



UHF SYNTHESIZED TRANSMITTER INSTRUCTION MANUAL

406 - 470MHZ

Covers Models:

UT-3/420-SXCX00

UT-3/460-SXCX00

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Module Manuals included:

IM20-MT3TXMN - Transmitter Main Board

IM23-UT400AMP - UHF Amplifier

IM10-OS3AH - Enhanced FM Synthesizer

IM23-UT3400CT - UHF Channel Designation Table

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NOTE

The user's authority to operate this equipment could be revoked through any changes or modifications not expressly approved by Daniels Electronics Ltd.

The design of this equipment is subject to change due to continuous development. This equipment may incorporate minor changes in detail from the information contained in this manual.

RF Exposure Warning

Exposure to radio frequency (RF) energy has been identified as a potential environmental factor that must be considered before a radio transmitter can be authorized or licensed. The FCC has therefore developed maximum permissible exposure (MPE) limits for field strength and power density, listed in FCC 47 CFR § 1.1310. The FCC has furthermore determined that determination of compliance with these exposure limits, and preparation of an Environmental Assessment (EA) if the limits are exceeded, is necessary only for facilities, operations and transmitters that fall into certain risk categories, listed in FCC 47 CFR § 1.1307 (b), Table 1. All other facilities, operations and transmitters are categorically excluded from making such studies or preparing an EA, except as indicated in FCC 47 CFR §§ 1.1307 (c) and (d).

Revised FCC OET Bulletin 65 (Edition 97-01) provides assistance in determining whether a proposed or existing transmitting facility, operation or device complies with RF exposure limits. In accordance with OET Bulletin 65 and FCC 47 CFR § 1.1307 (b), this Daniels Electronics Ltd. transmitter is categorically excluded from routine evaluation or preparing an EA for RF emissions and this exclusion is sufficient basis for assuming compliance with FCC MPE limits. This exclusion is subject to the limits specified in FCC 47 CFR §§ 1.1307 (b) and 1.1310. Daniels Electronics Ltd. has no reason to believe that this excluded transmitter encompasses exceptional characteristics that could cause non-compliance.

- Notes:**
- The FCC's exposure guidelines constitute exposure limits, not emission limits. They are relevant to locations that are accessible to workers or members of the public. Such access can be restricted or controlled by appropriate means (i.e. fences, warning signs, etc.).
 - The FCC's limits apply cumulatively to all sources of RF emissions affecting a given site. Sites exceeding these limits are subject to an EA and must provide test reports indicating compliance.

RF Safety Guidelines and Information

Base and Repeater radio transmitters are designed to generate and radiate RF energy by means of an external antenna, typically mounted at a significant height above ground to provide adequate signal coverage. The following antenna installation guidelines are extracted from Appendix A to OET Bulletin 65 and must be adhered to in order to ensure RF exposure compliance:

Non-building-mounted Antennas:

Height above ground level to lowest point of antenna \geq 10 m or
Power \leq 1000W ERP (1640W EIRP)

Building-mounted Antennas:

Power \leq 1000W ERP (1640W EIRP)

The following RF Safety Guidelines should be observed when working in or around transmitter sites:

- Do not work on or around any transmitting antenna while RF power is applied.
- Before working on an antenna, disable the appropriate transmitter and ensure a "DO NOT USE" or similar sign is placed on or near the PTT or key-up control.
- Assume all antennas are active unless specifically indicated otherwise.
- Never operate a transmitter with the cover removed.
- Ensure all personnel entering a transmitter site have electromagnetic energy awareness training.

For more information on RF energy exposure and compliance, please refer to the following:

- 1) FCC Code of Regulations; 47 CFR §§ 1.1307 and 1.1310.
- 2) FCC OET Bulletin 65, Edition 97-01, "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields".
- 3) <http://www.fcc.gov/oet/rfsafety/>



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GENERAL INFORMATION

INTRODUCTION

The UT-3 406 - 470MHz Transmitter is a synthesized FM transmitter capable of operating in 12.5kHz or 25kHz channels. The transmitter operates continuous duty in one of four frequency bands: 406 to 430MHz or 450 to 470MHz, and its output power is continuously adjustable from 0.5 to 2.0W or 2.0 to 8.0W. The transmitter is not to be operated within the 406 to 406.1MHz frequency band, unless specifically authorized by COSPAS/SARSAT through the Federal Communications Commission and/or Industry Canada. A modular design allows each of the transmitter's modules: MT-3 Transmitter Board, MT-3 Audio Processor, UT-3/400 Amplifier, and OS-3H400 Synthesizer Module to be individually assembled and tested. This facilitates construction, tuning, maintenance as well as troubleshooting procedures. The synthesizer module can be programmed to have up to 16 channels exclusive to one frequency band.

