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User's Guide

CN8-SW



OMEGA #M3350/0101

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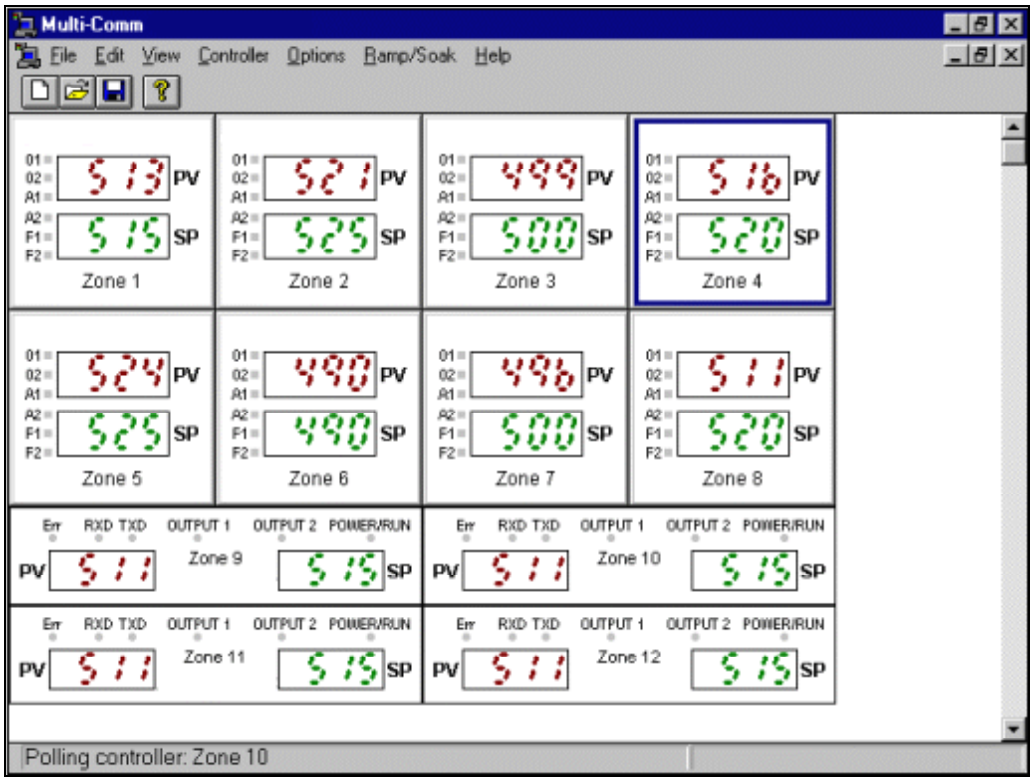
1. Introduction

1.1 Features

1.1.1 Transforms a PC into an Operator Station

The CN8-SW software makes it easy for operators to use a personal computer to monitor networked Omega controllers. Linked to the controllers by an RS-485 network, the PC can be used to read process values, change setpoints and other parameters, change controller mode, and monitor for alarms.[1] CN8-SW is also ideal for quickly configuring a single controller in a lab or service department, using an RS-232 link.

The CN8-SW application can communicate with any Omega controller that supports the Omega Plus Protocol or the original Omega Protocol. All the configuration parameter values stored in non-volatile memory in a controller that supports Omega Plus Protocol can be saved to the PC for backup, and loaded to the same or different controllers.



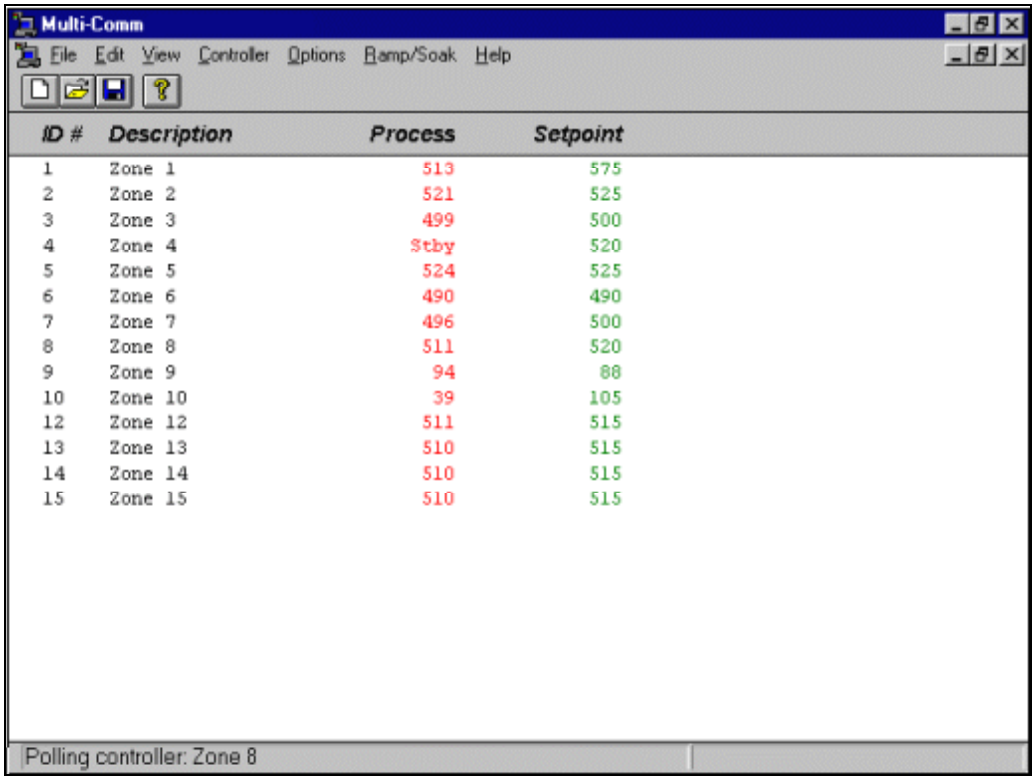
[1] Up to 32 controllers can be included on an RS-485 network without using a network repeater device. The CN8-SW software can address up to 254 controllers.

1.1.2 Graphical Interface

The CN8-SW software uses a graphical user interface and familiar point-and-click techniques. The main CN8-SW display shows PV and SP of every controller. The CN8-SW system can be set up to show all controllers on the network on a single display, or only selected controllers. Any message that can be displayed on a controller's front panel will also be shown on the CN8-SW display. Operators can see at a glance if a controller is in standby or other special mode, and if the controller detects a problem such as an open sensor.

Double-clicking (left button) on any controller in the main display will call up a display of all the parameters in Omega Plus Protocol-compliant controllers, and the most important parameters in controllers that support the original Omega Protocol. A right-click on a controller displays the form used to change its setpoint. A left-click on a controller selects the controller for functions on the Controller menu. Many additional functions are accessible using the other CN8-SW menus.

A "text only" view is available for operators who prefer to see the controller setpoints and process variables in list form. A left-click on a controller in the list selects the controller for functions on the Controller menu.



1.1.3 Automated Ramp and Soak Cycles

Use the CN8-SW Ramp and Soak function to configure any number of recipes consisting of any number of ramp and soak steps. These recipes are stored on the CN8-SW computer. Under the direction of CN8-SW, any controller on the network can execute your choice of recipe, even models that do not support configuration and execution of ramp and soak cycles using the controller front panel.

The CN8-SW displays also provide a quick way to configure and run recipes that use the controller's own recipe parameters.

1.1.4 Logging

The CN8-SW application supports optional logging of SP and PV for all controllers at configurable intervals. Logs are saved in ASCII text files with comma-separated-value format. These files can be viewed, printed, and manipulated with other applications, such as word processing and spreadsheet software.

1.1.5 Storing and Loading Configuration Parameter Sets

All the configuration parameter values stored in non-volatile memory in a controller that supports Omega Plus Protocol can be saved to the PC and loaded to the same or different controllers. Backing up a unique controller configuration on a PC is always prudent. If a controller is damaged later and must be replaced, its custom configuration can be loaded quickly to a spare controller, minimizing down time.

In large installations where many controllers use the same (or almost the same) configuration, its easy to configure one controller using the CN8-SW display, save the parameter set to the PC, then load the same parameter set to many other controllers on the network. The time saved by eliminating the need to configure each controller at its front panel more than pays for the CN8-SW package.

The ability to store and load a controller configuration also enables you to reuse tuning parameter values that have proved to be best for certain process conditions. If the responsiveness of your process is altered at times, you may find it desirable to save sets of tuning parameters to be used under different circumstances.

For example, if you autotune the controller for optimum control of the temperature of an engraving cylinder while one size is in use, save the parameter set before installing a larger or smaller cylinder. The different size cylinder may heat at a different rate, requiring different tuning parameters to be used for optimum control. Save the new tuning as a parameter set with a different name. When the day comes that you have to reinstall the first cylinder, reload the parameter set, including the tuning parameters that were optimized for that cylinder.

1.1.6 Local Alarms

If a controller that supports the Omega Plus Protocol is in alarm, the A1 or A2 indicator on the controller's "front panel" on the main display will appear to be lit (red), matching the behavior of the A1 and A2 indicators on the controller faceplate. The process value on the CN8-SW graphic display will also change color from magenta (normal) to red (alarm).

As a bonus, the CN8-SW supports "local alarms". These two process alarms can be configured in CN8-SW for each controller on the network, including controllers that do not provide an alarm function of their own, and controllers that support the original Omega Protocol.[2] If a controller's PV exceeds (high alarm) or falls below (low alarm) the configured local alarm limit, the alarm indicators on the main graphic display will "light" and the PV will change to red.

1.2 Hardware and Software Requirements

1.2.1 CN8-SW Computer

The computer used to run the CN8-SW software must meet the following requirements:

- 486SX or better processor
- 1 MB of disk space for CN8-SW software (plus additional space for log files)
- Windows 95 or Windows 98
- Available COM (serial) port or RS-485 port. Communication between the PC and an RS-485 network can be accomplished using a COM port and an RS-232-to-RS-485 converter. Communication with a single controller using a COM port for an RS-232 link does not require a converter, but does require an adapter.

1.2.2 Controllers

Any controller that uses the Omega Plus Protocol, and has an appropriate communication option card can communicate with the CN8-SW computer.

- One-to-one communication with the CN8-SW computer requires an RS-232 or RS-485 card.
- To be part of a multi-drop network, the controller must have an RS-485 option card installed.

[2] At the time of publication, the following controllers support the Omega Plus Protocol: Series CN8500 (1/16 DIN, 1/8 DIN and _ DIN). If you have a question about the protocol supported by a new model, please call your Omega sales / service representative at: 1-800-826-6342 in the U.S.A. and Canada and (95) 800-TC-OMEGA℠ in Mexico and Latin America.

1.3 Overview of Setup Tasks

The following tasks must be performed in this sequence to use the CN8-SW application successfully with an RS-485 network. The same basic process applies to using the CN8-SW application to communicate with a single controller over an RS-232 link. In the case of RS-232 links, the "network" consists of only the controller and the PC.

Step	Task	Section in this Manual
1	Connect the controllers to the network.	2 *and controller manuals*
2	Connect the personal computer to the network.	2
3	Install the CN8-SW software and log in.	3
4	Change the password on the default account "MULTI" *(not required, but strongly recommended).*	3
5	Set up operator accounts and assign passwords.	3
6	If any of the Omega Plus controllers' communication parameters have been changed from the factory defaults, use the front panel of each controller to set each controller's configuration parameters to the defaults.	4 *and controller manuals*
7	For controllers that support the original Omega Protocol, use each instrument's front panel to set the controller to use 8 data bits, no parity, 1 stop bit. Configure each controller to match the baud rate you plan to use for the network. If you plan to use the automatic "find controllers" option described in Step 11, set the Omega Protocol controllers to 9600 baud.	4 *and controller manuals*
8	Use the front panel of all controllers (Omega Protocol and Omega Plus Protocol) to assign a unique address (between 1 and 254) to each controller.	4 *and controller manuals*
9	Configure the CN8-SW communication parameters and port selection. (The CN8-SW communication settings will override, but not change, the operating system settings for the selected port on your PC.)	4
10	Use the CN8-SW software to recognize each controller on the network automatically. In the process, the CN8-SW software will set the baud rate in all Omega Plus controllers to 9600. (By default, not all Omega controllers are set to the same baud rate.)[3]	4
11	Name the controllers *(optional, but recommended).* By default, each controller's name will be its network address.	4
12	Save the .MCS (CN8-SW system) file so that the process of recognizing the controllers does not have to be repeated if CN8-SW is restarted.	4
13	Set up local alarms *(optional)*.	5
At this point you are ready to configure new controllers, or to begin monitoring process variables with the CN8-SW computer.		
To change setpoints, see Section 6.		
To change controller mode, including use of Autotune, see Section 7.		

[3] You had to use the controller front panel in Step 8 to set the baud rate of controllers that support the original Omega Protocol, because that protocol supports reading the baud rate, but not changing it.

Step	Task	Section in this Manual
To view and change controller configuration parameters, see Section 8.		
To configure and run ramp/soak recipes, see Section 9.		
To save and load controller configuration parameter sets, see Section 10.		
To log PV and SP values, see Section 11.		

1.4 Overview of CN8-SW Menus

1.4.1 Availability of Functions

The following tables provide an overview of the functions available on the CN8-SW menus. Not all functions are available all the time. If a function is not available, its name is displayed on the CN8-SW window in gray instead of black. If a keyboard shortcut is available for a function, the shortcut appears on the menu to the right of the function name.

File Menu		
Function	**Purpose**	**Section**
New	Start a new CN8-SW Setup (.MCS) file[4]. This function can also be invoked using the  button on the toolbar.[5]	4.10
Open	Open an existing CN8-SW Setup (.MCS) file. This function can also be invoked using the  button on the toolbar.	4.11
Close	Close the CN8-SW Setup (.MCS) file open now.	4.9
Save	Save the Mutli-Comm Setup (.MCS) file open now using the same file name. This function can also be invoked using the  button on the toolbar.	4.8
Save As	Save the Mutli-Comm Setup (.MCS) file open now to a file with a different name.	4.8
Login	Log into the CN8-SW application.	3.3
Logout	Log out of the CN8-SW application without closing the application.	3.8
Recent File	Once you have saved your CN8-SW setup to an .MCS file, this placeholder will be replaced by the name of the most recently used .MCS file. Up to four additional file names will appear on this menu.	--
Exit	Exit the CN8-SW application. If you have not saved the current setup to an .MCS file, you will be prompted to save before the application is closed.	3.8

[4]The contents of the .MCS file determine what controllers appear on the main display. The ability to create, save, and open a variety of .MCS files enables you to create displays that do not include all the controllers on the network hosted by the PC. For example, if Operator A is only interested in Controllers 1, 2, and 9, you can create an .MCS file that would cause the CN8-SW display to show only those controllers when Operator A uses that file. Operator B could use a different .MCS file to see a different custom display, one containing only Controllers 3, 4, 6, and 9, for example.

[5] If the CN8-SW toolbar is not visible, use the View menu's Toolbar item to display the toolbar.

Edit Menu

Function	Purpose	Section
Operator	Allows "Super Users" (CN8-SW Administrators) to set up operator login accounts and specify what CN8-SW features each operator will be allowed to use.	3.5 and 3.6
Password	Enables operators to change their own passwords.	3.4

View Menu

Function	Purpose	Section
Graphic	Display images of controller front panels on main CN8-SW display.	--
Text	Display a list of controllers, their setpoints, and process variables on the main CN8-SW display.	--
Toolbar	Turn on and turn off display of CN8-SW toolbar.	--
Status Bar	Turn on and turn off display of CN8-SW status bar at the bottom of the window. The right side of this status bar shows what address number is being checked when the Option menu "Start Find Controllers" function is used. During normal operation the left side of the status bar displays the name of the controller that the CN8-SW software is polling.	--

Controller Menu

Before you can use a function marked with an asterisk (*) below, you must select a controller on the main graphic display (or text view) by using the left button to click on the controller's image (or name in text view).

Function	Purpose	Section
Add *	Establish communication with a single controller. To use this function you must know the controller's network address.	4.4.3
Delete *	Sever communication with a single controller. Once this function has been used and the .MCS file saved, the CN8-SW computer will not be able to communicate with the controller until you use the Add function on this menu, or the Start Find Controllers function on the Options menu.	4.5
Delete All	Sever communication with all controllers. Once this function has been used and the .MCS file saved, the CN8-SW computer will not be able to communicate with the controllers until you use the Add function on this menu, or the Start Find Controllers function on the Options menu.	4.5
Select All	*Reserved for future use.*	--
Unselect All	*Reserved for future use.*	--
Configure *	Access the window used to change the name or network address of a controller with which the CN8-SW computer can communicate.	4.7

Controller Menu

Before you can use a function marked with an asterisk (*) below, you must select a controller on the main graphic display (or text view) by using the left button to click on the controller's image (or name in text view).

