RF500 Software M9 Onwards
User Interface

Document Reference RF500M9USG.docx
Issue 1 June 24th, 2019

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Overview

Comark's RF500A Software interface, version M9, has been re-designed from the ground up, to enhance the user experience, with a fresh look and feel, along with many new features. These include; new RAG Notification Screen; Multi-Graphs which can now be created and saved for later/repeat usage; new Calendar function throughout to select to and from periods for graphing and reporting, such as the Audit Trail and Alarm Events. ICONS are now used throughout for all Gateway and Transmitter notifications, complete with Hover Text for easy diagnosis. All new Tabulated Report for daily tabular temperature and humidity data. Speed of response improved throughout the website. Requires a compatible browser, please see below for more information.

This guide is intended to capture the new elements and provide details on the new layout and Gateway operation using the new user interface.

New Features

1. New Red Amber Green (RAG) Screen
2. Improved Transmitter Detail View
3. New Printed Report – for Tabular Data only
4. New Multi-Graph function to allow a user to create and save regular multi-graphs for use later. Create multi-graph for specific days, weeks, months or years'
5. Simplified/Improved List View
6. Transmitter Graphing is more dynamic and comprehensive
7. Calendar function improved across the board – ability to see months of data at a time, including Audit Trail, Events and Graph Data
8. Improved filtering for Audit Trail
9. Updated Transmitter Management
10. Improved/Simplified Administration Setup
11. Improved Clock Setup – can now set to the local PC time with one button click
12. Improved Mail Server Setup – includes default settings for GMail and Yahoo
13. The number of possible E-Mail recipients has been doubled to 24
14. Users can now change their own password – Password change for a regular user will also renew them for another fixed period of between 30 and 180 days.
15. Simplified User Filters
16. Improved/Simplified User Setup
17. Locations renamed Alarm Groups
18. A more logical and professional approach taken across the website to improve user interaction
19. Improved Gateway response across the website
20. Advanced User Administration has been included to add these functions to the Gateway:
    - Enforce Maximum password lengths of 6 to 31 characters for all new users and change of passwords
    - Enforce normal user expiry time between 30 and 180 days for all new users and renewal of users via password change
    - Users will be disabled after 5 consecutive incorrect login attempts
    - When a user's password is due to expire, changing their password will renew them for another period as per above
    - Data storage and data security have been improved, with the Gateway now storing up to three manual backups on the master SD card as security for the data card
    - New offline viewing software version, for viewing historic data via Manual Backups

Browser Compatibility

M9 Software for RF500 leverages the power of the Browser, installed on the PC, to provide the rich new user experience and as such, you may need to upgrade, or install another Browser on your PC.

If you are using Microsoft Internet Explorer (IE) and only IE, please upgrade to IE11 to enable you to use the new interface features.

If you are already using Mozilla Firefox, or Google Chrome, then M9 should work for you already.

It is advisable to contact your IT Department, if you believe that your current Browser is not compatible with M9, or if you need to install another Browser, as some companies restrict upgrading.

Note: M9 can only be used with Google Chrome, Mozilla Firefox or Internet Explorer Version 11 or later.

Can I still use the old HTML Interface?

Yes, you can, there is a link on the new login page for those customers who prefer not to use the new interface, or who are using features not included in the new M9 interface, such as languages, loading pictures and the MAP, please see image below….

Figure 1 – Previous User Interface

However, even though you are planning to use the old HTML interface you still must upgrade your Browser, as discussed above, see Browser Compatibility.

RAG View

The RF500 Gateway RAG (Red Amber Green) View provides the user an ‘at-a-glance’ view of the status of the system.

The RAG View is the default-landing page after Gateway login.

Once logged in you can navigate back to the RAG View simply by clicking on the RAG View tab.

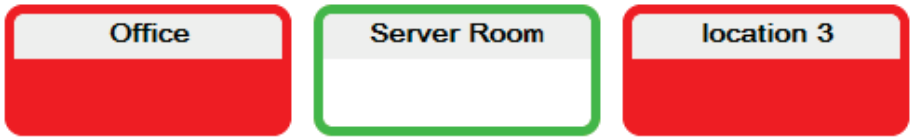


Figure 2 – RAG View

The RAG View display is dependent on your personal filter; see My Filter for more details.

Definitions

A location highlighted RED means that the Alarm Group has active Unacknowledged Alarms

A location highlighted AMBER means that the Alarm Group has active Acknowledged Alarms or other warnings (e.g. low or flat Battery)

A location highlighted GREEN means that the Alarm Group has nothing to report.

Hover Text

The RAG View has relevant Hover Text for each Alarm Group.

Simply hover the mouse over one of the locations to get a summary of the Alarm Group Status.

List View Filter

By clicking on the Alarm Group, you will be directed to the List View Tab, which is filtered to show this Location Only.

Click here for information on the List View.

Transmitter Detail View

Transmitter Detail View is the 'go-to view' for more details on an individual Transmitter and can be accessed in two ways.

1. Click directly on the Detail View tab
2. Click on an individual Transmitter summary from the List View

The Transmitter Detail View opens to this:

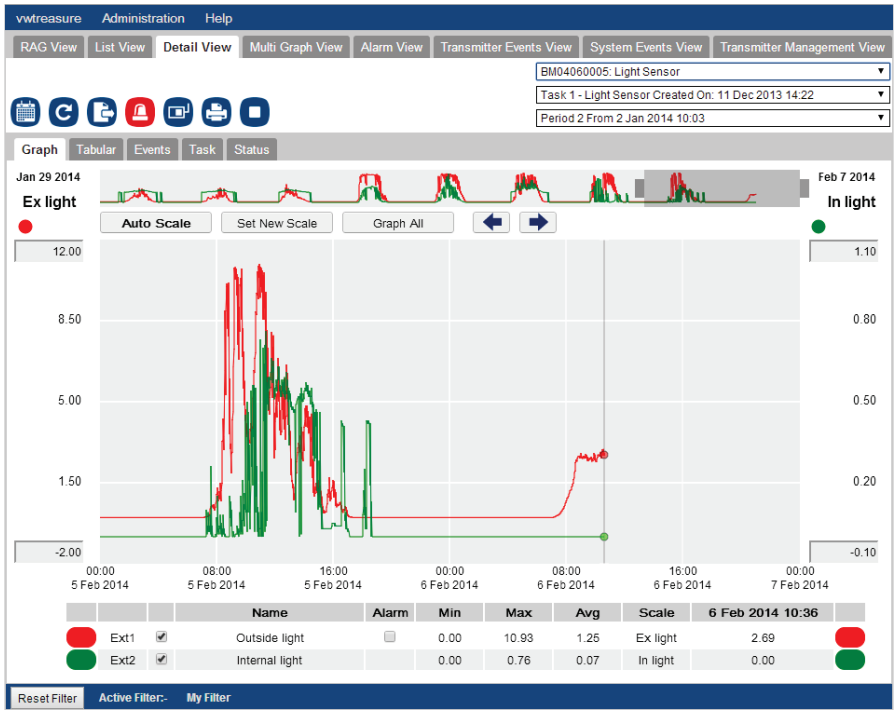


Figure 3 – Transmitter Detail View

When you select the Transmitter, Detail View the page will grow in size and the 'Warnings' Banner will be closed. Reverting back to the RAG or List View will re-open the 'Warnings' Banner.

The Transmitter Detail View is split into the following sections:

1. The Action Icons
2. Transmitter Drop Down
3. Detail View Tabs
4. The Graph Preview
5. The Graph
6. Channel Control

The Action ICONS

Figure 4 – The Action ICONS

There are five Action ICONS:

 1. Calendar	Click Calendar to view. Allows selections of Day(s), Date Range or individual Month to Graph.
 2. Refresh	Clicking Refresh will update the Detail View with the most up to date readings for the selected Transmitter
 3. Export	Clicking Export will present a dialogue for saving the tabular data in .CSV format. See Gateway Data Export for more information
 4. Alarm Ack/Snooze	Clicking Alarm Ack/Snooze opens up the Alarm Acknowledge/Snooze Dialogue. See Alarm Acknowledge/Snooze for more information. **NOTE when viewing Historic Data this button also doubles up as the Sign Data Button** 
 5. Program Task	Clicking Program Task will open up the New Task Dialogue. See Tasking for more information. Note: All unacknowledged Alarms must be Acknowledged prior to re-tasking a transmitter

Note: Greyed out ICONs indicate that an Action is not available at this time. For example, viewing Signed Historic Data the Sign Data ICON is greyed out  .

The Transmitter Drop Down

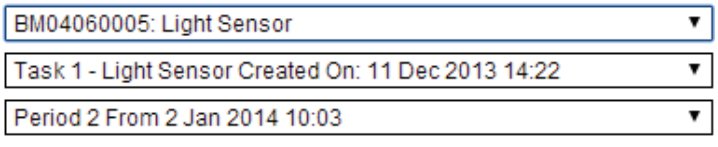


Figure 5 – The Transmitter Drop Down

Instead of jumping back to the List View it is possible using this drop down to select any other Transmitter on the system as filtered by 'My Filter'.

If the Transmitter has multiple Tasks/Periods, it is possible to then select these with the lower two drop downs.

The Detail View will update automatically when you select the Transmitter.

The Detail View Tabs

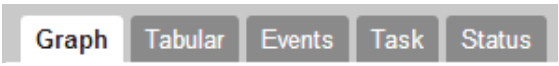


Figure 6 – The Detail View Tabs

There are five tabs to choose from in Detail View:

1. Graph The current TAB
2. Tabular Click Tabular to see Data in Tabular form.
3. Events Click Events to see the latest Events for the selected Transmitter.
4. Task Click Task to see a read only view of the selected Task.
5. Status Click Status to see the current Transmitter Status.

The Graph Preview

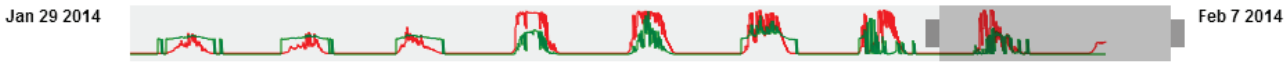


Figure 7 – The Graph Preview

By default, when you open Detail View the graph will show the last two days of data. However, the software has downloaded the last 8 days (where applicable). Looking at the Graph Preview you can see that the last section of the graph is highlighted in dark grey, this section also forms the main Graph Summary, see below.

See Graph Navigation for more information on using the Graph Preview.

The Graph

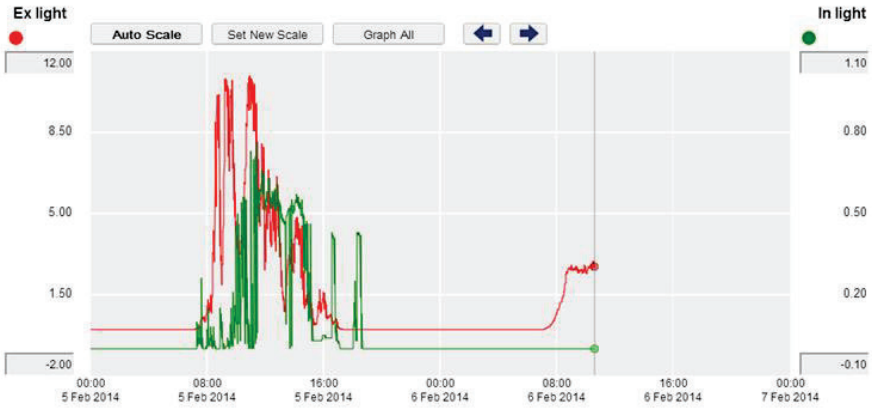


Figure 8 – The Graph

This is the main Graph for the selected Transmitter (last two days).

See Graph Navigation for more information on using the Graph Preview.

The Channel Control

			Name	Alarm	Min	Max	Avg	Scale	6 Feb 2014 10:36	
	Ext1	☑	Outside light	☐	0.00	10.93	1.25	Ex light	2.69	
	Ext2	☑	Internal light		0.00	0.76	0.07	In light	0.00	

Figure 9 – Channel Control

This is the main (Graph) Channel Control for the selected Transmitter.

Use Channel Control select individual channels and if programmed, it is possible to view Alarm levels on the graph.

Min/Max/Avg readings for the period selected, e.g. last two days, are included in the channel control summary.

The last column shows the results as per the graph cursor selection.

See Graph Navigation for more information on using the Graph Preview.

Tabular View

Tabular View presents one days' worth of data in tabular format, for the purposes of review and reporting, it also includes the option for a printable report.

This screen displays data for the currently selected day in tabular form.

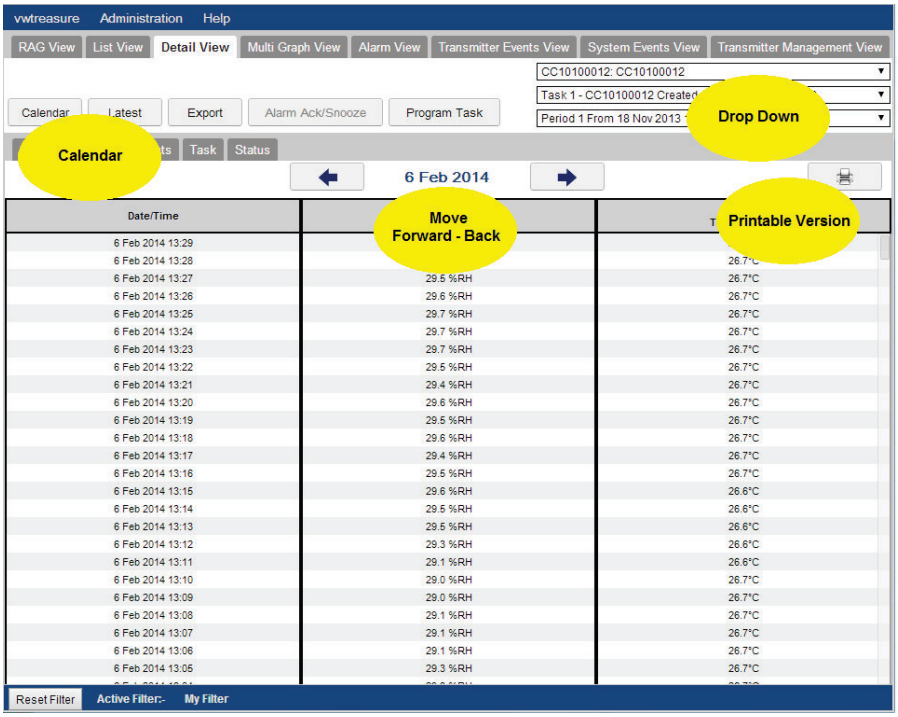


Figure 10 – Transmitter TAB View

The Transmitter TAB View has the following:

- Calendar
- Move Forward-Back
- Drop Down
- Printable Version

The Calendar

The Tabular view of the selected Transmitter defaults to the last date in the current selection, e.g. to-day. If you wish to see tabular data for any other date simply use the Calendar to select another day, date selection or month.

Move Forward-Back

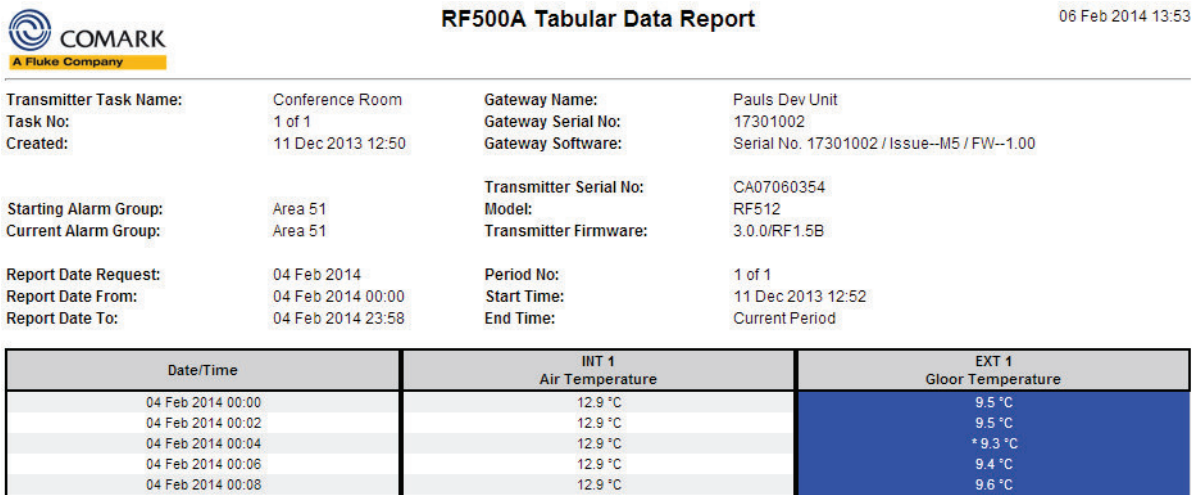
Clicking  will take you back one day and clicking  will take you forward one day within the current date selection.

Drop Down

Use the Drop Down to select a different Transmitter or just a previous Task or Period. Once the selection has been made the Tabular data will re-populate based on the new selection.

Printable Version

To ensure repeatability when printing we have added a printable version button to this TAB View. Simple click  to open a new TAB in the browser that will allow printing.



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RF500A Tabular Data Report

06 Feb 2014 13:53

Transmitter Task Name:	Conference Room	**Gateway Name:**	Pauls Dev Unit
Task No:	1 of 1	**Gateway Serial No:**	17301002
Created:	11 Dec 2013 12:50	**Gateway Software:**	Serial No. 17301002 / Issue--M5 / FW--1.00
		Transmitter Serial No:	CA07060354
Starting Alarm Group:	Area 51	**Model:**	RF512
Current Alarm Group:	Area 51	**Transmitter Firmware:**	3.0.0/RF1.5B
Report Date Request:	04 Feb 2014	**Period No:**	1 of 1
Report Date From:	04 Feb 2014 00:00	**Start Time:**	11 Dec 2013 12:52
Report Date To:	04 Feb 2014 23:58	**End Time:**	Current Period

Date/Time	INT 1 Air Temperature	EXT 1 Gloor Temperature
04 Feb 2014 00:00	12.9 °C	9.5 °C
04 Feb 2014 00:02	12.9 °C	9.5 °C
04 Feb 2014 00:04	12.9 °C	* 9.3 °C
04 Feb 2014 00:06	12.9 °C	9.4 °C
04 Feb 2014 00:08	12.9 °C	9.6 °C

Figure 11 – Tabular Report

Additional information is provided with the report, including details of the Transmitter and the Gateway.

Transmitter Tabular Data – Record Colouring

Black Text	Normal Reading not in alarm
Blue Text	Reading below the low alarm limit, but channel not in alarm
White Text – Blue Background	Channel in low alarm
Red Text	Reading above the low alarm limit, but channel not in alarm
White Text – Red Background	Channel in high alarm
Asterisk by Reading	This record is the Maximum or Minimum reading during an out-of-limit condition.

Other error conditions, black text over yellow background:

- Channel Fault
- Channel Reading Over Range
- Channel Reading Under Range

Transmitter Tabular Data – Door Readings

The readings reported for the door channel are given as two values:

- The first number if the cumulative number of minutes that the door has been open throughout the averaging interval, which is typically 60 minutes.
- The value in parentheses is the cumulative number of minutes that the door has been open throughout the averaging interval given as a percentage of the averaging interval, e.g. 50% would be a total of 30 minutes during an averaging period of 60 minutes.

Multi-Graph Overview

The Multi-Graph page allows data from several different Transmitters to be graphed together simultaneously.

Features:

- Multi-graph current and Historic Data on the same graph
- Multi-graph multiple periods and tasks
- Multi-Graph current and removed Transmitters on the same graph
- Create unique Filters that can be saved and used later
- Edit/Delete Filters

Note: The trace colours are fixed by the layout of the graph. If the chosen channels have too similar colours, it may be possible to add or remove Transmitters so that colours are more evenly distributed….

The Transmitter Detail View is spit into the following sections:

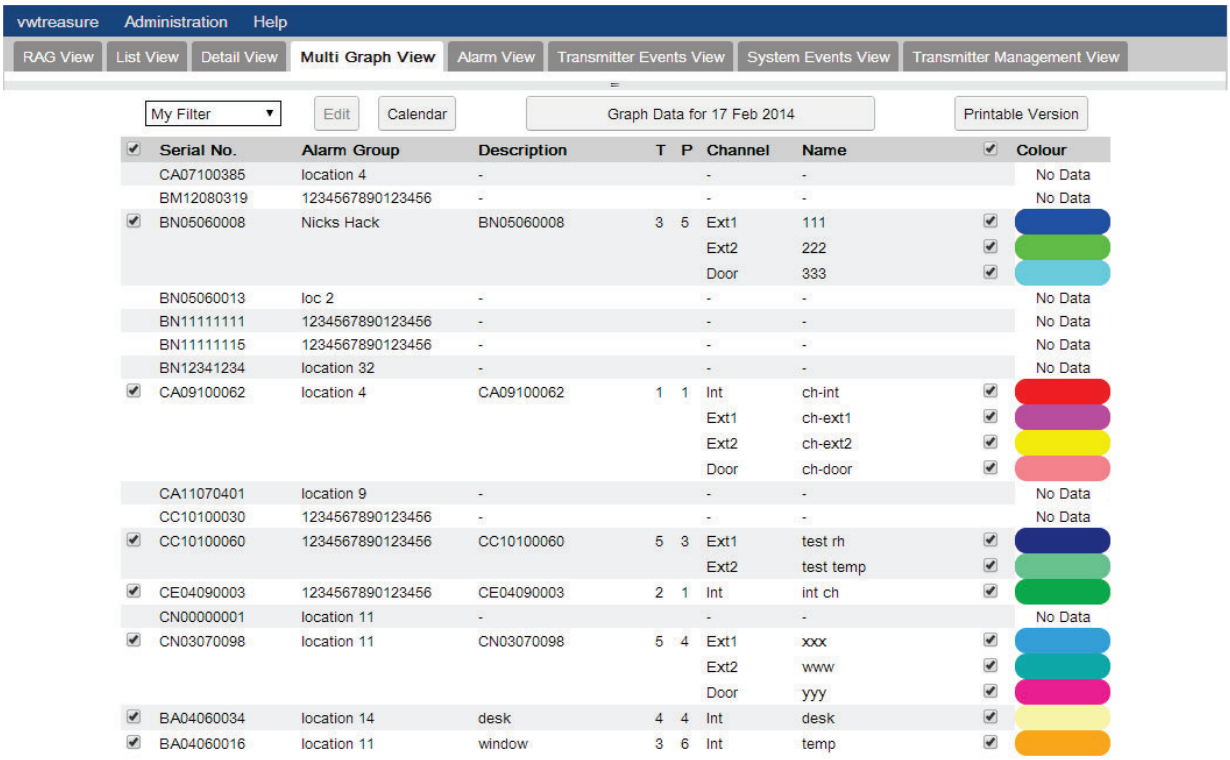
- Multi-Graph First Time Use
- Multi-Graph Options
- Create New List
- Save My First Filter
- Edit Existing Filter
- Delete an Existing Filter
- Printing Multi-Graph
- Calendar
- Graph Data

Multi-Graph First Time Use

Multi-Graph is accessed by selecting the Multi-Graph Tab from any other Tab.

