

Resource
Data Management

Bluetooth 232 Module

Commissioning/ User Guide
Document Revision 1.1i



PR0630

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Bluetooth Mesh Systems

From Resource Data Management

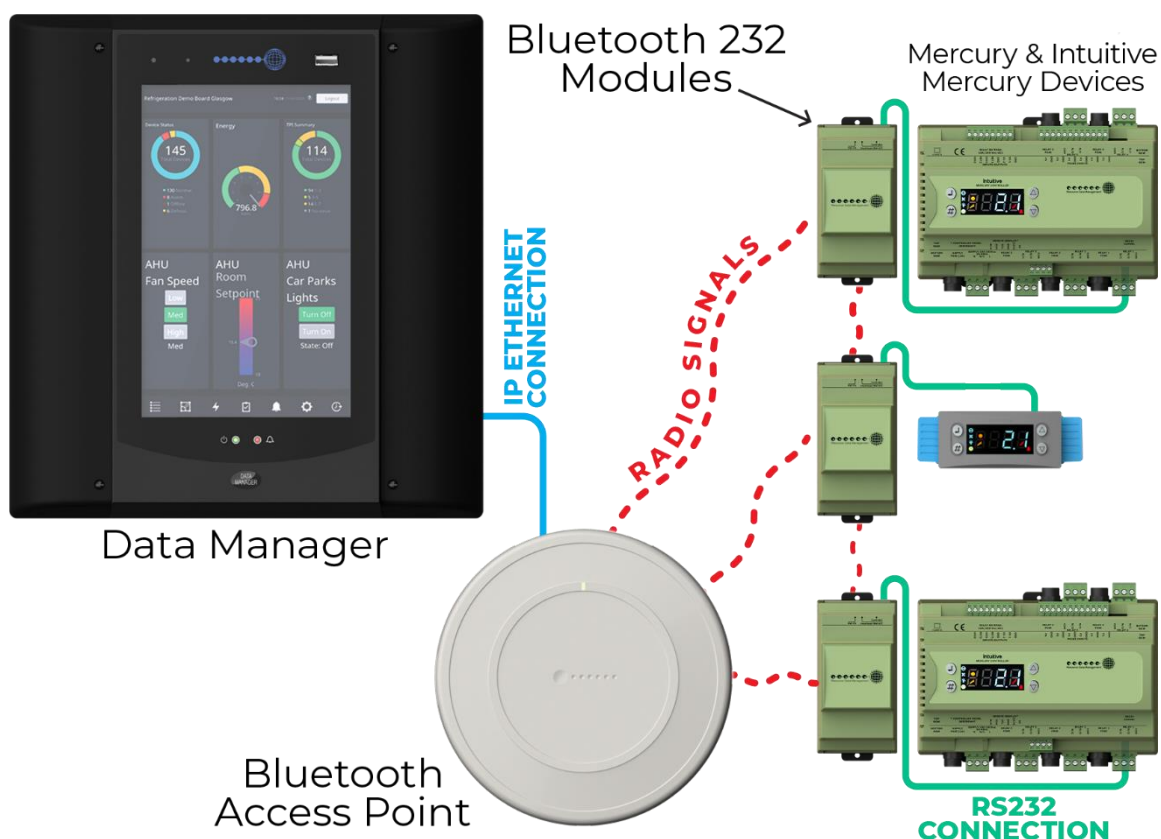
The RDM Bluetooth 232 network Communications module is designed to operate with a range of RDM devices such as the Mercury Case Controller. The wireless mesh Communications module uses the latest in Bluetooth wireless mesh technology and allows devices to be logged on to a Data Manager/miniDM/ front end system, via a Bluetooth Access Point (PR0632-DIN or PR0632-SF), without the need for a full site wired network infrastructure. This provides greater flexibility for monitoring and control solutions in applications where the installation of a wired network isn't feasible or cost effective.

The Communications network module is designed to communicate to RDM devices with RS232 comms. It obtains its power supply from the device it is connected to and therefore there is no need for a separate power supply.

Note: Bluetooth is only available from DMTouch software version v3.2.1 and above and miniDM software version v4.1

Example Site Setup

Below is a simplified example of a site setup:



In the above example a number of Intuitive Mercury devices are connected wirelessly to a Data Manager/miniDM. The Mercury device connects directly to the Bluetooth 232 module which then communicates with the Bluetooth Access Point. The Bluetooth Access Point is connected to the Data Manager/miniDM's Ethernet 0 IP network via a CAT5 patch cable (see section on [Bluetooth Access Point](#)). The wireless mesh communication module transmits the data it receives from the attached device to the Access Point as a radio signal. The Bluetooth Access Point in turn passes the data on to the Data Manager/miniDM via its Ethernet network connection. This same process allows the Data Manager/miniDM to send data to the Mercury device.



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Bluetooth Technology

Typical Non-Bluetooth Mesh Network

Shown below is a typical Wireless network. In Fig 1. Each Wireless device communicates directly to a central point which is the gateway. Any data provided by a device on the Wireless network is relayed via this gateway.

