CleaverBrooks®

Elite Monitoring System

Installation and Operation

Contents

Note: All screen shots and menu references in this manual are based on setting the MicroSoft Windows menu and task bar to the "Classic" setting.

Product Overview and Definitions

The Cleaver Brooks Elite Monitoring System is a software application designed to allow the user to monitor and record boiler activity and operating conditions from a location remote from the boiler room floor. The application does not permit any control functions of the boiler to be controlled from within the application, and boiler operation is not dependent on whether the remote monitoring software is running.

The base application is written by Cleaver-Brooks using Rockwell Automation Factory Talk SE and provided to the customer with a runtime license.

The runtime license allows limited changes to some parameters in the trending section; the rest of the application is fixed and locked.

The base application is detailed in the following pages.

This manual is meant as a general guide to install and set up this software. As with any computer system and network, the possible impediments to a successful implementation are too numerous to cover, and Cleaver-Brooks is not responsible for addressing all of these factors. A strong knowledge of computer systems, communications, and networking is required to use this product. If needed, assistance is available through our service department at our standard rates.

If these instructions are followed and the product is installed on a closed network, the installation should be successful.

Communications - OPC and Non OPC compliant

The Cleaver-Brooks remote monitoring application is written to communicate via Ethernet IP to the boilers, DA/ Surge or master panel only. All boilers are clients on the network. The customer PC on which the remote monitor package is installed must reside on the same network as the boilers. Deviation from this requirement is the responsibility of the customer.

The Cleaver-Brooks remote monitoring package Factory Talk portion includes RSLinx Enterprise, which must be installed and configured on the same computer as Factory Talk and the EMS application. RSLinx is the software communication server that is required to manage the client communications. Installation and configuration of all components is done at the factory - unless instructed at time of sale, default configurations and addressing will be used.

Communications wiring

See figure below as an example for a system with a master panel.
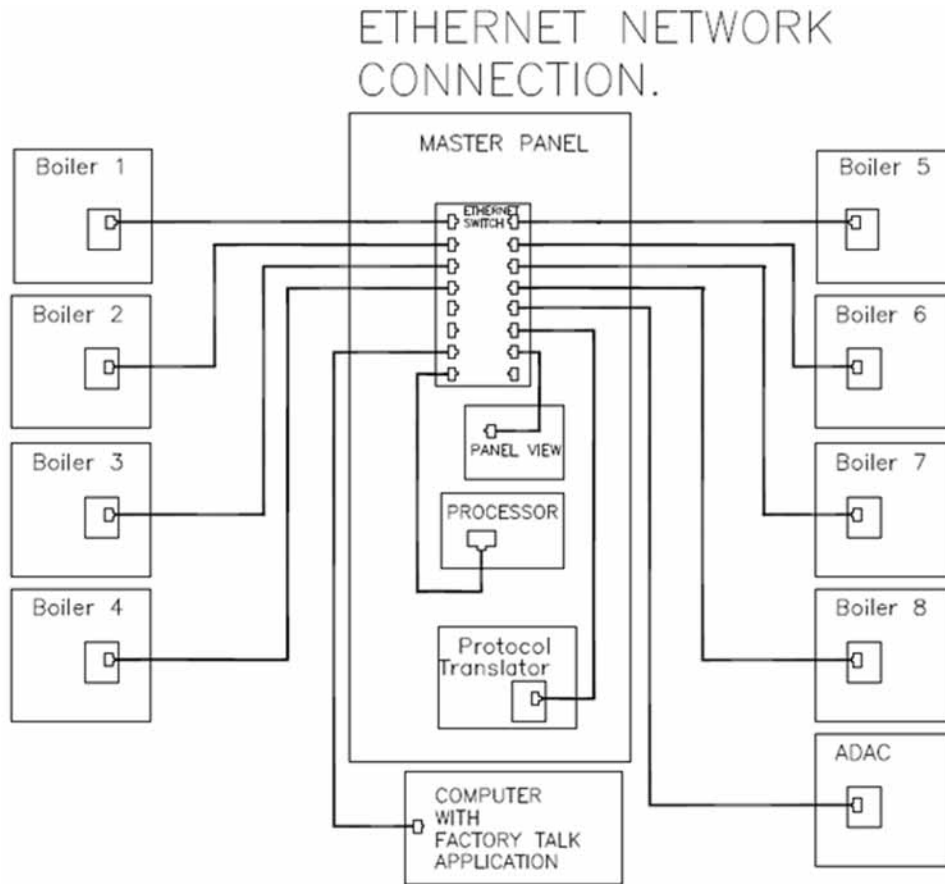
If the computer is going to be on the customer's Ethernet network, it is necessary to know which IP addresses are in use. The Hawk ICS and Remote Monitoring Software use fixed or Static IP addresses as defined on the next page. If the IP addresses are going to be changed to integrate into the customer network, a custom program change may be required for some devices as the IP address is hard coded into some applications. Call Milwaukee Sales for clarification on a job by job basis.

The distance limitation between any two Ethernet devices is 100 yards of wire. If the distance is greater than this, repeaters or hubs will be needed to extend the working range.

Cleaver Brooks is not responsible for the wiring or devices required between the master panel, individual boilers, and the computer with the Remote Monitoring application.

Factory default Ethernet IP addresses

Set IP addresses according to the table below for the devices in your system. Note that if you are trying to use different IP addresses on systems with Master Panels, you must contact Milwaukee R&D as these addresses are hard coded and cannot be changed by the end user.

Item	IP Address	Mask	Mask
Computer with RSLinx and Factory Talk	192.168.1.110	255.255.255.0	192.168.1.1
Master Panel PLC	192.168.1.100	255.255.255.0	192.168.1.1
Boiler 1 Panel PLC	192.168.1.101	255.255.255.0	192.168.1.1
Boiler 2 Panel PLC	192.168.1.102	255.255.255.0	192.168.1.1
Boiler 3 Panel PLC	192.168.1.103	255.255.255.0	192.168.1.1
Boiler 4 Panel PLC	192.168.1.104	255.255.255.0	192.168.1.1
Boiler 5 Panel PLC	192.168.1.105	255.255.255.0	192.168.1.1
Boiler 6 Panel PLC	192.168.1.106	255.255.255.0	192.168.1.1
Boiler 7 Panel PLC	192.168.1.107	255.255.255.0	192.168.1.1
Boiler 8 Panel PLC	192.168.1.108	255.255.255.0	192.168.1.1
Master Panel Ethernet Panelview Operator Interface	192.168.1.120	255.255.255.0	192.168.1.1
Boiler 1 Ethernet Operator Interface	192.168.1.121	255.255.255.0	192.168.1.1
Boiler 2 Ethernet Operator Interface	192.168.1.122	255.255.255.0	192.168.1.1
Boiler 3 Ethernet Operator Interface	192.168.1.123	255.255.255.0	192.168.1.1
Boiler 4 Ethernet Operator Interface	192.168.1.124	255.255.255.0	192.168.1.1
Boiler 5 Ethernet Operator Interface	192.168.1.125	255.255.255.0	192.168.1.1
Boiler 6 Ethernet Operator Interface	192.168.1.126	255.255.255.0	192.168.1.1
Boiler 7 Ethernet Operator Interface	192.168.1.127	255.255.255.0	192.168.1.1
Boiler 8 Ethernet Operator Interface	192.168.1.128	255.255.255.0	192.168.1.1
ADAC DA Single Tank PLC	192.168.1.150	255.255.255.0	192.168.1.1
ADAC Surge Single Tank	192.168.1.151	255.255.255.0	192.168.1.1
ADAC Dual Tank PLC	192.168.1.150	255.255.255.0	192.168.1.1
ADAC Ethernet Operator Interface DA Single	192.168.1.152	255.255.255.0	192.168.1.1
ADAC Ethernet Operator Interface Surge	192.168.1.153	255.255.255.0	192.168.1.1
ADAC Ethernet Operator Interface Dual Tank	192.168.1.152	255.255.255.0	192.168.1.1
Protocol translator	192.168.1.178	255.255.255.0	192.168.1.1
Protocol translator	192.168.1.200	255.255.255.0	192.168.1.1

Software Activation

The software is pre-installed but must be activated by the end user.

To activate the software, you will need the Serial number and Product Key (enclosed with your software) and access to the internet. You may need to disable your firewall or antivirus software to complete this task. Select defaults for the application - however, when prompted, be sure to tie the activation to the hard drive or Ethernet card and not to any other device.

Follow the instructions enclosed with the software disks.

Running the application

Once the PC with the Factory Talk application is connected to the same network as the boiler PLC and all IP addresses are verified, power up the PC.

When it finishes booting up you should see the following screen:

Log in as "Operator" to access the normal run time components of the software. Click on the <Log In> button at the bottom of the screen and the pop up should appear. Enter the user name and password.

If login is successful you should see in the upper left, "Current User : Operator"

Let's explore the application. Starting at the far left bottom, click on <Trending Menu>.

