Despatch

Thermal Processing Technology

ITW EAE

PROTOCOL MANAGER™ OVEN NETWORK SOFTWARE USER MANUAL

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PN: 324870
REVISION O
02/2023

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Despatch

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1	K. Livingston	XXX	XXX	2013/03
DESCRIPTION: Protocol Plus™ and Protocol 3™ controller support (v7.0)				

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DESCRIPTION: Ethernet communication support (v7.8.0)				

REVISION	PREPARED BY	CHECKED BY	APPROVAL	DATE
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DESCRIPTION:

- Reflect ITW EAE – Despatch company information
- Add missing information and differentiate between Protocol 3 and Protocol Plus when applicable.
- Content corrections and reorganization.

REVISION	PREPARED BY	CHECKED BY	APPROVAL	DATE
M	RKB	RKB	XXX	2021/05/26

DESCRIPTION:

- New appendix, General PC Serial Port Connection Setup, for serial communication assistance.
- New appendix, Protocol 3™ Ethernet Port MAC Address.

REVISION	PREPARED BY	CHECKED BY	APPROVAL	DATE
N	RKB	RKB	XXX	2022/11/18

DESCRIPTION:

- Support for Future Design Controls MCT4 and MCTB (v8)
- Common software features across all supported controller types where applicable (v8)

REVISION	PREPARED BY	CHECKED BY	APPROVAL	DATE
O	RKB	RKB	XXX	2023/02/06

DESCRIPTION:

- Updated section Data Logging Functions to reflect software v8.3.
- Note not available with Protocol Plus, Changes After Controller Start (v8 software)
- New appendix, Remove Application Lock. Also see Protocol Manager™ Software.

TABLE OF CONTENTS

1. ABOUT THIS MANUAL

1.1. Important User Information

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The information in this manual is subject to change without notice and does not represent a commitment on the part of ITW EAE - Despatch. ITW EAE – Despatch does not assume any responsibility for any errors that may appear in this manual.

In no event will ITW EAE – Despatch be liable for technical or editorial omissions made herein, nor for direct, indirect, special, incidental, or consequential damages resulting from the use or defect of this manual.

	Before operating this equipment, carefully read instruction manual. Values displayed on screens are examples only. Though those values may be typical, contact ITW EAE - Despatch for the final value.

	Users of this equipment must comply with operating procedures and training of operation personnel as required by the most recent Occupational Safety and Health Act (OSHA), Section 5 and relevant safety standards, as well as other safety rules and regulations of state and local governments. Refer to the relevant safety standards in OSHA and the most recent National Fire Protection Association (NFPA), section 86.

Danger!

Only fully trained and qualified personnel should setup and maintain this equipment. Improper setup and operation of this equipment could cause an explosion that may result in equipment damage, personal injury or possible death.

The information in this document is not intended to cover all possible conditions and situations that might occur. The end user must exercise caution and common sense when installing or maintaining Despatch products. If any questions or problems arise, call ITW EAE - Despatch at **1-800-762-0110** or **1-952-469-5424**.

1.2. Manufacturer & Service

The Protocol Manager software is developed by ITW EAE - Despatch.

ITW EAE - Despatch has specialized in thermal processing for over 100 years. Technical expertise gained over those years helps provide innovative solutions to critical applications in vertical markets and cutting-edge technology worldwide. Despatch products are backed by a drive for long-term customer satisfaction and a strong sense of responsibility. The worldwide network of factory-trained Service Professionals is available to support your Despatch equipment. From full-service preventive maintenance to routine repair and certified calibration and uniformity, the ITW EAE - Despatch service network is positioned to respond to your business needs. Our service programs are customized to meet your specific needs using our Advantage Service Assurance Program (ASAP). For more information on ASAP, visit **www.despatch.com.**

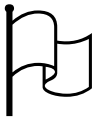
1.3. Organization of this Manual

This owner's manual contains a the most comprehensive set of information for Despatch Protocol Manager, including installation instructions, theory of operation, and operating instructions, among other things. To save time and expense in case of trouble, it is urged that the operators search this manual for helpful suggestions before requesting factory assistance.

Danger!

Failure to heed warnings in this instruction manual and on the oven could result in personal injury, property damage or death.

1.4. Conventions

	***This icon signifies information that describes an unsafe condition that may result in death, serious injury, or damage to the equipment.***
Danger!	***Danger is the signal word used to indicate a hazardous situation that, if not avoided, will result in death or severe injury.***
Warning!	***Warning is the signal word used to indicate a hazardous situation that, if not avoided, could result in death or severe injury.***
Caution!	***Caution is the signal word used to indicate a hazardous situation that, if not avoided, could result in moderate or minor injury.***
Notice	***Notice is the signal word used to indicate a hazardous situation that, if not avoided, could result in property damage.***
	***This icon signifies supplemental important information.***

2. THEORY OF OPERATION

2.1. Protocol Manager™ Software

The Despatch Protocol Manager oven network software enables the operation of up to 32 controllers from a single, remote PC. The controllers supported is dependent on the version of the software.

The software allows:

- Remote access and operation of one or more controllers using the Modbus communication protocol
- Use of a centralized PC to store and edit profiles
- Download the same profile to multiple controllers
- Upload a profile from a controller to the central PC for use in other controllers
- Centralized data logging from all controllers connected to the central PC
- Password security

	Use this manual together with the controller documentation. ***See Reference Documents for a list of controller specific documentation.***

	Terms "Profile" and "Recipe" are used interchangeably.

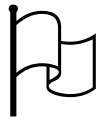
	Only one instance of the software can run on a PC at the same time. Multiple, simultaneous instances (e.g., multiple PC users logged) is not possible. Certain physical PC resources are not shareable. See Appendices for more information or recovery.

2.2. The Despatch Protocol 3™ Controller

The Protocol 3 is a microprocessor based digital temperature controller designed for simple and flexible oven operation. The controller operates as a dual-functioning controller/limit instrument.

The controller provides three primary operating modes:

- Manual: Oven operates continuously at a fixed temperature until turned off.
- Timer: Oven operates at a fixed temperature for a user-selected period, and then automatically turns off.
- Profile: Temperatures increase or decrease as defined by up to 255 segments in each of up to 64 ramp/soak profiles. The profiles can be linked to provide additional temperature combinations.



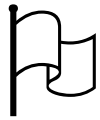
See Reference Documents for a list of Protocol 3 specific documentation.

2.3. The Despatch Protocol Plus™ Controller

The Protocol Plus operates as a dual-functioning controller/limit instrument. The controller has two displays. A dedicated LED upper display shows the oven temperature. A two-line LCD lower display provides information on control status, limit temperature and allows changes to be made to the control settings.

The controller provides three primary operating modes:

- Manual: Oven operates continuously at a fixed temperature until turned off.
- Timer: Oven operates at a fixed temperature for a user-selected period, and then automatically turns off.
- Profile: Temperatures increase or decrease as defined by up to eight ramp/soak segments in each of up to eight profiles.



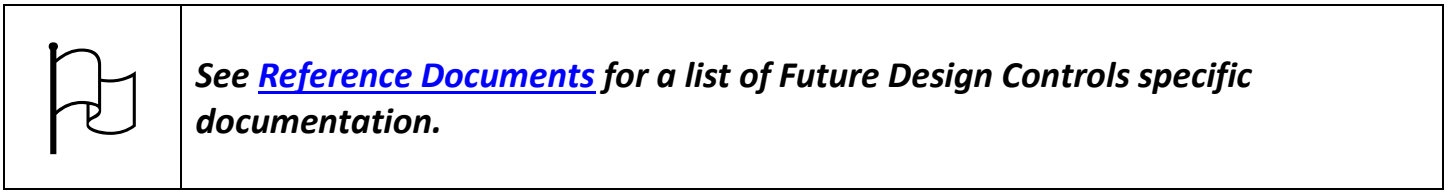
See Reference Documents for a list of Protocol Plus specific documentation.

2.4. The Future Design Controls MCT4 or MCTB Controller

The MCT4 or MCTB controller is a 4.3” color touch screen device combining features of a loop controller, high-limit control, video/chart recorder, and data logging system into a single/intuitive display device.

The controller provides two primary operating modes:

- Manual: Oven operates continuously at a fixed temperature until turned off.
- Profile: Temperatures increase or decrease as defined by up to 64 steps defined in each ramp/soak program. The number of programs is dependent on the amount of available memory.



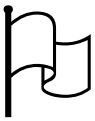
See Reference Documents for a list of Future Design Controls specific documentation.

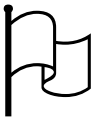
3. INSTALLATION

Installation and Setup provides directions for installing and connecting the software.

3.1. Software Requirements

- A computer running Windows 10 Pro, or later, operating system is recommended.
- Despatch oven(s) equipped with a controller supported by the software.
- When connecting controllers to the computer using serial communication, a serial port is required.
    - When connecting multiple controllers, RS-485 two-wire serial communication is required.
    - If the serial port on the PC only supports RS-232, an adapter will be needed to convert between the serial protocols.
    - If the PC does not have any serial ports, a port can be added using a USB-to-serial adapter.
- When connecting controllers to the computer using Ethernet communication (direct or via Modbus TCP gateway), an open Ethernet port is required. It is highly recommended the port is dedicated only to controller communication. An extra Ethernet port can be added to a PC with a USB-to-Ethernet dongle if necessary.

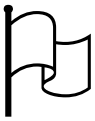
	***Note when using a Despatch Protocol 3 controller, the firmware must be version 2.3 or higher.***

	***See Reference Documents for a list of controller specific documentation.***

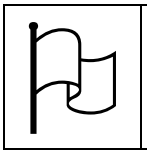
3.2. Configure Controllers

Before completing the software setup, set up each controller. Each controller connected in the same serial or Ethernet network requires a unique address.

- When using Modbus RTU (serial connection), each device needs a unique node address between 1 and 247.
- When using Modbus TCP (Ethernet connection), each device IP address and node address combination must be unique.
    - When using a direct Ethernet connection (not using a Modbus TCP gateway) from the PC to a Protocol 3 controller, the node address must be set to 1.
- When using serial connectivity or interfacing serial devices to Ethernet using a Modbus TCP gateway, set matching serial communication parameters in each device. Some controller types have restrictions on certain parameters. Adjust controller and software parameters accordingly. Refer to controller specific documentation for more detail.
    - Baud rate
    - Parity
    - Stop bit

	***Currently all connected controllers either need to all use serial or Ethernet. A mixed combination between serial and Ethernet connectivity is not currently supported. However, when using Ethernet, devices can be connected either directly using Ethernet, or by using a passive Modbus TCP gateway interfacing serial devices to Ethernet.***

3.3. Install Software



Close all open applications on the host PC before installing the software.

1. Launch the software installer.
2. Follow the on-screen instructions, accepting all software license agreements.
3. The software destination folder can be changed but is highly recommended to use the default location.
4. Install or repair any other supplemental software that may launch during the install.

4. SETUP

After installing the software and configuring the physical controllers, setup the controller network and software settings.

4.1. Startup and Login

This procedure uses the software previously installed.

1. Launch the **Protocol Manager** application.

	Logging into the software for the first time may signal a message that no setup information has yet been loaded.

2. Login to Protocol Manager
    a. Select **Login/Out** from the top menu or double-click on **(logged out)** shown in the upper left corner **User ID** status area.

	Login requires a User ID and Password. The User ID is case-sensitive and can be up to 16 characters long. The default password is "despatch" for top-level access.

    b. Login with a **User ID** and **Password**. The User ID can be any non-empty ID.

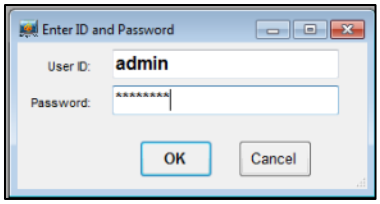


Figure 4-1 Login Dialog Box

c. After successful login, a **User ID** box will appear in the screen's upper left corner. Color indicates the user's level of access:

- Blue = Level 2
- Green = Level 3
- Red = Level 4 (Administrative)

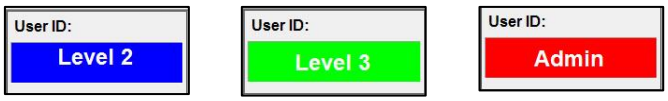


Figure 4-2 User ID color reflects access level

4.2. Application Settings

Open the top **Window** menu and select **Setup** to display the **Protocol Manager Setup** window.

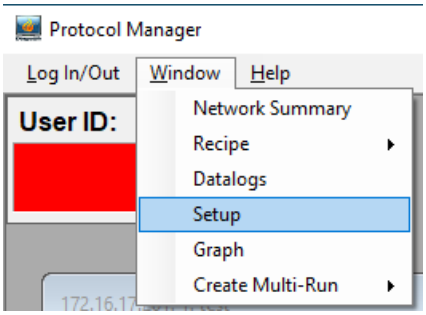


Figure 4-3 Setup Drop-down Menu

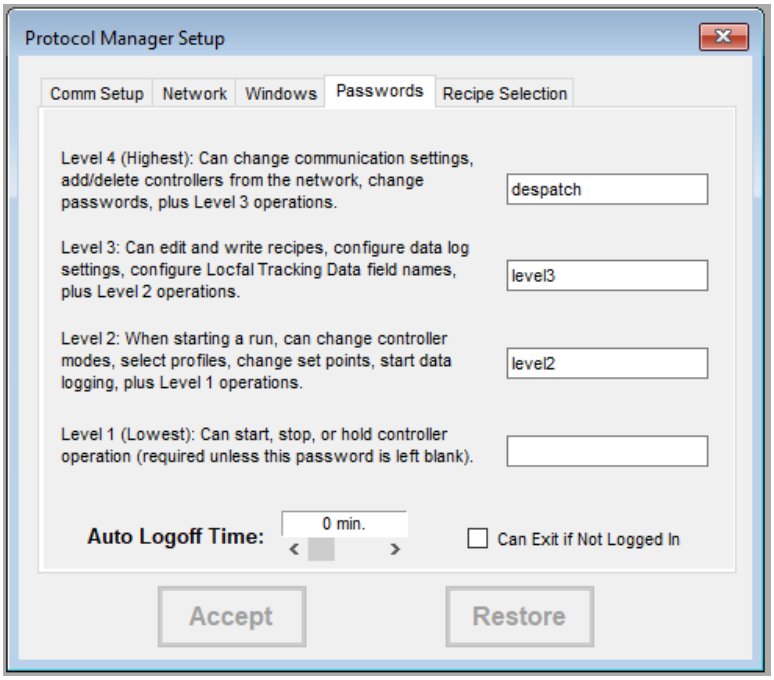


Figure 4-4 Setup Window (Passwords tab selected)

4.2.1. Set Communication Type

Use the **Comm Setup** tab to configure the communication channel for the network of controllers.

1. Select the **Comm Setup** tab and set the controller communication path.
    a. **Serial Communication**. Select a COM port from the **Port Selection** drop down list. Select an existing communication port in the computer. If switching from Ethernet to serial, it will be necessary to **Accept** the **Port Selection** before related serial settings are visible.

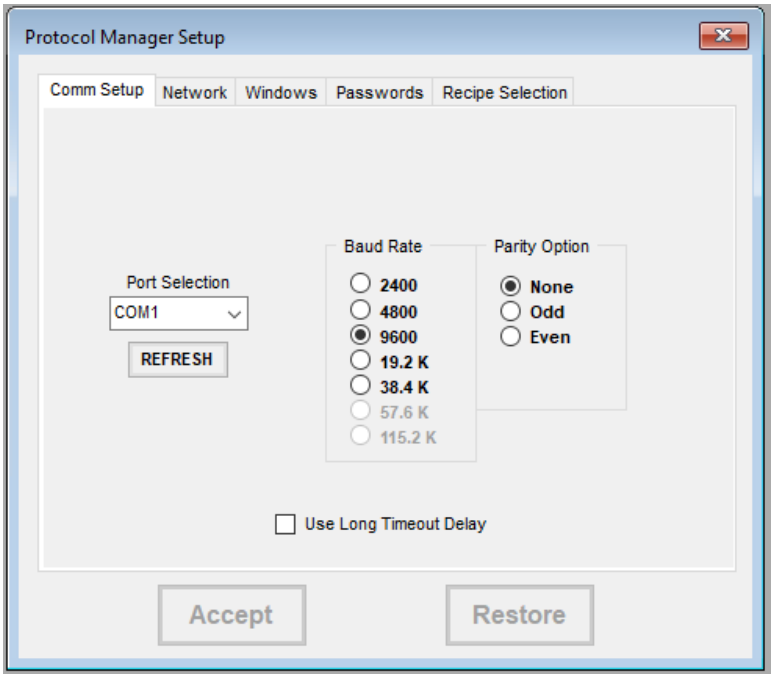


Figure 4-5 Comm Setup Tab - Serial

i. Select **Baud Rate**. Set the baud rate programmed in each of the connected controllers. **9600** is the default setting.
ii. Select **Parity Option**. Set the parity value programmed in each of the connected controllers. **None** is the default setting.
iii. **Use Long Timeout Delay** checkbox. A longer communication timeout delay may be required in some situations. **Use Long Timeout Delay** is enabled by default, however, when using serial communication, this can usually be unchecked.

b. **Ethernet Communication**. Select **Ethernet** in the **Port Selection** drop-down list. If switching from serial to Ethernet, it will be necessary to **Accept** the **Port Selection** before non-related serial settings are hidden.

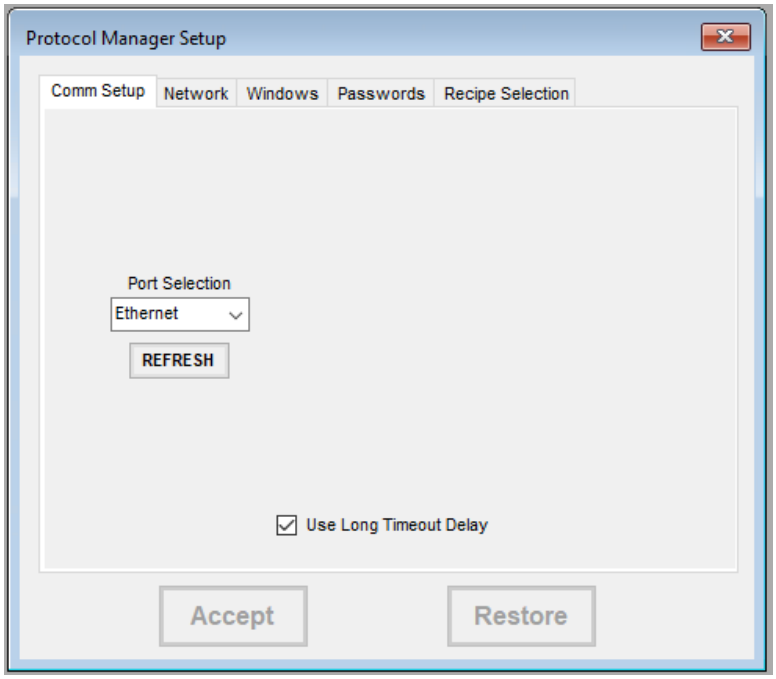


Figure 4-6 Comm Setup Tab – Ethernet

i. **Use Long Timeout Delay** checkbox. A longer communication timeout delay may be required in some situations. **Use Long Timeout Delay** is enabled by default. When using Ethernet communication is usually best to leave this checked.