Fig 1

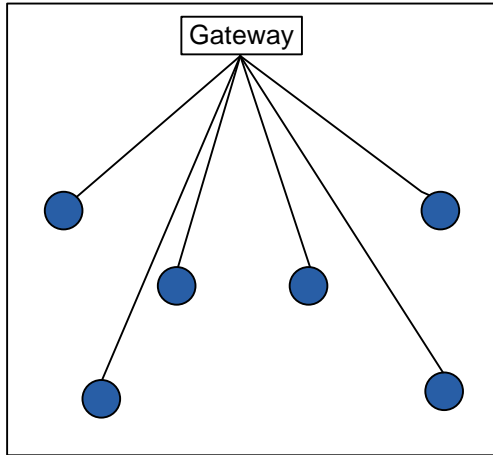
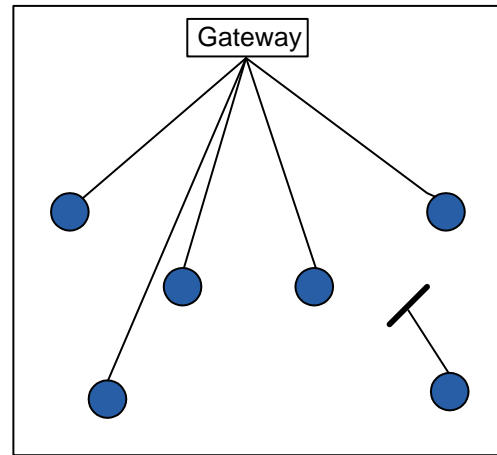


Fig 2



If any single Wireless device loses direct communication with the gateway, e.g. a structure is erected in front of the unit as seen in Fig 2, then the Wireless device would be unable to send/receive any data to/from the gateway. This results in having to either move the Wireless device, the obstruction or the gateway to restore communication.

Typical Bluetooth Mesh Network

Shown below is the RDM Bluetooth mesh system (Fig 3).

Fig 3

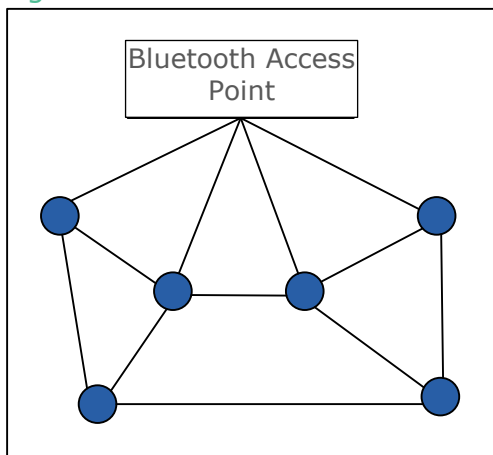
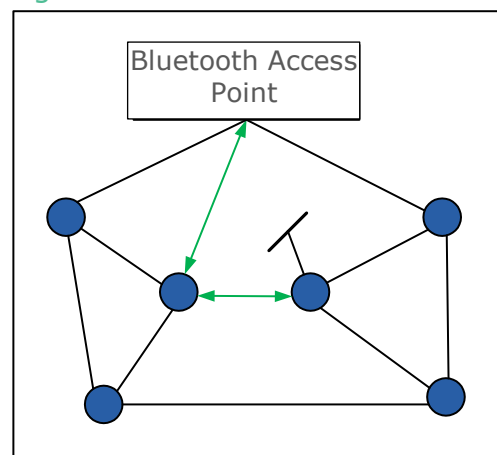


Fig 4



With the RDM Bluetooth mesh system, Bluetooth devices 'talk' to each other as opposed to only the gateway. Where a device doesn't have direct communication with the Bluetooth Access Point, its data can be forwarded via one of the other Bluetooth mesh devices which is in range of the Bluetooth Access Point as shown in Fig 4.

RDM recommends that at least one repeater is used for every 8 devices. This should ensure that there is enough coverage to create the Bluetooth mesh network for each module to communicate back to the DMTouch. The repeaters should be located in places to help the mesh network spread across the area that the probes are located in.

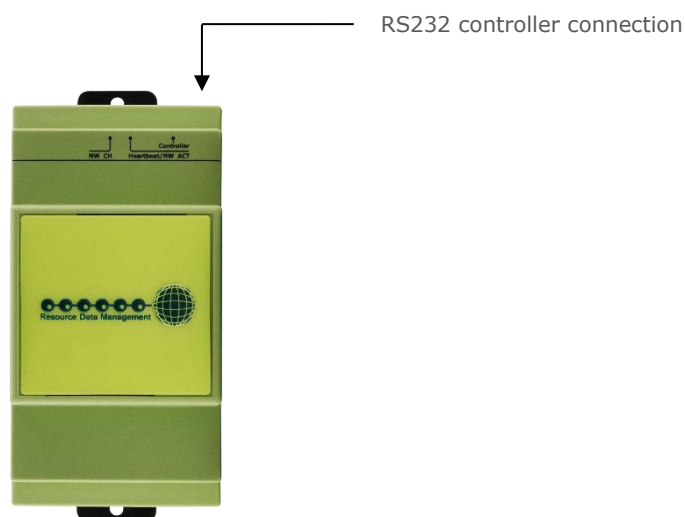


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Connections

The diagram below shows the connection details for the Bluetooth wireless mesh communication module.

NW CH – unused. Please refer to controller user manual for details on how to specify a network ID.



Connect a CAT 5 patch lead from the communication module's 'Controller' port to the RS232 port of the device to be logged on. **Note:** maximum cable length from communication module to the device is 5 Meters.

Network ID

Please refer to controller user manual for details on how to specify a network ID.

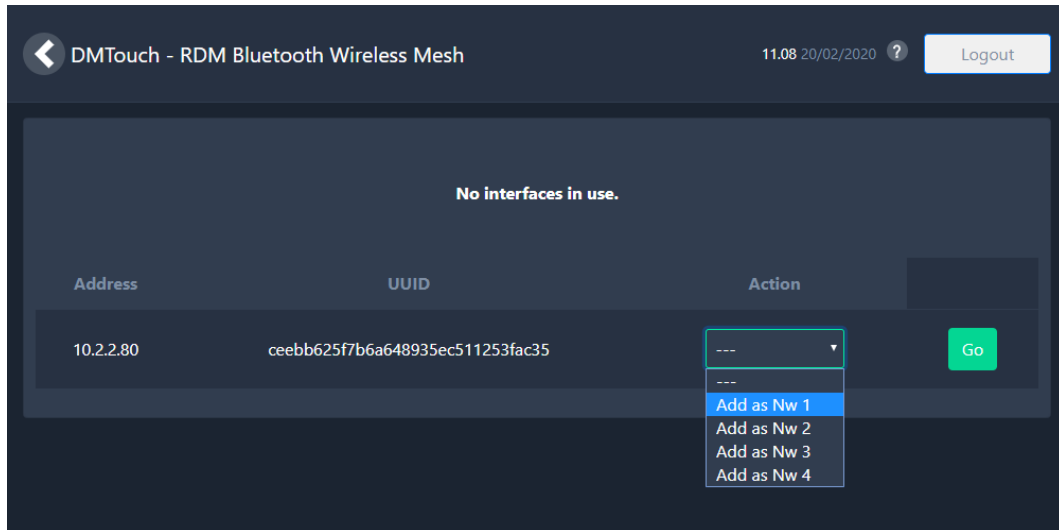


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Bluetooth Mesh Setup on Data Manager/miniDM