The UT-3 406 - 470MHz Transmitter is designed to interface with Daniels Electronics' MT-3 Repeater System while maintaining MT-2 System compatibility. Both repeater systems are characterized by dependable, low maintenance performance under the most severe environmental conditions.

MANUAL ORGANIZATION

The organization of this manual reflects the modular makeup of the UT-3 product line. Each module is fully described within its respective submanual, all of which are contained within this document. In general, each submanual contains:

- 1) A functional description and specification summary,
- 2) A detailed technical description (Theory of Operation)
- 3) Assembly, setup and alignment procedures relevant to that particular module.

Note: Material presented in a given “submanual” may include information related to other module versions not directly applicable to the UT-3 406 - 470MHz Transmitter family (eg, the OS-3H Synthesizer Instruction Manual covers models from 29MHz to 470MHz).

The module manuals are as follows:

UHF Transmitter Instruction Manual UT-3 406 - 470MHz: This manual provides an overview of the complete transmitter, manual organization and assembly in terms of the other modules.

MT-3 Transmitter Main Board Instruction Manual: This manual pertains to the audio processor module, transmitter Main Board and Front Panel Board. Most of the user selectable options are accessed within the Transmitter Main Board module, including channel selection. Since all external connections (including power and signal lines) are made to the Transmitter Main Board, most of the material pertaining to transmitter operation and installation is found here.

UHF Amplifier Instruction Manual UT-3 406 - 470MHz : The amplifier module provides the final stages of RF power amplification and harmonic filtering for the transmitter. This manual is intended primarily as a reference since the amplifier module is adjusted at the factory.

Enhanced Synthesizer Instruction Manual OS(R/T)-3(A/H) 132 - 470MHz: This manual pertains to the enhanced synthesizer module.

UHF Transmitter Channel Designation Table UT-3 406 - 470MHz: This document relates the operating frequency to the transmitter channel number.

UT-3 406 - 470MHz Transmitter Family Models

There are 8 distinct models in the UT-3/400 Transmitter family each with different bands of operation, channel spacing and/or power outputs. The 8 models are as follows:

- UT-3/420-SNC200 - synthesized, 406-430MHz band, 12.5kHz channels, 0.5-2.0W
- UT-3/420-SNC800 - synthesized, 406-430MHz band, 12.5kHz channels, 2.0-8.0W
- UT-3/420-SWC200 - synthesized, 406-430MHz band, 25kHz channels, 0.5-2.0W
- UT-3/420-SWC008 - synthesized, 406-430MHz band, 25kHz channels, 2.0-8.0W
- UT-3/460-SN02 - synthesized, 450-470MHz band, 12.5kHz channels, 0.5-2.0W
- UT-3/460-SN08 - synthesized, 450-470MHz band, 12.5kHz channels, 2.0-8.0W
- UT-3/460-SW02 - synthesized, 450-470MHz band, 25kHz channels, 0.5-2.0W
- UT-3/460-SW08 - synthesized, 450-470MHz band, 25kHz channels, 2.0-8.0W

The transmitters' band of operation is determined by select components in the synthesizer module and the channel width is determined by the roll-off of the splatter filter on the MT-3 Audio Processor.

PERFORMANCE SPECIFICATIONS

The following is a general set of specifications for the generic UT-3/400 transmitter. Additional specifications, specific to individual modules may be found in their respective submanuals.

