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USER'S HANDBOOK

WCCMAINT
(WCC MAINTENANCE UTILITY)

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FCC RULES COMPLIANCE

The equipment covered in this manual has been tested and found to comply with the limits for Class A digital devices, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his/her own expense.

DOCUMENT HISTORY

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DISCLAIMER

ASERVER AND WCCMAINT ARE DIAGNOSTIC TOOLS DESIGNED FOR NETWORK MANAGEMENT AND TROUBLESHOOTING. IT IS POSSIBLE TO RESET OR MISCONFIGURE REMOTE UNITS IN SUCH A WAY THAT CODELINE (CTC) TRAFFIC IS DISRUPTED. THE PURPOSE OF THIS DOCUMENT IS TO ACQUAINT THE END USER WITH THE FULL RANGE OF CAPABILITIES OF THESE TOOLS, AND THEIR USE MUST BE COMBINED WITH SPECIFIC KNOWLEDGE OF THE USER'S SIGNALING SYSTEM TO ENSURE UNINTERRUPTED SERVICE. ANY DIAGNOSTIC PROCEDURES THAT COULD DISRUPT SERVICE ARE CLEARLY MARKED AND SIEMENS ASSUMES NO RESPONSIBILITY FOR ANY MISUSE OF THESE TOOLS, ACCIDENTAL OR OTHERWISE

NOTES, CAUTIONS, AND WARNINGS

Throughout this manual, notes, cautions, and warnings are frequently used to direct the reader's attention to specific information. Use of the three terms is defined as follows:

WARNING

INDICATES A POTENTIALLY HAZARDOUS SITUATION THAT, IF NOT AVOIDED, COULD RESULT IN DEATH OR SERIOUS INJURY. WARNINGS ALWAYS TAKE PRECEDENCE OVER NOTES, CAUTIONS, AND ALL OTHER INFORMATION.

CAUTION

REFERS TO PROPER PROCEDURES OR PRACTICES WHICH IF NOT STRICTLY OBSERVED, COULD RESULT IN A POTENTIALLY HAZARDOUS SITUATION AND/OR POSSIBLE DAMAGE TO EQUIPMENT. CAUTIONS TAKE PRECEDENCE OVER NOTES AND ALL OTHER INFORMATION, EXCEPT WARNINGS.

NOTE

Generally used to highlight certain information relating to the topic under discussion.

If there are any questions, contact Siemens Industry, Inc. Application Engineering.

ELECTROSTATIC DISCHARGE (ESD) PRECAUTIONS

Static electricity can damage electronic circuitry, particularly low voltage components such as the integrated circuits commonly used throughout the electronics industry. Therefore, procedures have been adopted industry-wide which make it possible to avoid the sometimes invisible damage caused by electrostatic discharge (ESD) during the handling, shipping, and storage of electronic modules and components. Siemens Industry, Inc. has instituted these practices at its manufacturing facility and encourages its customers to adopt them as well to lessen the likelihood of equipment damage in the field due to ESD. Some of the basic protective practices include the following:

- Ground yourself before touching card cages, assemblies, modules, or components.
- Remove power from card cages and assemblies before removing or installing modules.
- Remove circuit boards (modules) from card cages by the ejector lever only. If an ejector lever is not provided, grasp the edge of the circuit board but avoid touching circuit traces or components.
- Handle circuit boards by the edges only.
- Never physically touch circuit board or connector contact fingers or allow these fingers to come in contact with an insulator (e.g., plastic, rubber, etc.).
- When not in use, place circuit boards in approved static-shielding bags, contact fingers first. Remove circuit boards from static-shielding bags by grasping the ejector lever or the edge of the board only. Each bag should include a caution label on the outside indicating static-sensitive contents.
- Cover workbench surfaces used for repair of electronic equipment with static dissipative workbench matting.
- Use integrated circuit extractor/inserter tools designed to remove and install electrostatic-sensitive integrated circuit devices such as PROM's (OK Industries, Inc., Model EX-2 Extractor and Model MOS-40 Inserter (or equivalent) are highly recommended).
- Utilize only anti-static cushioning material in equipment shipping and storage containers.

For information concerning ESD material applications, please contact the Technical Support Staff at 1-800-793-7233. ESD Awareness Classes and additional ESD product information are also available through the Technical Support Staff.

GLOSSARY

TERM	DESCRIPTION
AAR	Association of American Railroads - An organization that establishes uniformity and standardization among different railroad systems.
AEI Equipment:	Automatic Equipment Identification - AEI sites are installed along the track to read and report the train consist information.
ASERVER:	A software application designed by Siemens to centrally organize and distribute all network management traffic in ATCS networks.
ATCS:	Advanced Train Control System - A set of standards compiled by the AAR for controlling all aspects of train operation.
BCP:	Base Communications Package - Defined by the ATCS specifications as the transmitter / receiver base station and associated processors to handle communications between mobile and central office equipment
CADS:	A legacy serial-based CTC system in use at CSX Corp.
CC:	Cluster Controller - An ATCS ground network node responsible for the control of BCPs.
Congestion:	Congestion mode for a WCC is a condition that results from a system traffic overload, usually caused by very high inbound message traffic under ducting conditions. While in congestion mode, the WCC enforces restrictions on outbound traffic to mitigate the overload and help restore the system to normal.
CPC:	Central Protocol Converter - Modular component of Siemens' R/Link™ Radio Control System that converts CTC code line control and indication message data to ATCS-compatible data.
CRC:	Cyclical Redundancy Check - The CRC on a data packet is normally calculated and appended to the data so that the receiver can verify that no data was lost or corrupted during transit.
CTC:	Central Traffic Control System - The graphical display system by which the dispatcher controls field devices (switches, signals, etc). Also referred to as **Code Server.**
DTE device:	Data Terminal Device - A device that originates or consumes data.
Ducting:	A temporary RF condition that results in unusual coverage patterns for bases and groups, typically over very large distances. This condition is a natural phenomenon that is caused by a combination of atmospheric and weather conditions.

TERM	DESCRIPTION
FEP:	Front End Processor - An ATCS ground network node responsible for providing network access to ground host and terminal users.
GTC:	Ground Terminal Computer
HDLC:	High-level Data Link Control - A serial protocol for exchanging synchronous information.
HUB:	A logical process in ATCS that interfaces to base stations and distributes codeline traffic to and from any number of LCTs. Also referred to as FEPHUB.
IP:	See TCP/IP
LAN:	Local Area Network – A collection of devices, usually PCs or workstations, that are interconnected for the purpose of sharing data, typically on an Ethernet communications platform.
LCT:	Line Control Task - A logical process in ATCS that controls a collection of bases and groups and interfaces them to a CTC office. Commonly referred to as a code line.
LSB:	Least Significant Bit of a binary number (having the lowest numerical weight).
MCP/WCP:	Mobile/Wayside Communications Package - The radio and associated processor used by mobile and wayside ATCS compatible equipment to communicate to the central office.
MSB:	Most Significant Bit of a binary number (having the greatest numerical weight).
NGD:	Next Generation Dispatch – An IP-based CTC system designed by Union Switch & Signal currently implemented by CSX Corp.
OCG:	Office Communications Gateway – A software application that performs the functions of WCCs (controlling HUB and LCT functions). OCG was conceived as an alternative to using WCC hardware where no serial (RS-232) communications is involved (all communications are Ethernet-based).
OSI:	Open System Interconnection - A reference model created by the International Standards Organization (ISO) as a framework for networking communications architecture. The model divides network communications design and implementation into seven layers as follows: (1)(bottom layer) Physical, (2) Data Link, (3) Network, (4) Transport, (5) Session, (6) Presentation, (7) Application.
RSSI:	Received Signal Strength Indication – see SSI.
Squitter:	A squitter is a specific message in ATCS or ARES that broadcasts the identity of the sender. It is used in several different contexts, including XID and BCP tag messages.

TERM	DESCRIPTION
SSI:	Signal Strength Indicator - A measure of the relative strength of an incoming RF signal when it was received by a BCP.
TCP/IP:	Transmission Control Protocol / Internet Protocol - The Internet protocol used to connect a worldwide inter-network of universities, research laboratories, military installations, organizations, and corporations. The TCP/IP includes standards for how computers communicate and conventions for connecting network and routing traffic.
UDP:	User Datagram Protocol - A transport protocol used primarily for the transmission of network management information. Not as reliable as TCP.
WCC/FPD:	Wayside Communications Controller/Field Protocol Device – Siemens assembly A53401 (9-port model) or A53430 (12-port model) is a lan-based general-purpose platform capable of many communications and codeline functions including front-end processing (FEP), cluster control (CC), and centralized protocol conversion (CPC) in a variety of railroad signal, communications, and network environments, commonly referred to as a packet switch, WCC, FPD, or RFPD depending on local use and function.
WCCMAINT:	Abbreviated form of WCC Maintenance, Siemens' windows-based utility for maintaining and troubleshooting ATCS networks, used strictly in conjunction with Aserver.
WCE:	WCC-Extended – This is a logical extension of WCC hardware (assembly number A53401 or A53430) that has a unique configuration that allows it to support multiple codelines on one serial port. This implementation is CTC system-specific. Contact Siemens for advice on whether this configuration is appropriate for a given CTC system.
WCM:	Wayside Communications Manager – Siemens assembly A53477, commonly referred to as a 6-port packet switch, which is primarily used as an Ethernet-to-ATCS interface in a field application where the communications transport to the office is IP-based instead of the more traditional RF-based transport.

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SECTION 1
INTRODUCTION

1 INTRODUCTION

WCCMaint Version

This manual is updated to reflect changes in WCCMaint through version 5.3.6.0, released Dec 14, 2012.

NOTE

NOTE

From an overview perspective, OCG and WCC (packet switch) equipment are functionally identical, and a reference to WCC generally also refers to OCG. The exception to this would be in reference to the configuration details of the unit.

1.1 WCCMaint Overview

The Siemens WCC Maintenance utility (WCCMaint.EXE) is a standalone executable program that provides the user with a multipurpose graphical interface to a network of Siemens Wayside Cluster Controllers (WCCs) for maintenance and troubleshooting of the ATCS (or combined ATCS/ARES) system. As a single-point user interface tool, WCCMaint has 5 main functions:

1. Configuration: Graphical display of all OCGs and WCCs on the network for centralized configuration management.
2. Software management: WCC executive software versions may be maintained and individual WCC firmware modules may be uploaded via WCCMaint.
3. System monitoring: Graphical display of ATCS RF codelines with coverage data for field locations.
4. Diagnostic tests: Individual test functions for ATCS-aware components (WCCs, OCGs, BCPs, WCPs, and Communications Manager).
5. Troubleshooting: message tracing and log retrieval from enabled components.

In addition, WCCMaint has access to diagnostic traffic statistics, extended tests (DC codelines, HD networks, etc.), and ATCS alarms (via ATCS messages from field locations).

WCCMaint interfaces to the ATCS network via Ethernet LAN connection to the Siemens ATCS Server (ASERVER.EXE). ASERVER is a dedicated ATCS packet router that manages diagnostic traffic in and out of the combined OCG/WCC back office network.

Because ASERVER maintains diagnostic connections to all OCG/WCCs on the network, WCCMaint only needs to connect to ASERVER to have access to any OCG or WCC in the back office, or any ATCS-aware component (base or wayside) in the field network. See Figure 1-1 for WCCMaint connectivity to a typical ATCS network.

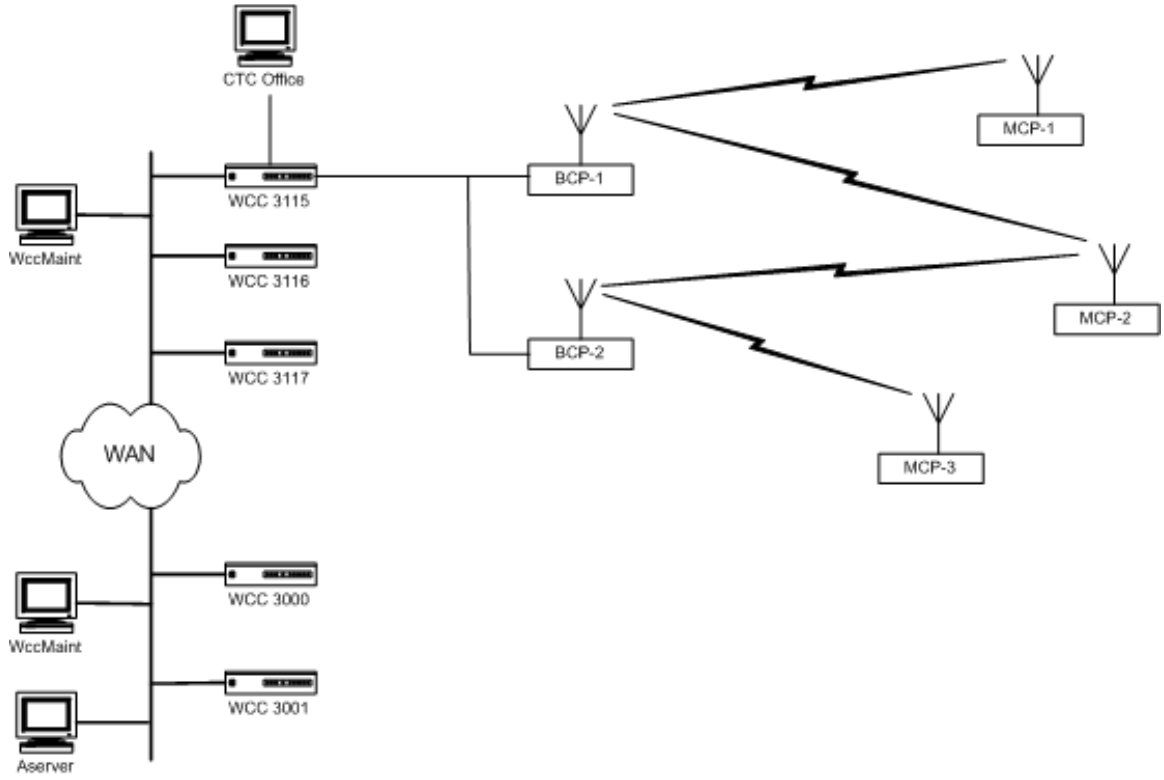

Figure 1-1 WCCMaint Connectivity

Figure 1-1 illustrates several points:

- Any number of WCCMaint sessions may connect to ASERVER (see Note) from any point on the network.
- ASERVER will connect to any properly configured WCC on the network regardless of LAN segmentation
- Any WCCMaint client, once connected to ASERVER, will be able to view any WCC, BCP, or WCP on the system (subject to security limitations imposed by the ASERVER administrator). For example, in the above illustration, the WCCMaint session can 'see' both BCPs and all MCPs on the line display for WCC 3115.

NOTE

NOTE

"Any number" is typically 4 or 5 and is sometimes as many as 25 or 30. Normally, ASERVER will not refuse a WCCMaint connection unless it is running in Secure Mode and the user is unable or unauthorized to log in. The number of secure logins is subject to licensing limitations. Refer to the ASERVER manual for details.

1.2 NMS Overview: WCCS, Aserver, OCG, and WCE

Understanding the structure of Siemens' NMS system and the role of its major components is critical to the successful planning and implementation of efficient ATCS network management. While a complete discussion of NMS systems design is beyond the scope of this manual, it is helpful to WCCMaint end-users to have an understanding of how NMS components work together to make WCCMaint the powerful tool that it is.

1.2.1 WCC

WCC stands for Wayside Cluster Controller and is more commonly referred to (somewhat inaccurately) as a packet switch. The WCC is the heart of the Siemens implementation of the ATCS system, and it manages all the code (control and indication) traffic to and from the office CTC computer and the field code units. The WCC takes control messages received from the office CTC (i.e. from the train dispatcher) and uses the available communications network to deliver these messages to the field code units reliably and efficiently. In the same way, inbound traffic (field indications) gathered by the communications network are managed by the WCC and delivered to the dispatcher's display console.

In terms of code (revenue) traffic to and from the field, WCCs only need to communicate with the office CTC computers and other networked WCCs to operate. However, a more robust system needs a way to centrally manage WCC configurations and software and to diagnose and troubleshoot problems in the system. For this reason, WCCs are internally configured to establish a connection to ASERVER, which is the gateway to the NMS network. Once this connection is established, WCCs regularly broadcast various messages which contain information about their status, routing tables, internal statistics, and other dynamic system statistics. WCCs will also respond to NMS requests for more specific information; for example, the current RF coverage data for a particular group on a codeline that the WCC controls. It is important to understand two points:

- A connection to ASERVER is not required for CTC systems to operate
- NMS message traffic, that is, traffic to and from ASERVER, is separate and not dependent on or related to code (CTC) traffic.

1.2.2 ASERVER

ASERVER is a shortened form of ATCS SERVER, which is the heart of Siemens' Network Management System (NMS). ASERVER is a centralized software application that continuously creates and maintains connections to office (WCC) equipment, creates logical connections from WCCMaint clients to these office WCCs, regulates all NMS traffic to and from the WCCs, and provides a common interface to any other office applications that need to communicate with the ATCS network.

ASERVER collects the broadcast messages from all WCCs and distributes them to connected WCCMaint clients and any connected office applications. In the outbound direction, ASERVER manages, coordinates, and routes messages sent toward the ATCS network (that is, addressed to any entity with an ATCS address – this could be a WCC, a field WCM, BCP, SEAR II, etc) from any of its connected clients.

1.2.3 OCG

OCG is an acronym for Office Communications Gateway. OCG is a software version of the traditional WCC and is designed as a Microsoft Windows-based application that runs on a standard PC workstation. OCG was designed as a software alternative to WCC hardware in situations where no demand for serial connectivity exists; therefore, all OCG communications are LAN-based. Because OCG carries an inherent advantage over WCC hardware in terms of memory resources and communications speed, it is designed to handle up to 32 LCT (codeline) or HUB processes concurrently, where WCC hardware is limited as a maximum to 3 such processes. Except for their expanded FEP capability, OCGs are functionally identical to WCCs.

Due to the design of the WCC-ASERVER LAN interface, only one OCG application may run on a given workstation. It is possible to configure OCG to run on the same machine as ASERVER, but this configuration is not recommended for normal use. Please contact Siemens Engineering for more details about this configuration.

1.2.4 WCE

A WCE is a WCC that has extended functionality in terms of the number of codelines it is configured to handle (WCE = Extended WCC). Normal WCCs can handle up to three codelines (LCTs) maximum and their display icon in WCCMaint is sized to display at most three codeline numbers.

WCEs can handle up to 12 codelines. Even though they are physically identical to WCCs, they are not displayed with WCCs because of their higher codeline display capacity. For this reason, they are grouped with OCGs on the OCG display tab.

Note that WCE implementation is CTC SPECIFIC; that is, some office CTC systems can support multiple codelines on one serial port connection. In this case, the WCE can be configured to assign up to 4 codeline numbers to a serial connection. Contact Siemens Engineering for specifics concerning WCE implementation.

SECTION 2
SETTING UP WCCMAINT

2 SETTING UP WCCMAINT

2.1 Files Required to Run WCCMaint

WCCMaint is distributed as a standalone Windows executable file (.EXE) and therefore requires no setup. Please note that both ASERVER and WCCMAINT are supported only on Windows 2000 or later operating systems. A separate settings file, **SAFETRAN.INI**, contains options for various WccMaint functions and storage for static application settings. In addition, there are several support files (DLL extension) that provide various support functions like WCC configuration editing and vendor-specific diagnostics. As new capabilities are added to WCCMaint, many of these upgrades will be distributed as DLL files so that they can be updated without requiring updates to WCCMaint itself. Table 2-1 lists currently supported DLL files.

Table 2-1 Currently Supported DLL Files

DLL NAME	DLL FUNCTION
WccConfig.DLL	WCC configuration editor
bOcgConfig.DLL	OCG configuration editor (BNSF)
cOcgConfig.DLL	OCG configuration editor (CSX)
Nmsp_RRR.dll	Personality module (per railroad or generic)
VPImgr.DLL	VPI log retrieval utility

NOTE

NOTE

If any supported DLL file is missing or not found, WCCMaint will still run and operate normally, except that when an operation is attempted that requires the DLL, the function will either be disabled or a message will appear stating that the function is unavailable (the name of the missing DLL will be supplied).

2.2 File Placement

Table 2-2 shows the preferred file locations for modern (Windows 7 and later) OS versions. In general, DLL files may be placed in C:\Windows, but if desired, DLLs may also be co-located with the EXE file. Siemens no longer recommends placing user files in the **Program Files** or **Program Files (x86)** folders to avoid issues with user permissions or other Windows constraints.

Table 2-2 Recommended File Structure

PATH	FILES
C:\Siemens\	WCCMaint.EXE, SAFETRAN.INI
C:\Siemens\Configs\	Configuration (PCF) files
C:\WINDOWS\	All DLL files

2.3 Centralizing File Management

If centralized management of WCCMaint distribution files is desired, WCCMaint.EXE may be placed on a network drive, and anyone on the network with the appropriate shortcut can execute a copy of WCCMaint on their machine. DLL files may also be centrally located and used by all WCCMaint clients, but in this case, each user workstation must be prepared as follows:

- A drive letter must be mapped to the DLL's network location
- The mapped drive must be added to the PATH environment variable
- SAFETRAN.INI must be updated to reflect the DLL mapping – see 'Configuring WCCMaint with SAFETRAN.INI' 2.5

NOTE

NOTE

WCCMaint searches directories for DLL files in the order the paths are listed in the PATH environment variable, using the first matching DLL found. Therefore, it is important to make sure that, if there are other copies of the same DLL (older versions, for example) on the workstation, they are NOT located in directories pointed to by the PATH string. Duplicate DLL files may also be renamed (WCCCONFIG_OLD.DLL) to avoid this situation.

2.4 Network Considerations

Workstations running WCCMaint must have a properly configured Ethernet card established for the local area network to which they will connect. ASERVER must be 'visible' to the workstation (via common subnet or via gateway for WANs) for a connection to be established. Pinging the ASERVER IP address successfully is the most common way to assure LAN connectivity for WCCMaint (subject to administrative or firewall restrictions – contact your LAN administrator for this information).

WCCMaint connects to Aserver via a TCP Client connection on port 5390. UDP connections are deprecated. The user should determine whether the network will allow this port connection (firewall and router configurations may prohibit this). Contact your network administrator if WccMaint is unable to connect to the server.

2.5 Configuring WCCMaint with Safetran.INI

SAFETRAN.INI is a text file that contains configuration data for many Siemens applications, including ASERVER and WCCMaint. Options specific to WCCMaint are located in a section of this file delimited by a header line (**[WCCMaint]**). This section of the INI file may be modified in a text editor to enable or disable certain program variables.

Due to OS constraints described above, it is suggested that SAFETRAN.INI be located in the same folder as **WccMaint.**exe. It is also strongly recommended that only one copy of SAFETRAN.INI be on any given workstation. Because WCCMaint dynamically reads and writes to this file, each working copy of WCCMaint needs its own INI file, so this file should not be located on a network drive.

Most of the entries in the WCCMaint section of the INI file are manipulated by WCCMaint itself and should not be modified. Currently, available program options for SAFETRAN.INI are shown in the following listing:

```
=== begin SAFETRAN.INI listing ===
    [WccMaint]
    ;
    ;  user-configurable options
    ;
    UseDLL_1=c:\windows\nmsp_csx.dll
    UseDLL_2=F:\windows\cocgconfig.dll
    WcmTimeout=1
    WccDropoutTime=90
    ExecUploadTimeout=300
    TerminalServices=FALSE
    FailColor=Red
    PatchBinaries=TRUE
    FastRegionScan=TRUE
    ;
    ; The remainder of this section contains program data
    ; that is managed  by WccMaint and should not
    ; be modified.
    ;
    ClientNode=1
    AudibleAlarm=0
    GlobalMask=0
    ServerName=Aserver
    ServerIPAddress=192.168.1.121
    ExecRootDir=C:\A53401\CSX GOLDDISK\
    ConfigRootDir=C:\A53401\
    ConnectionType=TCP
    AutoConnect=0
    ServerSpeed=0
```

```
ExecRootName=CSX GOLD
SystemName_1=Aserver
SystemIP_1=192.168.1.121
SystemERoot_1=C:\A53401\CSX GOLDDISK\
SystemCRoot_1=C:\A53401\
SystemSpeed_1=0
SystemTCP_1=1
=== end SAFETRAN.INI listing ===
```

NOTE

NOTE

All INI file entries consist of a key, an equals sign, and a variable parameter. Keys are strictly case-sensitive, and parameters generally are not. In the line “UseDLL=vpimgr”, for example, the key “UseDLL” Is case-sensitive, and the option will be ignored otherwise.

User-configurable SAFETRAN.INI options are as follows:

- **UseDLL**_1=z:\wccconfig.dll
- **UseDLL**_2=nmsp_bnsf
- **UseDLL**_3=vpimgr

This option instructs WCCMaint to load a particular support DLL. The ‘**.DLL**’ extension is optional and may be used for clarity. Line 3 instructs WCCMaint to look for a local copy of the VPI manager (VPIMGR.DLL). Do not use this switch for the OCG configuration editor – see **OcgConfigDllName** below.

NOTE

NOTE

WCCMaint assumes the existence of a WCC configuration editor (WCCCONFIG.DLL) in the PATH environment string of the local host. All other support DLLs must be explicitly listed with the **UseDLL** directive; otherwise, the functions provided by these DLLs will not be available. If WCCCONFIG.DLL is to be used from a network drive, the **UseDLL_x** switch must be used. See the discussion on ‘File Placement’ above.

- **OcgConfigDllName=bocgconfig.dll**

  Specifies which version of OCG and its configuration editor is used. BNSF and MRL use bocgconfig.dll (for ARES handling) and all other roads use cocgconfig.dll.

- **MaxOcgLct** = 6

  Specifies the maximum number of LCTs expected to be displayed on any OCG panel. The default is 32. This switch effectively sets the vertical height of the OCG panel, allowing more OCGs to be displayed per column. Row size is fixed at 8.

- **LogDir**=LOGS

  This specifies a folder in which log files are placed. This folder is created under the configuration root folder, which defaults to **C:\siemens**. **LogDir** defaults to NULL, which means logs are placed in the configuration root folder.

- **WcmTimeout**=60

  When WCMs are displayed on the WCM tab, they eventually timeout and disappear. Any WCM will remain on the screen as long as the user is interacting with it, but once it has been inactive for the time period specified by this parameter, it will disappear. The range for this option is 60 – 300 seconds (maximum 5 minutes); default value is 120 seconds.

- **WccDropoutTime**=90

  This option specifies how long (in seconds) WCCMaint will wait for a message from a WCC before it times it out, turning it a different color to indicate it is unavailable. The range for this option is 75 – 120 seconds; default value is 75 seconds.

- **ExecUploadTimeout**=300

  This is the retry timer for executive uploads. The upload session will retry a file upload when this timer has expired. This value may be set longer than the default 60 seconds for slow (eg satellite) links. Range is 60 – 300 seconds.

- **WcmRangeMin**=30

  The default range for the WCM node display is set using this option together with **WcmRangeMax.** When this range is defined in this way, WCCMaint will send the node range request to Aserver on startup, and WCMs in this range will be displayed on the WCM tab.

- **TerminalServices**=TRUE

  This switch enables or disables Terminal Services mode for WCCMaint. Use this setting only when WCCMaint is administered as a Terminal Services client. See Section 2.6 “Terminal Services Mode” for details. This option can only be set TRUE or FALSE; if omitted it defaults to FALSE.

- **LineDisplaysocketText**=TMDS

  This option changes the text displayed on the **NGD** panel on a line display (see Section 4.2.6). This panel reflects the state of the socket connection back to the CTC office. The default text is **NGD**.

- **PatchBinaries**=TRUE

  This option is used in conjunction with the PSV Maintenance tool to patch binary WCC configuration (PCF) files. This function has been **deprecated**.

  This option is used in conjunction with the PSV Maintenance tool to patch binary WCC configuration (PCF) files. This function has been **deprecated**.

- **FastRegionScan**=TRUE

  Default timers for line displays control the frequency of the requests for updated RF coverage for each group on the display. As a default, each group's coverage data is requested once per minute at most. Under some circumstances, it is desirable to request coverage data at the maximum allowable rate (once per second). The FastRegionScan switch enables the faster group scanning rate. This option is global for all codelines and cannot be changed while WCCMaint is running. If omitted, this option defaults to FALSE.

2.6 Terminal Services Mode

Terminal Services is a Windows server emulation where client workstations run remote applications (WCCMaint.EXE in this case) on the server in a virtual desktop environment. All processing of application software and system resources are handled on the server, with the workstation receiving only the graphical interface as though it were running the application itself. If Windows Terminal Services is to be used, Terminal Services Mode must be invoked within WCCMaint by using the **TerminalServices** switch in SAFETRAN.INI described above. A complete discussion of using Windows Terminal Services as a deployment method for WCCMaint is beyond the scope of this manual; please contact Siemens for more information.

2.7 Connecting to ASERVER

Once WCCMaint is installed and configured, it is ready to connect to ASERVER. WCCMaint supports multiple server definitions to allow for main and standby ASERVER instances. All server connection data is managed by the Server Connection Manager within WccMaint and stored in SAFETRAN.INI. Section 3 illustrates the use of the Connection Manager to create server connections.

2.8 Personality modules

Personality modules are DLLs that contain customized menu settings, options, etc. that are specific to each customer. Personality Modules are used to isolate features that are meaningful to one customer but have no use to any others. WccMaint features that are specific to personality modules are not visible unless the module is present. WCCMaint will operate normally without any personality modules, but some functions may be missing as a result. There are no common or essential features in WCCMaint that are disabled by not having a personality module supplied.

Personality modules are placed in the Windows system folder and are enabled in WCCMaint by using the INI **UseDLL** switch as described above.

SECTION 3
MANAGING SERVER CONNECTIONS & WCC FIRMWARE VERSIONS

3 MANAGING SERVER CONNECTIONS & WCC FIRMWARE VERSIONS

In its initial state, WCCMaint has no information about connections to ASERVER. The Connection Manager is used to enter information about server connections. As many as 16 server connections may be defined.

This section will demonstrate the creation of three server connections for a new copy of WCCMaint. Note that server connection information is kept in SAFETRAN.INI and that some WCCMaint installations do not allow writing to this file (clients running under terminal services, for example). In this case, the server connection information may be viewed but not modified.

On the main menu bar, click 'Server'. This will drop down a list of available servers. In this case, there are no servers defined. Click '**Manage Servers…**' (Figure 3-1) to open the Connection Manager (Figure 3-2).

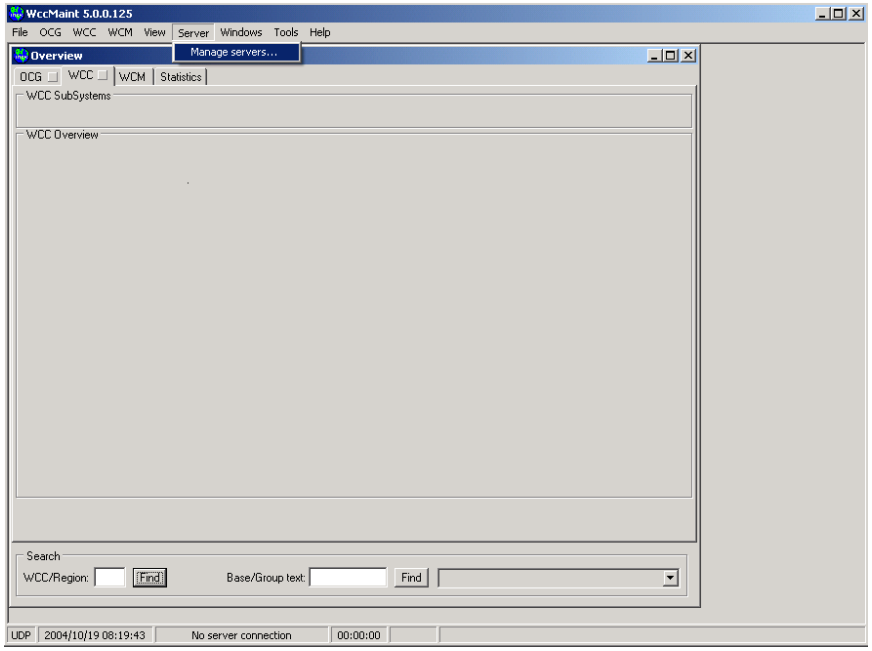

Figure 3-1 Opening the Server Connection Manager

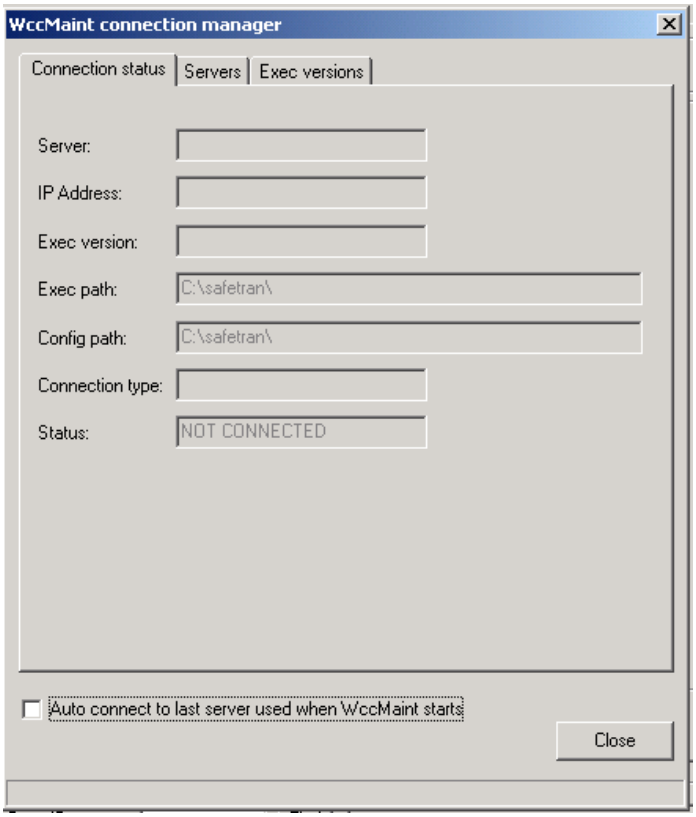

Figure 3-2 Server Connection Manager

The connection manager has three tabs:

Connection status: a read-only display of default connections that WCCMaint will use on startup.

Servers: Available servers are displayed, added, and modified from this tab.

Exec Versions: WCC executive firmware versions are displayed, added, or modified on this tab.

To add the first server connection click the ‘Servers’ tab.

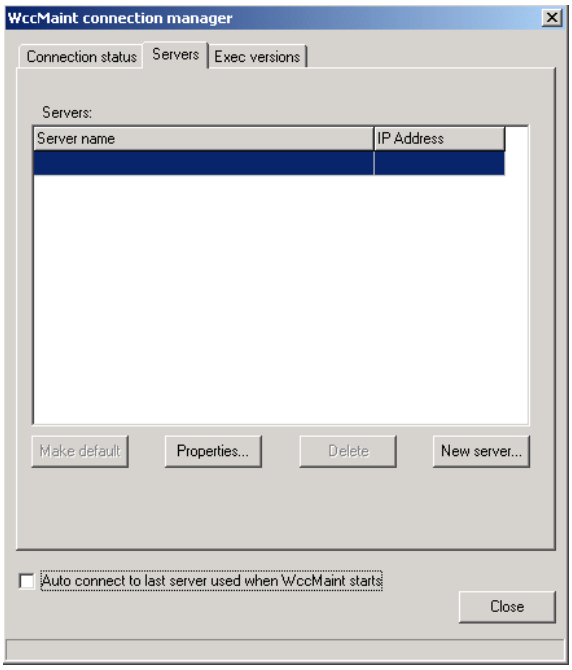

Figure 3-3 Creating the First Server Connection

Click ‘**New server…**’ to open the server properties editor.

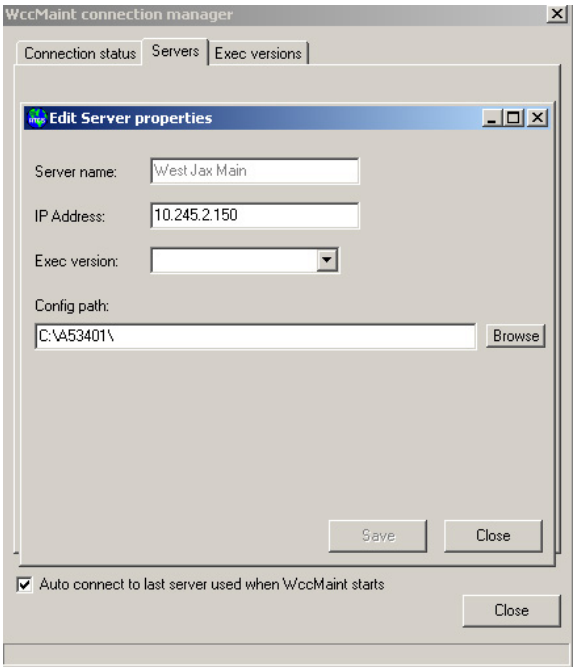

Figure 3-4 Adding Server Data

Enter the desired server parameters as shown in Figure 3-4.

- **Server name** may be any meaningful tag for this connection. Spaces are allowed, but avoid using punctuation.
- **IP Address** may be obtained from the ASERVER administrator.
- **Exec version** is a tag for a specific set of WCC firmware modules. This can only be selected from a list of defined versions, which is done in the next step. Leave this blank for now.
- **Config path** is the directory where WCC configuration (.PCF) files are stored. Type the desired path or click the 'Browse' button to locate the directory.

Click **Save** to store each server definition. Define as many connections as desired. Click **Close** to close the editor.

Three server connections have been defined in this example. To view the properties of any connection, highlight it and click **Properties** to open the editor (Figure 3-5).

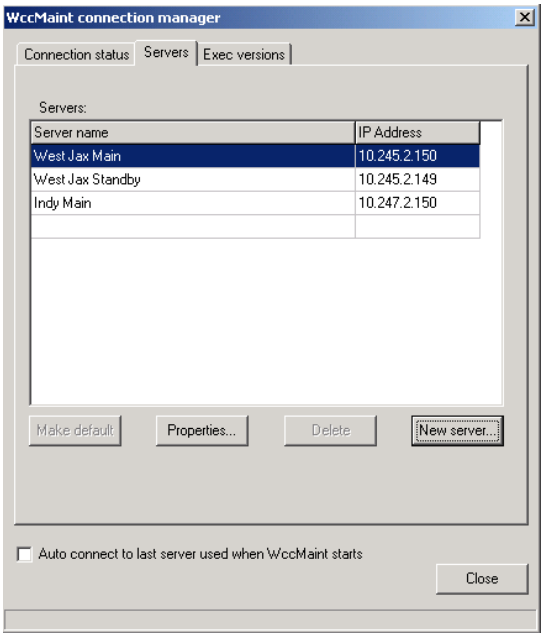

Figure 3-5 Three Server Connection Defined

Delete may be used to delete an unwanted connection.

Make default will load the selected server connection into SAFETRAN.INI so WCCMaint will load it on startup (subject to file write permissions).

Executive firmware versions are defined on the **Exec versions** tab (Figure 3-6).

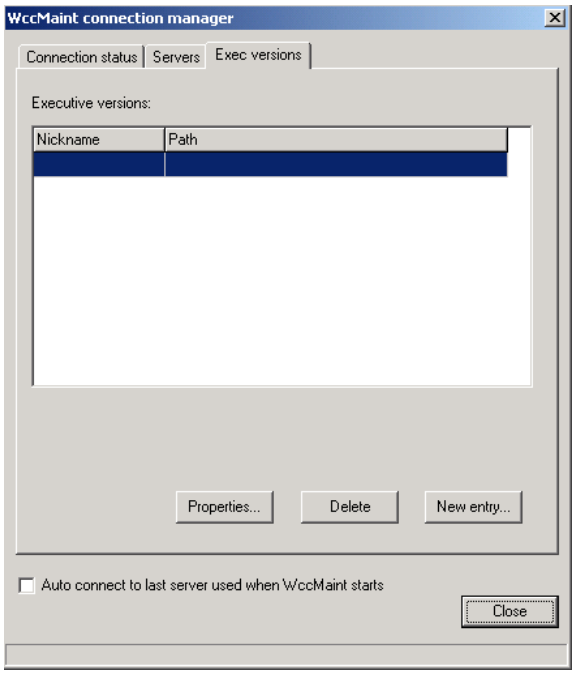

Figure 3-6 Executive Versions Tab

Click **New Entry…** to create a new version definition; the firmware properties editor will appear.

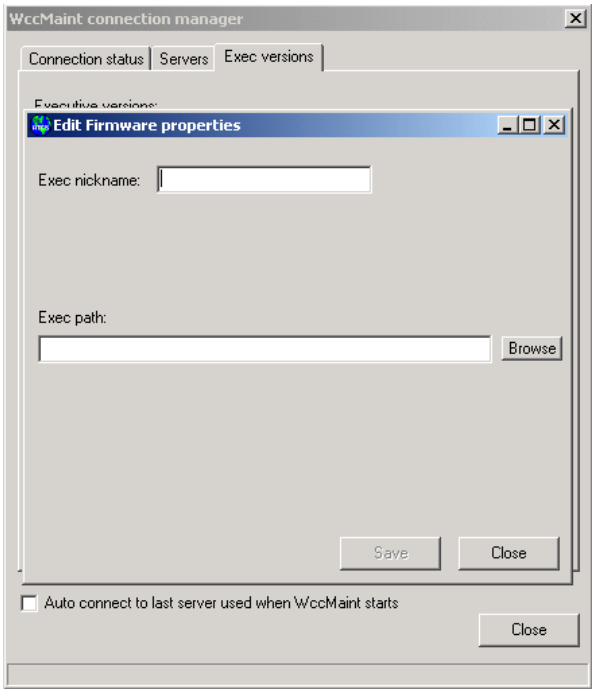

Figure 3-7 Adding Executive Versions

Exec nickname is any meaningful tag for a specific version, such as 'GOLD DISK' or 'STANDARD VERSION'. Using any punctuation is not recommended, and uppercase is forced.

Exec path is the directory where the ROOT of the PSV release is located. This is the directory to which the PSV ZIP file is unzipped. (WCC executive firmware modules are released in ZIP file format; the release file is named PSVxxx.ZIP).

Click **Save** to store as many Exec versions as necessary (up to 16). Click **Close** to close the editor.

Three exec versions have been defined in the example shown in Figure 3-8.

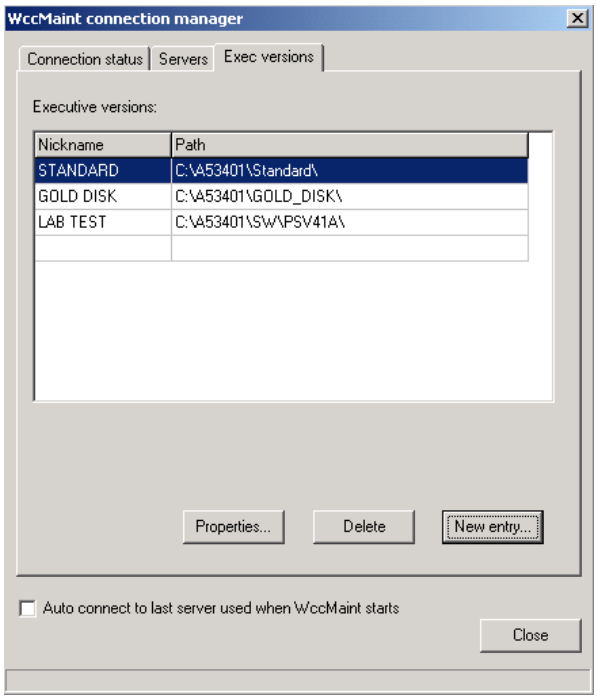

Figure 3-8 Three Executive Versions Defined

Once exec versions are defined, an exec version may be assigned to a server connection if desired. The same exec version may be assigned to any number of server connections.

From the **Servers** tab, select an exec version from the dropdown list (Figure 3-9) and click **Save**.

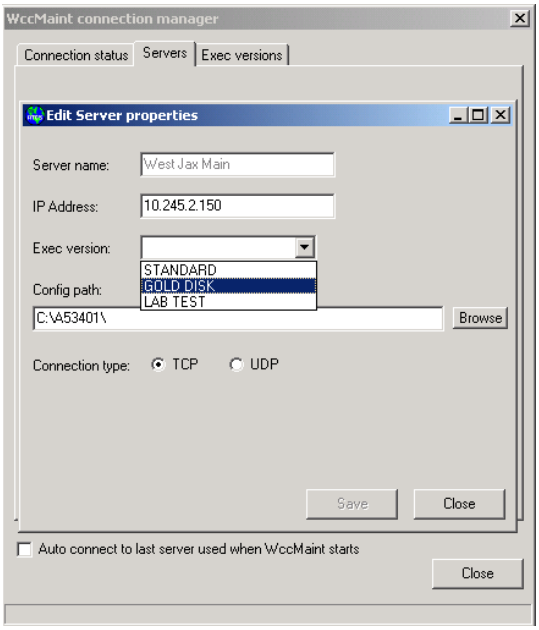

Figure 3-9 Adding Exec Version Tag to a Server Connection

Updated default connection status is now displayed on the **Connection status** tab (Figure 3-10).

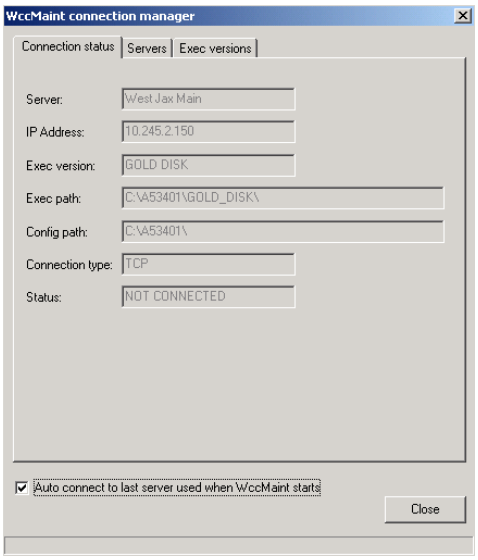

Figure 3-10 Updated Connection Status

WCCMaint will automatically attempt to connect to the default server on startup if the **Auto connect** checkbox is checked as shown in Figure 3-10.

Now that server connections have been defined, WCCMaint is ready to connect. Click **Close** to close the Connection Manager.

To connect to the desired ASERVER, from the main menu, click **Server** (Figure 3-11).

The top line in the popup menu will allow you to connect to the default server or disconnect if it is already connected.

At the bottom of the popup menu is a list of defined servers. Note that the default server is checked. This is the server connection WCCMaint will assume you want to use whenever you start the program.

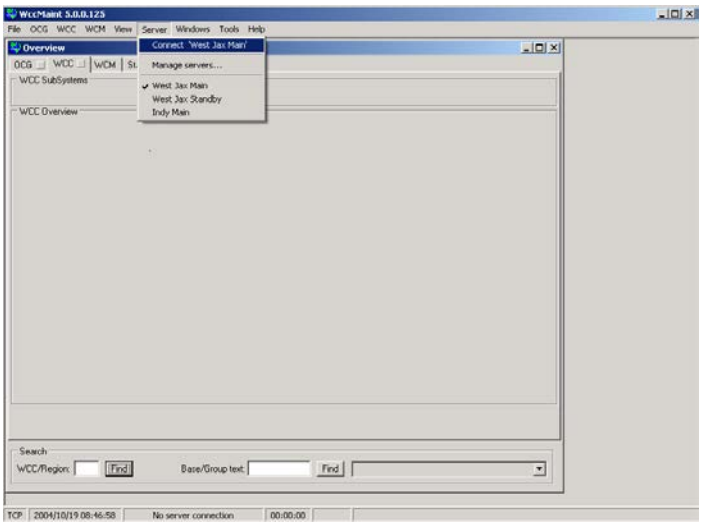

Figure 3-11 Connecting to the Default Server

To connect to a different server, simply click on the desired connection. WCCMaint will close the existing connection, set defaults to the selected connection, pause, and then attempt to connect to the selected server.

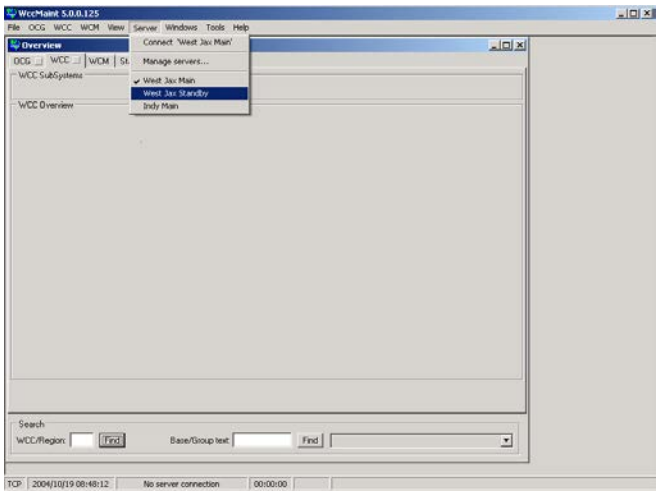

Figure 3-12 Connecting to an Alternate Server

If the connected ASERVER is running in secure mode, WCCMaint will invoke security and display a submenu of security-related options as shown in Figure 3-13.

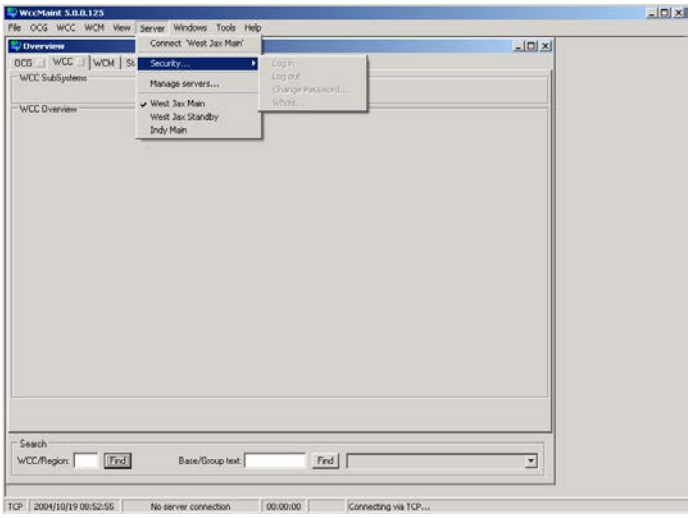

Figure 3-13 Security Options

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SECTION 4
WCCMAINT OPERATION

4 WCCMAINT OPERATION

4.1 WCCMaint Overview Screen

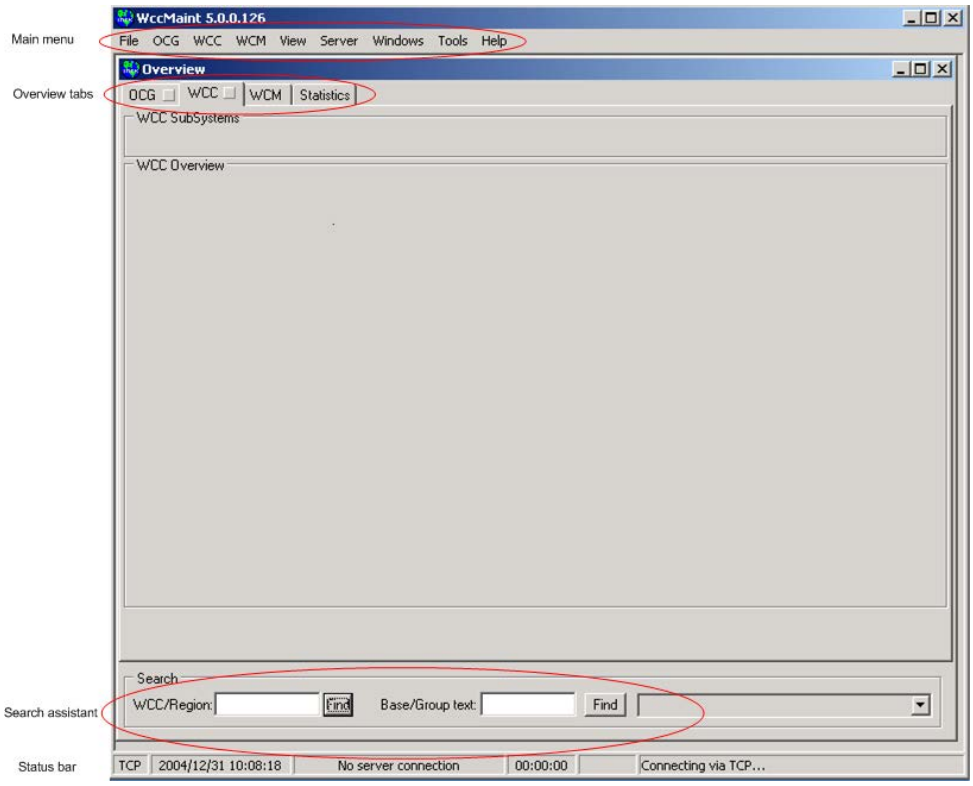

Figure 4-1 Overview Screen

This is the default opening screen for WCCMaint (no connection to ASERVER has been made). At the top, the caption bar displays the WCCMaint software version; when connected to the server, connection information is also displayed here. The components of the main form are:

- **Main menu**: Top-level menu for accessing all WCCMaint functions
- **Overview tabs**: All common items are grouped together on these main tabs.
- **Search assistant**: Allows for many types of search functions to enable the user to identify specific items that may not be visible on the current tab.

- **Status bar**: Displays connection information:
  - Connection type (always TCP)
  - Current date/time
  - Connected server, if any
  - Running time
  - Alarm status
  - Status messages

4.2 Navigating WCCMaint

4.2.1 Overview Tabs

A typical opening display is shown in Figure 4-2:

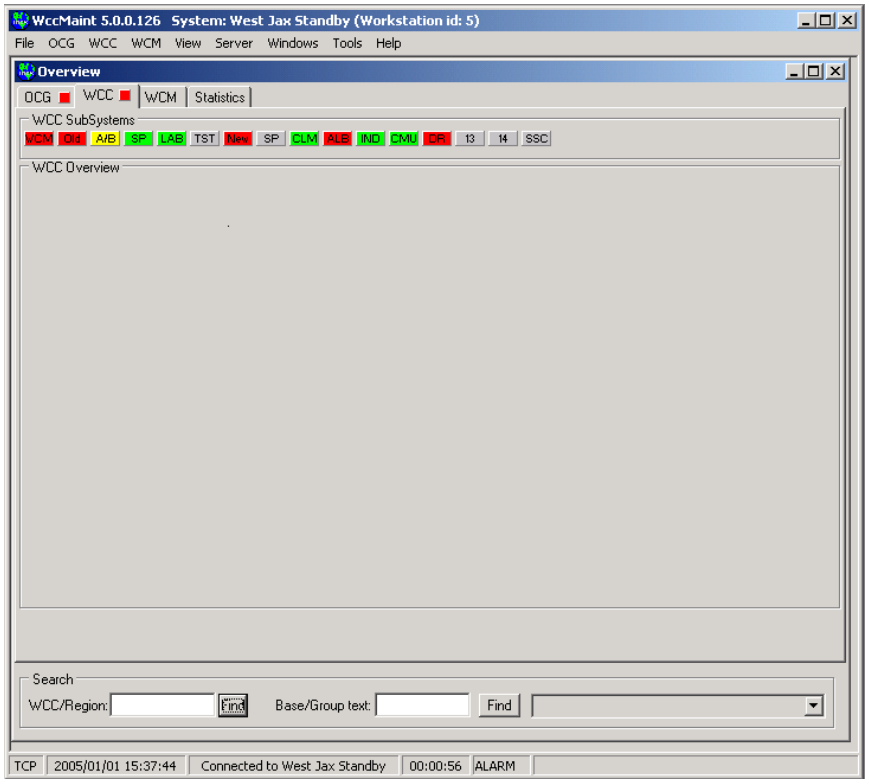

Figure 4-2 WCCMaint Opening Display with WCC Tab Selected

Of the four main overview tabs, the WCC tab defaults to being selected. Note that the OCG and WCC tabs have color panels on them (both red). The colors on these tabs are meant to draw your attention to system problems and lead you to them. Following colors to expose individual problems is covered in detail in section 4.2.5.

The overview tabs are meant to separate all the hardware into logical groupings for easier viewing. OCGs and WCE devices are displayed on the OCG tab, and all WCCs will be found on the WCC tab.

The four main tabs are displayed as follows:

4.2.1.1 OCG Tab

The OCG tab (Figure 4-3) displays both OCGs and WCEs organized into clusters, with up to 12 OCGs (or WCEs) per cluster. The display will accommodate up to 12 clusters.

Figure 4-3 OCG Overview Tab

OCG panels can display up to 32 codelines each. The OCG panel has a default height to accommodate 4 rows of FEPs; if it is desired to have more OCGs per column, there is an INI setting that will make this panel shorter. In this way, if OCGs are to be lightly loaded, the panel height can be set to accommodate 1 row of 8 FEPS. See section 2.

4.2.1.2 WCC Tab

The WCC tab (Figure 4-4) displays all the WCCs on the network organized into subsystems (clusters), with up to 5 columns of 16 WCCs per cluster. The display will accommodate up to 16 subsystems (up to 1024 WCCs).

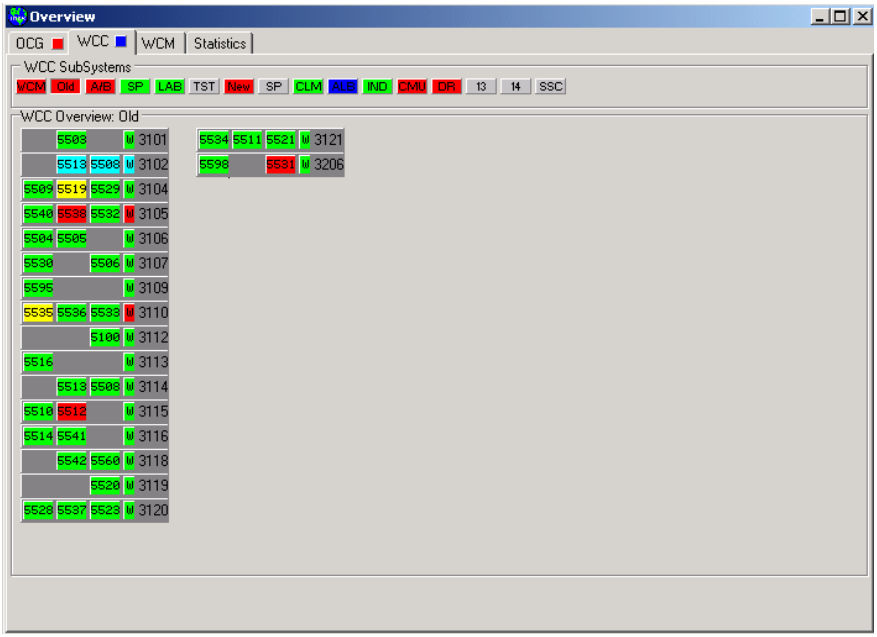

Figure 4-4 WCC Overview Tab

Cluster tabs have user-definable labels (up to 3 characters) to help identify the grouping. Typically, this is a shortened form of the railroad division.

Cluster tab labels for the WCC and OCG overviews are administered in ASERVER. Consult the ASERVER manual for modifying cluster tab labels.

4.2.1.3 WCM Tab

The WCM tab (Figure 4-5) is used to display WCMs as office equipment. Because the WCM is a field device that has both a type 7 (field) and type 2 (office), address associated with it, it can be represented in WCCMaint in the same way that WCCs are displayed.

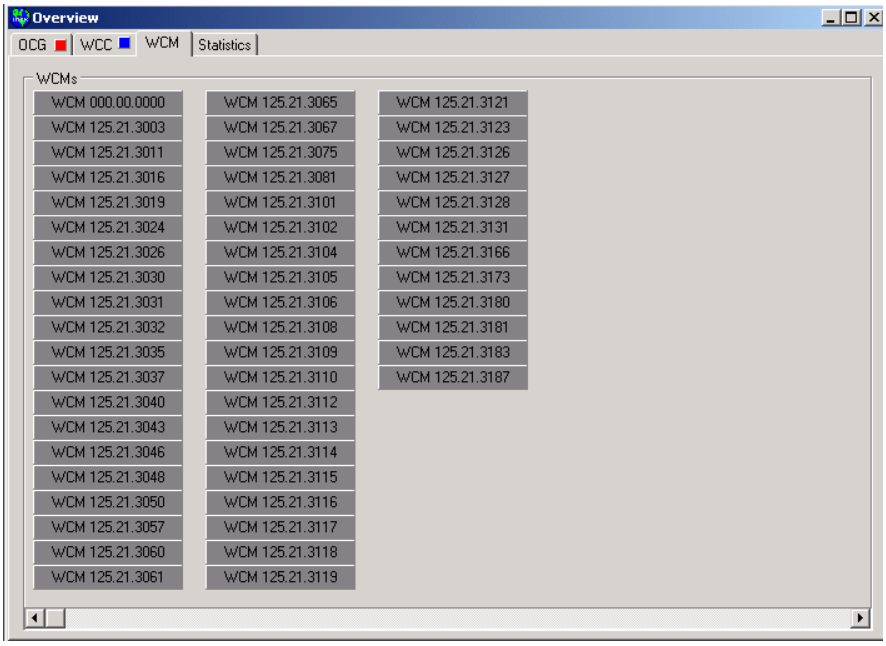

Figure 4-5 WCM Overview Tab

There are times when it may be convenient to temporarily display a group of WCMs on this tab to load configuration or software changes. WCMS are not normally displayed on this tab for routine diagnostics because they are individually accessible on the codeline display to which they belong. Once a group of WCMs are brought up on this tab, they will eventually time out and disappear because it is not practical to manage the display of up to thousands of WCMS. WCM functions are easily accessed from the line display (see Section 4.2.6).

4.2.1.4 Statistics Tab

The Statistics tab (Figure 4-6) displays traffic statistics for several different types of messages (broadcasts, Layer3, Layer4, and NMS) and error counts for all WCCs on the network. These statistics are grouped by WCC clusters, so that high traffic or error counts may be traced to a specific WCC or group of WCCs.

NOTE

NOTE

OCG devices are not included in this summary.

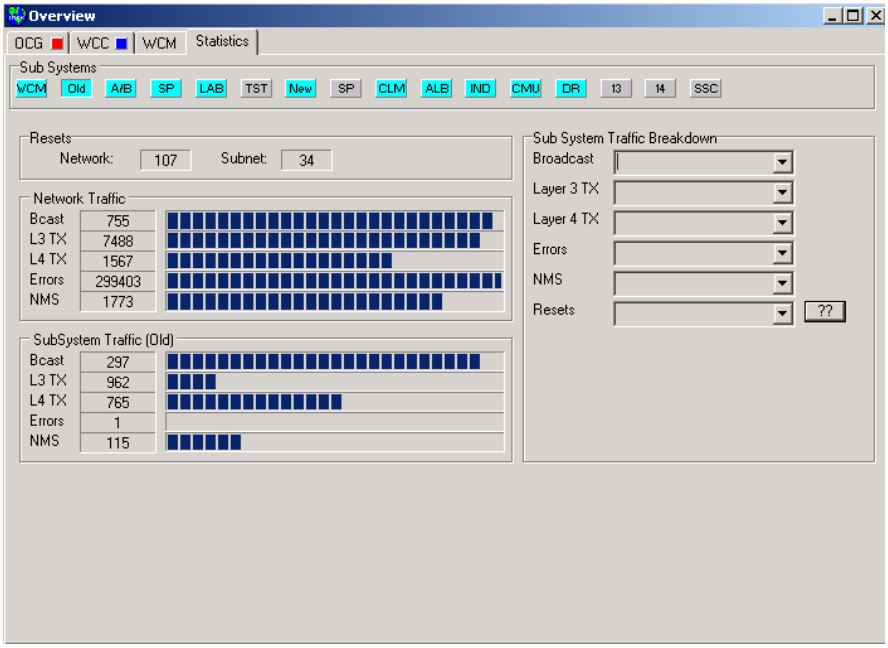

Figure 4-6 Statistics Tab

4.2.2 WCC displays

Once an overview tab is selected, groupings of WCCs are viewed by clicking on the cluster tabs. Clicking on the 'OLD' cluster shows 18 WCCs (Figure 4-7):

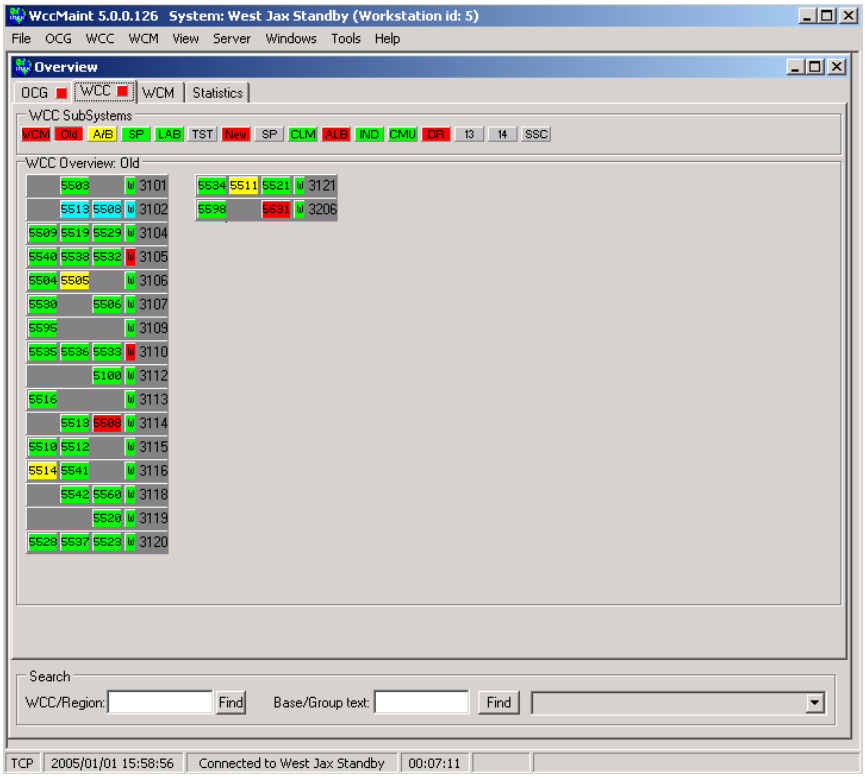

Figure 4-7 WCC Cluster Display

WCC panels hold up to three codeline regions and a WAN status indicator:

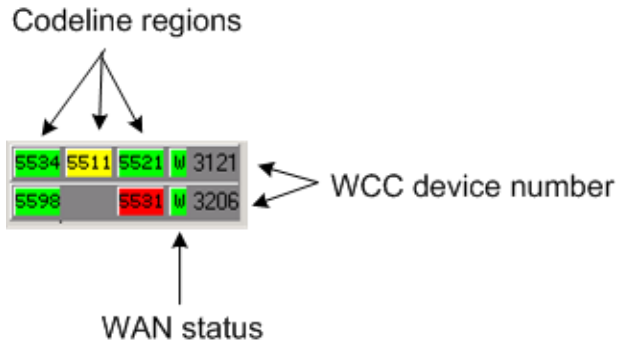

Figure 4-8 WCC Panels

4.2.3 OCG Displays

Clicking on the main OCG tab will bring up the system OCG display (Figure 4-9).

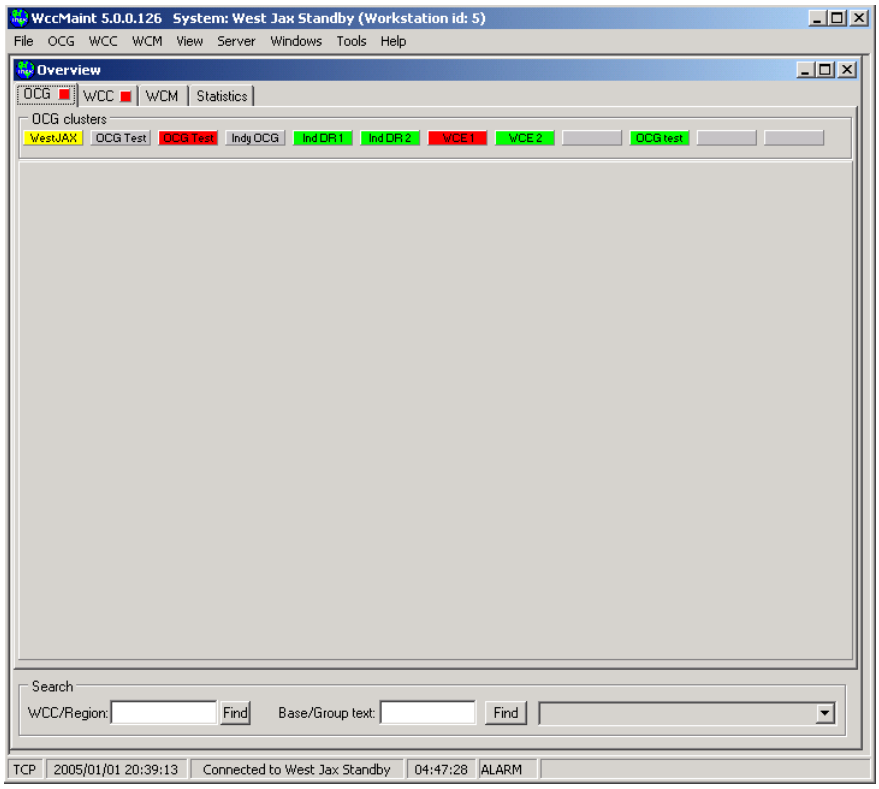

Figure 4-9 OCG Overview Tab

This page has 12 cluster tabs with assignable labels, each of which will display a sheet of up to 12 OCGs (or WCEs).

As shown in Figure 4-10, an OCG (or WCE) can run up to 32 HUB or LCT processes.

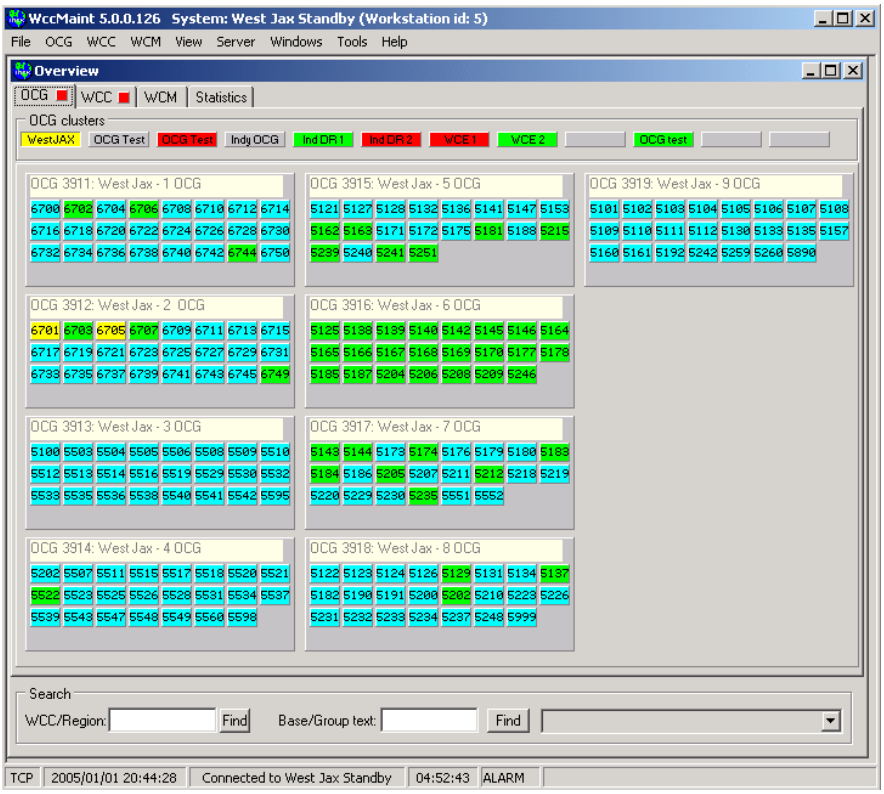

Figure 4-10 OCG Cluster Display

OCGs are functionally identical to WCCs, so the HUB or LCT region panels will open their respective line displays in the same way.

4.2.4 Line Displays

Clicking on a codeline region opens the line display; line 5521 is shown in Figure 4-11.

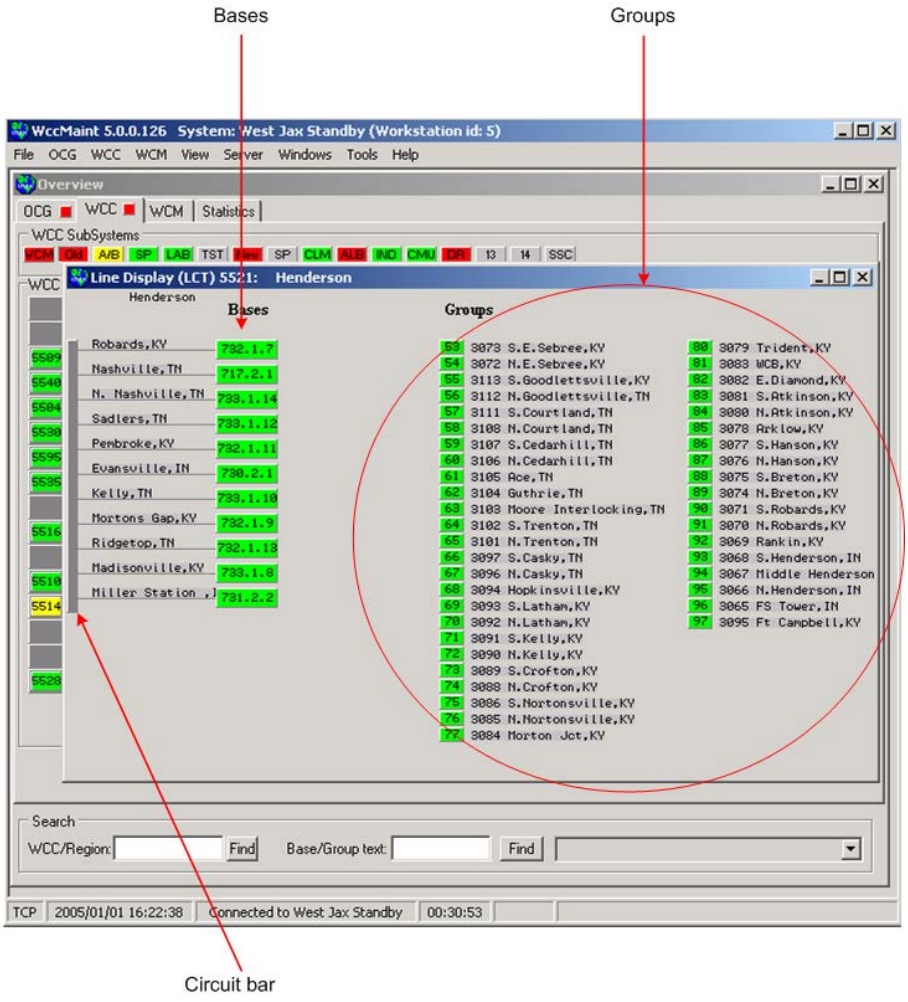

Figure 4-11 RF Codeline Display (LCT)

The line display will show up to five columns of groups with 25 groups to a column. Bases are shown in a single column. Scrollbars will appear on the line display form when groups or bases are outside the viewable area.

