Impeller
Data Industrial®

Wireless Modbus/Pulse Transceiver

ModHopper R9120-5

Badger Meter

XMT-UM-02107-EN-01 (June 2016)

User Manual

CONTENTS

MARKINGS AND SYMBOLS

WARNING: A potential risk exists if the operating instructions are not followed

GENERAL WARNING SYMBOL: THIS SYMBOL INDICATES THE NEED TO CONSULT THE OPERATING INSTRUCTIONS PROVIDED WITH THE PRODUCT.

THIS SYMBOL INDICATES THE PRESENCE OF ELECTRIC SHOCK HAZARDS.

THIS SYMBOL INDICATES: DO NOT APPLY TO OR REMOVE FROM HAZARDOUS LIVE CONDUCTORS.

DIRECT CURRENT SYMBOL.

OVERVIEW

The ModHopper wireless Modbus/pulse transceiver is designed to allow systems integrators the ability to communicate with remote locations while avoiding the costs associated with running low voltage wiring to multiple locations in a single or between multiple buildings. To meet these requirements, the R9120-5 transceiver provides the installer with all the tools necessary to install and configure the hardware and software with a minimum of time and investment.

APPLICATIONS

The R9120-5 wireless Modbus/pulse transceiver is designed for:

- Energy monitoring
- Solar PV Power Generation monitoring
- Malls, office buildings, and other tenant energy monitoring applications

INSTALLATION CHECKLIST

Required Hardware

Two or more ModHopper R9120-5 transceivers.

External Hardware

- RS485 Modbus master system such as Model 3700 data acquisition server or a Modbus-compatible PLC.
- Optional: RS485/Modbus slave devices such as power meters or I/O modules.
- Optional: Pulse output transducers for measuring gas, electricity, water, and so on from existing meters and sensors. Make sure to obtain the pulse output scale, or multiplier for each device you will be using.
- Low voltage wire for attaching pulse or Modbus devices to the R9120-5, typically 18…24 gauge

SPECIFICATIONS

Processor	60 MHz ARM7 embedded CPU
LEDs	3 × RF, 2 × RS-485, 2 × Pulse, Alive, Alarm
Power [1, 3]	North America: 110…120V AC, 60 Hz, primary, 9…12V DC class 2 power supply included CE/Europe: 100…240V AC, 50…60 Hz, primary (power supply not included)
Communication [1]	
Protocols	Modbus RTU, 2-wire
Addressing	Modbus address may be set from 1…247 via DIP switch
Baud Rate	9600/19200 baud, N, 8, 1
RF	Frequency hopping, spread spectrum (FHSS), ISM band (see table)
Inputs [2]	
I/O	2x Pulse, dry contact, standard or KYZ, closure threshold 100 Ω…2.5 Ω user selectable
Pulse Rate	User selectable to 10 Hz, 50 Hz, 100 Hz, 250 Hz Pulse rate option 10 Hz, minimum pulse width 50 ms Pulse rate option 50 Hz, minimum pulse width 10 ms Pulse rate option 100 Hz, minimum pulse width 5 ms Pulse rate option 250 Hz, minimum pulse width 2 ms
Storage	Pulse counts stored in non-volatile memory
Modbus	Modbus RTU, 2-wire, hard-wire connect up to 32 devices (expandable)
Range	R9120-5: 900 MHz, 1 W, 3000 ft (900 m) indoor, 14 miles (22 km) line-of-sight
Weight	1.25 lb (0.67 kg)
Size	6.5 in. × 4.5 in. × 2 in. (260 mm × 64 mm × 45 mm)
Environmental [2]	North America: 0…50° C [3], 0…90% RH, non-condensing CE/Europe: 5…40° C, 0…90% RH, non-condensing
Altitude	2000 m maximum
Pollution	Degree 2
Codes and Standards	
FCC ID	FCC ID OUR-9XTEND
IC (Industry Canada)	IC 4214A-9XTEND; FCC CFR 47 Part 15, Class A
Encryption	256 Bit AES

1 Intended for low voltage class 2 inputs or outputs.

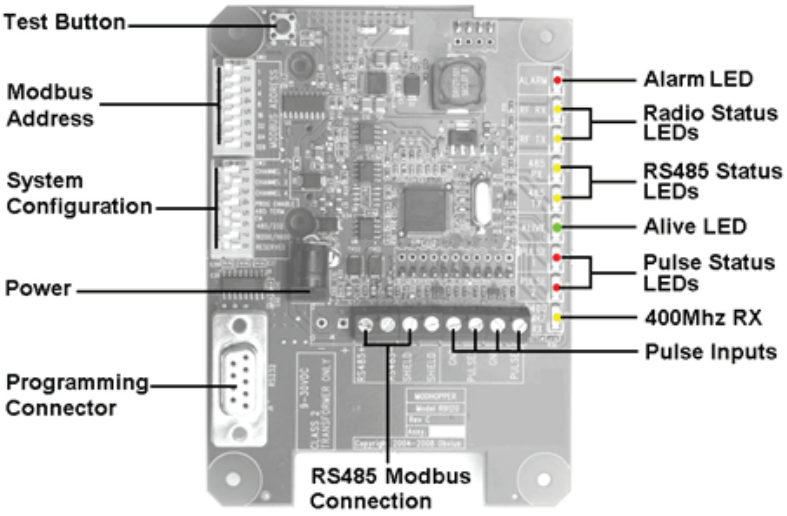
2 If the product is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

3 Not intended for use with rechargeable batteries.

The R9120-5 is not cross-compatible with the Badger Meter 345WT. For use with any Modbus RTU device/server.