Type:	MT-3 Series Transmitter.
Family:	UT-3 406 - 470MHz.
Compatibility:	MT-2 Series and MT-3 Series Radio Systems.
Frequency Range:	406 to 470MHz (406 to 406.1MHz unavailable, see note below).
RF Power Output:	Continuously Adjustable: 0.5 to 2.0W or 2.0 to 8.0W.
Modulation:	11K0F3E or 16K0F3E (Frequency Modulation).
System Impedance:	50 Ω ; Type N connector.
Duty Cycle:	100%; Continuous operation from -40°C to +60°C.
Spurious Emissions:	More than 80dB below carrier.
Harmonic Emissions:	More than 90dB below carrier.
Transmitter Mismatch Protection:	20:1 VSWR at all phase angles.
Transmitter Alarm:	Forward power sense and reverse VSWR; <ul style="list-style-type: none"> • open collector output (separate or 'OR'ed configuration); • linear output (separate lines only).
Operating Temperature Range:	-30°C to +60°C, optional -40°C temperature test.
Operating Humidity:	95% RH (non-condensing) at +25°C.
Operating Voltage:	+13.8VDC Nominal (range +11 to +16VDC), +9.5VDC Regulated.
Transmit Current:	1.2 Amps at 2Ws RF Power Output, 2.5 Amps at 8Ws RF Power Output
Front Panel Controls:	NORM (repeat mode), OFF, and KEY TX (Tx on).
PTT Activation:	<ul style="list-style-type: none"> • Active to ground with or without time-out-timer; • Microphone activated with or without time-out-timer; • Front Panel switch: KEY TX - without time-out-timer; • NORM - with or without time-out-timer. • Isolated (optional relay) with or without time-out-timer.
PTT Time-Out-Timer:	Selectable from 1 sec. to 8 hrs. (factory set 5 min.).
Channel Spacing:	12.5kHz or 25kHz.
Frequency Stability:	Standard: ± 1 ppm, -30°C to +60°C (optional: -40°C to +60°C).
Reference Frequency:	9.6/10MHz. Optional: high stability external 9.6/10MHz reference provided through front panel connection.

Channel Selection:	In 12.5kHz increments selected through four internal BCD rotary switches. Preset capability for 16 channel memory selectable through external control.
Standby Current and Rise time:	95% RF power, 95% system deviation within: <ul style="list-style-type: none"> • 50ms: typically 15mA (normal configuration) • 25ms: typically 160mA (synthesizer continuously enabled) • 10ms: typically 185mA (synth. and audio circuitry enabled)
DOC Type Approval	RSS119 142 194 241 RSS122 142 221 126
FCC Type Acceptance:	H4JUT-3-420-S02 (406-430MHz, 0.5-2.0W), H4JUT-3-420-S08 (406-430MHz, 2.0-8.0W), H4JUT-3-460-S02 (450-470MHz, 0.5-2.0W), H4JUT-3-460-S08 (450-470MHz, 2.0-8.0W).

Note: The transmitter is not to be operated within the 406 to 406.1MHz frequency band, unless specifically authorized by COSPAS/SARSAT through the Federal Communications Commission and/or Industry Canada.