The circuit bar at the left is an anchor for a region popup menu, which allows region-wide functions to be performed (see Section 4.2.6).

Typical LCT and HUB display codelines are shown in Figure 4-12:

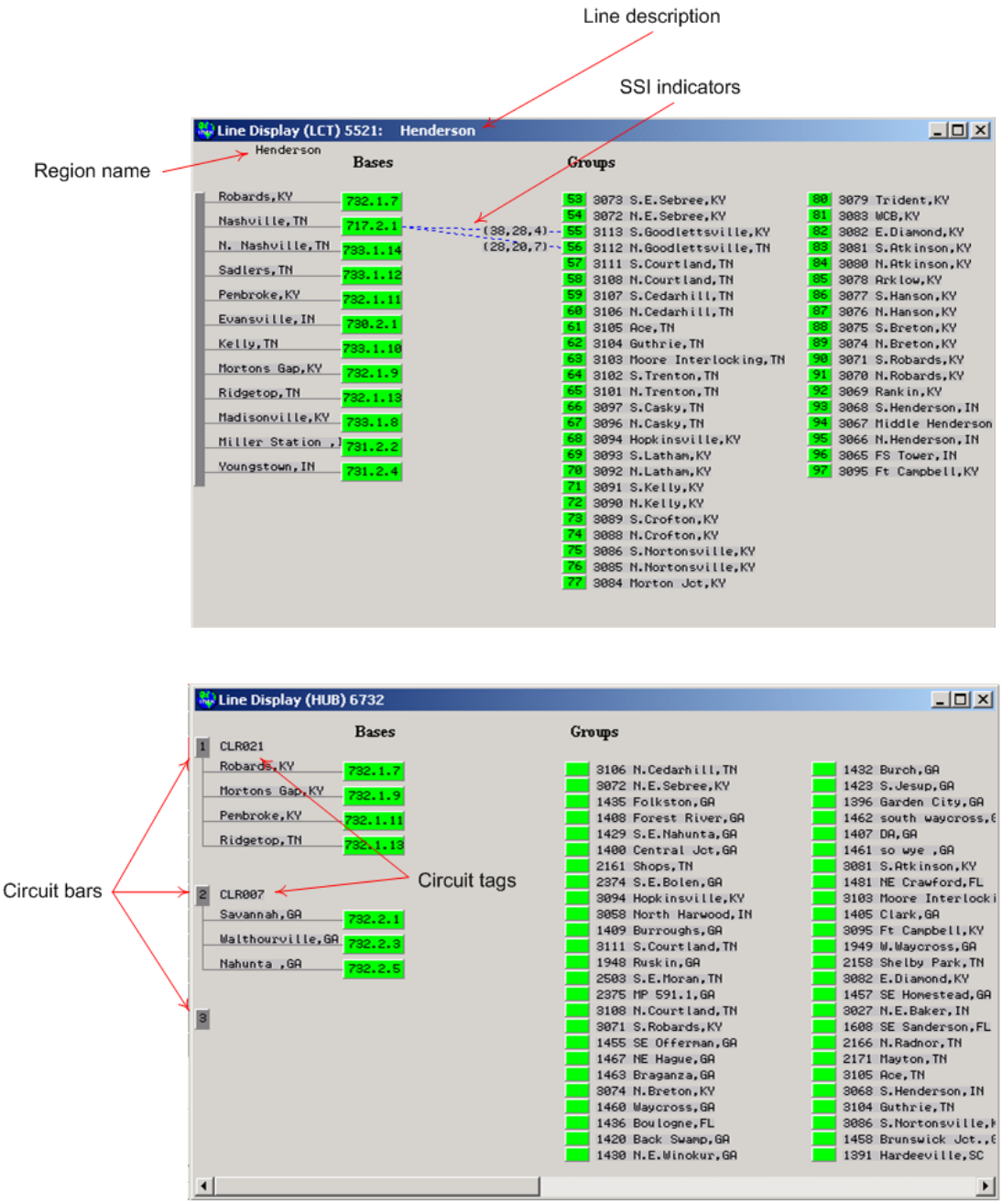

Figure 4-12 HUB And LCT Line Displays

On the LCT, the **line description** is displayed on the line display caption bar, and the **region name** is displayed below the caption bar. For the HUB, note that there are three **circuit bars**. Individual text **tags** may be assigned to these circuits, and they are displayed next to each circuit bar.

SSI indicators display lines of RF coverage between bases and groups. The indicators shown above are the result of clicking on the Nashville base. Clicking on any base draws coverage lines to all the groups it is receiving traffic from; clicking on any group displays coverage lines to every base that the group can talk to.

For a complete discussion of RF coverage see Appendix D, 'Managing coverage for RF groups'.

HUBs and LCTs: A region can either be a HUB or an LCT and although their line displays are similar, there are important functional differences between a HUB and an LCT. One obvious difference is seen in Figure 4-12. On the LCT display, individual group boxes are labeled with the group number, whereas on the HUB display, they are blank. This is because, on an LCT display, all groups belong to the same codeline by definition, and therefore each one is unique. On a hub, groups are displayed from many codelines, so there may be several groups with the same group number on the display. To avoid confusion, no group numbers are displayed on HUB line displays. Section 4.3 describes various options for sorting and naming line display objects.

LCT: An LCT is a Line Control Task and is a software process that runs on a WCC (or OCG). An LCT can be thought of as a collection of groups. The LCT is responsible for maintaining communications sessions with each group and controls sequence numbers, RF acknowledgments, and base switching for each group. It also interfaces to the office equipment (NGD/CADS) and passes control and indication messages to and from the field. LCT regions are always numbered in the 5000-5999 range.

HUB: a HUB is a FEPHUB process that runs on a WCC (or OCG). A HUB can be thought of as a collection of bases. HUBs communicate with bases (either via wireline connections or over IP networks) to establish communications paths to groups in the field. The HUB also establishes a link with any LCT that controls any group on the HUB display. The HUB has no contact with any CTC office. When a hub receives a group indication from one of its bases, it delivers it to the appropriate LCT, which processes it and sends it to the CTC office. The function of a HUB is to provide one or more communications paths for LCTs to send messages to wayside groups. HUB regions are always numbered in the 6000-6999 range.

Base IDs: All bases displayed in WCCMaint have an identifying number assigned. A base identifier is of the form AAA.B.CC where AAA is the hub region number (hub region – 6000), B is any number from 1-3, and CC is any number from 1-15. The B and CC parts of this number are arbitrary. For example, all bases on HUB 6732 have identifiers in the form of 732.B.CC.

4.2.5 Other Line Display Types

Figure 4-13 represents a code line with a single field WCM. The WCM is configured to regenerate a legacy serial code line (RCCI) that has 25 stations. The single link to the office is the IP connection from the WCM to OCG 3915.

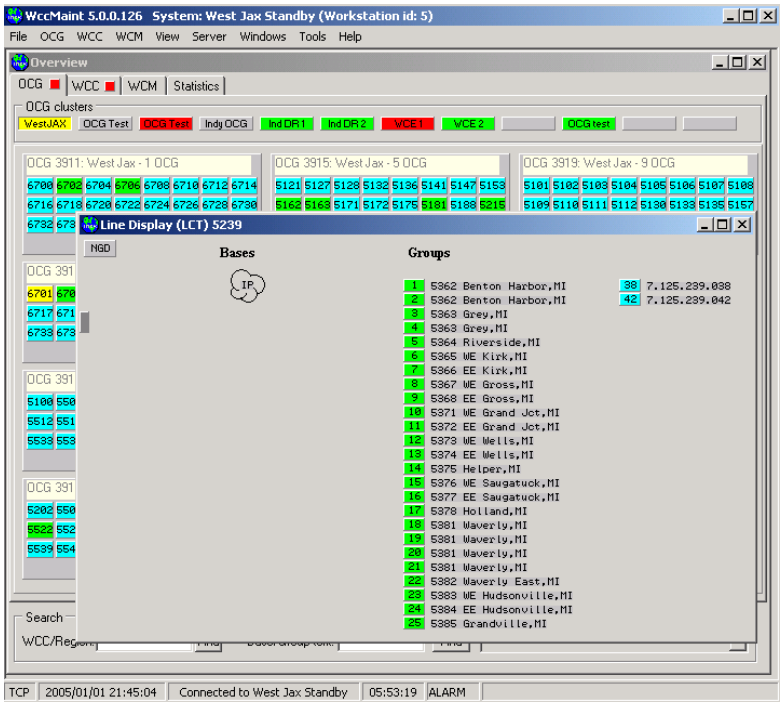

Figure 4-13 WCM with Regenerated RCCI Line

When an IP link exists on a codeline, the IP cloud is shown to represent the link from the office to the field.

If there are no MCP groups on a codeline (i.e. no groups with radios) there are no BCPs displayed.

Figure 4-14 is an example of a codeline with 18 groups, each of which is a WCM with its own IP connection to the office.

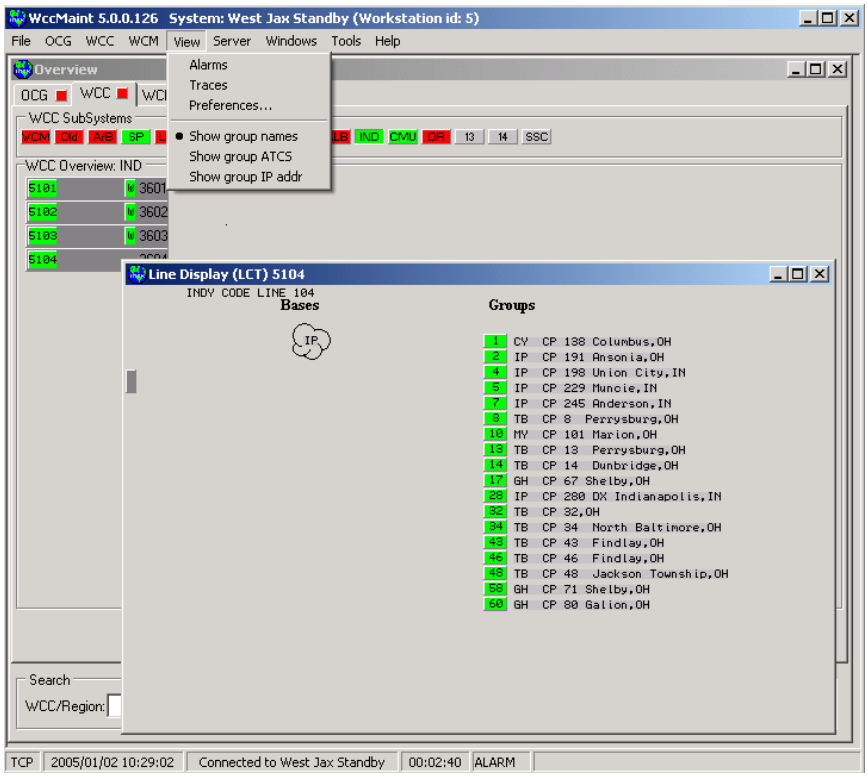

Figure 4-14 Multiple WCM Line Display

The IP cloud is displayed to represent the office link for all WCMs. The circuit bar is displayed to provide accessibility to the circuit popup menu.

From the main menu, click ‘View’, then ‘Show group IP addr’ to display WCM IP addresses instead of group names (Figure 4-15).

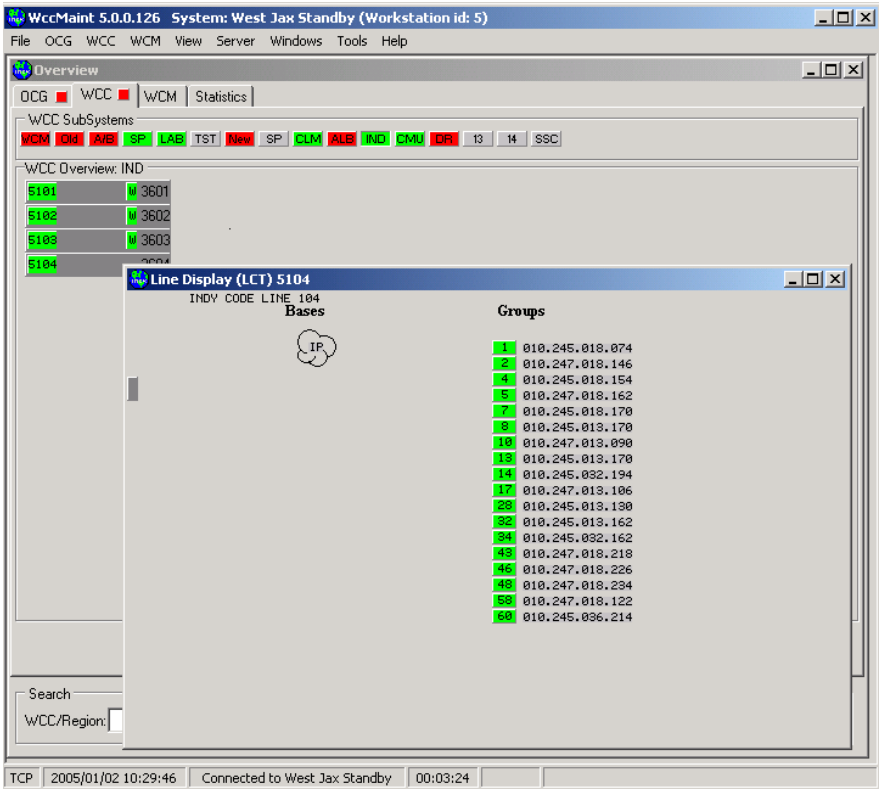

Figure 4-15 WCM IP Addresses Displayed

4.2.6 CTC Status

For LCT regions running on OCG, the CTC socket status is displayed on the line display as shown in Figure 4-16:

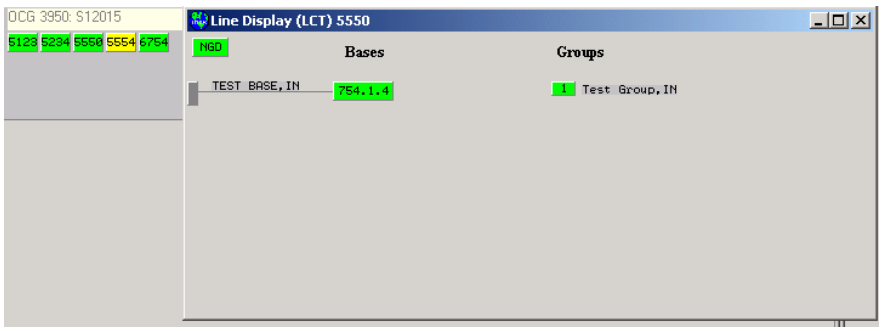

Figure 4-16 CTC Socket Status Indicator

The CTC status indicator in the upper left corner of the display represents the status of the TCP socket from OCG/WCC to the code server. The default text for this panel is "**NGD"**, but this is configurable in the SAFETRAN.INI file (see section 2). If the LCT is configured to alarm when the CTC socket is down, this indicator will turn red if the client connection on the LCT CTC socket drops. The status of the LCT CTC sockets is displayed on the CTC socket status form. To view CTC status, as shown in Figure 4-17, click on the CTC status indicator:

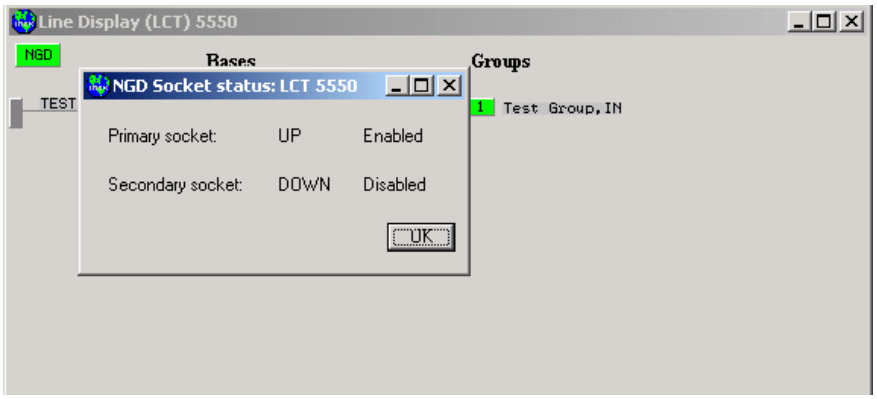

Figure 4-17 CTC Socket Status Form

If the CTC connection to this socket should go down, the status indicator will turn red as shown in Figure 4-18.

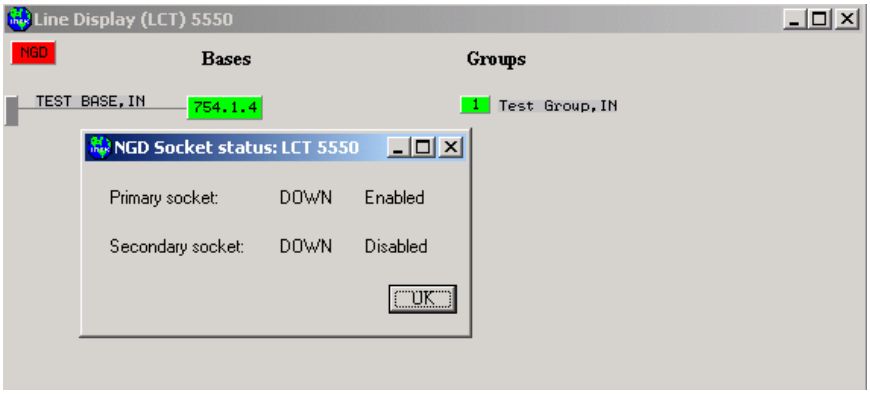

Figure 4-18 CTC Socket Has Dropped

If the CTC indicator is red, the region summary panel (and all summary tabs) will also be red, Figure 4-19

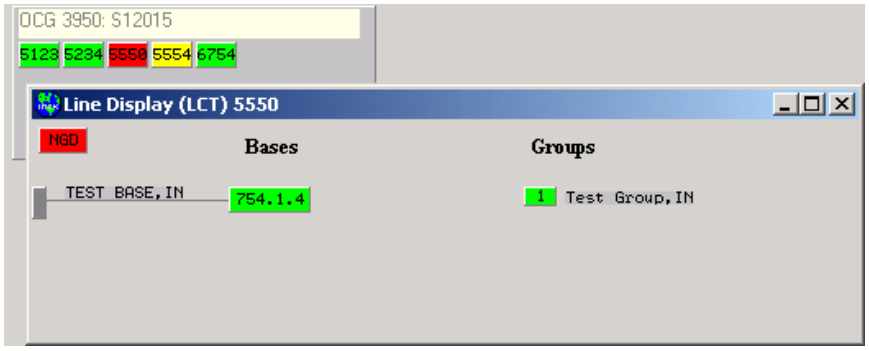

Figure 4-19 Region Summary Reflects CTC Socket Status

4.3 NAVIGATING THE MENU SYSTEM

4.3.1 The Main Menu

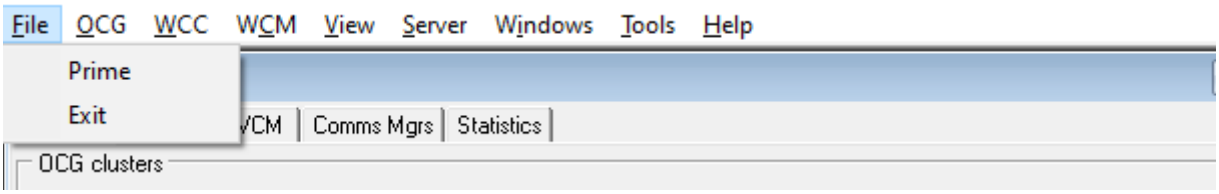

Figure 4-20 Main Menu - File

Prime

This opens the Priming form, which enables the user to force a known WCC that is not yet displayed to identify itself, which in turn will create the WCC panel on the overview display. This feature is rarely used.

Exit

Closes WCCMaint.

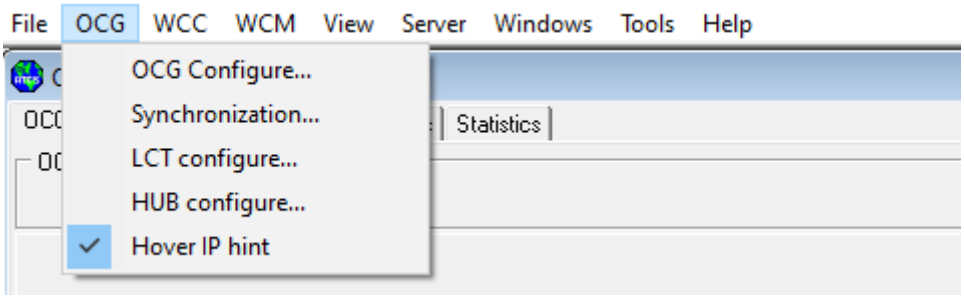

Figure 4-21 Main Menu – OCG

OCG Configure…

Enables offline editing of OCG configuration files (**.ocf** extension) stored on the network or the local workstation. Not used to download/edit working OCG configurations.

LCT Configure…

Enables offline editing of LCT configuration files (**.lcf** extension) stored on the network or the local workstation. Not used to download/edit working LCT configurations.

HUB Configure…

Enables offline editing of HUB configuration files (**.hcf** extension) stored on the network or the local workstation. Not used to download/edit working HUB configurations.**Hover IP hint**

Toggles the IP address hover hint for OCG panels

Hover IP hint

Toggles the IP address hover hint for OCG panels.

Refresh all

All WCCs and OCGs are refreshed, closing all child windows and releasing all cached information about WCCs and OCGs and their codelines. This essentially rebuilds the entire WCCMaint display and is equivalent to disconnecting from and reconnecting to the server.

Configurations…

Opens the Configuration Manager form, which enables editing of local WCC configuration files. Uploading and downloading to and from WCCs is not available from here. To work with the configuration data of a live WCC right-click on the desired WCC and select 'Configuration' (see popup menu).

Hover IP hint

Toggles the IP address hover hint for WCC panels.

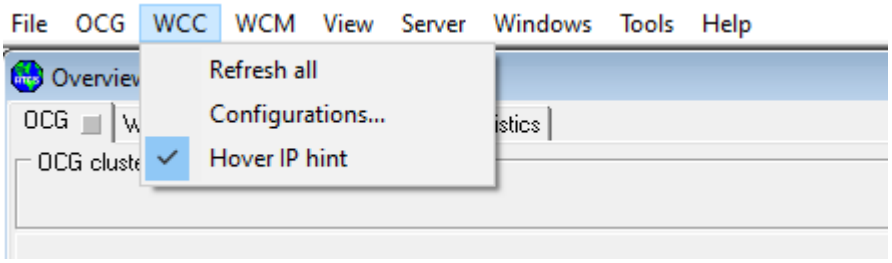

Figure 4-22 Main Menu - WCC

Remote Boot…

This opens the Remote Boot form, which is used to configure remote WCM units that have no configuration or firmware loaded. This process uses DHCP to send a basic bootstrap configuration to the WCM, which will then appear on the WCM tab for complete configuration and executive firmware loading. See Appendix E for remote WCM bootstrap loading procedures.

Set range…

This opens the WCM Range form, which allows the user to specify a range of node addresses for WCMS to be displayed on the WCM tab. For instance, if the range is set from 21 to 22, all WCMs with ATCS addresses in the range 2.RRR.21.3000 2.RRR.22.3999 will be displayed.

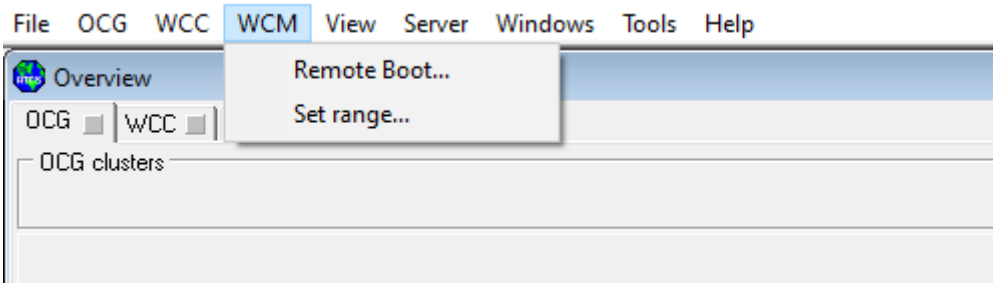

Figure 4-23 Main Menu - WCM

Alarms

This opens the System Alarms form. This display has two windows the Alarm log and the Alarm Summary. The alarm log displays text alarms and informational messages that come from WCCs, as well as internally generated messages from WCCMaint. This text may be saved to a file by clicking the 'Save Log' button. The Alarm summary window displays only CURRENT alarms either received from the Alarm Server or internally generated in WCCMaint. See the ALARMS section for a full discussion of WCCMaint alarm handling. Alarms are discussed in more detail in Section 12.

Traces

This opens the Port Trace form, which allows offline viewing of saved WCC parallel port traces. These are most commonly used for configuring and troubleshooting DC codeline protocols driven by the WCC parallel port.

Color Palette…

This opens a form that allows setting custom colors for various conditions (failed, SSI alarm, etc.). Changes made here are local to the WccMaint instance only.

Preferences…

This opens the User Preferences form, which enables the user to modify configurable options for WCCMaint.

Sort…

This allows various sorting options for line displays. For example, groups may be ordered alphabetically or by ATCS address. Sorting options are available for Groups, Bases, WCCs, WCMs, or Comms Managers.

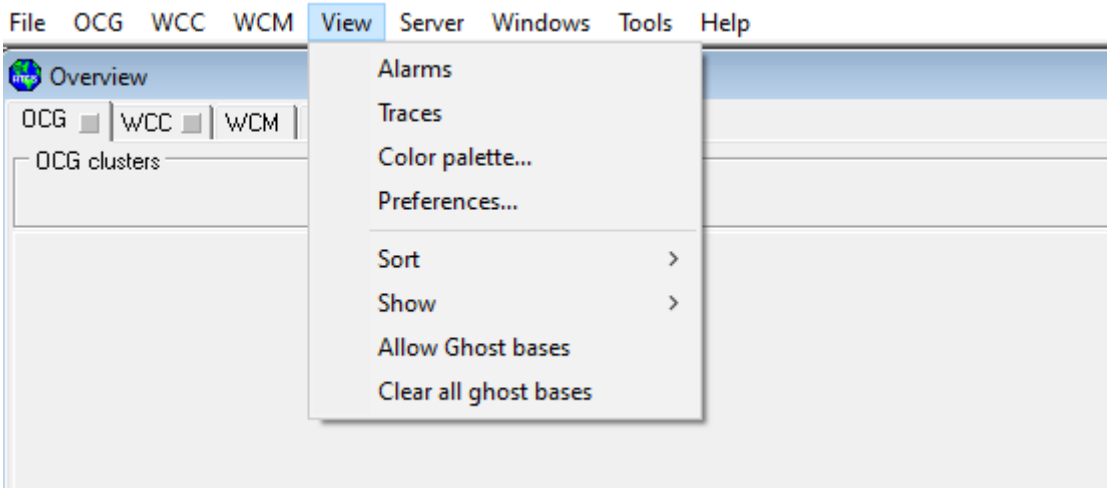

Figure 4-24 Main Menu - View

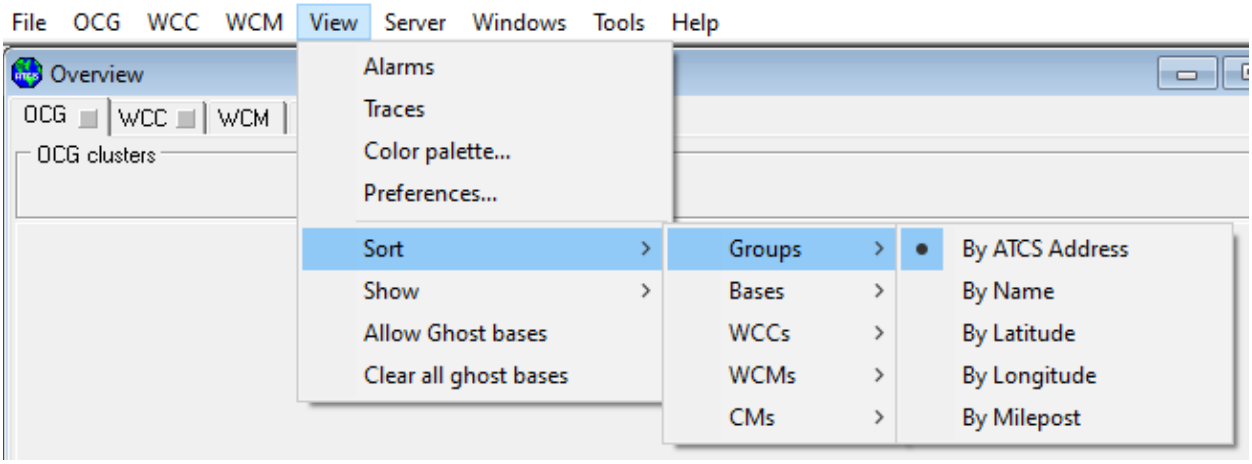

Figure 4-25 Sorting options for Groups

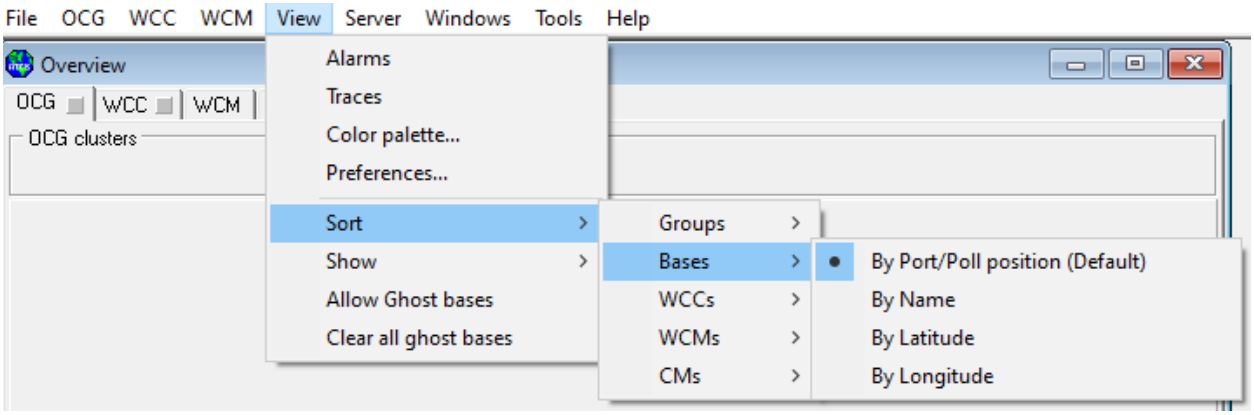

Figure 4-26 Sorting options for Bases

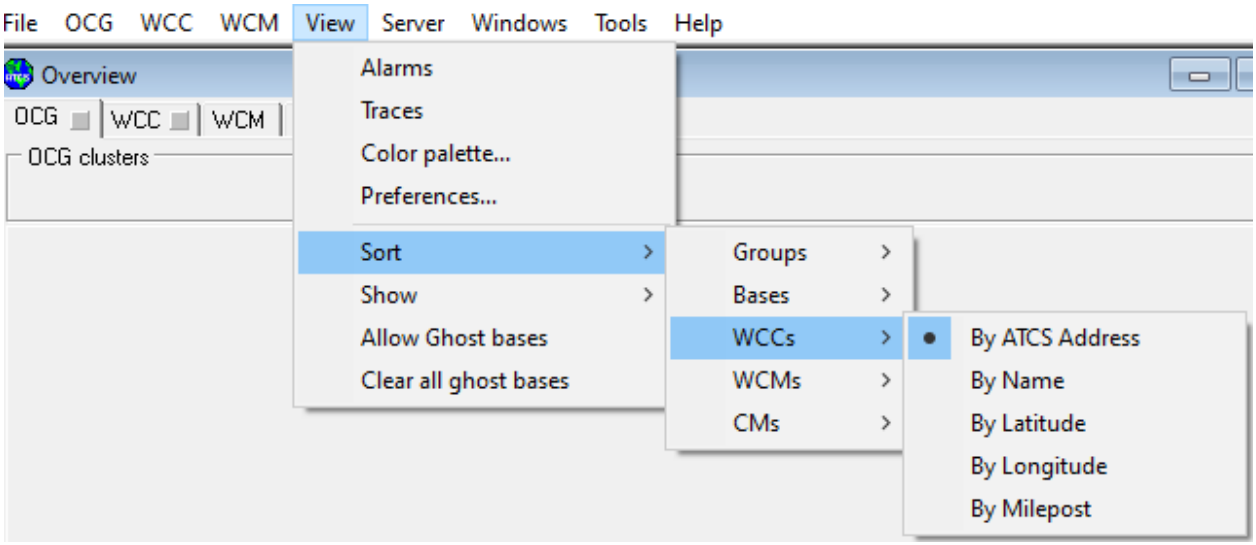

Figure 4-27 Sorting options for WCCs

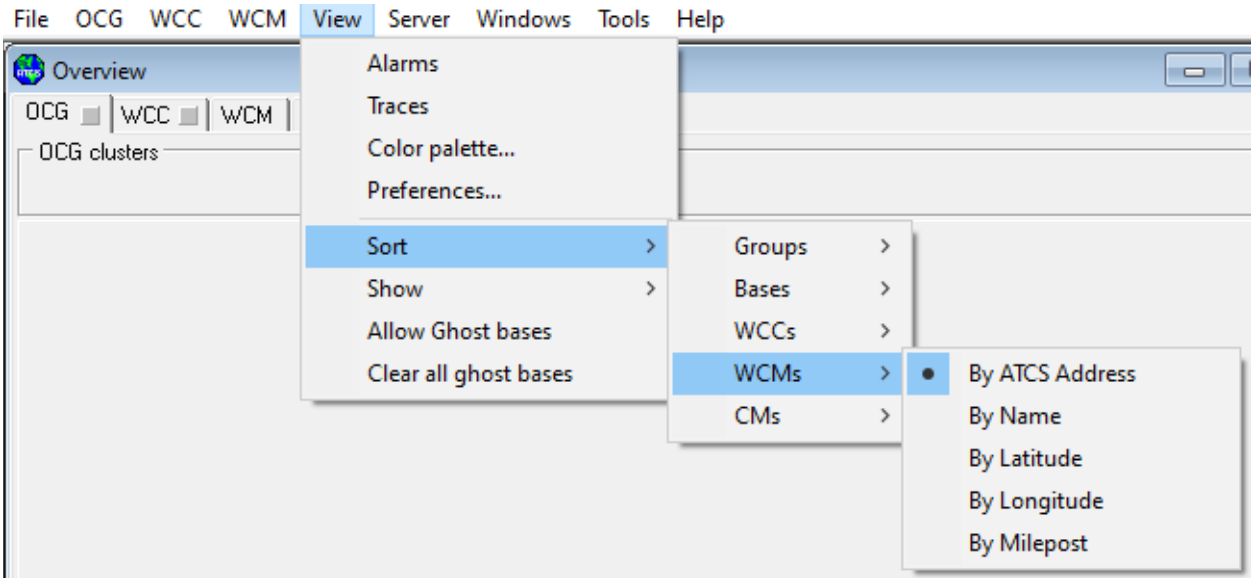

Figure 4-28 Sorting options for WCMs

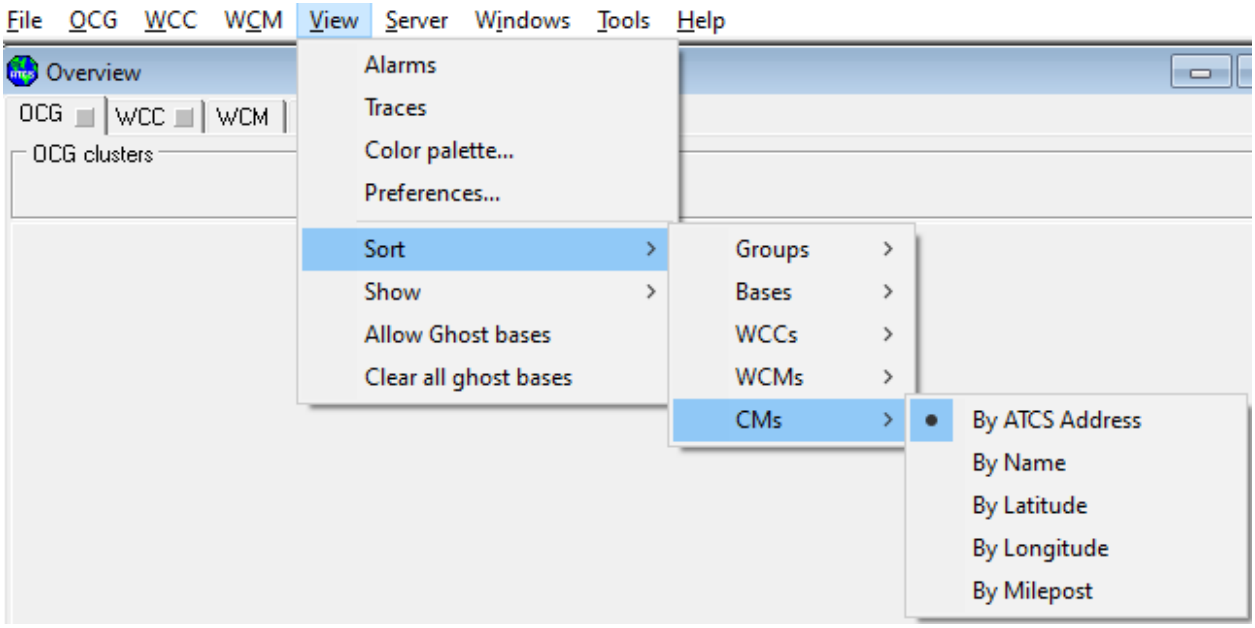

Figure 4-29 Sorting options for CMs

Show…

This opens display options for Groups, WCMs, or Comms Managers. When these items are rendered on a line display, they will display Names, ATCS Addresses, or IP addresses based on this selection.

Show options are shown in Figures 4-30 through 4-32.

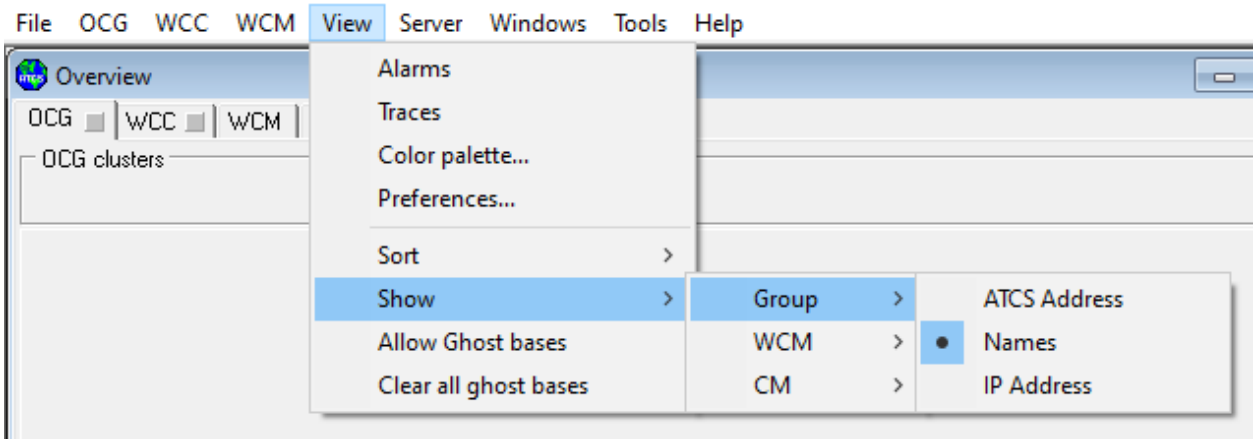

Figure 4-30 Show – group options

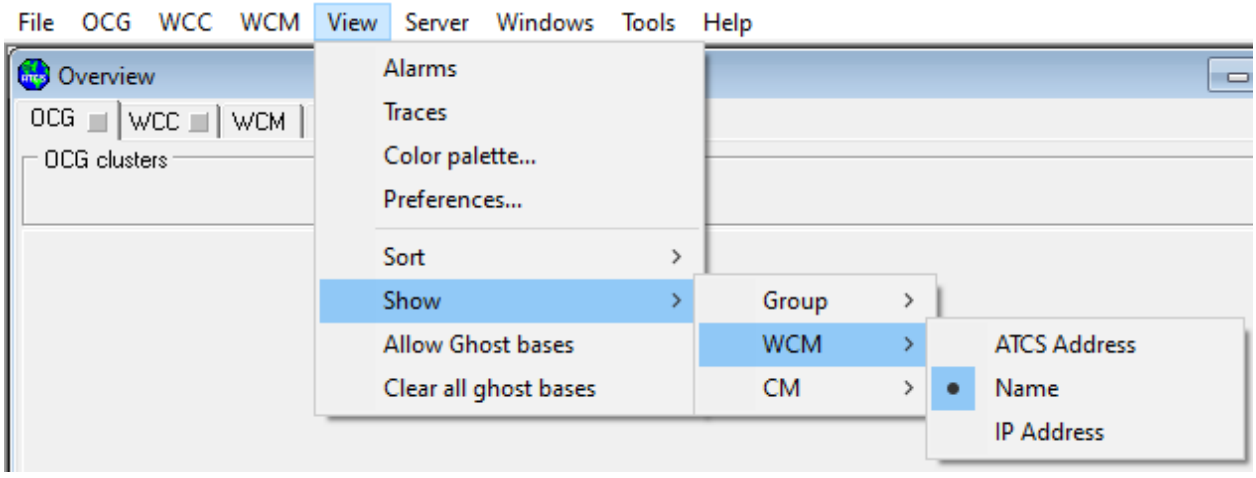

Figure 4-31 Show – WCM options

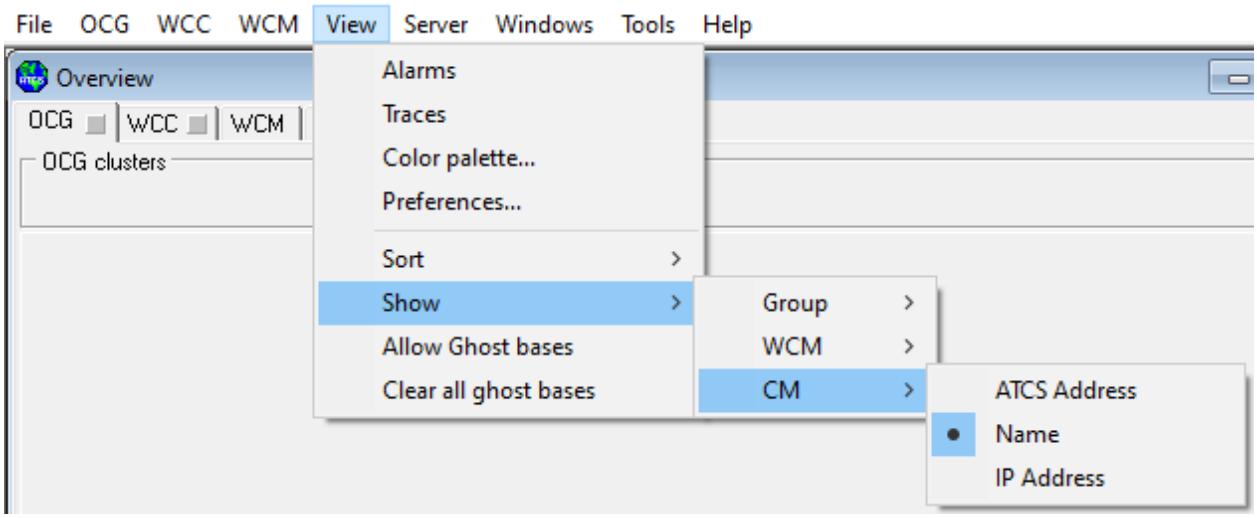

Figure 4-32 Show – CM options

Allow ghost bases

This is a check/uncheck option that will persist 'ghost' bases (bases that are no longer in RF coverage to any displayed wayside) on the line display. Ordinarily, a base that has timed out is removed from an active line display. Ghost bases only persist while a line display is open; they are not stored for display on any other forms.

Clear all ghost bases

Clears all ghost bases from all line displays.

Disconnect / Connect

This top menu item toggles the connection state of the current server. If there is no connected server, this item does not display.

Security…

This opens a submenu of security-related items:

- Log in
- Log out
- Change password
- Whois (identifies other users if security is enabled)

Manage servers…

This opens the Connection Manager form. See Section 3 for full details about the Connection Manager.

Server list

The lower portion of this menu lists all available server connections. The current default server is checked.

Click on a server to disconnect the current and connect to the new server.

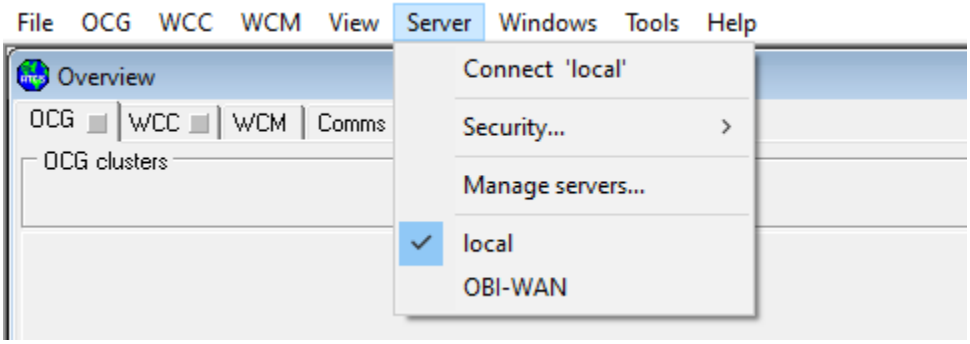

Figure 4-33 Main Menu - Server

Cascade

This is a Windows function that arranges all open windows in WCCMaint in a cascade arrangement. This can also be used to locate windows that may be hidden behind others.

Tile

This Windows function arranges all open windows in WCCMaint in a tiled display.

Window list

Any WCCMaint forms that are currently open are listed here. Many times an open form (a line display, for example) will go to the background if another window is opened or the user shifts focus to another window. If a form gets 'lost' it can be located in this list and restored by clicking on the form's caption.

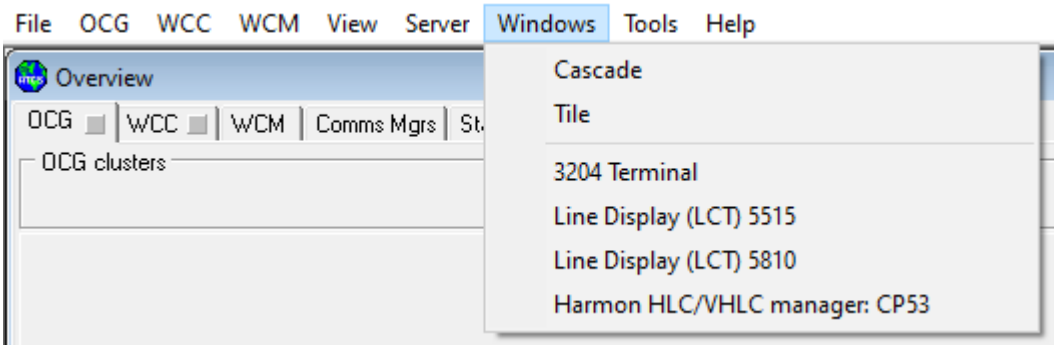

Figure 4-34 Main Menu - Windows

Tracing…

This opens the Tracing window, which contains WCCMaint diagnostic and informational messages. In addition, ATCS messages may be traced for troubleshooting. See Section 11.

CNA Utility

This function will launch the CNA diagnostic tool if WccMaint is configured to use it. CNA-1000 and CNA-2000 units are 3rd party hardware modules designed to interface various field devices to ATCS networks. This is a Wabtec product and its use is covered in Appendix X.

PSV maintenance…

PSV maintenance is a utility that explores module definitions within a PSV software release, enabling the user to compare CRC or revision differences for specific modules between two software releases. See Section 11.

Wayside data…

The Wayside Data utility is used to create a report of all active wayside devices (MCPs and WCMs) and their ATCS and IP addresses. The report may be saved to a text (.TXT) or spreadsheet (.XLS) file. Refer to Section 11.

Auto downloads…

The Auto Download utility is used to retrieve configuration data and version reports from multiple WCCs and WCMs as a background process. See Section 11 for details.

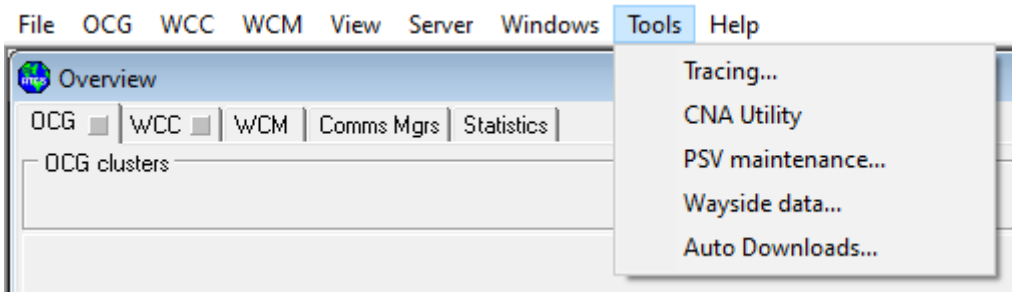

Figure 4-35 Main Menu - Tools

HELP:

This help form lists information about the current version of WCCMaint.EXE and dynamic information about auxiliary modules that are currently used. A short description of each release of WCCMaint is also included:

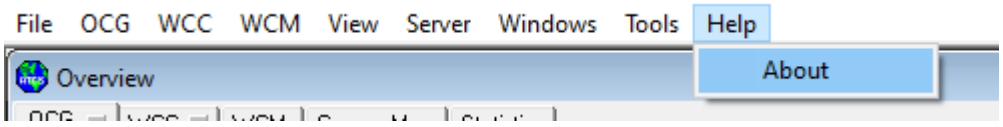

Figure 4-36 Main Menu - Help

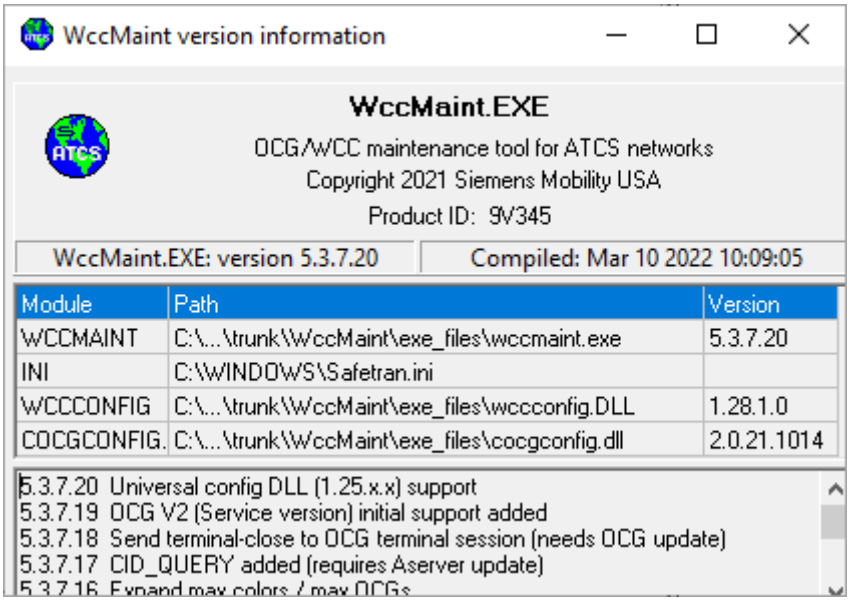

Figure 4-37 WCCMaint Help Information

4.3.2 Context (Popup) Menus

Context menus provide functions that are specific to a piece of equipment. Depending on the attributes of the object and security settings, certain menu options may or may not appear, or may not be enabled.

4.3.2.1 WCC Menu

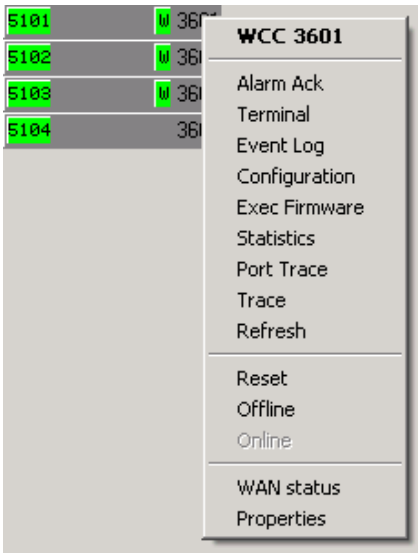

Figure 4-38 WCC Popup Menu

Alarm Ack

Acknowledges any current alarm on this WCC. Once an alarm is acknowledged, the visual and audible alarm indicators are stopped, and the alarm no longer affects the alarm summary color.

Terminal

Opens a terminal window for this WCC. See Section 13 for details.

Event log

Opens the event log utility for this WCC. See Section 13 for details.

Configuration

Opens the configuration manager for this WCC. See Section 5 for details.

Exec Firmware

Opens the executive firmware manager for this WCC. See Section 6 for details.

Statistics

Opens the statistics page for this WCC. See Section 4.6.

Port trace

Allows live or archived parallel port activity to be examined. This is useful for troubleshooting DC protocols that are driven by the WCC's parallel port.

Trace

This is a flag that, when checked, will send all messages to and from this WCC to the Trace log for viewing. See Section 11.

Refresh

This causes this WCC to be removed from the display and refreshed with current information from the WCC. See **Refresh All** above.

Reset

This causes the WCC to execute a soft boot, which resets all serial codeline processors. This is equivalent to typing RESET at the WCC terminal command prompt. **Note that this is a potentially traffic-affecting command that may result in a brief loss of communications with group locationsWAN status**

Opens the WAN Status form for this WCC, displaying the status of all WAN connections for which the WCC is configured. See Section 5.

Offline (Online)

OFFLINE and ONLINE work in tandem to place the WCC in a standby or active mode. When in standby, a WCC continues to receive all the traffic it normally would, but it does not send or acknowledge any messages to/from the field.

Properties

Opens the Properties window for this WCC so that database changes can be made. See Section 10.

4.3.2.2 WCM Context Menu

The WCM considered a type 2 device in this context, has the same diagnostic functionality as a WCC. The menu choices for a WCM are a subset of those available for a WCC, and produce the same result as the corresponding WCC menu item.

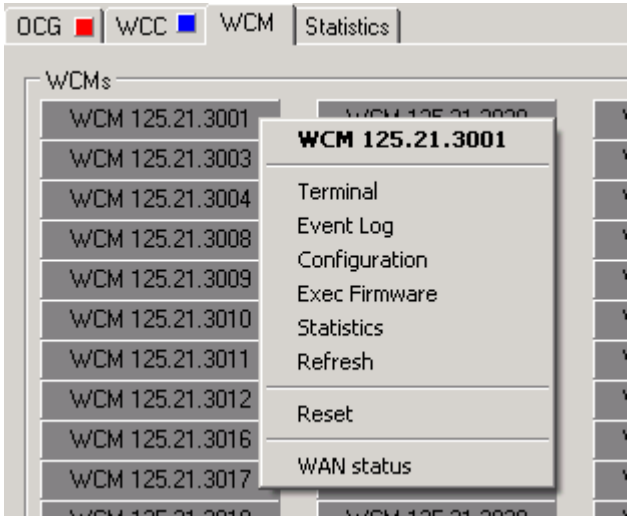

Figure 4-39 WCM Popup Menu

The WCM considered a type 2 device in this context, has the same diagnostic functionality as a WCC. The menu choices for a WCM are a subset of those available for a WCC, and produce the same result as the corresponding WCC menu item.

4.3.2.3 OCG Menu

Figure 4-40 shows the context of the OCG menu followed by a brief description of each menu item.

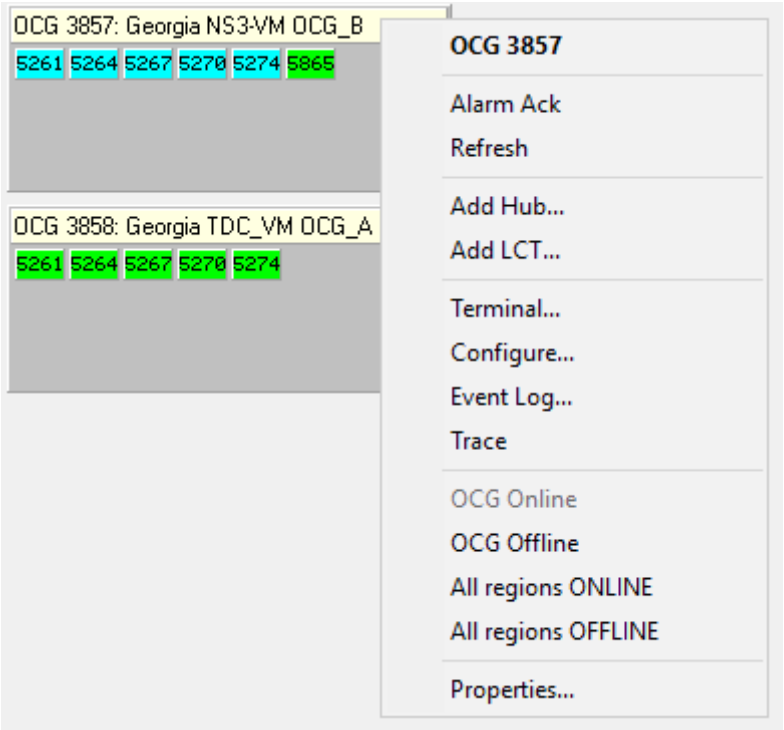

Figure 4-40 OCG Context Menu

Alarm Ack

Functionally identical to WCC Alarm Ack.

Refresh

Functionally identical to WCC Refresh.

Add Hub…

Add LCT…

These functions add new HUB/LCT regions to the OCG by opening the OCG editor. Refer to Section 8 for a full discussion.

Terminal

Functionally identical to WCC Terminal.

Configure…

Modifies the OCG configuration by running the OCG editor. Refer to Section 8.

Event Log

Functionally identical to WCC Event Log.

Trace

This is a flag that, when checked, will send all messages to and from this OCG to the Trace log for viewing. See Section 11.

OCG Online / OCG Offline

This command will set the entire OCG online or offline. Refer to Section 8 for details.

All regions ONLINE

Individual regions on an OCG may be set offline or online. This command brings all regions of an OCG online at once. If the OCG itself was offline, this command brings it online.

All regions OFFLINE

Individual regions on an OCG may be set offline or online. This command sets all regions of an OCG offline at once. The online/offline condition of the OCG itself is not affected.

Properties

Opens the Properties window for this OCG so that database changes can be made. See Section 10.

4.3.2.4 OCG Region Menu

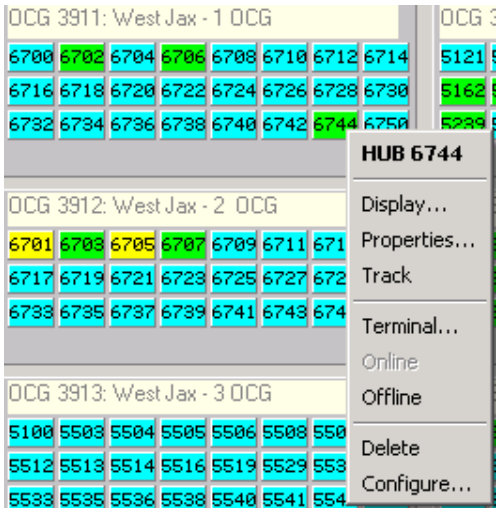

Figure 4-41 OCG Region Context Menu

Display…

Opens the line display. Regions are either HUB (6xxx) or LCT (5xxx) types. A line display is more commonly opened by left-clicking on the codeline panel.

Properties…

Opens the Properties window for the region, which reads the associated data record from the database for editing. Refer to Section 10 details.

Track

As a diagnostic tool, a region may be flagged for tracking. This creates extra log messages that track certain messages from WCCMaint to the associated region or host WCC. One HUB region and one LCT region may be simultaneously tracked. This is primarily a factory diagnostic tool.

Terminal…

OCG regions have their own terminal in addition to the OCG terminal. This command opens the region terminal. See Section 8 for details.

Online / Offline

OCG regions may be individually set online or offline. These commands work in tandem to place the OCG region in a standby or active mode. When on standby, the region does not send or receive any field traffic.

Delete

Permanently removes this region from the OCG. This option is disabled if the region is online.

Configure…

Enables configuration changes to this region using the OCG editor. See Section 8 for details.

4.3.2.5 WCC Region Menu

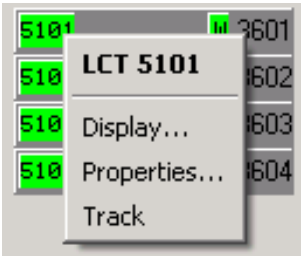

Figure 4-42 WCC Region Context Menu

Display…

Opens the line display. Regions are either HUB (6xxx) or LCT (5xxx) types. A line display is more commonly opened by left-clicking on the codeline panel.

Properties…

Opens the Properties window for the region, which reads the associated data record from the database for editing.

Track

As a diagnostic tool, a region may be flagged for tracking. This creates extra log messages that track certain messages from WCCMaint to the associated region or host WCC. One HUB region and one LCT region may be simultaneously tracked. This is primarily a factory diagnostic tool.

4.3.2.6 Circuit Menus

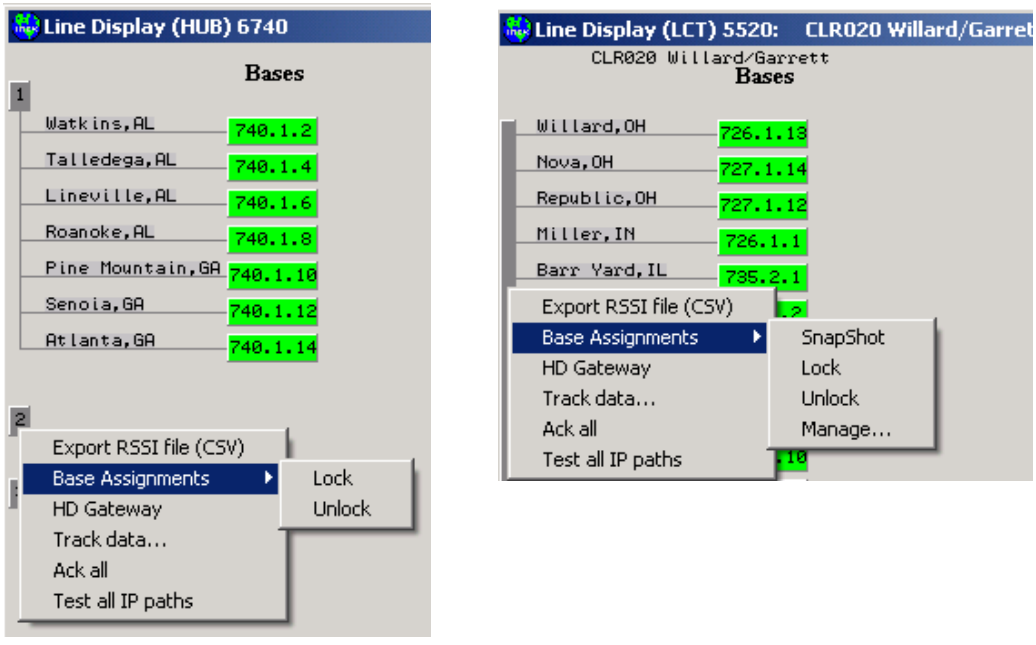

Figure 4-43 Circuit Context Menus for HUB & LCT

Circuit menus are slightly different between HUB and LCT codelines. Coverage snapshots are not allowed for HUBs, and the Coverage Manager is not available for HUBs. All other functions are identical.

Export RSSI file (CSV)

This function creates a comma-delimited (CSV) file containing a snapshot of all current coverage (SSI) values for the codeline. The filename is of the form RSSIxxxx.CSV, where xxxx is the codeline number. The file is saved in the current configuration default directory (the 'Config Path' specification on the Server connection form). Note that, because this is a snapshot of current SSI values, you must wait until all groups have been rendered for a complete picture of codeline coverage. On a large codeline, this may take up to one minute.

Base Assignments

Selecting or highlighting 'Base Assignments' from this menu opens a submenu from which the assigned, or engineered, coverages for the codeline can be manipulated. For a complete discussion of coverages, refer to Appendix D, ‘Managing coverages for RF groups’.

SnapShot:

Clicking 'snapshot' will set base coverage assignments for each displayed group to the bases it currently has coverage to, maintaining each base's priority (that is, the base that is currently primary will be saved as primary). A snapshot may be taken at any time by any WCCMaint client (subject to security restrictions), and any snapshot overwrites saved coverage information in the database.

Lock:

This will lock every group on the codeline down to its assigned coverages as determined by a previous snapshot. Locking a group's coverages has a slightly different effect depending on the region type (LCT/HUB) and the type of base to which the group has been locked.

Unlock:

Releases all groups on the codeline from a previous lock command. This restores normal WCC base selection for each group.

Manage…

Opens the Coverage Manager from, which allows the user to 'tweak' base coverages for a given codeline, so that bases may be removed, added, or assigned different priorities. Changes are stored in the database.

HD Gateway

For systems that are so equipped, this function opens the HD Gateway form, which allows remote access to linear network Siemens HD vital I/O module subsystems.

Track data…

This function is specific to CN Railway. Refer to separate CN documentation for details.

Ack all

When multiple alarms exist on a codeline, clicking this item is a convenient way to acknowledge every alarm. The effect is the same as clicking 'Alarm Ack' from the context menu of each group/base that has an alarm.

Test all IP paths

This command is specific to OCG and will instruct OCG to begin a series of tests on all IP-based dial backup paths available to this codeline. When invoked from a HUB display, all backup paths for IP bases will be tested. When invoked from an LCT display, backup paths for all IP groups will be tested. Once the region-wide backup test is in progress, the caption for this menu item changes to 'Abort IP backup testing'. Any WCCMaint client may abort a test in progress regardless of which client started the test. For a full discussion refer to Appendix C, 'Dial Backup Subsystem'.

4.3.2.7 Base Menu

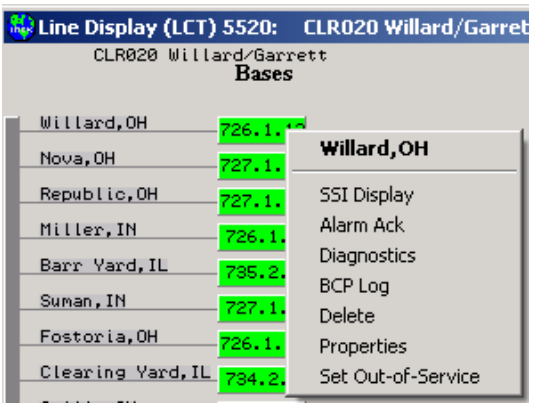

Figure 4-44 Base Context Menu

SSI Display

Clicking this menu item displays RF coverage lines and SSI values from the base to all groups that it is communicating with on the current line display.

Alarm Ack

Acknowledges the current alarm condition for this base. Once an alarm is acknowledged, visual and audible warnings are stopped, and the alarm condition is no longer reflected in the summary colors for the region or the associated tab.

Diagnostics

Opens the base diagnostics form. Most diagnostic functions for a base are done from this form. See Section 9 for details.

BCP Log

For a Siemens BCP, this opens the BCP log form, which enables the user to remotely examine the BCP diagnostic log and enter certain terminal commands. Functionally, this is a scaled-down version of the online terminal function available at the front panel diagnostics port of the A53105 BCM unit. See Section 13 for more information.

Delete

Deletes the BCP from the display, and removes it from the database if a record exists. Note that a live base will re-appear when it is 're-discovered' by the WCC it is connected to. When this happens, the base appears as a new item (in the default OUT_OF_SERVICE state, which is cyan colored), with no name or identity.

Properties

Opens the base properties form for database read/write. See Section 10.

Set Out-Of-Service

This is a check/uncheck menu item that may be used to quickly remove a base from service, or to restore it to service (for instance, after the restoration of a downed leased circuit). The effect of putting an item OUT_OF_SERVICE is to prevent it from affecting the region or tab summary colors. A base may also be taken out of service (or restored) by checking or unchecking the Service Date checkbox on its properties form and applying the change to the database. OUT_OF_SERVICE bases are blue on the line display.

4.3.2.8 Group Menu

Group context menus vary widely depending on what equipment is configured for the location. Two of the most common context menus are shown in Figure 4-45 and Figure 4-46.

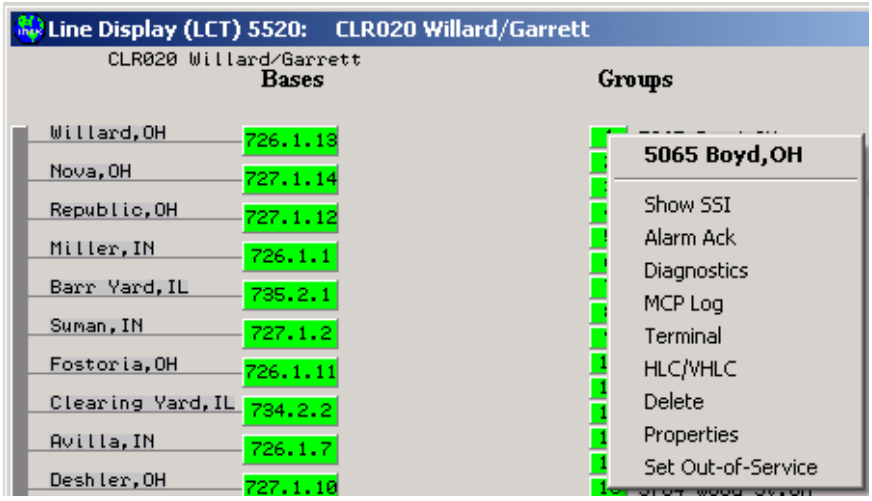

Figure 4-45 Group Context Menu (RF Group with HLC)

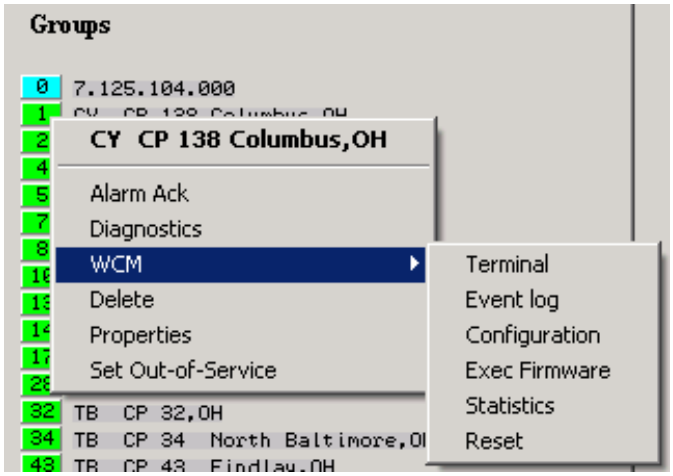

Figure 4-46 Group Context Menu (WCM)

Menu options for WCM groups are discussed first. Because WCM hardware is functionally similar to a WCC, the context menu for a WCM is a scaled-down version of the WCC context menu. Available commands are:

- **Terminal**
- **Event Log**
- **Configuration**
- **Exec Firmware**
- **Statistics**
- **Reset**

Refer to the corresponding WCC commands listed in 4.3.2.1.

Show SSI

Clicking this menu item displays RF coverage lines and SSI values from the group to all bases that it is communicating with on the current line display. Note that a group may actually cover more than three bases, but only coverage to the three strongest bases is displayed.

Alarm Ack

Acknowledges the current alarm condition for this group. Once an alarm is acknowledged, visual and audible warnings are stopped, and the alarm condition is no longer reflected in the summary colors for the region or the associated tab.

Diagnostics

Opens the Diagnostics form for this group. See Section 9 for full details.

MCP Log

For a Siemens MCP, this opens the MCP log form, which enables the user to remotely examine the MCP diagnostic log and enter certain terminal commands. Functionally, this is a scaled-down version of the online terminal function available at the front panel diagnostics port of the A53105 MCM unit. See Section 13 for more information.

CN2000 (CN only)

This menu option appears if the MCP's code unit has been designated as CN2000A/B. Clicking will open the CN2000 diagnostics form, which will remotely retrieve the log and other data from the code unit.

DHP2000 (CN only)

This menu option appears if the field location is a CN DHP2000 talker. DHP2000 units are displayed as separate MCPs, but they always have an associated 'real' MCP from which it derives its group address. Highlighting this option opens the DHP command submenu:

Reset Forces the DHP unit to warm reboot.

Repeat talker Forces the DHP unit to repeat its last broadcast.

CN2 emulator (CN only)

This menu option appears if the MCP code unit is designated as a CN2 emulator. The submenu opened by this option consists of commands that are CN2 emulator specific; refer to separate CN documentation for more information.

Terminal

This function is only available for Siemens MCP units. Opens a terminal window, which, if properly configured, allows a remote ASCII terminal session to be conducted from WCCMaint to a device connected to one of the serial ports on the remote MCM unit.

HLC/VHLC

This menu option appears if the MCP code unit is designated as a Harmon HLC or VHLC with ATCS software. It opens the HLC Manager form, which allows remote retrieval of the HLC/VHLC log.

VPI

This menu option appears if the MCP code unit is designated as an Alstom VPI unit with ATCS software. It opens the VPI Manager form, which allows remote retrieval of the VPI log.

Delete

Deletes the group icon from the line display, and erases all associated records from the database. If this is an active group, it should eventually reappear as an unidentified out-of-service group.

Properties

Opens the Properties form for this group for database read/write. See Section 10 for more information.

Set Out-Of-Service

This is a check/uncheck menu item that may be used to quickly remove a group from service or to restore it to service. The effect of putting an item OUT_OF_SERVICE is to prevent it from affecting the region or tab summary colors. A group may also be taken out of service (or restored) by checking or unchecking the Service Date checkbox on its properties form and applying the change to the database. OUT_OF_SERVICE groups are blue on the line display.

