

INSPIRED INNOVATION

Despatch
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Protocol Manager Network Utility Software INSTRUCTION MANUAL

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INTRODUCTION

The Despatch Protocol Manager network utility software enables the operation of multiple Protocol Plus controllers from a remote PC. As many as 32 Protocol Plus units may be operated.

The software performs the following functions:

- Remote access and operation of one or more Protocol Plus controllers
- Allows use of a centralized PC to store and edit profiles
- Allows the same profiles to be downloaded to multiple controllers
- Allows a profile to be uploaded from a particular controller to the central PC, so it can be passed to the other controllers
- Allows centralized data logging from all controllers connected to the central PC

NOTE: Use this document in conjunction with Despatch publication E98 (p.n. 143895), Protocol Plus Control Instruction Manual.

INSTALLATION

Host Computer Requirements

The host computer must be Pentium-class or equivalent, running Windows XP, Vista, Windows 7 both 32 and 64 versions.

Installing the Software

NOTE: Close all open applications before installing Protocol Manager software.

1. Insert the Protocol Manager software CD-ROM into the CD drive of the control computer.
2. Click on the start button in the lower left corner of the screen.
3. Click on the "Run" button from the menu that appears.
4. Click on the Browse button. Change the Look In box at the top of the window to the drive letter for your CD drive.
5. Double-click on the Despatch Protocol Manager application. The following screen will appear:

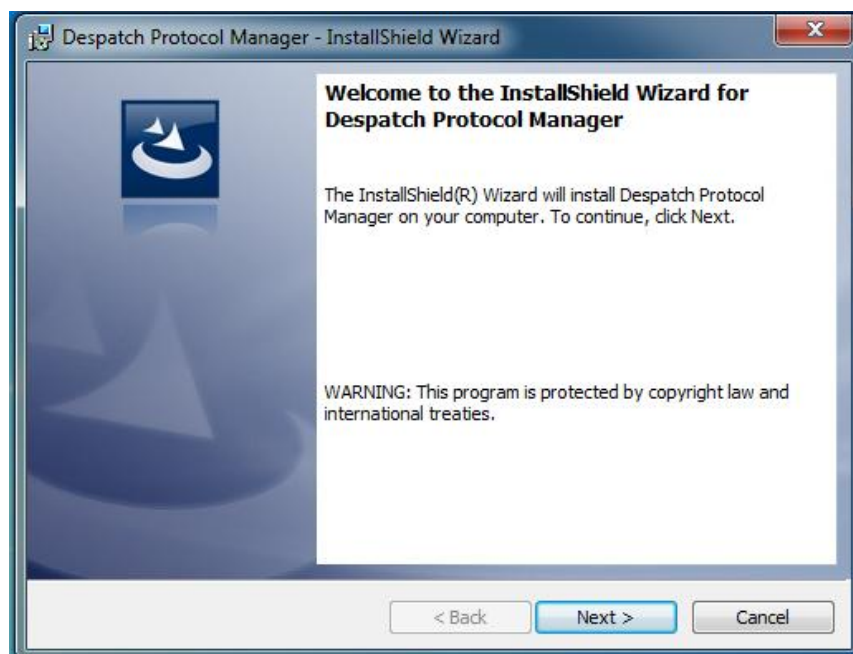


Figure 1: Protocol Manager Installer

6. Click on the Next button. The following screen will appear:

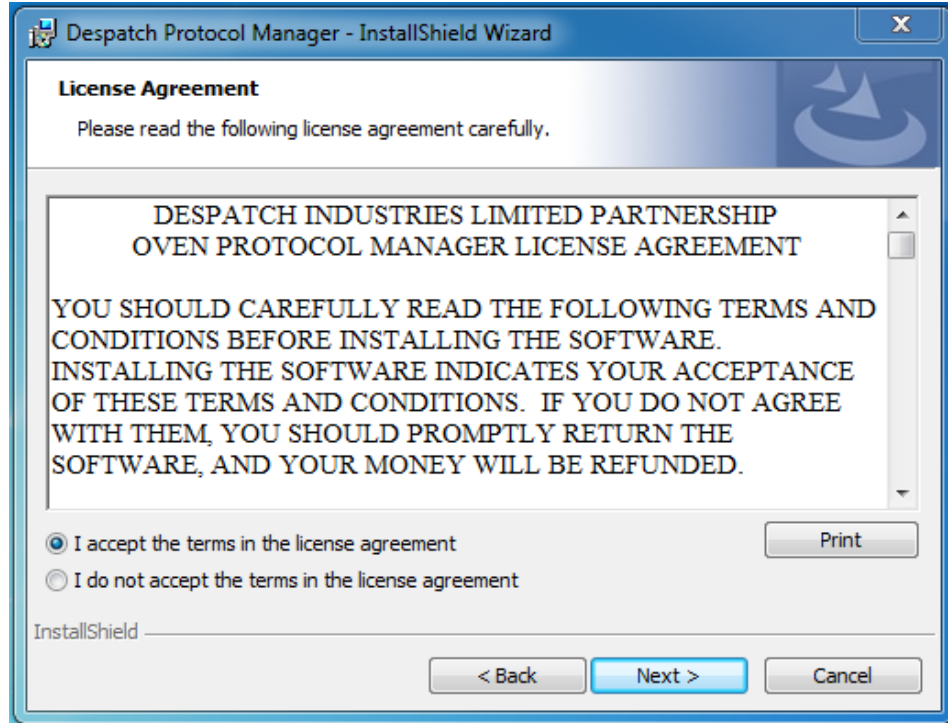


Figure 2: License Agreement

7. Scroll the window to read the license agreement, then click on the "I accept the terms" button and click Next to continue.

8. The following Destination Folder screen will appear.

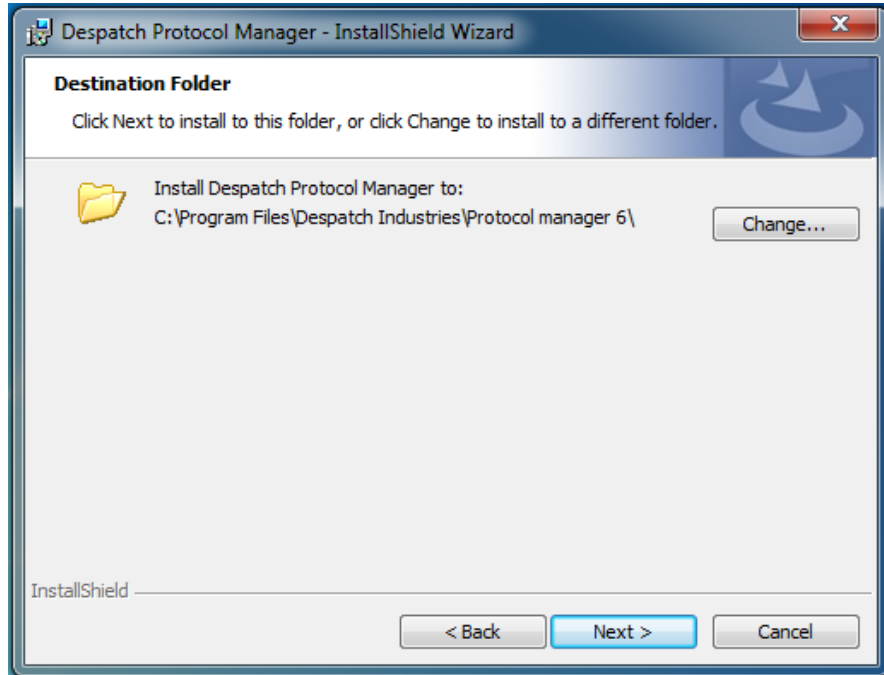


Figure 3: Destination Folder Selection

9. Either accept the directory shown and click Next, or select a new directory using the Change button, then click Next. The following screen will appear.

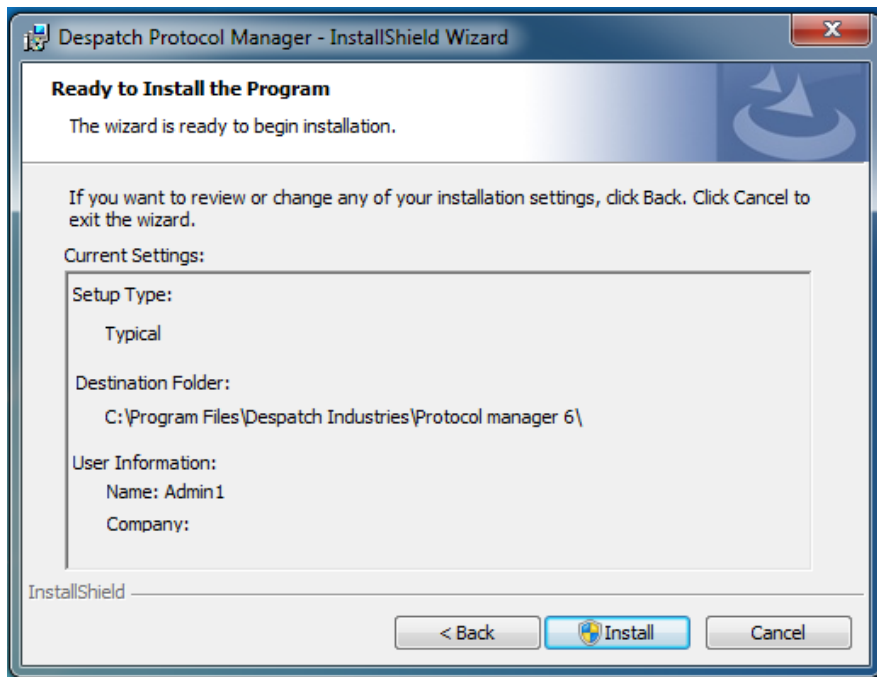


Figure 4: Install Screen

10. If all is in order, click the Install button to install the software. When the installation is complete, the following screen will appear.

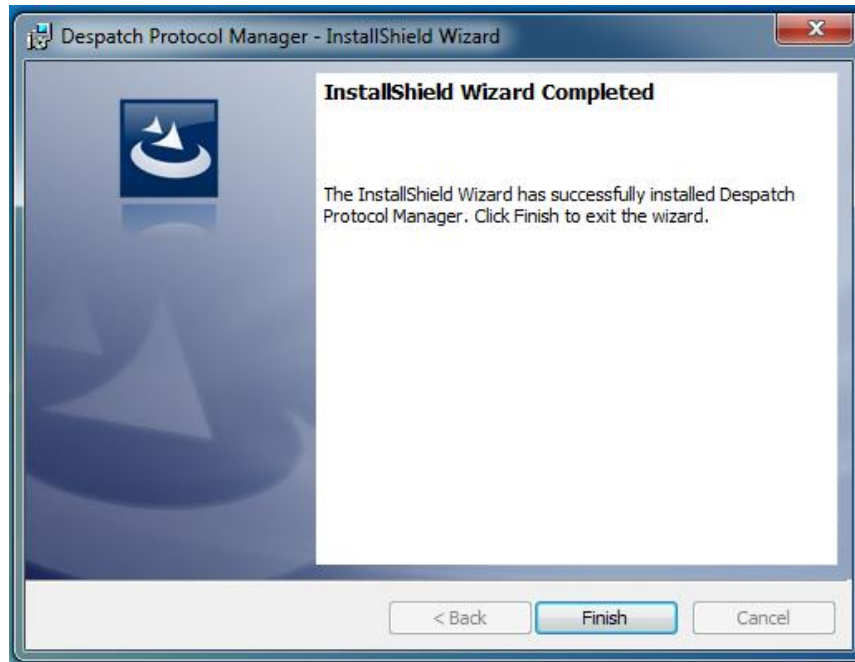


Figure 5: Installation Completed

11. Click on Finish to complete the installation.

Software Setup

Configuring the Controllers

1. Use the keys on the faceplate of each Protocol Plus controller to set these parameters. Consult Despatch Manual E98 for information on this process.
2. On each of the controllers, the following parameters must be defined in order for the new control software to communicate with the controllers. Normal conditions use the settings listed in parentheses in the **Communication Page** in the **Setup Mode** of the controller.
 - Address (1 - 247) - A unique address must be assigned to each controller. Make certain that controller addresses are known when setting up the software.
 - NOTE that each of the multiple controllers must have a different address.
 - Communication mode (MUST be Modbus)
 - Baud rate (19.2 K)
 - Parity (none)

Startup and Login

1. Start the application by clicking the Windows taskbar's **Start** button, then clicking **Programs** from the menu that appears, then clicking the **Protocol Manager** option from the list that appears.
 - a. NOTE: The very first time this is done, a prompt may appear that there is no setup information yet, and that the password is **despatch**.
2. From the main screen that appears, select **Login** from the pulldown menu (or double-click where it says **(logged out)** to log in. Note that an **Operator ID** must be typed in, to log into the software. Type **despatch** into the **Password** space. See Figure 6. NOTE that the **Operator ID** can be up to 16 characters long.

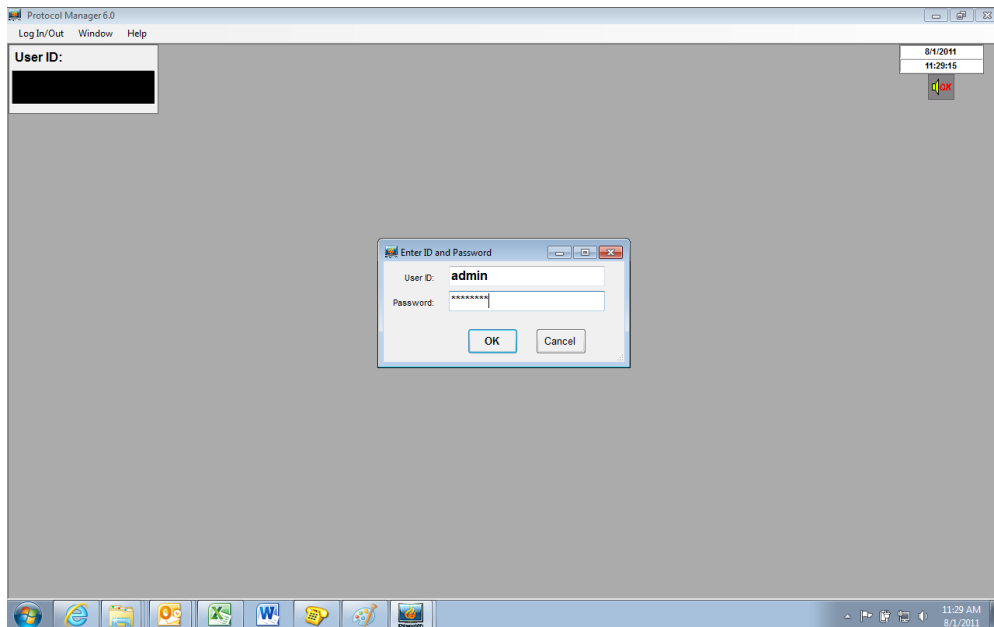


Figure 6: User ID and Password Entry

When login is successful, the **User ID** will appear in the upper left corner of the screen. NOTE that different operator levels have different colors behind the User ID: Level 2 is black, Level 3 is green, and Level 4 is red. See Figure 7.