Trending

Analog values read in from the PLCs are tracked on the screen with independent pens in an electronic chart-recording style.
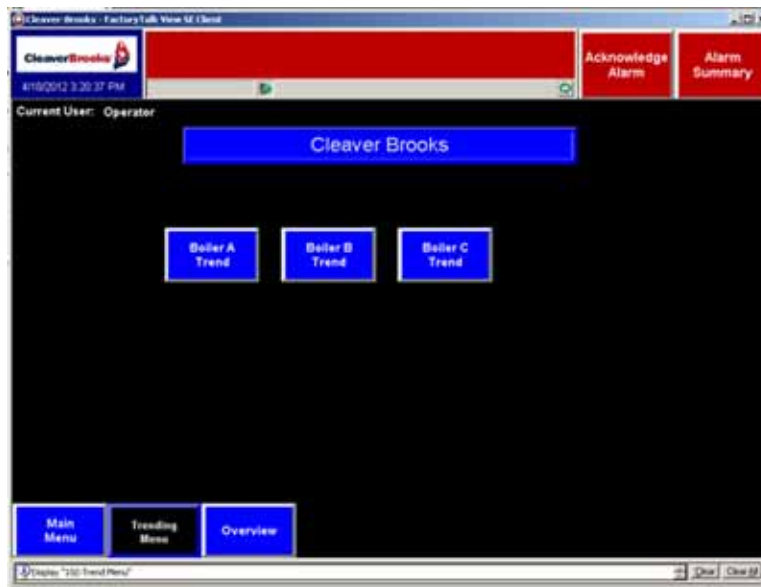
Based on the configuration, the appropriate trend options will appear. The configuration shown is for 3 boilers, no master panel.

Click on one of the boiler trends and this screen will appear:

Each analog value is assigned to a "tag" which is read by the computer. The pen assigned to that tag value traces any change in a continuous line.

The chart can be scrolled through in either direction using the arrow buttons at the bottom.

The chart can be printed by selecting the <Print Chart> button. A typical Windows printer pop up appears.
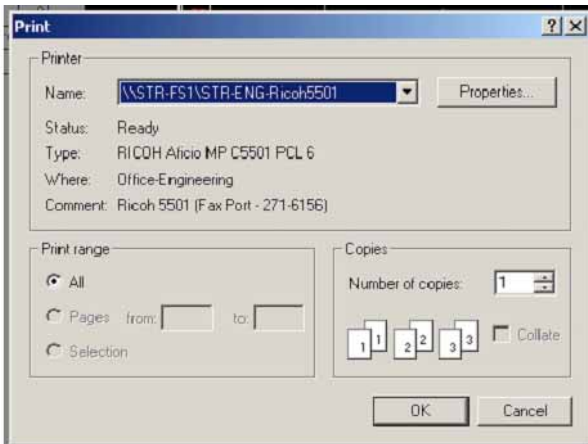
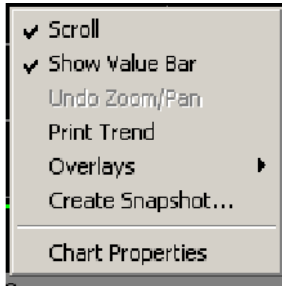Clicking on the trend inserts a marker and records the values at that point in time.
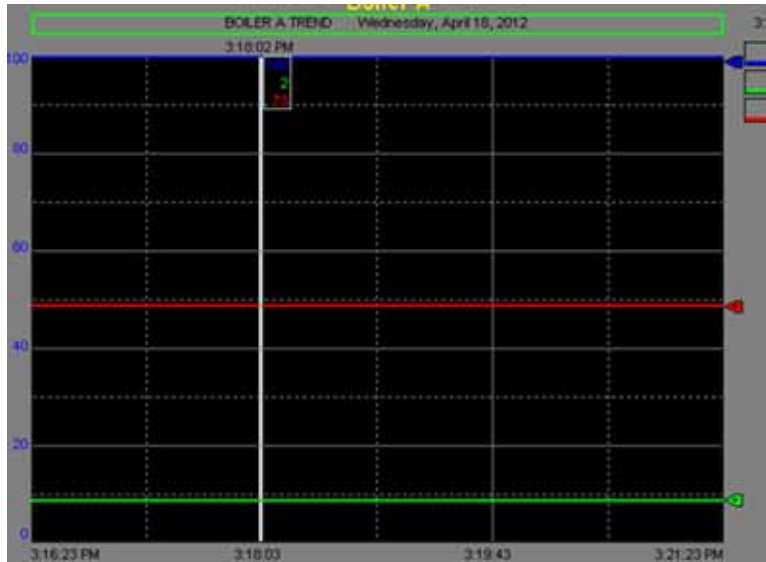
On the left side of the trend is the key which tells you each pen's name, assigned color, min and max, and engineering units

On the right side of the trend, the current value of each pen is displayed.
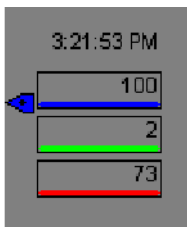
Right click on the trend and the following pop up appears:

"Chart Properties" allows the user to modify the appearance of the chart and pens, and to select which pens show on the chart. Min, Max, and Engineering Units are also listed. Some of these changes can be saved to a template file while using the runtime license. Overwriting the existing template files can result in an undesirable change to your trends. The existing trend templates are hard coded to the buttons on your trending screen. If permanent changes are required, please contact the Cleaver Brooks Controls and Conversions Department.

The following screens show the various trend properties. Refer to the online user manuals installed on the Factory Talk PC for detailed information.
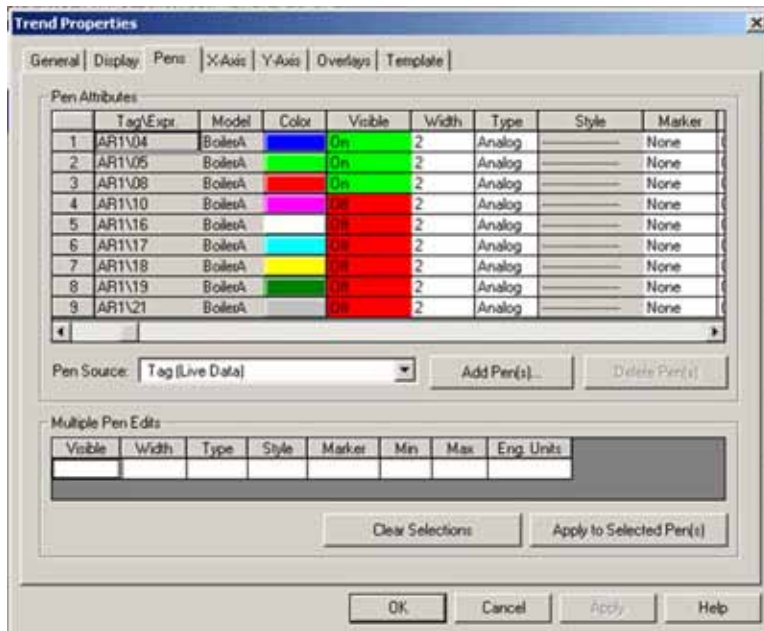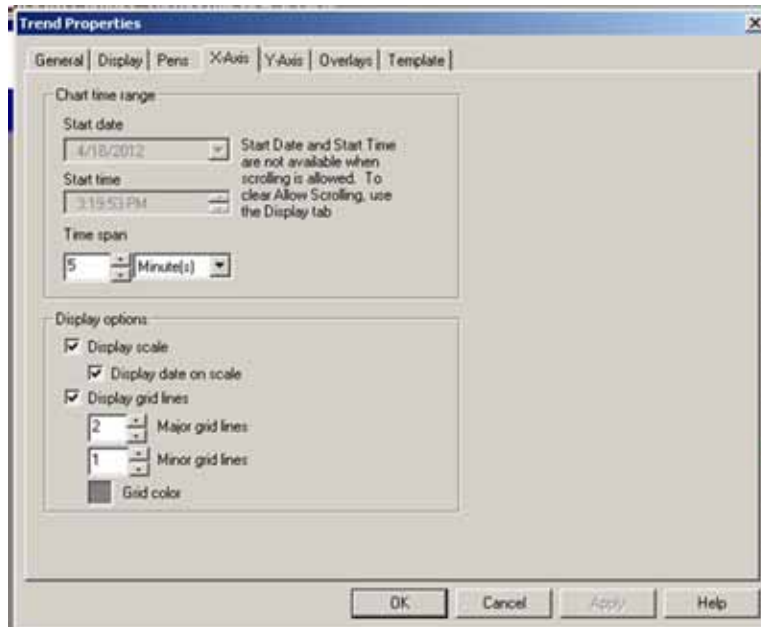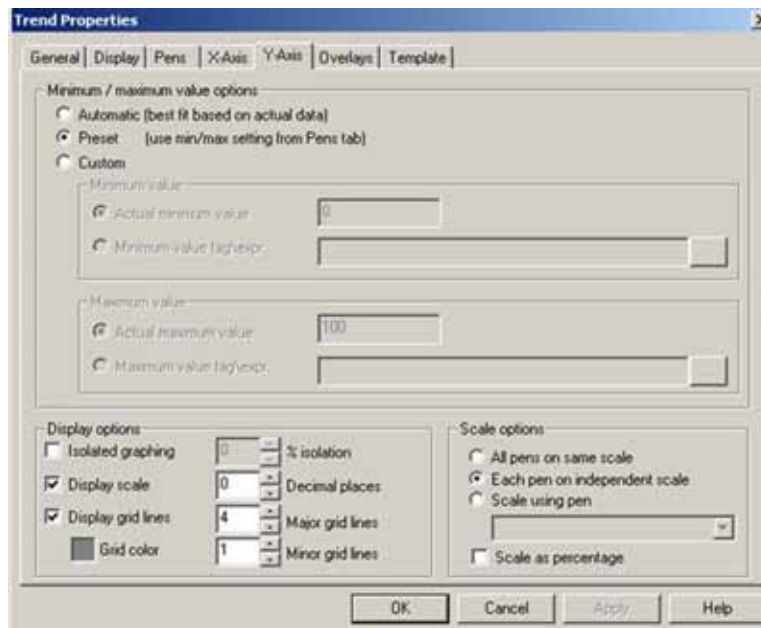
General Tab
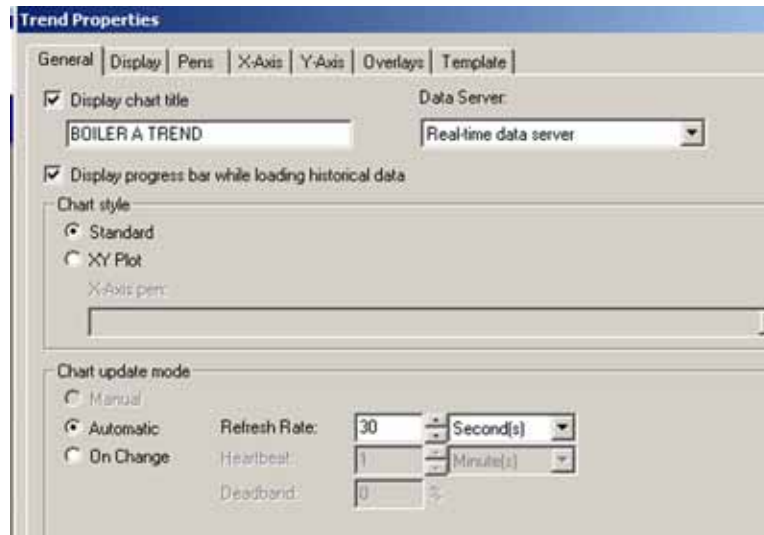
Display Tab
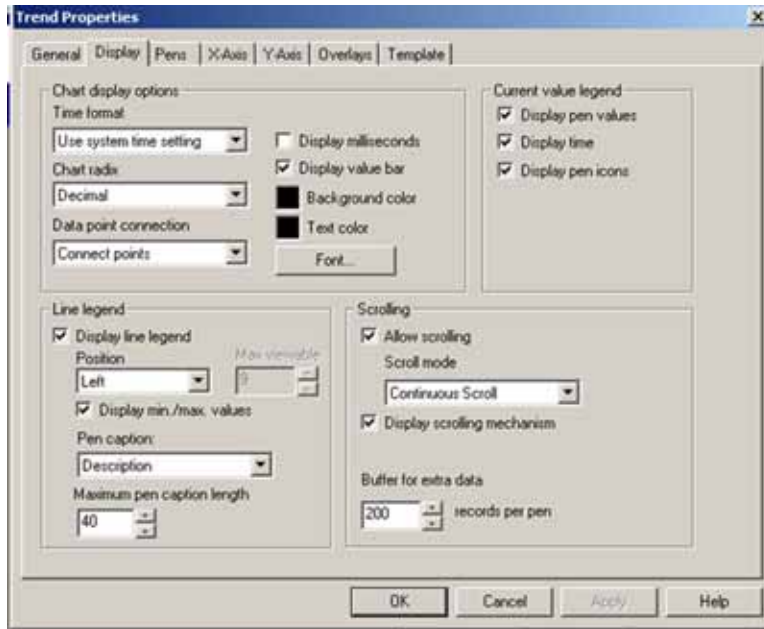
Pens Tab (scroll right to see the tag names, engineering units, and Min/Max)
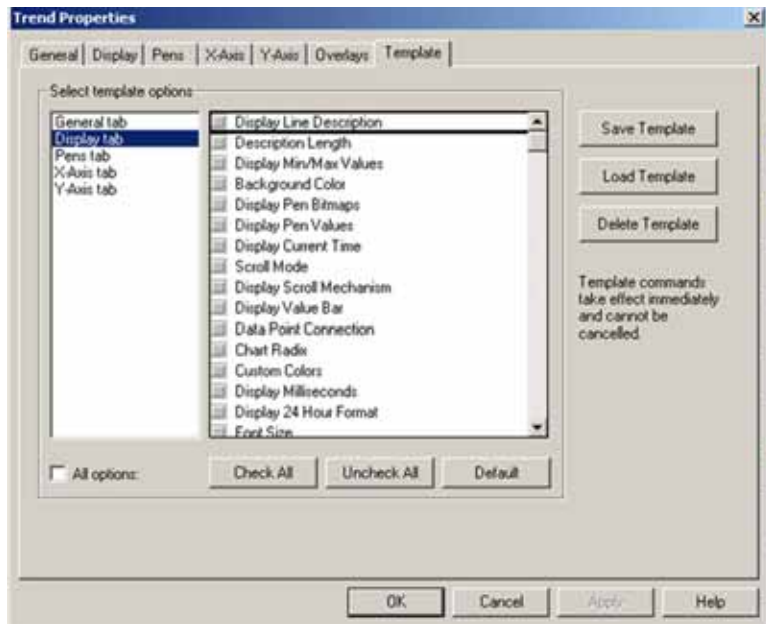
X Axis