2. Press **Accept** to save the settings or **Restore** to revert to previous settings.

4.2.2. Setup Controller Network

Use the **Network** tab to define the network of controllers.

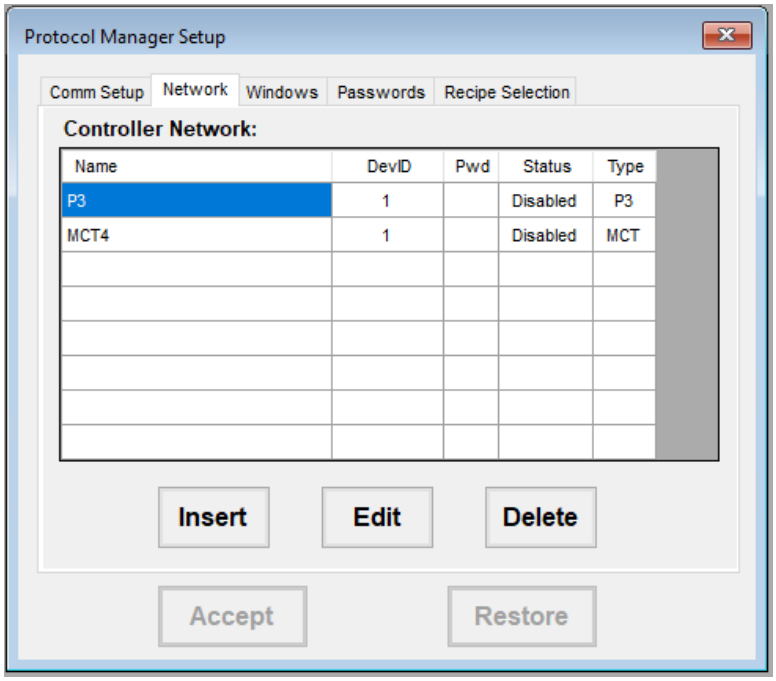


Figure 4-7 Set Network of Controllers

	If the Insert / Edit / Delete buttons are not active (grayed out), select an existing controller name or an empty Name to activate the buttons.

- To delete an existing controller, select a controller name. Press the **Delete** button.
- To edit an existing controller, select a controller name. Press the **Edit** button.
- To add a controller, select the first blank line. Press the **Insert** button.

When editing or adding a controller, the **Controller Setup** window will open. Select the **Controller Type** and set the remaining settings applicable.

Field	Controller Dependency	Purpose
Name		Unique name of oven or controller, maximum 24 characters
Address	Protocol 3 with Ethernet Address = 1	Node address programmed in the controller. When using serial, each node must be a unique value. When using a Modbus TCP gateway, each node must be unique connected to the fieldbus side of the gateway.
Password	Protocol Plus	The password must match the Level 2 password set in the controller. The default value is 2.
IP Address		Enter the IP address programmed in the controller, or a Modbus TCP gateway.
Enable Communication		Check the box to enable communication for the controller. If disabled, communication between the software and controller will not be attempted. Disable any controller not powered or being used.
Additional Settings	FDC MCT4/MCTB	See Determine Additional Settings, for more information. Not all controller settings are available through communication.

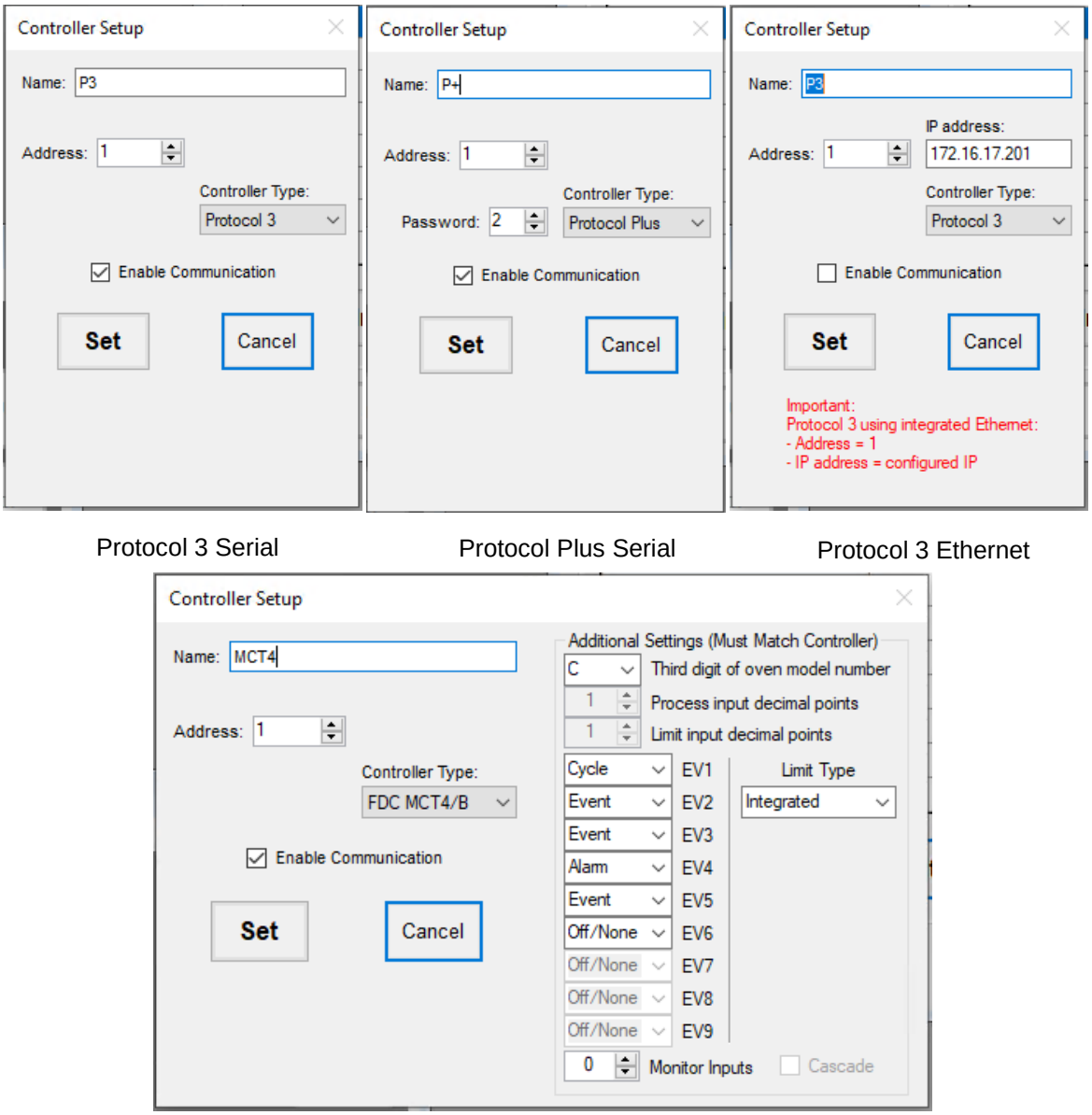


Figure 4-8 Controller Setup Dialog Examples

If the **Controller Type** selected displays the Additional Settings, see the next section, Determine Additional Settings, for more information.

Press **Set** to save the parameters and add the controller to the network.

4.2.2.1. Determine Additional Settings

For some controllers, additional settings are needed which cannot be read from the controller.

A configured controller and the electrical schematic showing wiring to the controller are typically required to determine the additional settings.

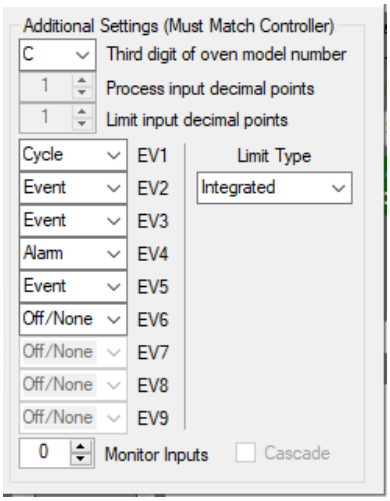


Figure 4-9 Additional Controller Settings

Field	Purpose
Oven model number	Refer to the Despatch oven model number. The third character specifies the maximum temperature rating. **B** = 0 to 400°F (204°C) **C** = 0 to 500°F (260°C) **D** = 0 to 650°F (343°C) **E** = 0 to 850°F (454°C) **F** = 0 to 1000°F (538°C)
Process/Limit Input precision	Both the process and limit input values are fixed to one decimal point at this time. The controller must be configured accordingly.

Field	Purpose
EV1 to EV9	Set event type, matching the controller configuration. • **Off/None** – not present • **Alarm** – event output assigned to a controller alarm function • **Cycle** – event output assigned to end of program (aka End of Cycle) alarm • **Event** – user adjustable event within controller screens and recipe and through the software screens Events are sequential and may not always be present in a controller. Event types set and not present in the controller are ignored. An electrical schematic showing event wiring and assignment will assist identifying event types. Changes to Despatch supplied controller configuration may require event type changes.
Limit Type	Specify the limit device. Refer to an oven schematic. • **None** – no limit controller is exposed to the software • **Integrated** – the limit controller is integrated into the main controller • ExtActive – **no current function** • ExtPassive – **no current function**
Monitor Inputs	Specify the number of optional process inputs configured in the main controller. Refer to an oven schematic. **This currently has no function**.
Cascade	Specify if the controller is setup with a cascade control loop. **No current function in software**. **Software currently works only with a single-loop controller configuration.**

4.2.3. Set Software Display Settings

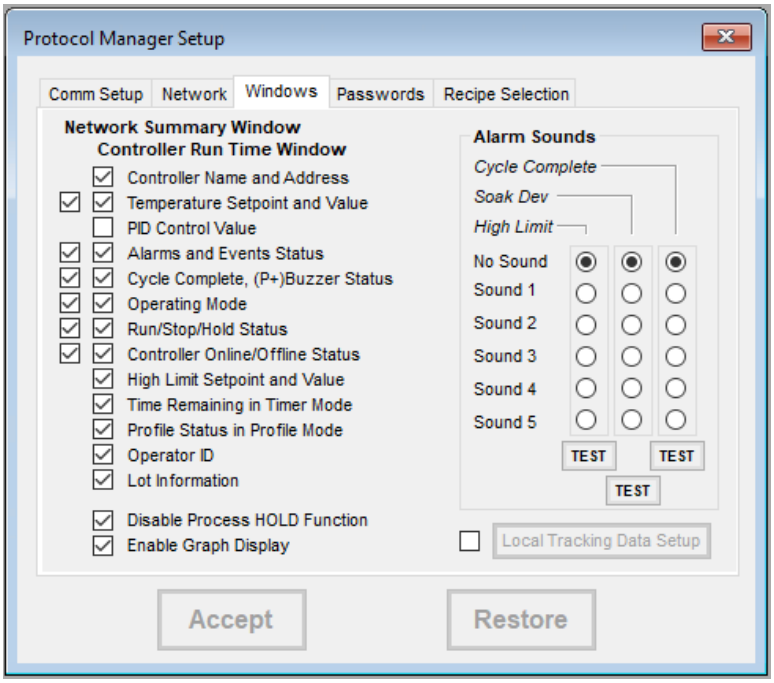


Figure 4-10 Set display settings

Use the **Windows** tab to select screen display items and other software settings.

1. Check the box of each desired parameter to display.
2. Select the desired alarms sounds for **High Limit**, **Soak Deviation** (from guaranteed soak band), and **Cycle Complete** (software generated, not controller generated).
    a. Select the sound to assign to the event.
    b. If the software detects no sound card, the **Alarm Sounds** field is grayed out.
    c. Test the chosen sound parameter by pressing **TEST**.
3. Set other options such as preventing manual process holds or enabling the graph display.
    - **Software v7 and earlier - Protocol Plus Only** – When running in Timer or Profile mode, the controller can be put in a manual Hold state. To disable this function, check the **Disable Process HOLD Function** setting.
    - **Software v8 and later** – When running in Timer (excluding FDC MCT4/MCTB) or Profile mode, the controller can be put in a manual Hold state. To disable this function, check the **Disable Process HOLD Function** setting.
4. Press **Accept** to save the settings. Press **Restore** to return to the previously saved settings.

4.2.4. Setup Recipe Local Tracking Data

Local tracking data is customizable data that can be included in recipe files for many different purposes. When enabled, named fields can be created or removed. Refer to the recipe editor sections for more information.

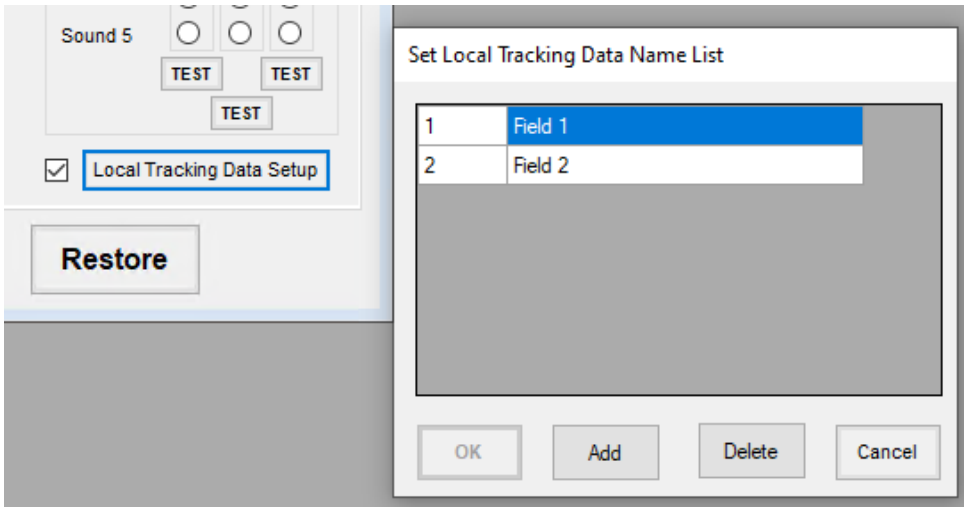


Figure 4-11 Local Tracking Data setup

4.2.5. Set Passwords

Use the **Passwords** tab to select login levels. The software provides four levels of access for operators using the ovens.

Access Level	Access Allowed
Level 4	Highest level of access. Level 4 operators can change communication settings, add/delete controllers from the network, change passwords and perform all lower-level operations.
Level 3	Level 3 operators can edit/write recipes, configure data log settings and perform all lower-level operations.
Level 2	Level 2 operators can change controller modes, select profiles, change set points, start data logging and perform Level 1 operations.
Level 1	Lowest level of access. Level 1 operators view run-time status, and start, stop or hold controller operation. No password is required.

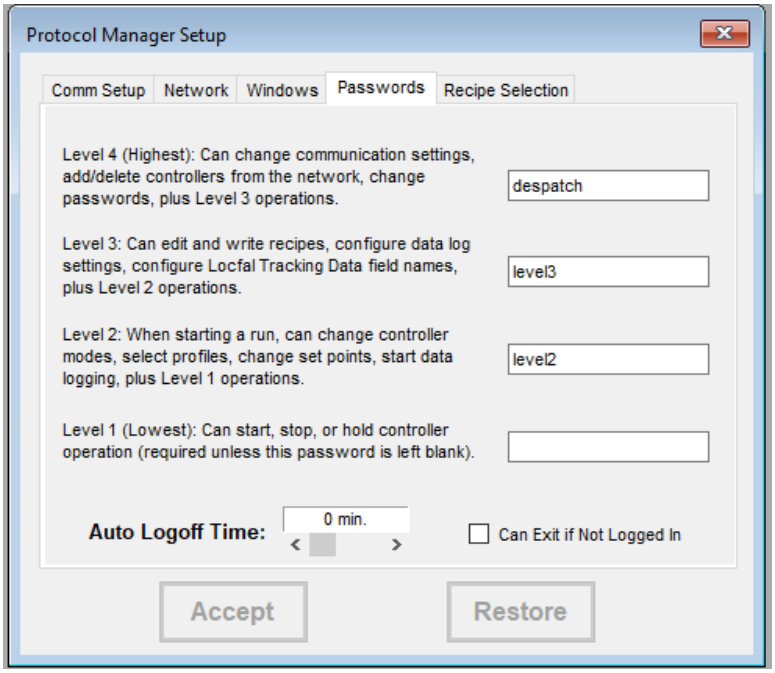


Figure 4-12 Set Passwords

- **Auto Logoff Time.** Time period before the operator is logged off.
  - Set a value from 0 minutes to 60 minutes by sliding the bar.
  - Zero disables this feature and the system will not automatically log off.
- **Can Exit if Not Logged In**. Enable to allow software exit at any time.
  - If left disabled, the software can be exited only if a user has successfully logged in at any level.

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

4.2.6. Setup Profile Mode Recipe Selection

This function exists as of software v8. Use the **Recipe Selection** tab to set how recipes can be selected when starting a controller in Profile mode.

The path field is used to set the folder where recipe files, allowed in Profile mode, are stored. This path is used when **Recipe Source** is set to allow **Load From File** or **Load From Both**. Refer to sections related to recipe management and starting a controller for more information.

