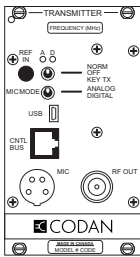


TN347 VT-4E VHF MT-4E Transmitter


The VT-4E VHF transmitter is an FM radio module capable of analog operation in 12.5 KHz (narrowband) or 25 KHz (wideband) channels. A firmware upgrade may be purchased to allow P25 digital operation. The VT-4E VHF transmitter operates over the frequency band from 136 to 174 MHz. A modular design allows each of the transmitter's internal modules to be individually assembled and tested. This facilitates construction, tuning and maintenance as well as troubleshooting procedures. The transmitter can be programmed with up to 2 banks of 16 channels each.

Specifications

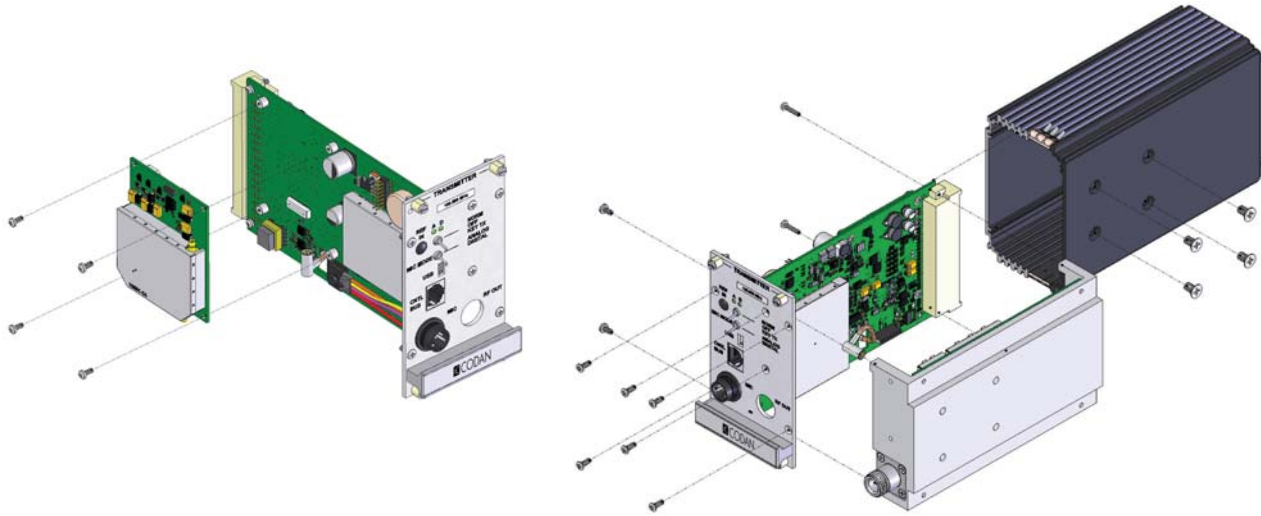
Frequency Band	136 - 174 MHz
Channel Spacing	12.5, 15, 25 and 30 KHz
Frequency Switching Range	Full Band; ± 0.5 MHz for VSWR alarm
RF Output Power	0.5 to 8.0 Watts adjustable
Duty Cycle	100% (-30°C to +60°C)
Undesired Emissions (Conducted Spurious)	≤ -70 dBc @ 8.0 Watts
Undesired Emissions (Adjacent Channel Power Ratio)	≤ -60 dBc; Narrowband Analog / ≤ -70 dBc; Wideband Analog ≤ -70 dBc; Digital
Intermodulation Attenuation	≥ 45 dB
FM Hum & Noise Ratio	≥ 42 dB; Narrowband / ≥ 48 dB; Wideband
Carrier Frequency Stability	± 1.0 ppm (-30°C to +60°C)
Emission Designators	Analog: 11K0F3E (Narrowband); 16K0F3E (Wideband) Paging: 9K20F1D P25 Digital: 8K10F1E (Digital Voice); 8K10F1D (Digital Data)
Audio Distortion (60% of maximum deviation)	$\leq 3.0\%$ (-30°C to +60°C)
VSWR Protection	$\leq 20:1$ VSWR (All Phase Angles)
Operating Temperature	-30°C to +60°C
Standby Current	≤ 50 mA / ≤ 80 mA with encryption module
Transmit Current (8.0 W)	≤ 2.80 A

Models Available

VT-4E150-00-800 12.5 / 25 KHz Bandwidth, 0.5 - 8.0 W, 136 - 174 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** from the frequency at which the last complete transmitter alignment was performed, the **VSWR alarm / overload** (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.