Y Axis
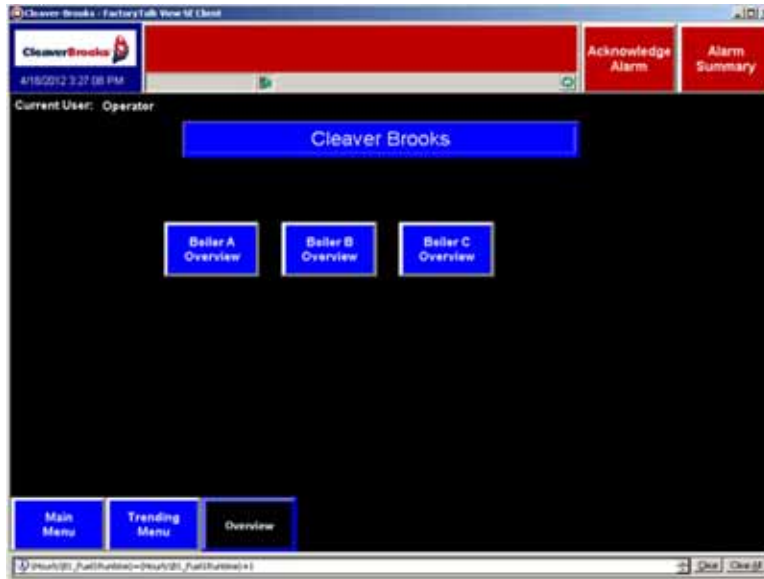
Overlay Tab
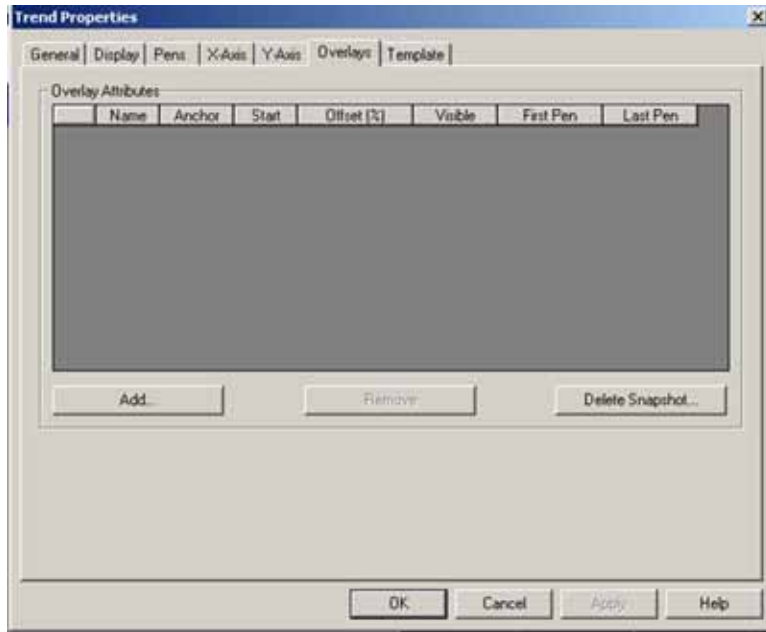
Template Tab

Display Screens

The next button on the main menu screen is <Overview>; click to access the overview menu. Based on the system's configuration, the appropriate overview buttons will appear. The configuration shown is for 3 boilers, no master panel or ADAC.


Click on one of the boiler overview buttons. The overview screen for the boiler appears. This is similar to the overview screen on the boiler's own controls. Options such as VFD, Economizer, and O2 Trim all populate on this screen if they are part of this boiler's Hawk control system.
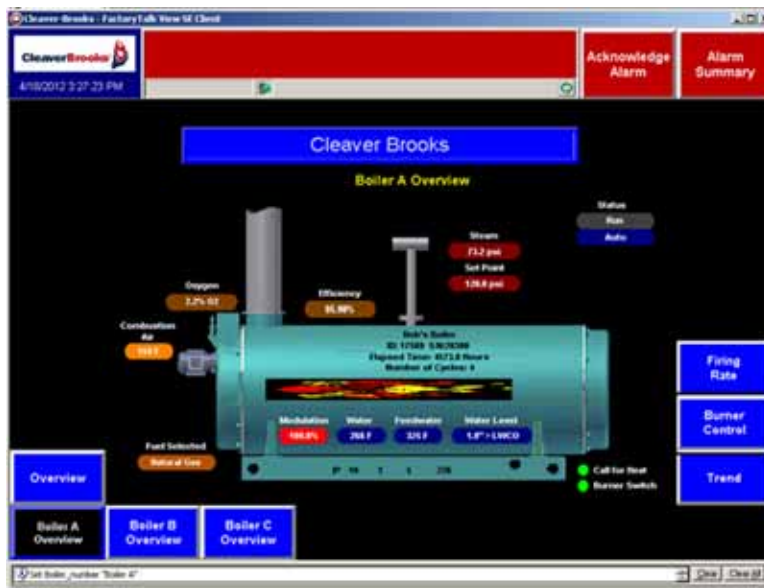
From this screen you can reach the other screens related to this boiler.