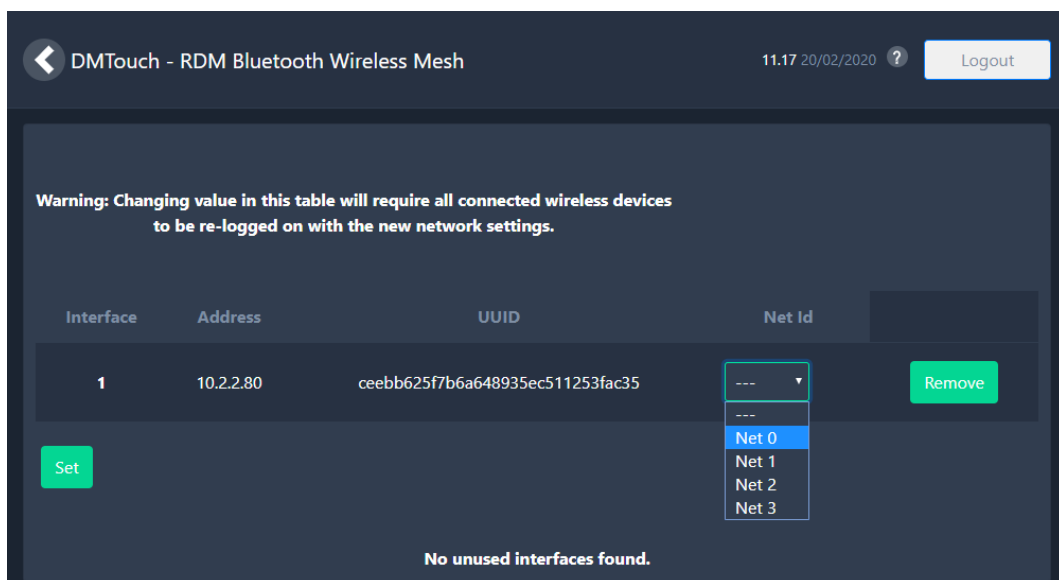
From the Service Menu select: Devices/ Network/ RDM Bluetooth Wireless

The following guide should be used to configure an RDM Bluetooth Access Point for use with a DMTouch. Up to 4 Bluetooth Access Points can be connected to the DMTouch's Ethernet 0 network. This is advantageous should the wireless network be split across multiple floors in a building.



Shown above is an example screenshot from the DMTouch's 'Bluetooth Setup' page. It shows no current interfaces in use and a single Bluetooth Access Point that has not yet been configured. As mentioned above up to 4 Bluetooth Mesh networks can operate simultaneously. The first step is to set the Access Point's Network number from the 'Action' drop down menu and click 'Go'.

Once the unit has been added as a network it will list it in the below table.



From here, select the desired Net ID (0 – 3) from the drop-down menu.

Note: Any Bluetooth mesh device to be logged on to the DMTouch via this Access Point must have its [network channel switch](#) set to the same Net ID selected for the Access Point.

Press 'Set' to save any changes made.

Now configure the wireless mesh device that is to be logged on to the DMTouch.



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Note: The software feature 'DMTouch Bluetooth Mesh Software Enabler' (PR0635) will allow 32 devices to be logged on to the DMTouch. This can be over a single Access point or multiple Access points.