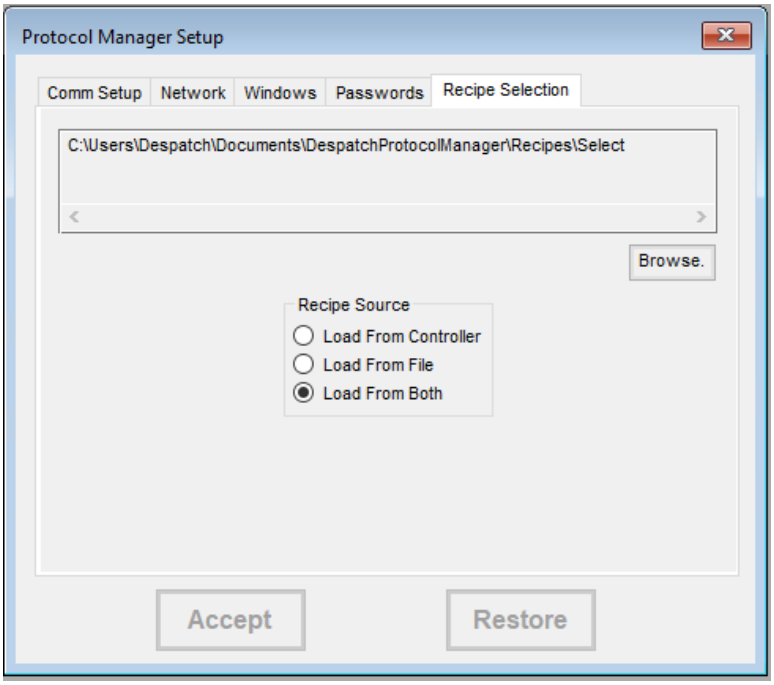


Figure 4-13 Setup Profile Mode Recipe Selection

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

5. OPERATION

5.1. Network Summary Window

Open the top **Window** menu and select **Network Summary** to display the **Network Summary** window.

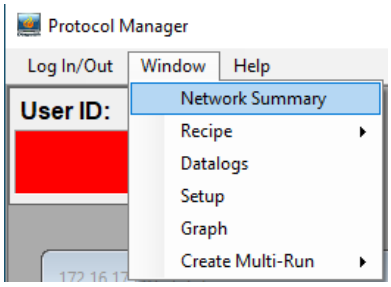


Figure 5-1 Open Network Summary

The network summary window simultaneously displays information for all controllers in the configured network. Information includes:

- Controller name and device address (node)
- IP address (Ethernet communication only)
- Controller Online/Offline status
- Operating mode
- Run/Stop/Hold status
- Temperature set point and value
- Alarms and Events status
- Cycle Complete and Buzzer (Protocol Plus only) status

Display settings are configured in Set Software Display Settings. Double-click on a controller name to display the associated controller run-time window.

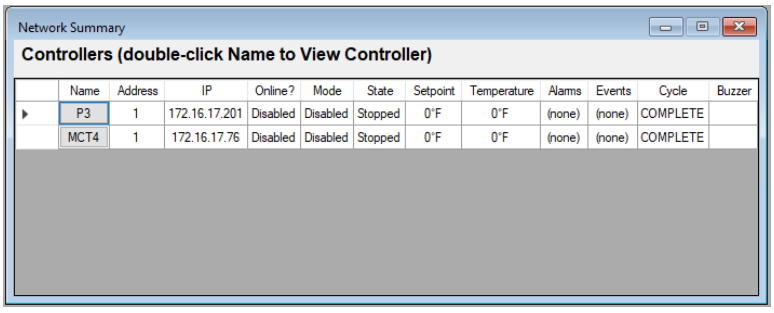
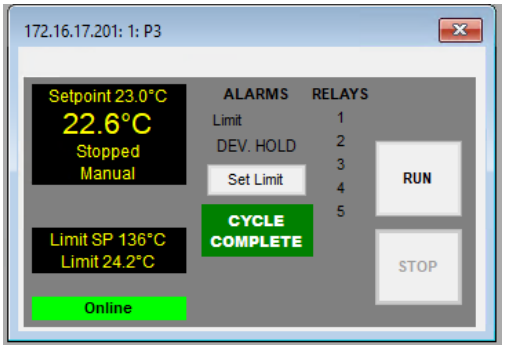


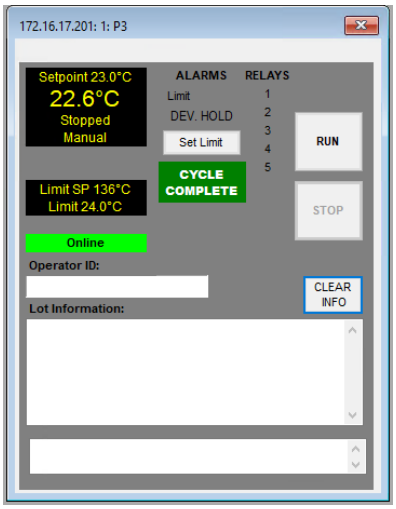
Figure 5-2 Network Summary Screen

5.2. Controller Run-time Window

The controller run-time window displays the status of an individual controller. Use this window to remotely operate the controller.



Run Time Window: Collapsed



Run Time Window: Expanded

Toggle between
full and collapsed views
by double-clicking anywhere in the
window background

Figure 5-3 Controller run-time window

Controller run-time window parameters include:

- Controller name and device address
- Temperature set point and value
- Alarms and Events status
- Cycle Complete and Buzzer status
- Operating mode
- Run/Stop/Hold status
- Controller Online/Offline status
- High Limit set point and Value
- Time Remaining in Timer ode
- Profile, Segment, and Time in Profile mode
- User ID
- Lot Information

Display settings configured in Set Software Display Settings.
If the controller window is closed, open the Network Summary Window to open.

5.3. Editing Recipes

Recipes establish time and temperature instructions for each controller. Setting up the software involves configuring recipes and then selecting the proper recipe for each use.

5.3.1. Edit Recipe – FDC MCT4/MCTB

	See Reference Documents for a list of MCT4 and MCTB specific documentation.

Open the top **Window** menu and open the FDC MCT4/B recipe editor.

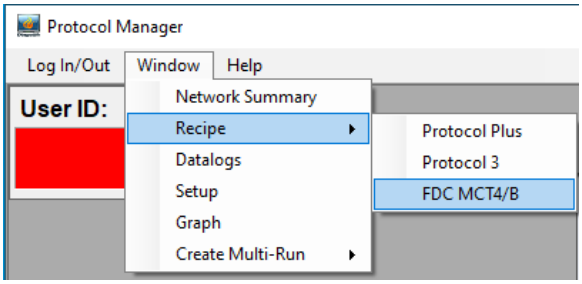


Figure 5-4 MCT4/MCTB open recipe editor

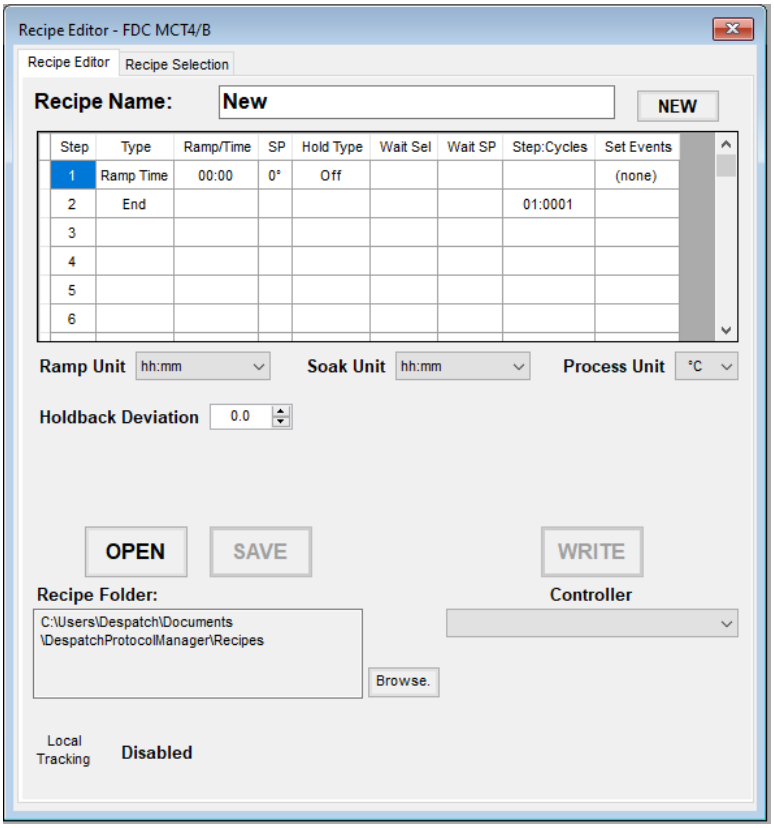


Figure 5-5 MCT4/MCTB recipe editor

5.3.1.1. Recipe Header – FDC MCT4/MCTB

Recipe header parameters are universal to the entire recipe file.

Field	Description	Parameters
Recipe Name	Name of recipe	Defaults to “NEW.” Replace with desired name.
Ramp Unit	Time range, or unit, for ramp steps.	• hh:mm (00:00 to 99:59) • mm:ss (00:00 to 99:59) • unit/min (0 to 9959) • unit/hr (0 to 9959)
Soak Unit	Time range for soak steps.	• hh:mm (00:00 to 99:59) • mm:ss (00:00 to 99:59)
Holdback Deviation	• Deviation from SP (above or below) • Triggers an automatic hold when exceeded. • A step’s time resumes when the deviation reduces. • Applicable for any step with a **Hold Type** of **Hold**.	0 to 1800.0
Process Unit	Process unit of recipe settings	

5.3.1.2. Recipe Steps – FDC MCT4/MCTB

Double-click any table field to open an editing window for the related parameter. Set the appropriate value and press **OK** to save the value (**Cancel** to delete).

Field	Description	Parameters
Step	Step number	1 to 64
Type	Set the step type	• Ramp; Time to reach SP. See Ramp Unit. • Soak; Time to keep current SP. See Soak Unit. • Jump; Go to step number • End; Last step of recipe
Ramp/Time	Duration of step	See Ramp Unit and Soak Unit • hh:mm, mm:ss – Time to ramp to the target SP or rim to soak at the target SP • unit/hr, unit/min –ramp rate to SP for a Ramp step
SP	Target SP	Range depends on configured controller.
Hold Type	Type of hold	• Off – no hold active • Hold – Monitor **Holdback Deviation** of recipe • Wait For – Compare **Wait For Selections** to **Wait For SP** set per step
Wait Sel	Input selections to use in a hold type of **Wait For**	Process and monitor inputs can be selected for comparison with the **Wait For SP** value. A selection is ignored if not present on a configured controller.
Wait SP	**Wait For SP** value used in a hold type of **Wait For**	Range depends on configured controller.
Step:Cycles	Step number and Cycle count for a Jump step. An End step is fixed to one cycle starting with step 1.	Step – range depends on the number of steps prior to step being edited Cycles – range 1 to 9999
Set Events	Event states for the duration of the step	States for event outputs not existing in the configured controller are ignored.

5.3.1.3. Save Recipe – FDC MCT4/MCTB

Press **SAVE** to save the recipe to the path specified in the **Recipe Folder** field. Recipes are saved to the **Recipe Folder** location, not to the controller itself.

5.3.1.4. Write Recipe – FDC MCT4/MCTB

1. Select the target controller name from the **Controller** list. Only FDC MCT4/MCTB controllers will be listed.
2. Press **WRITE** to write the recipe to the selected controller. The recipe is loaded in the controller.

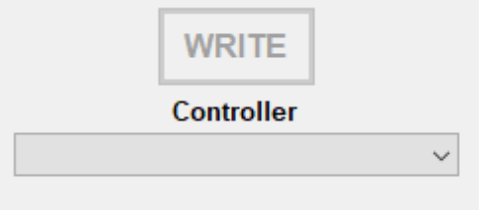


Figure 5-6 Identify target MCT4/MCTB

5.3.1.5. Open Recipe – FDC MCT4/MCTB

Press **OPEN** and select a recipe saved in the **Recipe Folder** path.

5.3.1.6. Read Recipe – FDC MCT4/MCTB

This function is not supported with this controller.

5.3.1.7. Recipe File Selection – FDC MCT4/MCTB

Recipe files stored on the PC need to be added to the **Recipe Selection Folder** so they can be selected to run.

- To add recipes to the selection list, press **Add** to browse and select recipe files.
- To remove recipes from the selection list, select one or more recipes from the **Selectable Recipe Files** list and press **Delete**.

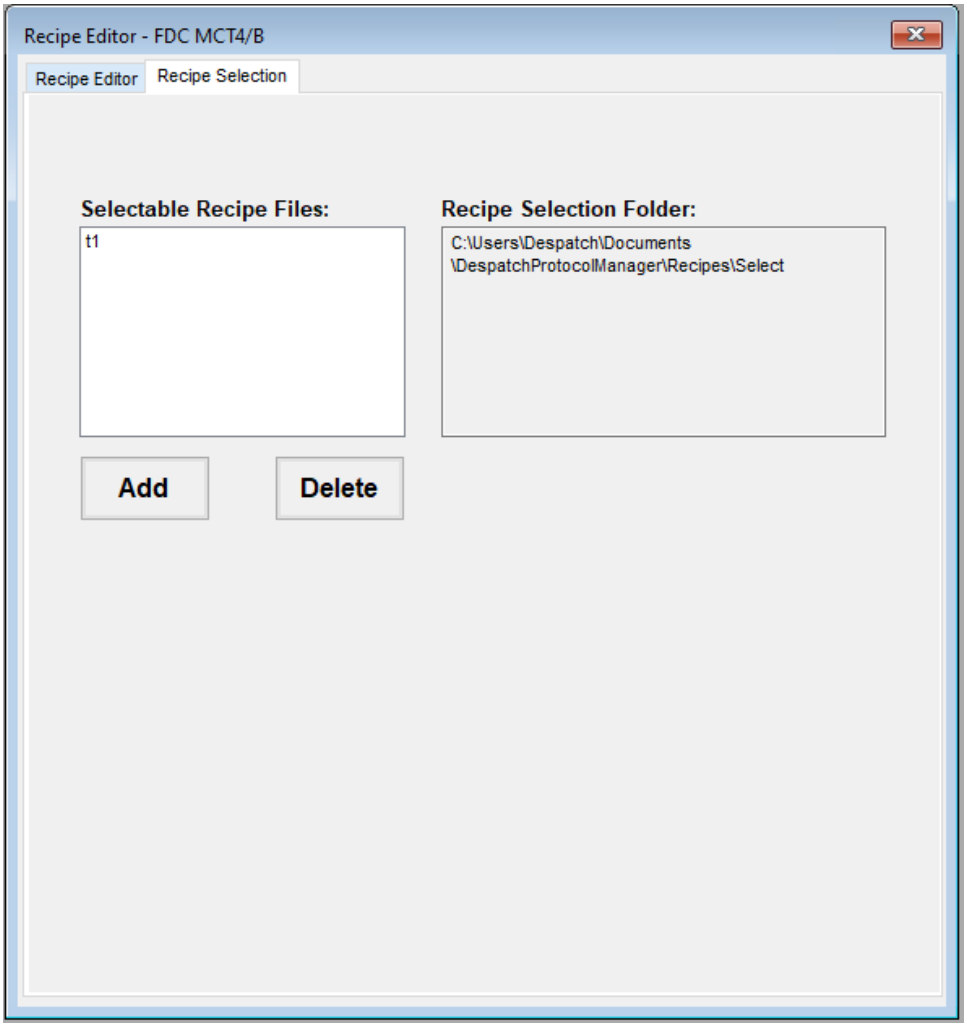


Figure 5-7 MCT4/MCTB Recipe Selection for Run

5.3.2. Edit Recipe – Protocol 3™

	See Reference Documents for a list of Protocol 3 specific documentation.

Open the top **Window** menu and open the Protocol 3 recipe editor. The menu path may differ slightly between software versions.

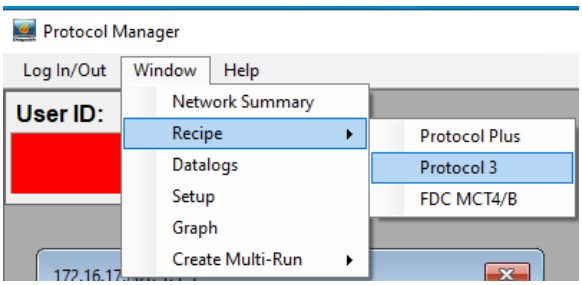


Figure 5-8 Protocol 3 open recipe editor

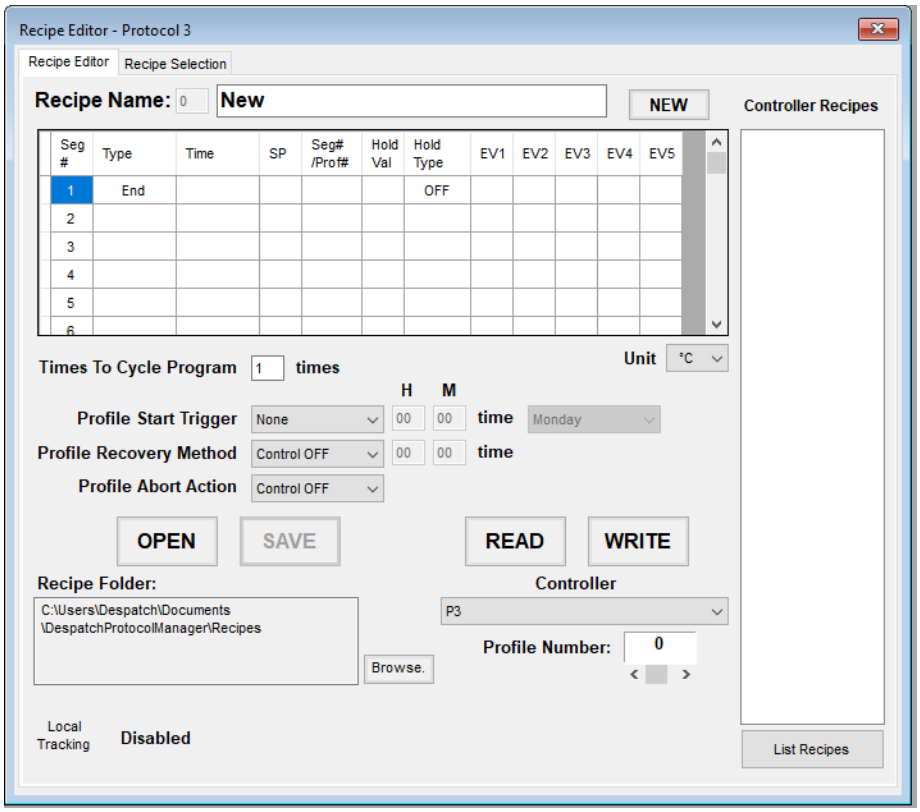


Figure 5-9 Protocol 3 recipe editor

5.3.2.1. Recipe Header – Protocol 3

Recipe header parameters are universal to the entire recipe file.