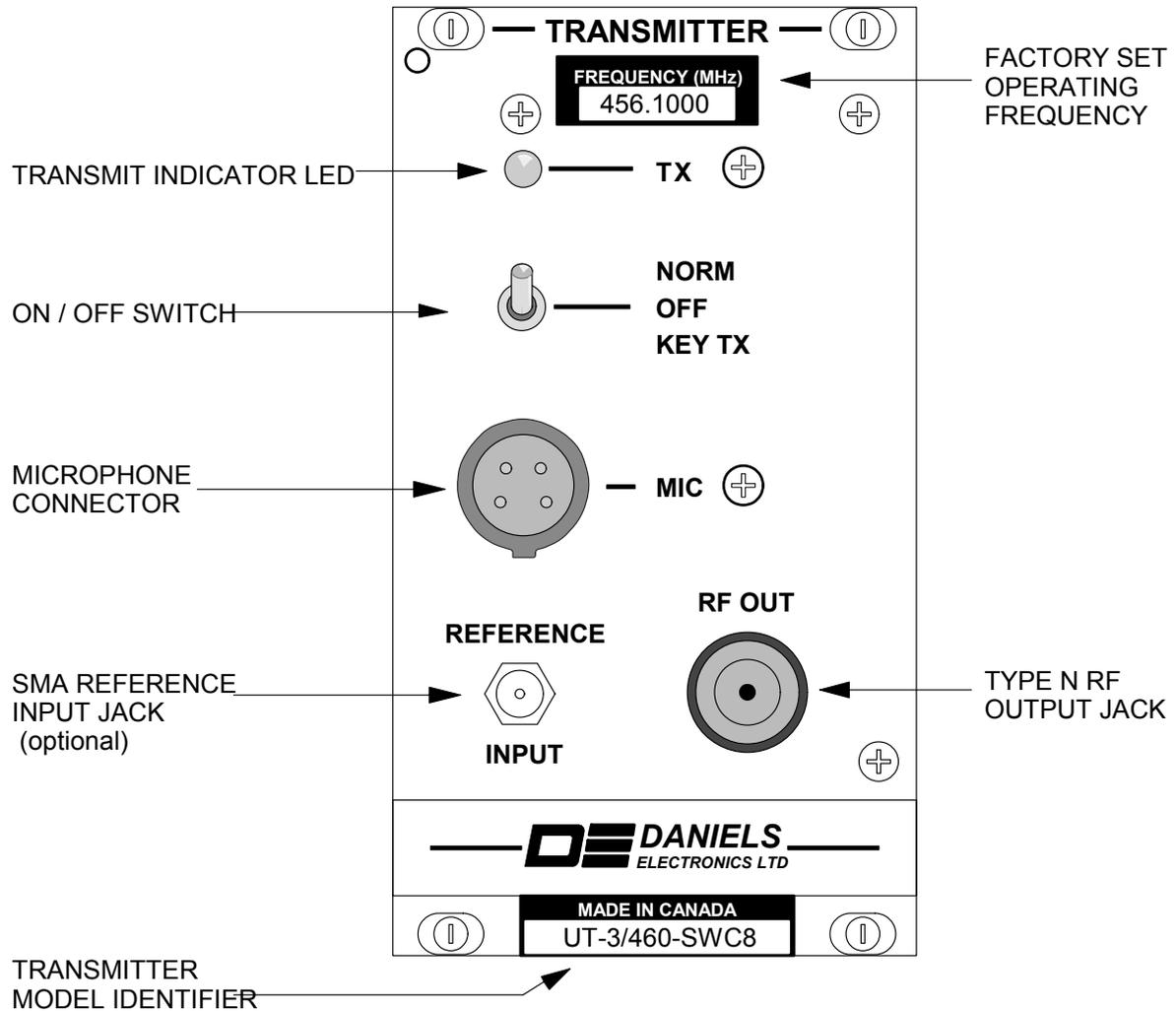
AUDIO SPECIFICATIONS

Audio Input:	<ul style="list-style-type: none"> • Balanced 600 ohm or unbalanced (optional) • Input level sensitivity, -25dBm to 0dBm
Audio Response:	Pre-emphasis (6dB per octave) +0.5 to -2.0dB from 300Hz to 3kHz
Flat Audio Response:	+1 to -1dB from 100Hz to 3kHz
Audio Deviation:	Preset to ± 1.5 kHz or ± 3.0 kHz with a 1kHz tone (capable ± 2.5 kHz or ± 5.0 kHz)
Subtone Audio Input 1:	0.5 Vpp at 200Hz for ± 500 Hz deviation (internally adjustable)
Subtone Audio Input 1 Freq range:	60Hz to 300Hz
Subtone Audio Input 2:	0.5 Vpp at 100Hz for ± 500 Hz deviation (internally adjustable)
Subtone Audio Input 2 Freq range:	DC to 150Hz
Direct Modulation Input:	0.5 Vrms at 1kHz or ± 3 kHz deviation
Direct Modulation Freq range:	DC to 5kHz
Audio Distortion:	Less than 2.5% THD 1kHz tone at 1.5kHz or 3kHz deviation (-40°C to +60°C)
Hum and Noise:	Better than 40dB (test receiver band limited: 400Hz to 30kHz)

