Type Acceptance Test Report

UHF Data Transmit Module

FCC ID: B2FTALON-U

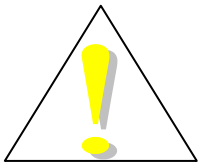
FCC Rule Part: 90

ACS Report Number: 03-0102-90TA

Manufacturer: Kantronics
Model: Talon UDC

Alignment Procedures

ALIGNMENT



WARNING

Only qualified and trained service personnel must perform alignment.

Required Test Equipment

The following test equipment is required to align the TALON Series radio modems. All test equipment should be properly calibrated with traceability to NIST or your country's authority.

- Service monitor or
  - RF signal generator at operating frequency of equipment with output level adjustment and FM.
  - FM demodulator, that can drive a deviation meter
  - Deviation meter
  - RF frequency counter: Must operate at the RF frequency of the equipment, with a resolution of 10 Hz or better, and accuracy of ± 1 PPM (± 150 Hz at VHF, ± 450 Hz at UHF) or better.
  - RF power meter: Capable of accurately indicating the equipment RF power output.
  - RF power attenuator or dummy load with coupled output. Must be 50 Ω impedance at the operating frequency, rated for the output power of the equipment, and have an output which can drive the FM demodulator and frequency counter at the correct level.
- Audio oscillator: Must have sinewave and squarewave output and adjustable output frequency and amplitude.
- Voltmeter for dc: ≥ 10 MΩ input impedance. Any good DMM will have this.
- Oscilloscope: ≥ 20 MHz bandwidth and 10 X probe.
- Power Supply: Capable of approximately 12 V dc at 3 A.

Note that alignment instructions are written for a service monitor.

Alignment Procedure

It is not necessary to perform all alignment steps detailed below. However, some adjustments have interaction with others (e.g.: balance affects deviation and output power has a slight affect on TX frequency trim). It is recommended to spot check all adjustments.

Refer to the last section of this manual for schematic diagrams, parts layouts, and parts lists.

After removing the cover:
- Jumper J8 with P3
- Be sure P2 is in place across J7
- Connect a PC to the TALON Series unit via a RS232 cable assembly
- Open a communications program, such as HyperTerm™ found in Windows™
- Attach the ANT connector to a communications service monitor
- Apply dc power to the unit
- Observe the correct display on the PC's VDT

Note:
- Press the "Esc" key to get out of any command
- Press the "B" key (PERM Radio parameters), when not in any other command, at any time to make adjustment parameters permanent

TRANSMIT AND RECEIVE FREQUENCY

Set transmit and receive frequencies with the "T" key to frequency of operation.

Note: If the receive frequency is the same as the transmit frequency, just enter the transmit frequency. Receive frequency will be set automatically. Otherwise, press the "R" key and set the receive frequency.

TX frequency _____ MHz

RX frequency (same as TX frequency unless indicated)

_____ MHz

RX FREQUENCY TRIM

Press the "1" key to change the RX FREQUENCY TRIM offset voltage at A2P1-7 to as close as you can to 2.50 V dc.

Note: If you have a frequency counter, with adequate accuracy, you may adjust the RX FREQUENCY TRIM to put the local oscillator "on frequency".

Measured value _____ V dc.

CARRIER DETECT

- Set service monitor generator frequency to receive frequency of radio modem
- Set modulation to 1200 Hz at 2.3 kHz deviation
- Set service monitor power output to signal level required for carrier-detect to go true. (Production Test will set this for –100 dBm.)

Press the "2" key for CARRIER DETECT ON TRIM adjustment. Adjust until there is a constant ON (on the VDT) indicated. This may be monitored at A2AR2-1 with a dc-coupled oscilloscope. There should be a 5-V dc level with no negative going glitches.

Carrier-detect ON power level –_____ dBm.

- Set the service monitor power output to signal level required for carrier-detect to go false. (Production Test will set this for –105 dBm.)

