



RM9600 Radio Modem

Application Note

BBV RS485 STARCARD & RX45X/RX55X MULTI PROTOCOL RECEIVER

RS485 Communications Over Radio

Benefits

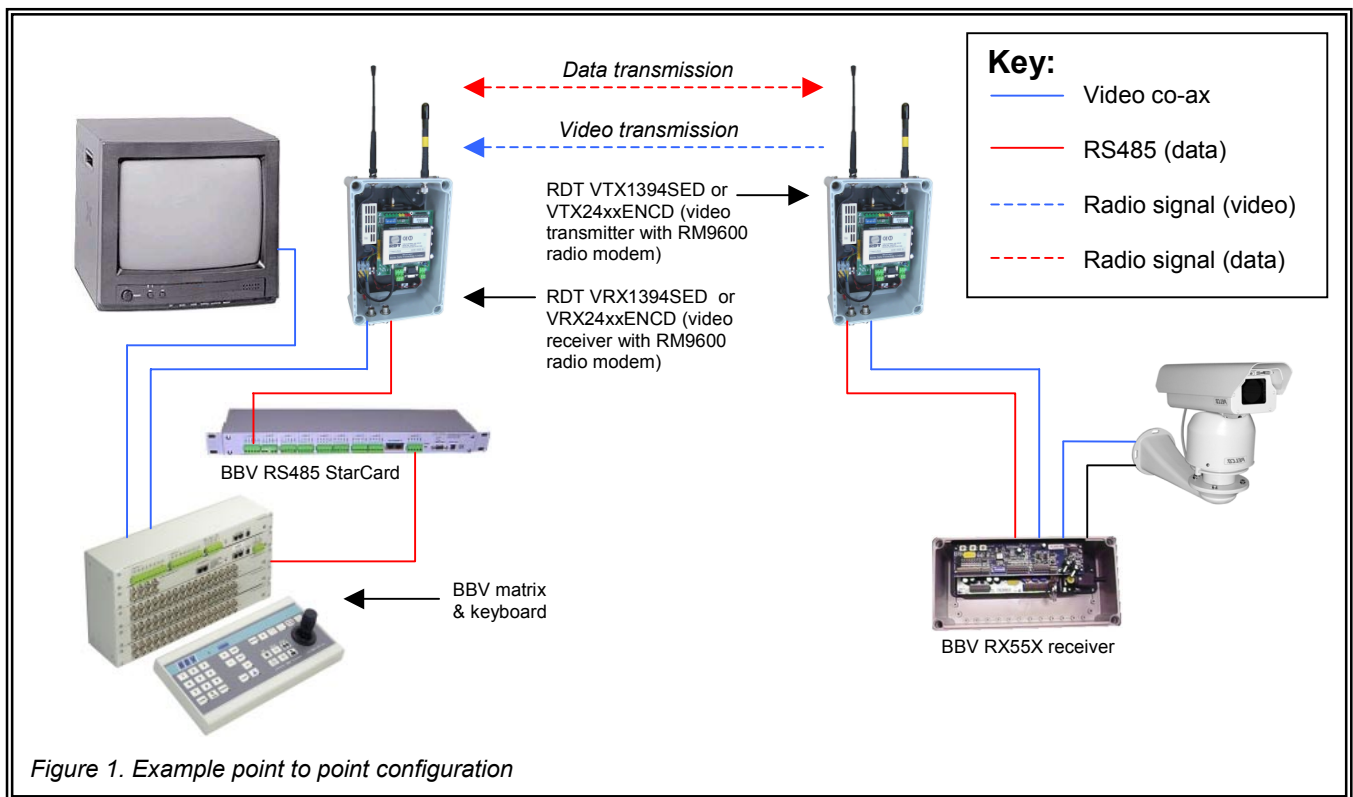
Permits wireless connectivity of the BBV RS485 StarCard with the RX45X and RX55X receivers

Configurable frequency of operation

Configurable addressing for security

Built-in radio path test facility

Removes RS485 data cables



Brief Description

The RM9600 Radio Modem is a secure radio data modem used for a variety of data transfer applications, including telemetry control. The use of radio for such tasks can permit a more cost-effective and flexible solution than with cabled methods. Combining the flexibility of radio data transfer with the BBV StarCard & telemetry receivers permits the construction of a system with rapid installation benefits without depending upon cables.