4.4 COLORS IN WCCMAINT

4.4.1 Overview Colors

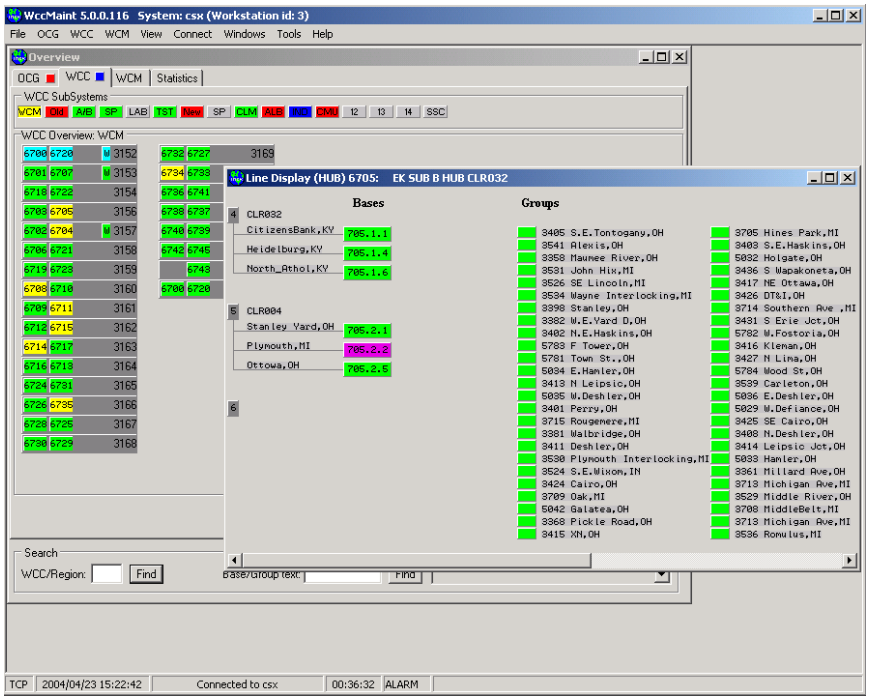

Figure 4-47 Example System Colors

In a typical overview, as shown, colors are used to indicate equipment states, warnings, and alarms. Colors are used as follows (listed in order of severity):

Green Normal status

Light blue (cyan) Standby or out of service

Yellow Warning level

Purple Alarm (ATCS)

Red Failed

Dark blue Congestion indicator

In WCCMaint, all summary tabs display the color corresponding to the most severe condition on any item belonging to the tab. To illustrate this, here is a closer look at summary tabs:

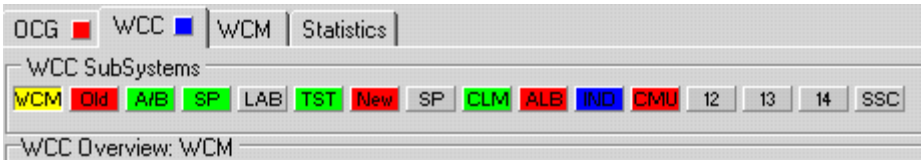

Figure 4-48 Summary Tab Colors

The main WCC tab is blue. This indicates that at least one of the 16 WCC cluster tabs must be blue. Clicking on this main WCC tab displays the WCC clusters (above). The IND cluster is blue, indicating that, if this cluster is clicked, at least one WCC must have a blue region, indicating a congestion condition.

This ‘drill-down’ method of investigating alarm colors allows the user to quickly follow an alarm or warning condition through all the displays until the problem item is found.

Following the same logic, the main OCG tab is red. This indicates that at least one of the 12 OCG cluster tabs below it is red. When the main OCG tab is clicked, any of the red OCG clusters may be clicked to reveal at least one OCG, base, or group that is offline. This process of resolving alarm colors when first running WCCMaint is discussed more fully in a later section.

Referring to Figure 4-43, the WCC main tab is active, and the WCM Subsystem button has been clicked. Of the WCCs that are shown, one is in standby (3152) and several others have yellow hub codelines (6705, 6704, 6708, etc). These yellow region panels indicate a warning condition that is investigated by opening the codeline (double-click). The line display for hub 6705 displays a purple icon for base 705.2.2, indicating an ATCS alarm.

Referring to

Figure 4-45, note that the overview WCC tab summary color is blue. This indicates that a congestion condition exists somewhere on a WCC below. Clicking on the WCC tab reveals that the Subsystem button labeled 'IND' is blue, indicating that the congestion exists on the IND Subsystem. Clicking the IND button displays the WCCs assigned to the IND subsystem as shown in Figure 4-49.

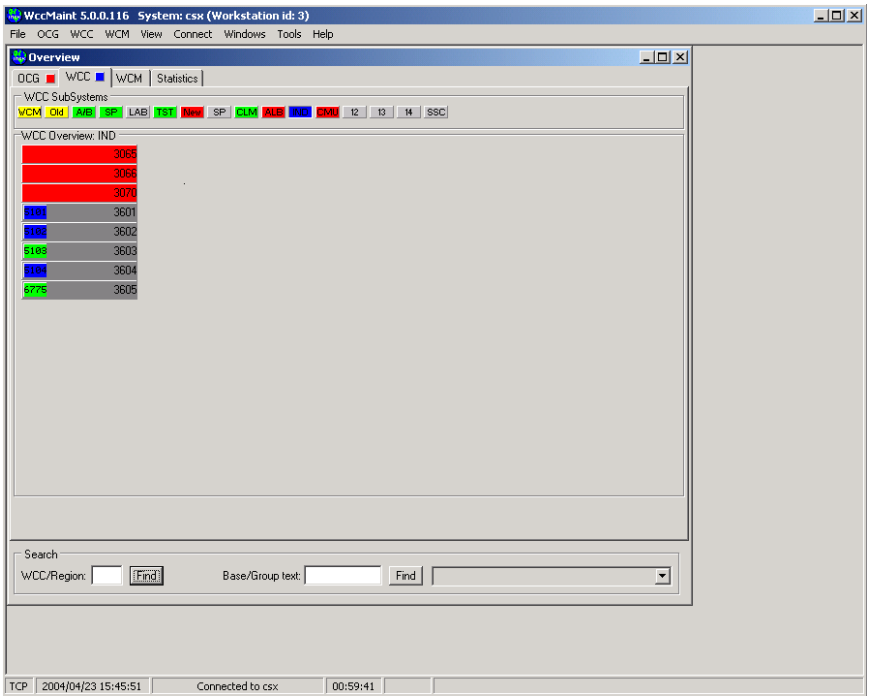

Figure 4-49 IND Subsystem Display

Congestion mode is indicated on three WCCs: codeline 5101 on WCC 3601, codeline 5102 on WCC 3602, and codeline 5104 on WCC 3604. Because congestion is a WCC condition, opening these codelines will not reveal any blue bases or groups (the congestion is actually a software alarm raised by the codeline processor on the WCC; for more information see congestion mode).

NOTE

NOTE

Be aware that three WCCs are shown in alarm (red), meaning that they have stopped communicating with ASERVER. The Subsystem summary button is blue, not red because the congestion condition is more severe by definition.

4.4.2 Line Display Colors

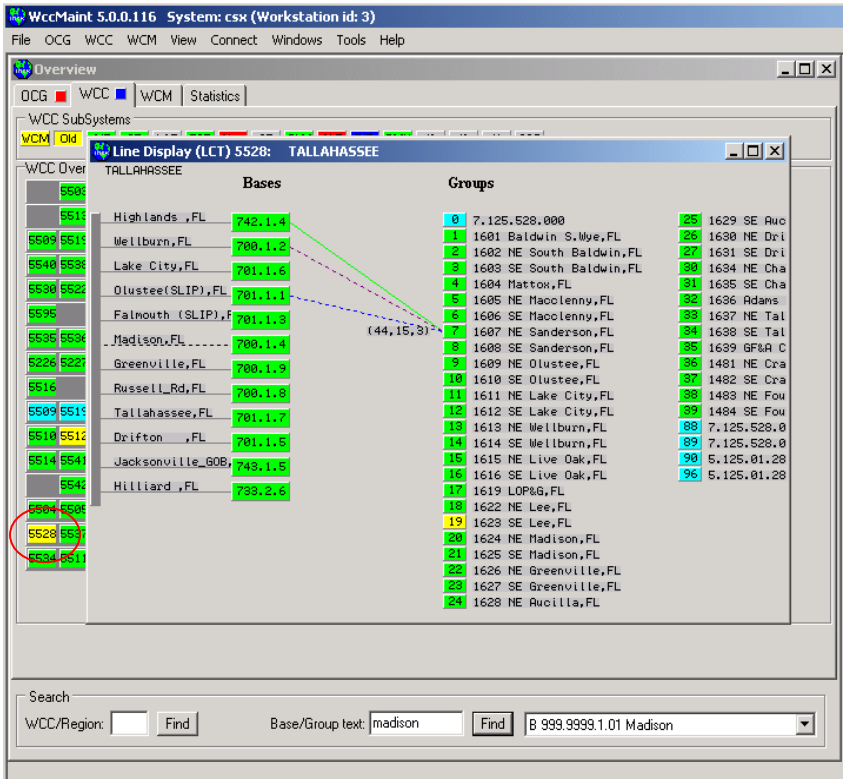

Figure 4-50 Sample Line Display

In the example for codeline 5528, group 19 has a warning condition (SSI alarm) and several groups are cyan, indicating they are not in service. The codeline icon on the WCC (circled) is yellow, correctly reflecting this condition. Note that cyan groups or bases do not 'drift up' to affect any summary panel colors - if group 19 were green, for example, codeline 5528 on the WCC would be green, not cyan.

Relative signal strengths are also indicated by color differentiation as seen in the RF coverage lines to group 7 above:

- Green = primary (strongest) coverage at +45 dBrn
- Blue = secondary coverage at +15 dBrn
- Maroon = tertiary coverage at +3 dBrn

A solid coverage line (green in this case) indicates that this base is currently the preferred base for coverage to this group; that is, when the LCT needs to send a control or acknowledgment to group 7, it will send the packet to base 742.1.4 for transmission.

For a more complete discussion of RF coverages, see Appendix D, ‘Managing Coverage for RF Groups’.

4.4.3 Using Colors To Locate Problems

The purpose of this section is to demonstrate the use of color to explore the system and locate problems.

On first opening WCCMaint, always allow at least two minutes for WCCMaint to build a complete internal ‘picture’ of the system.

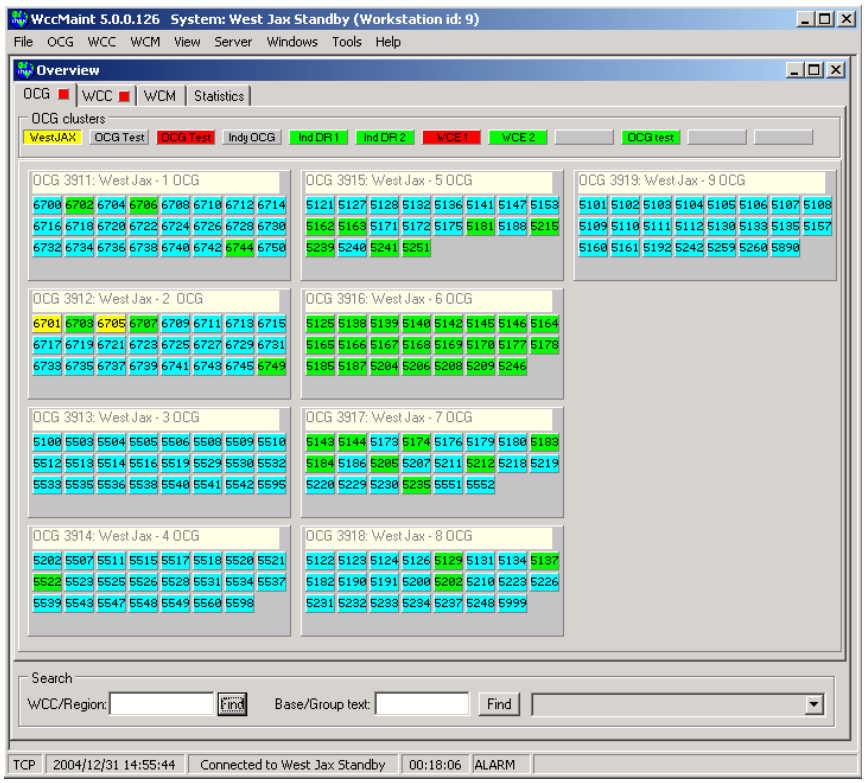

Figure 4-51 Typical Display

Using the OCG tab as a starting point (Figure 4-51), we will investigate the yellow and red cluster tabs.

OCG 3912 has two yellow regions: 6701 and 6705. Click on 6705 to open the line display as shown in Figure 4-52.

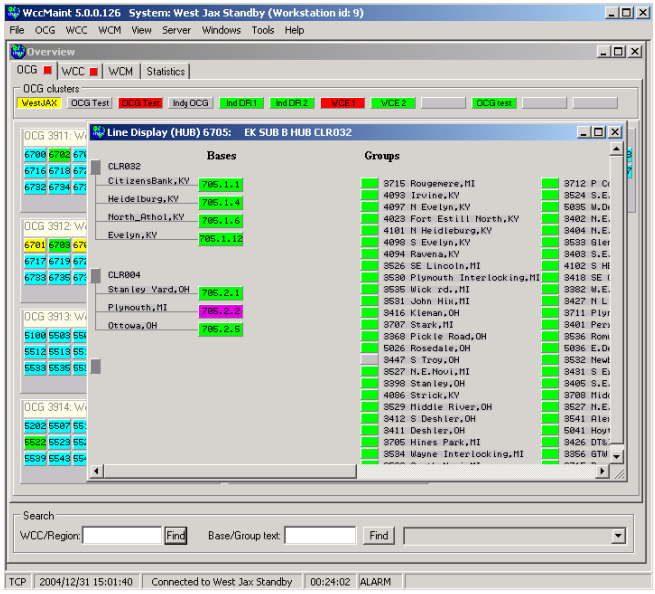

Figure 4-52 6705 Line Display

The purple base (Plymouth) has reported an ATCS alarm. Check the alarm by right-clicking on the base and selecting 'Diagnostics'.

On the diagnostics form, click the 'Alarms' tab (Figure 4-53).

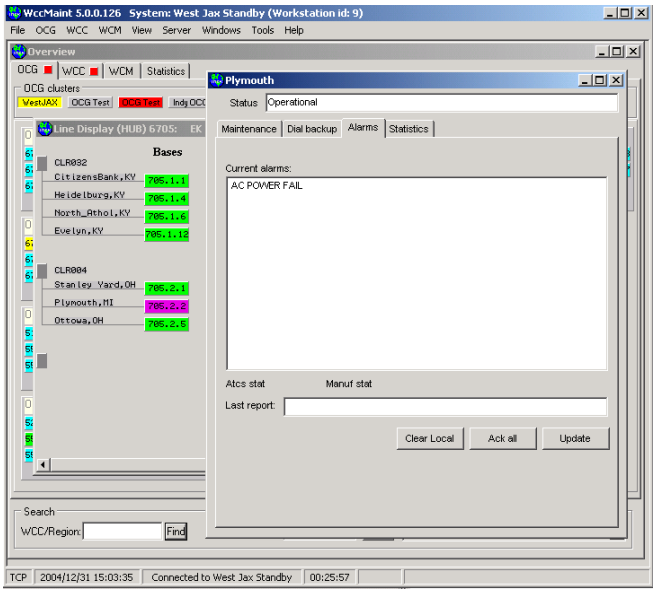

Figure 4-53 AC Power Fail Indication

This base is reporting an AC power fail alarm. Acknowledge the alarm with the ‘Ack all’ button. Close the diagnostics form and the 6705 line display.

Red colors always indicate a component failure and should be investigated.

Next, click the red ‘OCG Test’ cluster tab:

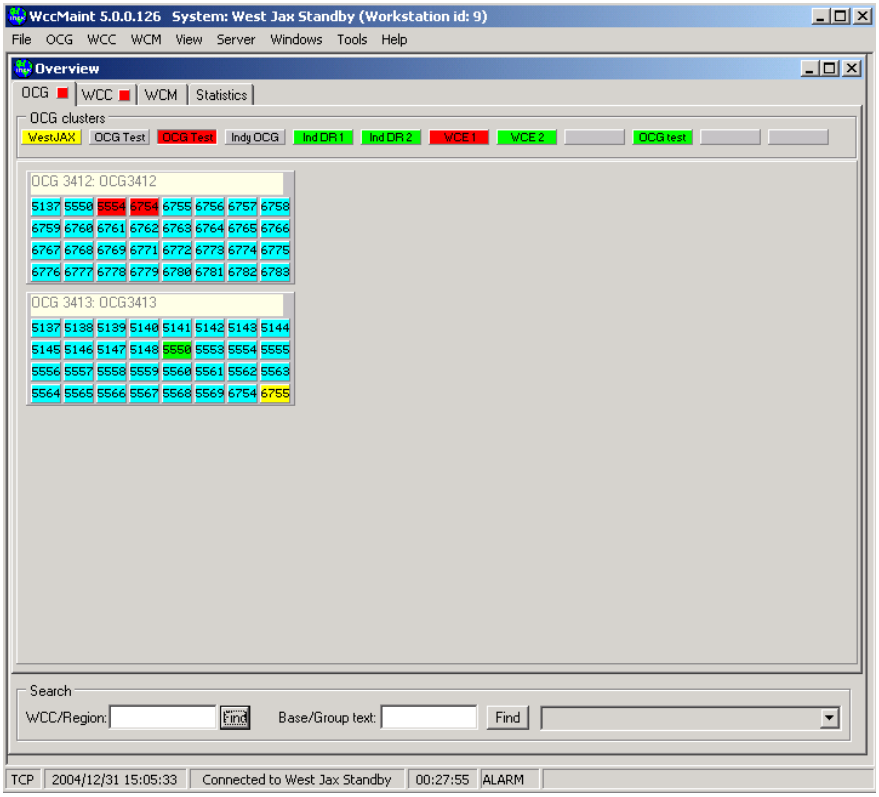

Figure 4-54 'OCG Test' Cluster Display

Two regions are red: 5554 and 6754, indicating that at least one base or group on each region has failed.

Click on 6754 to open its line display (Figure 4-55).

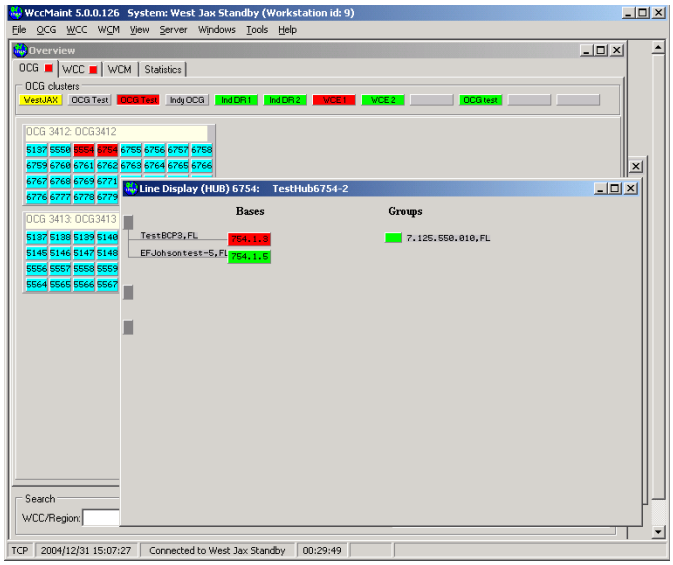

Figure 4-55 6754 Line Display

Failure of a ‘TestBCP’ is probably in a lab environment; just acknowledge the alarm by right-clicking on the base.

Select ‘Alarm Ack’ from the popup menu:

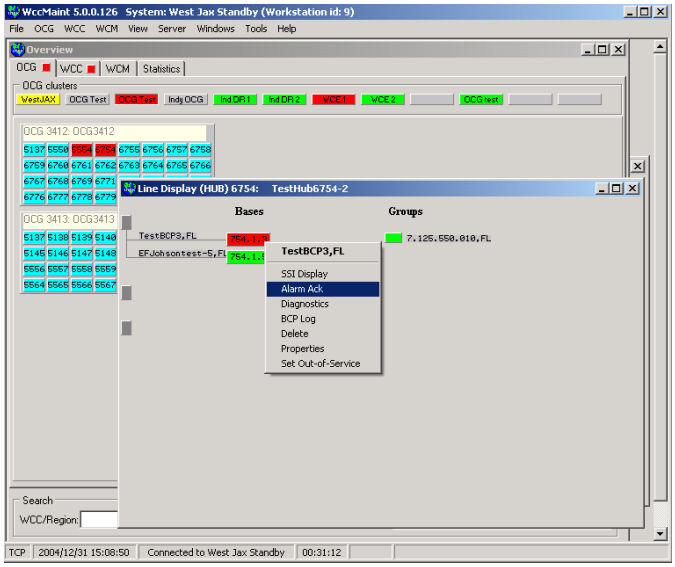

Figure 4-56 Acking an Alarm

The base bevel will reverse to indicate the acked condition and the region summary color on the OCG should return to green (see Figure 4-57).

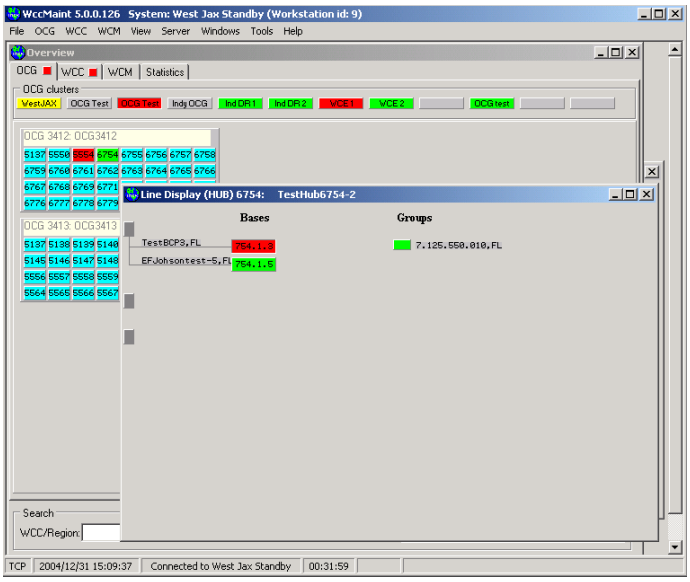

Figure 4-57 After Alarm Acknowledgement

Moving on to 5554, close the line display for 6754 and click on the red 5554 region:

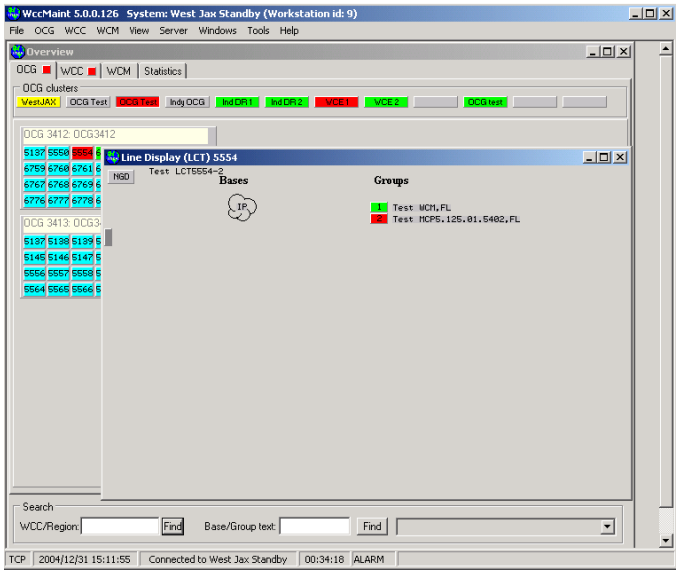

Figure 4-58 5554 Line Display

This is also likely a lab MCP. This can also be acknowledged to clear the alarm summary color.

NOTE

NOTE

Acknowledgments are local functions only; that is, they only affect the local copy of WCCMaint. If WCCMaint were to be shut down and restarted, these failures will return as red. A more permanent way of dealing with these would be to take them out of service. They would then display as cyan and would not affect region summary colors. This condition will be instantly reflected on all WCCMaint clients and will remain until the unit is put back in service.

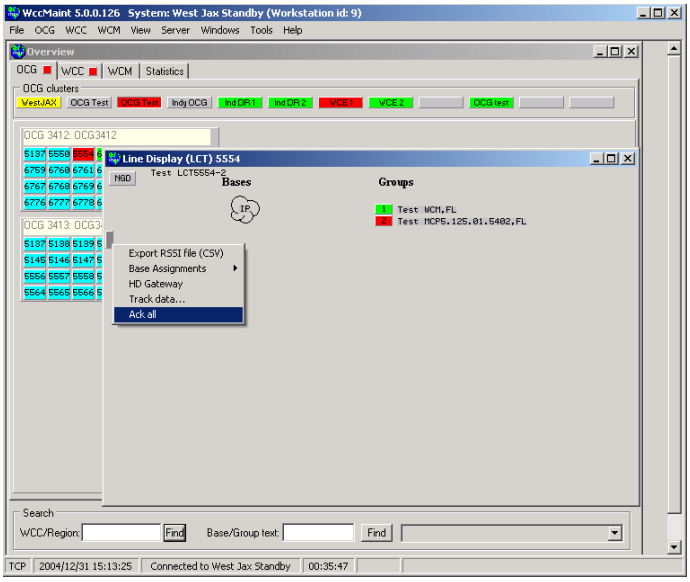

Figure 4-59 Ack All with Circuit Popup Menu

In this case, we acknowledge the alarm with the circuit context menu. Once acked, the region 5554 summary color should turn yellow, and the 'OCG Test' cluster tab should also turn yellow (to indicate an acknowledged alarm condition) (see Figure 4-60):

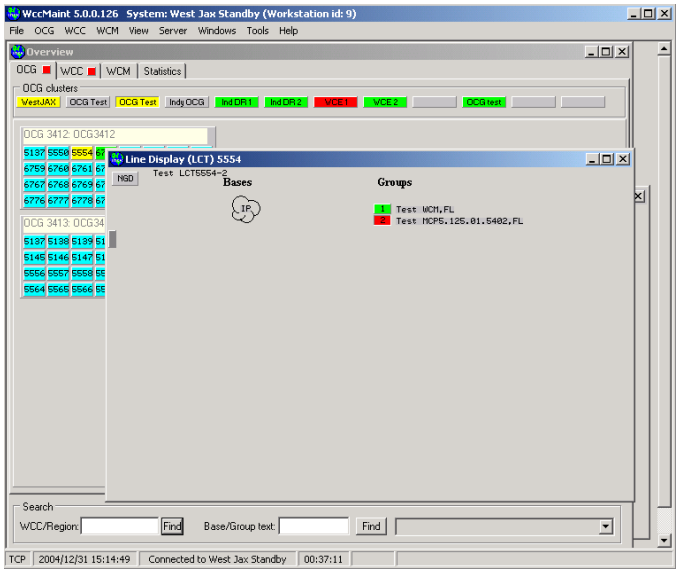

Figure 4-60 After Acknowledgement

Close the line display. The next check would be on the 'WCE 1' cluster tab:

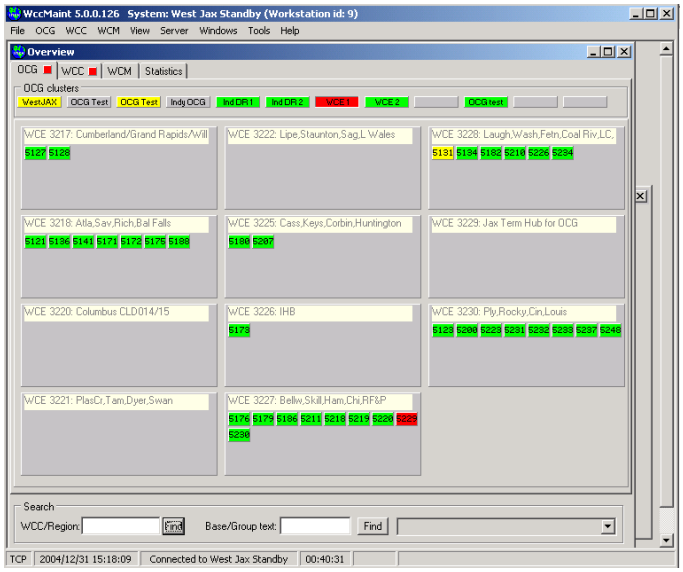

Figure 4-61 WCE1 Cluster Display

Region 5529 is the reason the 'WCE 1' cluster is red. Click on it to open the line display (Figure 4-62).

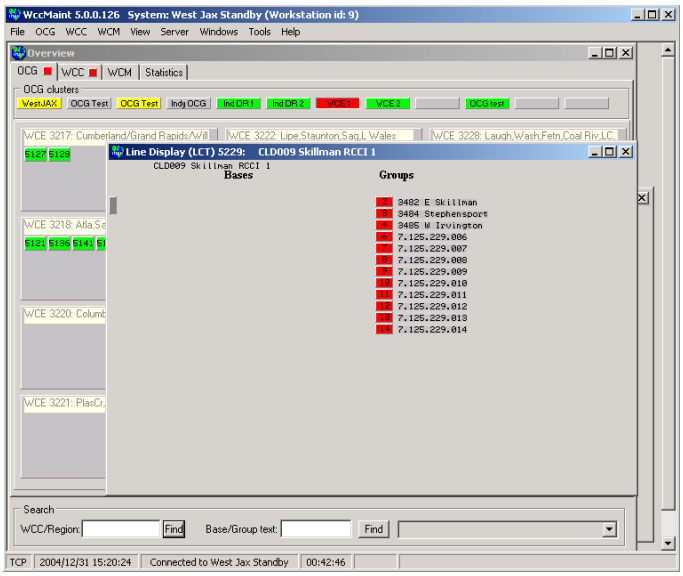

Figure 4-62 5229 Line Display

All groups down on an RCCI line is most likely either a problem with the WCM or the IP path. In this exercise, we will simply acknowledge the alarms and move on.

Ack all with the circuit bar context menu and close the line display.

Observe that the LCT 5554 and 'WCE1' colors are now yellow:

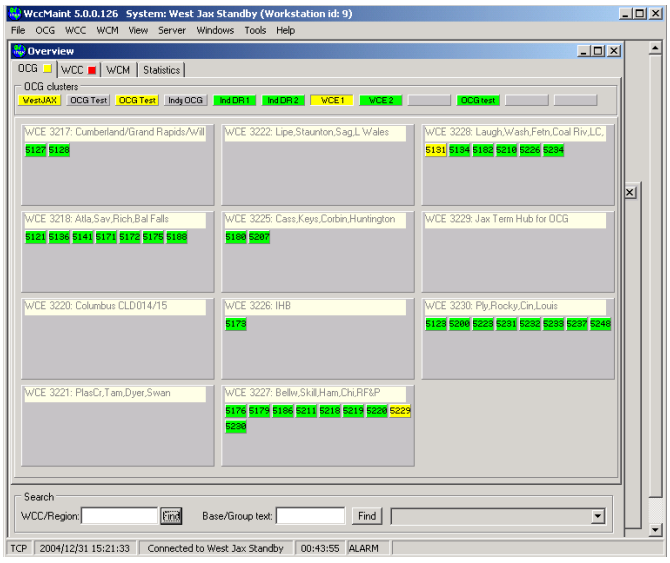

Figure 4-63 All Conditions Acknowledged

The next item to check is the yellow alert on LCT 5131. Open the 5131 Line Display (Figure 4-64).

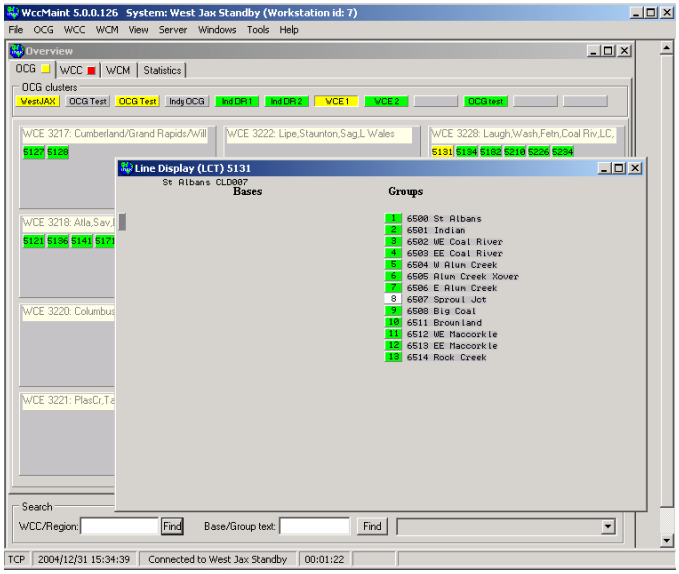

Figure 4-64 5131 Line Display

The WCM at group 8 is white, indicating that it is on dial backup. Right-click on it to open the context menu:

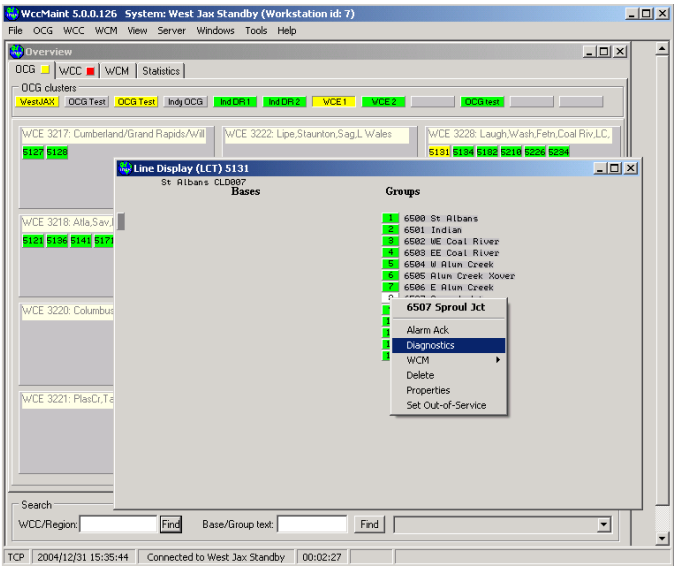

Figure 4-65 Opening Diagnostics Form

Select ‘Diagnostics’ to show path status:

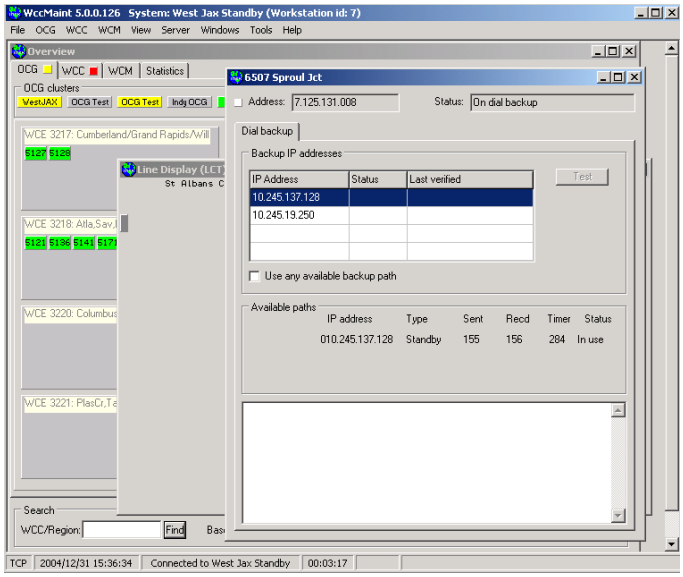

Figure 4-66 Diagnostics Form For Group 8

Now the status indicator at the top of the form says ‘On dial backup’. In the ‘Available paths’ group box, the current IP address is shown. The received count is 156, indicating this location has likely been on dial backup for approximately two hours (one indication per minute).

There is nothing to acknowledge for dial backup. Close the diagnostics form and the 5131 line display. Next to investigate is the WCC tab (Figure 4-67).

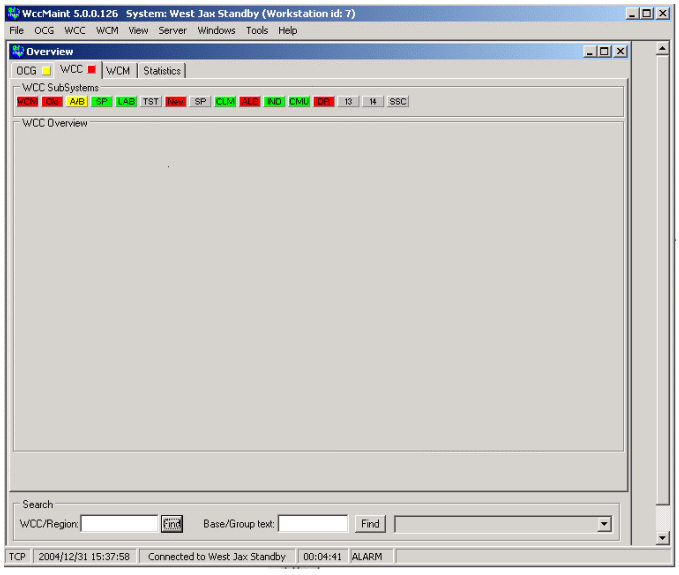

Figure 4-67 WCC Tab Display

Start with the WCM cluster:

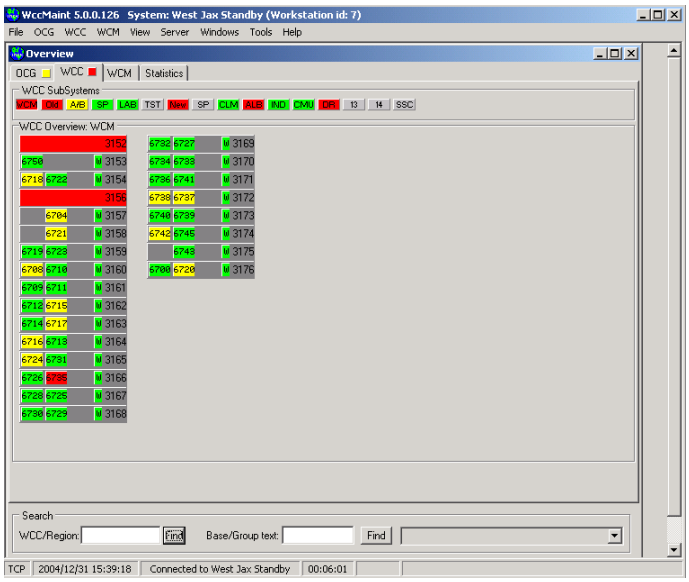

Figure 4-68 WCM Cluster Display

You can first eliminate the red WCCs by refreshing them:

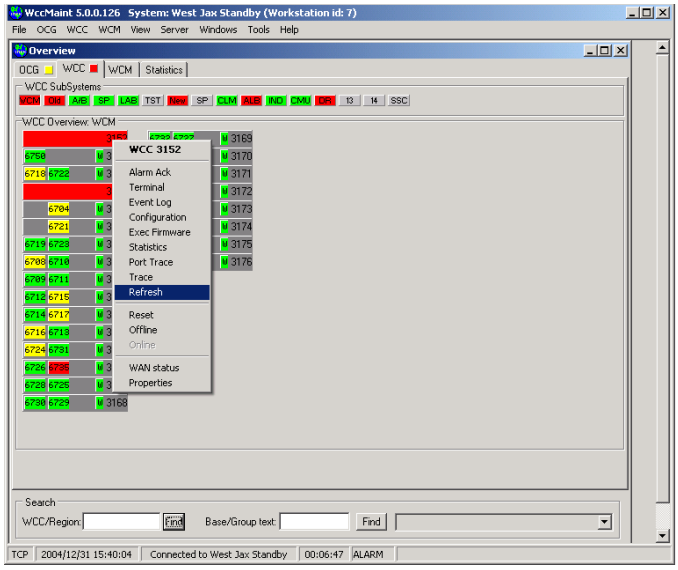

Figure 4-69 WCC Refresh

Once these WCCs are refreshed, they will be removed from the screen.

To check on the red 6735 region, open its line display:

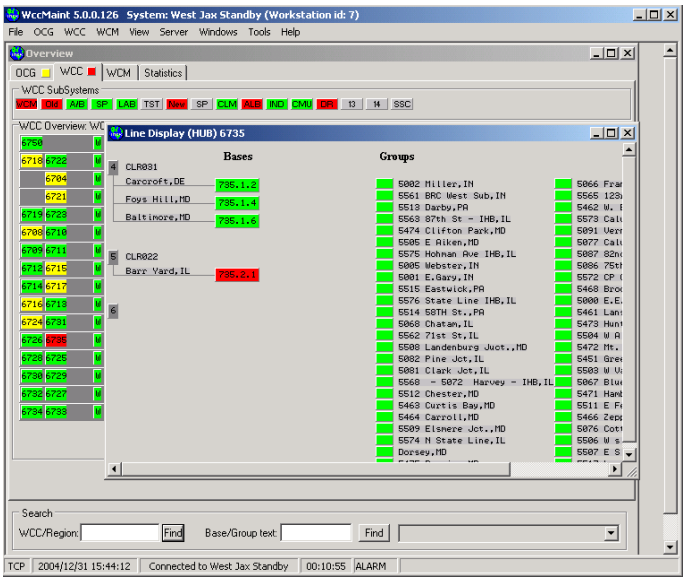

Figure 4-70 6735 Line Display

Take whatever action is appropriate, then acknowledge this alarm as demonstrated earlier. Next, click on the ‘OLD’ tab:

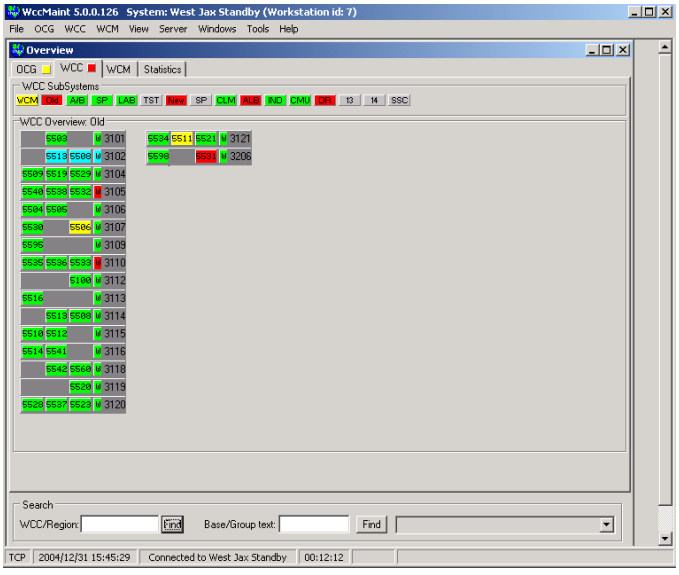

Figure 4-71 'OLD' Cluster Display

WAN status indicators are red on WCC 3105 and 3110. Click on the 'W' to open the WAN status display:

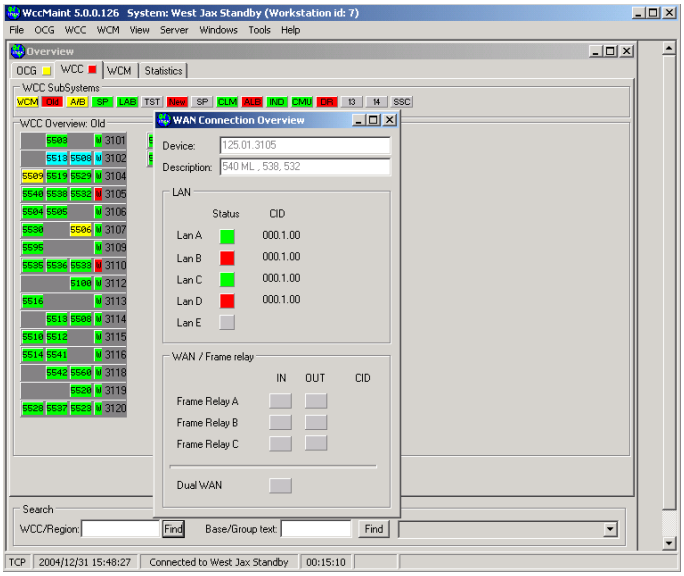

Figure 4-72 WAN Status Display

This indicates problems with the TCP sockets defined for this WCC. There is no acknowledgment for this type of problem, and red WAN status indicators do not reflect red on the summary tab.

The WAN status is also viewed by opening the WCC context menu and clicking 'WAN status'.

Close this form and open the line display for 5531:

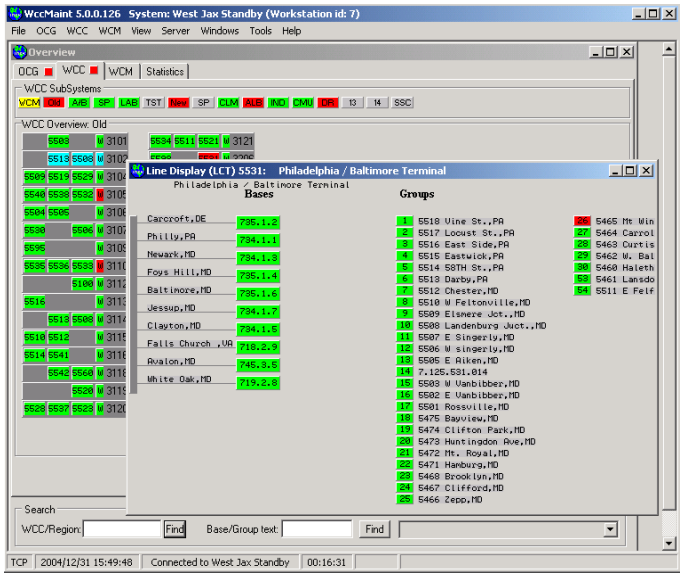

Figure 4-73 5531 Line Display

Acknowledge the failed group using any of the methods described above.

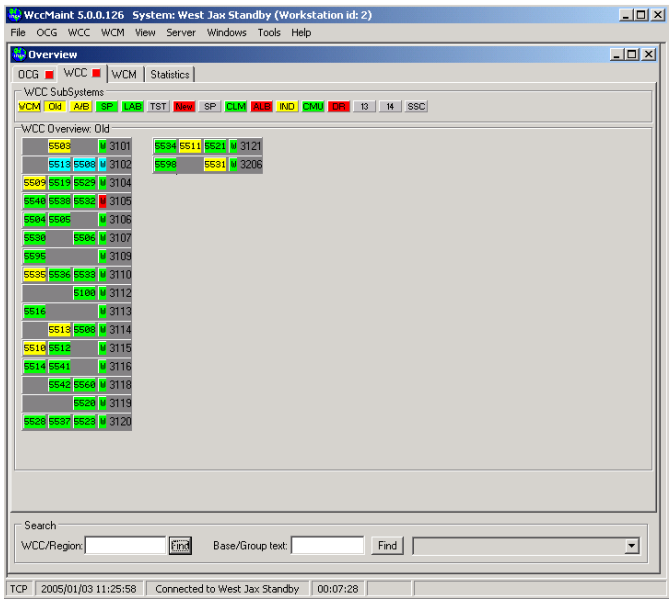

Figure 4-74 Overview Display

The red WAN status indicator for WCC 3105 does not force the ‘OLD’ summary tab to red; this is because there is no yellow condition defined for WAN status.

The techniques described above may be used to check all failed (red) conditions on the system until all summary tabs are yellow.

4.5 USING THE SEARCH ASSISTANT

At the bottom of the overview form is the search assistant tool:

Figure 4-75 Search Assistant

Use the search assistant to locate system components on very large systems. You may search for:

- WCCs / OCGs by device number (3xxx)
- WCCs / OCGs by IP address
- Regions (HUB or LCT)
- Group or Base names

4.5.1 Search For WCC

For example, to search for WCC3232, type 3232 in the WCC search box and click Find:

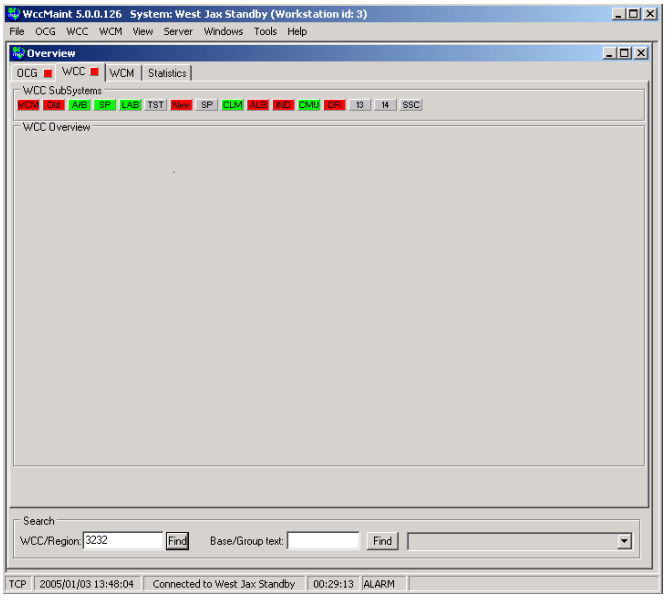

Figure 4-76 WCC Search

If WCCMaint knows about this device, it will locate it and open the appropriate tab and subsystem to display the WCC. In addition, the target WCC will turn white for a few seconds to help you locate it.

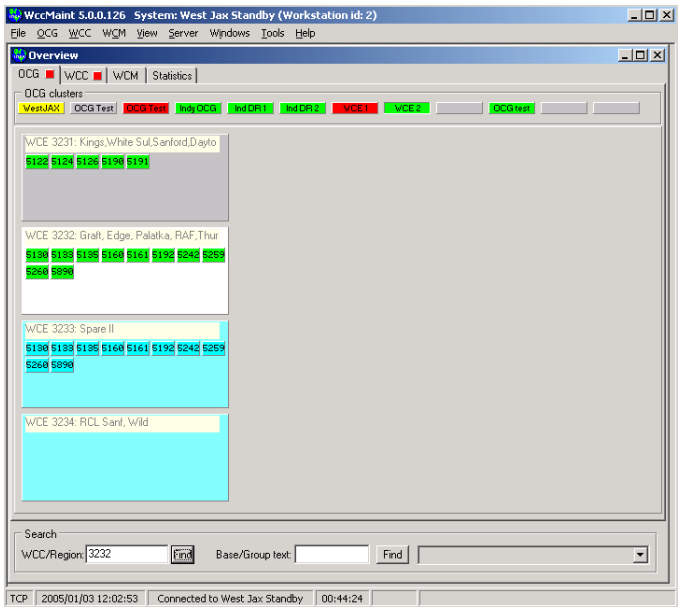

Figure 4-77 WCC Search Result

4.5.2 Search For Region

Regions (HUB or LCT) may be searched also. If WCCMaint can locate the region, it will display the appropriate page and turn the region white temporarily:

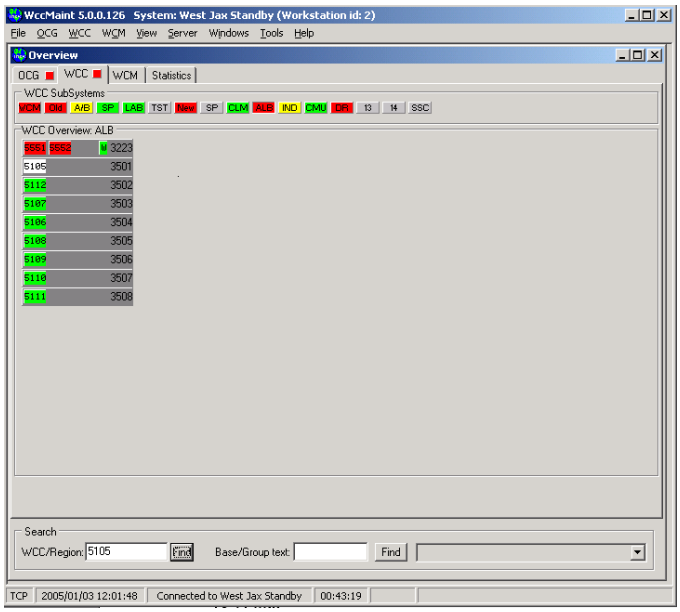

Figure 4-78 Region Search Result

4.5.3 Search For IP Address

IP addresses may also be searched. Enter the desired IP address in the WCC search box and click Find to locate:

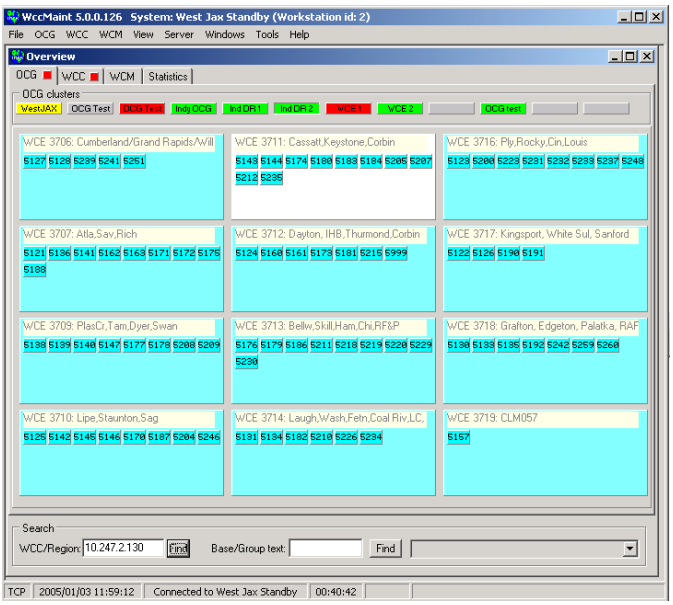

Figure 4-79 IP Address Search Result

4.5.4 Search names

A very powerful feature of the search assistant is the database name query.

If you know the name of a particular base but not which code line it is on, you can do a name search in the database. Partial name searches are allowed.

In the example shown in Figure 4-80, the search string ‘brick’ has been entered in the Base text box. Any results from the database are placed in the dropdown list box to the right of the Find button. Shown below are 2 database matches for ‘brick’.

Note: Searches are not case-sensitive.

The results box shows two items:

- **B 125.6728.1.07 Bricks**
- **G 125.506.024 6676 Bricks**

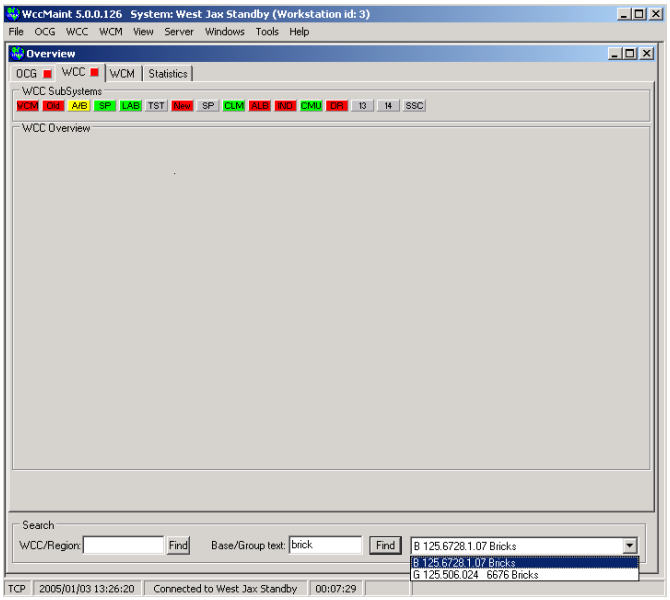

Figure 4-80 Name Search Results

The first letter of the results string indicates Base or Group. Following that is the (base) ID or (group) ATCS address, and the full name. To immediately open the line display for the matching string, click on the match in the dropdown box:

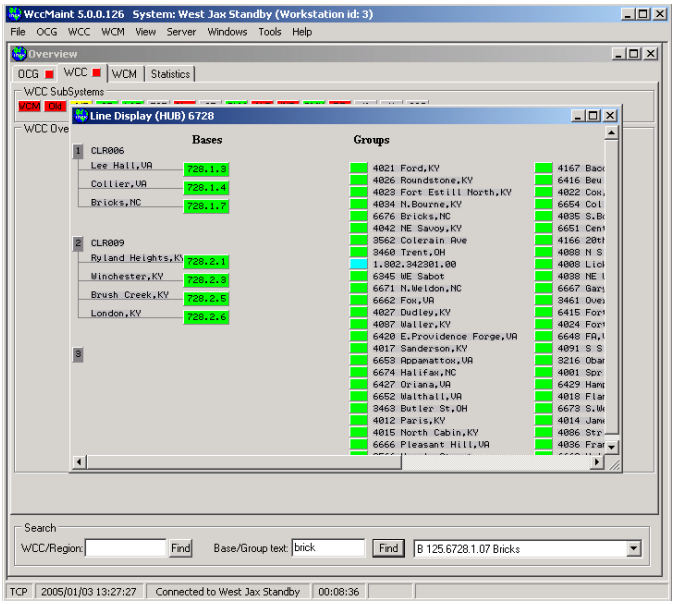

Figure 4-81 Search Opens Line Display

The codeline for the matched item will open. Note the base/group does not turn white in this case.

If the search string matches more than 30 database entries, nothing is returned, and you are prompted to use a longer search string.

4.6 INTERPRETING THE STATISTICS TAB

The Statistics tab is shown in Figure 4-82.

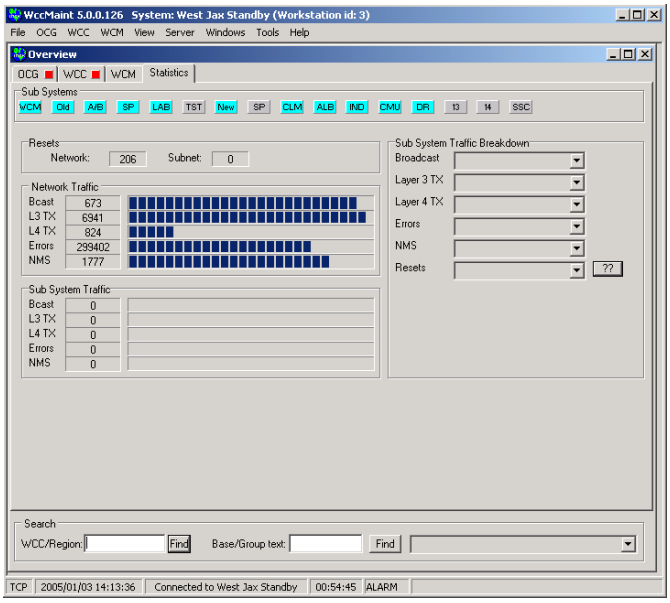

Figure 4-82 Statistics Tab

This page graphically displays network traffic counts reported by all WCCs. Statistics on this page are:

- **Broadcast:** broadcast packets are those that are sent to ASERVER for distribution to all WCCMaint clients (NMS traffic)
- **L3 TX :** ATCS Layer 3 packets sent from the WCC to the field
- **L4 TX :** ATCS Layer 4 packets sent from the WCC to CTC / CADS / NGD
- **Errors:** Line (communications) error counts
- **NMS:** Non-broadcast NMS traffic (between WCC and WCCMaint)
- **Resets**: WCC processor reset counts

The ‘Resets’ group box displays the number of WCC processor resets for the entire network for the selected cluster.

The ‘Network Traffic’ group box shows the accumulated statistics for **all** WCCs on **all** subsystems (clusters). Numbers displayed are packets per minute.

The ‘Sub System Traffic’ group box shows accumulated statistics for all WCCs **on the selected cluster**. Because there is no cluster selected, this area is empty.

To demonstrate the breakdown features available on this tab, we will walk through a diagnosis of the high Error count displayed.

The first thing to do is go through each cluster to isolate any subsystems that have a disproportionately high number of errors.

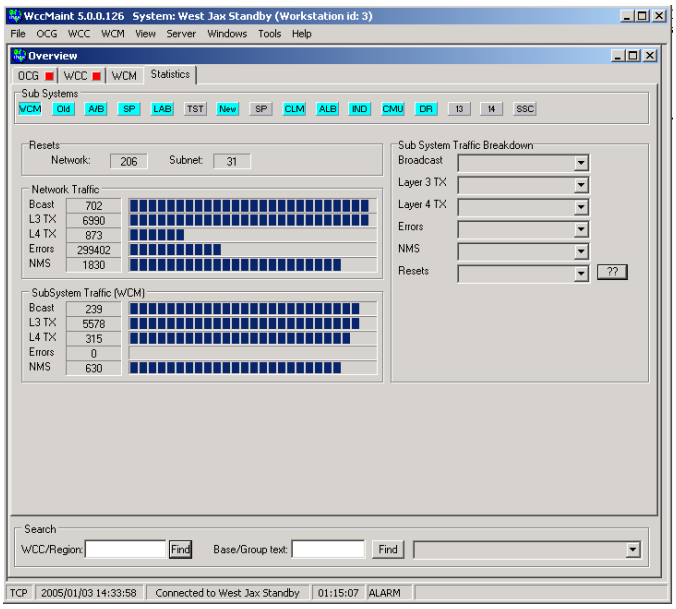

Figure 4-83 Subsystem Selection

The WCM cluster has no errors at all.

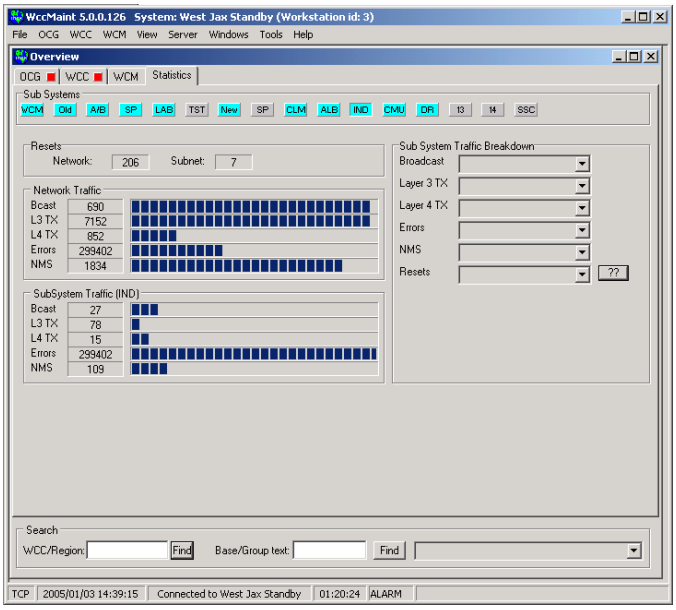

Figure 4-84 IND Subsystem Display

The IND tab is responsible for the entire error count, so we focus on this tab.

Moving to the 'Sub System Traffic Breakdown' group box on the right, we now want to isolate any particular WCC on the IND cluster that may be out of line with the rest in terms of error counts. Click on the 'Errors' dropdown box. Every WCC on this cluster will be in the dropdown list, along with its individual error count.

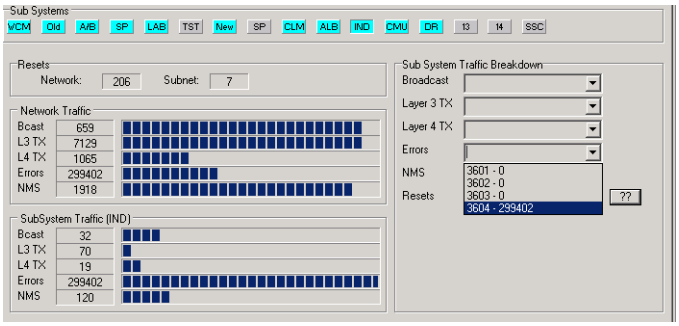

Figure 4-85 WCC Dropdown List

There are only 4 WCCs on this tab, and all errors belong to 3604. Scroll to 3604 and select it to display all 3604 stats:

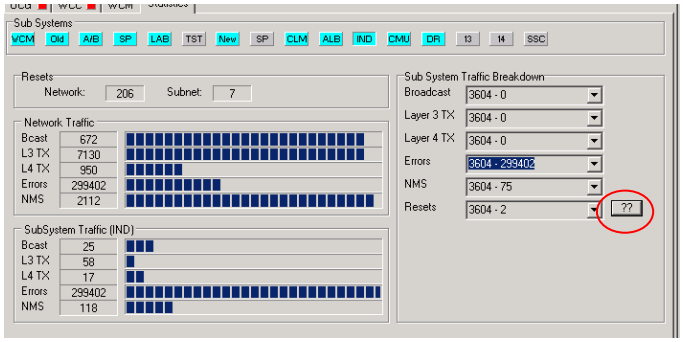

Figure 4-86 WCC 3604 Selected

To drill into this WCC, click the '??' button to show all its statistics:

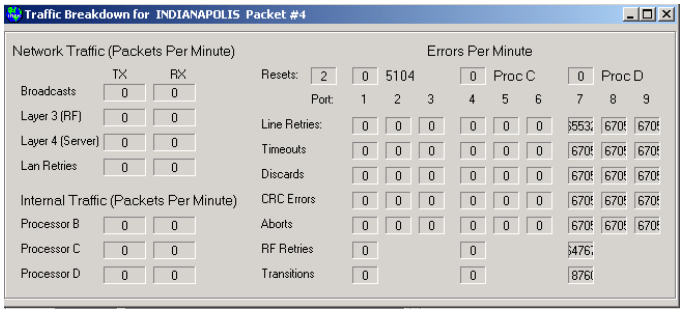

Figure 4-87 WCC 3604 Statistics Page

All errors are reported for Processor D. This implies that WCC 3604 is probably a 6-port unit (WCM) configured as an office WCC.

This technique for discovering anomalies in the system is the same regardless of the type of error you are investigating.

This traffic breakdown page is also available from the context menu of any WCC:

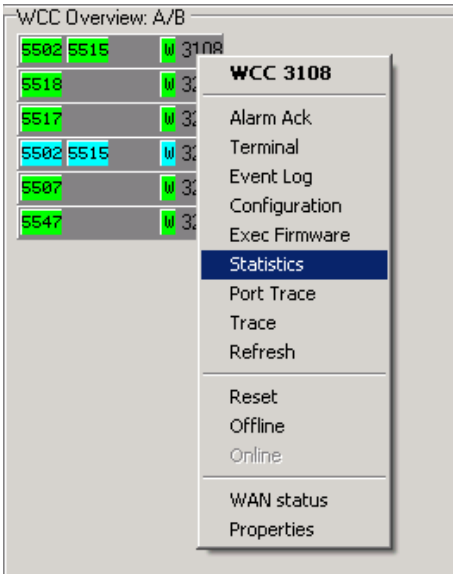

Figure 4-88 Access Statistics from WCC Context Menu

A more detailed look at this statistics page is shown in Figure 4-89.

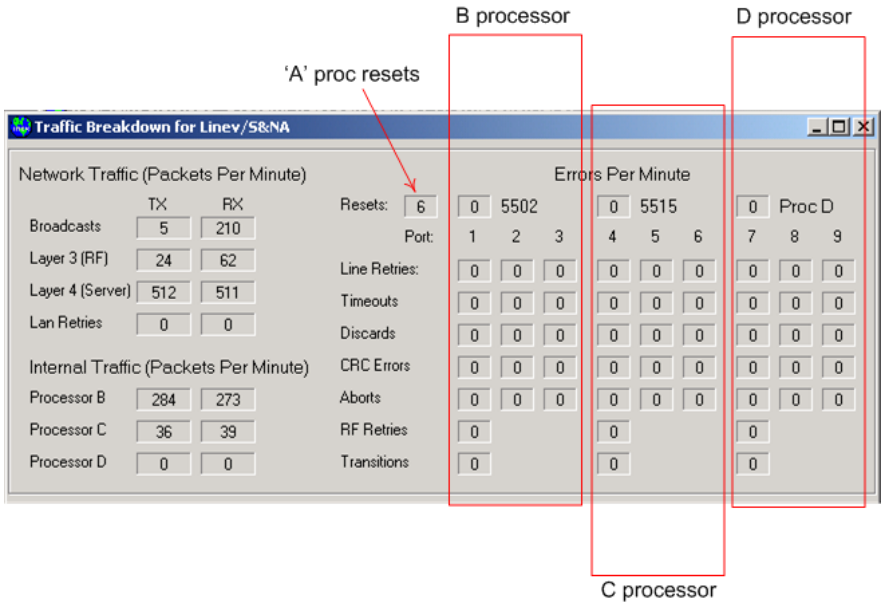

Figure 4-89 Statistics Breakdown

Individual processor resets are called out on this page. Also, any line impairments (timeouts, CRC errors, Aborts) per serial port are shown. This can be a useful tool when looking for clock problems on synchronous lines, etc.

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SECTION 5
WCC CONFIGURATION

5 WCC CONFIGURATION

5.1 Introduction

WCCs hold all their configuration data in a 5210-byte block of internal non-volatile memory. This configuration data is externally stored in data files with a .PCF extension. When modifications to a working WCC are required, the configuration data can be downloaded into WCCMaint, changed with the Configuration Editor as needed, and reloaded into the WCC. Alternatively, if the configuration data is stored on a local hard drive, the PCF file may be loaded, the contents edited, and the changed configuration may then be either uploaded to the target WCC or saved back to disk.

5.2 The Configuration Manager

The Configuration Manager controls the handling of the configuration data (loading, saving, uploading, etc) and calls the Configuration Editor as needed to modify the data.

To open the Configuration Manager, right-click on a WCC and select '**Configuration**':

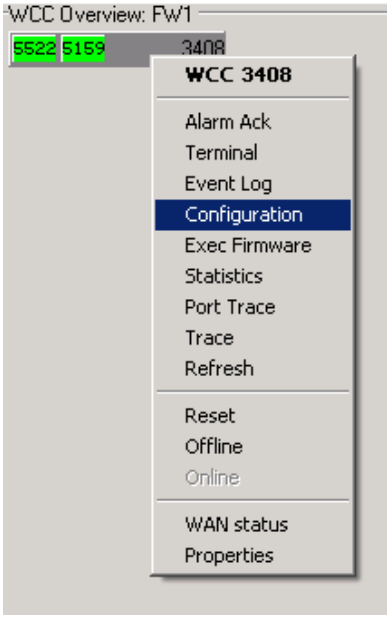


Figure 5-1 Opening the Configuration Manager

The Configuration Manager for WCC 3408 appears:

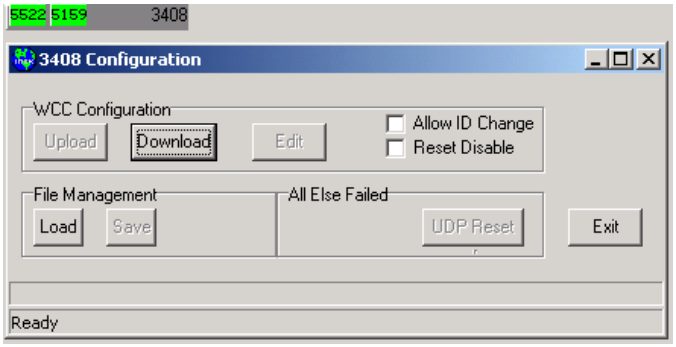


Figure 5-2 Configuration Manager

Each WCC has its own Configuration Manager so that you can open the Configuration Manager for many WCCs at the same time if desired. Once the Manager is open for a particular WCC, the 'Configuration' context menu item for that WCC is disabled.

The function of the Manager is to load a set of configuration data either from a WCC or from a disk file place the data in a workspace available for the Editor and move the changed data either to the WCC or back to a disk file. Manager functions are as follows:

Upload: Writes data to the WCC. The following two checkboxes modify the behavior of the WCC on receiving the data:

Allow ID Change: If basic identity information (IP address, subnet mask, etc) has been modified, this box must be checked or the WCC will ignore the identity fields (but all other data is accepted).

Reset disable: Normally, once an upload is complete and the WCC has check summed and accepted the data, the WCC will reboot. This checkbox prevents the reboot.

Download: Reads the configuration data from the WCC into a workspace ready for editing.

Edit: This button calls the Configuration Editor (WCCCONFIG.DLL), which is a separate module from WCCMaint. (See comments in Section 2). The Editor allows you to modify the configuration data that is in the workspace.

Load: Reads data into an edit workspace from a disk file. If there is already data in the workspace from a previous load or download, it is overwritten.

Save: Saves the contents of the workspace to a disk file.

Exit: Closes the Configuration Manager.

There is a progress bar on the Manager that displays the current state of a download from a WCC. This is helpful when downloading configuration data over a slow link (satellite, for example).

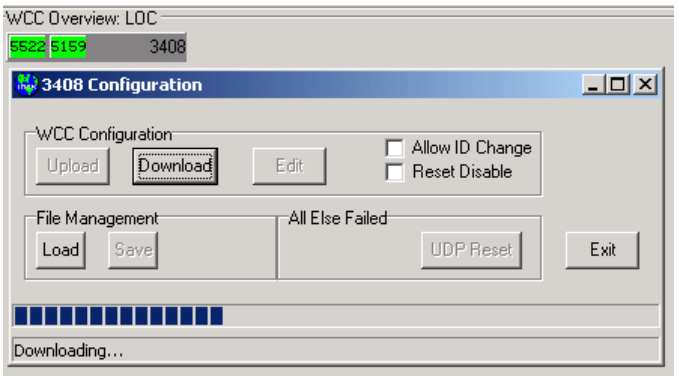


Figure 5-3 Progress Bar Indicating Download Status

5.3 The Configuration Editor

.

NOTE

NOTE

A comprehensive explanation of every possible configuration option for a WCC or WCM is beyond the scope of this manual. The most important fields for each page are outlined here, and several typical configurations are examined.

Once the edit workspace is loaded, the data is check summed, and if the checksum is correct, the Edit button is enabled. Click **Edit** to open the Configuration Editor (Figure 5-4).

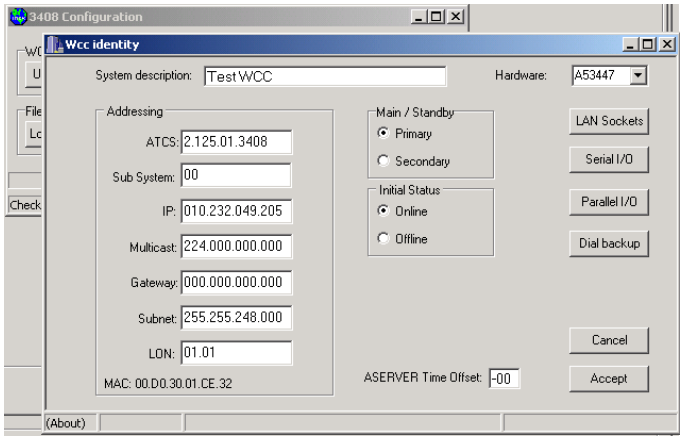


Figure 5-4 WCC Configuration Editor (Identity Page)

NOTE

NOTE

The configuration editor is a modal form, which means that no other windows will be active while it is open. Also, every additional form you open within the editor creates another modal form, so that **all editor windows must be closed in the reverse order in which they were opened**. You must complete all configuration changes and close the editor before going on to other WCCMaint functions.

Use the ‘Accept’ button when closing all editor forms to retain any changes.

5.3.1 Identity Page

Table 5-1 shows the Identity page of the Editor. As mentioned above, if any of these fields are to be modified, the '**Allow ID change**' checkbox in the configuration manager must be checked before uploading to the WCC.

Fields on the Identity page are listed in Table 5-1.

Table 5-1 Identity Page Fields

FIELD	MEANING
System Description	Wcc description field that appears on the top line of the terminal.
ATCS	The ATCS address for this WCC (WCM)
Sub System	Subsystem cluster tab this WCC will appear on
IP	Assigned IP address for this WCC/WCM
Multicast	Multicast group this WCC/WCM is to JOIN
Gateway	Network gateway address if used
Subnet	Assigned subnet mask
LON	Echelon hardware address. Contact Siemens for applications. Normally disabled by setting to 01.01
Hardware	Dropdown selection box for the hardware assembly number: A53477: 6-port model (WCM) A53401: 9-port model (WCC) A53430: 12-port model
Primary/Secondary	Used in only conjunction with Siemens A/B switch; otherwise ignored.
Online/Offline	Initial state WCC (WCM) is to assume after power-up.
ASERVER Time Offset	Offset, in hours, to be applied to system time received from ASERVER before it is propagated to field devices. Used to offset timezone differences.

From the Identity page, four additional main pages are available.

