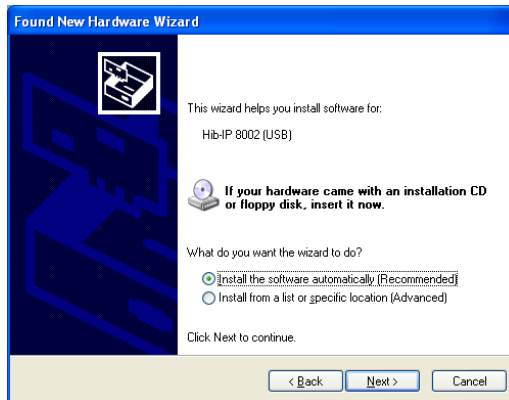
New Installation for Windows 7 and above

The program installation process will normally fully install the HIB-IP 8002 USB driver if the option is selected. If this is a new driver installation, install the driver using the following steps:

1. Check for and disable any real-time virus protection that are running (ex: McAfee Antivirus Access Protection & On-Access scanners).
2. Connect the HIB-IP 8002 module to the PC with a USB cable.
3. When the HIB-IP 8002 is connected, the Found New Hardware Wizard appears:



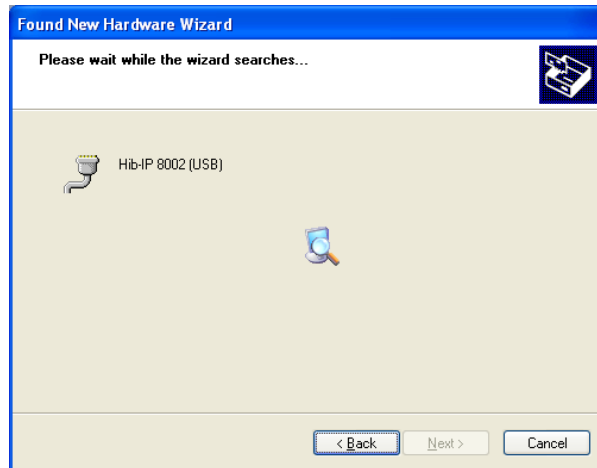
4. Windows Update does not have any HIB-IP 8002 drivers. Select "No, not this time" to the Windows Update prompt. Hit "Next".



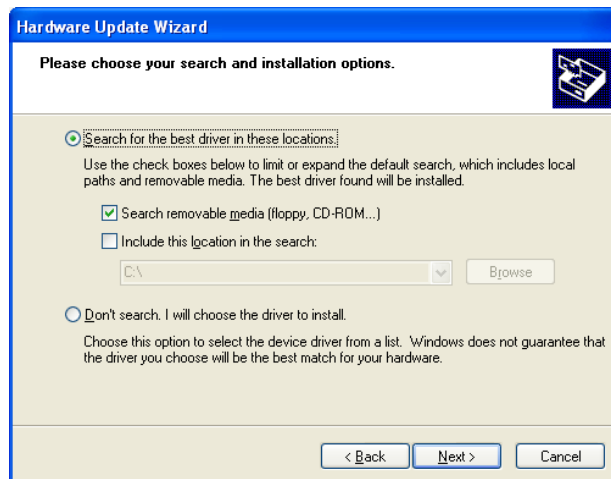
5. It is recommended to select "Install software automatically".

If the HIB-IP 8002 driver files were not originally installed, Load the MCN installation media on the PC and select "*Install from a list or specified location*".

6. For Automatic installations, Windows will search for the files.



7. For manual installations, or if Windows can't find the file, the following dialog box will appear.



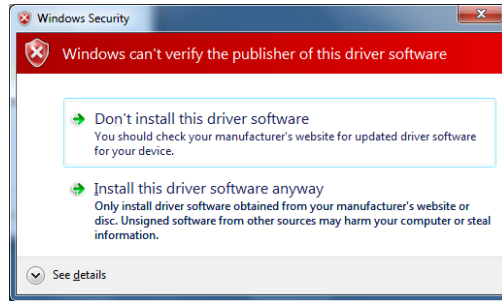
Verify that the MCN Installation media is loaded on the PC and select the removable media option as shown above and.

Alternately, select the "Don't search, I will choose the driver to install" option.