Field	Description	Parameters
Recipe Name	Name of new recipe being created	Defaults to “NEW.” Replace with desired name.
Times To Cycle Program	Enter the number of times to run the complete program	Minimum 1
Profile Start Trigger	Instruction to begin the selected profile	• None (profile start is not delayed) • After Delay or Day and Time

Profile Recovery Method	The power-on action if profile was running at power-down (for example, after a power cut), or following correction of a signal break.	• Control off
		• Restart profile
		• Maintain last profile setpoint
		  ○ Use controller setpoint
		• Continue profile
		  ○ Continue from where it was when power failed

Profile Abort Action	Action after profile is forced to stop before its end	• Control outputs off • Maintain last profile setpoint
Unit	Process unit of recipe settings	

5.3.2.2. Recipe Steps – Protocol 3

Double-click any table field to open an editing window for the related parameter. Set the appropriate value and press **OK** to save the value (**Cancel** to delete).

Field	Description	Parameters
Seg #	Shows the number of the profile segment being created	From 1-255
Type	Set the segment type.	• Ramp Time: time to reach target SP • Ramp Rate: rate of change towards target SP • Step: jump to target SP • Dwell: keep current SP • Hold: hold the profile until released • Loop: loop back to previous segment • Join: join to another profile • End: end the profile • Repeat/End: repeat a sequence of joined profiles – of which this is the last
Time	Desired Time	HH:MM:SS
Seg#/Pro#	**Seg#**: Segment number used with the Loop command **Pro#**: Profile number used with the Join command	"Seg#" identifies the segment to return to when using the Loop command.
EV1 – EV5	Events turn on for the duration of the segment.	For End Segments, the event state persists until another profile starts, the user exits from profiler mode, or the unit is powered down.

5.3.2.3. Save Recipe – Protocol 3

Press **SAVE** to save the recipe to the path specified in the **Recipe Folder** field. Recipes are saved to the **Recipe Folder** location, not to the controller itself.

5.3.2.4. Write Recipe – Protocol 3

3. Select the target controller name from the **Controller** list. Only Protocol 3 controllers will be listed.
4. Select the **Profile Number**, indicating the controller memory location to write. The **List Recipes** button can be used to query the selected controller's recipe memory.
5. Press **WRITE** to write the recipe to the selected controller and location.

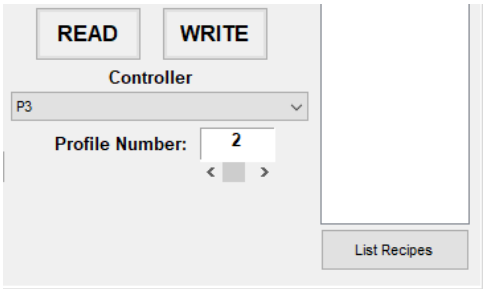


Figure 5-10 Identify target Protocol 3

5.3.2.5. Open Recipe – Protocol 3

Press **OPEN** and select a recipe saved in the **Recipe Folder** path.

5.3.2.6. Read Recipe – Protocol 3

1. Select the target controller name from the **Controller** list. Only Protocol 3 controllers will be listed.
2. Select the **Profile Number**, indicating the controller recipe memory location to read. The **List Recipes** button can be used to query the selected controller's recipe memory.
3. Press **READ** to read the recipe stored in the selected controller and location. The recipe data will populate the fields of the recipe editor, including name, steps, and header information.

5.3.2.7. Recipe File Selection – Protocol 3

Recipe files stored on the PC need to be added to the **Recipe Selection Folder** so they can be selected to run.

- To add recipes to the selection list, press **Add** to browse and select recipe files.
- To remove recipes from the selection list, select one or more recipes from the **Selectable Recipe Files** list and press **Delete**.

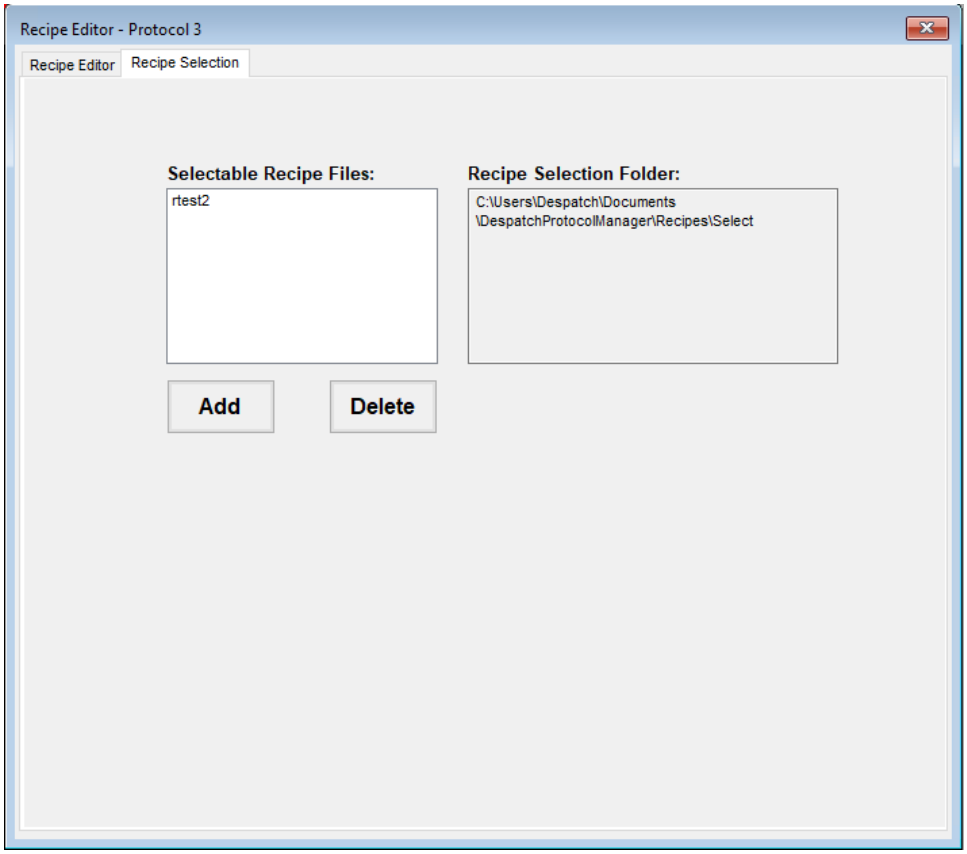


Figure 5-11 Protocol 3 Recipe Selection for Run

5.3.3. Edit Recipe – Protocol Plus

	See Reference Documents for a list of Protocol Plus specific documentation.

Open the top **Window** menu and open the Protocol Plus recipe editor. The menu path may differ slightly between software versions.

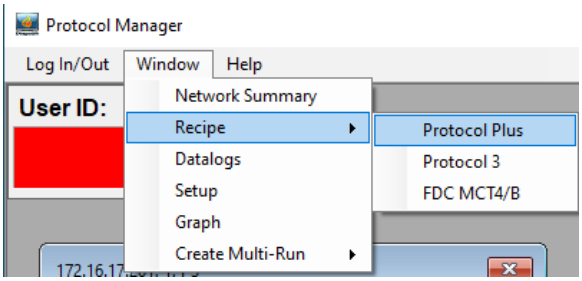


Figure 5-12 Protocol Plus open recipe editor

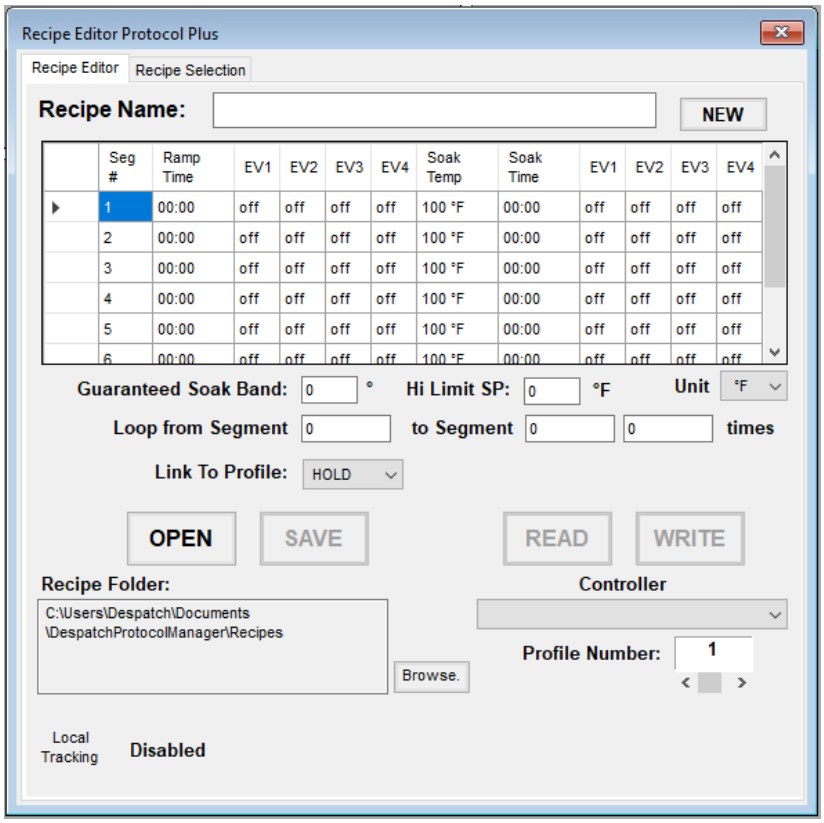
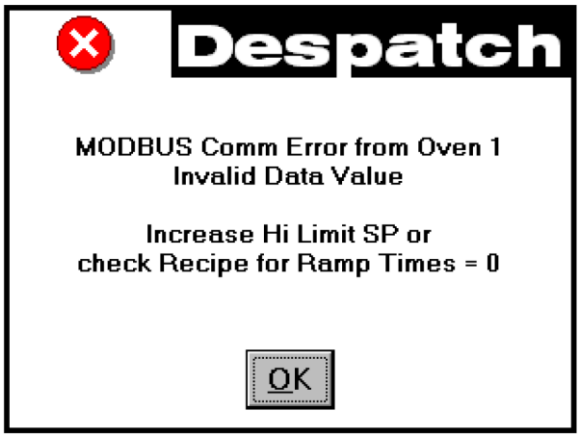


Figure 5-13 Protocol Plus recipe editor

An error will be displayed, and no changes will be made to the controller, if a recipe ramp time, soak temperature, or high limit setpoint value is incompatible with the range set internally for the target controller.

MODBUS Comm Error Message

If a recipe Ramp Time, Soak Temp or Hi Limit SP value entered using the Recipe Editor is incompatible with the internally set range for the target controller, the following error message displays:



If the message appears, no changes will be made to the controller profile.

The **Link to Profile** value **STBY** (Standby mode) can only be used with 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 is displayed, and the downloaded profile will set **Link to Profile** to **HOLD** for that controller.

Incompatible Link to Profile Option Message

The Link to Profile value STBY (Standby mode) can only be used with Protocol Plus controller version 4 or higher. If a recipe with Standby mode selected is chosen for download to an earlier-version controller, Protocol Manager displays this message:

The downloaded profile Link to Profile is set to HOLD for that controller.

5.3.3.1. Recipe Header – Protocol Plus

Recipe header parameters are universal to the entire recipe file.

Field	Description	Parameters
Recipe Name	Name of new recipe being created	Default is empty. Replace with desired name.
Guaranteed Soak Band	A hold condition is enforced if the process deviates from setpoint. The step resumes when the process is within range.	
Hi Limit SP	If the process exceeds this value, the limit alarm is set, and the loop is turned off. An event relay can be assigned to the limit alarm.[1]	
Loop from Segment	Enter the segment number to jump from, and the segment number to jump to, and the number of times that jump should be made.	
To Segment		
times		
Link to Profile	Link to another profile at the end of a profile.	Possible values include: • STOP: Stop oven operation • HOLD: Hold setpoint • 1 – 8: Jump to profile number • STBY: Enter standby mode
Unit	Temperature process unit of recipe settings	Recipes are stored on the PC, and in the controller, with temperature values in °F. This setting is for display. Automatic conversion is done as needed.

[1] Relays will actuate only when the controller has the relay cards installed and programmed for an event.

5.3.3.2. Recipe Steps – Protocol Plus

Double-click any table field to open an editing window for the related parameter. Set the appropriate value and press **OK** to save the value (**Cancel** to delete).

Field	Description	Parameters
Seg #	Number of profile segment being created	From 1 to 8 segments are available.
Ramp Time	Time required to ramp setpoint to temperature	• Enter values between 0 and 99:59 • Units are set locally at each controller as either hours and minutes (HH:MM) or minutes and seconds (MM:SS).
EV1 – EV4[2]	Events 1-4 states for both Ramp and Time portions of the applicable segment.	
Soak Temp	Temperature for segment	• Enter values between -18 to 538°C (0 to 1000°F)**Error! Bookmark not defined.**
Soak Time	Time required to ramp setpoint to temperature	• Enter values between 0 and 99:59 • Units are set locally at each controller as either hours and minutes (HH:MM) or minutes and seconds (MM:SS).

[2] Relays will actuate only when the controller has the relay cards installed and programmed for an event.

5.3.3.3. Save Recipe – Protocol Plus

Press **SAVE** to save the recipe to the path specified in the **Recipe Folder** field. Recipes are saved to the **Recipe Folder** location, not to the controller itself.

5.3.3.4. Write Recipe – Protocol Plus

1. Select the target controller name from the **Controller** list. Only Protocol Plus controllers will be listed.
2. Select the **Profile Number**, indicating the controller memory location to write.
3. Press **WRITE** to write the recipe to the selected controller and location.

Figure 5-14 Identify target Protocol Plus

5.3.3.5. Open Recipe – Protocol Plus

Press **OPEN** and select a recipe saved in the **Recipe Folder** path.

5.3.3.6. Read Recipe – Protocol Plus

1. Select the target controller name from the **Controller** list. Only Protocol Plus controllers will be listed.
2. Select the **Profile Number**, indicating the controller recipe memory location to read.
3. Press **READ** to read the recipe stored in the selected controller and location. The recipe data will populate the fields of the recipe editor, including name, steps, and header information.

5.3.3.7. Recipe File Selection – Protocol Plus

Recipe files stored on the PC need to be added to the **Recipe Selection Folder** so they can be selected to run.

- To add recipes to the selection list, press **Add** to browse and select recipe files.
- To remove recipes from the selection list, select one or more recipes from the **Selectable Recipe Files** list and press **Delete**.

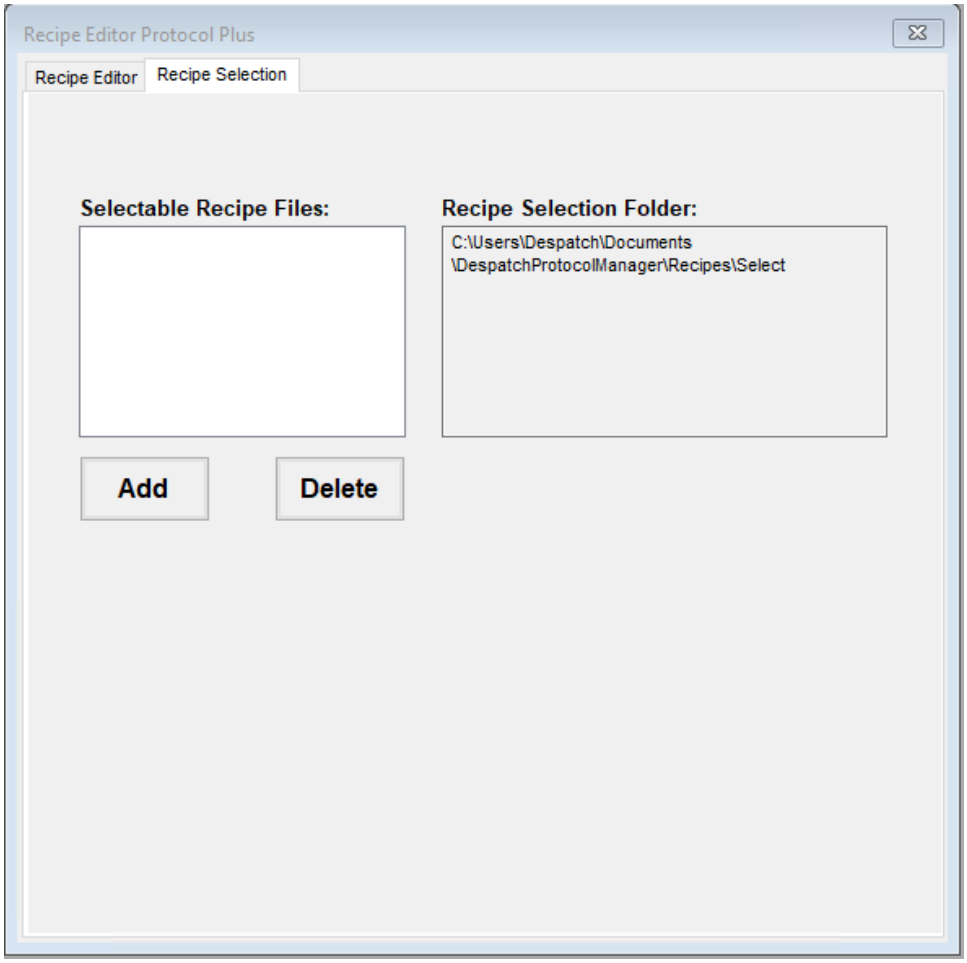


Figure 5-15 Protocol Plus Recipe Selection for Run

5.3.4. Local Tracking Data

Within a recipe editor, when enabled and defined in software setup, customizable data can be saved in recipe files. If the data fields have been modified since last recipe file save, only data matching currently defined fields will be read. If the recipe is modified and saved, only data in the currently defined local tracking data fields will be written, removing any prior, and currently undefined data.

Double-click the table cell to the right of a field name to open a prompt for data entry.

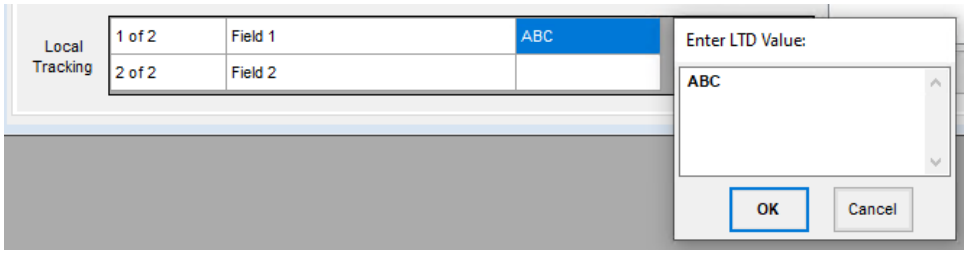
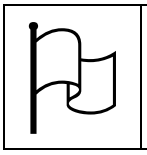


Figure 5-16 Local Tracking Data entry

5.4. Data Logging Functions



Data logging functions are independent from any inherent controller logging functions. Refer to the appropriate controller operator's manual for additional data collection capabilities. See Appendices.