5.3.2 LAN Applications Page

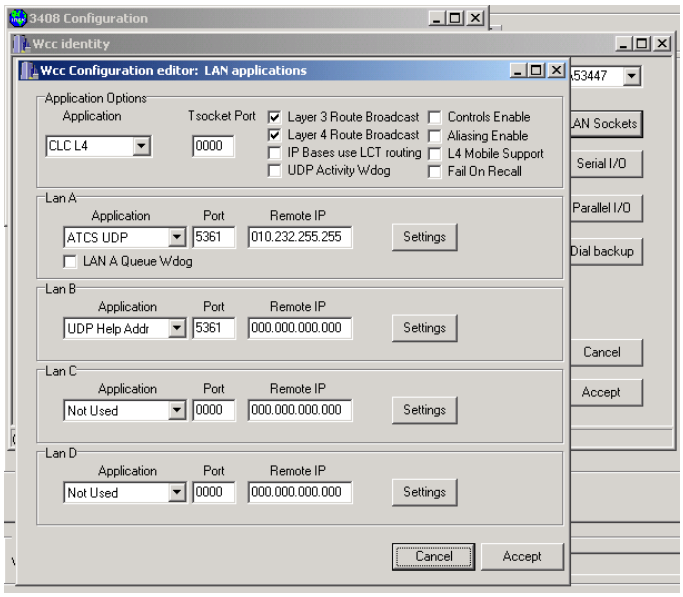


Figure 5-5 Editor - LAN Applications Page

Table 5-2 Main Fields of the LAN Applications Page

FIELD	MEANING
(Main) Application	'A' processor function, typically CLCL4 for office WCCs and CLCL3 for WCMs
LAN Application	A process that runs on an Ethernet interface. Typical applications are ATCS UDP, which clusters office WCCs, and UDP HELP ADDR, which is a secondary path used by the WCC to request route IDs from the system.
Port	Application specific; for ATCS UDP, port 5361 is required.
Remote IP	The IP address that the application will send requests to. For ATCS UDP, this is the address to which route requests will be sent. A gateway or multicast address may be used here.

5.3.3 Serial I/O Page

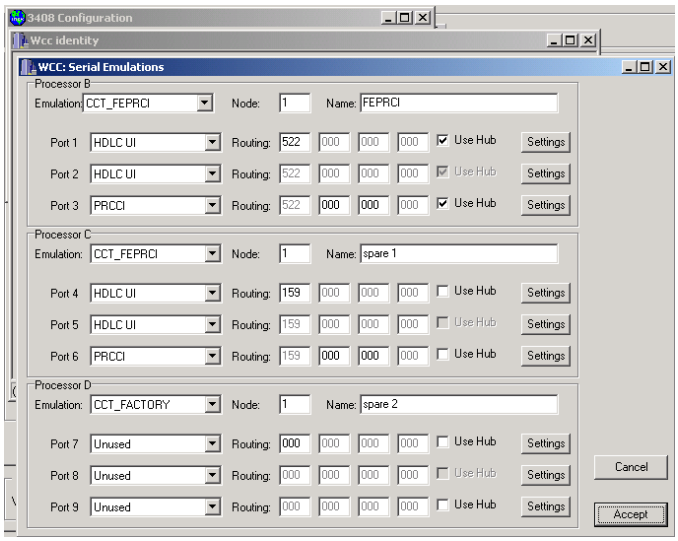


Figure 5-6 Editor – Serial I/O Page

Each serial processor has its own set of configuration fields. The fields are listed in Table 5-3.

Table 5-3 Serial Processor Configuration Fields

FIELD	MEANING
Emulation	Sets serial protocol emulation, i.e. RCCI, MCS, Genisys
Node	Sets node number for the ATCS address of this LCT
Name	Convenient name for this processor; this appears at the top of the WCC terminal
Port (n)	Sets individual serial port assignment for this protocol. Choices are protocol specific.
Routing	Sets the codeline number for this LCT. For example 552 results in an LCT region of 5552.
Use Hub	This checkbox is protocol specific. Typically used to instruct the LCT to allow traffic from hubs.
Settings	Individual serial port settings, ie baud rate, clocking, parity, etc

5.3.4 Parallel I/O Page

Parallel ports are generally used to drive DC codelines. Some of the available protocols are shown in the drop down list. Region settings are used to associate a particular parallel port with one of the serial processors.

Another function of the parallel port configuration is to allocate a block of WCC/WCM memory to be used as a cross-reference table for legacy protocols that have an addressing range outside of the normal ATCS-defined group number range. This is a common application for WCMs and is shown in one of the sample configurations below.

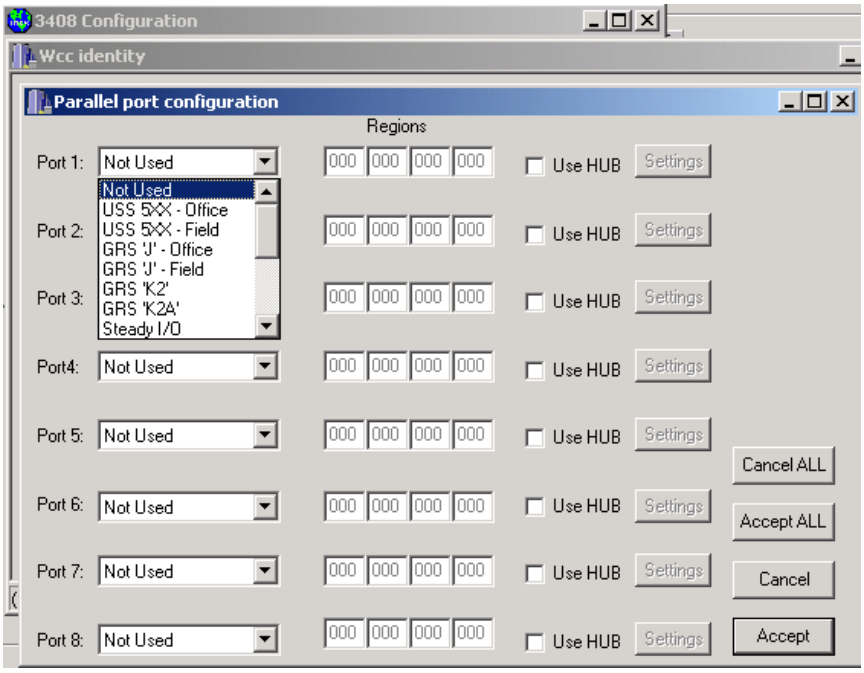


Figure 5-7 Editor – Parallel I/O Page

5.3.5 Dial Backup Page

For protocols that are dial-backup enabled, this screen sets up dial string or IP address backup numbers for analog or IP-based dial backup respectively.

For more details see Appendix C, ‘Dial Backup Subsystem’

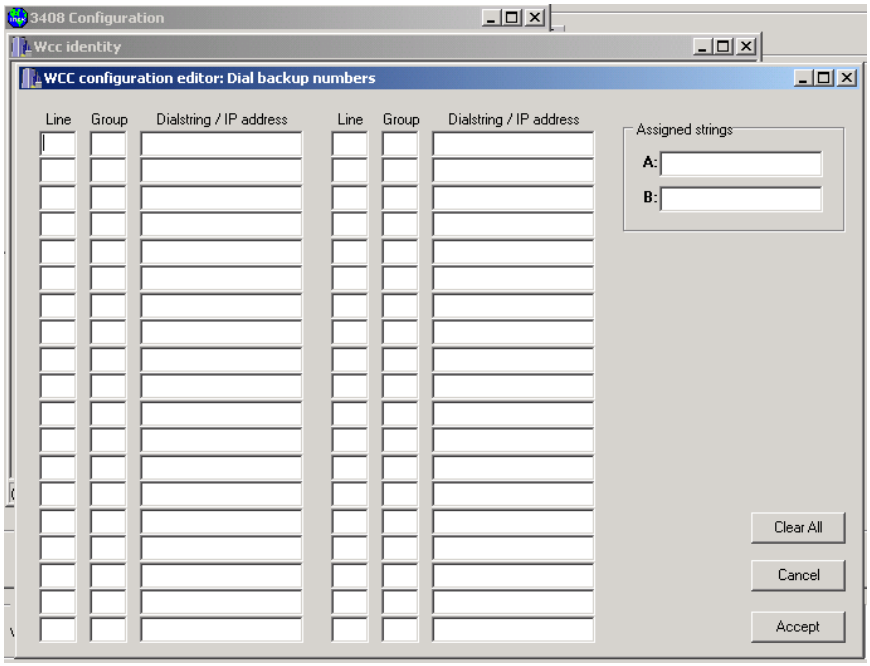


Figure 5-8 Editor – Dial Backup Page

5.4 Filename Conventions

All WCC and WCM configuration files have a PCF extension. WCCMaint requires a filename format of RRR.NN.DDDD.PCF, and this filename is generated as a suggestion when a file is saved. The format can be overridden and files saved with any desired filename; however, the format of the filename may affect executive uploads. See Section 11.4 for more information.

5.5 Configuration Exercise: Placing A WCC On A Specific Tab

As an exercise, we will run through a typical configuration edit task: moving a WCC from one tab on WCCMaint to another.

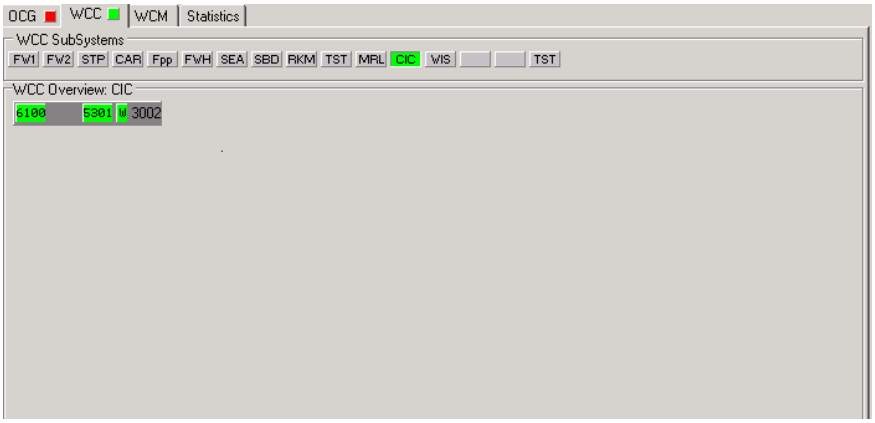


Figure 5-9 WCC 3002 on Tab CIC

WCC 3002 appears on the 'CIC' tab; we will move it to the 'WIS' tab.

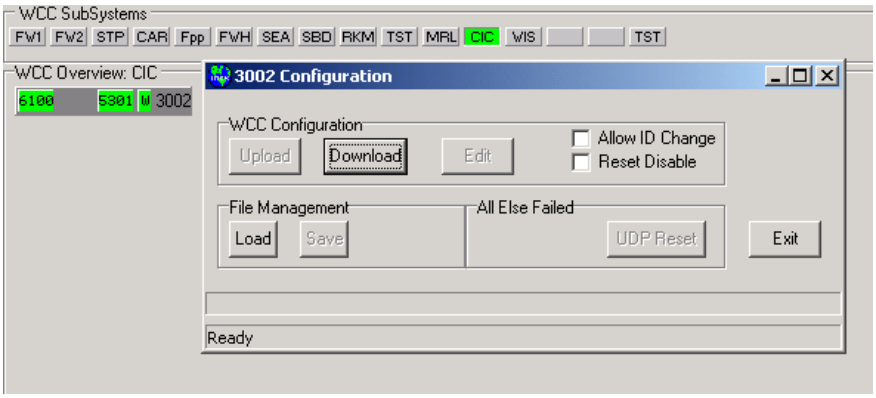


Figure 5-10 Preparing to Download WCC 3002 Configuration

First, download the configuration and open the Editor:

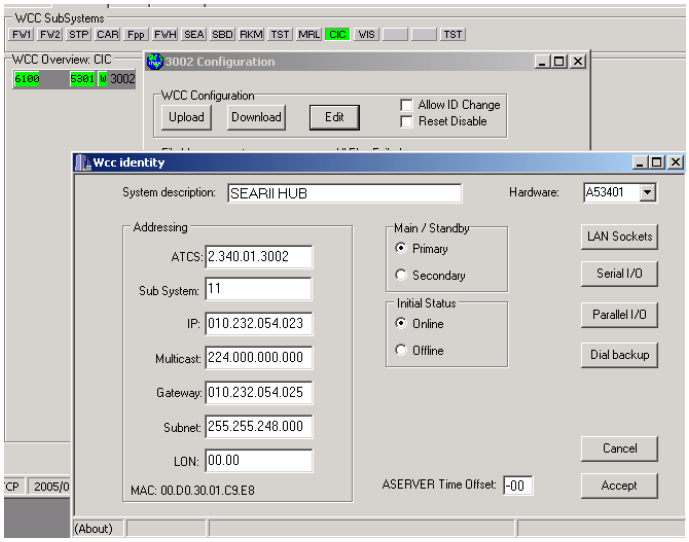


Figure 5-11 Editor – Identity Page

The WCC is configured to appear on tab 11 as shown in Figure 5-12.

Change the subsystem from 11 to 12. The first subsystem is 0, so 12 corresponds to the 13th cluster tab.

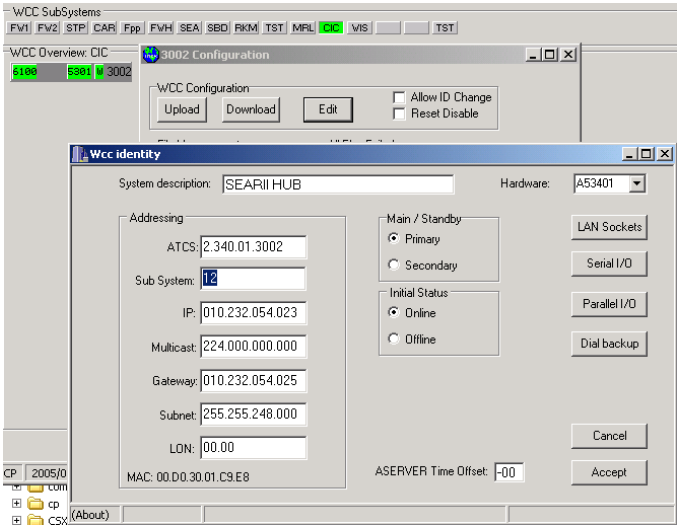


Figure 5-12 Editing the Subsystem Field

Click **Accept** to accept the change and close the Editor.

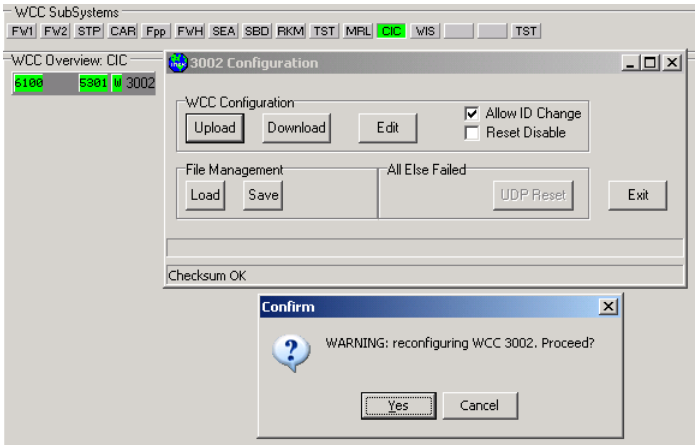


Figure 5-13 Uploading the New Configuration

Because the Identity page has changed, the **Allow ID Change** checkbox must be checked. Click **Upload** and then click **Yes** when prompted to reconfigure.

After the upload is complete, right-click on WCC 3002 and select **Refresh**. This will erase the WCC display and request new status messages from the WCC.

When the WCC returns, it will appear on the WIS tab.

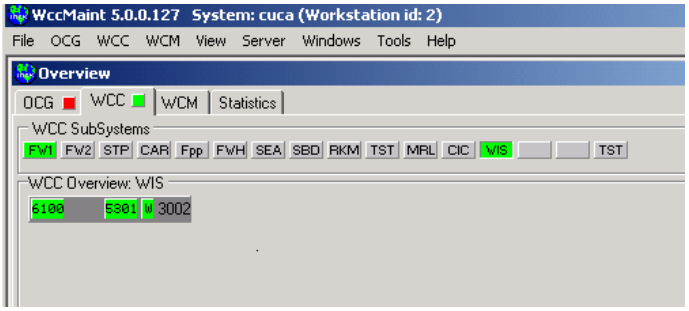


Figure 5-14 WCC 3002 Relocated to Tab WIS

5.6 Sample Configurations

5.6.1 Typical Office (LCT)

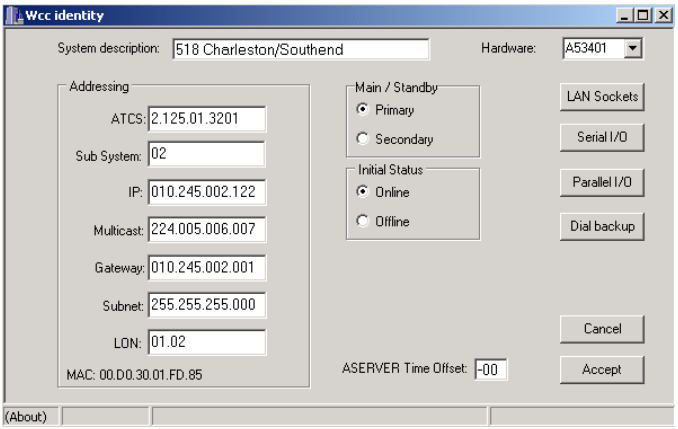


Figure 5-15 Typical Office Wcc (LCT)

The Identity page will not have anything that marks this WCC as an office unit with an LCT. The LAN Sockets and Serial I/O pages determine this.

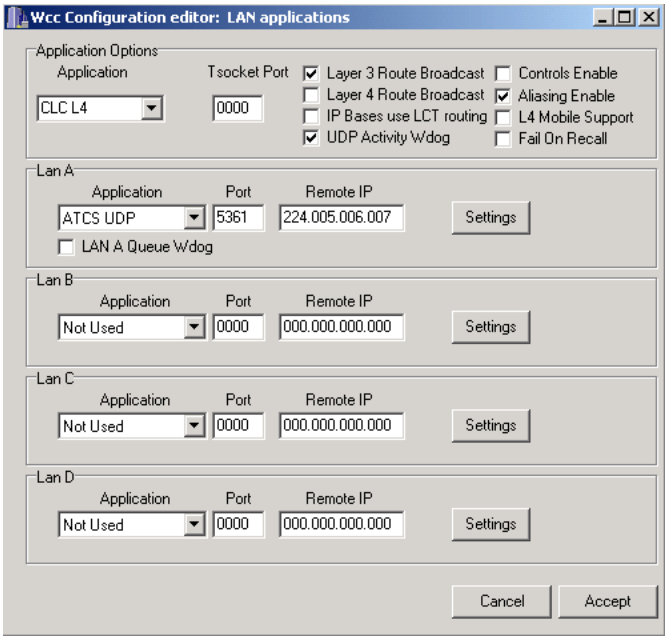


Figure 5-16 LAN Page

CLC_L4 is the application that must run on an office WCC. The **ATCS UDP** Application on Port 5361 is the clustering software that links all office WCCs together and links the WCC to ASERVER.

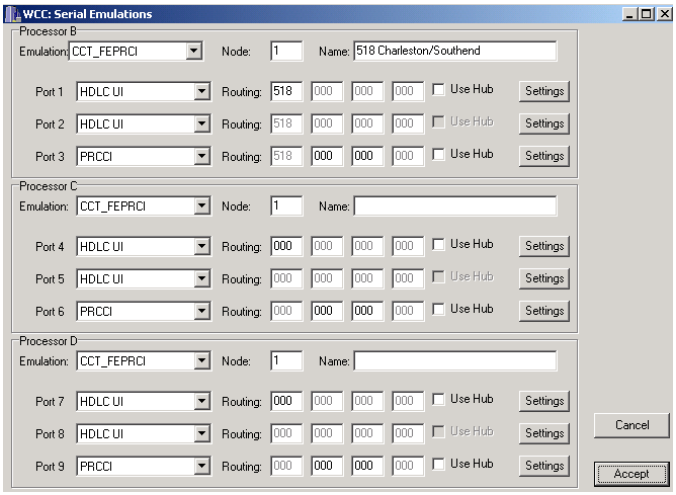


Figure 5-17 Serial Page (LCT)

Individual codelines are created on the Serial I/O page. The Emulation field determines what type of office protocol the field units expect to see; in this case, CCT_FEPRCI is the emulation module for PRCCI. The codeline number is placed in the Routing box; this entry of 518 will create the LCT region 5518.

Processors C and D are configured for PRCCI protocol also, but since the Routing field is blank (0), no LCT is created.

5.6.2 Typical Hub

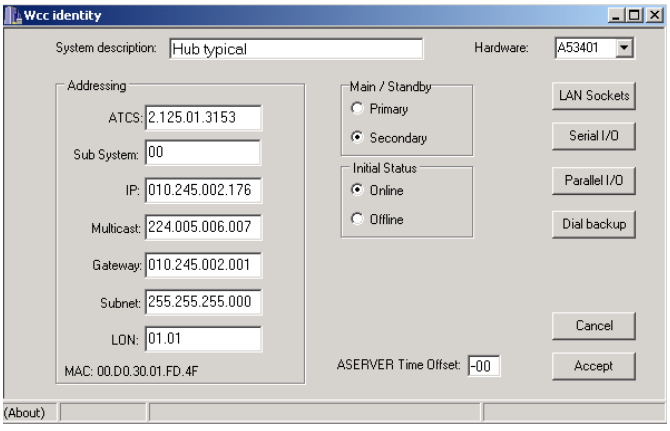


Figure 5-18 Typical Office WCC (HUB)

The HUB WCC configuration is very similar to the LCT; the only functional difference between the two is on the Serial I/O page.

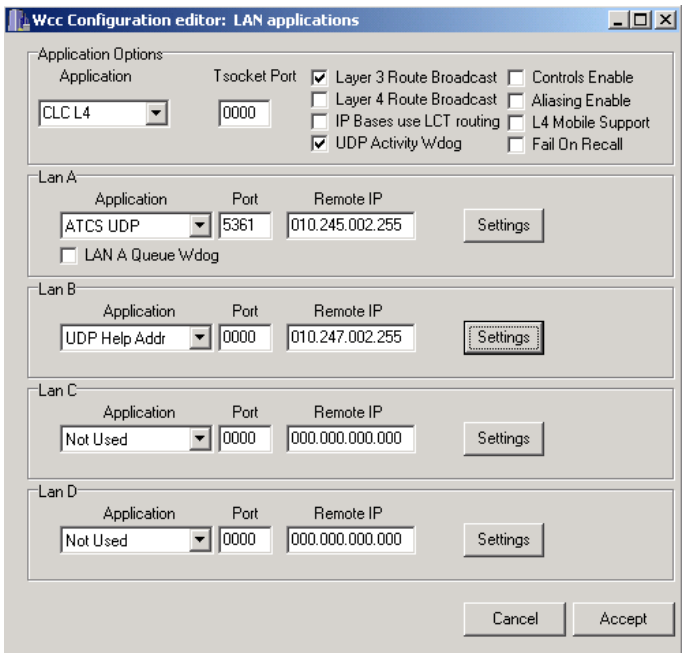


Figure 5-19 LAN Page

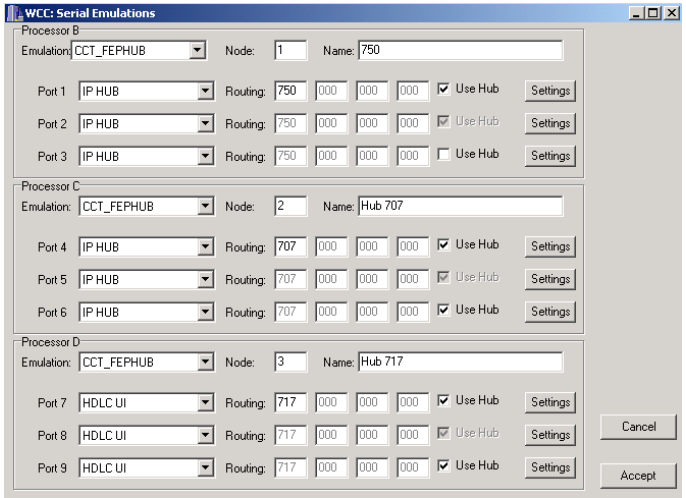


Figure 5-20 Serial I/O Page (HUB)

The emulation for a HUB function is CCT_FEPHUB; both wireline and IP BCPs are supported. Processors B and C (HUBs 6750 and 6707 respectively) are running IP bases; Processor D (HUB 6717) will poll wireline bases on serial ports 7 and 8.

5.6.3 Typical Office LCT for WCM Codeline Application

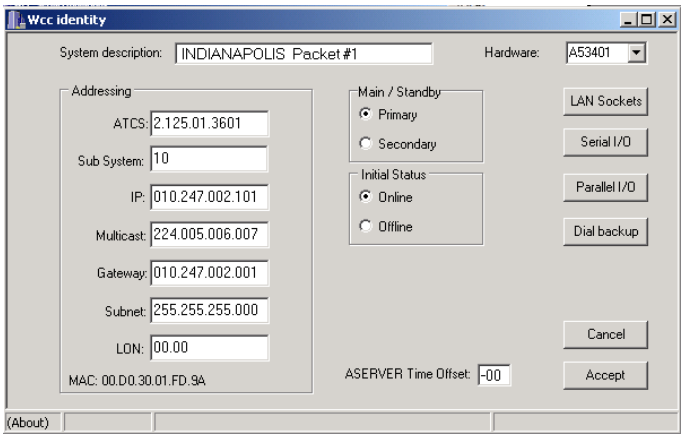


Figure 5-21 Typical Office WCC (WCM Codelines)

As before, the Identity page does not indicate anything about the LAN or serial emulations run by this office WCC.

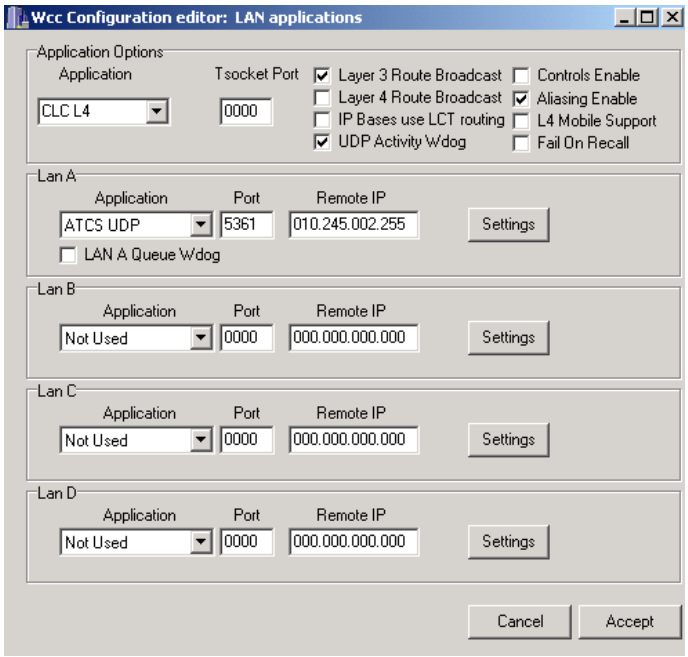


Figure 5-22 LAN Page

All office applications run **CLC_L4**, and **ATCS_UDP** is required for clustering.

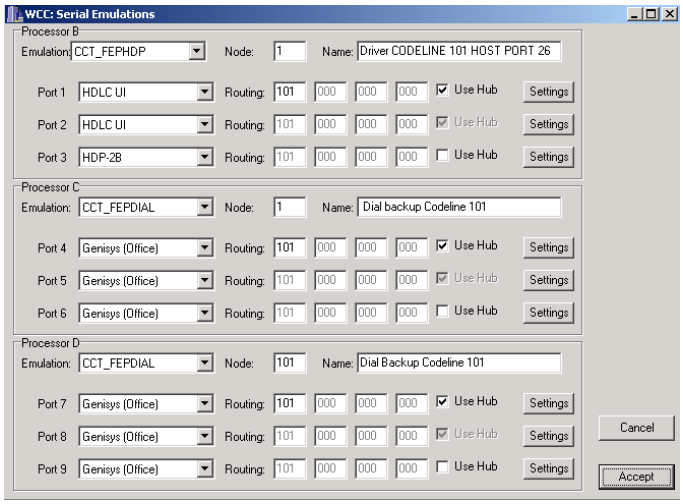


Figure 5-23 Serial Page with Dial Backup

This WCC is different in that it has been configured for automatic dial backup. Processors C and D have been configured for CCT_FEPDIAL, which controls serial dial backup via modems attached to serial ports 4 through 9.

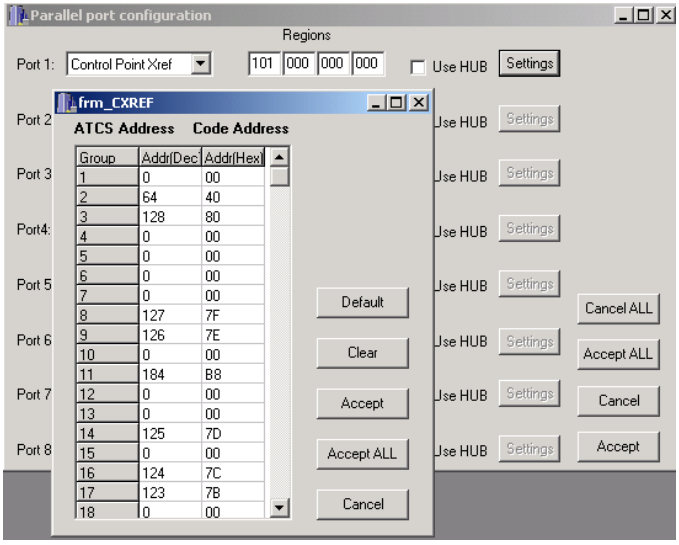


Figure 5-24 Parallel Port Cross-Reference Application

In addition, Parallel port 1 has been configured as a **Control Point Cross-Reference** table, which translates control point addresses outside of the defined ATCS range.

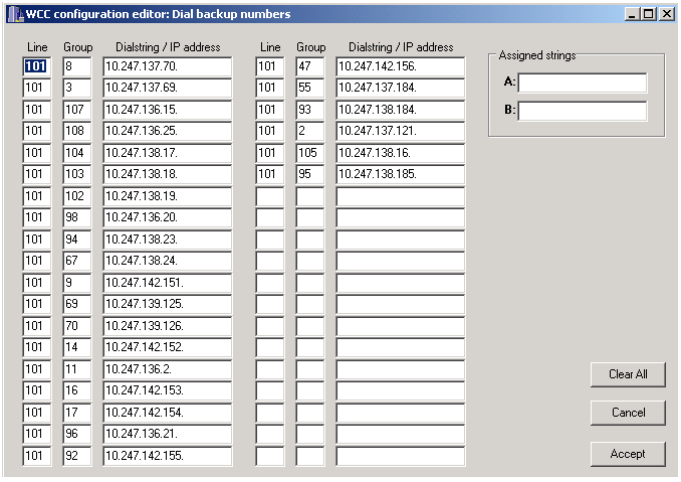


Figure 5-25 Backup IP Addresses

Finally, the dial backup IP addresses have been entered into the **Dial Backup** page.

5.6.4 Typical WCM

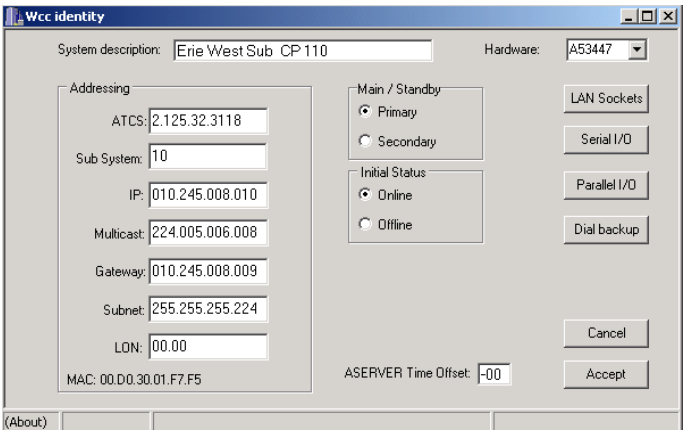
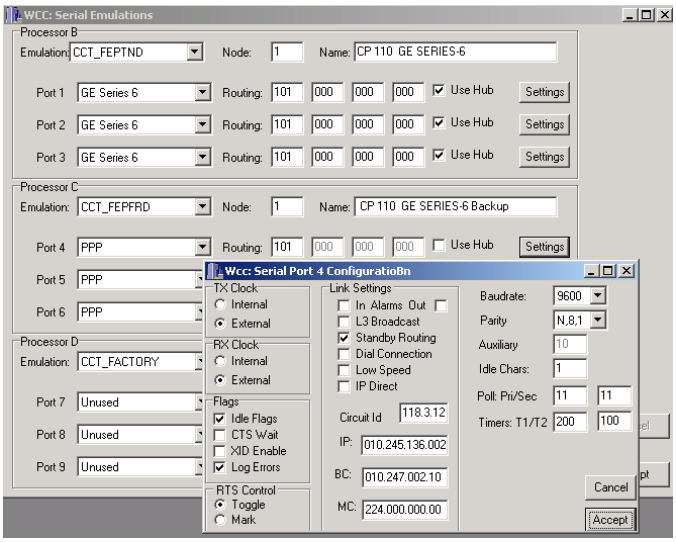


Figure 5-26 Typical WCM Identity Page

A typical WCM field unit is shown here. The gateway address is that of the local router that is located in the field along with the WCM.

For WCMs, the main LAN application is **CLC_L3**. Note that the UDP activity watchdog is disabled.

In addition to the required **ATCS UDP** application, Lan B must be configured for **ATCS_L3**, using port 5370. The Lan B settings page displays the **Circuit ID** for this WCM, which is a path tag similar to that used to identify an IP base.



For WCMs, the main LAN application is **CLC_L3**. Note that the UDP activity watchdog is disabled.

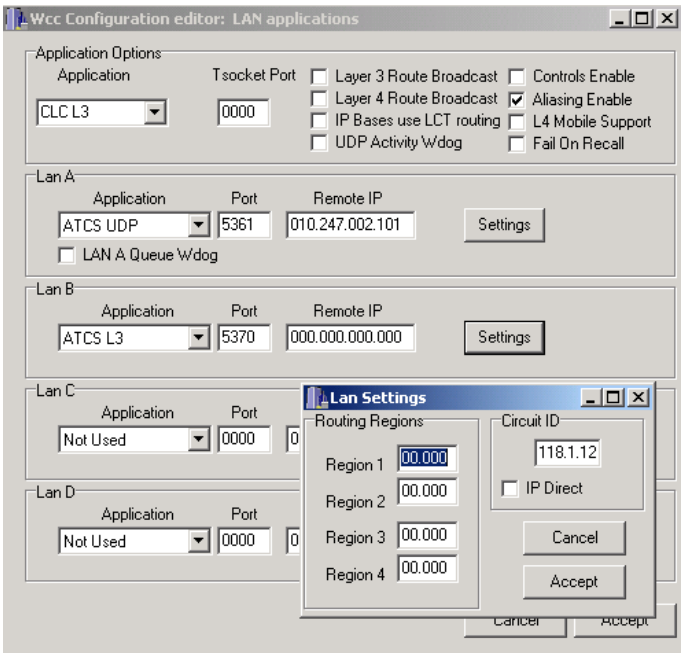


Figure 5-27 WCM LAN Applications Page

In addition to the required **ATCS UDP** application, Lan B must be configured for **ATCS_L3**, using port 5370. The Lan B settings page displays the **Circuit ID** for this WCM, which is a path tag similar to that used to identify an IP base.

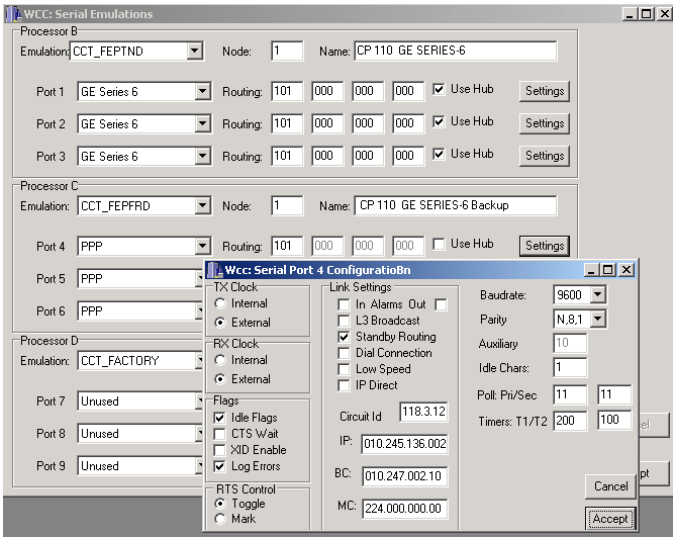


Figure 5-28 WCM Serial Configuration Page

This WCM is configured to communicate with a GE Series 6 field unit. **CCT_FEPTND** is an emulation module that contains drivers for Series 6 and other field protocols, including MCS, GE Series 90, and SCS-128.

For Processor C, **CCT_FEPFRD** is the frame-relay driver that supports PPP and SLIP links for dial backup. The configuration settings for serial port 4 show the IP addresses and options available for this type of backup.

SECTION 6
WCC EXECUTIVE FIRMWARE

6 WCC EXECUTIVE FIRMWARE

6.1 Introduction

Executive firmware is a collection of software modules required by a WCC to perform its configured functions. This software is organized into separate tasks, each of which performs an elemental function within the WCC, but cannot stand alone. Modules are combined to form the WCCs 'operating system' and give it the capability to perform tasks.

6.2 Software Versions

When updated WCC software is released, it is zipped into a file containing all compiled binary modules in a hierarchical folder structure. Release zip files have the naming format PSVxxx.ZIP, where xxx is the sequential release number.

When a PSV release is unzipped, it creates two main folders, 68302 and 68332. In general, the 68332 folder contains all modules related to the A processor and has to do with higher functionality such as the cluster controller and real-time kernel. The 68302 branch contains all driver modules that handle protocol emulation (B, C, and D processors).

The unzipped PSV release can be thought of as a master library of binary files, available for loading into a WCC if its configuration requires it. For example, assume a PSV release is unzipped to the folder c:\A53401\GOLD_DISK. For a WCC configured to run a PRCCI code line, the module C:\a53401\GOLD_DISK\68302\FEPRCI\FEPRCI.BIN is required and will be loaded during the executive upload process. When software modules are loaded into a WCC, only the name of the MODULE is loaded with the binary image – the WCC knows nothing about PSV ZIP files.

6.2.1 The Version List

Because all software loaded into a WCC is a collection of individual binary files, and the PSV release number is simply a convenient filename for a ZIP file, the software image in a WCC is displayed as a list of all loaded binary files with version numbers and CRC values.

To retrieve the version list for a WCC, open the Exec Firmware manager form by right-clicking on the WCC and selecting **Exec Firmware** (Figure 6-1). The Exec Firmware manager will request version information from the WCC and display it (Figure 6-2).

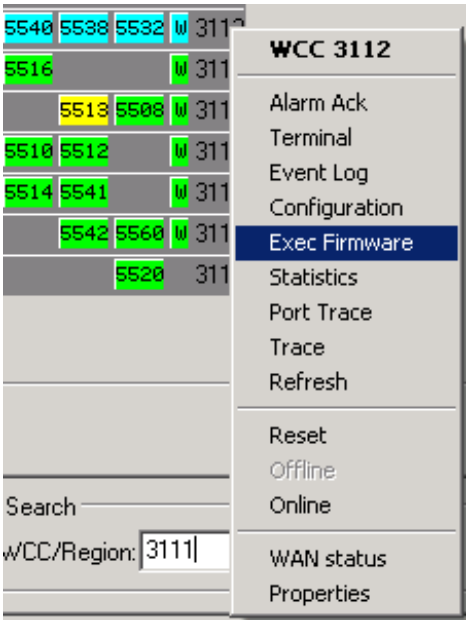


Figure 6-1 Opening the Exec Firmware Manager

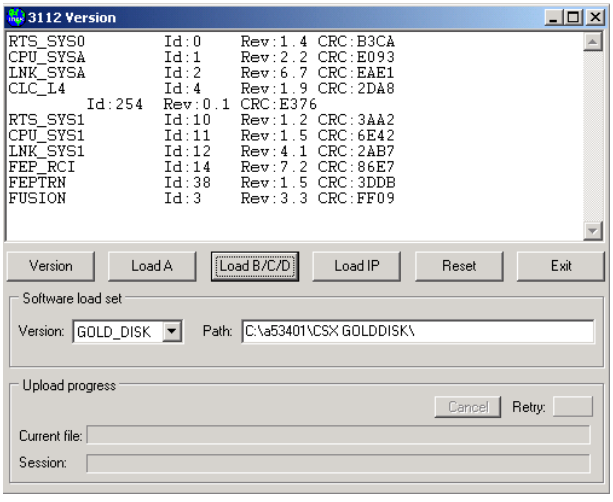


Figure 6-2 Exec Firmware Manager Version List

The columns in the version list contain the following information:

Module name: The module name is the mnemonic for the binary module.

- RTS_SYS0 Realtime kernal
- CPU_SYSA CPU module
- LNK_SYSA Layer 3
- CLC_L4 Cluster controller
- RTS_SYS1 Realtime kernal (B,C,D)
- CPU_SYS1 CPU (B,C,D)
- LNK_SYS1 Layer3 (B,C,D)
- FEP_RCI Protocol driver (PRCCI)
- FEPTRN Protocol driver (various)
- FUSION IP stack
- RTS_SYS0 Realtime kernal

ID number: Numeric tag for the module for header identification

Revision number: Revision number for the module.

CRC: Module CRC, which is calculated when the module is loaded to verify its integrity.

The ID of 254 is assigned to the configuration file name, and is found here only because it is located in the internal module list; the CRC is meaningless and this line can be ignored. This line may have a file name (ie 3001.PCF) in the first column.

A fresh copy of the version list can be retrieved from the WCC by clicking the **Version** button.

6.3 Software Load Options

There are three **Load** buttons on the form:

- **Load A** Loads firmware for the A processor only
- **Load B,C,D** Loads firmware for the serial (B,C,D) processors only.
- **Load IP** Loads the IP stack (FUSION) firmware.

The ability to load separate processes allows more flexibility when updating a live system. For example, if a change has been made to the PRCCI driver.

Load B/C/D will upload only the serial processor software, leaving the main (A) processor unchanged.

When a software module has been uploaded, it is stored in non-volatile memory that is copied to the appropriate processor on startup. This means a reset must take place for updated modules to execute. The entire WCC may be reset or individual serial processors may be reset. The latter allows a codeline to be restarted without rebooting the WCC. The **Reset** button on the Exec Manager form forces the WCC to do a warm reboot.

As discussed in Section 3, multiple firmware versions may be managed in WccMaint. These different software sets may be selected on the Exec Firmware form to load a WCC with a specific vintage of software. In this way, a WCC may be easily reverted to an earlier version of firmware if desired. Two available software sets are displayed in Figure 6-3.

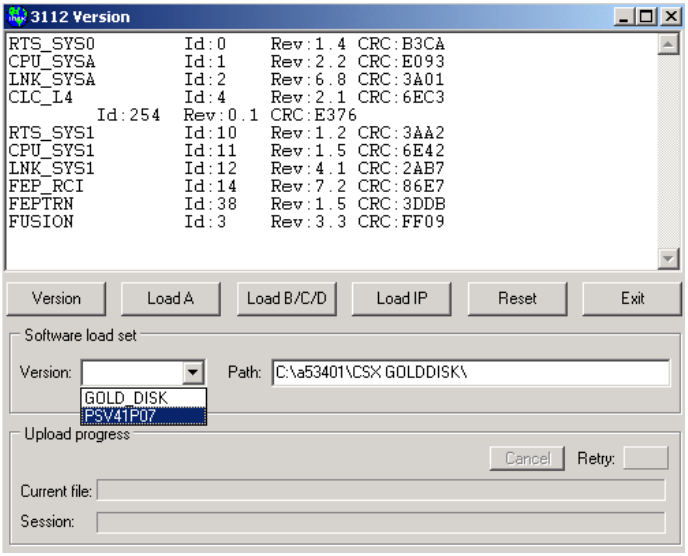


Figure 6-3 Available Executive Software Sets

6.4 Upload Procedures

As an example, in this section, we will update the A processor with firmware from software release PSV41P07. Select the version set as shown in Figure 6-4 and click the **Load A** button to begin the upload.

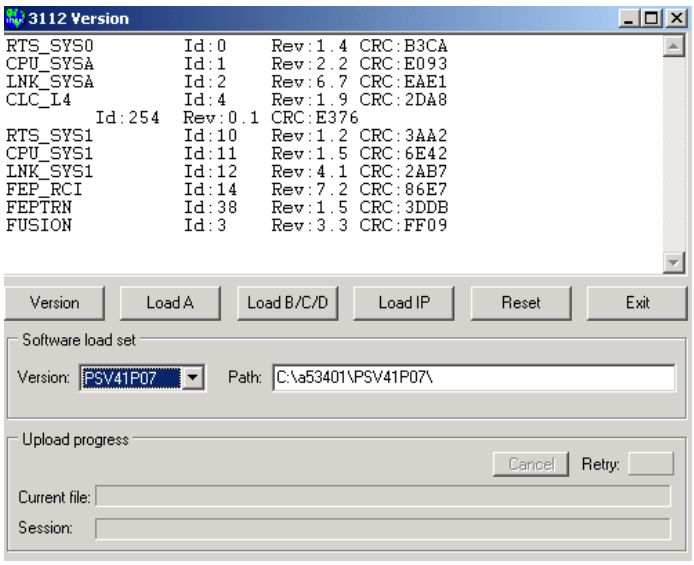


Figure 6-4 Ready To Upload Exec Firmware

The system will warn that you are about to modify firmware (Figure 6-5). Click **Yes** to continue.

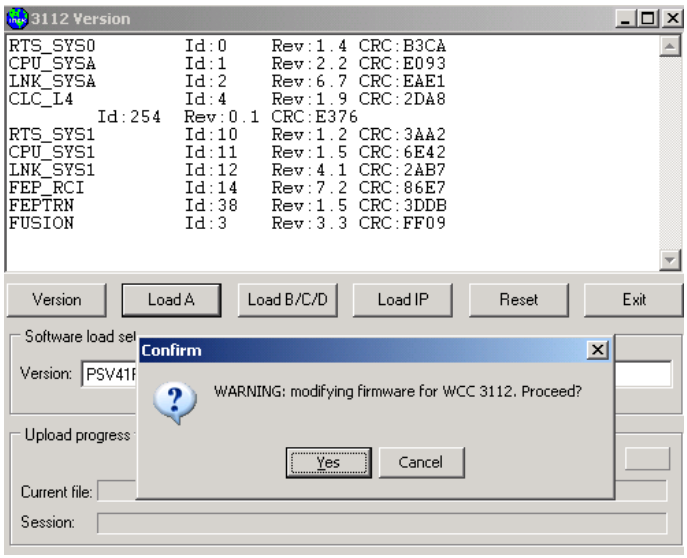


Figure 6-5 Warning Confirmation Dialog Box

The popup dialog box shown in Figure 6-6 illustrates a key concept in firmware uploads: the WCC configuration file must be locally available for WccMaint to complete the upload. The reason for this is that WccMaint will get a list of specific binary modules to load for the selected processor **based on its configuration**. The list of modules is retrieved from WCCCONFIG.DLL, so it is also important that the latest version of this DLL be present as well or the upload process cannot continue.

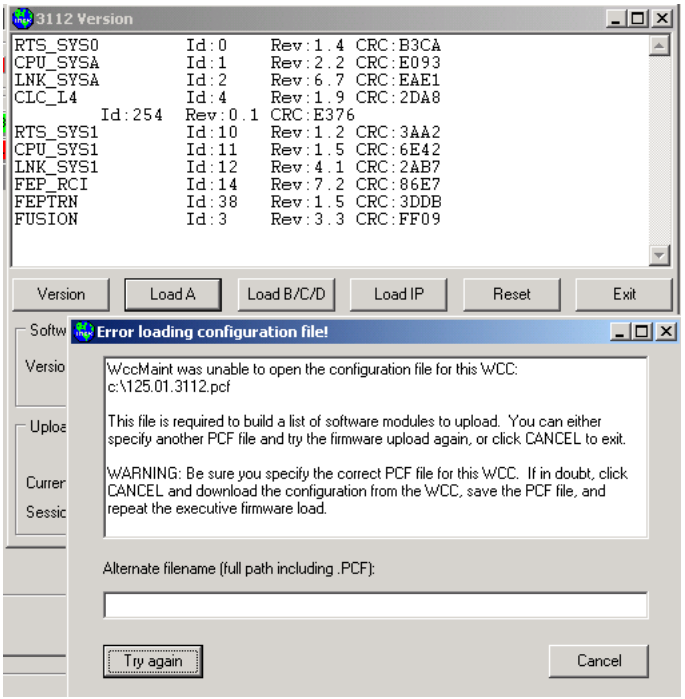


Figure 6-6 Configuration File Missing

To remedy the above situation and complete the upload, you must first download the configuration for the target WCC and save the PCF file before continuing.

Take note of the alternate filename input box in the popup window. This allows you to store PCF files with any desired name (ie, sitename.pcf) and specify this alternate filename for loading here. The disadvantage to this approach is that you will be prompted for the filename every time you load exec firmware.

Once the PCF file is available, click the **Load A** button again to load the software. The version window displays dynamic information about the load process and the 'Upload progress' group box has progress bars that visually indicate the state of both the current file upload and the entire upload session (Figure 6-7).

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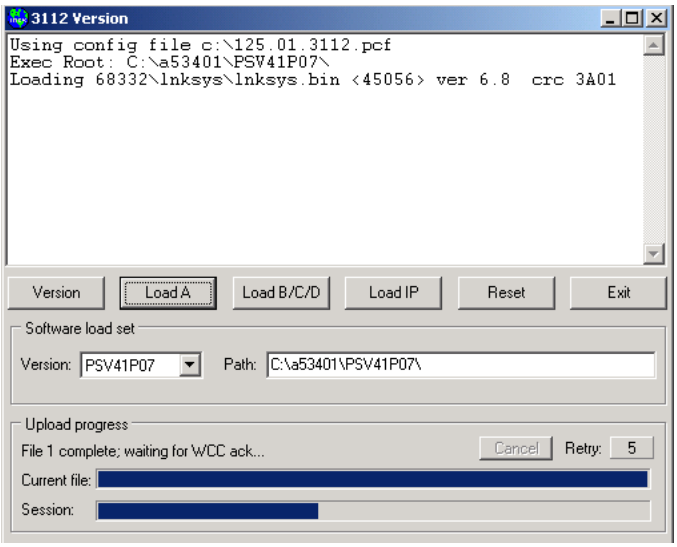

Figure 6-7 Upload In Progress

As stated earlier, when a WCC receives a complete module upload, it calculates the module CRC to ensure the module integrity. Once the CRC has matched, it sends an acknowledgment back to WccMaint that the module has been successfully updated. Shown here in the Upload Progress box is the status that the first file has been sent and WccMaint is waiting for the ack from the WCC.

Take note of the CRC (3A01) at the end of the 'Loading' line in the version window.

Near the end of the upload session (Figure 6-8), notice again the 3A01 CRC in the version window. The trailing plus sign is the indication that this module has been acked. This version display indicates that the last module has not yet been acked.

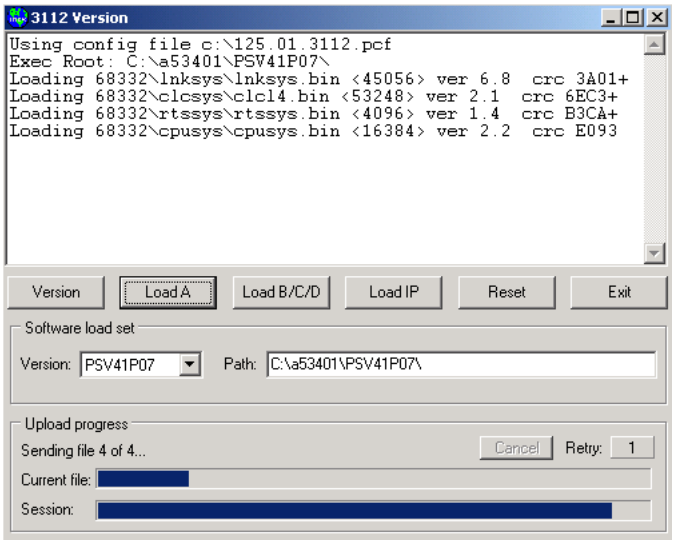

Figure 6-8 Upload Nearing Completion

When all modules have been successfully loaded, the version window indicates the session has been completed (Figure 6-9).

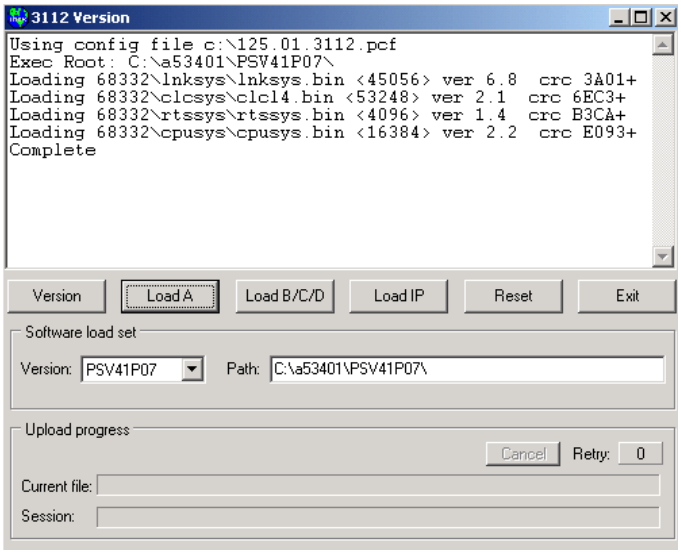

Figure 6-9 Upload Successfully Completed

The WCC log also makes an entry every time an exec module has been updated, as shown here in the terminal window (displaying the log) for WCC 3112.

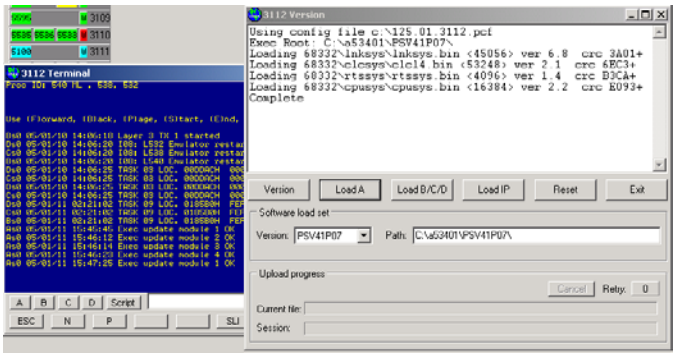

Figure 6-10 WCC Log Confirms Module Updates

To complete the procedure, the WCC must be rebooted. You may click the **Reset** button on this form to accomplish this. The WCC can also be reset from its context menu if this form has been closed.

Serial (B,C,D) uploads are performed in the same way. Loading the IP stack involves additional considerations as explained in the next section.

6.5 Load IP: Special Considerations

The fusion stack (FUSION.BIN) is a very large file (> 100K bytes). Because of the way the WCC must load this file into an intermediate area pending the reset, the size of the image forces it to overwrite part of the internal header information for the serial (B,C,D) processors. The effect of this is that **loading the IP stack corrupts the serial emulations and requires these files to be reloaded**. This is not a problem; once the **Load IP** is complete, you must reset the WCC, and when it is running again, you must do a **Load B/C/D**, and reset the WCC a second time.

For UDP clients (this connection type is normally no longer used), for a Load IP to be successful, ASERVER must re-assemble the load image before sending it to the WCC. Under the **Aux** menu in ASERVER, you must check the **Enable L2 segments** option before the upload. This option should be turned back off after the upload is complete. Contact your ASERVER administrator to see if this unusual situation applies to you.

6.6 Complete Load Sequence

If a WCC is to be completely updated with all available software, the following sequence is recommended:

1. Load A
2. Load IP
3. Reset the WCC
4. Load B/C/D
5. Reset the WCC a second time

6.7 Session Logging

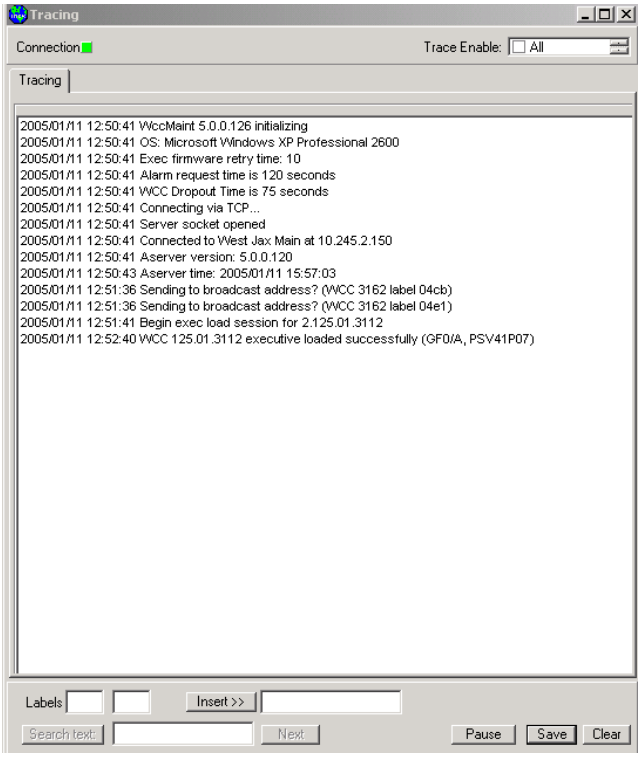

Figure 6-11 Upload Sessions Logged

WCC exec upload sessions are logged in WccMaint. As shown in Figure 6-11, the Trace window logs the start of an exec upload session, and its completion status, including the type of load and the executive software set used.

ASERVER logs configuration and executive firmware uploads as well, but it does not track what version of firmware is loaded.

SECTION 7
WCC MANAGEMENT

7 WCC MANAGEMENT

7.1 Introduction

WCMs have a divided functionality in WCCMaint. They are field devices, interfacing directly with code equipment at wayside locations. In terms of network management, they are functionally identical to WCCs, communicating directly with ASERVER. WCMs are the only device that has both a type 7 and type 2 ATCS address assigned. In WCCMaint, this means that a WCM could be graphically represented as either a WCC or as a group on a code line display.

Once a WCM is fully configured and operational, it is most commonly displayed in WCCMaint as a code line group, but there are circumstances where it is more convenient to view a WCM (or a group of WCMS) as a type 2 device. This is the reason for the WCM overview tab.

As a type 2 device, a WCM ‘looks’ like a WCC to ASERVER. To differentiate between WCMs and WCCs, ASERVER uses the node number portion of the ATCS address (the ‘NN’ part of 2.RRR.NN.DDDD). As an addressing requirement, WCMS must not use node number 1 or 99, and the device (DDDD) number must be in the range 3000-3999. Based on this node number, ASERVER blocks broadcast traffic from WCMs so that they do not display (as WCCs) in WCCMaint.

This node number convention for WCMs is also a convenient way for system designers to logically group WCMs. For example, one subdivision may use node 13 for all WCMs and another subdivision may use node 75. In this way, all the WCMs for a subdivision may be displayed as a group using the WCM tab.

7.2 Using The WCM Tab

Figure 7-1 shows the WCM overview tab in WCCMaint. The default is that no WCMs are displayed here because any system may have thousands of WCMs (addressing allows for 97,000 unique WCM addresses), which would make the display unmanageable.

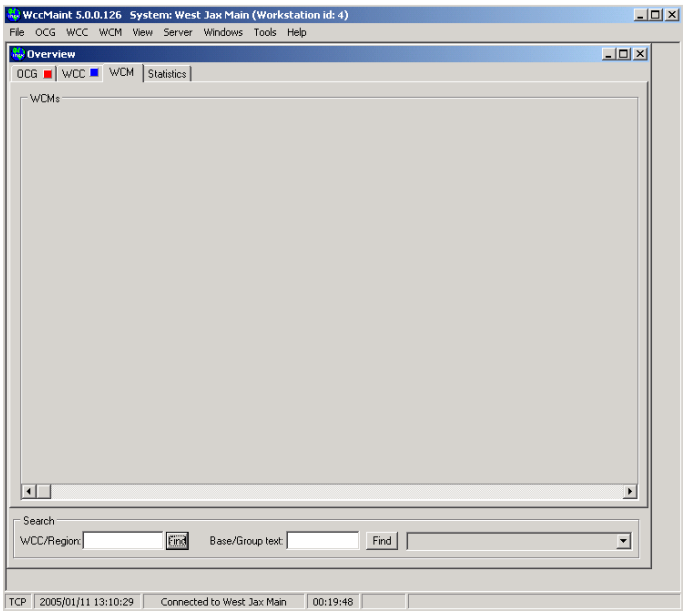

Figure 7-1 WCM Overview Tab

A group of WCMs may be requested for display by telling ASERVER you are interested in viewing all WCMs with node numbers in a certain range. When this message is sent, ASERVER will 'unblock' the NMS broadcast traffic from these WCMs temporarily so that they display on the WCM tab.

To request a set of WCMs for display, the Set Range function is used. From the Main menu, click **WCM**, then select **Set Range…** (Figure 7-2).

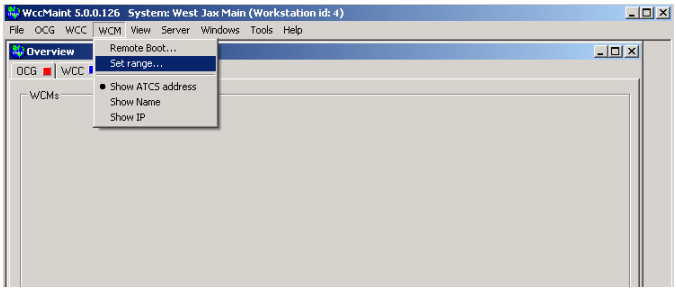

Figure 7-2 Set Range Menu Option

A single node number or a range of node numbers may be entered. Click the **Set Range** button to send the request to ASERVER (Figure 7-3).

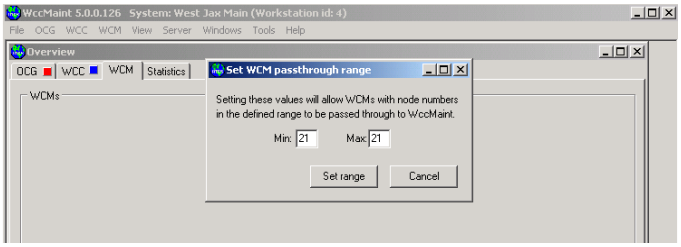

Figure 7-3 Setting the WCM Range

When ASERVER receives the request, it unblocks traffic for the requested node range **only for the specific WccMaint client that made the request** and sends a request for status to these nodes. As the WCMs send status messages in, they are built as panels on the WCM tab (see Figure 7-4).

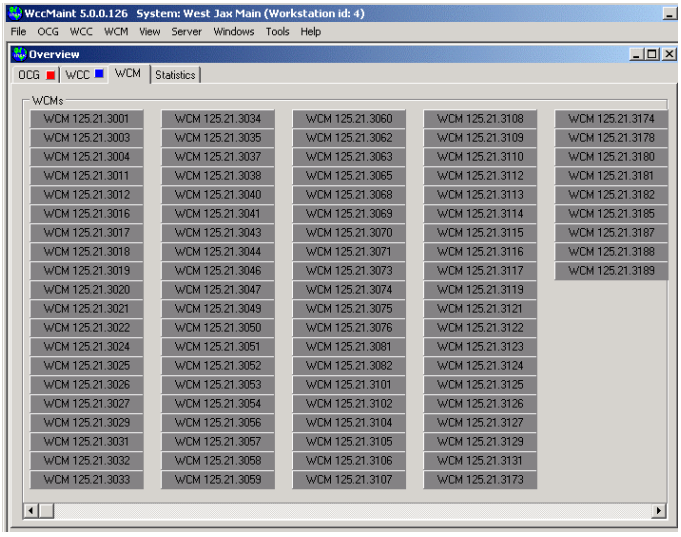

Figure 7-4 WCMs Displayed

WCMs displayed on the WCM tab are temporary and will eventually time out and disappear from the display.

The WCM panel identifies itself with its ATCS address by default; however, the WCM may be more commonly known by its configured name or by its IP address.

The label for a particular WCM may be toggled between these three display modes by clicking on it.

Click once on a WCM panel to display its name, as shown in Figure 7-5.

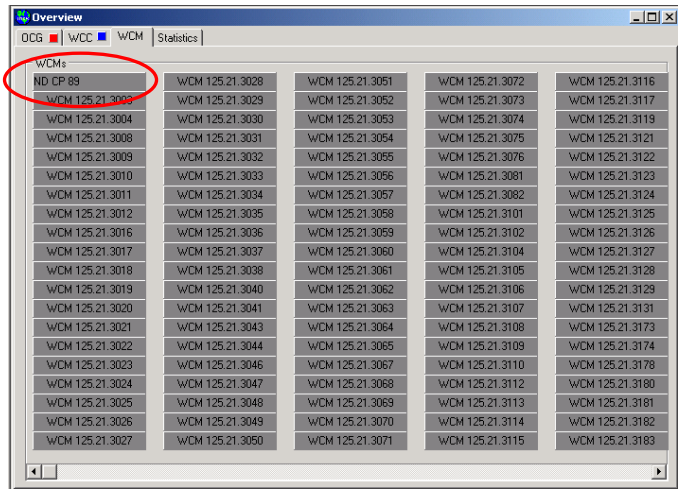

Figure 7-5 Toggling the WCM Caption (Name)

Another click displays the WCM IP address (Figure 7-6).

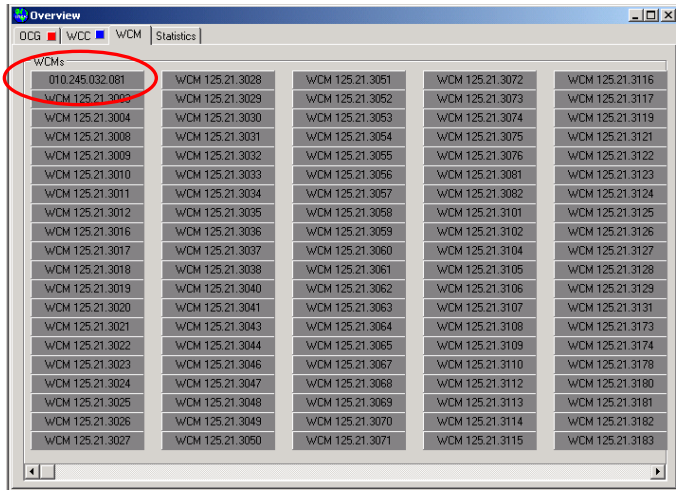

Figure 7-6 Toggling the WCM Caption (IP Address)

The caption format for all WCMs on the tab may be changed at once from the WCM menu. Click on **WCM** on the main menu and select any of the three caption modes as shown in Figure 7-7.

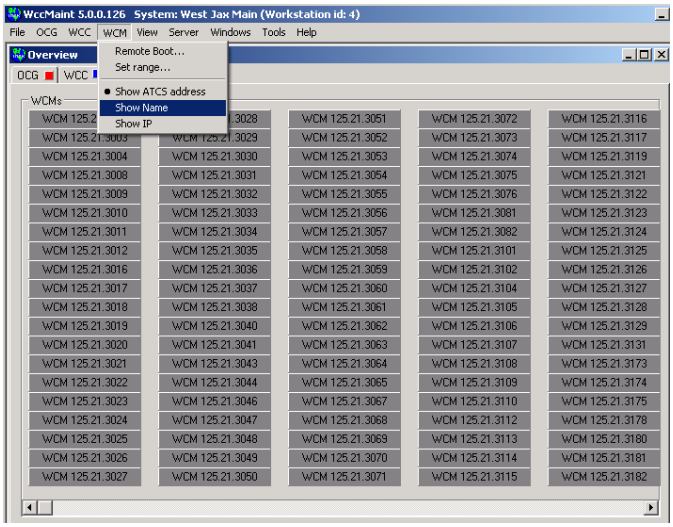

Figure 7-7 Toggling All WCM Captions

In the example in Figure 7-8, the **Show Names** option was selected.

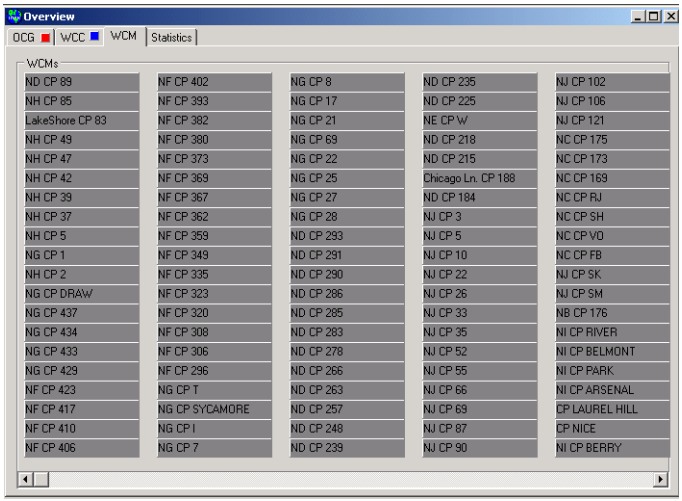

Figure 7-8 WCM Names Displayed

7.3 WCM Options

Access to all WCM diagnostic functions is through its context menu, as shown in Figure 7-9.

Take note that the WCM context menu is a subset of the WCC context menu. All menu functions for a WCM are identical to those for the corresponding functions on a WCC. Context menu functions are explained in detail in Section 4.

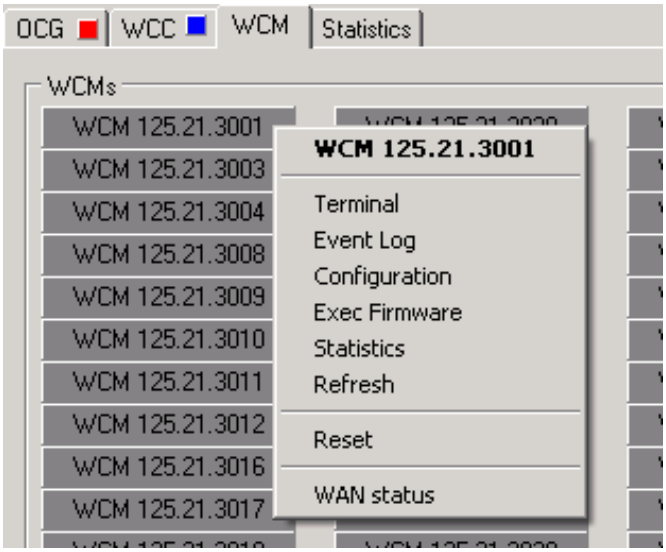

Figure 7-9 WCM Context Menu

A WCM appears on the WCM tab as a type 2 device, but all WCMs are actually codeline groups that connect to the office via IP instead of RF links. This means that a particular WCM will be found on an LCT code line display, but it is difficult to determine from the WCM tab which code line will display the WCM. The way to do this is with the Search Tool.

7.4 Using The Search Tool To Find A WCM On Its Code Line Display

Referring to Figure 7-10, first, toggle the WCM caption until its name appears (ND CP 89 in this example). Type a portion of this name (cp 89) into the **Base/Group text** search box and click **Find**.

The database will return a list of matching records (bases and groups) for the given search text. This result is shown as **G 125.105.109 NH CP 89 Erie**.

To open this target code line (109) directly, open the dropdown box and click on the NH CP 89 entry. Code line 109 will be located and opened automatically.

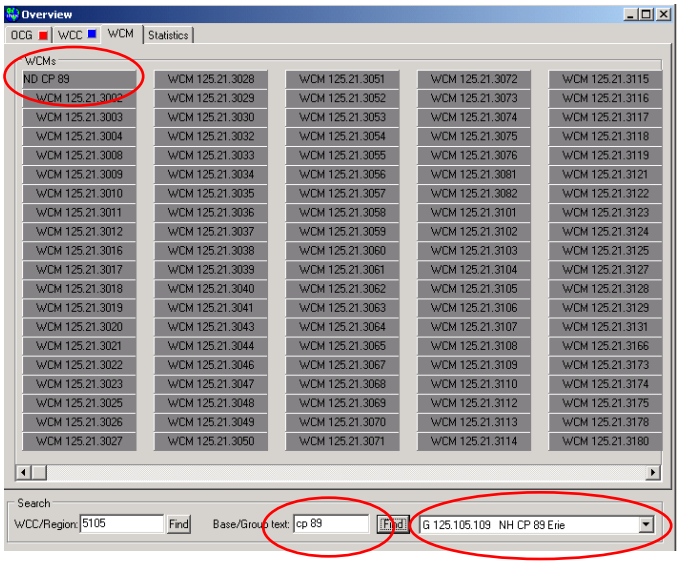

Figure 7-10 Locating a WCM Line Display

Figure 7-11 shows the WCM located on its 'home' code line. Note that the **WCM** entry in the group context menu has a submenu that is essentially the same as the WCM context menu on the WCM tab shown in Figure 7-10.

Access to a WCM's diagnostic functions will normally be done from the code line display. The WCM tab is meant to show a grouping of WCMs when they need to be acted on as a group; for example, if a software upgrade needs to be applied. This is more convenient than opening many codeline displays to access the same set of WCMs.

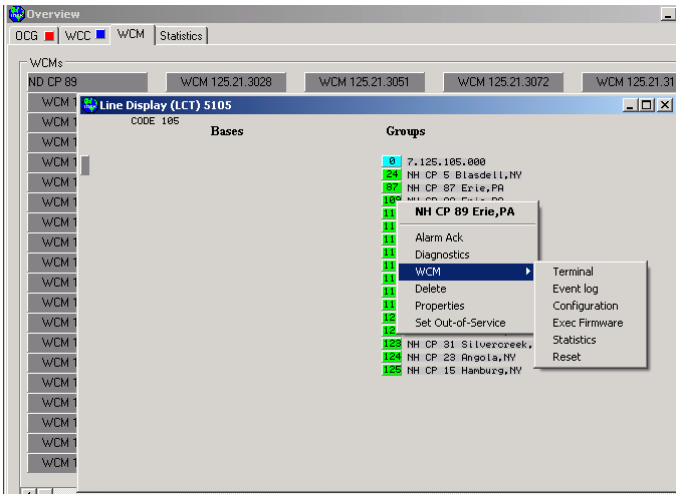

Figure 7-11 WCM Line Display Shown

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SECTION 8
OCG MANAGEMENT

8 OCG MANAGEMENT

8.1 Introduction

All OCGs are displayed on the OCG main tab (Figure 8-1). Clusters of up to 12 OCGs are displayed on each cluster tab. Cluster tabs have assignable names (in this example, ‘LAB-01’ and ‘LAB-02’) which are managed from the ASERVER console.

