

# INSTRUCTION MANUAL



**RTMC Pro**  
Revision: 8/10

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# RTMC Pro

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## 1. Introduction

The RTMC (Real-Time Monitor and Control) Pro software provides the ability to create and run graphical screens to display real-time data as LoggerNet or RTDAQ collects it from the dataloggers. Controls are also provided to view and set datalogger ports and flags, as well as input locations or variables. In LoggerNet, RTMC Pro can combine data from multiple dataloggers on a single display. In RTDAQ, RTMC Pro projects are limited to a single datalogger. As LoggerNet or RTDAQ collects data from the dataloggers, the displays in RTMC Pro are automatically updated.

RTMC Pro is used to create and edit a real-time graphic display screen to display the data collected from the dataloggers. Once the screen is built and saved as a project, \*.rtmc2, the screen can be displayed using RTMC Run-time. This allows graphic display screens to run on other computers with just the RTMC Run-time program.

RTMC Pro is an enhanced version of the standard RTMC Development that ships with LoggerNet and RTDAQ. RTMC Pro contains more graphical components than RTMC. For example, more alarms (multi-state), alarm events (email, FTP, run/open), switches (lever, rocker, rotary), charts (XY and scope), gauges (rotary, compass), and layout components (group box, bevel, panel) are available. For components that exist in both versions, more properties have been exposed in RTMC Pro resulting in more design control. RTMC Pro also includes run/open button, hotspot, snapshot, and alarm log capabilities. In LoggerNet, you also have the ability to add data files, databases, and additional LoggerNet servers as data sources for RTMC Pro projects. See Section 2.5, Managing Data Sources, for more information.

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### NOTE

A project that is created with the standard RTMC Development version can be converted to RTMC Pro format. However, once a project is converted to RTMC Pro format, it cannot be opened in standard RTMC.

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For help in getting started with RTMC, there is a tutorial provided on the Downloads page of our website, <http://www.campbellsci.com/downloads>. The tutorial is done using standard RTMC development, but the same concepts apply to RTMC Pro.

The same RTMC Run-time is used to run projects developed in either RTMC Pro or the standard RTMC Development.

One copy of RTMC Run-time is provided with LoggerNet and RTDAQ. For LoggerNet, additional copies to run on remote machines can be purchased separately.

RTMC projects can also be run using RTMC WebServer. In RTMC WebServer, no run-time events are active. It provides a static snapshot view only with no user interaction. Therefore, no values can be changed, alarms

cannot be acknowledged, and there are no audio, email, or run/open capabilities.

**NOTE**

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In LoggerNet, data must be collected from the datalogger for RTMC's displays to be updated. Typically this is done by setting up a schedule in LoggerNet's Setup Window. It can also be done from RTMC's Project | Configure Override Scheduled Collection menu item.

In RTDAQ, RTMC performs a manual poll to update project data when RTDAQ is connected to the datalogger. Therefore, RTDAQ must be connected to the datalogger for RTMC's display to be updated. You can override the default one-second interval from the Project | Configure Override Scheduled Collection menu item.

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## 1.1 What's New in RTMC Pro 3.2?

RTMC Pro 3.2 includes the following enhancements from 3.1:

- A database can now be used as a data source. (See Section 2.5.1.3 Database Data Source for more information.)
- Report generation is now supported. This includes the new components: Report Range, Report Header, Report Note, and Report Export. (See Section 2.6 Reports in RTMC for more information.)
- New Segmented Label, Segmented Digital, and Segmented Time components.
- A ValueSynch function has been added to allow you to synchronize the data when displaying data from two different stations. (See Section 2.4 Expressions for more information.)
- New functions are available for expressions including ToDate, ToFloat, ToInt, IsFinite, Ceiling, Floor, Hex, HexToDec, Round, StdDev, StdDevOverTime, StdDevOverTimeWithReset, AvgRunOverTimeWithReset, MaxRunOverTimeWithReset, and MinRunOverTimeWithReset. (See Section 2.4 Expressions for more information.)
- Added wildcard support to the Image component. This allows RTMC to display images being brought in by LoggerNet when the names may be changing. It displays the newest image that matches the wildcard filter.
- Added an age gradient option to the XY Chart. If an age gradient is used, the newest point will be the first color specified and the oldest point will be the second color specified. Points in between the newest and oldest will slowly progress from the first color to the second color.
- Images and sounds used in a project are now embedded in the project. This allows projects to be shared more easily.

- A Load as Template menu item has been added which enables you to easily use the same project for multiple stations. (See Project Menu in Section 2.3 for more information.)
- Miscellaneous other changes.

## 2. Development Mode

RTMC Pro is a graphic display editor that allows the user to easily place graphical components on the display screen and associate them with data values.

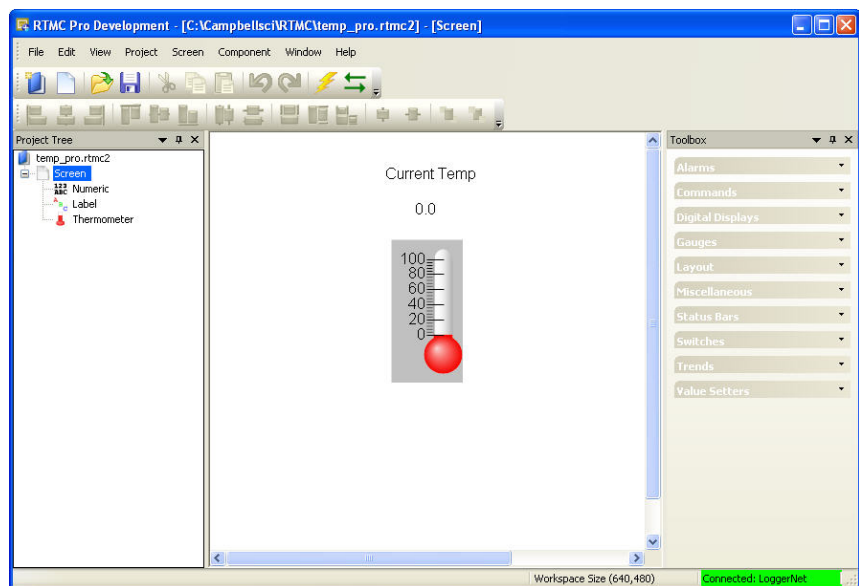
The RTMC Pro window, as shown below, has three sections.

**Project Tree** - The panel on the left shows the hierarchy of the display components and how they are associated with each other. Every component of the display screen is shown in this list and it provides a shortcut to get to any graphical component.

**Project Workspace** - The middle panel is the display screen workspace. The graphic components are placed in the workspace, as they should appear on the final display.

**Component Toolbox** - The toolbox on the right contains the display screen components that can be placed in the workspace. Selecting a component and clicking in the workspace places the component and brings up the Properties window for that component.

RTMC Pro was designed to be easy and straightforward to use. Experiment with different combinations and options to get the display results you are looking for.



As seen in the example screen above, different types of graphical components can be combined to create an attractive real-time display. Company logos,

maps, or any image stored in a standard graphic file format can be placed on the screen.

Many images have been included with RTMC Pro. The default directory in which these files are stored is C:\Campbellsci\Lib\RTMCMediaLib. Custom images can be used as well; these should be placed in the media library directory to make them available for RTMC Pro's use.

## 2.1 The RTMC Pro Workspace

The RTMC Pro workspace is a container for holding one or more display screens. As new display screens are added (Project | Add New Screen) they appear in the project tree. In RTMC Run-time, each screen will be displayed as a tab. The size of the workspace and the run-time window can be changed by selecting Project | Configure WorkSpace. Refer to Section 2.3, Project Menu, for additional information on sizing options.

## 2.2 Display Components

Display components are the objects that are used to display data. Available components for each component type can be displayed by clicking the arrow on each tab in the Component Toolbox. To add a component to the workspace, click an item on the Component Toolbox and then click anywhere in the workspace or click and drag to the desired size. The component's Properties window is automatically displayed when the object is first placed in the workspace. The Properties window is used to customize colors, scale values, text, etc., and to assign the data value to be displayed by the component.

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**NOTE**

When a display component is linked to a data value, if **Use Live Data** is active, the value will be automatically updated on the display if data is available. (Refer to Section 2.3, View Menu, for more information on **Use Live Data**.)

In LoggerNet, if data collection is not set up for the station, the values will not update and an exclamation point will appear in the upper right corner of the component. Data collection can be set-up through the LoggerNet Setup window or with RTMC's Project | Configure Override Scheduled Collection menu item. Input locations, ports and flags for mixed-array dataloggers are collected at the scheduled collection interval or any time a manual collection is done. The Public table must be enabled for scheduled collection to display these values for table-data dataloggers.

In RTDAQ, if RTDAQ is not connected to the station, the values will not update and an exclamation point will appear in the upper right corner of the component.

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As changes are made to component properties, they appear on the screen in real-time. After a component's properties have been set, select OK to keep the changes and close the Properties window. Once the link to the data value has

been applied, if there is data available from LoggerNet or RTDAQ for the component, the value on the display will update, if **Use Live Data** is active.