As per SIPCO LLC, this product may be used in a system and employ or practice certain features and/or methods of one or more of the following patents: U.S. Patent No. 7,103,511, U.S. Patent No. 6,914,893, U.S. Patent No. 6,891,838, U.S. Patent No. 5,714,931, U.S. Patent No. 6,233,327, U.S. Patent No. 7,397,907, U.S. Patent No. 6,618,578, U.S. Patent No. 7,079,810, U.S. Patent No. 7,295,128, U.S. Patent No. 7,263,073, U.S. Patent No. 7,480,501, U.S. Patent No. 6,437,692, U.S. Patent No. 7,468,661, U.S. Patent No. 7,053,767, U.S. Patent No. 7,650,425, U.S. Patent No. 7,739,378

ELECTRICAL CONNECTIONS



HARDWARE INSTALLATION

1. Unpack materials: Remove all materials from shipping box and verify all required components are available.
2. An antenna inside a non-metallic enclosure will be required. Metal enclosures restrict RF communications. If a metal enclosure is required, use an external antenna and an RF antenna cable.
3. Connect the pulse output devices. For KYZ pulse output meters, attach the normally-open circuit to the R9120-5 transceiver. These are usually the K and Z terminals.
4. Connect the RS485 Modbus network loop as shown in the wiring diagram. Follow the manufacturer's instructions for installing and powering other Modbus devices. Verify that the Modbus address settings are unique for each device (no two devices with the same address). Connect each device in the chain by "daisy-chaining" the devices together . Observe + and – polarity on the Modbus devices.

Do not ground the RS485 shield inside an electrical panel. All RS485 and 24V DC power wires, including the shield should be insulated to prevent accidental contact to high voltage conductors.

The pulse, RS485 and power cable should be mechanically secured where it enters the electrical panel.

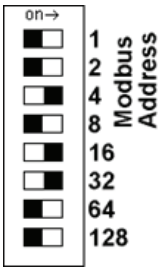
Insulate the wire used to provide pulse and RS485 communications to meet requirements of the voltages present inside any box the wire is mounted within. For example, Belden 1120A has a 600V insulation rating and can be used in many applications. Check with your electrical installer for details as local code requirements may vary.

WARNING: AFTER WIRING THE R9120-5 TRANSCEIVER, REMOVE ALL SCRAPS OF WIRE OR FOIL SHIELD FROM THE ELECTRICAL PANEL. IT COULD BE DANGEROUS IF WIRE SCRAPS COME INTO CONTACT WITH HIGH VOLTAGE WIRES.

5. Attach the antenna to the R9120-5 transceiver. When using an antenna cable, avoid sharp bends; kinks in the antenna cable will degrade performance.
6. Attach the power to the R9120-5 transceiver and apply power. Observe the LEDs to confirm the device is operating.
   - ◊ **Alive (green)**: blinks once per second while the system is operating correctly.
   - ◊ **RS485 RX**: The RX LED should blink whenever a Modbus query is sent on the RS485 loop. (regardless of the target address of the query). If the R9120-5 transceiver is attached to a Model 3700 data acquisition server, the RX LED should blink about once per second.
   - ◊ **RS485 TX**: The TX LED will blink when the A89DC-08 responds to a Modbus query.

NOTE: If cleaning is required, use a dry towel to remove dust from the R9120-5 transceiver. Do not use fluids to clean the R9120-5 transceiver.

Modbus Address



Before the R9120-5 transceiver can be used, you must set the Modbus address of the R9120-5 transceiver. This address must be unique among all Modbus devices in the system, including all devices that are connected on remote wireless links. Address 0 (all switches OFF) is not allowed.

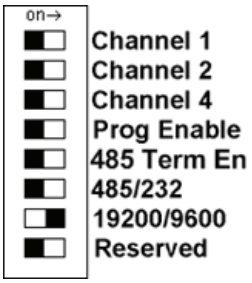
Select an address, and set the dipswitches to match.

The sum of the value of the switches is the address. In the example to the right, address 52 is set by placing switch 4, 16 and 32 to the ON position.

NOTE: 4 + 16 + 32 = 52

System Settings

For most systems, set all of the system switches to the OFF position.



Radio channel: This option selects the channel number that can be used to isolate a group of ModHoppers. This option may be set for channels 0 to 6. Channel 7 (all 3 switches ON) is not allowed.

Programming: Set the *Prog Enable* to OFF for normal operation.

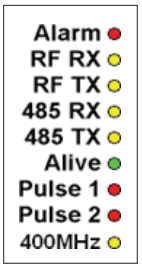
485 Termination Enable: Set the *485 Term En* to ON to enable a 120 Ohm termination resistor on the RS485 network. This should be used when the R9120-5 transceiver is on the end of a 485 wiring run. Set this switch to OFF when the R9120-5 transceiver is in the middle of an RS485 wiring run.

Port RS232 or RS485: Set the switch to the OFF position for RS485 operation. The R9120-5 transceiver can communicate via the RS232 connection however most Modbus devices will need 485 terminals. .