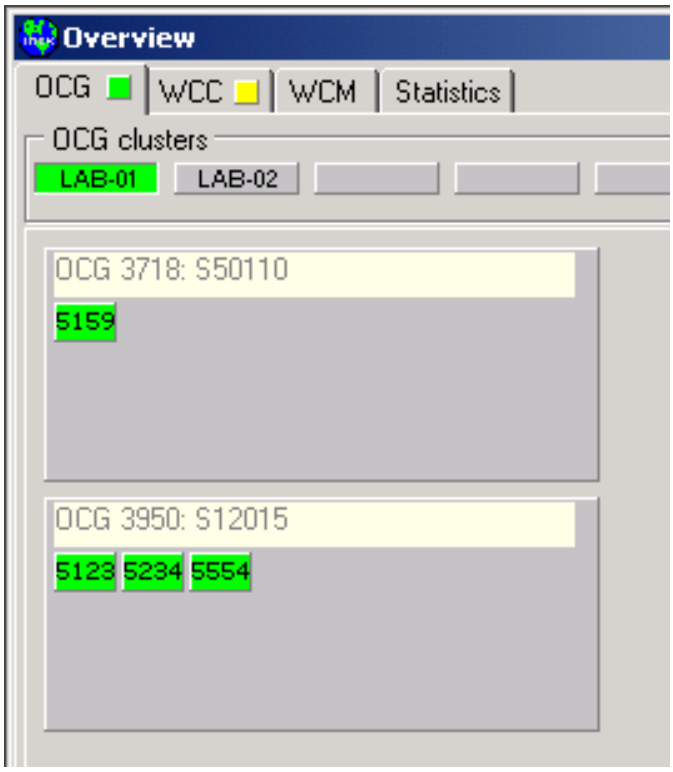


Figure 8-1 OCG Display

8.2 Configuring OCG

All configuration management for OCGs, HUBs, and LCTs is handled by a single DLL. There are two versions of configuration DLL: **cocgconfig.dll** (used by CSX) and **bocgconfig.dll** (used by BNSF). To ensure compatibility with current OCG and WCCMaint software, it is important to have the latest version of this DLL. To determine the DLL version, click 'Help', then 'About' on the WCCMaint main menu:

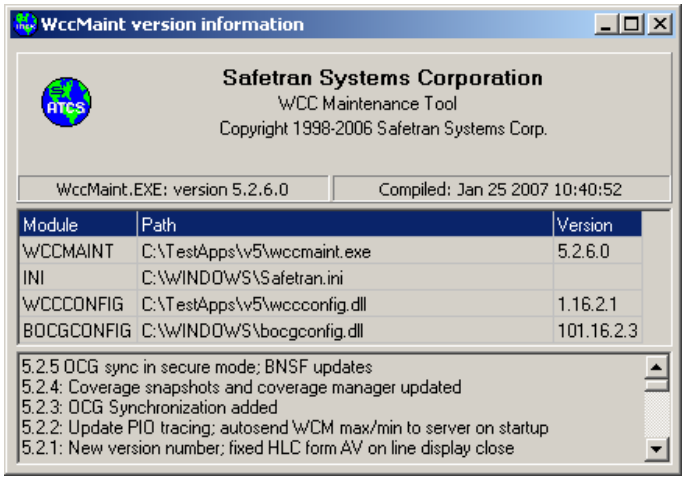


Figure 8-2 OCGCONFIG.DLL Version Displayed

The version of all DLL files is listed here; the current version for BOCGCONFIG.DLL in this example is 101.16.2.3.

To configure the OCG itself, right-click on the OCG and select 'Configure':

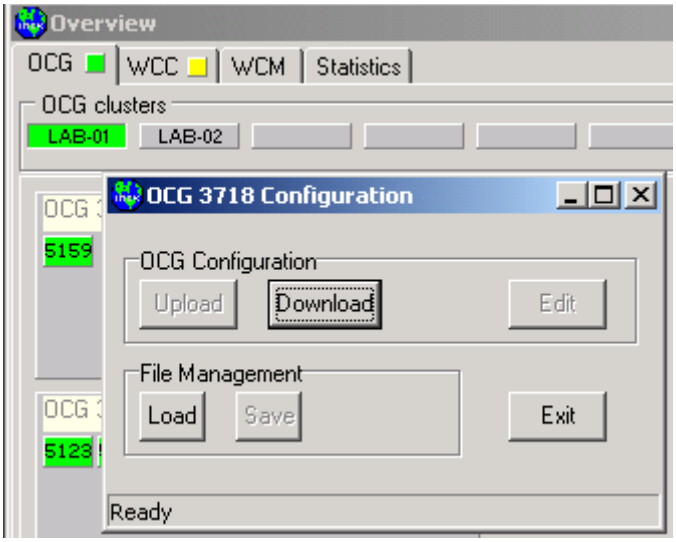


Figure 8-3 OCG Configuration Manager

Click **Download** to retrieve configuration data from the OCG. When all data has arrived, a checksum is calculated to ensure the data has not been corrupted in transit. The status bar will indicate the checksum status as shown in Figure 8-4. ('Checksum OK'):

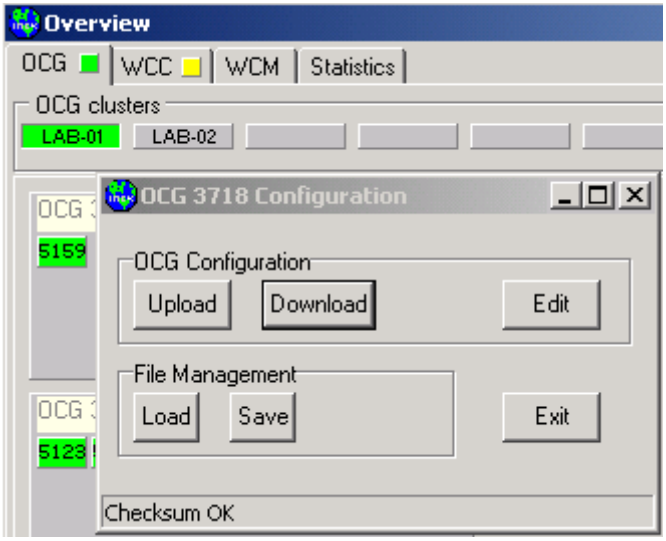


Figure 8-4 Checksum Passed

When the data has been validated, the **Edit**, **Upload,** and **Save** buttons are enabled, and the data may now be modified. Click **Edit** to open the configuration editor (Figure 8-5):

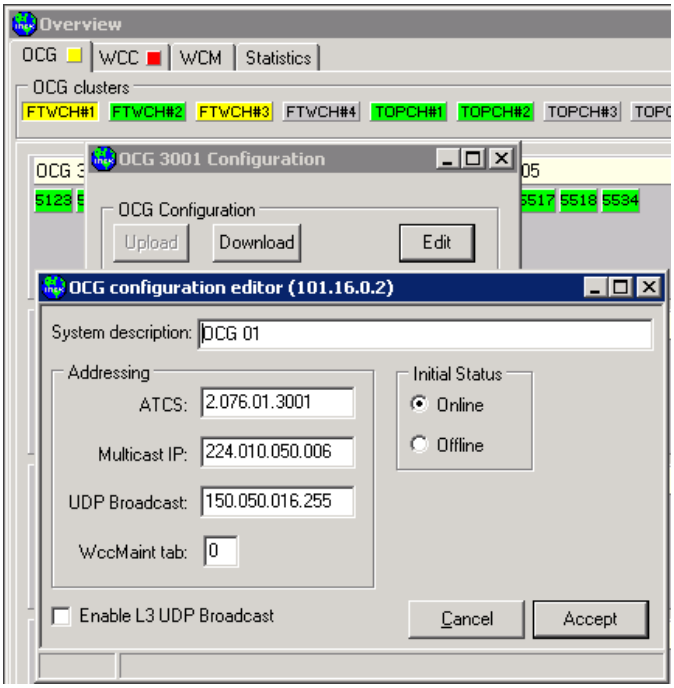


Figure 8-5 Editing OCG Configuration

In this example, the System Description will be changed. Edit fields for OCG are:

System Description: The system description will identify this OCG in WCCMaint.

ATCS address: ATCS address assigned to this OCG. NN must be 1 and DDDD must be 3000-3999.

Multicast IP: Multicast group that OCG will attempt to join if supported by the host network.

UDP broadcast: Address to which OCG will send route requests. This is the primary means of locating and linking to ASERVER. This address may be a subnet address if supported by the host network.

WCCMaint tab: The OCG cluster tab under which this OCG is to be located.

Online/Offline: The initial online status for this OCG. This will be a power-up default; if set to offline, the OCG will start up in offline mode **regardless of its state when it is shutdown**.

Enable L3 UDP broadcast: every 10 seconds OCG will send an RTE-UPDATE message to the configured UDP broadcast address.

When edit changes are complete, click 'Accept' to keep changes or 'Cancel' to exit without saving changes. The new data can then be uploaded to OCG and/or saved to a local disk file (OCG configuration files have an OCF extension). Click 'Upload' to move these changes to the OCG:

Click 'Yes" when the confirmation query appears (Figure 8-6) and the data will be sent to OCG. OCG calculates the checksum for the received data and sends an acknowledgment if the data is intact:

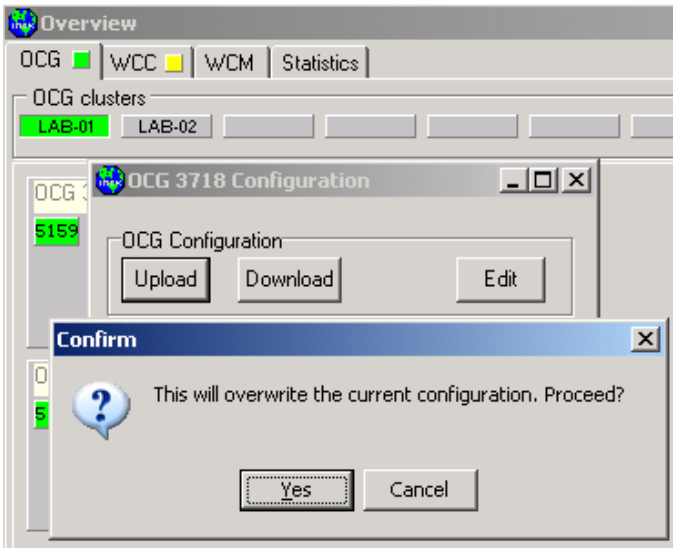


Figure 8-6 Upload Confirmation Dialog

Click ‘Exit’ to close the configuration manager form and refresh the OCG to see the updated description (Figure 8-7 and Figure 8-8):

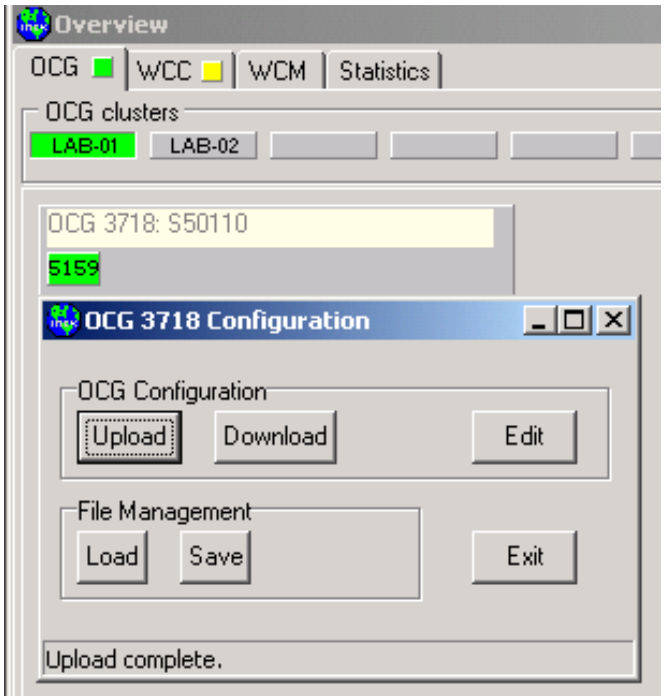


Figure 8-7 Upload Confirmed By OCG

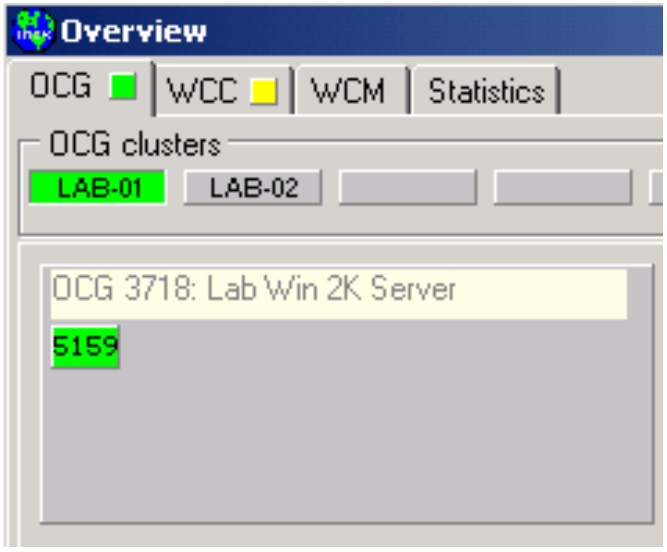


Figure 8-8 Updated Data Displayed

8.3 Adding, Removing, And Configuring Lcts And Hubs

8.3.1 Adding An LCT

To add an LCT to OCG, right-click on the OCG and select 'Add LCT…' to open the LCT configuration editor:

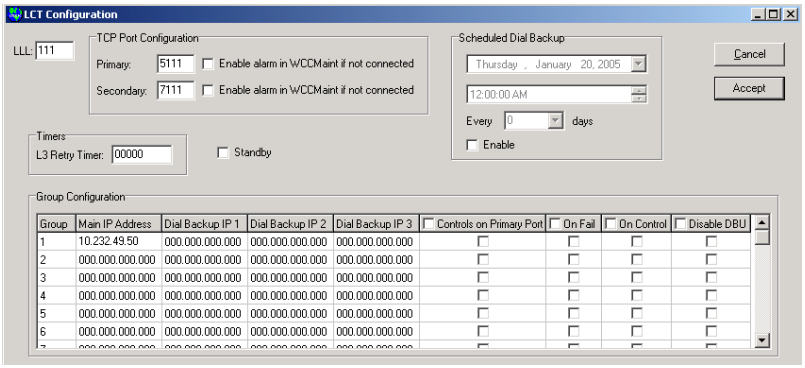


Figure 8-9 LCT Configuration Editor

NOTE

NOTE

There are slight differences between the two OCG configuration editors **cocgconfig.dll** and **bocgconfig.dll**, used by CSX and BNSF railways respectively. Most of these are concerned with ARES configuration settings. The CSX version is used for illustrative purposes here.

Configuration fields for an LCT are as follows:

LLL: The LLL number will be the 3-digit codeline number. For example, entering 111 in this field will cause OCG to create LCT region 5111.

TCP Port Primary: The TCP port configuration creates TCP socket connections to the CTC system. For NGD, the Primary socket is set to the same as the LCT region (5111).

TCP Port Secondary: The secondary socket allows a connection to CADS via a pass-through connection provided by a WCE. This socket is numbered as 7000 + the line number (7111 in this example).

NOTE

NOTE

When the LLL number is typed, the primary and secondary socket numbers are automatically typed to conform to this standard.

You must complete all configuration changes and close the editor before going on to other WCCMaint functions.

Enable alarm if not connected: If this box is checked, OCG will flag the socket as being in alarm if there are no client connections. WCCMaint uses this flag to signal the user that a socket connection to NGD (or CADS) has failed.

L3 retry timer: Outbound messages are retried after six seconds as a default if there is no response from the field. This retry interval is configurable to 'n' seconds by putting a non-zero value in this field. A value of 0 leaves the default of six seconds intact.

Standby: if this box is checked, this LCT will be immediately placed on standby when it is created. Also, this is the default state for this LCT whenever this OCG is restarted.

Main IP address: Enter the main (primary path) IP address for IP-enabled groups (WCMs) in this field.

Controls on primary port: If this checkbox is checked, controls from the primary port (NGD) will be allowed to be sent to the group. Otherwise, outbound traffic from the primary CTC port to the group is inhibited. Traffic from the secondary port is not affected.

Dial backup IP addresses:

On fail, On control, Disable DBU checkboxes:

Scheduled dial backup items: All these items have to do with IP-based dial backup for this LCT, and are discussed in detail in Appendix C

NOTE

NOTE

For any column with checkboxes, there is a master checkbox in the top row of the column that will check or uncheck the entire column.

Click **Accept** to keep all changes and **immediately upload this new LCT configuration to OCG**. Click **Cancel** to close the editor without sending any data to OCG:

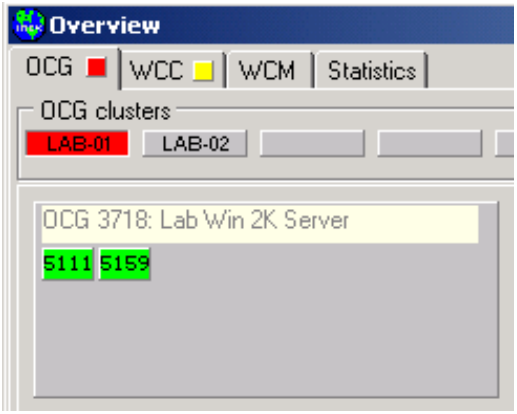


Figure 8-10 New LCT Displayed

The new LCT has been added. Note that all LCT and HUB regions on an OCG are sorted in numerical order.

8.3.2 Modifying An LCT

To change an LCT configuration, right-click on the LCT region panel and select **Configure…**

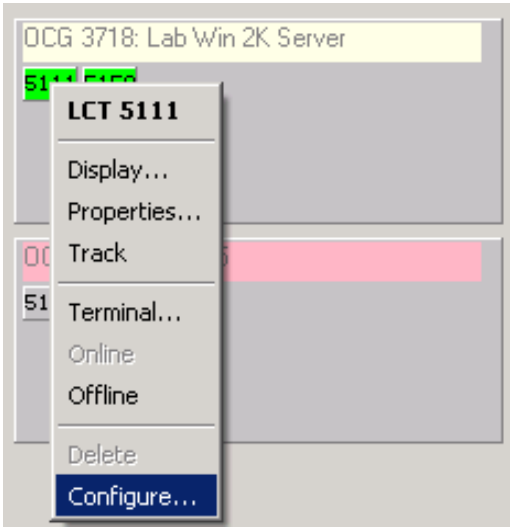


Figure 8-11 LCT Context Menu

The OCG/LCT configuration manager will open:

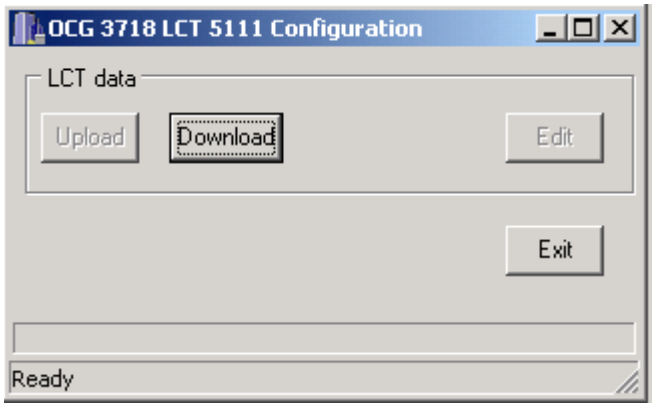


Figure 8-12 LCT Download Manager

Click ‘Download’ to request the LCT configuration data from the OCG; when all the data has arrived, the checksum is calculated. If the data is intact, the ‘Edit’ button is enabled. Click ‘Edit’ to open the configuration editor and modify the data as needed, then click ‘Accept’ to exit the editor with changes intact. Finally, click ‘Upload’ to send the changes to OCG.

8.3.3 Deleting An LCT

To delete an existing LCT, right-click on the region panel. Select 'Delete' to remove the LCT.

NOTE

NOTE

If the LCT is online, the **Delete** option is disabled (see Figure 8-11); you must first put an LCT offline before it can be deleted.

8.3.4 Adding A HUB

To add a new HUB to OCG, right-click on the OCG and select **Add HUB…** to open the HUB configuration editor:

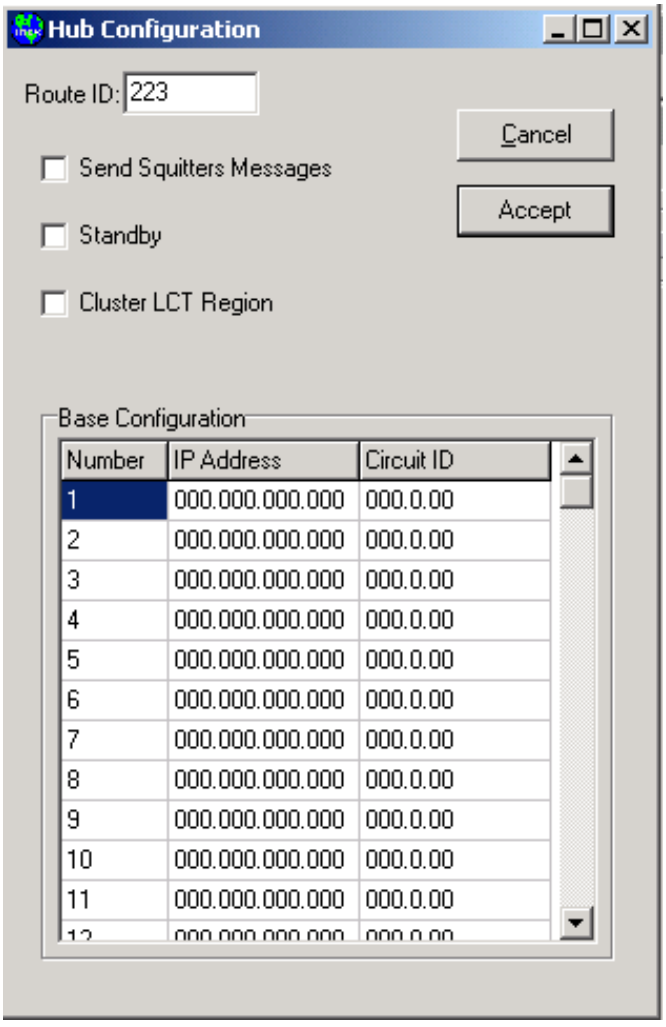


Figure 8-13 HUB Configuration Editor

Edit fields for a HUB are as follows:

Route ID: This is the 3-digit line number. The hub will use this to create region 6000 + (line number), in this example 6223.

Send Squitters Messages: If this box is checked, the HUB will send BCP_ID timestamp messages every 30 seconds. These messages are not used on all systems.

Standby: if this box is checked, this HUB will be immediately placed on standby when it is created. Also, this is the default state for this HUB whenever this OCG is restarted.

Cluster LCT region: This option was originally used for compatibility with WCC LCT regions and is no longer used.

IP Address: The IP address of every base belonging to this hub is manually entered in this table. This facilitates quick switching between OCGs because when an OCG is started, it looks in this table and sends a route update to every (IP) base. This way, each base instantly knows the 'new' IP address of the OCG to which it must send all inbound traffic.

Circuit ID: The circuit ID, or base ID, of every IP base belonging to this hub, is manually entered here along with its IP address. The base ID is an assigned 16-bit value that is used as a unique tag for each base.

Click 'Accept' to keep all changes and **immediately upload this new HUB configuration to OCG**. Click 'Cancel' to close the editor without sending any data to OCG:

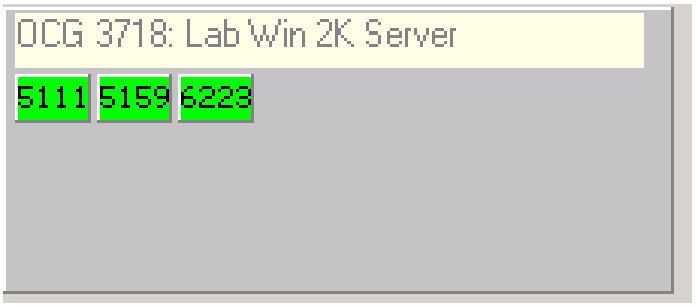


Figure 8-14 New HUB Displayed

8.3.5 Modifying A HUB

To change a HUB configuration, right-click on the HUB region panel and select ‘Configure…

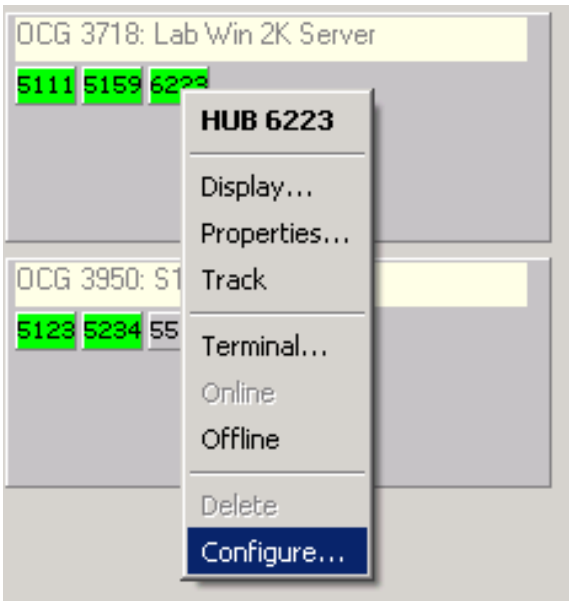


Figure 8-15 HUB Context Menu

The OCG/HUB configuration manager will open:

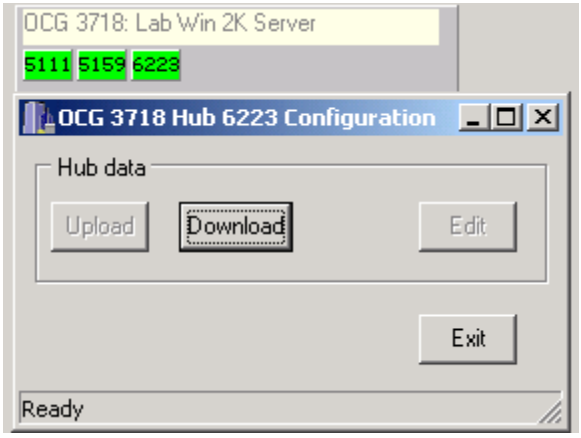


Figure 8-16 HUB Download Manager

Click ‘Download’ to request the HUB configuration data from the OCG; when all the data has arrived, the checksum is calculated. If the data is intact, the ‘Edit’ button is enabled. Click ‘Edit’ to open the configuration editor and modify the data as needed, then click ‘Accept’ to exit the editor with changes intact. Finally, click ‘Upload’ to send the changes to OCG.

8.3.6 Deleting A HUB

To delete an existing HUB, right-click on the region panel. Select 'Delete' to remove the HUB.

NOTE

NOTE

If the HUB is online, the 'Delete' option is disabled (see Figure 8-11); you must first put a HUB offline before it can be deleted.

8.4 Main/Standby Switching

8.4.1 Changing Online/Offline States

To facilitate switching a HUB or LCT process from one OCG to another, each HUB/LCT may be put into an offline state without affecting the other HUB/LCTs on the OCG (or the state of the OCG itself). In contrast, for WCCs, HUBs, and LCTs are not individually set online or offline; the WCC is set offline, and all of its regions follow the WCC offline state as a group.

When a region is offline, it inhibits all outbound traffic. Should it receive any code-related traffic from the field, it will not pass it on to NGD.

A common configuration is to have two identically configured OCGs in different locations, with one online and the other on standby (offline).

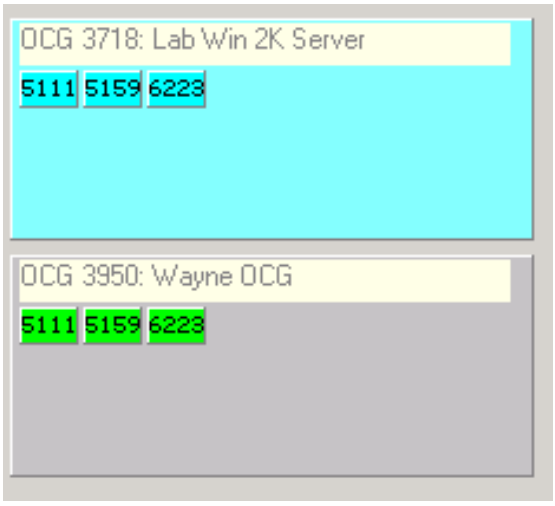


Figure 8-17 Main and Standby OCGs

OCG was designed with a great deal of flexibility for manipulating online and offline states for OCG itself and all HUB and LCT processes running on it.

The entire OCG 3950 can be taken offline with a single click:

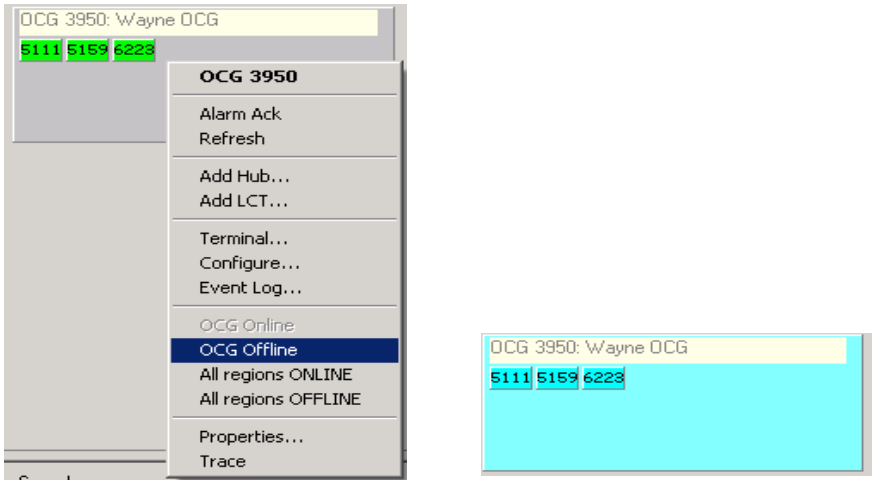


Figure 8-18 Set OCG Offline

Or all regions can be set offline, leaving OCG online:

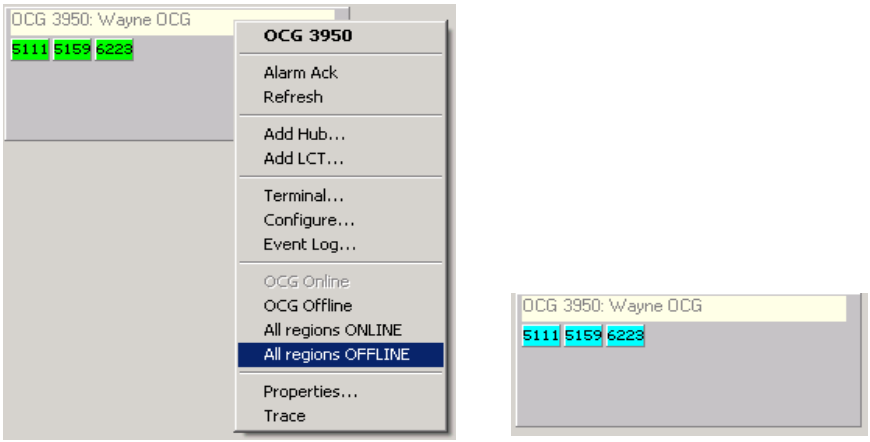


Figure 8-19 Set All Regions Offline

If an OCG is offline, none of its regions can be set online. Individual regions can be set offline as well, as shown in Figure 8-20.

Figure 8-20 Setting a Single Region Offline

8.4.2 Bringing Spare OCGs Online

To bring an entire standby OCG online, the recommended procedure is to first take the working OCG offline, then put the standby OCG online. The following sequence illustrates the following:

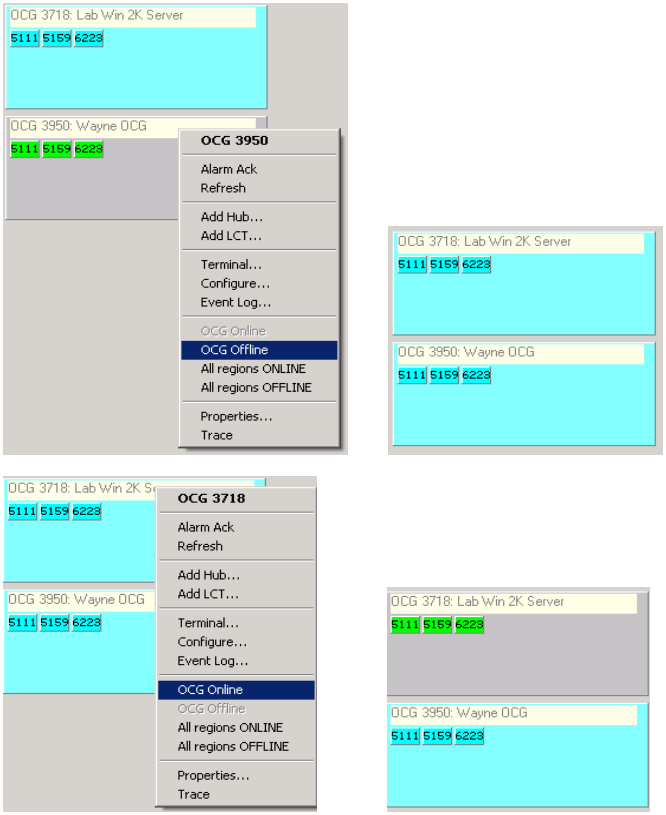


Figure 8-21 Switching Main and Standby OCGs

SECTION 9
DIAGNOSTICS

9 DIAGNOSTICS

9.1 Introduction

In WCCMaint, most individual diagnostic functions for bases and codeline groups are grouped on a single form for easy access. Many diagnostic functions are the same for bases and groups.

9.2 Base diagnostics

To open the diagnostics window for a base, right-click on the base and select **Diagnostics**:

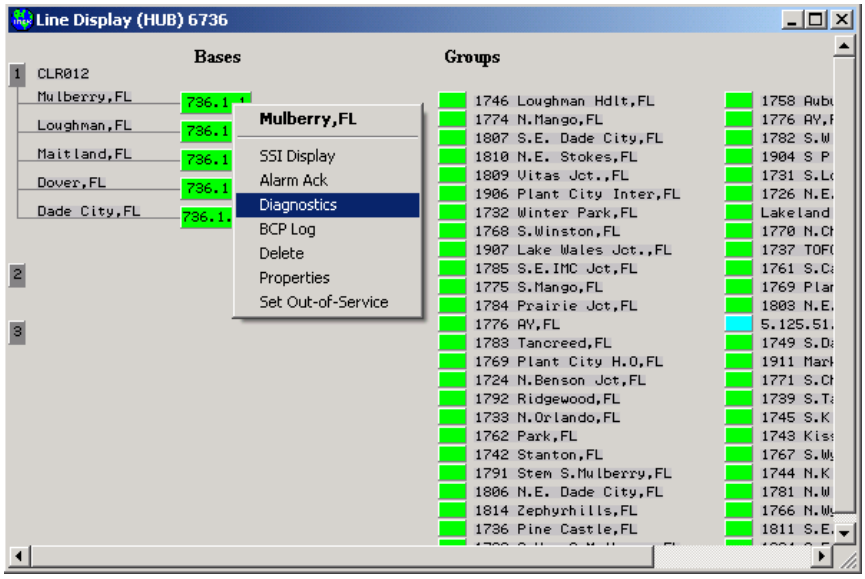


Figure 9-1 Base Diagnostics Form Selection

The diagnostics form will appear, as shown in Figure 9-2.

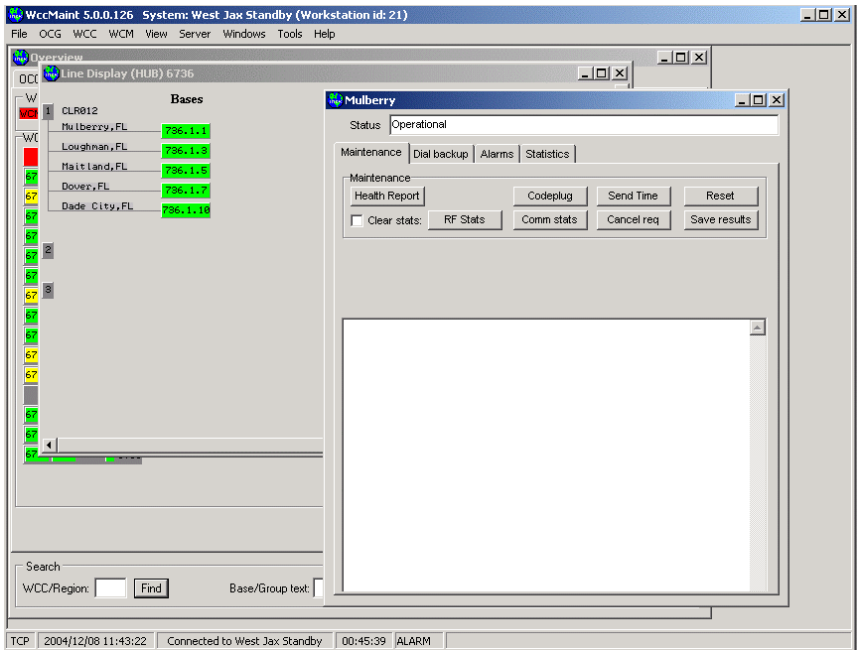


Figure 9-2 Base Diagnostics Form (Maintenance Tab Shown)

The status window at the top of the form reflects the current condition of the base as reported by the WCC/OCG, in this case ‘Operational’, indicating no problems. Possible status conditions for a base are shown in Table 9-1.

Diagnostic functions available for this base are grouped into tabs:

- **Maintenance**: commonly used tests and remote functions
- **Alarms**: summary of ATCS alarms reported by this base
- **Dial backup**: Access to primary/secondary path information and DBU tests
- **Statistics**: packet and traffic statistics for this base

Table 9-1 Base Status Conditions

STATUS TEXT	EXPLANATION
Operational	Normal operation
Operational (standby available)	Normal operation with a secondary (backup) circuit ready. Message traffic is using the primary circuit.
On dial backup	Normal operation, with message traffic using the secondary (backup) path
Test mode	BNSF/GTC only
Modem looped	BNSF/GTC only
RF looped	BNSF/GTC only
No inbound RF traffic	Base has not received any field indications in (nominally) two minutes. Indicates a possible receiver problem with the base in a multi-group environment.
Out of Service	Base exists but is out-of-service
Offline	Base is not responding
Comm errors	For wireline-connected bases, this indicates errors on the HDLC link from the WCC to the base.
Unknown	WCC/OCG is not reporting status

9.2.1 Base Maintenance Tasks

On the Maintenance tab, the available functions are described in Table 9-2:

Table 9-2 Maintenance Tab Functions

TEST	FUNCTION
Health report	Solicits an ATCS health report message
Code Plug	Retrieves code plug data from the BCM
Send Time	Sends TIME message to base.
RF stats	Retrieves HSTAT report
Comm stats	Retrieves COMM STAT report
Reset	Remotely reboots the BCM module.
Cancel request	Cancels pending operation
Save	Saves results to a file.

Each of the maintenance functions are explained as follows.

9.2.1.1 Health Report

To retrieve a health report from this base, click **Health report**. The status window will log 'Requesting health from <base name>'. When the report arrives, the message data is formatted and shown in the status window:

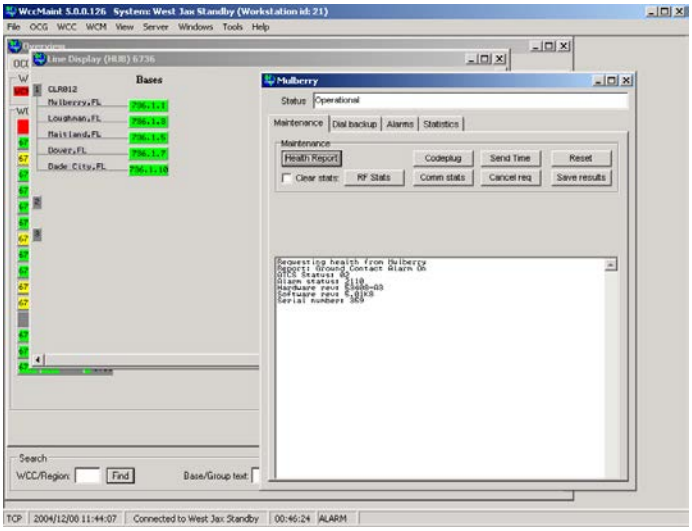


Figure 9-3 Typical Health Report

9.2.1.2 Code Plug

Click **Codeplug** to retrieve code plug information from the base. A typical code plug display is shown in Figure 9-4.

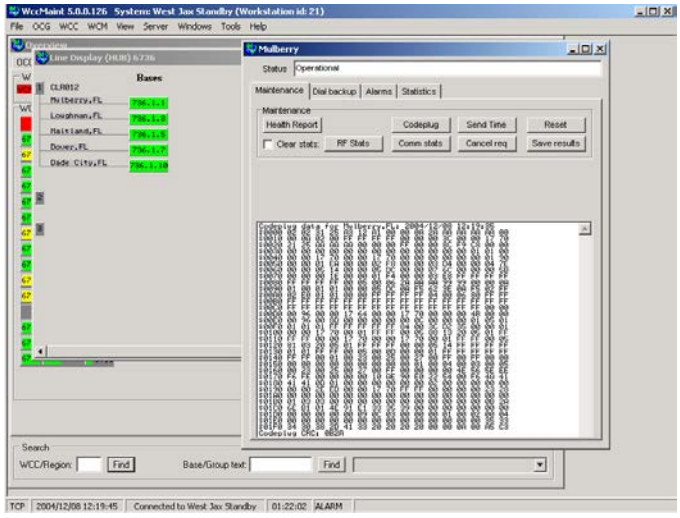


Figure 9-4 Code Plug Display

9.2.1.3 Send Time

To update the base station's local clock, click **Send Time**. The exact time sent to the base is displayed in the results window. The base does not respond to this message. The only effect of this command is that the local log entries in the base will reflect the updated time.

Note: this function sends a time stamp generated by the workstation running WCCMaint, and because of time zone differences or system configuration, this time may be different from the system time updates that are periodically sent to all field devices by the WCC/OCG.

9.2.1.4 Reset

Clicking this button will send an HW_MCP_RESET message to the BCM controlling the base. The BCM responds to this by executing a warm boot. Note that the base station itself does not reboot; only the controlling BCM.

⚠ CAUTION

CAUTION

THIS IS A POTENTIALLY SERVICE-AFFECTING PROCEDURE. YOU WILL BE PROMPTED TO CONTINUE BEFORE THE MESSAGE IS SENT.

9.2.1.5 RF Stats

Clicking this button will retrieve a set of RF statistics from the BCM. RF packet and HDLC communication channel statistics are included. This is equivalent to the HSTAT command entered locally at the BCM diagnostic port. A typical report is shown in Figure 9-5.

Note: Checking the **Clear Stats** checkbox before the **RF stats** button is clicked will remotely clear these stats at the BCM; no report is returned.

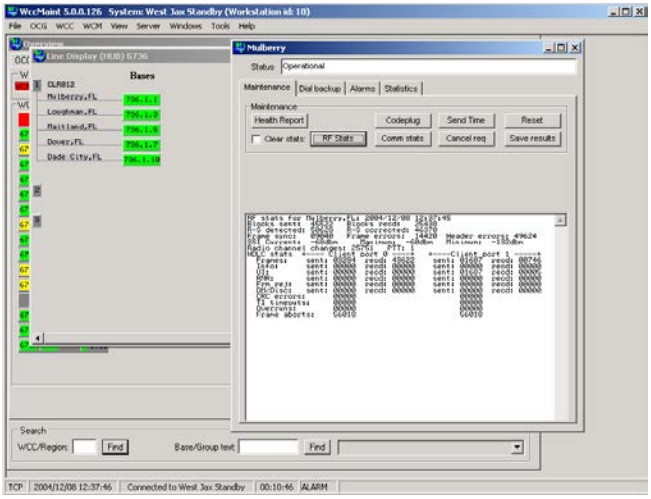


Figure 9-5 RF Stats Display

9.2.1.6 Comm Stats

Clicking this button will retrieve the COMM STATS report from the BCM. These are packet statistics for the RF link for each logical channel, and hardware failure counts. Equivalent to a local CSTAT command entered at the BCM diagnostic port. A typical report is shown below.

Note: Checking the **Clear Stats** checkbox before the **Comm stats** button is clicked will remotely clear these stats at the BCM; no report is returned.

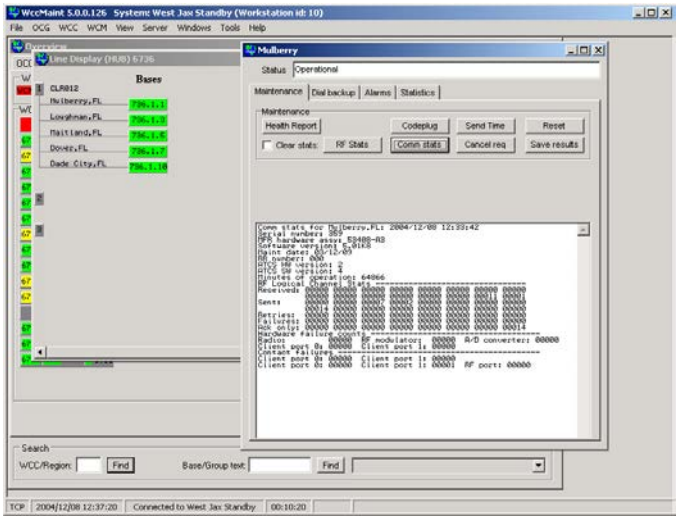


Figure 9-6 Comm Stats Display

9.2.1.7 Cancel Request

This is a local function that clears the results window and ends the current request, for example when a health report has been requested but the base is not responding to the request.

9.2.1.8 Save

Click this button to save the contents of the results window to a file.

9.2.2 Base Alarms

The base alarm screen is shown in Figure 9-7.

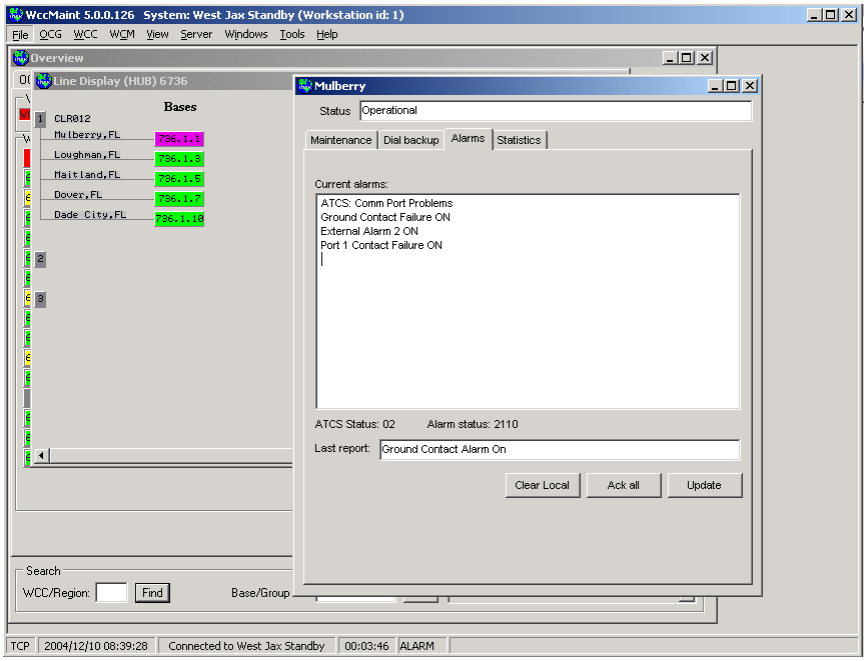


Figure 9-7 Base Diagnostics: Dial Backup Tab

Current alarms for this base are displayed. The ATCS message used by the base to report these alarms has two alarm types defined: ATCS status and manufacturer's status. ATCS status is a set of pre-defined conditions; manufacturer's status is a 16-bit field of alarm bits that have meanings assigned by the device manufacturer.

There is only one ATCS status byte, and it can only contain one of the pre-defined alarm values shown in Table 9-3.

Table 9-3 Pre-Defined Alarm Values

STATUS	MEANING
2	Comm port problems
4	A/D converter failure
6	RF Modulator failure
11	Codeplug failure
17	Radio AC power failure
26	Radio failure

In the example shown in Figure 9-7, the ATCS status is shown as 02, so the corresponding 'Comm port problem' alarm is shown in the alarm window.

NOTE

NOTE

ATCS status is not supported for Siemens MTR-2000 and MTR-3000 BCPs, and this status byte has no meaning for this hardware regardless of its value. ATCS status alarms may be individually masked out for this hardware to avoid confusion.

Manufacturers' status bits are defined for all Siemens and Motorola BCPs only. The mapping of these alarm bits is shown in Table 9-4.

Table 9-4 Manufacturer's Status Bit Mapping

BIT	ALARM	MEANING
0	Comm buss failure	Hardware failure on communications buss. Not supported for Siemens MTR-2000
1	Radio PA failure	Radio power amplifier failure. Not supported for Siemens MTR-2000
2	Carrier without data alarm	Receiver detects unmodulated carrier signal.
3	Mobile channel usage alarm	Raised by MCPs when unable to transmit due to busy receive channel
4	Ground contact alarm	Unit is configured for ground contact and was unable to successfully complete.
5	Out of Coverage	No data received for a configurable time interval, typically two minutes. This applies to MCPs only.
6	External alarm 0	Closure or state change on external alarm contacts. Currently, 4 external alarms are supported. This alarm applies to both BCPs and MCPs.
7	External alarm 1	
8	External alarm 2	
9	External alarm 3	
10	Not assigned	
11	Not assigned	
12	Port 0 contact failure	No data or clock detected on serial port 1
13	Port 1 contact failure	Hardware problem with serial port 1
14	Port 0 hardware failure	No data or clock detected on serial port 2
15	Port 1 hardware failure	Hardware problem with serial port 2

The alarm status word as shown is a hexadecimal value of 2110, which indicates alarm bits 4,8, and 13. The corresponding alarm text is displayed in the alarm window.

NOTE

NOTE

All alarms may be individually masked as part of the base (group) properties. If an alarm is masked, it is not reported to WCCMaint. However, the alarm still exists, and it will still be reflected in the ATCS status or manufacturer's alarm word in the health report. This is why you may see alarm bits set in the alarm word but no alarms are displayed.

The 'Last report' text field contains the text received in the last ATCS health report from this base. Even though several alarms may be active at the same time, this text only reflects the latest change in overall alarm status.

The function buttons on the Alarm tab are described in Table 9-5.

Table 9-5 Base Diagnostics - Alarm Tab Function Buttons

BUTTON LABEL	FUNCTION
Clear Local	Clicking this button clears all alarm bits for this base. This is only true for this copy of WCCMaint, and will not cause any display change for other users. Because all alarms are cleared, the base will now be displayed as healthy (green).
Ack All	Clicking this button will acknowledge all alarms for this base.
Update	This button refreshed the alarm status display.

9.2.3 Base Statistics

The statistics tab is shown in Figure 9-8.

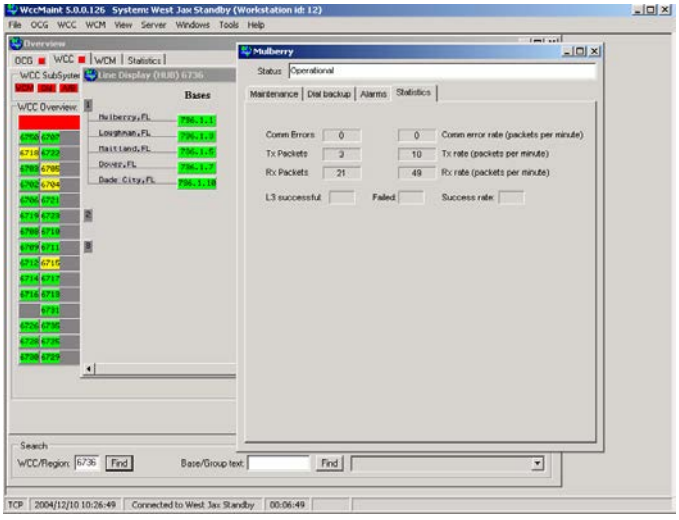


Figure 9-8 Base Diagnostics - Statistics Tab

These are statistics gathered at the WCC (OCG), not at the base itself, that reflect all packet activity to and from the base. Individual statistics are explained in Table 9-6.

Table 9-6 Statistics Tab Field Descriptions

LABEL	MEANING
Comm Errors	Cumulative count of low-level errors on the communications circuit from the WCC to the base (framing, parity errors, etc). Note this does not apply to IP-connected bases. This count is reset once per minute.
Comm error rate	Highest error rate since last processor reset (the highest one-minute error count).
TX packets	Cumulative count of packets sent to the base. This count is reset once per minute.
TX rate	Highest error rate since last processor reset (highest one-minute count).
RX packets	Cumulative count of packets received from the base. This count is reset once per minute.
RX rate	Highest error rate since last processor reset (highest one-minute count).
L3 successful	Layer 3 packet success statistics. Currently only implemented for ARES (non-ATCS) bases.
L3 failed	
L3 success rate	

9.3 Group Diagnostics

To open the group diagnostics form, right-click on a group and select 'Diagnostics'.

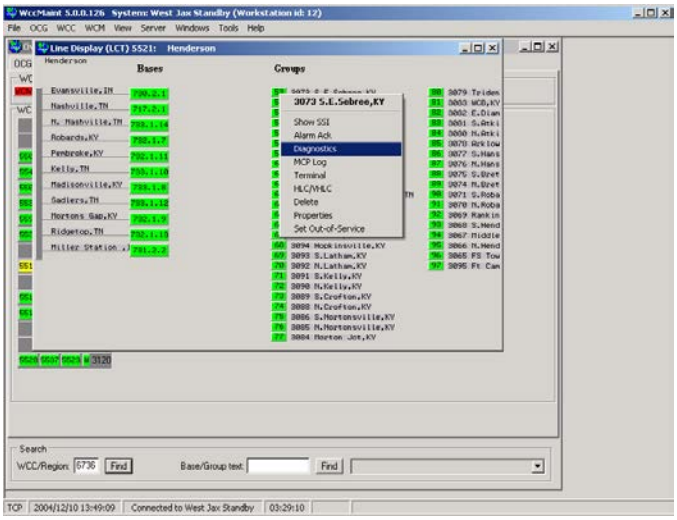


Figure 9-9 Group Diagnostics Selection

NOTE

NOTE

The ‘Diagnostics’ option may not be available, depending on the type of equipment at the site.

The group diagnostics form is shown in Figure 9-10.

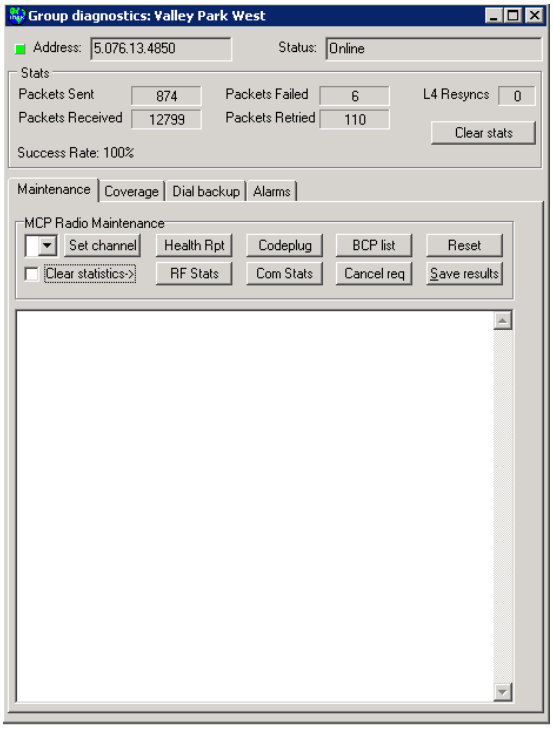


Figure 9-10 Group Diagnostics - Maintenance Tab

The status window at the top right corner of the form reflects the current condition of the group as reported by the WCC/OCG, in this case, ‘Online’, indicating no problems. Possible status conditions for a group are described in Table 9-7.

Table 9-7 Group Status Conditions

STATUS TEXT	EXPLANATION
Online	Normal operation
Offline	Group is in code fail (displayed red). This indicates the group timer has expired, meaning no indications have been received from this site for the (configurable) timeout interval.
Out of service	The group exists but has been taken out of service. This is primarily to prevent any alarm conditions for this group from being displayed at the summary level.
SSI alarm	Group is operating normally but is currently at low signal strength as reported by the primary base. Low signal strength is defined to be less than one-half of the maximum signal strength the WCC has ever seen from this group. Does not apply to WCMs.

Unlike the base diagnostics form, group diagnostics display packet and traffic statistics on the upper part of the form. Diagnostic functions available for this location are grouped into tabs:

- Maintenance: commonly used tests and remote functions
- Alarms: summary of ATCS alarms reported by this base
- Coverage: displays base coverage and locking
- Dial backup: Access to primary/secondary path information and DBU tests

NOTE

NOTE

Different equipment types may have different diagnostic tabs. For example, a WCM (IP-connected MCP) has only the 'Dial backup' tab available. The tabs previously described are typical for an RF-connected MCP.

9.3.1 Group Maintenance Tasks

On the maintenance tab, the functions listed in Table 9-8 are available.

Table 9-8 Group Maintenance Functions

TEST	FUNCTION
Set channel	Change ATCS RF channel (1-6) MCP is operating on
Health report	Solicits an ATCS health report message
Code Plug	Retrieves code plug data from the BCM
BCP List	Retrieves list of MCP's active BCPs
RF stats	Retrieves HSTAT report
Comm stats	Retrieves COMM STAT report
Reset	Remotely reboots the BCM module.
Cancel request	Cancels pending operation
Save	Saves results to a file.

These maintenance functions are explained in the following paragraphs.

9.3.1.1 Set Channel

This button allows the user to change the RF (radio) channel the MCP is operating on. This is useful for implementing ATCS channel reassignments or for forcing the MCP to use a known secondary coverage channel. The user is prompted for verification before the command to change channels is sent to the field location.

⚠ CAUTION

CAUTION

THIS PROCEDURE IS POTENTIALLY SERVICE-AFFECTING. SWITCHING THE MCP RADIO TO AN UNUSED OR POORLY COVERED ATCS CHANNEL MAY MAKE THE UNIT UNSERVICEABLE. THIS CONDITION CANNOT BE REMOTELY UNDONE; A MAINTAINER WILL HAVE TO GO TO THE SITE TO REPROGRAM THE CHANNEL.

9.3.1.2 Health Report

This button retrieves the ATCS health report from the MCP. Refer to the BCP health report described above.

NOTE

NOTE

Because MCP diagnostic messages must flow across an RF link, they are inherently much slower than the direct connection to the BCP (BCPs are either on dedicated communications circuits or direct frame relay). You will typically wait up to 10 seconds for a diagnostic response from an MCP. This applies to any of the maintenance functions available (health report, code plug, RF stats, etc).

9.3.1.3 Code Plug

This button retrieves the code plug information from the MCP. Refer to the BCP code plug description above.

9.3.1.4 BCP List

Clicking this button retrieves a list of all BCPs the MCP is currently receiving messages from, including current and maximum signal strengths for each base (messages do not have to be addressed specifically to the MCP for the sending base to be included in the list). This function will only produce a base list if the system is configured to allow reverse SSI data gathering at the MCP. Refer to Appendix B, **Configuring Reverse SSI**.

9.3.1.5 RF Stats, Comm Stats, Cancel Request, Save

These functions are identical to the corresponding BCP maintenance functions previously described.

9.3.2 Group Dial Backup

The Dial Backup tab for a typical WCM is shown in Figure 9-11.

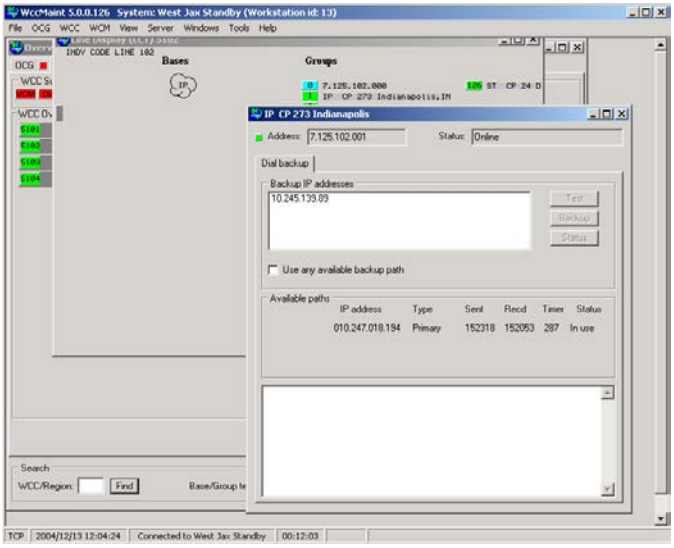


Figure 9-11 Group Diagnostics for WCM

NOTE

NOTE

Dial backup, as treated in this manual, assumes an IP-based dial backup subsystem. Manual and analog dial backup for wireline-based communications circuits are not discussed.

The only diagnostics tab available for WCMs is the dial backup tab. In the 'Backup IP addresses' group box, all stored backup IP addresses for this group are listed. These IP addresses are available for testing or for restoration of service when the primary link is unavailable. The buttons in this group box are described in the following paragraphs.

9.3.2.1 Test

Automatic dial backup functionality has been deprecated; this button has no effect.

9.3.2.2 Backup

Automatic dial backup functionality has been deprecated; this button has no effect.

9.3.2.3 Status

Automatic dial backup functionality has been deprecated; this button has no effect.

9.3.2.4 'Use any available path' Checkbox

Automatic dial backup functionality has been deprecated; this button has no effect.

9.3.2.5 Status Window

At the bottom of the form, the status window logs any dial backup activity; for example, if you bring up a secondary IP path for verification this window logs any changes in test status.

9.3.3 Group Coverage

For RF-connected group locations, the Coverage tab provides display and testing for all RF paths to the MCP (up to a maximum of three). A typical display is shown in Figure 9-12.

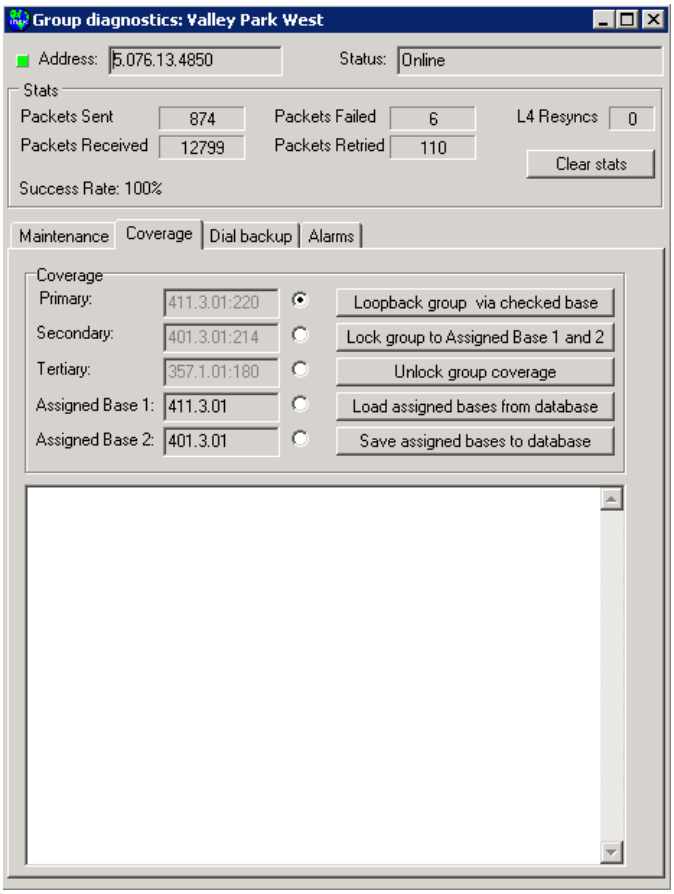


Figure 9-12 Group Diagnostics - Coverage Tab

9.3.3.1 Primary', 'Secondary' and 'Tertiary' Text Boxes

The top three text boxes are labeled Primary, Secondary, and Tertiary and display the base and signal strength of the corresponding coverage. Remember that SSI as indicated here is the received signal strength at the **base receiver**.

9.3.3.2 'Assigned Base' Text Boxes

The 'Assigned Base' text boxes display the currently assigned coverage bases for this group base on the codeline coverage map. See Appendix D, 'Managing coverage for RF groups' for a complete discussion of group RF coverage.

9.3.3.3 'Loopback group via checked base' Maintenance/Test Function

This function sends an MCP_LOOPBACK message to an ATCS MCP or an ARES_LOOPBACK to an ARES WIU. If supported in the field device, the message will be returned to the sender. In turn, every base that receives this answerback from the remote unit will forward the message to the packet switch, which then sends the responses back to WCCMaint. The result is a list of bases that currently are able to 'hear' transmissions from this field site. Typical results of a loopback test are shown in Figure 9-13.

This test indicates that transmissions from Valley Park West are being heard by five bases: Stanton, Lindenwood, Otto, valley Park, Foley, and a fifth base that is not in the database.

Specifically, here is the loopback reported by Lindenwood:

404.2.01 (Lindenwood) RX level: 167

This indicates the physical address of the base (404.2.01) and the signal strength of the received transmission from Valley Park West (167). The signal strength at which the field site received the initial loopback is indicated by the 'Wayside RX level' line above the base reports (222 in this case).

Recall that this message was sent via base 411.3.01 (Valley Park). This means that the field site received a transmission from valley Park base at a signal strength of 222. Because you can force a loopback to be sent via any listed base, **the loopback message is one of the best tools to directly test the ability of a particular base to transmit.** Use the radio buttons to the right of the BCP ID box to select which base will be used for the loopback test. You may also arbitrarily type in the address of any desired BCP to be used in this test in either the 'Base 1' of 'Base 2' edit box, select this base using the radio button, then click the 'Loopback' button to execute the test.

NOTE

NOTE

This page updates dynamically when messages from the WCC (OCG) are received with new coverage status for this group. When this happens the radio button for the primary base will automatically become checked. **Be sure to verify the intended base is checked before clicking the 'Loopback' button or your test may give you misleading results.**

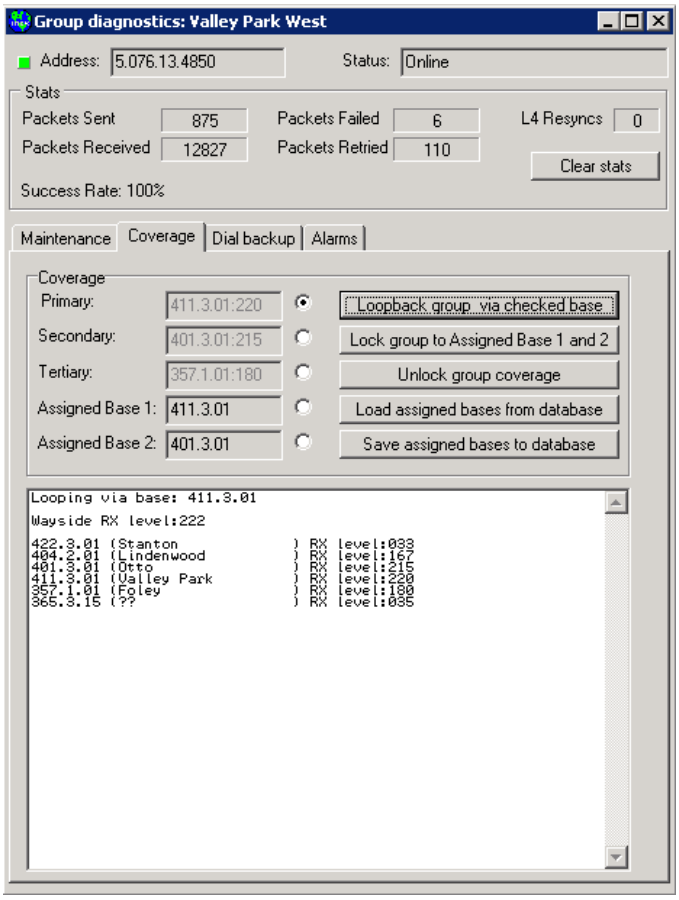


Figure 9-13 Using the Loopback Message

9.3.3.4 'Lock group to assigned Base 1 and 2' Maintenance/Test Function

Clicking this button will send a message to the WCC (OCG), instructing it to use either Base 1 (preferred) or Base 2 to send messages to this group. This technique is called **locking coverage** and is discussed fully in Appendix D, 'Managing coverage for RF groups'. This coverage locking feature requires at least one base ID to be entered (Base 1) with an option for secondary coverage (Base 2). You may either type in BCP IDs manually or load these values from stored assignments in the database (see For WCMs, the main LAN application is **CLC_L3**. Note that the UDP activity watchdog is disabled). It does not matter which radio button is selected for this function.

Once the WCC puts the lock in place, it sends an updated group status message to WCCMaint, which will update the form to reflect the group's lock status. When coverage is locked, the base station edit boxes are cyan as shown in Figure 9-14.

Once the WCC puts the lock in place, it sends an updated group status message to WCCMaint, which will update the form to reflect the group's lock status. When coverage is locked, the base station edit boxes are cyan as shown in Figure 9-14.

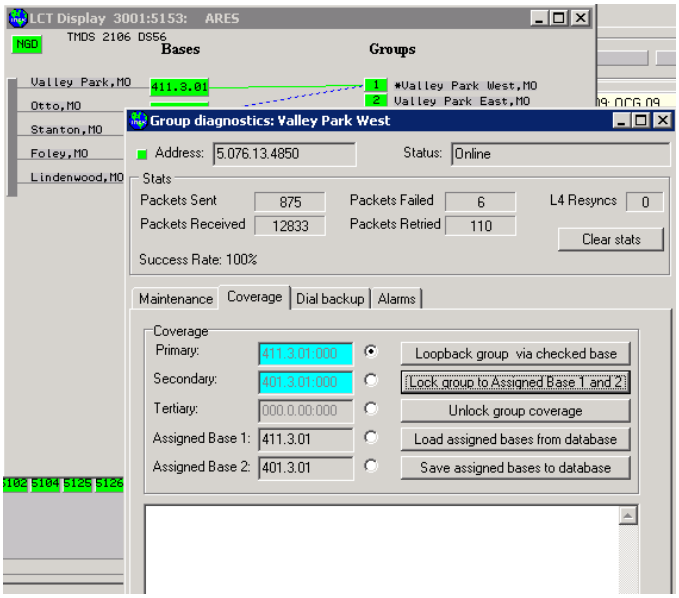


Figure 9-14 Locking Group Coverage

Take note that, when a group is locked into coverage, an asterisk (*) precedes the group name on the line display.

9.3.3.5 'Unlock group coverage' Maintenance/Test Function

Clicking this button sends a message to the WCC (OCG) to release any coverage restrictions for this group.

9.3.3.6 'Load assigned bases from database' Maintenance/Test Function

Clicking this button retrieves the Primary and Secondary coverage bases from the database and enters these base IDs into the Base1 and Base2 edit boxes respectively. If no base numbers appear, there are no saved coverages for this group.

9.3.3.7 'Save assigned bases to database' Maintenance/Test Function

Clicking this button updates the database with the base coverage assignments in Base1 and Base2.

9.3.4 Group Alarms

This tab contains ATCS alarm information for this group. All functions are identical to the Alarm tab described above for BCPs.

9.3.5 Group Statistics

Group statistics are maintained by the WCC (OCG), not the group itself.

Referring to Figure 9-14, the statistics on this display are described in Table 9-9.

Table 9-9 Statistics Tab Data Field Descriptions

STAT LABEL	MEANING
Packets sent	Total number of packets (not ATCS messages) sent to this group. This does not include RF acknowledgments.
Packets received	Total number of packets received from this group.
Packets failed	Failed packets are unacknowledged packets that have been retried via every listed coverage base and were eventually discarded as undeliverable.
Packets retried	When a packet is sent to a group, the group will send an L3 ACK to acknowledge receipt (this is primarily to verify the RF link). If no ack is received within 6 seconds, the packet is resent (via a different base if available) and this count is incremented.
L4 resyncs	This counter is incremented every the MCP reinitialized ground contact. This could be due to an MCP reset or RF coverage issues.
Success rate	The ratio of unsuccessful packets to total number of packets sent.

SECTION 10
USING THE DATABASE

10 USING THE DATABASE

10.1 Introduction

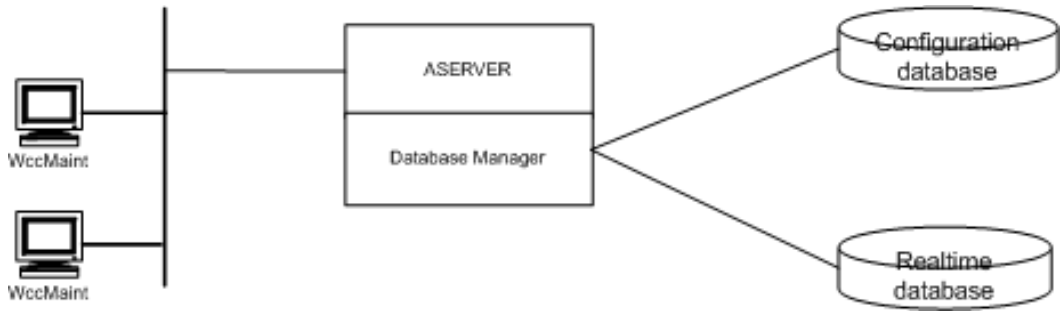


Figure 10-1 NMS Database

The ATCS database used by NMS is actually two separate databases; a configuration database and a realtime database. The configuration database contains all static data for all elements of the system, including bases, groups, WCMs, etc. Static data once entered into the database, does not change until it is modified manually. Static data includes names, equipment types, milepost, IP addresses, ATCS addresses, and any other data that is assigned.

The realtime database is used to store data that changes constantly as system conditions vary. Examples are RF coverages, ATCS alarms, online/offline transitions, etc.

For NMS, the database is isolated from the WCCMaint user in the sense that WCCMaint does not interface with the database directly. All database requests from WCCMaint are handled by ASERVER, which is the sole interface to the database. This way, the WCCMaint user does not need to know the location of the database in order to run.