The first time that Multi-Graph is selected there will be no Multi-Graph to view. However, there will be a list of Transmitters as based on your current filter. The list of Tasks and Periods will be the current Task and Period for the Transmitters for today.

The Multi-Graph is as shown below.



Serial No.	Alarm Group	Description	T	P	Channel	Name	Colour
CA07100385	location 4	-			-	-	No Data
BM12080319	1234567890123456	-			-	-	No Data
BN05060008	Nicks Hack	BN05060008	3	5	Ext1	111	
					Ext2	222	
					Door	333	
BN05060013	loc 2	-			-	-	No Data
BN11111111	1234567890123456	-			-	-	No Data
BN11111115	1234567890123456	-			-	-	No Data
BN12341234	location 32	-			-	-	No Data
CA09100062	location 4	CA09100062	1	1	Int	ch-int	
					Ext1	ch-ext1	
					Ext2	ch-ext2	
					Door	ch-door	
CA11070401	location 9	-			-	-	No Data
CC10100030	1234567890123456	-			-	-	No Data
CC10100060	1234567890123456	CC10100060	5	3	Ext1	test rh	
					Ext2	test temp	
CE04090003	1234567890123456	CE04090003	2	1	Int	int ch	
CN00000001	location 11	-			-	-	No Data
CN03070098	location 11	CN03070098	5	4	Ext1	xxx	
					Ext2	www	
					Door	yyy	
BA04060034	location 14	desk	4	4	Int	desk	
BA04060016	location 11	window	3	6	Int	temp	

Figure 12 – Multi-Graph My Filter View

Multi-Graph Options

The following Multi-Graph options are available

Create New List	**From the drop-down list select Create New List to generate a new Multi-Graph Filter**
Edit	**Select Edit to edit the current Multi-Graph Filter. Not available until the first Multi-Graph Filter is created.**
Calendar	**Select Calendar to choose the period over which you wish to graph data.**
Graph Data for Date	**Click Graph Data for the chosen period.**
Printable Version	**Click Printable Version to bring up a version of the Multi-Graph with Table suitable for printing.**

Create New List

Select Create New List from the drop down to bring up this dialogue.

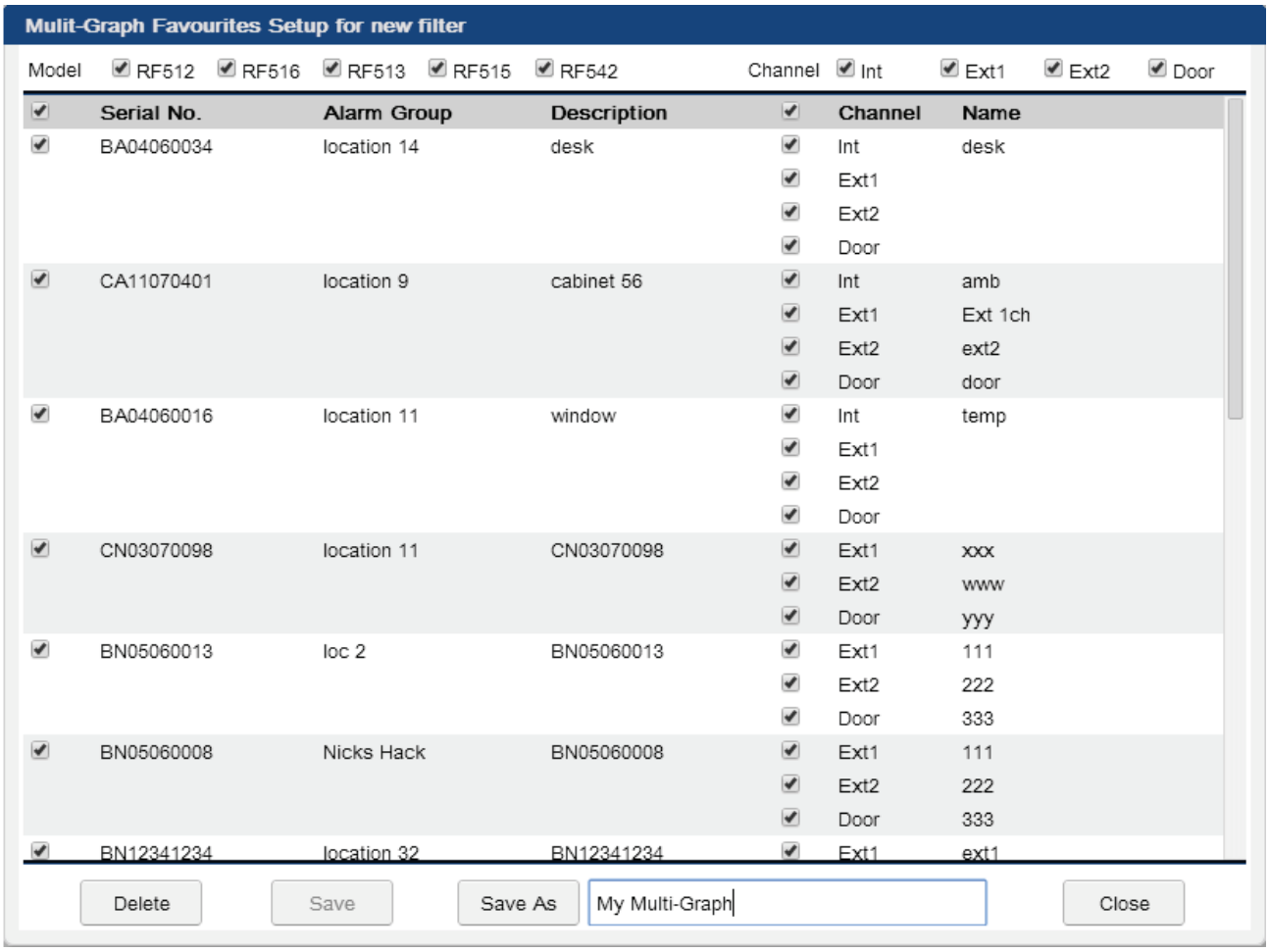


Figure 13 – Multi-Graph Create New List

The list as displayed is as per the logged-in users' My Filter selections, including the selected locations and the order in which Transmitters are displayed. If a Transmitter or Alarm Group is not shown, then visit the My Filter settings and make changes. By using the model tick boxes along the top of the dialogue it is possible to filter the list further.

The options are as follows:

RF512	**Tick to show all RF512s. Untick to remove RF512s from the list.**
RF513	**Tick to show all RF513s. Untick to remove RF513s from the list.**
RF515	**Tick to show all RF515s. Untick to remove RF515s from the list.**
RF516	**Tick to show all RF516s. Untick to remove RF516s from the list.**
RF542	**Tick to show all RF542s. Untick to remove RF542s from the list.**

Note: It is not possible to un-tick all the models. At least one model must be selected.

By using the Channel tick boxes along the top of the dialogue it is possible to filter the list further. The options are as follows:

Int	**Tick to select all Internal Channels. Untick to remove Internals from the Filter**
Ext 1	**Tick to select all External 1 Channels. Untick to remove External 1 from the Filter**
Ext 2	**Tick to select all External 2 Channels. Untick to remove External 2 from the Filter**
Door	**Tick to select all Door Channels. Untick to remove Door from the Filter**

It is possible to de-select all Channels using this filter. This allows for individual channels to be selected.

By using the tick-boxes in the grey banner it is possible to globally select either all Transmitters or all Channels remaining once the filters have been set above.

If you un-tick an individual Transmitter from the list, then the channels pertaining to this Transmitter will also be deselected.

Save My First Filter

For a new Filter it must be given a name before it can be saved.

Enter your Filter Name in the box provided, and click Save As to save, close and select your new Filter, or Close to close without saving.

Edit an Existing Filter

Once you have at least one new Filter, you can then edit the Filter.

Select the Filter you want to edit from the drop-down list and select Edit.

The dialogue will appear, and all edit options will be available as above.

Click Save to update the current Filter or enter a new name and selected Save As to save a new Filter, or Close to exit without saving.

Delete an Existing Filter

Any Filter can be deleted. To delete a Filter, select the Filter from the drop-down list and select Edit. If you wish to delete the Filter, click Delete and the Filter will be deleted and the dialogue will close. If you do not wish to delete the Filter, then select Close to close without deleting.

Note: All Filters are User specific. So, if more than one user wants to see the same Multi-Graph then they will need to log-in and create the filter themselves. There is no limit to the number of filters you can store, but it is recommended to only store a small number for the sake of ease of use.

Printing Multi-Graph

Please see the section on printing with M9 including Multi-Graph

Calendar

Click on to bring up the calendar dialogue, see below…

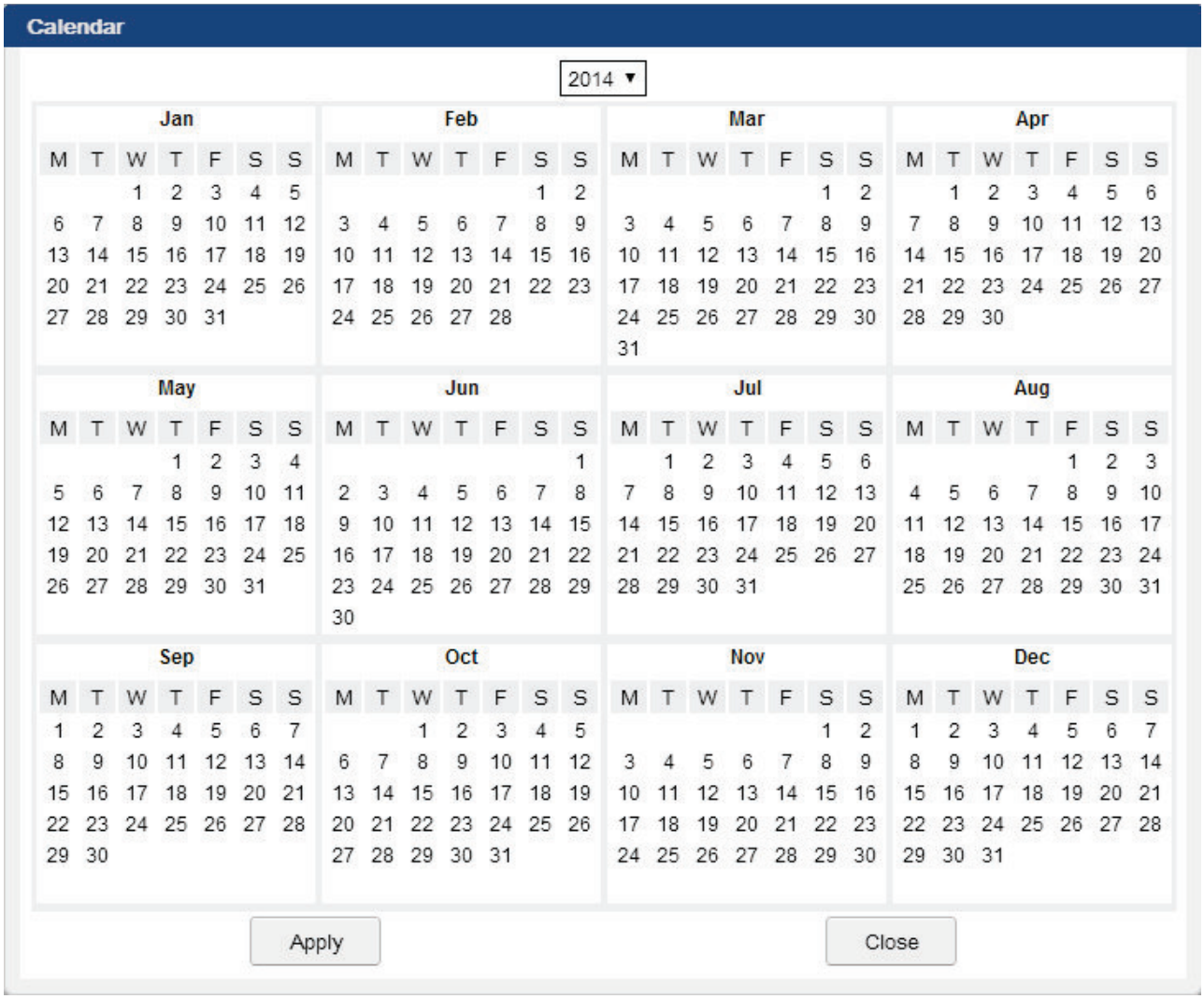


Figure 14 – Multi-Graph Calendar

Simply click on the date range you want by selecting two dates. The selection will automatically determine the start and end date. You can also select dates over the end of year, by selecting the first date, and then using the year drop down, and selecting another date. If you want to simply graph a single month then select a month by clicking on the month name.

Click Apply to apply the date range, close the dialogue and make the data request from the Gateway or select Close to close the calendar dialogue.

Graph Data for Date

Once you have made the selection of Dates from the calendar the graph date button will represent the dates selected.

Graph Data From 5 Feb 2014 To 28 Feb 2014

Simply click the button to draw the Multi-Graph.

Note: The Graph will be drawn at the top of the page, and the Table at the bottom will take up a smaller amount. You can increase the size of the table at the bottom by adjusting the page splitter.

Gateway List View

In the figure below, an example of a Gateway well populated with Transmitters is shown with the main areas of information highlighted as yellow balloons.

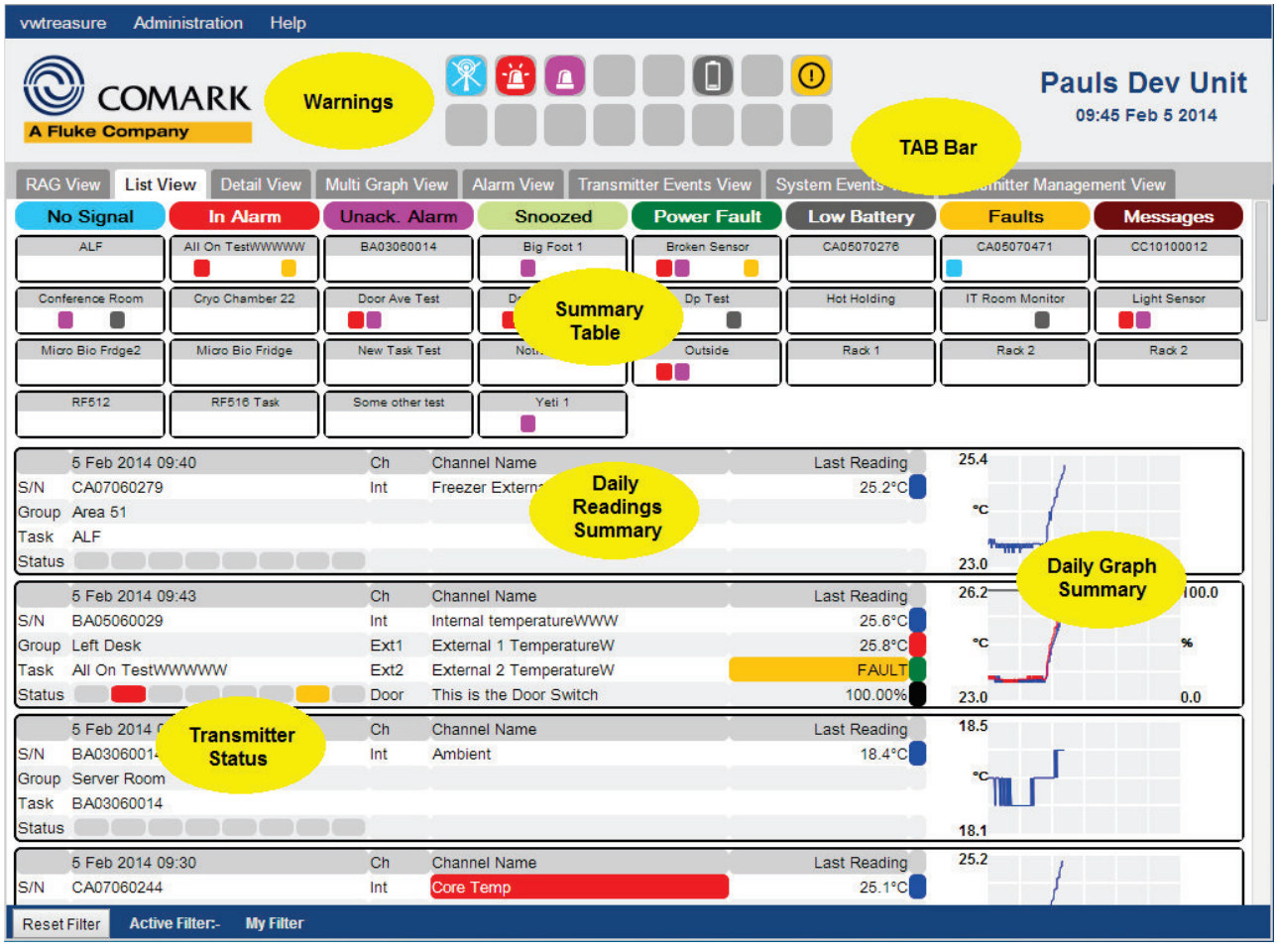


Figure 15 – Gateway List View

Each area of significance will be explained individually, below.

Warnings

This area will be populated with click-able ICONS and provides a summary of alarms and faults (via Hover Text). The user can see at a glance when the Gateway or Transmitters require attention. Each possible warning ICON is explained below. Clicking on the ICONS will take the user to the appropriate screen to deal with the alarm or fault.

TAB Bar

The Tab Bar contains TABS which direct the user onward to other pages, see List View TAB Bar below for more information.

Summary Table

This area shows every Transmitter active on the Gateway (as per My Filter selection) in a single table which should be totally visible without scrolling. Coloured blocks indicate various states as in the key above the grid.

Transmitter Status

This area shows for each Transmitter, the Transmitter serial number, the Task Description, the date and time of the last received record, and commands waiting to be sent to the Transmitter and any detected faults for the Transmitter. It will also replicate the coloured blocks in the grid at the top of the page.

Daily Readings Summary

This area shows for each Transmitter, the enabled channels with Channel Name. The last received record for the current Daily Interval.

Daily Graph Summary

This area shows for each Transmitter, a small graph for all enabled channels over the current Daily Interval.

Warning ICONS

Each possible warning that may be displayed in the Warnings Area is explained here. Some warnings give a count of the number of Transmitters to which the warning applies, via Hover Text. Several of the ICONS are also click-able which will take you direct to the relevant page for more information.

No Signal

The Gateway has not received any signal from a transmitter for a long time – Usually 1 Hour or 5 times the transmitter's radio rate whichever is the longest.

Un-ack Alarm

One or more transmitters have Unacknowledged Alarms – This is a link to the Active Alarm List page.

In Alarm

One or more transmitters have On-Going Alarms – This is a link to the Active Alarm List page.

Snoozed

One or more transmitters have Snoozed Alarms – This is a link to the Active Alarm List page.

Low Battery

One or more transmitters have Low Battery – This is a link to the Transmitter Management List page.

Dead Battery

One or more transmitters have Dead Battery – This is a link to the Transmitter Management List page.

 *Sensor Fault*	One or more transmitters have Faults – This is a link to the Transmitter Management List page.
 *Backup Fault*	The Gateway has not received a response from the RF500 Backup Server within the time period specified in the Data Backup page.
 *E-mail Fault*	The Gateway has failed to send an email successfully for at least 1-hour; Click the Administration button then the Setup Email button then the Comark button to view the error report.
 *Hardware Error*	A Gateway fault has occurred; the Hardware Page will provide further information to aid Comark Technical Support in the diagnosis.
 *Converting Images*	Uploaded images are being prepared for viewing. Images are not available for viewing during this time.
 *Creating Backup*	The Gateway is preparing a manual backup archive for later download – See the Data Backup page
 *Manual Backup Error*	The manual backup request has failed. Please contact Comark Technical Support for help.

Manual Backup Ready	A new backup archive is ready for download – See the Data Backup page.

List View Tab Bar

RAG View Tab	Click here to navigate to the RAG View
List View Tab	This TAB
Detail View Tab	Click here to navigate to the Detail View Tab which shows data for a single Transmitter.
Multi-Graph View Tab	Click here for the Multi-Graph Tab which allows data from multiple transmitters over multiple Tasks and Periods to be graphed together in one place.
Alarm View View Tab	Click here for the Alarm View Tab is where all the transmitters with current and Unacknowledged Alarms will be displayed.
Audit Trail View View Tab	Click here to navigate to the Audit Trail for the Gateway.
Transmitter Management View Tab	Click here to navigate to the transmitter management view Tab shows the details for all Transmitters, e.g. battery status, firmware version etc.

List View Automatic Refresh and Daily Interval

The List View Page shows summaries for transmitter data over a Daily Interval. This is done because of the nature by which Transmitter readings are stored, that is in separate daily files for each Transmitter. The effect of this 24-Hour cycle is that at midnight (00:00) the Daily Readings Summary and Daily Graph are both reset. The Daily Readings Summary shows no accumulated data and the Daily Graph shows a blank graph. As data is Transmitters to the Gateway the Daily Readings Summary is updated and fresh information is then available for download, graphs however are redrawn every minute but only if new data exists. The traces will extend from left to right during the day as fresh data is available and fills the area at 23:59 just before resetting again at 00:00.

The Home Page, by default, will automatically refresh itself at one-minute intervals so that updated summaries and redrawn graphs are always displayed.

Summary Table

A Summary Table at the top of the List View shows the eight most important selected status criteria for each Transmitter. Each criterion is denoted by a coloured block shown in a legend at the top of the table as in the figure below. The eight statuses are described below.

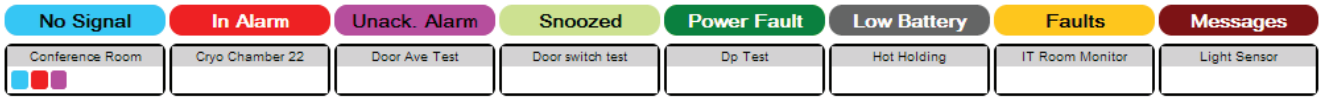


Figure 16 – Summary Table

Each Transmitter is identified by its current Task Description so for example in Figure 16 above, the Transmitter with the Task Description Conference Room has an Unacknowledged Alarm. The absences of any coloured blocks indicate either that the Transmitter has no issues or that it is in a state which cannot be shown in the Summary Table. All Transmitter states are shown similarly in the Transmitter Status section of this the Gateway Listed View.

The Summary Table has Hover Text enabled, therefore when placing the mouse pointed over the summary legend a pop-up text box will appear after a short delay which provides extra information about that Transmitter; see List View Hover Text for more details.

The Legend is also a link; Clicking on the legend for a Transmitter will cause the lower section of the Home Page to jump to show the Daily Readings Summary and Daily Graph Summary for the selected Transmitter.

Summary Table Status and Colour Code

Blank	If all is well with a transmitter all fields will be blank
No Signal	The Gateway has not received any signal from a transmitter for a long time. Usually 1 hour or 5 times the radio rate whichever is longest.
In Alarm	The transmitter is currently in an Active Alarm State.
Un-Ack Alarm	The transmitter has raised an alarm Event which has not yet been acknowledged. See Alarm Acknowledge.
Snoozed Alarm	The transmitter has raised an alarm Event which has been snoozed. See Alarm Acknowledge.

