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| <b>Production Procedure</b>  |                            |                           | <b>DATARADIO</b>                 | ISO 9001<br>Registered®    | Pg: 1 of 10 |
| <b>Author:</b> N Savard  | <b>Validated:</b> M Martin | <b>Apprvd:</b> M. Poirier | <b>Procedure:</b> 20170-51-01_20 | <b>Rev. date:</b> 02/08/28 |             |
| <b>Tx Module Dual-Point Modulation – Tait Base (Series II) UHF and 800 MHz</b> |                            |                           |                                  |                            |             |

**Radio:** 800 & 900 MHz T800 Tait Series II Base Station (800-960 MHz)  
Full/Half/NPSPAC channel  
UHF T800 Tait Series II Base Station (400-520 MHz) Full/Half channel

**Interface type:** Data only; DBA/DSP

**Product:** Paragon/PD

**Channel Type:** Full and half Channels

|  |          |
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## History

### Version 2.0 August 28, 2002

- Procedure updated to support 800/900 MHz Half and NPSPAC channels
- Added figure for the low frequency balance resistor location for the UHF exciter modification.
- Added the Exciter synthesizer alignment section 5, page 6.
- Added VCO figure to locate components more easily. Figure 3, page 7
- Added comments in note section 6, page 7
- Added T800 Base Station Radio Programming Mod Balance adjustment information:  
Addendum 1, page 10

### Version 1.0 July 27, 2001

- First release, version 1.0

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## 1. Part List

The following test equipment is required:

- 1x IFR COM120-B communication monitor
- 1x 13.6VDC power supply
- 1x Special Tait base TX module interface cable
- 1x Computer with Window 95 or 98
- 1x Tait software PGM800Win version 3.00 or later
- 1x Tait programming kit
- 1x ATS Exciter II software
- 1x Coaxial cable RG-223 50 ohm N male/ N male 3' long
- 1x Special ¼" mono
- 1x Resistor kit, range of 30.1 Kohm to 97.7 Kohm 1%
- 1x Pace Soldering/Desoldering station
- 1x Tin 63/37
- Pozidriv screwdrivers #1 and # 2 and Torx screwdrivers #T-10 and #T-20
  