Firing Rate - this screen shows you the boiler's set point, on/off points, manual/auto mode, status, calculated efficiency, and fuel selected
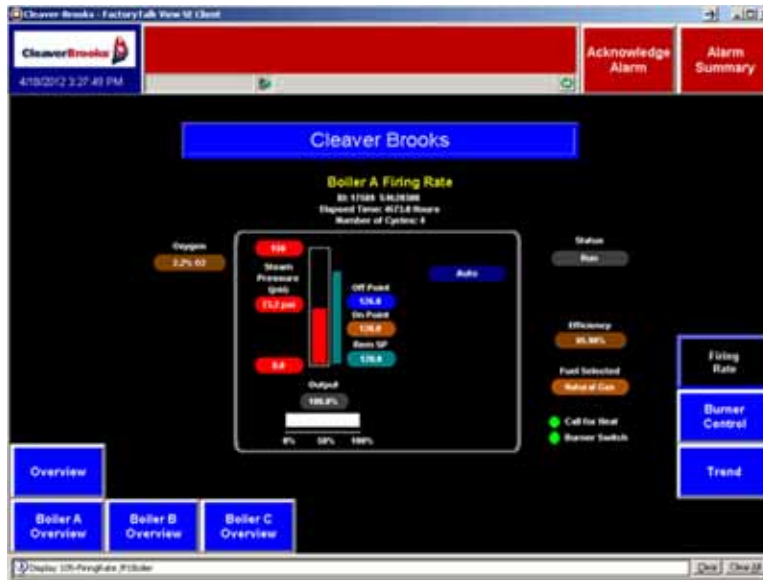
Burner Management - this screen shows the status of the connected points on the burner management device as well as messages, flame signal strength, and other data similar to what appears on the boiler operator interface.

Alarm History
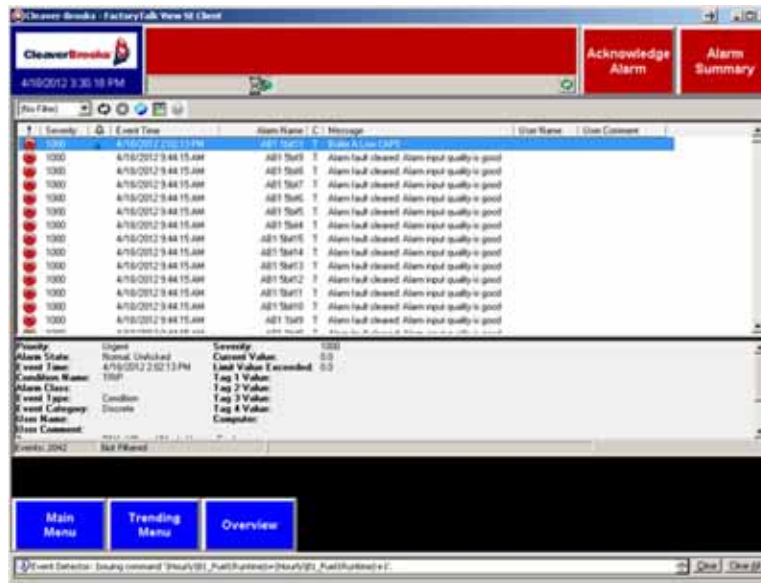
This display has three sections. The top section contains the date and time, alarm banner, <Acknowledge Alarm> and <Alarm Summary> buttons. The alarm banner scrolls through any active alarms. To acknowledge an alarm, select it then select <Acknowledge Alarm>. <Alarm Summary> takes you to a page showing active alarms only.

The middle section shows all of the alarms that have taken place, even those acknowledged and cleared.

If you click on an alarm in that window, the bottom section gives you extended information about that alarm.

Alarm Summary - This screen accesses additional alarm details and alarm management functions.

The Alarm Banner shows all active alarms.

The Active Alarm Summary, found right below the banner, lists all the active alarms and provides some tools and other useful information.
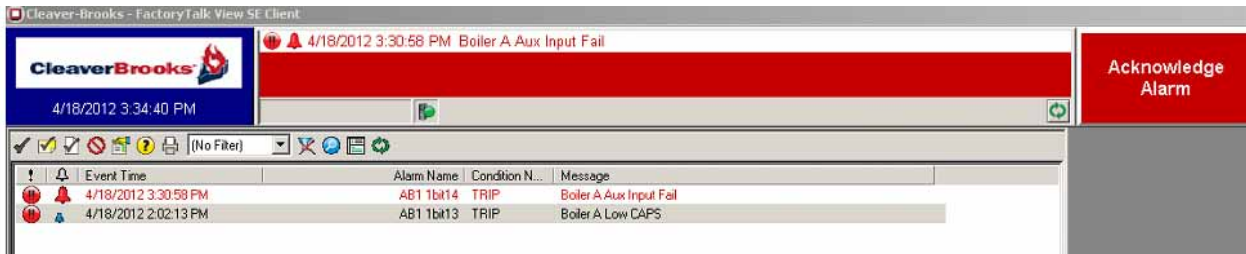
Here is the key for the icons shown in front of the alarms.

This icon	Indicates the alarm condition has this state
🔔 (red)	In Alarm and Unacknowledged
✓ (red)	In Alarm and Acknowledged
▲ (blue)	Normal and Unacknowledged

Acknowledging the selected alarm

Acknowledge selected alarm

To acknowledge selected alarms in an alarm and event summary, use one of these methods:

- Select the alarms, and then click the toolbar button Acknowledge selected alarm.

- Select the alarms, right-click, and then click Acknowledge.

Acknowledging all alarms

Acknowledge page of alarms

To acknowledge all alarms in an alarm and event summary, use one of these methods:

- To acknowledge all currently visible alarms, click the toolbar button Acknowledge page of alarms.

Acknowledge all alarms

- To acknowledge all alarms, including those that aren't visible in the current page of the list, click the toolbar button Acknowledge all alarms contained in the list.

  If an alarm filter is applied, acknowledging all alarms excludes alarms that have been filtered from the list.

To suppress alarms

Suppress
selected alarm

1. In the alarm and event summary, select one or more alarms, and then click the toolbar button, Suppress selected alarm.

2. In the Suppress Alarm dialog box, type an optional comment, and then click Suppress. The comment is recorded with the suppressed alarms, in the alarm and event log.

Viewing alarm details

View details

To view details for the selected alarm, on the alarm status explorer's toolbar, click View details (or right-click the alarm, and then click View Alarm Details).

The Alarm Details dialog box (shown in the following illustration) shows the last time an alarm was disabled or enabled, and suppressed or unsuppressed, and by whom. You can also view information about the most recent alarm condition, and the priority and severity associated with the alarm.

Alarm condition details vary, depending on the type of alarm. For a level alarm, for example, details are listed for each alarm level (High High, High, Low, and Low Low). For details about options in the Alarm Details dialog box, click Help.

Examples

Active alarms
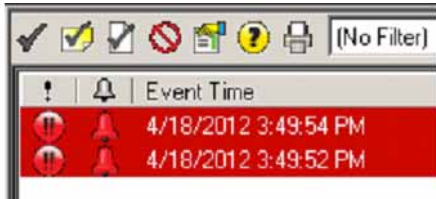
Top alarm is active, second alarm is still active but has been acknowledged

Both alarms are Acknowledged
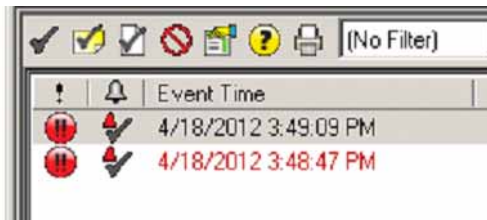
Details of the first alarms

Acknowledge with comment
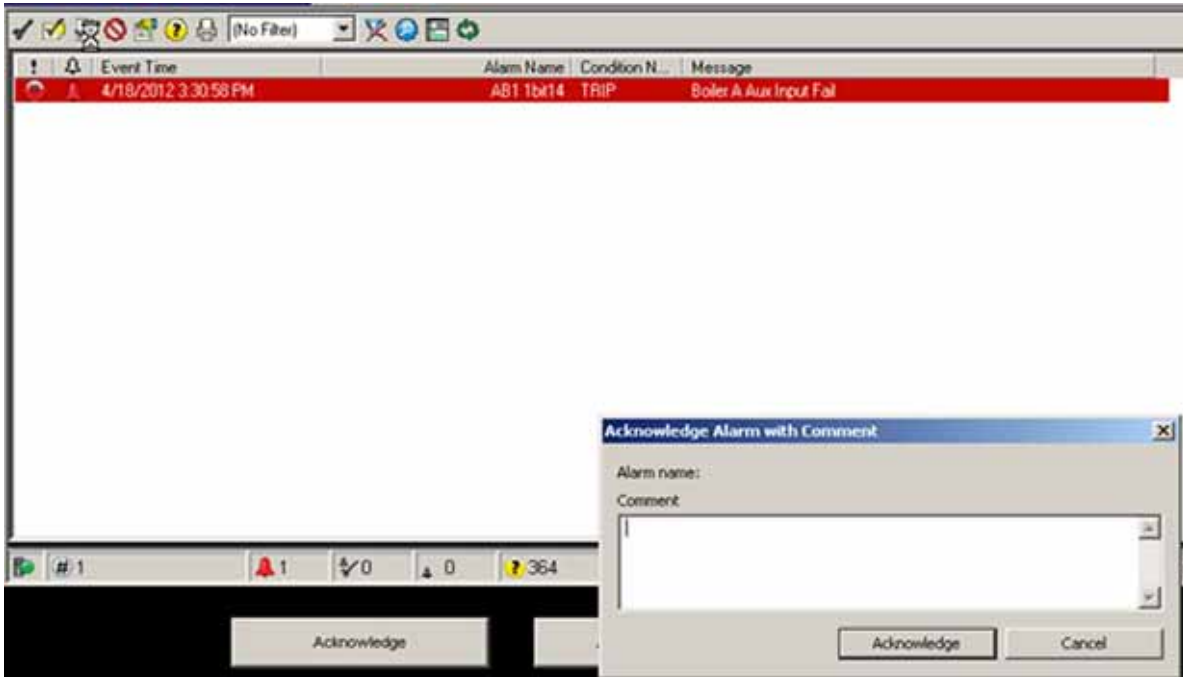
This feature allows you to add a specific comment to an alarm. For example, it may be a note that you found a loose connection that is now fixed.