TN347 VT-4E VHF MT-4E Transmitter

The VT-4E VHF transmitter is primarily software controlled, allowing tuning, programming and maintenance to be done via software service with few hardware adjustments required.

VSWR Alarm / Overload Adjustment:

The VSWR alarm / overload only requires adjustment if the VSWR Alarm is being used. When the VSWR alarm / overload circuit is properly set, the Amplifier is protected from excessive antenna VSWR by reducing the amplifier's gain when an overload condition occurs. If the VSWR alarm is not set, the amplifier is still protected by a current limiter circuit. The circuit limits Amplifier current draw to 2.0 Amps and protects the Amplifier from damage.

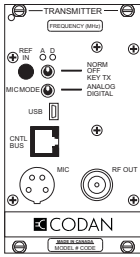
To set the VSWR alarm / overload circuit properly, the RF power level must be set to the desired RF power output first. After the RF power level is properly set, rotate the VSWR alarm adjust potentiometer (RV3) fully counter clockwise. Terminate the transmitter with a 3:1 mismatch load and connect a voltmeter to Pin 5 of connector J1 in the transmitter. Slowly adjust the VSWR alarm adjust potentiometer (RV3) clockwise until Pin 5 reads +2.5 Vdc, or a noticeable drop (10% of total current or more) in current on the +13.8 Vdc line occurs.

RSS Service Mode:

The RSS has the ability to put a transmitter into Service Mode, where the Reference Oscillator may be aligned, Audio Levels, Subtone Deviation Levels and RF Power Levels may be set, Jumper Settings may be selected, and Test Patterns can be generated. To put the transmitter into Service Mode, it must be connected to a PC running the Radio Service Software (RSS) using a type A to 5 pin mini-type B USB cable. From the RSS Transmitter Configuration window, click on the Service button. When any required Service functions have been completed, the radio can be taken out of Service Mode by clicking on the Quit button in the Service window.

NOTE: Do not remove power to the radio or swap radios during servicing.

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

TN367 UT-4E UHF MT-4E Transmitter


The UT-4E UHF transmitter is an FM radio module capable of analog operation in 12.5 KHz (narrowband) or 25 KHz (wideband) channels. A firmware upgrade may be purchased to allow P25 digital operation. The UT-4E UHF transmitter operates in one of three frequency bands: 380 to 406 MHz, 406 to 470 MHz or 470 to 520 MHz. A modular design allows each of the transmitter's internal modules to be individually assembled and tested. This facilitates construction, tuning and maintenance as well as troubleshooting procedures. The transmitter can be programmed with up to 2 banks of 16 channels each.