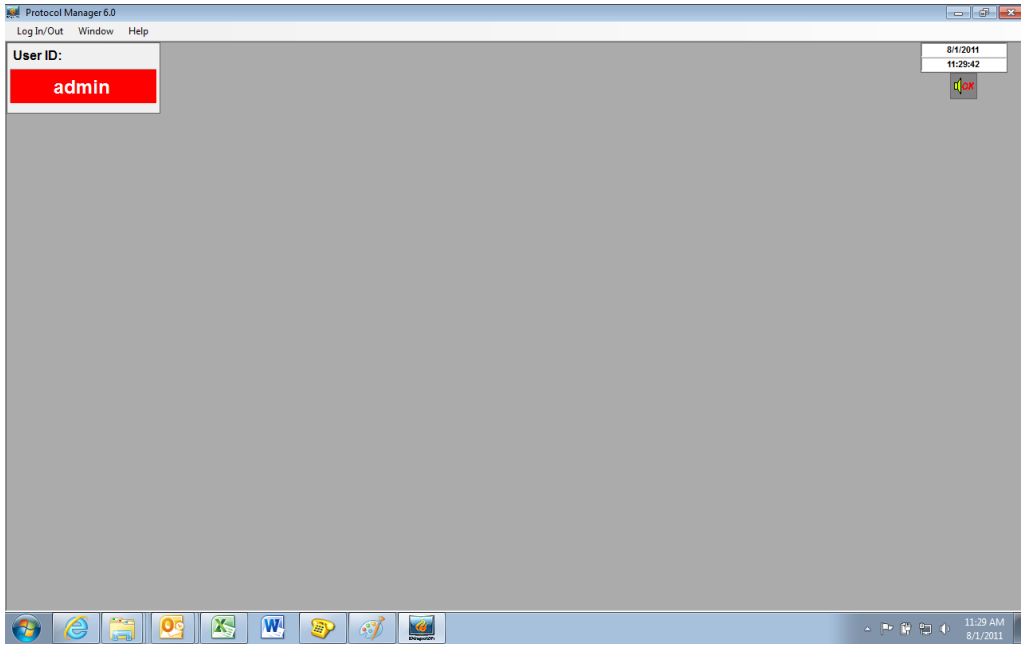


Figure 7: User ID after Log in

Setup

1. At this point the system must be set up. Move the cursor to the top of the screen and click on the **Window** prompt to reach the **Setup** pulldown. See Figure 8.

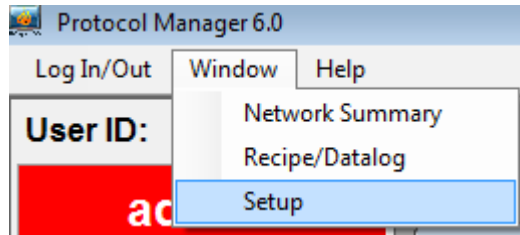


Figure 8: Setup Pulldown Menu

2. Click on the **Setup** prompt, and the **Software Setup** window will pop up. See Figure 9.

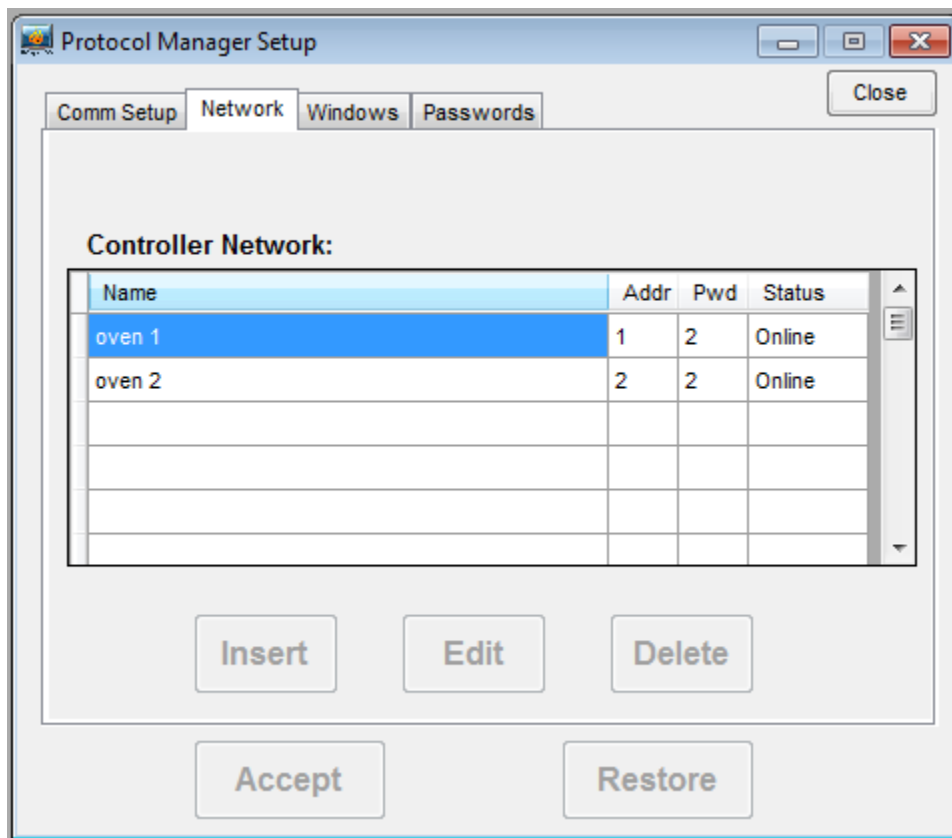


Figure 9: Software Setup Window

Comm Setup

The first tab on the left is the Comm Setup tab. Use the cursor to make selections to allow the computer and Protocol Plus controllers to communicate.

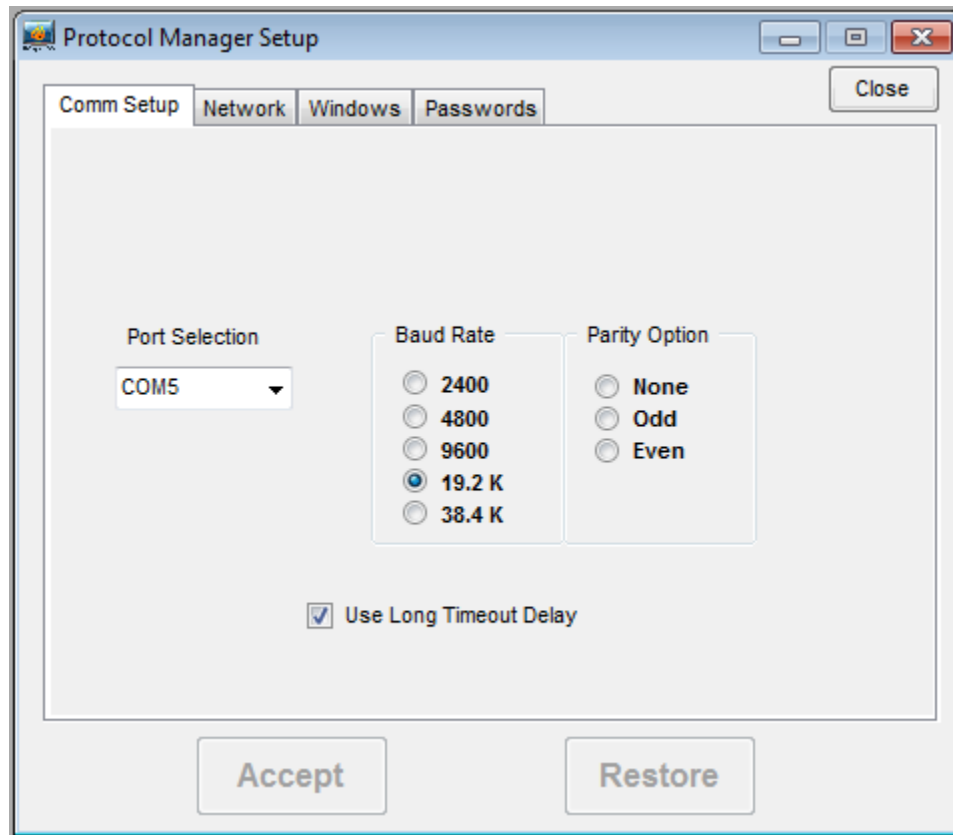


Figure 10: Protocol Manager Setup - Comm Setup Tab

1. Port Selection

Drop down menu will populate with communication ports.

Select the communication port that matches your host computer hardware.

2. Baud Rate

- 2400
- 4800
- 9600
- 19.2 K
- 38.4 K

Select the baud rate that corresponds to the rate programmed into the Protocol Plus controller(s). 19.2 K is the default configuration. 38.4 K provides fastest communication. If the controller(s) will not go on line, try a lower speed.

3. Parity Option

- None
- Odd
- Even

Select the parity that corresponds to that which is programmed into the Protocol Plus controller(s).

4. Use Long Timeout Delay checkbox

The software uses a timer to check Protocol controller response time. The software calculates acceptable response time - especially critical when using multiple controllers. If an unexpected communication failure occurs, checking this box will increase the communication timeout period. NOTE: For normal operation, leave this box unchecked: don't check this box unless a communication failure occurs.

5. Press the Accept button to save the selected parameters. Press the Restore button to return to the previously saved parameters.

NOTE that changes will not take effect until the Accept button is pressed.

6. Click on the OK button to save settings.

Network Setup

1. The second tab from the left on the **Software Setup** window is the **Network** tab. Select this tab to add controllers to the system. See Figure 11. Note that if all the buttons are not active, click on the space below the **Name** to activate the insert button.

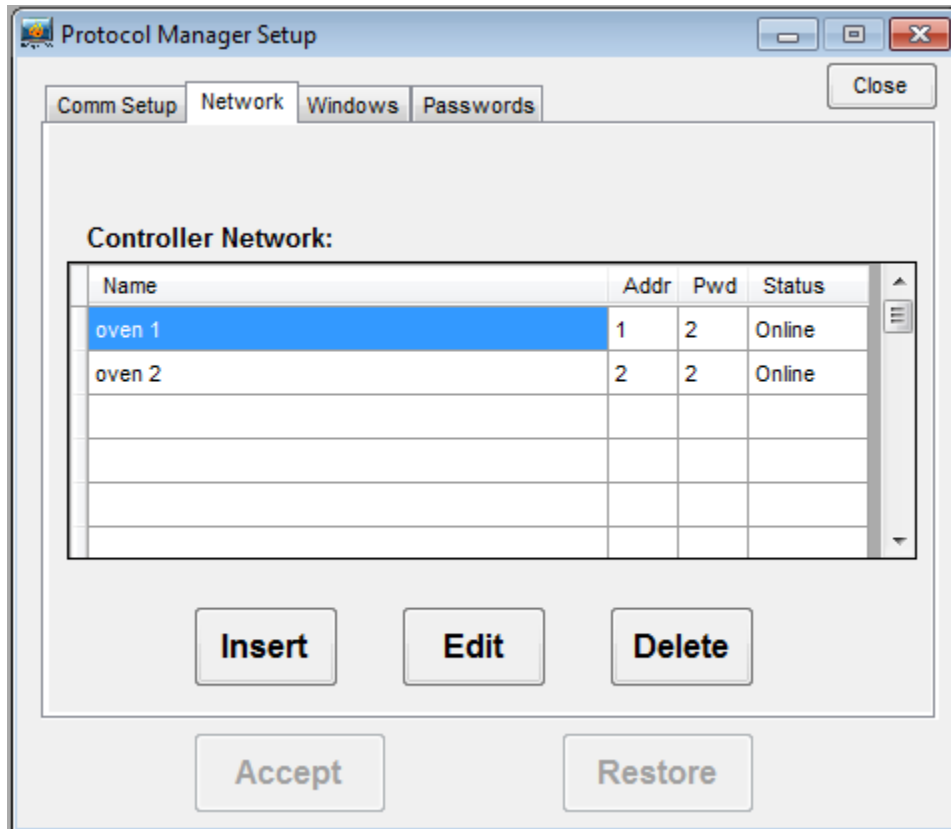


Figure 11: Protocol Manager Setup - Network Tab

2. Use this screen to add as many controllers as are connected to the host PC. Click on the first blank line to select it, then click the Insert button and press it to add a new controller to the software. The **Controller Setup** window will pop up. See Figure 12.

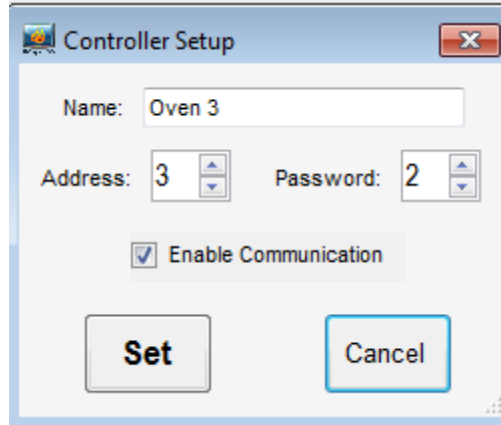


Figure 12: Controller Setup Window

Name Field: Designate and type in the name of the oven or controller, up to 24 characters long, maximum.

Address Field: Type the address or move the slide bar of the **Address** field to enter the address of the controller. (This field must correspond with the address programmed into the controller on the **Communication Page**; see Manual E-98 for directions.) Values 1 through 247 are accepted.

Password Field: Type the password or move the slide bar of the **Password** field to enter the password Level 2 of the controller. (This field must correspond with the Level 2 password programmed into the controller on the **Enable Page**; see Manual E-98 for directions.) Values from 1 to 999 are accepted. Default is 2.

Enable Communication Checkbox: Use the cursor to check this box to add it to the list of controllers working under the software. If the status for the controller shows **DISABLED** in the **Status** column of the **Network** tab of the **Software Setup** window (see Figure 12), this box must be rechecked.

A controller can be disabled by leaving this box unchecked. Communication will not be attempted with disabled controllers, which may be desirable if an oven is shut off (not used) for a long period of time.

3. When the chosen parameters have been entered, press the **Set** button on the popup. A question box will pop up (see Figure 13).

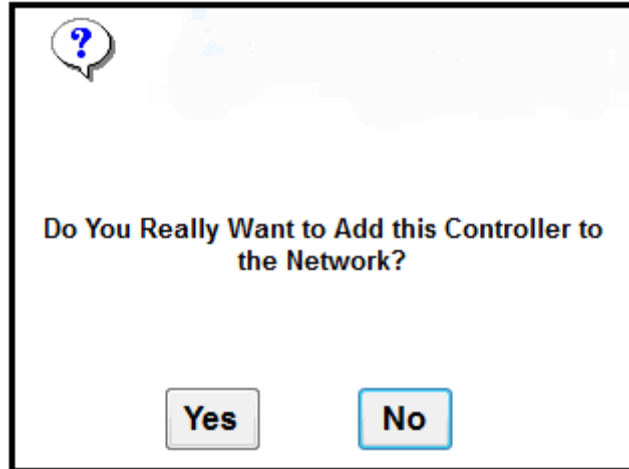


Figure 13: Controller Question Popup

4. Click **Yes** to add the controller to the network.

Windows Setup

1. The third tab from the left on the **Software Setup** window is the **Windows** tab. This allows the operator to select the parameters that may be viewed from the **Network Summary Window** and the **Controller Run Time** window. Press this tab to bring up its screen. See Figure 14.