Alarm Faults Summary - Clicking on the question mark pops up another window summarizing the current day's alarms.
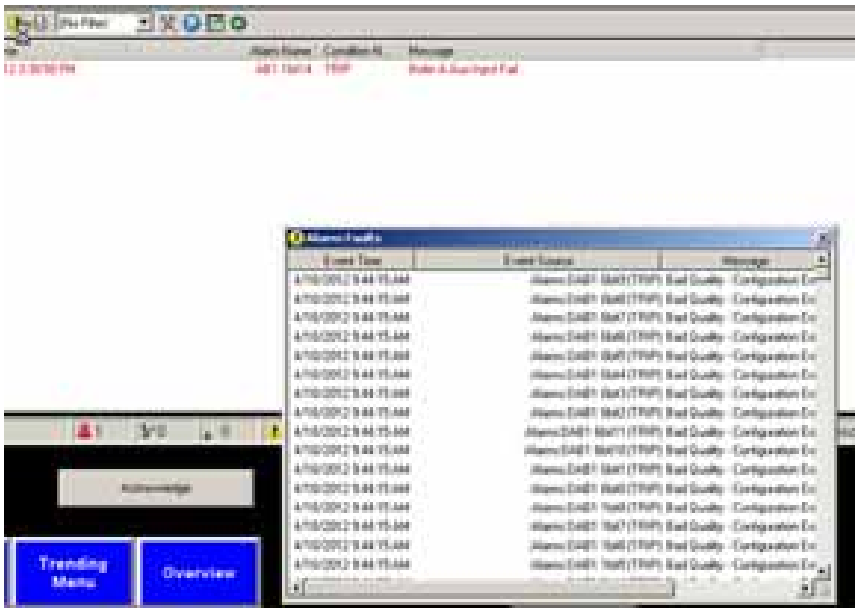
Select the alarm in the alarm summary screen and then click on <Acknowledge>. This button functions the same as the Acknowledge Alarm button.

Reports - From this display you can select current or previous reports.
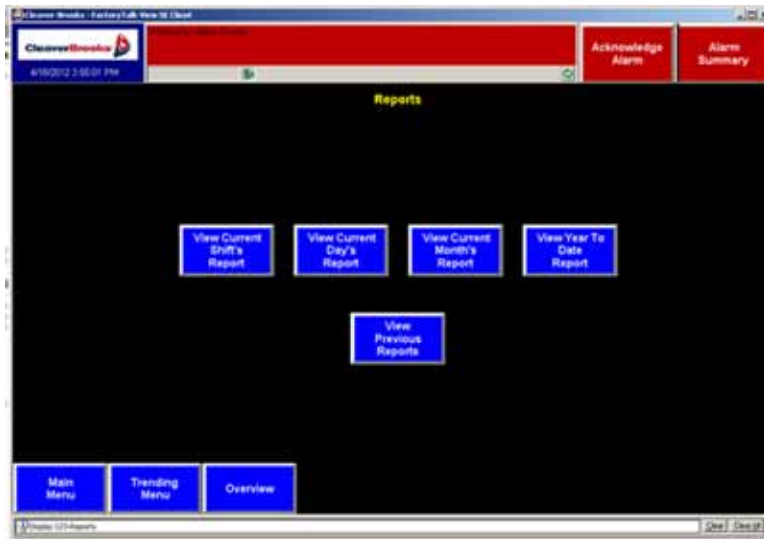
If you click on View Previous Reports it opens up Microsoft Word Pad.

Click on File>Open, and from the root of your C drive you will see a folder named Reports

Click on Reports and you will see Daily, Hourly, Shift, Yearly.
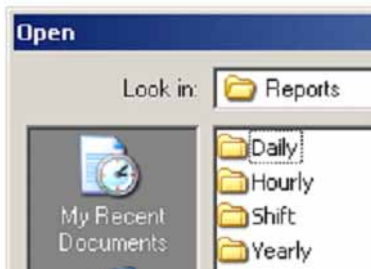
Click on the folder for the type of report you want to view.

Then select the report you want to open.

You can edit or print the report from there.

Example report:

```
                                    HOURLY REPORT
                                      4/11/2012
                                    12:22:26 PM


                    Steam Usage    Gas Consumed    Water Usage    Oil Consumed
                      (Klbs)          (Kscf)          (Kgal)         (Kgal)
        Boiler A       0.041           0.021           0.033          0.082
        Boiler B       0.041           0.021           0.033          0.082
        Boiler C       0.041           0.021           0.033          0.082
        Boiler D       0.041           0.021           0.033          0.082
        Boiler E       0.041           0.021           0.033          0.082
        Boiler F       0.041           0.021           0.033          0.082
        Boiler G       0.041           0.021           0.033          0.082
        Boiler H       0.041           0.021           0.033          0.082

        Totals         0.328           0.168           0.264          0.656


                              Fuel Runtime
                    Fuel 1          Fuel 2          Fuel 3
                    (Hrs)           (Hrs)           (Hrs)
        Boiler A       0               0             0.07
        Boiler B       0               0             0.07
        Boiler C       0               0             0.07
        Boiler D       0               0             0.07
        Boiler E       0               0             0.07
        Boiler F       0               0             0.07
        Boiler G       0               0             0.07
        Boiler H       0               0             0.07


                    Hours of Operation            Elapsed Time
        Boiler A            2                         859
        Boiler B            2                         859
        Boiler C            2                         859
        Boiler D            2                         859
        Boiler E            2                         859
        Boiler F            2                         859
        Boiler G            2                         859
        Boiler H            2                         859
```

Additional Equipment Displays

If properly equipped, your system can also connect to our Master Panel and ADAC (Advanced Deaerator Control) and can read in and display data from their respective control systems.

The Master Panel is a separate PLC-based system that controls the Lead Lag sequence, firing rates, and rotation of up to 8 boilers. This is the one instance where you can write data to the PLC using our application. Below is a summary of the master panel displays and functions from within our software.

Master Overview - Displays the status, actual and control points for up to 8 boilers, the header pressure (steam) or temperature (hot water), Header setpoint, boiler availability, and current mode
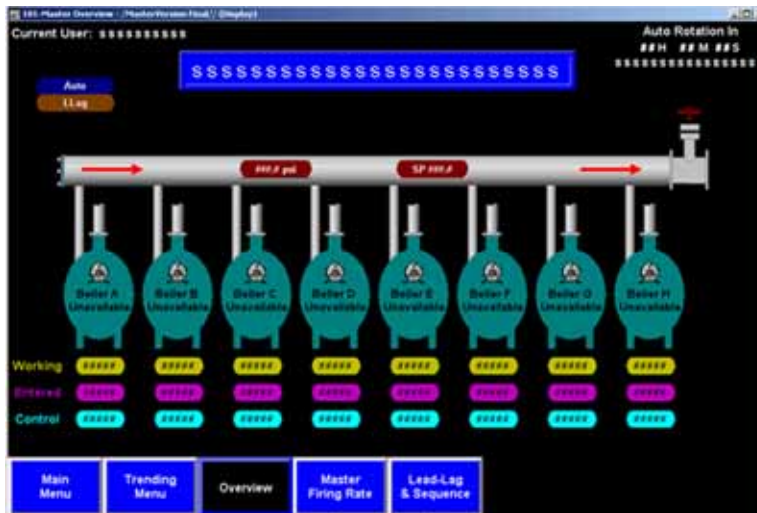
Master Firing Rate - This is one of the two screens that can write data to the Master Panel PLC. This screen allows you to change the system set point for the Master Panel. Note it is a two step process; you enter the new value and press enter, then click on Apply Changes to write the changes to the PLC.
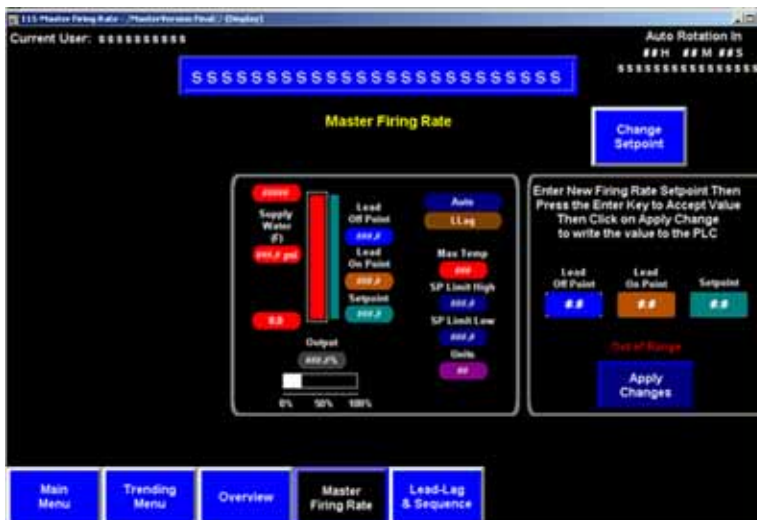
Lead Lag and Sequence Setup - This screen allows you to write changes to the master panel PLC. You can define or change the Start point, Start delay, Stop Point, Stop delay, and the lead lag sequence of the boilers.
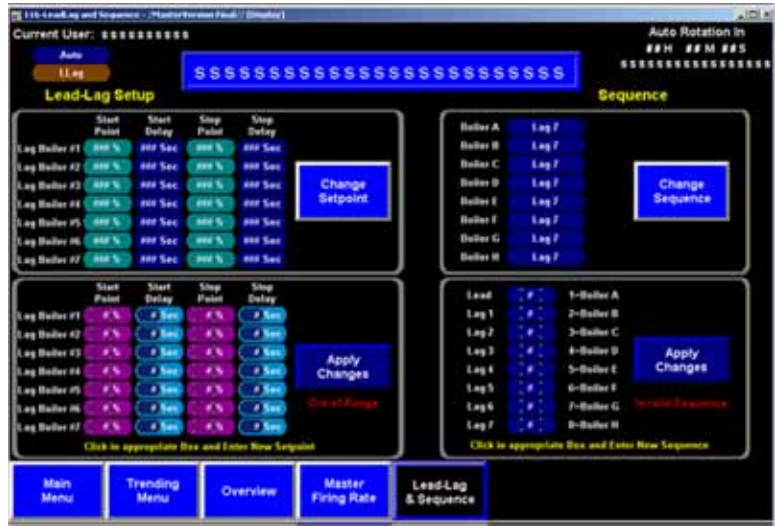
Refer to the latest O&M manual for the Master Panel for explanations of each of these functions.