Application note produced with the co-operation of:

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Description of Application

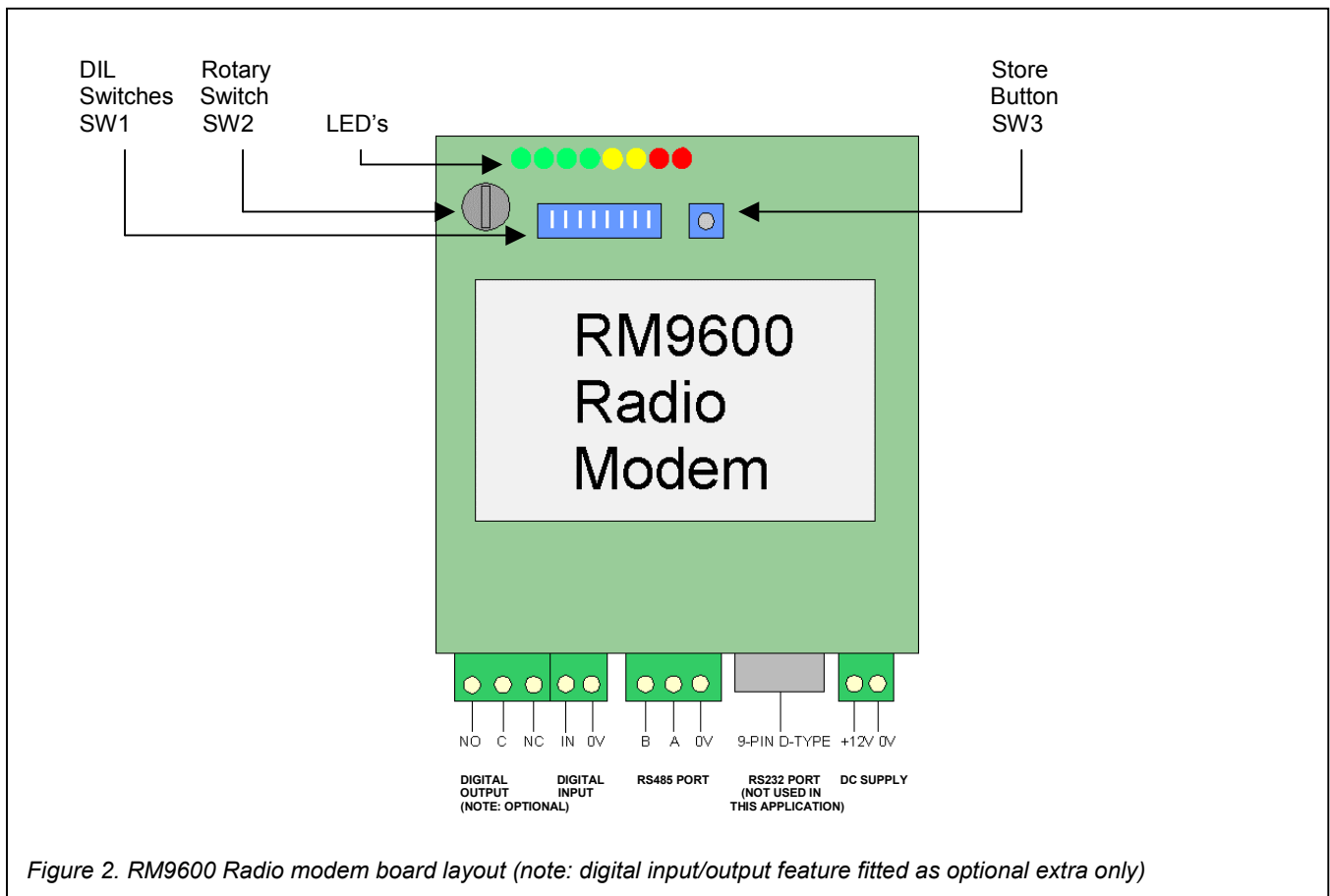
The BBV StarCard and RX45X/RX55X telemetry receiver can communicate across the radio link utilizing RS485 protocols in 2-wire half duplex or simplex mode. The standard radio modem unit required at all locations is the RM9600 model, which is available in the following versions:

Part Number	Description	Antenna connection	Weatherproof
RM9600	Radio modem board module	SMA	No
RM9600B	Radio modem in aluminium enclosure	BNC	No
RM9600E	Radio modem + mains PSU in IP67 enclosure	BNC or N-type	Yes
VTX1394SED	Radio modem + 1394MHz colour video transmitter & mains PSU in IP67 enclosure	BNC or N-type	Yes
VRX1394SED	Radio modem + 1394MHz colour video receiver & mains PSU in IP67 enclosure	BNC or N-type	Yes
VTX24xxENCD	Radio modem + 2400MHz colour video transmitter & mains PSU in IP67 enclosure	BNC or N-type	Yes
VRX24xxENCD	Radio modem + 2400MHz colour video receiver & mains PSU in IP67 enclosure	BNC or N-type	Yes

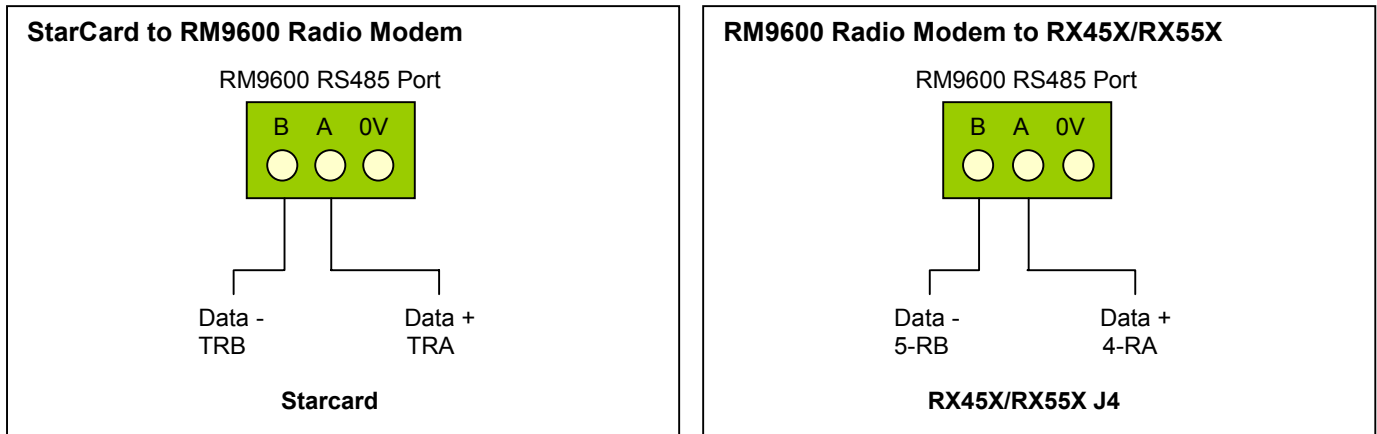
Please refer to the RM9600 and videowave data sheets for further details of the above options.

The radio modem incorporates a synthesized UHF transceiver, tested to ETS 300 220-3 for operation in the UK without a license. Various approvals are held for worldwide operation. Configuration is via the rotary and DIL switches on the RM9600 which allow a band of up to 64 radio channels to be selected, (no. of channels available is dependant on regulations in the country of operation, UK specification has 15 channels), along with the serial interface baud rate, parity and character length.

Radio Modem Board Layout



Connection and Configuration Details



How to configure the RM9600 radio modem to operate with the StarCard and RX45X/RX55X using BBV RS485 protocol (9600,N,8,1). If using other telemetry protocols (e.g. Pelco P), please refer to the relevant RDT application note for configuration details.

- Step 1 With RM9600 powered, turn the rotary Switch (SW2) to position 'F' and then press the 'STORE' button (SW3). This will reset the modem to factory settings.
- Step 2 Turn the rotary switch SW2 to position 3. Set the DIL switches SW1 numbers 1 to 7 all OFF, and number 8 ON. Press the store button SW3. This sets the unit to RS485 operation.
- Step 3 Turn Rotary switch back to position '0' (run mode).
- Step 4 Set DIL switches for required power level and RF channel. (see RM9600 User Manual)
- Step 5 Repeat steps 1 to 4 for the RM9600 radio modem at the other end of the link.