10.1.1 Database Structure

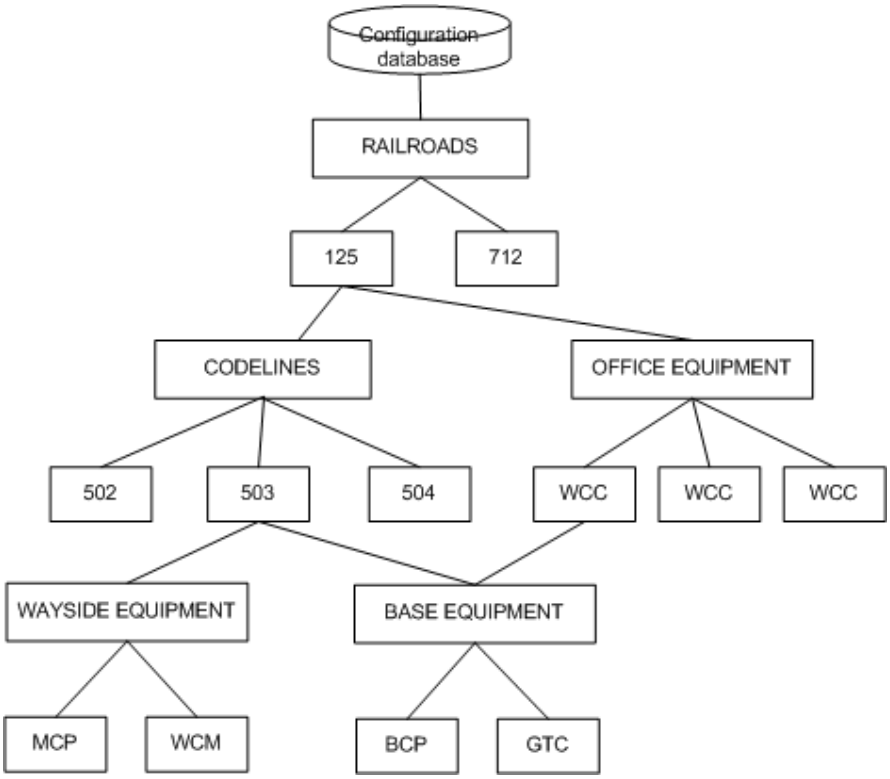


Figure 10-2 Database Hierarchy (Simplified)

Figure 10-2 illustrates the hierarchical nature of the NMS database structure: no database element can exist without the supporting structure above it. A BCP, for example, cannot be entered into the database unless there is a WCC and a codeline defined for it, and a WCC cannot be entered without an associated railroad.

This concept becomes important when defining the properties for a new base or group, as illustrated in the examples below.

In WCCMaint, there are four graphical elements that have properties that are stored in the database:

- WCCs (OCG)
- Regions (HUB or LCT)
- Bases
- Groups

Editing the properties of each of these items is described in the following paragraphs.

10.2 WCC Properties

Selecting **Properties** from the WCC context menu opens the Properties form (Figure 10-3).

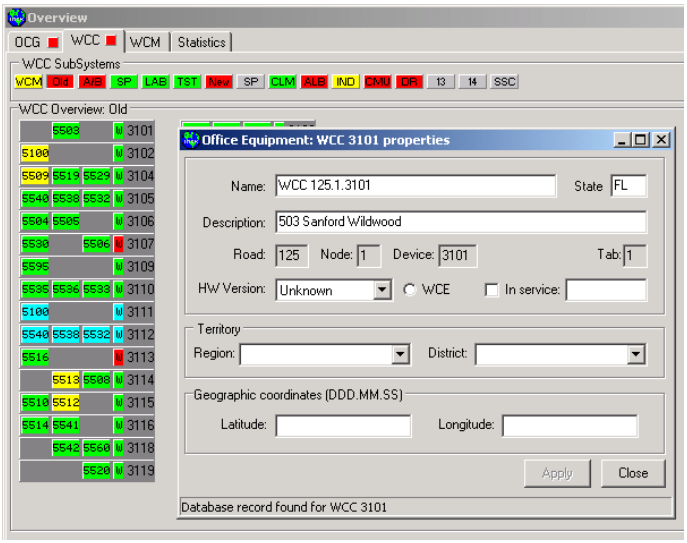


Figure 10-3 WCC Properties Form

This form displays the contents of a record returned from the database: the status bar at the bottom says 'Database record found'.

Properties for a WCC are described in Table 10-1.

Table 10-1 WCC Properties

PROPERTY LABEL	DESCRIPTION
Name	Any descriptive name for this WCC.
State	Optional state field
Description	Any descriptive text up to 66 characters
Road, Node, Device	The RRR,NN, and DDDD portion of the ATCS address for this WCC. Note that these fields are not editable; these values are filled in by WCCMaint based on the known ATCS address of the WCC. **Tab**: This is the WCCMaint tab that the WCC will appear on; this field is not editable. The initial value is filled in by WCCMaint from broadcast messages received from the WCC.
HW version	This drop down list identifies the type of WCC hardware. Options are: • Unknown • A53477 (6-port) • A53401 (9-port) • A53430 (12-port) • Virtual (OCG)
WCE	Check this button if the WCC is used as a WCE. Because this is a configuration option instead of hardware, it is not listed in the hardware list.
In Service	The date the WCC was placed in service is stored here. The checkbox is used to set the WCC in or out of service.
NOTE The in-service checkbox is used to force this WCC to appear in WCCMaint regardless of its online or offline state. Any in-service WCC will be displayed in WCCMaint; if it is currently offline, it will be red. This means that WCCs that have been used in the past but are now retired or removed from service will continue to appear red in WCCMaint until they are set out-of-service. Database records for these retired units can be completely removed from the database using the DB Maintenance tool; see section 11 for details. **NOTE** WCCs that exist but have no database records may not appear in WCCMaint if they should fail. ASERVER looks in the database for all WCCs when it starts up so that if any WCCs fail to report, ASERVER is able to notify all WCCMaint clients about the failure, and the failed WCC will appear red.	
Region, District	These are optionally defined railroad regions and districts that this WCC may be assigned to. These dropdown boxes display a list of established regions and districts in the database. To create regions and districts in the database the DB Maintenance tool must be used.
Latitude, Longitude	Optional fields.

10.2.1 WCC Properties Defaults

If there is no record for a WCC, the properties form displays default values.

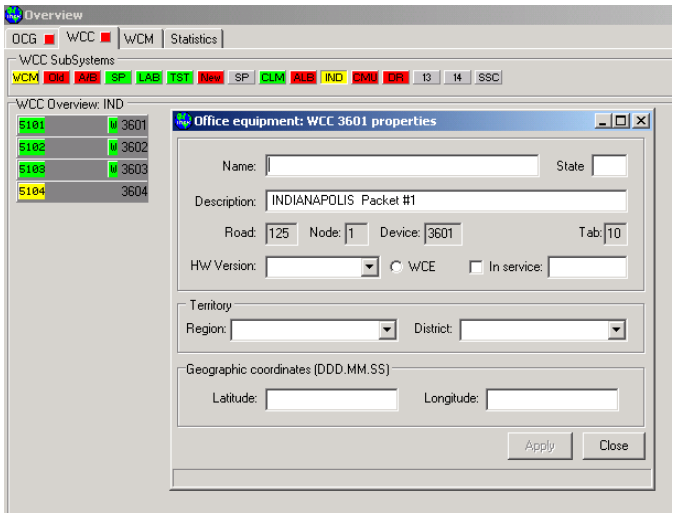


Figure 10-4 WCC Database Properties

Default values are filled in by WCCMaint from information it already knows about the WCC based on its broadcast messages. The road, node, and device fields are derived from the ATCS address of the WCC. The tab and description fields are taken from the status message that the WCC broadcasts once per minute.

These fields are part of the configuration data within the WCC itself. Editing the configuration data for this WCC shows the above fields on the Identity page.

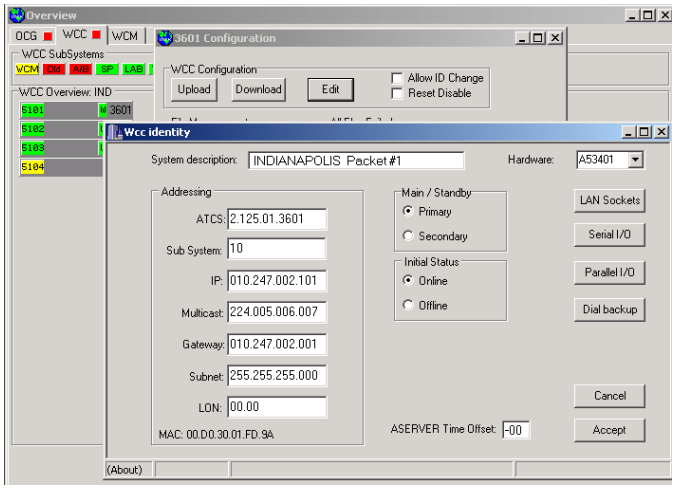


Figure 10-5 WCC Configuration Data

10.2.2 Creating A WCC Database Record

To create a database record for this WCC, fill in the desired fields and click **Accept**:

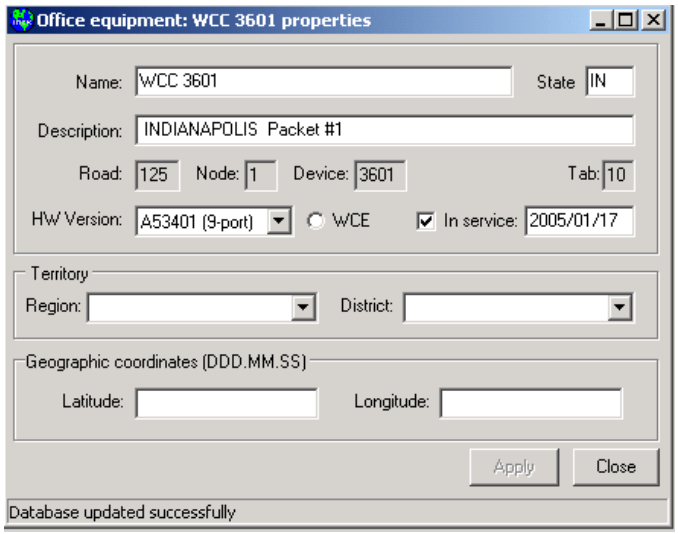


Figure 10-6 Creating A WCC Record

The status bar will indicate if the database was updated.

NOTE

NOTE

This database record **MUST EXIST** and the In-service check box **MUST BE CHECKED** to ensure this WCC will appear (in red) on the WCCMaint display if it fails.

10.2.3 Out-Of-Sync Fields For WCC Properties

The node (NN portion of the ATCS address) for a WCC is part of its internal configuration data. This data is used when a WCC database record is first created. If a WCC's node number is then changed, the database must be updated or the fields will be out of sync.

The same is true for the TAB value in the WCC configuration (the Tab field determines which SubSystem cluster the WCC will be displayed on). If a WCC is moved to a different tab (by changing its configuration data), the database must be updated.

Figure 10-7 demonstrates a WCC record with out-of-sync fields:

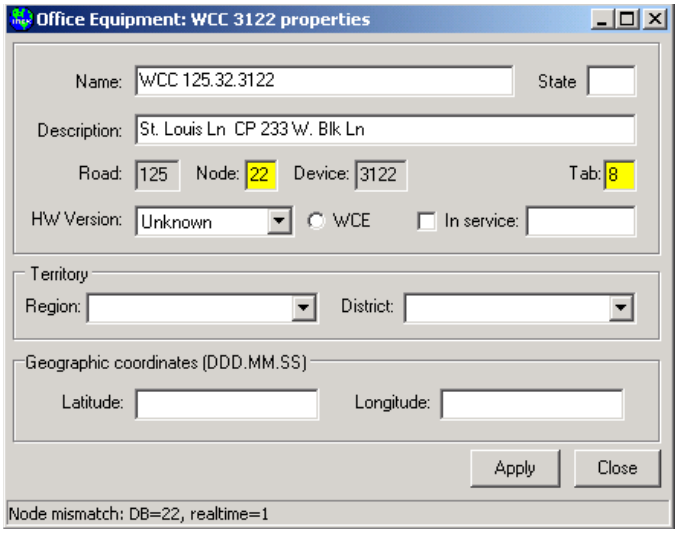


Figure 10-7 Node and Tab Fields Out Of Sync

Both the Node and Tab values do not agree between the actual configuration data and the values stored in the database. The status bar states that the node number in the database (22) does not match the actual node number of the WCC (1). The yellow Tab field indicates that the database Tab value has been overwritten by the actual Tab value (8). This is a typical scenario when a WCC is created, then later reconfigured without updating the database. Notice that in this particular case, the node number in the Name field (32) does not agree with either of the other node values.

Why this is important:

If the tab value in the database is incorrect, if the unit should go offline, ASERVER uses the database Tab value to tell WCCMaint where to put the red 3122 WCC. This is why red WCCs sometimes appear on the wrong tab then return to the correct tab when they come back online.

If the node number is incorrect, it could cause ASERVER to misinterpret a WCC as a WCM and vice versa. For example, if ASERVER believes a WCC to be a WCM, the WCC will not appear on WCCMaint.

Correcting this condition:

To correct the tab mismatch, all that is necessary is to rewrite the database record. The correct tab value has already been placed in the tab field, so click **Apply** to rewrite the record:

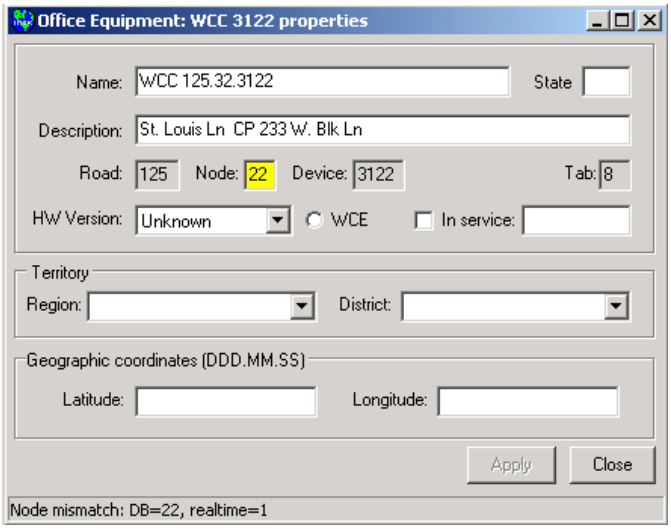


Figure 10-8 Tab Field Corrected

The dark background for the Tab field indicates the database value is now correct.

The node number must now be corrected. In the database, changing a WCC node number involves changing the ATCS address, which is a database key. This is a more complicated process involving multiple database queries, so this task is most easily accomplished by using the DB Maintenance tool. The correction of this problem is fully illustrated in 11.3.4 and is not repeated here. After the node number is changed to 1, the database record reflects the changes (see Figure 10-9).

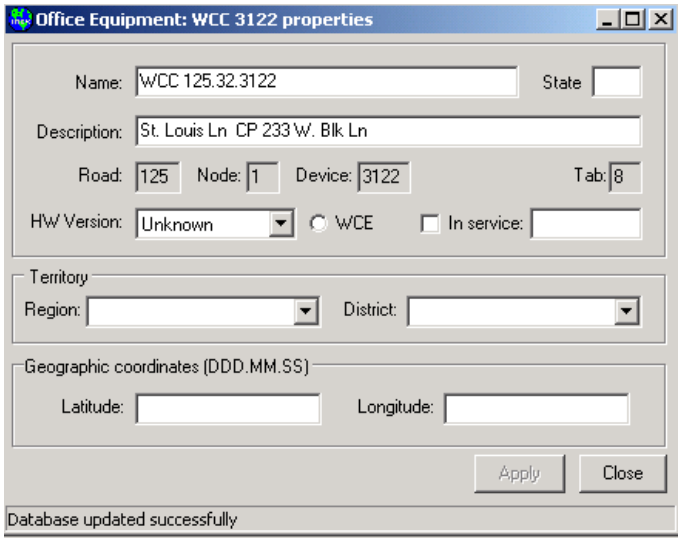


Figure 10-9 Node and Tab Fields Corrected

As a final step, manually edit the Name field to correct the node (or change the name of this WCC altogether). Click **Apply** to save the change:

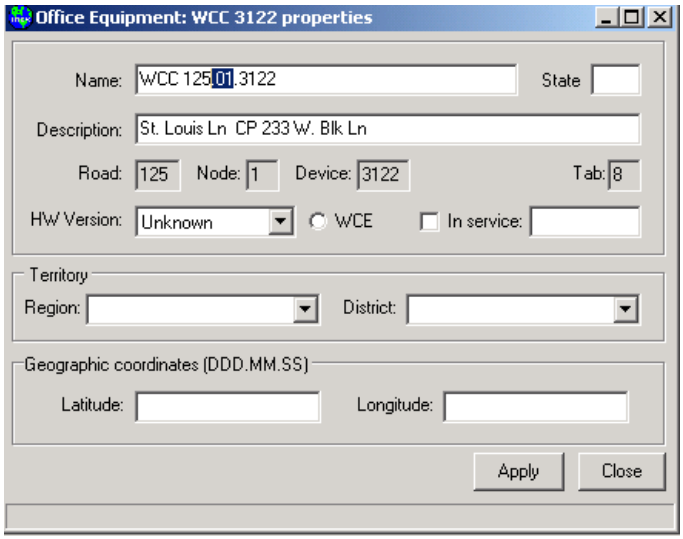


Figure 10-10 Correcting WCC Name Field

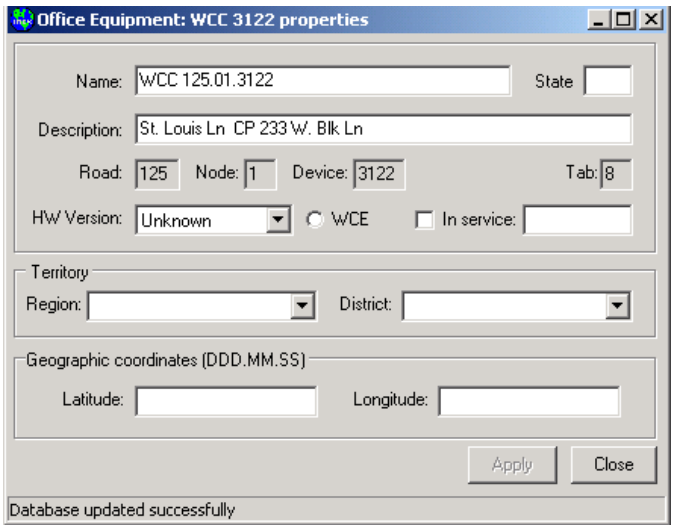


Figure 10-11 WCC Record Saved

10.3 Region Properties

10.3.1 HUB Regions

Codeline properties are modified by opening the region properties form. Right-click on the region panel and click **Properties**.

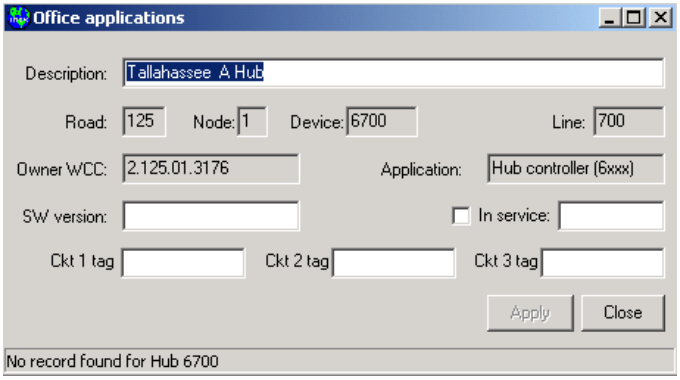


Figure 10-12 HUB Region Properties Defaults

Figure 10-12 shows the default fields filled in when no database record is found for a given region. Fields with a dark background are generated automatically and are not editable; all other fields may be modified.

Region fields are described in Table 10-2.

Table 10-2 Region Field Descriptions

FIELD LABEL	DESCRIPTION
Description	Any descriptive text is allowed. Initially, the description field is copied from the configuration data of the WCC that owns this region.
Road, Node, Device	These fields are generated automatically from the region ATCS address and cannot be modified.
Line, Application type	These fields are generated automatically.
SW version	Any freeform text is allowed here.
In service	This field is included for compatibility only and is not currently used.
Ckt Tag 1,2,3	Circuit tags are text fields that will appear next to the corresponding circuit on the line display. See Figure 10-13.

Fill in any desired fields and click **Apply** to save the record to the database.

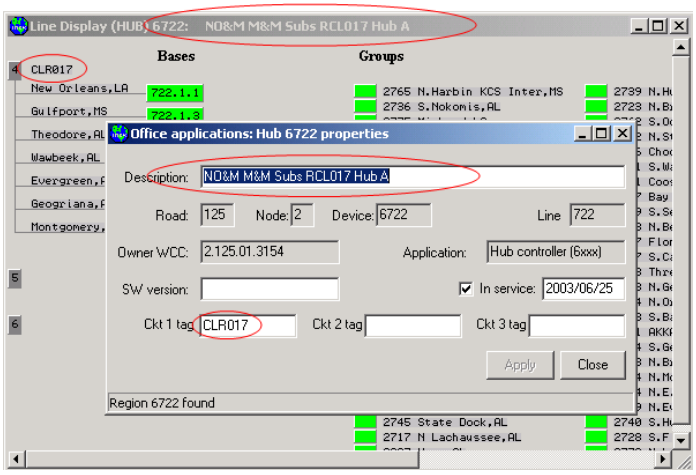


Figure 10-13 HUB Region Properties And The Line Display

Figure 10-13 shows the correspondence between certain database fields and the line display. For a hub, the Description field is used as a caption for the line display. In addition, each circuit (4,5,6 in this example) has an associated descriptive tag field (CLR017 for circuit 4).

Take note that 'Ckt1' on the properties form refers to the first circuit on the hub display.

Circuit numbers on the line display vary according to which WCC processor is running the HUB process. In this example, HUB 6722 is running on processor 'C', which is mapped to serial ports 4, 5, and 6.

10.3.2 LCT Regions

Figure 10-14 shows a default LCT properties page when no database record is found. All fields on this form are the same as for the HUB record shown above with the exception of the Name field.

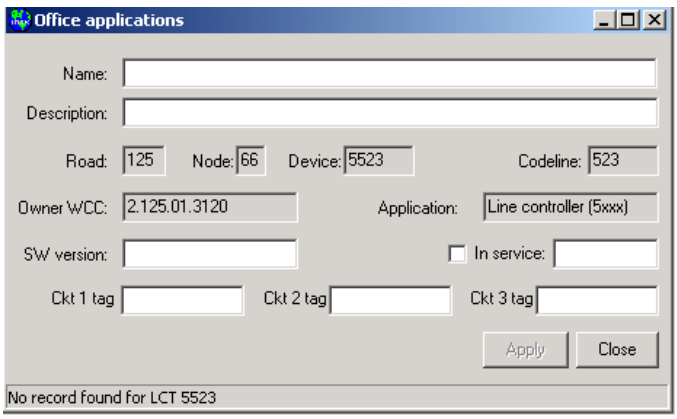


Figure 10-14 LCT Region Default Properties

Figure 10-15 demonstrates the use of the Name field for LCT regions. On the line display, the region name is displayed as an additional text field above the Bases column. Any text is allowed for a name field.

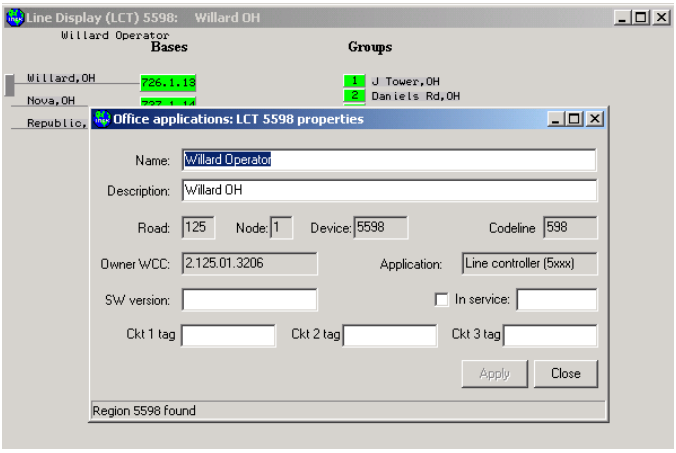


Figure 10-15 LCT Region Properties and The Line Display

Circuit tags are not used on LCT line displays.

10.4 Base Properties

10.4.1 Base Data Tab

Selecting **Properties** from a base context menu opens the base properties form (Figure 10-16).

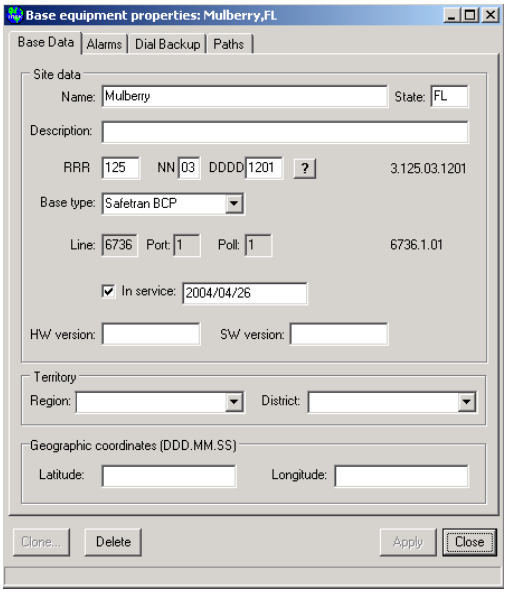


Figure 10-16 Base Properties - Defaults

Properties forms for bases may have different tabs depending on the type of base equipment selected. For example, Siemens and Motorola BCPs support ATCS alarms, so an Alarm tab appears when either of these base types is selected. The fields on the basic tab (Base Data) are described in Table 10-3.

Table 10-3 Base Properties Form Data Fields

FIELD LABEL	DESCRIPTION
Name, State	Location of this BCP. This is how the base will be identified on the line display.
Description	Any freeform description is allowed here; this field is only displayed on this form.
RRR,NN,DDDD	Road, Node, and Device segments of the ATCS address for this base. See the discussion of base station ATCS addresses below.
Base type	Select the type of BCP from this dropdown list.
Line, Port, Poll	These fields are automatically derived from the base ID and cannot be edited. Refer to paragraph 4.2.4 for a discussion of base IDs.
In service	The in-service date field will retain the original installation date for this BCP when the checkbox is first checked. This original installation date may be modified if necessary. The checkbox is also used to temporarily remove the base from service or to reinstate it.
HW version, SW version	Optional fields.
Region, District	Optional fields. To create regions and districts, use the DB Maintenance tool.
Latitude, Longitude	Optional fields for GPS coordinates.

Referring to Figure 10-16, there is a question-mark button next to the ATCS address. If the ATCS address configured at the base is unknown, this button may be clicked to send a message to the base asking for its ATCS address. Not all base station hardware supports this function, but if a response is received, the address will be filled in automatically.

NOTE

NOTE

BCPs do not require an ATCS address to function in an ATCS environment. Any properly configured base will send and receive messages to the field and relay them to the office WCC, and the base will display properly on a WCCMaint line display. An ATCS address is required when messages need to be sent to the base itself (a health request, for example).

Figure 10-17 shows the result of a successful base address query. When a response is received, the address is filled in and the button disappears.

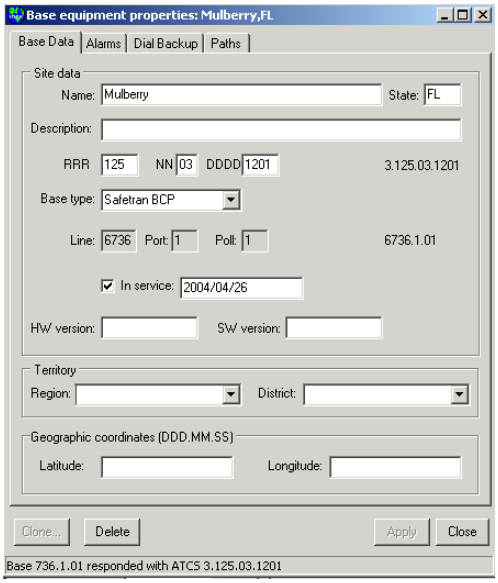


Figure 10-17 Base ATCS Address Query Response

10.4.2 Alarm Tab

The Alarms tab is shown in Figure 10-18.

This page is used to mask unwanted alarms from appearing in WCCMaint.

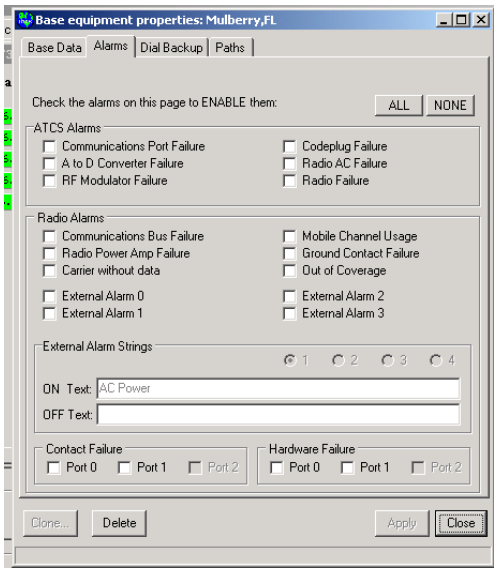


Figure 10-18 BCP Alarm Tab

Siemens and Motorola BCPs support the ATCS alarm message, which contains numeric and bitmapped values corresponding to pre-defined alarms. There are two general categories of alarms:

- **ATCS alarms**: These are broad categories for BCP alarms defined in the ATCS spec. Only one of the listed alarm conditions can exist at a given time.
- **Manufacturer alarms**: This is a field of 16 alarms that are specific to the manufacturer's hardware. Any combination of these alarms may exist at a given time.

Table 10-4 lists all alarms with their meanings and whether the alarm is supported by (M)otorola or (S)iemens:

Table 10-4 BCP Alarms

CATEGORY	ALARM	MEANING	SUPPORT
ATCS	Comm port	Internal communications error. Usually tied to manufacturer 'Comm bus'	M
ATCS	A/D converter	A/D converter failed self test	M
ATCS	RF modulator	RF modulator failed self test	M
ATCS	Codeplug	Codeplug CRC invalid	M
ATCS	Radio AC	AC power feed to radio failed	M
ATCS	Radio	General radio failure	M
Manufacturer	Comm bus	Failure in SB 9600 bus	M
Manufacturer	Radio power amp	Radio power amp failure	M
Manufacturer	Carrier w/o data	Unmodulated RF carrier detected	M,S
Manufacturer	Mobile channel	(MCP only) Receive traffic inhibits transmission	M,S
Manufacturer	Ground contact	(MCP only) ground contact failure	M,S
Manufacturer	Out of coverage	No outbound traffic received in OOC timeout interval	M,S
Manufacturer	External 0	External alarm contact closure	M,S
Manufacturer	External 1		
Manufacturer	External 2		
Manufacturer	External 3		
Manufacturer	Port1 Hardware	Configured port not connected	M,S
Manufacturer	Port2 Hardware		
Manufacturer	Port1 Contact	No data or clock from configured port	M,S
Manufacturer	Port2 Contact		

Any time there is a transition in the state of any of the above alarms an ATCS alarm message is generated and sent to the office.

ATCS alarm messages are **NOT** locally handled by each WCCMaint client. ASERVER intercepts these messages, stores the alarm in the realtime database, then checks the alarm mask for the BCP (or MCP) sending the alarm. If the alarm is not masked according to the alarm tab shown above, an alarm notification message is broadcast to all WCCMaint clients for local display.

As indicated in

Figure 10-19, any alarm that is **CHECKED** will be passed on to WCCMaint for display.

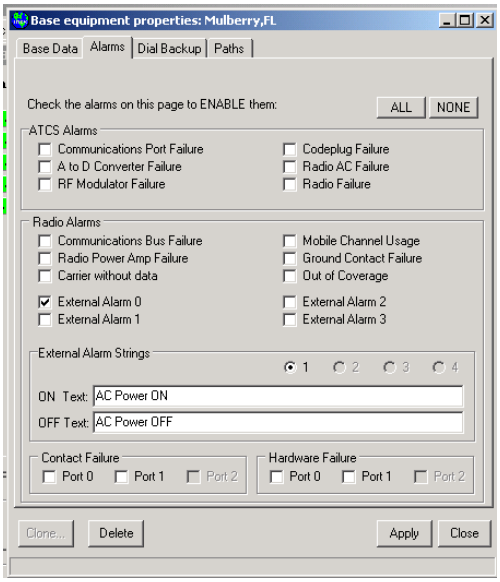


Figure 10-19 Modifying External Alarm Strings

10.4.2.1 Setting Up External Alarms

External alarms are dry contact closures that can be used to send alerts for external equipment or conditions such as AC power failure, battery chargers, door or perimeter alarms, etc. Text strings may be assigned to each of the two states for every external alarm. If no strings are assigned, these alarms will report with default strings, such as 'External alarm 0 ON'.

To assign alarm strings, check the appropriate checkbox as shown in Figure 10-19 and enter the desired text for both the ON and OFF conditions. When the alarm is displayed, nothing will be appended to this string, so the alarm string must include the alarm state, for example, ON/OFF, HIGH/LOW, ALARM/NORMAL, etc.

10.4.3 Dial Backup Tab

Referring to Figure 10-20, there are many types of dial backup systems; some of the fields on this tab will not be implemented depending on the nature of your dial backup subsystem.

NOTE

NOTE

For OCG regions, dial backup is configured directly in the OCG and these database properties are not used. The same applies to WCM/MCP field units. Database properties for dial backup are only used for WCC regions.

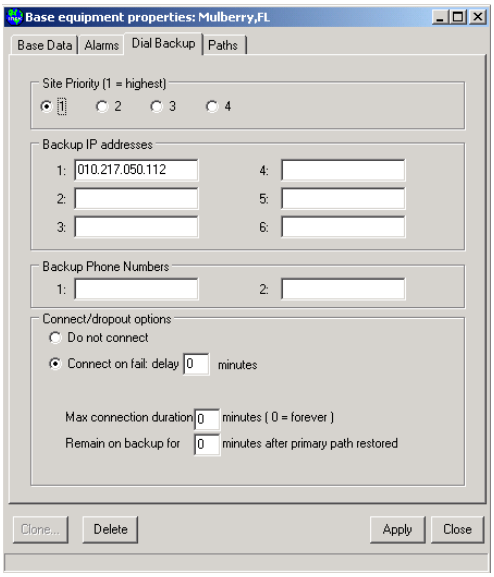


Figure 10-20 Dial Backup Tab

Dial backup fields are described in Table 10-5.

Table 10-5 Dial Backup Field Descriptions

FIELD LABEL	DESCRIPTION
Priority	Use the radio buttons to set the dial backup priority for this base (highest priority = 1). Priority is used in situations where only one dial backup circuit is available and two bases need to be backed up; priority will determine which base will be assigned to the backup circuit.
IP addresses	Enter up to six backup IP addresses for IP-based DBU systems
Phone numbers	Enter up to two phone numbers for analog dial-up systems.
Do not connect	Check this radio button if dial backup is configured but temporarily not to be used for this base.
Connect on fail	Check this radio button to initiate dial backup immediately on failure or to wait for a certain interval before going to backup. The delay range is from 0 – 99 minutes.
Max duration	Any non-zero value in this field will set the connection duration in minutes before the backup circuit is released. This feature is to prevent a base from being on dial backup indefinitely. A value of 0 in this field will allow the backup circuit to remain up until manually taken down.
Remain on backup after primary restoral	This is a configurable delay (in minutes) for returning to the primary circuit after it is restored. This is meant to prevent flip-flopping when the primary circuit is unstable. This value is usually set to a nominal value of 10 minutes.

10.4.4 Paths Tab

This tab lists all known paths for this base. A path can be thought of as a hardware address, so that for example path 6736.1.01 shown in Figure 10-21, represents Port 1, Poll address 1 on the 6736 HUB processor. For IP bases, this path does not represent a physical connection; it is just a tag associated with the particular IP address.

The reason for multiple paths for a base is to accommodate systems that expect the same base to appear on WCCMaint on a different path depending on whether or not it is on dial backup. For example, a base connected to LCT 5501 port 2, poll address 7 is known as 5501.2.07. When this base goes on dial backup, the backup circuit may go to HUB 6201, port 3, poll address 7, which will identify the base as 6201.3.07. Having multiple paths defined allows WCCMaint to correctly display this base regardless of its connection.

If the backup path(s) are known, the Path Editor may be used to enter or correct all backup path information using the ‘New’ or ‘Update’. Alternatively, instead of entering secondary paths manually, the base can be brought up on the backup circuit, and the new base appearance can be cloned to the original. See Section 10.6 for an example of cloning bases.

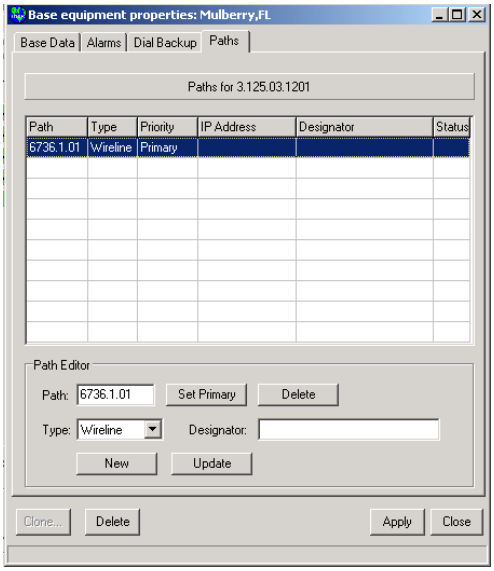


Figure 10-21 Paths Tab

Secondary path management is primarily used for systems that employ analog dial-up modems for dial backup. IP-based dial backup systems (as implemented on OCG) do not rely on this mechanism.

10.5 Group Properties

The group properties form is opened by right-clicking on the group and selecting **Properties**.

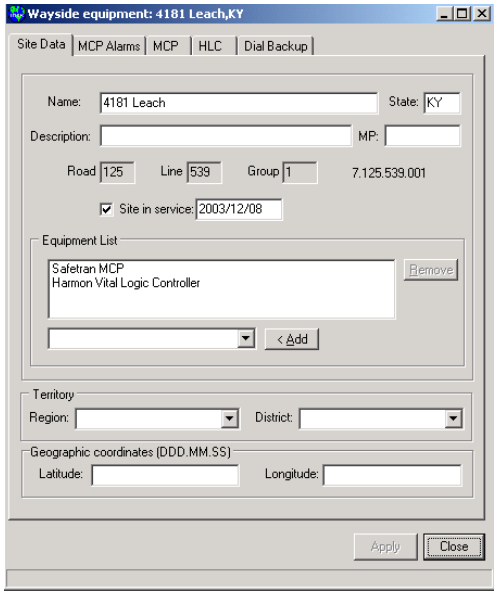


Figure 10-22 Group Properties Defaults

Every tab shown on this form corresponds to a record in the database. Different tabs will appear depending on the equipment selected for the site. In this case, the group is a typical RF MCP connected to a Harmon VHLC.

This example form has 5 tabs:

- Site data
- MCP alarms
- MCP
- HLC
- Dial Backup

Fields for each tab are described in the following paragraphs.

10.5.1 Site Data

Refer to Figure 10-22 and Table 10-6 for field descriptions.

Table 10-6 Group Property Site Data Fields

FIELD LABEL	DESCRIPTION
Name, State	Location of this MCP. This is how the group will be identified on the line display.
Description	Any freeform description is allowed here; this field is only displayed on this form.
MP	Milepost, if applicable.
Road,Line,Group	RRR,LLL, and GGG portions of the ATCS address for this group.
In service	The in-service date field will retain the original installation date for this MCP when the checkbox is first checked. This original installation date may be modified if necessary. The checkbox is also used to temporarily remove the group from service or to reinstate it.
Equipment list	The equipment list is built by adding the MCP first, then any other equipment at the site. Each equipment item will generate a corresponding tab for a database record. Adding different equipment types here will affect the context (drop-down) menu for this group on the line display. **Region, District**: Optional fields. To create regions and districts, use the DB Maintenance tool.
Latitude, Longitude	Optional fields for GPS coordinates

10.5.2 MCP Alarms Tab

This tab is identical to the alarm tab for bases described above with one exception: there is an 'SSI threshold' field at the top of the form. This field is intended to record the average expected SSI for the site and is for recordkeeping purposes only.

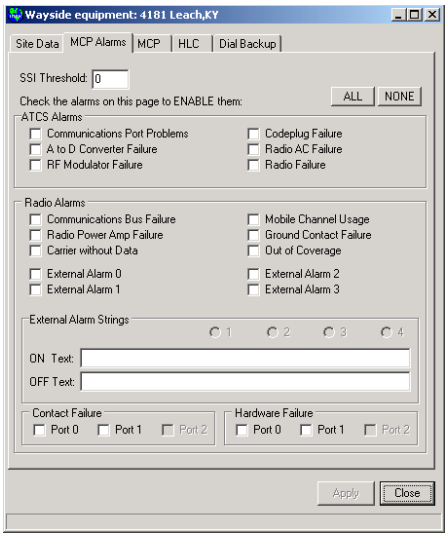


Figure 10-23 MCP Alarms Tab

10.5.3 MCP Tab

This tab is generated automatically because the database requires it. No user interaction is required for this record, although the fields shown (Figure 10-24) are user-defined and may be filled out for recordkeeping purposes.

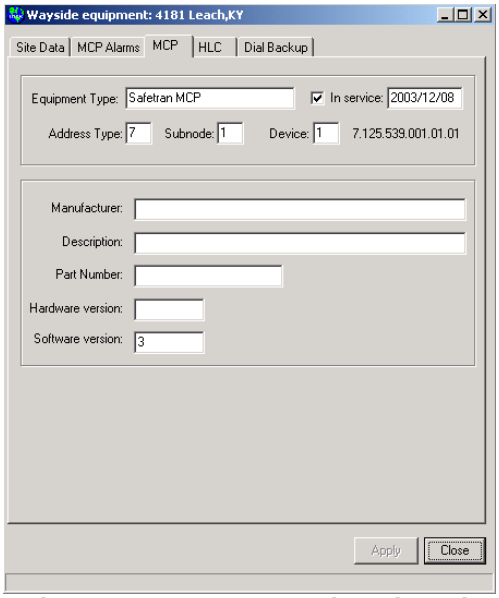


Figure 10-24 MCP Subnode Tab

10.5.4 HLC tab

This tab is generated automatically and functions identically with the MCP tab described in 10.5.3. Fields here are available but not required.

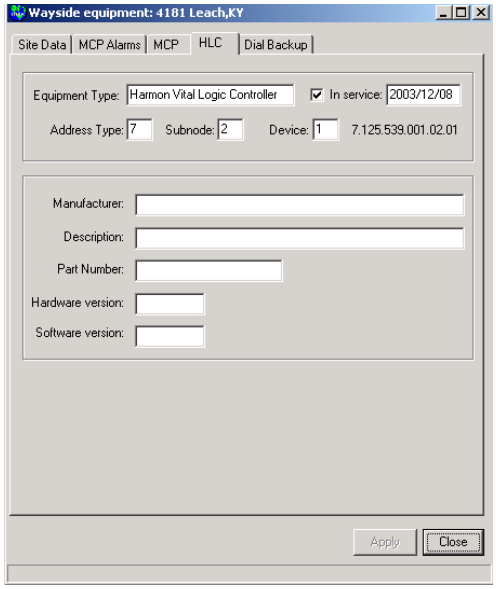


Figure 10-25 HLC Subnode Tab

10.6 Example 1: Adding A New Base

In this exercise, the new base on LCT 5550 will be added to the database. Right-click on the base and select **Properties** to open the Properties form (Figure 10-27).

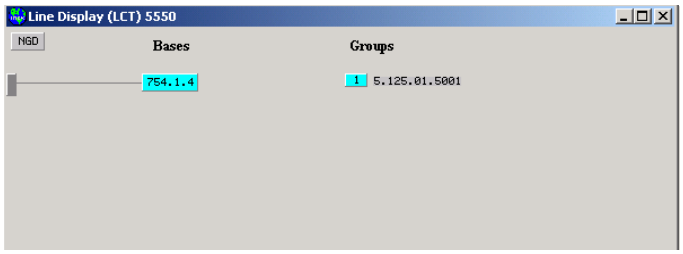


Figure 10-26 New Base On The Line Display

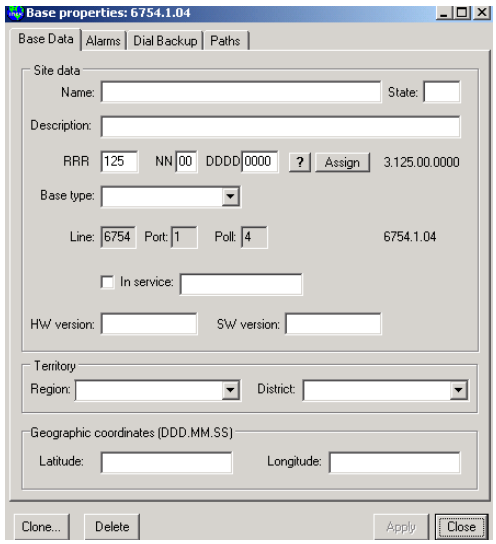


Figure 10-27 Base Properties Defaults

A name field is required, but the state is optional. Fill in any desired text

An ATCS address is required to put this base into the database. If the ATCS address is unknown, any type 3 address will satisfy the database as long as it is unique. If the address is known (it must be programmed into the BCM module at the BCP as well), enter it in the NN and DDDD fields.

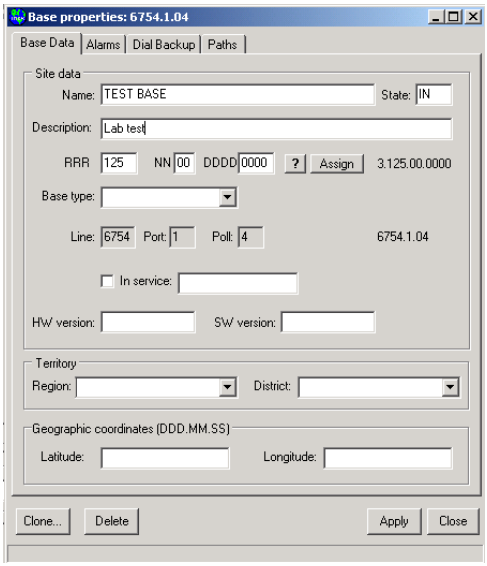


Figure 10-28 Entering BCP Information

If the ATCS address is unimportant, the database will assign a unique address for this base if the **Assign** button is clicked. The database server will fill in the NN and DDDD fields as shown below.

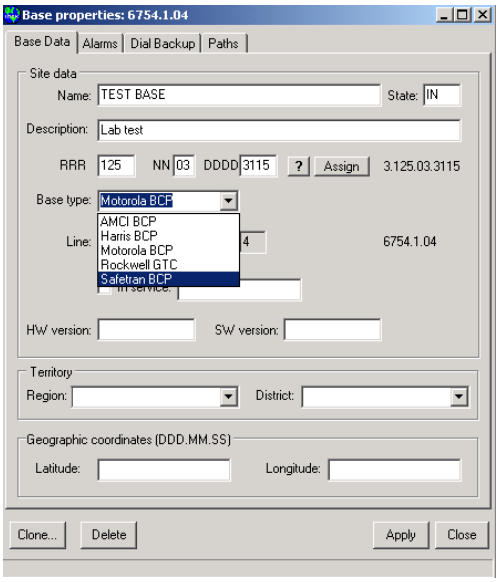


Figure 10-29 Selecting Base Equipment Type

After the ATCS address has been entered, select a base type from the dropdown list.

With the base equipment type set, click the **In Service** check box and click **Apply** to send the record to the database:

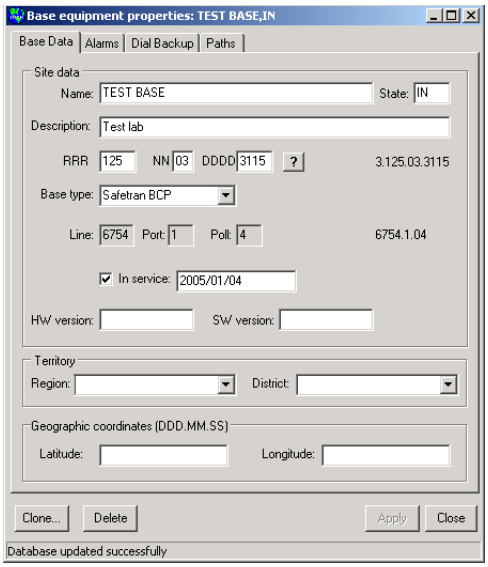


Figure 10-30 Base Record Updated

Once the database has been updated, the base will appear correctly on the line display.

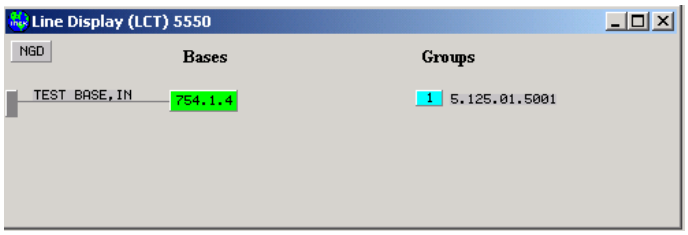


Figure 10-31 Line Display with Updated Base

10.6.1 Cloning A Base

As explained in 10.4.4, the same physical base may have different paths to the office (primary and one or more secondary). Once a base is established in the database, it can be brought up on a secondary circuit. Initially, this will appear as a new base. To associate this base appearance with the existing base record, the **Clone** button is used.

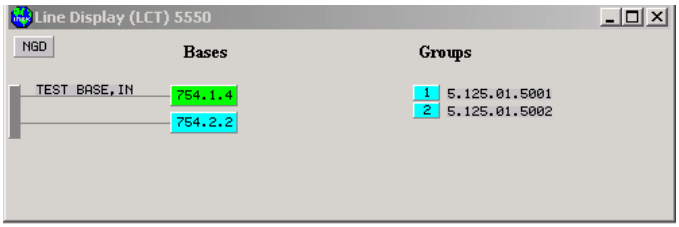


Figure 10-32 New Base on Line Display

Bring up the properties form for the new base.

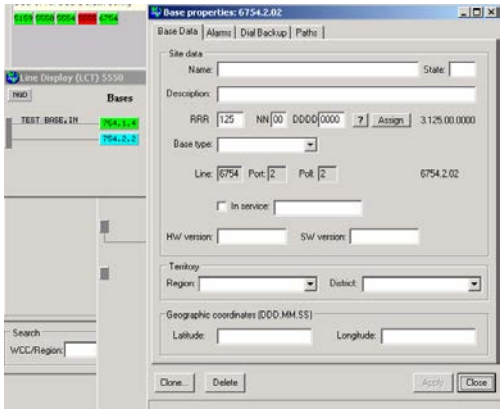


Figure 10-33 Properties for Base Cloning

Because this new base is known to be the same as the TEST BASE, the **Clone** button is used to associate this path with the original record.

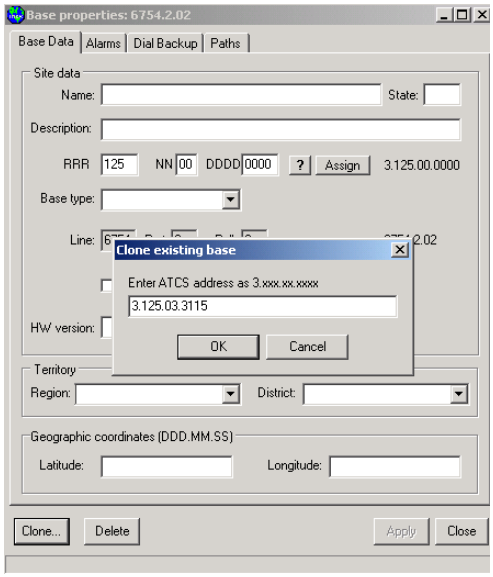


Figure 10-34 Cloning an Existing Base

Enter the ATCS address of the original base and click OK.

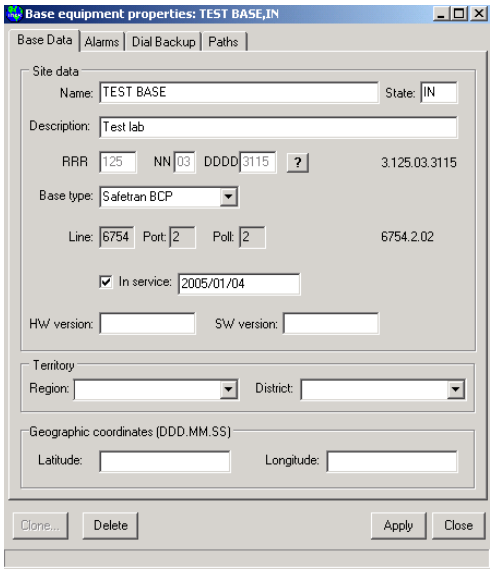


Figure 10-35 Existing Base Record Copied

The original base record information has been overlaid on this form. The **Clone** button is disabled, and the ATCS address cannot be edited. Click on the **Paths** tab to see the new secondary path.

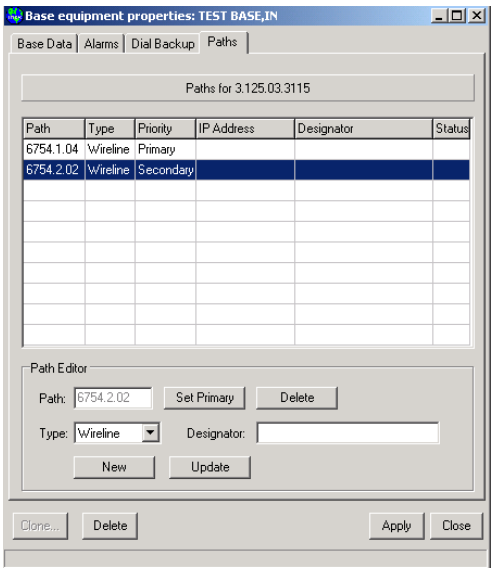


Figure 10-36 Updated Paths Tab

The new path now appears as a secondary path for the test base. Click **Apply** to update the TEST BASE record.

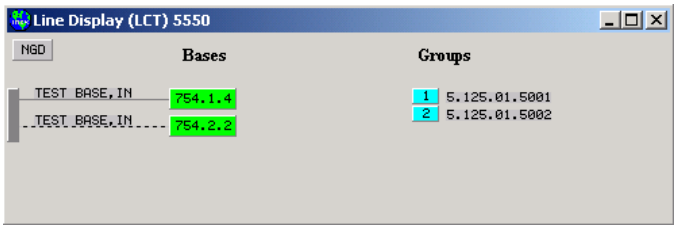


Figure 10-37 Primary And Secondary Paths For Same Base

Because both paths are active, the TEST BASE shows twice on the line display. The secondary (backup) path is shown as a dotted line.

With this multiple-path scenario, if the primary path is down, the 754.1.4 base will appear red, and the 754.2.2 will display as shown. When the primary path is up, and the backup path is down, the backup path (754.2.2) does not appear at all, since this is considered a normal condition.

10.7 Example 2: Adding A New Group

Adding group 1 to the sample codeline starts with opening its Properties form.

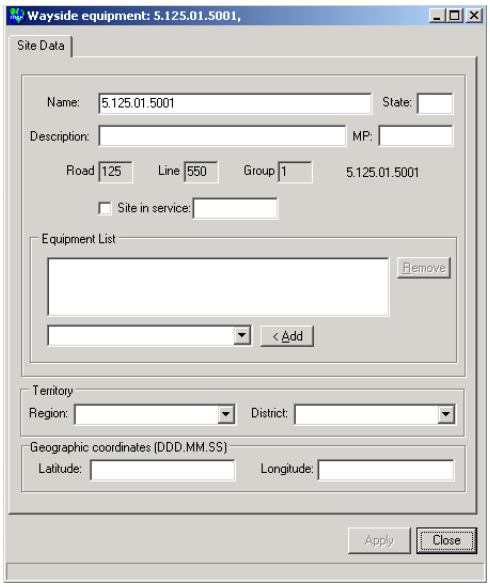


Figure 10-38 Group Properties Defaults

A default name is suggested; overwrite this with the desired group name and fill in the other fields as required.

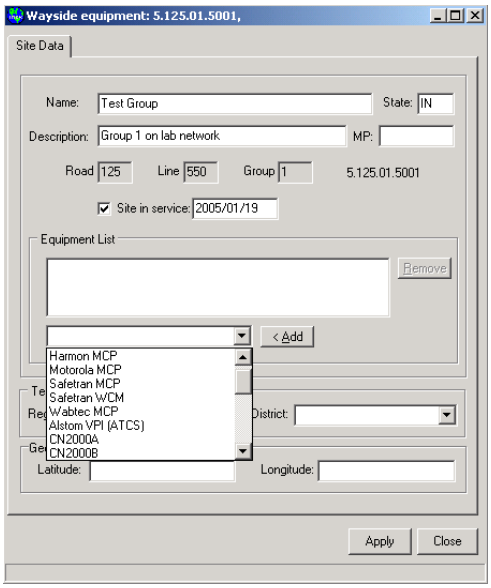


Figure 10-39 Selecting Group Equipment Type

The equipment dropdown list supplies the most known types of field equipment. Select the appropriate equipment and click **Add** to place it in the equipment list.

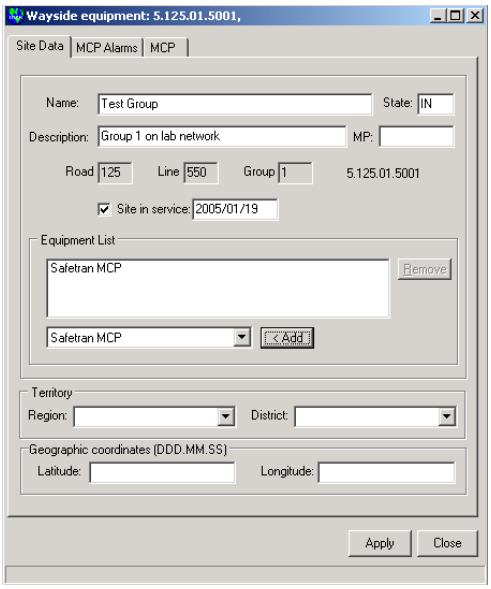


Figure 10-40 MCP Added To Equipment List

Note that two MCP-related tabs appear. Ordinarily, there is a code unit associated with this MCP. A Harmon VHLC is a common addition.

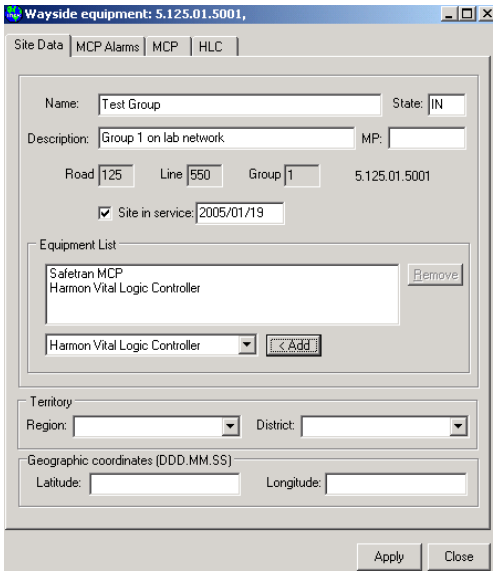


Figure 10-41 VHLC Added To Equipment List

The additional HLC tab. Adding field equipment modifies the context menu for the group. In this case, the context menu will have now options for MCP log, MCP terminal, and HLC log retrieval.

Click **Apply** to save this data. The line display will reflect the changes.

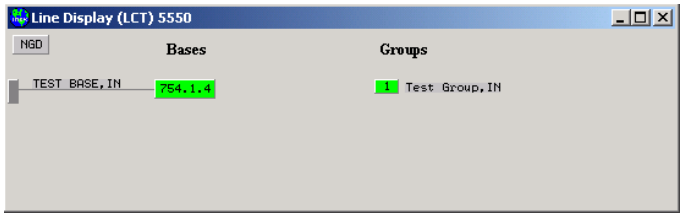


Figure 10-42 Updated Line Display

SECTION 11
USING TOOLS

11 USING TOOLS

11.1 Introduction

There are several utilities in WCCMaint that are not generally part of everyday maintenance and diagnostics. These tools are intended to perform maintenance or information gathering on the system as a whole.

To access system tools, use the main menu.

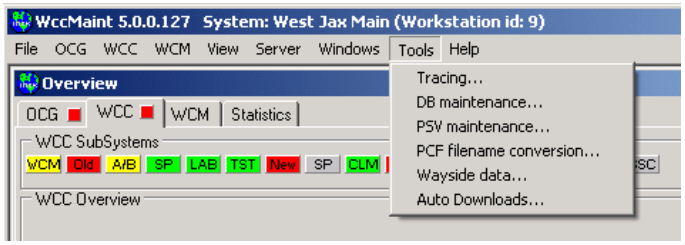


Figure 11-1 Tools Main Menu

The available tools are described in the following paragraphs.

11.2 Tracing

The tracing window has two functions: 1) general logging of significant events or conditions and 2) ATCS message tracing. A typical trace display is shown in Figure 11-2.

All log messages in WCCMaint go to the trace window, as shown.

A powerful feature of the trace window is its ability to trace specific ATCS messages as a troubleshooting aid. The red highlighted boxes in Figure 11-2 are the message tracing controls.

In the upper right, the Trace enable listbox enables different categories of message tracing. Each entry in this listbox has its own checkbox that enables the specific category; more than one category may be checked. The categories are described in Table 11-1.

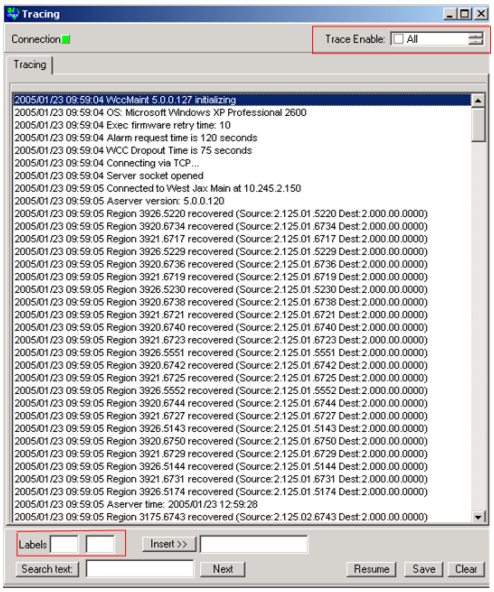


Figure 11-2 Trace Tool

Table 11-1 Trace Enable Categories

TRACE CATEGORY	DESCRIPTION
All	All messages are displayed. On busy systems, this will display so much traffic that the results may be too cluttered to be of any help. The other categories are more specific and will yield more succinct results
Layer3	Only ATCS messages are displayed; no TCP headers or Layer 2 UDP housekeeping packets are displayed.
WCCs	Only ATCS messages broadcast from WCCs are displayed.
Traced WCCs	Only messages to and from WCCs marked as traced are displayed.
Database	Only database messages (ATCS label 04F6) are displayed.
Addr query	Only name queries (ATCS label 04EE) are displayed.
Discard	Only discarded messages (usually with unknown labels) are displayed

In the lower-left, two edit boxes are available for entering ATCS message labels for filtered tracing. For example, entering 0842 in one box and 0882 in the other will trace health report requests and any health report replies from the field. A sample trace using message label filtering is shown in Figure 11-3.

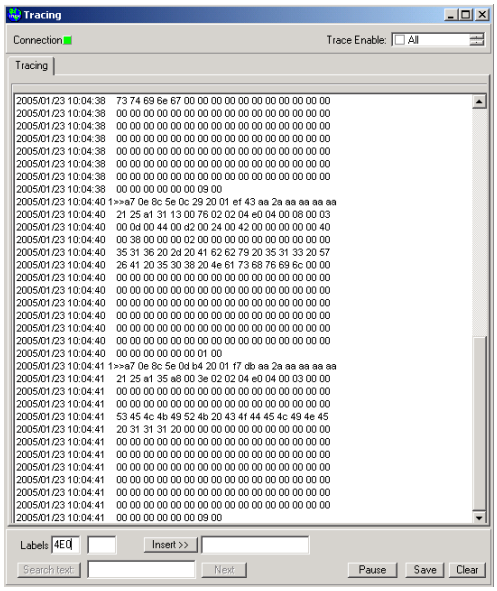


Figure 11-3 Message Label Tracing

In Figure 11-3, message label 04E0 (WCC_LOCAL_STATUS_REPLY) is traced.

One of the most useful filter tracing methods is the traced WCC. The **Trace** function in a WCC context menu is checked in Figure 11-4.

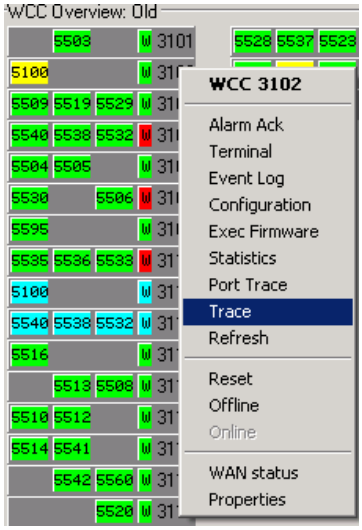


Figure 11-4 Setting the WCC Trace Flag

In Figure 11-5 the WCC is marked with a blue background color to indicate that it is being traced. All messages to and from this WCC and all of its codeline regions will be traced.

Figure 11-5 WCC in Trace Mode

To complete the WCC trace, you must check the **Traced WCCs** checkbox in the **Trace Enable** list box.

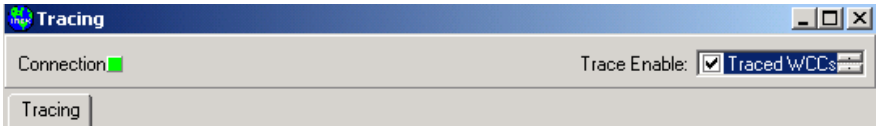


Figure 11-6 Trace Enable List Box

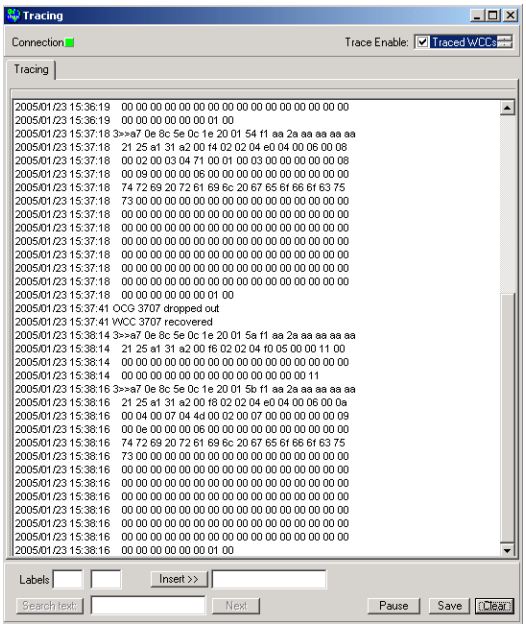


Figure 11-7 Traced WCC Traffic

Messages from WCC 3102 are now displayed.

NOTE

NOTE

If this WCC is refreshed, the tracing flag is lost and the WCC will revert to its normal display.

11.2.1 Text Searching In the Trace Display

When the trace display is Paused, the text search controls are enabled. Enter the search text in the input box and click **Search text**. The entire text window (all contents – not just the visible text) is searched. If found, the line containing the first occurrence of the search text is highlighted. Click the **Next** button to search for more occurrences.

It is sometimes useful to insert text into the window to add comments. Any text in the **Insert** edit box will be inserted as the last line in the text window.

Use the **Save** button to save the entire contents of the trace window to a file.

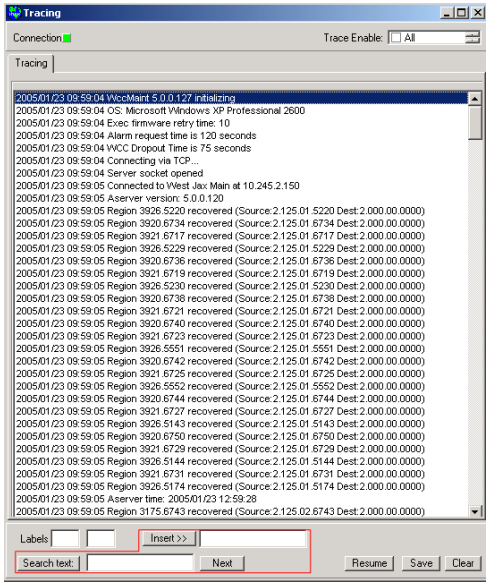


Figure 11-8 Text Search Controls

11.3 DB Maintenance Tool

The DB maintenance form is primarily used for:

- Converting HD INI files into database records
- Adding or deleting railroad numbers from the database
- Marking WCCs in-service
- Adjusting incorrect WCC node numbers
- Adding railroad regions and districts

When the DB maint form first opens, all WCCs in the database are listed, and any defined codelines that have no bases or groups assigned are listed as orphans in the **ATCS lines** window. Below this window, the**?** button is used to refresh the orphan line list.

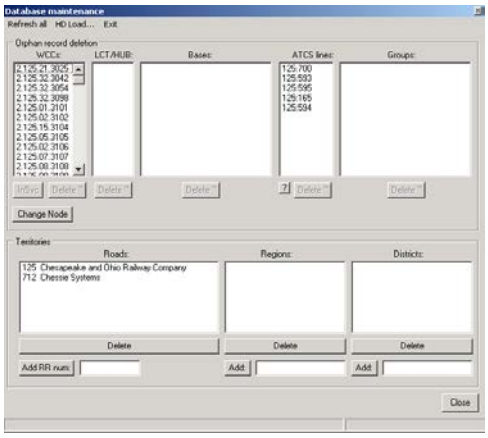


Figure 11-9 DB Maintenance Form

The database may be 'browsed' by selecting a WCC. Its dependent LCT/HUB regions are displayed in the **LCT/HUB** window. When an LCT or HUB region is selected, its bases and groups are displayed.

NOTE

NOTE

Although the Delete buttons are active, deleting database records from this form is not recommended unless it is done by a database administrator with a thorough knowledge of the database structure.

11.3.1 Marking A WCC In-Service

When a WCC is selected (highlighted), the **InSvc** button becomes enabled. Clicking this button sets the in-service state to TRUE for this WCC. This is equivalent to checking the **In Service** checkbox on the WCC properties page.

This button is needed to put a WCC in service while it is offline; an offline WCC may not have a panel displayed on WCCMaint, which means there is no context menu to open its properties form.

WCCs must be flagged as in-service in the database in order for ASERVER to raise an alarm if they do not come online after a restart.

11.3.2 Adding / Deleting a Railroad

To add a railroad to the database, type the RRR number in the edit box (Figure 11-10) and click **Add RR num** button.

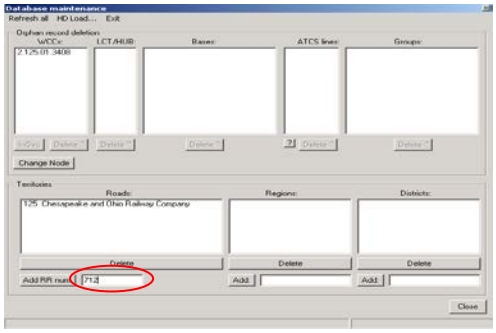


Figure 11-10 Adding A Railroad

The new railroad appears in the **Road** list (Figure 11-11), and the status bar displays the results of the database transaction.

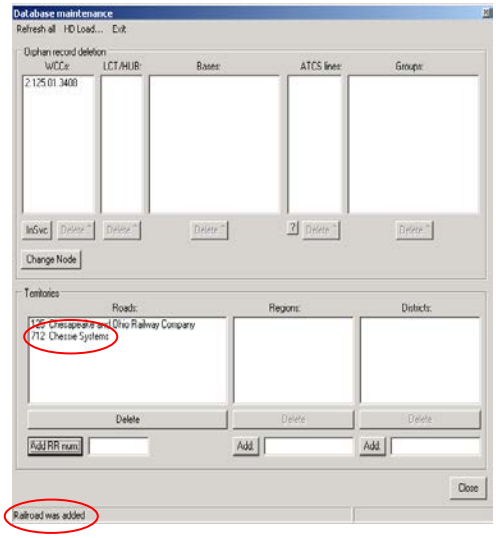


Figure 11-11 New Railroad Added

Once a railroad is added, it may be deleted using the **Delete** button under the **Roads** window. Note that, once WCCs, codelines, bases, and groups have been added under that railroad number, the process becomes more involved because there are dependent records that must first be deleted.

11.3.3 Adding Regions And Districts

Regions and districts may be added to a railroad to provide convenient groupings of codeline regions. Once entered, a list of districts will be available on the properties forms for WCCs, bases, and groups in order to associate the item with a particular territory.

In the database, regions belong to railroads, and districts belong to regions. This means that a region must be added to the database before its districts can be added This process is illustrated in Figure 11-12 through Figure 11-15.

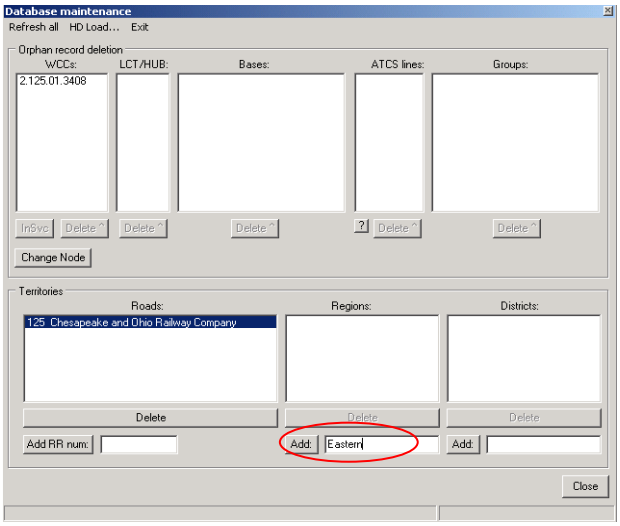


Figure 11-12 Adding A Region

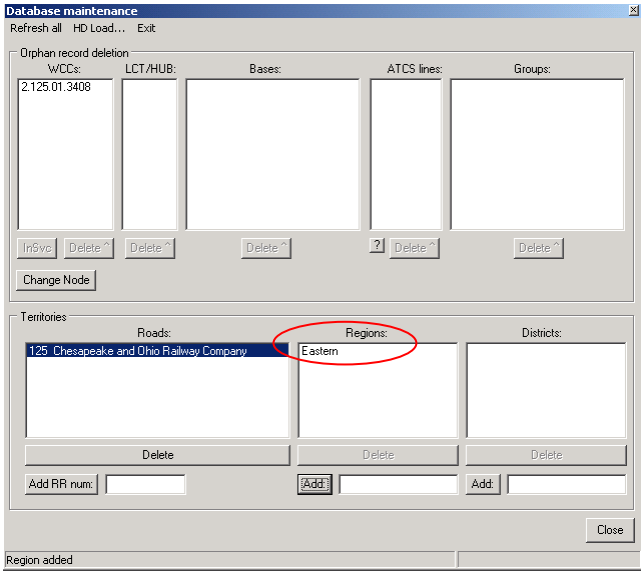


Figure 11-13 Region Successfully Added

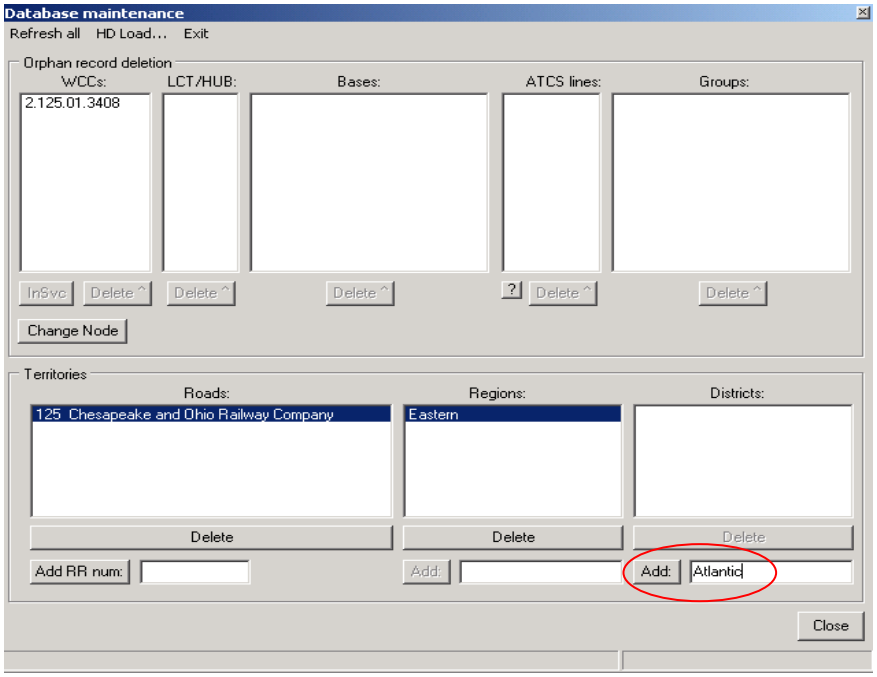


Figure 11-14 Adding A District

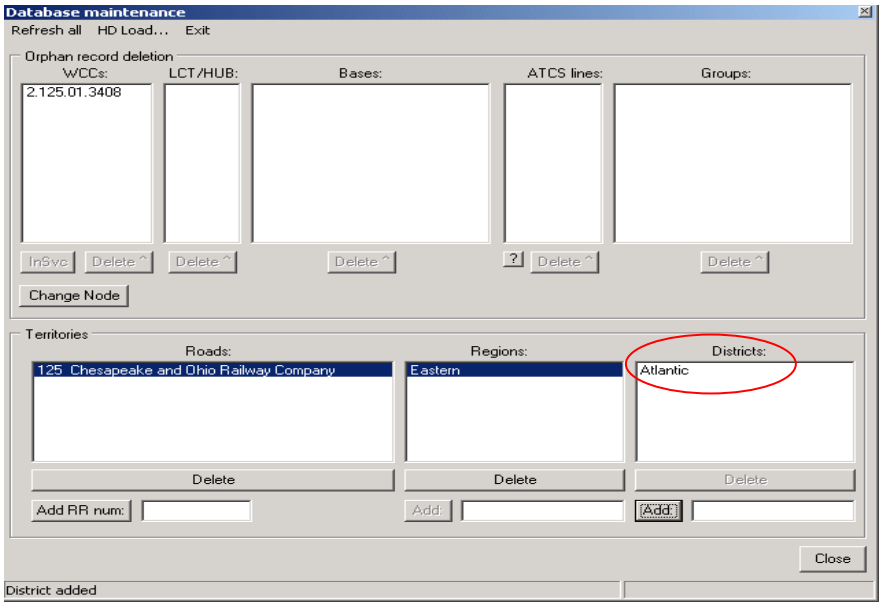


Figure 11-15 District Successfully Added

11.3.4 WCC Node Maintenance

The situation described in paragraph 10.2.3 (WCC nodes out of sync) can be corrected in DB maintenance.