Master Panel Trend - A trend screen is automatically added to provide a trend of the process value of the system header and shows the system set point for reference.
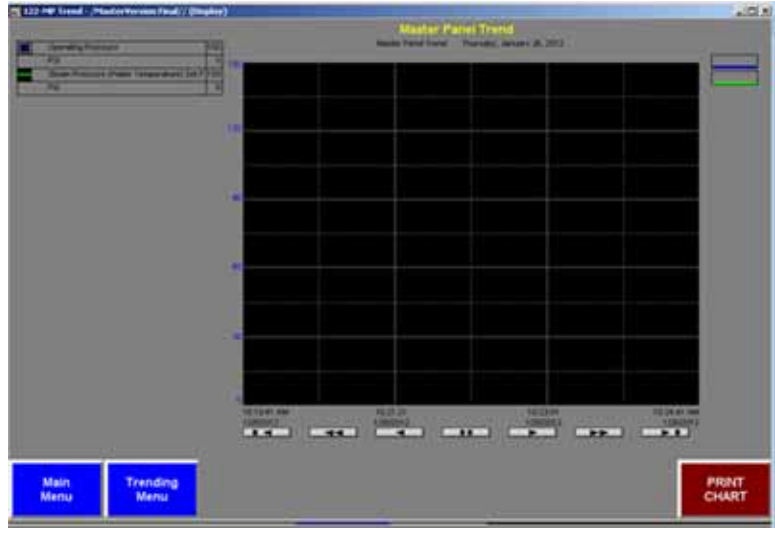
Two Boiler Integrated Lead Lag Overview

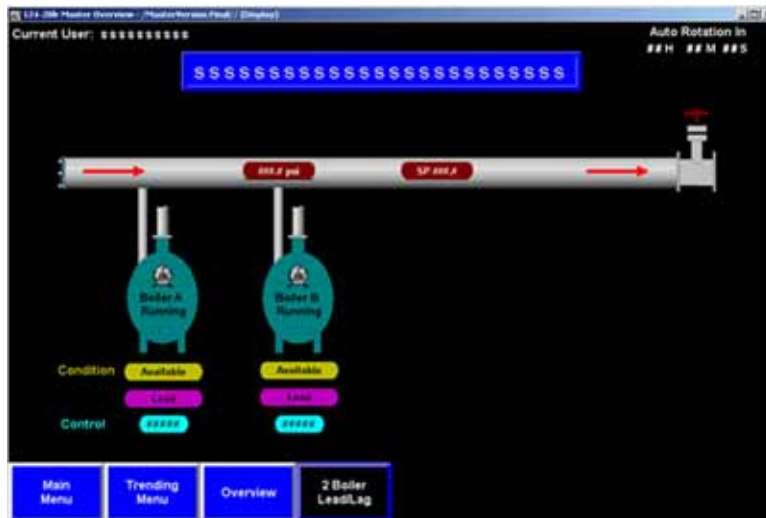For installations that consist of two boilers, and do not have a master panel, some Cleaver-Brooks Hawk controls have 2 boiler lead lag functionality integrated into the product. For those systems, this display can be activated to give you an overview. Note that you cannot write any commands to these PLCs.

Please refer to the latest product manuals for details.

ADAC (Advanced Deaerator Control) This is a PLC based control system for DA and Surge tanks. We read the data and alarms in from the ADAC PLC and provide the following displays.

DA Tank
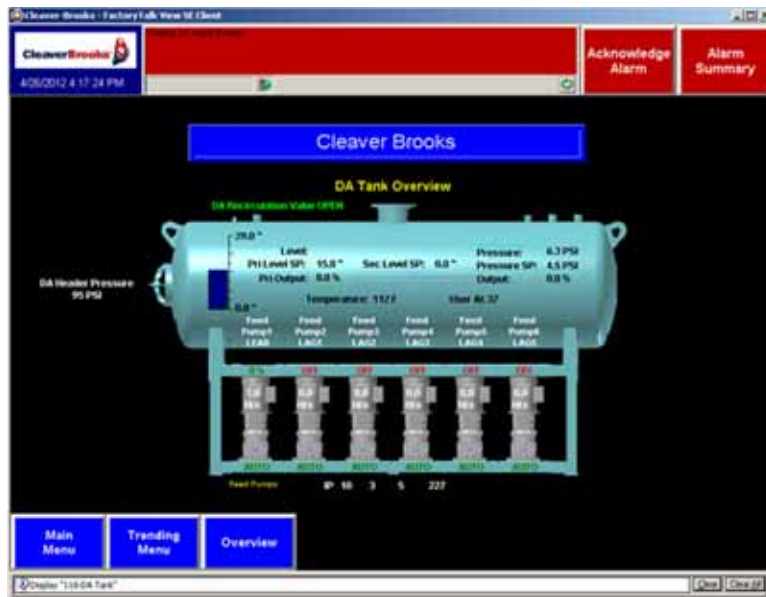
This example shows DA Level, Primary Make up Valve Setpoint, Secondary Make Up Valve Setpoint, Primary Make Up Valve Output, Tank Pressure, Tank Pressure Setpoint, Tank Pressure Reducing Valve Output, DA Pump Header Discharge Pressure, DA Recircula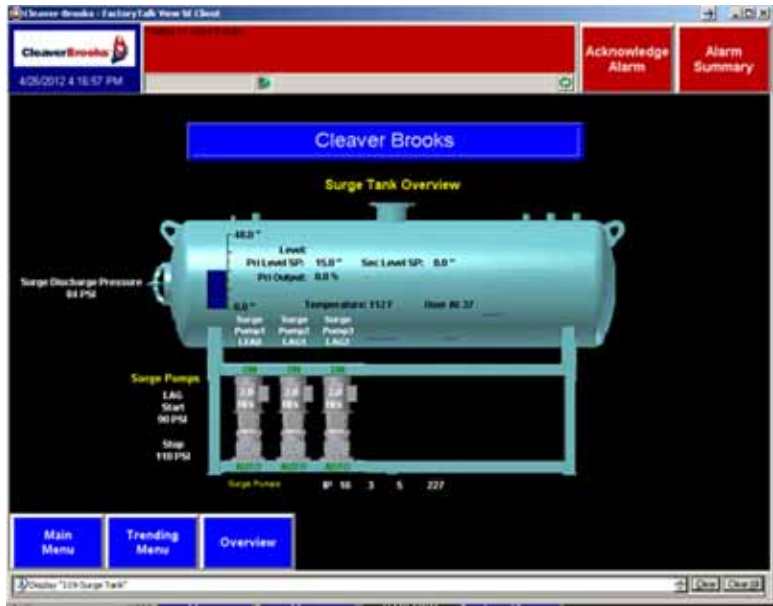tion Valve State, Number of Boiler Feed Pumps, Lead Lag Sequence, VSD Speed if on, Off if Off, Run Time Hours, Operating Mode, and IP address of the processor.

See ADAC literature for more information or contact your Cleaver-Brooks Representative.

Surge Tank

This example shows Surge Tank Level, Primary Make up Valve Setpoint, Secondary Make Up Valve Setpoint, Primary Make Up Valve Output, Surge Pump Header Discharge Pressure, Number of Transfer Pumps, Lead Lag Sequence, Pump Status, Run Time Hours, Operating Mode, and IP address of the processor.