Function	Purpose	Section
Alarms*	Configure the local alarms.	5.5
Graph*	Display a graph showing the controller's SP and PV in real-time.	6.3
Setpoint*	Access the window used to change the controller's setpoint.	6.4
Parameters*	Access the window used to view and change the controller's configuration parameters. A shortcut for accessing the parameter display is double-clicking (left button) on the controller on main graphic display.	8.2
Standby*	Place the controller in Standby mode. The PV for the controller in Standby will alternate with the display of "StbY". This item will be checked on the menu when accessed after selecting a controller in Standby mode.	7.7
Manual Control*	Place the controller in Manual mode. The PV for the controller in Manual will alternate with the display of "FOP". This item will be checked on the menu when accessed after selecting a controller in Manual mode.	7.2
Tune*	Place the controller in Autotune mode. The PV for the controller in Autotune will alternate with the display of "Atun". This item will be checked on the menu when accessed after selecting a controller in Autotune mode. Before putting a controller in Standby mode, be sure to read the manual supplied with the controller. Autotune will not work correctly unless you prepare the process and the controller as described in the controller manual.	7.2
Start Recipe*	The functionality of this item depends on the features the controller supports and how the controller is configured (for multi-step ramp, single-step ramp, or ramping disabled). *If the controller supports a multi-step ramp and soak recipe based on parameter values stored in the controller and the feature is enabled,* **Start Recipe** is used to start running that multi-step ramp and soak recipe. *If the controller supports use of the single-step ramp to setpoint function at times other than at startup and the feature is enabled,* **Start Recipe** item is used to ramp the current process variable to the current setpoint over the time period specified using the appropriate parameter. *If the controller supports use of the single-step ramp to setpoint function at times other than at startup and the feature is disabled,* **Start Recipe** can also be used to ramp the current process variable to the current setpoint. However, if ramping is set to "disabled", then a confirmation message is displayed before the PV is ramped using the default ramp time, one minute.	6.5

Options Menu		
Function	**Purpose**	**Section**
Communications	Access the window used to specify PC port and communication parameters to be used by the CN8-SW software. These parameters will override (but not change) the communication settings in your operating system for the selected port.	4.4
Logging [Stop Logging]	Access the window used to specify the time interval at which PV and SP for all controllers should be written to a log file, name the file, and turn on logging. When logging is active, this menu item becomes Stop Logging.	11
Start Find Controllers [Stop Find Controllers]	Start the process used by the CN8-SW software to poll each possible address on the network to see if there is a controller at that address. When this process is active, this menu item becomes Stop Find Controllers. The alternative to using this automatic process to enable the CN8-SW computer to recognize controllers is to recognize controllers one at a time using the Controller menu Add function.	4.4.2

Ramp/Soak Menu		
Function	**Purpose**	**Section**
New	Access the window used to begin the process of configuring a new ramp and soak recipe to be executed under the direction of CN8-SW.	9.2.1
Edit	Access the window used to select an existing recipe (on any accessible drive) for edit.	9.2.2
Run	Access the window used to select an existing recipe to run on one or more controllers.	9.3.1
Hold	Access the window used to hold (pause) execution of an active (running) recipe on one or more controllers. While a controller is in hold, its setpoint will not be changed.	9.3.2
Resume	Access the window used to resume (continue) execution of a "held" recipe in one or more controllers.	9.3.3
Stop	Access the window used to stop (terminate) the execution of an active or "held" recipe in one or more controllers.	9.3.3

Help Menu		
Function	**Purpose**	**Section**
About CN8-SW	Access CN8-SW version information. If you phone for technical support, be ready to supply this number.	--

1.4.2 Menu Convention Used in This Manual

The instructions in this manual use the following format to tell you to use a particular item from a menu: **<menu name> | <function>**. For example, to tell you to access the Alarms function on the Controller menu, the instructions will say "Select **Controller | Alarms**".

1.5 General Instructions for Using CN8-SW Windows

When the instructions refer to "CN8-SW main window", this is a reference to the graphic display showing images of controller front panels.

To select an item on display, move the cursor over the item and use the left button to click (or double-click when directed) on a display item to select it, unless the instructions in this manual specifically tell you to use the right button on your mouse.

To select an item from a dropdown list, click on the  button next to a text entry box. A list of choices will be displayed. Select an item from the list by placing the cursor on top of the item, then clicking the left mouse button.

To enter text or a numeric value, place the cursor somewhere in the text entry box and click to "gain focus" on the box, then type in your text or value. If you make a mistake, use the **Delete** key to remove characters to the right of the cursor or the **Backspace** key to remove items to the left of the cursor.

To move the cursor from one text entry box to another in the same window, use the **Tab** key.

2. Wiring the Network and Connecting the Computer

2.1 Introduction

For communication to be established between the personal computer running the CN8-SW software and an Omega controller that supports Omega Plus Protocol (or the original Omega Protocol), the computer and the controller must be connected to the same network. (See 1.2 for hardware and software requirements for the personal computer.)

Communication between a single controller and the CN8-SW computer can be established using an RS-232 interface. This requires:

- an RS-232 option card in the controller
- an available serial (COM) port on the PC
- an adapter to make the correct pin connections for the transmit, receive, and signal ground at the PC serial port's D-connector.

Communication between the CN8-SW computer and multiple controllers can be established using an RS-485 interface.[6] This requires:

- an RS-485 option card in the controller
- an available RS-485 port on the PC, or an available serial (COM) port and an RS-232-to-RS-485 adapter (p/n 223A001U01)

ATTENTION: All wiring should be done by an experienced technician and be installed in accordance with national and local electrical codes. To avoid serious personal injury and damage to equipment, follow all warnings and cautions provided in the controller manuals.

[6] Up to 32 controllers can be included on an RS-485 network without using a network repeater device. The CN8-SW software can address up to 254 controllers.

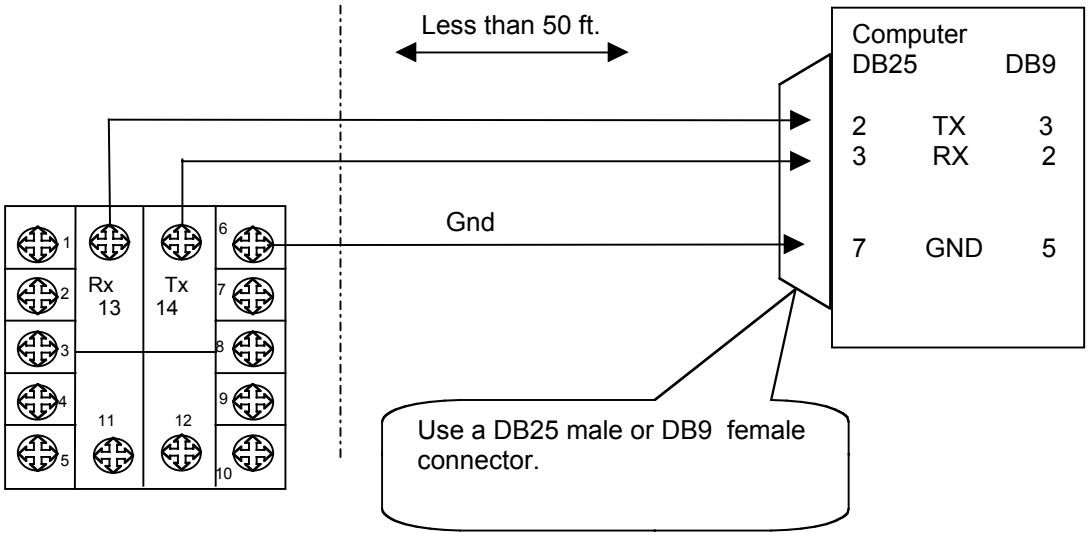
2.2 Connecting Controllers and the Computer to the Network

2.2.1 Introduction

The manual supplied with each controller identifies the terminals to be used for RS-232 or RS-485 communications. Consult those manuals before attempting to connect the controllers to the network.

2.2.2 RS-232 Interface

Follow the instructions in the controller manual for making an RS-232 connection to the instrument. Refer to the diagram below to see how an adapter should route signals to and from the computer's serial port.

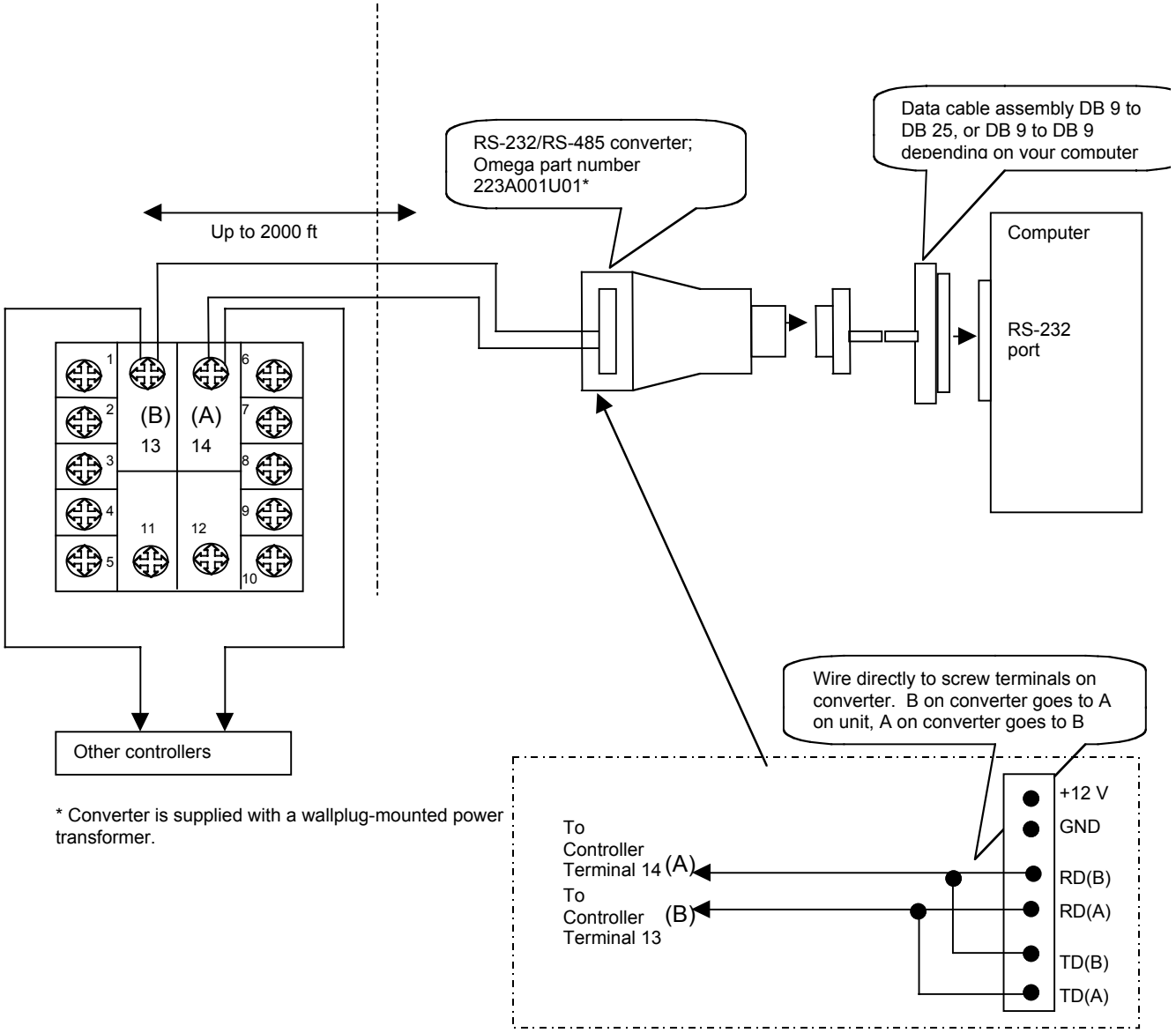


RS-232 Communication:
One-to-one connection between the controller and an RS-232 port

2.2.3 RS-485 Network

If your computer is equipped with an RS-485 interface, connect to the controller network in accordance with the instructions provided with that option card.

If you plan to use a serial (COM) port to connect to your network, install an RS-232-to-RS-485 converter on the port (see diagram below). A suitable converter is available from Omega.



RS-485 Communication:
One-to-many connection between an RS-232 port (with converter) and multiple controllers; if the computer has an RS-485 port, no converter is needed

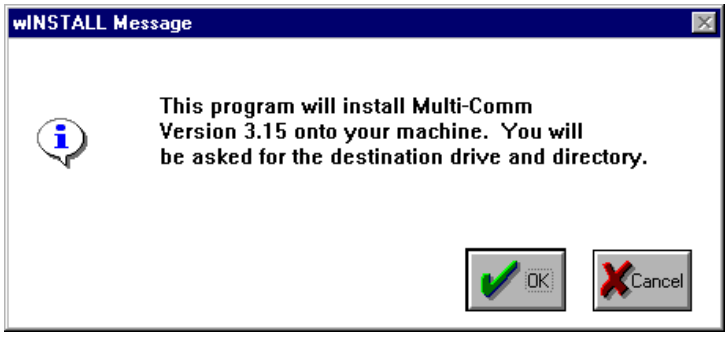
3. Installing the Software and Logging In

3.1 Installing the Software

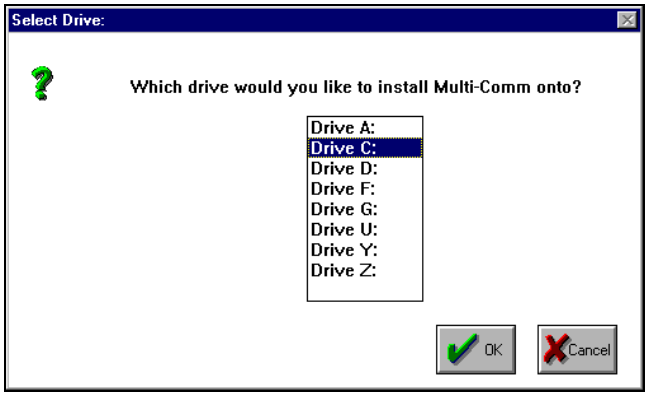
The CN8-SW software is supplied on a 3.5 inch diskette. Before installing the software, please read the licensing agreement. Installing the software indicates that you accept the terms of the agreement. Note that registered users are permitted to make one backup copy from the master diskette for their own use.

To install the software:

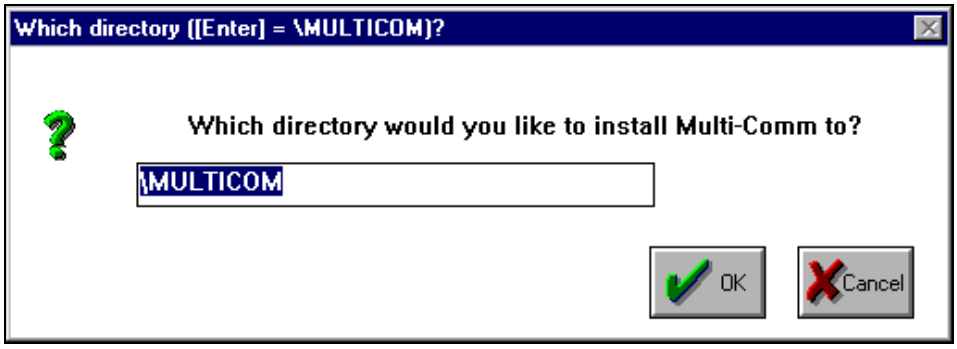
1. *Optional, but recommended:* Close any other applications that are running.
2. Put the CN8-SW diskette in the drive.
3. Select **Start | Run**. The Run window will open.
4. Type in the letter of your 3.5 inch drive, followed by **:\Winstall**. (For example, if your floppy drive is A, then type **A:\Winstall**.) The first installation window will be displayed.



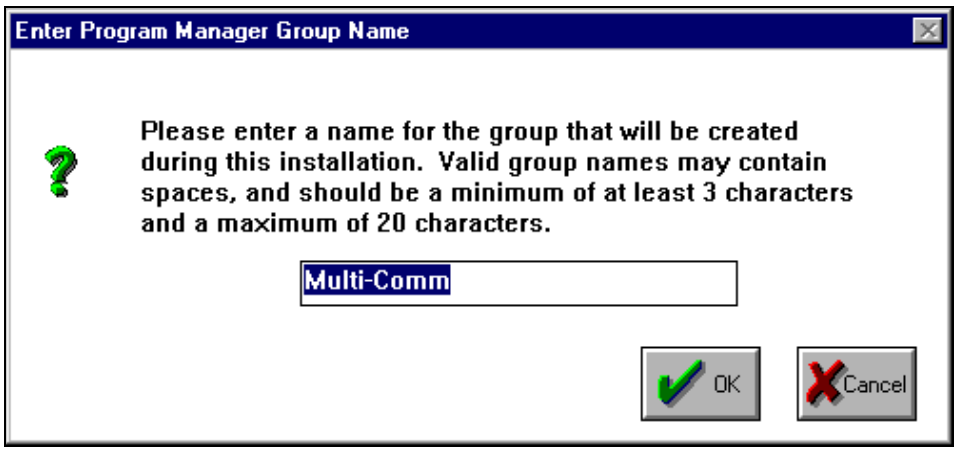
5. Click on **OK** to proceed. The next installation window will open.



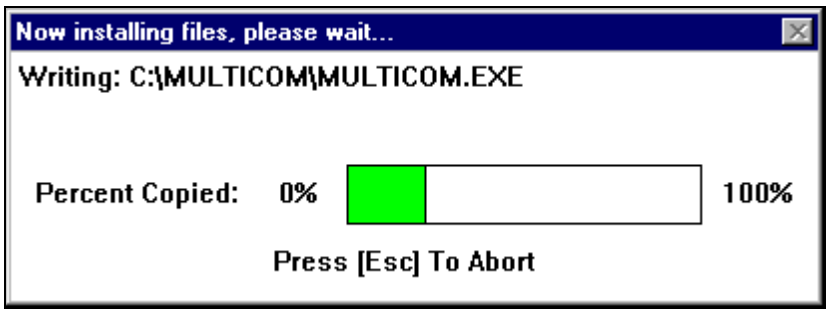
6. Select the drive where the software will be installed. Click on **OK**. The next installation window will open.



7. This window is used to specify the name of the directory in which the CN8-SW software will be installed. To accept the default name "MULTICOM" click on **OK.** To use a different name, type it in the box provided, then click on **OK**. Once you click on **OK**, the next installation window will open.