 *Power Fault*	This Backbone transmitter has detected that external power has failed. The Mains adaptor for this transmitter may have been unplugged.
 *Low Battery*	The transmitter is reporting that its battery voltage is low and should be replaced as soon as possible. Please consult the RF500 System Manual for the part number of the replacement battery, instructions and precautions for changing the battery and note on disposal of exhausted battery.
 *Tx Fault*	This transmitter has reported a fault with one, or more, of the channels. For example, an external probe may have become disconnected.
 *Messages*	This is reserved for System Messages that might occur from time to time, for example a Command has been sent to the transmitter, for example after performing an Alarm Acknowledge.

Daily Readings/Daily Graph Summary

For each Transmitter and channel this summary shows the following items:

- The Channel and Channel Name
- The date and time of the most recent data
- The last or most up to date reading in the current Daily Interval
- The Alarm Group to which the Transmitter is registered
- The Summary Status is also replicated here, along with its associated Hover Text
- To the far most right-hand side is the Daily Interval Graph

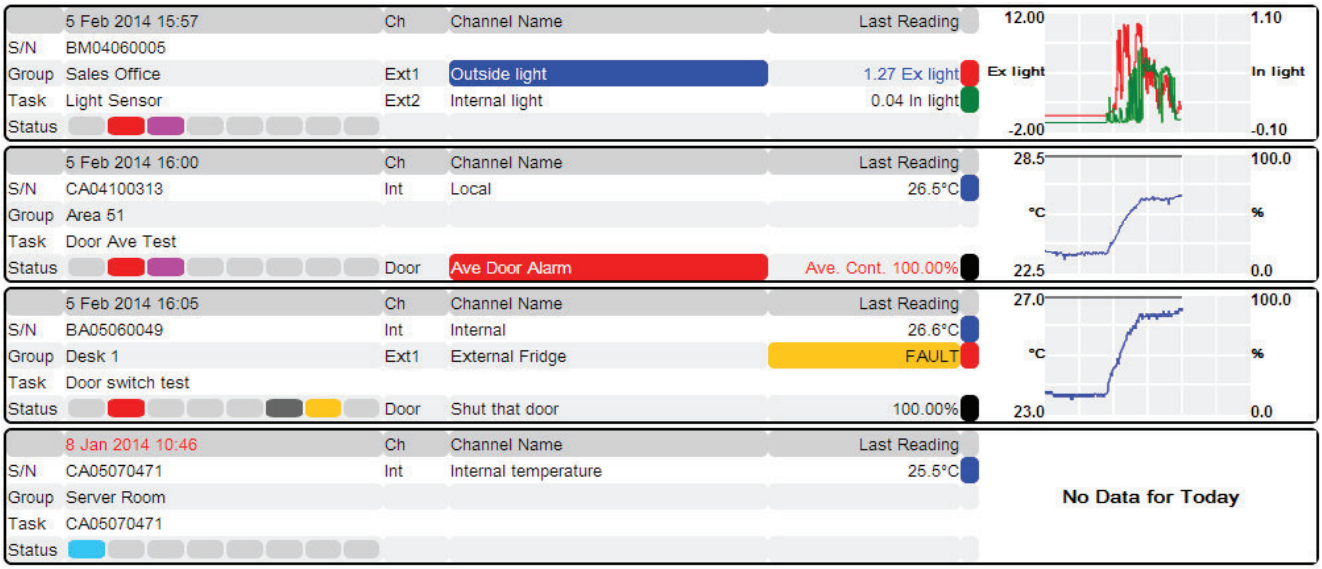


Figure 17 – Daily Readings/Daily Graph Summary

When a channel has been in a high or low alarm state which is yet to be acknowledged, the Channel Name is shown with a solid red or blue background respectively. In the example above, the External 1 Channel on BM04060005 has an unacknowledged low alarm.

The Last reading shown in red or blue text indicates that the channel is currently in high or low alarm. Red indicates high alarm, blue indicates low alarm.

Fault is shown where a Channel has been in a fault condition during the current Daily Summary. After the fault is cleared, the next Daily Interval will show normal readings.

For the door, 'Ave.' indicates average door alarm, and 'Cont.' indicates continuous door alarm. See Transmitter Tabular Data – Door Readings for more detail about the percentage reading.

For each Daily Interval graph summary that shows data, the trace colours are given by the vertical bar at the right-hand edge of each channel row.

The top Transmitter is an RF515 Multi-Parameter Transmitter and is treated as a special case. The left and right-hand Y-axis refer to the manual scales for EXt1 and EXt2.

For all other Transmitters, the right-hand Y-axis shows the scale for the Door and Humidity channels, and the left-hand Y-axis shows the scale for all the other channels.

For example, the second Transmitter has two channels enabled.

The Int Channel Named “Local” has a blue ident indicating that it is drawn as a blue trace. It is a temperature channel, so the scale is 22.5 – 28.5°C

The door channel names “Ave Door Alarm” has a black ident so is drawn as the black trace. It is a door channel, so the scale is 0% – 100%

The third Transmitter has three enabled channels, the Internal, External 1, and the door channel. However, only two traces are drawn as the External 1 channel has a fault.

List View Hover Text

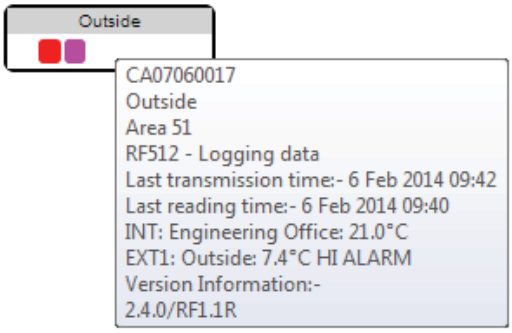


Figure 18 – Hover Text

When the cursor is moved over the Transmitter in the Summary Table then a grey box is displayed showing the following:

- The Transmitter Serial Number
- The Task Description for the Transmitter
- The Transmitter model and whether it is logging data or not
- The date and time of the last reading transmitted
- The date and time of the last reading transmitted
- The last reading for all enabled channels including whether the channel is in Alarm
- Version information; firmware.

Graph Summary

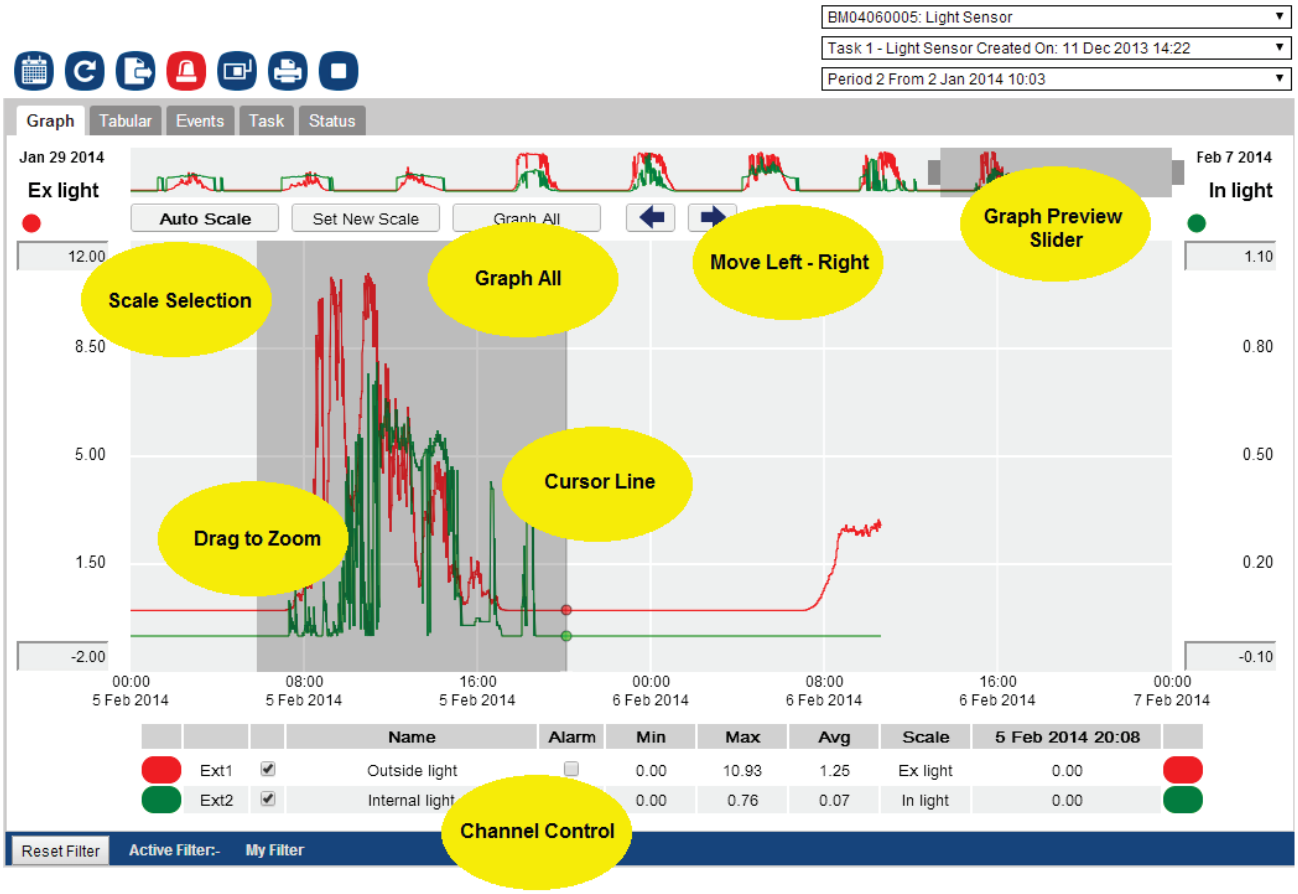


Figure 19 – Graph Navigation

There are seven action areas on the Graph Summary:

Graph Preview Slider

The Graph Preview Slider indicates what portion of the whole is displayed. The slider can be dragged left and right, to move through the graph in time. It can only slide in the preview window, therefore if the period to be graphed falls outside the current selection then the Calendar must be used to graph more data.

The size of the Graph Preview Slider can also be changed. Click on one of the handles (left or right) and drag it left or right to expand/shrink the graph.

Graph All

The Graph All button is simply a shortcut to graph all the data as displayed in the graph preview in the main Graph Summary Window.

If a smaller period is required then either drag and re-size the Graph Preview Slider, see above, or Drag to Zoom on the main Graph, see below.

Drag to Zoom

Select a start point on the graph with a single left click of the mouse, and then drag out to the required size. Release the left mouse button and the graph will automatically re-draw.

Cursor Line (Not shown)

Place the mouse on any part of the graph, in either the Graph Preview or the Main Graph Summary and a grey line will appear from top to bottom of the graph. This line corresponds to a point in the data, which is then displayed in the final column of Channel Control. Note: To see an accurate value for the reading and date/time it might be necessary to zoom further into the graph.

Scale Selection

The Graph has two scale options. AUTO will try to best fit the available data onto the graph view, but if you want to see a specific range of temperatures then you can. Simply enter the high and low values into the grey boxes and select Set New Scale. The graph will automatically re-draw. To revert to AUTO scales simple, select AUTO Scale.

Channel Control

Use Channel Control to select which channels you wish to graph. By default, all channels are set to on. Simple un-tick/tick the box to deselect/select channels. If a channel has been programmed with alarm values, then the Alarm box can be selected (one channel at a time), and this will display the alarm limits on the graph.

Move Left Right

The Left and Right arrows can be used to navigate forward or backward in time on the graph and is useful where you wish only to make a small movement.

Calendar

There are several pages which show data records or events by Day, Week or Month. These have a Calendar date picking function which helps significantly in finding information for specific item. To use the Calendar function on pages which it available click the Calendar button to display a calendar as in the example below.

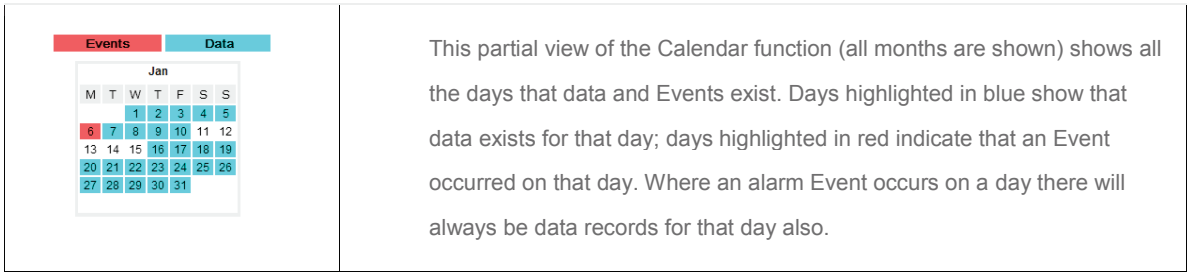
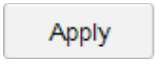


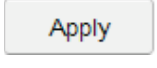
Figure 20 – The Calendar

Using the Calendar

The Calendar has a single primary function to allow the user to select a period for the relevant screen. Dates can be selected in one of three modes.

1. Single Day Mode – Simply select the day required on the Calendar followed by clicking on 

to confirm the changes. If required, you can use the drop down to first select the Year required.

2. Multiple Days Selection Mode – If more than one day is required then the process works as thus; select the first, or last day required, then navigate to the last/first day and click again. The Calendar view will change with all the dates selected will have circles to identify them. Click on 

to confirm the changes. If required, you can use the drop down to first select the Year required.

3. Single Month Mode – If a single month is required, then the process is similar; select the month by clicking on the name at the top of the box. The dates will be selected as if you manually selected the 1st and last date of the month.

Click on Apply to confirm the changes. If required, you can use the drop down to first select the Year required.

Audit Trail

RF500 includes a full Audit Trail for the purposes of complete record keeping complying with the requirements of 21 CFR Part 11.

Click on Audit Trail TAB

Figure 1 – System Tabs

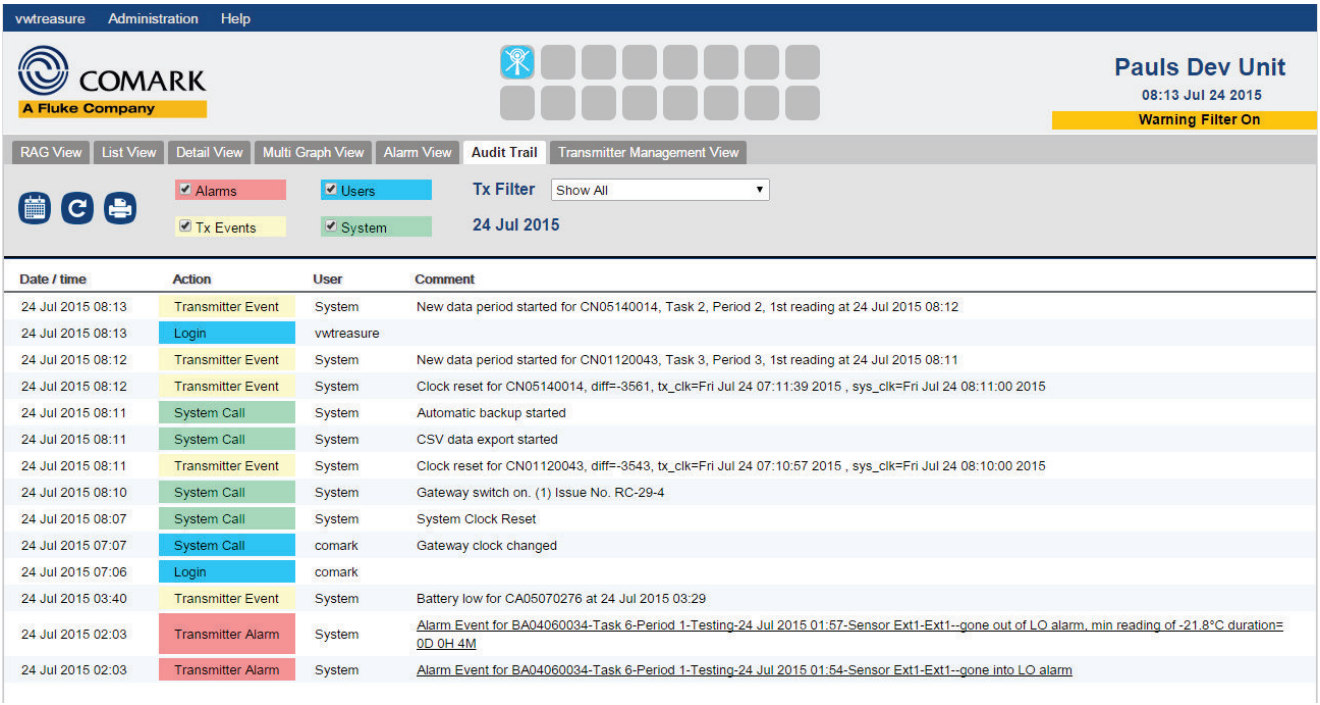


Figure 21 – Audit Trail

The default view displays activity for the current day, sorted in descending time order. Administration of New Tasks entered are also displayed.

Audit Trails can be grouped by Date / Time, Action or User by clicking the following column headings:

Date /Time	Sorts the Audit trail view in descending time order
Action	Groups the Audit Trail view by action order
User	Groups the Audit Trail view by username in the order of which users were added

The Date/Time, Action, User Grouping setting is remembered, the next time Audit Trail is clicked during the same session.

Audit Trail Filters

By default, the Audit Trail will show everything, which can be quite complicated to view. So, various pre-set filters can be selected/de-selected to filter the view.

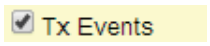
Alarms

Toggle the tick the box to select/deselect Alarms from the current view

Users

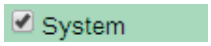
Toggle the tick the box to select/deselect User Actions from the current view

Tx Events



Toggle the tick the box to select/deselect Transmitter Events from the current view

System



Toggle the tick the box to select/deselect System Events from the current view

Transmitter Filter

Use the drop down to select All Transmitters or select one individually.

Calendar ICON

Click on the Calendar ICON  to bring up a date picker to select a single date of interest or a date range for the Audit Trail

Refresh ICON

Click on the refresh ICON  to update the Audit Trail with the latest data.

Print ICON

Click on the PRINT ICON  to bring up a Printer Friendly version of the Audit Trail. Click Print (ICON) to print and Close (ICON) to close and return to the Audit Trail.

Transmitter Management

Transmitter Management in M9 has been completely re-designed to provide the Administrators of the system better visibility of the Transmitters on the system and their status.

Transmitter Management is split into three perspectives…

Adjust

Adjust is your main go to page for Transmitter Management on a Day-to-Day basis. Here you can Add/Remove Transmitters, ask for Task and Data Retrieve as well as change the Radio Rate, Registered Alarm Group, Default Repeat Alarm Period, set to backbone and turn off the LCD.

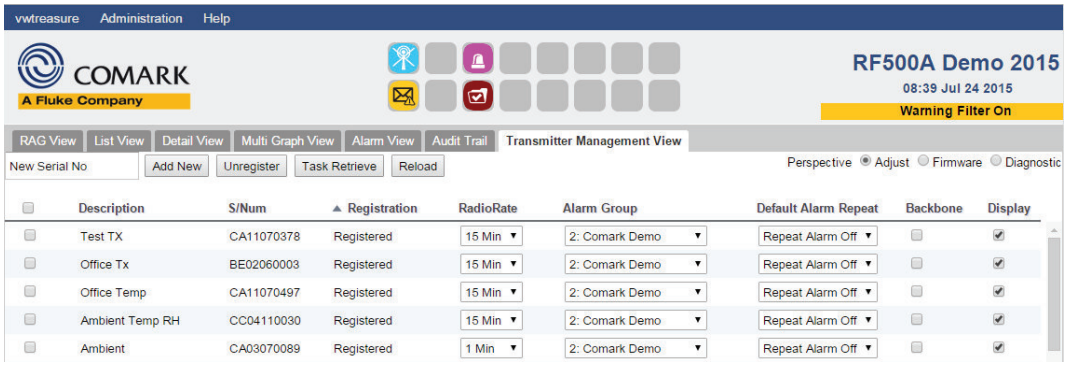


Figure 22 – Transmitter Adjust

There are Action buttons for Add New, Unregister (Remove), Task (and Data) Retrieve and to reload the page with the latest information.

There are no Action buttons for changing Radio Rate, Registered Alarm Group, Default Repeat Alarm Period, toggling Backbone or the LCD as all these actions will simply be actioned when you have made the change the next time the Transmitter contacts the Gateway.

Firmware

Firmware is the go to page when Transmitters are due a firmware upgrade.

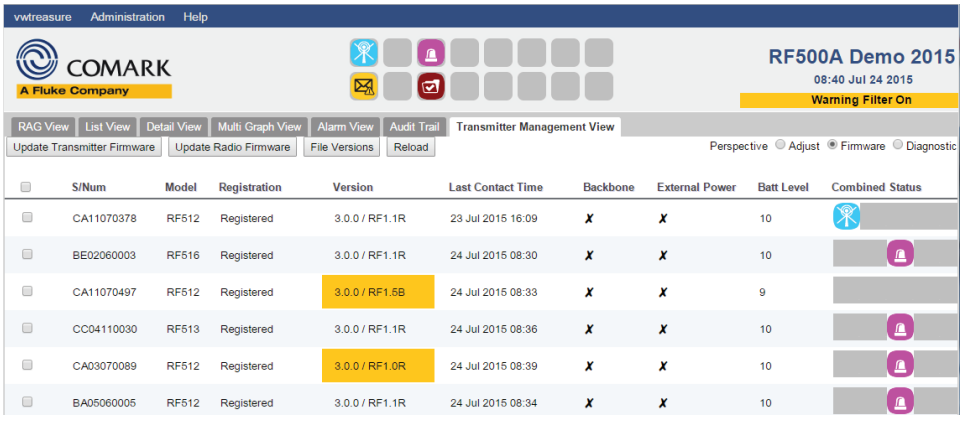


Figure 23 – Transmitter Firmware

Here there are action buttons to Update Transmitter Firmware and to update the Radio Firmware.

Note: There is no need to update Transmitter firmware in normal use. If you think that the firmware does need to be upgraded, please contact Comark who will advise you.

There is an additional File Version Action Button which will bring up this view to show the current firmware versions and allow you to upload more up to date files from Comark.

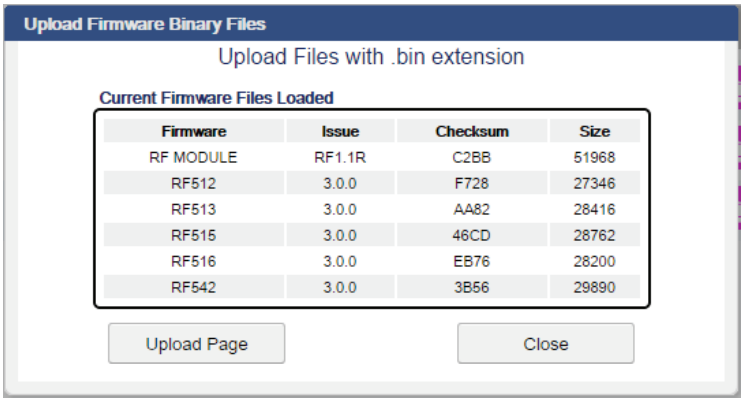


Figure 24 – Firmware Versions

Diagnostic

Diagnostic View is included for Comark Service to diagnose faults/issues with the Transmitters and is included here just for completeness.

