

# **ACU-Controller Control Software for the ACU-1000/2000, ACU-T and ACU-M Software Installation and Operation Manual**

Designed and Manufactured by:

**JPS Interoperability Solutions, Inc.**

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## **Glossary**

<b>AP-1</b>	Audio Processor Module, applies a variety of functions to other ACU-2000 or ACU-T module inputs or outputs, mainly used for additional digital delay.
<b>COR</b>	Carrier Operated Relay - A receiver signal that indicates that a carrier or signal is being received and the receiver is unscquelched. Same as COS.
<b>COS</b>	Carrier Operated Squelch - See COR.
<b>CPM-4 or CPM-6</b>	Control Processor Module - This ACU module controls all aspects of system operation.
<b>DTMF</b>	Dual Tone Multi Frequency - The standard touch-tone telephone dialing method sends DTMF characters over the PSTN line.
<b>DSP</b>	Digital Signal Processing (or Processor).
<b>DSP-2 or DSP-3</b>	The Digital Signal Processor Module, the main radio interface of the ACU system. DSP algorithms provide VOX, VMR, Audio Delay, Noise Reduction, and Tone Keying functions.
<b>EIA</b>	Electronic Industries Association.
<b>Extension</b>	Each interface module in the ACU system is given an extension number. A user enters this extension number to make a communications link through the selected module.
<b>Hang Time</b>	A system with hang time will remain in the transmit mode for the duration of the set hang time beyond the time indicated by any keying inputs. The hang time prevents transmitter unkey during brief pauses in the transmission.
<b>HSP-4</b>	The ACU Handset/Speaker/Prompt Module. It provides a local operator interface. System voice prompt creation circuitry also resides on this module.
<b>Key</b>	To key a transmitter means to cause it to transmit.
<b>LED</b>	Light Emitting Diode.
<b>LMR</b>	Land Mobile Radio.
<b>LP-1</b>	The Local Phone Module in the ACU system.
<b>Mute</b>	To quiet or inhibit audio.
<b>NXU</b>	Network Extension Unit. JPS device for interconnectivity with Ethernet.
<b>PCB</b>	Printed Circuit Board.

## Glossary

<b>PIN Number</b>	Personal Identification Number. When PIN Security is enabled, only users who enter a valid PIN are allowed to access the ACU system.
<b>Port</b>	The rear panel connectors P1 through P12 (ACU-1000/2000) or side panel P0 through P5 (ACU-T) provide <i>Communications Ports</i> to interface with other communications equipment (such as radios).
<b>PSTN-1 or PSTN-2</b>	The ACU module to interface to the Public Service Telephone Network
<b>PTT</b>	Push-to-Talk. An active PTT signal causes a transmitter to key.
<b>RX</b>	Receiver or Receiving.
<b>Slot</b>	A physical location in the ACU chassis where a module can be inserted.
<b>Squelch</b>	A means of detecting audio and causing some action when it is present, such as keying a transmitter or unmuting an audio path.
<b>Template</b>	A template file contains all of the settings for an ACU-T or ACU-1000/2000 Interface module. It may be called up to quickly apply the same settings to another module that is being configured. Used mainly with the DSP module for radio interfacing.
<b>TX</b>	Transmit or Transmitter.
<b>VMR</b>	Voice Modulation Recognition. A type of squelch, which is activated only by spoken words and not by tones, noise, or other audio information.
<b>VOX</b>	Voice Operated Xmit (Transmit). A circuit or algorithm, which causes a transmitter to key or some other action when voice is present. This squelch type is activated by any audio signal, and is not restricted to voice only.

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# 1 Introduction & Installation

## 1.1 Introduction

The ACU Controller is a graphical control interface for the ACU-1000, ACU-T, and the ACU-M (they will be given the common name “ACU” in this manual for simplicity). It allows its operator to quickly make and break several types of module-to-module interconnections, modify module setups, save and load various configurations of the ACU system, and take advantage of many other features designed to improve the functionality of your ACU system. It’s possible to simultaneously run several instances of the ACU Controller, with each instance providing control of a different ACU. The ACU Controller can control an ACU via either serial RS-232 or Ethernet. The Ethernet control allows multiple ACU Controller installations to simultaneously monitor or control any ACU connected to the network

**Note: This manual is intended as a companion to the ACU-1000/2000 or ACU-T manual or the ACU-M Training CD, not as a replacement.**

**Proper setup of the system will require a thorough understanding of the ACU equipment and its ACU manual or training CD. Once the ACU system is set up, this manual is all that is required to fully understand its operation via the ACU Controller program.**

**ACU-1000 & ACU-2000 names interchangeable**

## 1.2 Computer System Requirements

In order for the ACU Controller to run on your computer, these requirements must be met:

- The operating system is Windows 95, Windows 98, Windows Me, Windows NT, Windows 2000, or Windows XP
- The video card and display support at least one of these resolutions: 800x600, 1024x768, or 1280x1024
- At least 64MB of RAM
- 50MB of free hard drive space

- A serial port dedicated to the ACU for RS-232 communication
- For Ethernet control of an ACU (or group of ACUs), the computer must have an Ethernet card or other means to access the same network that the ACU units are connected to. The computer must have TCP/IP network protocol capability.

The use of a mouse is recommended, but not required (operation is also possible via keyboard or touch screen.)

**Note: Proper operation of the ACU Controller with an ACU-1000/2000 or ACU-T with a CPM-2 module requires that the CPM-2 module has firmware revision 1.16 or higher. No revision restrictions apply to CPM-4 and CPM-6 modules or for use with the ACU-M.**

## 1.3 Installation

To install the ACU Controller, insert the ACU Controller CD in your CD-ROM drive. The installation program should start automatically and guide you through the installation process. You can also run the installation program manually. It is called "Setup.exe" and is located in the root directory of the ACU Controller CD-ROM.

The Part Number for the ACU Controller Option, which consists of the ACU Controller CD-ROM and a copy of this manual, is 5961-298100.

## 1.4 Getting Started

Before running the ACU Controller, make sure the serial cable is plugged into both the computer and the ACU. The serial cable must remain connected at all times during operation.

You can launch the ACU Controller either before or after the ACU has been turned on.

### 1.4.1 Serial Remote Control

If the ACU will be connected to the computer by an RS-232 serial connection rather than by Ethernet, the first time you run the ACU Controller, you will need to select a new serial port if the default, COM1, is not the correct port. The ACU Controller will notify you whenever it cannot communicate via the selected serial port. In addition, if everything seems to be correctly set, but no module icons appear in the grid, the COM setting may be wrong. COM1 is usually the correct port.

## 1.4.2 Ethernet Control

To control an ACU via Ethernet, it will be necessary to enter the IP address and port associated with the ACU that is to be controlled. The ACU must be connected to the same network as the computer running the ACU Controller. When an ACU-1000 with a CPM-2 module is used, the network connection is made by the JPS ETS-1 (Ethernet To Serial Converter). The IP address and associated port number are configured in the ETS-1. The default port number for the ACU Controller (23) is also the default port number configured in each ETS-1, so a change is not required at the ACU Controller unless the ETS-1 default is changed.

## 1.4.3 First Steps at Initial Start-Up

With the ACU Controller running, the first step is set the proper screen size, then set the other preferences as necessary. Set any desired security (password protection) provisions (see Section 4).

## 1.5 Pull Down Menus

The following subsections give a basic understanding of each of the pull-down menu options. In some cases, it provides references to other sections explaining the features in detail.

## 1.6 File Menu

The File Menu has five options:

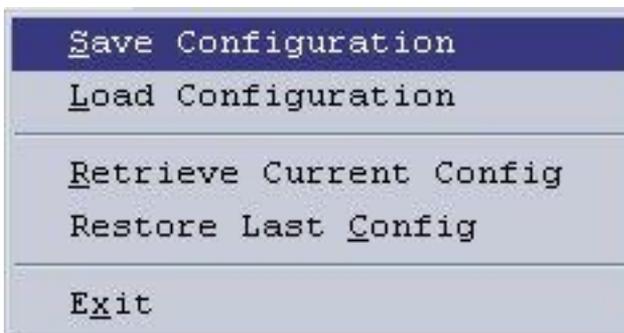


Figure 1-1 File Menu

## 1.6.1 Save Configuration

This gives the user the option of storing the current configuration in a file so it can be recalled later. The **Configuration** saved includes any nets (module-to-module connections), the current settings of each module, PIN security and speed dial databases, and any customization the user has made to the screen, including icon colors, text added to icons, custom icons, etc. The user is prompted to save the current configuration via standard Windows methods, making it easy to name and store the configuration in the proper location. The correct extension “.acu” is automatically appended. By default, the configuration files are stored in the “Configurations” directory, although another directory may be specified by the user. The current configuration is always automatically saved when the program is exited (see 1.6.4).

## 1.6.2 Load Configuration

This menu option is selected when the user wants to set the ACU Controller to one of the configurations that has been saved via the “Save Configuration” command.

**Note: The configuration selected by the Load Configuration command must be made up of a similar complement of ACU modules, in the identical locations, as are installed in the actual ACU (not applicable to ACU-M).**

The program will attempt to load configurations for setups, which are similar, but if the system is different from what the configuration was when saved, an error message will be displayed. For example, if additional modules have been added to the ACU chassis since the configuration was stored the Load Configuration process will be successful. This is because the initially installed modules have not been moved or deleted, so the program can run the Load Configuration feature with respect to these modules, ignoring the new modules. If the locations of some module types have changed (for example, if the locations of a DSP module and a PSTN module are swapped), it will not be possible to load the configuration.

## 1.6.3 Retrieve Current Configuration

This option commands the program to interrogate the ACU regarding its current configuration and set the ACU Controller to match. This option should be rarely if ever needed. It may be used, for example, if the serial

remote control cable is temporarily lost and the program becomes out of sync with the ACU (because changes have been made in the interim at the ACU), or if the ACU Controller shows no module icons despite a proper serial connection.

## **1.6.4 Restore Last Configuration**

Use this option to revert to the configuration the ACU Controller was in when it was last powered down. Whenever the ACU Controller is shut off, it stores its current configuration. When turned back on (if no other configuration is installed via the Load Configuration command) it reverts to the last stored setup parameters that relate to how the computer screen looks (icons, background color, screen size, animation speed, etc.). However, the program does not return to either the module-to-module interconnect scheme or the internal module settings that existed when it was turned off. Instead, it adopts the current conditions of the ACU that it is controlling.

After the ACU Controller was powered down, it is possible that the ACU internal settings were changed via the HSP-2 or that module-to-module interconnections may have been created by the HSP-2 or via DTMF from outside users. In addition, the entire communications scenario may have been changed since the ACU Controller was powered down, with the whole system moved to a new location. Therefore, previous interconnections and settings are not restored without an explicit Restore Last Configuration command from the operator. When selected, this command returns the ACU fully to the state it was in when the ACU Controller was last shut down. The only exceptions are the dynamic PSTN module connections, as they rely on a system user taking a handset off-hook, or may have been initiated by an unidentifiable outside user. For instance, if someone calls into the ACU via a telephone, the ACU Controller does not know the telephone number and cannot re-establish the connection.

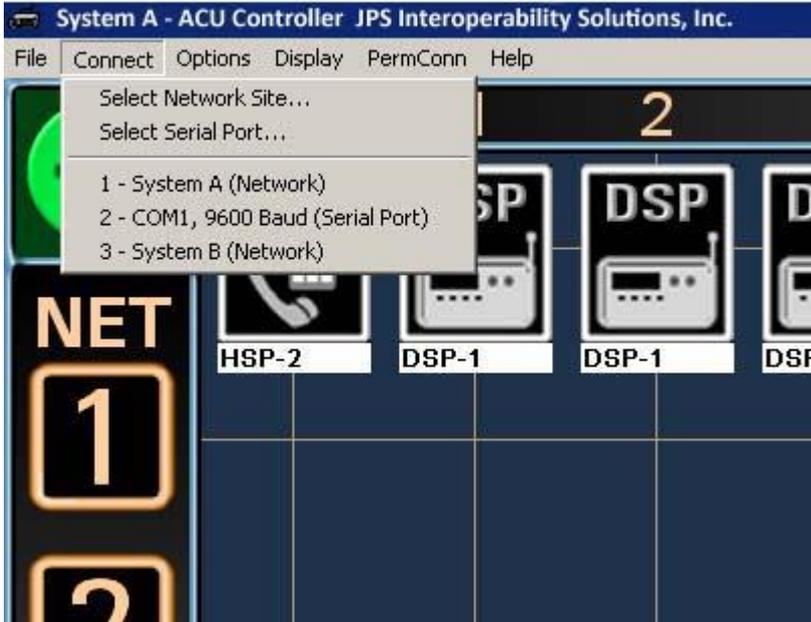
**Note: Before the ACU Controller can Load or Save any configurations, communications must be established with the ACU.**

## **1.6.5 Exit**

This selection (or the “X” box in the window’s upper right corner) may be used to shut down the ACU Controller program.