Specifications

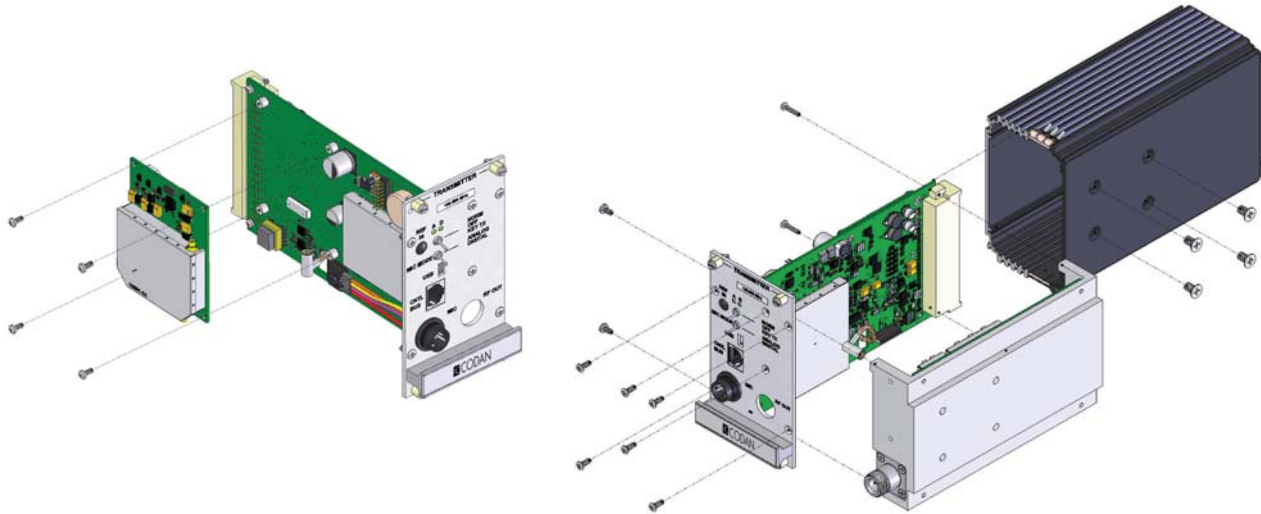
Frequency Bands	380 - 406 / 406 - 470 MHz / 470 - 520 MHz
Channel Spacing	12.5 and 25 KHz
Frequency Switching Range	Full Band; ± 0.5 MHz for VSWR alarm
RF Output Power	0.5 to 8.0 Watts adjustable or 0.5 to 6.0 Watts adjustable
Duty Cycle	100% (-30°C to +60°C)
Undesired Emissions (Conducted Spurious)	≤ -70 dBc (-31 dBm @ 6 / 8 W) 380 & 450; (-32 dBm @ 6W) 500
Undesired Emissions (Adjacent Channel Power Ratio)	≤ -60 dBc; Narrowband Analog / ≤ -70 dBc; Wideband Analog ≤ -67 dBc; Digital
Intermodulation Attenuation	≥ 40 dB (380) / ≥ 45 dB (450 & 500)
FM Hum & Noise Ratio	≥ 40 dB NB ; ≥ 46 dB WB (380) / ≥ 38 dB NB ; ≥ 44 dB WB (450) ≥ 34 dB; NB ; ≥ 40 dB; WB (500)
Carrier Frequency Stability	± 0.5 ppm (-30°C to +60°C)
Emission Designators	Analog: 11K0F3E (Narrowband); 16K0F3E (Wideband) Paging: 9K20F1D P25 Digital: 8K10F1E (Digital Voice); 8K10F1D (Digital Data)
Audio Distortion (60% of maximum deviation)	$\leq 3.0\%$ (-30°C to +60°C)
VSWR Protection	$\leq 20:1$ VSWR (All Phase Angles)
Operating Temperature	-30°C to +60°C
Standby Current	≤ 50 mA / ≤ 80 mA with encryption module
Transmit Current (8.0 W)	≤ 2.80 A

Models Available

UT-4E380-00-800	12.5 / 25 KHz Bandwidth, 0.5 - 6.0 W, 380 - 406 MHz
UT-4E450-00-800	12.5 / 25 KHz Bandwidth, 0.5 - 8.0 W, 406 - 470 MHz
UT-4E500-00-800	12.5 / 25 KHz Bandwidth, 0.5 - 6.0 W, 470 - 520 MHz *Not available in Canada

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** from the frequency at which the last complete transmitter alignment was performed, the **VSWR alarm / overload** (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.

TN367 UT-4E UHF MT-4E Transmitter

The UT-4E UHF transmitter is primarily software controlled, allowing tuning, programming and maintenance to be done via software service with few hardware adjustments required.

VSWR Alarm / Overload Adjustment:

The VSWR alarm / overload only requires adjustment if the VSWR Alarm is being used. When the VSWR alarm / overload circuit is properly set, the Amplifier is protected from excessive antenna VSWR by reducing the amplifier's gain when an overload condition occurs. If the VSWR alarm is not set, the amplifier is still protected by a current limiter circuit. The circuit limits Amplifier current draw to 2.0 Amps and protects the Amplifier from damage.