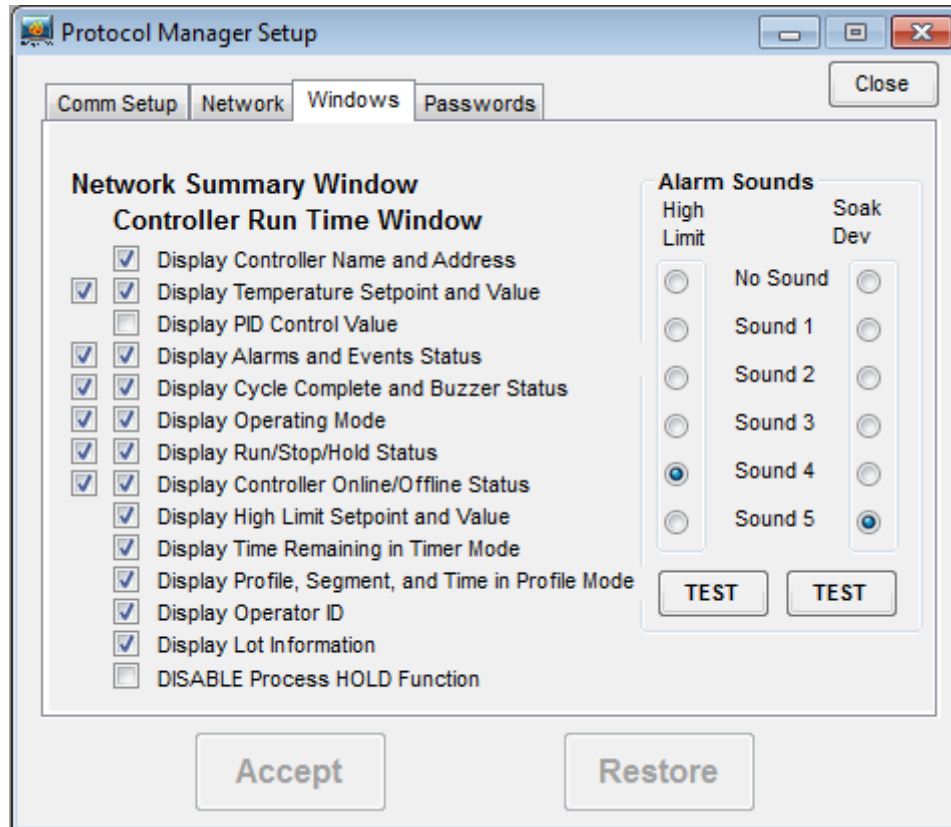


Figure 14: Protocol Manager Setup - Windows Tab

Use the checkboxes on the left side of the screen to select which parameters to display when viewing the **Network Summary Window** and **Controller Run Time Window** (both described below). Press the **Accept** button to save the selected parameters. Press the **Restore** button to return to the previously saved parameters.

When the controller is running in Timer or Profile mode, the Run/Hold button can be clicked to put the process in Hold. If you would like to disable this function so it remains a Run only button, click the box next to **DISABLE Process HOLD function**.

On the right side of the screen, select the alarm sound from one of five preset sounds for high limit trip, and for soak deviation from guaranteed soak band. (If no sound card is detected, the **Alarm Sounds** field is grayed out.)

2. Click **Yes** to save settings.

Software Setup: Passwords Setup

The fourth tab from the left on the **Software Setup** window is the **Passwords** tab. Press this tab to bring up its screen. See Figure 15.

Three levels of passwords may be set at this screen, which controls the software login level. The highest level, **Level 4**, enables the user to change communication settings, add/delete controllers from the network, change passwords, and perform all lower-level operations.

The next highest login level, **Level 3**, enables the user to edit/write recipes, configure data log settings, and perform all lower-level operations.

The next login level, **Level 2**, enables the user to change controller modes, select profiles, change set points, start data logging, and perform Level 1 operations.

The lowest login level, **Level 1**, allows the user to view run-time status, and start, stop or hold controller operation. No password is required.

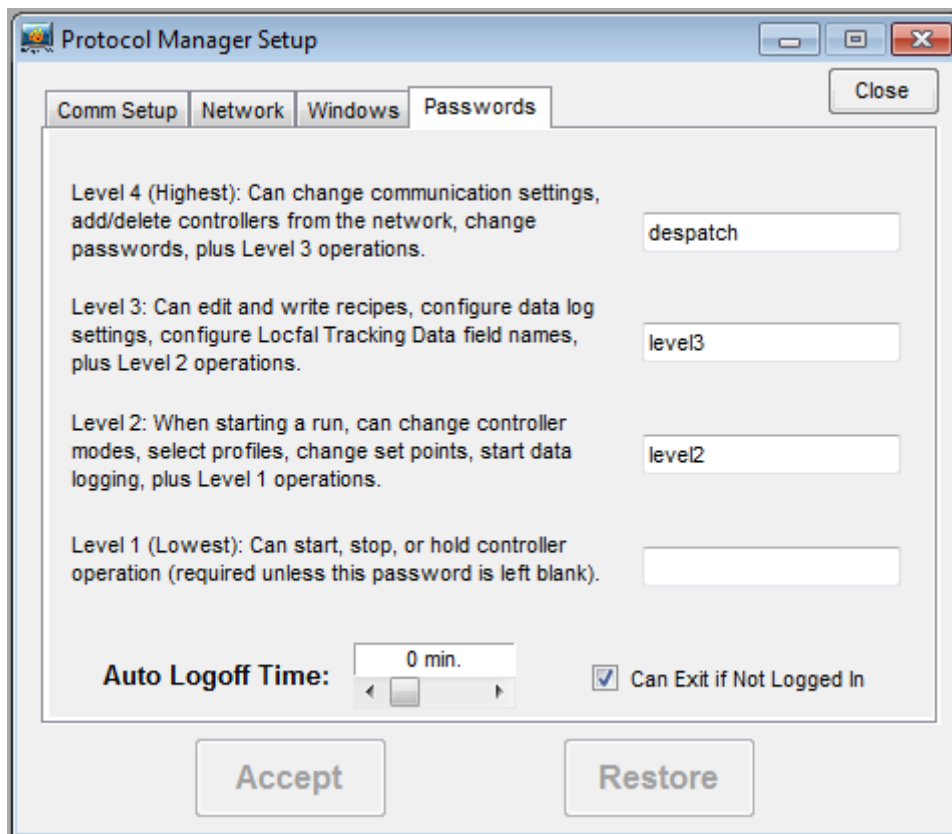


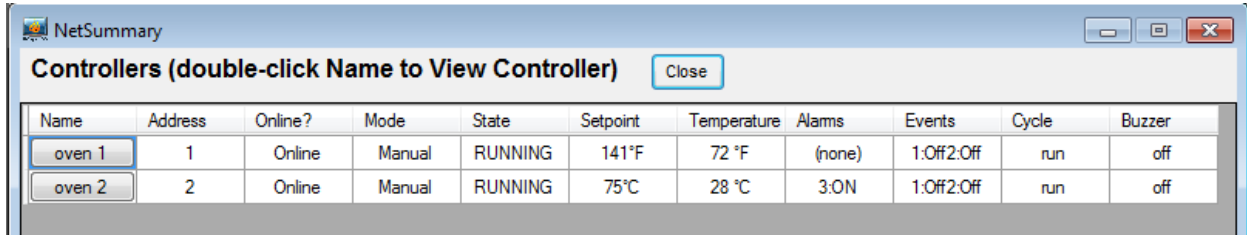
Figure 15: Protocol Manager Setup - Passwords Screen

Values from 0 minutes to 60 minutes may be set in the **Auto Logoff Time** window, which will automatically log the operator off the system after this predetermined period of time. Setting this value to zero disables this feature and the system will not automatically log off. Press the **Accept** button to save the selected parameters. Press the **Restore** button to return to the previously saved parameters.

The '**Can Exit if Not Logged In**' option can be checked to allow Protocol Manager to be stopped at any time. If this option is left unchecked, Protocol Manager can only be stopped if a user has successfully logged in at any level.

Exit the **Setup Mode** by clicking the close box or clicking the X box at the upper right-hand corner of the **Software Setup** box.

Network Summary Window



The screenshot shows a window titled "NetSummary" with a "Close" button. Below the title bar is a table with the following data:

Name	Address	Online?	Mode	State	Setpoint	Temperature	Alarms	Events	Cycle	Buzzer
oven 1	1	Online	Manual	RUNNING	141°F	72 °F	(none)	1:Off2:Off	run	off
oven 2	2	Online	Manual	RUNNING	75°C	28 °C	3:ON	1:Off2:Off	run	off

Figure 16: Network Summary Window

To view the Network Summary Window, click on the Windows prompt to reach Network Summary. Click on the Network Summary prompt, and the Network Summary Window will pop up. See Figure 16.

The **Network Summary Window** simultaneously displays parameters for all the controllers connected in the system. Parameters that may be displayed in the Network Summary Window are:

- Controller Name and Address
- Temperature Setpoint and Value
- Alarms and Events Status
- Cycle Complete and Buzzer Status
- Operating Mode
- Run/Stop/Hold Status
- Controller Online/Offline Status

Use the check boxes in the **Windows** tab (**Software Setup** page) to select how many of these parameters will be shown.

Double-click on a **Controller ID** in the **Name** column to display the associated **Controller Run Time Window** (see Figure 17).

Controller Run Time Window

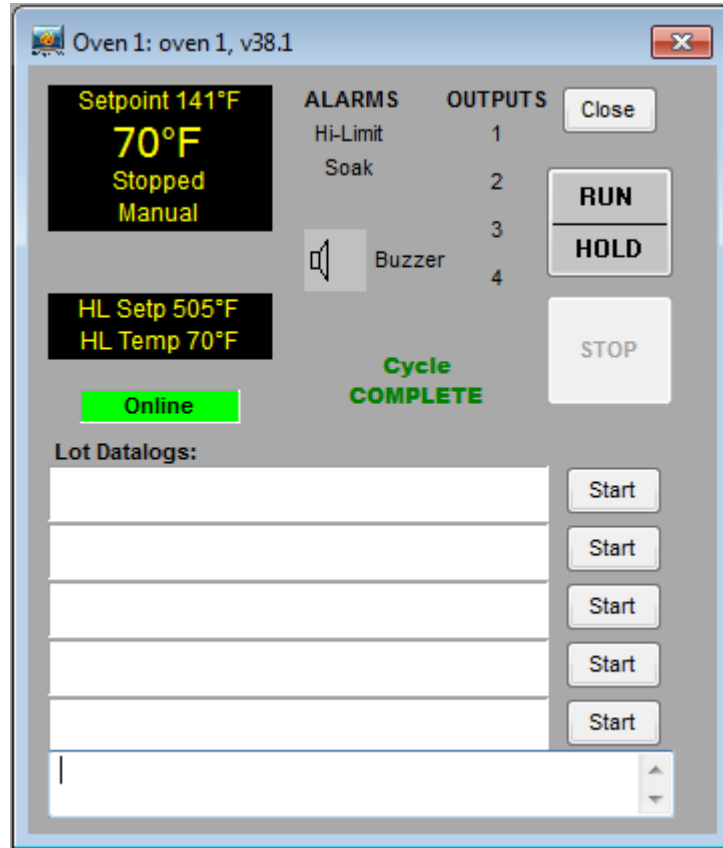


Figure 17: Controller Run Time Window

The **Controller Run Time Window** displays current status of an individual controller. Parameters that may be displayed in the Controller Run Time Window are:

- Controller Name and Address
- Temperature Setpoint and Value
- Alarms and Events Status
- Cycle Complete and Buzzer Status
- Operating Mode
- Run/Stop/Hold Status
- Controller Online/Offline Status
- High Limit Setpoint and Value
- Time Remaining in Timer Mode
- Profile, Segment, and Time in Profile Mode
- Operator ID
- Lot Information

Recipes are started, run, and stopped from this window. This window may be used to remotely control the controller's operating mode and state. If this window disappears, click on the **Network Summary** window and double click on the controller name. If the

Network Summary window does not appear in the main menu, click on windows on the task bar and then click on **Network Summary** on the pull down menu.

The Controller Run Time Window initially appears “collapsed” as shown below:

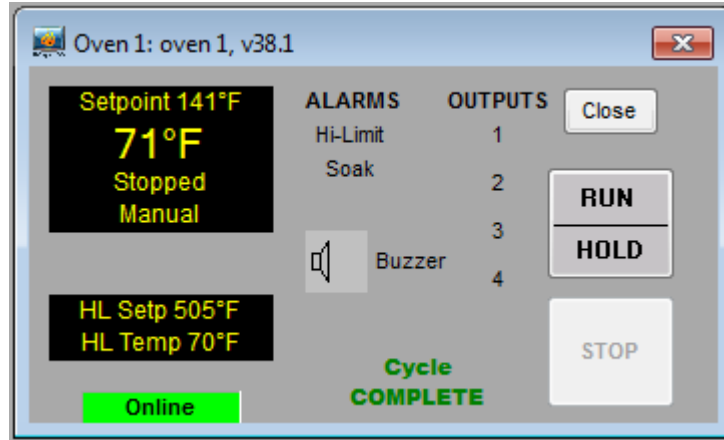


Figure 18: Collapsed Controller Run Time Window

Double-Clicking the “Cycle COMPLETE” indicator will alternately expand or collapse the Controller Run Time Window.

The expanded window appears as shown below if Lot Datalogs have not been enabled (see “Datalog functions”):



Figure 19: Expanded Controller Run Time Window with Datalogs not enabled

The expanded window appears as shown in Figure 17 if Lot Datalogs have been enabled (see “Datalog functions”).

Configuring a Recipe

To create a recipe, go to the bar at the top of the screen and pull down to **Recipe/Datalog** from the **Window** designation. The **Recipe Editor Window** will appear (See Figure 20 and Figure 21).