## 1.7 Connect Menu

This pull-down menu provides options for connecting the ACU Controller to an ACU-1000/2000, ACU-T, or ACU-M.



*Figure 1-2 Connect Menu*

Note that at the top of the ACU Controller Main Screen, the name of the currently connected site is displayed. A recently connected site list (up to 10 different sites) also appears to allow quick connections to these sites. For connections to new sites, the “Select Network Site” and “Select Serial Port” options are provided.

### 1.7.1 Select Network Site

If the ACU Controller will be controlling an ACU via Ethernet rather than RS-232 serial, choose the Select Network Site option to bring up a dialog box to configure the connection. The top portion of the Select Network Site dialog box has blanks for entering a new IP address and port. (See also 1.7.1.1). Entering a description is optional but recommended, as the description will be displayed at the top of the screen, allowing the user to

quickly see which ACU is being controlled in a multi-ACU system. Once these items are typed in, click the **Add** button to add the new site to the list that the ACU Controller will store in the preferences file (also shown in the dialog box under “Stored Network Sites”). Clicking the **Add and Connect** button will add the site to the list, then attempt to connect to that new site immediately and close the dialog box.

Sites entered by the user are displayed in the lower portion of the dialog box; up to 500 sites can be stored. To connect to a site in the list, click on a site in the list, and then click the **Connect** button. The dialog box will close immediately. While the Controller is attempting to connect to a site, its window title will change to “Connecting...” Once the connection is made, the window title at the top left of the screen will change to the site’s stored description. If no description was entered, the IP address will be displayed instead.

A site can be removed from the stored list by first clicking on it in the list to select, then clicking the **Remove** button. Note that if the Controller is currently connected to a network site, that site cannot be removed from the list until the network connection is changed.

At start-up, the ACU can be set to either:

- Automatically attempt to reconnect to the site it was last connected to.
- Require the operator to establish any Ethernet connections

See Sec 1.8.11 for information regarding automatic connection options.

**Note: Once connected to a network site, any icon colors, custom icons, or module names specified by the user will be automatically associated with that site and will be loaded whenever the ACU Controller reconnects to that site. This allows the user to switch between a multiple ACUs at different network sites without having to save the current configuration before switching, and then reload it when returning to that site.**

**This feature is available for Ethernet control only, not for RS-232 serial control.**

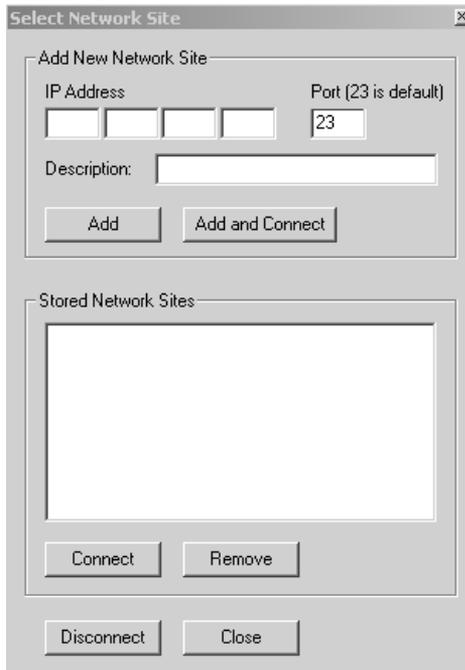


Figure 1-3 Select Network Site Dialog Box

### 1.7.1.1 Port Selection for IP Address

As can be seen in Figure 1.3, the default port selection associated with each IP address is 23.

Note that the ACU Controller stores Network Site Addresses and names whenever a new connection is made. To connect to any of these stored sites, highlight and click the “Connect” button.

## 1.7.2 Select Serial Port

For a serially-controlled system, this option allows the user to set which of the host computer's serial ports will be used to communicate with the ACU for this version of the program. Users wishing to control multiple ACUs might have multiple instances of the ACU Controller program running concurrently; each will need to communicate via a different serial port. The default is COM1. This selection need be made only once, the first time the ACU Controller is run, unless using a different serial port becomes necessary. The serial port selection will be saved in the preferences file.

The default Baud Rate for the CPM-2 is 9600 Baud, and this setting should be used unless other instructions are given.

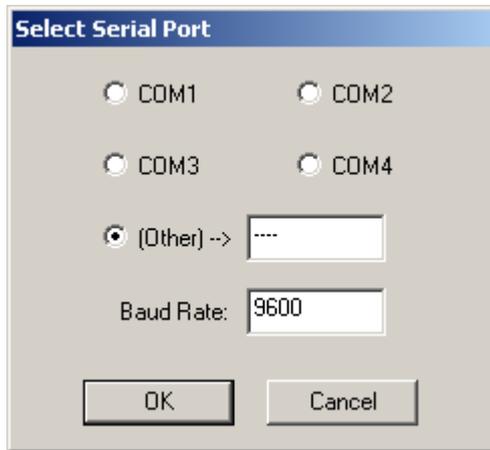


Figure 1-4 Serial Port Selection Dialog Box

## 1.8 Options Menu

This pull-down menu gives the user the control of a wide variety of system setup, control and monitoring options.



*Figure 1-5 Options Menu*

### 1.8.1 Pin Settings

This menu option provides access to the database that sets PIN numbers, User IDs, and Security Levels. Does not apply to the ACU-M as this unit has no external DTMF Control features. See section 4.

Access to this database may be Password Protected; see Section 4.2 and Section 1.8.2.

## 1.8.2 Password Protection

This menu option opens the Password Dialog Box. This allows the user to set which (if any) of the following require a password to modify:

- ACU PIN Settings Database
- Permanent Connections
- Module Settings

See Section 4 for full information regarding PIN Settings and Password Security. See Section 2.2.5 for an explanation of Permanent Connections. Module Settings are covered in Section 3.

The Password Protection Feature allows the system to be set up as desired and then turned over to an operator, with important aspects of the feature placed outside of the operator's control.

## 1.8.3 View Recent Log

The ACU Controller maintains a log of all basic system operations:

- What connections are made
- For PSTN connections, the phone number dialed and whether the connection succeeded
- The User ID if Password Security is in place
- The time and date of each activity

This information is recorded in a Log File. The View Recent Log option brings up the last 30 log entries in reverse chronological order (i.e., the most recent activity at the top of the list).

The View Recent Log option may be selected over the View Entire Log option if, for example, the ACU Controller operator is forced to leave the computer for a while and, on his return, wishes to review the activity that took place during their absence. The ACU Controller will use the computer's default text editor to display the file. If for some reason, no default text editor is specified, the log files can be opened manually. Look for the log files in the ACU Controller installation directory. They all have the ".log" extension. A sample log file is explained in Section **Error!**  
**Reference source not found.**

## **1.8.4 View Entire Log**

This opens the log, which can be very lengthy if the New Log option is seldom used. The full log is displayed in chronological order, first activity at the top of the list. See the View Recent Log option above to see only the most recent activity.

## **1.8.5 New Log**

Select this to get the ACU Controller to start a New Log. The user will be prompted to enter a name for this new log file and from then on all activity will be stored in this new file. The previous log file remains stored, and can be manually accessed at any time.

## **1.8.6 Connect All/Revert**

When selected, Connect All causes all of the ACU modules to be interconnected in a single net, except for any currently unconnected PSTN-1 modules. If any PSTN-1 modules are currently connected in any net, they will remain connected. When Revert is selected, the single net is dissolved, disconnecting all modules, and then all modules (except PSTN-1 modules) are returned to the nets they were in prior to the Connect All. The program is unable to reconnect the dynamic PSTN-1 connections, since for example; the connection may have resulted from an outside user calling into the system. The ACU Controller has no record of the phone number of the caller and hence cannot re-establish the connection.

## **1.8.7 Disconnect All/Revert**

When selected, Disconnect All dissolves all current interconnections (nets). When Revert is selected, all modules (other than PSTN-1 modules, see section 1.8.6) are returned to whatever nets they were in prior to the Disconnect All.

### **1.8.8 Voice Prompts On/Off**

This menu selection controls the ACU voice prompting. The default selection is On, with voice prompts aiding system users to understand system status and changes. Please note that voice prompts are sent out only in response to external users who attempt to gain access to the system via DTMF, and not in response to activity commanded by the ACU Controller. Even this voice prompting is sometimes not desired (for example, when system users are involved in surveillance or public safety operations where silence is required most of the time).

### **1.8.9 Right Mouse Button**

This menu selection allows the right mouse button to be configured to either disconnect any module the cursor is right-clicked on, or else to bring up the module's settings screen.

- If the right mouse button is set to disconnect nets, the module settings screens can be viewed by double-clicking the appropriate icon with the left mouse button. In this mode, an operator can quickly connect and disconnect modules with a minimal number of mouse clicks. Keep the Connection Indicator set to "+" and use the left mouse button to connect two modules by clicking on each in succession, then disconnect quickly with the right mouse button.
- If the right mouse button is configured to bring up the module setting screens, a module can be quickly disconnected by left clicking on its icon when the Connection Indicator is in the disconnect mode (see section 1.8.10).

### **1.8.10 Connection Indicator**

The connection indicator resides in the upper left corner of the standard screen. When it is a plus "+" sign, left clicking on two modules in succession will create a net between those two modules (See Section 1 for more complete details). When the Connection Indicator is a minus "-" sign, any module that is left clicked will be removed from its existing net. There are two options for the way the connection indicator is used:

- Remain in its current "+" or "-" state until it's toggled (by a left click)
- Return to "+" after each time it's used to disconnect a module

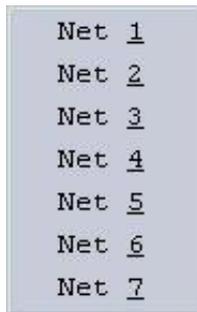
### 1.8.11 Auto Connect On Startup

This option determines what the ACU Controller does at program startup regarding connections. When set to “On”, the ACU Controller will attempt to automatically restore its last successful connection (Note: Serial operation only). If there was no existing serial connection when the program was terminated or the computer power shut down, the program will still attempt to restore its last successful connection. Alternatively, the Auto Connect at Startup feature can be set to “Off”, and no connection is made until commanded by the ACU Controller operator.

## 1.9 Permanent Connections (PermConn) Menu

This menu is used whenever a net is assigned “Permanent Connection” status (see Section 2.2.5). When any one of the Nets, 1 through 7 is selected via this pull-down menu, the net becomes a Permanent Connection.

The Permanent Connection selection acts as a toggle. If the selected net does not currently have Permanent Connection status, the selection will apply it. If the net already is set as a Permanent Connection, the selection of this net via the PermConn menu will remove the Permanent Connection status.



*Figure 1-6 Permanent Connections Menu*

## 1.10 Display Menu

This pull-down menu allows the look and sound of the ACU Controller to be customized.

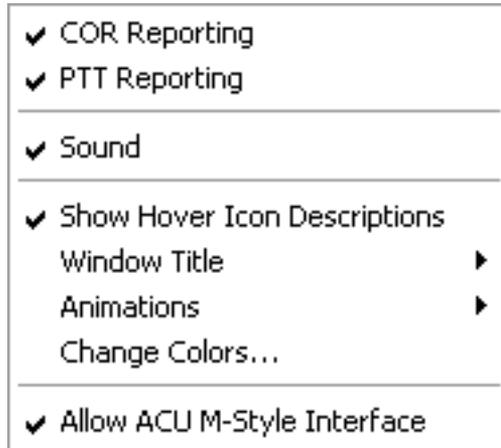


Figure 1-7 Display Menu

### 1.10.1 COR/PTT Reporting On/Off

This selection decides if the current COR or PTT status of each module will be displayed on its icon by a small additional icon in the upper right quadrant. (See Figure 1.5; it shows full duplex activity with both of these icons simultaneously on; in most cases, only one will be seen at a time).



Figure 1-8 COR & PTT Icons

### 1.10.2 Sound On/Off

The sound effects accompanying most basic ACU controller actions help provide a positive or negative indicator of current activity, and may be

turned off if desired. Custom sound effects may be installed in place of the set provided. See section 6.3.