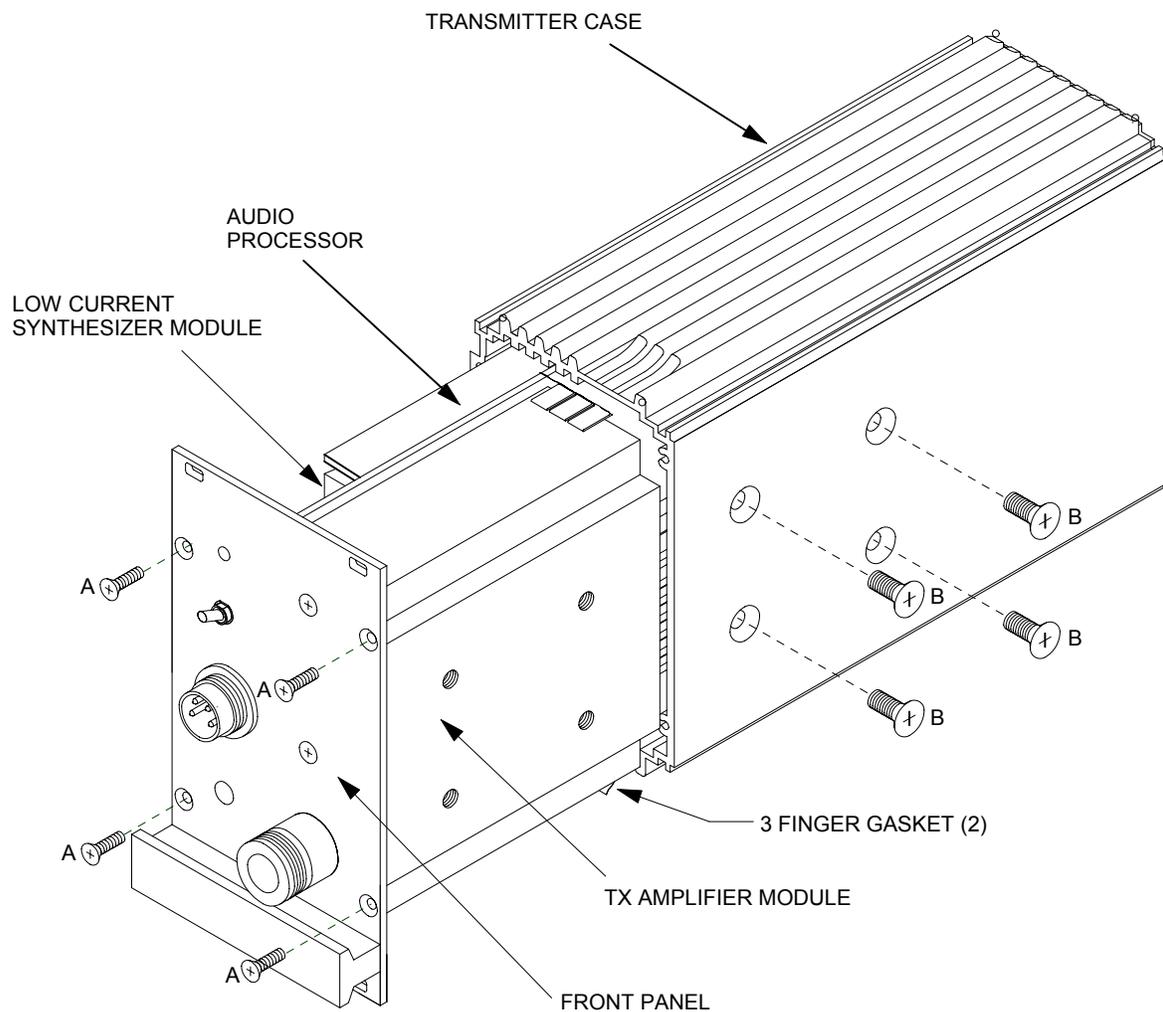
PHYSICAL SPECIFICATIONS

Physical Dimensions:	Width: 7.1cm (2.8in)	Height: 12.8cm (5.05in)	Depth: 19cm (7.5in)
ModuleWeight:	1.5kg (3.3lbs)		
Corrosion Prevention:	Anodized aluminum construction. Stainless steel hardware. Selectively conformal coated glass epoxy 2 and 4 layer printed circuitboards. Gold plated module connectors.		
Module Design:	Compact Eurostandard modular design. Plug-in modules mate with Daniels standard M3 repeater subrack. Subracks / modules comply with IEEE 1101, DIN 41494 and IEC 297-3 (mechanical size / modular arrangement).		
External Connections:	RF Connection: type N connector located on the transmitter module front panel. Motherboard Connections (Audio, Power, and Control) are made through a 48 pin, gold plated, type F connector on the rear of the transmitter module. User connection made through mated "motherboard" assembly of the repeater subrack. Type F standard connector complies with DIN 41612 Level 2 (200 mating cycles, 4 day 10ppm SO2 gas test with no functional impairment and no change in contact resistance).		
Handle Text Colour:	Black		

FRONT PANEL



EXPLODED VIEW

**INSTRUCTIONS**

1. REMOVE THE FOUR SCREWS DESIGNATED BY "A" ON THE FRONT PANEL.
2. REMOVE THE FOUR SCREWS DESIGNATED BY "B" ON THE SIDE OF THE TRANSMITTER CASE.