Data log files periodically store controller data to a disk file. Two different types of data log files can exist for each networked controller, Profile data logs and Lot data logs.

- **Profile data logs**: Use Profile data logs for jobs based on a specific process run. When enabled, logs are initiated automatically when a controller is started and closed automatically when the controller stops.
- **Lot data logs**: Use Lot data logs for jobs not related strictly to an entire, single process run. Logs are started and stopped manually using the controller run-time window, regardless of the controller's running status.

Both Profile data logs and Lot data logs contain header information followed by periodic data records. Set header information and record data for both types of data logs using the **Profile Datalog** settings. Both types of files will be stored in the **Log File Folder** path indicated in the **Profile Datalog** settings tab.

5.4.1. Configure Profile Data Log

The **Profile Datalog** tab provides options for setting file content and naming options and log entry interval options.

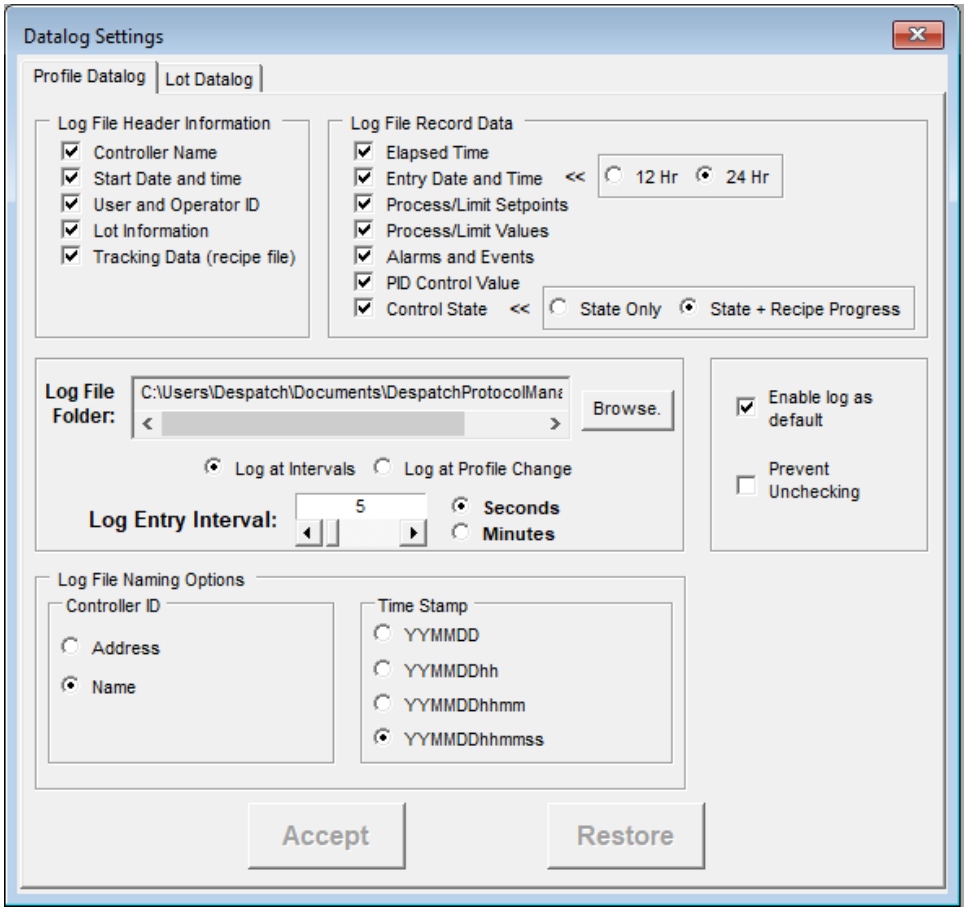


Figure 5-17 Profile data log settings

Log File Header Information	
Field	Description
Controller Name	Controller Name
Start Date and Time	Start Date and Time
User and Operator ID	Unique operator ID
Lot Information	Lot information entered by the operator when starting a run.
Tracking Data	See recipe Local Tracking Data. Must use Profile mode with a recipe file.

Note: Data such as file path, controller mode, recipe name when applicable using Profile mode, and logging interval is always included in the header information.

Log File Record Data	
Field	Description
Elapsed Time	Time since beginning of process run
Entry Date and Time	Timestamp of log entry (12- or 24-hour format)
Process/Limit Setpoints	Process and limit setpoints
Process/Limit Values	Process and limit values
Alarms and Events	Alarm and event states
PID Control Value	Loop output
Control State	Select between • controller operating state only • controller state and recipe (Profile mode) progress

Log action	
Field	Description
Log File Folder	Select the target path using the **Browse** button.
Log at Intervals	Logging at fixed time intervals. Also set time interval and unit.
Log at Profile Change	Logging will occur at every programmed change of the recipe.
Log Entry Interval	Interval to log data to the file
Log File Folder	Select **Browse** to navigate and set desired folder.
Enable Log as default	Logging is enabled by default when starting a controller.
Prevent Unchecking	Prevents changes to logging state when starting a controller.

5.4.1.1. Profile Log File Naming

Profile log files have several naming options possible.

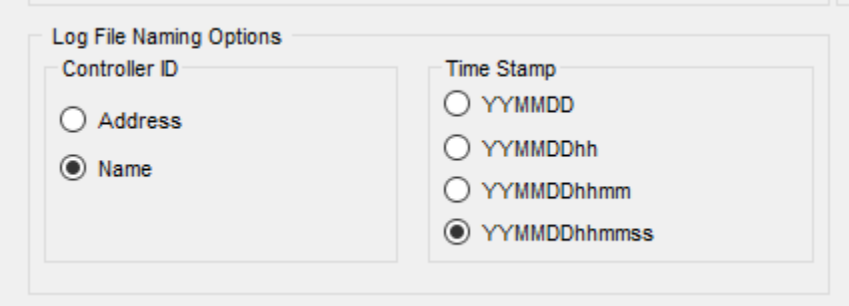


Figure 5-18 Profile log file naming

Table 1. Profile Datalog tab - Log File Naming Options

Field	Description	Parameters
Controller ID	First part of log file name	Log file name starts with address (three digits with leading zeroes), or name as entered in network setup. If name is selected, blank spaces are converted to underscore characters.
Time Stamp	Second part of the log file name	Choose desired format for the time stamp

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

When a data log is started, and a filename is created, duplicate filenames are checked for. If a file with the created name already exists, the filename is appended with an underscore and a numerical value to create a unique filename.

Examples

For a controller named "East Fab #1" with an address of 2, a log 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 log filename would be "East_Fab_#1_00020414.csv". If a file with that name already existed, however, the new file would be renamed "East_Fab_#1_00020414_1.csv".

5.4.2. Configure Lot Data Log

Refer to Configure Profile Data Log for selecting file content. Lot data log entry interval is independent from the main data logging interval.

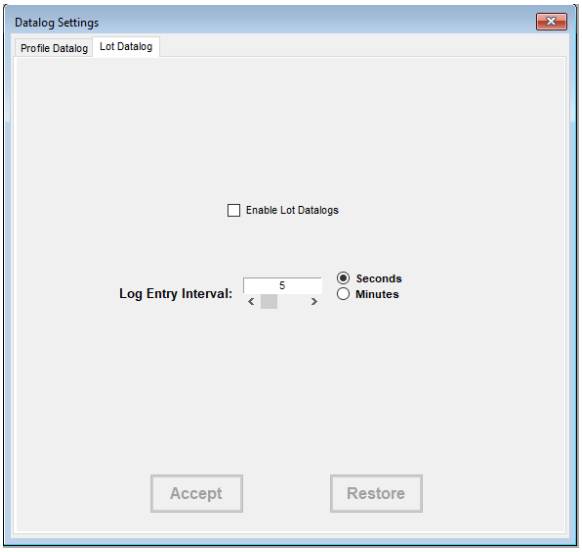


Figure 5-19 Lot data log options

When a log is started, the operator will be prompted to enter an Operator ID (populated with the logged in user by default) and lot identifier. The lot data log filename will be the lot identifier appended with a ".csv" extension. When a data log is started, and a filename is created, duplicate filenames are checked for. If a file with the created name already exists, the filename is appended with an underscore and a numerical value to create a unique filename.

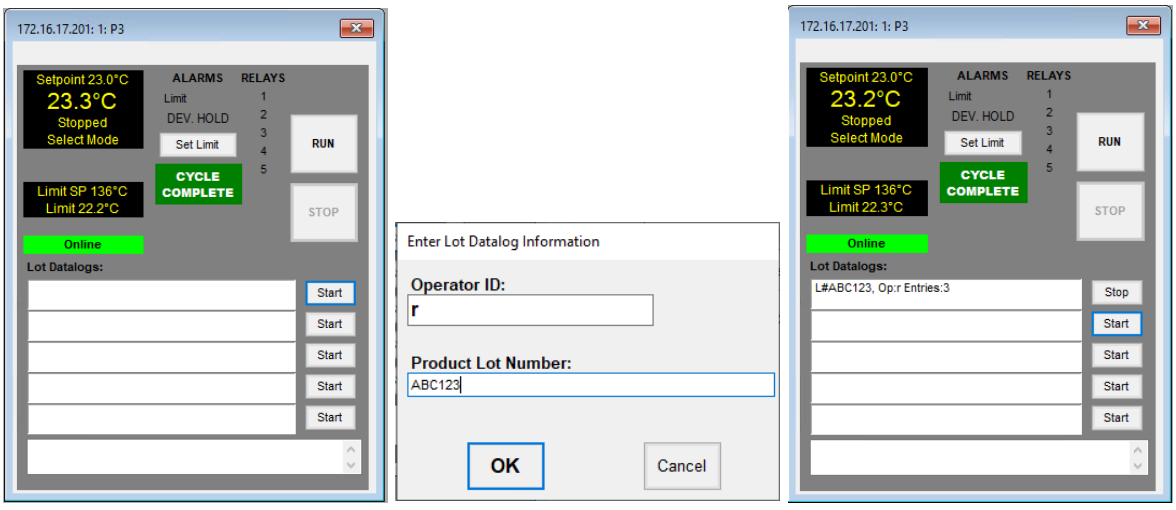


Figure 5-20 Lot data log operation

5.5. Data Trending

Data trending provides a graph view of basic temperature process data versus time. Each controller configured in the network can be selected in the graph view (one at a time) to see the controller's trend data. The trend data is independent of other data logging functions and always active when the graph option is enabled. To enable the graph and trending, refer to Set Software Display Settings.

Once the trend graph has been enabled the graph window will be displayed. It may also be running minimize within the application window. If the graph option is enabled but not displayed or minimized from the application's top **Window** menu select **Graph**.

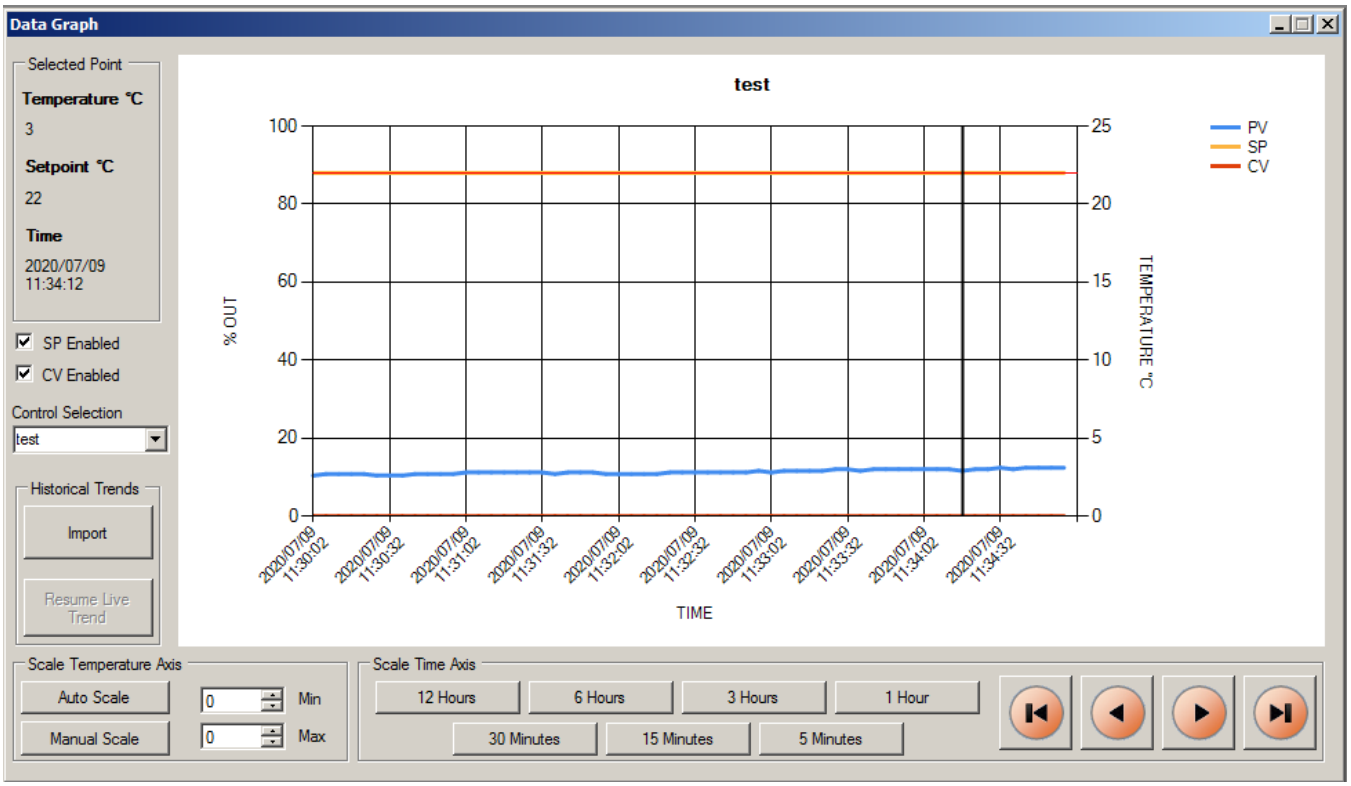


Figure 5-21 Trend graph

The main process input temperature (PV) is graphed automatically. Both the temperature set point (SP) and process output (CV) are optional.

The graph cursor can be positioned by moving the mouse. The current data of the cursor position is displayed in the **Cursor** section of the graph window.

The **TIME** axis is automatically scaled based on the **Scale Time Axis** (duration window) selected. The most recent data point of the view is always the furthest right data point. Navigation of the trend log in time can be done with the navigation buttons.

The **TEMPERATURE** axis can be set to **Auto Scale** or **Manual Scale** using the controls in the **Scale Temperature Axis** section.

A previously stored trend log can be imported for display. Press the **Resume Live Trend** button to return to the current trend. After initial application installation it may take a little time for a trend log to be available for import/viewing.

6. THE CONTROLLER

6.1. View the Controller

View a controller by selecting top menu **Window** and selecting **Network Summary**.

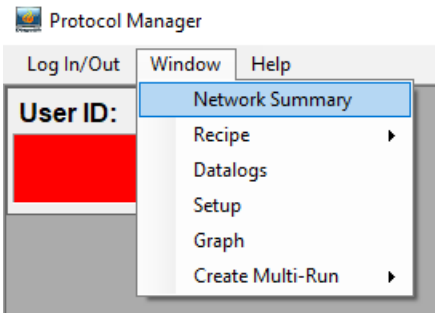
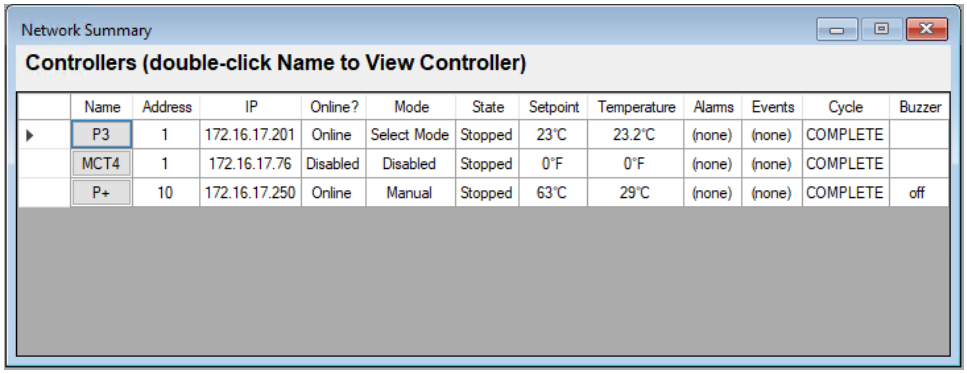


Figure 6-1 Open Network Summary



Name	Address	IP	Online?	Mode	State	Setpoint	Temperature	Alarms	Events	Cycle	Buzzer
P3	1	172.16.17.201	Online	Select Mode	Stopped	23°C	23.2°C	(none)	(none)	COMPLETE	
MCT4	1	172.16.17.76	Disabled	Disabled	Stopped	0°F	0°F	(none)	(none)	COMPLETE	
P+	10	172.16.17.250	Online	Manual	Stopped	63°C	29°C	(none)	(none)	COMPLETE	off

Figure 6-2 Network Summary

Double-click on a controller name to open a run-time window.

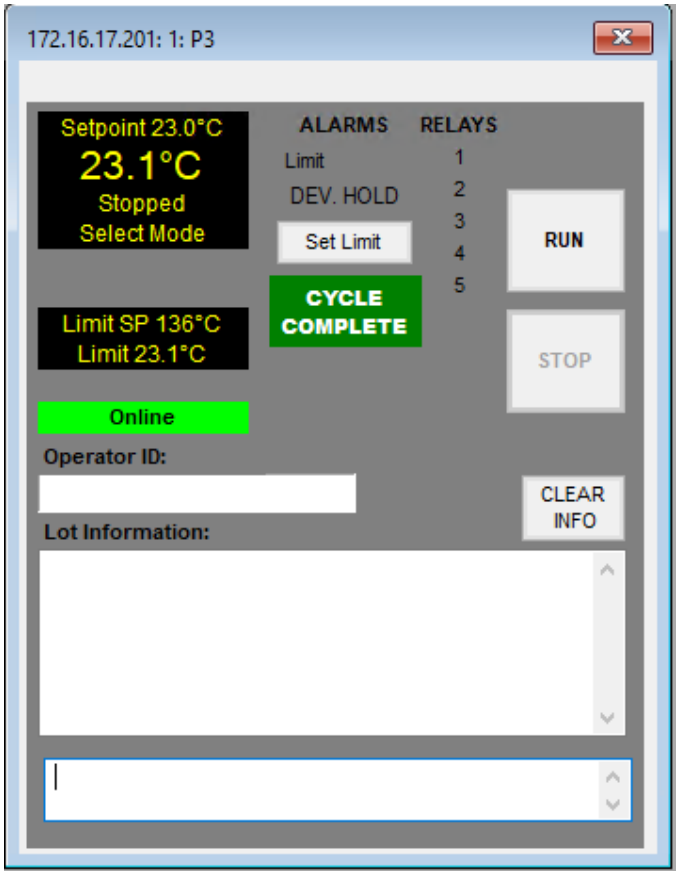


Figure 6-3 Controller run-time window

No login is needed to run the controller from the run-time window. However, if closed, a user must login to open the run-time window.