### **1.10.3 Show Hover Icon Descriptions**

When this feature is selected and the cursor is placed over a Module Icon, the full Icon Description will be displayed. If this feature is disabled, only the initial characters of the description (those that fit under the icon) are shown.

### **1.10.4 Animations**

Use this menu selection to change the speed of the animations, which accompany changes to the connections displayed on the main screen. The animations are intended to provide the operator with visual cues to screen changes. The best way to determine the optimum animation speed is simply to experiment with the settings. The four choices are Slow (700ms), Medium (500ms), Fast (300ms), and Off, which means “No Animations”; the changes will be instantaneous.

### **1.10.5 Screen Size**

Use this menu selection to appropriately size the ACU Controller screen to the monitor being used. This selection will probably not be required as the ACU Controller is automatically configured to maximize.

### **1.10.6 Change Colors**

This selection allows the operator to change the background and grid colors of the main screen. Several presets are provided, along with infinite variability. One of the grid selections is “Match Background”; this allows the grid to be removed from sight completely for operators who would rather not have a grid.

### **1.10.7 Set Window Title**

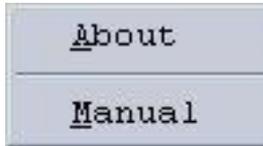
This selection allows the customization of the title at the top of the ACU Controller Window (the same title is displayed on the Windows task bar). This title is saved whenever a configuration is stored. Different Window Titles may be particularly useful if multiple instances of the ACU Controller are simultaneously open, controlling several ACUs.

### **1.10.8 Allow ACU M-Style Interface**

When checked, the ACU Controller is allowed to enter ACU-M mode if it detects that the connected unit is an ACU-M. The ACU-M interface has larger icons and a different method for forming monitor connections, since with the M, only the Local Operator (L module) can monitor.

## 1.11 Help Menu

Use the Help pull-down menu to access an HTML version of this manual. The computer must have a Web Browser in order for this manual to be viewed. To enhance system security, the HTML manual will not include the instructions telling how to change the system password that are included in this printed manual.





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## 2 Basic Operation

### 2.1 Understanding the Main Screen

There are six parts to the main screen:

- Module Grid
- Column Heading Area
- Net Area
- Connection Indicator
- Message Area 1
- Message Area 2

These are described below and labeled in Figure 2-2.

#### 2.1.1 Module Grid

The module grid contains an icon representation of the HSP module as well as each interface module in the ACU system. Five different module types are supported: HSP-2 or HSP-4, DSP, RDI-1 (Obsolete, PSTN, and LP). All modules of these types will appear as icons on the screen. Other installed module types will not show up.

The horizontal position of each icon indicates the corresponding module's physical position in the ACU chassis (and its extension number). See the next sub-section, The Column Heading Area, for details.

The vertical position of each icon indicates the *net* in which this particular module resides. A "net" is a group of two or more modules interconnected (communicating with each other). Modules at the very top are not in a net (this is called the "*idle row*" of unconnected modules). Each net has an associated *net number* (1 through 7), listed along the far left in the net area.

The module grid is the main interface for making and breaking connections if you are using a mouse or touch screen.

#### 2.1.2 Column Heading Area

This area, which stretches across the top of the screen, has a numerical heading for each column. Each extension in the ACU is represented by a column on the screen. For example, an icon in column 5 in the grid is associated with a module installed in extension 05 of the ACU. With a single ACU-1000, the columns will be numbered 0 to 12, with the HSP associated with the "0" column at the far left. (The extension number for

the HSP is “00” for local “Operator”). In systems where two ACU-1000 chassis are connected together in the master/expansion configuration, there are 26 columns. If an HSP is installed in the expansion chassis, it will be represented by an icon in the column at the far right, at its extension number 25. Physical positions 1 through 12 in the expansion chassis are represented by their extension numbers 13 through 24 in the column heading area.

For an ACU-T, along with the HSP module, there can be a maximum of five interface modules installed; so the columns number simply 0 to 5.

The column heading area is also the interface for entering the Monitor Mode. To do so, click on the number of the Monitoring Module. See Section 2.2.4.

### **2.1.3 Net Area**

This area consists of seven numbered net icons arranged vertically down the left side of the screen. When a net contains modules, a *net line* will appear, stretching horizontally from the net number icon to the right edge of the screen. Any module icons positioned on the net line are members of that particular net. All modules that are members of a net are interconnected (communicating with each other). A thin green net line indicates a normal connection between the modules. Thicker blue, red, or yellow net lines indicate *Vertical Connections*, where different nets are connected with each other. Further explanation is provided in Section 2.2.2.

If you are using a mouse or touch screen, the net number icons form the interface for simultaneously dealing with an entire net of modules.

## 2.1.4 Connection Indicator

The connection indicator is the square box in the upper left corner of the screen. It indicates whether the program is in the *Connect Mode* or in the *Disconnect Mode*. A green circle around a plus sign is shown for Connect Mode. Disconnect Mode is indicated by a red circle around a minus sign. The current mode setting determines how the program will respond to clicks of the left mouse button (or clicks on the touch screen) on module icons or net number icons. Generally, when the program is in the Connect Mode, clicks on icons will result in the creation of new connections. When in Disconnect Mode, clicks on icons will break connections. To toggle the current mode, click on the connection indicator.



Figure 2-1 Connection Indicator

**Note:** It is also possible to quickly make and break connections with the mouse's left and right buttons, skipping steps and ignoring the Connection Indicator completely. See 1.8.9 for details.

**Note:** An optional mode sets the Connection Indicator so after a connection is broken when in the Disconnect Mode; the indicator automatically reverts to the Connect Mode. See 1.8.10 for instructions.

## 2.1.5 Message Areas

The two message areas provide a variety of information to the ACU Controller operator. Message area 1 is at the bottom of the screen on the left, message area 2 on the right. The first message area is mainly used to display the full description of a module when it is selected or when the mouse cursor passes over its icon. The second displays various messages in response to certain commands from the program operator or from the ACU.

These areas are the only parts of the screen that do not respond to any type of operator input.

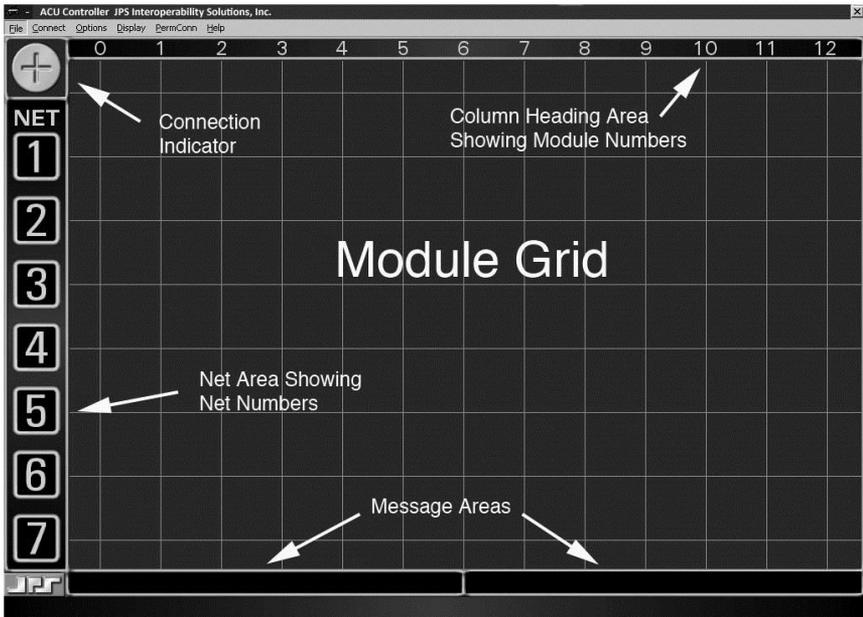


Figure 2-2 Main Screen Areas

**Note: A Main Screen optimized for use with the ACU-M may be selected. See Section 2.3.**

## 2.2 Making and Breaking Connections

There are five ways to connect ACU modules to each other via the ACU Controller:

- Normal Connections, which form “nets”
- Vertical Connections, connect existing nets together
- Priority Connections, temporarily patch members of existing nets together, removing them for this period from their original nets
- Permanent Connections, add varying levels of protection to existing nets
- Monitor Connections, allow a user to hear (monitor) but not speak to other users. This means that the monitoring extension will not cause any system radios to transmit.

This section describes the different types of connections and how to work with them using the mouse or touch screen. For details about making and breaking connections with the keyboard, see Section 5.

The quickest method for making and breaking connections uses the mouse as follows:

- Make connections with the left mouse button
- Break connections with the right mouse button

Connections may also be made or broken using only the left mouse button; the current state of the Connection Indicator controls which of these two operations occurs. The same procedure must be used with a touch screen system, as a tap of the touch screen simulates a click of the left mouse button (see Section 2.1.4). The right mouse button, which is normally used for disconnecting nets, can be configured (via the Options menu) to instead access the individual module settings screens. In this case, right clicks on module icons will not result in disconnections, but right clicks on net number icons still perform the disconnect function. Throughout the remainder of this section, it is assumed the right mouse button is set to disconnect, not to access settings screens. Whenever a right-click is mentioned, a left-click (made while the Connection Indicator is in the Disconnect Mode) performs equivalently.

**Note: Throughout this manual, the term “click” by itself means press the left mouse button or a tap on the touch screen.**

All connections except Monitor Connections require just two clicks. You can generally click on any combination of module icons and net number icons to form connections. Clicking on two module icons will always connect the modules together, but the exact type of connection depends on whether both of the modules are currently part of an existing net. If they are not, the two modules are interconnected in a normal net. If they are both already in nets, it is important to note they will now be formed into a **Priority Connection** (see section 2.2.3).

When you have made the first click in a connection (effectively selecting a module or net), the mouse cursor will change to an arrow alongside a “plus” sign. Whenever this cursor is displayed, the next click on a module or net number icon will complete the connection attempt. To clear the selected module or net and restore the normal cursor, click on an empty area of the screen or press the keypad’s Esc (escape) key, or wait approximately 15 seconds.

**Note: While the ACU Controller is processing commands from the ACU, you will not be able to make or break connections. This state is indicated by an hourglass cursor instead of the pointer cursor and a notice in the message area #2. Wait until the cursor returns to normal before attempting further commands.**

## 2.2.1 Normal Connections (Nets)

Whenever two modules are interconnected, they form a net. Additional modules can be interconnected with these two modules; all are then part of the same net. This means any radios or other devices associated with the modules in the net are all interconnected and can communicate with each other. A net is the most common type of connection, forming the basis for most of the ACU Controller functionality. A module may be temporarily removed from a net to become part of a Priority Connection. See Section 2.2.3 for details regarding Priority Connections.

**Note: Normal Connections (nets) can also be created by system radio users or external PSTN callers. These connections are requested by entering the appropriate DTMF characters when prompted by the ACU. When these connections are made or broken, the change in system status will be displayed on the screen the same if the changes were commanded by the ACU Controller operator. This external access can be limited by enabling PIN Security or by disabling DTMF detection on a module-by-module basis. Consult the ACU-1000/2000 or ACU-T manual for further information.**

### 2.2.1.1 Forming a New Net

To form a new net, click on two idle module icons in succession (“idle” means not currently connected, from the “idle row” at the top of the screen). When the new net is formed, the pair of icons will slide down into alignment with the first available empty net number, and a green net line will appear behind them.

Due to hardware limitations of the ACU-1000, no more than six different nets can be formed with a single chassis, limited by the 13 available module extensions, and no more than seven can be formed with the master/expansion configuration, due to audio bus limitations. However, other types of connections can still be made after this overall net limit is reached. The ACU-T, because only the HSP and 5 Interface Modules may be installed in the chassis, has a limit of 3 separate nets.

The figure below shows two nets. The first consists of DSP-1 modules 2 & 7, while the second is a three-way net with modules 4, 6 & 9.