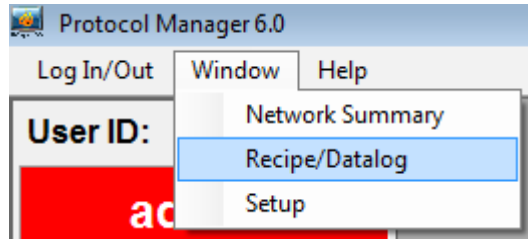


Figure 20: Recipe/Datalog Pulldown Menu

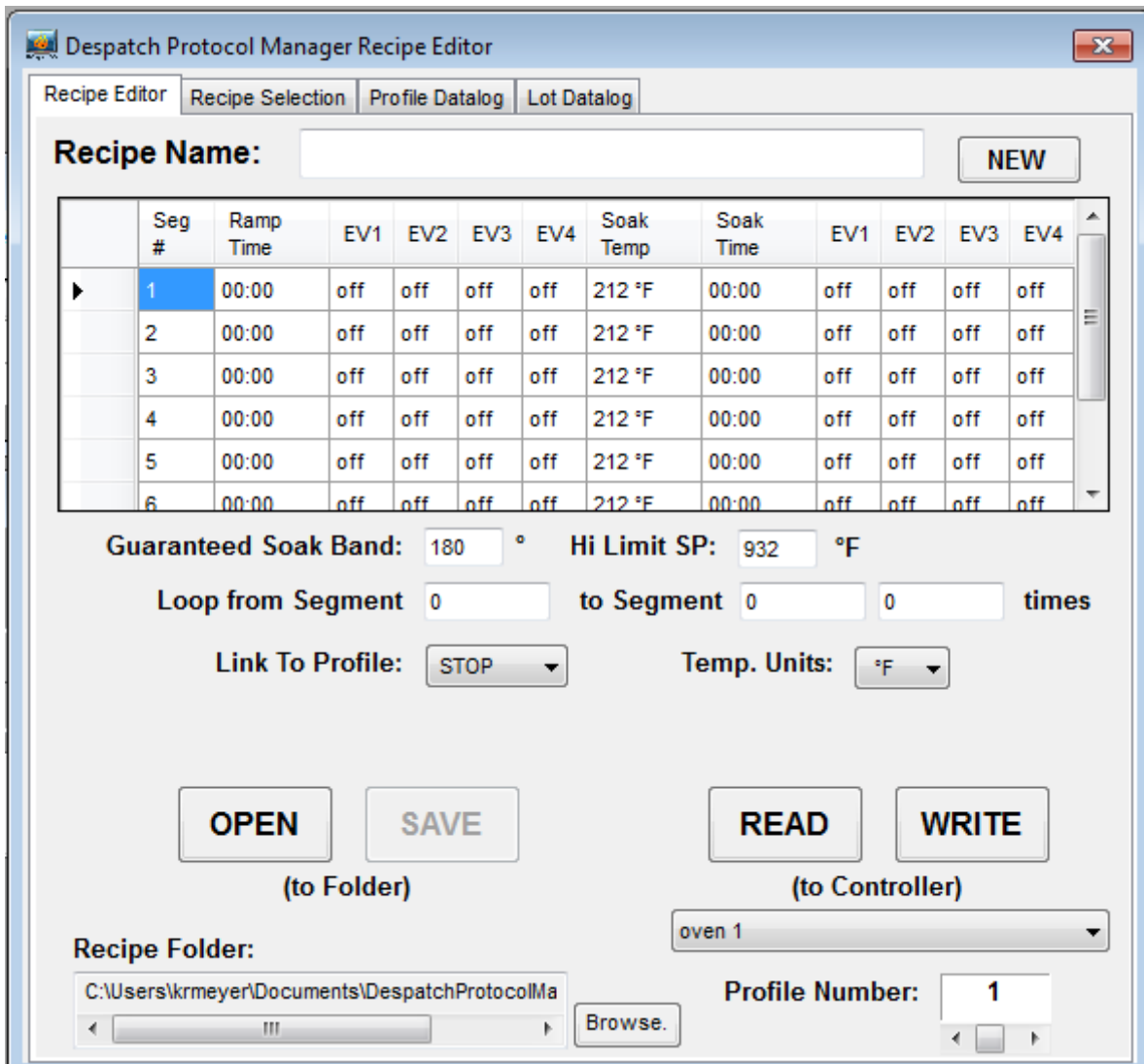


Figure 21: Recipe Editor Screen

Double-click on the fields in the center of the Recipe/Datalog window to bring up a window box to access and change the value shown. Move the slider to change the value quickly. Click on the arrow at either end to change the value by 1. Click in the white space to the left and right of the slider to change the value by 10. Click OK to lock in the change. See Figure 22.

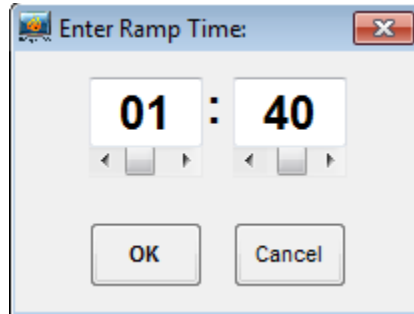


Figure 22: Value Change Window

Parameters on the Recipe screen include:

- Recipe Name** Type the name of the new recipe being created.
- Seg#** Recipe segments 1 through 8 may be programmed, each with its own set of events, ramp and soak times, and soak temperature.
- Ramp Time** The time required to ramp setpoint up to temperature may be programmed here. Values between 0 and 99:59 are allowable. As in the Protocol Plus controller, profile ramp and soak times are stored without units. Units are independently set locally, in the actual controller, as either hours and minutes (HH:MM) or minutes and seconds (MM:SS).
- EV1 through 4** From 1 to 4 events may be programmed into the ramp time portion of each segment here. These typically involve actuating/disabling relays to close/open valves or perform other relay-controlled functions. NOTE: These will only actuate when the controller has the relay cards installed and programmed for an event. Recipes may contain four Ramp and four Soak event choices, although only those relays actually supplied in a Protocol Plus controller and configured for events will be affected by recipe settings, when used to run a profile.
- Soak Temp.** The temperature of a particular segment is entered here; it can range from -18 to 540 degrees C (0 to 1000 degrees F). See Notes on Soak Temp and Hi Limit SP, below.
- Soak Time** The duration of soak is entered here; the value can range from 0 to 99:59.

EV1 through 4	From 1 to 4 events may be programmed into the soak portion of each segment here. These typically involve actuating/disabling relays to close/open valves or perform other relay-controlled functions. NOTE: These will only actuate when the controller has the relay cards installed and programmed for an event.
Guaranteed Soak Band	If the process temperature deviates from the setpoint by more than this value, the timer is placed in a hold condition. The timer continues when the process temperature falls within range.
Hi Limit SP	The high limit setpoint may be entered here; if the temperature exceeds this value, the hi-limit will alarm and shut off the heater. See Notes on Soak Temp and Hi Limit SP, below.
Loop from Segment ____ to Segment ____ times	These values enable the profile or controller to jump from a certain step to another step of the recipe a preset number of times.
Link to Profile	Values for the end of profile option are: STOP Stop oven operation HOLD Hold setpoint 1 – 8 Jump to selected profile number STBY Enter standby mode. See note on Standby Mode below.
Temp. Units	Selects degrees Fahrenheit or Centigrade, for the recipe display only. Recipes stored on the host PC, like profiles in the Protocol Plus, are always stored with temperatures in degrees Fahrenheit, regardless of the selected viewing units. Note that changing the display units converts displayed recipe temperatures accordingly.
OPEN/SAVE (to Folder)	These buttons enable the operator to open a new recipe, or save the current one to a predetermined folder.
READ/WRITE (to Controller)	These buttons enable the operator to upload a recipe from one of the Protocol Plus controllers in the system, or to write the current recipe to one of the controllers.
Profile Number	Selects which of the Controller's eight profiles is used when reading or writing recipes.

Notes on Soak Temp. and Hi Limit SP Values

In the recipe editor screen, **Soak Temp** and **Hi Limit SP** values can be adjusted in the range of -18 to 538 °C (0 - 1000 °F). Errors may occur attempting to download a recipe to a Controller's profile if one of the recipe's ramp times, soak temperatures, or the high limit setpoint value is incompatible with the range set internally for the target controller. In this case, an error message similar to Figure 23 will be displayed, and no changes will be made to the Controller's profile.

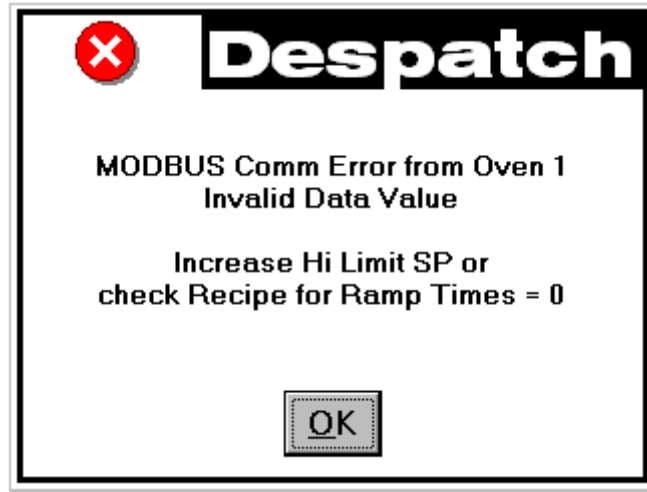


Figure 23: MODBUS Comm Error Message

Note on Standby Mode

In the recipe editor screen, the **Link to Profile** value “STBY” option (Standby mode) can only be used with Protocol Plus controller version 4 or higher. If a recipe with the Standby mode selected is chosen for download to an earlier version controller, a popup message will be displayed by Protocol Manager, and the downloaded profile will set the **Link to Profile** value to the “HOLD” option for that controller.



Figure 24: Standby Mode Message

Creating a New Recipe

1. Pull down from the **Windows/Recipe/Datalog** position on the menu bar to **Recipe**.
2. Press the **NEW** button.

3. Enter the values desired.
4. Press **SAVE** to save the recipe.

Opening an Existing Recipe

1. Press the **OPEN** button at the bottom of the **Recipe Editor** screen.
2. Select the recipe from the popup list.

Reading/Writing a Recipe to/from a Controller

1. Select the controller from the box at the bottom right corner of the **Recipe Editor** screen. See Figure 25. Only controllers that are currently enabled and **Online** will be listed in the box.



Figure 25: Read/Write Area, Recipe Editor Screen

2. Select a profile (1 through 8) to be read/written from/to the controller.
3. Press the **READ** or **WRITE** button to either call up the recipe from the selected controller, or write the current recipe to the selected controller.

NOTE: Reading the parameters from a controller will overwrite any information stored in the displayed recipe.

Recipe Selection Setup

1. Go to the second tab from the left at the top of the **Recipe Editor** screen.
2. Click on this tab and the **Recipe Selection** screen will pop up. See Figure 26.

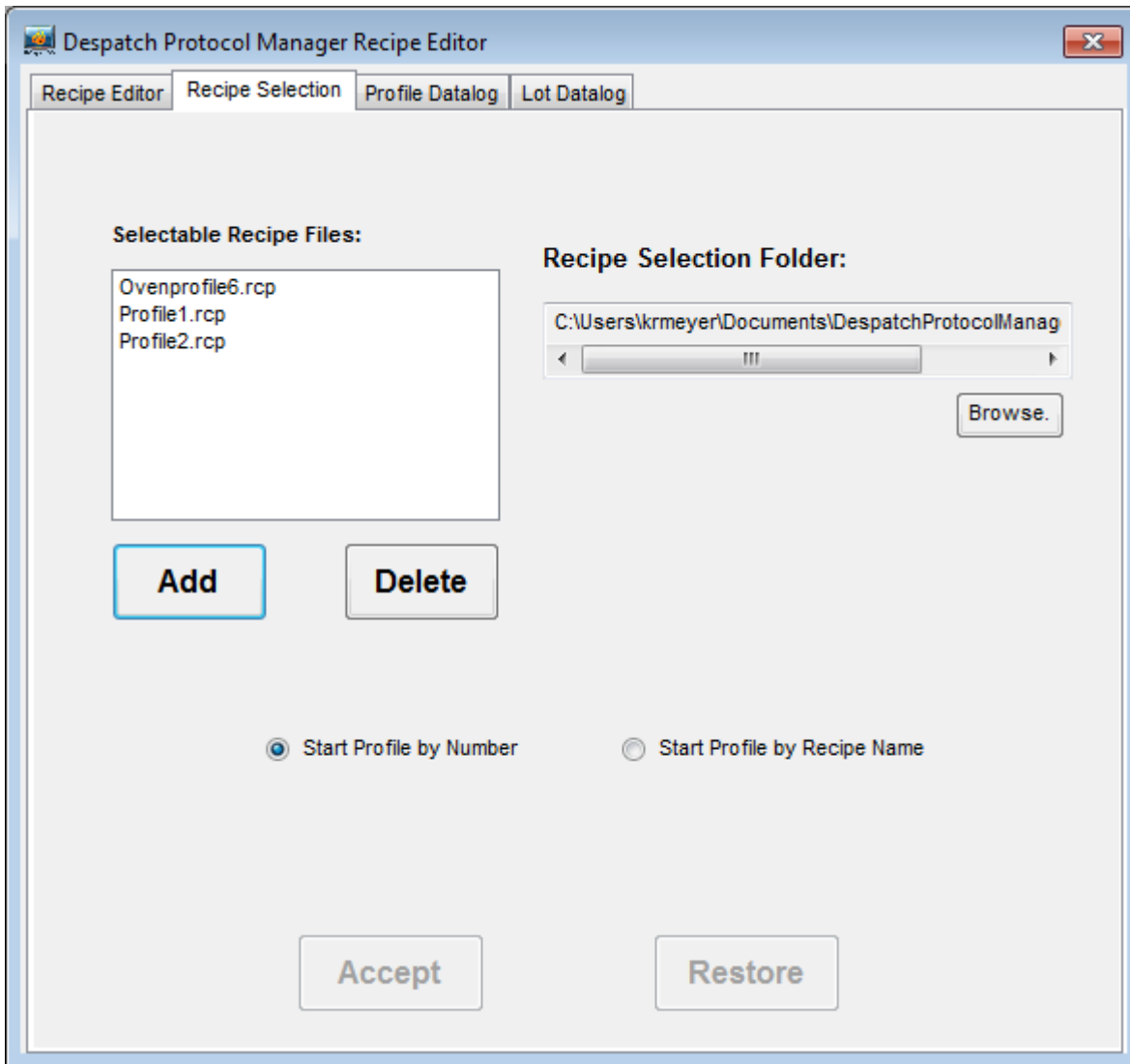


Figure 26: Recipe Selection Screen

The **Selectable Recipe Files** list indicates which recipes can be selected by name when starting a profile run remotely. Recipes can be added to this list by clicking the **"Add"** button and selecting a recipe from the list box that pops up. If a profile in the selectable recipe files list is changed, the recipe will need to be deleted and re-added to the list for changes to take effect.

Profiles can be started remotely by profile number only if the **"Start Profile by Number"** option is chosen as shown above. If the "Start Profile by Recipe Name" option is chosen in this window, starting a profile will require selection of a recipe, by name, from

the "Selectable Recipe Files" list that will be displayed in the controller start window (see "Starting the Controller").

Datalog Functions

Datalog files are maintained to periodically record controller data to a disk file for future analysis. Protocol Manager can maintain two different types of datalog files from networked controllers.