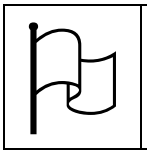
6.2. Start the Controller

The run-time window provides up to three options for operating a controller.

- Manual mode
- Time mode
- Profile mode

Availability will depend on the controller configured.

Press the **RUN** button to select the run mode.



Some information entered in run screens cannot be altered once the controller has started. If changes are needed, the controller must be stopped, data modified, and re-started.

6.2.1. Start Manual Mode

In Manual mode the process is held at a single setpoint temperature until the operator stops the process. Enter the process setpoint, limit setpoint and event states.

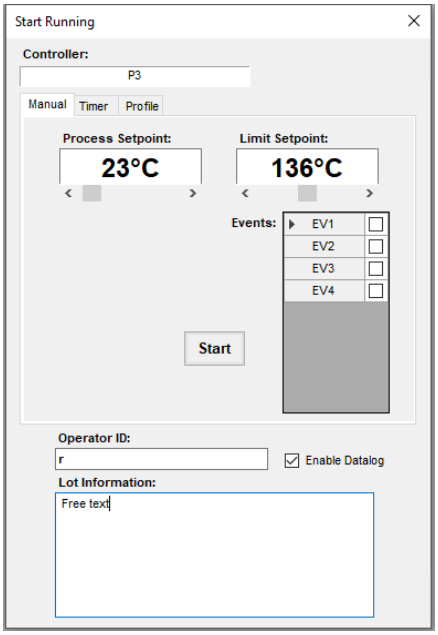


Figure 6-4 Start manual mode

Before pressing the **Start** button other data such as **Operator ID** and **Lot Information** text can be entered or altered. Also, if setup to allow in application settings, data logging can be enabled or disabled.

6.2.2. Start Timer Mode

In Timer mode the process is held at a single setpoint temperature for a preset length of time. The operator can stop the process early if needed. Enter the process setpoint, limit setpoint, event states, and time duration.

A guaranteed soak band function is available in Timer mode. If the process deviates outside of the soak band around setpoint, an automatic hold is enforced pausing the timer. Once the process temperature falls back inside the soak band limits, the hold is removed, and the process timer resumes.

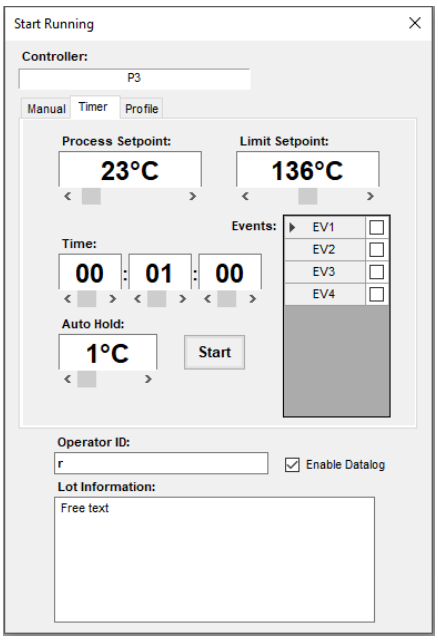


Figure 6-5 Start timer mode

Before pressing the **Start** button other data such as **Operator ID** and **Lot Information** text can be entered or altered. Also, if setup to allow in application settings, data logging can be enabled or disabled.

6.2.3. Start Profile Mode

In Profile mode the process follows a pre-configured recipe loaded into the controller. Refer Editing Recipes for setting up recipes for a respective controller. Profile mode may be started by selecting a recipe on the PC, or when applicable, a recipe already stored in the controller.

6.2.3.1. Recipe Mode – FDC MCT4/MCTB

Only a recipe file stored on the PC can be selected. A recipe name can be selected from the file list, manually entered, or selected by browsing the PC file system. Refer to Editing Recipes for details setting a recipe available for selection in the file list or through manual entry. If the recipe file exists and passes validity checks, the **Start** button will be available. Upon pressing **Start**, the recipe is written to the memory of the controller and the recipe is started.

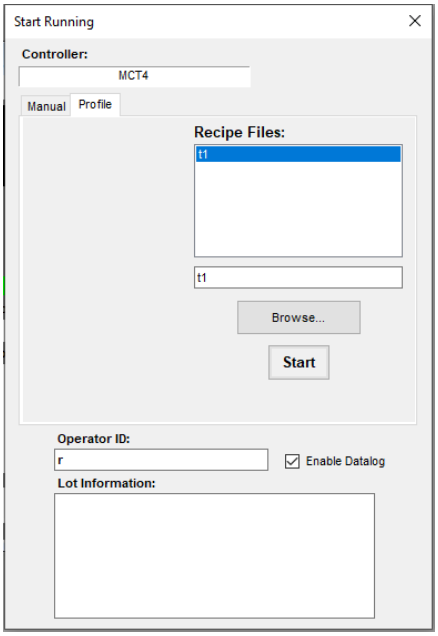


Figure 6-6 FDC MCT4/MCTB Run Recipe

Before pressing the **Start** button other data such as **Operator ID** and **Lot Information** text can be entered or altered. Also, if setup to allow in application settings, data logging can be enabled or disabled.

6.2.3.2. Profile Mode – Protocol 3

A recipe already stored in the controller, or a recipe file stored on the PC, can be selected (refer to Setup Profile Mode Recipe Selection). Refer to Editing Recipes for details writing recipes to the controller memory and setting a recipe file available for selection in the file list or through manual entry.

- When selecting a recipe stored in the controller (left side of screen), the list of recipes stored can be queried by pressing the **Load Recipes** button. Once a recipe from the list is selected the **Start** button (left side of screen) will be available.
- When selecting a recipe file (right side of screen), a recipe name can be selected from the file list, manually entered, or selected by browsing the PC file system. If the recipe file exists and passes validity checks, the **Start** button (right side of screen) will be available. Upon pressing **Start**, the recipe is written to recipe location **zero** of the controller, recipe zero is selected, and the recipe is started. **It is advised to not use recipe location zero for general recipe storage.**

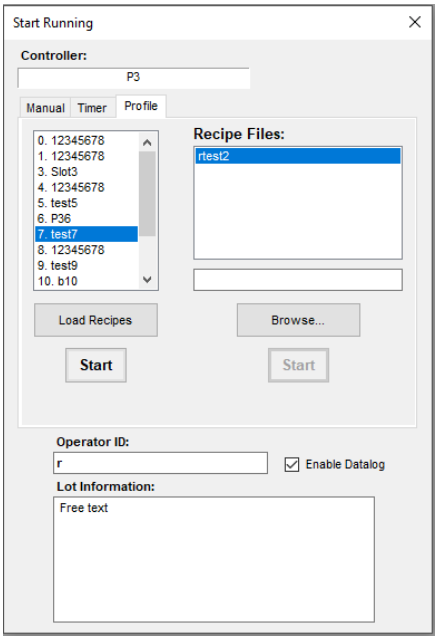


Figure 6-7 Protocol 3 run profile

Before pressing the **Start** button other data such as **Operator ID** and **Lot Information** text can be entered or altered. Also, if setup to allow in application settings, data logging can be enabled or disabled.

6.2.3.3. Profile Mode – Protocol Plus

A recipe already stored in the controller, or a recipe file stored on the PC, can be selected (refer to Setup Profile Mode Recipe Selection). Refer to Editing Recipes for details writing recipes to the controller memory and setting a recipe file available for selection in the file list or through manual entry.

- When selecting a recipe stored in the controller (left side of screen), select the **Profile Number**. Once a location is selected press the **Start** button (left side of screen).
- When selecting a recipe file (right side of screen), a recipe name can be selected from the file list, manually entered, or selected by browsing the PC file system. If the recipe file exists and passes validity checks, the **Start** button (right side of screen) will be available. Upon pressing **Start**, the recipe is written to profile number **eight** of the controller, profile eight is selected, and the recipe is started. **It is advised to not use profile number eight for general recipe storage.**

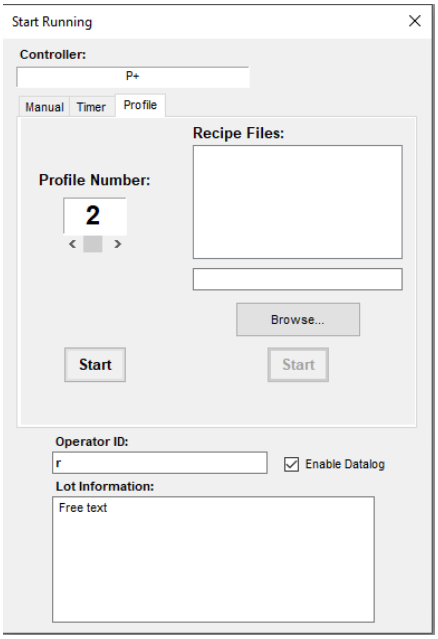


Figure 6-8 Protocol Plus run profile

Before pressing the **Start** button other data such as **Operator ID** and **Lot Information** text can be entered or altered. Also, if setup to allow in application settings, data logging can be enabled or disabled.

6.3. Grouped Controller Start

A group of like controllers can be created and controlled as a group. From the application's top **Window** menu **Create Multi-Run** for the type of controllers in the group.

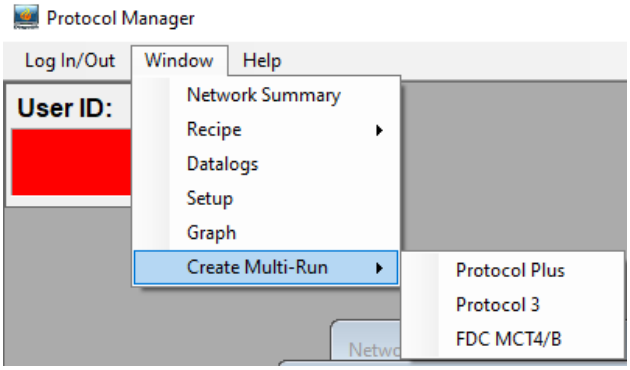


Figure 6-9 Multi-Run Control

Each instance of a controller group can be named and configured with a list of controllers. A controller can only be a member of one group at a time. For each group window, press the three-dot ellipsis button to rename and add controllers to the group. If any controller in the group is disabled or not communicating, the **RUN** function will be disabled. If a group window is closed, any controllers that were part of the group are returned to independent control.

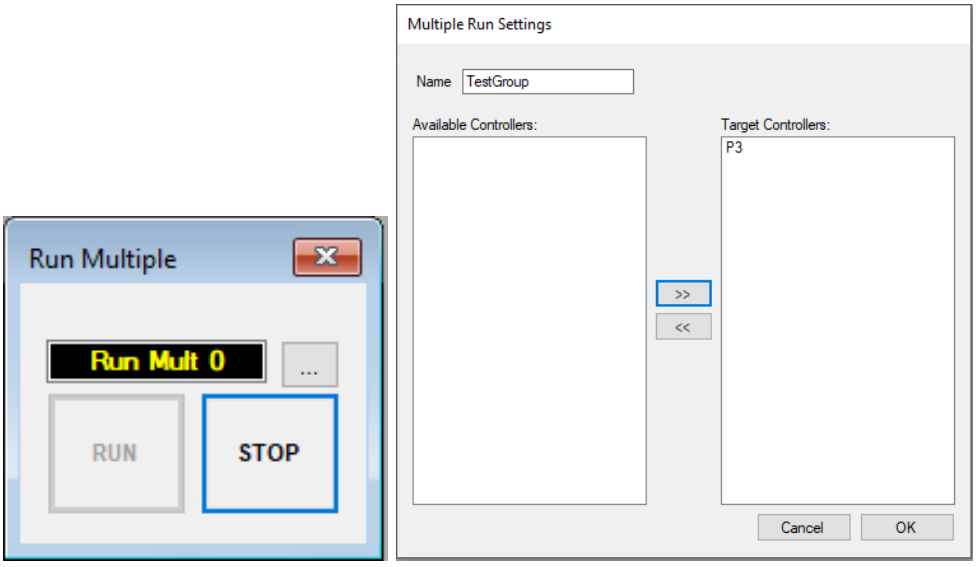


Figure 6-10 Operate controllers as a group

A controller in a group is indicated in the run-time window for the controller.

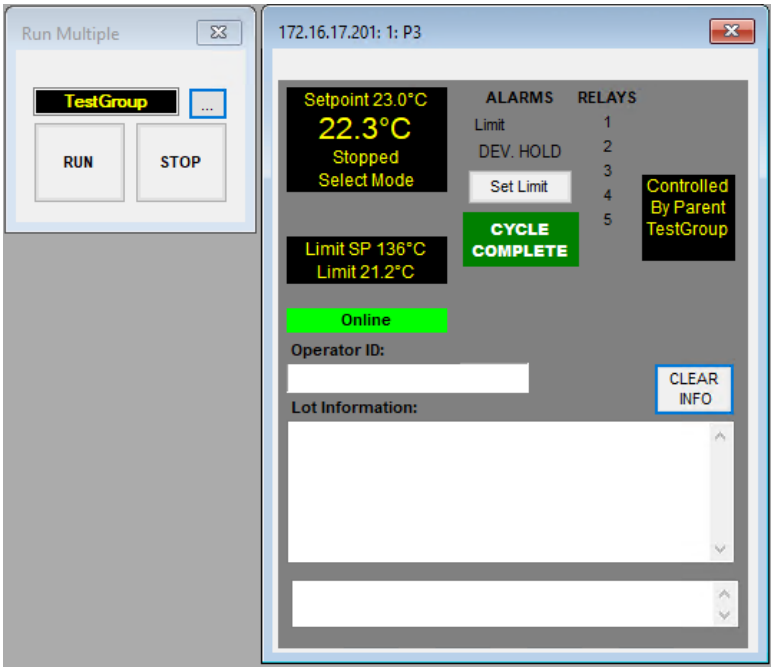


Figure 6-11 Controller part of a group (run-time)

The group of controllers can be started and stopped using the group's window. Just as running a controller independently, pressing the **RUN** button will allow the controller group to run in the mode of choice, Manual, Timer, or Profile modes.

6.3.1. Special Profile Mode Considerations

When running in Profile mode, the “master” controller of the group is the first controller added to the group. When starting Profile mode by selecting a recipe stored in the controller, it is the operator’s responsibility to ensure identical recipes are stored in the selected location in each controller of the group. Refer to Editing Recipes on how to write recipes to controllers. When starting Profile mode by selecting a recipe file, the file is written to each controller of the group first before starting each controller. Refer to Start Profile Mode for additional details specific to a controller type.

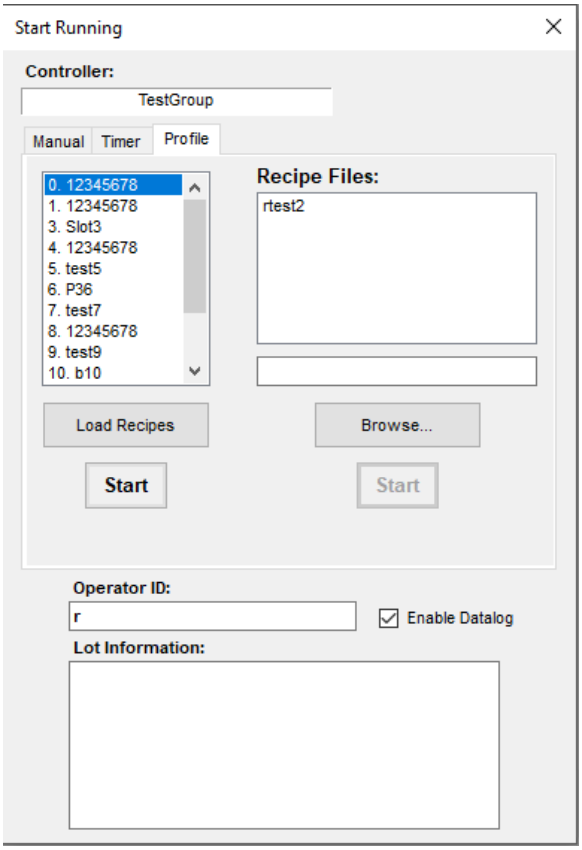


Figure 6-12 Select run mode of configured group

6.4. Changes After Controller Start (v8 software)

Controllers not assigned to a group can have certain operating values adjusted after being started. When operating in Manual or Timer mode, the target setpoint, event states, and limit setpoint can be altered. When operating in Profile mode only the limit setpoint can be adjusted.

	This feature is not available when using the Protocol Plus controller.

- To adjust the target setpoint, double-click the first line in the black box located in the upper left corner of the run-time window. The line starts with “Setpoint”.
- To adjust relay/event states, double-click the relay/event number. Each double-click will toggle the state of the output.
- To adjust the limit setpoint, press the **Set Limit** button.