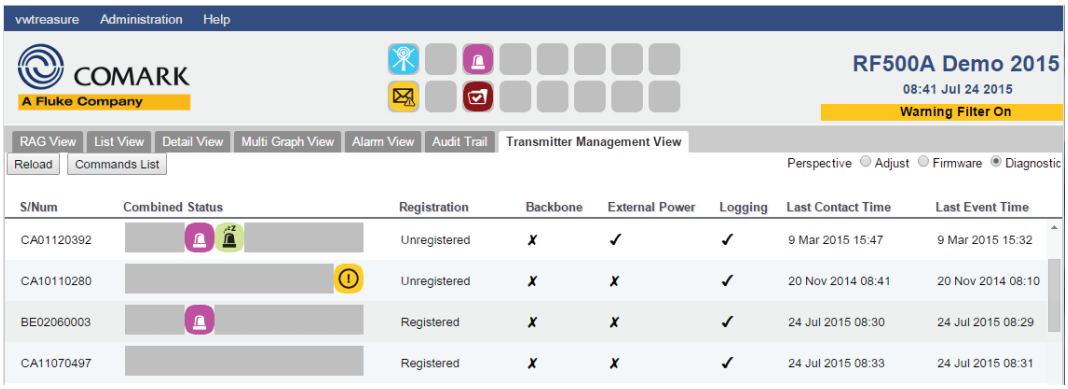


Figure 25 – Diagnostic View

Gateway Administration

Gateway Administration in M9 has had a makeover to simplify the structure and to bring all Administration Functions under one single list.

Gateway Administration now includes these headings.

System Settings

Here you can change/setup the following…

- Gateway Name
- Gateway Time
- Network
- Mail System
- Updates (Software Updates)

Hardware

The following options are available under Hardware

- View Status
- Hardware E-mail Notification
- Switch Outputs Setup
- Reset (Reset Gateway)
- Shutdown (Shutdown Gateway)

Backup

Under Backup the following options are available

- Request a Manual Backup
- Setup Automatic Backup (Software and Shared Drive)
- CSV Export
- Restore (Restore a Blank Gateway from a Backup File. Comark Service use only)
- Email Notification

Users

All User Management is done from here.

E-mail Recipients

E-mail Recipients for the Gateway Alarms and other notifications are setup here.

Alarm Groups

The new name for Locations. All Alarm Group setup is done here.

Gateway Time

The Gateway Time can be set by an Administrator at any time, although it is recommended that it is configured upon initial start-up and configuration.

Resetting the Year, Month, Day and the Time will cause the Gateway to reset and a New Period to be generated for all Transmitters.

To set the Year, Month, Day and the Time options as follows:

Login as an Administrator, then click the Administration button followed by System Settings then the Gateway Time button to bring up this page.

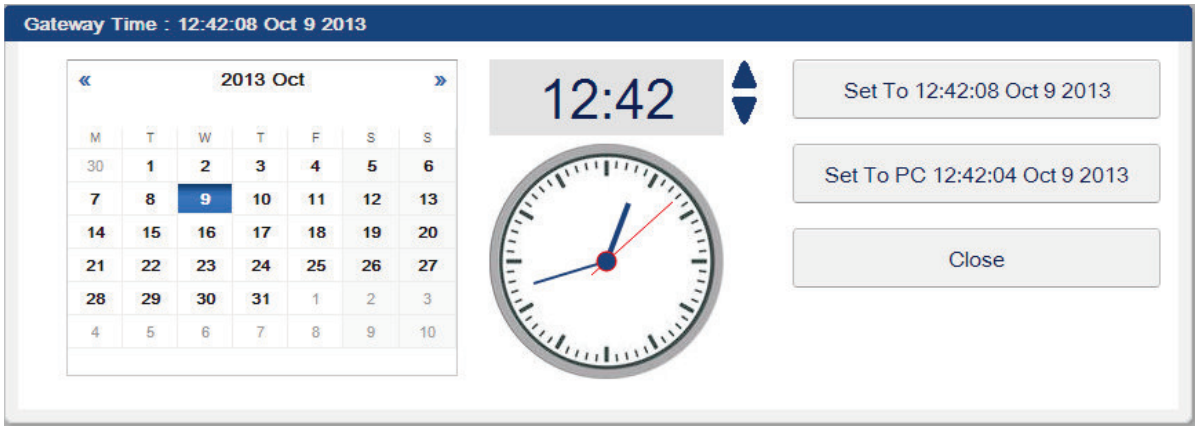


Figure 26 – Setting Gateway Date and Time

Configure the required Year, Month, Day and the time settings by either:

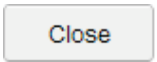
- Manually using the Calendar, Year and Date picker, followed by the up and down Time set arrows.

The 

button will display the manually set Year, Month, Day and time settings, a difference more than one minute from the current PC time will cause the button text to turn red.

A warning message “Clock maybe incorrect” will also be displayed in red in the upper banner screen.

- Automatically by clicking on the 

button will set the Gateway to use the current PC time.
- Click the 

button to close and cancel the changes.

If changing the Clock, you will be presented with the following dialogue box:

Figure 27 – Gateway Reset

The time will be updated after an automatic Gateway reset, completion will be signified by the Gateway bleeping.

Once the Gateway has re-booted simply click Reload and Login.

Clock Change (GMT & BST)

In the UK the clocks go forward for BST (British Summer Time) 1 hour at 1am on the last Sunday in March, and back 1-hour GMT (Greenwich Mean Time) at 2am on the last Sunday in October.

The Gateway will not automatically adjust the time automatically for Daylight Saving.

Mail Server Setup

Usually your IT Department will provide the information for this section and whether a customer from address is required. However, if you are using an Internet Server Provider's (ISPs) mail server or web E-Mail service you will find the information required on that Company's support web pages.

Due to the proliferation of E-Mail spam, many USA based ISP's companies and web-based E-Mail services such as Google and Yahoo require user authentication before allowing E-Mails to be sent using their servers. The authentication is typically performed using SSL encryption which is configured as shown below.

	If a Yahoo! Mail or Google Mail account is used solely for RF500 e-mails then you should regularly log into the account using a web browser otherwise these organizations suspect that the account is dormant and suspend it.

In order to enter the Mail Server Details, you must first log in as an Administrator. Then from the blue banner at the top of the page, select Administration – System Settings – Mail System, see below…

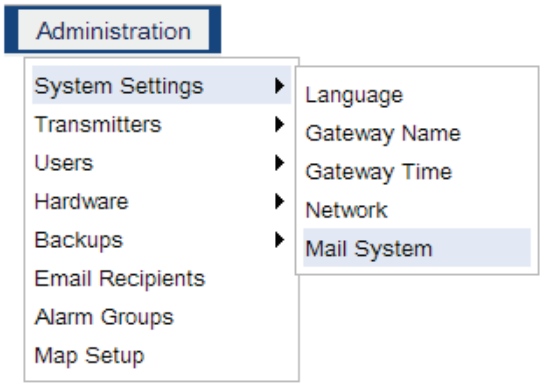


Figure 28 – Mail System Setup

That will open the following dialogue box…

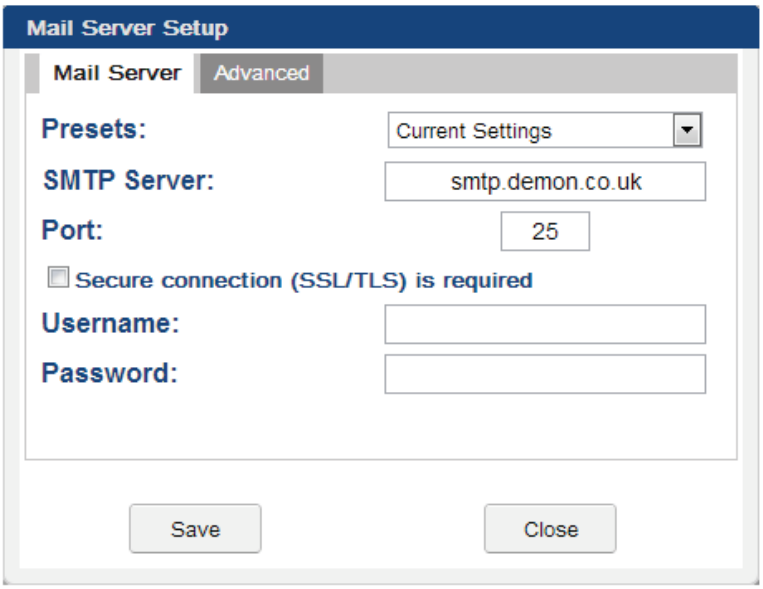


Figure 29 – Mail Server Setup

Entering the Mail Server Settings can be done in two ways. Firstly, you can manually enter the settings, or secondly you can select one of the pre-set configurations. The default configuration when you open this dialogue will be the Current Settings.

Pre-sets:

Use the drop down to select either Yahoo! or Gmail. The SMTP and Port Number will be auto-filled. Both Gmail and Yahoo required SSL/TLS certification. Please now enter your Username and Password into the boxes provided.

Manually:

Enter the SMTP Server as a name, e.g. smtp.gmail.com or as an IP address e.g. 173.194.66.108

Enter the Port as a number, e.g. 587

Click on Save to save and exit, or Close to exit without saving.

Advanced Tab

Click on the Advanced Tab to bring up this dialogue….

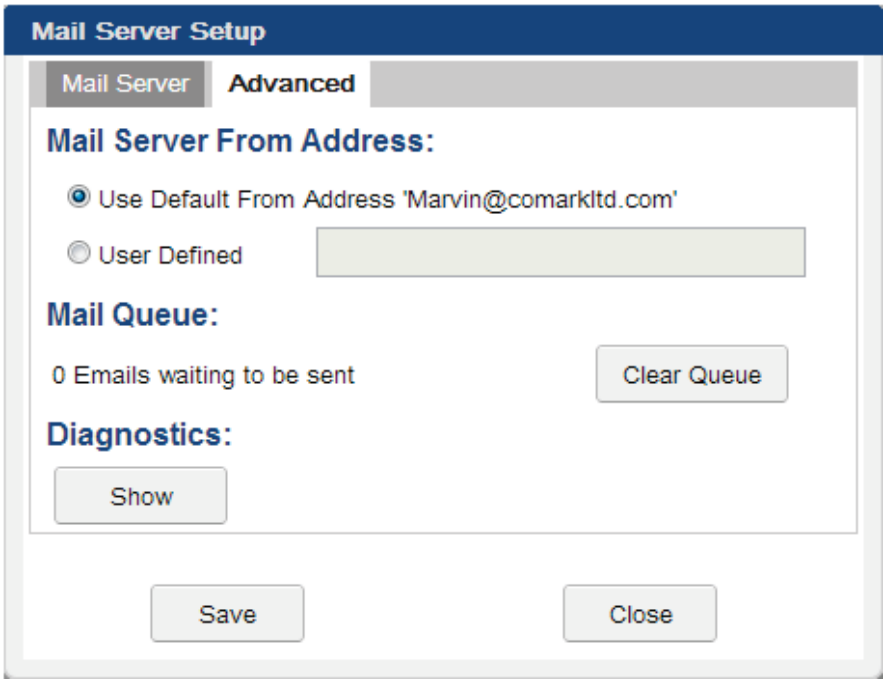


Figure 30 – Advance E-mail Server Setup

The advanced tab allows for several different actions.

Mail Server 'From' Address:

RF500 uses the following default E-Mail address 'RF500 Gateway Name@comarkltd.com'. However, in some circumstances the from e-mail address can be ignored by the mail server as it appears not to eliminate from inside the network and could therefore be considered as spam e-mail. In this event either set the from address to your own E-Mail address (RF500 E-Mails will appear to come from you) or set the from E-Mail to something more recognizable, e.g. GatewayName@MyCompany.com

Mail Queue:

The Mail Queue, is as the name suggests, is the queue of e-mails waiting to be sent from the Gateway. The E-Mail queue can be cleared by selecting Clear Queue button and then OK to confirm.

Diagnostics:

The diagnostics button is useful when trying to understand why E-Mails or SMS's are not being sent from the Gateway. Click on Show to see the status of the last E-Mail/SMS sent.

At any time, you can click on Save to save and exit, or Close to exit without saving

Change My Password

Change My Password allows the logged-on user to change his/her password if it is about to expire or as per company policy on changing passwords frequently.

Log on to the Gateway and select 'myusername' and click on "Change My Password" to display this dialogue….

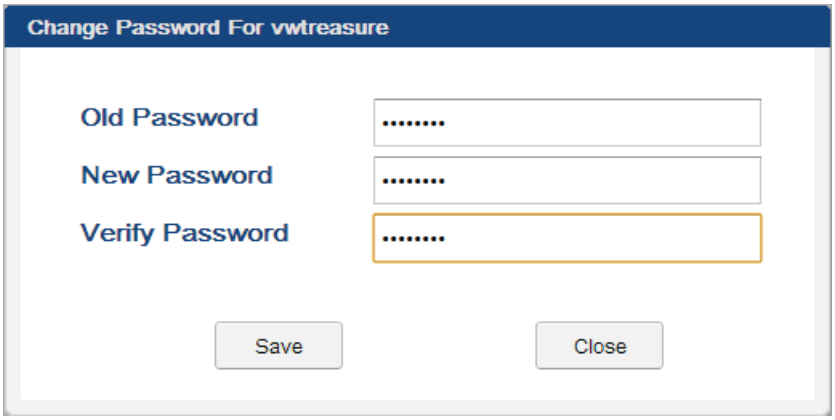


Figure 31 – Change My Password

To change your password, enter the old password, followed by the new password, and then verify the new password.

When entering a new password please be aware of the Password Format, see below.

The Gateway will not validate that an entered password is strong, this check must be performed by the person entering it.

To save and exit, click Save, and to exit without saving click Close

Password Format

When choosing a password, the Gateway enforces a minimum password length of 6-31 characters and allows a maximum of 31 characters. These characters can be any mixture of the following:

Alpha-numeric	A-Z, a-z or 0-9 and space
Special characters	! @ $ % * ( ) – _ ' full stop

This scheme allows companies that require the use of strong passwords to implement them.

My Filter

My Filter allows each user to set his/her own preferences for the displayed information on the Gateway. Any changes made in the My Filter dialogue will be automatically saved as your user preferences. Every time you log in the Gateway, your personal preferences will take effect.

To change My Filter, log into the Gateway and hover over your username, top left, and then click on My Filter, to be presented with this dialogue…

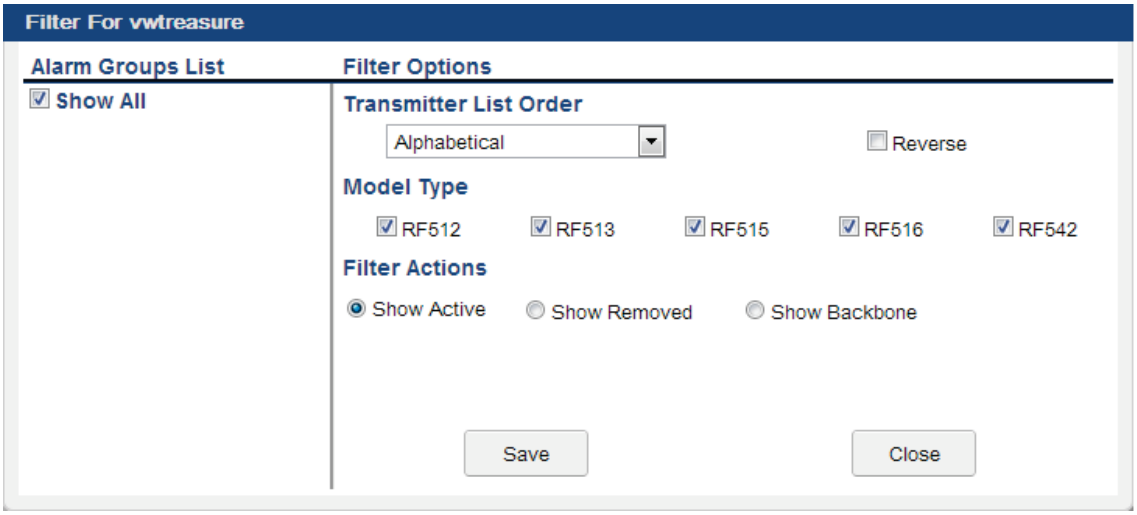


Figure 32 – My Filter

The My Filter dialogue is split into two areas…

Alarm Groups List

It is possible to select 'Show All' Alarm Groups, as above. Or if the box is un-ticked then you can choose which Alarm Groups you wish to view, subject to the Alarm Groups selected when you were first setup on the Gateway. See Adding New User for more details.

When the box is unticked, this is the view you will get…

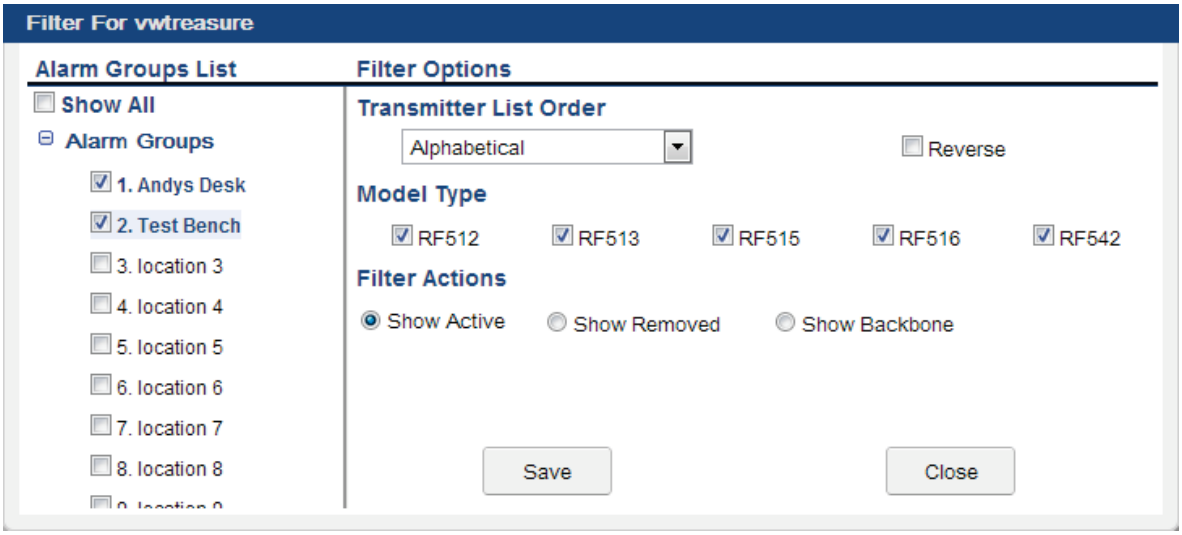


Figure 33 – Setting Alarm Groups

To select Alarm Groups, simply tick the relevant boxes.

Filter Options

Filter Options are by the following determinants…

Transmitter List Order

- Alphabetical – Transmitters will be listed in alphabetical order by their Task Description?
- Model – Transmitters will be listed by Model
- Date – Transmitters will be listed by Date order (Date refers to the Date when the Transmitter was added to the system)
- Alarm Group – Transmitters will be listed in Alarm Group Order as per the selection above.
- Reverse – Transmitter order as selected above will be reversed.

Model Type

Select the Transmitter types you wish to be shown.

Filter Actions

- Show Active – Show all Transmitters current active on the Gateway
- Show Removed – Show all Transmitters currently set as removed from the system
- Show Backbone – Show all Transmitters currently designated as Backbone

To save and exit, click Save , and to exit without saving click Close

	When the settings in My Filter cause the RAG View or List View to exclude any active transmitters from the view, a warning message will be displayed on the Home Page.
	Consider setting up 'other' Users for specific filters so that you do not need to keep re-visiting My Filter

User Administration

The RF500 has two types of user, each with different levels of user permissions:

Administrator	Has unrestricted access to all Gateway functions.
Restricted User	Does not have unrestricted access to all Gateway functions and must be granted permission to access each major Gateway function.

There are no defined limits to the number of users that can exist. Any number of Administrators and Restricted Users can be created.

Password Format

When choosing a password, the Gateway enforces a minimum password length of 6 characters and allows a maximum of 31 characters. These characters can be any mixture of the following:

Alpha-numeric A-Z, a-z or 0-9 and space

Special characters ! @ $ % * ( ) – _ ‘ and full stop

This scheme allows companies that require the use of strong passwords to implement them.

Note: The Gateway will not validate that an entered password is strong, this check must be performed by the person entering it.

Account Expiry

All Restricted User accounts will expire 180 days after they are created or renewed. Administrator accounts do not expire. When an account is due to expire within 14 days, a warning message such as ‘Warning: Your account will expire on Sat Jun 16 11:59:53 2007’ will show on the Login Screen. After an account has expired the user will not be able to login to the Gateway until renewed by an Administrator using the ‘Renew User’ option in ‘Editing User Options’.

Add New User

Navigate to Administration Users to bring up this dialogue and click Add New User.