Bluetooth Access Points

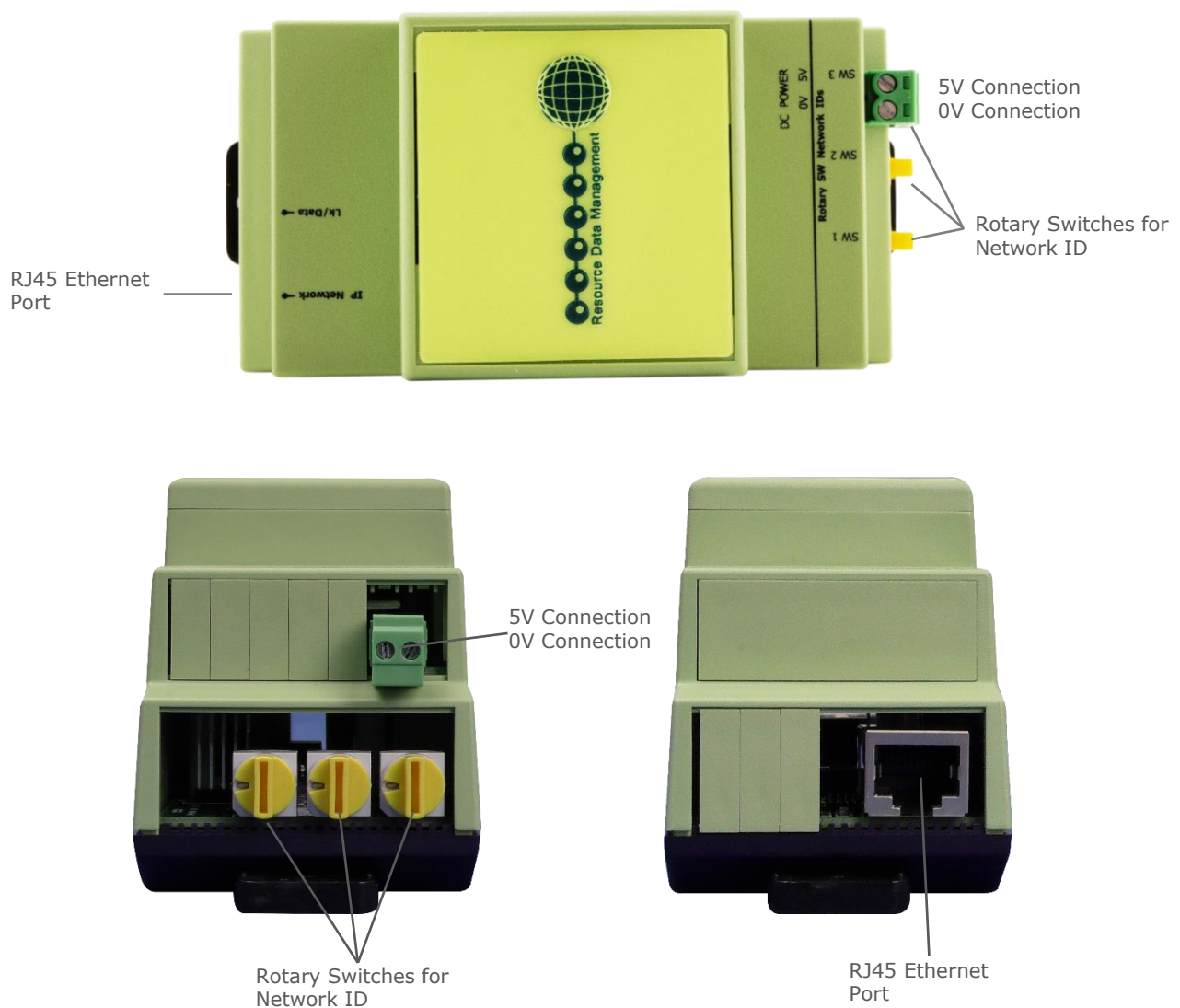
The Bluetooth Access Point comes in two hardware platforms both similar in function; A PR0632-DIN or a PR0632-SF. Both units are setup using the same method.

Note: The Bluetooth Access Point will only work with DM software V3.2.1 and above.

Note: The access point should be connected and powered up before adding Bluetooth devices.

PR0632-DIN

The DIN rail mountable PR0632-DIN has the below connections.



The gateway itself must be powered by a 5Vdc supply and connected to the Data Manager/miniDM via a standard Ethernet IP network.

The three rotary switches can be adjusted depending on the network it is connected. See [IP Configuration](#) for more details.

From this point the gateway must be configured as outlined in the [Bluetooth Mesh Setup on a Data Manger](#) section.

Note: - The PR0632-DIN comes supplied with a 5v Din Rail mount PSU



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PR0632-SF

The wall mountable PR0632-SF has the below connections.



The PR0632-SF/PR0632-SF-RPT has the options of being powered by either a 5Vdc supply or by using Power over Ethernet (PoE) and then connected to the Data Manager/miniDM via a standard Ethernet IP network. RDM's PoE injector kit can be utilised to supply power (PR0619).

The three rotary switches can be adjusted depending on the network it is connected. See [IP Configuration](#) for more details.

From this point the gateway must be configured as outlined in the [Bluetooth Mesh Setup on a Data Manger](#) section.

Note: - The PR0632-SF / PR0632-SF-RPT comes supplied with a 5v External Desktop PSU



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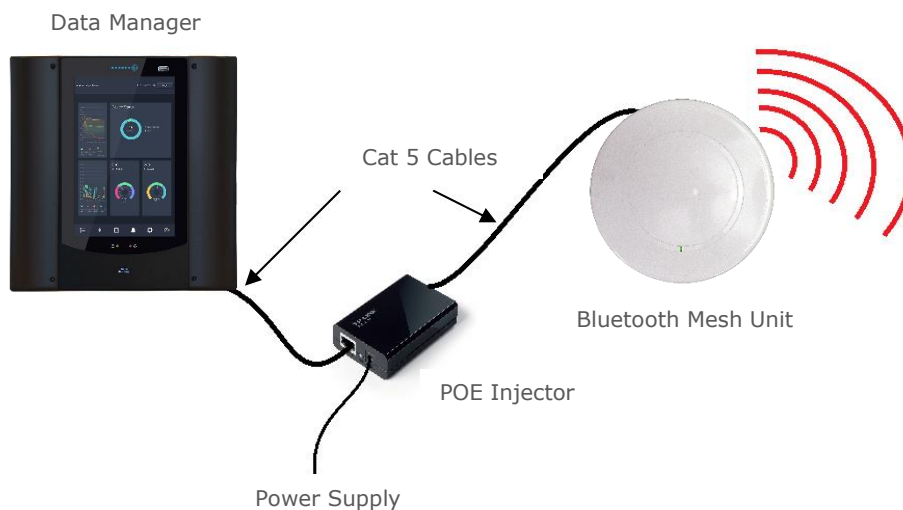
Option 1 – Direct Power Supply – PR0632-DIN/PR0632-SF/PR0632-SF-RPT

There are two methods to which the Bluetooth Access Point can be connected to the Data Manager/miniDM. The first, simply uses its IP interface to directly connect to the Data Manager/miniDM's Ethernet 0 IP network via a CAT5 cable where the Bluetooth Access Point is powered from a direct power supply (5Vdc).



Option 2 – Power over Ethernet (PoE) – PR0632-SF/PR0632-SF-RPT

The second utilises the Power over Ethernet standard (PoE) where the POE Injector can be ordered (PR0619) separately. In this instance the Bluetooth Access Point is powered directly via the CAT5 lead and would require no additional power supply. The PoE injector is powered separately and is connected directly to the Ethernet 0 network of the Data Manager/miniDM (LAN IN). The second IP (LAN OUT) port of the injector will be to communicate and power the Bluetooth Access Point.