Baud Rate: This option sets the serial port speed for the Modbus devices connected to the R9120-5 transceiver. Set this option to OFF for 19200. Set the switch to ON for 9600 baud.

Reserved: Set this option to OFF.

Status LEDs



The device should power up and be ready in a few seconds. The LEDs should blink in the following manner.

- The Alive LED starts to blink about once per second.
- The Alarm LED will blink when transmission errors occur.
- The RF TX/RX LEDs will blink when the radio is receiving or transmitting data.
- The RS485 LEDs will blink for local Modbus activity.
- The Pulse input LEDs will light when the corresponding pulse input terminals are closed.
- If the device has the -SN option, the 400 MHz LED will blink when an RF packet from a 400 MHz sensor transmitter is received.

Signal Strength Test

When the R9120-5 transceiver is operating, the *Test* button can be used to report the signal strength received by the R9120-5 transceiver from another unit.

Press and hold down the **Test** button. The status LEDs will light up as a bar graph display. Each LED is approximately 10% of scale. For example, if PULSE 1 and 2 are on, the received strength is approximately 20% to 29%.

For useful signal reporting, it is important to turn OFF all but one other R9120-5 transceiver. When reporting the signal strength, the most recent wireless transmission received is displayed. If two R9120-5 transceivers are transmitting, the display will only show the most recently received packet, and you will not be able to determine which R9120-5 transceiver the signal strength being reported.

NOTE: The normal operation of the R9120-5 transceiver is suspended while the *Test* button is pressed. Modbus communications and wireless transmissions are not processed.

MONITORING USAGE

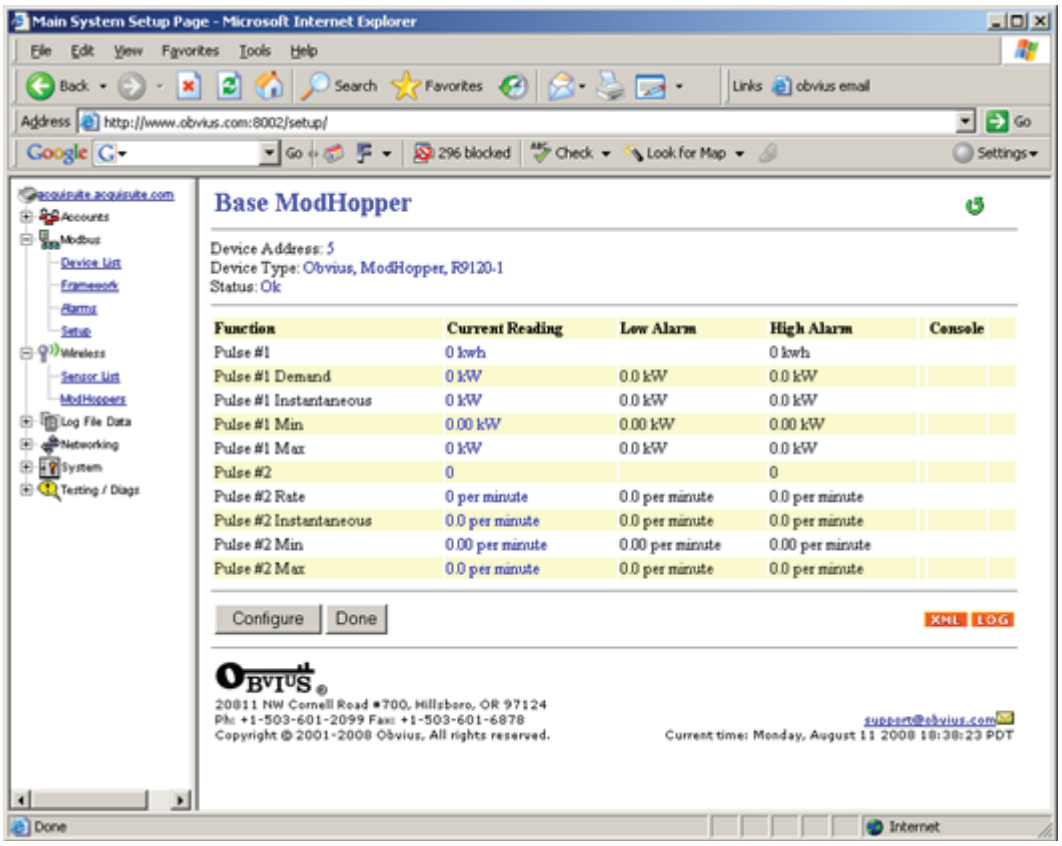
The R9120-5 transceiver has several data points that may be read using the Modbus protocol.

For each of the two pulse inputs, the R9120-5 transceiver reports a value for consumption and rate. Rate fields are provided for the average rate during the log period (block demand), the instantaneous rate, and the min/max instantaneous rate observed during the log period. The pulse counts for each input are stored in non-volatile memory to preserve the count when power is removed. For more information on the specific Modbus registers used for the pulse inputs, refer to the Modbus register section of this manual.

When configuring a Modbus Master such as a PLC, TCP Gateway, or computer software, you must increase the timeout on the RS485 port of your system. The R9120-5 transceiver adds about 500 ms of delay per hop. In a complex system with multiple R9120-5 transceivers, a 1 to 2 second round trip time is not uncommon.