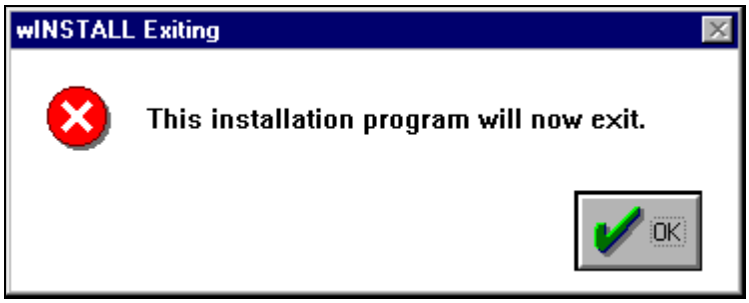


8. This window is used to specify the name of the software category that will be created on your operating system's Program menu. To accept the default name "CN8-SW", click on **OK.** To use a different name, type it in the box provided, then click on **OK**. Once you click on **OK**, the next installation window will open.



9. This window is a status window. You do not have to do anything more to install the software. If you want to stop the installation process, use the **ESC** key.

   When the installation process has been completed successfully, the following window will be displayed.



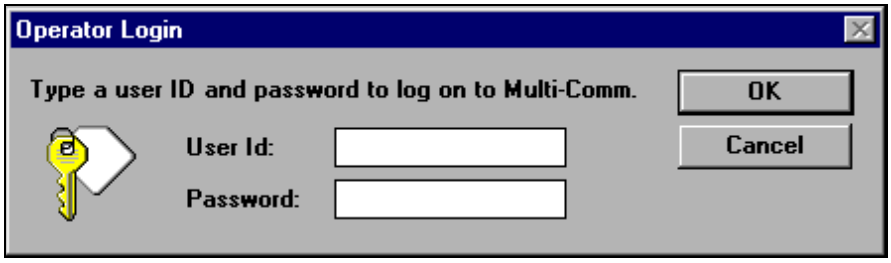
10. To close the window and exit the installation program, click on **OK**.

3.2 Starting the Software

Start the software as you would any other installed application.

3.3 Logging In to CN8-SW Using the Default Account

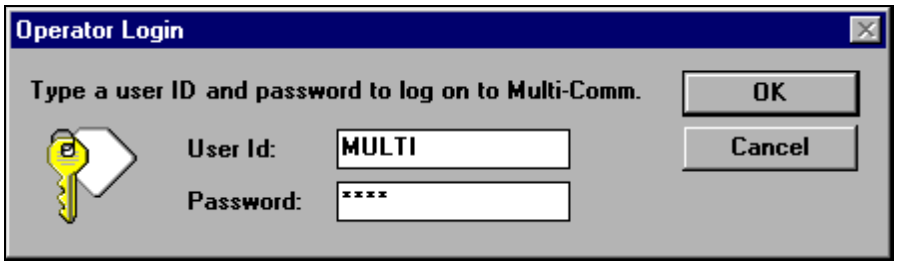
When you start the CN8-SW application, the Operator Login Window will be displayed.



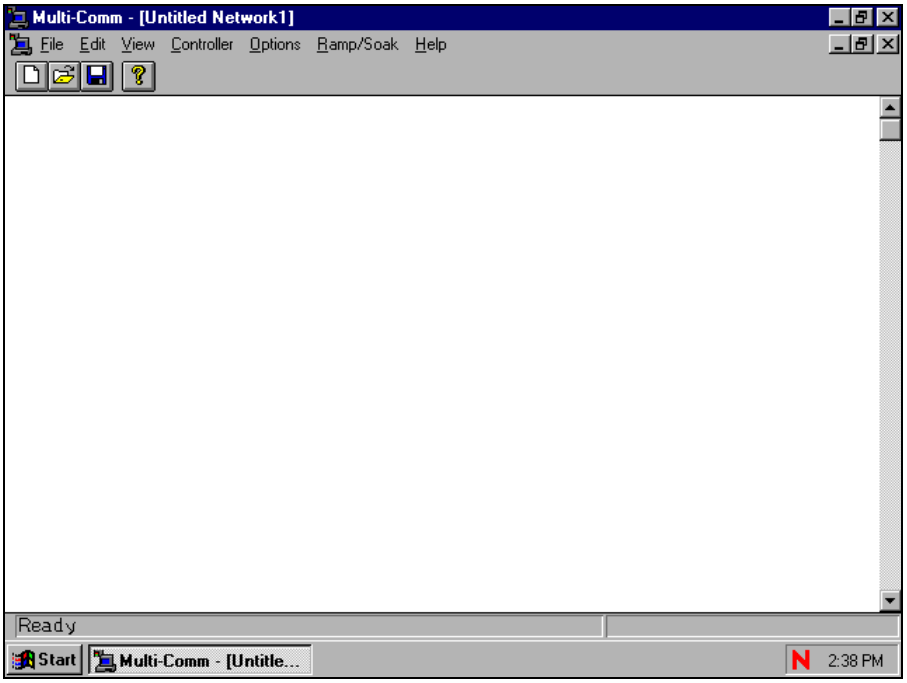
By default, newly installed CN8-SW software will be set up to recognize one login account. This is user "MULTI". The password is "COMM".

To log in:

1. Start the CN8-SW application.
2. Select **File | Login**. The Operator Login window will be displayed.
3. Click on the User Id text entry box and type in MULTI. CN8-SW user names and passwords are case-sensitive. This means that capitalization matters. To the software "MULTI", "multi", and "Multi" are all different names.
4. Tab to the Password entry box or click on it. Type in COMM.



5. Click on **OK**. The CN8-SW window will open. Because the software was newly installed, the main display will be blank. In the future, once communication has been established with controllers, and the controller identities saved as a CN8-SW system file, logging in will result in the display of the controllers in the most recently used .MCS file.



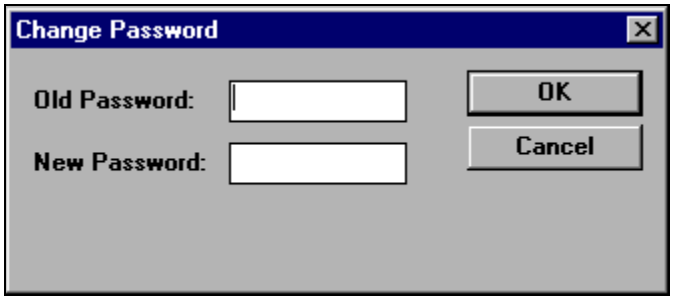
3.4 Changing the Password for the Default Account

The default account, MULTI, has permission to do everything, including create and delete other user accounts. Therefore, it is a good idea to immediately change the password for the MULTI account from COMM to something unique to your installation. Remember the new password. If you forget it before you create another account with "Super User" permissions, you will not be able to add operator accounts without reinstalling the software.

The MULTI account cannot be deleted, nor can its permissions be changed.

To change the password:

1. Select **Edit | Password**. The window used to change the password will open.



2. Type the old password COMM in the box provided.
3. Type the new password in the box provided.
4. Click on **OK.** The new password will be saved.

3.5 Setting Up Operator Accounts

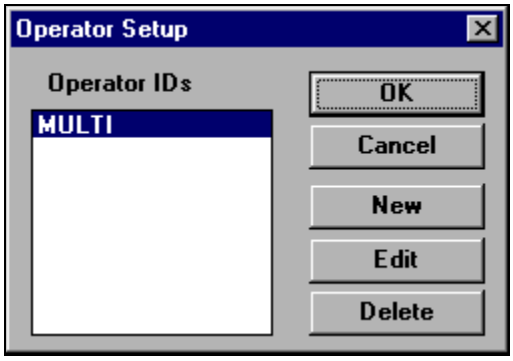
At most sites, operators will not need permission to use all CN8-SW functions, particularly the ability to create and delete other users' accounts. Therefore, it is a good idea for the CN8-SW system administrator (the person who knows the password to the MULTI account) to create login accounts for operators.

3.5.1 Permissions Available

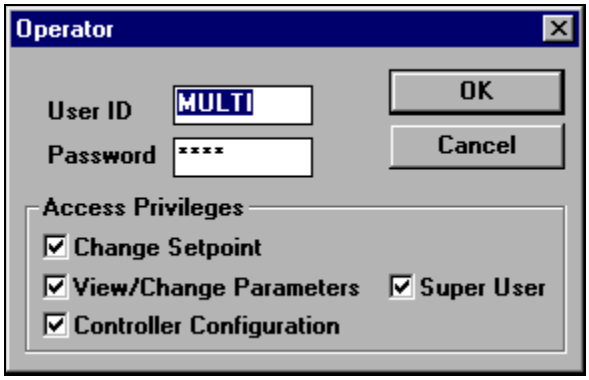
The CN8-SW system supports several permission classes. To see these classes, take a look at the definition of the MULTI account.

To see the permissions available to a user account:

1. Select **Edit | Operators**. The Operator Setup window will open.



2. MULTI is already selected because it is the only login account in existence. After you add operator user IDs, those will also appear on this list. Click on **Edit**. After the display of a message reminding you that only the MULTI password can be changed, the Operator window will be displayed.



This window shows the definition of the Multi account. All the Access Privileges boxes are checked, indicating that the user MULTI can do everything. The permissions assigned to MULTI cannot be changed.

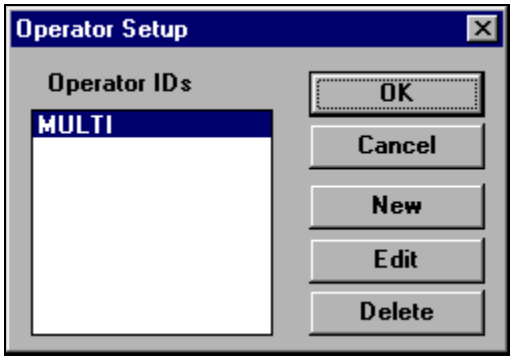
The access privilege categories grant the following permissions.

Change Setpoint	Change the setpoint using the Change Setpoint window (see Section 6), change the controller mode (see Section 7), and run ramp/soak recipes under the direction of CN8-SW or under the direction of the controller (see Section 9).
View/Change Parameters	Use the CN8-SW parameter window to view and change the parameters stored in the controllers' non-volatile memory (see Section 8).
Controller Configuration	Add and delete controllers from the CN8-SW system (see Section 4).
Super User	Add and delete user accounts (operator login IDs) (see 3.5.2).

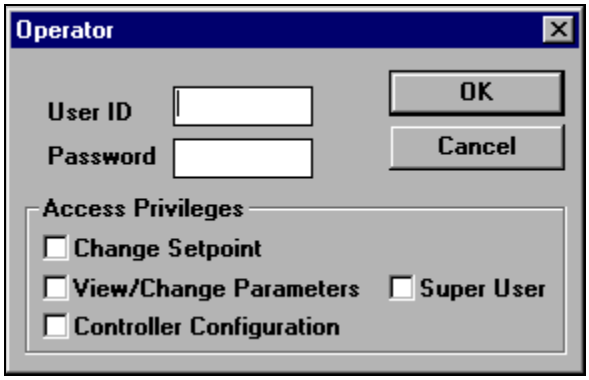
3.5.2 Procedure

To add an operator login account:

1. While logged in as MULTI, select **Edit | Operators**. The Operator Setup window will open.



2. Click on **New**. The Operator window used to define a new login account will be displayed.



3. Enter the new User ID (0 to 10 letters and/or numbers).

4. Enter a password (optional, but recommended).

5. Click on the check box for each set of access privileges you want the user to have. "Super User" does not automatically include all the other privileges.

6. If you change your mind and want to clear a checked box, click on it again to "erase" the check.

7. When you are satisfied with the user definition, click on **OK** . The window will be closed and the user definition will be saved in a .DAT file in the directory where the CN8-SW software was installed.

3.6 Editing an Operator Account

To edit an operator login account, use the procedure in 3.5.1 to select the operator, then change the password, and view and change privileges. You must be logged in as MULTI or another user with Super User privileges.

3.7 Deleting an Operator Account

To delete an operator login account, use **Edit | Operators** to access the Operator Setup window, select the operator, then click on **Delete**. You must be logged in as MULTI or another user with Super User privileges.

3.8 Logging Out of the CN8-SW Application

To log out but leave the CN8-SW application open, use **File | Logout**.

To log out and close the CN8-SW application, use **File | Exit**.

4. Establishing Communication with Controllers

4.1 Introduction

Once you have connected the controllers and the computer to the network, installed the CN8-SW software, and changed the password on the MULTI login account, you are ready to establish communication between the CN8-SW computer and the controllers on the network.

You must do the following tasks.

- Use the front panel user interface of each controller to assign each a unique address (between 1 and 254).
- If the Omega Plus controllers' communication parameters have been changed from the factory defaults, use the front panel of each controller to set the communication parameters at their default values as described in 4.2.
- Use the **Communications** option on the CN8-SW **Options** menu to specify the COM port to be used by the Multi-Com software. If you choose not to use the automatic "find controllers" feature described in 4.4.2 to set up your network, then you must also specify the baud rate to be used by the CN8-SW software.[7] Configuration of communication parameters is described in 4.3.
- Set the communication parameters of the controllers that support the original Omega protocol to match the CN8-SW software as described in 4.2.
- Make the CN8-SW system aware of all devices on the network as described in 4.4. This can be done using the automatic "find controllers" operation, in which the CN8-SW system seeks and finds Omega Plus controllers using the default baud rate of each controller and sets all the Omega Plus controllers to work at 9600 baud. Alternatively, you can add controllers to the network one at a time. If you use this manual method, then the software will poll at the baud rate specified in the CN8-SW Communications Setup window.
- Save the set up as an .MCS files as described in 4.8.

[7] If you do use the "find controllers" function, the CN8-SW software will automatically use 9600 baud.

4.2 Configuring Communication Parameters and Assigning Network Addresses in Controllers

4.2.1 Communication Parameters

Your goal is to make sure that:

- all the controllers that support Omega Plus protocol have their communication parameter values set to their defaults
- all the controllers that support the original Omega protocol have their baud rate set to match the CN8-SW software, and their other parameters set to 8 data bits, no parity, 1 stop bit.

The CN8-SW software is designed to recognize Omega Plus controllers using the controllers' default communication parameters. Therefore, if any Omega Plus controller's communication parameters have been changed from the factory defaults, return the communication parameter values to their defaults. The default baud rate depends on the controller series, but all use 8 data bits, no parity, 1 stop bit.

- The network baud rate will be 9600 if you do use the automatic "find controllers" function. The software will change each Omega Plus controller's baud rate to 9600.
- The network baud rate will be determined by the rate you configure for the CN8-SW software if you do not use the automatic "find controller's function".

The baud rate of controllers that support the original Omega protocol can be read, but not changed, by the CN8-SW computer. Therefore, you must use the front panel display and buttons to set the baud rate in these controllers to 9600 (and make sure the other communication parameters are set to 8 data bits, no parity, 1 stop bit) before you use the automatic recognition process described in 4.4.

- The communication parameters in new ("out-of-the box") Omega Plus controllers were set to their defaults at the factory. If the controllers are new, you can proceed to configuring network addresses (see 4.2.2).
- If necessary, follow the instructions provided in the controller manuals to power up the controllers, and use the front panel display and buttons to set all the Omega Plus Protocol controllers to their default communication parameter values (and all Omega Protocol controllers to 9600, 8 data bits, no parity, 1 stop bit), then go on to 4.2.2.

4.2.2 Network Addresses

Your goal is to assign each controller on the network a unique address between 1 and 254.

This can be accomplished using the buttons and display on the front panel of the controller as described in the manual supplied with each controller.

If you will have fewer than 254 controllers on the network and plan to use the CN8-SW function of automatically detecting devices on the network, use the lowest address numbers first. The software will begin polling with address 1 and proceed up to 254 unless you stop the polling process. You can save time getting your network up and running if you stop the process once you know the CN8-SW system has found the controller with the highest address number you have assigned.

Assign the addresses and go on to 4.3.

4.3 Configuring Communication Parameters for CN8-SW System

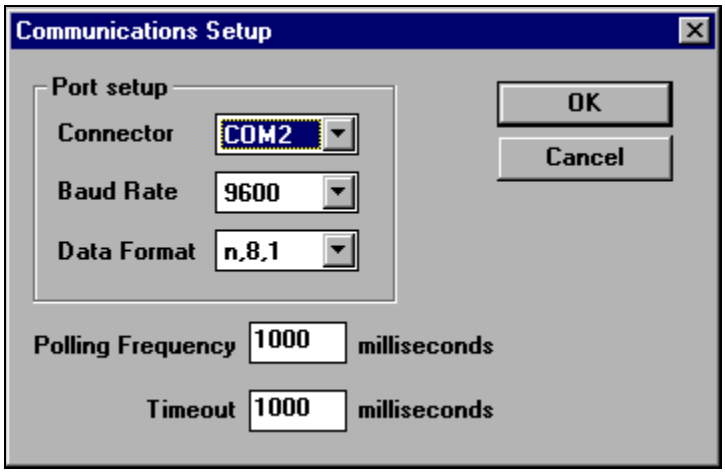
Your goal is to select the COM port to be used by the CN8-SW software.

- If you do not plan to use the automatic "find controllers" option described in 4.4, then you can also specify a baud rate other than 9600 (the default) for the network.
- If you do use the automatic "find controllers" feature, then the software will use 9600 baud, regardless of the baud rate specified using the Communications Setup window shown below.

The other communication parameters must match the controller settings. All use 8 data bits, no parity, 1 stop bit, which are also the CN8-SW defaults.

To configure the CN8-SW communication settings:

1. Launch the CN8-SW application as described in Section 3 and log in as MULTI.
2. Select **Options | Communication**. The Communications Setup window will open.