- 1x T881-10/16-0200 transmitter or 1x T-857-10/16-0250

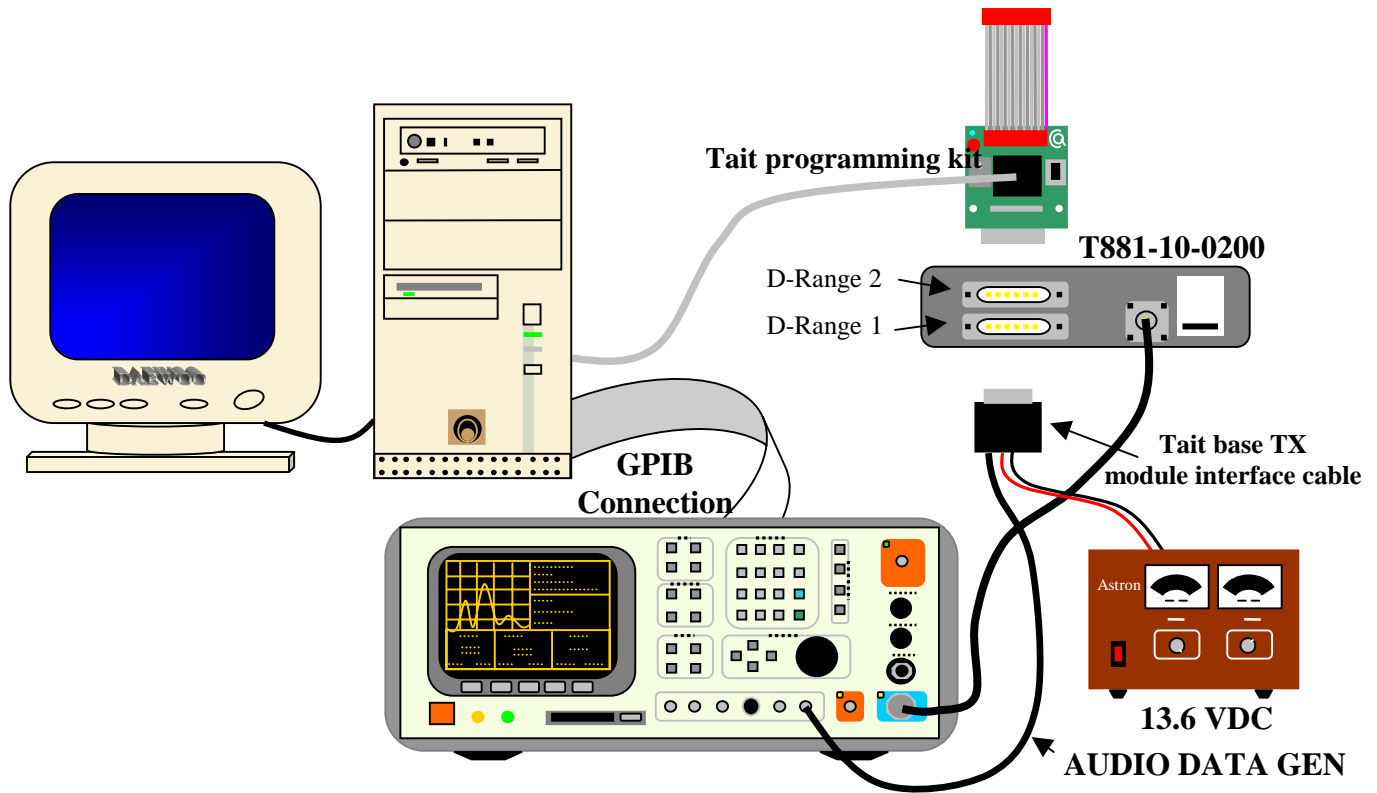
## 2. Radio interface

The following three Radio interface bulletins must be performed before running the Exciter II ATS:

- Radio interface bulletin - Tait 800 & 900 MHz (series II) for n FSK modulation.  
Procedure 16428100-051 rev. xx
- Radio interface bulletin – Tait UHF Series II (diversity).  
Procedure 16420006-031 ver. xx
- Radio Interface bulletin – Tait – Half & NPSAC channel 800 & 900 MHz (Series II) for *n*-FSK  
Procedure 16428101-051 ver. xx

|  |                     |                    |                           |                         |             |
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### 3. Setup