Profile Datalogs – are initiated automatically when a controller is remotely started running, and are closed automatically when the controller stops running. Profile datalog files are useful for jobs that are based on a specific process run.

Log Datalogs – are initiated, and subsequently closed, manually, using the Controller Run Time Window, regardless of the controller's running status. Log Datalogs are useful for jobs that are not related strictly to an entire, single process run.

Both types of datalog files will contain header information, followed by periodic data records. Header information and record data are set for both types of datalog files in the Profile Datalog Window. Both types of files will be stored in the Log File Folder path indicated in the Profile Datalog window.

The Profile Datalog window also allows setting file naming options and log entry interval options for Profile Datalogs.

The Lot Datalog window is used to enable Lot Datalogs, and set the Log Entry interval specifically for Lot Datalogs.

The **Profile Datalog** and **Lot Datalog** screens are accessed from the tabs at the right side of the initial **Recipe Editor** screen, off the **Recipe/Datalog Window**. See Figure 27 and Figure 28.

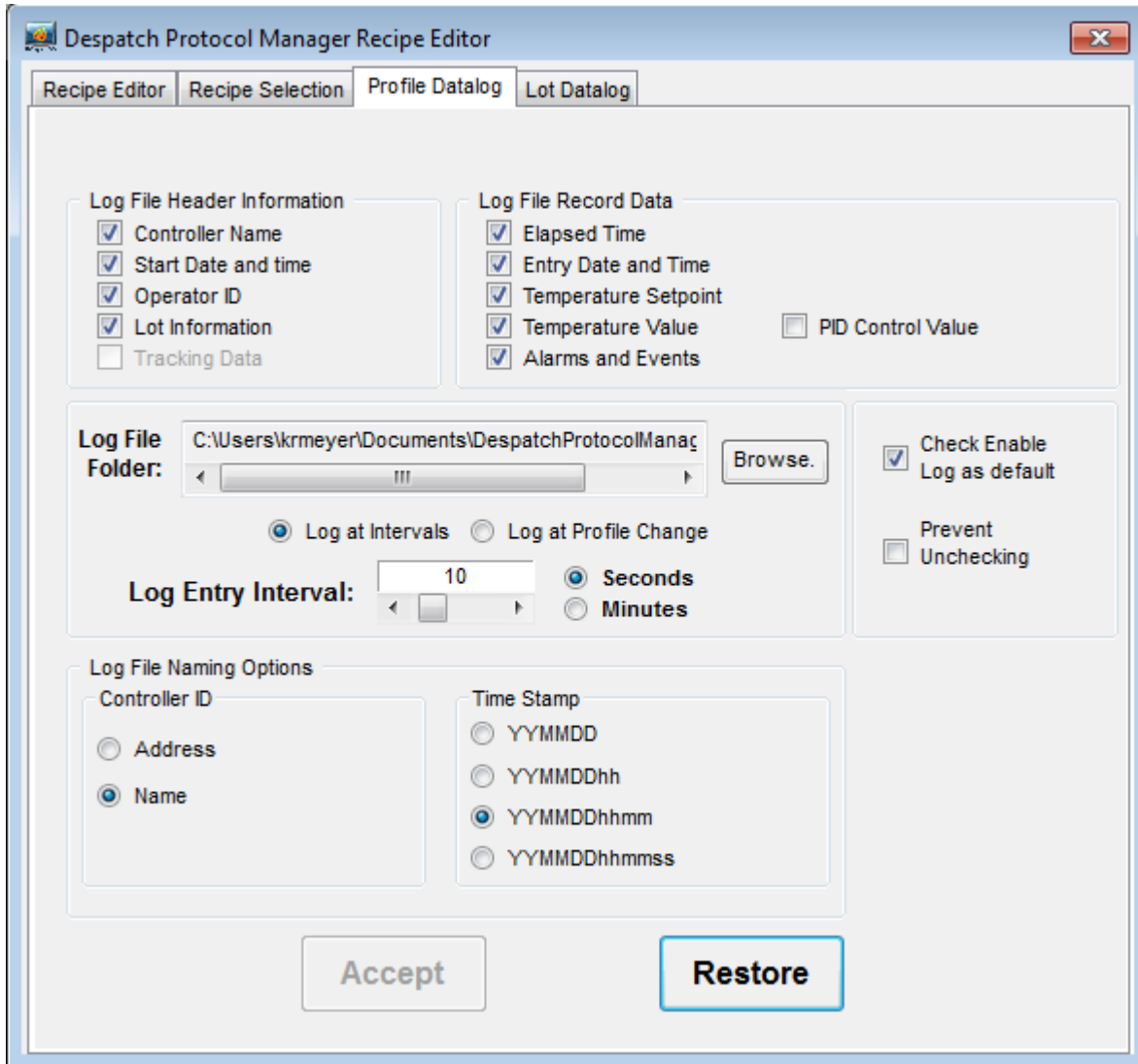


Figure 27: Profile Datalog Window

Select the parameters to be written to the datalog by checking the boxes on the Profile Datalog Window screen.

Log File Header Information

Check the following boxes to select the types of data to be written into the log file header:

- Controller Name
- Start Date and Time
- Operator ID
- Lot Information

Log File Record Data

Check the following boxes to select the types of data to be written into the log file itself:

- Elapsed Time
- Entry Date and Time
- Temperature Setpoint
- Temperature Value
- Alarms and Events Status
- Recipe Name

Log File Folder

This field displays the folder used to store datalog files.

Log At Intervals/Log at Profile Change

These buttons determine whether data will be logged at a certain time interval (see Log Entry Interval, below), or if data will be logged at every change point programmed into the recipe (start point, beginning of ramp, beginning of soak, etc.). Select one of these logging options depending on the detail level required, and the amount of disk space available for log records. Typically, a short run with few steps might use the time interval option, and a long run with many steps might use the profile change option.

Log Entry Interval: This value controls how often data is logged into a local disk file when selected for a running controller. For example, if two minutes is selected, data will be logged from each running controller approximately every two minutes; it does not mean that all controllers will be polled for data within a two minute period.

The minimum usable interval depends on the number of controllers in the network. Typically, the minimum interval, in seconds, can be approximated by $T_{min} = 4 + N$, where N = number of Controllers on the network.

Datalog files take up storage space. Typically, a log file's header contains from 10 to up to about 250 bytes, plus **Lot Information** (Lot Information contains from 0 to 576 bytes), depending on which header information is selected. Each logged data entry contains up to 50 bytes, depending on which data is selected. One running controller, logging data every 15 seconds, would produce a datalog growing at a rate of about 11 Kbytes per hour. 11 Controllers running at this rate would consume about 1 Mbyte of storage every 8 hours.

The datalog is enabled by the **Enable Datalog** checkbox in the Run Time Window (described later in this manual).

Log File Naming Options

Log file names consist of a **Controller ID** and **Time Stamp**, created when a data log is started.

Controller ID

Controller ID identifies the controller by address (three digits with leading zeroes) or name. If name is selected, blank spaces and characters not legal for use in a Windows file name are converted to underscore characters.

Time Stamp

Select the time format used for the log entries.

Notes on Log File Naming Options

The **Controller ID** and **Time Stamp** are combined, but separated by an underscore character, to create a datalog file name prefix. The file name is automatically appended with a ".log" extension.

For a controller named "East Fab #1" with an address of 2, a datalog file name would either begin with "002" (if **Address** selected) or "East_Fab_#1" (if **Name** selected).

For a run started on February 4th, 2000, at 2:13:45 pm, the Time Stamp would be either "000204" (if YYMMDD selected), "00020414" (if YYMMDDhh selected), "0002041413" (if YYMMDDhhmm selected), or "000204141345" (if YYMMDDhhmmss selected).

If "Name" and "YYMMDDhh" were selected, the complete file name prefix would be "East_Fab_#1_00020414", and the new datalog filename would be "East_Fab_#1_00020414.log". If a file with that name already existed, however, the new file would be renamed "East_Fab_#1_00020414_1.log".

When a datalog is started, and a filename is created, duplicate filenames are checked for; if a file with the created name already exists, the new filename's prefix has an underscore and a numerical value appended to it to create a unique filename.

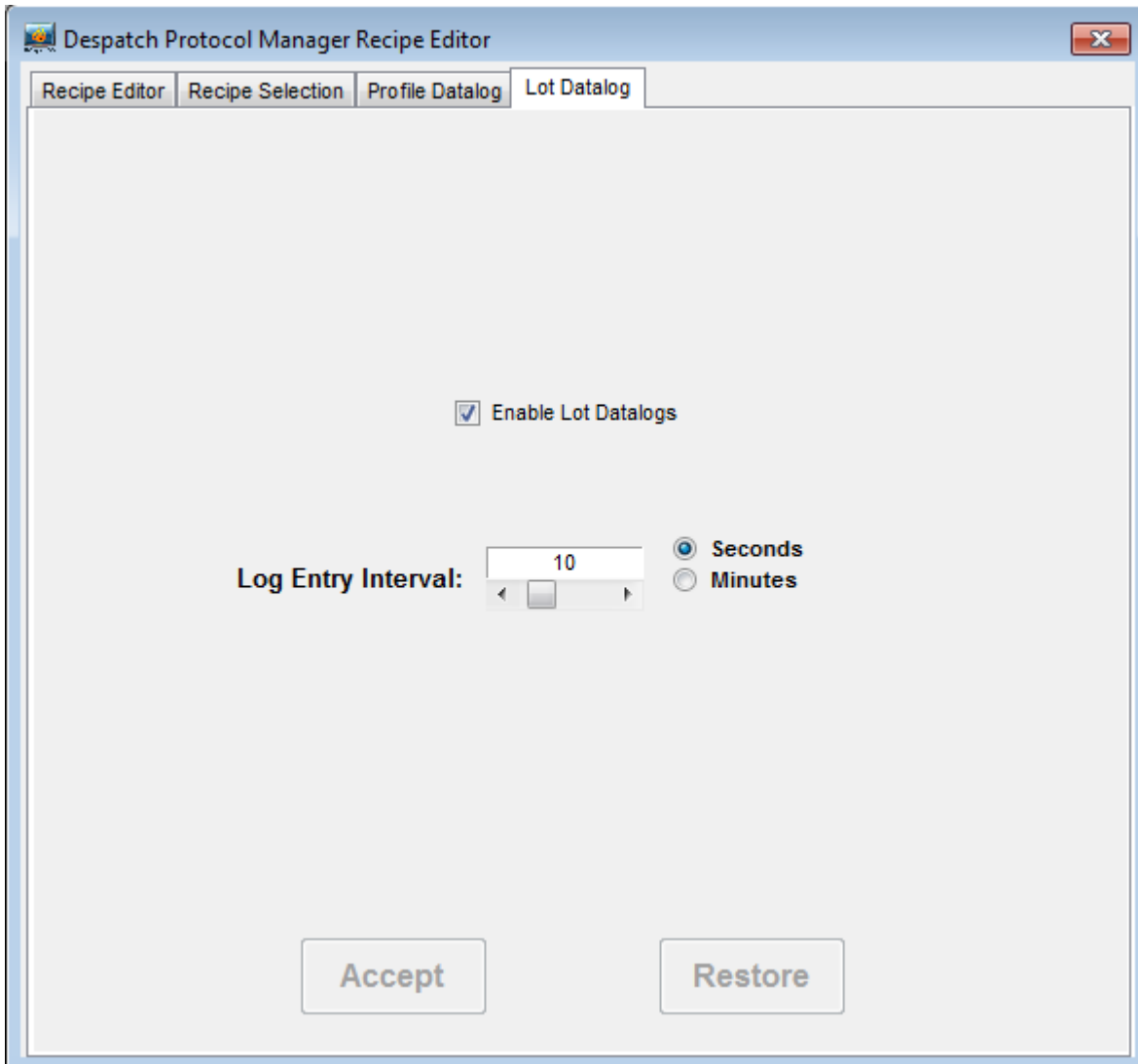


Figure 28: Lot Datalog Window

The **Lot Datalog** screen enables datalog functions to be selected on a per-job basis rather than for all jobs.

STARTING THE CONTROLLER

The controller is started by using the **Controller Run Time Window(s)** which are accessed from the **Window** pulldown off the main screen.

Start the profile by pressing the **RUN/HOLD** button at the top right portion of the Controller Run Time window. The **Start Running** screen will appear. See Figure 29.

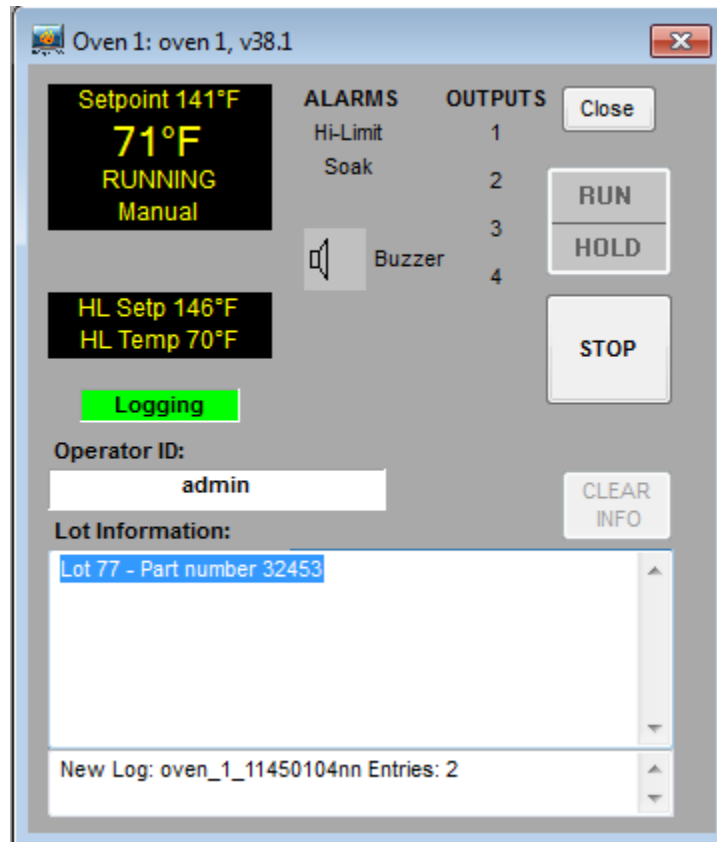


Figure 29: Controller Run Time Window

NOTE that the operator need not be logged in to start or run the controller from the **Run Time Window**. However, the **Start Running** screen requires a login.

Run Time Window

Three different modes of operation are available as tabs from the **Start Running** screen:

- Manual mode
- Timer mode
- Profile Mode

Manual Mode

Figure 30 illustrates the **Manual** operating mode. The process run is held at a single setpoint temperature until the STOP button is pressed at the **Controller Run Time Window**. Process setpoint, hi-limit setpoint and event status may be entered in the appropriate fields.