Select the WCC from the **WCCs** window and click the **Change Node** button.

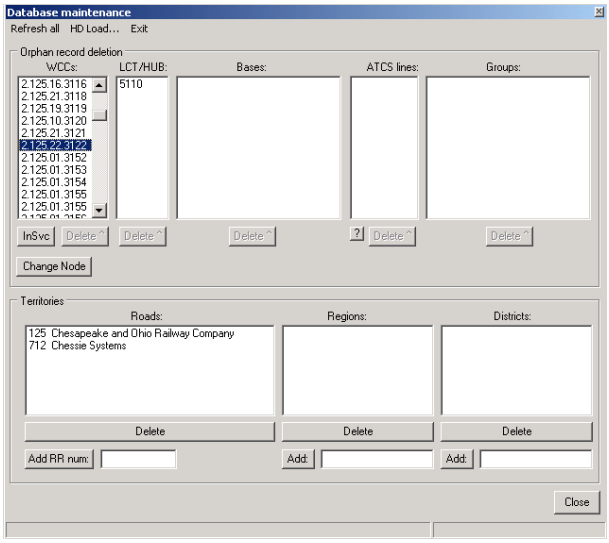
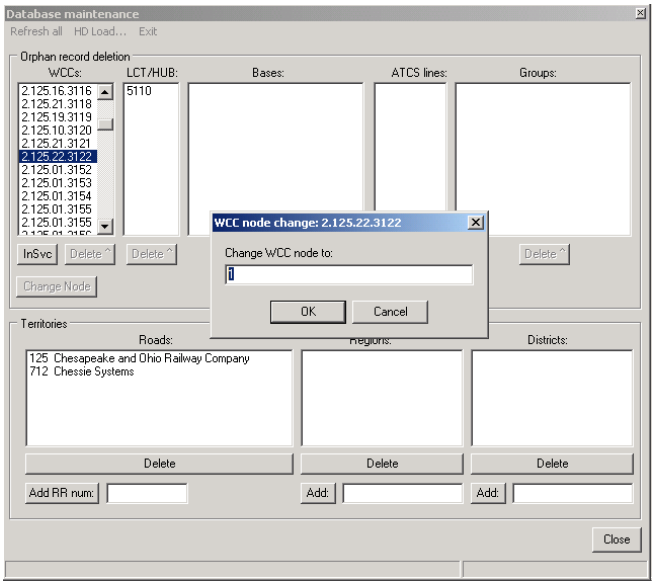


Figure 11-16 Repairing Out-Of-Sync WCC Node Numbers

Enter **1** when asked for the new node number: all WCCs must have 1 for a node number by definition. See Figure 11-17.



.

Figure 11-17 Enter WCC Node Number

The status bar displays the result of the database change (Figure 11-18).

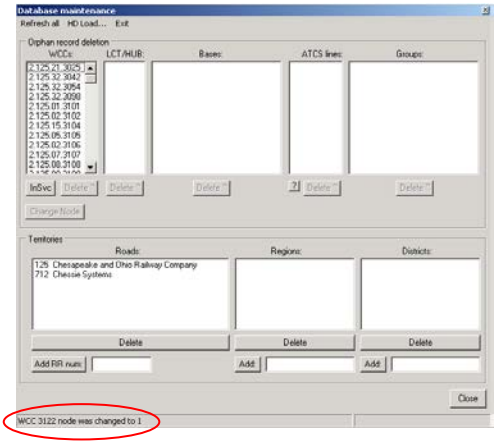


Figure 11-18 WCC Node Number Changed

11.4 PSV Maintenance Tool

The PSV maintenance tool (

Figure 11-19) examines the internal structure of a PSVxxx.ZIP executive software release and creates a Tree View display that can be searched for a specific module (

Figure 11-20). The software release must first be defined as a version set (see Section 3). A particular driver module may be located, and the right pane of the display will show the module details (version, CRC, etc) as shown in Figure 11-21.

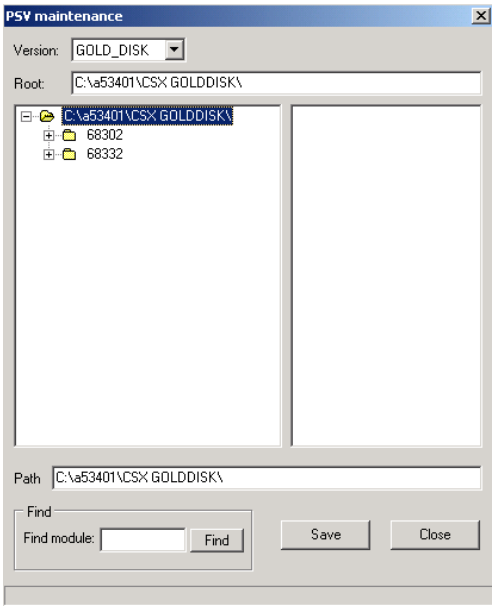


Figure 11-19 PSV Maintenance Tool

If the mnemonic for a driver is known (FEP_RCI for the PRCCI driver, for example), its module may be found by typing the mnemonic into the **Find module** edit box and clicking **Find**. See Figure 11-20.

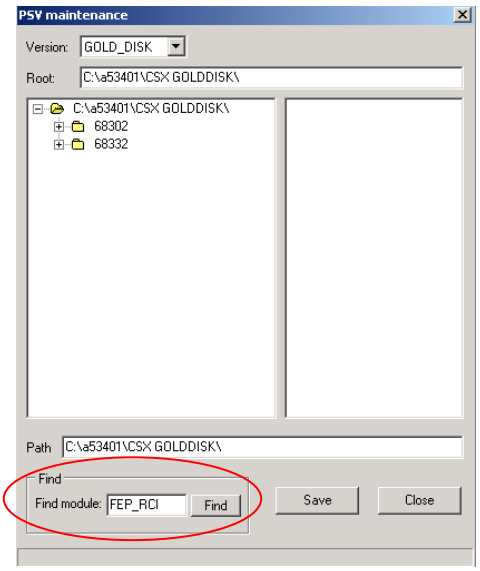


Figure 11-20 Locating a Specific Driver

If the module is found in the given release, the tree expands to locate it, and the right pane displays the module information (Figure 11-21).

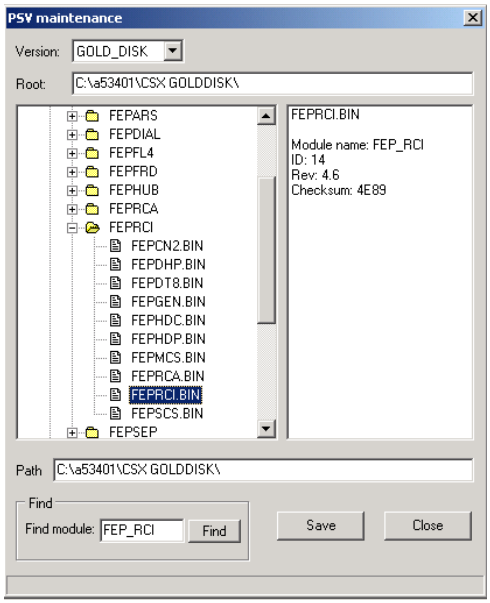


Figure 11-21 Module Information Displayed

11.4.1 Saving The Output File

Click the **Save** button to save the entire contents of the PSV release to a text file.

A sample PSV module list file is shown below:

PSV module CRC listing:
Created by WccMaint.EXE 2004/11/30 11:42:31

Root node: C:\a53401\CSX GOLDDISK\
C:\a53401\CSX GOLDDISK\68302\CN2CN2\CN2CN2.BIN: CN2_CN2 id:34 v1.1 size:40960CRC:2DF4
C:\a53401\CSX GOLDDISK\68302\CN2CN2\CN2HDP.BIN: CN2_HDP id:33 v1.1 size:36864CRC:8F21
C:\a53401\CSX GOLDDISK\68302\CN2HDP\CN2CN2.BIN: CN2_CN2 id:34 v1.1 size:40960CRC:2DF4
C:\a53401\CSX GOLDDISK\68302\CN2HDP\CN2HDP.BIN: CN2_HDP id:33 v1.1 size:36864CRC:8F21
C:\a53401\CSX GOLDDISK\68302\CN2XXX\CN2CN2.BIN: CN2_CN2 id:34 v1.1 size:40960CRC:0ADC
C:\a53401\CSX GOLDDISK\68302\CN2XXX\CN2HDP.BIN: CN2_HDP id:33 v1.1 size:36864CRC:3708

11.5 PCF Filename Conversion Tool

Earlier versions of WCCMaint (before 5.0.0.104) used the device address of the WCC as a filename, ie '3408.PCF'. Because type 2 addresses for WCMs are also in the 3000-3999 range, this file descriptor is no longer unique: the PCF file for both WCC 3919 and a WCM with address 2.125.32.3919 would be 3919.PCF. File names for WCC and WCM configuration files are now of the form RRR.NN.DDDD.PCF.

The format of the filename is important for executive uploads (see Section 6); WCCMaint requires a configuration file for any WCC (WCM) before it can upload executive software, and it searches for the file based on this filename format.

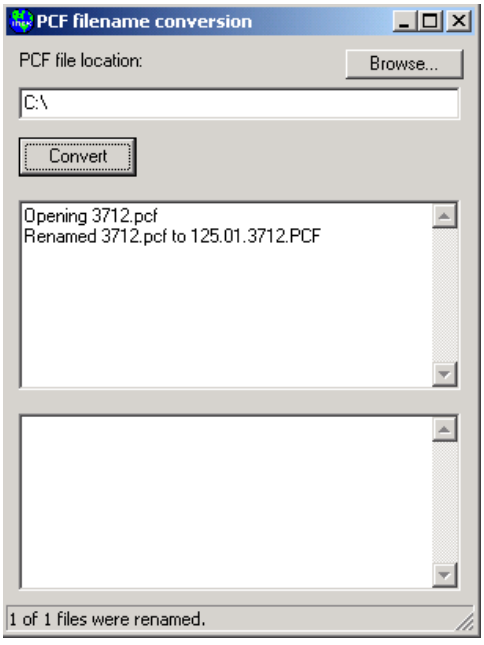


Figure 11-22 PCF Filename Conversion Tool

To rename older PCF files to the newer format, point the tool to the folder where the files are stored using the **Browse** button and click **Convert**. As shown in Figure 111111111, the upper results pane displays the progress of all conversions. The lower pane displays any errors resulting from the conversion.

This utility opens the PCF file and retrieves the embedded ATCS address of the device from the configuration data. This address is used as the filename of the new PCF file. The contents of the file is not modified.

11.6 Wayside Data Tool

The wayside data tool gathers a list of all active code lines on the system. It will then scan each region by internally opening its codeline display, and gather the following information for every group on each region:

- Group name
- ATCS address
- IP address (if any)
- In-service flag for the group

The tool will create a CSV output file for any selected region that may be used in a spreadsheet for administrative purposes.

When the tool is first opened, it begins to assemble a list of all active regions.

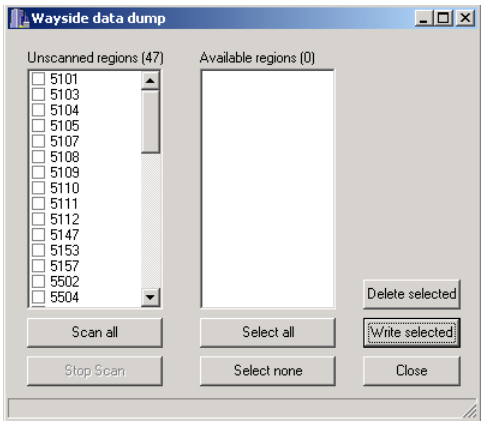


Figure 11-23 Wayside Data Tool

It should take no longer than four minutes to build a complete list of active regions.

The **Scan all** button is then clicked to begin the line-by-line scanning process. As each code line is checked, when all group information is complete, the region number is copied to the right pane of **Available regions** (Figure 11-24). This process can be very lengthy depending on the size of the system.

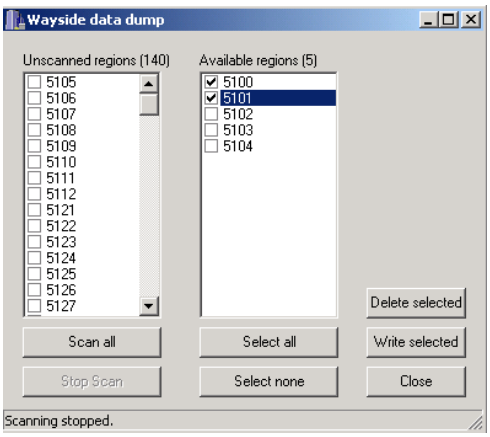


Figure 11-24 Scanning Regions

When the list of available regions is complete, any regions that are required in the output file are checked (use the **Select all** button for all regions), and the **Write selected** button (Figure 11-25) is clicked to produce the output CSV file.

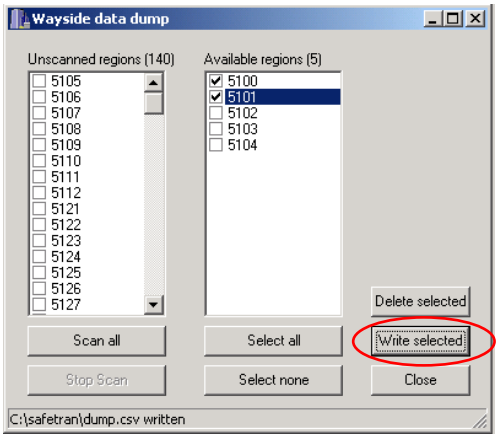


Figure 11-25 Selecting Regions for File Save

A sample fragment of the output file is shown below:

IB CP 17 Dale,5101,7.125.101.002,010.245.019.194,InService
SH CP 3 Cleveland,5101,7.125.101.003,010.245.018.034,InService
SH CP 8 Cleveland,5101,7.125.101.008,010.245.018.042,InService
SH CP 9 Cleveland,5101,7.125.101.009,010.245.037.198,InService
EW CP 110 West Springfield,5101,7.125.101.011,010.245.008.010,InService
SH CP 14 Cleveland,5101,7.125.101.014,010.245.037.201,InService
SH CP 16 Parma,5101,7.125.101.016,010.245.037.204,InService
SH CP 17 Shore,5101,7.125.101.017,010.245.037.207,InService
CZ CP 174 Euclid,5101,7.125.101.047,010.245.037.233,InService
CZ CP 175 Euclid,5101,7.125.101.048,,InService

11.7 Auto Download Tool

The Auto download manager is a background facility for downloading configuration data and version reports from WCCs and WCMs.

Configuration data is automatically saved to a PCF file; version reports are automatically saved to a text file. The target directory for all output files is specified in the **Target dir** text box.

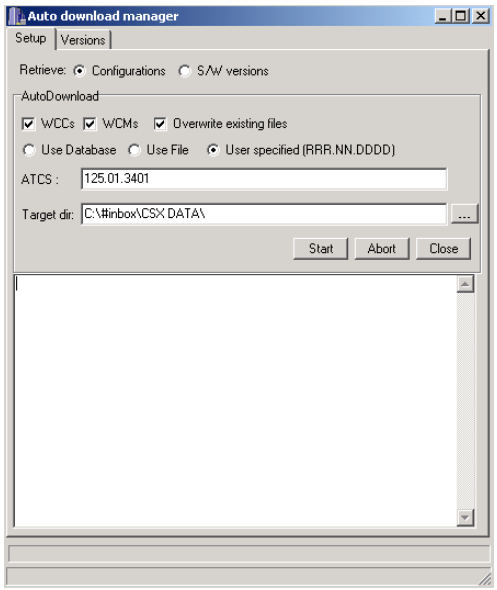


Figure 11-26 Auto Download Tool

There are three ways to give the auto download manager a list of WCC/WCMs to work from.

- **Use Database**: ASERVER will supply the address of the next WCC/WCM to query
- **Use File**: ATCS addresses of WCCs/WCMs on the system can be retrieved from a text file.
- **User specified**: a single ATCS address may be supplied if typed into the **ATCS** edit box as shown in Figure 11-26.

If the **Use File** option is specified, a properly formatted text file is required for the list of WCCs/WCMs to query. The best option is to save the WCM list and WCC list from ASERVER, which automatically saves a CSV file in the correct format. The text files can then be merged into a master file if desired.

The radio buttons at the top of the form allow the user to choose whether to download configuration data or version reports.

The checkboxes regulate the following options:

WCCs: Include all WCCs (ATCS node 1) in the download list

WCMs: Include all WCMs (nodes 2-98) in the download list

Overwrite existing files: If an output file exists for a given WCC (WCM) in the specified destination folder, the download will be skipped for that unit unless this box is checked.

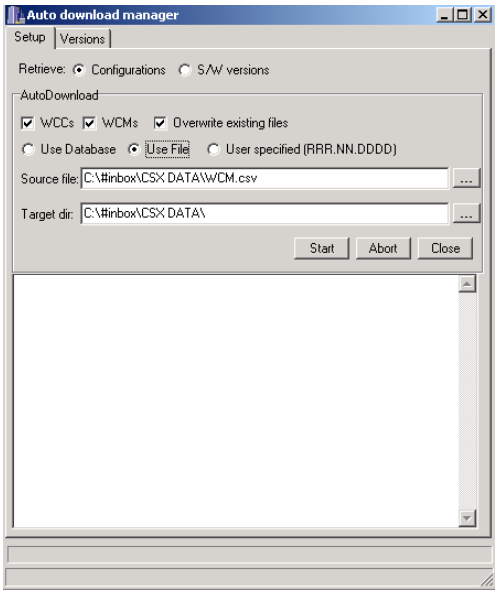


Figure 11-27 File Method Of Retrieval

To begin the auto download process click **Start**. In this example, configuration data will be downloaded from all available units (Figure 11-28).

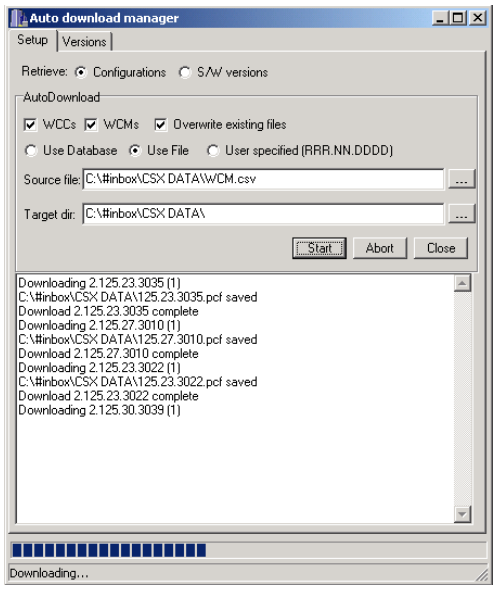


Figure 11-28 Downloading Configurations

The status window displays each WCC/WCM and the progress of the download and file save. This process can run unattended until all configuration files have been downloaded.

In Figure 11-29, version data is being retrieved. Version reports are saved as text files.

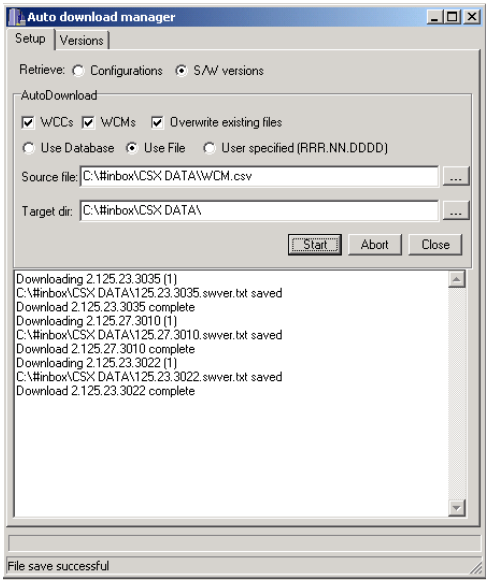


Figure 11-29 Downloading Version Reports

Each version report is listed on the **Versions** tab as it arrives.

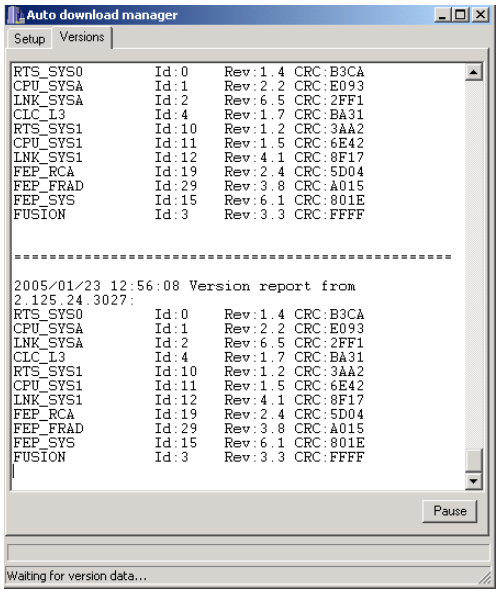


Figure 11-30 Versions Displayed On The Version Tab

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SECTION 12
MANAGING ALARMS

12 MANAGING ALARMS

12.1 Introduction

WCCMaint receives several types of alarm and warning messages:

- Messages that reflect dynamic field conditions come from individual WCCs (and OCGs). These are text-based and are placed in the alarm log. In addition, if a BCP or MCP has gone offline there is a visual indicator as well.
- ASERVER notifies WCCMaint when WCCs (OCGs) go offline
- ASERVER sends separate critical alerts to WCCMaint when any WCC or OCG that is designated as critical has gone offline or online.
- Bases and groups may send ATCS alarm messages to report changes in local alarm status. These messages are intercepted by ASERVER and stored in the realtime database. The configuration database is then checked to see if the reported alarm is masked. If the alarm is not masked, an alarm message is broadcast to all WCCMaint clients.

NOTE

NOTE

Alarm masking is set for each base and group on the system by modifying its properties. See Section 10 for a discussion of using the Properties form to set alarm masking.

12.2 Viewing Alarms

All alarm messages are logged and can be viewed by clicking **View**, then **Alarms** on the main menu. A typical alarm summary is shown in Figure 12-1.

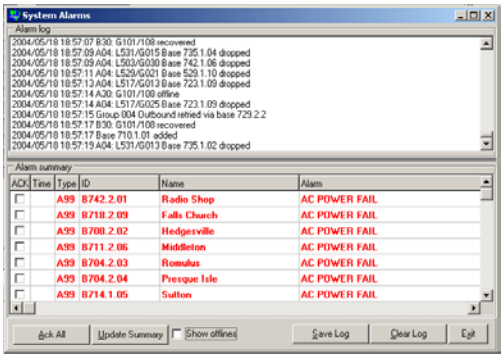

Figure 12-1 Typical Alarm Summary

The System Alarms dialog box has 2 panes: the Alarm Log in the upper window and the Alarm Summary in the lower window.

The Alarm Log continuously scrolls every alarm and warning message received by WCCMaint from any source.

The Alarm Summary shows only current alarms; no warnings are displayed. When an alarm is first received, it is shown in red until it is acknowledged. In Figure 12-2 the screen for the Radio Shop BCP (742.2.01) reports an AC Power Failure.

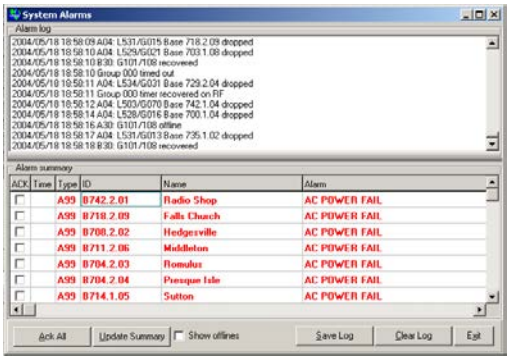

Figure 12-2 Radio Shop BCP (742.2.01) Alarm

To examine the codeline this base belongs to, double-click on the base ID. The codeline display for hub 6742 opens is shown in Figure 12-3

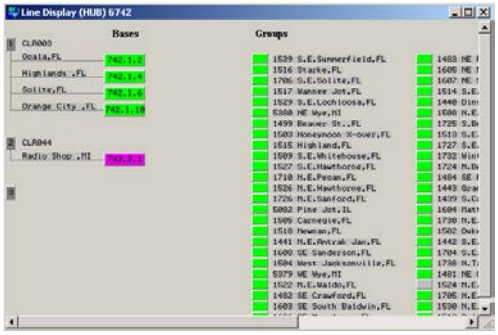

Figure 12-3 Radio Shop BCP (742.2.01) Codeline View

12.3 Acknowledging Alarms

The Radio Shop base appears as purple, indicating an alarm condition. Acknowledging this alarm does three things:

- the audible alarm is silenced
- the flashing **Alarm** in the status bar is turned off
- the BCP panel bevel is inverted, indicating the alarm is acked

There are several ways to acknowledge an alarm.

- In the System Alarm dialog box, acknowledge this alarm individually by checking the **ACK** checkbox in the first column of the alarm grid.
- All alarms on the system can be acked at once by clicking the **Ack All** button.
- From the line display, right-click on the circuit bar and click **Ack All** to acknowledge all alarms on the codeline.
- From the line display, right-click on the base and click **Ack alarm**.

NOTE

NOTE

Acknowledging an alarm is a local function; that is, it does not affect any displays on any other WCCMaint clients.

Once an alarm is acknowledged, the codeline summary panel changes to green (if no other alarm or warning conditions exist in the region), and the alarm text in the Alarm Summary reverts to black as shown in Figure 12-4.

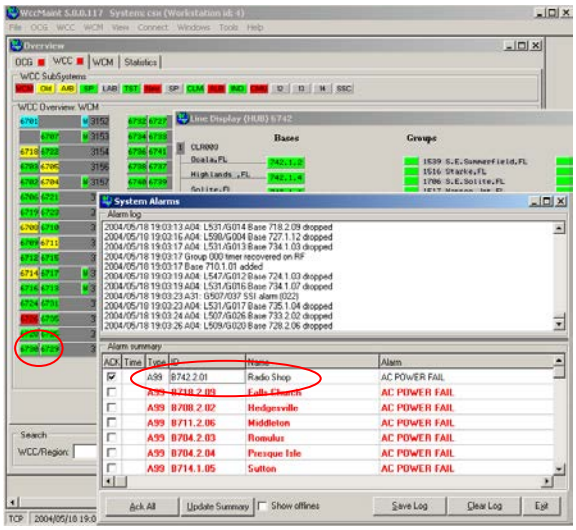

Figure 12-4 Acknowledged Alarm

12.4 Critical Alerts

Critical alerts are high-priority messages from ASERVER that are broadcast to all WCCMaint clients when a designated WCC or OCG has gone offline or online. Device numbers for critical devices and alarm text for each device is configured in ASERVER.

When a critical alert is received, a red message box is popped up on top of all other WCCMaint windows (Figure 12-5 and must be acknowledged by clicking **Close**. If more than one unacknowledged critical alert exists, each one must be individually acknowledged.

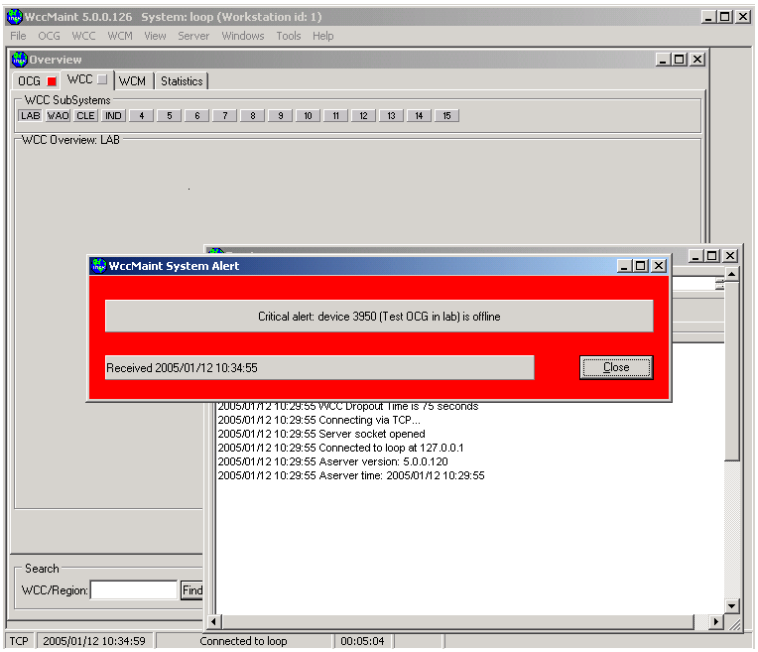

Figure 12-5 Critical Alert Display

SECTION 13
BASIC TROUBLESHOOTING

13 BASIC TROUBLESHOOTING

13.1 Introduction

This section provides help in basic troubleshooting with WCCMaint. The three main tools for diagnosing common problems are

- Terminal windows (WCC and OCG)
- Event logs
- TCP socket status windows

13.2 Using The WCC Terminal

The WCC terminal window is a LAN-based copy of the local diagnostic terminal utility available on the front panel of the WCC hardware. Because they share a common hardware platform, WCEs and WCMs have terminal windows that are identical to the WCC terminal.

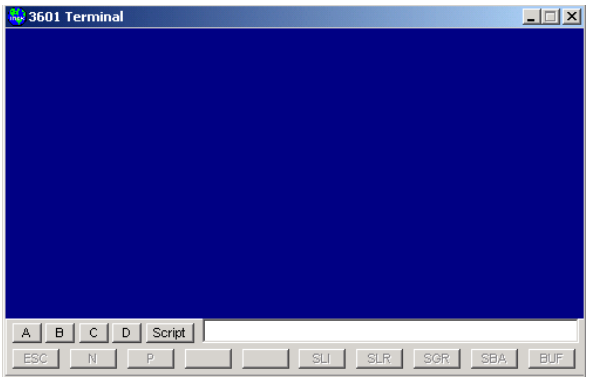

Figure 13-1 WCC Terminal

A terminal window has four processor buttons labeled A,B,C, and D. Clicking these buttons is the equivalent of logging into the associated processor.

Command buttons along the bottom of the terminal window provide one-click execution of the following common terminal commands:

- **ESC**: escape
- **N**: Next page (used for scrolling log displays)
- **P**: Previous page
- **SLI**: Show links
- **SLR**: Show link requests
- **SGR**: Show groups
- **SBA**: Show bases
- **BUF**: display buffer counts

Another reason for these buttons is that under Terminal Services and certain security modes, users are not allowed to execute commands typed in the command text window.

Begin a terminal session by clicking on a Processor button.

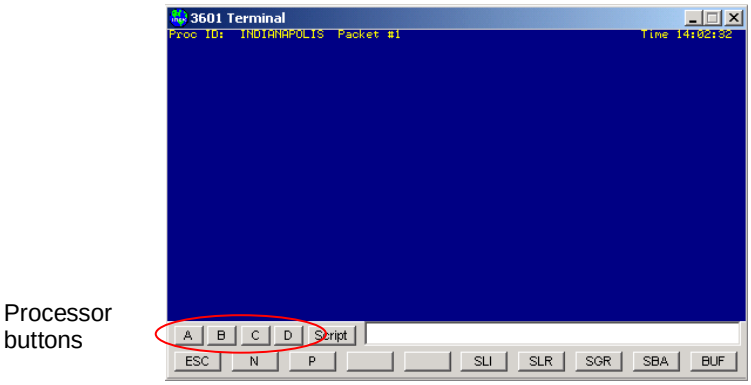

Figure 13-2 'A' Processor Logged In

Once the WCC responds, an identity string and timestamp is displayed on the top display line. The time stamp does not increment when the terminal is idle; it updates when the entire window updates in response to a command.

The command buttons are now enabled. Click **SLI** to show the A processor active links.

ESCape, Next, & Previous buttons

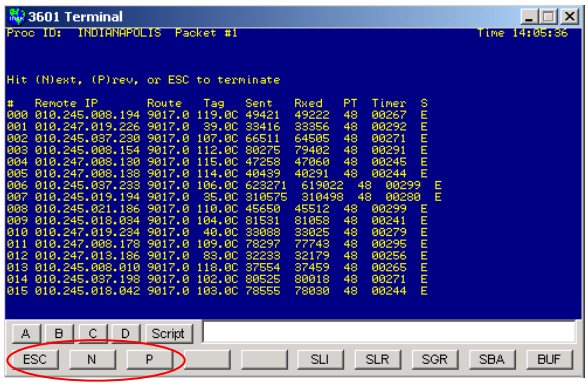

Figure 13-3 SLINKS Display

Select the Next, Previous, or ESCape buttons to scroll this display. If the text window is used, you must also press ENTER for the command to be sent to the WCC.

NOTE

NOTE

When entering commands in the command text box, pressing ENTER will have no effect unless the main display is **empty**. In the above example, typing **SLR** <**ENTER**> in the text box will have no effect, because the **SLI** display is still active. Press **ESC** to clear the screen before entering any text command.

13.2.1 Command Lists

Any processor has its own list of available commands based on the application type or emulation type. To view a list of commands, type **?**.

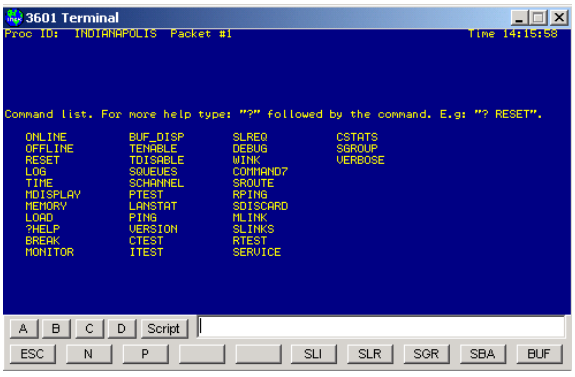

Figure 13-4 Command Listing

Shown in

Figure 13-4 is a list of A processor commands. Many commands in this type of command list are of no use other than in a debug environment.

CAUTION

USE TERMINAL COMMANDS WITH DISCRETION; THE EXECUTION OF SOME COMMANDS MAY AFFECT SERVICE.

The most useful commands for the A processor are listed in Table 13-1.

Table 13-1 A Processor Command Descriptions

COMMAND NAME	DESCRIPTION
ONLINE/OFFLINE	This command puts the WCC online or offline in the same way the context menu does. Taking a WCC offline takes all of its regions offline.
RESET	Resets the WCC.
LOG	Displays the event log. Using the Event Log window from the context menu is a better way to view and save log data.
TIME	Resets the WCC local time. This is the timestamp used to propagate time out to field devices. A WCC updates its local time when ASERVER broadcasts time (approximately every 12 hours).
BUF_DISP	Displays buffer count statistics.
TENABLE/TDISABLE	Trace enable and Trace disable allow filtered message tracing.
SQUEUES	Displays the list of the WCC's internal queues.
SCHANNEL	Displays the list of the WCC's internal channels.
LANSTAT	Displays LAN statistics.
PING	Sends an ICMP PING message to the specified IP address.
VERSION	Displays a module version list.
SLREQ	Displays outstanding link requests.
SROUTE	Displays the WCC route list.
RPING	Route Ping sends a RTE_REQUEST message for a specific route.
SLINKS	Displays the list of currently active UDP links.
SERVICE	Places the WCC in service mode. This is equivalent to pressing the SRVC button on the WCC front panel. This is typically used to put a WCM in BOOTP mode.
SGROUP	Displays a list of active groups.
VERBOSE	Modifies the verbosity of the log.

Command syntax:

For the syntax of a given command, type **?** followed by the command name. For example, typing **? VERB** displays a list of log verbosity options.

NOTE

NOTE

Commands may be abbreviated to the shortest length that makes the command unique. For example, **SLI** may be entered instead of **SLINKS**, but typing **SL** is ambiguous.

13.2.2 Sample Terminal Displays

SLINKS:

The SLINKS command was entered. This is a list of all UDP links for this WCC. Links are established to other WCCs for message routing, or to IP bases or IP groups (WCMs). In this case, these links are to field WCMS.

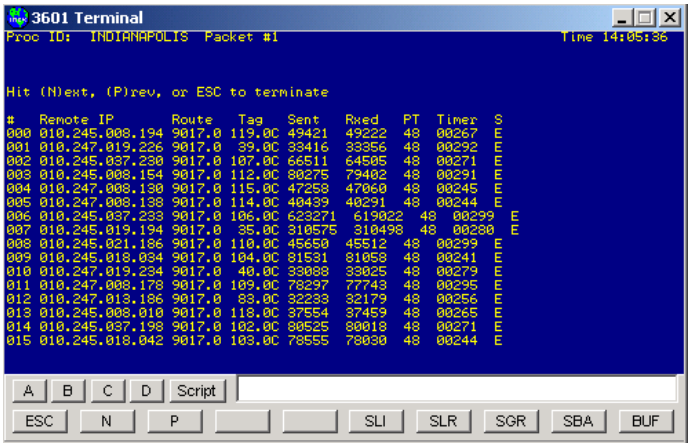

Figure 13-5 Show Links (SLINKS)

On the top line, for example, route 9017 identifies this link as a WCM. The IP address is shown, and the Tag number is the configured Circuit ID for the WCM. A tally of sent and received packets is included. The PT column is the path type. A path type of 48 (this is a hexadecimal number) indicates a primary IP path. Dial backup (secondary) paths are identified as C8 or 88.

NOTE

NOTE

Circuit IDs in a terminal display require a bit of interpretation. The circuit id for IP 10.245.8.194 is listed as 119.0C. The configured circuit ID for this WCM is 119.1.12 (aaa.b cc designation). The number to the right of the decimal is a decimal number representing the **aaa** portion (119). The first digit to the right of the decimal point is one less than the **b** portion of the circuit ID. The rightmost digit is a hexadecimal number representing the **cc** portion of the ID (Hex C = decimal 12).

BUFFERS:

The significant number in this display is the **Used buffers** count. This is a measure of processor loading for this WCC. The buffer count should ordinarily be some value below 30 to 40.

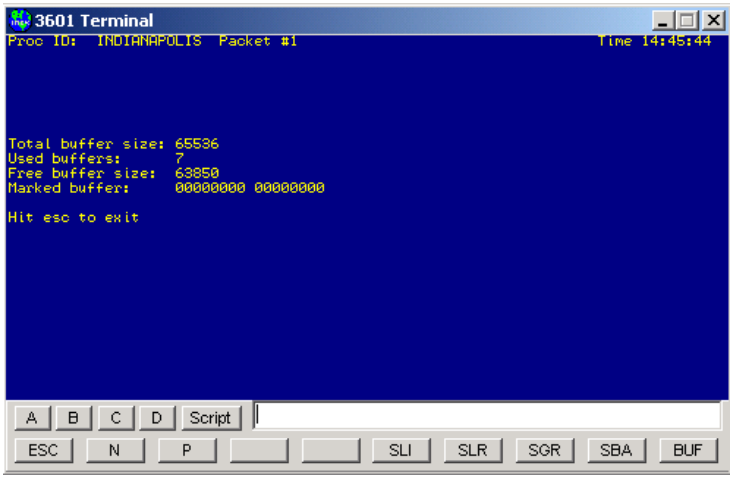

Figure 13-6 Buffer Display (BUF_DISP)

PING:

The PING command works like the DOS command line PING. Replies are listed as they arrive. ESCAPE terminates pinging.

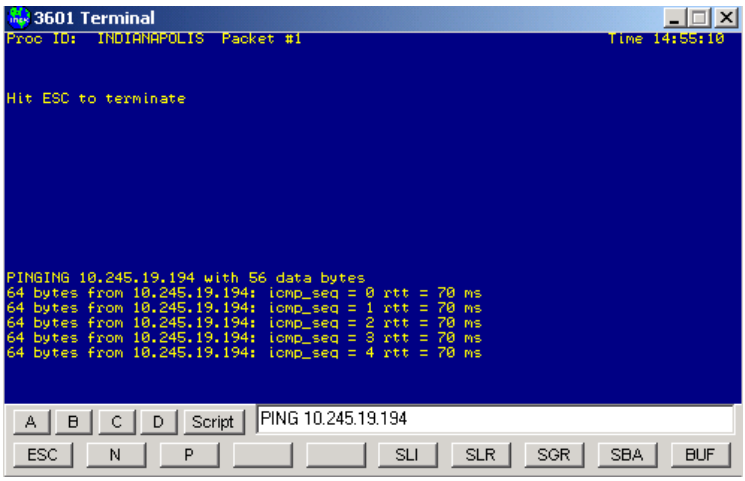

Figure 13-7 PING Command

NOTE

NOTE

When a terminal window is closed, WCCMaint sends a final ESCAPE key to stop any ongoing processes like pinging.

VERSION:

The **version** display is a shortened form of the module version report shown in the Executive Firmware Manager window. See section 6 for a full discussion of module versions.

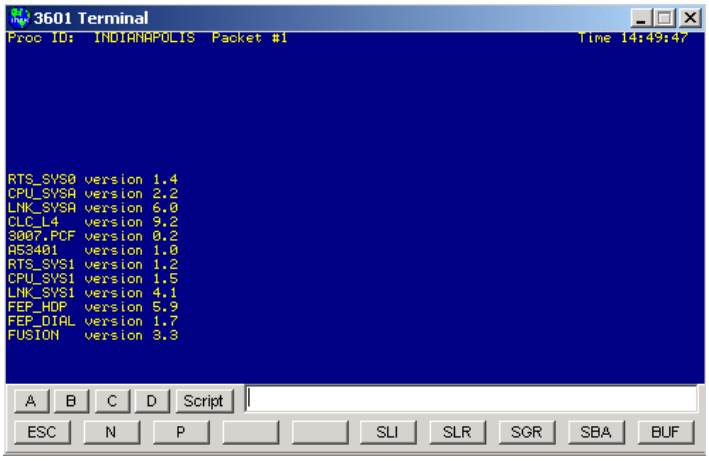

Figure 13-8 VERSION Command

SLINKS:

Show Link Requests displays the table of links that this WCC has requested but has not yet been answered. The WCC sends an RTE_REQUEST message to the network to solicit a response from the WCC that 'owns' this route.

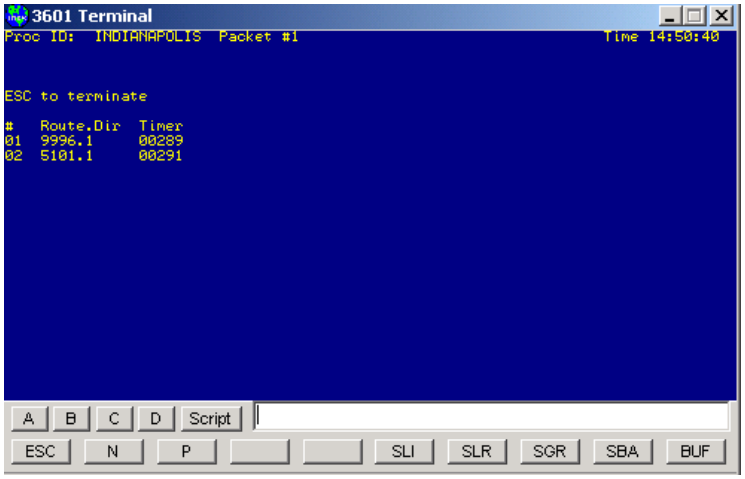

Figure 13-9 Show Link Requests (SLREQ)

SROUTES:

Show Routes displays the WCC routing table. These are routes that belong to this WCC. From this display, we see that this WCC is running codeline 5101.

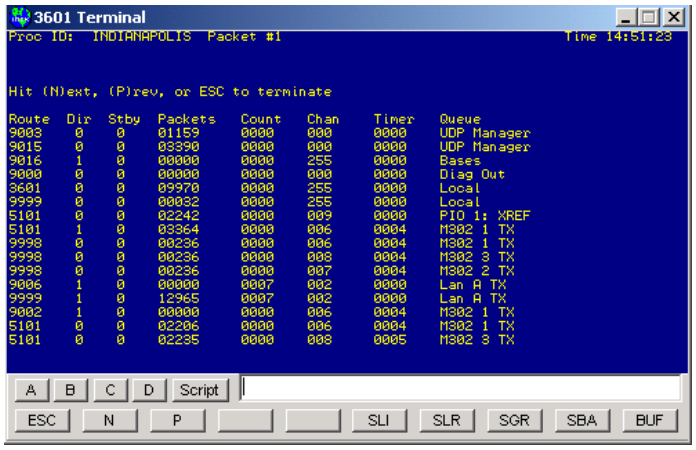

Figure 13-10 Show Routes (SROUTES)

RPING:

Route Ping sends a RTE_REQUEST message to the network. This is a good way to test network connectivity between WCCs and between subnets.

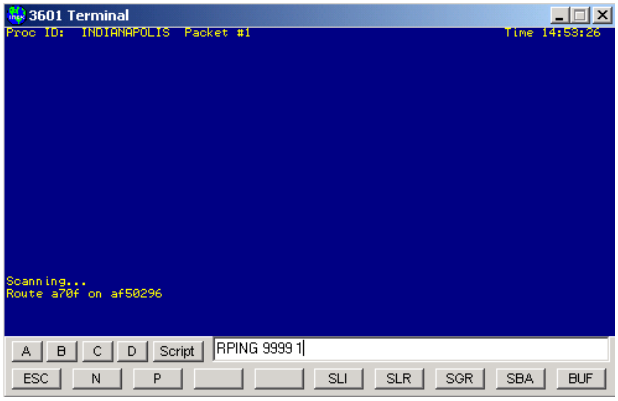

Figure 13-11 Route Ping (RPING)

In this example, the RTE_REQUEST was for route 9999.1, which is the inbound NMS route, or ASERVER.

The reply contains the route requested and the IP address of the route owner in hexadecimal. The high bit of the route number (Hex 8000) is a flag designating the route as inbound, so route A70F is inbound, with the route number 270F = 9999. The IP address is also in hex, ie 0A.F5.02.96 = 10.245.2.150.

SGROUPS:

Show Groups displays the codeline group table. Note that this command was executed on the B processor, which is running LCT 5101. These are WCM groups, so there is only one base number corresponding to the WCM circuit ID. The group timers are in the right column; when a group timer reaches 0, the group goes into code fail. The group timer is refreshed every time an indication is received from the group.

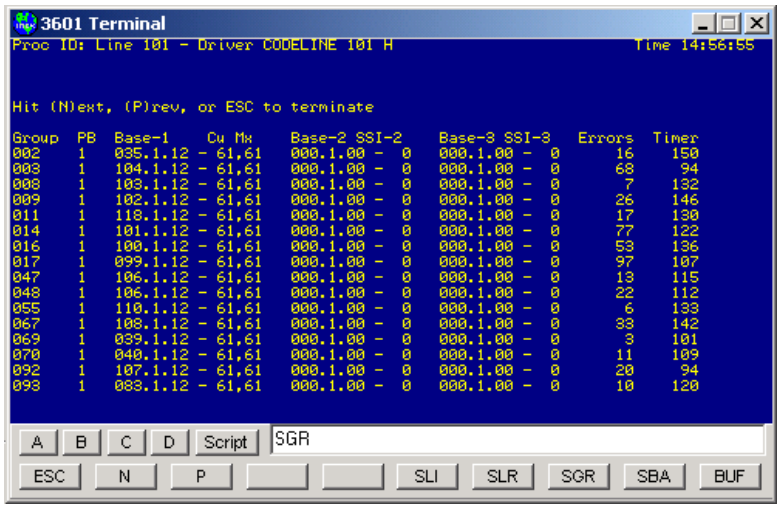

Figure 13-12 Show Groups (SGROUPS)

SBASES:

Show Bases displays the base table for an LCT or HUB. This command was also executed on the B processor running LCT 5101.

These ‘bases’ are the circuit IDs of each of the WCMs on this codeline.

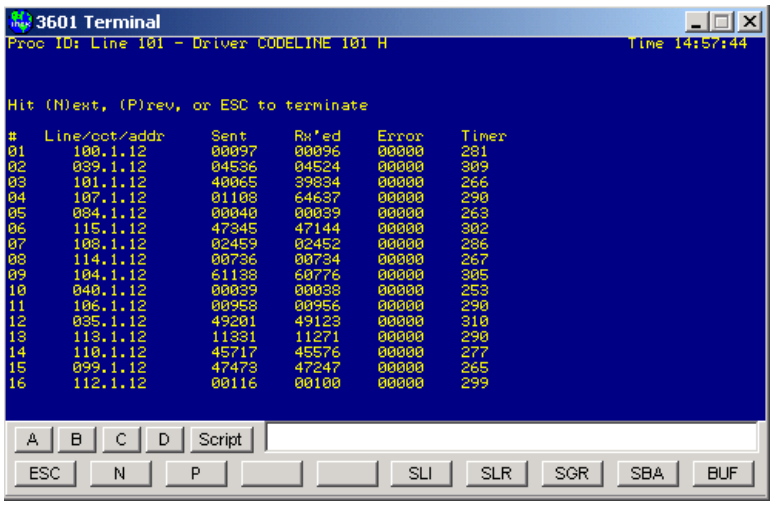

Figure 13-13 Show Bases (SBASES)

13.2.3 Terminal Lockout

A characteristic of terminal windows for WCC hardware is that if one WCCMaint client is using a terminal window for WCC 3401, all other WCCMaint clients are locked out of the terminal session. A terminal window will open, but when any button is clicked, a lockout message appears as shown in

Figure 13-14.

The original user of WCC 3401 terminal must close the terminal to make it available to other WCCMaint users.

The WCC terminal window and event log are tied together for this lockout; if a WCCMaint user has the Event Log for WCC 3401 open, no other WCCMaint users can access **either** the Event Log or the terminal for WCC 3401 until it is released.

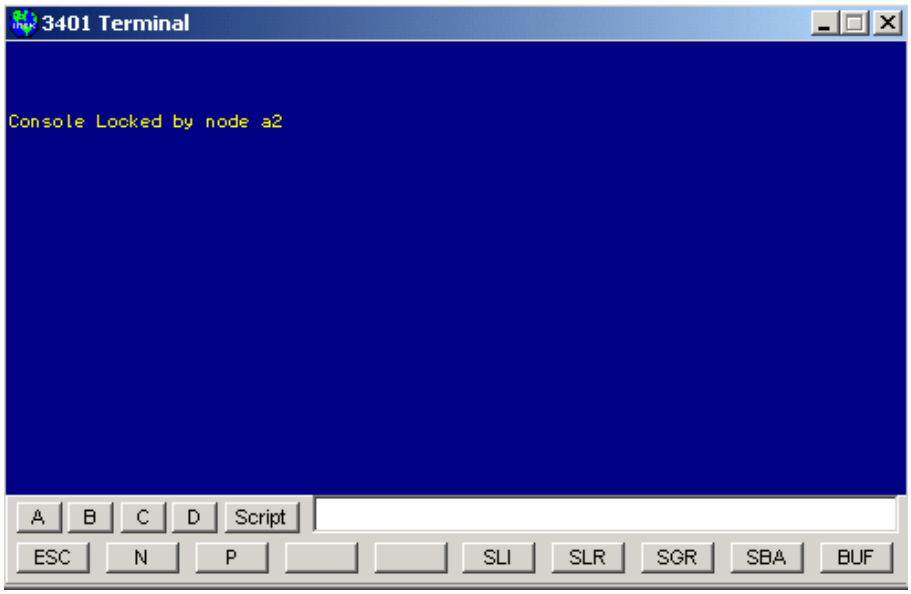

Figure 13-14 Terminal Locked

13.2.4 Running Terminal Scripts

WCC terminal windows have the capability of running script files, which are text files containing one or more terminal commands. Script files are most useful for factory simulation testing, but any repetitive sequence of terminal commands may be put in a script. Script files have a .CMD extension.

When the **Script** button is clicked, a file open dialog request the name of the script file. When the file is opened, each line in the file is 'typed' into the command text box and executed. One line of the script file is executed per second.

13.3 Using The OCG Terminal

The OCG terminal was designed to visually mimic the WCC terminal. OCG terminal commands are different than those for the WCC terminal. The command list is retrieved with a **?** command as in the WCC terminal.

A feature of OCG terminals is that multiple WCCMaint users may open a terminal window for the same OCG.

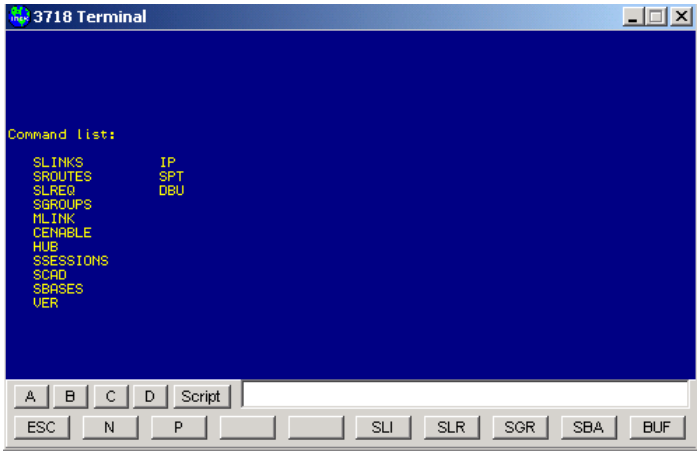

Figure 13-15 The OCG Terminal Command List

The OCG terminal was designed to mimic the WCC terminal. The command list is shown. Commands for OCG are listed in Table 13-2.

Table 13-2. OCG Command Descriptions

COMMAND NAME	DESCRIPTION
SLINKS	Show links (same as WCC)
SROUTES	Show routes (same as WCC)
SGROUPS	Show groups (same as WCC)
SLREQ	Show link requests (same as WCC)
SBASES	Show bases (same as WCC)
VER	Displays the version of OCG software running.
MLINK	Modify link. Used to disable, enable or remove UDP links.
CENABLE	Controls enable. Used to enable or disable NGD controls on a socket.
HUB	Obsolete command (no effect)
SESSIONS	Shows LCT field sessions (see explanation below)
SCAD	Show CAD sessions
IP	Display OCG IP address.
SPT	Show TCP port mapping table
DBU	Display the current state of dial backup in the OCG log.

NOTE

NOTE

An up-to-date listing of OCG terminal commands may be found in the latest OCG manual.

The syntax for some of the above commands is detailed as follows:

MLINK link_number command where:

link_number is the link number obtained from the SLINK display; command = D (disable) or E (enable) or R (remove)

For example, to remove the first link in the table, enter '**MLI 1 R**'

CENABLE line group command where:

line is the 3-digit line number, group is the 3-digit group number, and command = E (enable) or D (disable)

This command acts on the configured primary TCP port socket.

For example, to enable NGD controls for line 202, group 4, enter '**CE 202 4 E**'

13.3.1 SSESSIONS

Show LCT field sessions. Displays the ATCS address, line, group, online status, recall status, control enable status, recall timer, session active timer, number of message delivery failures, number of message retries, and indication type. An SSESSION command appears as shown in Figure 13-6.

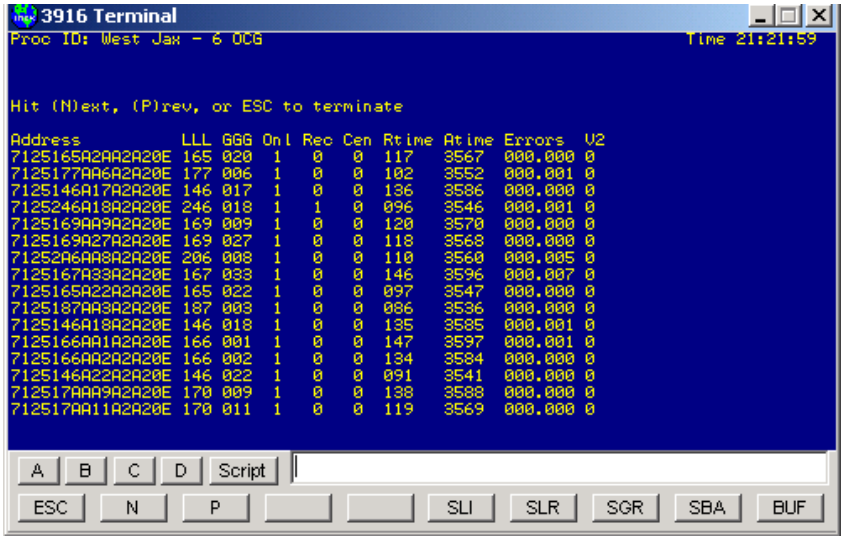

Figure 13-16 SSESSIONS Display

SSESSIONS display column headers are defined as follows:

Address: ATCS address
LLL: codeline number
GGG: group number
Onl: group online status
Rec: recall flag (1 = group is being recalled)
Cen: NGD controls enabled flag (0 = disabled)
Rtime: group recall timer
Atime: session active timer
Errors: FFF.RRR = message delivery failures (FFF) and number of retries (RRR)
V2: indication type - 1=SAFETRAN_INDICATION; 0=CODELINE_INDICATION

This display, unlike WCC terminal displays, updates dynamically.

13.3.2 SCADS

Show CAD sessions. Displays route, socket number, TCP port, active flag, socket number, IP address, connection port, socket status, and packet counts. A typical SCADS display is shown in Figure 13-17.

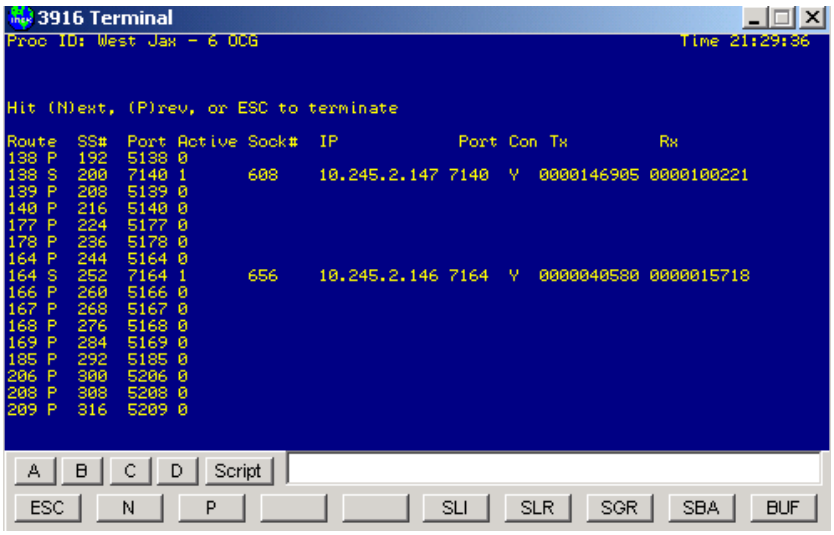

Figure 13-17 SCADS display

The display shows two active connections with IP addresses.

13.4 Event Logs

Event logs are a primary source of general system information and dynamic error conditions. All of the major components of NMS have a system event log that is available for viewing and/or downloading.

13.4.1 WCC/WCE/WCM Event Log

The WCC event log (WCE and WCM also apply for this discussion) is accessible from the WCC context menu.

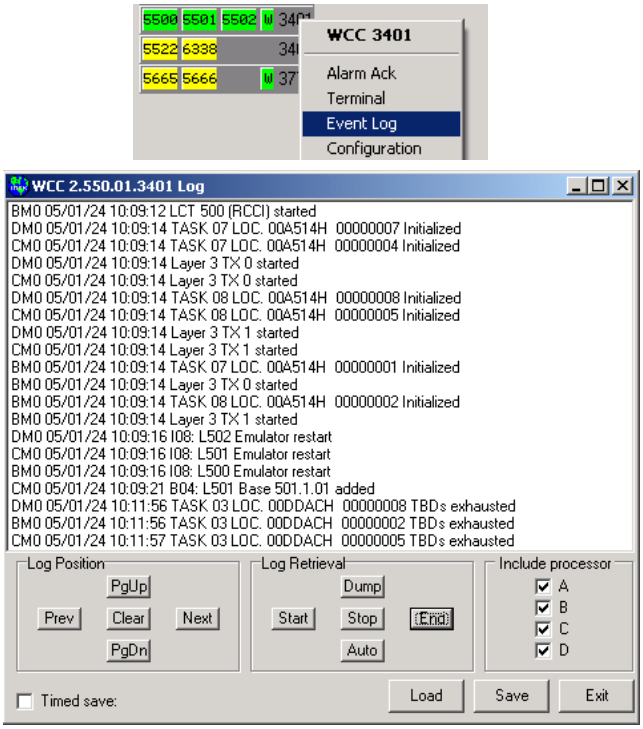

Figure 13-18 Event Log

NOTE

NOTE

When the Log Form retrieves the log from the target WCC/OCG, it makes a local copy of the data. The log data within the WCC (OCG) itself is not affected.

On the Log form there are three groups of controls:

- **Log Position**: these buttons are for navigating the log one window at a time
- **Log Retrieval**: these buttons control the flow of data from the WCC/OCG to the local log window
- **Include processor**: these checkboxes filter log lines as they come into the window.

Table 13-3 Log Position Button Functions

BUTTON LABEL	FUNCTION
Clear	Clears the log window.
Next	Fetches the next page of the log. The log cursor is not moved.
PgDn	Fetches the next log page and moves the log cursor with it.
Prev	Fetches the previous log page; the cursor is not moved.
PgUp	Fetches the previous page and moves the log cursor up.

Table 13-4 Log Retrieval Button Functions

BUTTON LABEL	FUNCTION
End	Retrieves the last page of the log
Start	Retrieves the first page of the log
Dump	Retrieves the entire log.
Auto	Starts a timer that asks for the last page of the log every 4 seconds. This effectively makes the log window scroll in realtime with the WCC (OCG).
Stop	Stops the auto timer. The window contents are left intact.

Include processor boxes:

If a checkbox is checked, log lines from the associated processor are displayed in the log window. Leaving a box unchecked effectively filters out log entries from that processor. These filters are only effective as lines are being read into the window.

Timed Save:

This feature allows the log window to be automatically saved at specified intervals. This way the log window can be left open for extended periods and all logged events will be saved. The log window is cleared after each file save. Files are named using the WCC id and the time/date.

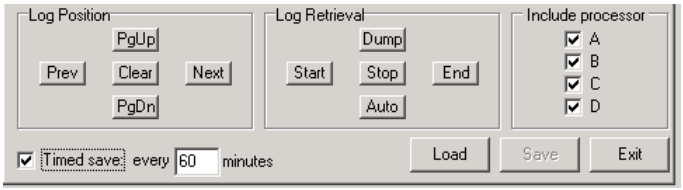

Figure 13-19 Event log timed save feature

If the form is closed while timed save is active, the user is prompted to abort timed save before closing.

The **Save** button saves the contents of the log window to a text file. The **Load** button loads a previously saved log file (or any text file) into the window.

13.4.2 OCG Event Log

The OCG event log form is identical to the WCC log form with the exception that there are no processor filtering checkboxes. All other functions are as described above for the WCC event log.

13.4.3 BCP and MCP Event Logs

The BCP/MCP log is a limited extension of the serial port utility available at the front panel of the BCM or MCM unit. In WCCMaint, only one BCP/MCP log session is allowed. The same form is used for BCP and MCP retrieval.

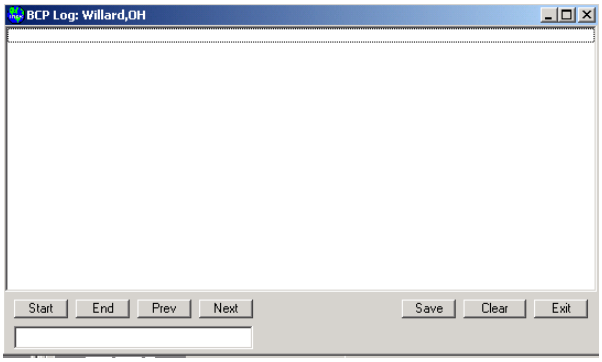

Figure 13-20 BCP/MCP Log Window

The **Start, End, Prev,** and **Next** buttons remotely fetch the corresponding page of the BCP (MCP) log.

Figure 13-21 shows the first page of the log after the **Start** button was clicked.

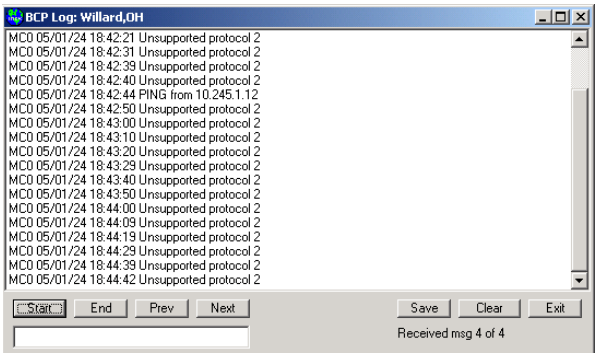

Figure 13-21 BCP Log Retrieved

Terminal commands may be entered in the command text box. Note that commands that would create a local display (e.g. Client List, Alarms, etc) at the BCM terminal are not duplicated in WCCMaint. Only the event log is brought to the log window. The command line is useful for starting message tracing at the BCP. In Figure 13-22 layer 2 tracing on the RF port is enabled.

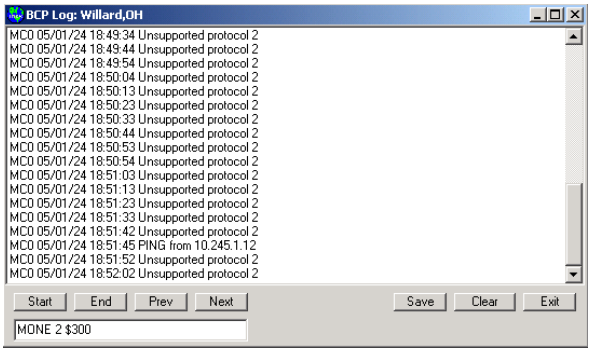

Figure 13-22 Entering A Command

The BCP will respond with an asterisk if the command was applied.

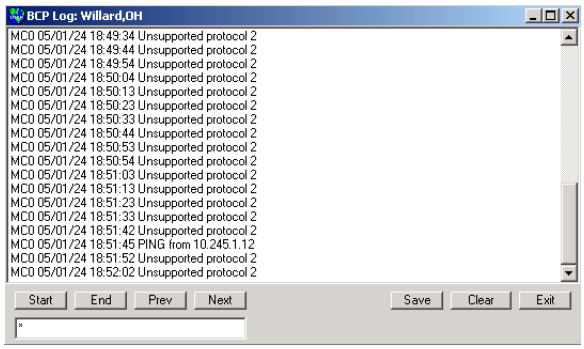

Figure 13-23 Command Accepted By BCP

This indicates that the log is now tracing layer 2 message traffic. After a few moments, the tracing is disabled with a MOND command. The contents of the log may then be retrieved:

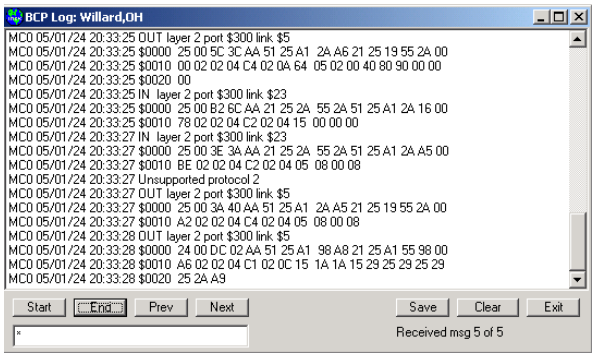

Figure 13-24 Detailed Log Retrieval

The traced messages are now in the log. This same technique works for MCP locations except that MCP connections are much slower because of the RF link.

13.5 TCP Socket Status

NMS devices that rely on TCP sockets to NGD and other devices routinely report status of these sockets to WCCMaint. In general, WCCs and WCMs report the status of their configured LAN applications (WAN status), and LCTs running on OCG report the status of their configured NGD (or WCE) connections.

13.5.1 WAN status

The WAN status form is available from the context menu of a WCC and displays the current status of all LAN applications configured in the WCC.

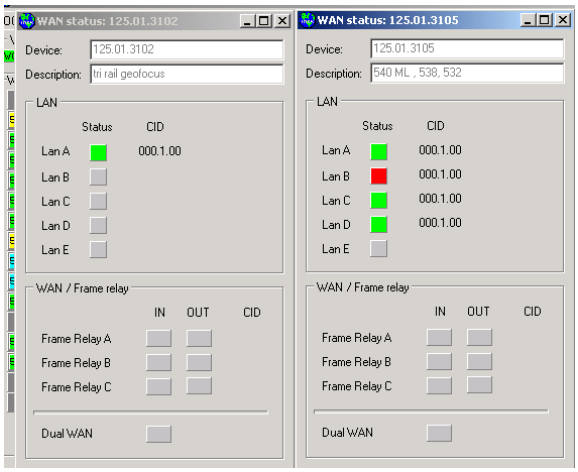

Figure 13-25 WAN Status Display

Figure 13-25 shows two WAN status forms. WCC 3105 is indicating a problem on LAN B.

To investigate, it is necessary to download and edit the 3501 configuration. The LAN page will display the configured sockets for 3501.

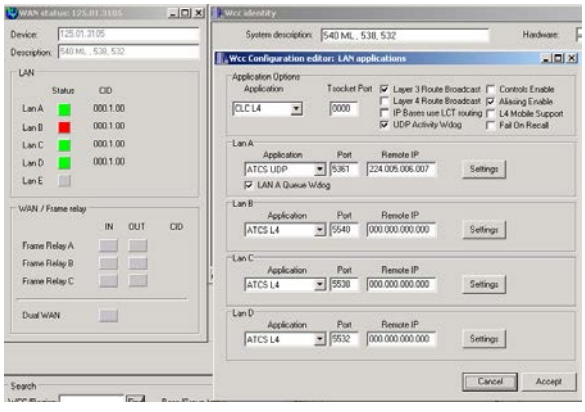

Figure 13-26 WCC LAN Configuration

LAN B is configured to open a server socket on port 5540. The client connection for this socket has dropped, causing the LAN B indicator to display red.

13.5.2 CTC status

For OCG, the socket status to the CTC office (NGD for CSX) is monitored. The status of the LCT socket connections is summarized by the CTC status indicator in the upper left corner of the LCT line display.

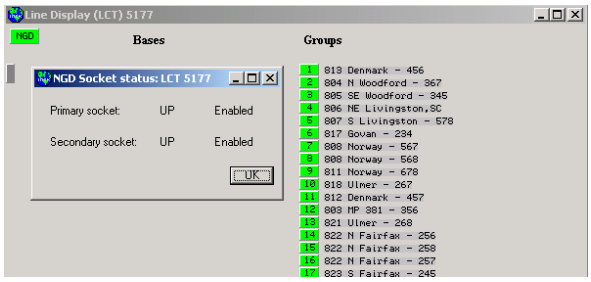

Figure 13-27 NGD Status

The text of the CTC status panel is configurable as **LineDisplaySocketText** in SAFETRAN.INI; see Section 2.

Clicking on the status indicator opens the CTC status form, which details the socket connections.

CTC status is explained in more detail in Section 4.

13.6 CSX WCM Network: General troubleshooting methods

13.6.1 Quick Checklist

If a problem with WCM operation is suspected – follow these steps to make an initial assessment:

1. Access the WCM in terminal mode using the WccMaint program as shown above. From the “A” prompt – enter the command “SLI” to display the active network links. Normally a WCM will maintain two of these network links – one to Aserver, with a route id of 9999.1, and one to the office OCG with a route id of 5xxx.1 where xxx is the codeline id. If the codeline link is present, proceed to step 5.
2. If the codeline link is not present – enter the “SLR” command from the A prompt to determine if the link is being requested. If the 5xxx.1 link is present on the “SLR” display – then the problem is network / OCG related. Proceed to step 4.
3. If the codeline link is not present on the SLR display, then the WCM is not actively trying to forward field traffic. From the “B” prompt – enter the “TEN 0” command to trace the protocol traffic between the WCM and the PRCCI / Code units. Depending on the protocol, verify that the field equipment is responding and that there is both inbound and outbound communication. If the communication can not be verified enter the “RESET” command from the “B” prompt to ensure that the problem is not WCM related. Wait 1 minute for the WCM to reboot. If communications problems persist – contact the field maintainer to verify the operation of the code unit.
4. Note that for PRCCI locations it may be possible to dial remotely into the PRCCI for additional diagnostic functions. Contact Siemens Technical support for additional help in deciding if the problem is field related or not.
5. Perform the “RPING 5xxx.1’ command to verify that the OCG is reachable from the WCM. If not - activate the standby link following the procedures described elsewhere in this manual. If operations do not recover within 5 minutes escalate the problem to CSX network or Siemens technical support.
6. Verify that the IP address in the SLI display corresponds to the OCG that is running this particular codeline. From the “A” prompt – perform the “RPING 5xxx 1” command to verify that one and only one OCG is advertising this codeline.
7. If the RPING command is not successful contact CSX network and/or Siemens technical support for assistance.

