DANIELS™
ELECTRONICS LTD.

MT-3 RADIO SYSTEMS

VHF ENHANCED
EXTRA WIDEBAND
RECEIVER
INSTRUCTION MANUAL
VR-3H 29 - 50 MHz

Covers model: VR-3H035-SWA, VR-3H045-SWA
Converted for 50 kHz Channel spacing

Daniels Electronics Ltd.
Victoria, BC

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1 GENERAL

1.1 Introduction

The VR-3H040 Enhanced Extra Wideband Receiver family provides high performance synthesized FM reception in 50 kHz channels in one of two frequency bands: 29 to 38 MHz or 38 to 50 MHz. A modular design allows each of the receiver's three internal modules; 21.4 MHz FM IF/Audio Main Board, FE3H Enhanced Front End, and OS-3H Synthesizer to be individually assembled and tested. This facilitates construction, tuning, and general receiver maintenance. The internal synthesizer module may be programmed with up to 16 channels for remote frequency control applications.

The VR-3H040 Receiver family combines state of the art performance in a compact modular enclosure for applications ranging from remote mountain top repeaters to congested urban radio environments. Each receiver module is characterized by dependable, low maintenance performance under the most severe environmental conditions.

The VR-3H040 modular receiver family is compatible with all Daniel's subrack and base station enclosures.

1.2 VR-3H040 Extra Wideband Receiver Family Models

There are two distinct receiver models in the VR-3H040 Extra Wideband Receiver family covering 29 to 38 MHz and 38 to 50 MHz bands respectively while operating in 12.5 kHz or 20/25 kHz occupied channel bandwidths. The two models are as follows:

- VR-3H035-SW- synthesized, 29-38 MHz band, Converted for 50 kHz Channel spacing
- VR-3H045-SW- synthesized, 38-50 MHz band, Converted for 50 kHz Channel spacing

1.3 Manual Organization

The organization of this document reflects the modular construction of the VR-3H040 family of products. Each Section (e.g. Theory of Operation, Alignment, etc.) contains "subsections" specific to each electronics module.

In general, this instruction manual includes the following information for the VR-3H040 Receiver and for each of its electronics modules:

1. A functional description and specifications summary.
2. A detailed technical description (Theory of Operation).
3. Assembly, setup and alignment procedures.

Along with a system overview of the entire receiver, information for the following electronic modules is contained within this document:

21.4 MHz FM IF / Audio Main Board Instruction Manual: This manual provides complete information on the operation of the 21.4 MHz FM IF / Audio Main Board. The bulk of the material relating to receiver operation and installation can be found within this manual. The majority of receiver options, including channel selection, are accessed through the FM IF / Audio Main Board. In addition, most of the external receiver connections are made through the FM IF / Audio Main Board.

FE3H Front End Instruction Manual: This manual provides information on alignment and operation of the FE3H Front End Module. The Front End module provides filtered low level RF signal amplification and down conversion to the IF frequency of 21.4 MHz.

Enhanced Synthesizer Instruction Manual: This manual provides information on alignment and operation of the Enhanced Synthesizer Module. The synthesizer module provides the low noise first local oscillator signal to the FE3H Front End module.

VR-3H 29 - 50 MHz Channel Designation Tables: This manual provides tabular frequency / channel number assignment.

1.4 Performance Specifications

1.4.1 General

Type:	MT-3 Series Synthesized Receiver.
Family:	VR-3H040 Converted for 50 kHz Channel spacing
Compatibility:	MT-3 Series Radio Systems
Frequency Range:	29 to 38 MHz or 38 to 50 MHz.
System Impedance:	50 Ω (Type N connector).
Frequency Generation:	Synthesizer Module (Internal).
Channel Spacing:	Converted to 50 kHz
System Deviation:	± 15 kHz
Channel Selection:	In 5.0 or 6.25 kHz increments selected through four internal BCD rotary switches.
Number of Channels:	Preset capability for 16 channel memory selectable through four external logic control lines.
Channel Switching Range:	±1 MHz. (38 - 50 MHz, No tuning adjustment) ±0.5 MHz. (29 - 38 MHz, No tuning adjustment)
Reference Sensitivity:	-114 dBm (typically -116 dBm) for 12 dB SINAD.
Local Oscillator Frequency Stability:	±5 ppm; -30°C to +60°C. Provision for external 10.0 MHz reference input.
First IF	21.4 MHz, 8 pole crystal filter.
Second IF	455 kHz
Adjacent Channel Selectivity:	90 dB; 50 kHz channel.
Conducted Spurious + Harmonics:	95 dB
Intermodulation Rejection:	75 dB (typical 80 dB); as per TIA/EIA 603
Hum and Noise:	60 dB; 20 kHz LPF

Audio Output:	600 Ω balanced or unbalanced line output; De-emphasis output, +3 dBm maximum level; Flat response output, +3 dBm maximum level;
Audio Distortion:	Less than 3.0% (typical < 2%) THD at +25°C; less than 3.5% THD, -30°C to +60°C.
De-emphasized Audio Response:	+1, -2 dB; (500 Hz to 2.8 kHz) +1, -3 dB (300 Hz to 3 kHz
Flat Audio Response:	+1, -1 dB; (300 Hz to 3 kHz)
Squelch Hysteresis:	Adjustable from 2 dB to 20 dB.
Squelch Threshold:	Adjustable from -123 to -105 dBm.
Squelch Operation:	Noise based (standard) or optionally configured RSSI controlled.
Front Panel Controls:	Receiver power On (Norm) / Off. Squelch Disable (Push-button).
COR Interface:	2 amp, 50 V open drain power MOSFET; 100 mA, 30V opto-isolator (optional); 2 amp, form C electro-mechanical relay (Optional).
Supply Voltage:	+9.5 Vdc (Supplied by SR-3 Subrack or SM-3 System Monitor Supply).
Supply Current:	Normal programmed options less than 385 mA.
Operating Temperature Range:	-30°C to +60°C Standard;

1.4.2 Enhanced Front End Performance Specifications

Frequency Range:	29.0 MHz - 38.5 MHz (FE3H035) 37.5 MHz - 50.0 MHz (FE3H045)
IF Frequency:	21.4 MHz
3 dB Bandwidth:	> 5 MHz (Preselector Filter)
Conversion Gain:	12.5 dB
Third Order Intercept Point:	> +18 dBm
Impedance:	50 Ω at RF, LO, and IF ports
Temperature Range:	-30˚C To +60˚C
Power Requirements:	+9.5 Vdc @ 160 mA