SYSTEM OVERVIEW

TRANSMITTER OPERATION

Several modules are integrated by the UT-3 Transmitter Main board to provide the complete transmitter. The Transmitter Main Board, Front Panel Board and Audio Processor are generic in that they apply to all transmitter models. The Front Panel Board and Audio Processor are soldered directly to the Transmitter Main Board and are treated collectively in the Transmitter Main Board Manual. The operating frequency and power range is determined by the choice of Amplifier and Frequency Synthesizer, both of which plug into the Transmitter Main Board and can be changed with minimal effort. Circuitry and jumpers on the Transmitter Main Board control the operation of all modules and the overall operation of the transmitter. Technical details and a complete description of transmitter operation can be found in the Transmitter Main Board Manual.

The UT-3 406 - 470MHz transmitter requires two power supplies; a regulated +9.5VDC supply and a +13.8VDC supply, the latter of which is connected only to the Amplifier Module. The (nominally) +13.8VDC supply's range is +11VDC to +16VDC. For the 0.5 to 2.0W transmitters, there is no current drawn on the 13.8VDC supply. For the 2.0 to 8.0W transmitters, the current drawn from the +13.8VDC supply (while transmitting at the rated power) is approximately 1300mA with temperature, operating frequency and power supply voltage. The current drawn by the 13.8VDC line should not exceed 1500mA.

The +9.5VDC current drawn by all transmitter models while transmitting at the rated power is approximately 1200mA and should not exceed 1300mA. The UT-3 Transmitter has four different standby modes that trade-off standby current consumption for start-up speed. The standby modes are determined by three jumpers (refer to the MT-3 Transmitter Main Board Manual):

J6 - always turns on the '+9.5VDC Switched' supply

J7 - selects the power source for the MT-3 Audio Processor

J18 - selects the enable line for the Synthesizer

MODE 1: Jumper J6 out

- the audio processor is switched by a PTT signal
 - the synthesizer module is switched by a PTT signal
 - standby current: Synthesized - typically 7mA
 - start-up time: Synthesized - typically 50ms
-

MODE 2: Jumper J6 in, jumper J7 in the 'Y' position, jumper J18 in the 'X' position

- the audio processor is switched by a PTT signal
 - the synthesizer module is enabled all of the time
 - standby current: Synthesized - typically 65mA
 - start-up time: Synthesized - typically 25ms
-

MODE 3: Jumper J6 in, jumper J7 in the 'X' position, jumper J18 in the 'Y' position

- the audio processor is enabled all of the time
 - the synthesizer module is switched by a PTT signal
 - standby current: Synthesized - not used in this mode
 - start-up time: Synthesized - not used in this mode
-

MODE 4: Jumper J6 in, jumper J7 in the 'X' position, jumper J18 in the 'X' position.

- the audio processor is enabled all of the time
 - the synthesizer module is enabled all of the time
 - standby current: Synthesized - typically 90mA
 - start-up time: Synthesized - typically 10ms
-

The front panel bears a DPDT toggle switch (mounted on the Front Panel Board; see the Transmitter Main Board Manual) which controls the operation of the UT-3 406 - 470MHz Transmitter. When in the 'OFF' position, the transmitter is turned off; however, the +13.8VDC remains on the Transmitter Main Board terminals and on the Amplifier Module. When in the 'KEYED' position, +9.5VDC is supplied to the transmitter circuitry and the transmitter is continuously transmitting. When this switch is in the 'NORM' position, +9.5VDC is supplied to the transmitter circuitry although the transmitter does not transmit until keyed from one of several Push-To-Talk (hereafter PTT) inputs. The red indicator LED is illuminated during transmit.

Microphone, RF output and optional reference input are mounted on the front panel; power and other signal connections are provided by a type 'F' connector at the rear of the Transmitter Main Board. Details on their functions can be found in the Transmitter Main Board Manual.

FREQUENCY SELECTION

Synthesizer Transmitter

Eight backplane connections are used to communicate with the synthesizer unit. Pins D28, D30, and D32 are used (in house) to program the synthesizer. Channel select lines (pins D20, D22, D24, and D26) are used once the synthesizer is programmed to select one of 16 channels. If the channel select lines are all low (channel 0) the frequency for the synthesizer is read from switches FSW1 (most significant), FSW2, FSW3, and FSW4 (least significant). Refer to the UHF Transmitter Channel Designation Table UT-3 406 - 470MHz Manual for the simplified channel number and frequency information.

For UT-3 406 - 470MHz Synthesized models:

Subtract the base frequency from the Transmitter frequency, then divide the result by channel increment.