See ADAC literature for more information or contact your Cleaver-Brooks Representative.
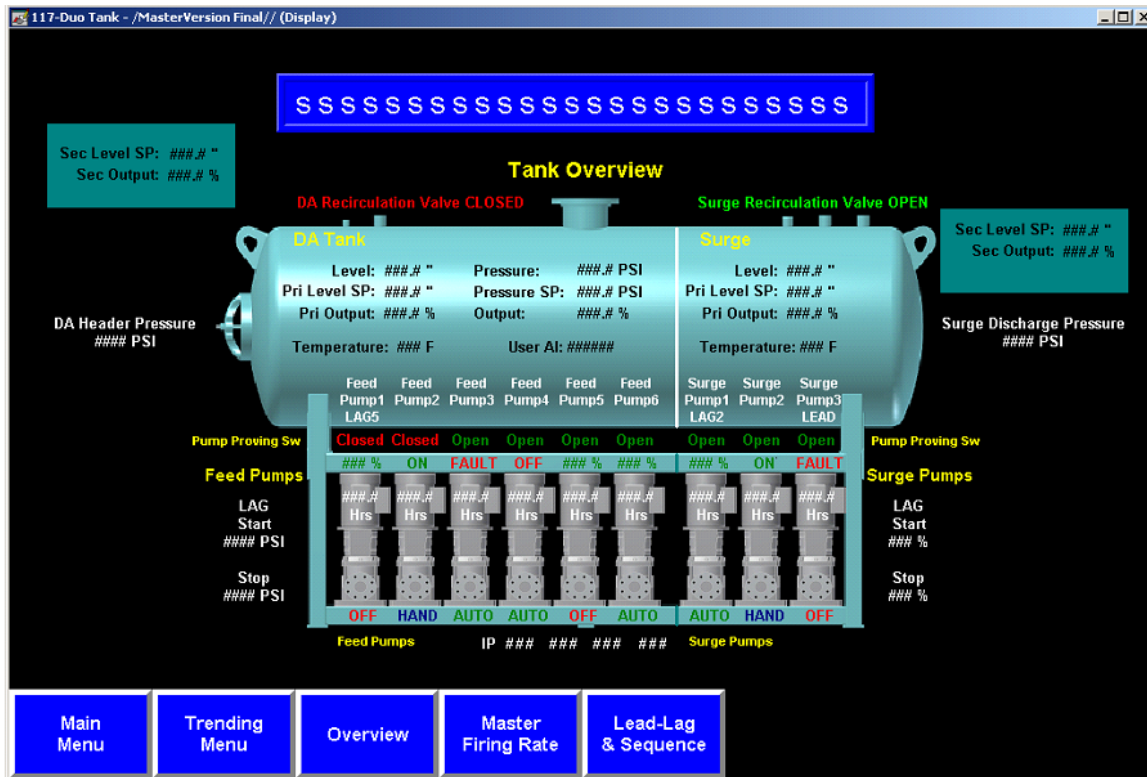
Duo Tank combination of DA and Surge in one vessel

This example shows both the DA and Surge Tank Level, Primary Make up Valve Setpoint, Secondary Make Up Valve Setpoint, Primary Make Up Valve Output, Surge Pump Header Discharge Pressure, Number of Boiler Feed and Transfer Pumps, Lead Lag Sequence, Pump Status, Run Time Hours, Operating Mode, and IP address of the processor.

See ADAC literature or contact your Cleaver-Brooks representative for more information on the ADAC system.

Data Logging

Data logging is part of the trending function. Changes to data logging cannot be made with a runtime license. Parameters must be set in advance when placing the order. By default, CB sets the data logging to log all trended values, once every 30 seconds, keeping all values for 1 year. This consumes 30-40 gigabytes of hard drive space.

Alarm and Activity Logging

These files are created automatically by the system. Should there be a need to reprint, summarize, or review this data, the files can be opened in spreadsheet programs such as MicroSoft Excel or by other viewing software. Alarm and activity log files are stored on your computer's local drive.
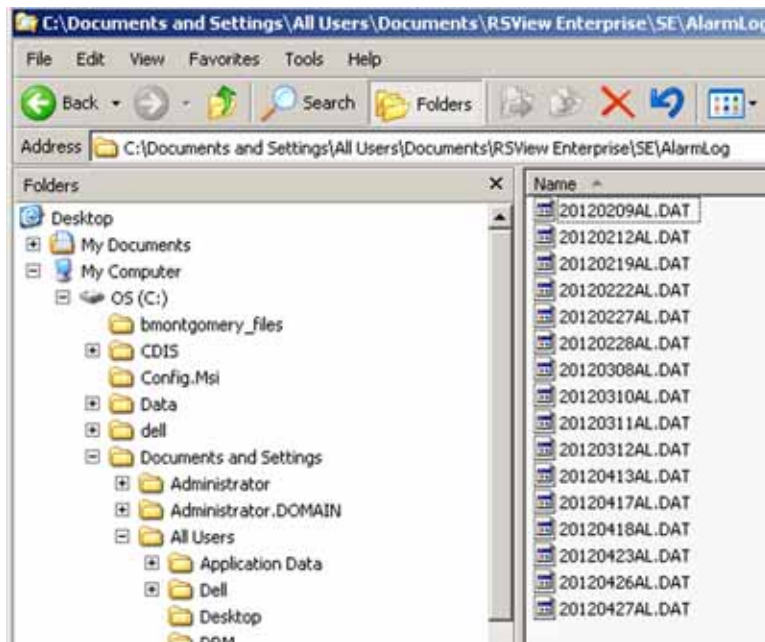
Select the file, Right click and click on Open with...
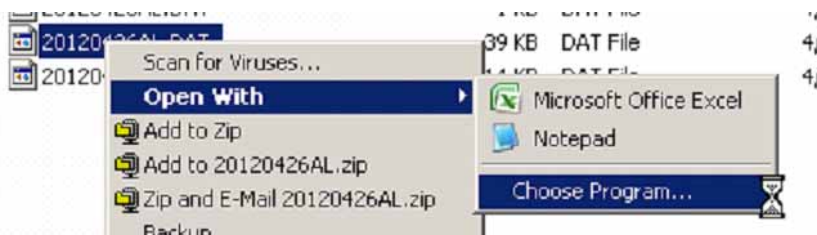
If Microsoft Excel or another spreadsheet program is on your machine, select it or use "Open With".
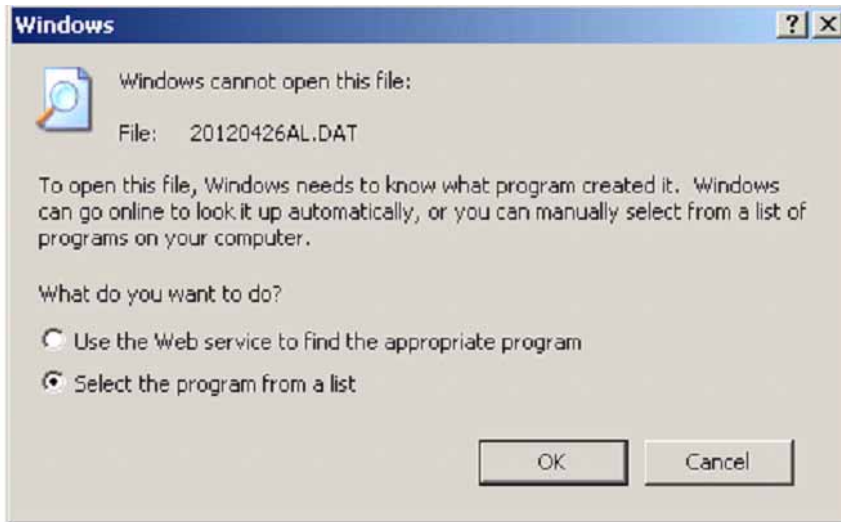
Click on <OK>.

And in this window, find your spreadsheet program (not provided by Cleaver-Brooks) and click on <OK>.

The file opens in its raw data format. For example, in the first column, the time stamp may be a very long number as shown here.

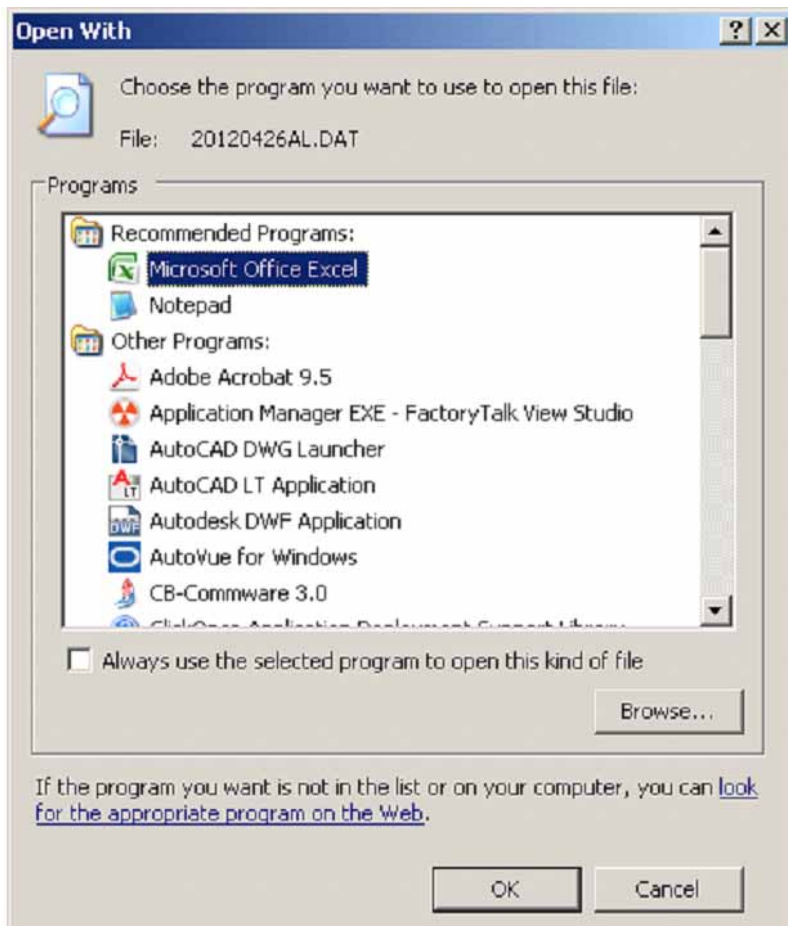|	A	B	C	D	E	F	G	H	I	J	K
1	TimeStmp	MilliTime	TransType	A	SrcArea	TagName	TagValue	T	ThreshVal	T	ThreshLbl
2	41017.4057291666000000000000	502	InAlm		RNA://SLocal/MasterVersion Final	AB1\1bit13	1.0000000000		0.0000000000		B1 Low Comb. Air Pres
3	41017.5846064814000000000000	458	InAlm		RNA://SLocal/MasterVersion Final	AB1\2bit9	1.0000000000		0.0000000000		B1 Main Fuel Vlv Open
4	41017.5846064814000000000000	458	InAlm		RNA://SLocal/MasterVersion Final	AB1\3bit11	1.0000000000		0.0000000000		B1 Firing Rate Manual
5	41017.5846064814000000000000	458	InAlm		RNA://SLocal/MasterVersion Final	AB1\2bit0	1.0000000000		0.0000000000		B1 Blower
6	41017.5846064814000000000000	458	InAlm		RNA://SLocal/MasterVersion Final	AB1\2bit10	1.0000000000		0.0000000000		B1 Fuel 1 Selected
7	41017.5848611111000000000000	456	OutAl		RNA://SLocal/MasterVersion Final	AB1\1bit13	0.0000000000		0.0000000000		

