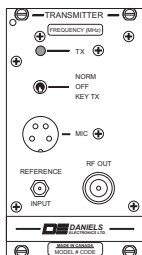


## TN320 VT-3H040 VHF Lowband Transmitter



The VT-3H040 transmitter is a low power, enhanced synthesized FM transmitter capable of operating in 20 KHz channels. The VT-3H040 transmitter operates in one of two frequency bands: 29 MHz to 38 MHz or 38 MHz to 50 MHz. A modular design allows each of the transmitter's modules, MT-3 Transmitter Mainboard, MT-3 Audio Processor, VT-3H040 Amplifier and OS-3H040 Synthesizer, to be individually assembled and tested. This facilitates construction, tuning and maintenance as well as troubleshooting procedures. The synthesizer module can be programmed to have up to 16 channels exclusive to one frequency band.

### Specifications

Frequency Bands	29 - 38 MHz / 38 - 50 MHz
Channel Spacing	20 KHz
Frequency Switching Range	± 0.5 MHz (29 - 38 MHz) / ± 1 MHz (38 - 50 MHz)
RF Output Power	0.5 to 3.0 Watts adjustable
Duty Cycle	100% (-40°C to +60°C)
Undesired Emissions (Conducted Spurious)	≤ -80 dBc
Undesired Emissions (Conducted Harmonics)	≤ -90 dBc
FM Hum & Noise Ratio (300 Hz - 3.4 KHz)	≥ 55 dB
Carrier Frequency Stability	± 5.0 ppm (-30°C to +60°C) (-40°C to +60°C optional)
Emission Designator	16K0F3E (FM)
VSWR Protection	≤ 20:1 (All Phase Angles)
Audio Distortion	≤ 2.0% @ 25°C (≤ 2.5% @ -40°C to +60°C)
Operating Temperature	-30°C to +60°C (-40°C to +60°C optional)
Standby Current	≤ 15 mA
Transmit Current (3.0 W)	≤ 1.20 A

### Models Available

VT-3H035-SWA300	Enhanced Synthesized, 20 KHz Bandwidth, 3.0 W, 29 - 38 MHz
VT-3H045-SWA300	Enhanced Synthesized, 20 KHz Bandwidth, 3.0 W, 38 - 50 MHz

### Transmitter Operating Frequency

The transmitter is initially aligned at the factory for the frequency shown on the label on the front panel. For a small frequency change, no re-alignment of the transmitter may be required. If the frequency change is greater than **±0.5 MHz** or **±1 MHz** from the frequency at which the last complete transmitter alignment was performed, the **synthesizer, audio processor, amplifier power output** and **amplifier alarms** (if used) will need to be realigned. To align and / or adjust the transmitter, the outer cover needs to be removed; the transmitter needs to be plugged into the subrack via a cable and / or extender card; and power must be applied to the system. A 50 Ω dummy load should be connected to the RF output when transmitting.

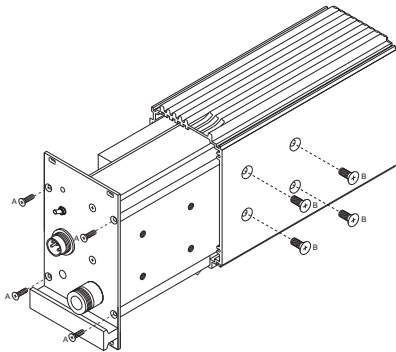
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## TN320 VT-3H040 VHF Lowband Transmitter



Remove the four front panel screws (A) and four side panel screws (B) to slide the transmitter outer cover off and expose the Main Board, Local Oscillator, Audio Processor Board and Amplifier.

**Synthesizer Alignment:**

The enhanced synthesizer is manufactured with two different synthesizer chips. Depending on the version of the chip, the loop control voltage (TP4) will be set at a "center voltage". To determine the "center voltage", the synthesizer lid needs to be removed. If a single jumper wire is installed next to C29, the "center voltage" is +2.3 Vdc. If the jumper wire is NOT present, the "center voltage" is +4.5 Vdc. As of the year 2001, all new products have a +2.3 Vdc "center voltage" FM enhanced synthesizer. Labels have been applied to MOST enhanced synthesizers that have a "center voltage" of +2.3 Vdc. Using a high impedance (10 M $\Omega$ ) DC Voltmeter, measure the PLL control voltage

at TP4 located on the synthesizer module at room temperature. Using a small standard blade screwdriver, carefully adjust the VCO fine frequency "tune" trimmer capacitor C24 until the "center voltage" is obtained. If the "center voltage" at TP4 is unattainable through adjustment to C24, then the coarse frequency jumpers, JU2 - JU4, require modification in order to pull the VCO tune range within the adjustment range of fine tuning capacitor C24. The top synthesizer cover must be removed in order to gain access to the coarse frequency jumpers. The coarse frequency jumpers may be considered to be selectable binary weighted capacitor elements with JU2 being the most significant 'bit' and JU4 being the least significant 'bit'. If the voltage is higher than the "center voltage", decrease the tuning jumper setting by 1 'bit' position and re-adjust C24. If the tuning voltage is lower than the "center voltage", increase the the tuning jumper setting by 1 'bit' position and re-adjust C24. Access to TP4 and C24 is available through the synthesizer top cover. Note: In order to measure the loop control voltage (TP4), the synthesizer is required to be turned on by keying the transmitter.

**Audio Processor Alignment:**

For circuit board versions 43-911916 through 43-911923, refer to Technical Note TN130 Audio Processor Tuning Procedure. For other circuit board versions, refer to the appropriate manual.

**Amplifier Output Power Adjustment:**

Turn R48, the output power adjustment, clockwise to the desired transmitter output power. If the RF output power does not reach 3.0 Watts, or current draw to the transmitter exceeds 1.2 Amps, the amplifier should be realigned. To realign, disconnect the LO input to the amplifier and connect an ammeter to the +13.8 Volt line into the transmitter (+13.8 Volts to the transmitter, not the main power input at the back of the subrack). The +13.8 Volt line to the transmitter is available on the extender card, however traces are required to be cut in order to connect an ammeter. Turn R5 and R42 fully counterclockwise and R48 fully clockwise. Adjust R28 and R29 fully counterclockwise and R16 fully clockwise. Key the transmitter and adjust R42, the final current limiter, until 900 mA is drawn on the +13.8 Volt line. Adjust R5, the driver idle current, clockwise until the +13.8 Volt line increases by 10 mA (this is the MINIMUM setting R5 can be turned to). Increase R5 clockwise until the +13.8 Volt current draw is 1000 mA while counting the pot turns. This is the MAXIMUM setting that R5 can be tuned to. Return R5 to the minimum setting of 910 mA. Reconnect the LO input and adjust R5 clockwise until the RF power output no longer increases or the maximum number of turns is achieved. Set R48 at the desired transmitter output power (0.5 to 3.0 Watts).

**Amplifier Alarm Adjustment:**

Refer to the Instruction Manual for amplifier alarm adjustments.

*Note: For complete alignment procedures, refer to the instruction manual. These notes are for reference only.*

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