Antenna Selection

RDT supply a range of antennas suitable for various applications. Please refer to the appropriate product data sheets for detailed information including range charts for various transmit/receive antenna combinations.

Antennas for RM9600 radio modem, 458MHz data transmission

Part Number	Description	Length	Gain	Connection	Mounting Requirements
ANT0006A	Half wave whip.	302mm	-3dB	BNC	Direct to enclosure
ANT0008	End-fed dipole.	905mm	0dB	N-type	50mm dia. pole
ANT0009-8	8 element yagi.	1600mm	10dB	N-type	50mm dia. pole

Antennas for 1394MHz video transmission

Part Number	Description	Length	Gain	Connection	Mounting Requirements
ANT0002	Half wave whip	159mm	0dB	TNC	Direct to enclosure
ANT0003	Half wave whip	138mm	0dB	SMA	Direct to enclosure
ANT0005	End fed dipole	600mm	0dB	N-type	50mm dia. pole
ANT2350	3dB Patch	100mm	3dB	TNC	Direct to enclosure
ANT2351	12dB Patch	180mm	12dB	TNC	50mm dia. pole

Antennas for 2400MHz video transmission

Part Number	Description	Length	Gain	Connection	Mounting Requirements
ANT2373	3dB Patch	100mm	3dB	TNC	Direct to enclosure
ANT2400	Half wave whip	144mm	0dB	TNC	Direct to enclosure
ANT2374	12dB Patch	180mm	12dB	TNC	50mm dia. pole
ANT0026	Reflector	266mm	14dB	N-type	50mm dia. Pole

LED Operation

The LED's D10 to D17 on the RM9600 radio modem will provide different functions depending on the mode of operation selected by the rotary switch SW2. For example: In test mode they will indicate that the transmitter is active, or the received signal strength. In configuration modes, they will indicate the stored settings. In normal operating mode (Run Mode: Rotary switch SW2 position 0) they will indicate the following functions:

- D10 Green LED – RfCD (Carrier Detect). Indicates that the receiver is detecting a carrier signal on the selected Rf channel. For example, on a unit connected to a telemetry receiver this LED will illuminate when data is being received over the air from the remote telemetry controller. Illumination of this LED when data is not being received may indicate interference on the selected Rf channel.
- D11 Green LED – TxFull (Buffer Full). Indicates that the RM9600's data buffer is full.
- D12 Green LED – Rx D (Receive Serial Data). Indicates that data is being received via the serial port. Illumination of this LED should be followed by D15 (RfTx) to indicate that the received serial data is being transmitted. On a unit connected to a telemetry controller, if the D12 LED does not illuminate when a command is sent from the controller, check the RS485 serial data connection.
- D13 Green LED – Tx D (Transmit Serial Data). Indicates that data is being output via the serial port. For example, on a unit connected to a telemetry receiver, this LED will illuminate following the receipt of data over the air from the remote telemetry controller to indicate that the data is being output to the receiver.
- D14 Yellow LED – RfRx (Rf Receive). Indicates that the radio transceiver is currently in receive mode. This is the normal status for any unit when data is not being received via the serial port.
- D15 Yellow LED – RfTx (Rf Transmit). Indicates that the radio transceiver is currently in transmit mode. This will follow receipt of data via the serial port (indicated by illumination of the D12 LED). The status of the D15 LED will always oppose that of the D14 LED (RfRx).
- D16 Red LED - +10.5V (Supply Voltage). Indicates the presence of DC supply voltage. This LED will remain illuminated at all times when the radio modem is in run mode.
- D17 Red LED - +5V (Supply Voltage). Indicates the presence of DC supply voltage. This LED will remain illuminated at all times when the radio modem is in run mode.

Please refer to the RM9600 user manual for further information on configuration, test, and run modes.

For further information on this or any other application for the RM9600 Radio Modem, please contact your nearest RDT distributor.

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