The screenshot shows the 'Start Running' window in Manual Mode. The 'Controller:' field is set to 'oven 1'. The 'Process Setpoint' is 141°F and the 'Hi-Limit Setpoint' is 146°F. The 'Manual Events' section shows four events, all set to 'OFF'. The 'Operator ID' is 'admin' and the 'Enable Datalog' checkbox is checked. The 'Lot Information' field contains 'Lot 77 - Part number 32453'.

Figure 30: Start Running Screen - Manual Mode

Timer Mode

Figure 31 illustrates Timer Mode. This mode allows the operator to start and stop the process for a preset length of time.

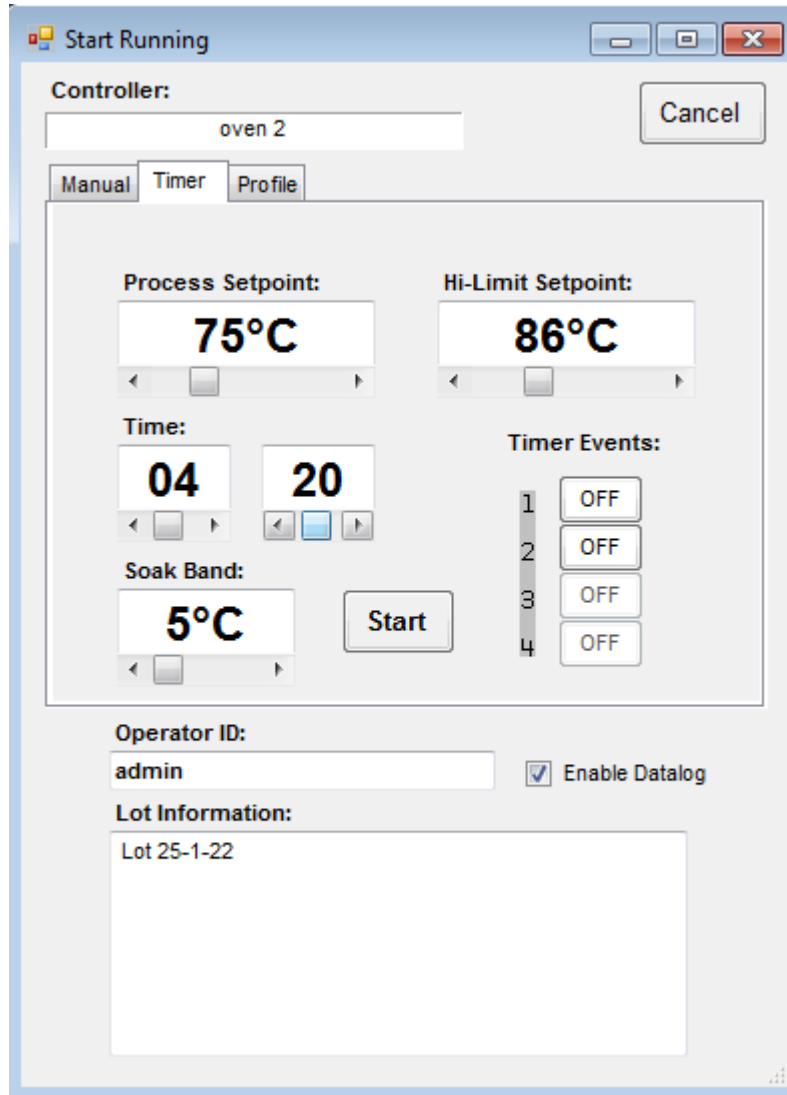


Figure 31: Start Running Screen - Timer Mode

The timer mode is similar to the manual mode except that the time at temperature is added.

If the soak band temperature deviates from this setting, the timer is placed in a hold condition.

Profile Mode

Figure 32 illustrates **Profile Startup Mode** with the "Start Profile by Number" option selected (see "Recipe Selection Setup"). In this mode, one of eight separate profiles (recipes) may be run. Profiles are created or added to the system at the **Recipe Editor Screen** (Figure 21). NOTE that if a profile number is selected here, but was not created and stored, the profile will not start.

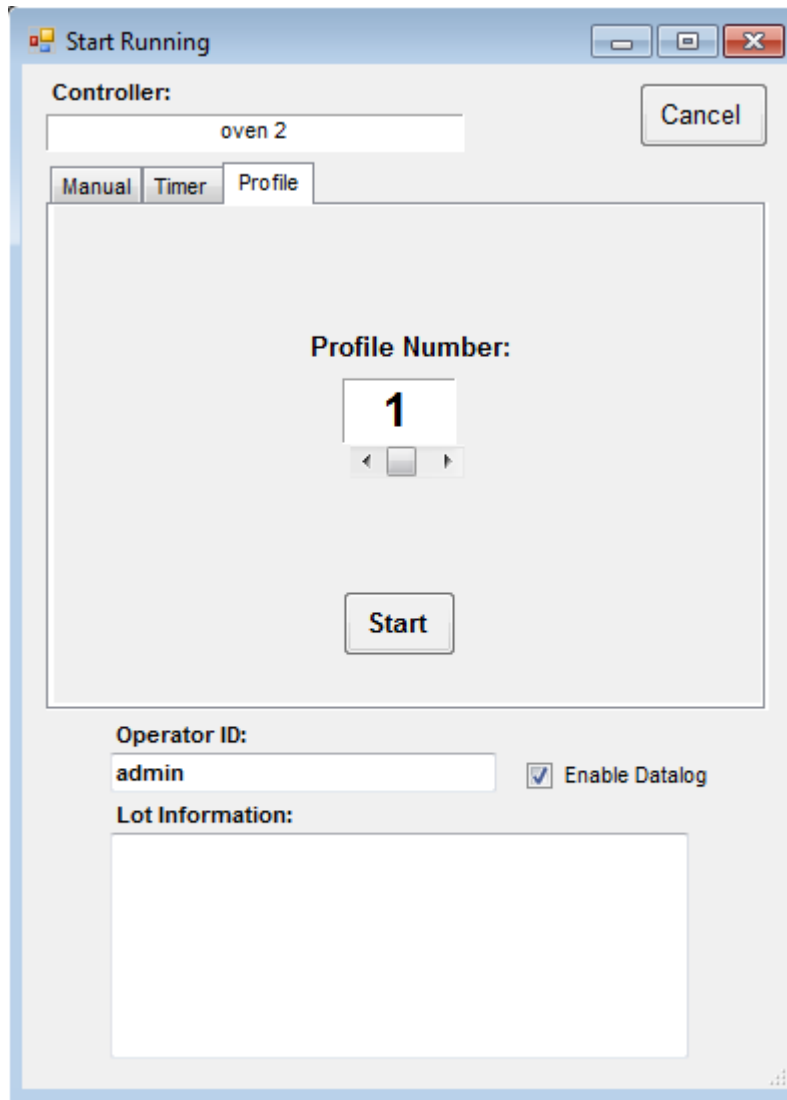


Figure 32: Start Running Screen - Profile Mode

Figure 33 illustrates Profile Mode startup with the “Start Profile by Recipe Name” option selected (see “Recipe Selection Setup”).

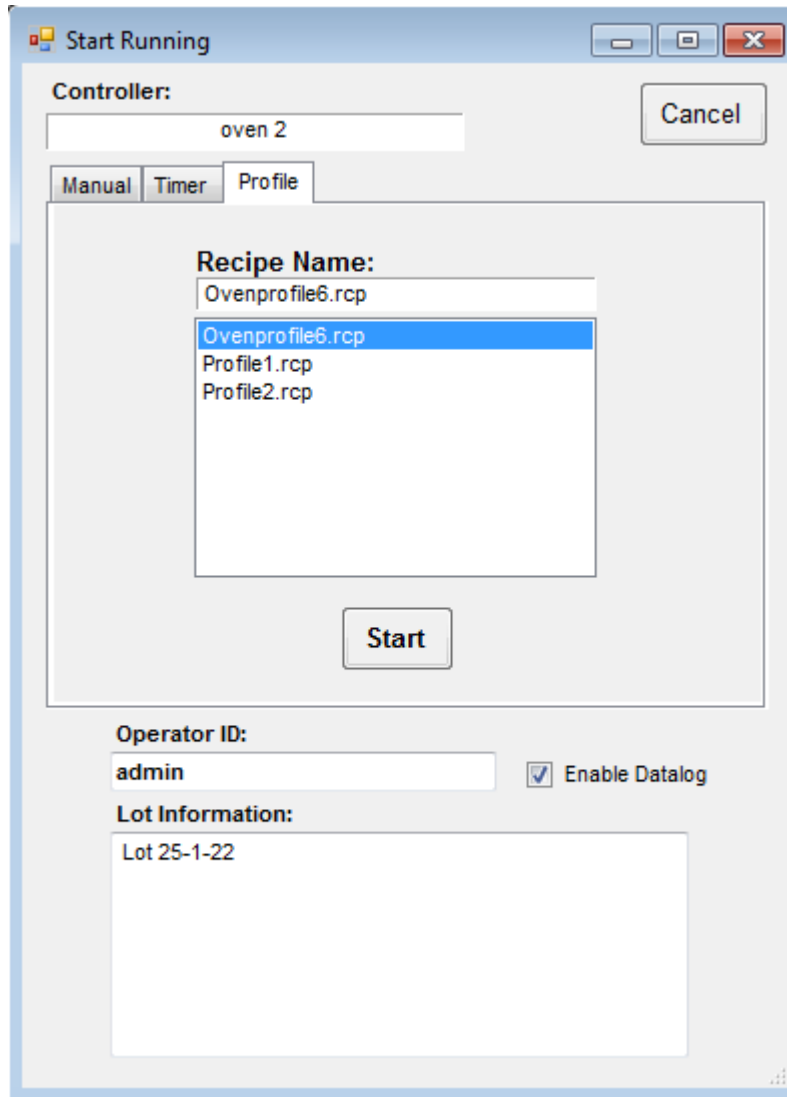


Figure 33: Profile Mode Startup with "Start Profile by Recipe Name"

NOTE: The list of recipes shown is created from the collection of recipes that have been stored locally. Selecting to start a profile using a recipe from this list will first cause the recipe to be downloaded to the controller as Profile 8, then Profile 8 will be started.

COMMUNICATION CARD INSTALLATION AND JUMPER SETTINGS

Wiring Diagrams

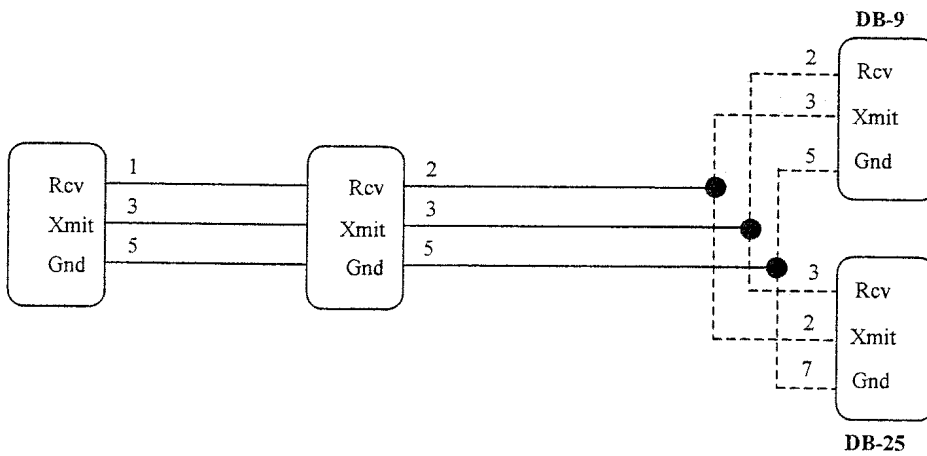


Figure 34: RS232 Wiring

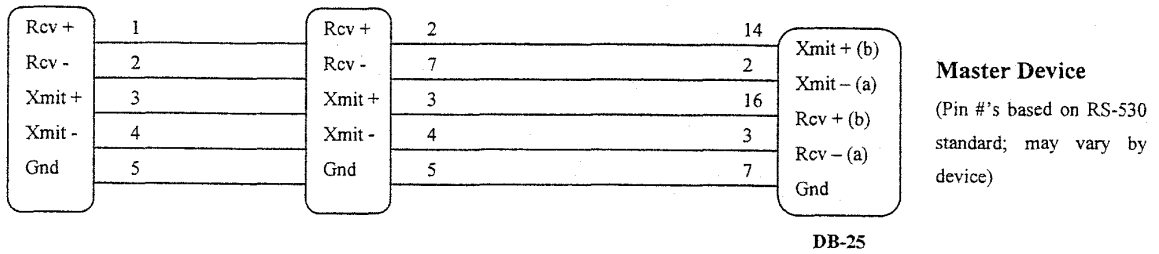


Figure 35: RS422A Wiring (4 wire)

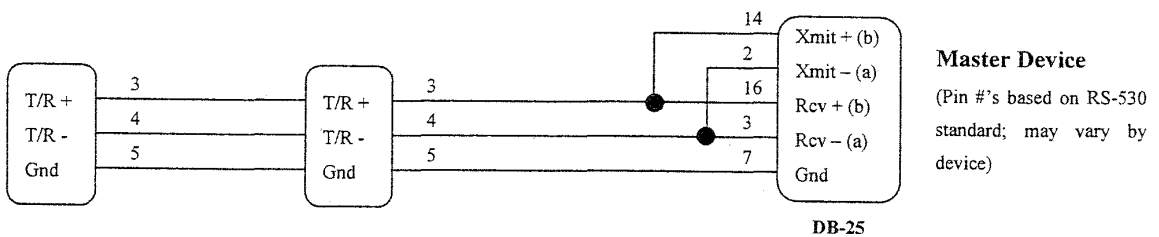


Figure 36: RS485 Wiring (2 wire)

WARNING

Electronic components are extremely sensitive to static electricity. Before opening the controller case, read and follow the precautions below to prevent damage from static electricity.

1. Turn off power to the controller.
2. Touch a bare metal surface on the exterior of the controller.
3. Disconnect the power connection from the controller or unplug from the power source.

Also follow these static electricity precautions:

- Avoid static-causing surfaces while working with electronic components.
- Remove parts from their anti-static bags only when ready for use. Do not lay parts on the outside of the anti-static bag because only the inside provides protection.
- Hold circuit boards by their edges or any metal mounting hardware. Avoid touching components or connectors on the circuit boards.

Communication Card Installation

1. Turn off power to the controller.
2. Remove the back cover of the controller by removing the two screws at the top of the unit.
3. Looking into the back of the controller with the connector terminal strips at the bottom, install the communication card onto the two 5 pin headers on the rear circuit board. Be sure the jumper blocks on the communication card are positioned toward the bottom of the controller. See Figure 37: Controller rear view with Communications Card (left). Be sure the card is seated firmly onto the headers.
4. Set the jumpers on the communication card for the desired serial communication interface based on Figure 38: Communication Card Jumper Settings.
5. Reinstall the back cover.
6. Wire the communication connections on the rear of the unit for the desired serial communication interface based on Figure 34: RS232 Wiring, Figure 35: RS422A Wiring (4 wire), or Figure 36: RS485 Wiring (2 wire).
7. Reapply all power connections to the controller.

