9600 bps TNCs and the Ritron RPM-150 VHF-FM transceiver

The Ritron (http://www.ritron.com/ritron/) RPM-150 VHF-FM 30 Watt Programable Synthesized [RPM-150 Image] Radio Transceiver is a great radio for use with a 9600 bps packet modem. It is even more suited for use with a dual mode 1200/9600 bps modem.

This is because the RPM-150 has about a 60 millisecond TX/RX synthesizer settling time from application or release of the PTT signal. There aren't any synthesized amateur radios that are any faster and you can't use a TNC TXDELAY setting that is faster than the slowest user you want to support on the system. If you want really fast TX/RX transitions Ritron makes the RM series crystal controlled telemetry modules that do a full TX/RX transitio in less than 1.5 milliseconds. But then with who would you be able to connect?

Also the connection for the 1200/9600 bps modulation can be made to an internal op amp summing node. This means that the signals from the internal microphone speech processor, internal sub-audible tones, 1200 bps and 9600 bps modems do not interact or load each other and change modulation levels.

Finally the RPM-150 uses a two point modulation technique. This provides essentially flat frequency response from a few Hertz to 5000 Hz. This really helps provide good 9600 bps modulation response.

And of course, the RPM-150 is proudly designed and manufactured in the United States of America.

Here is a description of what is required for a typical installation.

Using the RPM's PC programming software, disable the PTT Debounce function for minimum TX/RX delay. This feature is available in RPM's with the "04" microcontroller or later. Earlier units with an "02" or "03" microcontroller cannot eliminate the 16 to 32 millisecond debounce time and will therefore run slower.

Short R608 to ground on the volume control / display board. It enables the receive audio to be set all the way to zero.

The microphone gain is set for commercial applications. Change C237 from 1000pF to 100pF and R248 from 56K to 120K for more microphone gain. This is optional since the modem signals do not go through this path.

Install the optional Ritron 9 pin accessory connector on the RPM-150 rear panel wired per Figure 1.

The popular Kantronics KPC-9612 has been successfully used with the RPM-150
as follows:

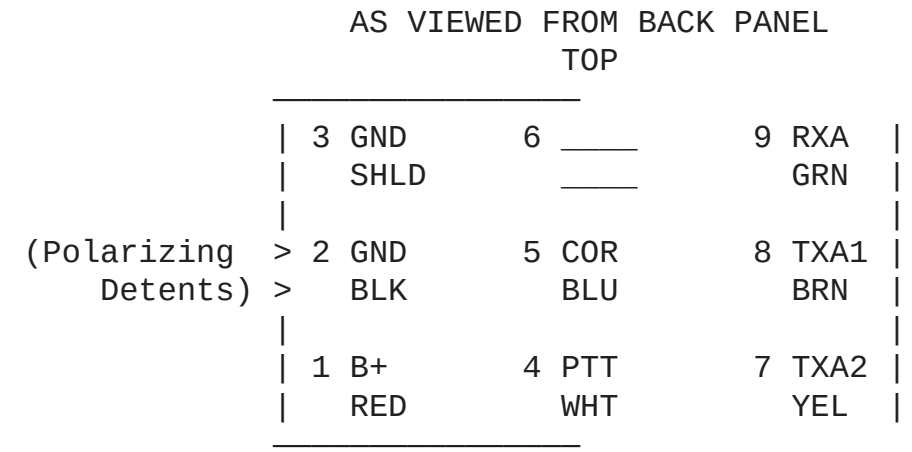
1. Remove R5. It overloads RXA discriminator output.
2. Set the 9600 bps TXDELAY for 9 or 10.
3. No special TX or RX equalization is required.
4. Remove J6 to decouple the 9600 bps modulation.
5. Set J16 and J17 to position 2. This allows power to be applied via DB-9 pin 7.
6. Install J7 for proper output level.
7. Install J1 in for proper 1200 bps RX equalization.
8. Remove J2 for proper 1200 bps modulation.
9. Adjust for proper 1200 & 9600 bps deviation per the manual.

For connection between the KPC-9612 and the Ritron RPM-150, make a cable with a mating 9 pin connector for the radio to a DB-15M and DB-9M connector wired as follows:

RPM-150	DB-9M	DB-15M	DESCRIPTION
1	7		+12VDC switched from radio to modem.
2	6		Ground Wired.
3			
4	3	1	Pull to ground to activate TX.
5			
6			
7	1		Transmit Audio 1 Wideband DC Coupled Flat
8	3		Transmit Audio 2 Wideband DC Coupled Flat
9	5	2	Receiver Audio Wideband DC Coupled Flat

Run the cable into the DB-9 shell and run just the 3 required lines over to the DB-15.

Figure 1. Ritron RPM High Speed TNC Interface Connector
An optional 9 pin connector block can be installed on the RPM-150 rear panel and wired as follows:



Acc Pin	ID	Wire Color	PCB Pin	Description	
1	B+	RED	3	Output	+12VDC switched from radio to modem.
2	GND	BLK	2	Ground	Wired.
3	GND	SHLD	16	Ground	Shield wire.
4	PTT	WHT	4	Input	Pull to ground to activate TX.
5	COR	BLU	19	Output	+5 VDC on signal detect.
6					Spare
7	TXA2	YEL	-	Input	Transmit Audio Wideband DC Coupled Flat Through a 100K resistor to IC204 pin 13
8	TXA1	BRN	-	Input	Transmit Audio Wideband DC Coupled Flat Through a 100K resistor to IC204 pin 13
9	RXA	GRN	1	Output	Receiver Audio Wideband DC Coupled Flat Unsquelched and not de-emphasized.

Current RPM-150's have push on pins on the printed circuit board for most of the connections. Some earlier radios had the pin connections shown on the schematic but the pins themselves where not on the board.

Thanks to K9DC and K9JRI for allowing themselves to be test subjects.

Good Luck and Happy 1200/9600 BPS Packet Operation!

Steve Henke, KB9KWD

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