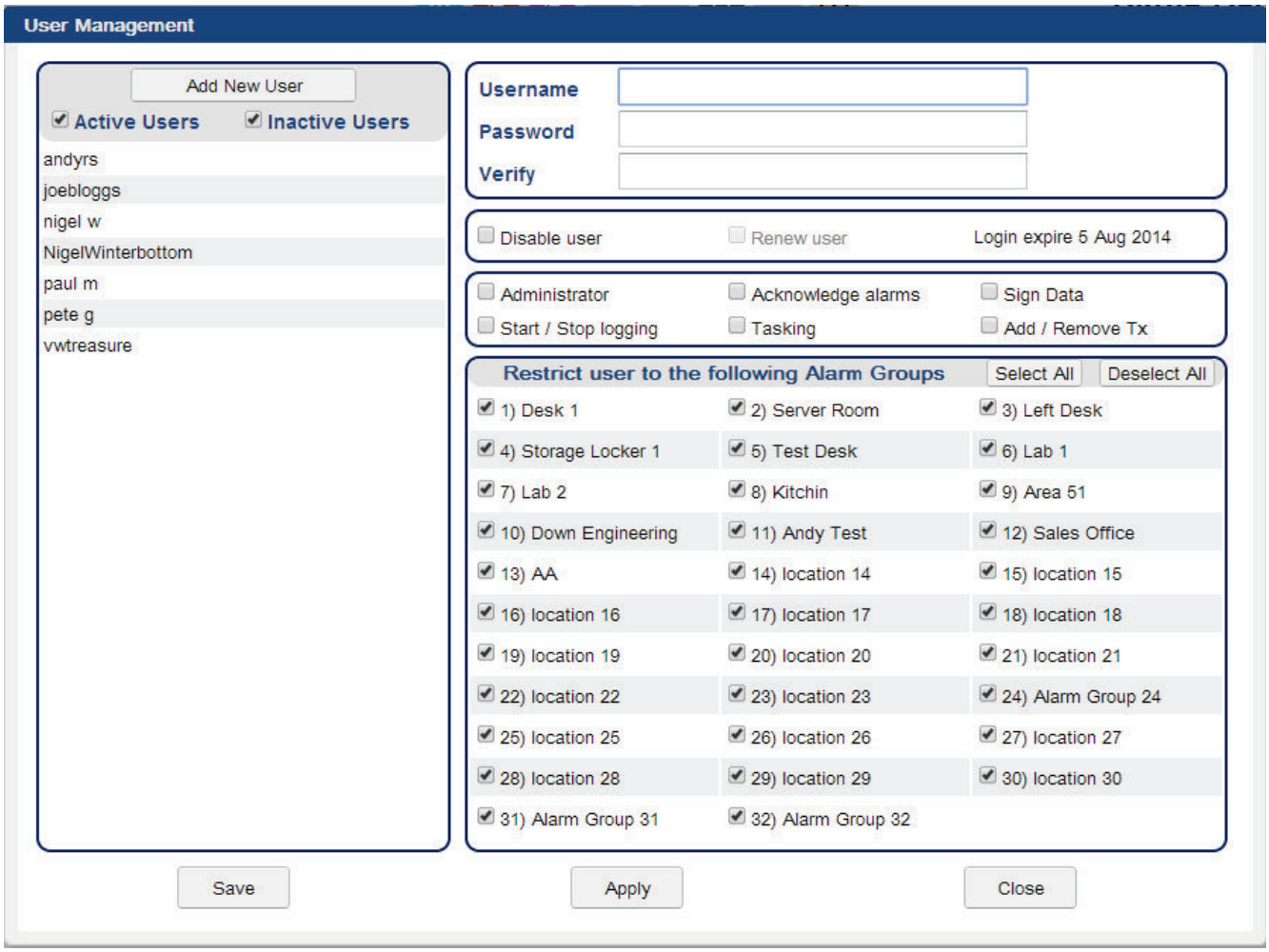


Figure 34 – Add New User

The following parameters must be completed:

Username	Enter a unique username of your choice to identify the new user.
Password	Enter the login password for the new user
Verify Password	Re-enter the login password for the new user
Make User Administrator	If not ticked, the user will be a Restricted User

The following self-explanatory fields are only applicable for a Restricted User

… Acknowledge Alarms	See Alarm Acknowledge
… Sign Data	See Signing Data
… Start / Stop Logging	See Start / Stop Logging
… Tasking	See Tasking
… Add / Remove Tx	See Transmitter Management

Restricting Locations

Any user whether an Administrator or a Restricted User can have access limited to a sub-set of the Alarm Groups. In this way several systems can co-exist on the one Gateway, but other users will not be able to see transmitters from other users' Alarm Groups. To restrict users from some or all Locations un-tick the appropriate boxes.

Changing Passwords

Users are able to change their own password, enabling the system Administrators to add a new user with a 'temporary' password which the user can then change themselves. Note that the Gateway will not force a user to change his/her password on first login. Click on 'Username' and select 'Change My Password' from the drop down.

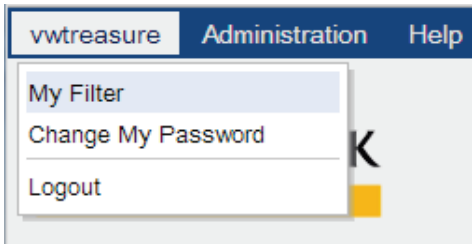


Figure 35 – Select Change My Password

That will bring up the following dialogue.

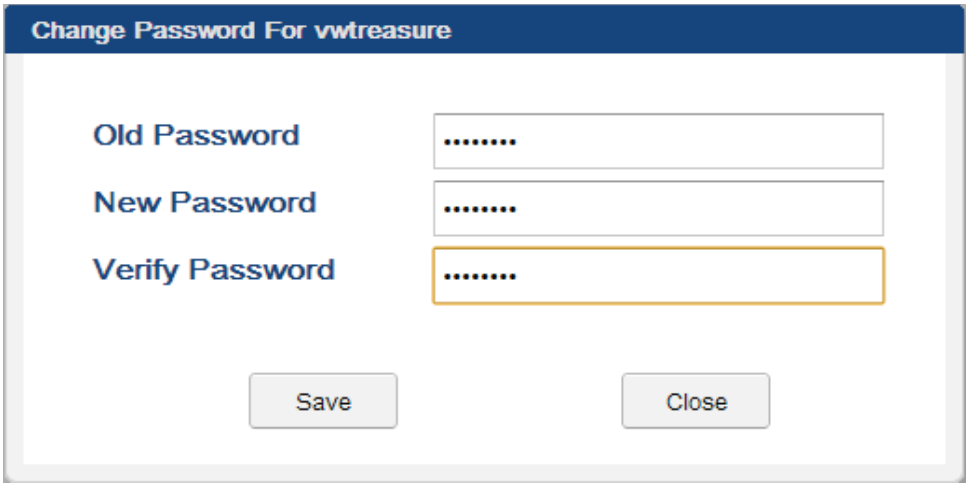


Figure 36 – Change My Password

Enter the current password, followed by the new password, and then verify the new password, before clicking Save to save and close, or Close to close and exit without saving.

Edit Users

Navigate to Administration Users to bring up this dialogue:

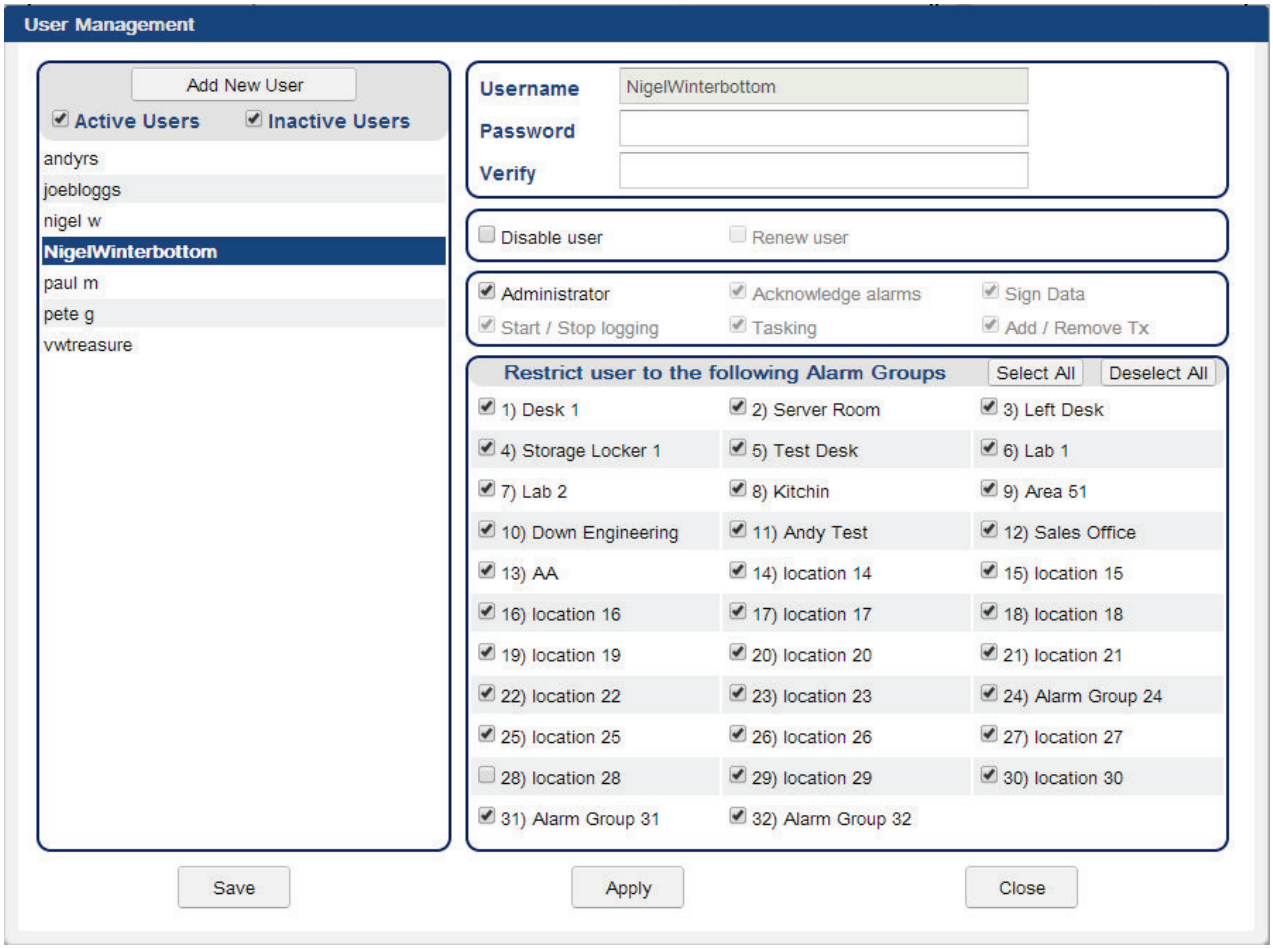


Figure 37 – Edit User

Note: You cannot edit your own preferences as an Administrator aside from changing the Alarm Groups that you have access too. This is to ensure that at least one Administrator is always activated on the Gateway.

By selecting another User from the list on the left-hand pane, you can now edit that user as you see fit. If the user has expired (password expiry) or has been previously disabled, clicking the relevant boxes it is possible to re-enable them. Do not forget to click Apply to Save changes, and Close to Save and Close.

Note: Users cannot be deleted, only disabled. This is because the Gateway keeps a record in the Audit Trail of all users' actions such as creating a Transmitter Task, Signing Data, or each Alarm Acknowledge for auditing purposes. If a user were to be deleted these records would also be deleted.

User Login Expiry (Date Showing)

Restricted users will expire automatically after 90 days. This upcoming date will be shown when the user is selected. After this date the user will need to be renewed to continue using the Gateway. Administrators do not expire.

Advanced User Administration

Additional features have been added, based on Customer Feedback, to the latest version of Comark's RF500A Software.

Advanced User Administration allows System Administrators to make changes to the length of a user password, 6 to 31 characters in length and the length of time before user password expires, from 30 to 180 days.

Access to this Administration is handled outside of the usual RF500A Interface and can be accessed using this link format…

http://YourIPAddress/cgi-bin/usersconfig

Which will bring up this page….

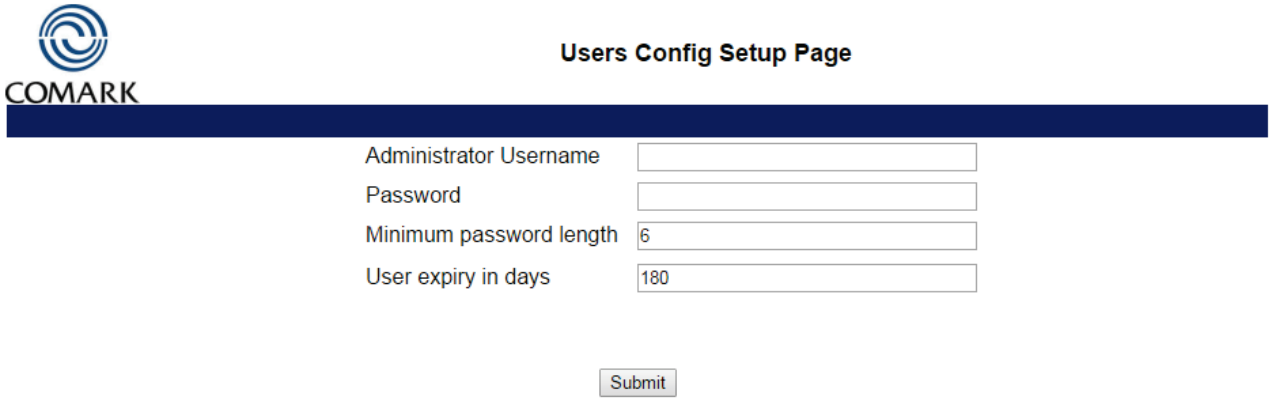


Figure 38 – Users Config Setup Page

Using the page is very straightforward.

Enter your Administrator Username followed by your password, then enter the minimum password length you wish to set in the range 6-10 and then set the User expiry in days in the range 30-180 then click Submit.

If all is well, you will see the 'Done' message to confirm.

What Happens Next?

What happens next is dependent on the status of your RF500A System.

If the System is new and not yet commissioned, then all users added must conform to the new settings.

If the System is already setup and in use, nothing will happen to the existing users until they are due for a change of password, at that point the new settings will kick in.

Transmitter Tasking

Data cannot be collected from a Transmitter until a Task has been programmed. To create a new Task, click the Task button  on the Transmitter Action ICONS  and the Transmitter Task page will appear, see below…

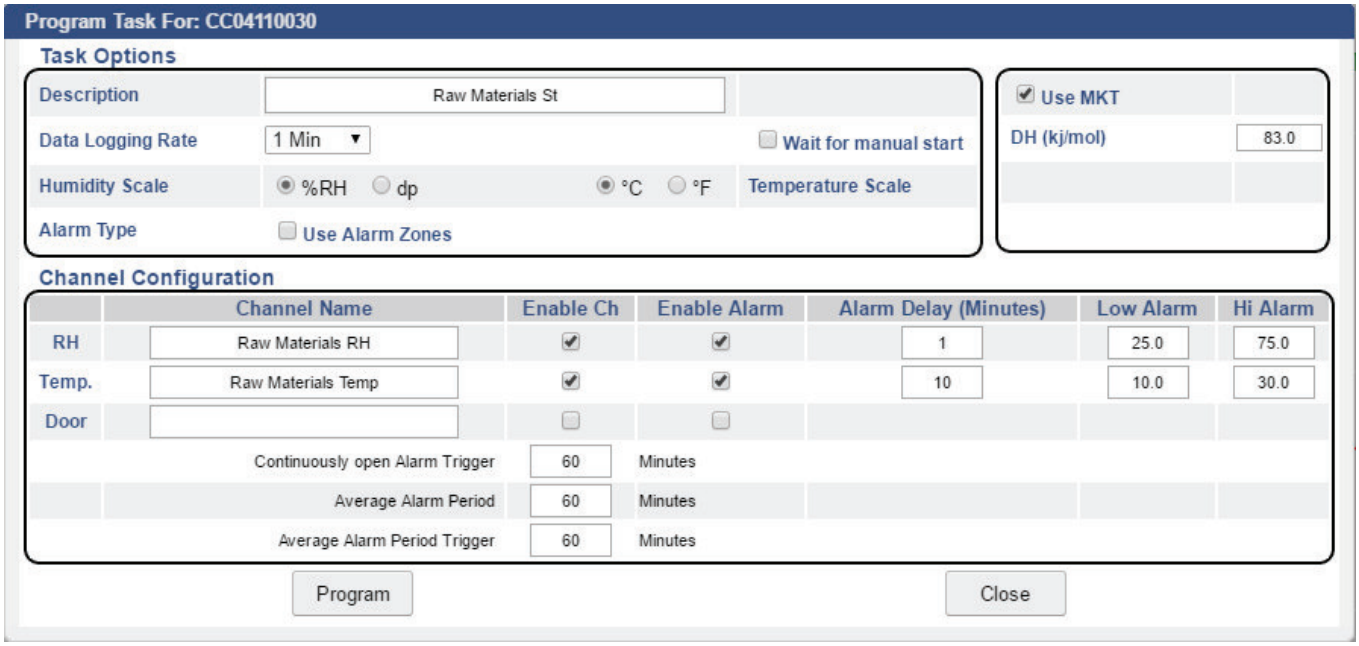
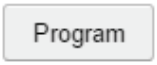


Figure 39 – Transmitter Task

Transmitter Task

- Description Up to 16 characters available to describe transmitter, e.g. transmitter Location
- Log rate Selection of log rate – available log rates: 1, 2, 3, 5, 10, 15, 20, 30, 60 minutes
- Wait for Manual Start If this box is ticked then the transmitter will not automatically start logging and must be started manually See Start / Stop Logging.
- Humidity Scale Choose %rh or dew point as required (If applicable)
- Temperature Scale Choose °C or °F as required.
- Use Alarm Zones (Previous Dynamic Alarms)
- Channel Name Text box to identify each channel. (Up to 23 characters available)
- Enable Ch Enable or Disable individual channels.
- Enable Alarm Enable alarm limits for individual channels.
- Use Lethality/mkt See Mean Kinetic Temperature and Lethality.
- Note: log rate of less than 15 minutes will reduce battery life.
- Alarm Delay Set alarm time delay, e.g. for defrost cycle.

Transmitter Task – Tasking

Once the 

Task button is clicked, the Transmitter Summary on the Gateway List View Page will indicate Tasking. It can take several minutes for the Task to be sent to the transmitter because the Gateway must first wait for the transmitter to contact it.

Transmitter Task – RF515

The Task page for RF515 deserves special mention because it is very different from other transmitters, in that this page caters for both regular task setup and configuration of scale mapping between analogue units and engineering units of the sensor.

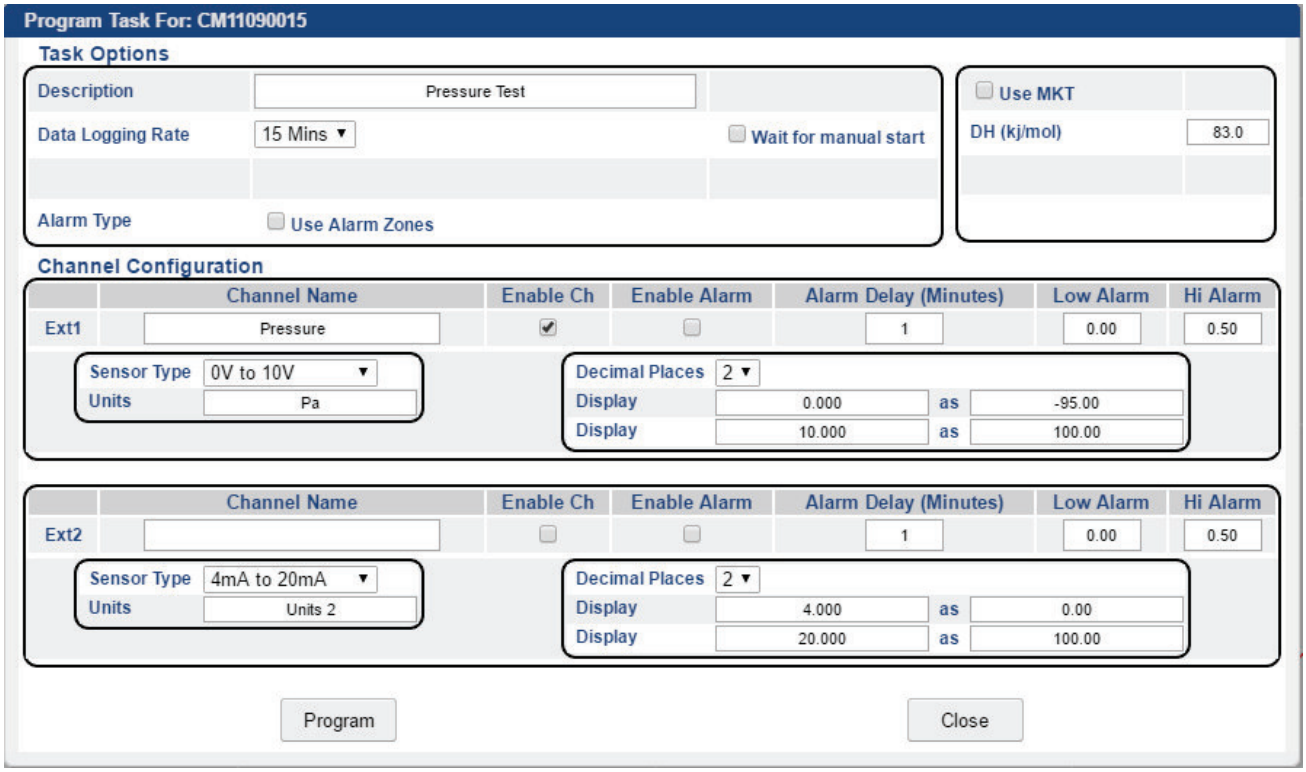


Figure 40 – RF515 Transmitter Task

Task Setup for RF515

Sensor Type Select the option to match the sensor output

- 0V to 1V
- 0V to 10V
- 4mA to 20mA

Units - Engineering units for sensor (Up to 8 characters available)

Decimal Places - The number of decimal places required for engineering units (0 to 5)

Display xxxxx as yyyyy These 2 sets of numbers define the scale mapping between measured units (V or mA) and sensor units. The example for Ext1 shows 4-20mA mapping to 0-100%RH Lo Alarm & Hi Alarm limits are entered using engineering units for the sensor.

The allowable range of values for yyyyy in the Display xxxxx as yyyyy field and in Lo Alarm & Hi Alarm depends on the number of decimal places selected. See the table below.

Decimal Places Range

- 0 ±32000
- 1 ±3200.0
- 2 ±320.00
- 3 ±32.000
- 4 ±3.2000
- 5 ±0.32000

Transmitter Alarms

The graph below shows a temperature profile for a transmitter tasked for 15 minutes log rate, the High Alarm at 5.0 and Low Alarm at 1.0, and 5-minute alarm delay.

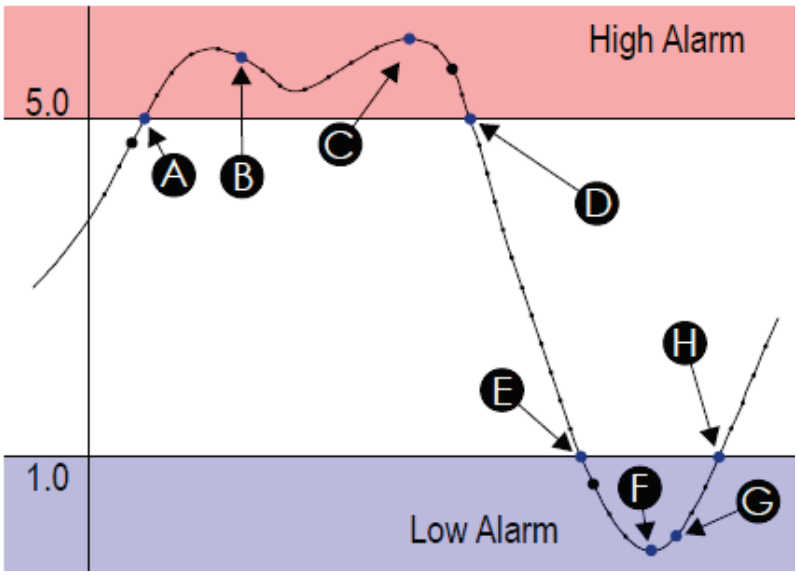


Figure 41 –Transmitter Alarms

- The curve indicates the actual temperature being sampled by RF500.
- The small dots indicate the sampling at 1-minute intervals.
- The large black dots indicate readings logged at 15-minute (log rate) intervals.
- When the temperature goes out-of-limit, extra records are logged as indicated by the blue dots as follows:
- A The record logged as the temperature goes out-of-limit (high)
- B The record logged because the temperature has remained out-of-limit throughout the alarm delay
- C The maximum temperature reached for the out-of-limit period
- D The record logged as the temperature again becomes within limits
- E The record logged as the temperature goes out-of-limit (low)
- F The minimum temperature reached for the out-of-limit period
- G The record logged because the temperature has remained out-of-limit throughout the alarm delay
- H The record logged as the temperature again Low Alarm becomes within limits

Points B and G correspond to data records which generate alarm Events. They cause the transmitter to have an unacknowledged alarm which in turn generates alerts according to the Location in which the transmitter is placed. These alarm Event records are shown as entries in the Transmitter Events Page and in the Audit Trail.