1.4.3 Enhanced Synthesizer Performance Specifications

Frequency Range: *(Tuning range with no adjustment is shown in [ ] brackets.)*	29 MHz - 38 MHz [±0.5 MHz] (OST-3H035) 38 MHz - 50 MHz [±1.0 MHz] (OST-3H045) 50.4 MHz - 71.4 MHz [±1.0 MHz] (OSR-3H061)
Output Power:	+5 dBm ±2 dBm into 50Ω
External Reference Input:	● External reference input signal via SMB connector J1 ● Input level 0 dBm ±3 dB ● Input impedance 50Ω ● Input frequency 10.0 MHz or 9.6 MHz (selectable through digital board jumper JU1)
Power Requirements:	Normal Configuration: +9.5 Vdc @ 160 mA for FM Low Current Standby Mode (TCXO enabled): +9.5 Vdc @ 14 mA for FM

1.4.4 Physical Specifications

Physical Dimensions:	Width:	Height:	Depth:
	7.1 cm (2.8 in)	12.8 cm (5.05 in)	19 cm (7.5 in)
Module Weight:	1.0 kg (2.2 lbs)		
Corrosion Prevention:	Anodized aluminum construction. Stainless steel hardware. Selectively conformal coated glass epoxy 2 and 4 layer printed circuit boards. 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 receiver 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 "mother board" assembly of the repeater subrack. Type F standard connector complies with DIN 41612 Level 2 (200 mating cycles, 4 day 10 ppm SO_2 gas test with no functional impairment and no change in contact resistance).		
Handle Text Colour:	Orange.		

2 SYSTEM OVERVIEW

2.1 Receiver Operation

A VR-3H040 Receiver family is constructed using three primary modules; the FE3H Front-End module, the MT-3 Receiver FM IF/Audio Main Board and the OSR-3H061 local oscillator synthesizer (refer to section 3.3, VR-3H040 Family Enhanced Receiver Block Diagram).

Two Front-End modules, FE3H035 and FE3H045 provide frequency coverage from 29 - 38 MHz and 38 - 50 MHz respectively. Tuning within each frequency band is provided through five ferrite core slug adjustment points. The FE3H Front-End (FE3H035, FE3H045) combines a low noise BJT amplifier with a cascaded, multiple pole, high selectivity coupled resonator filter structure. A high intercept point active mixer is also located within this module. The module has inputs for the RF signal (Front Panel N connector), local oscillator input signal, and an output for the 21.4 MHz IF signal which connects directly to the FM IF / Audio Main Board. Interconnections are made using quick connect SMB style connectors.

The MT-3 Receiver FM IF/Audio Main Board accepts the IF signal of 21.4 mHz. The signal passes through the following stages: selective crystal filtering, amplification, second IF frequency conversion to 455 kHz, and final audio FM demodulation / amplification. The board provides a high degree of receiver flexibility by providing a number of different audio paths, audio levels, and control interconnect options.

The OSR-3H061 Synthesizer Module produces a low noise, high stability RF local oscillator signal covering the frequency band of 50.4 - 71.4 MHz which translates to a receive frequency range of 29 - 50 MHz. The internal TXCO is used for frequency stability, but an external reference signal may also by used.

2.2 Frequency Selection

Receiver channel selection is achieved by setting a decimal number on four BCD frequency select switches, FSW1 through FSW4. These rotary switches are located on the FM IF/Audio Main Board and are made accessible by removing the outer receiver cover. The switch settings are scanned by the synthesizer module when the receiver is first powered up, and the desired local oscillator frequency is generated. Refer to the following equations or the channel designation manual for simplified channel number and frequency information.

VR-3H035-S and VR-3H045-S (29 - 50 MHz) with:

- 5 kHz channel increments (BCD settings from 0000 to 4999):

$$\text{CHNL\#} = \left[\frac{\text{Rx}_{\text{frequency}} - 29\ \text{MHz}}{5\ \text{kHz}} \right]$$

or

$$\text{Rx}_{\text{frequency}} = [\text{CHNL\#} \times\ 5\ \text{kHz}] + 29\ \text{MHz}$$

- 6.25 kHz channel increments (BCD settings from 5000 to 9999):

$$\text{CHNL\#} = \left[\frac{\text{Rx}_{\text{frequency}} - 29\ \text{MHz}}{6.25\ \text{kHz}} \right] + 5000$$

or

$$\text{Rx}_{\text{frequency}} = [(\text{CHNL\#} - 5000) \times 6.25\ \text{kHz}] + 29\ \text{MHz}$$

Alternatively, a frequency and channel lookup table is available in the 'Channel Designation Table' manual for the VR-3H040.

A channel can be selected from a set of 15 (maximum possible) factory programmed channels by the four channel select lines available at the rear 'F' connector on the Receiver Main Board. A single user selectable channel is set by switches located on the Receiver Main Board. See the Receiver Main Board Manual for details.

2.3 Receiver Assembly and Adjustment

All modules and the front panel are mounted on the Receiver Main Board which then forms a single assembly. The FE3H Front End is attached with two front panel screws and one screw through the rear F connector. Removal is required to access the Synthesizer for tuning. An enclosure is formed by an extruded aluminum shell that slides over the Receiver Main Board as illustrated in section 2.8). The enclosure is completed by the installation of side and front panel screws (see section 7 in this manual for parts lists).

Receiver 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 Subrack, SM-3 System Monitor, and RF extender cable to provide receiver power and signal interconnection. Alternatively, +9.5 Vdc and +13.8 Vdc, as well as any required test signals, may be applied directly to the individual modules. Refer to section 4.

Throughout the alignment procedure reference is made to a "standard signal". This refers to an external generator signal source with FM modulation, 1 kHz tone, and 60% system deviation connected to the receiver RF input type N connector (if a nominal receiver frequency is not given, it can be assumed to be the selected receiver channel frequency).

2.3.1 Complete Receiver Alignment

A complete Receiver 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 receiver modules be aligned on a per module basis in the following order.