To make changes in display component settings, the Properties window can be opened by double-clicking the component or right-clicking the component and then choosing Properties from the drop-down menu. If you make changes to a component's properties but then decide to reject those changes, press the Cancel button to return the properties to the last applied state. If Cancel is selected when a component is first placed in the work area (and OK has not been pressed), the display component will be removed from the screen.

### Available Components

The following is an overview of the display components available. The online help has detailed information about each of the components and their properties.

#### All Tabs



Pointer

Returns the cursor to a normal selection tool.

#### Alarms Tab



Basic Alarm

Provides visual and/or audible notification that a data value has exceeded a defined limit. An audible alarm can be disabled by right-clicking the component with your mouse and selecting **Acknowledge Alarm**. An alarm can also cause an email to be sent to a specified email address and/or a specified file to be opened. All events (audio, email, run/open) and alarm acknowledgement occur only in run-time mode.



99<sup>o</sup> Numeric Alarm

Provides visual and/or audible notification that a data value has exceeded a defined limit. An audible alarm can be silenced by right-clicking the component with your mouse and selecting **Acknowledge Alarm**. An alarm can also cause an email to be sent to a specified email address and/or a specified file to be run or opened. All events (audio, email, run/open) and alarm acknowledgement occur only in run-time mode.

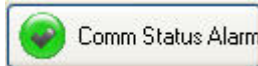


Rate of Change ...

Provides visual and/or audible notification that the rate of change of a data value has exceeded a defined limit. An audible alarm can be disabled by right-clicking the component with your mouse and selecting **Acknowledge Alarm**. An alarm can also cause an email to be sent to a specified email address and/or a specified file to be opened. All events (audio, email, run/open) and alarm acknowledgement occur only in run-time mode.

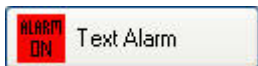


Provides visual and/or audible notification that no data has been received from a selected table for a specified period of time. An audible alarm can be disabled by right-clicking the component with your mouse and selecting **Acknowledge Alarm**. An alarm can also cause an email to be sent to a specified email address and/or a specified file to be opened. All events (audio, email, run/open) and alarm acknowledgement occur only in run-time mode.

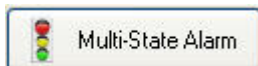


Provides visual and/or audible notification when scheduled collection is disabled in the Setup Screen, the schedule is paused from the Status Monitor, or communication has failed a sufficient number of times to put the datalogger into a Primary or Secondary Retry mode (the retry mode used is based on the Condition property for the component). An audible alarm can be disabled by right-clicking the component with your mouse and selecting **Acknowledge Alarm**. An alarm can also cause an email to be sent to a specified email address and/or a specified file to be opened. All events (audio, email, run/open) and alarm acknowledgement occur only in run-time mode.

Note that because a Comm Status Alarm applies to scheduled collection failures, it will never be triggered when RTMC is launched from RTDAQ.



Provides visual and/or audible notification that a data value has exceeded a defined limit. An audible alarm can be disabled by right-clicking the component with your mouse and selecting **Acknowledge Alarm**. An alarm can also cause an email to be sent to a specified email address and/or a specified file to be opened. All events (audio, email, run/open) and alarm acknowledgement occur only in run-time mode.



Provides visual and/or audible notification of the state of a data value. Default states include Off, Warning and Critical. These can be changed and additional states can be added. An image, sound file, email, and/or run/open can be defined for each state. An audible alarm can be disabled by right-clicking the component with your mouse and selecting **Acknowledge Alarm**. All events (audio, email, run/open) and alarm acknowledgement occur only in run-time mode.

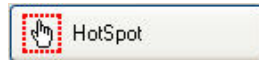
## Commands Tab



Provides a button that will run/open a specified file (\*.exe, \*.bat, \*.doc, etc.) when pressed in run-time mode.



Provides a button that will execute a specified CoraScript command when pressed in run-time mode. CoraScript is a set of commands that can be used to interact with the LoggerNet server. For more information, see RTMC Pro's online help.

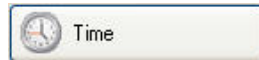


Provides a hotspot that will jump to a specified RTMC screen or open a web browser to a specified web address when clicked in the run-time mode. In RTMC Run-time the hotspot will be invisible. The only indication of a hotspot will be the changing of the cursor to a hand (☞) when over the hotspot. A label, button, or other component can be used to indicate what the hotspot will do when clicked.

## Digital Displays Tab



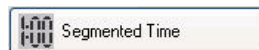
Depicts the selected data value as a numeric value, text string, or Boolean.



Depending upon the option chosen, displays the server time, server time at last data collection, station time, station time of last record stored, PC time, or a time stored in the data table (such as time of minimum or maximum).

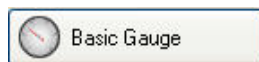


Depicts the selected data value as a numeric value, text string or Boolean.



Depending upon the option chosen, displays the server time, server time at last data collection, station time, station time of last record stored, PC time, or a time stored in the data tables (such as time of maximum or minimum).

## Gauges Tab



Displays the selected data value on a gauge. In run-time mode, max and min pointers can be reset by right-clicking the component.



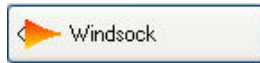
Displays the selected data value on a rotary gauge.



Provides an eight-point compass on which to display data.

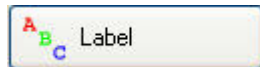


Displays the selected data value on a gauge with a logarithmic scale. In run-time mode, max and min pointers can be reset by right-clicking the component.

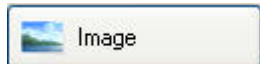


Displays wind speed and wind direction from a datalogger table in the form of a windsock.

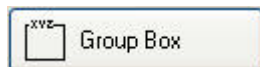
### Layout Tab



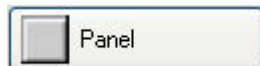
Displays a static text string that can be used to label other components.



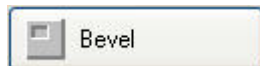
Allows you to place a static image on the display.



Allows you to place a box on the display in order to group components together.



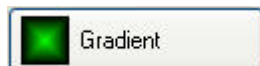
Places a panel on the display that can be used to group components together.



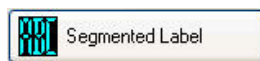
Places a beveled edge on the display that can be used to bevel the edges of other components.



Allows you to place a circle, ellipse, square, rectangle, or rounded rectangle on the display.

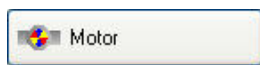


Allows you to place a gradient on the display.

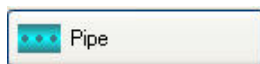


Displays a static text string that can be used to label other components or simply add text to the project.

### Miscellaneous Tab



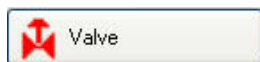
Provides a motor that can be depicted as on or off based on a data value.



Displays a pipe. The flow through the pipe can be determined by a data value. A pipe is horizontal by default. To make a vertical pipe, unlock the aspect ratio and resize it so that it is taller than it is wide.



Provides a pipe joint that can be used to connect two pipes.

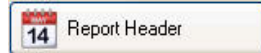


Provides a valve that can be depicted as opened or closed based on a data value.

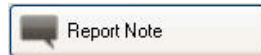
## Reports Tab



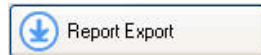
Provides a button bar that allows the user to customize the date range of their report. It also provides buttons in run-time to step through data or jump to a specific date.



Displays the report range. The user can customize the dates shown and the format used. In run-time mode, the header updates as the report date range changes.

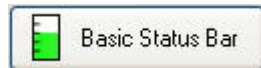


Allows the user to insert custom notes at run-time before the report is exported. Notes are temporary and are lost when the report is closed.

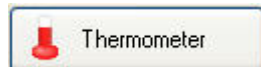


Provides options for controlling how reports get exported. Export options include HTML, PDF, PDF (Image), PNG, JPEG, GIF, and BMP. The reports can also be setup so they are printed, emailed, or FTP'd when the report is exported. The component also allows you to specify which of the above export options are available in RTMC Run-time.

## Status Bars Tab



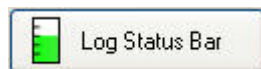
Depicts the selected data value as a single vertical or horizontal bar. In run-time mode, max and min pointers can be reset by right-clicking the component.



Displays the data value on the image of a thermometer. In run-time mode, max and min pointers can be reset by right-clicking the component.

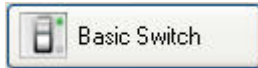


Displays the data value as the level in a tank.



Depicts the selected data value as a single vertical or horizontal bar on a logarithmic scale. In run-time mode, max and min pointers can be reset by right-clicking the component.

**Switches Tab**



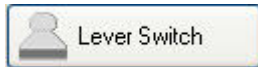
Basic Switch

Indicates the state of a port, flag, input location, or public variable. A 0 is considered Off (false); any non-zero number is considered On (True). In run-time mode, right-click a switch to change its state. The option to change the state of a switch with a double-click or a single-click can be enabled in the Properties window.