Please refer to the CAT5 standard with regards to maximum cable lengths. The POE injector will supply power up to 100m of cable.

Note: - The PR0632 does not come supplied with PoE (Power over Ethernet) injector.



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IP Configuration

For the Bluetooth Access Point to connect to a DMTouch its IP address must be configured and connected to the Eth0 interface. The IP address of the module is dependent on the rotary switch positions. The table below shows the configuration.

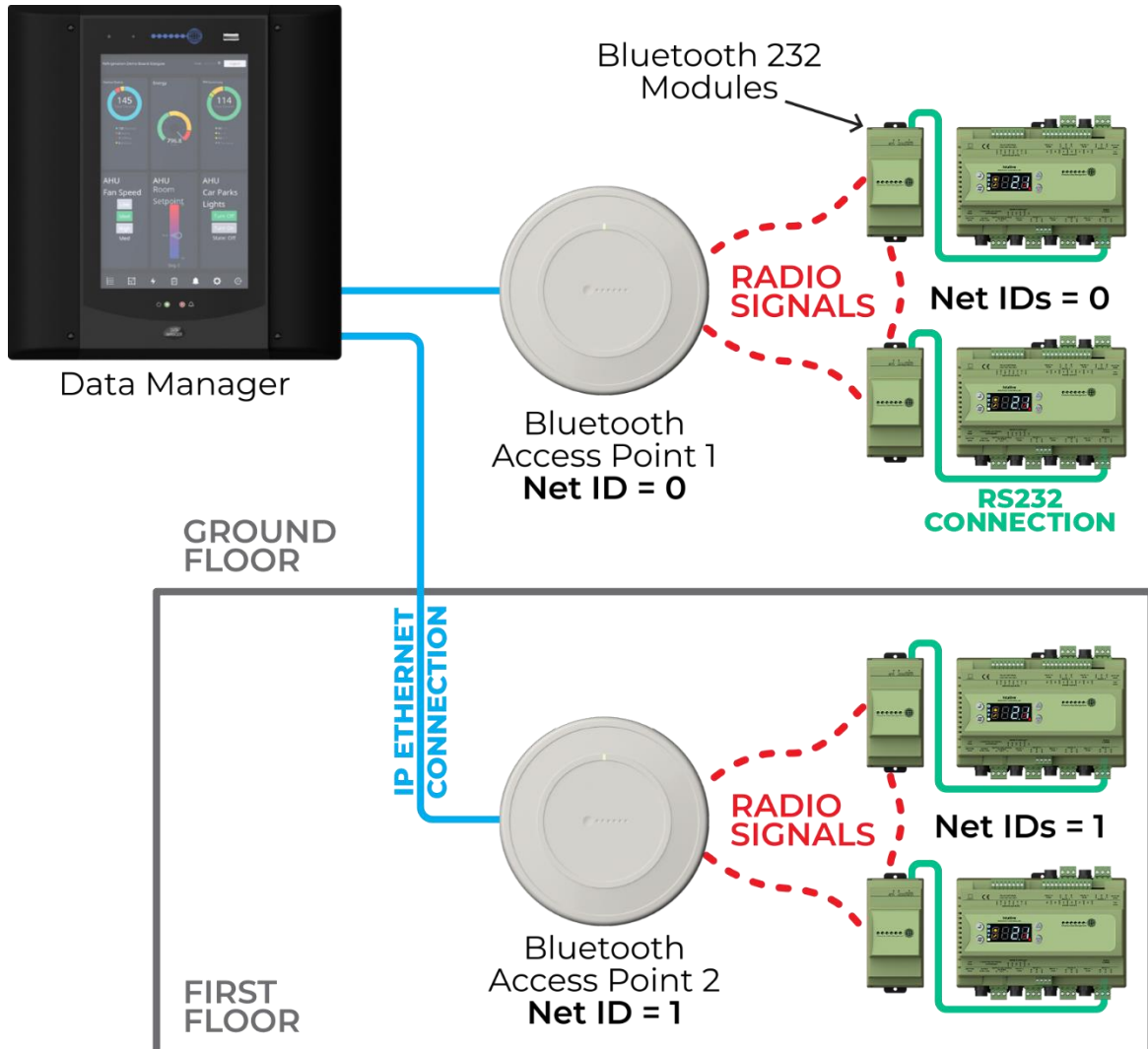
Rotary Address	IP Address Range
001 to 254	<p>The module is set to operate in the 10.1.2.XXX range with the last part of the IP address being a number between 1 and 254. The last part of the IP address determined by the rotary switch address entered.</p> <p>For example, if the rotary switch address is set to '150' then the module will be assigned the address 10.1.2.150.</p>
301 to 555	<p>The module is set to operate in the 192.168.0.XXX range with the last part of the IP address being a number between 1 and 254. The last part of the IP address is determined by the rotary switch address entered.</p> <p>Rotary address 301 equates to 1, 302 is 2 etc up to address 555 which is 254. If you add 300 to the last part of the desired IP address it will provide the required rotary switch setting.</p> <p>For example, if the desired IP address is '192.168.0.150' then the module rotary switch address will be '450'.</p>
000 or 999	The module is set to DHCP mode and will request an IP address from network. Set '999' and power on the module.
Remaining Addresses	The remaining rotary switch addresses are reserved for future use and should not be used.



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Multiple Bluetooth Access Points

The Data Manager/miniDM can support up to four Bluetooth Access Points (any combination of PR0632-DIN and PR0632-SF). This is advantageous should the Bluetooth network be split across multiple floors in a building. Shown below is a simplified network configuration with two Bluetooth Access Points.