Sequence	Module
(1)	Front End
(2)	Synthesizer
(3)	Receiver Main Board

2.3.2 Frequency Change

The receiver is initially aligned at the factory for the frequency stamped on the 'Factory Set Operating Frequency' label (see section 3.1). This label should list the frequency at which the last complete receiver alignment was performed. For a small frequency change, a simple channel change (see section 2.2) 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 0.5 MHz from that stamped on the label, then a second frequency change of 1 MHz in the same direction would result in a total change of 1.5 MHz. The action taken would be on the basis of the 1.5 MHz value. Failure to perform a realignment after a large frequency change could result in unreliable receiver operation or operation that does not conform to the published specifications.

Size of Frequency Change	Modules to be Aligned
less than ± 0.5 MHz, 29 - 39MHz (minor)	Receiver Main Board (Channel Change).
less than ± 1.0 MHz 38 - 50 MHz, (minor)	Receiver Main Board (Channel Change).
greater than ± 0.5 MHz, 29 - 39MHz (major)	Complete alignment.
greater than ± 1.0 MHz 38 - 50 MHz, (major)	Complete alignment.

2.3.3 Minor Frequency Change

Changes less than ± 0.5 MHz (29 - 38 MHz) or ± 1 MHz (38 - 50 MHz) from a previously tuned working receive frequency will generally not require any adjustment. Change the channel frequency select switches (Section 2.2) and inject a standard signal at the new channel frequency. Verify that the receiver sensitivity is ≈ -114 dBm for 12 dB SINAD. Slight adjustment of the Front End tuning slugs (5) may be performed to maximize sensitivity at the new frequency. Be aware that the preferred Front End tuning procedure (Refer to sub-manual IM10-FE3H040) requires swept frequency response measurement of the Front End filter in order to provide a maximally flat response over a range of input frequencies, with the primary channel frequency centered in the filter passband (5 MHz wide). This alignment approach is not mandatory for single channel operation.

A quick check of the Synthesizer module PLL control voltage at TP4, accessible through the synthesizer top cover, is advisable at all programmed frequencies. The voltage at TP4 should range between +0.5 Vdc and +4.5 Vdc at all programmed frequencies. Measured voltages outside this range indicate a possible "out-of-lock" condition and should be avoided. The Front End module must be removed (but left connected) from the main receiver chassis in order to access TP4. The synthesizer top cover foil label may have to be cut in order to access TP4. Fine Frequency TUNE adjust trimmer capacitor C24 may then be adjusted to position the PLL loop voltage (TP4) as close as possible to the nominal +2.3 Vdc for all programmed frequencies. For single channel operation, TP4 should always be set to +2.3 Vdc.

2.3.4 Major Frequency Change

Changes greater than ± 0.5 MHz (29 - 38 MHz) or ± 1 MHz (38 - 50 MHz) from a previously tuned working receive frequency will require complete FE3H Front End and OSR-3H061 Synthesizer alignment as per section 4 in this manual. Changing a high band receiver (VR-3H045-S) to a low band receiver (VR-3H035-S) or vice-versa requires a complete change out and alignment of the Front End module (FE3H035 or FE3H045) in addition to OSR-3H061 alignment.

2.4 21.4 MHz IF/Audio Main Board

The 21.4 MHz IF / Audio Main Board is the main board for all receivers up to 512 MHz. This board provides interconnects for Daniels Synthesized and Crystal Controlled Oscillators, and Daniels high performance and low current Front Ends. An F48 type connector plugs into Daniels M3 Motherboard. The 21.4 MHz IF / Audio Main Board is configurable at the factory for either narrow band or wide band channels. Different bands within a frequency range do not require a configuration change.

2.5 Enhanced Front End

The FE3H040 Enhanced Front End is a highly integrated, frequency selective, down converter used in Daniels Electronics standard MT-3 Low Band VHF FM receiver product line. The FE3H040 Front End connects to the 21.4 MHz IF / Audio Main Board and the enhanced Synthesizer to form a complete receiver.

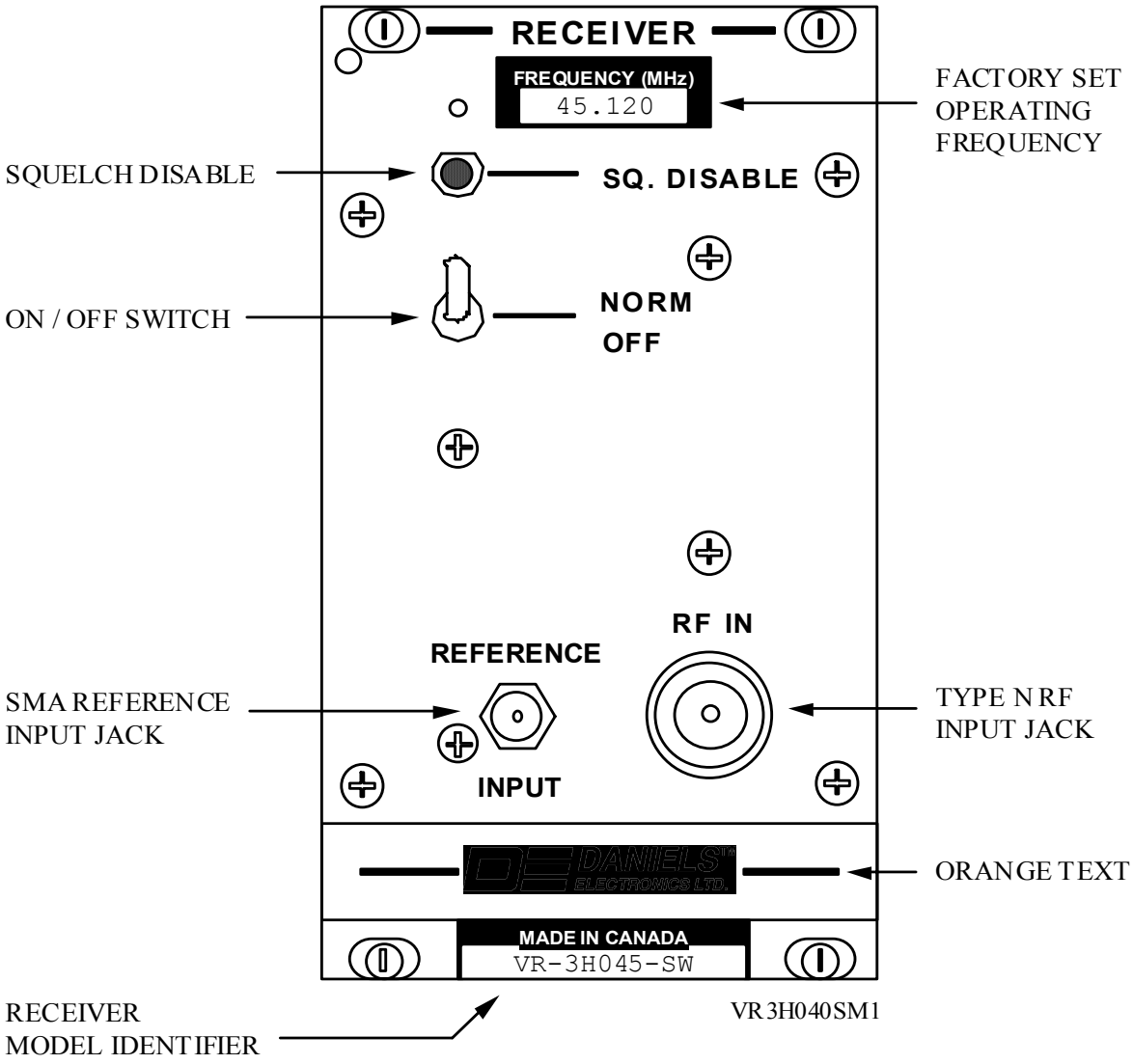
The Enhanced Front End amplifies and down converts the RF signal to the IF frequency of 21.4 MHz. The FE3H035 and FE3H045 Front Ends use high side injection. The Enhanced Front End consists of the following:

- Five Section L-C coupled Bandpass Filter
- Single Stage Low Noise RF Amplifier
- Image Rejection Filter
- Local Oscillator Low Pass Filter
- Double Balanced Active Mixer

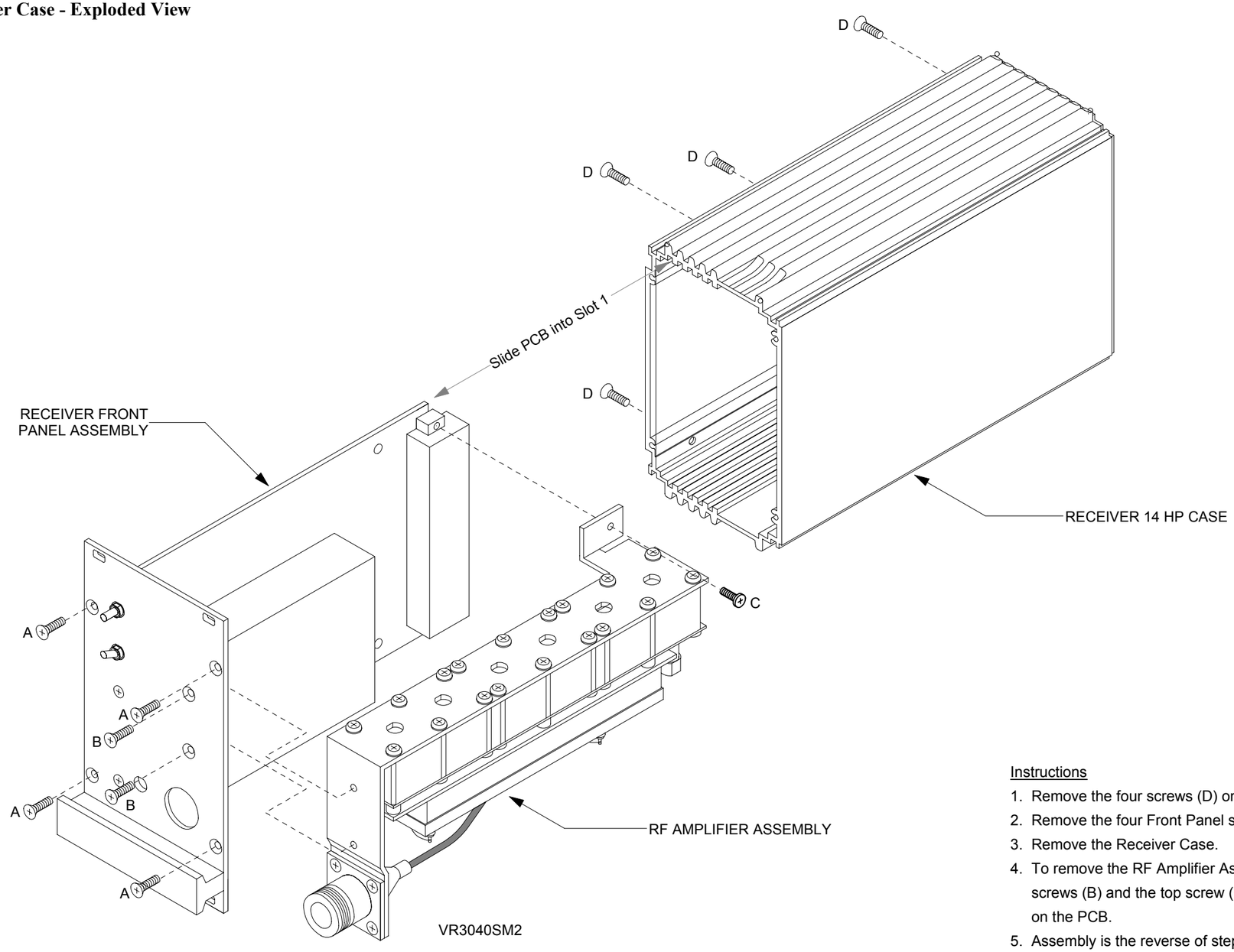
2.6 Enhanced Synthesizer

The OS-3A/H Synthesizer is a compact, fully shielded and environmentally rugged frequency synthesis module that is the nucleus of every MT-3 synthesized Receiver and Transmitter radio module. The OS-3A/H generates a high stability, low distortion radio frequency signal in one of several frequency bands, including 29 - 50 MHz. The OS-3A/H utilizes an internal temperature compensated 9.6 MHz reference to produce a signal stable to ±1 ppm within the temperature range of -40°C to +60°C. Alternately, the OS-3A/H can be disciplined by an external 9.6 MHz or 10 MHz reference of higher stability. All synthesizer modules are designed to be easily removed for programming, calibration and/or repair. The synthesizer circuitry is distributed between two printed circuit boards (PCBs) which are isolated yet interconnected via photo-logic optical transceivers that effectively eliminate residual electrical noise between digital and analog circuitry. Further shielding of the synthesizer's RF filter circuitry is provided by an internal shielded enclosure.