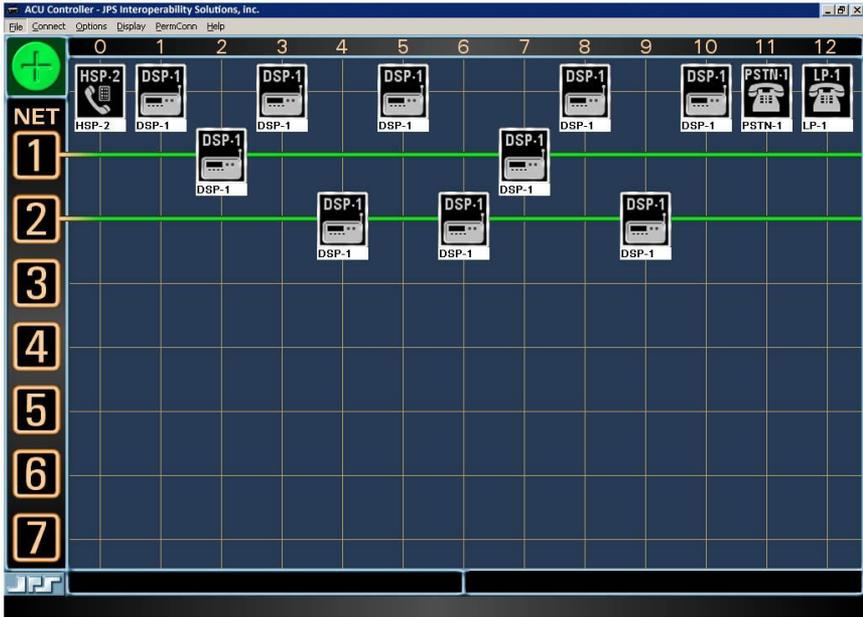


Figure 2-3 Nets Displayed on ACU Controller Screen

### 2.2.1.2 Adding a Module to a Net

To add another module to an existing net, click on the desired idle module, and then click on either the appropriate net number icon or the icon of any module in the net. You can also do the clicks in the opposite order. The added module icon will move into the net.

### 2.2.1.3 Moving a Module from One Net to Another

To move a module from one existing net to another net, click on the module to be moved, and then on the net number of its new net. Note that if this leaves the first net with just a single module, the original net is dissolved.

Do not click on the module to be moved and then on a module in the new net, as this is the procedure to create a Priority Connection.

### **2.2.1.4 Removing a Module from a Net**

To remove a module from its current net, right-click on the module, or left-click on the module while in Disconnect Mode (see Section 2.1.4). The module icon will then return to the “idle row” at the top of the screen, indicating that it is no longer in a net.

You will not be able to disconnect modules in this way if they are in a *Permanent Connection* (see Section 2.2.5); the Permanent Connection status must be removed first.

Modules in Priority Connections require a pair of disconnection commands since the Priority Connection must be broken first.

If removing a module from a net would leave the net with only a single module, then the net is dissolved, and the remaining module also returns to the idle row.

### **2.2.1.5 Disconnecting an Entire Net**

To quickly disconnect all modules in a net either right-click the net number icon, or while in Disconnect Mode, left-click on the icon. The net is dissolved and all modules return to the idle row at the top of the screen. All modules in the net are disconnected from all others, unless they are in Priority Connections, which remain active even when the module is not in a net.

Nets in Vertical Connections cannot be immediately disconnected; they must first be removed from the Vertical Connection. This means two right-clicks will be required to disconnect them instead of a single click. The first click on a net number icon removes the net from the Vertical Connection; the second click dissolves the net.

## **2.2.2 Vertical Connections**

Vertical Connections connect two or more nets together. These are temporary connections, intended to allow communication between nets for a short time. When a Vertical Connection is broken, the original nets are restored.

Vertical Connections are indicated by a thick blue, red, or yellow net line, instead of the thinner green lines that denote a normal net. All nets having the same color thick line are vertically connected to each other; with each module interconnected with every other module.

### 2.2.2.1 Forming a Vertical Connection

To form a Vertical Connection between a pair of nets, click on the net number icons for each of the two nets in succession. When a Vertical Connection is formed, the targeted nets' lines will change from green to blue, red, or yellow. These colors are arbitrary and all are functionally equivalent. All modules in the Vertical Connection (except those involved in Priority Connections) are in communication with each other.

Two existing Vertical Connections can be merged by clicking on any net number icon in one of the Vertical Connections, then any net number icon in another. The two merged nets will take on identical net line colors. In the figure below, nets 2 & 3 have been merged to create a vertical net.

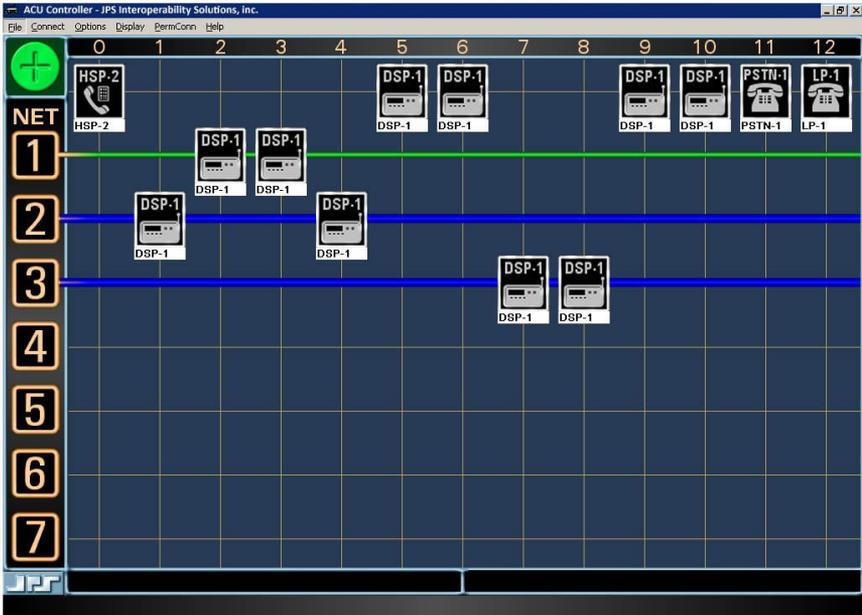


Figure 2-4 Vertical Connections

**Note: No more than three different Vertical Connections can be formed at one time with the ACU-1000, and since the ACU-T is limited to three nets, it can create only one Vertical Connection.**

### **2.2.2.2 Adding a Net to a Vertical Connection**

To add an additional net to an existing Vertical Connection, click on the net number icon, and then click on the net number icon of any net that is in the Vertical Connection. The color of the added net line will change to that of the existing Vertical Connection.

A Vertical Connection can contain up to six nets.

### **2.2.2.3 Removing a Net from a Vertical Connection**

To remove a net from a Vertical Connection, right-click on its net number icon. If a Vertical Connection would then be left with only one net, the Vertical Connection is dissolved completely, but the modules will remain connected in their respective original nets.

## **2.2.3 Priority Connection**

Priority Connections are used to make connections (normally temporary) between individual modules that are not in the same net. For example, commander A of the red team wants to have a quick talk with commander B of the blue team. They do not want anyone in their original nets to be part of this planning session, but they do want to return to the original nets as soon as their conversation is over. Priority Connections are indicated on the screen by a colored numerical icon on the lower left-hand corner of a module icon. See the figure below. The Priority Connections have numbers, from 1 to 7, to differentiate them from each other. (The numbers are arbitrary and functionally equivalent.)

Making or breaking Priority Connections will not interfere with the structure of any existing nets or Vertical Connections.

While modules are part of a Priority Connection, they may communicate only with other members of that Priority Connection. They are not in communication with the other members of their existing standard (or vertical) nets (except for any net members that are part of the same Priority Connection).

When Priority Connections are merged together, (by clicking on a module from one Priority Connection and clicking on another) all affected modules take on the number of the original Priority Connection.

Note that it is not possible to then split the modules apart into the original two Priority Connections.

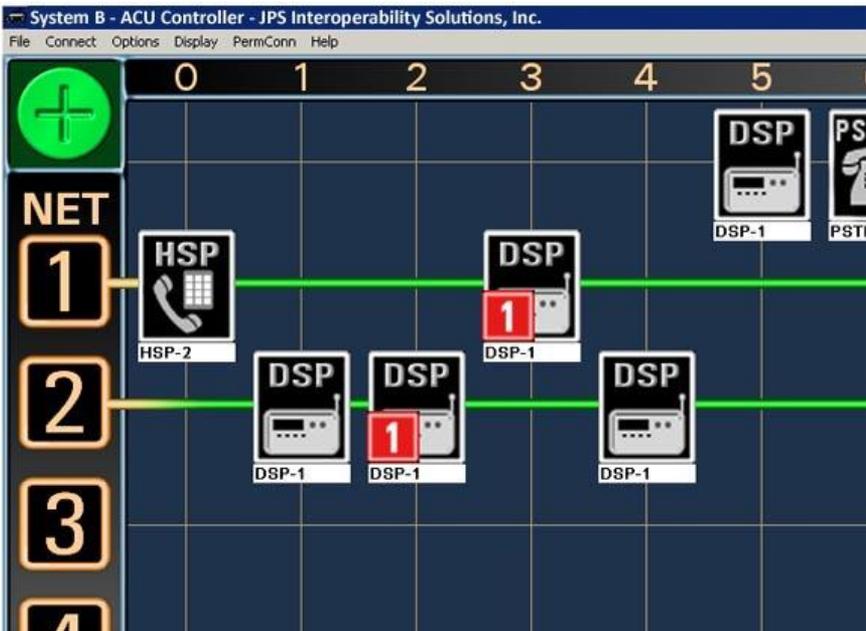


Figure 2-5 Modules 2 & 3 In A Priority Connection

### **2.2.3.1 Forming a New Priority Connection**

To form a new Priority Connection, click on a module icon, and then click on another module icon. Both of the modules must be members of existing nets (if not, a normal net will be formed instead). When a Priority Connection is formed, the targeted module icons will stay in their original locations on the screen, but the small red priority icon will appear in their lower left quadrant. They will receive the lowest Priority Connection number available.

### **2.2.3.2 Adding a Module to an Existing Priority Connection**

To add a module to an existing Priority Connection, click on the icon for the module to be added, and then click on any module icon in the existing Priority Connection. As with most other connection operations, you can make these two clicks in reverse order.

### **2.2.3.3 Removing a Module from a Priority Connection**

To remove a module from a Priority Connection, right-click on the module's icon. If removing a module from a Priority Connection would leave the Priority Connection with only a single module, then the Priority Connection itself will be dissolved.

When a module leaves a Priority Connection, it is automatically reconnected with the members of its current normal net (if a member of one.)

## 2.2.4 Monitor Connections

Monitor Connections are one-way connections. Each Monitor Connection has a *monitoring module*, and one or more *monitored modules*. The monitoring module will receive audio from the monitored modules, but not vice-versa. When a module is monitoring one or more other modules, a white monitor icon (see Figure 2-6 Icon Showing Monitor Mode) appears on its lower right quadrant.



Figure 2-6 Icon Showing Monitor Mode

**Note: The monitoring module hears the Receive Audio (external input into the module) of all modules it is monitoring. It does not hear their Transmit Audio (external output from the module). Furthermore, the Monitor Function will not cause any of the monitored modules to transmit.**

### 2.2.4.1 Monitor Mode

The ACU Controller Monitor Mode facilitates the making and breaking of Monitor Connections. First enter Monitor Mode by clicking on the column heading of the desired monitoring module (at the top of the screen). The Monitor Mode screen will appear as seen in Figure 2-9.

**Note: A different control method for Monitor Mode is available when using the ACU Controller with the ACU-M. See Section 2.3**

The module being configured as the monitoring module will be indicated by a special icon. Until setup is complete, a question mark will be present. Modules not part of the Monitor Connection are depicted by ghost icons. Next click on the modules that are to be monitored; they will switch to normal icons. See Figure 2-9 and Figure 2-10.



