APPENDIX 6

TRANSMITTER ALIGNMENT

FOUR (4) PAGE ALIGNMENT PROCEDURE FOLLOWS THIS SHEET

ALIGNMENT PROCEDURE

The Pi U/V Receiver is by design, broad band covering UHF(440 to 470 MHz) and VHF(148-174MHz) and should require no special alignment, unless repairs are performed on the receiver portion.

The only alignment normally required is to squelch circuit. Apply a signal that produes 10dB SINAD, reduce the input to -130dBm, close the squelch contorl(RV1) until the receiver mutes. Increase the signal to 10dB SINAD reading reference level and adjust RV1 until the squelch opens. In high noise environment, some users may prefer to have the squelch opening set somewhat tighter, e.g.:12 to 14dB SINAD.

Should repairs be required, the following procedures should be applied:

VCO

1. Set the unit to the lowest transmitter frequency, 440MHz(UHF), 1484MHz(VHF) and adjust the VCO L303 to 3 volts.
2. Set the unit to the highest transmitter frequency, 470MHz(UHF), 174MHz(VHF) and check that the VCO voltage is below 11 volts. Adjust L303 for 3.0 volts.
3. Set the unit to the lowest receiver frequency, 440MHz(UHF), 148MHz(VHF) and adjust the VCO C208 to 2 volts.
4. Set the unit to the highest receiver frequency 470MHz(UHF), 174(VHF) and check that the VCO voltage is below 11 volts. if voltage is above 11volts, adjust L203 for 11volts or less.

* Note : use TP1 to measure the voltage.

Receiver

1. Apply a standard test signal to the receiver antenna terminals.
2. Adjust T1 for maximum sensitivity and audio output with minimum audio distortion.
3. Adjust VR3 for the specific audio output level

This completes the receiver alignment procedures.

Transmitter

Connect the unit to a Service Monitor with the power meter setting to the 5 W scale (or autorange)

TCXO

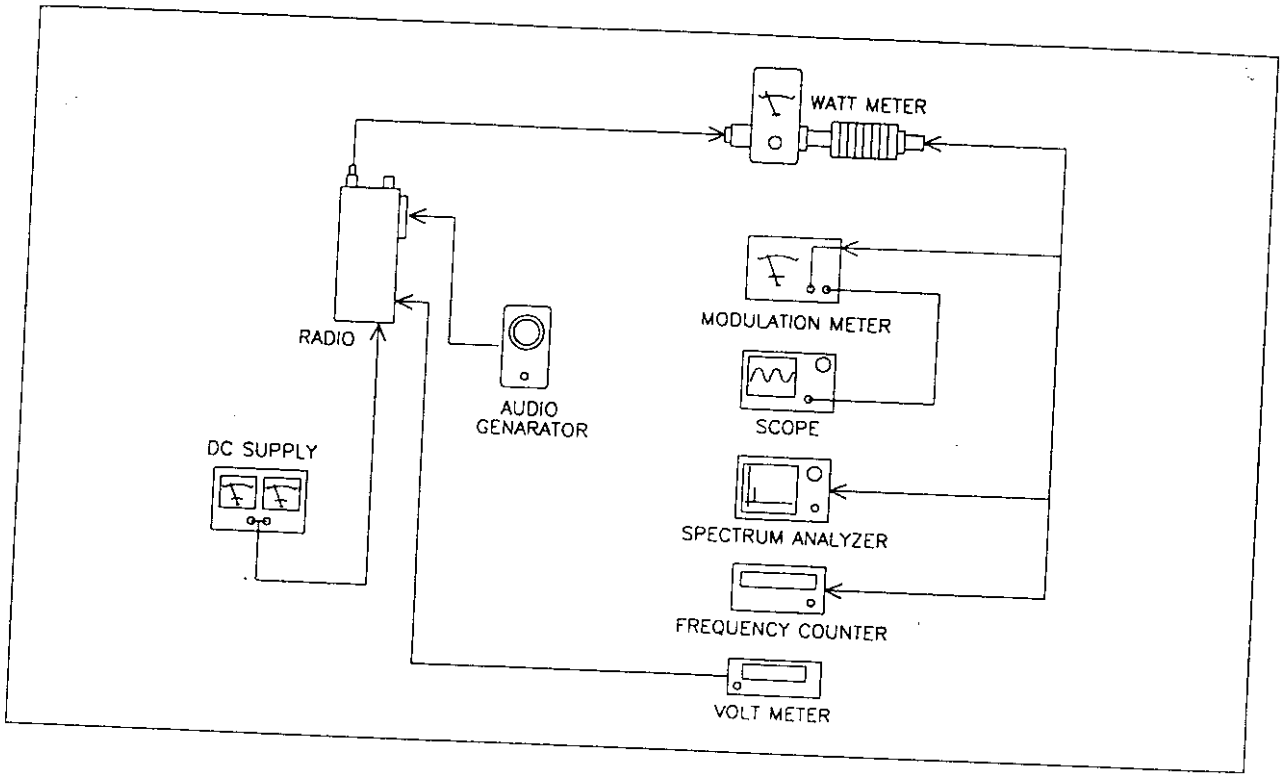
Set the channel selector to the mid-range frequency 455 MHz, adjust CT1, for a reading of 445 MHz - - 200Hz. For the VHF data radio, adjust the CT1 and set the frequency within the required range.