2.7 Receiver Front Panel Illustration



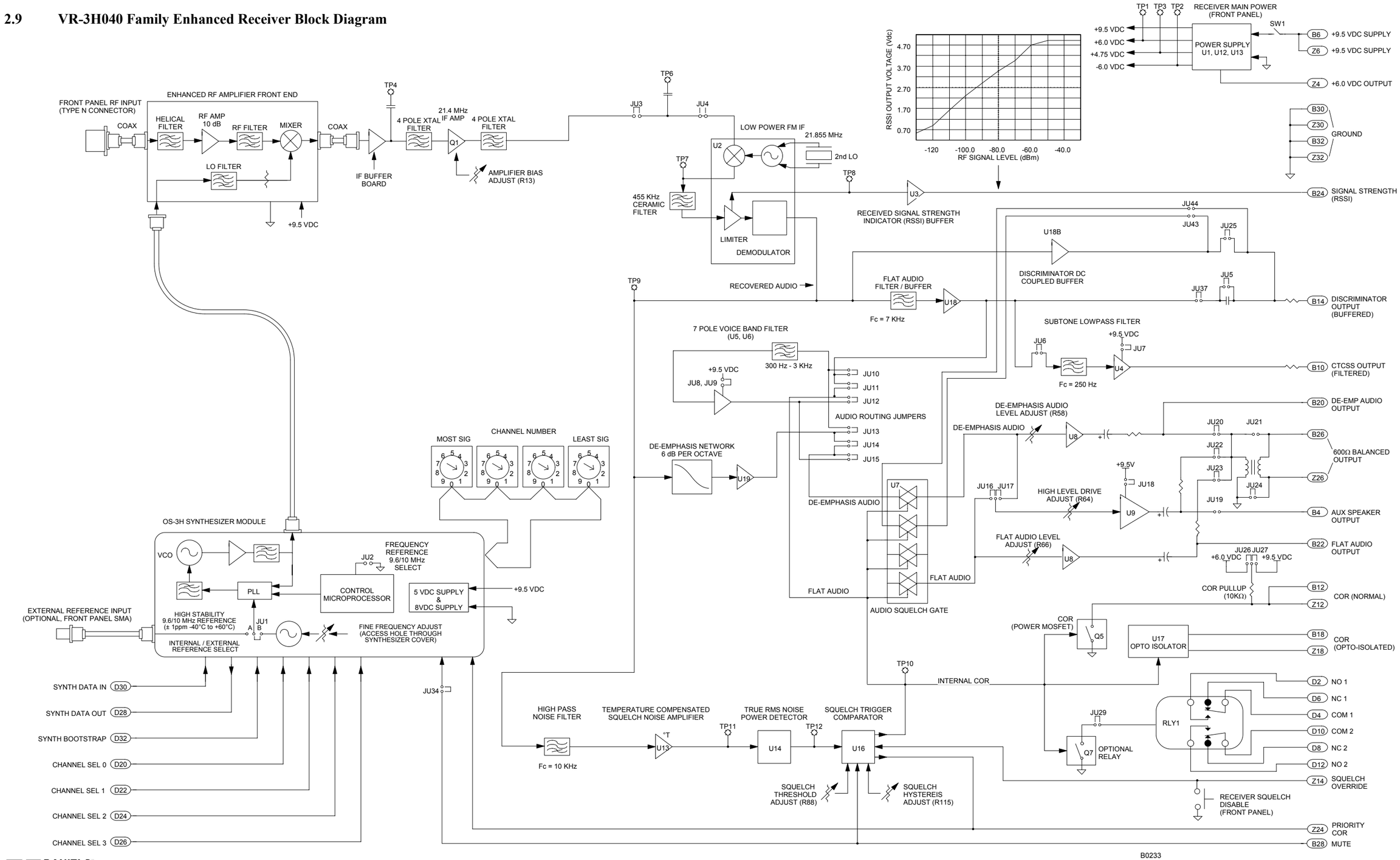
2.8 MT-3 Receiver Case - Exploded View



Instructions

1. Remove the four screws (D) on the side of the Receiver Case.
2. Remove the four Front Panel screws (A).
3. Remove the Receiver Case.
4. To remove the RF Amplifier Assembly, remove Front Panel screws (B) and the top screw (C) holding the F48 connector on the PCB.
5. Assembly is the reverse of steps 1 through 4.

2.9 VR-3H040 Family Enhanced Receiver Block Diagram



3 THEORY OF OPERATION

Detailed circuit analysis and signal flow description for each of the three electronic modules; Main Board, Enhanced Front End, and Synthesizer are provided in the subsections below. Refer to Section 2, System Overview, of this manual for a description of the overall receiver operation, and the receiver block diagram.

Refer to the appropriate drawings in Section 6 for each module.

3.1 21.4 MHz IF / Audio Main Board

3.1.1 General

The 21.4 MHz IF / Audio Main Board accepts the low level IF signal from the Front End. This processing includes: selective filtering, IF amplification, and final audio demodulation / amplification. This board provides a high degree of receiver flexibility by providing a number of different audio paths, audio levels, and control interconnect options. Refer to section 6 - "21.4 MHz IF / Audio Main Board Schematic Diagram".

3.1.2 Power Supplies

The receiver operates from a main +9.5 Vdc source (from the system monitor) applied to B6 / Z6 at the main 48 pin connector. This source provides power to the Front End, local oscillator module, IF amplifier, operational amplifiers, high level audio drive (U9), and internal regulators. Regulator IC U1 provides +6.0 Vdc to the IF / Audio Main Board demodulation IC U2. Switching inverter supply U12 provides -6.0 Vdc to the squelch detection circuitry (U14, U16). Operational amplifier U13B provides + 4.75 Vdc for virtual ground generation.

3.1.3 IF Buffer Board

The IF Buffer board is required for Enhanced Front Ends only. SMB connector J7 provides IF signal input from the Front End to the IF Port at 21.4 MHz. The IF Buffer board provides the mixer on the Front End with a constant 50Ω load while providing a 50Ω source impedance to the IF / Audio Main Board. L3 and C4 are series resonant at the IF frequency and provide a signal path to the FET amplifier. C5 and L4 provide a shunt for frequencies other than the IF. The IF Buffer board draws 30 mA of current.

