TAPR DevMtr Notes

Lyle Johnson, WA7GXD

There have been a few minor problems and misunderstandings about the TAPR Deviation Meter kit. I hope this article will help to dispell some of them!

1) The directions for S1 and S2 are reveresed. If you don't get the action called out in the directions, press the other button!

2) Some kits were shipped with an incorrectly programmed PLD (18CV8). The symptom is that the DevMtr will sign-on, but it will not accept any keystrokes from your computer.

   If you have this symptom, contact the office and we'll see to it that a replecement is sent in exchange for your old one. These parts are re-progrmmable, so the old one may be re-used.

3) Some kits were shipped with a DE9P connector for the PC board serial port connector. The correct connector is a DE9S (female sockets, not pin contacts).

   If your kit has the wrong connector, contact the office for instructions on getting a replacement. Or, you may use the one supplied, just swap pins 2 and 3 in the directions and use pin 1 for ground instead of pin 5.

4) Not all TNCs have a CAL mode. The calibration instructions ask you to make the TNC send its high tone and then set the transmitter deviation.

   YOU MAY CALIBRATE THE DEVIATION USING A NORMAL PACKET AS WELL AS A TONE! THE ONLY WAY TO GET IT WRONG IS TO SEND ONLY A STEADY LOW TONE!

   The DevMtr will also calibrate for voice or almost any other waveform. At least one person wanted to return the DevMtr because he thought it would only work with a steady high tone. I apologize for my unclear instructions in the manual.

HELP!

Please let us know which receiver or transceiver you interface your DevMtr to and what EEPROM default value changes you made, if any. We will then share the information in PSR and in future revisions of the DevMtr manual. Thank you!

Buttons Notes

The directions calling for pressing switch one or switch two are not always accurate. If pressing the specified button does not result in the expected action, try the other button.

Manual Errors

The following contributed by Bdale Garbee, N3EUA.

Page 3:
The color coding for the 470 ohm resistors is wrong. Change from red-red-brn-gld to yel-vio-brn-gld.

The TK1413 inductor designator may be a bit confusing to the novice builder. The units are actually marked TKANS-9447.

Page 6:

If your resistors are supplied on tape rather than loose, be sure to cut the resistor leads to remove them from the tape rather than just pulling them out from the tape. The tape leaves a residue which may result in good-looking but poor-performing solder joints!

Serial Port Notes

The serial port is a 3-wire interface which supports neither hardware (RTS/CTS) nor software (Ctrl-S/Ctrl-Q) flow control. The following tips are for users of MS-DOS-based PCs. If you are using another computer type, or you are using another communications program, consult the program documentation for proper setup for a three-wire interface with no flow control operating at 9600 baud, no parity, eight (8) data bits and one (1) stop bit.

PROCOMM PLUS

If you are using ProComm Plus, perform the following steps to use it with the DevMtr:

( )   Start ProComm Plus
( )   Type ALT-S (hold the ALT key down and then press the letter
      "S", then release both keys). A Setup Menu appears.
( )   Select Terminal. Another menu appears.
( )   Set Soft Flow Ctrl ON
( )   Set Hard Flow Ctrl OFF
( )   Press the <Escape> key.
( )   Select the Save Setup Option entry and press <Enter>.
( )   At the main screen, press ALT-P.
( )   Select 9600 bps (5) and 8/N/1 (ALT-N).
( )   Select the correct Comm Port for your computer.
( )   Press ALT-S to save these settings.

You are now ready to communicate with the DevMtr.

PROCOMM 2.4.2

If you are using ProComm 2.4.2 (shareware version), perform the
following steps to use it with the DevMtr:

( )   Start Procomm.
( )   Type ALT-S (hold the ALT key down and then press the letter
( )   "S", then release both keys). A Setup Menu appears.
( )   Select Terminal. Another menu appears.
( )   Set Flow Control to NONE.
( )   Press the <Escape> key.
( )   Select the Save Setup Option entry and press <Enter>.
( )   At the main screen, press ALT-P.
( )   Select 9600, N,8,1 (11) and press <Enter>.
( )   Select the correct Comm Port for your computer and press
      <Enter>.
( )   Select Save Changes (24) and press <Enter>.
( )   Press <Escape> to begin operating ProComm.

You are now ready to communicate with the DevMtr.

WINDOWS TERMINAL

If you are running MicroSoft Windows 3.0 or 3.1, you may use the included Terminal application. To do this:

( )   Start Windows.
( )   Select the Accessories Group.
( )   Double-click the Terminal Icon to start Windows Terminal.
( )   Click Settings on the Menu Bar.
( )   Click Communications on the drop-down Menu to open the Communications dialog box.
( )   Click the 9600 Baud Rate button.
( )   Click the 8 Data Bits button.
( )   Click the None Parity button.
( )   Click the None Flow Control button.
( )   Click the 1 Stop Bits button.
( )   Select the correct COM port option in the Connector box.
( )   Be sure the Parity Check and Carrier Detect boxes are not checked.
( )   Click OK to accept these settings and close the Communications dialog box.

You are now ready to communicate with the DevMtr.