Then navigate to the following folder on the installation MEDIA:

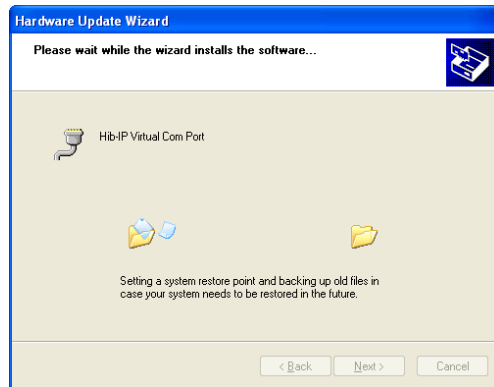
HibVCom\X86 for 32 Bit Windows installations or
HibVCom\X64 for 64 Bit Windows installations or

8. When Windows finds the file, it may complain that the driver is not signed.

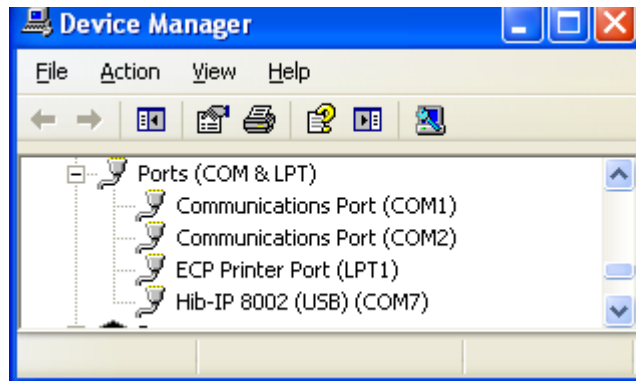


If you wish to proceed, select the appropriate option

Windows will proceed to install the driver:

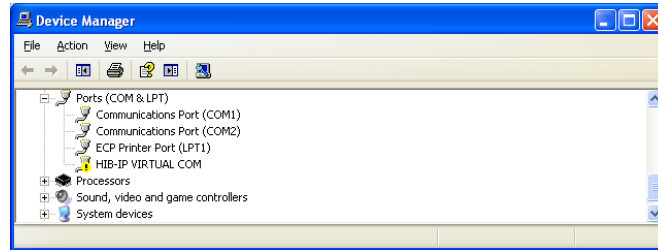


9. When the HIB-IP 8002 driver is correctly installed, it will be shown in the Device Manager without an error indication:



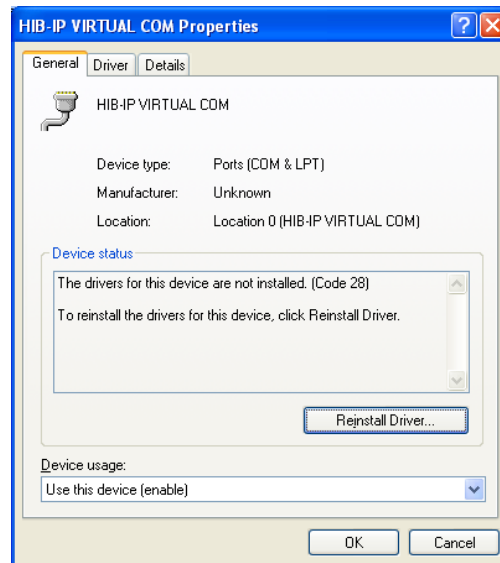
Driver Installation Problems – Manual Installation

If there is a problem with the driver installation, the HIB-IP 8002 unit will be displayed with an error indication in the Device Manager:



If this happens, you can manually install the driver:

- 1) Check for and disable any real-time virus protection that are running (ex: McAfee Antivirus Access Protection & On-Access scanners).
- 2) Load the MCN Server 8000 software installation media on your PC.



- 3) Double-click on the HIB-IP VIRTUAL COM port in the Device manager.

Select "Reinstall Driver".

- 4) Proceed as shown in the previous section.
- 5) In some rare cases, you might have to un-install the driver and then re-install it.

Appendix F: IP traffic priority: TOS / QoS / DSCP Settings

IP Traffic Prioritization

Some IP networks support traffic prioritization for various types of IP packets. This is typically done through the following IP packet fields:

- TOS Type of Service
- QoS Quality of Service
- DSCP Differentiated Services Code Point

The TOS, QoS and DSCP fields use the same byte in the IP packet as defined by the appropriate RFCs. Different network devices will interpret the byte differently depending on how they are configured. Some routers may be configurable for prioritization based on TOS. Others may be configurable based on QoS. Others may be configurable based on DSCP. Others may use a combination of two or more of the above.

Do not assume that a higher value will always give you higher priority. Consult your network administrator for the proper value to use.