In the example above, two Bluetooth Access Points are connected to a Data Manager/miniDM via Eth 0. One is configured as Net ID 0 and the other as Net ID 1. One is installed on the ground floor of a building and the other on the first floor. By setting the Net ID on the communication modules to the appropriate Net ID (set within the Data Manager/miniDM) the associated modules can be logged on to the desired Bluetooth Access Point.

Note: - Bluetooth communication modules can only communicate with other Bluetooth mesh modules or a single Access Point which are set to the same Net ID.



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Addressing a Device

It is necessary to address the device connected to the wireless mesh Communications module so that it can log on to the Data Manager/miniDM's wireless mesh network. Once addressed the devices have an auto-initialise function, which will automatically log the device onto the site network. Please refer to the relevant device's user document for instructions to access the devices display software menu.

Connecting a wireless mesh Communications module to the device will govern which network set up screens are made available. For ease of use the screens shown are similar to that of an RDM device which is connected to a RS485 legacy module. The following options can be found in the "nET" menu of the device display software menus.

Display	Option
485t	Network Type (see below)
485A	Wireless Mesh Address/ Name
gAdd	Shows underlying wireless mesh network address assigned to device – Read Only
rLog	Re-log the device back onto the network
CLrA	Clear the address/name from the device
ESC	Exit network menu. Note: this option must be selected to save any changes made in this menu

The **485t** option shows a value representing the network type. The possible options are:

Value	Network Type
1	Genus compatible (Wired Network)
2	RDM Wireless Mesh System (Wireless Mesh)

Set **485t** to type 2 to enable wireless mesh feature in the device.

The **485A** option shows the current address/ name of the device on the wireless mesh network. If the address is 00-0 then the device has yet to be addressed/ named and will not log on to the wireless mesh network. Using the up or down arrows on the device display scroll to the desired three-digit address/ name. The address/ name shown is of the form '**05-6**'. This means the device would try to log onto the wireless mesh network using the name 'RC05-6'. Press enter to confirm the address details and scroll to the **ESC** menu option and press the enter button to instruct the device to log on.

The **gAdd** option displays the underlying network address assigned to the device when it is logged onto the wireless mesh network. The device receives this address from the Data Manager/miniDM. If '**nA**' is displayed it indicates that the device has not received an address from the Data Manager/miniDM.

The **rLog** option allows the device to be logged back onto the network with its current name. The 'rLog' message will flash for confirmation. On the device display press the Enter button to execute the command, Up or Down buttons to cancel.

The **CLrA** option will clear out the **gAdd** network address and **485A** name in the device. Scroll to the '**CLrA**' menu option and press enter. A message will flash for confirmation press the Enter button to execute the command, Up or Down buttons to cancel. Use this option if the incorrect address has been entered for the device or if you wish to remove the device and log it onto another wireless mesh system.

Note: The device would have to be deregistered from the Data Manager/miniDM if the wrong address has been entered.



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Technical Specification

Power Requirements	
Supply Voltage Range	5VDC \pm 10%
Supply Frequency	DC
Maximum Supply Current	0.2A
Typical Supply Current	< 0.1A
General	
Operating Temperature Range	0°C to +50°C (32°F to +122°F)
Operating Humidity	80% maximum
Storage Temperature Range	-20°C to +65°C (-4°F to +149°F)
Environmental	Indoor use at altitudes up to 2000m, pollution degree 2
Dimensions – L x W x H	110mm (4.3in) x 52.5mm (2in) x 68mm (2.7in)
Approx. Mass	103g (0.227lbs)
IP Rating	IP20
EMC	EN 61326-1: 2013 EN 55032: 2015 ETSI 301 489-1 V2.2.3 ETSI 301 489-17 V3.1.1 FCC – X8WBT832 ICES-003 Issue 6
Ventilation	There is no requirement for forced cooling ventilation
Origins	Product designed in the UK manufactured in Taiwan
RS232	Max cable length must not exceed 15m.
Bluetooth	
Bluetooth version	5.0
Operating Mode	BLE Mesh Network
Frequency	40 Channels pseudo-randomly selected from 2.4 – 2.485 GHz using AFH
Output Power	+4dBm to -20dBm
Range	Range dependant on site conditions. Obstacles such as metal structures and the presence of other 3 rd party wireless devices operating in the same frequency range affect the maximum range achievable.
Data rate	125Kbps to 2Mbit/s
Max Number Hops	5
Max Number Devices	64 per Bluetooth Access Point
Bluetooth ® is a registered trademark of Bluetooth SIG.	
NFC	
Frequency	13.56 MHz
Signal Type	NFC-A Type 2 Tag conforming to ISO 14443-3A 10mm (0.4in) – 30mm (1.2in)
Range	Range dependant on 3 rd party wireless device used to communicate to the NFC on the RS232 Module.
Data Rate	106 kbps



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Technical Specifications – PR0632-SF/RPT/DIN