Radio Interfacing Notes

The DevMtr expects the detector output voltage to increase as the input frequency increases (increasing voltage during calibrate). Some receiver detectors operate opposite to this, with lower applied frequencies resulting in higher detector output voltages (decreasing voltage during calibrate). If your DevMtr signs on as Version 1.0, it needs a software patch to work with radios of this type. If you received this notice packed in your kit, the EPROM has been patched even though it still signs on as Version 1.0. If it signs on as Version 1.1 or later, it has the patch.

If your radio receiver has a decreasing voltage output during self-calibration (if you lack a voltmeter, the other symptom is that the DevMtr never displays a deviation value), make the following changes to the EEPROM:

( )   Attach a computer or terminal to the serial port of the DevMtr.

( )   Load a communications program and configure it for 9600 bps, no parity, eight (8) data bits, one (1) stop bit. (See **Serial Port Notes** above for details on communications programs.)

( )   While holding switch S2 closed, apply power to the DevMtr.

The following sign-on message will appear from the monitor program in EPROM U9:

BUFFALO 3.4 (ext) – Bit User Fast Friendly Aid to Logical Operation

( )   Release S2.

( )   Press the <CR> or <ENTER> key of the computer to get the monitor prompt:

    >

( )   Type

MM B62B <CR>

where <CR> means the <ENTER> key of your computer.

( )   The DevMtr will respond with

B62B 81

( )   Type

85<CR>

( )   Type

MM B62C <CR>

( )   The DevMtr will respond with

B62C DF

( )   Type

00<CR>

( )   Type

MM B62E <CR>

( )   The DevMtr will respond with

B62E 81

( )   Type

85<CR>

( )   Type

   MM B62F <CR>

( )   The DevMtr will respond with

   B62F FD

( )   Type

   1F<CR>

The DevMtr is now set up to use a descending output detector.

Interfacing the DevMtr to a Radio Shack 2021 Scanner

This material contributed by Jeff Angus, WA6FWI.

   I assume that you have all the manuals required for this
in your hands. If not, the catalog number of the PRO-2021
scanner was 20-113. Both replacement Owners Manuals and Service
Manuals are available from Radio Shack and may be ordered at any
of the local stores. Approximate cost of the service manual is
$5.76 and is worth it to prevent costly damage to a scanner that
cost over $200 when new.

   Step one: Assemble the kit per instructions supplied
with.

   Step two: Discriminator output from the scanner is
available at TP3. Solder a 10 Kohm resistor into the pad marked
TP3. This is also connected to pin-9 of IC2. (TK10402, FM
detector sub-assembly) Solder the shielded DISC input lead of the
deviation meter to the free end of the new 10 Kohm resistor.

   Step three: RSSI output from the scanner is taken off of
resistor R96 near IC5. (uPD4069BP, Hex inverter) Remove R96 and
replace with a new 22 Kohm resistor. Insert the long (folded) end
of the resistor in the pad marked with a circle on the silkscreen
(this is pin-12 of the IC). Solder the RSSI input lead to this
end of the resistor.

   Step four: CAL input to the scanner is connected to the
collector of Q14 (2SC2668Y) at resistor R96. Remove R96 and
replace with a new 220 Kohm resistor with the long (folded) end
connected to the collector of Q14. Solder the 10 Kohm resistor
from the deviation meter kit to this end of R96. Connect the
shielded lead from the CAL output of the deviation meter to the
free end of the 10 Kohm resistor.

Step five: 12 VDC output from the scanner is taken off of the series diode, D40, (1S2076A) leading to the voltage regulator IC10. (S-81250HG). Connect the 12 VDC input lead from the deviation meter to the Cathode end of D40.

Step six: Configuration of the EEPROM values. Press and hold S2 while turning power on at the scanner. The computer should display the debugger sign-on message. Pressing the carriage return should result in a ">" symbol. The values of the EEPROM that have to be modified are listed below.

B65A was 2A change to 29   ; these 2 are for IF frequency
B65B was 62 change to CC   ;

B626 was A7 change to B2   ; this is RSSI polarity

Note: Check revision number of EPROM. If it is greater than 1.0 follow the patch changes below. If it is not, either TAPR or I will supply you will the code to add to the EPROM. (Between the addresses of $0500 to $055F.) See footnote.

B62B was 81 change to 85   ; these 4 are for discriminator
B62C was DF change to 00   ; output polarity
B62E was 81 change to 85   ;
B62F was FD change to 1F   ;

Step seven: Calibrate unit. Press and hold S1 while tuning coil L1 on deviation meter for a reading between 38 and 44. (See page 15 of TAPR manual) Release S1 and Press S2 to reinitiate the deviation meter calibration sequence again.

This completes modification and connection of your TAPR deviation meter to your PRO-2021 scanner.

Footnote: The EEPROM patches to locations $B62B and $B62E relocate the calibrate lookup values to a new table. The reason for this is that the PRO-2021 scanner discriminator output changes in the opposite direction than that of the PRO-59. An alternative to the patch values and a new EPROM code is to change the injection frequency in the scanner from 10.245 MHz to 11.155 MHz. You can either change the crystal or remove it entirely and use a Hewlett-Packard 8660C signal generator coupled in through a 0.001 uf capacitor to pin-1 of the detector chip IC2. (A signal level of -40 dBm is adequate :-)