ASTRO® 25 7.16 (and up) RNI

The MSI ASTRO® 25 Version 7.16 System RNI supports prioritization from:

- The MCN Server 8000 PC to the HIB-IP 8002 module.
(Controlled by a Windows Group Policy Object (GPO) with a default DSCP value of 16.)
- The HIB-IP 8002 module to the MCN Server PC (using a default TOS value of 2).

For ASTRO® 25 version 7.16 and above systems, Motorola Solutions, Inc. will include the appropriate GPO settings for the MCN Server 8000 in their Supplemental Media distributions. The file for ASTRO® 25 version 7.16 systems is in:

ActiveDirectory\Data\GPO...

Look for: {0013C79A-8871-45E8-888D-03189E1297D3}.

Follow the appropriate MSI instructions to install that media on the appropriate PCs (including Domain Controllers).

HIB-IP 8002 Type of Service Field:

The HIB-IP 8002 module supports a configurable IP Type of Service or TOS field. MCN software version 7.20 and later (particularly in the MCN Config program) is required to configure this field.

The HIB-IP 8002 module uses the TOS setting since it is the most configurable. It can take on a value of 0 to 255 (decimal).

Typical TOS values used with the HBI-IP 8002 module are:

- 0 No Priority (default)
- 2 For Motorola Solutions, Inc. (MSI) ASTRO® 25 Version 7.16 and up
Radio Network Infrastructures (RNI).

If your network uses the QoS or DSCP interpretation, you can convert those values to the proper TOS value and enter it into the HIB-IP 8002 configuration. Contact your system administrator or see http://en.wikipedia.org/wiki/Type_of_service for more information on converting between these values.

MCN Server 8000 DSCP Field:

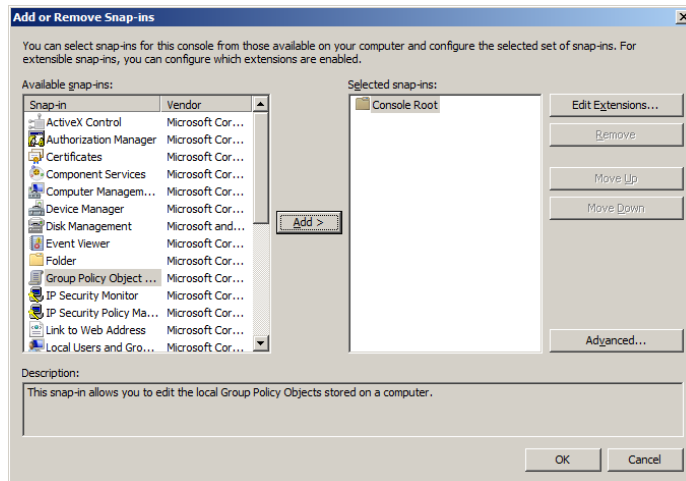
Traffic priority for packets from the MCN Server 8000 PC to the HIB-IP 8002 module is controlled in Windows 7.x by a configurable Differentiated Services Code Point (DSCP) field. This is done through a Group Policy Object. For the DSCP to work, the following conditions must be met:

- 1) A Group Policy Object must be created (see below),
- 2) The MCN Server PC must be joined to a Windows Domain and
- 3) The IP hardware interface (NIC) in use must be the one that is connected to the above Windows Domain.

Manually Setting the Group Policy Object in Windows

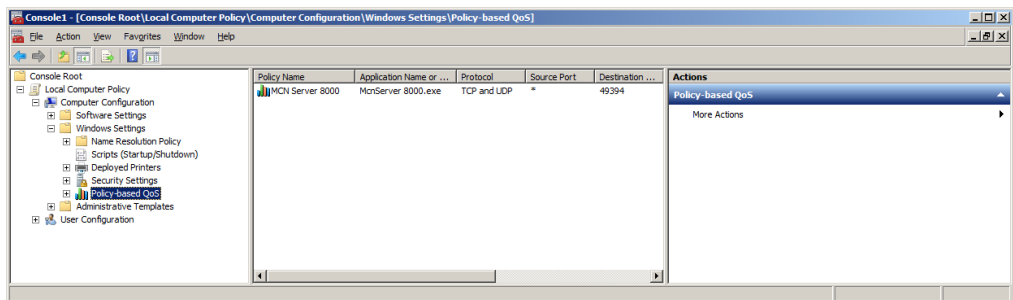
If you don't have the appropriate MSI Supplemental Distribution media, you can use the following steps to manually set the Group Policy Object:

1. Run Microsoft Management Console (Start / Run / MMC)
2. Add the Group Policy snap-in (Menu: File / Add/Remove Snap-in)



- Select the Group Policy Object.
- Hit "Add" button
- Hit the "Finish" button.
- Hit the OK button.