13.7 WCM operation

The WCM operation needs to be understood in the following steps:

1. Generating Indications
2. Linking with the office WCC/OCG
3. Control and Indication acknowledgment
4. Standby link activation

13.7.1 Indication Traffic Generation

A WCM will not become operationally active unless it is attached to a code unit and able to recall the code unit correctly. A WCM that has no code unit attached, or is misconfigured, will be visible on its diagnostic address (2.RRR.NN.3DDD) but will not respond to controls or recalls addressed to the operational type 7 address(es).(7.RRR.LLL.GGG.SS.DD), and will show as failed on the office WccMaint display.

If necessary for testing purposes, indication traffic can be temporarily generated with the “ITEST” simulation command available on the A> prompt.

A normal WCM startup will proceed as follows:

1. The WCM initiates operation when the FEPTND driver starts polling the codeunit(s) attached to it. The unit will previously have been configured for the correct serial parameters, and polling range (if applicable) and will issue periodic rechecks (recalls) to obtain the current indication status of each code unit that is potentially attached.

   This polling can be verified by observing the LED indicators on the port connected to the code unit or tracing the data from the B processor terminal window.

2. As each active code unit is identified, a type 7 ATCS address is generated by which the code unit is then known throughout the system. This address may be partially derived from the poll address of the code unit, or it may be referenced from a look-up table in the WCM.

3. Once an indication is received, the WCM will attempt to send it to the office WCC/OCG equipment. If this is successful, the indication will be acknowledged back to the code unit (if appropriate for the code unit type). (See description below). There is a configurable timeout associated with this process, after which the operation will repeat.

4. For code protocols such as Genisys, it is therefore easy to determine if the WCM has office connectivity by looking at the serial communication LEDS – if they are fast polling, connectivity is established – if not, there is a problem and the unit is continually being recalled (rechecked).

13.7.2 Linking with the Office WCC/OCG

To send indications into the office, a newly started WCM that has successfully connected with its attached code units must next discover a working communications path into the office and obtain a valid destination IP address for the indication packet. These two requirements are combined into one message exchange, called the ROUTE_REQUEST / ROUTE UPDATE process. This process is similar to the IP “ARP” used on Ethernet networks.

The WCM identifies the appropriate office destination for the indication by constructing a ROUTE ID from the type 7 ATCS address assigned to the code unit that generated the indication. The route id is calculated by adding 5000 to the LLL portion of the address, i.e. to the codeline number. A WCM with indications from location (say) 7.125.034.005.02.02 will therefore determine that the indication message needs to be sent to the office unit that handles 5034 routes. There is a concept in the system of routes carrying traffic either inbound (towards the office) or outbound (from the office), hence the exact route id needed would be 5034.1, where the “1” indicates inbound traffic. Route 5034.O would similarly be used for outbound traffic on this codeline.

The WCM proceeds to construct a ROUTE_REQUEST message and transmits this into the network. (The IP address used for this transmission is configurable in each WCM for each link). Since all office units are joined on this group, they will all receive the ROUTE_REQUEST, and one of them will recognize a match and generate a ROUTE_UPDATE in response. A WCM that receives a ROUTE_UPDATE will now know the IP address of the office unit that currently handles indications for this particular codeline.

Timers are used to age out these routes so that a WCM will have to refresh the route information every 300 seconds.

There is a legacy mechanism that can optionally be enabled to link the WCM units to their office WCC/OCG units. In this scheme, the inbound multicasting is not used, but instead, the office units broadcast their route IDs every 10 seconds outbound. A WCM can then find the appropriate office unit by merely listening to these broadcasts. Since not all WCMs may be joined in the outbound multicast group, this scheme is not particularly useful on CSX.

13.7.3 Linking Via Standby Connections

A WCM with more than one available link into the office – e.g. RF connected locations with more than BCP providing coverage, or WAN connected WCM units with an active standby link – will broadcast ROUTE REQUEST messages on all its links, and will potentially receive ROUTE_UPDATES on more than one link. Processing then depends on the configuration options selected for each link:

1. If links are not specifically identified as standby links, then the WCM will send duplicate copies of inbound traffic on all active links for the particular destination route. The office units will receive these copies via the different links, each with a unique source IP address, and will maintain a table with up to three of these addresses. Optionally (e.g. for RF links) there may be a signal strength indication associated with each copy, in which case the office units can rank the available links.
2. Links configured as standby links will not get copies of inbound traffic unless there are no non-standby links.

13.7.4 Inbound Linking Example

Consider the case of a WCM that is connected to a Genisys code unit, and that has a permanent 10-baseT connection to the WAN, and a standby PPP dial-up circuit.

1. The code unit is polled, and an indication is obtained.
2. The ATCS address for this code unit is constructed, and an inbound route id for the appropriate office unit is derived.
3. A ROUTE_REQUEST message is built and sent via (a) the primary 10-baseT connection, and (b) if it is active, also via any standby connections.
4. ROUTE_UPDATE responses are received on one or more links, and a timer is started for each one received. As long as the timers are active, the links are considered to be valid.
5. Indication traffic is now sent via (a) the primary link if it is valid, and (b) any standby links if it is both valid and the primary link is not.
6. After 300 seconds, the ROUTE_REQUEST is repeated, and the timers refreshed. If a timer expires, the link is no longer considered valid.
7. To speed up linking via standby routes, the WCM will also initiate the ROUTE_REQUEST mechanism whenever a standby link transitions from inactive to active. This avoids having to wait the full 300 seconds before the standby link is considered valid.

The status of these links and their timers can be viewed by entering the “SLINK” command from the appropriate processor prompt. Route id’s that have been requested but not yet resolved can be viewed with the “SLREQ” command.

13.7.5 Indication Acknowledgement

The office units are responsible for acknowledging indications back to the WCM. The WCM will repeat an indication up to four times before discarding it and will cease polling the code unit while it is waiting for the office to acknowledge.

The WCM will queue up to three indication messages to the office for each attached code unit. If more are received, the oldest indications are discarded.

For code unit protocols that support indication acknowledging, (e.g. Genisys), the WCM will delay the acknowledgment to the code unit until it has received a valid acknowledgment across the WAN from the office.

If more than one link to the office is active, the WCM will accept the acknowledgment via anyone, regardless of which link the inbound indication was sent on.

13.7.6 Controls and Recalls

A WCM can receive control and recall messages from the office units at any time via any active link. These messages are processed and translated to the appropriate code unit protocol.

The WCM will not send control messages to code units that are not active. Recall messages are sent regardless of the state of the code unit.

Control messages further require the WCM to send an acknowledgment packet back to the office unit. Controls that are not acknowledged are retried by the office up to four times. Note that the acknowledgment packet can be sent back on any active link – i.e. it is not necessary for the WCM to acknowledge the indication on the link on which it was received.

13.7.7 Diagnostic Traffic

During normal operation, each WCM maintains a connection with the Aserver program running on a central computer and uses this connection to send in periodic diagnostic updates about its operation to Aserver and the attached WccMaint programs. Signal technicians using WccMaint can perform the following functions on a WCM:

1. Display the current event logs, and dump these to file if necessary
2. Open a terminal session with a WCM to do detailed diagnostics and message tracing.
3. Update the WCM firmware
4. Update the WCM configuration
5. Place the WCM offline / online as needed
6. Reset the WCM if needed.

These operations require relatively high bandwidth and are not usable below speeds of 34Kbaud. The WCM units will not link up with Aserver over low-speed communication links.

Each WCM also monitors the status of its links and will update Aserver with this information. This allows the WccMaint program to display the current communication links used by each WCM in realtime.

APPENDIX A
ADVANCED TRAIN CONTROL SYSTEM

APPENDIX A ADVANCED TRAIN CONTROL SYSTEM

The Advanced Train Control System (ATCS) standardizes the message formats and addressing scheme used by all railroads for train control applications. The system operates by sending and receiving standard datagrams (using a standard addressing scheme) between the various ATCS compatible signaling and operating equipment. Addresses are provided for wayside equipment, central office equipment, onboard equipment, base stations, maintenance equipment, railcars, and anything else found in a railroad environment. These messages convey operating instructions and status information such as track-and-time permits, codeline controls and indications, hot-box data, etc.

A typical ATCS network is shown in Figure A-1. Centralized Train Control (CTC) office equipment communicates with the onboard and wayside equipment via Base Communication Packages (BCPs), controlled by Cluster Controllers (CCs). Network Management System (NMS) office equipment monitors the dynamic performance of the network. Field radios are a mixture of Wayside Communication Packages (WCPs) and Spread-Spectrum Radios (SSRs). All communications use ATCS datagrams or packets.

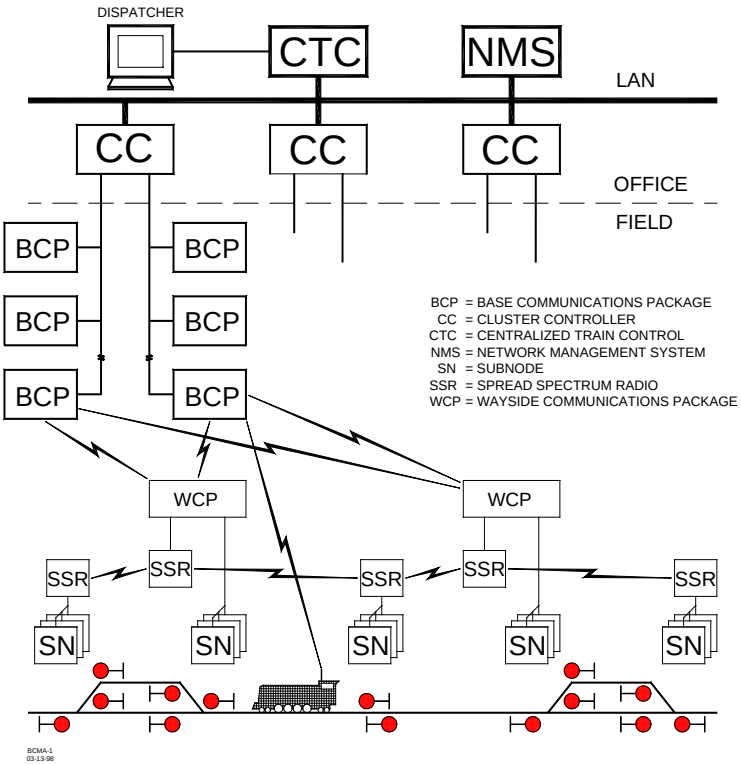

Figure A-1 Typical ATCS Network

A.1 ATCS ADDRESSING

Each ATCS datagram carries with it a destination address (i.e., the address of the equipment it is destined for), and a source address (i.e., the equipment that generated it). These addresses are constructed with slight differences for the various uses. For example, on-board equipment will have a Type 1 (locomotive) address while wayside equipment will have a Type 7 (wayside) address.

A number of the various types of addresses used are described in the following paragraphs. For further information concerning ATCS addressing, refer to the following specifications:

ATCS Specification 200 (March 1993) - ATCS Protocols

ATCS Specification 250 (March 1993) - ATCS Message Formats

ATCS Specification 700 (March 1993) - CPC Specification

ATCS Specification 157 (March 1993) - CPC Operation

R/Link ATCS Radio Code Line System Application Logic Generation Guide (Siemens Document No. C-00-94-06)

A.1.1 Locomotive Addresses (Type 1)

Each locomotive address consists of twelve digits in the following format: **1.RRR.VVVVVV.DD**

where:

1	=	Locomotive address type
RRR	=	Railroad number (see Appendix D)
VVVVVV	=	Locomotive number
DD	=	Device on board locomotive (e.g., Engineers display)

A.1.2 Office Equipment Addresses (Type 2)

Each office equipment address consists of ten digits in the following format: **2.RRR.NN.DDDD**

where:

2	=	Office equipment address type
RRR	=	Railroad number (see Appendix D)
NN	=	Unit in the office (e.g., CTC computer, A53401 Packet Switch, etc.)
DDDD	=	Application in the office (e.g., maintenance alarm monitoring)

A.2 Base Station Address (Type 3)

Each address consists of ten digits in the following format: **3.RRR.NN.DDDD**

where:

3	=	Wire line address type
RRR	=	Railroad number (see Appendix D)
NN	=	Node number (railroad defined)
DDDD	=	Base device number (railroad defined)

The ATCS specification recommends that the BCP node number be the same as the node number of the CC (A47620) to which it is connected. The device number is user defined and can be set to any convenient value.

A.2.1 Wayside Equipment (Type 5)

The type 5 wayside address was used on earlier ATCS systems and is the default addressing scheme for Advanced Railroad Electronic System (ARES) wayside equipment. Although the ARES network differs slightly from the ATCS specification, for purposes of this discussion, the two can be considered identical systems.

Each address consists of ten digits in the following format: **5.RRR.NN.LL.GG**

where:

5	=	Wayside address type
RRR	=	Railroad number (see Appendix D)
NN	=	Node or routing region number
LL	=	Code-line number
GG	=	Group or location number

This addressing scheme cannot address multiple devices at each location. The node number typically follows the node number of the CC controlling the base stations for the location.

A.2.1.1 Wayside Equipment (Type 7)

This is the default ATCS wayside addressing scheme.

Each address consists of fourteen digits in the following format: **7.RRR.LLL.GGG.SS.DD**

where:

7	=	Wayside address type
RRR	=	Railroad number (see Appendix D)
LLL	=	Code-line or region number
GGG	=	Group or location number
SS	=	Equipment or subnode at location
DD	=	Device controlled by this equipment

The LLL fields are normally assigned by each railroad according to internal conventions and may represent a region, district, code line, or other area designation that shows it is part of the railroad.

The GGG field must be coordinated between the CTC equipment and field equipment configuration.

For the SS field, two subnode numbers are always pre-assigned at each location. The wayside-to-office communications device is defined as number 01, and number 02 is reserved for the wayside-to-wayside communications system. Any additional equipment (e.g., the R/Link™ I/O modules), will therefore have subnode numbers starting with 03.

Device numbers (DD field) are allocated in sequence beginning at 01. Each piece of field equipment has at least one internal device, but it may have more depending on the equipment.

Examples of full ATCS addresses for a wayside code system would be as follows:

For CP Rail, code line 8, control point 1: 7.105.008.001.03.02.

For the MCP radio at the same location: 7.105.008.001.01.01.

A.2.2 Other Address Types

Other address types are defined in ATCS for future applications. Please refer to the appropriate ATCS specifications for full details.

A.2.3 Addressing Conventions And Constraints For NMS

Siemens utilizes the following address conventions for systems regulated by Safetran Network Management software:

1. Office equipment (WCC,WCE,OCG) must have a node number of 1 or 99 and have a device number between 3000 and 3999.

2. WCM equipment must (for its type 2 address) have a node number OTHER THAN 1 or 99 and a device number between 3000 and 3999.

3. Duplicate line numbers (LLL) as applied to LCT and HUB applications (ie, 6201 and 5201) are not allowed.

4. Circuit IDs attached to IP paths (AAA.B.CC) and base ID tags must be unique. For example, a base ID of 734.1.02 must not be used as an IP circuit ID anywhere else on the system. The exception to this is that a WCM with a main and standby IP path may have the same circuit ID for both.

A.3 ATCS MESSAGE FORMATS

The major fields in an ATCS message are shown in Figure A-2.

Figure A-2 Major Fields of an ATCS Message

The **Destination** field is the address of the recipient equipment. For example, if this is an indication message coming from a wayside code unit, the destination address will be the CTC dispatching equipment (2.RRR.NN.DDDD).

The **Source** field is the sender's address (e.g., 7.RRR.LLL.GGG.SS.DD).

The number in the message number (**M#**) field is allocated by the sender in a sequential fashion so that the recipient can detect duplicate, missing, or out of order messages.

The **Label** field describes the type of data carried by the message. Many different labels have been defined in ATCS Specification 250. Additional labels are defined by suppliers to perform custom functions.

The **Data** field carries the particular data required for the type of message defined by the **Label** field.

A.4 ATCS RADIO NETWORK – LAYER 1

The ATCS radio network consists of pairs of UHF channels. These channels are as follows:

Channel Number	Base to Mobile Frequency	Mobile to Base Frequency
1	935.8875	896.8875
2	935.9375	896.9375
3	935.9875	896.9875
4	936.8875	897.8875
5	936.9375	897.9375
6	936.9875	897.9875

NOTE

NOTE

Transmission on the channels is baseline FSK. the deviation of the carrier to a higher frequency is interpreted as a logical 0 and to a lower frequency as a logical 1. The bit rate is 4800 bits per second. Nominal channel separation is 12.5 kHz.

APPENDIX B
CONFIGURING REVERSE SSI

APPENDIX B CONFIGURING REVERSE SSI

B.1 Background

SSI, or Signal Strength Indication, is normally displayed on an LCT or HUB line display as a value between 1 and 61 indicating the relative strength of the signal at a BCP receiver. This information is helpful in determining the overall quality of the RF link and the reliability of the radio network for a specific group. SSI information is critical to ATCS operation in that it provides the LCT a means of determining which base to use to communicate with any particular group. This information is readily available to the LCT because each base appends one SSI byte to the end of each message it receives from the field.

There are circumstances where it would be helpful to know what the MCP receiver is able to detect and which bases can communicate with it. This functionality was not part of the original ATCS design, because the basic operation of the RF network does not depend on the office having any knowledge of which bases are talking to a specific MCP.

To help in troubleshooting coverage problems, Siemens developed the 'reverse SSI' feature which allows WCCMaint users to get a 'picture' of what bases are visible to the MCP. Currently, only Siemens and Wabtec MCP hardware support this feature.

B.2 How Reverse SSI Works

The concept behind reverse SSI is simple: a special ATCS message (consisting of only a timestamp) is broadcast from the LCT approximately every 20 seconds. As a broadcast, the message is sent to every BCP controlled by the LCT and is subsequently transmitted over the radio link. In the field, an MCP will receive these messages and use them to build a table of bases that it has heard from along with the SSI associated with each (maximum and current SSI is kept in the table).

When a WccMaint client retrieves the 'BCP list' from a group (from the diagnostics menu) it sends a command to the MCP to send the contents of its BCP SSI table, the same way a health report or comm stat report is sent.

B.3 Configuring reverse SSI

There are three requirements for reverse SSI to function:

1. Executive firmware in the WCC must be PSV48 or later
2. Executive firmware in the MCP must later than June 2002
3. The office WCC must be configured to send out the timestamps

To configure the WCC, the XID flag must be set for the serial port that ordinarily feeds the CTC office. For Processor B, this is port 3, for C it is port 6, and for D it it port 9.

The location of this flag is shown in Figure B-1.

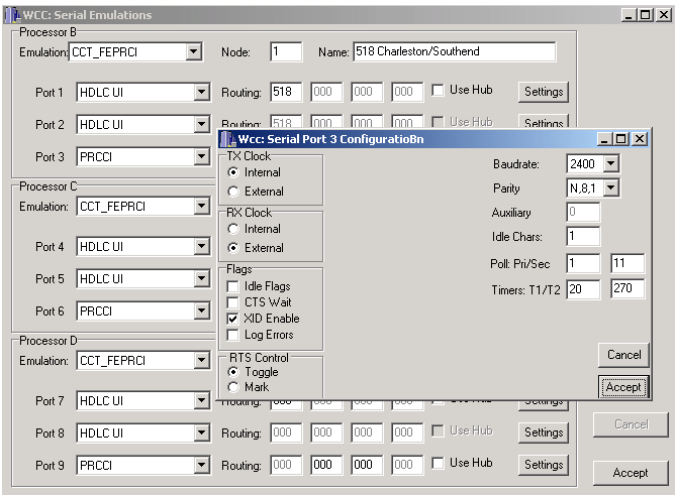

Figure B-1 XID Flag Set For Processor B On Port 3

In the ‘Flags’ section of the serial port 3 configuration box, the ‘XID Enable’ flag is checked; this will enable the timestamp broadcast.

To configure an OCG, open the HUB configuration by right-clicking on the HUB, downloading the configuration, and clicking **Edit**:

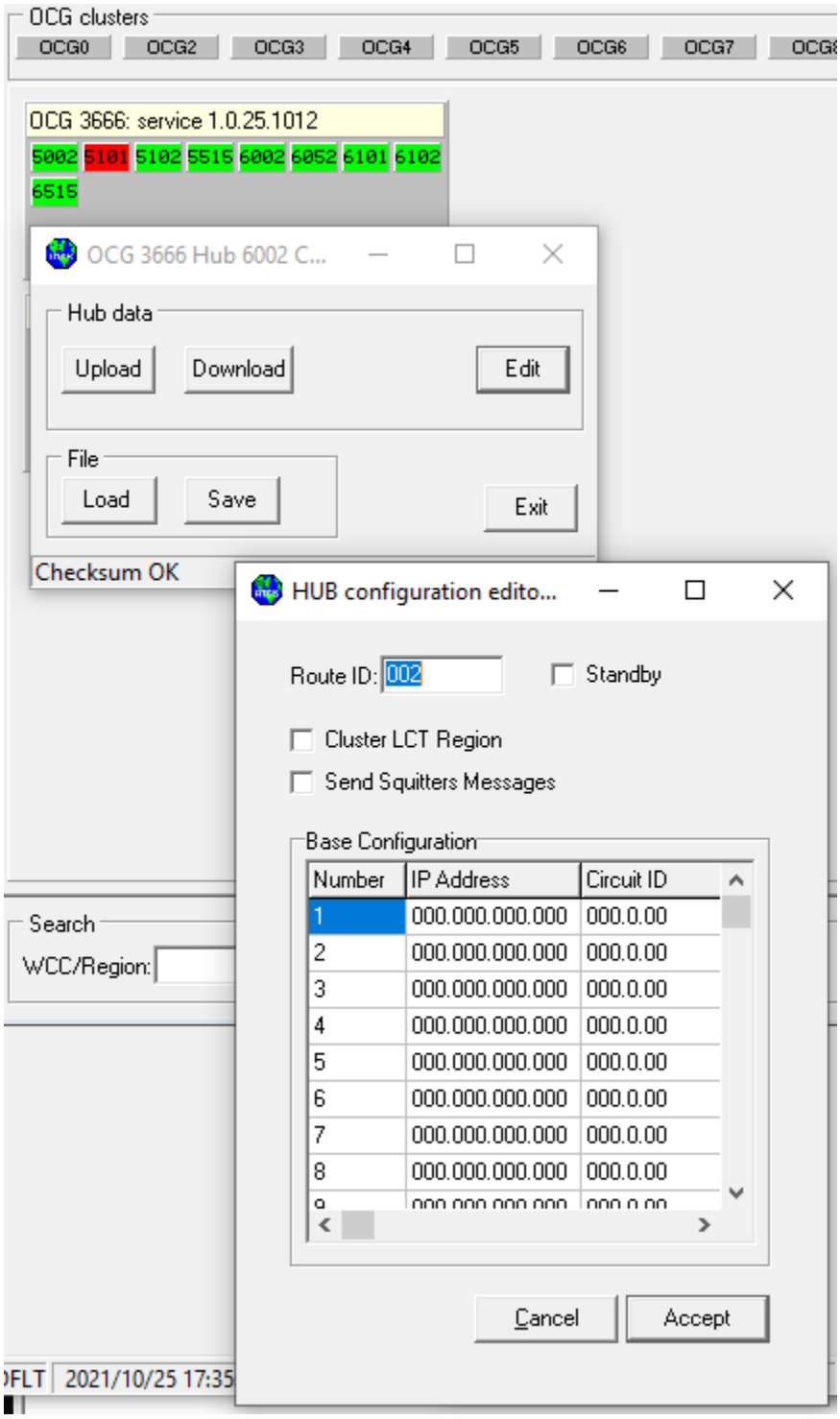

Figure B-2 OCG Clusters – HUB Configuration Editor

Check the '**Send Squitters Messages**' checkbox to enable the time message broadcast. You must do this for each hub on the OCG.

Once the office is configured, allow several minutes for the time messages to propagate to the field.

To read an MCP's reverse SSI (BCP list), open the MCP diagnostics form, select the Maintenance tab, and click 'BCP list'. After several seconds, the report should appear (Figure B-3).

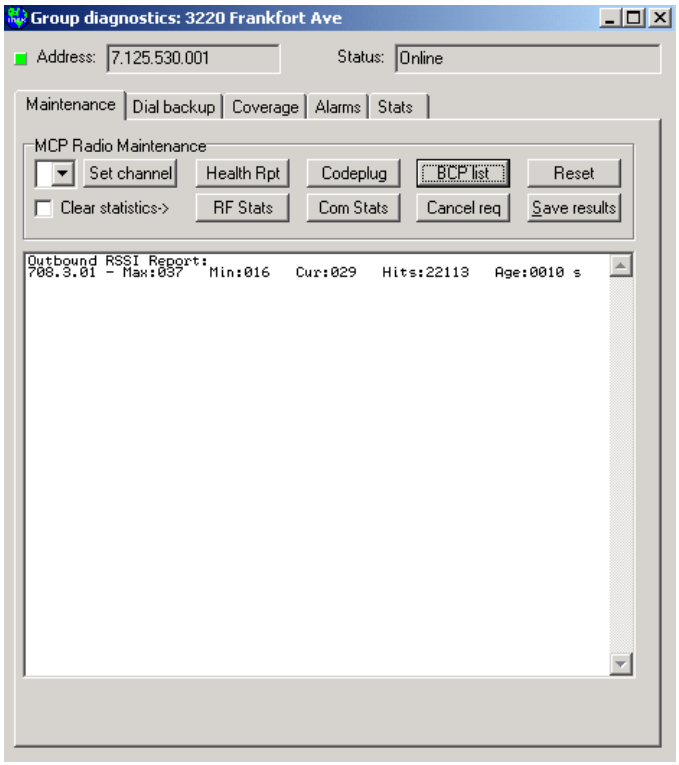

Figure B-3 BCP List Report

This MCP is reporting coverage to only one base: 708.3.01.

Highest SSI = 37; Lowest = 16; Current = 29

Hit count is the total number of timestamps received from this base.

Age (in seconds) is the time elapsed since the last time stamp was received. The MCP will remove any bases in this list that have aged more than 5 minutes.

APPENDIX C
DIAL BACKUP SUBSYSTEM (DEPRECATED)

APPENDIX C DIAL BACKUP SUBSYSTEM (DEPRECATED)

C.1 INTRODUCTION

Modern methods for backing up a primary signal path typically involve Ethernet-based systems. Most of these technologies were underdeveloped at the time of the original production of this document.

Because this functionality is now generally in the IT domain, it has been deprecated in Siemens ATCS components and is no longer actively supported.

Please contact Siemens Mobility USA with any questions about providing duplicate or standby protection for legacy ATCS network components.

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APPENDIX D
MANAGING COVERAGE FOR RF GROUPS

APPENDIX D MANAGING COVERAGE FOR RF GROUPS

D.1 Signal Strength in ATCS Systems

The RF portion of the RLINK code system is a multi-path environment with a unique set of potential problems and troubleshooting techniques. Because any particular RF path is subject to attenuation, obstruction, or interference, multiple BCP coverage to any MCP location is the only way to mitigate these adverse effects.

In WCCMaint, the codeline display gives a dynamic graphical representation of these RF paths and their relative signal strengths. Some basic definitions are:

SSI: An acronym for Signal Strength Indication, a measure of the relative magnitude of a given carrier signal at a receiver. This is also sometimes referred to as RSSI, or Received Signal Strength Indication.

dBrn: This term describes how the signal strength measurement is referenced. There are many ways to qualify signal levels; this term refers to 'dB above reference noise', and is the reference for all SSI readings in WCCMaint. This means that any signal strength reading in WCCMaint is referenced to the noise floor of the receiver, which is different for each type of radio receiver. For example, the MTR-2000 receiver noise floor is -120 dBm (where dBm is another relative measure – this is against a standard power level); this represents the lowest signal level that the receiver can differentiate from random noise.

FADE MARGIN: This is the amount by which an SSI may be reduced without causing system performance to fall below an acceptable level.

An SSI reading of 56 on a line display, therefore, gives a clear idea of how strong the signal is (56 dB above the noise, regardless of the type of receiver). By the same token, a signal with an SSI of 3 is so low that it is barely distinguishable from noise.

In general, an SSI less than 10 should not be considered a reliable link to an MCP (signals fluctuate at different times of day and in various weather conditions) as a primary path. It is not unusual for an RF link to fade 10dB or more throughout the day.

Here is a typical WCCMaint line display (for codeline 506):

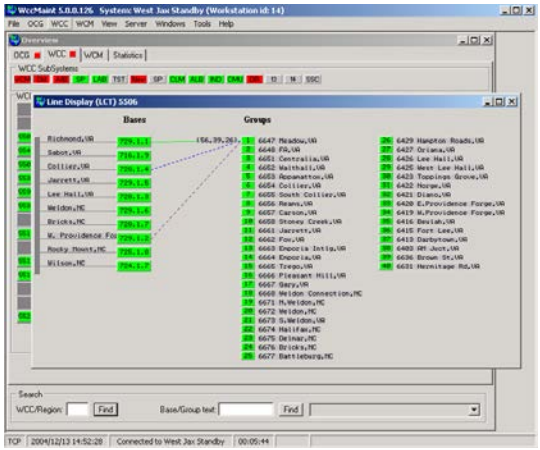

Figure D-1 Typical Line Display

Group 1 has been clicked to show radio coverages to its 3 active bases (an MCP may be able to reach more than 3 BCPs, but only the highest 3 are used for coverage indications).

The coverage lines are coded to indicate the properties of each path: green indicates the highest SSI (Richmond), blue secondary (Collier), and magenta tertiary (W. Providence). The SSI reading (56,39,26) lists the primary, secondary, and tertiary signal strengths. In addition, all coverage lines except one are dashed. The solid coverage line indicates the base that is currently **preferred**. This is not to be confused with primary, which simply means highest signal strength. The preferred base is the one the WCC (OCG) is currently using as an outbound path to this MCP. The primary base is not always necessarily the preferred base, as explained below.

D.2 BASE SWITCHING

The LCT (line control task, in this case, 5506) controlling this codeline maintains BCP coverage tables for all groups. Coverage tables are built when an indication from the MCP arrives at various bases (hopefully more than one). Each base in turn sends this indication on to the WCC (OCG) which ultimately delivers it to the LCT, which processes the first one received and discards all others. The process continues for every indication received until the LCT has built a 'picture' of coverages for this group.

When an outbound message comes from the office system (CADS/NGD), initially the base with the highest signal strength is selected to send the message. Should another base register the same MCP at a signal strength more than 7 dB higher than the primary, the higher base will become the preferred (as well as primary) base.

SSI is not the only criterion used for setting a preferred base. For example: assume base A has an SSI of 53 and base B has an SSI of 14 for group 6. If base A is preferred, a control from the office will be sent to group 6 via base A. Should base A have a transmitter problem, group 6 will not receive the message, so no acknowledgment will be returned to the LCT. After 6 seconds without an acknowledgment, the LCT will retry the same control via base B. If an acknowledgment now arrives, the LCT will set base B as the preferred base for group 6 even though the SSI is only 14 and is in fact much lower than base A.

D.3 COVERAGE LOCKING

Locking coverage for a group means that the WCC (OCG) controlling the group will only use specific, user-defined BCPs for outbound messages, temporarily abandoning the base switching algorithm described above. Once a group is locked, it will remain in that condition until it is released by a WCCMaint user. The WCC keeps group locking information in non-volatile memory so that if the WCC is reset, any locking in effect will continue to be enforced when the codeline LCTs are restarted.

There are two coverage-locking mechanisms in WCCMaint, individual group locking, and codeline locking. Individual group locking is normally used for testing, for example, when a base is suspected of having a bad transmitter. Codeline locking is normally used when a severe ducting event is taking place and all groups need to be locked.

To lock an individual group, open the diagnostics form from the group's popup menu.

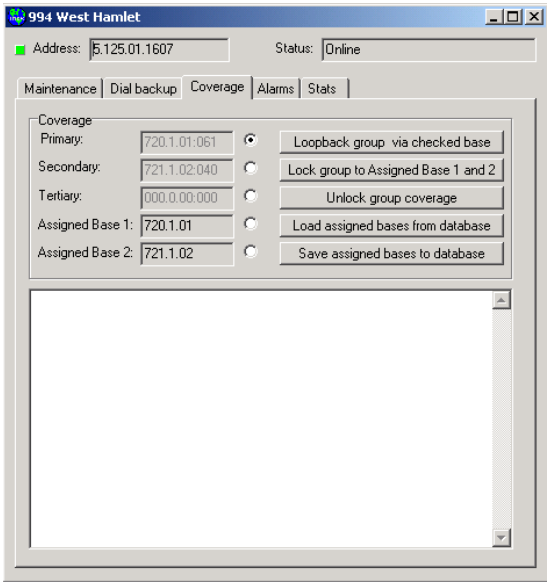

Figure D-2 Group Diagnostics Form

The Assigned Base fields have been filled in by the database. These two fields are editable; the Primary, Secondary, and Tertiary coverage fields are not (the P, S, and T fields change dynamically as the group coverage changes).

This form shows that this group is currently covering its engineered bases. To lock coverage, verify that the desired primary (and secondary if desired) base numbers are in the Assigned Base fields (in this case they are already in place) and click the **Lock group to Assigned Base 1 and 2** buttons.

A lock command is sent to the WCC (OCG), which saves the locking information and updates the group status back to WCCMaint. Once the group is locked, the P, S, and T fields are displayed in cyan.

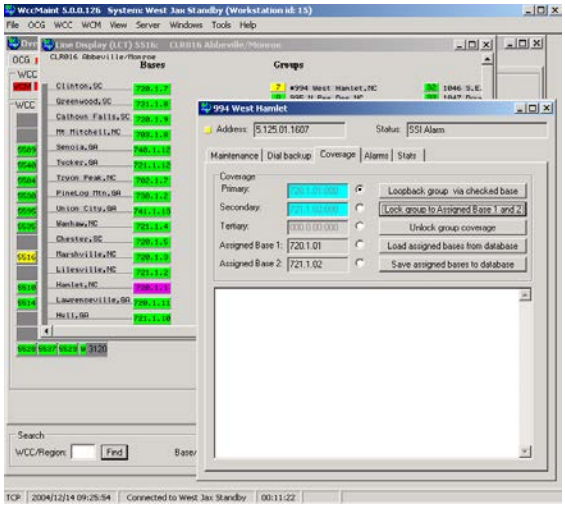

Figure D-3 Locking Coverages

Note also that the name of the group on the line display now has an asterisk (*) to indicate that it is locked.

To restore normal coverage and base switching for this group, click the **Unlock group coverage** button.

D.3.1 Locking/Unlocking A Codeline

All groups on a codeline can be locked into their engineered coverages by executing a single command in WCCMaint. This can be done from either a codeline display (5xxx) or a hub display (6xxx), and the WCC (OCG) implements the lock command slightly differently depending on whether a HUB or an LCT is involved.

NOTE

NOTE

Locking a codeline assumes that a baseline set of coverages has been established for every group on the codeline and saved in the database. The preferred way to do this is to take a 'coverage snapshot' of the codeline at a time when the system is running normally. Taking a snapshot is described in the next section.

D.3.2 Locking an LCT

To lockdown an LCT, open the line display and right-click on the circuit bar (the vertical gray bar at the far left of the display), then cursor to 'Base Assignments'. A submenu will appear as shown in Figure D-4.

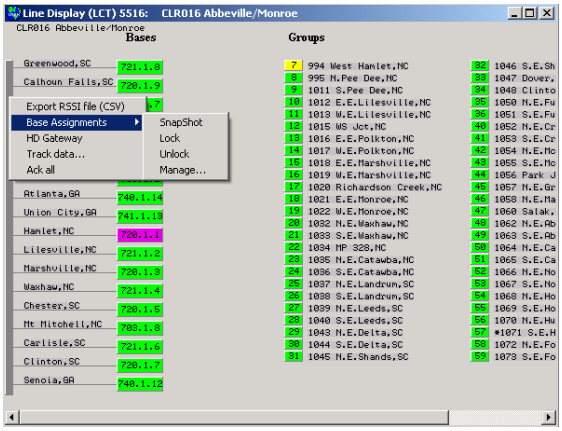

Figure D-4 Locking an LCT

Click **Lock** to lock down coverages to their engineered bases for the entire codeline.

Because this is an LCT (5516), the WCC (OCG) interprets the lock condition to mean that each group's outbound signal path (BCP) is set to the engineered base and will not change. In other words, the base switching algorithm is turned off for any group that is locked.

Once the codeline has been locked, as updated group status messages come from the LCT, asterisks(*) will appear in front of the name of each group that is locked.

D.3.3 Locking A Hub

To lock down a hub, open the hub display, right-click on the circuit bar, and cursor to **Base Assignments**. The submenu will appear as shown in Figure D-5.

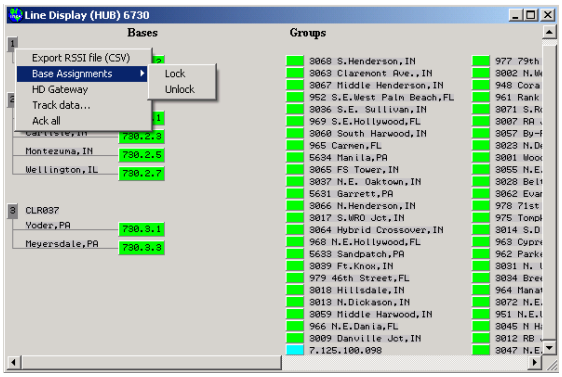

Figure D-5 Locking a HUB

Click **Lock** to lock the group coverages for all groups on this hub.

The lock command is implemented differently by a HUB. In terms of inbound traffic, the function of a hub is to 'gather' messages from the field and route them to the appropriate LCT. The hub processor, when in a lockdown state, will only route an inbound message from a group to an LCT if the base that received the message is one of the engineered coverage bases for that group.

Locked groups on a hub display also show the asterisk in front of the group name.

D.4 TAKING COVERAGE SNAPSHOTS

To initiate a codeline lockdown, there must be a database record of preferred coverages for each group on the codeline. This is best done by taking a snapshot of a codeline during ideal conditions.

Snapshots only apply to LCTs. To take a coverage snapshot, open the desired codeline, right-click on the circuit bar, cursor to **Base Assignments,** and select **Snapshot**. The user will be prompted to overwrite existing engineered base assignments. Click **YES** to take the snapshot. All group coverages will be recorded in the database.

NOTE

NOTE

It is important to wait until all the codeline groups are fully rendered before taking the snapshot. Once the name of the last group appears, all coverage information has arrived and a snapshot can be taken.

D.4.1 MANAGING CODELINE COVERAGES

There may be situations where certain bases are meant to be assigned to coverage for a particular group, but the base is not present on the codeline when the snapshot is taken. Also, there may be some bases on the codeline display that are not meant to be included in the snapshot. To verify or modify the recorded coverages for all groups on a codeline, the Coverage Manager may be used.

To open the Coverage Manager, open the LCT line display, right-click on the circuit bar, highlight **Base Assignments,** and click **Manage…**.

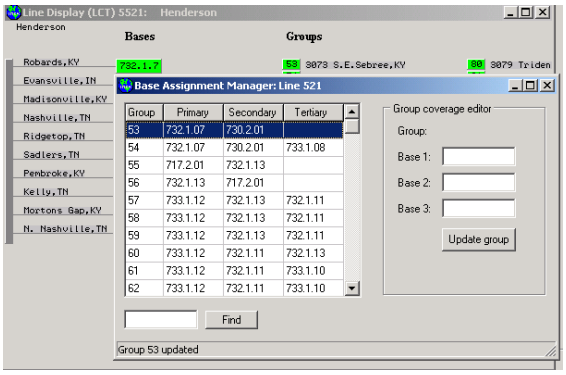

Figure D-6 Coverage Manager

When the Coverage Manager form is opened, a query is sent to the database for all coverage assignments for each group on the codeline, and this information is placed in a grid for display.

To modify a group's base assignments, click the group in the grid. The 'Group coverage editor' group box will display the base assignments, which can then be edited and updated. As an example, we will add base 733.1.08 as tertiary coverage for group 56.

Start by selecting group 56 in the grid. The editor will show base 1 and 2.

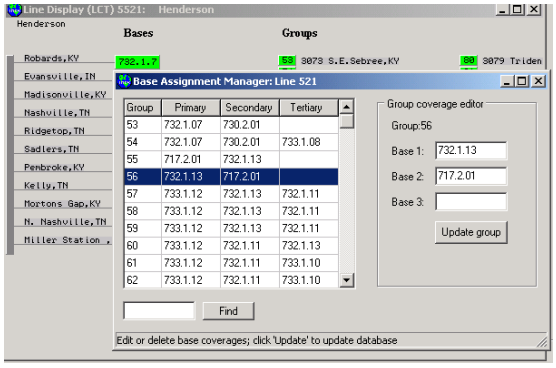

Figure D-7 Editing Group Coverage

Type in 733.1.08 in the 'Base 3' edit field and click **Update Group**. The data is sent to the database, and the grid will update to show the 3rd base:

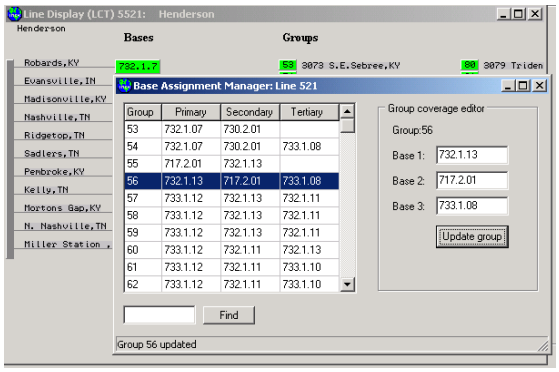

Figure D-8 Updated Coverage

The status line at the bottom of the form indicates that Group 56 has been successfully updated. Unwanted bases may be deleted in the same way.

The **Find** button will locate any group that has any coverage to the target base. For instance, if a base was part of a coverage snapshot but is no longer in service, all groups that cover that base may be located and edited to remove the base.

For example, to locate and remove any instances of base 717.2.11, type this base number in the '**Find**' edit box and click the **Find** button.

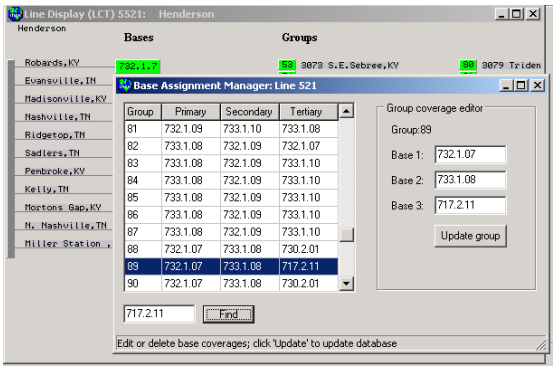

Figure D-9 Using the FIND Feature

This base has been located as tertiary coverage to group 89. Edit 'Base 3' to remove this base and update the group.

Alternatively, if a number of bases are to be removed from snapshot data, it may be easier simply to take another snapshot. **Taking a new snapshot will completely erase all coverage data for a codeline and create a new set of base assignments** based on the current condition of the codeline.

APPENDIX E
OCG SYNCHRONIZATION

APPENDIX E OCG SYNCHRONIZATION

E.1 Background

OCG synchronization is a means to ensure that configuration data on one OCG matches exactly the configuration data on another (standby) OCG, with certain exceptions. For example, one OCG running several LCT and HUB processes may be designated as primary. Another OCG may be identically configured to the original, to function as a standby OCG:

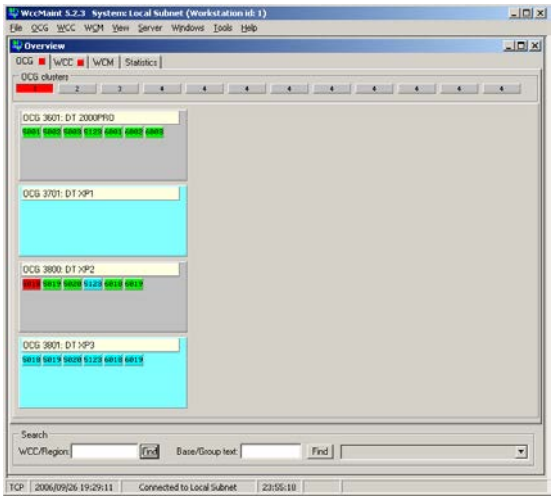

Figure E-1 Main and Standby OCGs

In Figure E-1, OCG 3801 is configured to run the same codelines and hubs as OCG 3800, so as a standby, it's important that these LCTs and HUBs be identically configured to those on OCG 3800.

In large systems, any user may download a configuration from an OCG, make a small change, and upload it. Over time, FEPs that appear to be identical may have very different configuration options due to these user edits.

To guarantee that OCG 3801 is ready to be put online, every LCT and HUB should be 'transferred' from the source OCG to the target by downloading the configuration, saving it to a file, then re-opening the file and uploading it to the standby. This process is time-consuming and prone to error.

WCCMaint has an OCG synchronization feature that forces standby OCG/HUB/LCT configurations to be identical copies of the source OCG. This is done either on-demand or automatically, and it may be done for a single FEP, for a complete OCG.

NOTE: Synchronizing OCGs with WccMaint will not copy the master SAFETRAN.INI file to the standby OCG. Certain features may be lost if the target INI file does not shadow the master copy. This must be done by hand in a text editor.

For systems using security, OCG SYNC operations require the CONFIGURATION permission, so users without this specific permission will not have any OCG SYNC controls enabled. In addition, Autosync will not run if the logged in user does not have this permission.

E.2 Exempt configuration data

For an OCG to function as a standby for another (main) OCG, it must be identically configured for network access type and number of FEPs, etc. However, each OCG on the network, regardless of its function, must be unique from an administrative and IP networking point of view. In other words, if a standby OCG were configured EXACTLY like the main, it would be indistinguishable from the main unit, and the two could never be on the network at the same time.

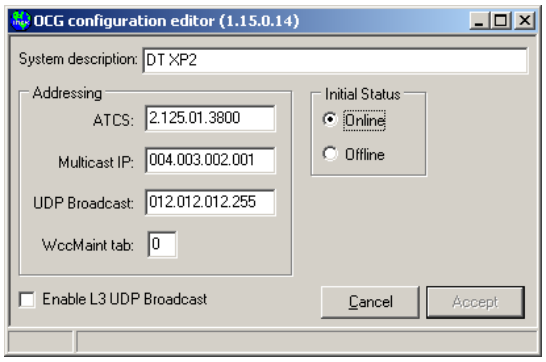

Figure E-2 OCG Main Configuration (3800)

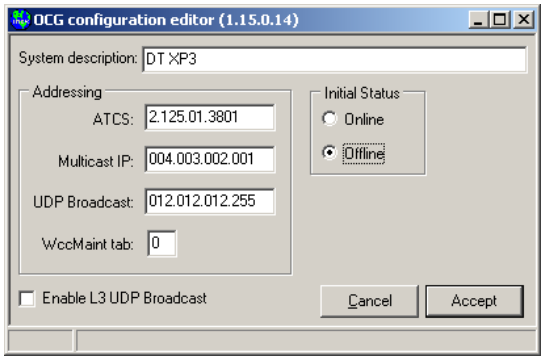

Figure E-3 OCG Standby Configuration (3801)

Main (3800) and Standby (3801) configurations are shown in Figure E-2 and Figure E-3. The fields that make these OCGs FUNCTIONALLY IDENTICAL are the Multicast IP address, the UDP broadcast address, and the 'Enable L3 UDP Broadcast' flag. All other fields are unique to the OCG and should remain so when these OCGs are synchronized, with the additional stipulation that the standby OCG has its OFFLINE flag set, as shown. WCCMaint calculates a CRC value for main and standby configuration data, but these exempt fields are left out of the calculation. In this way, the CRCs for the two OCG configurations shown above will be identical.

In the case of HUBs or LCTs, these configurations have only one exempt parameter, and that is the online/offline flag. Therefore, for HUBs and LCTs, this flag is not considered when the CRC is calculated.

When WCCMaint synchronizes an OCG/LCT/HUB configuration, it downloads the source configuration and uploads this configuration to the target. When this is done, a special flag is set for the upload that instructs the target OCG NOT to overlay exempt data. 'Offline' flags are automatically set for target OCGs.

E.3 Security

Several security interlocks ensure the correct data is downloaded from the correct source and uploaded to the correct OCG.

- **Sync locking** is a special mode invoked on both source and target OCGs.
- **Option control** in WCCMaint controls menu options during synchronization
- **Menu control** in WCCMaint prevents popups, manual uploads, and other functions during synchronization.

SYNC LOCKING: Before an LCT or HUB is synced from one OCG to another, WCCMaint sends a message to each OCG requesting Sync Lock. The source OCG is synced as the master, and the target OCG is synced as a slave during the sync process. Once sync lock is granted by OCG to WCCMaint, the OCG applies rules to any uploads or downloads during the sync lock interval. In effect, once sync lock is granted, an OCG only responds to downloads or uploads from the sync lock (WCCMaint) owner. Sync lock rules are as follows:

- (Master only) No uploads are ever allowed during sync lock
- No sync lock requests are granted during sync lock
- All download or other requests are answered only for the sync lock owner
- Sync lock expires in 15 seconds if there is no upload/download activity

OPTION CONTROL: The WCCMaint client that is the sync owner disables normal upload/download menu features while synchronization is in progress. Synchronization is never allowed when the target OCG has any online LCTs or HUBs. The target OCG itself may be offline or online, but the synchronization process places the target offline.

MENU CONTROL: Operations that could disrupt synchronizing uploads/downloads are temporarily disabled in ALL WCCMaint clients. All WCCMaint clients can visually see that OCGs are in a sync process by the OCG panel bevel and border regardless of which WCCMaint client originated the sync process.

In addition, source and target OCGs must qualify for synchronization. A target OCG is not qualified if it has ANY HUB or LCT online. A target OCG may be online or offline to be qualified if all FEPS are offline. Both source and target OCGs must have minimum software revision levels for both the OCG itself and the OCGCONFIG.DLL configuration editor. The minimum OCG version for synchronization is 1.60.0.14. The minimum revision level of the OCGCONFIG dll is 1.15.0.14, and the minimum revision level of WCCMaint to support synchronization is 5.2.3.

Synchronization functions are also subject to security settings determined by the Aserver User Manager if the Aserver-WCCMaint system is running in secure mode. Secure users must have 'Configure' permission to perform any OCG synchronization.

E.4 Manual (ad-hoc) Synchronization

E.4.1 FEP-to-FEP

To synchronize a single LCT or HUB, right-click on the FEP and select **Sync to…**

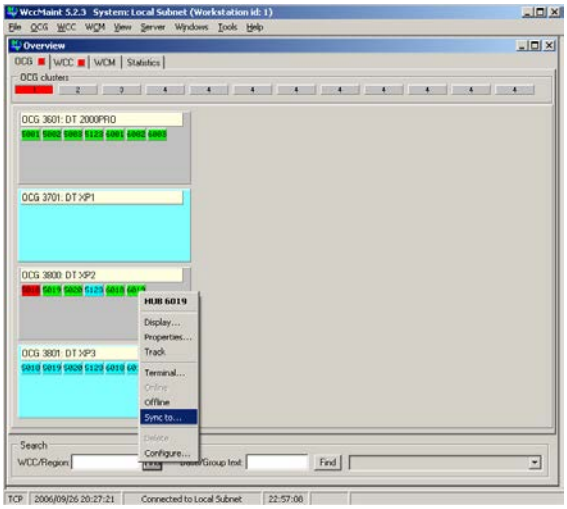

Figure E-4 Selecting FEP Sync-To…

The single-FEP synchronization form appears:

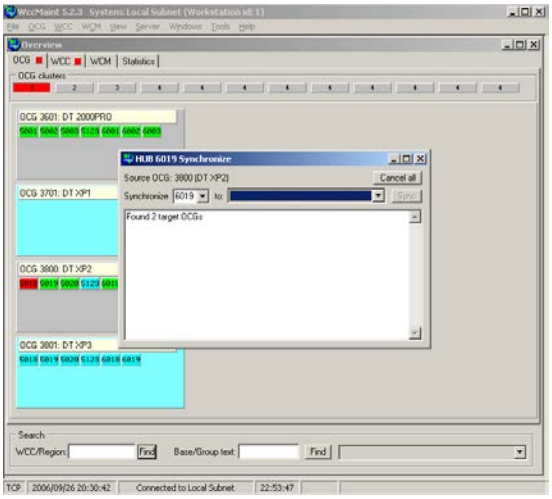

Figure E-5 FEP Synchronization Form

The status window says that there are two eligible OCGs to receive configuration data from this source OCG. This form is prepared to synchronize HUB 6019 to any selected target OCG.

Drop down the list of target OCGs to select one:

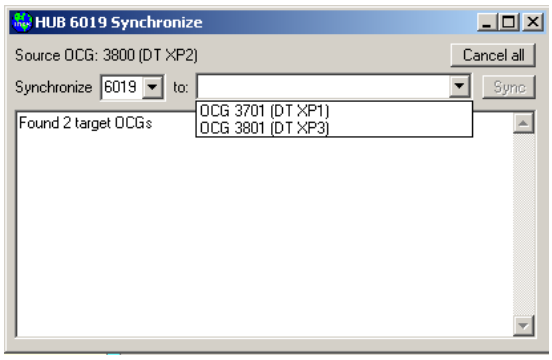

Figure E-6 Target OCG Selection List

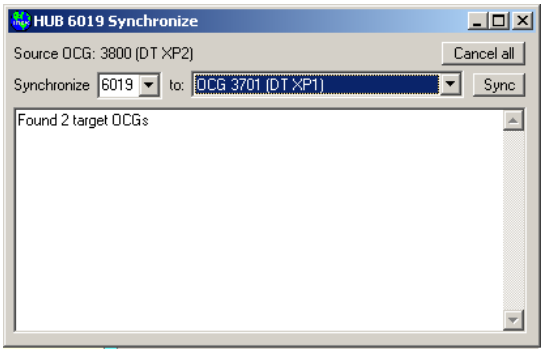

Figure E-7 Selected OCG Target

Click **Sync** to start the Sync process:

All ad-hoc synchronizations are challenged for confirmation (Figure E-8). Click Yes to proceed.

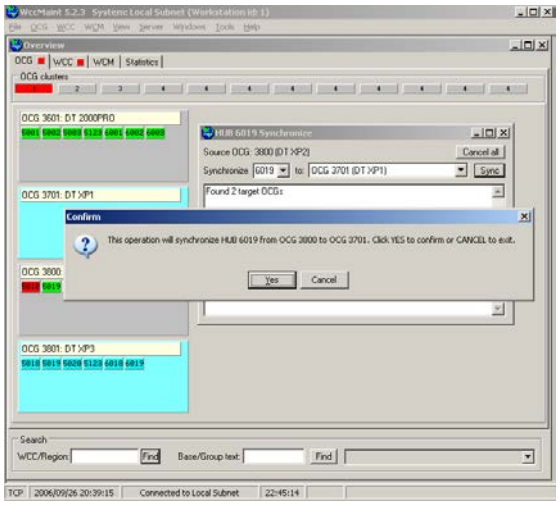

Figure E-8 Synchronization Confirmation Message Box

The status window follows the progress of the sync operation until it is complete (Figure E-9).

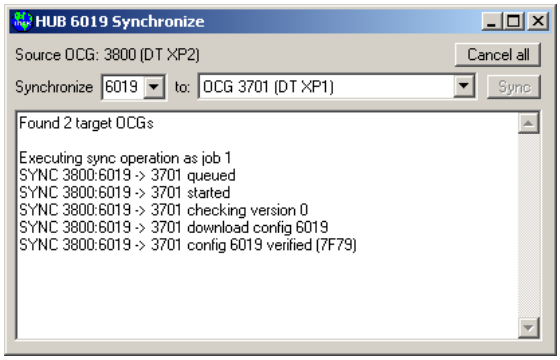

Figure E-9 Synchronization Status Window

All sync operations are tagged with a unique identifier for log sorting, window synchronization, and internal use. This is the **job 1** tag shown above. The final status shows that HUB 6019 is now on both OCGs, and the configurations have matching CRCs (7F79).

Multiple ad-hoc sync windows are allowed. Sync processes may be started in any order and at any time; WCCMaint organizes these sync jobs and executes them one by one in the order they are queued.

E.5 OCG to OCG

To synchronize a complete OCG to an offline spare, right-click on the OCG and select **Sync to…**

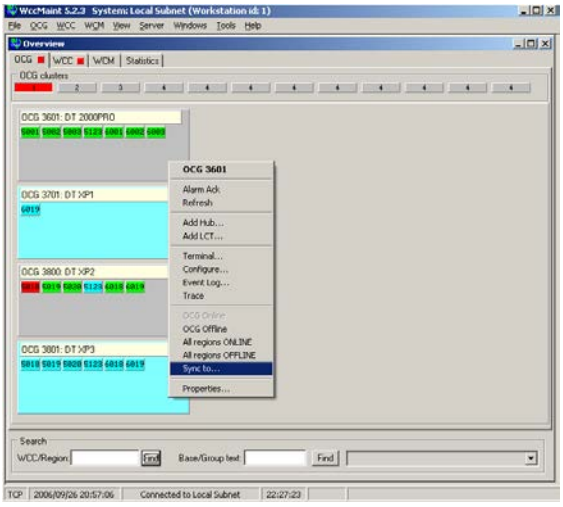

Figure E-10 Selecting OCG Sync-To…

Select the target OCG as above and click **Sync:**

The OCG sync operation is also challenged for confirmation. Click **Yes** to proceed.

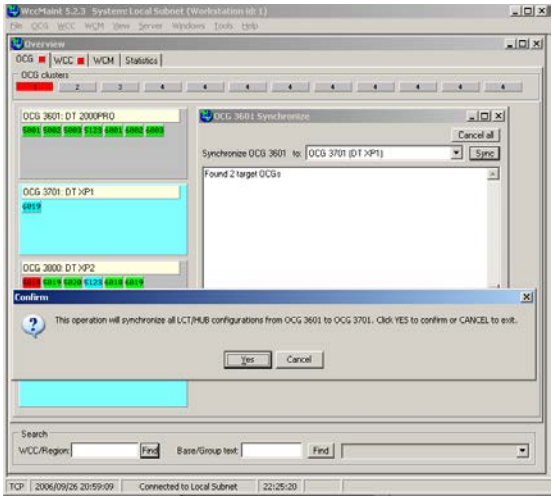

Figure E-11 Synchronization Confirmation Message Box

Status of this longer sync operation is scrolled into the status window:

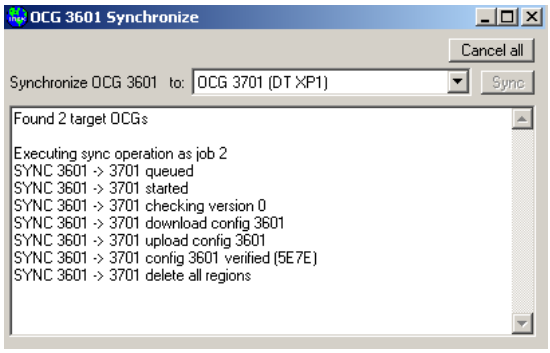

Figure E-12 Synchronization Status Window

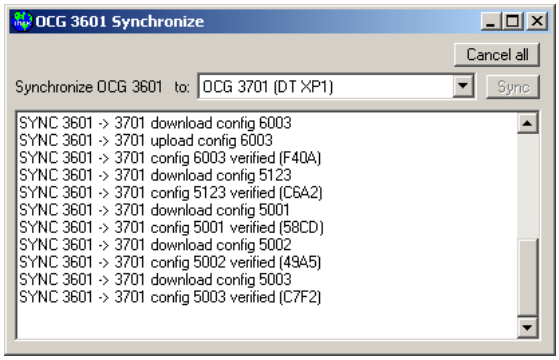

Figure E-13 Scrolling Status

When completed, the source and target OCGs are in sync as shown in Figure E-14.

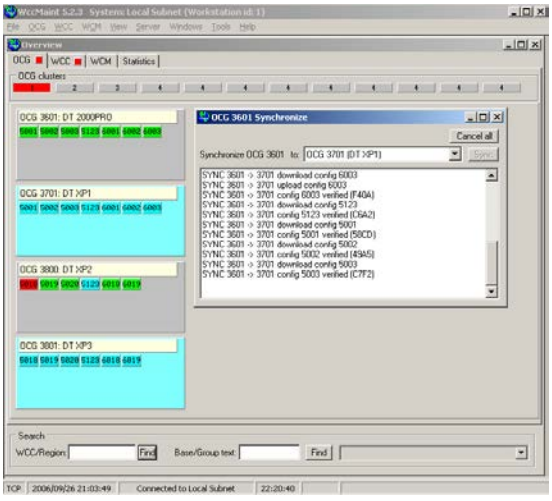

Figure E-14 Synchronized Source And Target OCGs

E.6 Automatic synchronization

WCCMaint also provides an unattended synchronization agent that monitors the synchronization level of all defined master-slave OCG sync pairs on the system. Central to this autosync agent is the concept of **OCG master-slave pairs**. Sync pairs must be defined by the user and may be configured either on the **Setup** tab of the **Sync Manager** (see E.7) or by direct edits to SAFETRAN.INI. It is recommended that the Sync Manager Setup be used to maintain lists of sync pairs.

Once configured, the autosync agent will examine the state of OCG sync pairs, requesting information from the OCGs as needed, and determine via FEP and OCG CRC values whether or not any FEPs (or the OCG configurations) are out of sync. Any synchronization tasks required will be run in the background, with the security lockouts described earlier.

When autosync is in progress, the OCGs involved will display inverted bevels to indicate they are currently locked out of any manual configuration management.

The autosync agent runs at user-specified intervals from 1 to 99 hours. Autosync setup is described in the next section (CONFIGURING AUTOSYNC).

E.7 The Synchronization Manager

A complete overview of the sync states of all OCGs and the results of any sync processes will be found on the Sync Manager form. On the Main Menu, click **OCG**, then **Synchronization…**

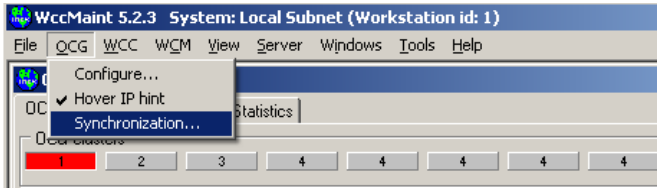

Figure E-15 Selecting The Synchronization Manager

The Sync Manager is displayed. Shown in Figure E-16 is the master sync log:

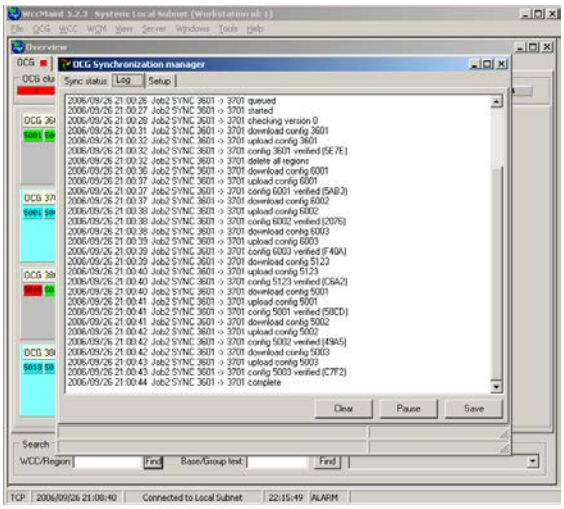

Figure E-16 Sync Manager Master Sync Log

The sync manager form has three tabs: **Sync Status**, **Log**, and **Setup.** The **Log** tab shown above displays all sync activity during the current WCCMaint session. Buttons are provided to clear or pause the scrolling log window, or to save selected text from the window to a file (separate from the sync log file). All sync activity is saved to a log file that is specified on the **Setup** tab.

E.7.1 Configuring Autosync

The sync manager setup tab is shown in Figure E-17.

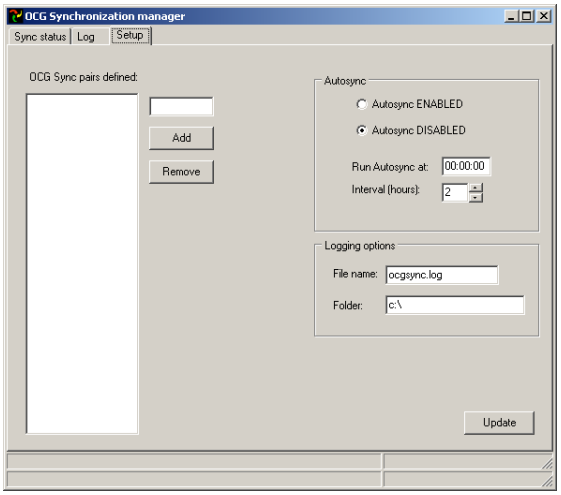

Figure E-17 Sync Manager Setup Tab

E.7.1.1 Sync Pairs

Use the edit box above the **Add** button to create new OCG master-slave sync pairs. The format for entering a sync pair is **MMMM:SSSS**, using the ATCS device number of each OCG. It is crucial that the **MASTER OCG MUST BE THE FIRST** device number in the string. For example, the string 3800:3900 will create a sync pair with OCG 3800 as the master (source) OCG and 3900 as the slave (target) OCG.

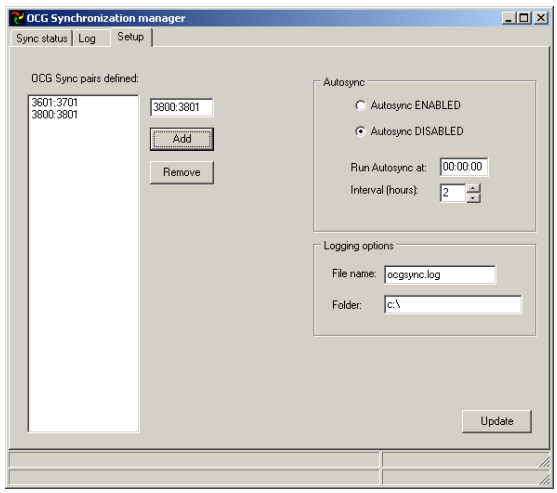

Figure E-18 Entering Sync Pairs

Two sync pairs have been added. To remove a sync pair, select the pair in the list box and click the **Remove** button.

E.7.1.2 Autosync Options

Enable or disable Autosync by clicking the appropriate option. Enter the start time for Autosync in the format **HH:MM:SS**. The 24-hour time format is used. A value of all 0's as shown will run Autosync at midnight. Once Autosync has run, it will run at intervals specified in the **Interval** edit box.

NOTE: WccMaint must be left running for unattended Autosync to be performed.

NOTE: As a security precaution, for Autosync to run, ONE WccMaint client must be designated as the sync Master. To enable Autosync, in addition to the above requirements, **you must enter a key in SAFETRAN.INI.** Refer to the INI editing instructions see E.7.1.4

E.7.1.3 Logging Options

Enter the filename (with extension) for the sync log file and the folder in which the log is to be saved in the appropriate edit boxes. Log file and log folder names default to the values displayed.

E.7.1.4 Using Safetran.Ini

All Autosync options on the Setup tab may be entered directly in SAFETRAN.INI. All Autosync entries must be under the **[OCG Sync]** heading. Default values created by WCCMaint are:

[OCG Sync]
SyncTime=00:00:00 ; sets first sync time to midnight
SyncInterval=2 ; Autosync repeat interval in hours (1-99)
LogFile=ocgsync.log ; default sync log file name
LogFolder=c: ; default sync log folder
AutoSyncEnabled=false ; sets the ENABLE/DISABLE button on the setup tab

Sync pairs may be entered or edited using the following syntax:

SP1=3601:3701
SP2=3800:3900

Finally, for Autosync to run, you must manually enter the following line in this section:

Master=true

Without this key, regardless of any other Autosync settings, Autosync will not run.

E.7.1.5 Sync Status

The Sync Status tab displays the state of all defined sync pairs on the system. In the example shown in Figure E-19, the first line of the grid shows 3601 synced to 3701. This refers to the configuration data of the respective OCGs themselves. The next line, 3601:6001 synced to 3701:6001, means that HUB 6001 on OCG 3601 is correctly replicated on OCG 3701.

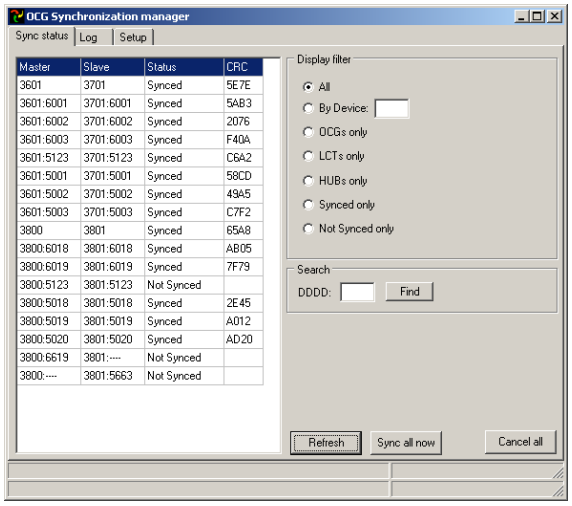

Figure E-19 Sync Status Tab

This display may be filtered by any of the display filter keys shown in the panel on the right. Selecting the filter **Not Synced only** results in the following display:

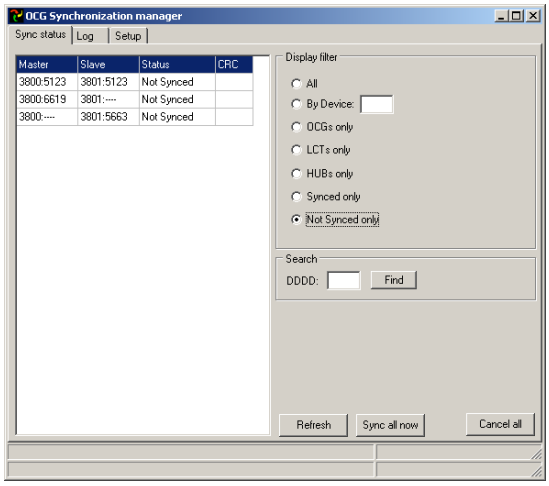

Figure E-20 'Not Synced Only' Filter Display

These lines in Figure E-20 are interpreted as follows:

3800:5123 3801:5123 not synced means that the replicated LCT 5123 on the slave has changed since the last sync operation.

3800:6619 3801: - - - - not synced means that the master OCG has a HUB that is not present on the slave OCG.

3800: - - - - 3801: 5663 not synced means that the slave OCG has an LCT that is not present on the master OCG. This LCT will be deleted on the next sync.

Synchronization can be manually forced from this screen. Right-clicking on any of the lines in the status grid displays a popup menu that allows ad-hoc syncing of the selected pairs:

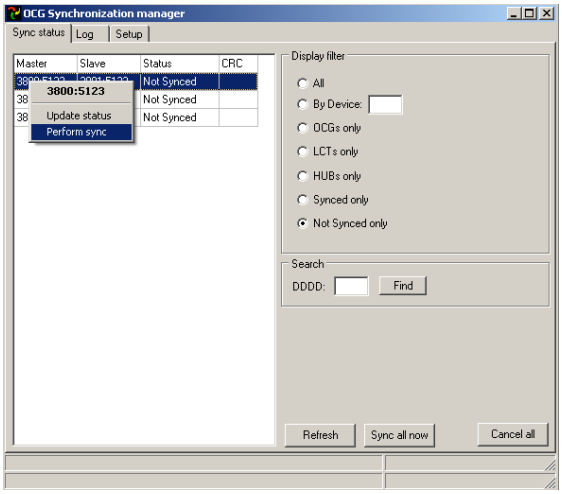

Figure E-21 Forcing Synchronization Of Selected Pairs

This LCT ONLY is immediately synced from 3800 to 3801:

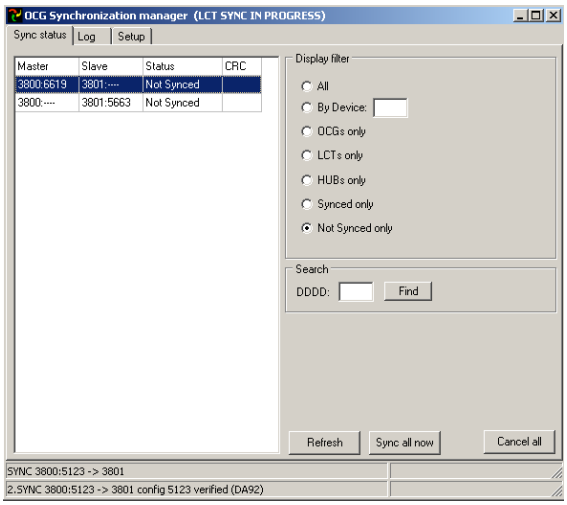

Figure E-22 Successful Synchronization

The status bars at the bottom of the form show the current status of the sync agent anytime it is running. The upper line shows the sync job that is running, the lower line shows the task within that sync job that is currently executing. All of this activity is also displayed on the log page and sent to the log file.

Note that the status grid automatically updates, and has removed the out-of-sync status for LCT 5123. The status grid displays OCG sync pair status dynamically so that if ANY user on the system modifies a HUB/LCT that belongs to a sync pair, it will immediately show **Not Synced** in the grid.

The remaining unsynced FEPs shown here may be synced either individually using the popup menu method above, or by clicking the **Sync All Now** button. This is equivalent to running Autosync immediately, and ALL defined OCG sync pairs will be renewed.

The **Refresh** button updates the status grid (necessary on startup or if new sync pairs are added on the **Setup** tab). The **Cancel All** button immediately stops all sync activity and deletes any pending sync jobs as well.

E.7.2 OCG Logging

Sync operations are logged in both the master and slave OCGs. The above single-FEP sync operation, replicating LCT 5123 on OCG 3801 from OCG 3800, was recorded in the OCG 3800 log as follows (for documentation purposes, this sync operation was performed twice, so there are two identical sync operations logged):

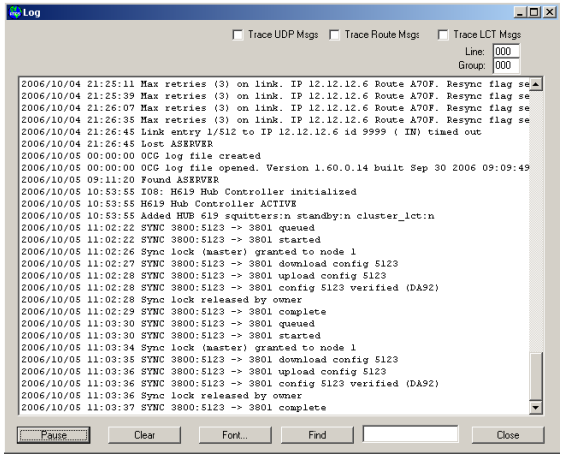

Figure E-23 Sync Operations Log

At 11:02:02, Sync operation was started. Lines beginning with SYNC are updates from WCCMaint, and their format (**SYNC 3800:5123 -> 3801**) matches the log entries in the WCCMaint sync log. Other entries are locally generated, for example, **Sync lock (master) granted to node 1**.

Node 1 is the WCCMaint workstation node, corresponding to the ATCS address 2.125.AA.2AA1.

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