3. Use the Connector dropdown list to pick the port to be used. Sometimes, particularly when using a laptop computer, a COM port may already be in use without your being aware of it. If you get a message "COM 1 (or 2) in use" when you attempt to use the CN8-SW computer to poll controllers over the network as described later in this section, use a different COM port.
4. If you do not plan to use the automatic "find controllers" option, use the Baud Rate dropdown list to set the baud rate at which you want the network to operate, usually 9600.
5. If the CN8-SW communication settings were changed from the defaults, use the Data Format dropdown list to set n,8,1.
6. If necessary, change the Polling Frequency from the default value. The Polling Frequency is the minimum number of milliseconds in the interval between the CN8-SW system receiving a reply from one controller and the system trying to communicate with the next controller.

7. If necessary, change the Timeout from the default value. The Timeout is the number of milliseconds the CN8-SW system will wait to receive a reply from a controller before giving up and moving on to the next controller.

8. When the settings are correct, click on **OK** to save the settings and close the window.

4.4 Recognizing Controllers with the CN8-SW Software

4.4.1 Introduction

Once you have assigned a unique network address to each controller, and set communication parameters in all controllers to their defaults, and set the CN8-SW to use the desired COM port, you are ready to enable the CN8-SW software to recognize the controllers.

- If you intend for all operators to see all controllers, you can take advantage of the CN8-SW function that finds all the powered up controllers on the network by polling every address between 1 and 254, as described in 4.4.2. If you use this feature, the network will be set to operate at 9600 baud, regardless of the baud rate specified using Communications Setup window described in 4.3.

- If you want some operators to be able to see only some of the controllers, you must use the manual process described in 4.4.3. The system will use the baud rate specified using Communications Setup window described in 4.3.

4.4.2 Automatically Using the Find Controllers Option

The CN8-SW "find controllers" option polls each address, beginning at 1 and continuing until it has polled address 254, unless you stop the process using the Options menu. During the "find controllers" process, the CN8-SW software first polls every address at 9600 baud, the default rate used by some Omega Plus-compliant controllers. If the CN8-SW software is able to communicate with a controller at 9600 baud, the system adds the controller to the display. The CN8-SW system then polls the next address at the 9600 rate.

After the CN8-SW system has polled every address (1 to 254) at 9600 baud, the software temporarily switches itself to poll at 2400 baud, the other rate used by some Omega Plus controllers as the default. The CN8-SW software goes back to the lowest address at which it did not find a controller when polling at 9600 baud, and polls the address at 2400 baud. If the CN8-SW system can communicate with a controller at that address using 2400 baud, the CN8-SW system adds the controller to the display. The CN8-SW software also changes the baud rate of the Omega Plus controller to 9600.

After the system has changed the baud rate of the controller it found using 2400 baud (or if the system does not find a controller at the address), the CN8-SW system then uses 2400 to poll the next higher address at which it did not find a controller when polling at 9600, and the process continues.

At the conclusion of the polling process (or if you stop the "find controllers" operation as described in Step 6 below), the CN8-SW software switches itself back to 9600 baud.

- The CN8-SW system polls address 1 at 9600 baud, establishes communication with the 16C controller, adds the controller to the main display, and moves on.

- The CN8-SW system polls address 2 at 9600 baud, establishes communication with the 16C controller, adds it to the main display, and moves on.

- The software polls addresses 3 through 254 at 9600 baud.
- The network is ready to operate at 9600 baud.

To use the automatic function:

1. Make sure all the controllers are powered up.
2. Use the front panel display and buttons on controllers that do not support the Omega Plus protocol to set their communication parameters to 9600 baud, 8 data bits, no parity, 1 stop bit. (The baud rate of controllers that support the original Omega protocol can be read, but not changed, by the CN8-SW computer.)
3. While you are logged in as MULTI (or another user with Controller Configuration Privileges) select **Options | Start Find Controllers**. The process will begin.
4. You will be able to monitor the progress of the operation. A message in the status bar (lower right corner of the main CN8-SW window), will be displayed: "Checking for a controller at ID*n*". [8]
5. As each controller is found, an image of its display will appear in the main CN8-SW window. By default the name of the controller will be the same as its address number. You can give each controller a different name later (see 4.6).
6. When you see that the controller with the highest address number you assigned has been recognized (appears on the main display), you can stop the process using **Options |Stop Find Controllers**.
7. After the find controller function has been completed or has been stopped as described in Step 6, the CN8-SW software will begin normal operation at 9600 baud, polling the controllers and displaying their PV and SP values.

[8] If the CN8-SW status bar is not visible, use the View menu's Status Bar item to display the status bar.

8. Any message that can be displayed on a controller's front panel will also be shown on the CN8-SW display. Operators can see at a glance if a controller is in standby or other special mode, and if the controller detects a problem such as an open sensor.

If any controllers were not recognized:

a) they were not powered up during the "find controllers" operation,

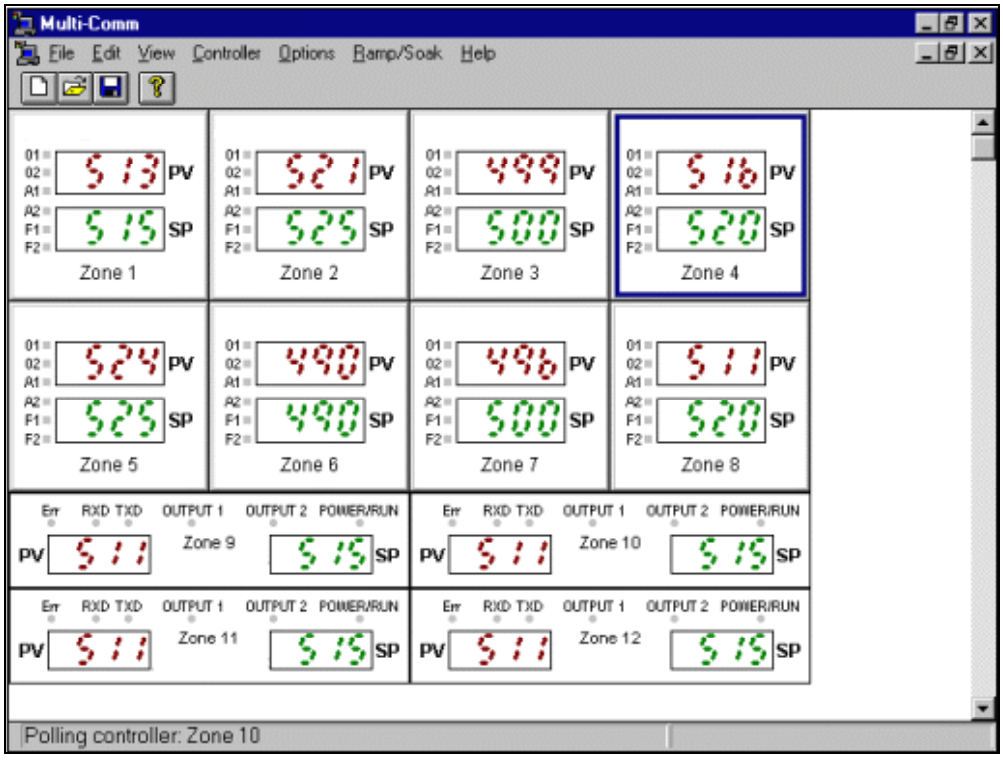
or

b) their communication settings were not set to the factory defaults (Omega Plus Protocol controllers) or to 9600 baud, 8 data bits, no parity, 1 stop bit (Omega Protocol).

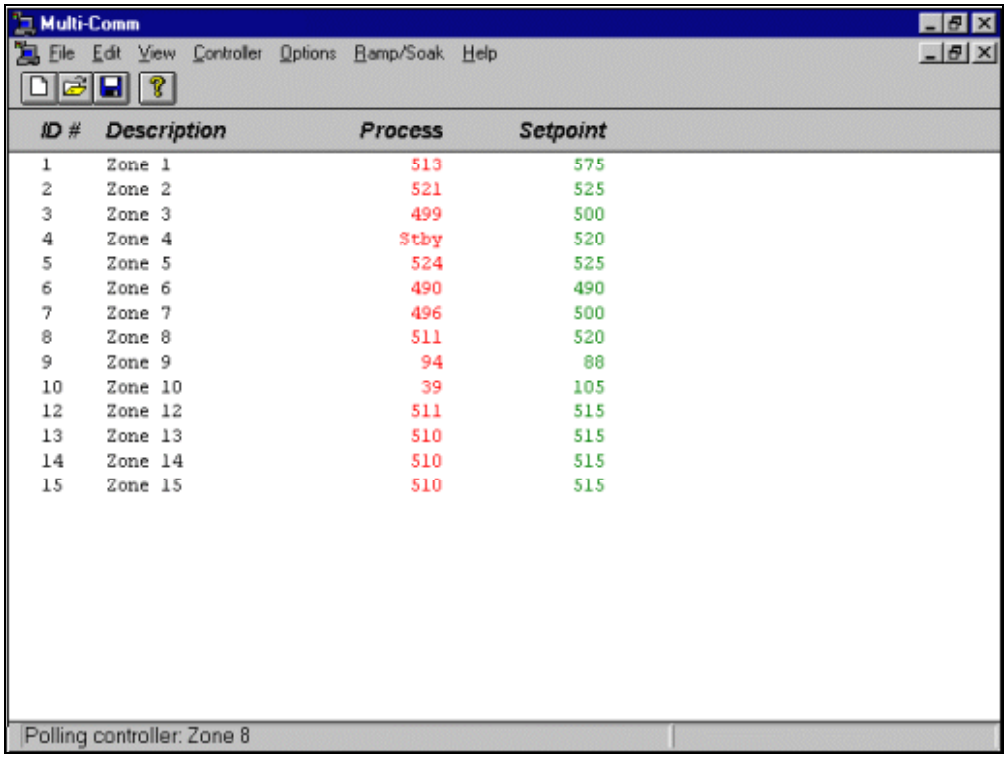
or

c) the network has not been wired correctly.

Begin by checking (a), then (b). If neither is the problem, check (c). Once the problem has been fixed, add the unrecognized controllers manually as described in 4.4.3. After adding the missing controllers, save the CN8-SW Setup file as described in 4.8.



A "text only" view is available for operators who prefer to see the controller setpoints and process variables in list form. **To access the text only view**, select **View | Text**.



To return to the graphic view, select **View | Graphic**. When the instructions in this manual refer to the "main CN8-SW window", that means the graphic view.

4.4.3 Manually Using the Controller Menu

If you want some operators to be able to see only some of the controllers on the network, you must use the manual process described here to add the controllers one operator will see, save the configuration to an .MCS file as described in 4.8, then start again, adding controllers to create a new different .MCS file for the use of a second operator.

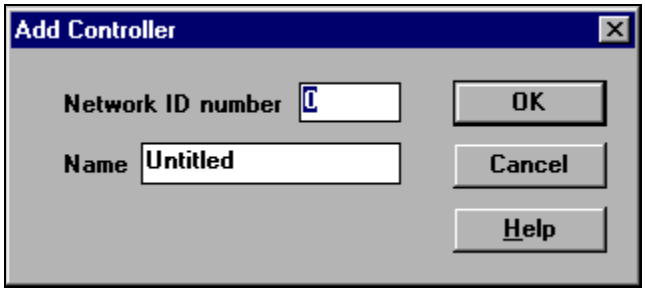
This manual process can also be used to establish communications between the CN8-SW computer and a controller that was added to the network after the automatic process in 4.4.2 was used.

To add a controller manually:

1. Make sure the controller is powered up.

2. Use the front panel display and buttons to set the controller's communication parameters to match the CN8-SW communication parameters.

3. While you are logged in as MULTI (or another user with Controller Configuration Privileges) select **Controller | Add**. The Add Controller window will be displayed.



4. Type in the network ID assigned to the controller. This must match the ID stored in the controller.

5. Type in an optional name to be associated with this controller on CN8-SW displays. If no name is entered, the system will use the controller's address as its name.

6. Click on **OK**. The CN8-SW computer will poll for a controller at that address (using the baud rate specified in the Communications Setup window described in 4.2) and the Add Controller window will close.

   If a controller is found at that address, it will appear in the main CN8-SW window.

   If no controller is found at that address or a controller has already been recognized by the CN8-SW software at that address, a message will be displayed.

Repeat the process for other controllers as needed.

4.5 Deleting a Controller

Any controller can be deleted from the CN8-SW setup, regardless of whether the controller was added using the automatic process described in 4.4.1 or the manual method described in 4.4.2.

To delete a controller:

1. While you are logged in as MULTI (or another user with Controller Configuration Privileges) select the controller to be deleted by clicking on it (left button) on the graphic display. The border of the controller will be highlighted.

2. Select **Controller | Delete**. The controller will be deleted without any confirmation message. However, if you have already saved the setup to an .MCS file as described in 4.8, the controller will not be removed from the file until you save again.

   If you change your mind about deleting the controller, add it again using the manual method in 4.4.2. Alternatively, close the .MCS file without saving so that the file is not changed to reflect the deletion, then reopen the file. The controller will still be part of the setup, because you did not save the file after you deleted the controller.

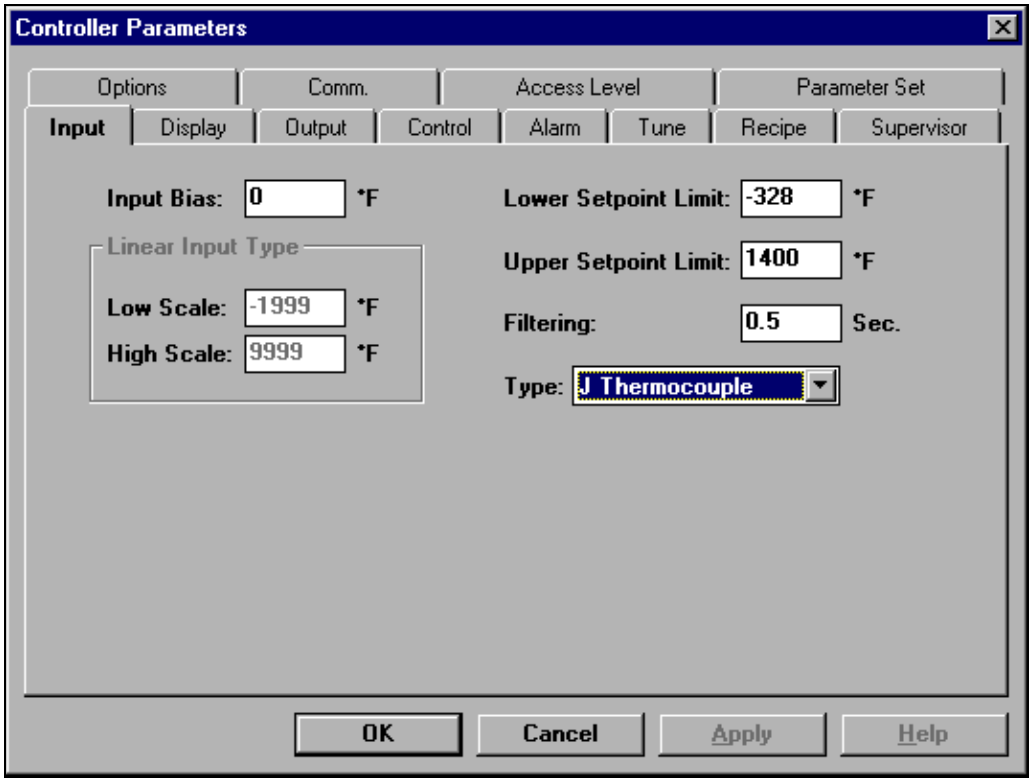
4.6 Changing Baud Rate after Communication Has Been Established

You can use the CN8-SW application to change the rate of all controllers that support the Omega Plus Protocol. As soon as you change the rate, you will lose communication with the controllers. Once all the controllers have been set to the same new rate, change the CN8-SW communication setting to match. Detailed instructions for changing the baud rate follow.

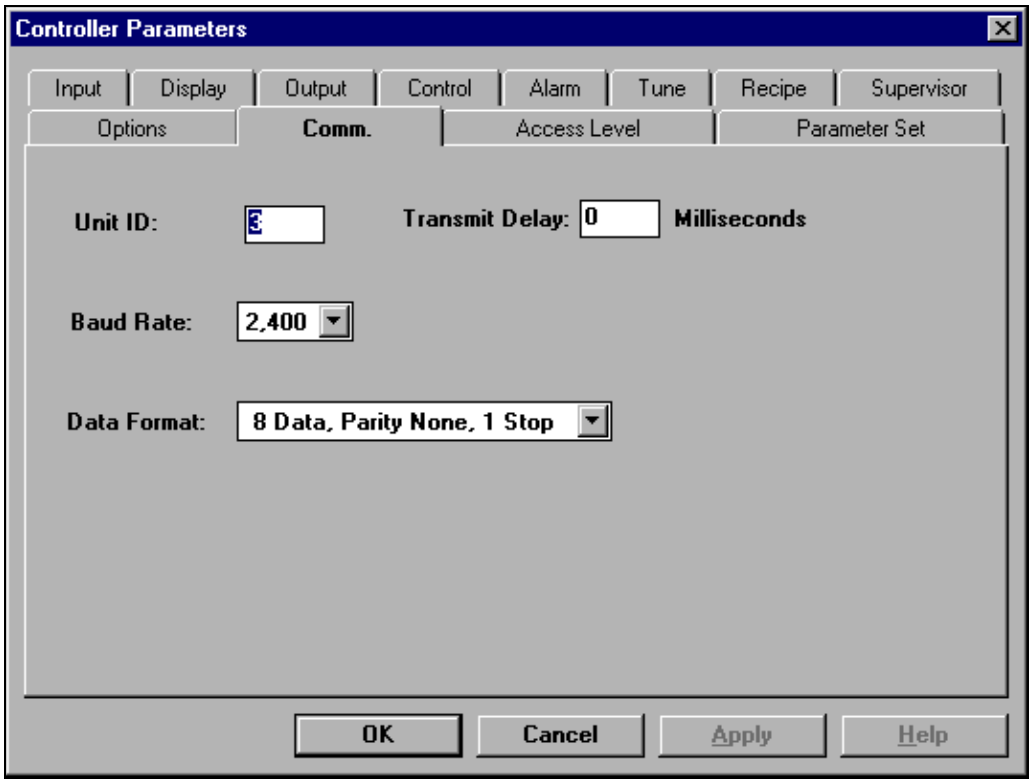
To change the baud rate after communication has been established:

1. While logged in as MULTI (or another user with View/Change Parameter privileges), select the controller by clicking on it in the main graphic display.