Door Alarms

RF500 includes two types of Door Alarm:

Continuous Door Alarm – Alarm on Door continuously open for a period of more than X minutes

Average Door Alarm – Alarm on Door open for more than X minutes cumulatively in a given period of up to 60 minutes. This alarm captures many individual shorter door open times that may fail to trigger a continuous door alarm but are nonetheless still important.

Both continuous and average door alarms are enabled or disabled together, therefore if the average door alarm is not required, setting the average limit equal to the average period causes the average alarm never to occur because the limit cannot be exceeded.

Whenever a continuous door alarm is triggered an Event only is generated, tabular data will not be coloured to indicate the alarm.

Date / Time	Temperature	Door
01 Jul 2010 08:07	25.7 °C	12 (32.19%)

A representation of tabular data shown above shows a typical reading. The readings reported for the door channel are given as two values:

- The first number is the cumulative number of minutes that the door has been open throughout the averaging interval, which in this example, is the preceding 60 minutes.
- The value in parentheses is the cumulative number of minutes that the door has been open throughout the averaging interval given as a percentage of the averaging interval.

The percentage gives a measure of how much time a door spends opened which could represent a problem in a real-world application. Consider the following scenario:

A door to a laboratory is monitored using RF500 and the continuous alarm is set to 20 minutes to capture a "door left open" event. If that door is opened then closed after 19 minutes have elapsed, then immediately opened again for 19 minutes then closed, the continuous alarm event would not have been generated; however, that door has effectively been open for 38 minutes during the previous 40 minutes or so. With an averaging interval of 60 minutes the RF500 system would report a door reading of approximately 63% or with an averaging interval of 40 minutes a door reading of close to 100% would be reported. It may be the case that this high level of "door open" condition may cause environmental controls to be overloaded.

Alarm Zones

Dynamic alarms allow the transmitter to vary the alarm limits or indeed disable alarms for each 30-minute time-slot throughout a 7-day period. Typical uses for this feature include cycling incubators which cycle between temperatures and chillers which are only active for certain times during the week.

From the Task Setup, click the Use Alarm Zones box to activate this function. The fixed alarm limits for each channel are replaced by Dynamic Times buttons. For each enabled channel, click the 

Dynamic Times button to configure the alarm limits for each time-slot of the 7-day period.

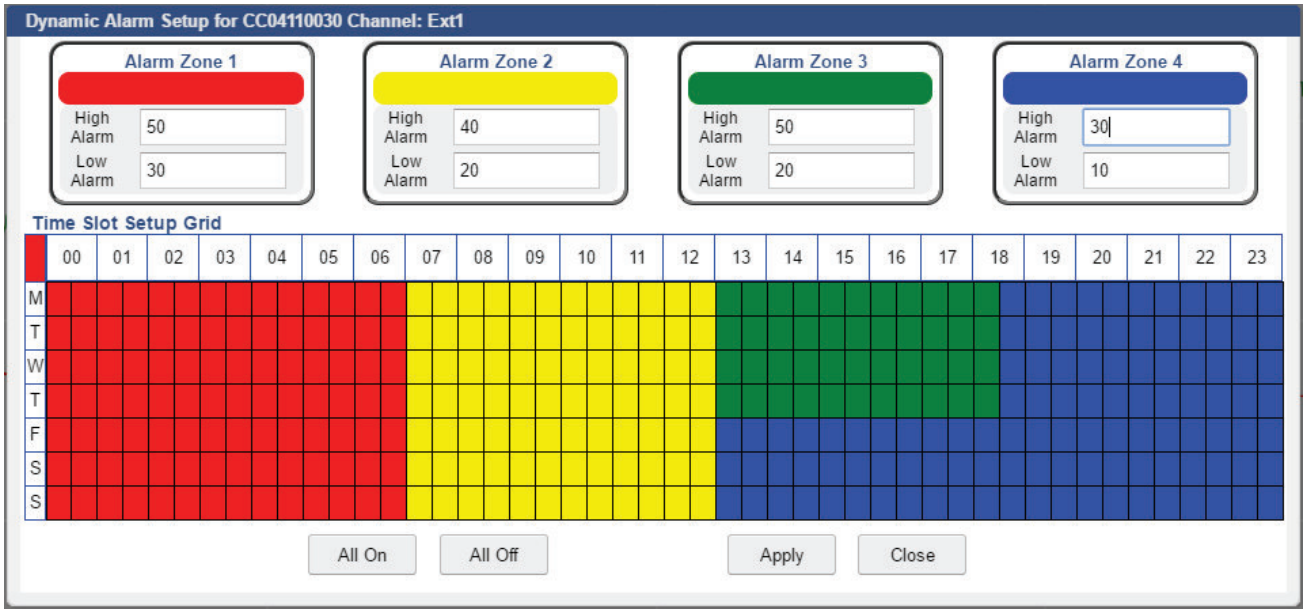
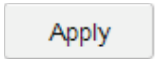


Figure 42 –Transmitter Alarms

Dynamic Alarm Setup

Each cell represents the alarm limits for a 30-minute time slot the first beginning at midnight 00:00 and the last beginning at 23:30. Enter up to four sets or zones of alarm limits as required. To allocate an alarm zone to each cell first click the Slot coloured block to the left of the alarm zone then click the cell to allocate to the selected zone. The area above the M representing Monday, shows which alarm zone has been selected.

When done click the 

button.

Dynamic Alarms for Door Switch

Setup of dynamic alarms for Door Switches is as per temperature or RH channels except only the average alarm limit for Door can be changed dynamically, the continuous alarm limit always remains in effect.

Issue Control

Version	Date	Reason
1	24th June 2019	Issue 1 Released

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RF500 Gateway – Description

The RF500 Gateway is an embedded microprocessor device running a Linux Operating System. It provides a Web Browser interface for the complete operation of the system, including all setup and data display.

RF transmit and receive is via licence free band running at 2.4GHz. This provides the wireless communication for all system operations.

The RF technology in use provides for radio frequency communications between the transmitters and the gateway via meshing and self healing protocols.

The Gateway contains a 40Gb Hard Drive for all data storage. Connection to the Gateway is via Network (Ethernet) connection or remotely via modem. For modem access a dedicated Analogue phone line must be provided. Two relay connectors are provided for external alarms, Autodiallers/Klaxons etc. All other connections to the Gateway are disabled. See Gateway Specifications for further details, Page 9.

E-mails for alarms will be instigated directly from the GATEWAY. It will also be possible through a third party system to send a text message alarm via e-mail.

wireless
Monitoring Solutions

RF500A GATEWAY
SYSTEM MANUAL

COMARK
A Fluke Company

RF500A Gateway System Manual

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Check Packed Items

Please confirm that the kit contents are all present and correct. If you believe any parts are missing or damaged please contact Comark or your local Distributor to arrange replacements.

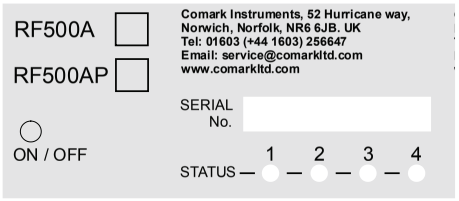
Software and USB drivers are no longer provided on CD and can be downloaded free of charge from our website. See “RF500A-CONFIG - RF500A Configuration Utility” {Page 13} for instructions on how to download and install the software and drivers.

RF500A Gateway

The RF500A Gateway is available in two variants:

- RF500A Standard
- RF500AP Power over Ethernet enabled

The actual Gateway model is indicated on the side label by a check mark adjacent to the model code.



The RF500A and RF500AP Gateway Kits consist of the following items:

- RF500A Gateway Part No. RF500A or RF500AP
- Transmitter Activator Part No. RF525
- High Gain Antenna Part No. RF504
- AC Adaptor with Mains Lead with either UK, EU or US plug
- Ethernet Cable
- USB Cable (Required for configuration only)

RF500 Transmitters

RF512, RF513, RF515 & RF516 transmitters are packed with a mounting bracket and 2-tie-wraps.
RF542 transmitters are additionally packed with:
1x RF520 AC Adaptor including regional mains plug attachment
1x Cat5e Ethernet Cable
1x RF525 Transmitter Activator
1x RF542 Quick Reference Guide

RF500 Product Range

RF500 Gateway

The RF500 Gateway is available in two variants:

- RF500A Standard
- RF500AP Power over Ethernet enabled

RF500 Transmitters are available as follows:

RF512 Temperature Transmitter

- Integral temperature sensor plus connectors for two external temperature sensors and an external door sensor
- External temperature range: –40°C to +125°C

RF512M Temperature Transmitter Backbone Option

- Integral temperature sensor plus connectors for two external temperature sensors and an external door sensor
- External temperature range: –40°C to +125°C
- Includes High Gain Antenna and RF520 AC adaptor

RF513 Temperature and Humidity Transmitter

- Integral temperature sensor, one integral humidity sensor and connector for an external door sensor
- Integral temperature range: –30°C to +70°C
- Humidity range: 10-90% RH

RF513M Temperature and Humidity Transmitter Backbone Option

- Integral temperature sensor, one integral humidity sensor and connector for an external door sensor
- Integral temperature range: –30°C to +70°C
- Humidity range: 10-90% RH
- Includes High Gain Antenna and RF520 AC adaptor

RF515 Analog Input Transmitter and RF515A Connection Box

- Two analog input channels, each capable of configuration as 0-1V, 0-10V or 4-20mA using RF515A connection box

RF516 Precision Temperature Transmitter

- Integral temperature sensor, and connector for one external temperature Pt100 sensor and an external door sensor
- External temperature range: –200°C to +400°C

RF542 Temperature Transmitter

- Connectors for two external temperature sensors and an external door sensor
- External temperature range: –40°C to +125°C
- Includes RF520 AC adaptor

Optional Accessories

RF520	AC adaptor for RF512, RF513, RF516 and RF542
RF502	RF Bridge - 0.5m lead to enable transmission through RF resistant barriers
RF503	RF Bridge - 1.0m lead to enable transmission through RF resistant barriers
RF515A	2-Channel Terminal Box with 0.25m lead terminated with 6-Pin Lumberg Plug Includes two sets of 10R, 2K and 18K2 precision resistors
RF521	Door Sensor for hinged doors
RF522	Door Sensor for roller shutter type doors
RF525	Transmitter Activator
RFJACK	Alarm Output jack (2.5mm)
RFALARM	Alarm Output lead - 2m fig-8 wire terminated with 2.5mm jack

Safety Information

Under no circumstances may a user make any changes to the RF500A Gateway that would alter its performance. Any modification would void the CE compliance of the Gateway and may invalidate the warranty.

If the equipment is used in a manner not specified by Comark Instruments, then the protection provided by the equipment may be impaired.

No user serviceable parts are provided in RF500 Comark Wireless Monitoring Equipment. Contact Comark Instruments or your local distributor for all service requirements.

Warning

- Before connecting or disconnecting the antenna, ensure anti-static precautions are observed.
- Use only the FRIWO 12V AC adaptor; Type FW74010/12 as supplied with the RF500A Gateway.
- Do not modify the RF500A Gateway AC adaptor in any way.
- Use only the PHIHONG, PSM11R-050 5V AC adaptor or FRIWO type FW7662/05 with RF500 transmitters. It is supplied by Comark Instruments as three variants:

RF520	Transmitter AC adaptor with UK mains plug
RF520/EU	Transmitter AC adaptor with European mains plug
RF520/US	Transmitter AC adaptor with North American mains plug
RF520/AUS	Transmitter AC adaptor with Australian mains plug

- Do not modify the AC adaptor in any way.
- RF500 transmitters contain a C-size lithium cell (AA-size for RF542). This cell must not be incinerated or subjected to temperatures in excess of 100°C. Do not deform, mutilate, crush, pierce, disassemble, recharge or short circuit. Such abuse can result in loss of seal, and/or cell explosion. Also exposure to humid conditions for long periods should be avoided.
- Do not insert metal objects into connectors.

- Ensure the antenna is securely connected before powering the equipment. Internal damage may result otherwise.
- The Gateway and Transmitters have been designed to operate with the antenna supplied by Comark, and having a maximum gain of 7dBi. Antennas not supplied by Comark Instruments or having a gain of greater than 7dBi are strictly prohibited for use with this device.

WEEE

RF512, RF513, RF515, RF516 and RF542 transmitters contain a non rechargeable lithium battery. This battery must be disposed of in accordance with local regulations.

Powering On and Off

Switch On

BEFORE SWITCHING ON, ENSURE THE ANTENNA HAS BEEN FITTED - IT IS ESSENTIAL TO AVOID DAMAGE.

1. Plug the Gateway AC adaptor into the socket on the underside of the Gateway, or for the PoE model (RF500AP) plug the Ethernet cable into a PoE enabled network socket. The Power/Battery indicator should show steady green.
2. Using a paper clip or similar object, press in and hold the ON / OFF switch on the side of the Gateway for 4 seconds. The Gateway will beep once and the blue ON* indicator will flash at a half-second interval. Gateway bootup will begin. On successful boot, the ON indicator will show solid blue.

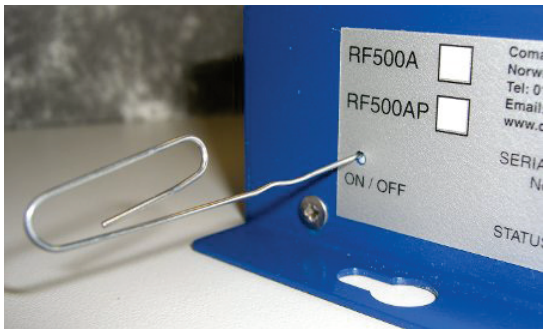


Figure 1 - Switch On using Paper Clip

* The ON indicator is shown in “Figure 6 - Front Panel Indicators” {Page 24}

The Gateway contains an internal backup battery, if this battery is not sufficiently charged; the Gateway will not switch on. Once external power is connected the internal battery will begin recharging. Whenever the charge state becomes sufficient the Gateway will automatically start as requested. Whilst in this mode Status LEDs 1, 2, 3 and 4 will flash in sequence. See “Figure 8 – Left Hand Side View of Gateway” {Page 26} for location of these LEDs.

It takes a few minutes for the Gateway to initialise; a sequence of 2 beeps followed by 4 beeps indicates successful initialisation.

Gateway Switch OFF

To turn the Gateway OFF navigate to the hardware page of the Gateway Web-View and use the **Shutdown Gateway** button, this will initiate the Gateway shut-down procedure.
If for some reason it is not possible to use the Gateway Web-View, then using a paper clip or similar object, press in and hold the ON / OFF switch on the side of the Gateway for 4 seconds. The Gateway will beep once and the ON indicator will flash at a 3 second interval to indicate shut-down. Once the shut-down sequence begins, the Gateway will beep 10 times in quick succession. The shut-down procedure could take up to 5 minutes to complete. After shut-down is complete the ON indicator extinguishes.

Gateway Reset

There are several circumstances under which the Gateway will perform a software reset, (for example performing Gateway Clock Setup). At start of the sequence the Gateway will beep 10 times in quick succession. The reset could take up to 5 minutes to complete which is indicated by a sequence of 2 beeps followed by 4 beeps to indicate successful initialisation. Unlike the shut-down described above, the ON indicator will remain steady during the reset sequence.

Transmitter Activation

RF500 transmitters are despatched in a disabled state to preserve the battery. To activate these, insert the RF525 Activator into the 3-pin socket marked B in “Figure 10 - Connector view of RF512, RF515, RF516 & RF542 Transmitter” {Page 28} until the display is enabled then remove the RF525.

On rare occasions RF542 Transmitters may show low battery on activation. This is due to a chemical process within the AA lithium cell called passivation, this is normal and the AA cell is not necessarily dead. Simply remove and replace the same battery by following the instructions in “Changing Lithium Battery on RF500 Series Transmitters” {Page 43}. The low battery indication should not re-appear.

Once activated, transmitters can only be de-activated by removing the battery.

RF500A-CONFIG - RF500A Configuration Utility

Each Gateway is shipped with a default IP address of 192.168.25.220. The Gateway IP address must be changed to the Static IP address provided by your IT department before connecting to the LAN.

Comark Instruments provides a Windows utility: RF500A-CONFIG to allow changing or viewing the Gateway IP address via the USB port.

Requirements for RF500A-CONFIG

- Windows XP, Windows XP 64-bit or Windows 7, Windows 7 64-bit
- Comark USB Drivers (The USB drivers must be installed prior to installing RF500A-CONFIG)
- Oracle (previously Sun) Java Runtime Environment 1.6.0 or later

Installation of USB Drivers

Obtain Comark USB Drivers

Comark USB Drivers can be downloaded from the following websites:

- http://www.comarkinstruments.com/software.tpl – UK and International
- http://www.comarkusa.com/software.tpl – USA, Canada and South America

Click the **Comark USB Driver.exe** link shown on web page above. Fill in the form and tick the box to confirm you have read the Software License Agreement. Proceed to download the file and choose the **save** option to start the download.

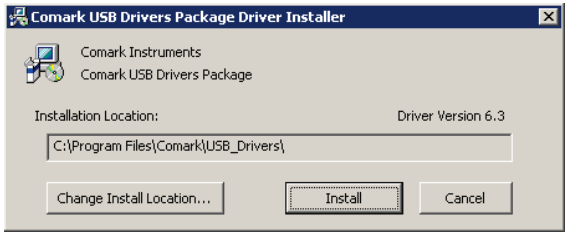
USB Driver Installation Instructions

When the download is complete; click the **run** button.

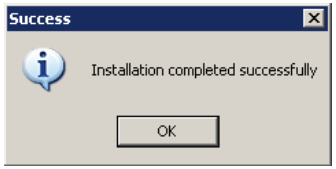
NOTE: Windows will ask if the user wants to allow this program wto run, select **yes**.

Confirm you wish to install.

The screen opposite should be displayed - Click **Install**.



Once installation is complete you will see the screen opposite.



Please note your computer may request a restart after installation completes.

Installation of RF500A-CONFIG

Obtain RF500A-CONFIG Utility

Comark RF500A-CONFIG can be downloaded from the following websites:

- http://www.comarkinstruments.com/software.tpl – UK and International
- http://www.comarkusa.com/software.tpl – USA, Canada and South America

Click the **RF500A Config Util-1.00-Setup.exe** link shown on the web page above. Fill in the form and tick the box to confirm you have read the Software License Agreement. Proceed to download the file and choose the **save** option to start the download.

RF500A-CONFIG Installation Instructions

- When the download is complete, click the **run** button.
- NOTE: Windows may ask if the user wants to allow this program to run, select **yes.**
- Confirm “English” as the install language (there is no other choice available).
- In response to the question: *This will install RF500A-Config Util on your computer. Continue ?* Click **YES.**
- The following screen states: It is recommended that you close all that all other applications before continuing After closing these applications click the **Next** > button.
- When prompted to *Choose Destination Folder* accept the default of: *C:\Program Files\Comark\RF500A Config Util* by clicking the **Next** > button.
- When prompted to *Start Copying Files* click the **Next** > button.
- The installer will copy the files and confirm that it has s*uccessfully installed RF500A Config Util.* Click the boxes to install your choice of short-cuts and click the **Finish** button.

Running RF500A-CONFIG for the First Time

RF500A-CONFIG will examine the Java environment and update it if necessary. Successful update is confirmed by the message opposite.

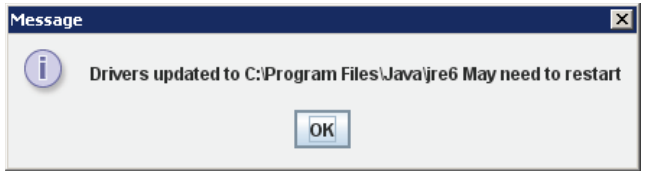


Figure 2 - Java Environment Update Successful

After clicking **OK**, RF500A-CONFIG will attempt to restart automatically but on some systems this may not occur. In this instance simply restart RF500A-CONFIG using the Start Menu or other installed short-cut.

RF500A-CONFIG is now properly installed and ready for use during Gateway Commissioning as follows:

Gateway Commissioning

This section covers:

- Network configuration
- Setup of first Administrator
- Setting Gateway language
- Setting Gateway name
- Setting date and time

Requirements for Commissioning

- Computer with USB port and RJ45 Ethernet jack
- Comark RF500A-CONFIG Utility and USB cable
- Static IP address, Subnet mask and Default gateway (Usually allocated by IT Department)
- Email server name or IP address
- DNS server IP address (required if email server is named)

Setting of Gateway IP Address using RF500A-CONFIG

Each Gateway is shipped with a default IP address of 192.168.25.220. The first stage of commissioning is to complete basic network configuration. Comark provides a Windows utility: RF500A-CONFIG to perform this configuration.
To complete this section, you will need the following pieces of information from your IT department:

- Static IP address for the Gateway
- Subnet mask
- Default Gateway
- DNS Server *Not a requirement for this stage but may be needed for later configuration*

1. Connect the RF500A Gateway to the computer using the USB lead.
2. Switch on the RF500A. See “Powering On and Off” {Page 10} for instructions.

3. Start the RF500A-CONFIG Utility using the Windows Start Menu – The screen as shown in “Figure 3 - RF500A-CONFIG Screenshot” opposite, will be displayed:
4. Enter the Serial Number of the Gateway connected then click the **View Current Settings** button - Wait until the various fields are populated.
5. Enter the IP address, subnet mask and Default Gateway using dotted decimal notation into their respective fields.

Software Issue	For Comark Instruments use only
Comms Port	For Comark Instruments use only
Mac Address	Hardware address of the Ethernet interface
IP Address	The IP address allocated to the Gateway
Net mask	The subnet mask associated with the IP address
Default Gateway	The IP address of the network gateway to allow access from a different subnet

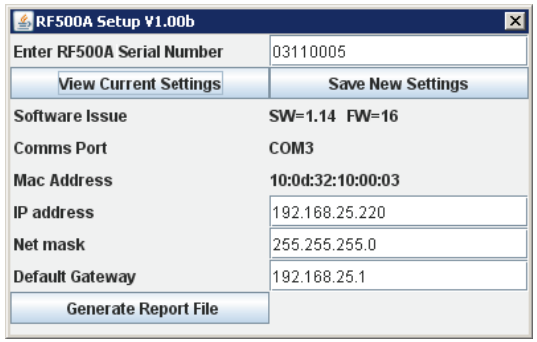


Figure 3 - RF500A-CONFIG Screenshot

6. Click the **Save New Settings button** - After successful transfer, RF500A-CONFIG will Reset the RF500A.

The **Generate Report File** button is only for use under instruction from Comark Technical Support.

Viewing the Gateway Login Page

Ensure both the computer and Gateway each have an Ethernet cable connection to the LAN or are connected together via Ethernet cross-over cable.

Recall the IP address that was configured in
"Setting of Gateway IP Address using RF500A-CONFIG" above.

1. Start the Web Browser on the computer.
2. Enter the IP address into the Address Bar as displayed opposite.
3. Press "Enter" key or click "Go".
4. The Gateway login screen as in Figure 5 below will be displayed.