3. Expand the tree in the left pane to:
Local Computer Policy / Computer Configuration / Windows Settings / Policy-based QoS



- Highlight the Policy-based QoS item.

4. Create a new Policy:
Menu: Action / Create new policy.

5. Follow the wizard and enter the following values:

Policy Name	MCN_Server_8000
DSCP Value	16
Outbound Throttle Rate	Unchecked
Application Name	McnServer 8000.exe (include the space)
Source IP Address	Any
Destination IP Address	Any
Protocol	UDP
Source Port	Any
Destination Port	49394

6. Hit the Finish button.
7. Close the MMC

Appendix G: Running on non WHK PCs – UDP Port Settings

It is highly recommended that the MCN Server 8000 system be run on a WHK hardened PC when connected to an MSI RNI. The default UDP port settings on the MCN Server 8000 software are set to run on a WHK PC.

If the software is run on a non-hardened (non-WHK) PC, the UDP port settings must be changed from the default values.

1) Background – Default Ports & WHK

The default UDP ports used by MCN Server 8000 were assigned for a PC running with Motorola Solutions Inc. (MSI) Windows Hardening Kit (WHK) and running on an ASTRO® 25 7.13 or above Radio Network Infrastructure (RNI). One of the things that WHK does is reserve a pool of UDP and TCP ports in Windows for use by various MSI programs. It does this by changing the Windows starting Dynamic port number (with a default of 49152) to a higher number. The MCN Server 8000 software UDP Port defaults are then set to a value within the reserved range above 49152 and below the new maximum set by the WHK.

If the software is run on a non-WHK PC, the default port numbers will fall into the Windows Dynamic Port range. This will present a problem if another program or process uses that port before the MCN Server 8000 software starts.

- a. If the MCN Server 8000 software is run on a non-WHK PC, the fix is either:
Move the start of the Dynamic port range to 52152 (preferred) or
- b. Set the MCN Server ports to something below the start of the dynamic ports.

2) Checking and setting the start of the Windows Dynamic IP Port Range

To check what your dynamic port range is, run the following from the CMD prompt:

- ✓ netsh int ipv4 show dynamic port tcp.
- ✓ netsh int ipv4 show dynamic port udp.

To set the range, do the following from the CMD prompt:

- netsh int ipv4 set dynamicport tcp start=52152 num=13384
- netsh int ipv4 set dynamicport udp start=52152 num=13384

3) Setting the MCN Server ports below 49152:

Note: Since this solution may cause problems in communications across the various routers in the RNI, it should only be used for MCN Server PCs that are NOT running on an MSI RNI.

To set the UDP ports used by the MCN Server 8000 software, run MCN Server 8000 and do the following:

- a. Click Menu: Options / IP Settings
- b. Enter the appropriate UDP ports.

Available ports will depend on your system, but the following ports have been used for years on other versions of our MCN Server software (not on the MSI RNI) without problems.

- Server Port: 222
- Multicast Port: 333

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Glossary

1250	Legacy MCN 1.25mbps high speed backbone Network Rate
78K	Legacy MCN 78kbps standard network rate for CIB, HIB, AIB, IIB, and IOB modules.
AGU	MLC 8000 Subsite Link Converter Includes 4 ports for connection to the BR (Base Radios) Used in MLC 8000 Analog Comparators.
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).
BR	Base Radio – May be a Transmit/Receive unit or just a Receiver. BR Base Radio (Base station)
CEN	Customer Enterprise Network, separated from the Radio Network Infrastructure (RNI) by routers and/or firewalls.
CIB	Legacy 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).
CSS	Configuration / Service Software – Used for the GCM 8000 comparator and Base Radios
CT	Configuration Tool – Software used to configure the MLC 8000 Analog Comparator
CTI	Shorthand for our full company name, "CTI Products, Inc."
DA	Dispatch Application furnished with the MLC 8000 Analog Comparator CT software. This allows limited status monitoring of receivers.
EXB	Legacy System Extender Module is used in pairs to connect two MCN networks together or to extend the length of an MCN network beyond 4000 feet. Allows control and monitoring of multiple remote comparators from a central site.
EXB-232	Legacy System Extender Module with RS-232 Asynchronous Serial Interfaces Connects remote sites using Asynchronous Serial channels (typically Subrate cards over T1 channel banks)
EXB-IM	Legacy System Extender Module with an Internal Modem Connects remote sites over 2-Wire or 4-Wire audio circuits.
EXB-IP	Legacy System Extender Module with an Ethernet IP interface Connects remote sites over IP networks.
GCM	Shorthand for GCM 8000
GCM 8000	Motorola Solutions IP Comparator for Digital radio systems
GPW 8000	Motorola Solutions Satellite Receiver
Group	Used in Legacy systems. Equivalent to the Subnet portion of the network address, less one. Valid values are from 00 to FE (hexadecimal).
GRV 8000	“G” Series analog or digital IP Comparator. Supports up to 96 BRs – either IP BRS (typically GTR 8000s) or 4-Wire BRs through G Series Link Converters (GSLCs).
GSAC	“G” Series Comparator – GRV 8000