2. To see the present values of the configuration parameters stored in its non-volatile memory, select **Controller | Parameters**. The parameter window for that controller will open. By default, the Input "tab" will be on top.



3. Click on the Comm tab. The communication parameter values, including baud rate, will be displayed.



4. To select another baud rate, use the dropdown list.

5. Click on **OK**. The value will be sent to the controller and the window will close. (Once the value is written to the controller's non-volatile memory, communication with this controller is lost until the CN8-SW baud rate has been set to match.)

6. Repeat the process to assign the same new baud rate to every Omega Plus controller.

7. Use the controller front panel display and buttons to set the same new baud rate in every controller that supports the original Omega Protocol. (You can view, but not change, the baud rate in these controllers using the CN8-SW parameters window.)

8. After you have set all the controllers to the same new rate, select **Options | Communications**.

9. Set the CN8-SW computer to match the new rate configured for all the controllers.

10. Communication with all controllers will be established again. The main display will be updated to reflect the current process variable and setpoint for each controller.

4.7 Naming Controllers

By default, the CN8-SW displays use a controller's address as its name. However, you can assign a more meaningful name to each device. This can be done during the manual addition process described in 4.4.3. You can also assign a name (or change the assigned name) of any controller using the **Controller | Configure** menu function. A name may contain up to twenty letters, numbers, spaces, and special characters.

The Controller Configuration window can also be used to change the network ID of a controller. If you do change the address in the controller's memory using the CN8-SW system, the system will not be able to communicate with the controller again until you use the procedure described in 4.4.3 to add the controller to the system using the device's new ID.

4.8 Saving the .MCS File

It is very important that you save your CN8-SW setup in a CN8-SW Setup (.MCS) file. The contents of the .MCS file determine what controllers appear on the main display. The ability to create, save, and open a variety of .MCS files enables you to create displays that do not include all the controllers on the network hosted by the PC. For example, if Operator A is only interested in Controllers 1, 2, and 9, you can create an .MCS file that would cause the CN8-SW display to show only those controllers when Operator A uses that file. Operator B could use a different .MCS file to see a different custom display, one containing only Controllers 3, 4, 6, and 9, for example.

If you do not save your setup to an .MCS file, then the next time you start the CN8-SW application you will have to repeat the recognition process. (If you try to close the CN8-SW software using **File | Exit** or double-clicking on the X at the top right of the main CN8-SW window, you will be prompted to save.)

To save the setup to the .MCS file now open (named at the top of the main CN8-SW window)**,** use **File | Save** (or the  button on the toolbar). The configuration will be saved to the open file.

To save the setup to an .MCS file with a new name, use **File | Save As**. The operating system Save As window will open. Use it to specify the destination directory and file name for the .MCS file.

4.9 Closing an .MCS File

To close an .MCS file, use **File | Close**. Before the file is closed you will be prompted to save it if you have added any controllers or changed any controller names since the file was last saved.

4.10 Creating a New .MCS File

To create a new .MCS file, use **File | New** (or the  button on the toolbar). The open .MCS file will be closed and the main display cleared. You can now add controllers for a new CN8-SW setup.

4.11 Opening an Existing .MCS File

To open a different .MCS file, use **File | Open** (or  button on the toolbar). The operating system Open window will be displayed. Use it to select the .MCS file to open.

5. Configuring Local Alarms

5.1 Introduction

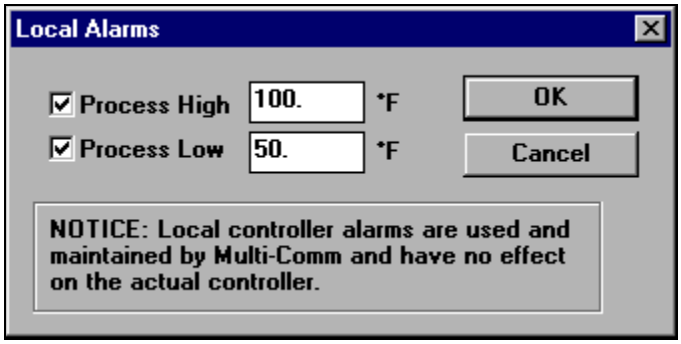
The CN8-SW system can use the Omega Plus Protocol to read the alarm state of any controller that supports the protocol. Therefore, if an Omega Plus controller's alarm parameters have been configured and the controller has detected an alarm condition, the A1 or A2 indicator on the controller's "front panel" on the CN8-SW main display will appear to be lit (red), matching the behavior of the A1 and A2 indicators on the controller faceplate. The process value on the CN8-SW graphic display will also change color from magenta (normal) to red (alarm). Controller alarm parameter values can be changed using the CN8-SW software using the procedure described in Section 7.

As a bonus, the CN8-SW supports "local alarms". These two process alarms can be configured in CN8-SW for each controller on the network, including controllers that do not provide an alarm function of their own, and controllers that support the original Omega Protocol.[9] If a controller's PV exceeds (high alarm) or falls below (low alarm) the configured local alarm limit, the alarm indicators on the main display will "light" and the PV will change to red. Local alarms are configured using the procedure described below.

5.2 Procedure

To configure local process alarms:

1. While logged in as MULTI (or another user with Controller Configuration privileges), select **Controller | Alarms**. The Local Alarms window will open.



2. To enable local process alarm 1 (signaled using the controller image's A1 indicator on the main display), click on the box to the left of Process High.

[9] Although some controllers that support the original Omega Protocol do provide parameters for configuration of controller alarms (such as the Series 16 controlers), their alarm status cannot be read using the original Omega protocol.

3. To enable local process alarm 2 (signaled using the A2 indicator on the CN8-SW display), click on the box to the left of Process Low.

4. Type in the alarm limit for each alarm.

5. Click on **OK** to save the changes and close the window.

6. Viewing Process Values and Changing Setpoint

6.1 Introduction

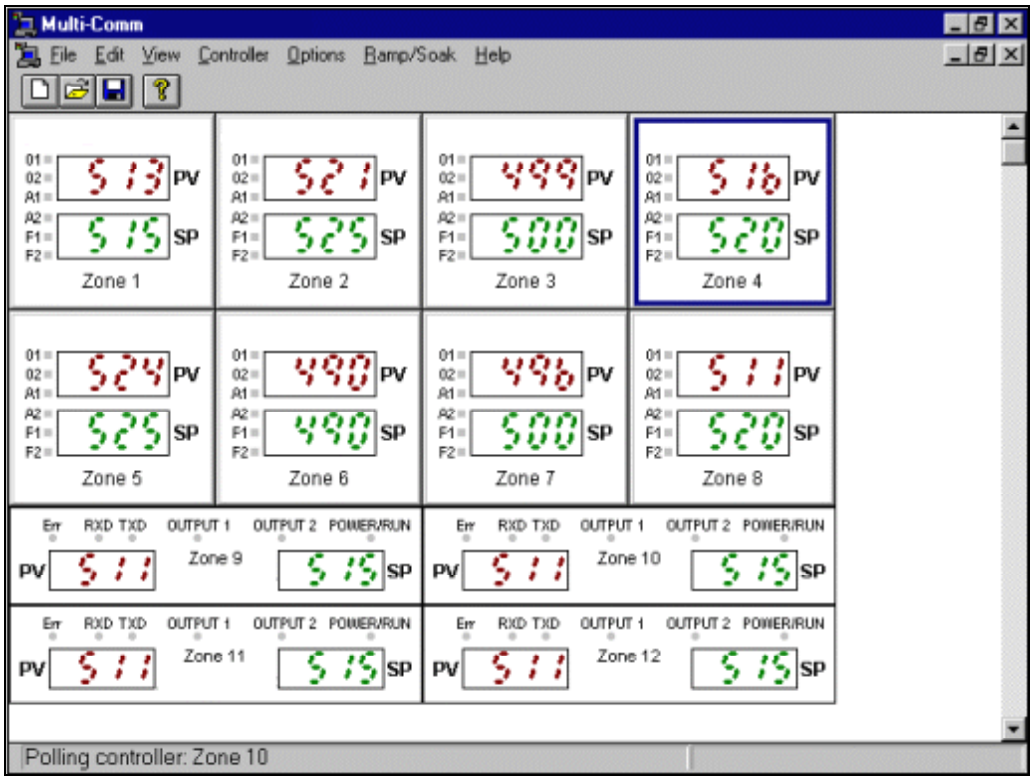
For your convenience, the CN8-SW system provides several ways to view process variable and setpoint as described in 6.2 and 6.3.

Any operator whose login account is configured with the appropriate privilege can use the CN8-SW system to change a controller's setpoint as described in 6.4. (Instructions for changing the setpoint using ramp and soak recipes are in Section 9.)

Some Omega controllers can use the single step Ramp to Setpoint function at times other than at startup. The CN8-SW system provides a method to start the timer on the ramp to setpoint as described in 6.5.

6.2 Viewing PV and SP in the Main Window

The CN8-SW system always displays process value and setpoint for every controller in the main window, either on the graphic view or the list view. The refresh rate is dependent on baud rate, the number of controllers on the network, and the configured polling frequency and timeout (see 4.3).



6.3 Viewing PV and SP in a Graph

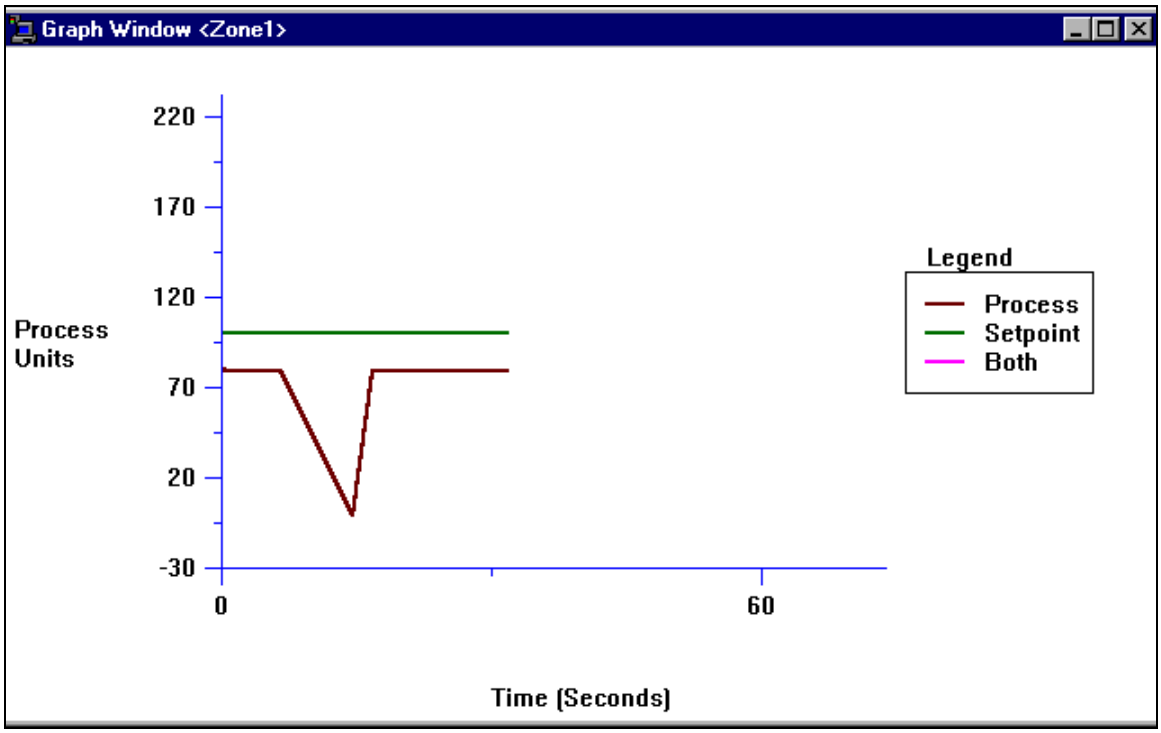
The CN8-SW system allows operators to display a trend graph showing any controller's SP and PV in real-time.

To view the real-time trend graph:

1. While logged in as MULTI (or another user with Controller Configuration privileges), select the controller by clicking on its image in the main graphic display. The border of the controller will be highlighted.

2. Select **Controller | Graph.** The trend graph will be displayed.

Initially the graph will not show any trend tracings. However, as soon as the selected controller is polled by the CN8-SW system, trend tracings will begin to be drawn. As long as the Graph Window remains open, the trend tracings will be updated.



To close the Graph Window, double-click on the **X** in the top right corner.

6.4 Changing the Setpoint Using the Setpoint Dialog Box

Any operator whose login account is configured with the appropriate privilege can use the CN8-SW system to change a controller's setpoint.

To change a controller's setpoint:

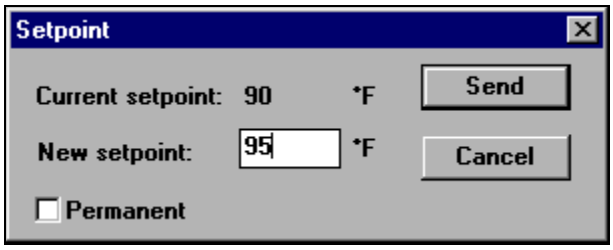
1. Access the window used to change the setpoint by:

   - right-clicking on the controller's image in the main display,

     or

   - left-clicking on the controller to select it, then selecting **Controller | Setpoint.**

   Either of these actions will open the Setpoint window.



2. Enter the new setpoint.

3. If you want the setpoint to be written to the controller's non-volatile memory when you click on **Send**, click on the box in front of "Permanent". The box will be checked. (Clicking on the box again clears it.) If the controller's power is cycled after you click on **Send**, the new SP will be used again when power is restored, because the new SP will have been stored in the controller's non-volatile memory.

   or

   If you want the setpoint to be written to temporary (volatile RAM) memory when you click on **Send**, do not click on the "Permanent" box. If the controller's power is cycled, the new SP will be lost.

4. Click on **Send**. The new setpoint will be sent to the controller the next time the CN8-SW computer communicates with the controller. [10]

[10] As with any RS-485 host, the CN8-SW computer communicates with one device at a time. To see which controller the CN8-SW application is currently communicating with, check the message at the left of the status bar (at the bottom of the CN8-SW main window). If the status bar is not visible, use the View menu's Status Bar item to display the status bar.

6.5 Configuring and Invoking the Single-Step Ramp Function

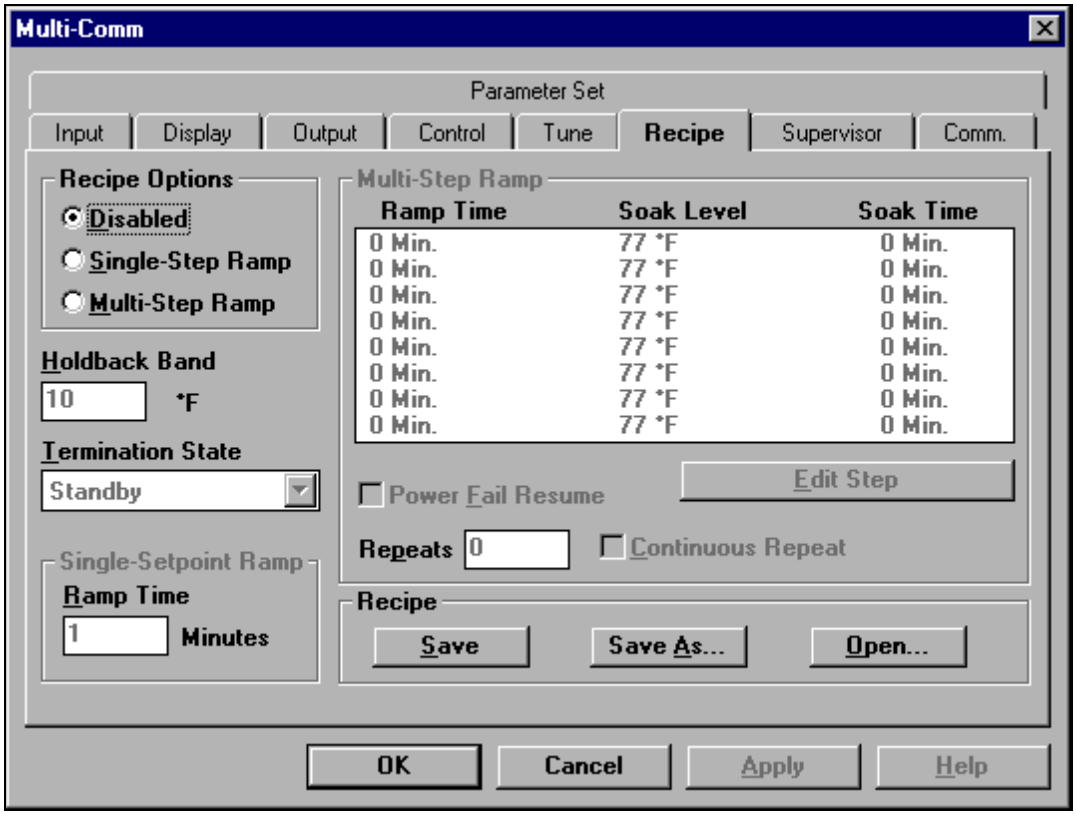
The CN8-SW system provides a method to configure the single-step ramp time. The software also provides a means to invoke this single-step Ramp to Setpoint function in those Omega controllers that can use the function at times other than at startup.