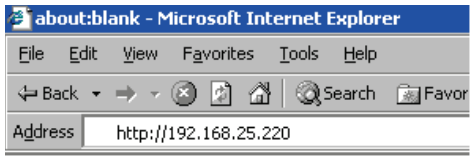


Figure 4 - Browser Address Bar

Figure 5 - Gateway Login Screen

Setup of First Administrator

As shipped, the Gateway has no users configured except for a special “one-time-use” installation user which enables an installer to add the main Administrator to the Gateway. Thereafter this Administrator’s username is used to perform all subsequent commissioning.

1. At the Gateway user login screen, type the username “comark” and click **Enter.**
2. At the password screen enter “42” and click **Enter.**
3. You will be logged into the Gateway as the installation user.
4. The Gateway will inform you that “You are about to commission a new system”.
5. Click on the **Enter Administrator Details** button.
6. When the Add 1st Administrator screen appears, fill in the fields with the username and password of your choice.
7. In the top left box, marked “Password Required”, enter the installation password: ”42” and then click the **Submit** button.
8. If successful the Gateway will return the message “New user added”.
9. Click the **OK** button to return to the Gateway user login screen.
10. Login as the new Administrator you just created.

Gateway Language

The language the Gateway uses in web pages and in emails can be changed as follows:

1. Click the **Administration** button then the **Language** button.
2. Click the radio button below the flag corresponding with your choice of language. Enter your password and click the **Submit** button.

The language selected is used immediately for all web pages and emails generated for all users.

Gateway Name

A Gateway name is required for email operation.

The Gateway Name is any name you choose, subject to the limit of up to 16 alphanumeric characters only. It will be used in the “From:” field in email and SMS notifications. This is important if you have more than one Gateway in your wireless system and all should be unique.

1. Click the **Administration** button then the **Gateway Name** button.
2. Enter the new Gateway Name into the entry field.
3. Enter your password then click the **Submit** button.

Gateway Clock Setup

1. Click the **Administration** button then the **Set Clock** button.
2. Enter the current date and time using a 4-digit year.
3. Enter your password and click the **Submit** button.

The Gateway will automatically reset after this step.

Network Setup

The Network Settings page has many fields but at this stage for a basic LAN connectivity test, only the Network Details section is required.

This section assumes a network connection via LAN and the IP address configured using RF500A-CONFIG as opposed to using a cross-over cable and the RF500A default IP address of 192.168.25.220.

Click the **Administration** button then the **Setup Network** button to show the Network Details page.

Network Details

Your IT Department usually provides the following information in order to set up your Gateway for Network Access:

- *Static IP Address*
- *Subnet Mask*
- *Default Gateway*
- *DNS Server*

Enter these using dotted decimal notation into their respective fields. If access from different subnets is required also enter the Network gateway IP address. Users who implement MAC address access security will find the MAC address of the LAN interface displayed in this screen.

Static IP Address	The IP address which has been allocated to the Gateway. E.g. 192.168.25.217
Net mask	The subnet mask associated with the above IP address. E.g. 255.255.255.0
Default Gateway	The IP address of the network gateway to allow access by users on a different subnet
DNS No	The IP address of your LAN Name Server

1. Double-check the *Static IP Address* entered because any entry mistake here can cause problems connecting after settings are saved.
2. To save changes, enter your password and click the **Save** button. The Gateway may automatically reset after this step.
3. Wait until the Gateway has successfully reset. See “Gateway Reset” {Page 11} for details.
4. Verify that a connection can be made to the Gateway by following the steps in “Viewing the Gateway Login Page” {Page 19}.

Gateway Programming and Use

This, the RF500A System Manual covers installation and commissioning of the RF500 Wireless Monitoring system from a hardware point of view.

A Web-View Help Guide for the RF500 Wireless Monitoring System is available online via the Gateway itself. This is a detailed manual incorporating help and detailed information on use of the Gateway and transmitters, including all the available pages.

Using the Web-View manual as a guide the remainder of the RF500 Gateway configuration can be performed. This includes:

- Email Setup
- Email Account
- Adding Transmitters
- Create a Backup

RF500 System Components

Know your Gateway

RF500A Front Panel Indicators

Figure 6 - Front Panel Indicators

There are four LEDs on the front of the Gateway:

ON	*Steady Blue*	The Gateway is running
	Flashing at ½s rate	Gateway is starting up
	Flashing at 3s rate	Gateway is shutting down
POWER / BATTERY	*Steady Green*	External power is available
	Flashing Green	Gateway is on and running off the battery pack
	Off	Gateway is off and external power is not available
FAULT	*Flashing Yellow*	Contact technical support from your local distributor or Comark Instruments. The Home Page may provide more information on possible faults
ALARM	*Flashing Red*	An enabled alarm event has occurred

Bottom Connections

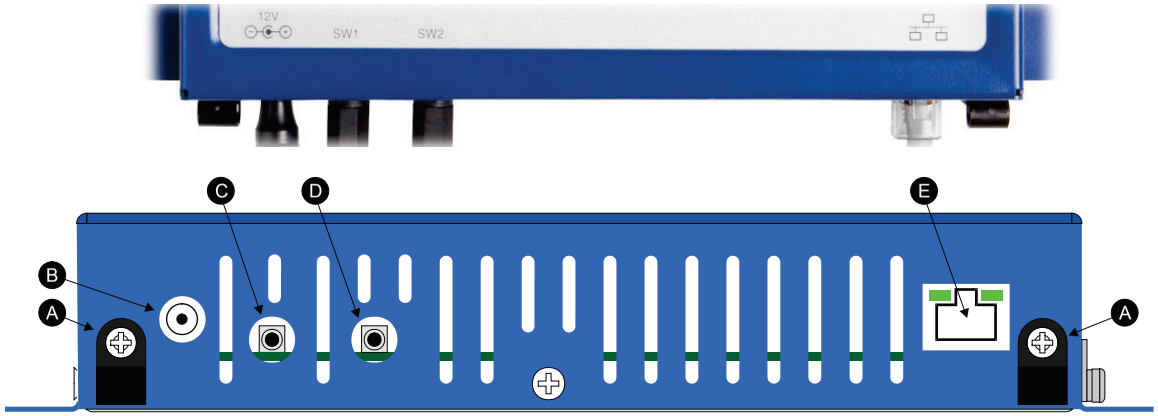


Figure 7 - Bottom View of RF500A Gateway

A. Cable clamps
B. 12 VDC input
C. SW1 – Jack Socket for Relay Output 1
D. SW2 – Jack Socket for Relay Output 2
E. RJ45 Ethernet LAN Socket

Alarm Outputs

SW1 & SW2 are two switched outputs provided for connection to customer alarm indicators, via relay contacts with **24Vdc 500mA** rating, configurable for either NO (Normally Open) or NC (Normally Closed). These are marked as SW1 and SW2, and are in the form of 2.5mm Jack Sockets. Plugs to fit these sockets can be ordered from Comark Instruments using part number: RFJACK.

With the Gateway switched OFF the relays are in a Normally Open condition, this may cause any equipment connected to the contacts to energise.

Side Switches and Indicators

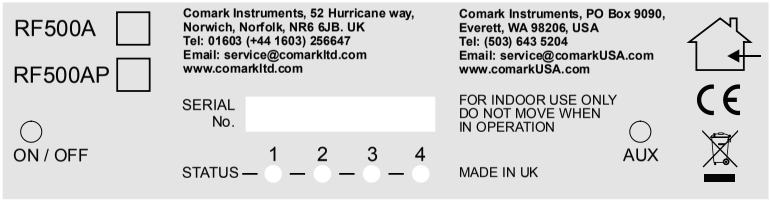


Figure 8 – Left Hand Side View of Gateway

ON / OFF	Gateway Startup/Powerdown switch
STATUS	Diagnostic LEDs for technical support use
AUX	Reserved Switch

Know your Transmitter

A. Alarm LED. Flashes red to indicate any one channel in alarm
B. Active LED. Flashes green to indicate external power detected
C. Infra-Red interface. For Comark use only
D. Antenna. (Do not remove whilst in operation)
E. Lashing eye - Four available
F. Internal temperature sensor

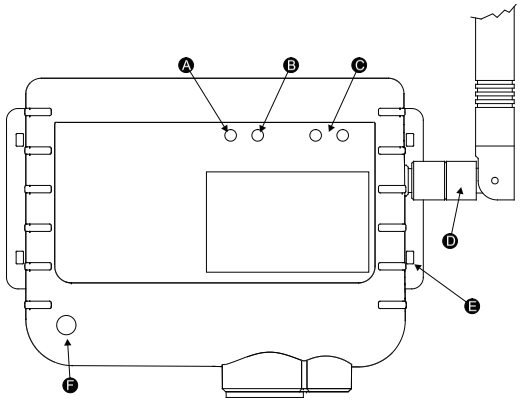


Figure 9 - Front view of RF512 Series Transmitter

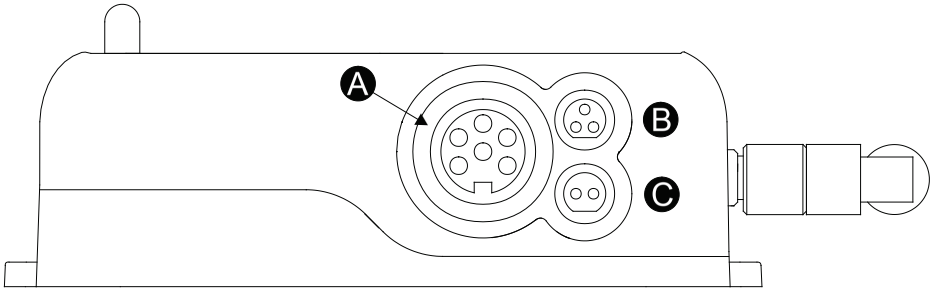


Figure 10 - Connector view of RF512, RF515, RF516 & RF542 Transmitter

A. Lumberg Socket for Probe
B. Socket for Door & RF525 Activator (Dual function)
C. External DC adaptor socket

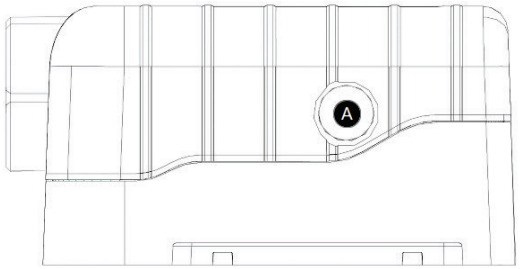


Figure 11 - Ethernet Link Indication Window (RF542 Only)

A. Ethernet link indication (once a link is detected the green indicator will be illuminated)

Transmitter Display

RF500 transmitters all have a liquid crystal display as shown below. Only RF512 is capable of using all three display areas and annunciators.

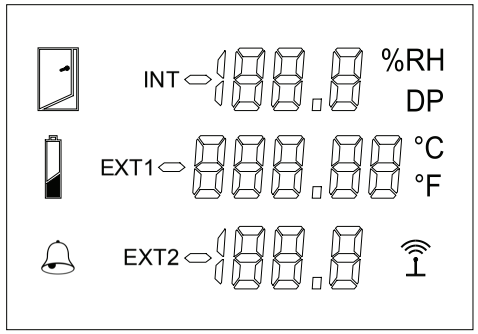


Figure 12 - Transmitter Display

Indicates that the door channel reads open.

Indicates that the internal lithium battery requires replacement.

Indicates an unacknowledged alarm on any channel.

When steady, indicates that the transmitter has logged onto the Gateway.
When flashing, indicates the transmitter is currently attempting transmission with the Gateway.

-11- Indicates that the sensor or probe is broken.

b 19 Indicates that the number to be displayed is too big to fit on the LCD. E.g. 2000 cannot be shown on a “1999” digit area.

RF542 Network Transmitter - Detailed Operation

The RF542 Network Transmitter is a two external channel temperature monitor. Communication to the RF500 Gateway does not use RF but an Ethernet LAN connection is used instead. It allows temperature monitoring in locations which are out of radio range of the Gateway.

The RF542 will only transmit data to its associated Gateway when connected to external power via the RF520 AC adaptor. If external power is removed, transmitter temperature monitoring and logging will continue. Once external power is restored, data record transmission to the Gateway will resume.

Whilst external power is connected, the transmitter will become noticeably warm to the touch.
This is normal and expected behaviour.

Figure 13 - RF542 RJ45 Network Port

Connections to Network

This device supports fixed speed 100Mbps, half duplex. It has a DHCP client so the IP address will be assigned by the network; there is no facility to set a static IP address.

RF542 Setup Procedure

1. Plug RF542 into network.
2. Plug the RF520 into the mains and into the RF542.
3. Plug in the RF525, the LCD will first display the current IP address of the RF542 which needs to be noted down for the next step. In the example in Figure 14 below the IP address would be 192.168.25.188. If the RF542 IP address is 0.0.0.0 this means the network has not issued an IP address yet, remove the RF525 and try again. If you missed some of the sequence, remove the RF525 and try again.

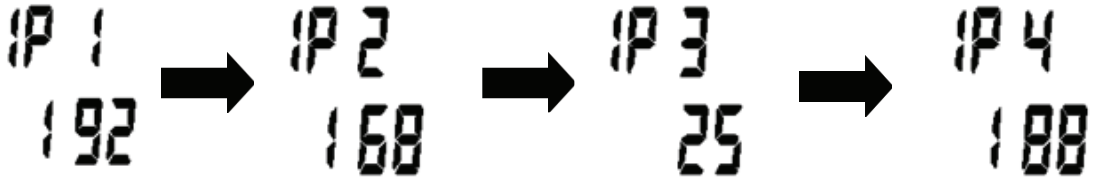


Figure 14 - Display of RF542 IP Address

4. Once the set of four numbers for the IP address has been displayed the LCD will finally show SETUP as shown below:

Figure 15 - RF542 in Setup Mode

5. Using the PC and a suitable Web Browser (use Firefox, Chrome or Internet Explorer), enter the IP address as noted down from step 3 into the address bar and the page opposite will be displayed:

6. In the text box above the buttons type in the IP address or URL of the RF500A that will store the data for this transmitter.

4. Click the Enter button and the confirmation screen opposite will be displayed:

5. Setup is now complete. Remove the RF525, the transmitter will now revert to normal operation ready to be added to the Gateway for tasking.

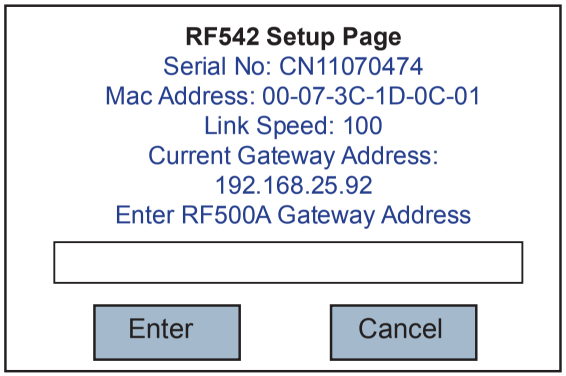


Figure 16 - RF542 Setup Page

7. Click the **Enter** button and the confirmation screen opposite will be displayed:

8. Setup is now complete. Remove the RF525, the transmitter will now revert to normal operation ready to be added to the Gateway for tasking.

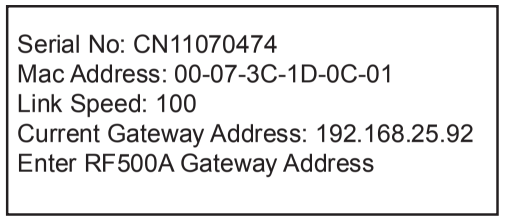


Figure 17 - RF542 Setup Page Confirmation Page

Equipment Installation

Comark Instruments strongly recommend that RF500 System installation is carried out by a Comark Installation Engineer or by a Comark Authorised Distributor or Agent.

Gateway Fixing

Mounting of the Gateway is possible using the keyhole screw fixings provided on the rear of the Gateway itself. However the fixings used are to be determined by the installation engineer depending on the type of material used in the construction of the area where the Gateway is to be placed. To avoid accidental disconnection, the DC power cable and cables connecting to the Relay Outputs should be secured using the cable clamps provided on the Gateway case. See “Figure 7 - Bottom View of RF500A Gateway” {Page 25}.

Positioning of the Gateway should be in such a way as to limit the risk of liquid being spilt on it as damage may result.

Transmitter Fixing

Mounting of the transmitters is possible using the mounting bracket provided. The bracket is fixed using 2 screws and the transmitter then slides into the bracket from the top. With each transmitter, Comark Instruments provide two cable ties which, once the transmitter is slid into the bracket, can be fed through the slots in both bracket and transmitter case to retain it. The door and DC power cables should be tie-wrapped to the bracket to avoid accidental disconnection.

Mains Wiring

Connections to mains supply for the Gateway and powered transmitters is via the AC mains adaptors supplied and a locally installed socket. Any power requirements for the hardware will be determined during survey and should be installed by qualified electrician and certified as safe to use before installation can be started.

Ventilation

At no time should the ventilation slots on the Gateway be covered or obstructed. At least 100mm of free space must be provided above and below the Gateway to ensure that sufficient airflow is maintained through the case to provide adequate cooling. Failure to do this may result in damage to the Gateway due to overheating and invalidation of the warranty.

RF500 Wireless Monitoring System Overview

Gateway – Introduction

The RF500A Gateway is an embedded microprocessor device containing a radio module for RF communications to the monitoring transmitters. The radio module uses a licence free band in the 2.4GHz spectrum. Comark Instruments RF500 uses proprietary protocols over a standard IEEE 802.15.4 link. These protocols achieve reliable communication between the transmitters and the Gateway via self-healing mesh radio networks.

Data from measurements taken by the transmitters is stored on the RF500A Gateway in contrast to other systems which store their data on a PC using special software. For operating the RF500 system the only software required is a Web Browser such as Internet Explorer or Firefox. There is no requirement to install software on each user's computer.

The Gateway contains sufficient data storage capacity for up to 10 years which can be automatically backed up to external storage using the built in shared drive backup method, or by manual request to generate and download a backup file via your web browser.

An external power adaptor provides the mains power for the Gateway. An internal Nickel-Metal-Hydride (Ni Mh) rechargeable battery is included, this provides normal operation of the Gateway during power failure until the battery is exhausted; the Gateway then shuts down until power is restored.

Two relay connectors are provided for external alarms, Autodiallers/Klaxons etc. All other connections to the Gateway are disabled. See “Figure 7 - Bottom View of RF500A Gateway” {Page 25} for further details.

Emails for alarms will be instigated directly from the Gateway. It is also possible to send a text message alarm via email using a third party provider.

The Gateway can be either desk mounted or wall mounted. Wall mount keyhole slots are provided on the case. The external long range Antenna has variable orientation to suit vertical or horizontal mounting.

Four LEDs on the Gateway display the current status of the system – ON, Power/Battery, Alarm indication, and Fault indication.

Overview of RF500 Mesh Networking

The RF500 Wireless Monitoring System uses the IEEE 802.15.4 radio transmission standard to implement a radio mesh network.

A mesh network is comprised of the following devices:

- Gateway
- Mesh Transmitter
- Transmitter

On installation each transmitter is associated with a particular Gateway by serial number. Messages are transferred between transmitters and the Gateway using two-way communication with acknowledgement of successful message reception.

Transmitters which are physically close to their associated Gateway such as transmitter A in Figure 18 below will most likely transmit directly to it. Others such as transmitter B which are further away rely on meshing transmitters to forward messages to and from the Gateway on their behalf.

The route taken by the message can vary depending on network load and link reliability. The ability to dynamically reconfigure the network is termed self-healing. In the figure below the self-healing ability is shown.

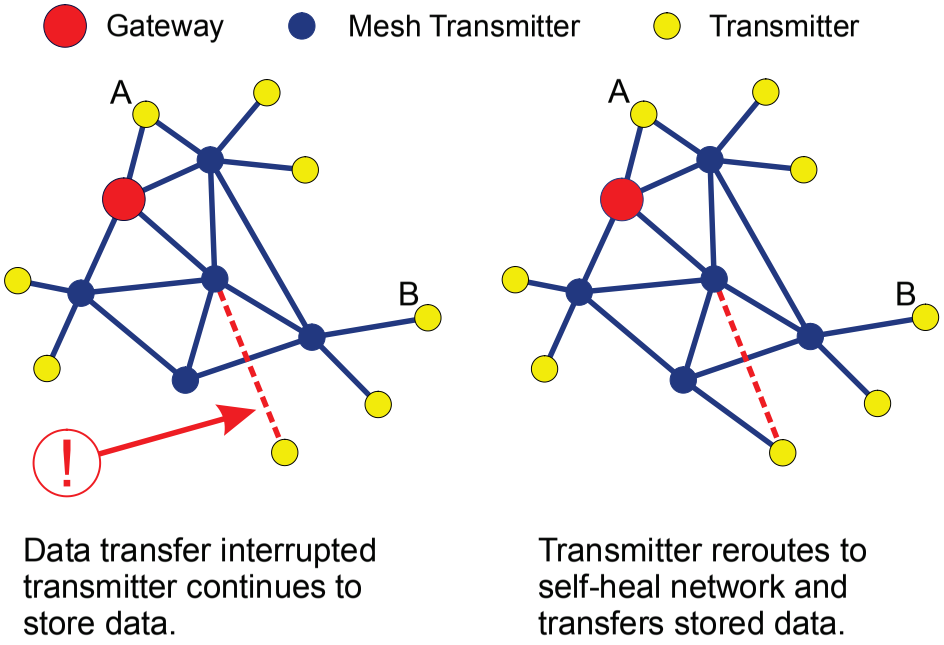


Figure 18 - A Typical Mesh Network

Meshing Transmitters and Backbone Transmitters

Whenever a RF512, RF513 or RF516 transmitter is powered by a RF520 AC adaptor it will become a Meshing transmitter and will form part of the radio mesh network, intelligently forwarding messages on behalf of other transmitters. However if external power is removed it will revert back to a regular transmitter.

In “Figure 18 - A Typical Mesh Network” above , regular Transmitter B is supported by its nearest Mesh Transmitter (coloured blue/dark) which in turn is supported by other Mesh Transmitters. If external power failed on one on those Mesh Transmitters; Transmitter B would not have a route back to the Gateway, effectively isolating it from the radio network. To prevent missed alerts from transmitters such as B it is recommended to set those Mesh Transmitters it depends on for its radio route to the Gateway as Backbone Transmitters.

RF512, RF513 and RF516 have the option to become “Network Backbone” transmitters, this option can be enabled using a setup option in the Gateway. Backbone transmitters will form part of the mesh network continuously even when not powered by a RF520. Due to the very large drain on the internal battery, Backbone transmitters must be powered using a RF520 mains adaptor. The internal battery is considered only as a backup battery for Backbone transmitters.

Automatic Data Retrieval (ADR)

The fact that transmissions between transmitters and the RF500 Gateway are acknowledged ensures that the transmitters know exactly which data records have been successfully transferred to the Gateway and those which must be re-transmitted. Therefore if the Gateway is temporarily unable to receive or transmit messages for whatever reason, data will not be lost during this period. When the Gateway is again able to receive and transmit properly the transmitters will re-transmit those records which were unable to be transmitted during the period of outage.

This re-transmission of data happens automatically without user intervention and results in seamless graphical and tabular data with no gaps.