3.1.4 First IF Amplifier

MOSFET Q1 provides linear 21.4 MHz IF amplification, while crystal filters XF1 through XF4 provide the optimum bandpass characteristics for good selectivity and low distortion. Potentiometer R13 is used to bias Q1 to an operating point drain current of 7.5 mA. The 21.4 MHz IF amplifier provides an overall gain of approximately 14 dB, including crystal filter losses.

3.1.5 Second IF / Demodulation

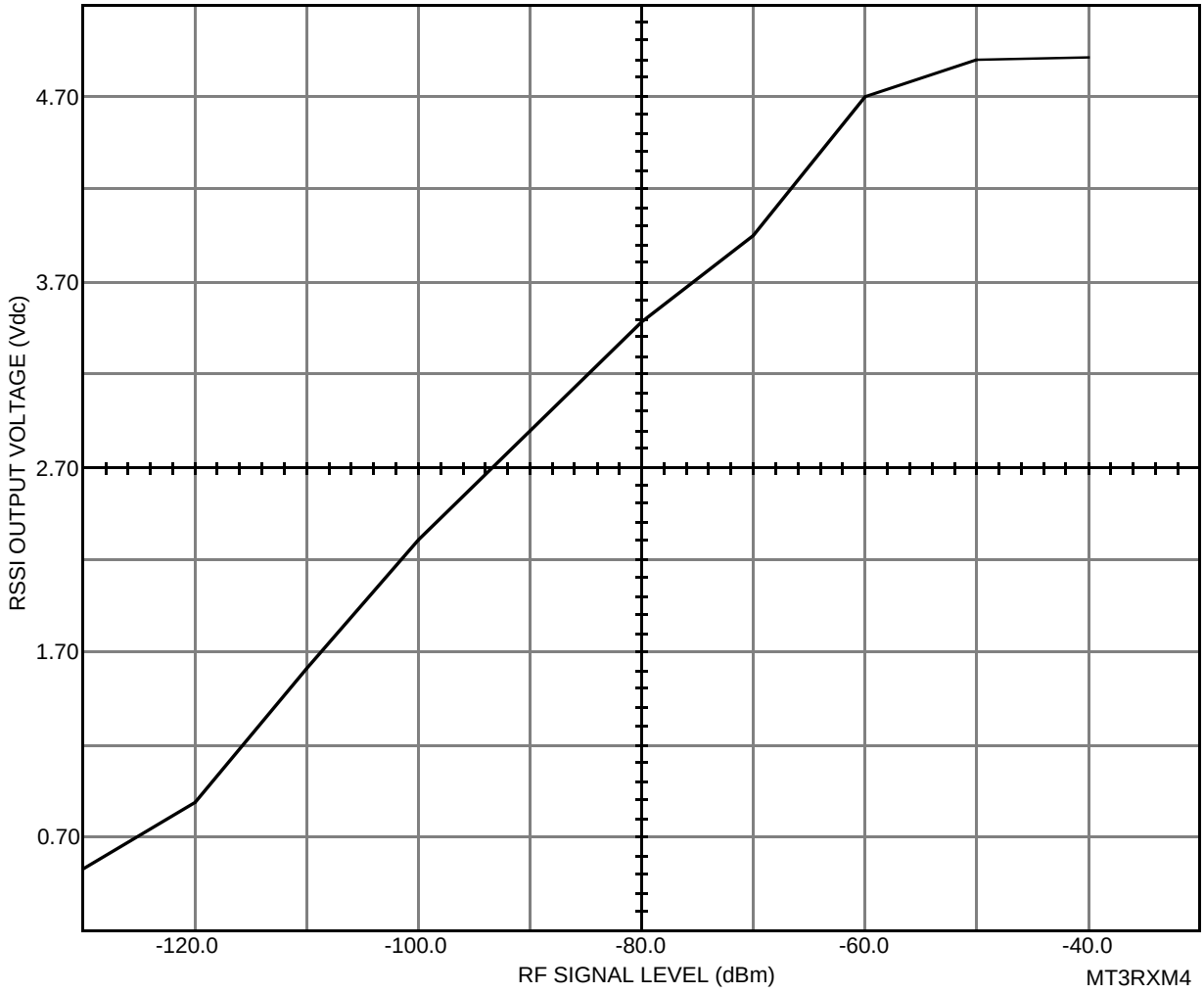
The 21.4 MHz output of the IF amplifier is fed into the second mixer of U2, a low power, FM IF IC. This IC consists of an oscillator, mixer, limiting IF amplifier, quadrature discriminator, and received signal strength indicator (RSSI). A second local oscillator source of 21.855 MHz, derived from a fundamental mode on-chip oscillator (crystal X1), mixes with the 21.4 MHz first IF to produce a 455 kHz second IF. Second IF filtering is achieved through the use of CF1, a multi-element 455 kHz ceramic filter. Inductor L5, capacitor C137 and resistor R16 form the passive quadrature discriminator tuned circuit. Recovered audio is output on pin 9 of IC U2.

3.1.6 Received Signal Strength Indicator (RSSI)

A received signal strength indicator (RSSI) output is provided at pin 13 of IC U2. This pin sources up to 60 μA over a linear 60 dB of input signal range. Operational amplifier U3A translates the RSSI current to a +1 to +5 Vdc output range that is made available at B24. This signal can be used for accurate signal strength measurements making the RSSI function useful for path diagnostics or receiver voting systems. Operational amplifier U3B inverts, scales and level shifts the RSSI output signal to achieve a signal range suitable for triggering the receiver squelch on the basis of received signal carrier strength.

It should be noted that noise triggered squelch is normally employed in the receivers due to less variation in squelch threshold caused by changes in received signal modulation. RSSI based squelch does however offer squelch hysteresis ranges of up to 60 dB which may find limited application in specialized radio systems.
Jumpers JU30 and JU31 provide selection of the desired squelch source signal option. RSSI based squelch also improves the unsquelch (turn on) time for narrow band receivers driven by an over-deviated signal.

Graph of the RSSI Output Voltage versus RF Signal Level.



Note: Standard input signal used (1kHz tone, 3 kHz deviation).

3.1.7 Audio Processing

Recovered audio from pin 9 of U2 supplies both audio and squelch circuitry. Operational amplifier U18A is AC coupled to the recovered audio line providing low pass filtering with a cutoff frequency of approximately 8 kHz, together with amplification of the recovered audio signal. The output of U18A provides a flat audio response which can be routed, via jumpers JU10, JU11 and JU12, through a voice band filter and/or connected directly through the audio squelch gate U7.