Figure 2-7 Monitoring Module Icon During Setup



Figure 2-8 Normal Icon and Ghost Icon

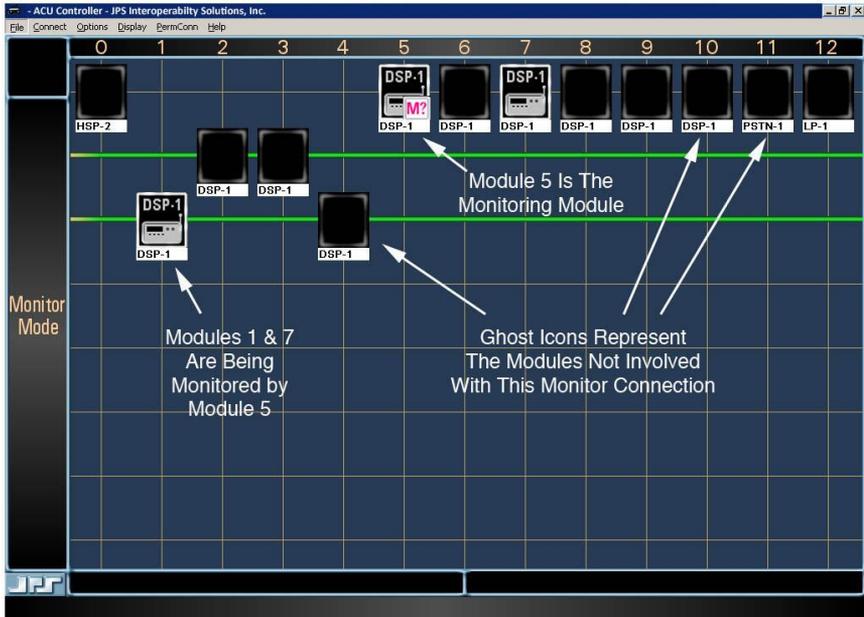


Figure 2-9 Monitor Mode Setup Screen

In the figure above, the operator has first clicked on the number 5 in the column heading area (to configure Module #5 as the module that will monitor other modules), and then on modules 1 and 2 to select them to be monitored. The modules that are not involved in the Monitor Connections are all depicted with ghost icons.

Three modules have normal icons:

- Module 5 is the Monitoring Module.
- Module 1 is being monitored; it's part of a current net.
- Module 7 is also being monitored; it's in the "idle row", not part of any current net.

Click any ghost icon to add that module to the group of modules being monitored; the ghost icon will change to the normal icon. When the selection of modules is complete, click on the monitoring module one more time to leave the special set up mode. The question mark in the monitoring module will be replaced by a headset image over the "M".

The monitor feature is independent of current system connections; modules can be set up to be monitored whether or not they are currently

part of a net. If Module 7 in the figure is later made part of a net, its receive (input) audio will still be monitored by Module 5. If the net consisting of Modules 1 & 4 is broken, Module 1 will still be monitored by Module 5.

While still in the Monitor Mode, a click on a normal module icon will stop monitoring that particular module, and the icon will verify the change by returning to the ghost version. If the right mouse button is currently configured to disconnect, a right mouse-button click will also end monitoring.

Monitor Mode is always specific to the module that was selected by its column heading. While in Monitor Mode, you can select a different monitoring module by clicking on the number of another module in the column heading area.

One common use of the Monitor Mode is for the operator of the ACU Controller to set the ACU so the HSP-2 monitors all modules. The operator, stationed near the ACU, can then listen to all traffic and be prepared to respond quickly to a changing situation and any requests from system users.

### **2.2.4.2 Exiting the Monitor Mode**

There are four equivalent ways to exit Monitor Mode:

- Click the module icon of the monitoring module.
- Click its column heading.
- Press your computer keyboard Esc (escape) key.
- Click in the net area where the word "MONITOR" is displayed.

Monitor Connections do not interfere with any other type of connection.

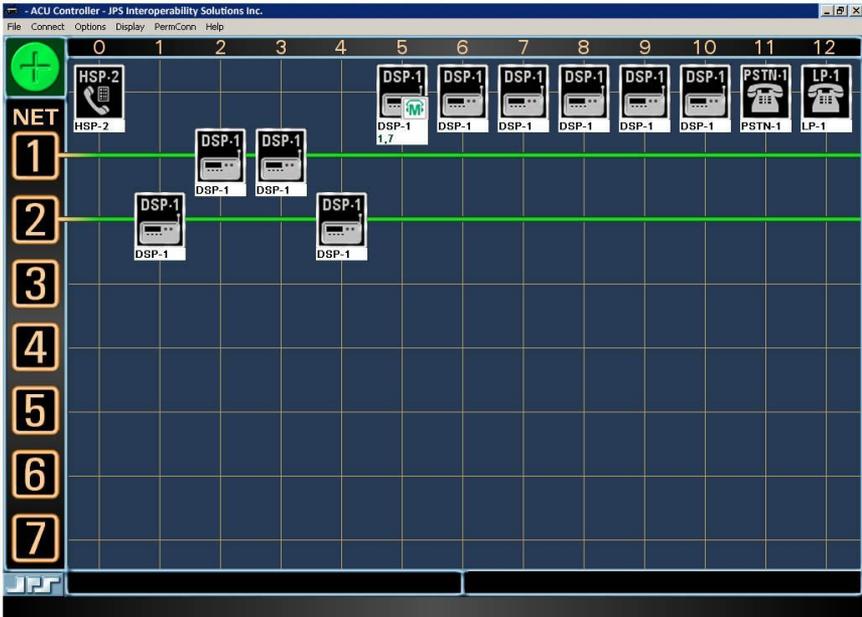


Figure 2-10 Monitor Indication

Figure 2-10 shows the standard ACU Controller screen after the Monitor Setup Mode has been exited. Note that the icon for Module 5 shows that it is a Monitoring Module and also lists the numbers of the modules being monitored.

## 2.2.5 Permanent Connections

Permanent Connections provide extra security to a net. An extra step must be made by the Controller operator to break a net that has been turned into a Permanent Connection. A further level of security can be gained by making the creation and removal of Permanent Connections a password protected feature. (See Section 4). When a module is a Permanent Connection, a special small icon is displayed on top of the module icon, and it cannot be disconnected from any current net by the normal right-click method. See the figure below.

**Note: The Permanent Connection status given to a net applies only to the ACU Controller that sets that status on the net. For example, it does not prevent a user from removing himself from the net via DTMF, nor does it prevent changes to the net by a second Controller if the ACU is being controlled over Ethernet. DTMF control can be disabled on a module-by-module basis. See the ACU manual for details.**

To form a Permanent Connection, pull down the “PermConn” menu and select a net number. All modules in the net not in Priority Connections will then be assigned Permanent Connection status. A net must already be formed before it can be made a Permanent Connection.

To remove the Permanent Connection status from any net, simply repeat the procedure. Selecting the net number from the “PermConn” menu acts as a toggle, first adding, then removing, the Permanent Connection status from the selected net.

Permanent Connections can only be applied to normal nets; Priority Connections cannot be protected in this way. If a net is assigned Permanent Connection status while one of its members is in a Priority Connection, only those modules not in the Priority Connection will receive the PC icon and status.



*Figure 2-11 Permanent Connection Icon*

## **2.2.6 Ethernet Connections via the NXU-2**

The ACU can be interconnected via Ethernet (LAN, WAN, Internet, Wireless LAN etc.) to another ACU, or to a radio or any other four-wire device. If two ACUs each have Ethernet connectivity to a network, then it's possible to cross connect any module in one ACU to any module in the other ACU, allowing interoperability throughout any area within reach of the network.

This Ethernet connectivity is established by wiring a DSP module to a JPS NXU (Network Extension Unit) channel. An NXU channel connects any 4-wire device to an Ethernet interface. Consult the equipment manual or the JPS website ([www.jpsinterop.com](http://www.jpsinterop.com)) for more information about NXU devices, such as the NXU-2. The ACU-M's VoIP channels V1 & V2 can also be connected across a network to an NXU unit.

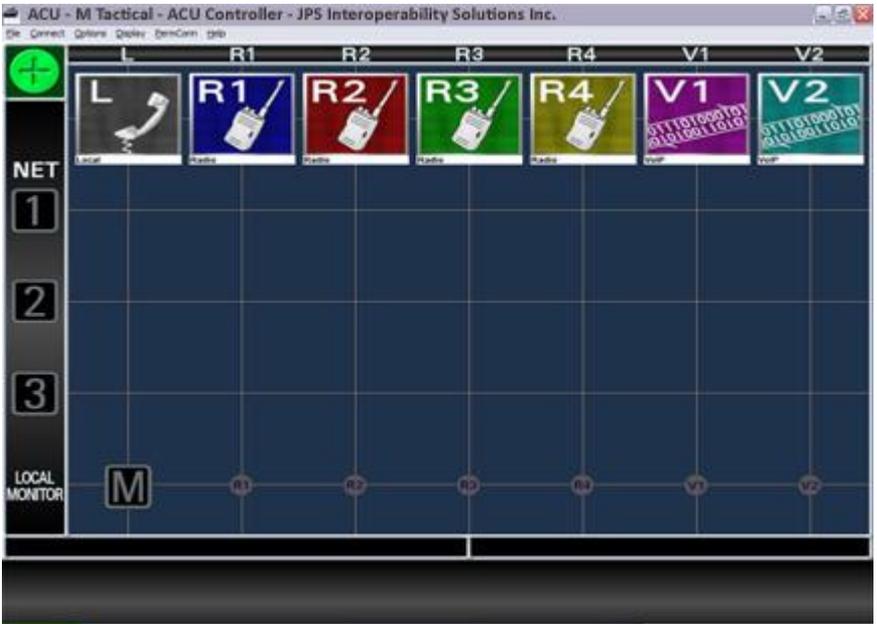
A special module icon is available to clearly indicate any DSP modules that are connected to the Ethernet via an NXU channel. It's provided with the other custom icons on the ACU Controller CD. See Section 3.3 for details regarding custom icons.



*Figure 2-12 NXU Custom Icon*

## 2.3 ACU-M Operation

The ACU Controller (revision 5.0 and higher) has a special display mode that can be used with the ACU-M. To use this mode, select “Allow ACU-M Style Interface” from the “Display” pull-down menu. When the ACU Controller is used with an ACU-M, this is Main Screen:



*Figure 2-13 ACU-M Main Screen*

The screen is optimized for use with the ACU-M. Since the ACU-M always has a Local Operator Port and four Radio Ports, they are always shown. If the Network Option has been enabled, icons for the two VoIP Channels (V1 and V2) will also appear. Since the maximum number of nets that can be constructed is three, only three are shown and the screen size is altered to match. Because the ACU-M allows monitoring of other ports only by the Local Operator Port, this can be simply controlled and illustrated via the Local Monitor line near the bottom of the screen.

Basic operation is the same as the standard ACU-1000/ACU-T display mode except as noted in this section.

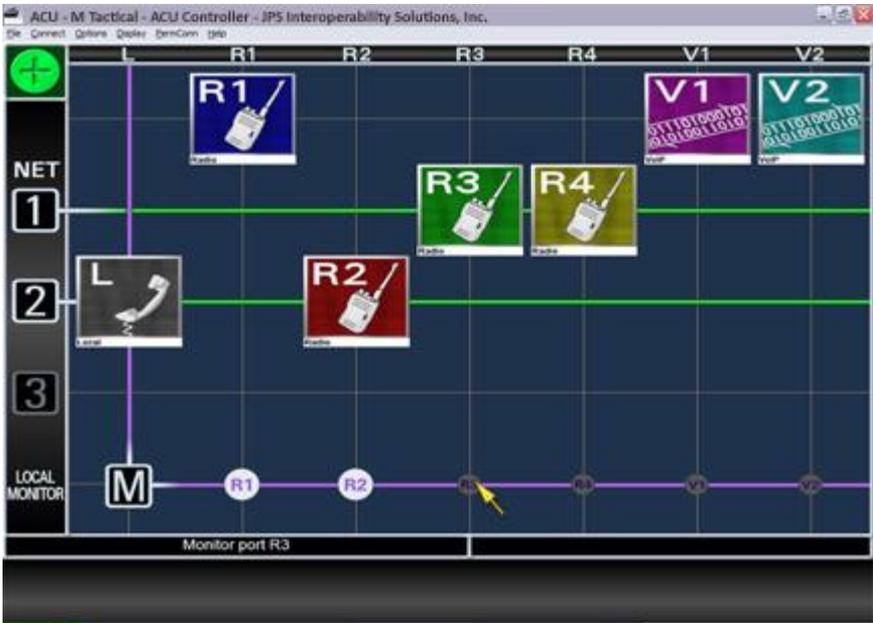


Figure 2-14 ACU-M Monitor Operation

This figure shows a pair of nets; one consists of Radio Ports 3 & 4 and the other of the Local Operator and Radio Port 2. The Local Operator is also currently monitoring Radio Ports 1 & 2. The cursor is currently hovering over the small grey “R3” icon. The Message Area on the lower left of the screen indicates the action that will occur if the left mouse button is clicked while the cursor is in this location (or, for a touch screen, what will happen if this screen area is pressed). The purple lines help indicate that all monitoring is being done by the Local Operator.

Click on any of the small grey Local Monitor Row icons to select a Radio Port (or VoIP channel) to be monitored by the Local Operator (handset, headset, and/or speaker). The icon increases in size and switches to a white background to indicate a port or channel being monitored. Click on one of these larger icons to discontinue monitoring.