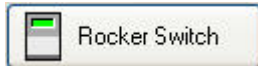
LED Switch

Indicates the state of a port, flag, input location, or public variable by the color of an LED. A 0 is considered Off (false); any non-zero number is considered On (True). In run-time mode, right-click a switch to change its state. The option to change the state of a switch with a double-click or a single-click can be enabled in the Properties window.



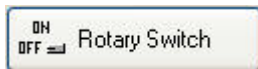
Lever Switch

Indicates the state of a port, flag, input location, or public variable by the position of a lever. A 0 is considered Off (false); any non-zero number is considered On (True). In run-time mode, right-click a switch to change its state. The option to change the state of a switch with a double-click or a single-click can be enabled in the Properties window.



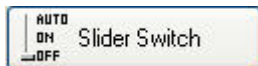
Rocker Switch

Indicates the state of a port, flag, input location, or public variable by the position of a rocker. A 0 is considered Off (false); any non-zero number is considered On (True). In run-time mode, right-click a switch to change its state. The option to change the state of a switch with a double-click or a single-click can be enabled in the Properties window.



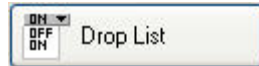
Rotary Switch

Indicates the state of a port, flag, input location, or public variable by the position of a rotary dial. The default switch has two positions. A 0 is considered Off (false); any non-zero number is considered On (True). Other positions can be added. In run-time mode, click on a position to change to that state.



Slider Switch

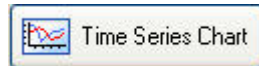
Indicates the state of a port, flag, input location, or public variable by the position of a horizontal or vertical bar. The default switch has two positions. A 0 is considered Off (false); any non-zero number is considered On (True). Other positions can be added. In run-time mode, click on a position to change to that state.



Drop List

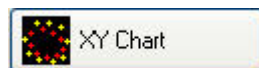
Indicates the state of a port, flag, input location, or public variable by displaying an option from a list designated by the user. The default drop list has two options. A 0 is considered Off (false); -1 is considered On (True). Other options can be added. In run-time mode, click on the component to display the list of options and change the value of the variable.

### Trends Tab



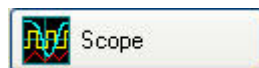
Time Series Chart

Displays one or more time domain series on a chart. The time stamp on the X axis reflects the data timestamp. In run-time mode, it is possible to zoom in by clicking and dragging a box around the desired zoom area. Also, in run-time mode, right-clicking the chart will bring up a menu that allows the chart to be printed, copied, or exported.



XY Chart

Displays one or more XY series on a chart. The user specifies what will be used for both the X axis data values and the Y axis data values. Each X axis data value is plotted against the Y axis data value with an identical timestamp. In run-time mode, it is possible to zoom in by clicking and dragging a box around the desired zoom area. Also, in run-time mode, right-clicking the chart will bring up a menu that allows the chart to be printed, copied, or exported.



Scope

Displays one or more series on a chart. The time stamp on the X axis reflects the data timestamp. The Scope is similar to the Time Series Chart, but has the appearance of an oscilloscope screen and has the ability to display data at a faster rate. In run-time mode, right-clicking the Scope will bring up a menu that allows the Scope to be printed, copied, or exported.

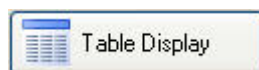


Table Display

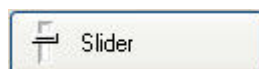
Displays the data from a datalogger table in a row and column format. In run-time mode, right-clicking the table will bring up a menu that allows the table to be printed, copied, or exported.



Wind Rose

Displays wind speed and wind direction from a datalogger table in the form of a wind rose.

### Value Setters Tab



Slider

Depicts the selected data value as a single horizontal or vertical bar. In run-time mode, the data value can also be set to a new value by dragging the slider.



Like the Digital component, depicts the selected data value as a numeric value, text string, or Boolean. However, in run-time mode, a data value can also be set to a new value by double-clicking the component and entering a new value in the resulting dialog box.



In run-time mode, reads a value in a datalogger and writes to another value in that datalogger or a different datalogger. The value that is written can be the value read, a 0 or -1, or a specified constant.

Note that in RTDAQ, RTMC projects are limited to a single station. Therefore, the value read can only be forwarded to another value in the same datalogger.



Depicts the selected data value as a pointer on a dial. In run-time mode, the data value can also be set to a new value by dragging the pointer.

---

**NOTE**

A description of each field in a component's Properties box can be displayed by pressing F1 or clicking the help button (?) in the top right-hand corner of the dialog box.

---

## 2.3 Functions Available from the RTMC Pro Menus

All of the RTMC Pro operations are available from the menus at the top of the RTMC Pro window. Many of the options are also available as buttons on the toolbar, or by right clicking the components or other parts of the window or project tree.

### **File Menu**

**New Project** starts a new RTMC Pro project. The currently opened project will be closed. If there are changes that have not been saved, the user will be prompted to save changes.

**Open** brings up the File Open dialog to open a previously saved project.

**Save** will save the changes in the current project to the RTMC Pro project file. If this is the first time the project has been saved, a Save As dialog will open to select the file name and directory for the project file.

**Save As** brings up the Save As dialog to save the current project with another name or in a different directory.

**Run Project** displays the current project in a run-time window.

**Save and Run Project** saves the changes in the current project and displays it in the run-time window.

**NOTE**

---

This option is not available when RTMC Pro is run from inside RTDAQ.

---

**Exit** closes RTMC Pro. If there are unsaved changes, the user will be prompted to save changes before exiting.

**Edit Menu**

**Cut/Copy/Paste** are standard editing operations to add selected objects to the Windows clipboard and paste them into RTMC Pro or other applications.

**Undo** cancels the last change made to the project.

**Redo** repeats the change that was just undone.

**Find and Replace** allows you to find all occurrences of a designated string and replace them with a different string. Some instances where this may be useful are if a datalogger name in your network map has changed or a variable name in the datalogger program has changed. The user determines if the find and replace applies to the entire project, only the current screen, or only the current component.

**Select All** selects all of the components in the workspace. The components can then be cut, copied, deleted, etc.

**Clear Selection** clears the selection of components currently highlighted on the active screen.

The **Preferences** menu item is used to change some global settings that affect all projects in RTMC Pro. The *Visual Theme* determines the look and feel of the application (i.e., colors, button appearance, etc.). The *Working Directory* is the directory in which to store RTMC Pro project files. By default, this is C:\Campbellsci\RTMC. Press the *Change Default Font* button to set a new font for components that have text (numeric value text, chart titles and axes labels, etc.).

Component summaries (“tooltips”) are small boxes that are displayed on the screen beside a component when your mouse cursor hovers over the component for a few seconds. The box displays information on the type of component, the data value linked to the component, images used, series plotted, etc. Select the *Show Component Summaries* box to display these hint boxes or clear the box to turn off the display of the information.

The *Grid Options* settings allow you to turn on or disable the display of a grid in the project workspace and lets you set the size of the grid.

With the *Graphics Options* settings, you can control the maximum number of times the RTMC screens will be updated per second, disable animation when a data value changes, and specify whether high quality or high speed is more important. (Disabling animation disables the smooth transition between values on gauges, status bars, etc. When a data value changes, the component will jump to the new value. This greatly enhances performance when dealing with fast data or large, complex projects.)

The **Customize** menu item brings up a dialog box which allows you to customize RTMC Pro's toolbars and menus.

### **View Menu**

All of the View menu items are toggles. When a check mark appears to the left of the menu item, it is enabled. When the check mark is absent, the option is disabled. These options are toggles—if an option is off (unchecked), select it once to turn it on (checked) and vice versa.



### **Full Screen Mode**

When selected, the RTMC workspace expands to fill the entire computer screen. This provides more space to work with in designing your project. In this mode, you must use the right-click menus to add components and perform other functions available from RTMC's toolbar. Press the Esc key to exit this mode.

### **Use Live Data**

*LoggerNet* - When selected, RTMC Pro uses the data that has been collected by LoggerNet and stored in LoggerNet's data cache. Therefore, if LoggerNet is running and data is being actively collected from the datalogger network, the values displayed by the components will be updated as data is collected. However, run-time events (audio, email, run/open, alarm acknowledgement, switch state changing, value changing, value forwarder, etc.) will not be active. When Use Live Data is not selected, RTMC Pro does not use the data stored in LoggerNet's data cache. Therefore, the values displayed by the components will not be updated until RTMC-RT is launched.

*RTDAQ* - When selected, RTMC Pro performs a manual poll to update the project data every second if RTDAQ is connected to the datalogger. Therefore, if RTDAQ is connected to the datalogger, the values displayed by the components will be updated every second. However, run-time events (audio, email, run/open, alarm acknowledgement, switch state changing, value changing, value forwarder, etc.) will not be active. When Use Live Data is not selected, RTMC Pro does not perform manual polls to update project data. Therefore, the values displayed by the components will not be updated until RTMC-RT is launched.

This menu item can also be toggled off or on by selecting an icon on the toolbar. The icon has a different appearance, depending on whether or not Use Live Data is currently off or on. When Use Live Data is off, the icon will appear as . When Use Live Data icon is on, the icon will appear as .