To configure the timer for the single step Ramp to Setpoint function:

1. While logged in as MULTI (or another user with View/Change Parameter privileges), select the controller by clicking on it in the main graphic display.

2. To see the present values of all parameters stored in the controller's non-volatile memory, select **Controller | Parameters**. The parameter window for that controller will open. By default, the Input "tab" will be on top.

3. Click on the Recipe tab. The existing recipe-related parameter values will be displayed.



4. To enable Single-Step Ramp, click on the white dot ("radio button") next to it. A black dot in the circle indicates that the function has been selected. The gray number in the Ramp Time entry box will become black, indicating that the number can be changed.

5. Enter the ramp time (in minutes) to be used to achieve the current setpoint when either of two conditions occur: power to the controller is cycled or the CN8-SW system is used to gradually ramp to the current setpoint.

6. Click on **OK**. The value will be sent to the controller and the window will close.

To invoke the single step ramp function:

1. Select the controller by clicking on its image in the main graphic display. The border of the controller will be highlighted.

2. Select **Controller | Start Recipe**.[11] The function will be invoked. (If the Recipe Option is set to "Disabled", a confirmation message will be displayed before the PV is ramped to the setpoint; the default one minute will be used.)

[11] If the Recipe Option is set to "Multi-Step Ramp", then the Controller menu Start Recipe function will begin execution of the ramp and soak recipe stored in the controller's recipe parameters as described in Section 8.

7. Changing Controller Mode and Using Autotune

7.1 Introduction

The CN8-SW system provides operators with an easy, reliable way of changing a controller's mode without using the unit's front panel. This ability to change mode includes placing the controller in Autotune. Before putting a controller in Autotune, be sure to read the manual supplied with the controller. Autotune will not work correctly unless you prepare the process and the controller as described in the controller manuals.

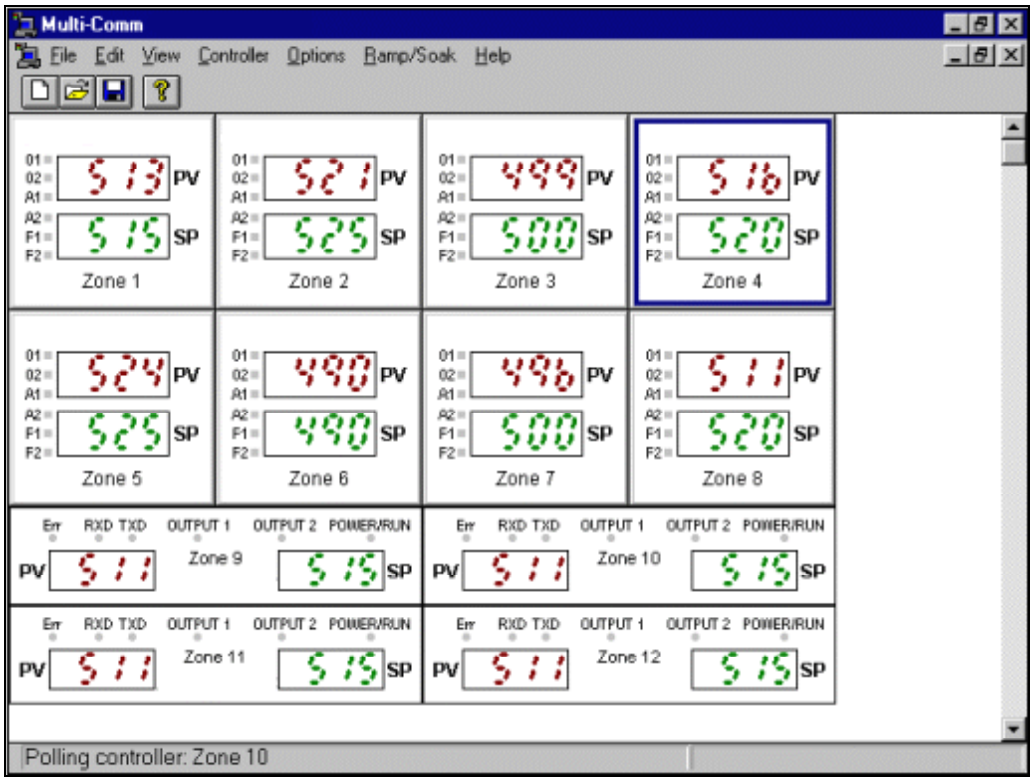
7.2 Procedure

To change a controller's mode:

1. While logged in as MULTI (or another operator with View/Change Parameters privileges), select the controller by clicking on its image in the main graphic display. The border of the controller will be highlighted.

2. Select **Controller | Standby** (or **Manual** or **Tune**). (If you attempt to put the controller into Autotune mode, a confirmation message will be displayed. Before using Autotune, you should read the manual supplied with the controller and comply with the Autotune guidelines provided in that manual. After you acknowledge the confirmation message, the Autotune command will be sent to the controller.)

3. The image of the controller on the main display will match the controller's display in the new mode. For example, in Standby mode the PV value will alternate with the message "StbY" as shown in the following picture (see the "Zone 4" controller).



4. To take the controller out of the mode, select the controller again.

5. Open the Controller menu. You will see the controller's current special mode checked. For example, if the controller is in Standby, then the menu will show √ **Standby.** Click on the checked mode to take the controller out of that mode.

8. Viewing and Changing Controller Configuration Parameters

8.1 Introduction

The CN8-SW system permits any operator with View/Change Parameter privileges to access parameter values stored in each controller's memory.

The Omega Plus Protocol supports viewing and changing all parameter values over the network. These Omega Plus controller values are read and stored in non-volatile (permanent) memory.

The original Omega Protocol supports viewing the most important parameters and changing a sub-set of these parameters. You can specify whether you want to see and change the values in volatile (temporary) memory or in non-volatile (permanent) memory.

8.2 Accessing Configuration Parameter Displays

To access the parameter displays:

1. Log in as MULTI (or another user with View/Change Parameter privileges).
2. Use one of the following two methods to access the displays:
   - select the controller by clicking on it in the main graphic display, then using **Controller | Parameters**,

     or

   - double-click on any controller in the main graphic display.

   Either method will open the window showing the current value of the controller's accessible parameters.

In the case of an Omega Plus-compliant controller, the window will contain a set of tabbed "layers". Click on a tab to select the group of parameters to be viewed.

8.3 Using Configuration Parameter Displays

Be aware that not all displayed parameters apply to the selected device, or to the current configuration. In some cases the value of an unused parameter is gray, and no input is accepted. For example, on the 16th DIN Omega CN8500 Input tab shown earlier in this section, the Low Scale and High Scale parameters do not apply when a thermocouple input is used. Therefore, the Low Scale and High Scale values are gray. They do not apply to the current configuration and cannot be changed.

Sometimes it is possible to type a value in the CN8-SW window, but the value will not be accepted by the controller. The value will not be accepted if the controller hardware does not support use of the parameter. You will be informed by a CN8-SW message that the controller will not accept the input.

The displayed values are currently stored in the controller. If you change a value in a parameter window, the change does not take effect until the next scan cycle after you click on the **Apply** button.

Note that some controllers make a distinction between values stored in volatile (temporary) memory and those stored in non-volatile (permanent) memory. The parameter displays for those devices are supplied with Temporary and Permanent selections. Use these to specify the destination of an entered value before applying it.

9. Configuring and Running Ramp and Soak Recipes

9.1 Introduction

Use the CN8-SW Ramp and Soak function to configure any number of recipes consisting of any number of ramp and soak steps. These recipes are stored on the CN8-SW computer. Under the direction of CN8-SW, any controller on the network can execute your choice of recipe, even models that do not support configuration and execution of ramp and soak cycles using the controller front panel. Instructions for configuring these recipes are in 9.2. Instructions for running these recipes are in 9.3.

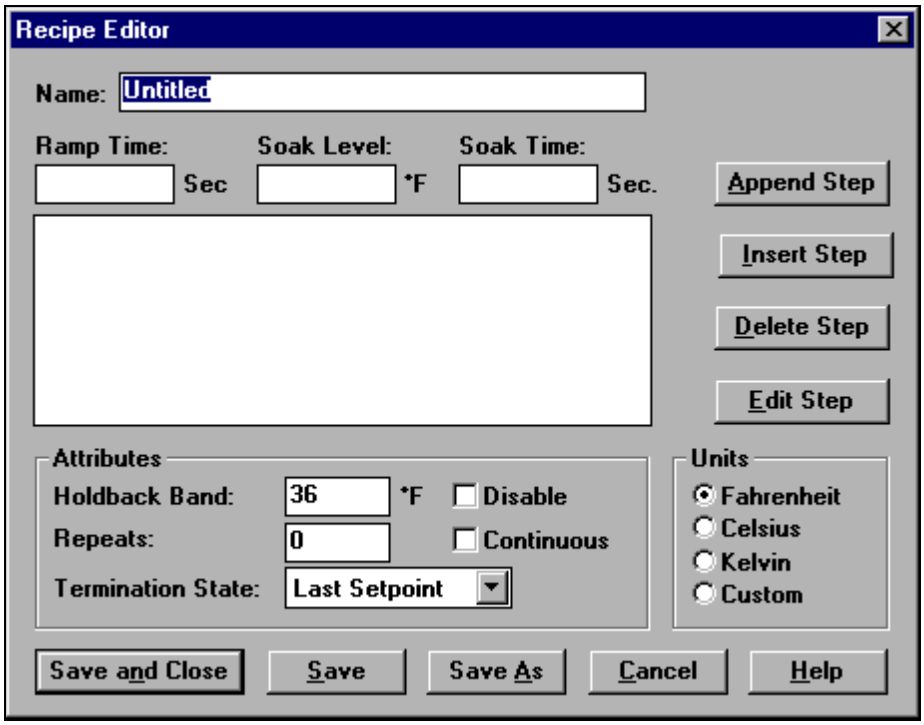
The CN8-SW displays also provide a quick way to configure and run recipes that use the controller's own recipe parameters. Instructions for configuring these recipes are in 9.4. Instructions for running these recipes are in 9.5.

9.2 Configuring CN8-SW Recipes

9.2.1 Creating a New Recipe

To create a new recipe to be run on any controller under the direction of the CN8-SW system:

1. While logged on as MULTI (or another user with View/Change Parameter privileges), select **Ramp/Soak | New.** The Recipe Editor window will be displayed.



   You will use the Ramp Time, Soak Level, and Soak Time boxes to configure each step, then use the **Append Step** button to add the step to the end of the recipe in the large white box. (Steps can also be inserted, edited, and deleted as described below.)

2. Enter a recipe name. This name will be used on the list of recipes on the list of active recipes and the list of "held" recipes. (This will not be the name of the recipe file unless you use the same name when you **Save As**.)

3. Select the engineering units to be used by clicking on the white dot in front of your choice. A black dot will indicate that an option has been selected.

4. Use the Termination State dropdown list to specify what you want to happen when execution of the recipe has been completed. (If you stop execution of a recipe before completion, the setpoint will remain at the value it has when you stop execution.)

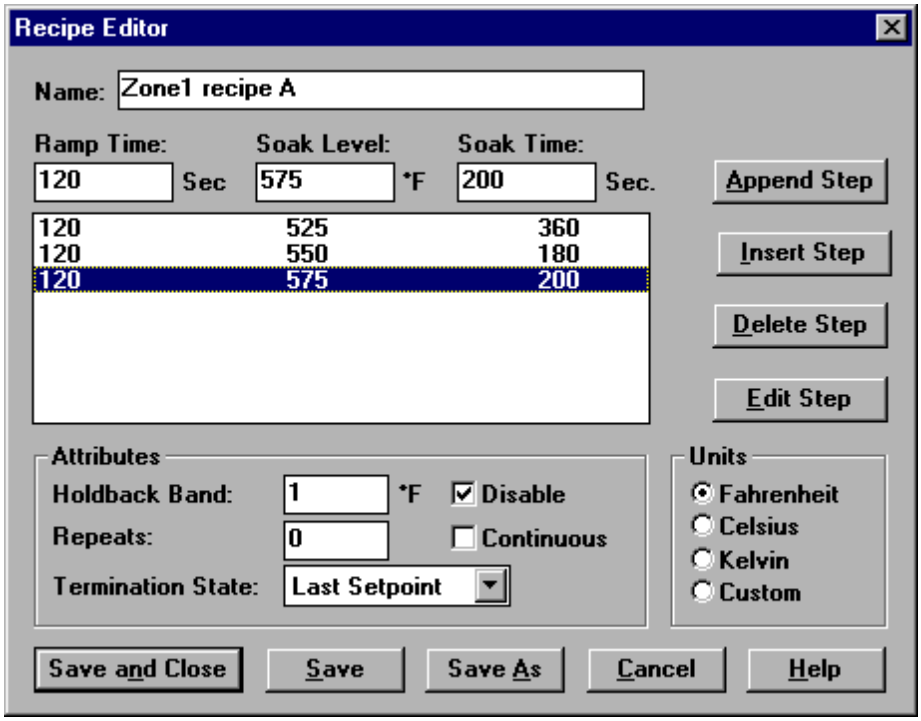
5. Use the Repeats box to enter the number of times you want the recipe to execute each time it is run. If you want the recipe to run once, leave the Repeats value at the default, zero. If you want the recipe to cycle continuously once started, click on the box to the left of "Continuous". The box will be checked, indicating that the option has been selected.

6. Enter a Holdback value of at least 1, or disable holdback.[12]

7. Enter the Ramp Time, Soak Level (setpoint), and Soak Time for a recipe step in the boxes provided.[13]

8. Click on **Append Step**. The step will be added below the steps already in the recipe box. The Ramp Time, Soak Level, and Soak Time boxes will be cleared in preparation for entering your next step.

9. Repeat Steps 7 and 8 as many times as you want.



10. Save the .RCP file for the first time using **Save As**. A window will open in which you can specify the filename and directory. You must replace "Untitled" in the window with a meaningful file name ending with the .rcp extension. This will be the name you select when you run the recipe.

[12] If you are concerned that your process might not be responsive enough to reach the soak levels in the specified ramp times, use the holdback feature. If holdback is enabled, then the system will not allow the setpoint to become more than *n* engineering units away from the process value, where *n* is the Holdback value. The system will "hold back" the SP until the PV has had a chance to catch up. This has the effect of "stopping the clock" on the SP ramp time until the PV is within *n* units of the SP.

The specified holdback value *n* will also be applied to the soak level. If the temperature falls more than *n* units from the soak level, then the clock is stopped on the soak time until the PV is again within *n* units of the SP specified for the soak level.

[13] Because of the effect of the holdback value, these ramp and soak times should be considered minimums if holdback is enabled.

11. To delete a step from the recipe as shown in the white box, click on the step to select it. The values of the selected step will be displayed in the Ramp Time, Soak Level, and Soak Time boxes. Click on **Delete Step.** The step will be removed from the recipe.

12. To edit a step, select it. Its values will be displayed in the Ramp Time, Soak Level, and Soak Time boxes. Make your changes, then click on **Edit Step.** The new values will replace those in the selected step.

13. To insert a step, select the step it should precede. The values of the selected step will be displayed in the Ramp Time, Soak Level, and Soak Time boxes. Enter the values for the step to be inserted, then click on **Insert Step.** The new step will be inserted before the step selected.

14. To save the recipe without closing the Recipe Editor window, click on **Save**. The file will be saved to the file specified in Step 10, overwriting the old contents of the file.

15. When the recipe displayed in the white box meets with your approval, click on **Save and Close.** The recipe will be saved to the .rcp file and the editor will close.

While you are learning to use the Recipe Editor, it is a good idea to use the **Ramp/Soak | Edit** function described in 9.2.2 to take a second look at your recipe before running it.

9.2.2 Editing an Existing Recipe

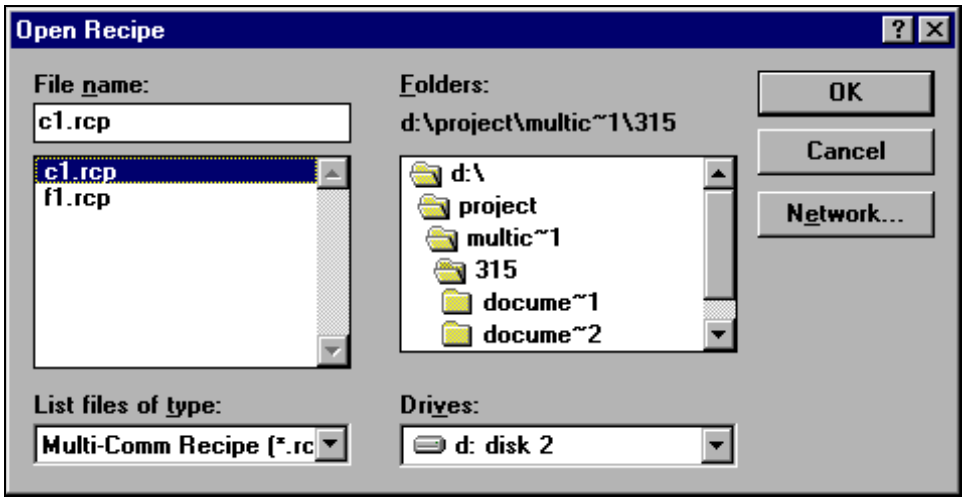
The same Recipe Editor functions are used to edit an existing recipe. Use **Ramp/Soak | Edit** to open the window used to select the .rcp file to be edited. Once you have selected a file, the Recipe Editor will open. The steps in the existing file will be displayed in the white box. The previous selections for engineering units, holdback, etc. will be filled in. Add, delete, edit, and insert steps as needed, then use **Save** to overwrite the old recipe file you selected, or **Save As** to create a new file.

