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Using FreeWave Spread Spectrum Radios to Tail-End an MDS Radio Network

August 21, 2002

Whether you are extending the range of an existing radio network, incorporating RS-485 into an existing RS-232 network, or replacing aging radios, it may become necessary to join a FreeWave master to an MDS slave.

Using a FGR series FreeWave radio with firmware version 2.13 or greater, it is possible to install a fully functional FreeWave network consisting of many repeaters and slave radios with the collected data then being funneled through an MDS licensed radio to its destination.

A FreeWave radio modem is ready to accept and transmit data the moment that data is applied to its RS-232 port. MDS radios require a delay between the time that the transmitter is keyed and the time that the radio is ready to accept data. Keying of the MAS radio is normally accomplished by raising the RTS line on its RS-232 port.

Equipment Required

9-Wire shielded RS-232 cable (1)
RS-232 9-pin male connector block (1)
RS-232 25-pin male connector block (1)

Programming the FreeWave Radios

Set the Turn on delay to 9. This is done by setting item ‘E’ in the Baud Rate menu to 0 (Turn off delay) and 9 (Turn on delay).

Verify that the Baud rate settings between the FreeWave Master and the MDS slave match. I.E. 1200, 4800, 9600.

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Phone: (303) 444-3862, Fax: (303) 786-9948, www.freewave.com
LAN5435AA Rev B

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RS-232 Wiring Diagram.

If using a board level FreeWave modem use the following wiring diagram:

FreeWave				MDS Radio
Pin Number	Function	Connect to	Pin Number	Function
8	Carrier Detect		4	RTS
5	Tx Data		2	Tx Data
7	Rx Data		3	Rx Data
6	Signal Ground		7	Signal Ground

If using an Enclosed FreeWave modem use the following wiring diagram:

FreeWave				MDS Radio
Pin Number	Function	Connect to	Pin Number	Function
1	Carrier Detect		4	RTS
2	Tx Data		2	Tx Data
3	Rx Data		3	Rx Data
5	Signal Ground		7	Signal Ground

How it works

When the master FreeWave radio receives data it will raise its CD line. Upon this happening the MDS radio will key up and become ready to transmit data. The turn on delay of 9 allows for the CD line to remain high for a period of time before the FreeWave radio will send its data to the MDS radio. This will allow the MDS time to accept and transmit the data.

Once the FreeWave system has finished the data transfer the CD line will fall causing the MDS radio to de-key.

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Notes:

- While performing tests it was noted that the MDS radio presented line noise on the RX line of the master on the MDS side following de-key. This noise was unpredictably interpreted as extra data or characters by our test software.

- If you experience flow control problems RTS to CTS flow control may be implemented between the FreeWave master and the MDS slave by wiring the FreeWave RTS to the MDS CTS. You will also need to set the Flow Control option in the Baud rate menu to 1, for RTS flow control.

- This setup was tested on both 2300 and 9710 MDS radio systems.

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