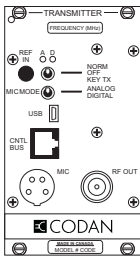
To set the VSWR alarm / overload circuit properly, the RF power level must be set to the desired RF power output first. After the RF power level is properly set, rotate the VSWR alarm adjust potentiometer (RV3) fully counter clockwise. Terminate the transmitter with a 3:1 mismatch load and connect a voltmeter to Pin 5 of connector J1 in the transmitter. Slowly adjust the VSWR alarm adjust potentiometer (RV3) clockwise until Pin 5 reads +2.5 Vdc, or a noticeable drop (10% of total current or more) in current on the +13.8 Vdc line occurs.

RSS Service Mode:

The RSS has the ability to put a transmitter into Service Mode, where the Reference Oscillator may be aligned, Audio Levels, Subtone Deviation Levels and RF Power Levels may be set, Jumper Settings may be selected, and Test Patterns can be generated. To put the transmitter into Service Mode, it must be connected to a PC running the Radio Service Software (RSS) using a type A to 5 pin mini-type B USB cable. From the RSS Transmitter Configuration window, click on the Service button. When any required Service functions have been completed, the radio can be taken out of Service Mode by clicking on the Quit button in the Service window.

NOTE: Do not remove power to the radio or swap radios during servicing.

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

TN387 UT-4E UHF 700 / 800 / 900 MHz MT-4E Transmitter


The UT-4E UHF 700 / 800 / 900 MHz transmitter is an FM radio module capable of analog operation in 12.5 KHz (narrowband), 25 KHz (wideband) or 20 KHz (NPSPAC) channels. A firmware upgrade may be purchased to allow P25 digital operation. The UT-4E UHF 700 / 800 / 900 MHz transmitter operates in one of two frequency bands: 768 to 869 MHz or 896 to 960 MHz. A modular design allows each of the transmitter's internal modules to be individually assembled and tested. This facilitates construction, tuning and maintenance as well as troubleshooting procedures. The transmitter can be programmed with up to 2 banks of 16 channels each.

Specifications

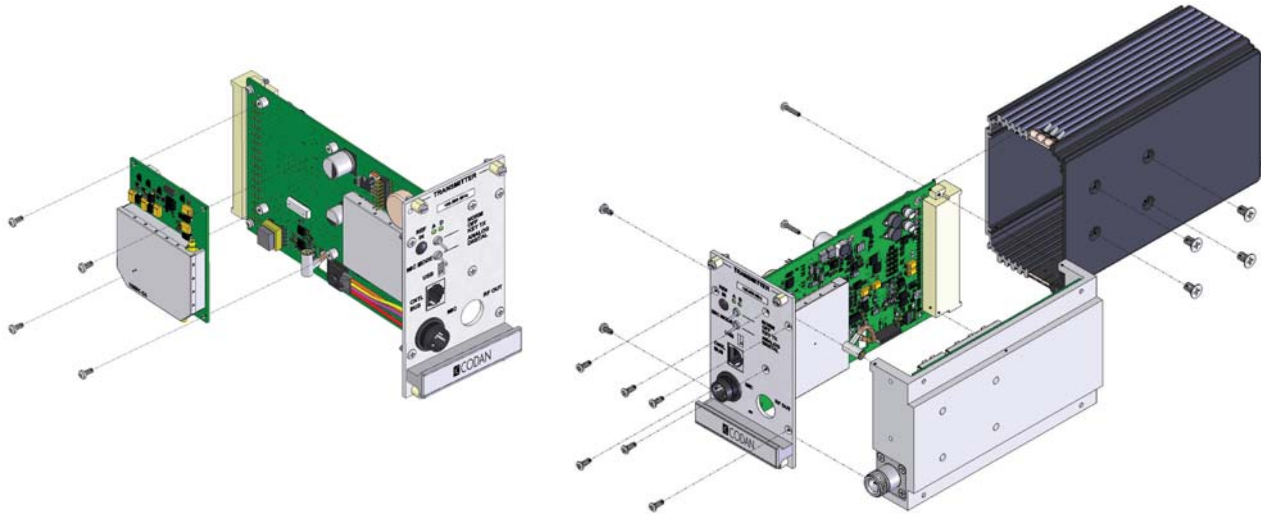
Frequency Bands	768 - 869 MHz / 896 - 960 MHz
Channel Spacing	12.5 and 25 KHz (20 KHz NPSPAC; 850 only)
Frequency Switching Range	Full Band; ± 0.5 MHz for VSWR alarm
RF Output Power	0.5 to 3.0 Watts adjustable
Duty Cycle	100% (-30°C to +60°C)
Undesired Emissions (Conducted Spurious)	≤ -80 dBc (-45 dBm @ 3.0 Watts) 850 ≤ -65 dBc (-30 dBm @ 3.0 Watts) 900
Undesired Emissions (Adjacent Channel Power Ratio)	≤ -50 dBc; Narrowband Analog / ≤ -60 dBc; Wideband Analog ≤ -67 dBc; Digital
Intermodulation Attenuation	≥ 40 dB
FM Hum & Noise Ratio	≥ 34 dB; NB ; ≥ 40 dB; WB ; ≥ 35 dB; NPSPAC (850) ≥ 31 dB; NB ; ≥ 37 dB; WB ; ≥ 35 dB; NPSPAC (900)
Carrier Frequency Stability	± 0.1 ppm (-30°C to +60°C)
Emission Designators	Analog: 11K0F3E (Narrowband); 16K0F3E (Wideband) Analog: 14K0F3E (20 KHz NPSPAC 850 only) Paging: 9K20F1D (Narrowband); 16K0F1D (Wideband) P25 Digital: 8K10F1E (Digital Voice); 8K10F1D (Digital Data)
Audio Distortion (60% of maximum deviation)	$\leq 3.0\%$ (-30°C to +60°C)
VSWR Protection	$\leq 20:1$ VSWR (All Phase Angles)
Operating Temperature	-30°C to +60°C
Standby Current	≤ 115 mA / ≤ 145 mA with encryption module
Transmit Current (3.0 W)	≤ 1.80 A