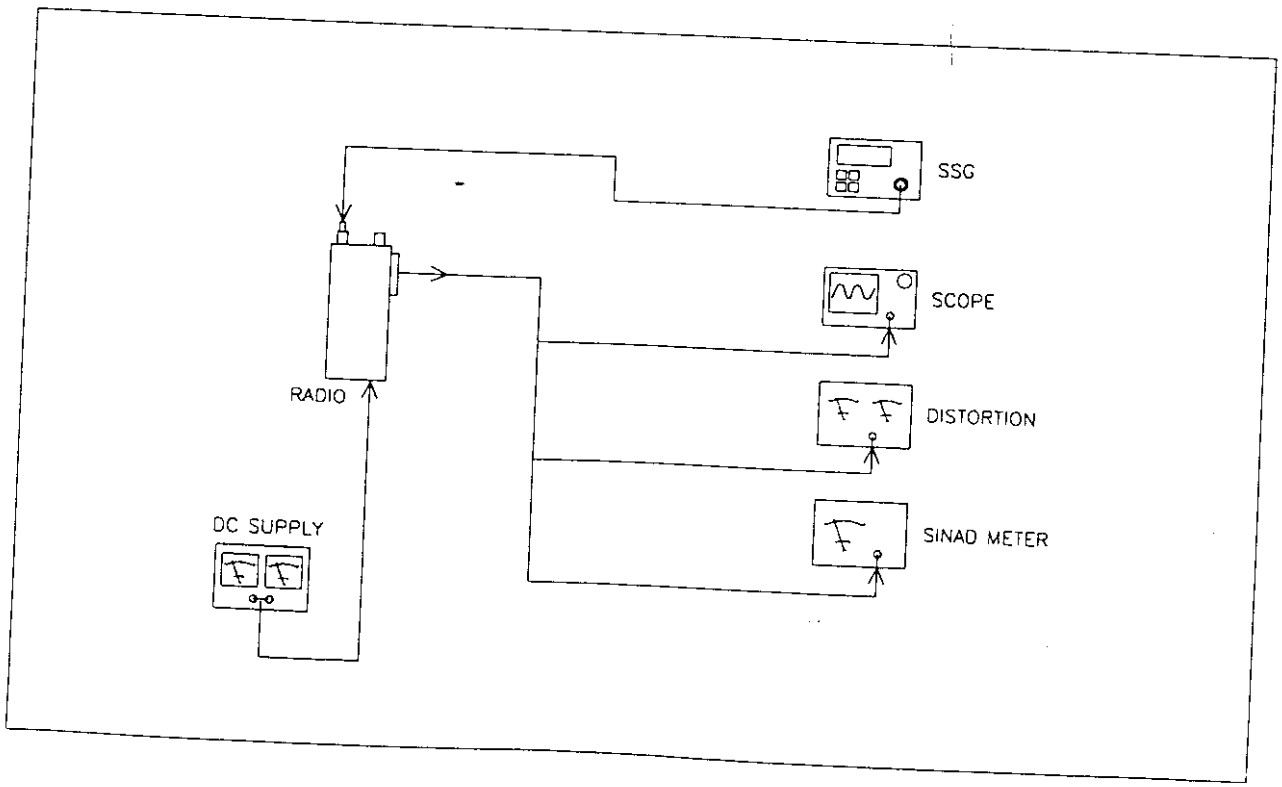
TX Deviation and Balance Adjustment

1. Set the unit to a mid-frequency and input the TX audio with 400Hz standard audio level.
2. Increase the signal level to 20 dB from standard level.