9.3 Running CN8-SW Recipes

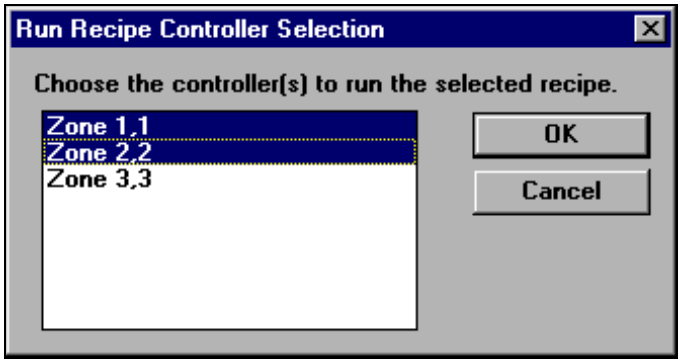
9.3.1 Starting to Run a Recipe

To run a CN8-SW Ramp/Soak recipe:

1. While logged in as MULTI (or another user with View/Change Parameter privileges), select **Ramp/Soak | Run.** The Open Recipe window will open.



2. Select the .rcp file to be run and click on **OK**. The Run Recipe Controller Selection window will open.



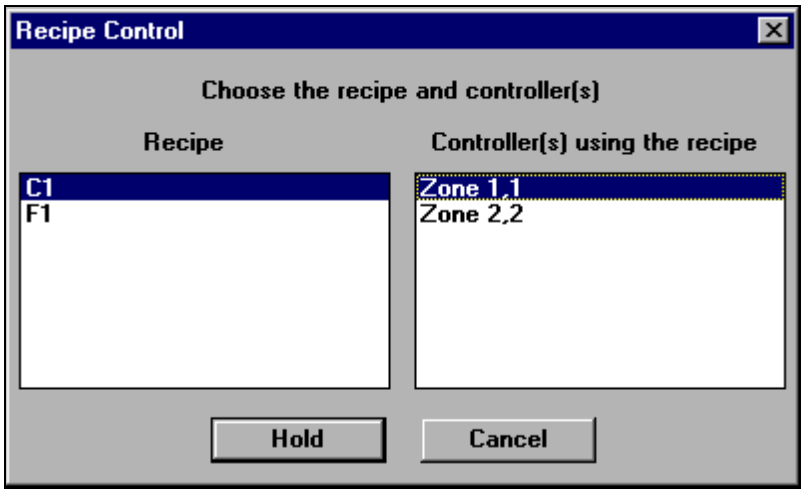
3. This window lists the name and network address of every control not currently executing a recipe under the direction of the CN8-SW system. Select one or more controllers. (You can hold down the Shift key to select multiple controllers that are together on the list, or hold down the Control key to select multiple controllers that are scattered on the list.)

4. Click on **OK.** The Run Recipe Controller Selection window will close, and the CN8-SW system will begin running the recipe on the selected controller(s). On the CN8-SW main display, the PV of any controller running the recipe will alternate with the display of “r-S”.

9.3.2 Holding (Pausing) Recipe Execution

To hold execution of a CN8-SW recipe:

1. While logged in as MULTI (or another user with View/Change Parameter privileges), select **Ramp/Soak | Hold**. The Recipe Control window will open.



2. The window lists all the recipes being run under the direction of CN8-SW. A recipe may appear on the list in the left pane more than once. This means that you started to run the recipe on different controllers (or sets of controllers) at different times. Each of these occurrences of a recipe on the list is referred to as an "instance" of the recipe.

   To see on which controller(s) you are currently executing an instance of a recipe, click on the name of the recipe. The controllers running the selected instance of the recipe that are not already on hold will be listed in the right pane.[14]

3. Select the instance of the recipe to be held.

4. Select the controllers to be held. (You can hold down the Shift key to select multiple controllers that are together on the list, or hold down the Control key to select multiple controllers that are scattered on the list.)

5. Click on **Hold**. Execution of the selected instance of the CN8-SW recipe will be paused for the selected controllers, and the window will close. On the CN8-SW main display, the PV of the "held" controllers will alternate with the display of "HOLd".

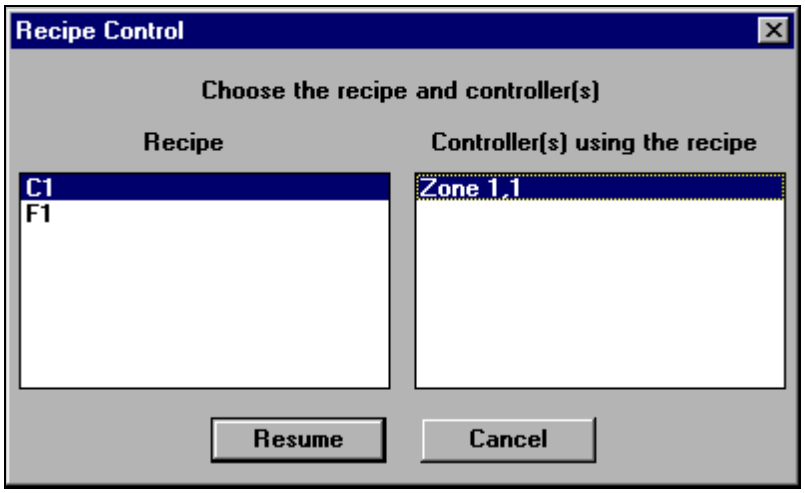
Execution of the selected instance of the recipe will be held for the selected controllers until you resume execution as described in 9.3.3, or stop (terminate) execution as described in 9.3.4.

[14] If all controllers on which you are running the selected recipe instance are already held, then no controllers will be listed in the right pane.

9.3.3 Resuming Recipe Execution

To resume execution of a "held" recipe:

1. While logged in as MULTI (or another user with View/Change Parameter privileges), select **Ramp/Soak | Resume.** The Recipe Control window will open.



2. The window lists all the recipes being run under the direction of CN8-SW. A recipe may appear on the list in the left pane more than once. This means that you started to run the recipe on different controllers (or sets of controllers) at different times. Each of these occurrences of a recipe on the list is referred to as an "instance" of the recipe.

   To see on which controllers you have held an instance of a recipe, click on the name of the recipe. The controllers on hold for the selected instance of the recipe will be listed in the right pane.[15] Execution of the selected recipe instance may have been held on the controllers in this group at different times.

3. Select the instance of the recipe to be resumed.

4. Select one or more controllers to be resumed. (You can hold down the Shift key to select multiple controllers that are together on the list, or hold down the Control key to select multiple controllers that are scattered on the list.)

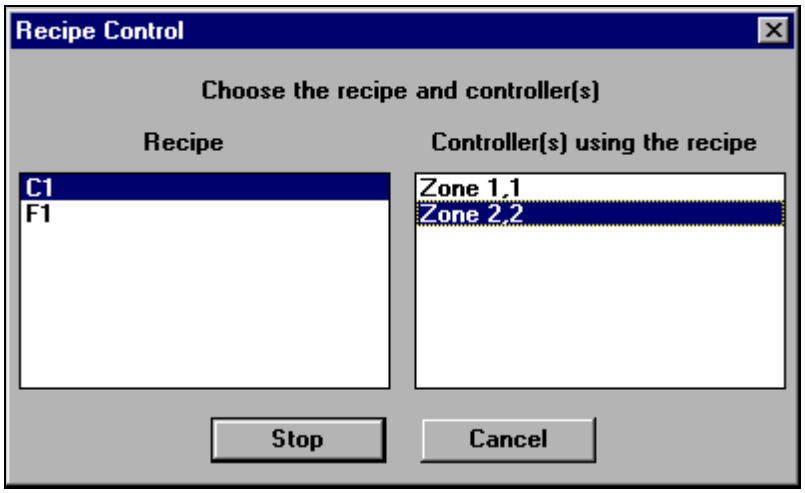
5. Click on **Resume**. Execution of the selected instance of the recipe will resume on the selected controllers at the point in the recipe where it was held for each controller. Execution of the recipe can resume at different steps in the recipe in different controllers. (Although you started to run the recipe instance in all the controllers at the same time, you may have held execution at different times.) On the CN8-SW main display, the PV of the selected controllers will again alternate with the display of "r-S", indicating that a CN8-SW recipe is active using those controllers.

[15] If the CN8-SW system is not holding execution of the recipe instance for any controllers, then no controllers will be listed in the right pane.

9.3.4 Stopping Recipe Execution

To stop execution of a CN8-SW recipe:

1. While logged in as MULTI (or another user with View/Change Parameter privileges), select **Ramp/Soak | Stop.** The Recipe Control window will open.



2. The window lists all the recipes being run under the direction of CN8-SW (both active and held). A recipe may appear on the list in the left pane more than once. This means that you started to run the recipe on different controllers (or sets of controllers) at different times. Each of these occurrences of a recipe on the list is referred to as an "instance" of the recipe.

   To see on which controller(s) you are currently running an instance of a recipe, click on the name of the recipe.

3. Select the instance of the recipe to be stopped.

4. Select one or more controllers. (You can hold down the Shift key to select multiple controllers that are together on the list, or hold down the Control key to select multiple controllers that are scattered on the list.)

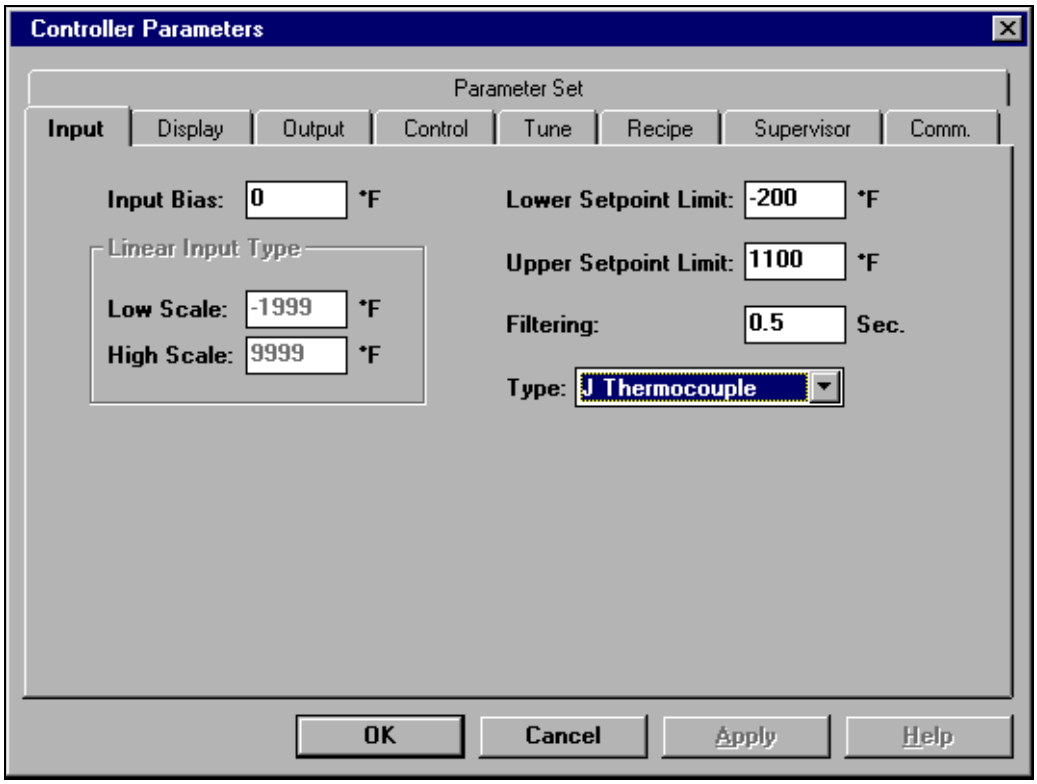
5. Click on **Stop**. Running of the selected instance of the CN8-SW recipe using the selected controllers will end. The setpoint for each selected controller will remain where the setpoint was when the recipe was stopped, not at the value determined by the Termination State configured for the recipe.

9.4 Configuring Controller Ramp and Soak Parameters

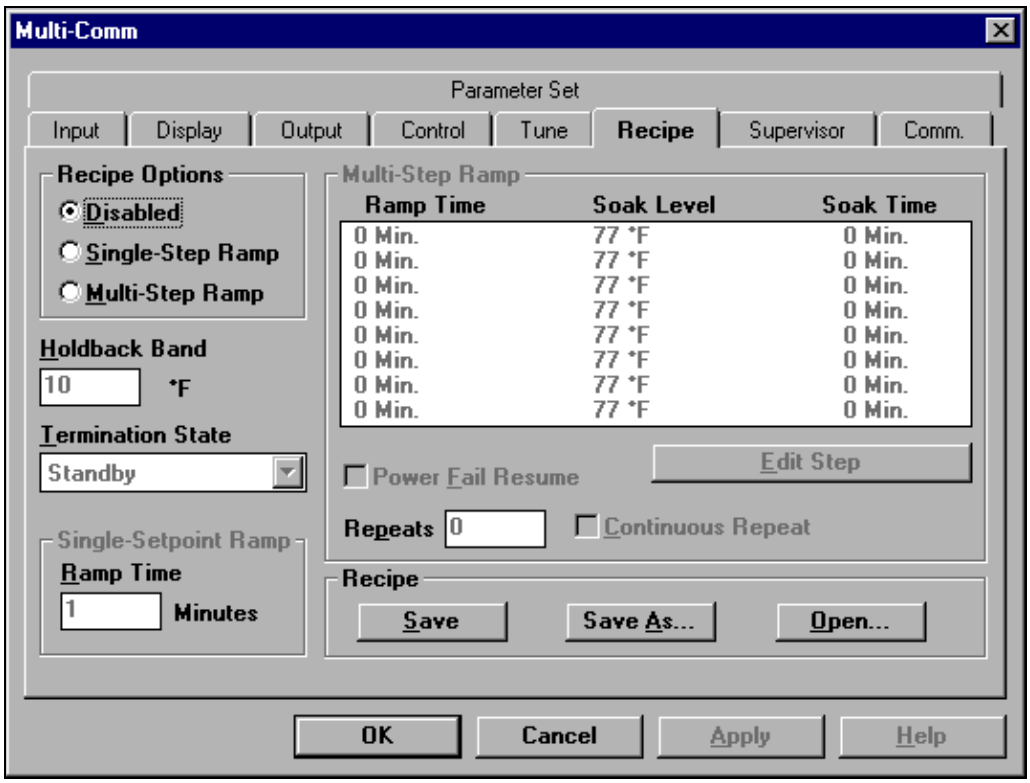
To configure a recipe using the recipe parameters of Omega Plus controllers which support this function:

1. While logged in as MULTI (or another user with View/Change Parameter privileges), select the controller by clicking on it in the main graphic display.

2. To display the present values of all parameters stored in the controller's non-volatile memory, select **Controller | Parameters**. The parameter window for that controller will open. By default, the Input "tab" will be on top.



3. Click on the Recipe tab. The existing recipe-related parameter values will be displayed.



4. To enable Multi-Step Ramp, click on the white dot ("radio button") next to it. A black dot in the circle indicates that the function has been selected. The gray values in the Multi-Step Ramp panel, and in the the Holdback Band, Termination State, and Repeats entry boxes will become black, indicating that they can be edited. The Power Fail Resume and Continuous Repeat labels will also become black, indicating that these options are available for selection. The values in the Multi-Step Ramp panel represent the values stored in the controller's recipe parameters. (The units of measure match those selected for the display units parameter.)

5. Use the Termination State dropdown list to specify what you want to happen to the controller when execution of the recipe has been completed.

6. Use the Repeats box to enter the number of times you want the recipe to execute each time it is run. If you want the recipe to run once, leave the Repeats value at the default, zero. If you want the recipe to cycle continuously once started, click on the box to the left of "Continuous". The box will be checked, indicating that the option has been selected.

7. Enter a Holdback value of at least 1, or disable holdback.[16]

---

[16] If you are concerned that your process might not be responsive enough to reach the soak levels in the specified ramp times, use the holdback feature. If holdback is enabled, then the system will not allow the setpoint to become more than *n* engineering units away from the process value, where *n* is the Holdback value. The system will "hold back" the SP until the PV has had a chance to catch up. This has the effect of "stopping the clock" on the SP ramp time until the PV is within *n* units of the SP.

The specified holdback value *n* will also be applied to the soak level. If the temperature falls more than *n* units from the soak level, then the clock is stopped on the soak time until the PV is again within *n* units of the SP specified for the soak level.

8. To edit a step, click on it to select it, then click on **Edit Step**.

9. Enter the Ramp Time, Soak Level (setpoint), and Soak Time for a recipe step in the boxes provided.[17]

10. Repeat Steps 8 and 9 until the recipe meets the needs of your application.

11. If you want to save this recipe to an .RS file on a drive accessible to the CN8-SW computer, use the **Save As** button. A window will open in which you can specify the filename and directory. You must replace "Untitled" in the wintdow with a meaningful file name ending with the .RS extension. (If you make further changes and want to save to the same file, use the **Save** button.) When you click on **OK**, the ramp time, soak level, and soak time values will be saved in the file. They will not be sent to the controller.