Model 3700 Data Display Page

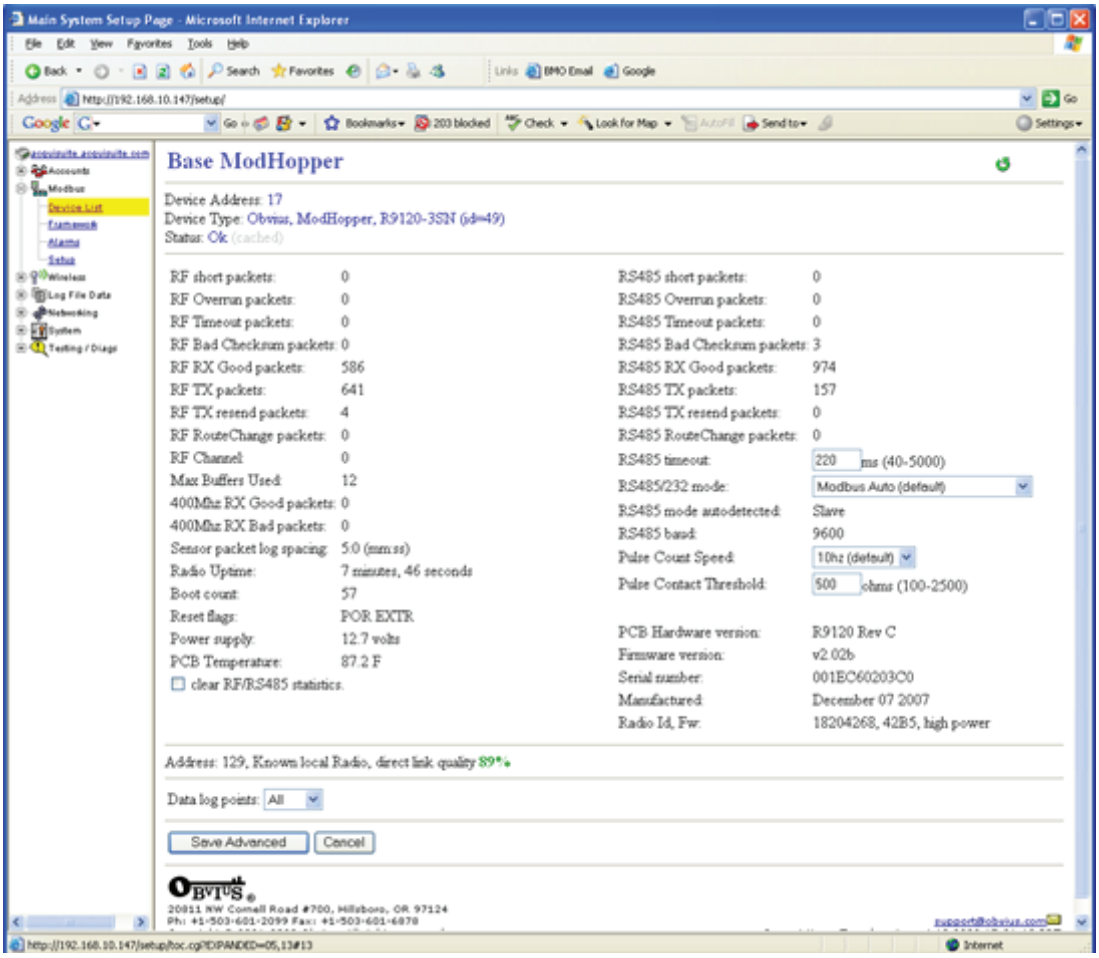
When using the R9120-5 transceiver with the Model 3700 data acquisition server, the server will read the pulse input data from the R9120-5 transceiver and provide configuration menus for all of the R9120-5 transceiver options.



The Model 3700 data acquisition server will report all the data values present on the R9120-5 transceiver. In addition, the instantaneous min/max rate values will be cleared after each logging interval. Click the **Configure** button to set up pulse input names, unit of measure and multipliers as needed.

Model 3700 Advanced Configuration Options

The Model 3700 data acquisition server setup and configuration page includes an advanced configuration page to set all of the R9120-5 transceiver features with a convenient web page interface. Below is an example screen for the Model 3700 advanced configuration page.



In this setup page, there are several options available.

- Serial port timeout, and protocol configuration: When a request comes in over the wireless mesh network and is sent out on the R9120-5 transceiver RS485 serial port, the R9120-5 transceiver must wait for the attached Modbus device to reply to the query. The timeout option controls how long the R9120-5 transceiver will wait before giving up on the attached Modbus device and discarding the query. Most Modbus devices will respond in 150 ms or less.
- Pulse input contact closure threshold: Allows you to set a maximum resistance to be counted as a "closed" contact. This is helpful when using intrinsic barrier devices. Default of 500 Ohms will work in most applications.
- Pulse input maximum count frequency: For most pulse meters, 10 Hz is adequate. Faster counting of mechanical relays may result in "relay bounce" and give an incorrect count. Consult the pulse output device for information on maximum expected pulse output rate.
- Data log control: Enable/disable Model 3700 data logging for the R9120-5 transceiver.