Example: Base frequency is 406MHz. The Transmitter frequency is 456.1MHz. The channel number is:

$$((456.1\text{MHz} - 406\text{MHz}) / 12.5\text{kHz}) = 4008$$

To determine the frequency for channel number 4008:

$$(4008 \times 12.5\text{kHz}) + 406\text{MHz} = 456.1\text{MHz}$$

TRANSMITTER ASSEMBLY AND ADJUSTMENT

All modules are mounted on the Transmitter Main Board which then forms a single assembly. An enclosure is formed by an extruded aluminum shell that slides over the Transmitter Main Board. This shell also serves as a heatsink to remove heat from the Amplifier module and for this reason, it is important that the four screws that bond the shell to the amplifier module be installed before prolonged operation of the transmitter. Moreover, the surface of the Amplifier module that contacts the shell should be clean and free of foreign material. The enclosure is completed by the installation of front and rear plates which are fastened to the Transmitter Main Board (see Transmitter Main Board Manual for parts lists).

Transmitter alignment is performed on a module by module basis and detailed steps are provided in the respective manuals. Alignment is simplified by using an SR-3 Sub rack, SM-3 System Monitor, and RF extender cable to provide transmitter power and signal interconnection. Alternatively, +9.5VDC and +13.8VDC, as well as any required test signals, may be applied directly to the individual modules. Refer to the corresponding manuals for details.

Complete Transmitter Alignment

A complete Transmitter Alignment is performed at the factory and should not be required under normal circumstances. A large change in operating frequency, as discussed in the next section, may require a complete realignment operation. This operation requires that all the transmitter modules be aligned on a per module basis in the following order.

Sequence	Module	Manual Reference
1)	Tx Main Board	<ul style="list-style-type: none"> Frequency selection section of this manual Tx Main Board Manual
2)	Synthesizer	Synthesizer Manual
3)	Amplifier	Amplifier Manual
4)	Audio Processor	Tx Main Board Manual

Frequency Change

The transmitter is initially aligned at the factory for the frequency stamped on the 'Factory Set Operating Frequency' label. This label should list the frequency at which the last complete transmitter alignment was performed. For a small frequency change, a simple channel change may be all that is required. A larger frequency change may involve the realignment of other modules. The frequency change in question is the accumulated frequency change in relation to the frequency stamped on the label. For example, if the frequency is changed by 0.5MHz from that stamped on the label, then a second frequency change of 1MHz in the same direction would result in a total change of 1.5MHz. The action taken would be on the basis of the 1.5MHz value. Failure to perform a realignment after a large frequency change could result in unreliable transmitter operation or transmitter operation that does not conform to the published specifications. The allowable frequency change is summarized below.

Size of Frequency Change	Modules to be Aligned
less than ± 0.2 MHz	<ul style="list-style-type: none"> • Transmitter Main Board (Channel Change)
between ± 0.2 and ± 0.5 MHz	<ul style="list-style-type: none"> • Transmitter Main Board (Channel Change) • Audio Processor
between ± 0.5 and ± 1.0 MHz	<ul style="list-style-type: none"> • Transmitter Main Board (Channel Change) • Audio Processor • Synthesizer • check RF alarm thresholds
± 1.0 MHz or greater	<ul style="list-style-type: none"> • Complete alignment

Note: It is advisable to confirm these frequency ranges with the individual module manuals notably the Amplifier and Synthesizer Module, as they are subject to change with updated versions. The values in the module manuals take precedent over those tabulated (following page).

Output Power Adjustment

The RF power output of the amplifier is set to its rated value of 2.0Ws or 8.0Ws at the factory. This should not require adjustment under normal circumstances. However, should it be necessary to correct the output power, the 'Output Power Adjustment' which is described in the Amplifier Manual can be adjusted accordingly. If the Synthesizer module is replaced, it is strongly recommended that the amplifier undergo a realignment as described in the Amplifier Module, unless it is confirmed that the original and replacement Synthesizer module have identical output power (within ± 0.5 dBm).

Deviation Setting

The transmitter maximum deviation range is set by jumpers at the factory to ± 5.0 kHz for the UT-3 406 - 470MHz transmitter. However, under some conditions such as a large change in transmitter operating frequency, the deviation control may need adjustment. The transmitter deviation is dependent on the operating frequency and this dependency is likely to be more severe at the band edges. For frequency changes exceeding ± 0.5 MHz, especially at the band edges, the deviation should at least be checked and corrected if necessary. See the Audio Processor section of the Transmitter Main Board Manual for details on setting the transmitter deviation.