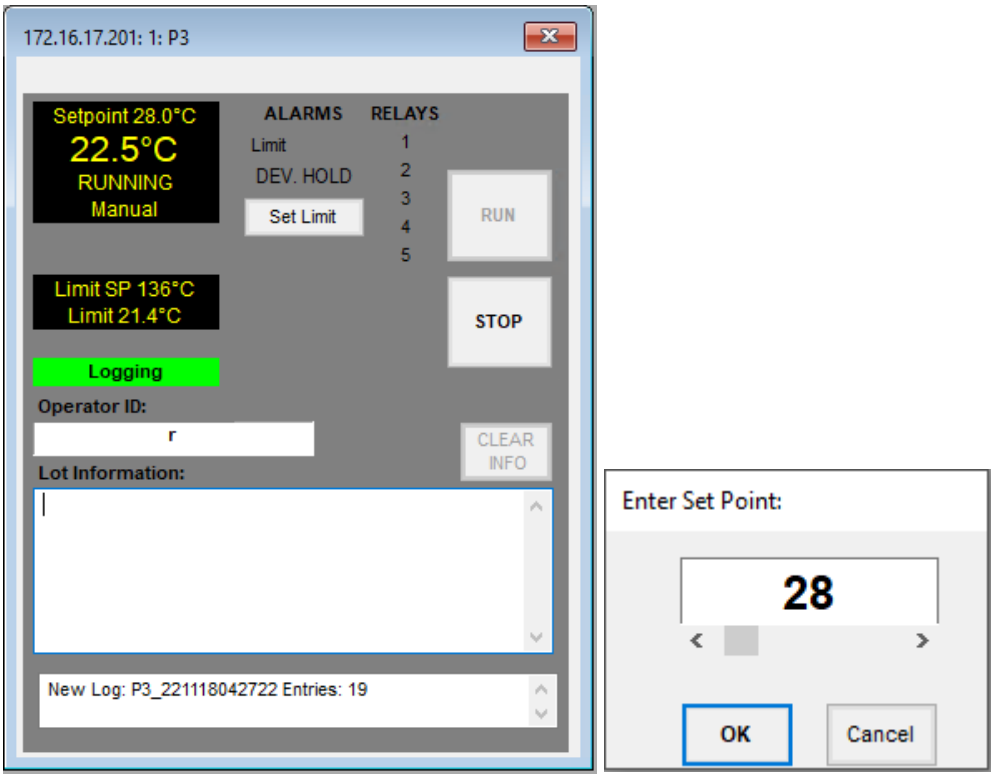


Figure 6-13 Changes after start

7. TROUBLESHOOTING

7.1. FDC MCT4/MCTB Software Version

Protocol Manager requires the Future Design Controls MCT4 or MCTB software to be at least version 1.3.0. If it is older, contact Despatch for information on obtaining more recent software.

7.2. Protocol 3 Firmware Version

Protocol Manager requires Protocol 3 firmware version 2.3 or later. If the firmware version is older contact Despatch for a replacement.

7.3. Device Communication Settings

For problems communicating between the Protocol Manager and devices, check each device's communication settings:

- Device Communication Protocol
  - Some devices support multiple protocols, or communication may be disabled by default. Refer to device documentation and follow setup details for serial RS485 or Ethernet TCP/IP using Modbus or Modbus TCP/IP.
- Device Addressing
  - Serial
    - Within each device on the same physical network, set the node/device ID/address to a unique value. Each device on the same physical network must have a unique address.
  - Ethernet
    - Within each device on the same physical network, set the IP address, subnet mask, and gateway. Typically, the subnet mask and gateway values will be the same on each device, however, the IP address must be unique for each device.
  - Modbus TCP gateway
    - Refer to Serial and Ethernet details above
- Serial Baud Rate
  - Within each controller on the same physical network, set each for the same baud rate. Not all devices support the same baud rates. Select a baud rate common to all devices on the same physical network.
- Serial parity and stop bits
  - Refer to the device documentation for any parity or stop bit settings. All devices on the same physical network should use the same parity and stop bit settings. These are not adjustable on some devices. Select settings common to all devices on the same physical network.

Once all device configuration and connections are complete, the application's controller network can be setup. Refer to Configure Controllers and Software Setup for additional information.

7.4. Serial RS485 – Oven Body Connector to Controller

If working with a Despatch oven it may likely have a communication port on the body of the oven. This may be a single DB9 connector, or it may be a dual DB9 connector for networking multiple ovens. Always refer to the oven specific electrical schematic for wiring details between the controller and oven body. If working with a device directly, refer to the device documentation on specific port or terminal connection information.

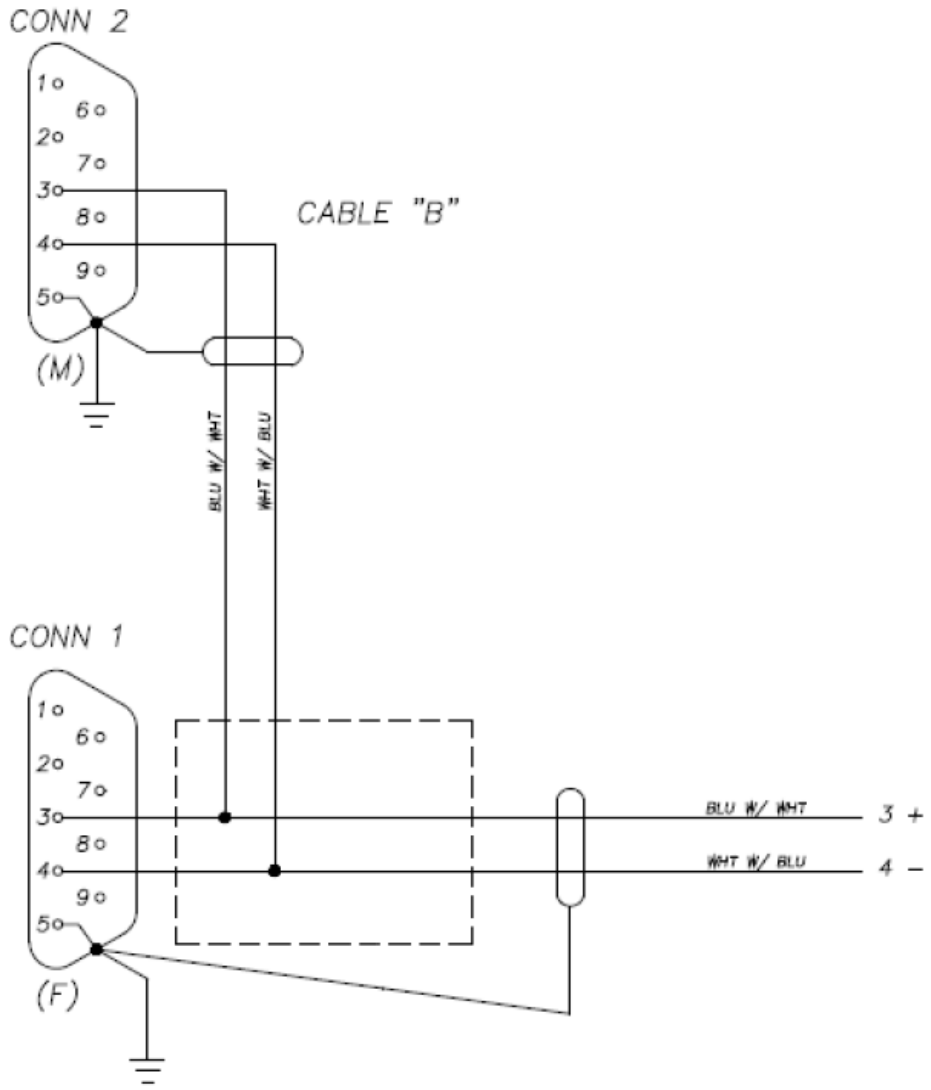
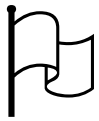


Figure 7-1 Typical Despatch oven body DB9 to controller RS485 wiring

Refer to Appendices for information on oven connectivity kits available from Despatch.

7.5. Ethernet

	***Protocol Manager v7.7.0, or later, is required to use Ethernet communication.***

7.5.1. FDC MCT4/MCTB

Ethernet is built in and always active on the MCT4 and MCTB. Refer to the controller documentation for setup and troubleshooting.

7.5.2. Protocol 3

1. Navigate to the contents of the software installer distribution and locate the file ***SetupEthernetTools.msi*** (PN 324868). The application may have already been installed during the Protocol Manager installation process.
2. Run the file and follow the prompts to install the Ethernet configuration program.
3. Refer to Appendices for options retrieving the controller MAC address.
4. Connect a single network cable between the PC Ethernet port and the controller. It is best ONLY one controller be connected to assist address setup. **Make sure there are no cable routes to a router or other DHCP server assigning the controller an IP address.**
5. From the Windows Start menu, navigate to **Graphical Controller Tools** and run ***Graphical Controller Ethernet Setup***.

6. Select **Set IP Address** from the top **System** menu.

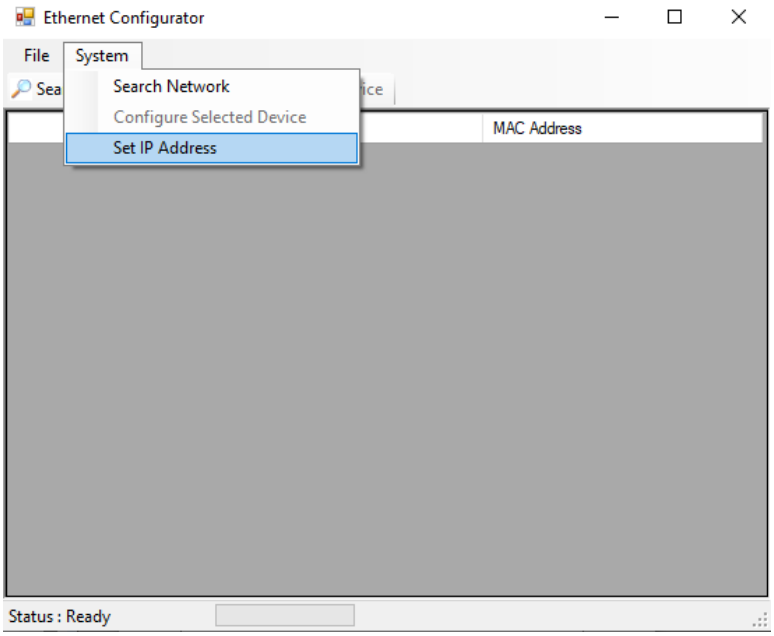


Figure 7-2 Protocol 3 setup IP address

7. Enter the MAC address and IP address for the control. Make sure the configured IP address does not conflict with another IP address on the same Ethernet network.

   For example, if you are connecting to a computer with an IP address of 192.168.10.1, subnet mask 255.255.255.0, you could set the control to 192.168.10.10. This is just an example.

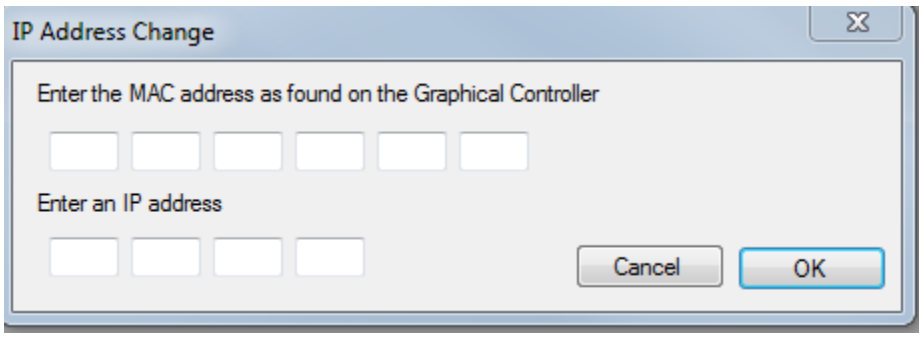


Figure 7-3 Protocol 3 assign IP address

8. Press **OK**.

9. To test if the controller's IP address has been correctly assigned, press the **Search Network** icon and the newly configured controller should be listed. If more than one device is listed, there are multiple controllers connected via Ethernet to the PC. Ensure configuration of the proper controller.

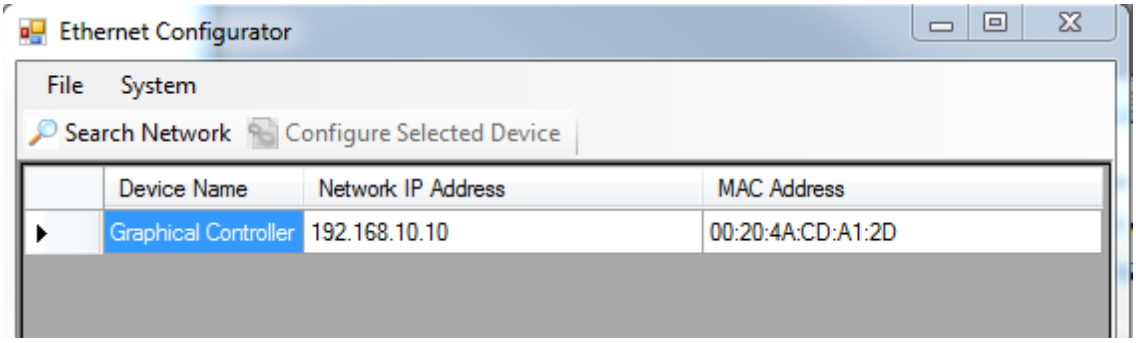


Figure 7-4 Protocol 3 Ethernet search for control

10. Double-click on a **Device Name** and a window will pop up with details of the controller. Check the parameters in the **Edit Modbus Settings** tab match what is programmed into Communications Configuration on the physical controller.

	When using the built-in Ethernet port on the Protocol 3, the hardware address must be set to 1 and the baud rate set to 9600.

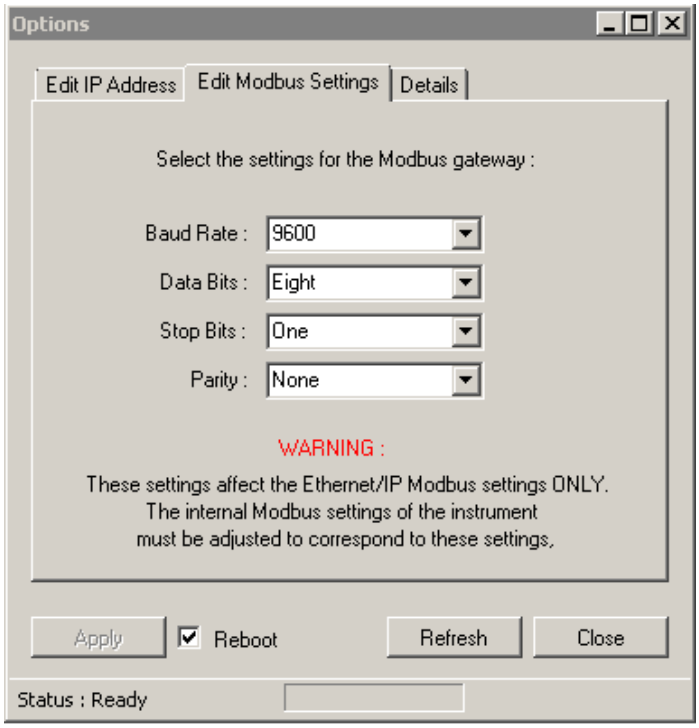


Figure 7-5 Protocol 3 Ethernet Modbus settings

11. Check the **Details** tab and make sure the three fields fill in with information from the control. If they are blank or an error is displayed, double check software, controller settings, and wiring.

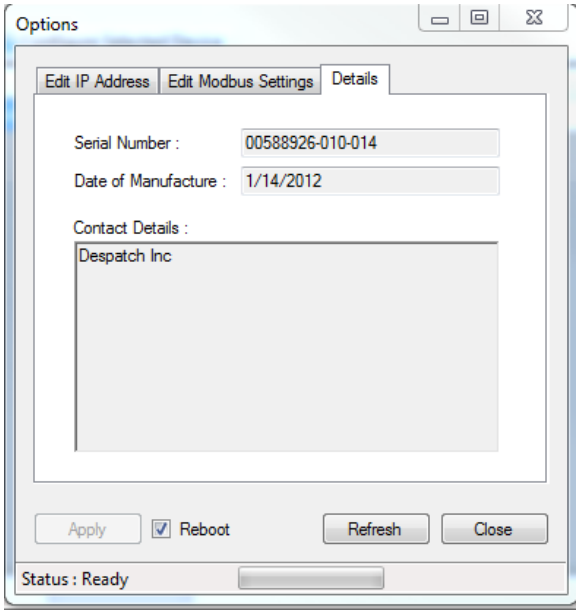


Figure 7-6 Protocol 3™ Ethernet communication check

7.5.3. Protocol Plus

Ethernet communication is not natively available. However, a certain type of Modbus TCP gateway device can be used to interface serial Modbus RTU devices to Modbus TCP/IP.

7.5.4. Modbus TCP/IP Gateway

Any Modbus RTU device can typically be interfaced to Ethernet and used with Modbus TCP/IP by using a Modbus TCP/IP gateway. Gateway devices, such as Despatch PN 301658, which performs protocol conversion between Modbus TCP, ASCII, and RTU communications protocols are supported. There are other types of gateway devices that are not supported.

8. APPENDICES

8.1. Serial RS485 – Oven Connectivity

Serial ports can be added to a PC using a USB-to-serial adapter. Despatch has kits available for purchase. Single-drop and multi-drop options are available. Contact Despatch (Manufacturer & Service) for additional information.