As with an ACU-1000 or ACU-T, the right mouse button can be set to edit the settings of a radio port. The settings screens are similar to those used for DSP modules of an ACU-1000 or ACU-T, but tailored to the

settings features and selections available with the ACU-T. See also Section 3.3

## 2.4 PSTN Module Operation

When the PSTN is connected into a net, the PSTN Dial dialog box appears, prompting the ACU Controller operator to enter the desired telephone number. [Note: No PSTN capability with the ACU-M.]

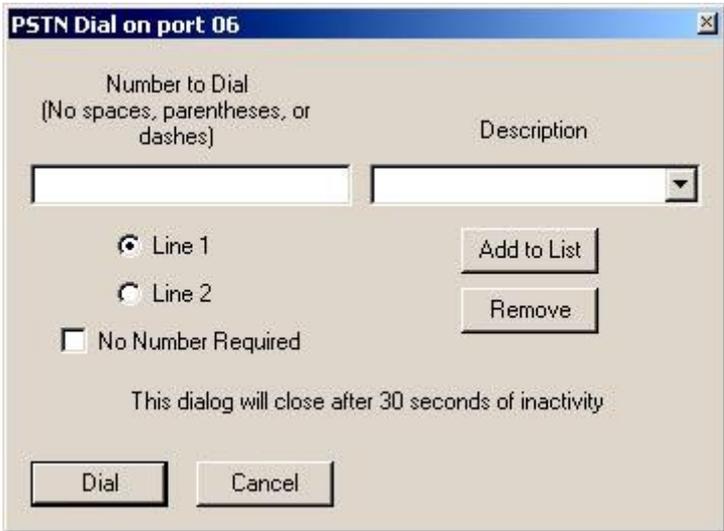


Figure 2-15 PSTN Dial Dialog Box

### 2.4.1 Placing a Telephone Call Using the PSTN

To place a call, type the phone number in the “Number To Dial” field, select Line 1 or Line 2, and click the “Dial” button. Do not include spaces or punctuation in the phone number. A number can be retrieved from the speed dial database; click on the small button at the end of the “Description” field to view and select current speed dial entries.

Line 1 and Line 2 refer to which of the two available PSTN-1 ports is to be connected. Only one of them can be in operation at any time. See the ACU-1000 or ACU-T manual for details.

## 2.4.2 Storing Phone Numbers

After you have typed in a phone number, you can also store it in the speed dial database for later use. Type in the “Description” field the associated description you want saved with the number and click the Add To List button. If you do not supply a description, the phone number itself will be used as a default description.

To recall a stored phone number, select a description from the list. The phone number associated with the description will appear in the “Number To Dial” field.

You can also remove a number from the list by selecting its description, then clicking the “Remove” button.

Phone numbers are stored in the preferences file (see Section 6.4).

## 2.4.3 PSTN Operation with Four-Wire Circuits

When the PSTN-1 is used with a four-wire circuit, there is no number to dial, and usually no need to terminate the net when the connected phone hangs up (goes “On Hook”). Therefore, 4W PSTN connections operate more like other system connections; the net stays in place until the ACU Controller operator removes the PSTN from the net.

The following assumes the PSTN-1 module being connected is set to 4W rather than 2W. See Figure 3-3.

To create a 4W connection, click on the PSTN-1 icon and another icon or net number. The PSTN Dial dialog box will appear. Click on cancel and the dialog box will disappear, and the PSTN net will be formed. If the PSTN-1 is set to 2W and the “Cancel” button pressed, the entire operation is canceled.

If it is desired the 4W connection remain in effect until broken by the ACU Controller operator, the inactivity timer for the PSTN-1 module should be set to zero (off). Otherwise the connection will be broken if no activity is detected from either party for the set timer duration (see Figure 3-3).

## 2.4.4 PSTN Operation with Two-Wire Leased Lines

Some two-wire leased lines and “ringdown” lines do not require you to dial a phone number. To accommodate these lines, select the “No Number Required” option from the PSTN Dial Dialog Box. It may be advisable to turn off the PSTN inactivity timer (set it to zero via the settings screen) if you want the connection to remain in effect until intentionally broken. Otherwise, the system will break the connection if no activity is detected for the set period.

## 2.5 System Operation at Power-Up

When the ACU Controller is booted up, it queries the associated ACU regarding its present module settings as well as the states of any module-to-module connections. The ACU Controller then configures itself to match. The operator has the option of resetting the system to the configuration that existed when the ACU Controller was shut down by requesting “**Restore Last Config**” from the **File** pulldown menu (see Section 1.6). If the ACU is not turned on, or the RS-232 cable not yet connected, the message area in the lower right corner of the screen instructs the user to verify the communications path to the ACU.

### 2.5.1 System Operation When ACU Power is Cycled

The ACU Controller is often installed in a laptop computer and used to control an ACU-1000 housed in a transportable case. It is possible the power to the ACU-1000 will be inadvertently lost. When the ACU-1000 power is restored, it is reset with no module-to module interconnections. Because the laptop can run on the laptop’s batteries, it continues to function throughout the power failure. Instead of reconfiguring to the ACU-1000 reset state, the ACU Controller instead re-establishes the pre-power cycle interconnections. The only exception is any PSTN connections in existence when the ACU-1000 or ACU-T power was cut cannot be restored.

## 2.5.2 System Operation When ACU Controller is Restarted

If the ACU power is maintained while the power to the computer housing the ACU Controller is cycled (or the program is turned off and back on), the ACU retains its connections, and the ACU Controller configures itself to match. However, some special connection features such as Vertical, Priority, or Permanent Connections are controlled entirely by the ACU Controller, so they will not show up on the screen after the program configures itself to match the current state of the ACU. If any of these features are being used, select the **“Restore Last Config”** option from the **File** pulldown menu (see Section 1.6). The screen will be updated to reflect what was current when the ACU Controller was shut down.

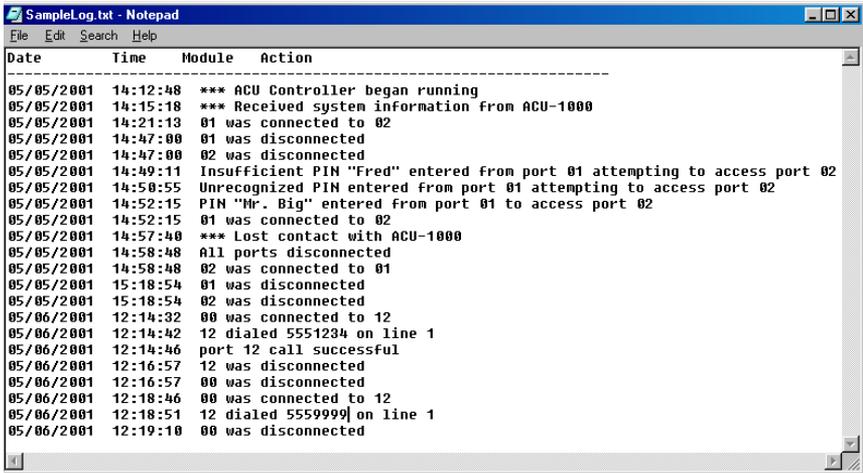


Figure 2-16 Sample Log File

This is a sample log made by a test system in the JPS Systems Engineering lab. In this test system, there are DSP-1 modules installed at extensions 01 & 02, and a PSTN-1 module at extension 12. The log entries begin when the ACU Controller is launched (this log is for an ACU-1000; a similar log for an ACU-T would not include any extensions higher than “05”):

- At 2:12 PM, the ACU Controller begins operation.

- A few minutes later, the ACU Controller has automatically queried the ACU regarding its current status, and the ACU has uploaded its current configuration to the ACU.
- At 2:21, the ACU Controller Operator connects module #1 to module #2. Normally, there is no way to differentiate between an ACU Controller operator-commanded connection and one that was initiated externally by a system user via DTMF commands. However, in this case, module #2 has a security level greater than 0, so any externally initiated connections would require the entry of a valid PIN number; see subsequent connections examples.
- At 2:47, the connection between modules #1 & #2 is dissolved.
- At 2:49, a radio user on the frequency of the radio associated with DSP-1 module #1 attempts to make a connection to module #2. When this user is asked to enter his pin number, he entered the PIN number associated with the USER ID “Fred” on the PIN number database. Unfortunately for Fred, his PIN number does not have a security level high enough to connect to module #2, so access is denied. Note that the USER ID is listed in the log, rather than the associated PIN number. This prevents operator access to the PIN numbers, which may be password protected. See Section 4 for more information about PIN security.
- At 2:50, a radio user on the frequency of the radio associated with DSP-1 module #1 attempts to make a connection to module #2. When this user is asked to enter his pin number, he entered a number that’s not on the PIN database. Again access is denied.
- At 2:52, another attempt is made to connect to module #2 via module #1. This time, the PIN number entered is associated with the USER ID “Mr. Big” from the database. Mr. Big’s PIN number has a high enough security rating, so this time access is granted.
- At 2:57, the ACU power is turned off and back on, simulating a momentary power glitch. The ACU Controller is installed in a battery backed-up laptop computer, so its power is not affected.
- At 2:58, the ACU reports that all of its modules are disconnected (which always occurs after a power outage).
- Again at 2:58, the ACU Controller automatically commands the ACU to re-assume the configuration that was in effect when it lost power: modules #1 & #2 connected together.
- At 3:18, the current connection is broken, either by the ACU Controller operator, or by “Mr. Big” at module #1 or the other

user at module #2. Either of them could enter the DTMF characters “\* #” to break the connection.

- The next day, the ACU operator uses the HSP-2 module to initiate a call to the phone number 555-1234 via line 1 of the PSTN module installed at extension 12. A few seconds later, the system indicates that the call went through as desired.
- The call is terminated at 12:16, either by the operator of the ACU Controller, or by a “\* #” entered by either party of the call.
- At 12 18, another call is initiated via the HSP-2. This call is not successful and the HSP-2 to PSTN-1 connection is automatically dissolved at 12:19 by the ACU Controller.

## **2.6 Multiple ACU Controller Operation**

An ACU that is connected to a network can be under the simultaneous control of a number of operators, each running an ACU Controller program on a computer connected to that same network. Each operator will be able to view the current ACU connections on his screen, and will see the changes made by the other operators.

### **2.6.1 Simultaneous Commands**

If two operators attempt to make changes at the same time, only the command received first by the ACU will be honored. If an operator sends a command while the ACU is busy with commands from a second operator, the first operator’s changes are not made and he receives this message on his lower-right message screen: “Busy, please try again”. This signals the operator that other changes were being made and that he should check to see what those changes are, and if the command that the operator had sent is still appropriate, it should be resubmitted. Note that a requested change will not affect what appears on the screen if the request is denied.

### **2.6.2 Special Considerations - Multiple ACU Controllers**

There are a number of features that function differently when a single ACU is under the control of multiple ACU Controller programs. These differences are all based on the fact that some aspects of these features reside in the ACU Controller and not in the ACU; therefore this information cannot always be shared with the other ACU Controllers. Included in this information are speed dial databases, passwords, special module icons or names, as well as some connection information as explained below.

### **2.6.2.1 Permanent Connections with Multiple ACU Controllers**

When any net is given Permanent Connection status by the ACU Controller, extra steps (which may include the entry of the correct password) must be taken to break the connection at that ACU Controller. This Permanent Connection status has no effect on other ACU Controllers that are in command of the same ACU. The screens of these other ACU Controllers do not even reflect the Permanent Connection status.

### **2.6.2.2 Priority Connections with Multiple ACU Controllers**

When multiple ACU Controllers are connected to a single ACU, and an existing net is converted by one of the ACU Controllers into a Priority Connection, this will be shown on all of the screens.

However, if an additional ACU Controller subsequently connects to the ACU, its screen will not reflect the Priority Connection condition. Instead, it will reflect the actual current connection status; it will show the two priority connection modules connected in their own net, and not connected to any other modules. When the priority connection is then broken, this late-connecting ACU Controller will then show the same connections as the other ACU Controllers.

### **2.6.2.3 Vertical Connections with Multiple ACU Controllers**

When multiple ACU Controllers are connected to a single ACU, and two existing nets are connected together into a Vertical Net by one of the ACU Controllers, this will be shown on all of the screens.

However, if an additional ACU Controller subsequently connects to the ACU, its screen will not reflect the Vertical Connection condition. Instead, it will reflect the actual current connection status as a single net containing all of the modules that comprise the Vertical Net. If the Vertical Net is broken, all ACU Controllers will then show the individual nets.