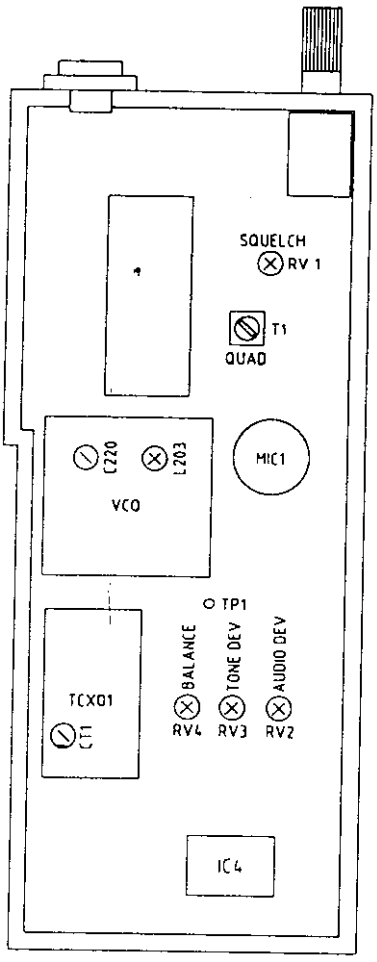
3. Monitor the demodulated signal from service monitor. And adjust with RV1 to make a monitored signal to be a balanced square wave.
4. Set the unit to a mid-frequency and and a CTCSS of 67Hz and 250Hz. Push PTT and adjust RV2 for desired CTCSS tone diviation(0.3KHz)
5. Inject a 13mV signal or 1KHz to the microphon input. This should produce a 3KHz diviation measure transmit distortion. that should be less then 5%.
6. Set the diviation by adjusting RV2 to 2.1KHz on the non-CTCSS. Select a CTCSS frequency and verify that the diviation is less then equal to 2.5KHz
7 Vary the radio frequency from 300Hz to 3KHz and varify that the diviation does not exceed 5KHz

TEST EQUIPMENT SETUP





ALIGNMENT POINTS DIAGRAM FOR PI



APPENDIX 7

CIRCUITS AND DEVICES TO STABILIZE FREQUENCY

A 12.8 MHz referenced TCXO PLL circuit establishes and stabilizes output frequency.

APPENDIX 8

CIRCUITS TO SUPPRESS SPURIOUS RADIATION, AND LIMIT MODULATION

A. Circuits to Suppress Spurious Emissions

The final power amplifier circuit of Q9 followed by a 7th order Chebyshev low pass filter consisting of L22, L23, L24, C62, C63, C64 and C65.

B. Circuits to Limit Modulation

The TX audio from the internal mic or external mic is fed into IC3 pin3. The TX audio output is applied to the high pass filter (IC10), where sub-auble voice products are removed. The TX audio output from IC10 is fed into IC2B with associated parts to form a mic amplifier and limiter. The output from Pin 7 (IC2B) is fed into IC2A to form a 3K low pass filter and fed into RV2 (TX modulation level adjust). The output is then fed into the audio mixer circuit.

APPENDIX 9

TRANSIENT FREQUENCY BEHAVIOR (90.214) TEST PROCEDURE

TWO (2) PAGES FOLLOW THIS SHEET

90.214 REQUIREMENTS: In the 440 - 500 MHz frequency band, transient frequencies must be within the maximum frequency difference limits during the time interval indicated below for 25, 12.5 and 6.25 kHz channels:

12.5 kHz:

Time Interval	Maximum Frequency	Mobile Radios 440 - 500 MHz
t_1	±12.5 kHz	10.0 ms
t_2	±6.25 kHz	25.0 ms
t_3	±12.5 kHz	10.0 ms

25.0 kHz

Time Interval	Maximum Frequency	Mobile Radios 440 - 500 MHz
t_1	±25.0 kHz	10.0 ms
t_2	±12.5 kHz	25.0 ms
t_3	±25.0 kHz	10.0 ms

TEST PROCEDURE: TIA/EIA TS603, PARA. 2.219, the levels were set as follows:

1. Using the variable attenuator, the transmitter level was set to 40 dB below the test receivers maximum input level, then the transmitter was turned off.

2. With the transmitter off, the signal generator was set 20 dB below the level of the transmitter in the above step (this level was maintained with the signal generator throughout the test).

3. Attenuation between the transmitter and the RF detector was reduced by 30 dB.

4. The transient frequency behavior was observed and recorded using a TEK TDS360 DSO.

Para. 2.995(a)(b)(d) Frequency stability

90.214 (continued) Transient Frequency Behavior