Operational amplifier U18B provides unity gain, direct DC coupling of the discriminator output which is enabled by installing jumper JU25 and removing jumper JU37.

Operational amplifier U19A is AC coupled to the recovered audio line providing the standard 6 dB per octave de-emphasis response from 300 Hz to 3 kHz. The de-emphasis audio output can be routed, via jumpers JU13, JU14 and JU15, through a voice band filter and/or connected directly through the audio squelch gate U7.

Operational amplifier U8A provides adjustable (R66) flat audio gain. With a standard input signal applied (-70 dBm on-channel signal modulated with a 1 kHz tone to 60% system deviation) , the flat audio output of U8A can provide up to 7 Vpp into a 10 kΩ load connected to pin B22 of the main 48 pin connector.

Operational amplifier U8B provides adjustable (R58) de-emphasis audio gain. With a standard input signal applied, the de-emphasis audio output of U8B can provide up to 7 Vpp into a 10 kΩ load connected to pin B20 of the main 48 pin connector.

High level drive IC U9 is used to drive the 600 Ω line transformer T1 through jumper JU22 to a level of +3 dBm. With JU19 installed, U9 can also be used to drive an external 4 to 16 Ω speaker connected to main connector pin B4 with up to 750 mW audio power. Jumpers JU16 and JU17 select the high level drive source from either the de-emphasis or flat audio signal path. Potentiometer R64 adjusts the gain of the high level drive to a maximum undistorted level of +3 dBm into a 600 Ω load connected to main connector pins B26 and Z26. Jumper JU24, when installed, unbalances the 600 Ω line transformer for single ended audio routing applications. For low power applications, a 4 mA reduction in receiver current is possible by removing jumper JU18, thus disabling the high level amplifier U9. Outputs of operational amplifiers U8B (de-emphasis) or U8A (flat audio) can then be used to drive the 600 Ω line transformer by installing jumper JU20 or JU23, provided that the 600 Ω line transformer output is adjusted for an output less than -8.0 dBm.

3.1.8 Post Discriminator Filtering

The 21.4 MHz IF / Audio Main Board circuitry includes two active filters; a 4 pole Butterworth low pass subtone filter with a cutoff frequency of 250 Hz and a 6 pole voice band high pass Butterworth filter with a cutoff frequency of 300 Hz. Both active filters are normally disabled to conserve supply current unless required for a particular application. Operational amplifiers U4A and U4B form a 4 pole subtone low pass filter that is used to remove modulation components above 250 Hz. Enabled via installation of jumpers JU6 and JU7, the subtone filter provides an output at main connector pin B10 that can be used to drive external sub-audible tone decoders. Alternatively, with the installation of jumper JU38, the subtone filter output can be output on pin B-14.

Operational amplifiers U5 and U6 form a 6 pole voice band high pass filter that is used to remove modulation components below 300 Hz. Enabled by the installation of jumpers JU8 and JU9, the voice band high pass filter provides an output that can be routed through either the flat or de-emphasis audio paths via jumpers JU12 or JU15. The primary purpose of the voice band high pass filter is for the effective removal of low frequency modulation components, such as sub audible tones (CTCSS) from the receiver audio path. This may be required in certain repeater applications where sub-audible tones are detected and regenerated independent of the receiver.

3.1.9 Squelch Circuitry

The 21.4 MHz IF /Audio board has two squelch detection methods: one based on noise operated squelch and the other based on carrier level (RSSI) operated squelch. Both methods provide the COR function (Carrier Operated Relay) in a flexible and efficient manner. Noise operated squelch is the preferred and standard method normally employed.

The demodulated signal at pin 9 of U2 contains noise, second local oscillator bleed through, and the desired voice band demodulation products. Noise based squelch works on the simple principle that receiver noise power varies with received signal strength (FM quieting effect). The demodulated signal from pin 9 of U2 is filtered by a selective passive filter consisting of C106, C107, C108, L7 and L8. This filter removes modulation components below 10 kHz, leaving band limited noise from 10 kHz to 100 kHz. It is important to remove modulation components below 10 kHz in order to prevent variations in squelch trigger point due to modulation changes in the received signal.

Band limited noise is then presented to operational amplifier U13A, where it is amplified with gain as a function of ambient temperature. This temperature compensation is necessary to account for changes in receiver noise over the wide operating temperature range capability of the Receiver family. The temperature compensated, band limited noise is connected to a "True RMS" power detector U14; the output of which is directly proportional to RMS noise power. Operational amplifier U16A is configured as a comparator monitoring the output of power detector U14. The trigger point of this comparator is established by the DC level at the non inverting input (pin 3). This level is set by the "Squelch Threshold Adjust" potentiometer R88 from the stable +2.5 Vdc reference U15. As the level of a received signal increases, the noise power decreases, which results in a lower output from the RMS detector U14. This causes the output of comparator U16A to go to the positive rail (approximately +8.5 Vdc) turning on transistor Q9 which further lowers the level at the inverting input of U16A by an amount established by the "Squelch Hysteresis Adjust" potentiometer R115. The positive feedback set up by Q9 requires the received signal to decrease in level (increasing noise power) to a point higher than the original squelch trigger point before the receiver will return to a squelched condition, indicated by U16A's output going to the negative supply rail (approximately -5.7 Vdc).

This provides a controlled amount of squelch hysteresis that prevents oscillating action of the squelch comparator circuitry. The amount of squelch hysteresis is normally factory set for 6 dB centered about the squelch threshold point. The squelch threshold setting is normally established as being the point of receiver 12 dB SINAD. The output of U16A is buffered by comparator U16B before being connected to squelch gate U7. When the output of comparator U16A to go to the positive rail, the output of comparator U16B also goes to the positive rail which, baring an active mute line, turns on squelch gate U7. The receiver is now in an active or unsquelched state. A receiver mute line brought out through main connector pin B28, when pulled low, acts to permanently squelch the receiver (depending on jumper JU40 and the state of the receiver squelch override line) by turning transistor Q10 on. Transistor Q10 pulls the inverting input (pin 6) of U16B to approximately +6.5 Vdc which mutes the receiver by causing the output of U16B to go low, opening squelch gate U7.

Jumper JU40 controls whether the mute line takes precedence over the squelch override line or vice versa. Jumper JU40 is normally installed giving the squelch override line precedence over the mute line so if both the mute and squelch override lines are active the receiver will become unsquelched. To give the mute line precedence, remove jumper JU40.