Gateway Specification – RF500A

No of Channels	Up to 256
No of Transmitters	Up to 64
Storage Capacity	Up to 10 years worth of data
RF Frequency	2.4GHz using IEEE 802.15.4
Operating Conditions	0°C to +40°C (+32°F to +104°F) 10-90% RH non-condensing
Power Sources	AC power adaptor, rechargeable Ni-Mh battery RF500AP only: Power over Ethernet (PoE) capability. Compliant to IEEE 802.3af
Power Adaptor	100-240VAC 1.5A 50/60Hz
Battery Backup	4.3Ah Ni-Mh Rechargeable Battery. Running time approximately 1 hour
Clock Accuracy	4ppm (2 minutes per year)
Relay Outputs (SW1 & SW2)	Two individual 2.5mm jack sockets. Contacts: 24Vdc 500mA maximum
Maximum Relay Output Lead Length	Not to exceed 30m
Power Consumption	12W typical
Dimensions	L 225mm x W 150mm x D 40mm
Weight	1.3kg

Transmitters Specification

Temperature Measurement Range Integral Thermistor Sensor - RF512, RF516 Integral Thermistor Sensor - RF513 External Sensor - RF512, RF542 External Pt100 Sensor - RF516	 -30°C to +70°C / -22°F to +158°F -30°C to +70°C / -22°F to +158°F -40°C to +125°C / -40°F to +257°F -200°C to +400°C / -328°F to +752°F
Humidity Measurement Range (RF513)	10 to 90% RH
Analog Input Measurement Range (RF515)	0-1V, 0-10V, 4-20mA
System Accuracy Temperature with Standard Sensors Internal Thermistor – 0°C to +70°C / -32°F to +158°F External Thermistor – -20°C to +70°C / -4°F to +158°F Thermistor – full range Pt100 – full range between two points	 ±0.5°C / ±1°F ±0.5°C / ±1°F ±1°C / ±2°F ±0.1°C / ±0.2°F
Humidity 10-90% RH	±5%
System Accuracy - Analog Input (23°C) / (73°F)	0.3% of reading

Resolution Temperature Thermistor Pt100 Door Sensor Humidity 10 to 90% RH Analog Input 0-1V 0-10V 4-20mA	 0.1°C / 0.1°F 0.015°C / 0.03°F 7.5 seconds ±0.1% 0.1mV 1mV 1µA
Maximum Probe Lead Length (Except RF516) Maximum Probe Lead Length (RF516)	Not to exceed 30m Not to exceed 3m
Pt100 Connection Type	4-Wire
Pt100 Sensor Drive Current	400µA Nominal
Operating Temperature Range (RF542)	0°C to +50°C (32°F to 122°F) 10-90%rh - Non-Condensing
Storage Temperature	-40°C to +85°C (-40°F to +185°F)
RF Frequency	2.4GHz using IEEE 802.15.4
Standard Antenna High-Gain Antenna (optional)	External, removable, Omni directional with pivot. Length: 90mm from pivot Length: 235mm from pivot
Radio Range*	*Typically 50 metres indoors

Clock Accuracy**	20ppm (1 minute/month) at 25°C (77°F)
Logging Memory	32000 records
Logging Frequency	Programmable between 1 minute and 60 minutes
Monitoring Frequency	1 minute
Indicator LEDs	Red – Warning Green – External Power (Not RF515) Green - LAN Connection (RF542 only)
Case Material	Over moulded food safe clear polycarbonate with BioCote® antimicrobial
Battery Type	Replaceable Lithium 'C' Cell Saft LSH14 LIGHT Saft LS26500 (Restricted for transport) Replaceable Lithium 'AA' Cell (RF542 only)
Battery Life***	Up to 3 years
Dimensions	L 134mm x W 83mm x D 34mm L107mm x W 83mm x D 40mm (RF542)
Weight	270g 215g (RF542)
Mains PSU	Optional Mains PSU Part No RF520 100-240VAC 0.3A 50/60Hz

* Internal RF range cannot be guaranteed as it varies from building to building. Requirement for all hardware is always determined on site by a physical site survey.

** Transmitters will synchronise their clocks with the Gateway at midnight.

*** When used at 23°C (73°F) room temperature and Radio Rate of 15 minutes.

RF542 Network Specification

Ethernet Connectivity	Fixed 100Mbps - Half Duplex - RF45 Jack
IP Address Configuration	DHCP Only
Link Status Indication	Green LED for Link Established

Changing Lithium Battery on RF500 Series Transmitters

Battery Reordering

RF512, RF513, RF515 & RF516 transmitters are fitted as standard with a high power 3.6V Primary lithium-thionyl chloride C-size cell. Manufacturers part number **Saft LSH14 LIGHT** or **Saft LS26500**.

The **Saft LS26500** battery can only be used in transmitters manufactured after April-2009. The date-of-manufacture is encoded in the serial number. The serial number has the format MMYYxxxx where MM represents the 2-digit month and YY represents the 2-digit year in which the transmitter was manufactured.

Comark recommend that only the **Saft LSH14 LIGHT** be used in powered transmitters. **The Saft LS26500** battery can suffer from short lifetime when installed in powered transmitters.

Only use **Saft LSH14 LIGHT** or **Saft LS26500** as replacements. Use Comark part number: 'RFBATT' to order a replacement battery.

RF542 transmitters use a 3.6V AA lithium thionyl chloride battery; this can be replaced by any brand of 3.6V AA lithium battery.

Battery Change Procedure

The transmitter latches any low battery condition and must be powered off fully for it to clear. Waiting for the display to go blank ensures that the low battery status is cleared.

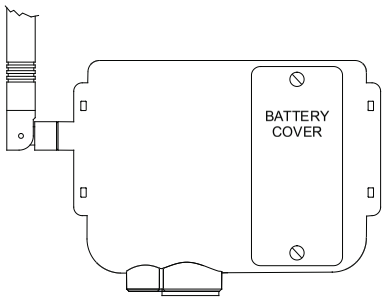


Figure 19 - Battery Cover

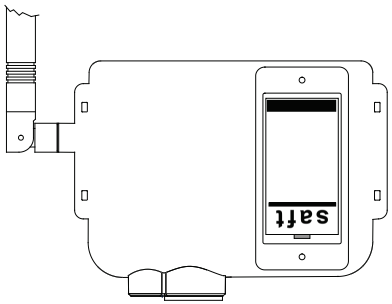


Figure 20 - C-Size Cell Fitment

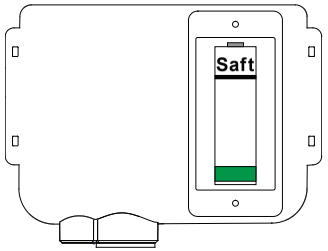


Figure 21 - AA-Size Cell Fitment

1. Disconnect all plugs from the transmitter and remove it from its mounting bracket by sliding it upwards.
2. Using a Philips No 0 or flat-blade screwdriver undo the two retaining screws and remove the battery cover.
3. Remove the exhausted battery and wait a few seconds for the display to blank.
4. Replace with a fresh one ensuring the polarity is correct and taking care to snap the new battery in cleanly without making and breaking the contacts repeatedly.
5. Replace the battery cover and do up the two screws taking care not to overtighten them.
6. Observe any local restrictions on disposal of the used cell.

Check for Transmitter Errors

The removal of the battery will cause the internal clock on the transmitter to reset and so generate a Code-100 condition. This will be cleared automatically by the Gateway, see “Transmitter Fault Codes” {Page 54} for details. Verify that the transmitter display shows either “No Code”, “No Fault” or “Code-100” only.

Should a “Code-400” or “Code-500” occur after battery change on a previously working transmitter try removing and reinserting the battery, taking care to snap the new battery in cleanly without making and breaking the contacts repeatedly.

Gateway Indication of Low Battery

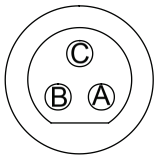
Once a transmitter shows “low battery” the radio is disabled, monitoring and data logging however will continue until the battery becomes completely exhausted. If a transmitter is left in a state of low battery for a long period, there may be many logged records awaiting transmission to the Gateway.

On changing the battery the transmitter logs a “battery good” record but due to Automatic Data Retrieval (ADR) {Page 37} this record is only transmitted to the Gateway after any previously logged temperature records have been transmitted. Therefore it may take several hours before the “battery good” record is received by the Gateway which in turn clears the indication of Low Battery for the transmitter.

Pinout and Wiring

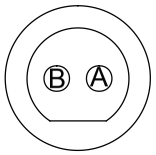
These connectors are drawn from the point of view of looking into the socket from outside the transmitter

Door Connector



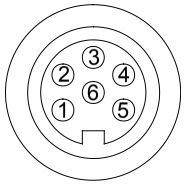
A	Door Positive
B	RF525 Activator Positive
C	Common Ground for Door and RF525

Power Connector



A	Positive +5 VDC
B	Negative Ground

Lumberg Connector



Pin No	RF512 Pinout	RF515 Pinout	RF516 Pinout
1	Thermistor External 2	External 2 Positive	Pt100 Positive Voltage Input
2	Thermistor External 1	External 1 Positive	Pt100 Positive Current Drive
3	Thermistor External 4 (Reserved for future use)	Reserved for future use Do Not Connect	No Connection
4	Thermistor Common	External Common	Pt100 Negative Current Drive
5	Thermistor External 3 (Reserved for future use)	Reserved for future use Do Not Connect	Pt100 Negative Voltage Input
6	No Connection	No Connection	No Connection

Gateway Relay Outputs

The two relay outputs each accept a 2.5mm jack plug. These are individually controlled SPST relay contacts. Comark can supply jack plugs for wiring external equipment to be activated by the Gateway.

The maximum lead length for the relay outputs is 30m.

Ensure that any external equipment presents only a low voltage on the jack so as to prevent any chance of personal injury due to electric shock should the jack plug become disconnected.

FCC Approvals

The RF500 Gateway and transmitters comply with Part 15 of the FCC Rules. Operation is subject to the following four conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.
- To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropic radiated power (e.i.r.p.) is not more than that permitted for successful communication.
- Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Transmitters must be placed greater than 20cm from the body.

Equipment Ratings

Supply Voltage

Comark will provide mains adaptors with plugs to suit your country, if the correct socket adaptor has not been provided please contact Comark for a replacement.

AC adaptors supplied for use with RF500A Gateway and transmitters have been designed for worldwide use over the following voltage and frequency ranges.

Voltage	100-240 VAC
Frequency	50/60Hz

Only use adaptors as supplied by Comark and do not attempt to use others as damage to the equipment and voiding of the CE approval may occur.

Environmental Conditions

All RF500 equipment is designed for indoor use only.
(Some outdoor installation of RF500 transmitters is permitted. Contact Comark for details)

Gateway Storage/Operating Conditions
Temperature 0°C to 40°C (32°F to 104°F)
Humidity 10-90% RH (Non-condensing)

RF51X Transmitter Operating Conditions
Temperature –30 to +70°C (-22°F to 158°F)
Humidity 10-90% (Non-condensing)

RF542 Transmitter Operating Conditions
Temperature 0 to 50°C (32°F to 122°F)
Humidity 10-90% (Non-condensing)

RF5XX Transmitter Storage Conditions
Temperature –40 to +85°C (-40°F to 185°F)
Humidity 10 to 90% RH (Non-condensing)

RF515 Maximum Input Conditions

0-1V Range	0 - 3V
0-10V Range	0 - 30V
4-20mA Range	0 - 100mA

Maintenance and Cleaning

No specific maintenance is required for the Gateway. Transmitters however will require periodic battery replacement which can be performed by the user by following the instructions on {Page 43} “Changing Lithium Battery on RF500 Series Transmitters”.

Cleaning of the Gateway should be limited to a dry lint free cloth to remove dust and debris from the airflow grills. A damp cloth may be used in the event that a more stubborn mark needs to be removed. At no time should a wet cloth or any detergent agent be used to clean the Gateway.

Service and Repair

Should service of the Gateway, transmitters or probes be required; then a “return to base” service is provided by Comark. Please contact Comark Instruments or your local distributor to make arrangements for return of any items for repair.

EC-Declaration of Conformity

Comark Instruments
52 Hurricane Way
Norwich
Norfolk.
NR6 6JB

Declare that the products:

Comark Wireless Monitoring System Comprising Part Numbers:
RF500A, RF500AP, RF512, RF513, RF515, RF516, RF520 & RF542

Is in conformity with the requirements of the following documents (Directives):

Radio & Telecommunications Terminal Equipment Directive (R&TTE) 1999/5/EC
Electromagnetic Compatibility Directive 2004/108/EC.
The Low Voltage Directive (2006/95/EC) Annex-1

Standards:
EN 61010-1:2010 Safety requirements for electrical equipment for measurement, control and laboratory
ETSI EN 301 489-17 V2.1.1 (2009-05) Specific conditions for 2.4 GHz wideband transmission systems and 5 GHz high performance RLAN equipment

David Goulden
Development Manage
Comark Instruments

[redacted]

Transmitter Fault Codes

Under certain conditions the transmitter display can show a status code or fault code. These codes can help in diagnosing the reason a transmitter may fail to transmit data to the Gateway. Status codes indicate problems that can be resolved by the user. Fault codes indicate more serious problems that generally require that the transmitter be returned for service.

This is not an exhaustive list of fault codes; only the most common will be described here.

Code	Meaning	Resolution
004	Fault with Radio / Ethernet Module	Try removing the battery then replacing it. Otherwise return for service
1000	Battery is Dead	Replace the battery
100	Date and time lost	Wait for the transmitter to receive correct date and time from the Gateway
400	Invalid Programmed Task	Program a new task from the Gateway
500	Codes 100 & 400 combined	Resolve Code 100 & Code 400 individually

Gateway Fault Conditions

Under certain conditions the Gateway Fault LED can flash to indicate an error. The possible faults which can cause the Fault LED to flash are:

- Overheating
- Battery Pack fault
- Clock error
- PSU fault
- Software errors
- Radio Module fault

Appendix A – Gateway Connection via RJ45 Cross-Over Ethernet Cable

1. Set up your computer temporarily with a fixed IP address using the instructions given in Appendix B - Setting a Fixed IP Address.
2. Connect the cross-over Ethernet cable between computer and RJ45 jack on the Gateway.
3. Configure the RF500A Gateway as in Gateway Commissioning. {Page 17}
4. Remove the cross-over Ethernet cable after the Gateway has reset. (See Gateway Reset {Page 11})
5. Using Appendix B - Setting a Fixed IP Address as a guide, restore the computer network settings back to as existed previously.
6. Connect both the PC and RF500 Gateway to the LAN using regular Ethernet patch leads.
7. Verify that a connection can be made to the Gateway by following the steps in “Viewing the Gateway Login Page” {Page 19} but using the newly configured IP Address instead of 192.168.25.220.

Appendix B - Setting a Fixed IP Address

The following instructions detail the Windows 98, ME, 2000 and XP procedure for setting a computer to a fixed IP address.

1. Go to the Windows control panel and double-click the Network icon or the Network Connections icon.
2. Right-click on the “Local Area Connection” and select Properties
3. In the General Tab select the “Internet Protocol TCP/IP” item and click on the **properties** button.

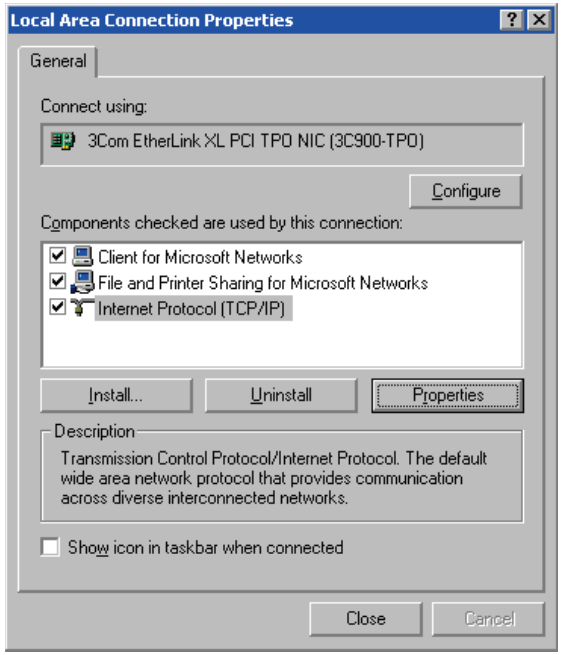
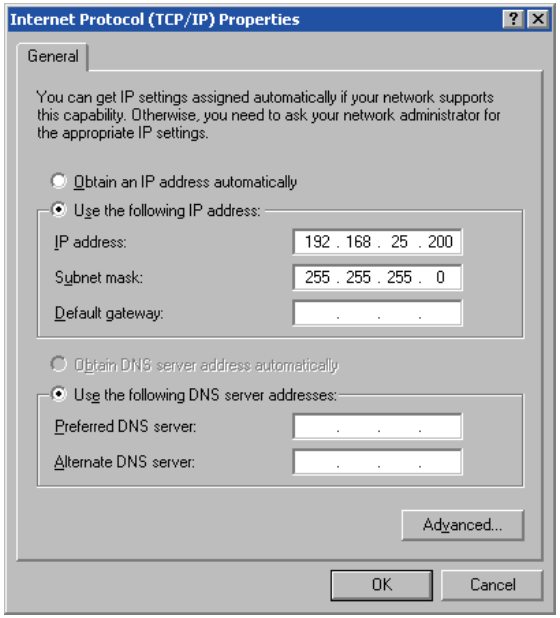


Figure 22 - Local Area Connection Properties

4. Record the original settings so that they can be restored after RF500 configuration.
5. Select the **Use the following IP address** button.
6. Enter the following IP address: 192.168.25.200.
7. Enter the following subnet mask: 255.255.255.0 then click OK.

The Computer is now setup to use a fixed IP address.



Definitions of Gateway Terminology

Avg – This is the average reading recorded in the Period being displayed. On the Home Page this is the average reading over the period of time from midnight to the timestamp of the latest reading received. In the summary pages the average reading could be over a much longer period of time.

Backbone – A transmitter during setup can be designated to be part of the Wireless Network Backbone. This requirement is identified during site surveys. A Backbone transmitter will be mains powered and constantly active. It will therefore (almost) always be available to re-transmit messages received from nearby transmitters.

Event Logging – All transmitters have the capacity to measure from one or more sensor inputs at a number of pre-defined logging intervals. However should an alarm event occur between log intervals then the transmitters will wake up to record this event. As soon as the alarm is triggered, the transmitter will wake up and transmit the alarm back to the Gateway via the mesh network. This technique allows for long intervals between logging static readings knowing that if an alarm does occur it will be captured. This results in a robust system that will log an extra reading when there is an event to record.

Gateway Name – A customer selectable name for each Gateway enables easy identification.

Last – This is the last known good reading from the transmitter. It does not imply that the transmitter is functional or currently within range.

Location – A logical grouping of transmitters for the purpose of filtering and directing alerts. These Locations may correspond to the physical siting of transmitters but more usually group transmitters monitoring equipment or environments “owned” by an individual person or department.

Login Page – A user name and password are required in separate pages to log in to the Gateway to perform any setup changes or maintenance.

Max – This is the maximum reading recorded in the Period being displayed. On the Home Page this is the maximum reading over the period of time from midnight to the timestamp of the latest reading received. In the summary pages the maximum reading could be over a much longer period of time.

Min – This is the minimum reading recorded in the Period being displayed. On the Home Page this is the minimum reading over the period of time from midnight to the timestamp of the latest reading received. In the summary pages the minimum reading could be over a much longer period of time.

Mesh Network – The technology used in the RF500 system to increase wireless reception reliability. Transmitters are setup to be either part of a Backbone or to be a regular transmitter. Those designated as part of the Backbone remain in RF contact with each other. By doing this the system is able to dynamically adapt to changing conditions automatically ensuring the integrity of the system at all times.

No Signal – The Gateway has not received any signal from a transmitter for a long time. Usually 1 hour or 5 times the radio-rate whichever is longest.

Period – A continuous session of logged records. Any break in monitoring will result in the creation of a new logging Period.

PST – Precision Semiconductor Technology or Thermistor, a sensor for measuring temperature.

Radio-Rate – The rate at which a transmitter enables its radio to contact the Gateway. The default is once every 15 minutes.

Restricted User – A user of RF500 who can only perform a selection of functions.

Self-Healing – As part of the Mesh technology the system is able to adapt automatically if one part of the system is damaged, i.e. Radio Contact is lost with part of the Backbone. Only regular transmitters directly reliant on the faulty part of the system will be affected with the rest of the transmitters simply finding alternative routes for the data.

Task – The name given to the collection of logging parameters for a specific monitoring job. Tasking is the action of entering these parameters into RF500 and sending them to the transmitter.

TextMagic™ – Internet SMS provider (www.textmagic.com). Warning emails sent from the Gateway can be converted to SMS messages using this service. Other service providers may also work but only TextMagic has been tested.

Transmitter – A transmitter is a device connected wirelessly to the system. This device records data locally from a number of sensors and sends the information back to the Gateway using RF. A transmitter is powered via battery or AC adaptor.

Glossary

21 CFR – The FDA (Food and Drug Administration) in the USA, issued regulations Title 21 CFR (Code of Federal Regulations) Part 11 that provide criteria for acceptance by FDA or an approved regulatory body, for the acceptance of electronic records, electronic signatures, and handwritten signatures executed to electronic records as equivalent to paper records and handwritten signatures executed on paper. These regulations, which apply to all FDA program areas, are intended to permit the widest possible use of electronic technology, compatible with the FDA's responsibility to promote and protect public health. Part 11 applies to any record governed by an existing FDA predicate rule that is created, modified, maintained, archived, retrieved, or transmitted using computers and/or saved on durable storage media. In other words any record from a data logger for instance that is at some stage stored on a PC or where a PC is used to retrieve the data, 21 CFR Part 11 can be applied. The RF500 system is designed to aid compliance with 21 CFR Part 11.

Administrator – An Administrator is a user who has unrestricted access to all Gateway functions.

Antenna – Electrical device for collecting or disseminating RF energy. The interface between a radio transmitter or receiver and transmission medium (air).

Autodialler – A device when triggered (by Gateway alarm for example) to dial a specific telephone number to playback a pre-recorded alarm message.

Ethernet/Network/LAN – Terms used to describe the connection of the Gateway to various users with access to the system. Personal Computers are connected together using a network via Ethernet ports combining to make a Local Area Network.

FCC – Federal Communications Commission.

Firmware – The software program operating the various components of RF500 e.g. Transmitter, RF module and RF500 Gateway.

Frequency – Number of oscillation cycles-per-second of a radio signal.

IE – Microsoft Internet Explorer.

IP address – Internet Protocol address. Unique identifier for each device connected to a network.

ISP – Internet Service Provider.

Licence free – Term used to describe the frequency band in which the system operates in terms of licence to broadcast. RF500 uses the licence free Industrial, Scientific and Medical (ISM) band of 2.4GHz where operators and users are not required to purchase any kind of licence in order to use the product.

Password – A password is a string of characters that is used for user authentication. The password is personal and should be kept secret.

Pt100 – Platinum Resistance Device for measuring temperature.

RF – An abbreviation of the words Radio Frequency. Commonly used to describe “wireless radio communication”.

RH – Relative Humidity. The amount of water vapour present in the atmosphere expressed as a percentage of the maximum that could be present at the same temperature.

Users – A user is anyone who is able to log onto an IT system such as RF500.

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Part No. 20081/5 8/13