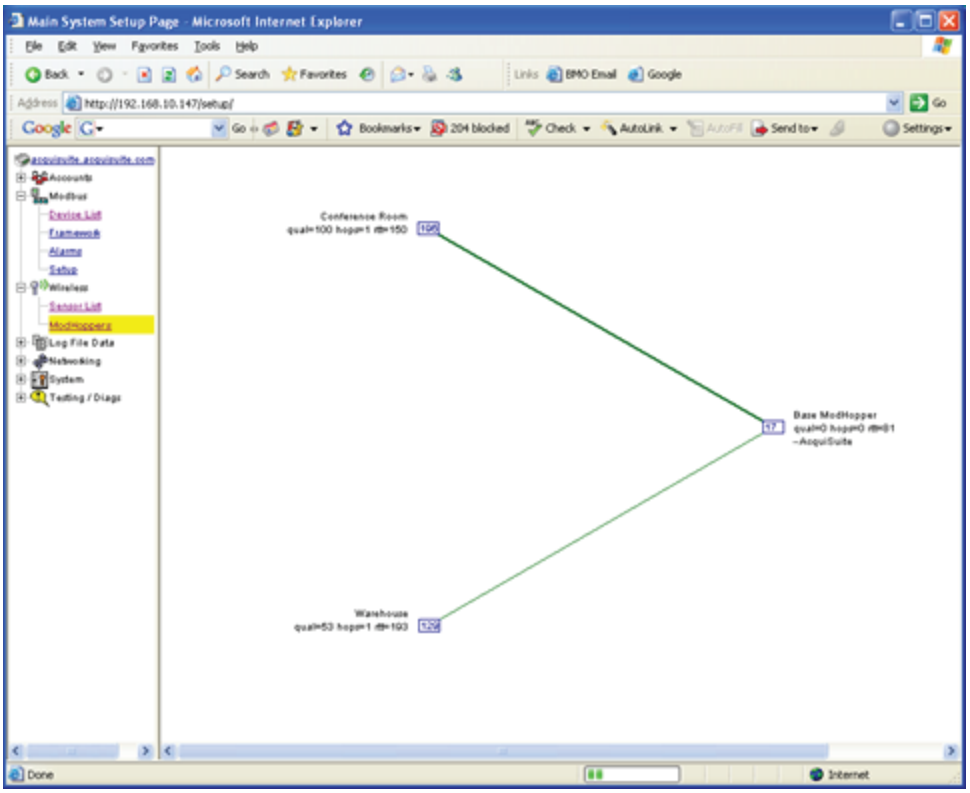
NOTE: This is an internal Model 3700 data acquisition server feature, and does not set any registers on the R9120-5 transceiver.

In addition to the configuration options, some further details about the R9120-5 transceiver are provided. These include the serial number, firmware version, uptime, RF/RS485 packet counters, and internal temperature and power supply monitor.

For further information configuration and status registers, see *"Modbus Features" on page 10*.

Model 3700 Route Mapping Display

The Model 3700 data acquisition server has additional diagnostic features that assist with R9120-5 transceiver deployments. The most useful is the R9120-5 transceiver route map. Select the R9120-5 transceivers menu from the *Wireless* section in the Model 3700 data acquisition server menu tree as shown below.



The graph will draw a blue box for each R9120-5 transceiver that is attached to the system. The blue number inside the box icon is the Modbus address of the R9120-5 transceiver. To the side of each icon, three lines of information will be shown.

- The device list name will be shown to the side of each R9120-5 transceiver icon.
- The link quality, hops and round trip time (rtt) will be printed under the R9120-5 transceiver name.
- A list of attached Modbus device addresses will be shown on the third line. This is a list of addresses that the R9120-5 transceiver has automatically detected on the local RS485 port.

The graph will print strong links in thick green lines. Lines progress from green, to yellow, to red to indicate weak links.

MODBUS FEATURES

Supported Modbus Functions

The R9120-5 transceiver responds to the following Modbus query functions:

- 0x11 Report slave id.
- 0x03 read holding registers (multiple) 0x06 preset single register

These should be sufficient to perform all operations (read many values, make single change, and identify). In addition, the device will respond to with Modbus exceptions for invalid function, value, and register if out-of-bound requests are made.

Modbus function *0x11 Slave ID* function will respond with ID=49 "Badger Meter, ModHopper, R9120-5".

Modbus Register List

All Modbus registers are read-only, unless otherwise noted.