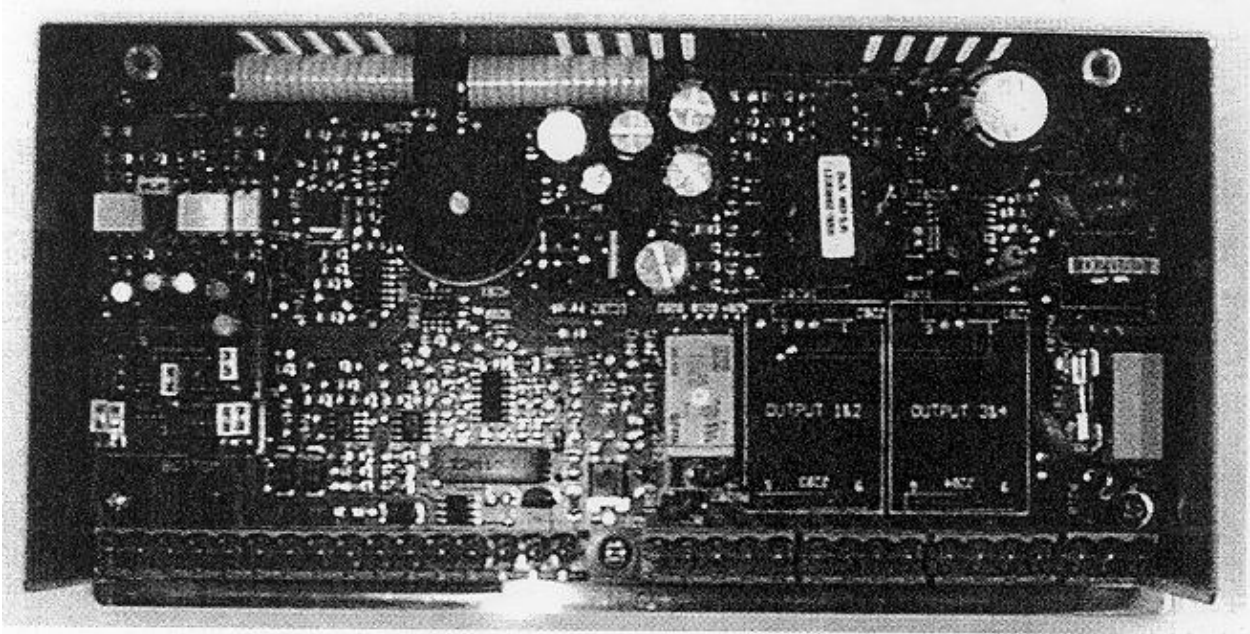


Figure 37: Controller rear view with Communications Card (left)

Communication Card Jumper Settings

1. Turn off power to the controller.
2. Remove the back cover of the controller (if it is not already removed) by removing the two screws at the top of the unit.
3. Set the jumpers on the communication card for the desired serial communication interface based on Figure 40, Communication Card Jumper Settings, below.
4. Reinstall the back cover.
5. Reapply power to the controller.

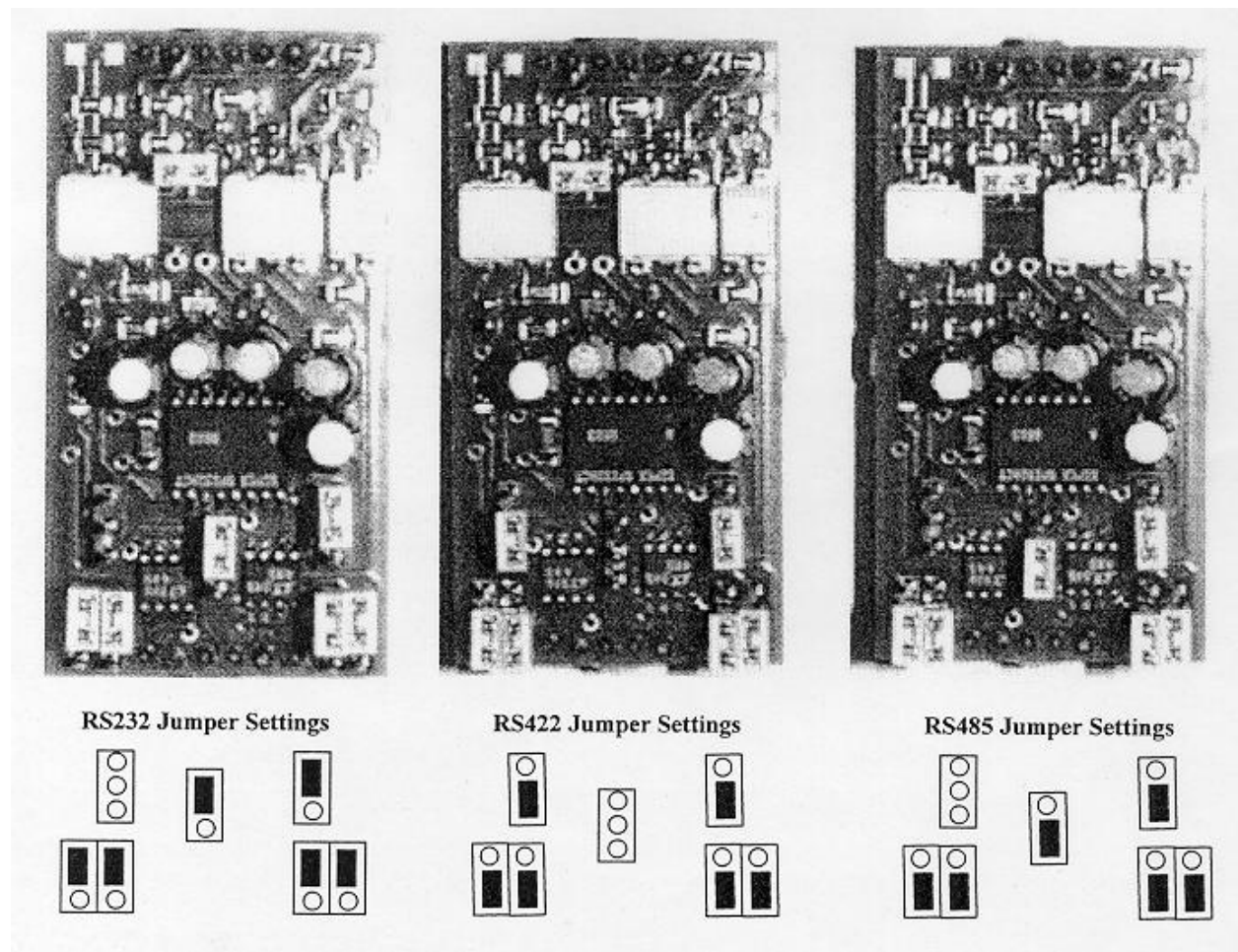


Figure 38: Communication Card Jumper Settings

Connecting Protocol Plus Controller(s) to a Communications Host PC

Single Oven

If the oven purchased was not supplied with communication option, order Despatch RS-232 communication kit P/N 161968. This kit contains all the parts required for one oven to host PC via RS-232 including: Protocol Plus add-on communications board, oven internal cabling, 25 foot null modem cable and Modbus protocol instruction manual.

For single oven communication, the Protocol Plus controller should be configured for RS-232 connection. Connect the host PC's RS-232 COM port to the oven's communication port using a null-modem cable. Despatch P/N 161971 provides a 25 foot null-modem cable. Refer to Protocol Plus Manual for communication card jumper and controller configuration settings.

Multiple Ovens

If the ovens purchased were not supplied with communication option, order Despatch P/Ns 141820, add on Protocol Plus communication board, and 161950 (the internal cabling) to make the ovens communication-ready including DB9 external cable connections. Order Despatch P/N 161955 for the components required to network two ovens to a host PC. This kit includes RS-232 to RS-422/RS-485 bi-directional adapter, cabling, and Protocol-specific termination plugs.

Generically speaking, the following description details the steps necessary to network multiple Protocol Plus controllers:

The host PC must have its assigned RS-232 COM port connected to a RS-422/RS-485 bi-directional adapter, for example a "B&B Electronics" adapter Despatch P/N 161938-40. These P/Ns provide the adapter, power supply and PC-to-adapter serial cable. The following wiring description refers specifically to the B&B device, but may be applied to acceptable substitute devices.

The Protocol Plus controller's optional communication card should be configured for RS-422A 4-wire connection. Set the dipswitches and jumpers on the adapter to match the communication from the host PC RS-232 COM port to the adapter. Wiring from the B&B adapter's RS-422A RS-485 terminals is daisy-chained to each of the Protocol Plus controllers. Connect the power supply pigtail leads from the adapter wall mount transformer into the +12V and GND on the adapter. Plug the transformer into a standard 120V / 60 Hz supply outlet.

It is important to note that the communication ready ovens are supplied with two DB9

network ports; “Communication In” and “Communication Out”. For shorter networking runs, standard serial communication rated cables are available in a variety of lengths. For example; Despatch P/N 161970 is a 25 foot serial cable. DB9 termination plugs are also available from Despatch including P/N 161969; the required termination for a RS-422 4-wire network. See remaining information if longer network cable lengths are required.

Typically, RS-422A/RS-485A cables consist of three individually shielded twisted pairs; one pair transmits data from the Host PC to the ovens, one pair transmits data from the ovens to the host PC, and one conductor from the third pair is the signal common. The remaining conductor of the third pair is unused. Cable such as Belden type 9843 should be used.

The network requires a cable breakout junction box near each oven. 120 ohm terminating resistors must be installed at each end of the RS-422/RS-485 network. Refer to the following page for a simplified network wiring diagram. In this case, "To Host PC" actually indicates a cable connection to the B&B adapter. The "PC Rcv" and "PC Xmit" terminals refer to the B&B adapter's RD and TD terminals respectively. Install the 120 ohm resistor between the RD+ and RD- terminals. Connect the GND wire to the 422/485 GND terminal. The remaining termination resistor is applied at the RD+ and RD- terminals of the “last in line” networked oven.

RS-422/RS-485 allows communication over wires up to 1000 meters in length. It is important to note that the associated runs from the oven’s Protocol Plus controller to the breakout junction box be limited to 5 meters maximum. The junction boxes provide a drop from the network cable to each oven. The cables marked “to Oven Controller” are terminated with 9-pin male subminiature “D” plug for mating with the oven controller’s Communication In” serial data receptacle.

Wire drop the cable according to the following table:

Oven signal	Junction box terminal	9-pin plug pin number
Rcv+	5	2
Rcv-	4	7
Xmit+	1	3
Xmit-	2	4
GND	3	5

The daisy chain drop cables may use shielded pairs. Cable shields should be connected as follows:

- At each junction box - to the box interior chassis.
- At each drop cable 9-in plug-to the lug shell if conductive.

If a non-conductive shell is used, no connection is required.

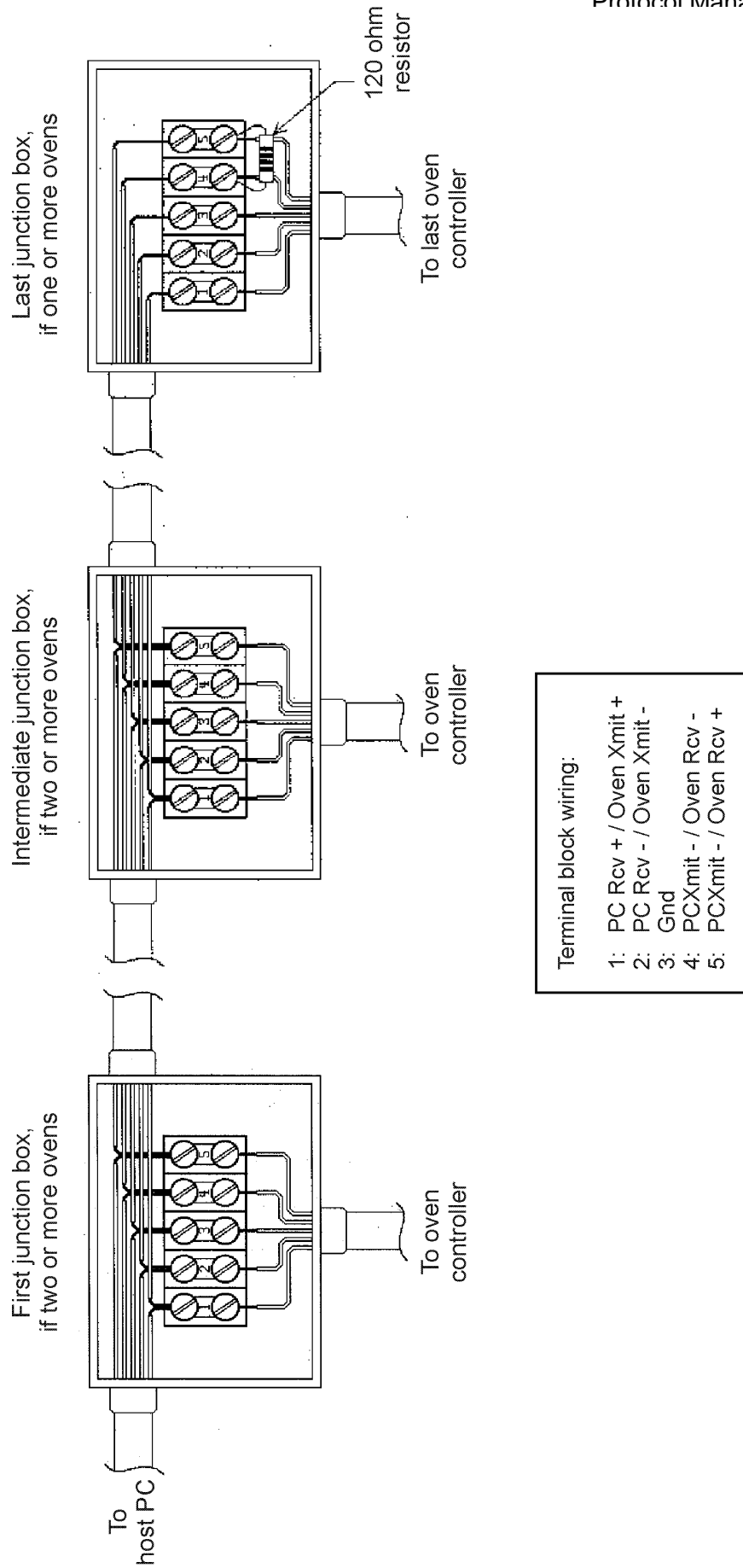


Figure 39:
Junction Box
Wiring

The junction boxes are used to provide a drop from the network cable to each Oven. The cables marked "To Oven Controller" are each terminated with a 9-pin Male subminiature "D" plug, for mating with the Oven Controller's serial data receptacle. Wire the drop cable according to the following table:

Oven Signal	Junction Box Terminal	9-Pin Plug Pin Number
Rcv +	5	2
Rcv -	4	7
Xmit +	1	3
Xmit -	2	4
Gnd	3	5

The daisy-chain and drop cables may use shielded pairs. Cable shields should be connected as follows:

- At the B&B adapter B to the earth ground terminal
- At each junction box B to the box interior chassis
- At each drop cable 9-pin plug B to the plug shell, if conductive; do not connect to anything if a non-conductive shell is used

TROUBLESHOOTING THE COMMUNICATIONS OPTION

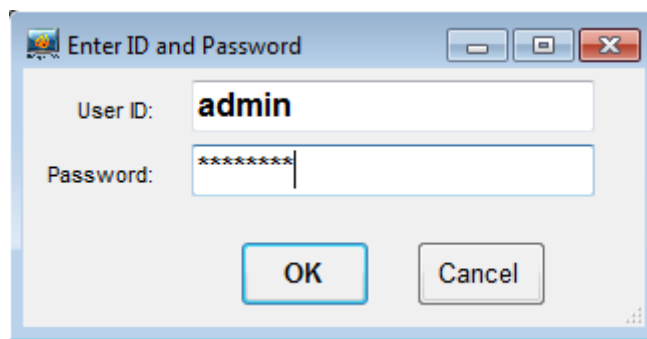
Controller Parameters

(see Protocol Plus manual to enter Communications Page)

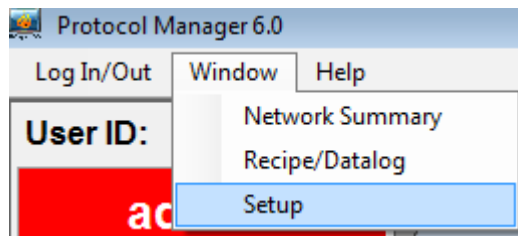
- Address (Default = 1) This setting must be different on each control/oven if using RS422/RS485 interface.
- Mode (Default = OFF) This must be set to Modbus.
- Baud Rate (Default = 19.2K) If you are having problems going to a lower baud rate may help, but do not change to start with.
- Parity (Default = None) This should remain the default.