## 4. Connectors

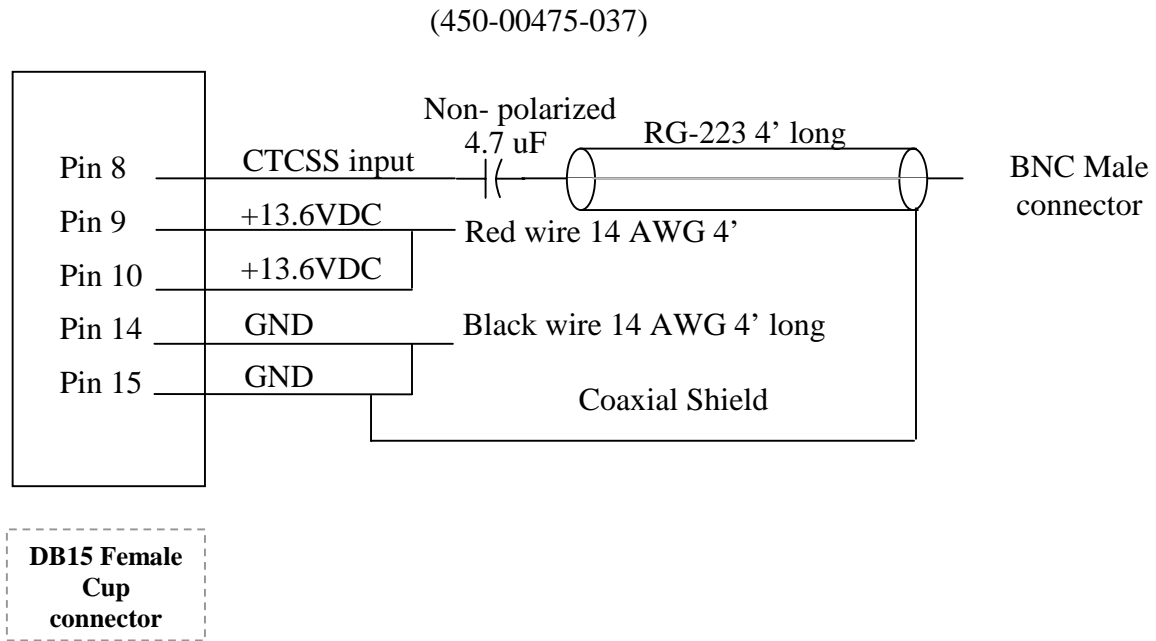


Figure 1 Tait base TX module interface cable schematic



Figure 2 Jack 1/4" mono schematic

|  |                     |                    |                           |                         |             |
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## 5. Synthesizer Alignment

*Note:*

*Adjust the Exciter transmit frequency according to the work order.*

### 5.1 UHF synthesizer alignment (Exciter (T857-xx-0250) module)

Single channel: Connect the multimeter to pin 1 of PL4 in the VCO (this measures the synthesizer loop voltage). Tune VCO trimmer C6 for a synthesizer loop voltage of 10VDC. Refer to **Figure 3** page 7.

Multiple channels: Connect the multimeter to the pin 1 of PL4 in the VCO. Adjust the VCO loop to 10V using the middle frequency channel. All channels should lie within the upper and lower limits of 16V and 3V respectively. Refer to **Figure 3** page 7.

**Warning:**

It is not recommended to program channels with a greater frequency separation than the specified switching range of 8 MHz (+/- 4 MHz from the middle channel). A channel outside that range will not be operational without re-tuning VCO and Front end.

### 5.2 800 MHz synthesizer alignment (Exciter T881-xx-0200 module)

Single channel: Connect the multimeter to the left side of L309 (100 nH) in the VCO (*this measures the synthesizer loop voltage*). Tune VCO trimmer CV300 for a synthesizer loop voltage of 10 VDC. Refer to Figure 5 page 9.

Multiple channels: Connect the multimeter to the left side of L309 (100 nH) in the VCO (*this measures the synthesizer loop voltage*). Adjust the VCO loop to 10 VDC. Tune VCO trimmer CV300 for a synthesizer loop voltage of 10 VDC (*working range is between 3V to 16V*). Refer to Figure 5 page 9.

**Warning:**

It is not recommended to program channels with a greater frequency separation than the specified switching range of 8 MHz (+/- 4 MHz from the middle channel). A channel outside that range will not be operational without re-tuning VCO and Front end.

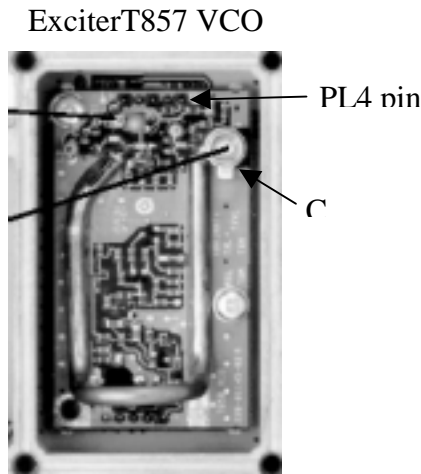
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## 6. Handling