**Show Project Tree** hides or displays the Project Tree (left pane of the default window).

**Show Toolbox** hides or displays the Component Toolbox.

**Show Layout Toolbar** hides or displays the Layout Toolbar.

**Show Tabs** hides or displays the tabs at the top of the RTMC workspace which allow the user to switch between screens. When tabs are not shown,

you can switch between screens by selecting a screen from the Project Tree. (Note this menu item is disabled for projects with only one screen.)

**Show Standard Toolbar** hides or displays the Standard Toolbar.

**Show Status Bar** hides or displays the Status bar at the bottom of the screen. The Status Bar provides hints on objects, window size, and the server connection.

**Show Grid** hides or displays a grid background for the workspace.

### **Project Menu**


Project Menu options work with the whole project or workspace.

**Configure Workspace** allows you to specify the size of both the development workspace and the RTMC Run-time screen. For **Development**, the size of the RTMC Pro workspace is set by choosing a size from the drop-down list. If you choose custom, you will be asked to specify the width and height in millimeters, inches, or pixels. For **Run-time**, when **Auto Size** is selected, the size of an RTMC display is set automatically by dragging the boundaries of the screen to a new size. The components will resize to match the new screen size. The aspect ratio of the components will be maintained only if **Lock Aspect Ratio** is selected. When **Fixed Size** is selected, the screen size is fixed. It is determined by the size set in the development mode.

**Manage Data Sources** opens a dialog box which allows you to manage the data sources for your RTMC project. See Section 2.5, Managing Data Sources, for additional information.

**Configure Alarm Log** opens a dialog box that allows an alarm log to be configured for all alarms that are generated. Options include enabling alarm logging, log directory, base file name, number of alarm log files kept, size or time interval of alarm log files, and whether a text entry is required for alarm acknowledgement. The text entry will be included in the log file. It can be used to log information about who acknowledged the alarm and other comments. Each entry in the log file will include the date and time of alarm, a numeric code indicating the type of entry (see table below), the data value used by the alarm, the alarm condition, the state of the alarm, and the user-entered text entry.

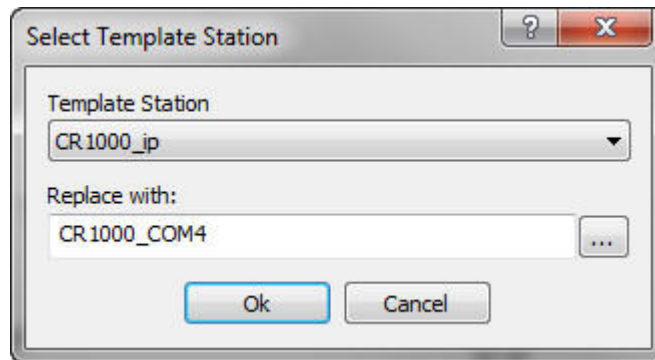
<b>Code</b>	<b>Description</b>
0	Entered alarm state
1	Leaving alarm state
2	Alarm acknowledged by user
3	Audible Alarm Sounded
4	Email Sent
5	Run/Open Executed
6	Multi-State Alarm state change
7	Multi-State Alarm turned Off

**Configure Auto Tabbing** lets you enable or disable the automatic switching between project tabs when an RTMC form is run, and set the rate at which a new tab will be displayed. When RTMC is in AutoTab mode, it will display a tab for a set amount of time and then display the next tab. If a screen is interacted with or a different tab is selected, auto tabbing stops and a button appears by the menu, , that can be clicked to resume tabbing.

**Configure Snapshot & FTP** opens a dialog box that allows the configuration of a snapshot of the current RTMC Pro state. A snapshot is a \*.png file of the current state. It can be configured to include selected screens or only selected components. For a snapshot of selected screens, a file will be saved for each screen with a filename of *screenname.png*. For a snapshot of only select components, a file will be saved for each component with a filename of *componentname.png*. A snapshot will be saved in Run-time to the designated directory at the specified interval. It can also be transferred to a designated FTP server on the same interval. Only the most current snapshot will be kept. It will be overwritten each time a new snapshot is saved.

**Configure Override Scheduled Collection** opens a dialog box that allows the collection interval to be specified. In LoggerNet, this data collection will be in addition to the scheduled collection specified in LoggerNet's Setup window. In RTDAQ, this will override RTDAQ's automatic one second polling to update the project data.

**Load as Template** enables you to easily use the same project for multiple stations. When a project designated as "Load as Template" is loaded in RTMC-RT, the following dialog box will appear:



The **Template Station** drop-down list will contain all of the stations used in your template project. After selecting a station from the drop-down list, you can open the Data Source Browser by pressing the button to the right of the **Replace with** field. From the Data Source Browser, you can select a station to replace the template station. Each reference to the template station in the project will be replaced by the designated station.

**Add New Screen** adds a new screen to the project. Each screen appears in the project tree. In run-time mode, each screen appears as a tabbed page on the display. When the project is run the user can click the tab to bring each screen to the front.

**Change Screen Order** allows you to change the order that the screens will appear. In development mode, this is the project tree order. In run-time mode, it is the order of tabs, left to right.

### **Screen Menu**

Screen Menu options work with the tabbed screens in the project. The Screen Menu is also available by right clicking any blank area of the workspace.

**Screen Properties** brings up the dialog to choose the background image and color for the current screen.

**Delete Screen** removes the current screen from the project. If there are components on the screen, they will also be removed.

**Rename Screen** brings up a dialog to change the name of the current screen. This is the name that appears on the screen tab in run-time mode.

**Paste** is a standard editing operation to paste an object from the Windows clipboard into RTMC Pro.

**Insert New** brings up a submenu allowing you select one of the components to insert on the screen. When the component is added to the screen the Properties window for the new component will come up.

### **Component Menu**

The Component Menu is used to set the component properties, placement and alignment. The Component Menu is also available by right clicking any of the components in the workspace. Many of the Component Menu's items (Align, Space Evenly, Make Same Width, Center, and Order) are also available from the Layout Toolbar.

**Properties** brings up the Properties window for the selected component.

**Delete Selection** removes the selected component(s) from the workspace.

**Lock Aspect Ratio** allows you to drag the object to a new size without distorting the look of the component. If the height of a component is changed, the width will automatically be changed as well. By default, Lock Aspect Ratio is off for all components.

**Rename Component** lets you change the name of the component in the list tree. If snapshots are configured, this will affect the name of the snapshot.

**Manual Resize** allows the user to set the size and position of the selected component.

**Cut/Copy** are standard editing operations to add selected objects to the Windows clipboard.

**Align** provides some options for lining up a group of components with the first component selected. Select two or more components by using the cursor to click and drag a box around the desired components. Components can also be selected by selecting the first component and then selecting the other

components while holding down the <ctrl> key. With the components selected choose one of the alignment options. The components will be aligned based on the last component selected. The last component is identified by the dark blue handles. The other selected components have handles with blue outlines.

---

**NOTE**

Be careful about the alignment you choose. Selecting Top Align for a group of components that are arranged vertically will cause all the components to end up on top of each other. This can be fixed by choosing Undo from the Edit menu.

---

**Space Evenly** will evenly distribute the selected components horizontally across or vertically down the page.

**Make Same Size** allows you to set two or more objects to the same overall size, width or height as the first object selected. Select one or more components by using the cursor to click and drag a box around the desired components. The components can also be selected by selecting the first component and then selecting the other components while holding down the <ctrl> key. The last component selected will be the basis on which the other components are sized. The last component is identified by the dark blue handles. The other selected components have handles with blue outlines.

**Center** will center the selected component(s) either vertically or horizontally on the page.

**Order** is used to manage the position of graphic objects on the workspace. This is often referred to as Z order. Displays are often a combination of a background graphic and data display objects in front. Objects added to the workspace are, by default, placed on top of any existing objects. These operations are used to determine the order in which objects are displayed. This is important when layering transparent objects.

**Group Components** allows you to group components together. They can then be moved, copied, ordered, etc. as a single object. Select the components to be grouped by holding the Ctrl key and clicking the components with the primary mouse button. Then choose the Group Components item from the Component menu or the Component right-click menu. You must have at least two components selected for this menu item to be enabled.

When a component group is selected, the menu item will change to Ungroup Components. You can undo the grouping by selecting this menu item.

When components are grouped, the properties for each component will show up as an item in the right-click menu. These menu items can be used to modify the properties for each component.

### ***Window Menu***

If there are multiple screens in the project, **Window** will allow you to change between the screens using the menu.

### ***Help Menu***

**RTMC Pro Development Help** provides access to help for all of the features of RTMC Pro.

**Keyboard Map** opens a dialog box from which you can print RTMC Pro's keyboard shortcuts or copy them to the Windows clipboard.

**About RTMC Pro Development** provides version and copyright information.

## 2.4 Expressions

RTMC Pro has a built-in expression interpreter that allows the user to scale the data or create displays based on calculations of a data point.

Components that display data values either numerically or graphically can be processed using expressions. These expressions can include simple mathematical expressions, functions to manipulate strings, or more complex functions that deal with the state of a data value over time.