Note: The adjustment of the balance compression levels, which is also discussed in the Audio Processor alignment section, is not required as this adjustment should not be affected by a change in frequency or deviation settings.

Setting RF Alarm Thresholds

The VSWR and Forward Power Alarms are factory preset to give alarm conditions for a 3:1 VSWR and 50% forward power respectively. The Amplifier Manual describes how to adjust these settings, should different levels be required. If the alarm thresholds are critical to operation of a particular installation and if the transmitter undergoes a large change in frequency, the threshold alarm levels, particularly the VSWR alarm, should be checked.

RECOMMENDED TEST EQUIPMENT LIST

Alignment of the transmitter requires the following test equipment or its equivalent.

Dual Power Supply: Regulated +9.5VDC at 2A.

Regulated +13.8VDC at 2A - Topward TPS-4000

Oscilloscope / Multimeter: Fluke 97 Scopemeter

Current Meter: Fluke 75 multimeter

Radio communications test set: Marconi Instruments 2955R

VSWR 3:1 mismatch load: JFW 50T-035-3.0:1

Alignment Tool: Johanson 4192

It is recommended that the radio communications test set be frequency locked to an external reference (WWVH, GPS, Loran C) so that the high stability oscillator may be accurately set to within its ± 1 ppm frequency tolerance.

REPAIR NOTE

The transmitter is mainly made up of surface mount devices which should not be removed or replaced using an ordinary soldering iron. Removal and replacement of surface mount components should be performed only with specifically designed surface mount rework and repair stations complete with Electrostatic Discharge (ESD) protection.

When removing Surface Mount Solder Jumpers, it is recommended to use solder braid in place of manual vacuum type desoldering tools. This will help prevent damage to the circuit boards.





PARTS LISTS

TRANSMITTER MECHANICAL PARTS LIST

Description	Part Number	Qty
CASE, 14HP RF PLUG-IN, MT-3 TX	3702-62502010	1
CONNECTOR, MIC., 4 PIN, MALE	5040-114ST0BK	1
FASTENER, QUICK RELEASE, GRAY	3702-10000120	4
GASKET, BeCu,3FINGER,.71",CLIP	5630-12023250	2
HANDLE, FRONT PANEL, 14HP,GREY	3702-10000614	1
HOLE PLUG, .250" HOLE,NYL.,BLK	5671-250N062B	1
LABEL SET, FOIL,RF MODULE INFO	3501-27101000	1
LABEL/LEXAN, 14HP, UHF: BLACK	3536-10131410	1
LOCKWASHER, M3, SPLIT,A2 STEEL	5814-3M0LK00S	4
NAMEPLATE, BLANK, 14HP, ALUM.	3702-10001214	1
NUT, M2.5, SQUARE-5mm, ZINC	5813-2M5SQ50Z	2
PANEL, REAR,POS.4,14HP EXTRSN.	3702-63002101	1
PANEL/FRNT,W/IDENT:TX-EXTR.VER	3802-61002101	1
SCREW, M2.5 x 14 FLAT/PHIL, A2	5812-2M5FP14S	2
SCREW, M3 X 6, PAN/PHILLIPS,A2	5812-3M0PP06S	4
SCREW, M3 x 6,OVAL C/S/PHIL,A2	5812-3M0VP06S	2
SCREW, M3 x 8, PAN/PHIL, BLACK	5812-3M0PP08T	4
SCREW, M3 x 8,OVAL C/S/PHIL,A2	5812-3M0VP08S	4
SCREW, M3 x10,OVAL C/S/PHIL,A2	5812-3M0VP10S	2
SCREW, M5 x 8, FLAT/PHIL., A2	5812-5M0FP08S	4





REVISION HISTORY

Revision	Date	ECO	Description
3	Aug 98		<ul style="list-style-type: none"> Manual formatted to modular style. All previous revision history located in issue 2
4	Dec 98		<ul style="list-style-type: none"> Added an advisory to our customers in section 1.1 and 1.4.1 that this transmitter is not to be operated within the 406 to 406.1MHz frequency band. Updated 'Standby Current' to reflect the use of the Enhanced Synthesizer
4-0-1	Mar 04		<ul style="list-style-type: none"> Updated document to new format.
4-1-1	Mar 05		<ul style="list-style-type: none"> Changed Manual and footer name from synthesizer to synthesized. Corrected Reference and Frequency Stability specifications. Added 10MHz reference option.
4-1-2	May 05		<ul style="list-style-type: none"> Added top level mechanical parts to the parts listing.