Power Requirements	
Supply Voltage Range	5VDC \pm 10%
Supply Frequency	DC
Maximum Supply Current	1A
Typical Supply Current	< 0.5A
General	
Operating Temperature Range	0°C to +50°C (32°F to +122°F)
Operating Humidity	80% maximum
Storage Temperature Range	-20°C to +65°C (-4°F to +149°F)
Environmental	Indoor use at altitudes up to 2000m, pollution degree 2, installation category III.
Dimensions – L x W x H (SF/RPT)	193mm (7.6in) x 193mm (7.6in) x 23mm (0.9in)
Dimensions – L x W x H (DIN)	110mm (4.3in) x 52.5mm (2in) x 68mm (2.7in)
Approx. Mass (SF/RPT)	305g (0.672lbs)
Approx. Mass (DIN)	121g (0.267lbs)
IP Rating	IP20
EMC	EN 61326-1: 2013 EN 55032: 2015 ETSI 301 489-1 V2.2.3 ETSI 301 489-17 V3.1.1 FCC – X8WBT832 ICES-003 Issue 6
Ventilation	There is no requirement for forced cooling ventilation
Insulation	Class III
Origins	Product designed in the UK manufactured in Taiwan
Ethernet	
PoE Supply Voltage Range - SF/RPT only	48VDC \pm 10%
	It's recommended that the product is powered by an IEEE 802.3af compliant power sourcing equipment (PSE).
PoE Supply Protection - SF/RPT only	Short circuit protected
PoE standard - SF/RPT only	Conforms to IEEE 802.3af Power-over-Ethernet (PoE) standard.
PoE Supply Frequency - SF/RPT only	DC
PoE Maximum Supply Current - SF/RPT only	1A
PoE Maximum Typical Current - SF/RPT only	< 0.5A
Ethernet Interface	Conforms to 10Base-T & 100Base-T with Auto MDI/MDIX
Max Cable Length	100m
Bluetooth	
Bluetooth version	5.0
Operating Mode	BLE Mesh Network
Frequency	40 Channels pseudo-randomly selected from 2.4 – 2.485 GHz using AFH
Output Power	+4dBm to -20dBm
Range	Outdoors (Line of sight): 220m (722ft) – 330m (1082ft) Indoors: 10m (33ft) – 50m (164ft) Range dependant on site conditions. Obstacles such as metal structures and the presence of other 3 rd party wireless devices operating in the same frequency range affect the maximum range achievable.
Data rate	125Kbps to 2Mbit/s
Max Number Hops	5 Hops
Max Number Devices	64 per Bluetooth mesh unit
NFC	
Frequency	13.56 MHz
Signal Type	NFC-A Type 2 Tag conforming to ISO 14443-3A
Range	10mm (0.4in) – 30mm (1.2in) Range dependant on 3 rd party wireless device used to communicate to the NFC on the gateway.
Data Rate	106 kbps



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Maximum Number of Devices per Network

Up to 4 access points can be supported by a single DMTouch. For example, wireless coverage across multiple floors/levels in a building. A DMTouch supports up to a total of 64 Bluetooth Mesh enabled devices*.

A software enabler is required per 32 devices (PR0635).

*Devices include the 2I20, 4I, wireless probes and comms modules.

Related Part Numbers

Description	Part Number
Bluetooth 232 Module	PR0630
Bluetooth Monitor (2I/ 2O)	PR0631-2I20*
Bluetooth Monitor (4 Input)	PR0631-4I*
Bluetooth Ethernet Access Point with POE	PR0632-SF**
Bluetooth Ethernet Access Point (No PSU)	PR0632-SF-NOPSU
Bluetooth Ethernet Repeater	PR0632-SF-RPT**
Bluetooth Ethernet Repeater (No PSU)	PR0632-SF-RPT-NOPSU
Bluetooth Ethernet Access Point	PR0632-DIN*
Bluetooth Probe	PR0633
Bluetooth Temperature Probe (Overseas)	PR0633-OS***
Data Manager RDM Bluetooth Enabler (Block 32 devices)	PR0635
miniDM RDM Bluetooth Enabler (Block 32 devices)	PR0635-MD

*Supplied with 5v DIN rail mount PSU

**Supplied with 5vDC external desktop PSU

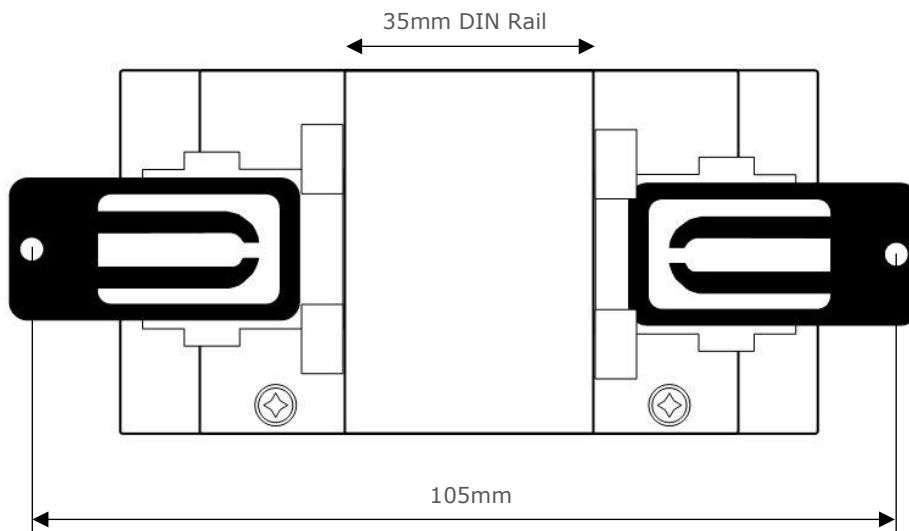
***No battery supplied with this device

Mounting and Installation Instructions

The following installation instructions apply to both the Communications module and the Bluetooth Access Point.

- When installing the Communications module try to avoid physical obstacles which block direct line of sight with the Bluetooth Access Point such as brick walls, metal structures etc, as this may reduce the effectiveness of the radio signal.
- The Bluetooth Access Point should be mounted centrally within the installation, taking care to position the Access Point away from physical obstacles, so that the Bluetooth Access Point can be detected by most wireless Communications module.
- As with all radio equipment avoid mounting the module nearby other electronic equipment as to minimise the possibility of interference.
- When mounting the module avoid metal surfaces, where possible, to maximise the radio signal range.
- Avoid mounting the module in between two metal surfaces and do not install the product inside metal enclosures.

The product is designed to be mounted on standard 35mm DIN rail and is provided with mounting clips as shown below (underside view). The mounting clips also have 4mm diameter mounting holes 105mm apart as an alternative fixing method.