For instance, a temperature reading in degrees Celsius can be processed to display in degrees Fahrenheit using a simple mathematical expression. This is done by first selecting the data value in the **Select Data** field, and then entering the mathematical expression after the defined data value. Using the above example, if the data value is defined as "Server:CR5000.TempData.Temp1" ("*Source:datalogger.table.variable*"), you would enter

```
"Server:CR5000.TempData.Temp1" * 1.8 + 32
```

to convert the temperature reading from degrees Celsius to degrees Fahrenheit.

As shown above, double quotes are used in RTMC to enclose the name of a data value (or source, datalogger, or table depending on the component). Therefore, when defining a literal string, a dollar sign is used as a prefix. This indicates to RTMC that you are defining a literal string rather than a data value. For example, to search for the position of the sequence abc in the data value mystring, you would use the following expression:

```
InStr( 1, "Server:CR1000.hourly.mystring", $"abc")
```

Expressions can also use "Functions with State" that involve the state of a data value over a period of time. For instance, you can return the maximum value of a data value over the past 24 hours using the expression:

```
MaxRunOverTime("Server:CR1000.QtrHour.Temp",Timestamp("Server:CR1000.QtrHour.Temp"),nsecPerDay)
```

When RTMC-RT is launched it begins processing with the newest record by default. Therefore, using the above expression, a component will not immediately display the maximum value over the past 24 hours. Rather, it will display the maximum value since RTMC-RT was launched. The 24-hour maximum will only be displayed after it has been running for 24 hours. In order to get a 24 hour maximum immediately, you can use a "Start Option Function" to cause RTMC to begin processing data at an earlier point. For example,

```
StartRelativeToNewest(nsecPerDay,ordercollected);
MaxRunOverTime("Server:CR1000.QtrHour.Temp",Timestamp("Server:CR1000.QtrHour.Temp"),nsecPerDay)
```

would begin displaying a 24 hour maximum immediately, provided that the data is available in the communications server's data cache.

### Aliases

If a data value is used multiple times in an expression, the expression can be simplified by declaring an alias for the data value at the first of the expression, in the form:

```
Alias(alias_name, data_value)
```

For example,

```
StartAtOffsetFromNewest(5,OrderCollected);IIF(ABS(("Server:CR1000.MyT
able.Value"-
ValueAtTime("Server:CR1000.MyTable.Value",TimeStamp("Server:CR1000.
MyTable.Value"),30*nsecPerSec,0))>10 AND
ABS(ValueAtTime("Server:CR1000.MyTable.Value",TimeStamp("Server:CR
1000.MyTable.Value"),30*nsecPerSec,0)-
ValueAtTime("Server:CR1000.MyTable.Value",TimeStamp("Server:CR1000.
MyTable.Value"),60*nsecPerSec,0)))>10,1,0)
```

can be replaced by:

```
Alias(X,"Server:CR1000.MyTable.Value");StartAtOffsetFromNewest(5,Order
Collected);IIF((ABS(X-ValueAtTime(X,TimeStamp(X),30*nsecPerSec,0))>10
AND ABS(ValueAtTime(X,TimeStamp(X),30*nsecPerSec,0)-
ValueAtTime(X,TimeStamp(X),60*nsecPerSec,0)))>10,1,0)
```

### Synchronizing Variables

The ValueSynch function can be used to synchronize data values coming from multiple data sources so that you can display the results of a calculation on those data values in a single component. The Value Synch function takes the form:

```
ValueSynch(synchronized_name, data_value)
```

Where synchronized\_name is the name of a new variable that will be used in a calculation at the end of the expression and data\_value is the name used within RTMC to access the data value, i.e., *Source:datalogger.table.variable*.

For example, if you wish to display the average air temperature of two stations on a chart, the following expression can be used to synchronize the timestamps of the stations and then calculate the average air temperature:

```
ValueSynch(air_temp_1,"Server:CR1000_1.SECOND.air_temp");ValueS
ynch(air_temp_2,"Server:CR1000_2.SECOND.air_temp");(air_temp_1 +
air_temp_2) / 2
```

---

**NOTE** Timestamps are truncated to seconds prior to synchronization. Therefore, synchronizing sub-second data is not recommended as the results will be unpredictable.

If the timestamps of the stations are not the same (for example, if one datalogger is a few minutes behind the other), the component will display the exclamation point indicating no data, until the data sources have common timestamps and, therefore, can be synchronized.

RTMC will buffer up to 100,000 points of a data value while waiting for a common timestamp from the other datalogger(s). Once the buffer reaches 100,000 data points the oldest data value will be removed from the buffer, each time a new data value is collected.

---

All of the functions available in RTMC are described below. For details on a function, click on the function name.

---

**NOTE** Spaces must be used to delimit the predefined constants and functions. Operators allow but do not require spaces.

---

**NOTE** An expression can include data values from multiple dataloggers.

---

## 2.4.1 Operators

<u>Operator</u>	<u>Description</u>
()	Prioritizes an expression
*	Multiply by
/	Divide by
^	Raised to the power of
+	Add
-	Subtract/Unary negation
=	Equal
<>	Not equal
>	Greater than
<	Less than
>=	Greater than or equal to
<=	Less than or equal to

## 2.4.2 Order of Precedence

- ❖ Anything inside parentheses ( )
- ❖ Exponentiation ^
- ❖ Negation (unary) -
- ❖ Multiplication \*, division /
- ❖ Modulo (remainder) MOD
- ❖ Addition +, subtraction -

When consecutive operators have the same priority, the expression evaluates from left to right. This means that an expression such as **a-b-c** is evaluated as **(a-b)-c**.

## 2.4.3 Predefined Constants

<u>Constant</u>	<u>Description</u>
e	2.718282
PI	3.141593
True	-1
False	0
NOPLOT	NAN
NAN	NAN
INF	INF

## 2.4.4 Predefined Time Constants

These predefined time constants can be useful as a parameter for the Functions with State, where the interval parameter must be specified in nanoseconds.

<u>Constant</u>	<u>Description</u>
nsecPerUsec	Number of nanoseconds in a microsecond
nsecPerMsec	Number of nanoseconds in a millisecond
nsecPerSec	Number of nanoseconds in a second
nsecPerMin	Number of nanoseconds in a minute
nsecPerHour	Number of nanoseconds in an hour
nsecPerDay	Number of nanoseconds in a day
nsecPerWeek	Number of nanoseconds in a week

## 2.4.5 Functions

The following functions show the use and placement of the numbers the function operates on. The parentheses are not required unless there are two or more parameter values (e.g., ATN2(y,x)).

<b><u>Function</u></b>	<b><u>Description</u></b>
ABS(x)	Returns the absolute value of a number.
ACOS(x)	Returns the arc cosine of a number.
ASIN(x)	Returns the arc sine of a number.
ATN(x)	Returns the arc tangent of a number.
ATN2(y,x)	Returns the arctangent of y/x.
CEILING(x)	Rounds a number up to an integer value.
COS(x)	Returns the cosine of a number.
COSH(x)	Returns the hyperbolic cosine of a number.
CSGN(x)	Changes the sign of a number by multiplying by -1.0.
EXP(x)	Returns e raised to a power.
FIX(x)	Returns the integer portion of a number. If the number is a negative, the first negative integer greater than or equal to the number is returned.
FLOOR(x)	Rounds a number down to an integer value.
FRAC(x)	Returns the fraction part of a number.
FormatFloat(x,s)	Converts a floating point value, x, into a string with format defined by the format string, s.
FormatFloatL(x,s)	Converts a floating point value, x, into a string with format defined by the format string, s. Applies any rules associated with the locale of the computer running RTMC.
IIF(x,y,z)	Evaluates an expression (x) and returns one value if true (y), a different value if false (z).
(x)IMP(y)	Performs a logical implication on two numbers.
INT(x)	Returns the integer portion of a number. If the number is a negative, the first negative integer less than or equal to the number is returned.
IsFinite(x)	Determines if a value is finite.
LN(x)	Returns the natural log of a number.
LOG(x)	Returns the natural log of a number.
LOG10(x)	Returns the logarithm base 10 of a number.
(x)MOD(y)	Performs a modulo divide of two numbers.
(x)PWR(y)	Raises constant x to the power of y.
RND	Generates a random number.
ROUND(x)	Rounds a number to a higher or lower integer value.
SGN(x)	Used to find the sign value of a number (-1, 0, or 1).
SIN(x)	Returns the sine of an angle.

SINH(x)	Returns the hyperbolic sine of a number.
SQR(x)	Returns the square root of a number.
TAN(x)	Returns the tangent of an angle.
TANH(x)	Returns the hyperbolic tangent of a number.

## 2.4.6 Logical Functions

The following functions perform logical operations.

(x)AND(y)	Performs a logical conjunction on two numbers.
(x)EQV(y)	Performs a logical equivalence on two numbers.
NOT(x)	Performs a logical negation on a number.
(x)OR(y)	Performs a logical disjunction on two numbers.
XOR(x)	Performs a logical exclusion on two numbers.

## 2.4.7 String Functions

The following functions can be used to manipulate strings. See the online help for information about the parameters required for each function.