GSLC	“G” Series Link Converter – Connects a legacy 4-Wire Base Radio to the GRV 8000 comparator over IP.
GTR 8000	Motorola Solutions Base Radio
HIB-232	Legacy 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	Legacy Host Computer Interface Module connects a PC to the MCN Network over an IP network.
HIB-IP 8000	Similar to the HIB-IP unit except with special UDP ports that can be used within Motorola's A7.13 and up RNI.
HIB-IP 8002	Newer version of the HIB-IP 8000 unit. New hardware that is configured using a USB port.
HIB	Legacy Input/Output Interface Module connects a parallel operator display device (such as a console) to the MCN Network. <ul style="list-style-type: none"> • Can be used with AIB ASTRO™25 -TAC™ Comparator Interface Modules to provide voting status indications (Vote, Receive, Disable, and Fail) to a console. • Can also be used with CIB Comparator Interface Modules to extend the comparator display and control for other comparators over a long distance.
IOB	Legacy 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 <i>in dotted decimal</i> 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 Subnet Mask definition also.)
MCN	Monitoring and Control Network
Mixed Mode	System operation with both digital and analog radio channels. Mixed Mode Voter Solutions include a GCM 8000 Digital Comparator and an MLC 8000 Analog Comparator.
MLC	Shorthand for MLC 8000 Analog Comparator
MLC 8000	Motorola Solutions IP Comparator for Analog radio systems Each MLC 8000 Analog Comparator is made up of one MLC 8000 Analog Comparator (VGU) and one or more MLC 8000 Subsite Link Converter (AGU)s.
MLC ID	See Radio ID definition also.
MM	Shorthand for Mixed Mode
Module (generic)	A Legacy Input/Output device (CIB, AIB, GPIO Module) or an IP comparator.

Module (MCN Address):	In MCN Addressing, the Module number is part of the MCN address (Group & Module numbers) used to identify an MCN legacy device. Each legacy MCN device will have both a Group and Module address. Valid values are from 00 to 7E (hexadecimal) for MCN I/O devices. For legacy MCN devices with rotary switches for the MCN addresses, the Module address will be a single hex digit from 0 to F.
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.
MSI	Motorola Solutions, Inc.
NIC	Network Interface Card – Interface card between the PC and the Ethernet network.
PCLTA	Legacy Internal MCN Network Interface for PC
Port (AGU)	Receiver Port Number (1-4) in a particular MLC 8000 Subsite Link Converter (AGU)
Port (GCM)	Receiver Port Number (1-64) in a GCM-8000 comparator
Port (IP)	A number indicating a logical connection within an IP device. Ports allow multiple types of messages (HTTP, FTP, etc.) to be sent to the same IP address. The IP device routes each incoming message based upon its destination port.
Radio ID	Unique ID number in an MLC 8000 Analog Comparator and MMC comparator to identify the Receiver in a particular channel. Each MLC 8000 Subsite Link Converter (AGU) will have 4 Radio IDs in it. This ID is needed when configuring the receivers for the MLC 8000 Analog Comparator or the MMC in MCN Config Server. The Radio ID is entered in the MLC ID field in the Receiver Window.
RCD	Remote Comparator Display
RNI	Radio Network Infrastructure – the Motorola Solutions Inc (MSI) network that includes the radio and console equipment. This is separated from the Customer Enterprise Network (CEN) by routers and/or firewalls.
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.
UDP	User Datagram Protocol is a simple transport protocol used on the Internet.
VGU	MLC 8000 Analog Comparator Includes port for connection to the console.
Voter ID	Unique ID number in an MLC 8000 Analog Comparator and MMC comparator to identify the Voter portion of the system for a particular channel. This ID is needed when configuring the MLC 8000 Analog Comparator or the MMC in MCN Config Server.