1. Connect the Tait base TX module interface cable supply wire (red and black 14 AWG wire) at 13.6 VDC power supply.
2. Connect the Tait base TX module interface cable (DA 15 connector side) at the Tait Exciter D-Range 1 connector.
3. Connect the Tait base TX module interface cable (BNC male connector) at the **AUDIO DATA GEN OUT** (IFR COM-120-B).
4. Connect the Tait programming kit between the computer COM port and at the Tait Exciter D-Range 2 connector.
5. Connect the coaxial cable RG-223 between the Tait exciter N connector and the **T/R RF IN/OUT** (IFR COM-120-B).
6. Open the Tait software PGM800Win in version 3.00 or later (for the low frequency balance adjustment).
7. Open the ATS Exciter II, last version.

*Note:*

- Always start by first unplugging the ¼" mono Jack to the Exciter prior to powering the IFR COM-120A/B.
- For location(s) of:
  - UHF exciter resistor(s), see **Figure 4** page 8.
  - 800 MHz exciter resistor(s), see **Figure 5** page 9.
- For UHF exciters, the VCO board must be first removed before soldering the resistor (value obtained via the ATS).
- Always carefully read pop up(s) coming from the ATS.
- If the unit successfully passed the EXCITER II ATS, perform the relevant alignment procedure listed hereafter. If it did not pass the ATS test, call the R&D department.
  - For UHF base station, Procedure 2017053-20\_XX
  - For 800 MHz base station (FC), Procedure 20170-53-10\_XX
  - For 800 MHz base station (HC & NPSPAC), Procedure 20170-53-11\_XX