<u>Function</u>	<u>Description</u>
Hex	Returns a hexadecimal string representation of an expression.
HexToDec	Converts a hexadecimal string to a float or integer.
InStr	Finds the location of a string within a string.
InStrRev	Finds the location of a string within a string. (Differs from InStr in that it searches from the end of the string rather than from the start of the string.)
Left	Returns a substring that is a defined number of characters from the left side of the original string.
Len	Returns the number of bytes in a string.
LTrim	Returns a copy of a string with no leading spaces.
Mid	Returns a substring that is within a string.
Replace	Used to search a string for a substring, and replace that substring with a different string.
Right	Returns a substring that is a defined number of characters from the right side of the original string.
RTrim	Returns a copy of a string with no trailing spaces.
Space	Returns a string value that is filled with a defined number of spaces

StrComp	Compares two strings by subtracting the characters in one string from the characters in another.
StrReverse	Returns a copy of a string with the characters in reverse order.
Trim	Returns a copy of a string with no leading or trailing spaces.

### 2.4.8 Conversion Functions

The following functions perform a type conversion on a value. See the online help for more information.

<u>Function</u>	<u>Description</u>
ToDate	Converts a value to a date.
ToFloat	Converts a value to a floating point number.
ToInt	Converts a value to an integer.

### 2.4.9 Time Functions

The following functions involve a timestamp or the system time. See the online help for information about the parameters required for each function.

<u>Function</u>	<u>Description</u>
FormatTime	Produces a string that formats a timestamp in the manner specified.
SystemTime	Returns the current computer time.
SystemTimeGMT	Returns the current GMT (Greenwich Mean Time) system time.
Timestamp	Returns the timestamp associated with the record from which a value is derived.

### 2.4.10 Start Option Functions

The following functions determine when RTMC begins processing data. See the online help for information about the parameters required for each function.

<u>Function</u>	<u>Description</u>
StartAfterNewest	No records are processed until a new record has been collected.
StartAtNewest	Attempts to start processing at the newest record in the table.
StartAtOffsetFromNewest	Attempts to start processing with the record at the specified offset back from the newest record in the table.

StartAtRecord	Attempts to start processing at the specified file mark and record number. If the specified record cannot be located, it starts processing at the oldest record in the source table.
StartAtTime	Attempts to start processing at the record that is closest to the specified timestamp.
StartRelativeToNewest	Attempts to start processing with the first record whose timestamp is greater than or equal to the newest record's timestamp minus the specified interval.

### 2.4.11 Functions with State

The following functions involve the state of a data value over a period of time. See the online help for information about the parameters required for each function.

<b><u>Function</u></b>	<b><u>Description</u></b>
AvgRun	Returns a running average of up to the last specified number of values.
AvgRunOverTime	Returns the running average of the specified value over time.
AvgRunOverTimeWithReset	Returns the running average of the specified value since the function was reset.
Last	Stores the specified value and returns the previous value.
MaxRun	Returns the maximum of all values that it has considered.
MaxRunOverTime	Returns the maximum of all values whose timestamps are greater than the newest timestamp minus the specified interval.
MaxRunOverTimeWithReset	Returns the maximum of all values since the function was reset.
MedianRun	Returns the median value of up to the last specified number of values.
MedianRunOverTime	Returns the median value in the set of values whose timestamps are greater than the newest timestamp minus the specified interval.
MinRun	Returns the minimum of all values that it has considered.
MinRunOverTime	Returns the minimum of all values whose timestamps are greater than the newest timestamp minus the specified interval.
MinRunOverTimeWithReset	Returns the minimum of all values since the function was reset.
StdDev	Returns the standard deviation of up to the last specified number of values.

StdDevOverTime	Returns the standard deviation of the specified value over time.
StdDevOverTimeWithReset	Returns the standard deviation of the specified value since the function was reset.
Total	Returns the total of all values that it has considered.
TotalOverTime	Returns the total of all values whose timestamps are greater than the newest timestamp minus the specified interval.
TotalOverTimewithReset	Returns the total of all values since the function was reset.
ValueAtTime	Returns the oldest value in a set of values from a specified time interval.

## 2.5 Managing Data Sources

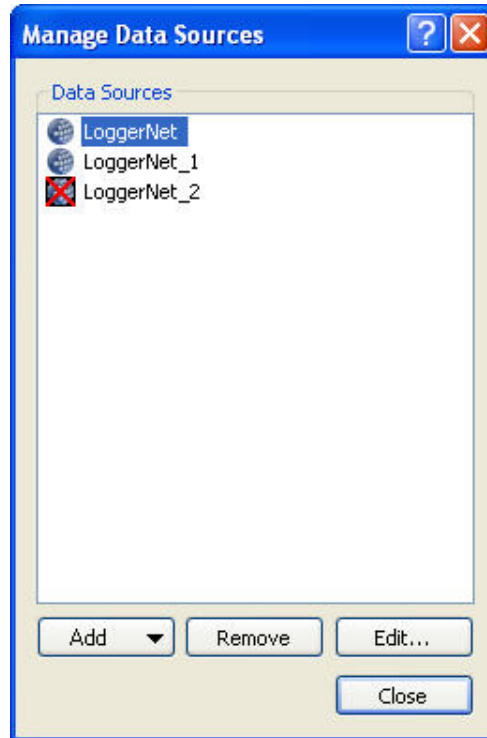
### 2.5.1 LoggerNet

When RTMC is run from LoggerNet, the Project | Manage Data Sources menu item allows the user to specify additional communications server(s), data file(s), and/or databases to be used as data sources in RTMC. Each communications server, data file, and database specified will be added to the Data Source Browser that is used to select data for RTMC components.

A server, data file, or database can be added by pressing the **Add** button, selecting the appropriate option and filling out the resulting dialog box as described below.

A server, data file, or database can be removed by selecting it and then pressing the **Remove** button. The **Edit** button can be used to bring up the Server Data Source, File Data Source, or Database Data Source Properties dialog box and make modifications. Note that if you change the name of a server, the change will be made to all references to that server in the project.

If a project contains only one data source, the status bar at the bottom right of the RTMC window will indicate the data source and connection state (connected or disconnected). If a project contains multiple data sources, the Status Bar will say **Data Source Status**. The background will be green if RTMC is able to connect to all of the data sources and red if there is a problem with at least one of the data sources. Double-clicking on **Data Source Status** will bring up the Manage Data Sources dialog box. The data source(s) to which RTMC is having trouble connecting will be indicated with a red X as shown below. You can select the data source from the list, press the **Edit** button, and modify the settings so that RTMC is able to connect to the data source.



### 2.5.1.1 Server Data Source

To add a server press the **Add** button and select **Add Server Data Source**. A dialog box will open requiring you to specify the following:

#### Source Name

Designates the name that will be used for the communications server in the Data Source Browser and on the status bar.

#### Server Address

This is the hostname or TCP/IP address of the computer running the communications server. This must be the valid name of an existing computer or a TCP/IP address (in the form `###.###.###.###` consisting of the IP network number, `###.###.###`, and the host number, `###`). If the software server resides on the same computer as RTMC, you can simply type in `LocalHost` for the server address. By default, LoggerNet's port number is 6789. If this default port number is used, it does not need to be specified in RTMC Pro. Otherwise, it is specified after Server Address, separated by a colon. An example would be `192.168.4.32:3000`, where 3000 is LoggerNet's port number. Note that a remote LoggerNet server must have Remote Connection enabled (Tools | Options | Allow Remote Connections) for RTMC Pro to be able to display the remote data.

#### Username

Your username on the communications server.

**Password**

Your password for the communications server.

**NOTE**

---

The **Username** and **Password** fields are required only if your server administrator has enabled security on your system. You can save the login information by selecting the **Remember username and password** check box.

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**2.5.1.2 File Data Source**

To add a data file press the **Add** button and select **Add File Data Source**. A dialog box will open requiring you to specify the following:

**Source Name**

Designates the name that will be used for the data file in the Data Source Browser. By default, the filename is used.

**Data File**

The data file to be used. Type in the name directly or press the button to the right of the field to browse to the data file.

**Label File**

*This field is used only for data files from array-based dataloggers.* The label file (\*.FSL or \*.DLD) to be used to provide labels for the data values. (The \*.FSL and \*.DLD files are created when a datalogger program is compiled in Edlog or Short Cut.) Type in the name directly or press the button to the right of the field to browse to the label file.

**Query Interval**

Specifies how often RTMC will query the data file for new data. Use the arrows or type in a number directly and then choose Milliseconds, Seconds, Minutes, Hours, or Days from the drop-down list.

**Back Fill Entire File**

When this box is selected, the entire data file will be brought in when initially queried by RTMC. When this box is not selected, the amount of data to be brought in is specified in the **Back Fill Offset** field.

**Back Fill Offset**

Indicates how much data, in KB, will be brought in when the data file is initially queried by RTMC.

### 2.5.1.3 Database Data Source

To add a database press the **Add** button and select **Add Database Source**. A dialog box will open requiring you to specify the following:

#### Source Name

Designates the name that will be used for the database in the Data Source Browser.