To convert it to a date and time, Right click>Format Cells>Time, scroll down to date and time and select OK.
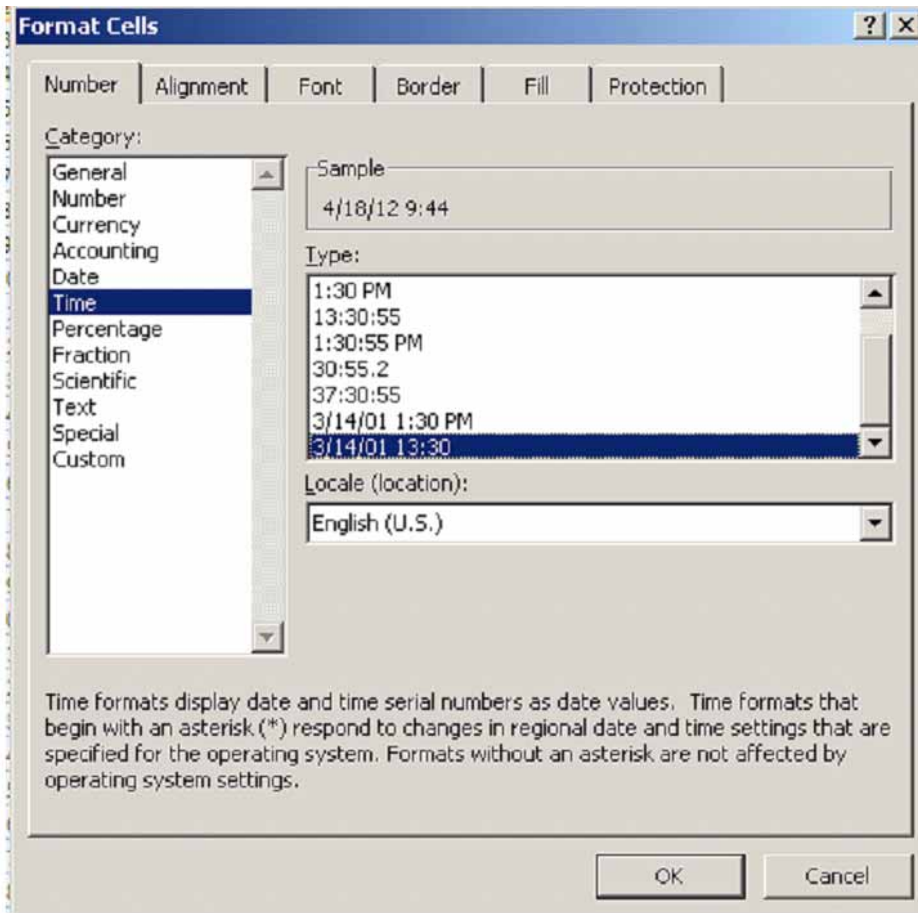
Now you see it has changed to the date and time.

Please refer to your spread sheet software documentation on how to perform other functions.

	A	B
1	TimeStmp	MilliTim
2	4/18/12 9:44	5(
3	41017.5846064814000000000000	4!
4	41017.5846064814000000000000	4!

Troubleshooting Tips

The most common issue with any data acquisition system is establishing communications. Possible problems are:

*   Distance and location of Ethernet wiring. It must be no longer than 100 yards of wire, and kept away from electrically noisy devices such as drives and high voltage lighting.
*   Terminations. The quality of the termination and correct order of conductors have significant impact on the consistency and quality of establishing and maintaining communications.
*   Spelling and path. This must be accurate. If your path does not match the actual path, your application will not run properly and you may not be able to establish communications.
*   Addressing. Just like getting mail from the post office, if your IP Addresses, Subnet, and Gateway are not correct, you will not send or receive messages.

First, confirm your PC Ethernet connection is set up properly. The quickest way is to use the "ipconfig" command.

To do this, click on Start>Run on your computer task bar.

In the box that appears, type in "command" and click on <OK>

When the command prompt window opens, type "ipconfig" and press the enter key.

Your screen will come back with the cuurent setup of your Ethernet connections.

```
C:\Documents and Settings\bmontgomery>ipconfig

Windows IP Configuration

Ethernet adapter Local Area Connection:

        Connection-specific DNS Suffix  . : Agcorp.Com
        IP Address. . . . . . . . . . . . : 10.3.5.30
        Subnet Mask . . . . . . . . . . . : 255.255.248.0
        Default Gateway . . . . . . . . . : 10.3.1.1

Ethernet adapter Wireless Network Connection:

        Media State . . . . . . . . . . . : Media disconnected

Ethernet adapter Bluetooth Network:

        Media State . . . . . . . . . . . : Media disconnected
```

Your information will be different from what is shown here. It should show the IP address, Subnet Mask, and Default Gateway as defined by your installation or the Cleaver-Brooks defaults defined at the start of this document.
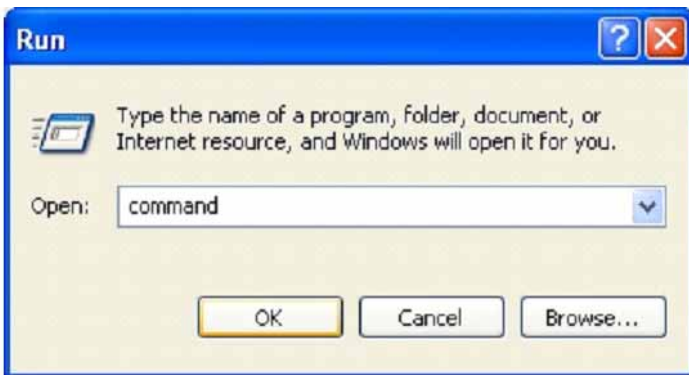
If those addresses are correct then proceed to the next page.

If you cannot establish communications in RSLinx, you can try to "ping" the devices from your computer.

To do this, click on Start>Run on your computer task bar.

In the box that appears, type in "command" and click on "OK"

In the window that pops up, type in the following command, for example, to ping the first boiler:

Ping 192.168.1.101

Press the <Enter> key.


```
C:\WINDOWS\System32\command.com

Cannot load VDM IPX/SPX support
Microsoft(R) Windows DOS
(C)Copyright Microsoft Corp 1990-2001.

C:\DOCUME~1\BMONTG~1>ping 192.168.1.101
```

If you have an active connection, you should see this type of response.


```
C:\WINDOWS\System32\command.com

Cannot load VDM IPX/SPX support
Microsoft(R) Windows DOS
(C)Copyright Microsoft Corp 1990-2001.

C:\DOCUME~1\BMONTG~1>ping 192.168.1.101

Pinging 192.168.1.101 with 32 bytes of data:

Reply from 192.168.1.101: bytes=32 time<1ms TTL=64
Reply from 192.168.1.101: bytes=32 time<1ms TTL=64
Reply from 192.168.1.101: bytes=32 time<1ms TTL=64
Reply from 192.168.1.101: bytes=32 time<1ms TTL=64

Ping statistics for 192.168.1.101:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\DOCUME~1\BMONTG~1>_
```

If you do not have an active connection, you will see a message like this.


```
C:\WINDOWS\System32\command.com

Cannot load VDM IPX/SPX support
Microsoft(R) Windows DOS
(C)Copyright Microsoft Corp 1990-2001.

C:\DOCUME~1\BMONTG~1>ping 192.168.1.101

Pinging 192.168.1.101 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.168.1.101:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\DOCUME~1\BMONTG~1>
```

If you are getting timed out responses, you need to check the IP Addresses, Subnet, and Gateway of all connected devices as well as your Ethernet wiring between your PC and the boilers.

For all other information or troubleshooting data, refer to your online Factory Talk SE manuals or to your Cleaver-Brooks O&M manuals, or contact your local Cleaver-Brooks representative.

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