*Figure 3 Exciter's VCO*

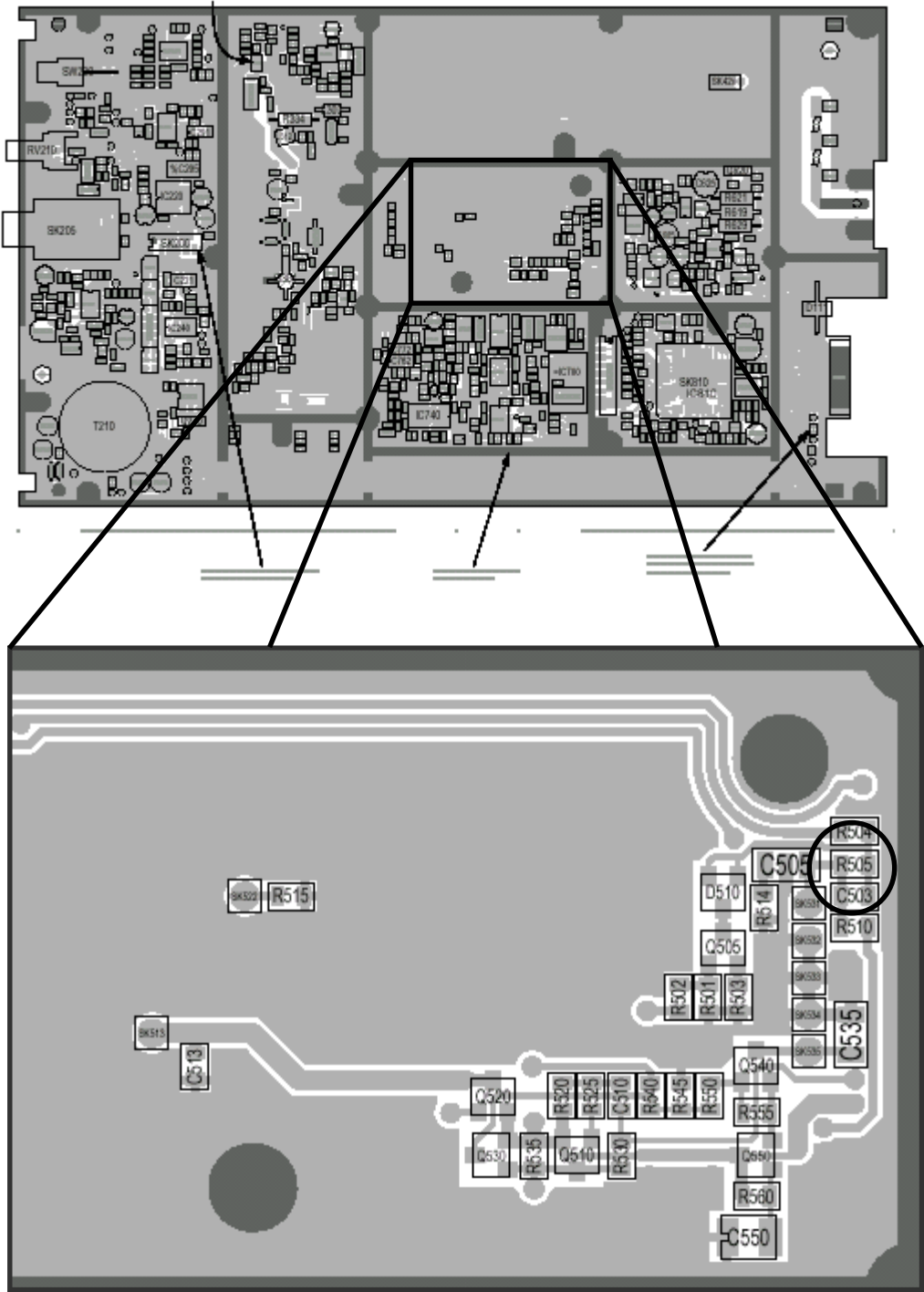


Figure 4 T857- UHF R505 location on Exciter PCB





|  |                     |                    |                           |                         |              |
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## Appendix 1 T800 Low Frequency Balance Adjustment via PGM800Win

*Note:*

- *PGM800Win version 3.00 controls this adjustment. Electronic potentiometer (256 steps) is used to allow channel adjustment of two-point modulation (Low freq. balance).*
  - *For more details about T800 Base Station Radio Programming, refer to:  
Procedure # 2016054-00 rev 1.04*
- a) Select the appropriate frequency channel specified by the work order (via PGM800Win)
  - b) Do a <CTRL P> TXON3 (100HZ square wave).
  - c) Using the PGM800Win ver. 3.00 (Tait software), adjust IC220 (“reference modulation”) to obtain the best square wave, no damping, no overshoot.
    - 1) In **Channel Information** section, select **EPOTs** bottom.
    - 2) Adjust the bar below the **Reference** box for a best square wave
    - 3) Click **OK**
    - 4) Select the **Reference Modulation** for the desired channel.
    - 5) Left click twice (mouse)
    - 6) Click **OK**
    - 7) Click **Write**
  - d) Do <CTRL P> TXOFF if the transmission has not ended by itself.
  - e) For multi-channel base, select the highest frequency channel (via PGM800Win) and repeat step “b” again, and transmit the 100Hz square wave. Record deviation again.
  - f) The difference in deviation between the two channels should be less than  $\pm 300\text{Hz}$ . If not, re-adjust IC220 (“reference modulation”) to "average" the square wave shape on both channels until the spec is met.
  - g) To confirm the adjustment, select the lowest frequency channel, compare the deviation between 1 kHz tone (<CTRL P> TXON7) and random data (<CTRL P> TXON4), the difference should be lower than 1.7 kHz for 4-FSK modulation and 0.5 kHz for DGFSK modulation. Repeat on the highest frequency channel.
  - h) Recheck deviation on the 1KHz tone (*as specified on step b*) and re-adjust as necessary.

*Note:*

*For multi-channel base, do not forget to re-program the correct frequency channel.*

*The IFR must show the oscilloscope screen (source: demod) and DC coupled be selected.*