Press the "3" key for CARRIER DETECT OFF TRIM adjustment. Adjust until there is a constant off. This is indicated by the ON (on the VDT) being off. Continue monitoring at A2AR2-1 with dc-coupled oscilloscope. There should be a 0-V dc level with no positive going glitches.

Carrier-detect OFF power level –_____ dBm.

RECEIVER DC OFFSET ADJUST

Set service monitor power output for a level above the carrier-detect on level with 1200 Hz at 2.3 kHz deviation modulation on.

Measure V_{BIAS} at MX919B IC terminal 21 (A2U3-21).

Measured V_{BIAS} value _____ V dc.

Press the "4" key for the RECEIVER DC OFFSET ADJUST.

Adjust this to get measured V_{BIAS} value at MX919B IC terminal 23 (A2U3-23).

Measured value _____ V dc.

Measured value after RX GAIN ADJUST _____ V dc.

RECEIVER GAIN ADJUST

Set modulation at a 1200 Hz tone for 2.3 kHz deviation.

Press the "5" key for the RECEIVER GAIN ADJUST.

Adjust this to get a 1 V pp signal at MX919B IC terminal 23 (A2U3-23).

Measured signal amplitude 1 V pp. _____ Check

Go back and check the RECEIVER DC OFFSET ADJUST, because the RECEIVER GAIN ADJUST interacts with it due to a dc offset in the radio transceiver.

TRANSMITTER RF POWER OUTPUT ADJUST

Set service monitor to measure transmitter power.

Press the "6" key for TRANSMITTER POWER ADJUST.

Adjust the RF power output level, up to 6 W, in accordance with your license. (Production Test will set this to 1 W.)

RF power output adjusted to _____ W.

Note: The transmitter is not rated for 100% duty cycle (continuous operation) at the higher power levels. Remove the cover and back panel and use a fan or blower to keep the heat dissipation from raising the temperature to extreme levels. Work quickly to set the power.

Note: Do not exceed 6 W as the analog voltage on the control line must not exceed 4 V dc. This will damage the RF power amplifier module.

TRANSMITTER BALANCE

For proper modulation and bandwidth occupancy, check and set this adjustment at transmit frequency.

Remove A2P2 from A2J7.

Connect a square wave generator at a frequency of 500 Hz, 50 % duty factor, 0.2 V pp, and 2.5 V dc offset to A2J7-2, adjacent to A2P1-7, and GND (A2D1-A).

Press the "7" key for TRANSMITTER BALANCE.

With an oscilloscope connected to the service monitor demodulator (ac coupled):

- Adjust the amplitude of the 500-Hz square wave to obtain 2.3 kHz deviation on the service monitor. Amplitude will be about 4 V pp.
- Now adjust the balance SMD potentiometer, A1R180. This is adjusted with a small flat blade screwdriver through a hole (MTH1) in the Controller ASSY. Adjust such that the oscilloscope display shows a square wave with no rounded corners or overshoot. (This is similar to compensating an oscilloscope probe.)
- Quit transmitting. Remove the square wave generator and replace the jumper on the header.

TRANSMITTER DEVIATION

Set service monitor to measure transmitter deviation.

Press the "8" key for TRANSMITTER DEVIATION.

Press "T" for 1200-Hz tone and adjust for 2.3 kHz deviation.

Check ☐

TX FREQUENCY TRIM

Recheck the dc offset voltage at A2P1-7. Should be at the voltage previously measured under RX FREQUENCY TRIM (2.50 V dc).

Press the "9" key for TX FREQUENCY TRIM and adjust the offset for 2.50 V dc.

Note: The transmitter will be on with no modulation. If you have a frequency counter, with adequate accuracy, you may adjust the TX FREQUENCY TRIM to put the transmitter "on frequency".

Measured value _____ V dc.

ADJUSTMENT COMPLETE

Remove jumper from J8 so unit will be in operating mode. P3 may be stored by attaching it to one terminal only of J8.

RF Transceiver Circuit Card Assembly Adjustments

Front End Inductors

TCXO Frequency Adjustment