#### Type

The type of database. Choose a type from the drop-down list.

The following database types are supported in RTMC:

SQL Server Compact

SQL Server

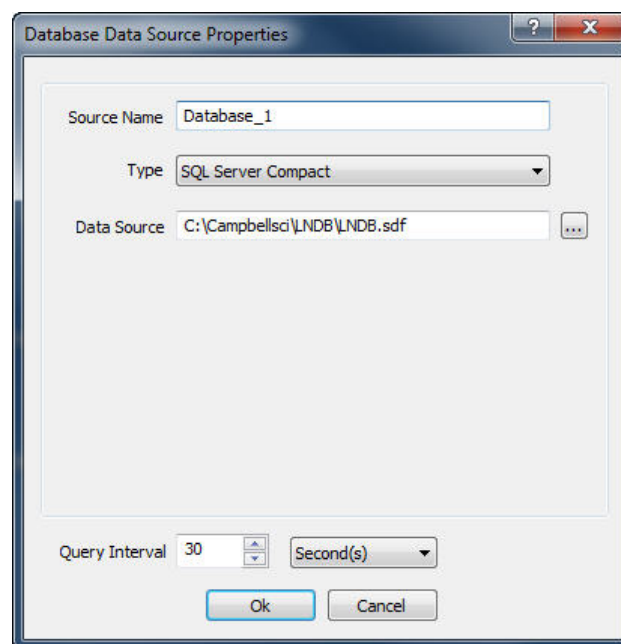
MySQL

#### Query Interval

Specifies how often RTMC will query the database for new data. Use the arrows or type in a number directly and then choose Milliseconds, Seconds, Minutes, Hours, or Days from the drop-down list.

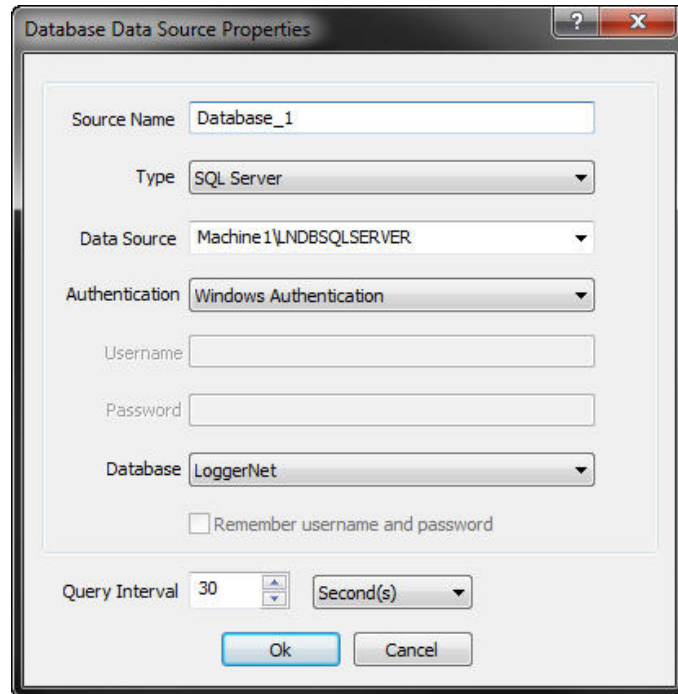
The remaining information changes depending on the database type as described below:

#### SQL Server Compact



The only additional information needed for a SQL Server Compact database source is the database file to be used. Type in the name directly or press the button to the right of the field to browse to the database file.

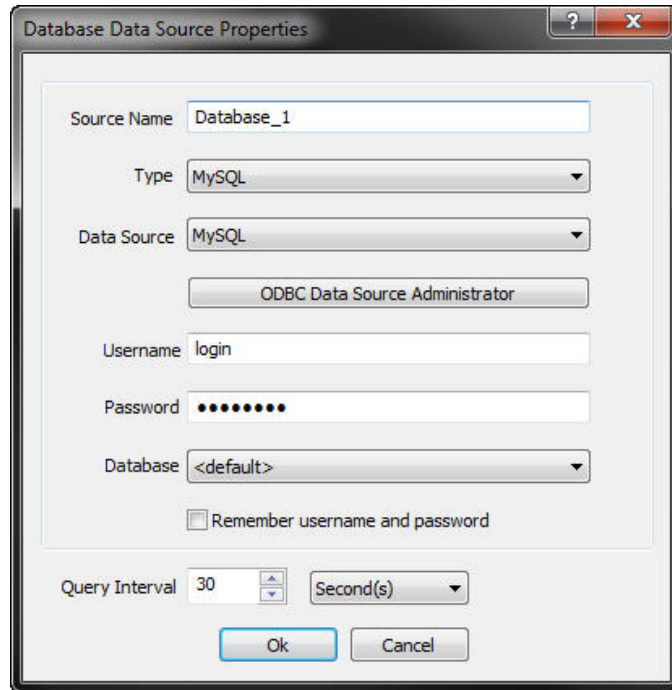
### SQL Server



To select a SQL Server database source you must select a SQL Server instance. The list of published SQL Server instances is shown in the Data Source combo box. You can also type into the Data Source combo box, because the desired server might not be published. Windows Authentication or SQL Server Authentication can be selected. Windows Authentication does not require a username and password, but rather uses Windows user accounts to authenticate valid users. SQL Server Authentication requires a login ID and Password and is independent of Windows user accounts. You can select the <default> database or select a specific database from the Database combo box.

The **Remember username and password** checkbox can be selected to save the username and password. If this check box is not selected and you are using SQL Server Authentication, you will be required to enter the username and password each time a project is opened that uses this database source.

## MySQL



The MySQL connection is an ODBC connection. You must use the Windows ODBC Data Source Administrator to configure the database connection. Currently only system data sources are supported and show in the Data Source combo box. The Username and Password may be optional. They will be set to blank in the connection string. It has been found that when set to blank, the login id and password configured in the ODBC Data Source Administrator are used. You can select the <default> database (default as configured in the data source) or select a different database.

The **Remember username and password** checkbox can be selected to save the username and password. If this check box is not selected and the username and password were not configured in the ODBC Data Source Administrator, you will be required to enter the username and password each time a project is opened that uses this database source.

### 2.5.2 RTDAQ

When run from RTDAQ, RTMC does not allow your to specify additional servers, data files, or databases as data sources. The only data source is LocalHost. Therefore, the Project | Manage Data Sources option only allow you to change the name used for LocalHost in the Data Source Browser and enter the username and password.

#### Server Data Source Properties

##### *Source Name*

Designates the name that will be used for the communications server in the Data Source Browser and on the status bar.

### *Server Address*

This is the hostname or TCP/IP address of the computer running the communications server. This must be the valid name of an existing computer or a TCP/IP address (in the form ###.###.###.### consisting of the IP network number, ###.###.###, and the host number, ###). If the software server resides on the same computer as RTMC, you can simply type in LocalHost for the server address. By default, LoggerNet's port number is 6789. If this default port number is used, it does not need to be specified in RTMC Pro. Otherwise, it is specified after Server Address, separated by a colon. An example would be 192.168.4.32:3000, where 3000 is LoggerNet's port number.

### *Username*

Your username on the communications server.

### *Password*

Your password for the communications server.

The **Username** and **Password** fields are required only if your server administrator has enabled security on your system.

You can save the login information by selecting the **Remember username and password** check box.

---

#### **NOTE**

When running RTMC from RTDAQ, the server connection is always to LocalHost. You cannot change the server address.

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## **2.6 Reports in RTMC**

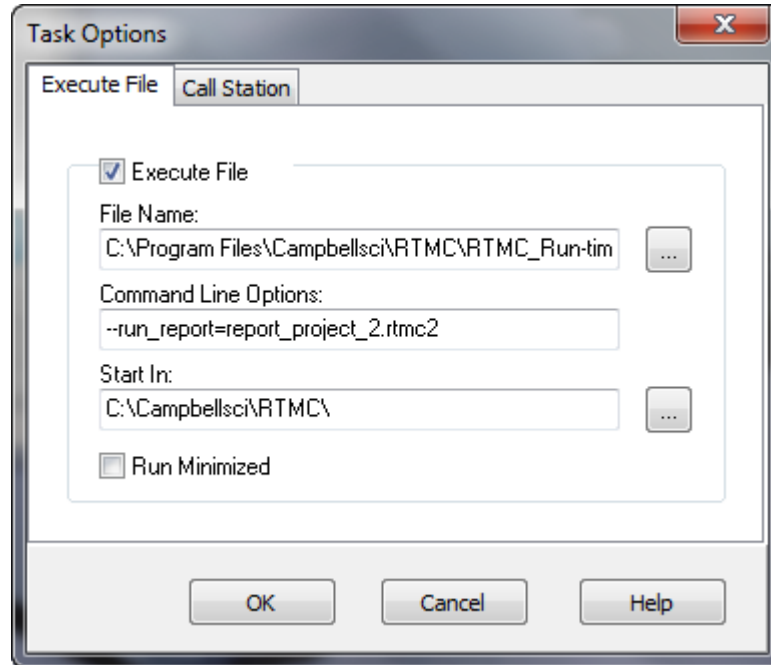
RTMC supports report generation. In order to designate a screen in your RTMC project as a report, you must place a Report Range component on it. The Report Range component lets you configure the data that will be displayed in the report. It also gives you RTMC Run-time options for stepping through data as described below. Once you place the Report Range component and specify the range of data for your report, you can start placing the display components you want in the report.