Data Points

offset	point	type	desc
0	40001	UINT32	N/V) pulse count 1 MSW
1	40002	UINT32	N/V) pulse count 1 LSW
2	40003	UINT32	N/V) pulse count 2 MSW
3	40004	UINT32	N/V) pulse count 2 LSW(same format as pulse
4	40005	UINT16	inst pulse 1 time (seconds)
5	40006	UINT16	inst pulse 2 time (seconds)
6	40007	UINT16	(R/W) min pulse 1 time (seconds)(write clears min/max)
7	40008	UINT16	(R/W) min pulse 2 time (seconds)
8	40009	UINT16	(R/W) max pulse 1 time (seconds)
9	40010	UINT16	(R/W) max pulse 2 time (seconds)
10	40011	UNIT16	(R/W, N/V) inst pulse count size. (default 5)
100	40101	UINT16	Serial Number (bytes 1,2) (serial number)
101	40102	UINT16	Serial Number (bytes 3,4)
102	40103	UINT16	Serial Number (bytes 5,6)
103	40104	UINT16	firmware version (e.g. v1.03, high byte=major, lowbyte=minor, 0x8000 flag set for Beta)
104	40105	UINT16	boot count
105	40106	UINT32	mfg date MSW
106	40107	UINT32	mfg date LSW
107	40108	UINT16	radio group id setting (0-6)
108	40109	UINT16	alarm flags (0x01 = boot from watchdog)
109	40110	UINT16	max packet buffers used.
110	40111	UINT32	Radio up time (seconds) MSW
111	40112	UINT32	Radio up time (seconds) LSW
112	40113	UINT16	RF short packets. write 0 to clear stat counters. (R/W firmware 1.17 or later)
113	40114	UINT16	RS485 short packets
114	40115	UINT16	RF Overrun packets
115	40116	UINT16	RS485 Overrun packets
116	40117	UINT16	RF Timeout packets
117	40118	UINT16	RS485 Timeout packets

offset	point	type	desc
118	40119	UINT16	RF BadChecksum packets
119	40120	UINT16	RS485 BadChecksum packets
120	40121	UINT16	RF RX Good packets
121	40122	UINT16	RS485 RX Good packets
122	40123	UINT16	RF TX packets
123	40124	UINT16	RS485 T Good packets
124	40125	UINT16	RF TX resend packets
125	40126	UINT16	RS485 TX resend packets
126	40127	UINT16	RF RouteChange packets
127	40128	UINT16	RS485 RouteChange packets
128	40129	UINT16	Number of known nodes. (including ourselves)
129	40130	UINT16	Our modbus address
130	40131	UINT16	R9120 Hardware Version (0=rev-A, 1=rev-B, etc)
131	40132	UINT16	Model number bytes 1,2 (4 registers = 8 char string)
132	40133	UINT16	Model number bytes 3,4 (4 registers = 8 char string)
133	40134	UINT16	Model number bytes 5,6 (4 registers = 8 char string)
134	40135	UINT16	Model number bytes 7,8 (4 registers = 8 char string)

135	40136	UINT16	Radio Serial MSW
136	40137	UINT16	Radio Serial LSW
137	40138	UINT16	Radio Firmware
138	40139	UINT16	Radio Type 1=R9120-1(lowpower), 2=R9120-3(highpower) 0=unknown)
139	40140	UINT16	(R/W) Modbus 485 timeout in ms. Default 240ms range 40max to 2000ms. Affects modhopper in master mode only.(max 5000ms in v1.17)
140	40141	UINT16	(R/W) Pulse KYZ flag bitmap. 0x01 = pulse1 kyz mode, 0x02=p2, etc.
141	40142	UINT16	Reserved
142	40143	UINT16	(R/W) RS485 force master/slave modes. 0=auto/default, 1=force-master, 2=force-slave. (firmware 1.17 or later)
143	40144	UINT16	RS485 master/slave mode status. 0=master, 1=slave. (firmware 1.17 or later)
144	40145	UINT16	RS485 baud rate.2=9600, 3=19200.(firmware 1.17 or laer)
145	40146	UINT16	(R/W) contact closure threshold. in ohms. 100-2550 ohms allowed. (rev-c only, firmware 2.02 or later)
146	40147	UINT16	(R/W) contact closure speed, pulse speed: 0=10Hz/default, 1=50Hz, 2=100Hz, 3=250Hz(firmware 2.02 or later)
147	40148	UINT16	power supply voltage monitor (rev-c only) scale: x100
148	40149	UINT16	pcb temperature monitor(rev-c only) scale: x100
149	40150	UINT16	400MHz RX Good packet count(rev-c only)
150	40151	UINT16	400MHz RX Bad packet count(rev-c only)
151	40152	UINT16	(R/W) minimum packet time, how frequent to save sensor data packets. (10-2550 seconds)(firmware 2.02 or later)
152	40153	UINT16	RS485 serial port option:(firmware 2.05 or later) bits 0-1: 0=N, 1=E, 2=O bit 2: 0=8bit, 1=7bit bit 3: 0=1stop, 1=2stop Note: read only, always returns 8N1
153	40154	UINT16	Radio RF speed mode (0=distance, 1=speed) (rev-c, -5 modhopper only, fw 2.05 or later)
154	40155	UINT16	Reserved
155	40156	UINT16	(R/W) preference lock.0=unlocked, 1=locked. when locked, preferences can be changed from 485 port only.(firmware 2.05 or later)
156	40157	UINT16	AES Encryption key present. 0=not available, 1=not-active,2=key-active/256bit. (firmware 2.05 or later, -5 modhopper only)
157	40158	UINT16	Max allowed software RF channel setting.0=not available. (firmware 2.06 or later)
712	40713	UINT16	bitmap of known radios (16 registers) LSB, MSB order. bit0=n/a, bit1=addr1, etc.

Register Functions

Pulse Count

The pulse count is stored as an unsigned 32 bit integer. This allows for 2^32 pulses (4.2 billion) to be counted before rollover. On Modbus systems that do not allow you to read 32 bit values, you can calculate the pulse count as follows:

count = (MSW * 65536) + LSW

or

count = (MSW << 16) | LSW [bit shift high order word by 16 bits and xor against low order word]

Pulse count registers accumulate a total number of pulses received on each pulse input. The pulse count totals always increment and cannot be cleared or set to an arbitrary value to prevent tampering. All pulse count totals are stored in non- volatile memory to preserve counts during power failure. The unsigned 32 bit counter values can accumulate up to 4.29 billion (2^32) pulses before rollover.