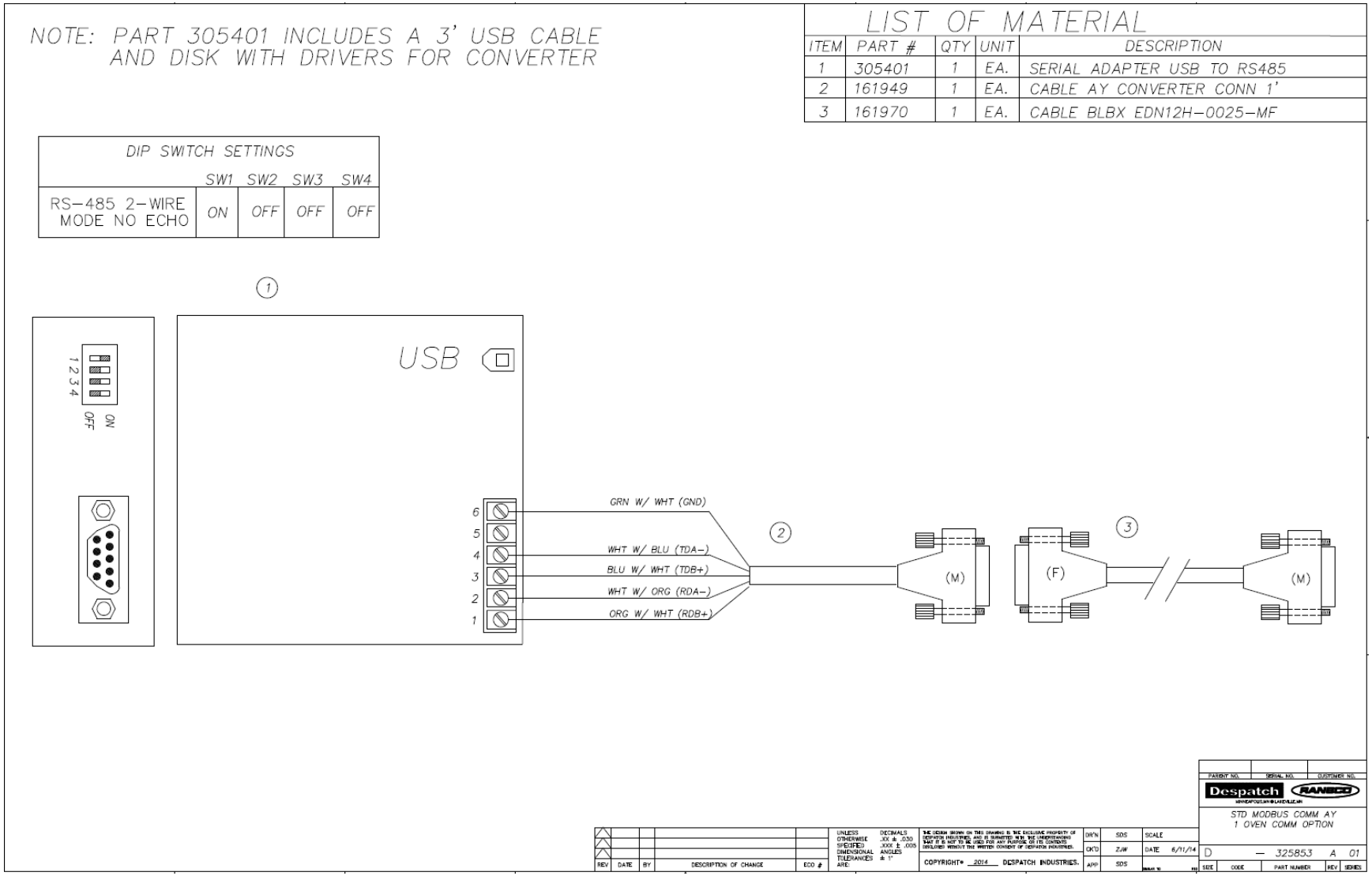


Figure 8-1 Serial – single oven network

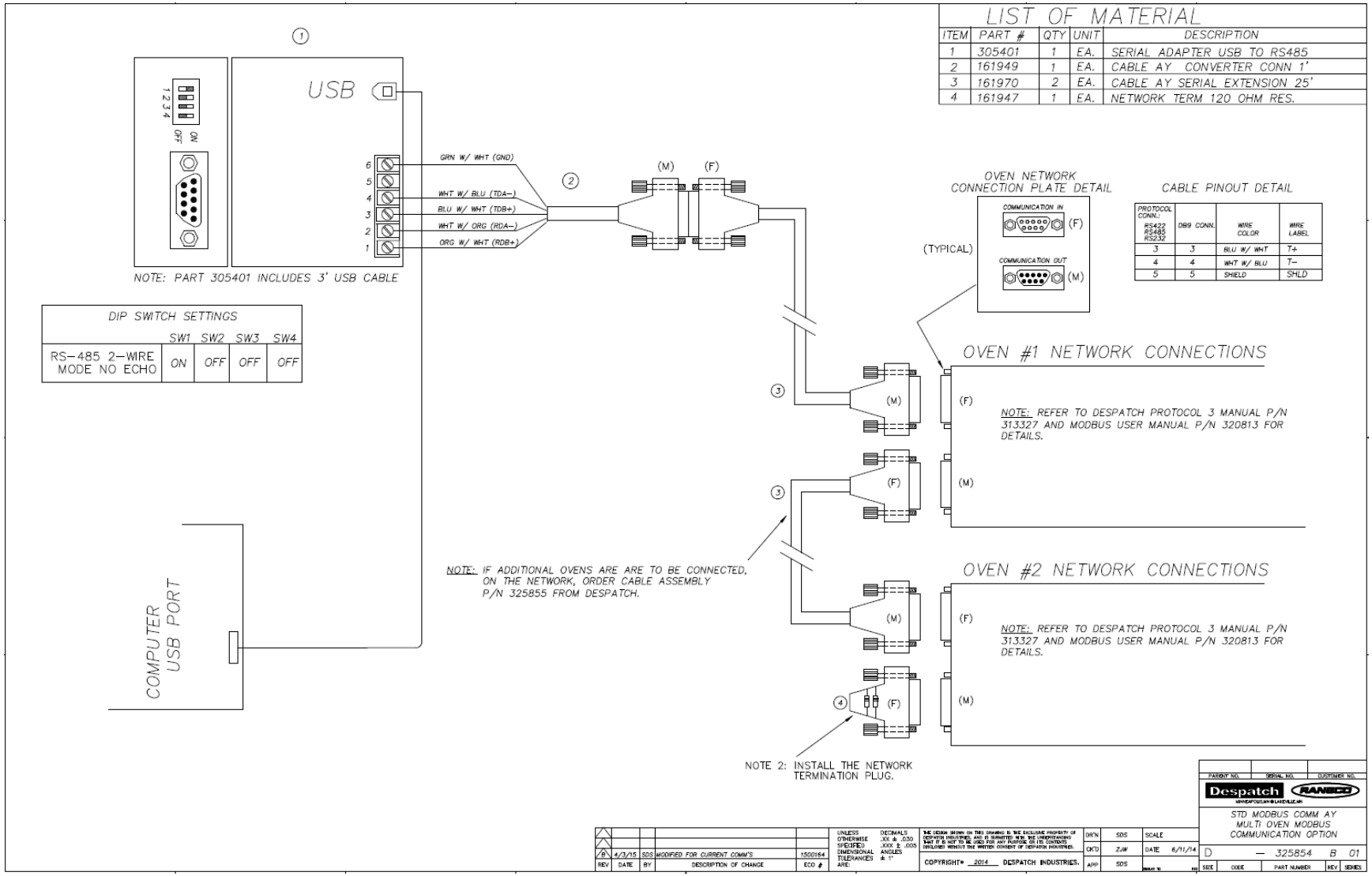
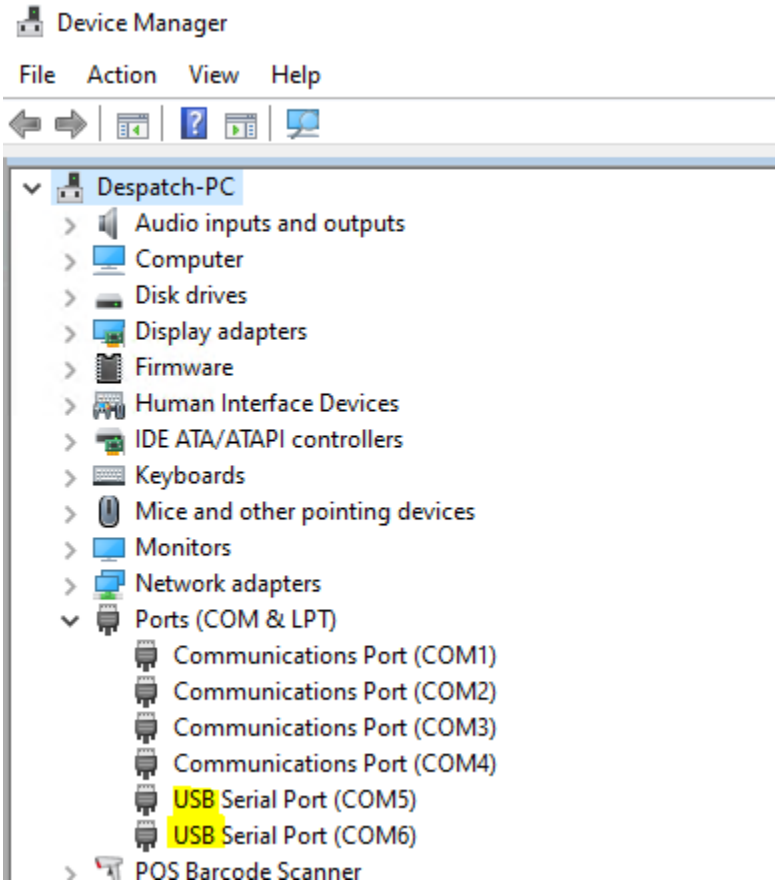


Figure 8-2 Serial – multiple oven network

8.2. General PC Serial Port Connection Setup

1. If using a USB-to-serial adapter, install the necessary drivers for the adapter. If the adapter supports multiple serial protocols (RS-232, RS-485, RS-422), refer to the adapter documentation to properly configure for two-wire, half-duplex RS-485. If using other passive adapters to convert RS-232 to RS-485, verify the pin-out and proper connections are used for RS-485.
2. Open **Windows Device Manager** and identify the COM*x* addresses available to Windows. When USB serial adapters are installed, they are easily identified.



3. Connect the serial adapter to the controller network. Follow industry standard wiring guidelines for the serial protocol being used. Additionally, refer to ***Reference Documents*** for controller specific documentation.

   If there are multiple **Communications Port (COM*x*)** entries in **Windows Device Manager**, and no identification on the PC for each port, each COM*x* address will have to be tried until successful communication is established. If using a USB serial adapter, select the **USB Serial Port (COM*x*)** address matching that of the adapter. If there are multiple **USB Serial Port**s listed in **Windows Device Manager**, it is easiest to identify a USB serial port by unplugging the USB cable and seeing what disappears or remains in the **Windows Device Manager** list.

Common Problems

- If not communicating, check the software communication settings match those set in the related controller(s). Also make sure the communication is enabled for the configured device in the software controller network setup.
- If communication settings in both software and controller match, then it is most likely a serial port setting or wiring issue.
- If using a USB serial adapter such Despatch PN 9-305401, the adapter has LEDs to assist communication debug.
  - If the TX LED is blinking, the software is talking to the serial port.
  - If the TX LED is not blinking, then the incorrect port is specified in the software, or the serial port is not properly setup in Windows (e.g. missing driver), or possibly communication to the controller was not enabled in the software controller network setup.
  - If the TX LED is blinking, but the RX LED is not, this usually means the serial wiring polarity is backwards (assuming RS485). Swap the polarity on one end of the link to see if communication is established.
- If using a serial adapter or PC serial port that does not provide TX/RX diagnostics, then you can only try each COM*x* address listed in **Windows Device Manager** to find the one that works. However, if the wiring is incorrect this will still not result in a successful link.

8.3. Protocol 3 Ethernet Port MAC Address

- The Ethernet port MAC address is required to set a static IP address.
- A new controller is configured for automatic IP addressing.
- If automatic IP addressing is used, the IP and MAC address can be found in the connected DHCP server routing table (may require company IT involvement).
- A controller configured on Despatch equipment with a PC and software already configured, will have a static IP address set in the controller.
- If a controller has been configured with a static IP address, and later the controller is to be used in an automatic IP addressing environment, contact Despatch (Manufacturer & Service).

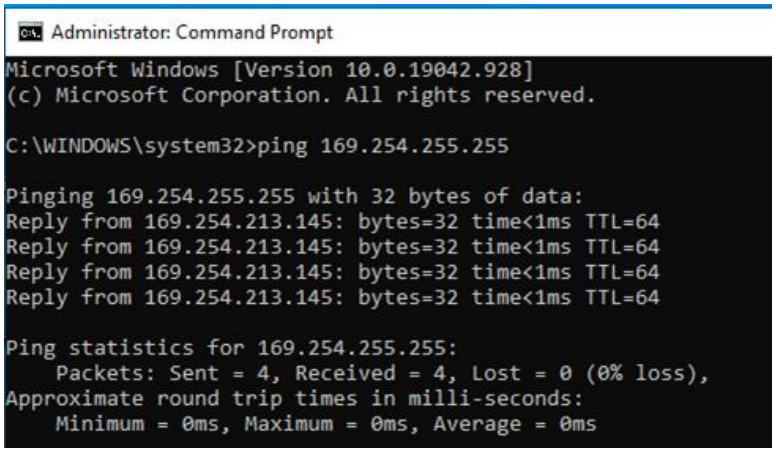
Typically, remove the back cover of the controller and record the MAC address listed on the Ethernet communications module. There are two screws holding the cover in place which can be removed with a T10 bit. **All electrical connectors must be unplugged to remove the cover. Note locations before unplugging.**

Figure 8-3 Protocol 3 remove cover and record MAC address

The following steps to retrieve the MAC address can be used as an alternative on a new controller only. **These steps will not work on a controller that has already had a static IP address assigned.**

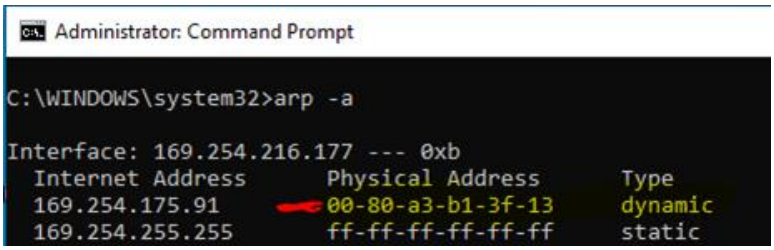
1. Set a network port on a PC to automatic addressing (a.k.a. DHCP).
2. Connect a single network cable between the PC Ethernet port and the controller. ONLY one controller should be connected to assist MAC address identification. **Make sure there are no cable routes to a router or other DHCP server assigning the controller an IP address.**

3. Wait at least 30 seconds while Windows network services attempt to get the IP of the connected controller. It may take longer before Windows stops the connection attempt.
4. Check the status of the PC Ethernet port connection in Windows network properties.
    a. It should be listed with an IP address in this format, 169.254.xxx.xxx.
    b. If not, double check the previous steps.
5. Open a Windows Command Prompt window (cmd.exe).
    a. On Windows 10 this may have to be run as an administrator.
6. Type the command "**ping 169.254.255.255**".
7. Wait for the response to complete.



8. Type the command "**arp -a**".
9. In the ARP list look for a MAC address that starts with **00-80-A3**.

    Note:
    On some older controllers the MAC address may start with **00-20-4A**.



8.4. Remove Application Lock

To prevent PC resource conflicts. multiple running instances of the software are prevented on the same PC. This prevents a PC setup with multiple users logged in from each running their own instance of the software.

In situations where the software was running and the application was not exited properly, the next attempt to start the software will result in a message displayed indicating the software is locked.

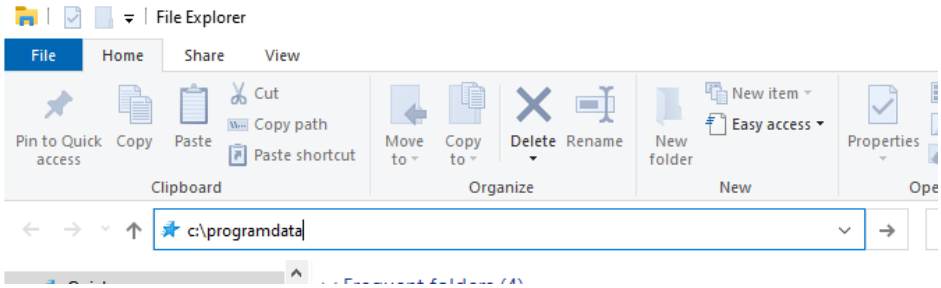
Some examples of improper software termination.

- Power failure
- Abrupt PC power disconnect
- Termination of the software from Windows Task Manager
- Windows user logout while the software was running.

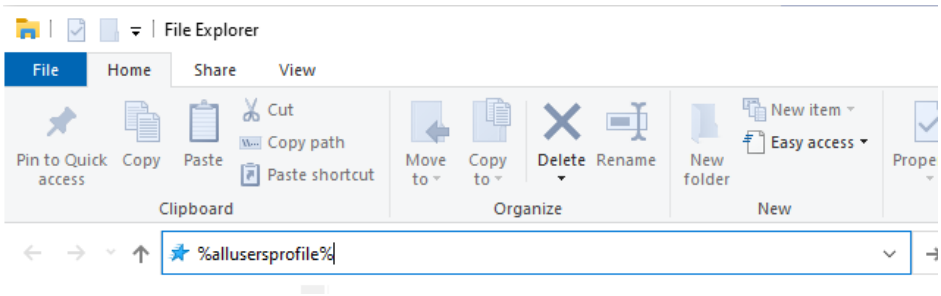
If the message indicates the software is running in another user session, login to the offending user account and close the software properly.

If an application lock must be forcibly removed, perform the following.

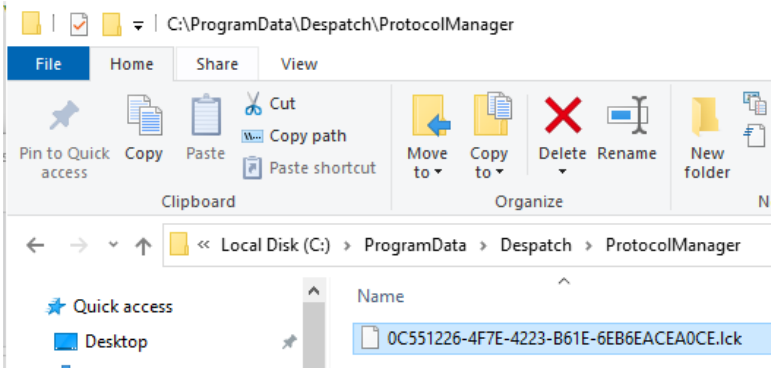
1. Close any message windows indicating the software is locked.
2. Navigate to the ***C:\ProgramData\Despatch\ProtocolManager*** folder. Windows Administrator access may be required.
    a. The ***C:\ProgramData*** folder may be hidden, but it does exist.
        I. Method 1 – type ***C:\ProgramData*** into the navigation bar and press Enter.



        II. Method 2 – Type ***%allusersprofile%*** into the navigation bar and press Enter.



3. Delete the .LCK file.



4. Start the software.

9. REFERENCE DOCUMENTS

9.1. Online Document

The latest version of this document is accessible online at:

https://www.despatch.com/manuals.html

Oven Manuals > Despatch Controls > Protocol Manager Software User Manual

9.2. Future Design Controls MCT4/MCTB Documentation

https://www.futuredesigncontrols.com/

9.3. Protocol 3™ Documentation

Refer to the following documentation for more specific controller details.

- Protocol 3™ Controller Owner's Manual (E-105), PN 313327
- Modbus User's Programming Manual for Protocol 3™ (E-106), PN 320813

https://www.despatch.com/manuals.html

9.4. Protocol Plus™ Documentation

Refer to the following documentation for more specific controller details.

- Protocol Plus™ Controller Owner's Manual (E-98), PN 143895
- Modbus User's Programming Manual for Despatch Protocol™ Plus (E-102), PN 143896

https://www.despatch.com/manuals.html

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