Protocol Manager Parameters

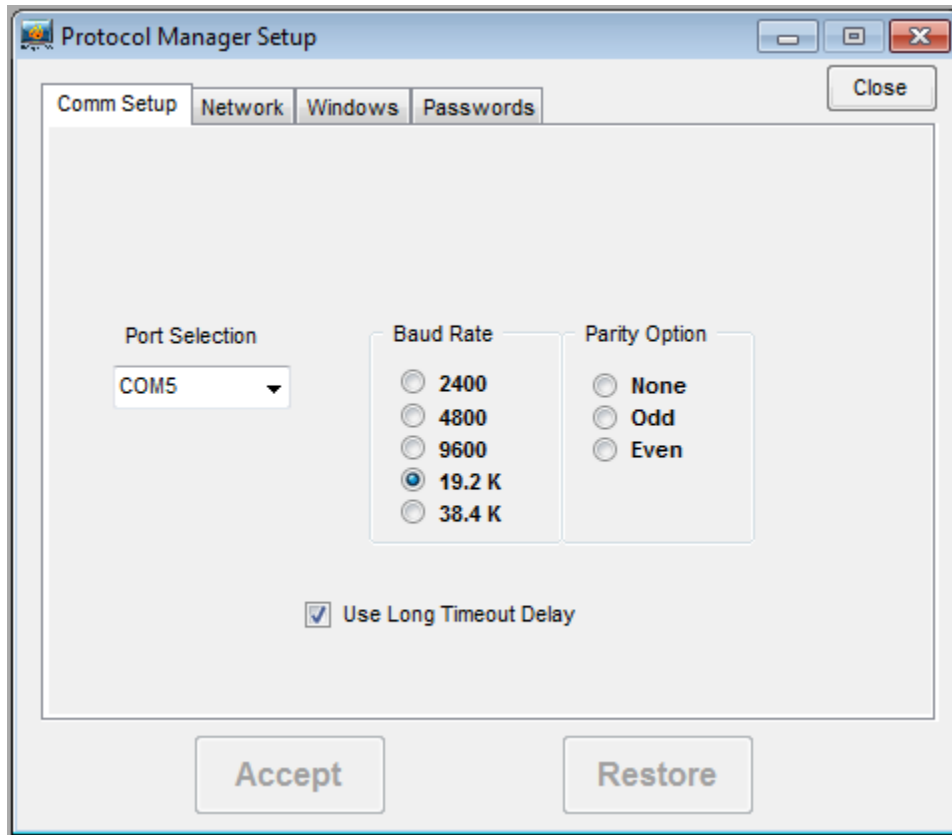
1. Log on the highest level security (Level 4). The default password initially is “despatch”.



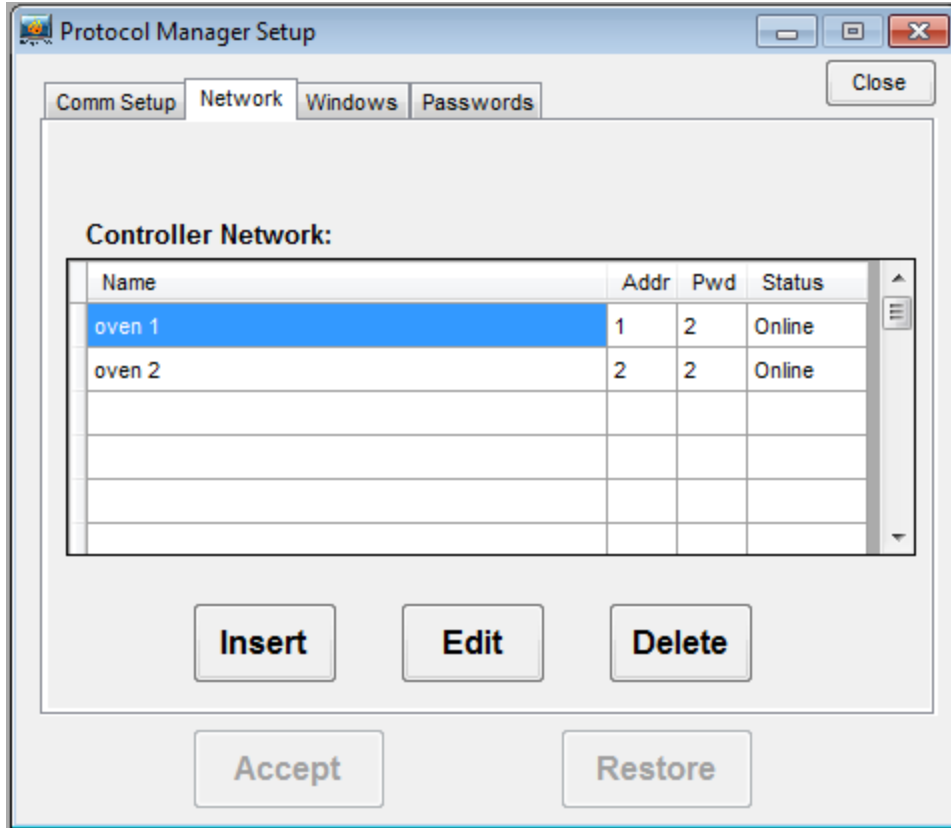
2. Click on the Windows pulldown menu at the top of the screen.
3. Click on Setup menu.



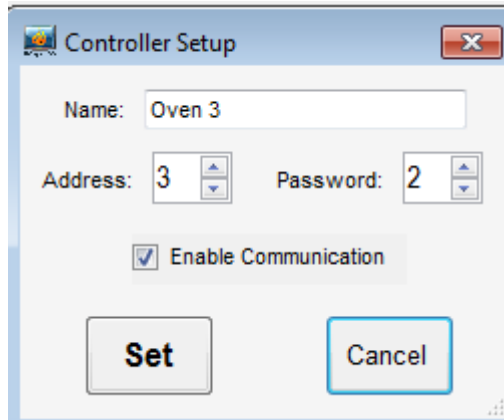
4. Click on the Comm Setup tab and verify the settings match the controller parameters set above. Click on the OK button when finished.



5. Click on the Network tab and highlight the oven you are trying to setup. Click on the Edit button.



6. Make sure the address matches and the password is set to the level 2 password of the controller (Default = 2). The enable communications box should be checked. Click on OK when finished.



The software should now show a green ON-LINE. If not, check the hardware and cabling.

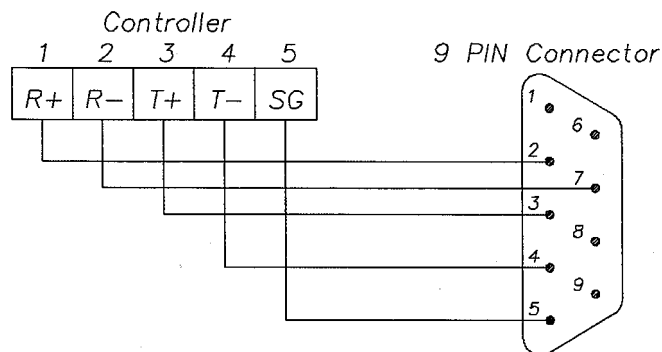
Controller Hardware and Cabling

Check the communications card

- The card needs to be installed correctly (jumpers are on the bottom of the card and should be facing the green terminals)
- The jumpers need to be setup for RS232 or RS422, depending on the interface being used. See Modbus User's Programming manual (E102) for proper settings.

Check cabling between the controller and outside of oven

- The R+ should be connected to terminal #1 on the back of the controller. Check with an ohm meter that pin #2 on the 9 pin connector on the outside of the oven is connected to this terminal.



- The R- should be connected to terminal #2 on the back of the controller. Check with an ohm meter that pin #7 on the 9 pin connector connected to this terminal.
- The T+ should be connected to terminal #3 on the back of the controller. Check with an ohm meter that pin #3 on the 9 pin connector connected to this terminal.
- The T- should be connected to terminal #4 on the back of the controller. Check with an ohm meter that pin #4 on the 9 pin connector connected to this terminal.
- The SG should be connected to terminal #5 on the back of the controller. Check with an ohm meter that pin #5 on the 9 pin connector connected to this terminal.

Check cabling between the computer and outside of oven

RS232 INTERFACE

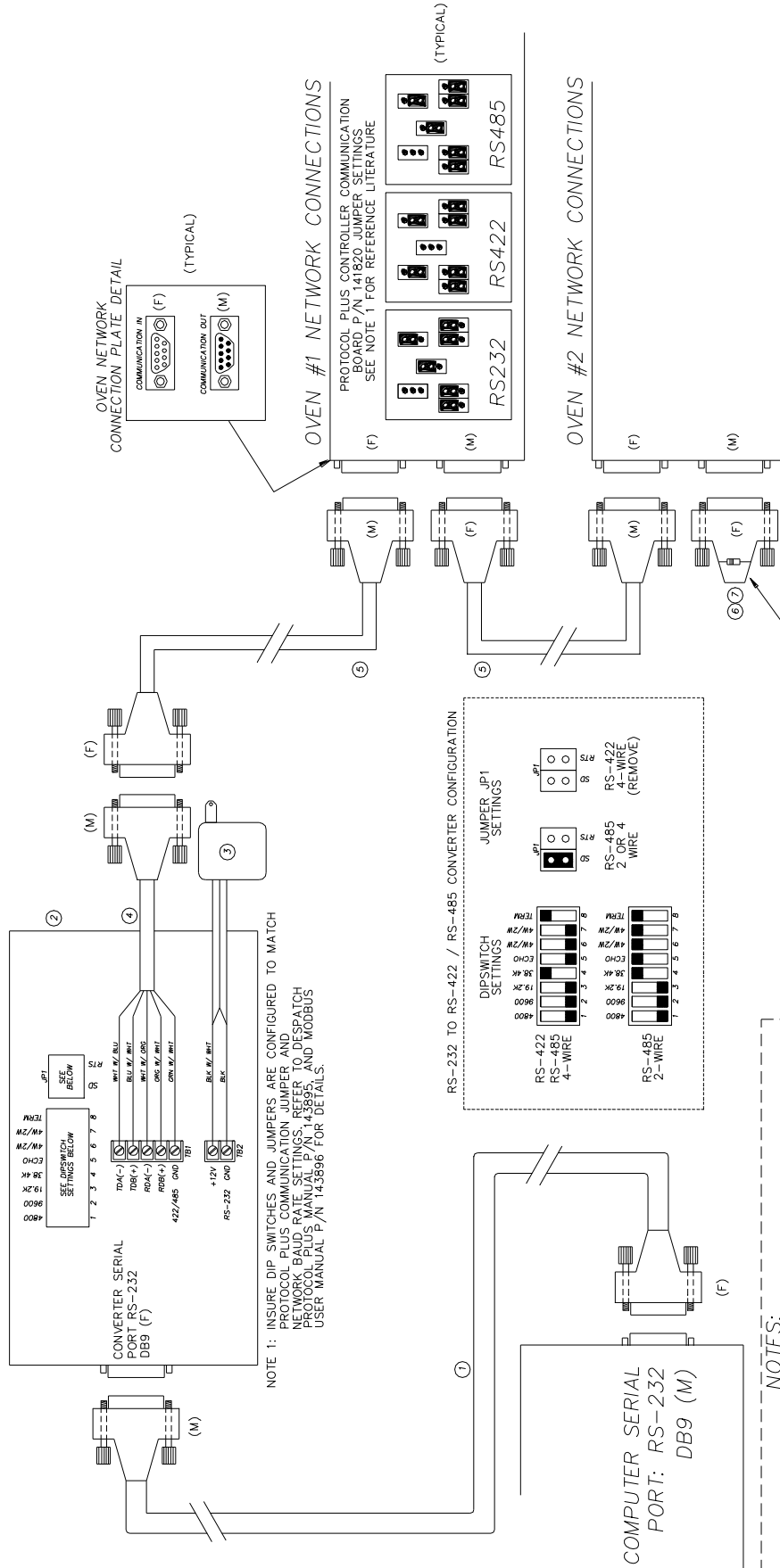
The cable running from the Oven's 9 Pin connector and the computer should be a null modem cable (for a PC with a 9 pin connector, pin 2 at each end connects to pin 3 at the other end, and the cable requires a female 9 pin plug at the PC end and a male 9 pin plug at the Oven end).

Despatch kit p/n 161968 includes all parts required to make one oven communication-ready. The kit also contains a 25-foot cable (p/n 161971) for PC-to-oven communication.

RS422/485 INTERFACE

The typical wiring scheme is shown on the next page using wiring kit p/n 161955. Additional ovens (maximum of 32 ovens) can be added using wiring kit p/n 161956.

RS-232 / RS-422 / 485 CONVERTER TERMINAL WIRING CONNECTIONS



NOTES:
 COMMUNICATION REQUIRES EACH OVEN TO HAVE NETWORK CAPABILITY. OPTIONAL COMMUNICATION KIT P/N 161957.
 IF ADDITIONAL OVENS ARE TO BE NETWORKED, ORDER COMMUNICATION KIT P/N 161956.