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Network Repeater

If communication issues are encountered setting the rotary switches on the Bluetooth 232 module, 2120 module or the 4I monitor to '999' will enable the modules or monitor to act as a repeater module for the network traffic. The repeater module will not appear on the Data Manager/miniDM as a device. This module can then be placed in between the Bluetooth Access Point and the problem module(s).

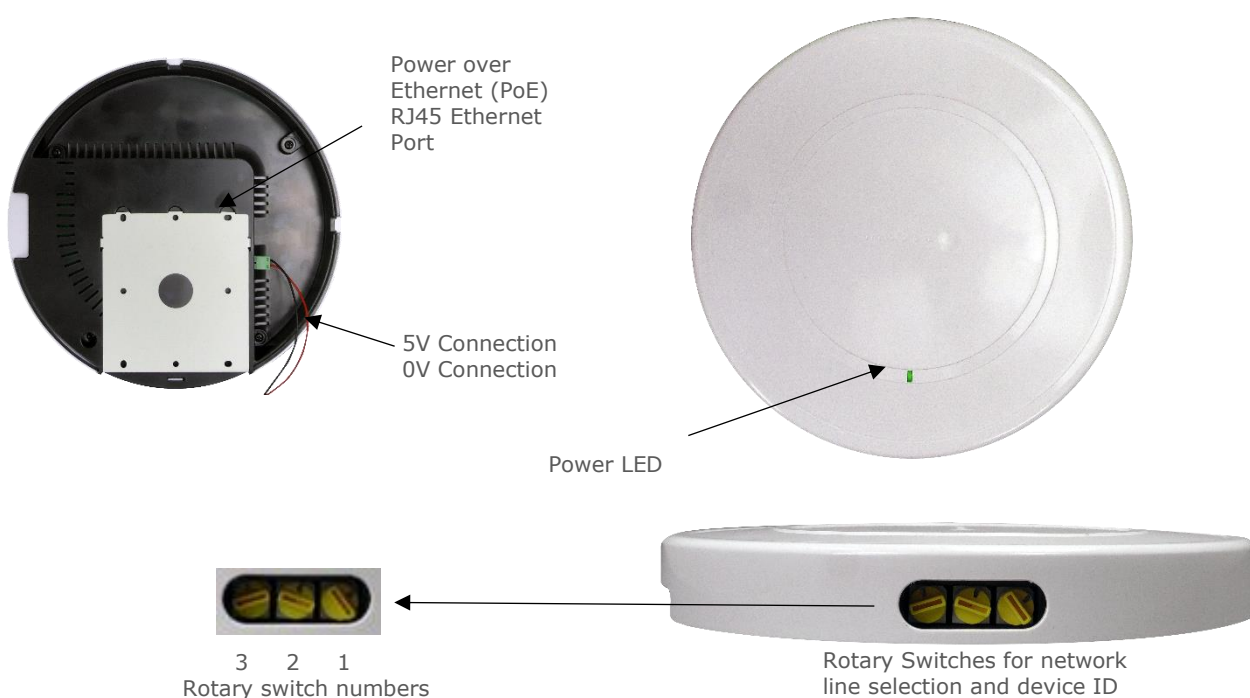
Note: Each repeater allows a maximum of 10 devices.

RDM recommends that at least one repeater is used for every 8 devices. This should ensure that there is enough coverage to create the Bluetooth mesh network for each module to communicate back to the DMTouch. The repeaters should be located in places to help the mesh network spread across the area that the probes are located in.

PR0632-SF-RPT

The PR0632-RPT acts as a repeater device to boost the signal between other Bluetooth devices.

It is wall mountable and has the below connections:



Rotary ID	Rotary Switch Operation
1	Switch number 1 sets the Bluetooth Network ID.
2	Sets the first digit of the Device ID as it would show when logged onto a DMTouch.
3	Sets the second digit of the Device ID as it would show when logged onto a DMTouch.
99*	If rotary switches 2 and 3 are both set to 9 then the repeater will be hidden and will not show on the Device List

For example, if rotary switch 2 is set for 5 and rotary switch 3 is set for 1 then the device would log onto the DMTouch as RC51-0. **Note:** This option is only available with DMTouch.

The PR0632-SF-RPT can be hidden from the Device List by setting rotary switches 2 and 3 to 9 along with rotary switch 1 set for the desired Network ID. If switches 2 and 3 are set to anything other than 9 then the PR0632-SF-RPT will be displayed on the Device List.

Note: If the PR0632-SF-RPT is set to show on the Device List then it will take up a network position on a PR0635. If it is set to be hidden from the Device List then it will not take up a network position.



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Current Compatible Device Software

Device Description	Part Number	Software Version Required or Greater
Mercury Case Controller M	PR0740 MX 232 CAS	4.8
Mercury Case Controller E	PR0740 EX 232 CAS	5.0
Mercury PHX	PR07XX PHX	3.3
Intuitive Mercury 3 Mains Stepper	PR095XX	3.1
Intuitive Mercury 3 Stepper	PR0740 STEP	3.6
ML Controller M	PR0123	3.4
ML Controller E	PR0123E	3.1

Warranty Information

www.resourcedm.com/terms-and-conditions/

Disclaimer

The specifications of the product detailed in this document may change without notice. RDM Ltd shall not be liable for errors or omissions, for incidental or consequential damages, directly or indirectly, in connection with the furnishing, performance or misuse of this product or document.

Revision History

Revision	Date	Changes
1.0	03/11/2020	First Release
1.1	18/12/2020	DM compatibility version added
1.1b	15/03/2021	Notes added regarding PR0632 units and power supplies.
1.1c	02/04/2021	Note added regarding devices logging on over multiple access points
1.1d	28/03/2022	PR0632-SF-RPT option added
1.1e	18/10/2022	Network repeater section updated to include the 232 module
1.1f	03/02/2023	Note added for the amount of repeaters recommended.
1.1g	07/03/2023	Note added to network repeater.
1.1h	06/04/2023	Images updated.
1.1i	12/06/2023	Network ID update.



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