All 32 bit data point values are encoded in 2 Modbus registers (16 bits each). Modbus master systems should always query the A8332-8F2D using a single query to read an entire block of registers. Never use two queries to read one register and then combine the two results into a single 32 bit value. Doing so will allow the pulse count to increment in the middle of the two Modbus queries, and will cause intermittent data readings that are incorrect.

For example, a pulse input has a count of 65534. This is represented as a 32 bit hex number 0x0000FFFE. The first 4 digits are the MSW register, the second 4 digits are the LSW register. The Modbus Master reads the first (MSW) register and gets 0x0000. In between the two readings, the pulse input counts 2 more pulses, making the total 65536 or 0×00010000 in hex. Next the Master reads the second (LSW) register and gets 0x0000. When the two registers are combined, the result is 0×00000000. The proper way to handle this situation is to simply read both registers in a single Modbus query.

Instantaneous Pulse Rate

The pulse rate values for instantaneous, minimum and maximum rates are calculated based on the time between arriving pulses. For example, if InstPulse1 = 30, and inst pulse count size is 5, then the average rate for the last 5 pulses is 6 seconds per pulse. To convert the register values (in seconds) to a rate value, use the following formula.

RatePerHour = (N * 60 * 60 / Inst_Register)

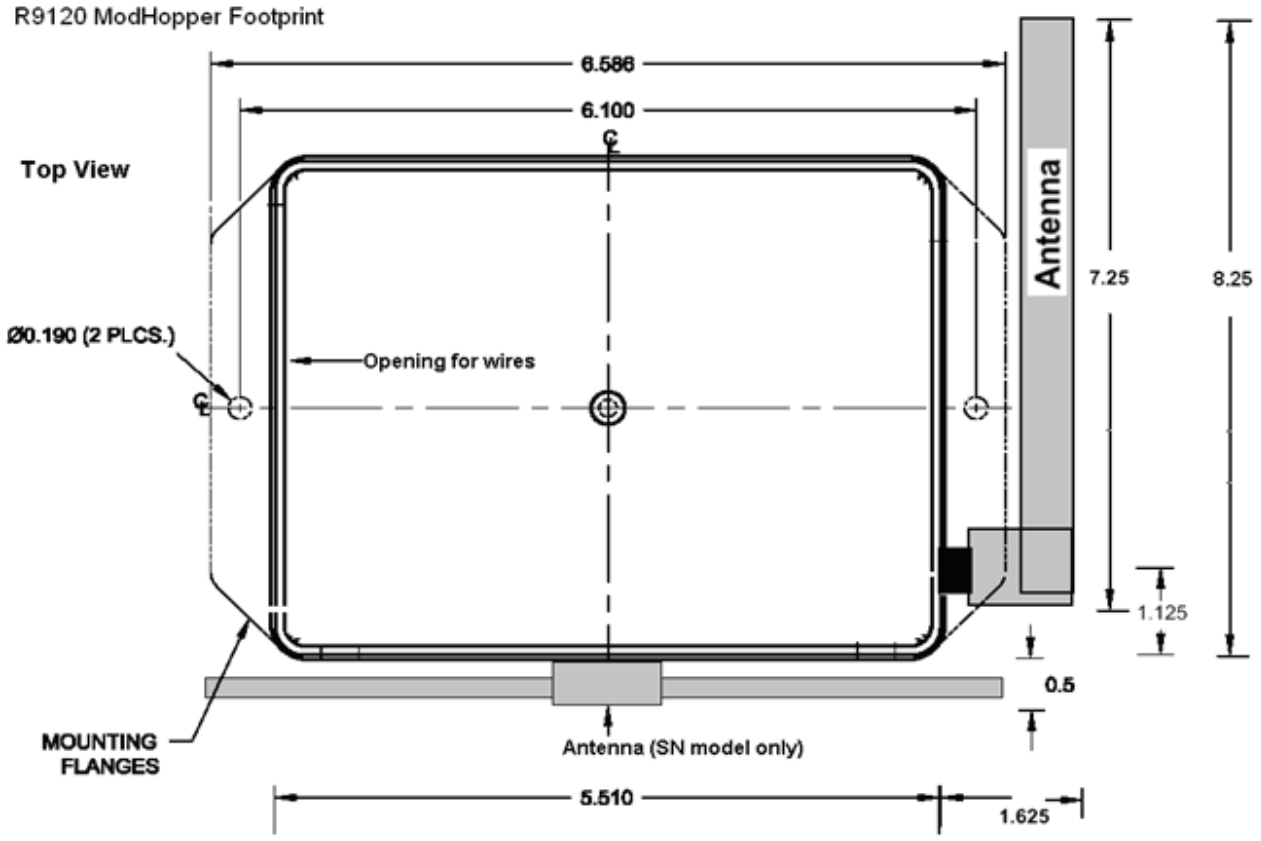
Where *InstRegister* is any of the 6 register values 4 through 9. *N* is the instantaneous pulse count size at offset 10.