12. When you are ready to write the recipe values to the controller, click on **Apply**, or **OK**. The values will be written to the controller during the next scan cycle. If you use **Apply,** the parameters window will stay open. If you use **OK**, the window will close.

To open a previously saved controller recipe .RS file (not a CN8-SW .RCP recipe file), use the **Open** button on the Recipe parameter tab and select the file. The ramp time, soak level, and soak time values in the file will be displayed on the Recipe tab. The values will not be sent to the controller until you click on **Apply** or **OK**.

[17] Because of the effect of the holdback value, these ramp and soak times should be considered minimums if holdback is enabled.

9.5 Running Controller Ramp and Soak Cycles

To run a multi-step ramp and soak recipe based on the values stored in the controller:

1. Select the controller by clicking on its image in the main graphic display. The border of the controller will be highlighted.

2. Select **Controller | Start Recipe**. The function will be invoked. Note that if the Recipe Option is set to "Single-Step Ramp" or "Disabled", then the multi-step ramp function is not available. In these cases, using **Controller | Start Recipe** will invoke the single-step ramp function. (If the Recipe Option is set to "Disabled", the CN8-SW software will display a confirmation message before executing a single-step ramp based on the one minute default ramp time.)

When a controller is executing a ramp/soak step based on values stored in the controller's parameters, the PV will alternate with "rS" on the CN8-SW main display to match the controller's front panel display.

10. Storing and Loading Controller Configurations

10.1 Introduction

All the configuration parameter values stored in non-volatile memory in a controller that supports Omega Plus Protocol can be saved to the PC and loaded to the same or different controllers. Backing up a unique controller configuration on a PC or removable medium is always prudent. If a controller is damaged later and must be replaced, the custom configuration can be loaded quickly to a spare controller, minimizing down time.

In large installations where many controllers use the same (or almost the same) configuration, its easy to configure one controller using the CN8-SW display, save the parameter set to the PC, then load the same parameter set to many other controllers on the network. The time saved by eliminating the need to configure each controller at its front panel more than pays for the CN8-SW package. (If you load the same configuration into more than one controller, remember to give each controller a unique network address using the controller's front panel.)

The ability to store and load a controller configuration also enables you to reuse tuning parameter values that have proved to be best for certain process conditions. If the responsiveness of your process is altered at times, you may find it desirable to save sets of tuning parameters to be used under different circumstances.

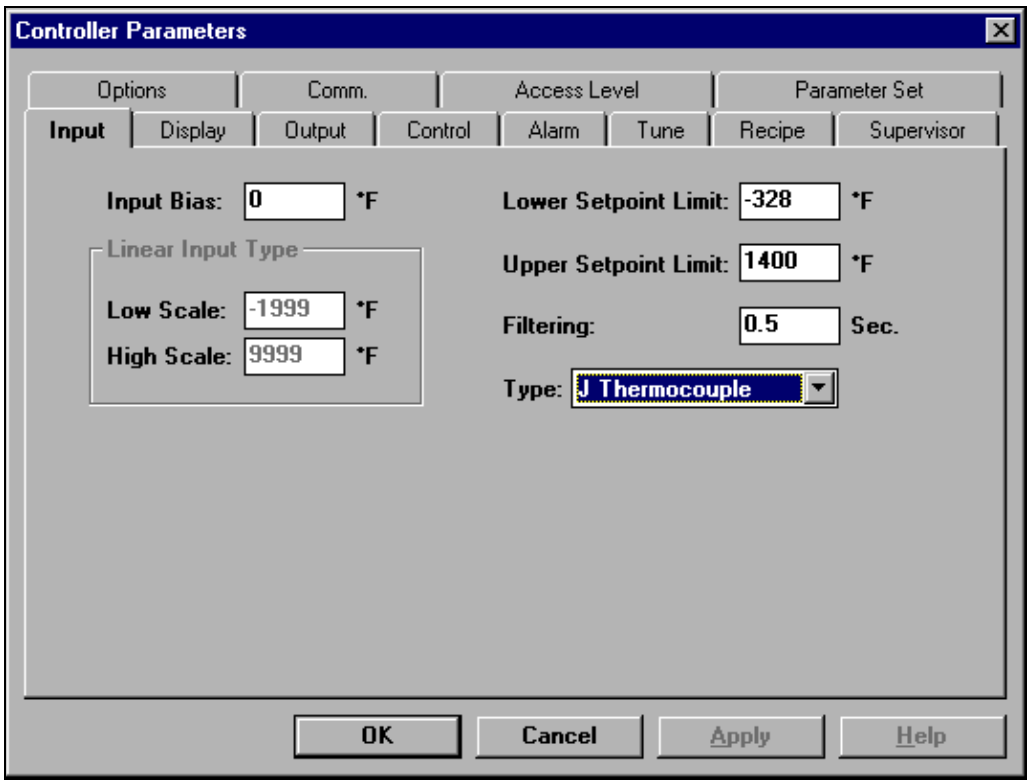
For example, if you autotune the controller for optimum control of the temperature of an engraving cylinder while one size is in use, save the parameter set before installing a larger or smaller cylinder. The different size cylinder may heat at a different rate, requiring different tuning parameters to be used for optimum control. Save the new tuning as a parameter set with a different name. When the day comes that you have to reinstall the first cylinder, reload the parameter set, including the tuning parameters that were optimized for that cylinder.

10.2 Storing Configuration

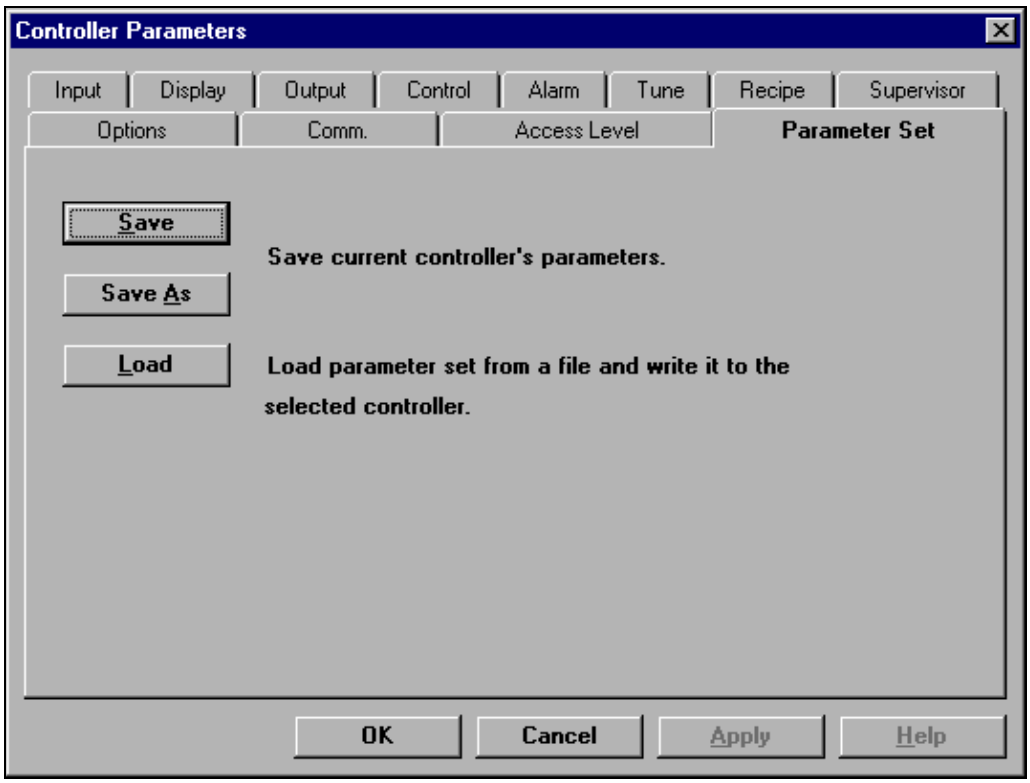
To save an Omega Plus controller's configuration on the CN8-SW computer:

1. While logged in as MULTI (or another user with View/Change Parameter privileges), select the controller by clicking on it in the main graphic display.

2. To display the present values of all parameters stored in the controller's non-volatile memory, select **Controller | Parameters**. The parameter window for that controller will open. By default, the Input "tab" will be on top.



3. Click on the Parameter Set tab. It contains the buttons used to save and load parameter sets.



4. To save the parameter set in a .PRF file, click on **Save As**. The Save Parameter Set window will open. Use it to enter a filename (with a .PRF file extension) and to specify a destination directory. (To save the parameter set to a file with the same name as the controller, click on **Save**. The file will be saved in the same directory where the CN8-SW software was installed.)

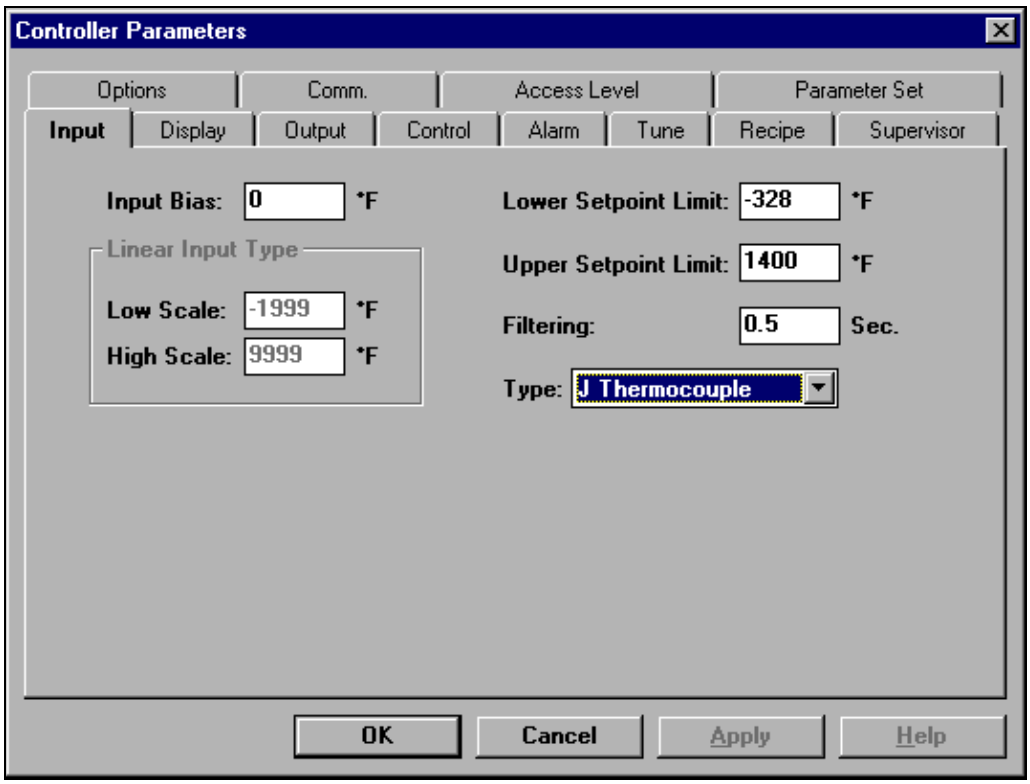
5. As the save progresses, a status window will be displayed. When the status window closes, the save operation is complete. You can click on **OK** to close the parameter window.

10.3 Loading Configuration

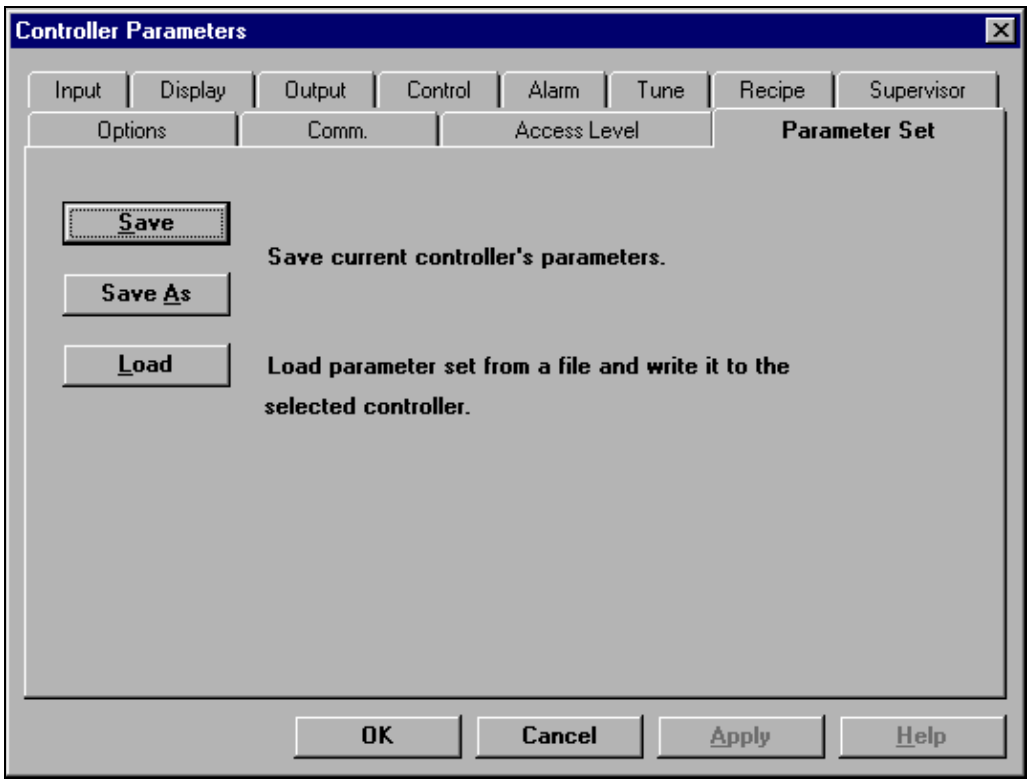
To save an Omega Plus controller's configuration on the CN8-SW computer:

1. While logged in as MULTI (or another user with View/Change Parameter privileges), select the controller by clicking on it in the main graphic display.

2. To display the present values of all parameters stored in the controller's non-volatile memory, select **Controller | Parameters**. The parameter window for that controller will open. By default, the Input "tab" will be on top.



3. Click on the Parameter Set tab. It contains the buttons used to save and load parameter sets.



4. To load a parameter set to the selected controller, click on **Load**. The Open Parameter Set window will open.

5. Select the name of the .PRF file to be loaded to the controller and click on **OK**. The parameter values stored in the file will be written to the controller.

6. As the load progresses, status windows will be displayed. When no more status windows are displayed, the load has completed successfully. If the CN8-SW system could not write all the parameter values in the .PRF file to the controller, messages containing the parameter numbers will be displayed. Usually a parameter value cannot be written to the controller because the hardware does not support the feature that uses the parameter. Note the parameter numbers in the messages, then check the controller manual to determine the names of the parameters. If the parameters apply to your application, configure the parameters individually.

11. Logging PV and SP Values

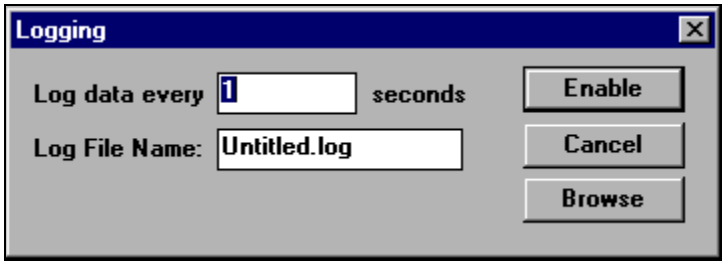
11.1 Introduction

The CN8-SW application supports optional logging of SP and PV values for all controllers at configurable intervals. Logs are saved in ASCII text files with comma-separated-value format. These files can be viewed, printed, and manipulated with other applications, such as word processing and spreadsheet software.

11.2 Turning On the Logging Function

To turn on the logging function:

1. While logged in as MULTI (or another user with Controller Configuration privileges), Select **Options | Logging.** The Logging window will be displayed.

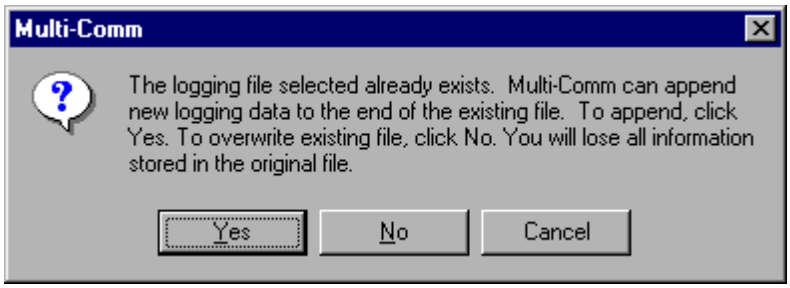


2. Enter the name of the log file to be used. Keep the .log file extension. (Unless you use the **Browse** button to specify a different location, the log file will be in the same directory in which the CN8-SW software was installed.)

3. Enter the frequency (in seconds) with which the SP and PV values should be logged. Remember that log files will grow rapidly at frequent logging rates. Be sure there is enough room on the drive containing the log files.

4. Click on **Enable**. If this file name has not been used before for a log, the logging will begin and the Logging window will close.

   If a log file already exists with that name in the CN8-SW directory, a confirmation message will be displayed.



5. To append new data to the old file, click on **Yes**. To overwrite the old file, click on **No.** This will result in the old data being lost.

11.3 Viewing and Printing Log Files

The log files are ASCII text file with comma-separated values. To view and print the files, use any text editor (such as WordPad) that will retain the line breaks.

11.4 Turning Off the Logging Function

To turn off the logging function:

1. While logged in as MULTI (or another user with Controller Configuration privileges), open the Options menu. When logging is enabled, the Options menu will include the item **Stop Logging**.

2. Select **Options | Stop Logging.** Logging will be disabled.

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