Models Available

UT-4E850-00-300	12.5 / 25 KHz Bandwidth, 0.5 - 3.0 W, 768 - 869 MHz
UT-4E900-00-300	12.5 / 25 KHz Bandwidth, 0.5 - 3.0 W, 896 - 960 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** from the frequency at which the last complete transmitter alignment was performed, the **VSWR alarm / overload** (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.

TN387 UT-4E UHF 700 / 800 / 900 MHz MT-4E Transmitter

The UT-4E UHF 700 / 800 / 900 MHz transmitter is primarily software controlled, allowing tuning, programming and maintenance to be done via software service with few hardware adjustments required.

VSWR Alarm / Overload Adjustment:

The VSWR alarm / overload only requires adjustment if the VSWR Alarm is being used. When the VSWR alarm / overload circuit is properly set, the Amplifier is protected from excessive antenna VSWR by reducing the amplifier's gain when an overload condition occurs. If the VSWR alarm is not set, the amplifier is still protected by a current limiter circuit. The circuit limits Amplifier current draw to 2.0 Amps and protects the Amplifier from damage.

To set the VSWR alarm / overload circuit properly, the RF power level must be set to the desired RF power output first. After the RF power level is properly set, rotate the VSWR alarm adjust potentiometer (RV3) fully counter clockwise. Terminate the transmitter with a 3:1 mismatch load and connect a voltmeter to Pin 5 of connector J1 in the transmitter. Slowly adjust the VSWR alarm adjust potentiometer (RV3) clockwise until Pin 5 reads +2.5 Vdc, or a noticeable drop (10% of total current or more) in current on the +13.8 Vdc line occurs.

RSS Service Mode:

The RSS has the ability to put a transmitter into Service Mode, where the Reference Oscillator may be aligned, Audio Levels, Subtone Deviation Levels and RF Power Levels may be set, Jumper Settings may be selected, and Test Patterns can be generated. To put the transmitter into Service Mode, it must be connected to a PC running the Radio Service Software (RSS) using a type A to 5 pin mini-type B USB cable. From the RSS Transmitter Configuration window, click on the Service button. When any required Service functions have been completed, the radio can be taken out of Service Mode by clicking on the Quit button in the Service window.

NOTE: Do not remove power to the radio or swap radios during servicing.

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