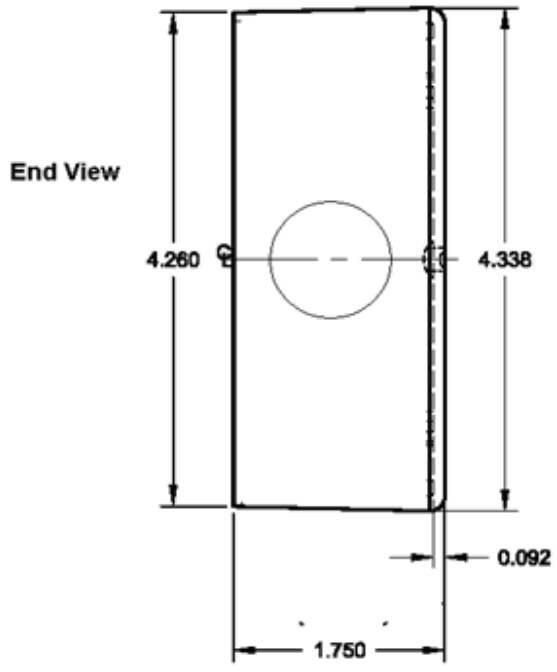
Min/Max Pulse Rate

These 4 registers are calculated from the instantaneous pulse rate. These latching registers are updated whenever the minimum or maximum rate fields are exceeded by the instantaneous rate. These 4 registers may be cleared by writing a zero to the register. Writing to one min/max register clears all four min/max registers.

MECHANICAL DRAWINGS

The R9120-5 transceiver must be wall-mounted, or mounted inside an appropriate enclosure rated for the weather, location, and electrical components located inside it. The R9120-5 transceiver mounting holes are detailed below.





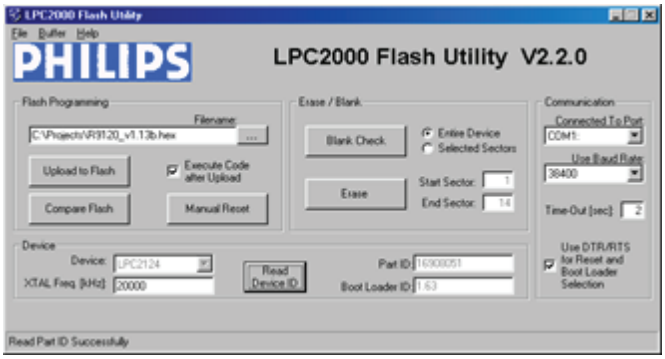
FIRMWARE UPDATE

From time to time, Badger Meter may release firmware updates with additional features and system changes. To find out what firmware your R9120-5 transceiver has installed, read the firmware version register with a Modbus utility, or use the *Advanced Configuration* page in the Model 3700 data acquisition server setup menu. Firmware update files may be obtained from Badger Meter technical support.

The firmware update process requires an RS232 serial port and a windows computer to run the firmware update utility. Before starting this process, verify your computer has a serial port available. You may need to deactivate other software such as the palm pilot utility or ups monitor software. USB connected serial ports may be used however you may need to reduce the baud rate if you receive errors updating the firmware.

To update the firmware, use the following procedure.

1. Install the Philips LPC2000 software as provided by Badger Meter.
2. Remove power, RS485 and pulse inputs from the R9120-5 transceiver. Power can be disconnected by removing the screw terminal or plug from the R9120-5 transceiver power connection socket.
3. Set the following dip switches:
   Prog Enable = ON
   485/232 = ON
4. Attach the R9120-5 transceiver to your computer with an RS232 serial cable. The R9120-5 transceiver programming connector is the 9 pin RS232 connector on the top of the device.
5. Power up the R9120-5 transceiver. The Green Alive LED should be lit up and solid.
6. Run the *LPC2000 Flash Utility*. The following screen will be displayed.



7. Set the following communications options:
   COM1 or COM2, depending on your computer serial port
   Use baud rate 38400 or slower
   Check *Use DTR/RTS for Reset*
   XTAL Freq[kHz] = 14745
8. Click **Read Device ID**. The *PartID* and *BootLoaderID* fields will be shown, if successful. Also, the *Device* drop-down menu should switch to *LPC2131*. The bottom of the window will display "Read Part ID Successfully."
9. Click **Filename…** . A dialog box will appear. Locate and select the R9120-5 transceiver firmware image file. In the example above, this is named "R9120_revC_v2.04.hex".
10. Click **Erase** to remove the existing firmware from the R9120-5 transceiver device.
11. Click **Upload to Flash**. The firmware update will start, and a blue progress bar will be shown across the bottom of the screen. While the upload is in progress, the green *Alive LED* on the R9120-5 transceiver will stay on solid.
12. When the update is complete, disconnect power from the R9120-5 transceiver. Remove the RS232 serial cable. Turn off the ProgEnable and 485/232 switches.
13. Re-attach the RS485 data and pulse wire connections. Power up the R9120-5 transceiver. The new firmware should now operate. To confirm the new firmware is installed, use the Model 3700 data acquisition server device details page, click **Configure**, and then click **Advanced**. The firmware version number will be displayed on the lower right side of the *Advanced Details* page.

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Legacy Document: R9120 rev C