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## 3 Module Settings

### 3.1 General

The ACU Controller allows you to change the settings of any HSP, DSP, RDI, PSTN, or LP module installed in your ACU-1000/ACU-T, or the radio ports of an ACU-M.

### 3.2 Entering the Module Settings Screen

Each of the ACU-1000/ACU-T modules or ACU-M radio ports has a settings screen (see Figure 3-1 for the DSP Module version). To access the settings screen for any module, click twice on its module icon. If the right mouse button is set to access the settings screen (see Section 1), you may also simply right-click once on a module icon.

### 3.3 Changing Module Settings

Each module setting can be individually controlled via the settings screen; changes will not take effect until either the Apply button or the OK button is clicked. “Apply” changes the setting but retains the setting screen; “OK” must still be clicked to make the change permanent. When OK is clicked, the settings in the ACU change and the new settings are stored in the ACU. If the ACU is then turned off, it will revert to these new settings when power is re-applied. If you click the Cancel button, any changes entered will be aborted.

The *description* and *color* settings are not settings that are stored in the ACU; they are only included to help identify module icons on the ACU Controller screen. The same is true for custom icons; they are stored only in configuration files of the ACU Controller software.

All of the available values for each settings option are available as pull-down menus. The factory default settings are noted, and any setting that is not currently available is grayed out (such as COR Sampling Width when the COR Sampling feature is disabled).

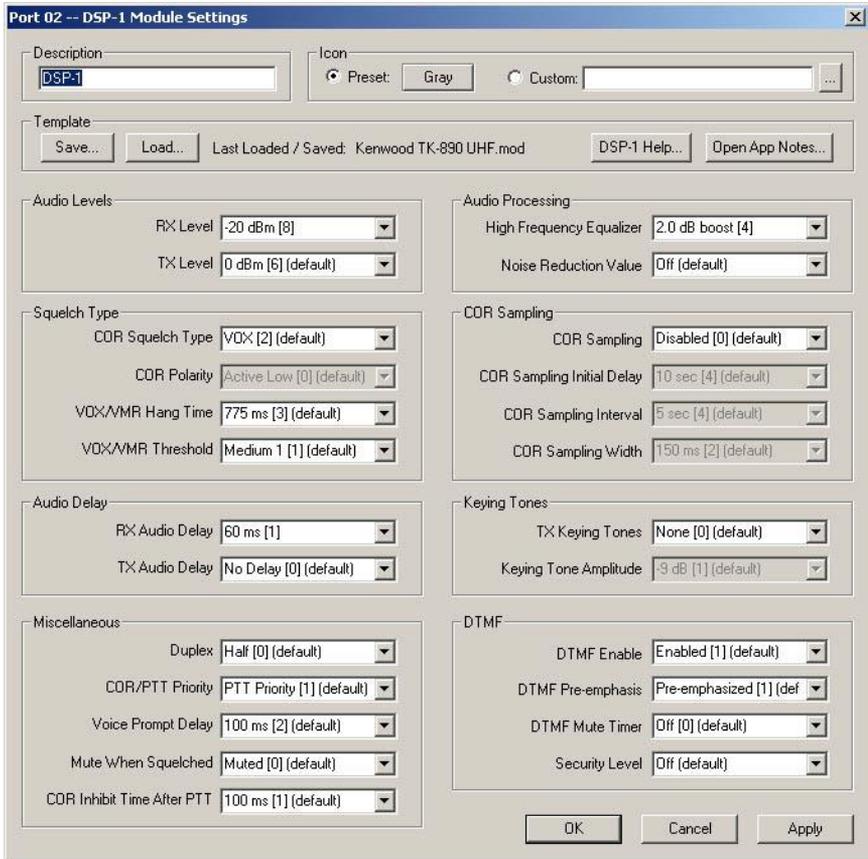
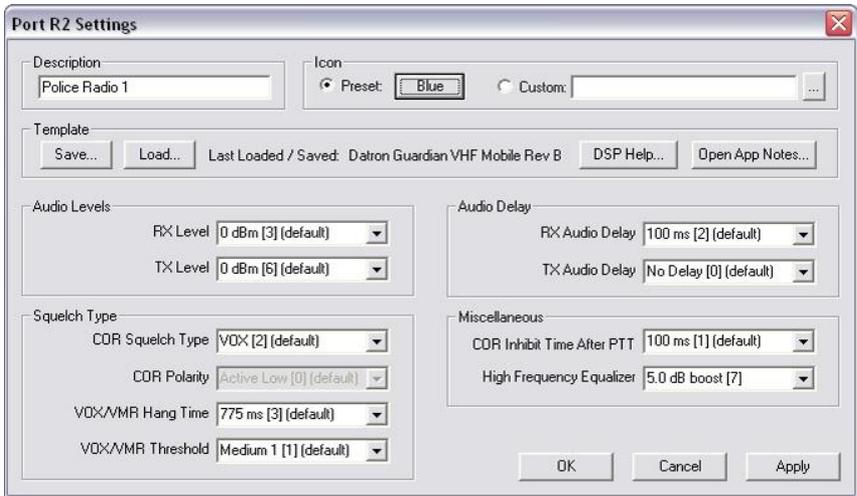


Figure 3-1 DSP Module Settings Screen



*Figure 3-2 ACU-M Radio Port Settings Screen*

The “DSP Help” button brings up a PDF file to guide an installer through a basic radio interface setup. The “Open App Notes” button allows the user to select any of the available Applications Notes for review or printing. Both functions use PDF files.

The settings screen functions are explained in detail in the sections that follow. Again, some settings features available with the ACU-1000 or ACU-T DSP-1/DSP-2 modules do not apply to the ACU-M radio ports.

### 3.3.1 Icon Color Choices

There are seven color choices for each icon: gray, red, orange, yellow, green, cyan, blue, and magenta. Change an icon’s color by clicking on the color button at the top right of any settings screen. As you click, the colors will cycle. The default color for all module icons is gray, so the color button will initially read “Gray.”

### **3.3.2 Apply Text to Icons**

The description field is used to change the text description of any module icon. The default description is the module type; in Figure 3-1, it is "DSP-1". At the bottom of each module icon is a label displaying the description. Most of the time, only as much text as will fit in the label will be displayed. The full description typed into this field will be displayed in message area 1 whenever the cursor passes over the icon. If the "Hover Icon Description" feature is enabled, the full description will also be displayed beneath the icon whenever the cursor hovers over the icon.

### **3.3.3 Installing Custom Icons**

Use the "Custom" field at the top of the settings screen, along with the accompanying buttons, to change a module icon to a custom version. You will be prompted to specify the directory where the icon image files are stored. The program will lead you to the "Icons" subdirectory, where the standard icons and a variety of other icons are stored. You can apply the same custom icon to any number of modules.

#### **3.3.3.1 Custom Icons**

The button at the right of the Custom Icon field can be used to browse all available icons. Any user-made icons can be stored in the same file for retrieval and use. The program will automatically stretch or compress custom icons to fit the required shape factor. The files themselves should be Windows or OS/2 compatible bitmap files, with a .bmp extension. They are not restricted to a certain color depth or resolution.

The bitmap files will be stretched or compressed to fit the following sizes (in pixels):

- 800 x 600 mode: 48 x 53
- 1024 x 768 mode: 61 x 68
- 1280 x 1024 mode: 76 x 90

In 26-module mode (dual-chassis, Master/Expansion mode), the widths will be 24, 31, and 39 respectively. The heights remain as listed above.

Icon bitmap files made at the proper form factor will produce the best results as both stretching and compression of images to a different form factor can affect clarity. If it is possible that the same custom icons will be used with more than one screen size, make the icons appropriate for the largest of the sizes to be used. It's preferable to compress them to yield smaller sizes rather than stretch them to create the larger sizes.

### 3.3.4 Module Settings Storage

All settings for all modules will be saved in a stored *configuration* (see Section 1) and will be restored when that configuration is loaded.

## 3.4 Templates

An ACU-1000 or ACU-T module can be quickly configured using pre-stored template files. A number of DSP Module templates are supplied by JPS covering a variety of frequently-used radios. Alternatively, the user may create and store templates.

### 3.4.1 Templates Supplied by JPS Interoperability Solutions, Inc.

Included with the ACU Controller CD are DSP Module templates that contain optimum radio setup values as determined by the JPS Systems Engineering Department. These settings are optimized when the specified radio is used with the conjunction with the radio configuration parameters and interface cable schematic as defined by the Applications Notes associated with the radio.

### 3.4.2 User-Created Templates

With *templates*, you can save and restore all settings for an individual module. Once a template is saved, you can recall those settings at any time and apply them to any module of the same type. One example for the use of templates is to store optimal DSP-1 settings for various types of radios. Whenever one of these radios is installed in the system, the appropriate template can be quickly loaded to set up the associated DSP-1 module.

**Note: Templates do not affect Module Security Levels.**

### 3.4.3 Saving Templates

To save a template, click the “Save” button in the settings screen. When prompted, type in a short name for the template, which could include the module type and some other brief description, perhaps the name of the type of radio it represents.

Changes made in the settings screen before clicking “OK” or “Apply” will be saved in the template, but the module’s actual setting will not change unless and until either the “OK” button or “Apply” button is clicked.

The description and color settings are not saved in templates and must be set separately for each individual module.

### 3.4.4 Loading Templates

To load a template, click the “Load” button in the settings screen. When prompted, select the template name. You can only load a template of the appropriate module type. Be sure that you want to load the template before selecting it, because as soon as you do, the templates settings will replace the current module settings. If you may want to revert to the pre-existing settings, use the “Save” button to store the current settings before selecting a new template to load.

The JPS-supplied DSP Module templates have the same name as the radio model they apply to, and all have Application Notes. You should view the Application Notes for the radio model before loading its template. To browse the notes, click on “Open App Notes”.

**Note: Any other changes you have made before loading a template will be aborted. Only the settings in the template will be installed.**

**The only exception is the Module’s Security Level setting.**

**Security Levels are not stored in Templates.**

**A Module’s Security Level is not changed when a Template is loaded.**

### **3.4.5 DSP Help**

This button brings up basic instructions for interfacing a radio to the DSP Module. The instructions include flow charts that guide a basic interfacing procedure both when the JPS-supplied radio templates and Application Notes are available and when they are not. The DSP Help document is provided in PDF format.

### **3.4.6 Browsing Application Notes**

The “Open App Note” button allows the user to browse to Application Notes that are currently stored with the ACU Controller. The files are named for the associated radio model. Open any file to view in PDF format.

## **3.5 Special Provisions, PSTN Settings Screen**

The buttons “Hang Up” and “Dial” reside in the lower left corner of the PSTN settings screen (below). These buttons may be used to change telephone connections without breaking an existing cross-connection between a PSTN-1 and another ACU system interface module. For example, the operator may create a PSTN-1 to DSP-1 net. The operator is monitoring the DSP-1 and when requested, terminates the current call using the “Hang-up” button. The operator can then create a new telephone link using the “Dial” button. During this process, it’s not necessary to remove the PSTN-1 from the current net.

In the PSTN settings screen shown, these two pushbutton controls are “grayed-out”, indicating they are currently unusable. They are functional only if there is the PSTN-1 is currently part of a net.

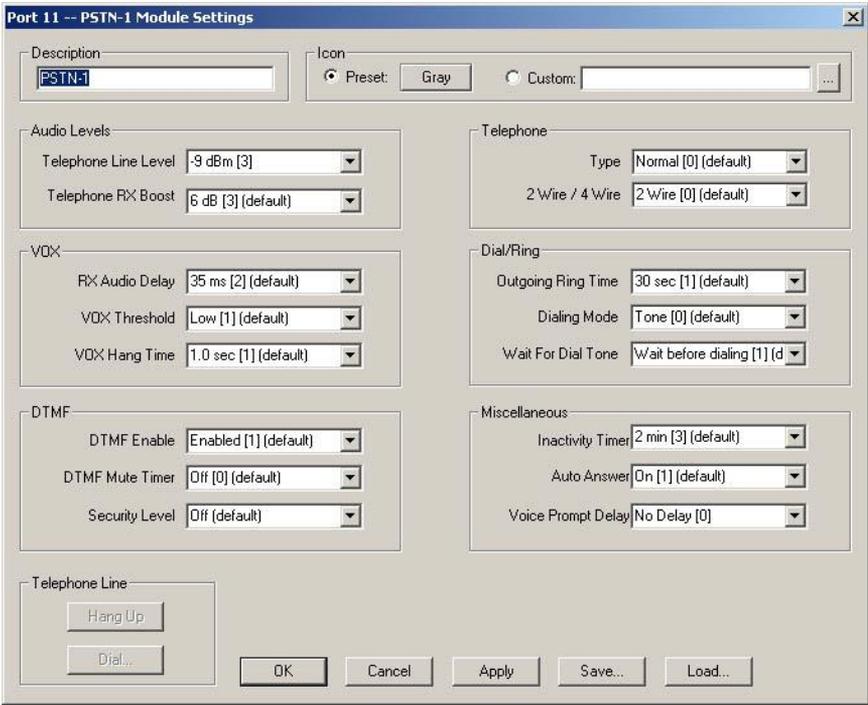


Figure 3-3 PSTN Module Settings Screen



When a connection is attempted via DTMF with any module having a security level higher than zero, a PIN number is requested by the system. The log file (see Section 1.8.3) records when this happens. To maintain the security of the passwords, the associated User ID, rather than the password, is listed in the log.