When you have finished designing your report, you need to specify how you want to export it. The Report Export component lets you configure how the report screen will be exported. You can choose to have the report exported by running a batch file and/or on demand from RTMC Run-time. For both batch export and RTMC Run-time, you can choose from a variety of file formats in which to export the report. You can also select events (Email, FTP, Print) to be triggered when the report is exported. In a batch export, all of the selected file formats will be exported and all of the selected events will be triggered when the batch export is executed as described below. In RTMC Run-time, all of the selected file formats and events will be available by clicking on the Report Export component.

Once you have your report range defined and export options set up, you are ready to run your report. If batch exporting is enabled, you will need to set up a batch file or scheduled task that runs the project. In the LoggerNet Task Master, you can set up a scheduled task to execute the file C:\Program

Files\Campbellsci\RTMC\RTMC\_Run-time.exe with the command line option --run\_report="C:\Campbellsci\RTMC\YourProjectFile.rtmc2". When this task is run, *YourProjectFile.rtmc2* will be loaded into RTMC Run-time in the background. Any report screens set up for batch export will collect data from the last full interval and the report will be exported in the specified format(s). For example, if your report was from midnight to midnight and your task ran at 8:00am, the report would contain yesterday's full set of data.

An example of setting up a report task in the LoggerNet Task Master is shown below:



Below is an example of running the same report from a command line:

```
"C:\Program Files\Campbellsci\RTMC\RTMC_Run-time.exe"
--run_report="C:\CampbellSci\RTMC\report_project_2.rtmc2"
```

In addition to setting the range of your report, the Report Range component also has run-time options for interactive reports. There is a **Jump** button (06/01/10) that will allow you to jump to a specific begin date, end date, or custom range. There are also **Step Forward** (▶) and **Step Backward** (◀) buttons that allow you to step through the data. The step size is determined by the interval specified in the Report Range component. The **Go Live** (▶) button is also available to put you in live data mode in the current interval. For example, if you are looking at data from a few days ago in your midnight to midnight report, and it is currently 8 a.m., clicking the **Go Live** button will display the current data collected from midnight until 8 a.m. and will update as data becomes available. As soon as midnight is crossed, the report will start over displaying data from midnight to the current time.

There are two additional report components in RTMC: the Report Note and the Report Header. The Report Note component allows the user to insert custom notes at run-time before the report is exported. Notes are temporary and are lost when the report is closed. The Report Header component displays the report range. The user can customize the dates shown and the format used. In RTMC Run-time, the header updates as the report range changes.

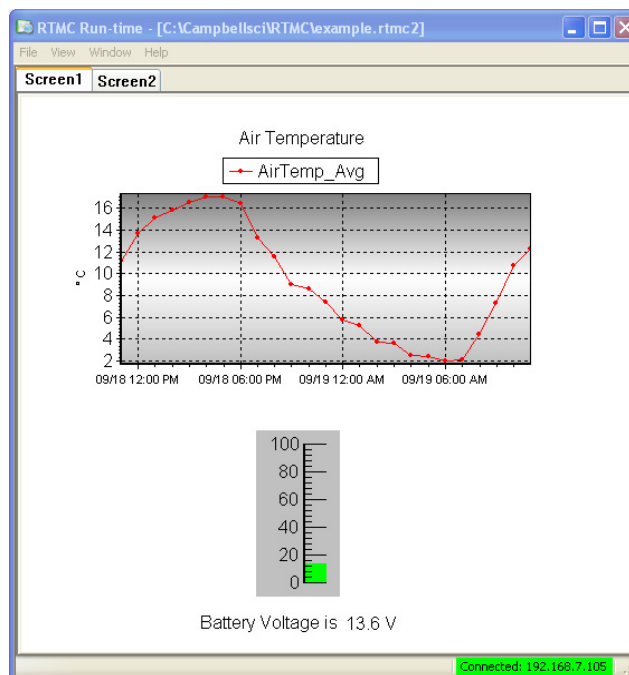
RTMC projects can mix real-time and reporting screens. For example, you can have a real-time data screen, a daily report screen, a monthly report screen, and a real-time control screen all in the same project. The Report Range component on a screen only affects the data being displayed on that screen. Your real-time screens (i.e. those without a Report Range component) won't be affected by stepping through historic data on a report screen.

#### NOTE

When viewing a report in RTMC Run-time, some components behave differently than on a normal RTMC screen. If you are looking at historical data, alarms cannot be acknowledged and you will not be able to toggle variables or set values with sliders or setpoints. These functions can only be performed when you are viewing live data in the current interval. Also, alarm events (i.e., audio, run/open, send email) are always disabled on a report screen.

## 3. RTMC Run-time

RTMC Run-time allows you to run the real-time graphic display screen that was created in RTMC Pro. In LoggerNet, you can test the operation of the display screen from the RTMC Pro window using the File | Save and Run Project menu or clicking the lightning bolt (⚡) on the toolbar. This will start the project window with RTMC Run-time as shown in the window below.



In RTDAQ, you must launch RTMC Run-time from the RTDAQ toolbar, and then open the project you have developed in RTMC Pro.

When the run-time display screen is started, the display components will have an exclamation point in a red box at the upper right until data is received from LoggerNet or RTDAQ. In LoggerNet, if data is not displayed, check to see that the data is being collected. This can be done in the LoggerNet Setup screen. Click on the appropriate station and then choose the Schedule tab. Also check the Data Files tab to verify the desired table is enabled for scheduled collection. Data Collection can also be set up when the project is developed in RTMC Pro with the Project | Configure Override Scheduled Collection menu item. In RTDAQ, check to see that RTDAQ is connected to the datalogger.

Once a project file has been created, the display screen can be run without starting RTMC Pro. From the Windows Start Menu under Programs | Campbell Scientific | RTMC click RTMC Run-time. In the run-time window select File | Open Project to select the RTMC Pro project screen to run. If Remember Username and Password was not selected in RTMC Pro, it will be necessary to enter them each time the project is run in RTMC Run-time.

In run-time mode, you can print an image of the RTMC display screen by selecting File | Print Screen. A new form to be run is selected under File | Open Project.

A copy of RTMC Run-time comes with LoggerNet and RTDAQ. For LoggerNet, if you want to run RTMC Pro projects on remote computers, additional copies of RTMC Run-time can be purchased separately. One copy is required for each computer on which RTMC Run-time will be used. As noted above, when running RTMC Run-time on a remote computer, the host computer must have Remote Connections enabled (LoggerNet Toolbar, Tools | Options | Allow Remote Connections).



## **Campbell Scientific Companies**

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### **Campbell Scientific, Inc. (CSI)**

815 West 1800 North  
Logan, Utah 84321  
UNITED STATES  
www.campbellsci.com • info@campbellsci.com

### **Campbell Scientific Africa Pty. Ltd. (CSAf)**

PO Box 2450  
Somerset West 7129  
SOUTH AFRICA  
www.csafrica.co.za • cleroux@csafrica.co.za

### **Campbell Scientific Australia Pty. Ltd. (CSA)**

PO Box 444  
Thuringowa Central  
QLD 4812 AUSTRALIA  
www.campbellsci.com.au • info@campbellsci.com.au

### **Campbell Scientific do Brazil Ltda. (CSB)**

Rua Luisa Crapsi Orsi, 15 Butantã  
CEP: 005543-000 São Paulo SP BRAZIL  
www.campbellsci.com.br • suporte@campbellsci.com.br

### **Campbell Scientific Canada Corp. (CSC)**

11564 - 149th Street NW  
Edmonton, Alberta T5M 1W7  
CANADA  
www.campbellsci.ca • dataloggers@campbellsci.ca

### **Campbell Scientific Centro Caribe S.A. (CSCC)**

300 N Cementerio, Edificio Breller  
Santo Domingo, Heredia 40305  
COSTA RICA  
www.campbellsci.cc • info@campbellsci.cc

### **Campbell Scientific Ltd. (CSL)**

Campbell Park  
80 Hathern Road  
Shepshed, Loughborough LE12 9GX  
UNITED KINGDOM  
www.campbellsci.co.uk • sales@campbellsci.co.uk

### **Campbell Scientific Ltd. (France)**

Miniparc du Verger - Bat. H  
1, rue de Terre Neuve - Les Ulis  
91967 COURTABOEUF CEDEX  
FRANCE  
www.campbellsci.fr • info@campbellsci.fr

### **Campbell Scientific Spain, S. L.**

Avda. Pompeu Fabra 7-9, local 1  
08024 Barcelona  
SPAIN  
www.campbellsci.es • info@campbellsci.es

*Please visit [www.campbellsci.com](http://www.campbellsci.com) to obtain contact information for your local US or International representative.*