The Security Settings Dialog Box can itself be password protected (see Section 4.2). When protected, the operator will be prompted for a password before the screen can be viewed or any changes made.

## 4.2 Passwords

Access the password dialog box (shown below) by selecting **Password Protection** from the Options menu. This allows you to apply password protection to:

- Security Settings
- Permanent Connections
- The Module Setup Screens

All are protected by the same password, and once any one of these Password Protection options have been enabled, the password will be required to enter the Password Protection screen in order to change these settings or the password itself.

To add or change the password, it must be typed twice and then the Apply button must be selected. The password protection information is encrypted and stored in the preferences file (see Section 6.4) and is loaded each time the ACU Controller is launched.

## 4.2.1 Lost or Forgotten Password

If you forget the password and need to clear it, you will have to delete or rename the preferences file, called “ACU\_Controller.cfg”, which is located in the ACU Controller’s installation directory. It will be necessary to exit the program to do this. When the program is restarted and it does not detect the preferences file, it will create a new file with all preferences set to factory defaults (see Section 6.4). Uninstalling and reinstalling the Controller program will also remove all password requirements and reset to factory defaults.

**NOTE: This information is not included in the manual accessible via the Help pull-down menu.**

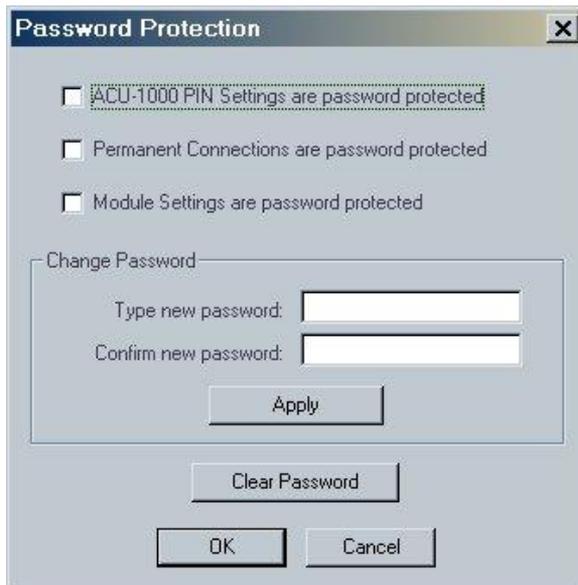


Figure 4-2 Password Protection Dialog Box



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## 5 Using the Keyboard

### 5.1 General

All commands in the ACU Controller can be accessed with the keyboard. It can be used in place of, or in conjunction with, the mouse or touch screen.

### 5.2 Simulating Mouse Input

Making and breaking connections with the keyboard consists of the same operations that would be used with the mouse, except each mouse click has a corresponding keystroke series: The “##” symbol represents a two-digit module or net number in each command.

- Click on module icon (left-click): c##
- Right-click on module icon: d##
- Click on net number icon: n##
- Right-click on net number icon: b##
- Click on column heading (enter/exit Monitor Mode): m##
- Toggle Connect / Disconnect Mode: t

**These commands are case-sensitive; all must be lower-case.**

For example, clicking on one module and then another puts the two in a net, so to connect module 1 with module 2, type c01c02. To add module 3 to net 1, type c03n01. To disconnect module 4, now type d04. To enter Monitor Mode for module 5, type m05.

**Note: The keyboard input is affected by anything that would affect mouse input. If the right mouse button is set to access module settings instead of disconnecting, the command d01 will go to the settings screen instead of disconnection module 1. (Normally, c01c01, two left clicks on module 1, would access settings.) Likewise, if the Connection Indicator is in Disconnect Mode, the command c01 will disconnect module 1.**

## 5.3 Menu Commands

The ACU Controller's pull-down menus can be accessed with the keyboard in the same way as all other Windows programs. To enter the menu, press Alt, followed by the key for the underlined letter in the menu you want to access, then the key for the underlined letter in the desired command. Some commands require an additional key if another sub-menu is present. ***For Windows XP, the underlining does not show up until the Alt key is pressed.***



*Figure 5-1 Options Pull-Down Menu*

For example, Alt O will select the Options menu. Use the keyboard to select any of the various commands. Alt F will turn off voice prompts. Press Alt OF with no delay in between. As in all Windows programs, these commands are not case sensitive; you can use either upper or lower case letters.

## 5.4 Other Commands

The only other keyboard command is Esc (ESCAPE). Pressing Esc will do the following things if appropriate considering the current state of the program & system:

- Deselect any selected module
- Clear keyboard input
- Exit Monitor Mode

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## **6 Advanced Topics**

### **6.1 General**

This section discusses information not covered in the previous sections, including additional options. Understanding this section is not necessary for normal operation of the ACU Controller.

### **6.2 Understanding Serial Communication with the ACU**

In order to maintain a consistent and accurate interface, the ACU Controller cannot act on a command from the user until the ACU has validated it. It would be dangerous for the ACU Controller to assume a command will work, indicate that it has to the operator by performing the operation on the monitor, and then sending the command to the ACU. Therefore, commands are always passed to the ACU and a response is then sent back, which sometimes can be slow, especially if the ACU Control Processor Module is currently otherwise occupied. The user may have to wait for periods of several seconds, or perhaps close to a minute, especially when loading a configuration that has a large number of modules. The speed of communication is entirely limited by the ACU itself and not by the computer running the ACU Controller.

Remember the ACU Controller cannot afford to miss any information from the ACU. This is why the serial cable must be plugged in at all times during operation. If the ACU Controller does miss something, it can become out-of-sync, and you will need to use the Retrieve Current Configuration command.

### **6.3 Customizing Sounds**

The ACU Controller uses a variety of pre-recorded sounds in the form of .wav files. They are all located in the “Sounds” directory right off the installation directory. If desired, these sounds can be changed by renaming the files and adding own new ones, using the original sound file names them regardless of whether they are the original files or ones the user supplied.

If you do change the sounds, be extremely careful not to use .wav files that are too long. Be sure to test (listen to) the new files with another application; supplying invalid .wav files may cause the ACU Controller to crash. The ACU Controller looks for these names and will play

## 6.4 Restoring Default Preferences

The customizable features of the ACU Controller are all stored in the preferences file called “ACU\_Controller.cfg,” located in the ACU Controller’s installation directory. You can delete or rename this file to reset all preferences back to their defaults; this will also clear the password and clear the stored phone numbers. (Exit the program before deleting or renaming this file from outside the program.) At startup, the ACU Controller will automatically create a new file (with default settings) whenever you delete or change the old one; you will then be able to change the preferences.

### 6.4.1 Factory Default Settings

The defaults are:

- Sound: On
- Right mouse button: Disconnects
- COR Reporting: On
- PTT Reporting: On
- Animation speed: Medium
- COM port: COM1
- Password protection: None
- Hover Messages: On
- Auto Connect: Off

## 6.5 Pop-Up Messages

This section lists all of the various cautionary and instructional messages that may appear on the Controller screen, along with an explanation for each.

### 6.5.1 Can't Make Connection: Conferencing Not Enabled

An attempted connection could not be made; because one or more of the modules involved has conferencing turned off and already is connected to a module. This message will only occur in response to a request from the Controller, not from radios or from the HSP-2.

### 6.5.2 Confirmation Doesn't Match Password Entry

The user tried to change the password, but the second entry did not match the first. The password has not been changed.

### **6.5.3 Create Window Error**

This message indicates an error with Windows. The Controller will exit after displaying this message. The user should try again, or reinstall Windows.

### **6.5.4 Connect All: Are You Sure?**

Clicking yes will connect all modules in one net.

### **6.5.5 Disconnect All: Are You Sure?**

Clicking yes will disconnect all modules from their present net.

### **6.5.6 Error Opening New COM Port**

The user selected a new COM port, but the new Port did not work correctly. Possibilities are the requested port either is already in use by another application or does not exist.

### **6.5.7 Failed to Register Window Class**

This message indicates an error with Windows. The Controller will exit after displaying this message. The user should try again, or reinstall Windows.

### **6.5.8 Retrieve Current Configuration from ACU First**

The user tried to Load Configuration, but the Controller is not aware of the ACU's current configuration or not in contact with the ACU.

### **6.5.9 Incorrect Password**

The incorrect password was not entered, please re-enter the password and try again.

### **6.5.10 Load Failed! Saved Configuration not Compatible with Current Configuration**

The user attempted to load a saved configuration that is not compatible with the ACU current compliment of plug-in modules. This can also occur on a Restore Last Configuration command. A saved configuration cannot be loaded if the modules currently installed in the ACU are not the same type and location (plug-in slot) as were installed when the configuration was saved.

### **6.5.11 Load Failed! Wrong File Version**

The user tried to load a saved configuration that was made with an incompatible earlier version of the program that used a different configuration file type.

### **6.5.12 Load File Could Not Be Opened**

The user tried to Load Configuration, but the Controller could not open the file. The file may be in use by another application of the Controller, or some other error occurred. The user should try again.

### **6.5.13 No COM Port is Currently Open**

The user exited the Select COM Port dialog while no COM port was open. Just a warning message, which assumes the user wanted to establish a useable COM port selection.

### **6.5.14 New COM Port Selected**

The user selected a new COM port, and it worked.

### **6.5.15 New Preferences File Created**

The Controller did not detect a preferences file and created a new one with the default settings.

### **6.5.16 No Data to Save**

The user tried to Save Configuration without having any info from the ACU.

### **6.5.17 No Default Text Viewer in Registry. You Will Have to Open the File Manually**

The user tried to view the Log, but the computer has no default text viewer set. User will have to either associate some application with .txt files, or explicitly open the log in some text editor.

### **6.5.18 No More Audio Busses Available**

An attempted connection could not be made, because the ACU is out of free busses. This message will only occur in response to a request from the Controller, not from radios or from the HSP-2.

### **6.5.19 No New Log File Selected**

The user tried to create a New Log, but cancelled or did not supply a name. This will cause logging to stop until a new file is chosen.

### **6.5.20 Password Changed**

The user has successfully changed the password. This is a confirmation dialog box.

### **6.5.21 Password Cleared**

The user has pushed the Clear Password button, and the password has been cleared. When this happens, the Controller will turn off password protection altogether.

### **6.5.22 Reset Configuration: Are You Sure?**

Ensures the operator really does want to reset the ACU Controller configuration to the current ACU configuration.

### **6.5.23 Save File Could Not be Opened**

The user tried to Save Configuration, but the Controller could not create a file. Not enough disk space could be the problem, but this could also be a Windows error. The user should try again.

### **6.5.24 Template File Could Not Be Opened**

The user tried to load or save a template (stored module settings), but the file could not be opened for the same possible reason listed above. The user could try again.

### **6.5.25 Template File is the Wrong Type**

The user tried to load a template into a module of the wrong type. For example, the template was the settings for a DSP module, and the user tried to load it into an RDI.

### **6.5.26 The ACU 1000 Software Is Not Compatible With This Version of the ACU Controller**

The CPM-2 software is too old and does not support some necessary commands. The Controller will exit after displaying this message.

### **6.5.27 The Password Must Be At Least 4 Characters**

The user tried to change the password to something too short. The password has not been changed.

### **6.5.28 The Phone Book Is Full**

The user tried to add another entry into the phone book, but it has reached its capacity.

### **6.5.29 View Log Failed**

The user tried to view the Log, but some sort of file error occurred. As with Load Configuration, the possible explanations are: the file is in use or Windows error occurred. The user should try again.

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