A receiver squelch override line brought out through main connector pin Z14, when pulled low, acts to permanently unsquelch the receiver (depending on jumper JU40 and the state of the receiver mute line) by turning transistors Q8 and Q11 on. Transistor Q8 pulls the non-inverting input (pin 3) of U16A to the +9.5 Vdc supply which causes the output of U16A to go to the positive rail which, baring an active mute line, unsquelches the receiver. Similarly, if jumper JU40 is installed, transistor Q11 pulls the non-inverting input (pin 5) of U16B to the +9.5 Vdc supply which causes the output of U16B to go to the positive rail which unsquelches the receiver regardless of the state of the mute line.

3.1.10 COR Outputs

The IF / Audio Main Board employs four methods of interfacing internal squelch circuitry to external devices, such as transmitters, site controllers, etc. These four methods of COR (Carrier Operated Relay) control include; an open collector priority COR signal (Q12), an open drain power MOSFET (Q5), an optional opto-isolated transistor (U17) and an optionally installed relay (RLY1).

- The priority COR signal, an open collector output (Q12) capable of sinking up to 50 mA when active, is available at pin Z24 of the main connector. Jumper JU39 allows for internal pull-up to either +6.0 Vdc or +9.5 Vdc. The priority COR signal is derived from the output of comparator U16A so priority COR will become active anytime the Receiver receives a signal strong enough to trigger the comparator or the squelch override line is activated. Priority COR is not affected by the receiver's mute line.

The other three COR outputs are all affected by the receiver's mute line, consequently, they only become active when the Receiver is unsquelched.

- MOSFET Q5 provides an open drain output capable of sinking up to 2 amps when active (unsquelched receiver) through main connector pins B12 / Z12. Jumpers JU26 and JU27 allow internal pull-up to either +6.0 Vdc or +9.5 Vdc respectively. Power MOSFET Q5 is rated for 60 Vdc maximum drain-to-source potential when in the off state (squelched receiver).
- Opto-isolator U17 (optional) may be enabled by installing jumper JU28. U17 can typically switch up to 100 mA of current while providing a high degree of electrical isolation at main connector pins B18 / Z18.

- Optional relay RLY1 is enabled by installing jumper JU29 and installing RLY1. RLY1 provides double pole, double throw connections at the main connector pins D2, D6, D4, D8, D10, and D12.

3.1.11 Channel Selection

Synthesized receiver channel selection is achieved by setting a decimal number on four BCD frequency select switches or by selecting one of 16 pre-programmed channels via the Channel Select Lines. Seven backplane connections are used to communicate with the synthesizer unit. Pins D28, D30, and D32 are used (in house) to program the synthesizer with up to 15 channels. Channel Select Lines CSEL0 (LSB) through CSEL3 (MSB) are used once the synthesizer is programmed to select one of 16 channels. If the Channel Select Lines are all low (channel 0) the channel for the synthesizer is read from switches FSW1 (most significant) through FSW4 (least significant) and the desired local oscillator frequency is generated; otherwise one of the 15 pre-programmed frequencies is selected. The BCD switches can be changed at any time however the low current synthesizer, due to the fact that it places itself in a sleep mode to conserve power, will not change frequency unless the receiver power is cycled or the Channel Select lines are changed. Since the resulting frequency is dependent on the receiver model, refer to the section on frequency selection in the Receiver Manual or to the channel designation tables for that particular receiver.

3.2 Enhanced Front End

3.2.1 General

The Enhanced Front End amplifies and down converts the RF signal to the IF frequency of 21.4 MHz. The FE3H035 and FE3H045 Front Ends use high side injection. The Enhanced Front End consists of the following:

- Five Section L-C coupled Bandpass Filter
- Single Stage Low Noise RF Amplifier
- Image Rejection Filter
- Local Oscillator Low Pass Filter
- Double Balanced Active Mixer

3.2.2 Power and Interconnection

The FE3H Enhanced Front End operates from +9.5 Vdc applied via a short red wire connected to supply point J6-2 on the receiver main IF/audio board. Ground return is supplied via direct mounting to the receiver chassis and coaxial cable interconnections. The FE3H Front End draws approximately 160 mA from the IF/audio board's +9.5 Vdc supply.

The RF input signal connected to the receiver front panel type N connector is fed to the front end SMB input connector (J1) by a short coaxial cable. The FE3H Front End's local oscillator input and IF output are respectively routed by coaxial cable from the local oscillator module and to SMB connector J7 on the main IF/audio board.

3.2.3 Preselector Filter

The received RF signal is filtered by a five section L-C coupled band pass filter. This filter provides front end selectivity and attenuates any potential antenna conducted spurious signals. The filter has an operational bandwidth of 5 MHz and a typical insertion loss of 2 dB. The filter is tunable (L1 through L5) in the following ranges :

- FE3H035 29.0 MHz - 38.5 MHz
- FE3H045 37.5 MHz - 50.0 MHz

Every Enhanced Front End has an identification label indicating one of two operating frequency bands.

3.2.4 RF Amplifier

The output from the preselector filter is coupled through DC blocking capacitor C8 to the base of RF amplifier Q2. The RF amplifier stage is supplied by the regulated +9.5 Vdc line and typically draws 60 mA of collector current. It provides a high third order intercept point and low noise figure. Transistor Q1 actively regulates the bias to RF transistor Q2. The output signal is coupled to an image rejection filter via DC blocking capacitor C10. Typically, the RF amplifier stage has a gain of 16 dB.

3.2.5 Image Rejection Filter

The amplified RF signal is followed by an image rejection filter. This filter rejects image noise after amplification. The low pass filter consists of C11 through C14, and L3 through L5. It is a low pass filter designed to pass the desired frequency range of 29.0 MHz - 50.0 MHz and reject the image band of 71.8 MHz - 92.8 MHz. Typical insertion loss is 1.5 dB.

3.2.6 Local Oscillator Filter

The local oscillator filter is a low pass filter consisting of C34 through C37, and L10 through L12. Typical insertion loss is 1.5 dB. Input level to the local oscillator filter is typically +5 dBm. Following the filter is a resistive attenuation network with an insertion loss of 7.5 dB.

3.2.7 Double Balanced Mixer

The Double Balanced Mixer consists of active mixer M1. The received RF signal in the 29.0 MHz - 50.0 MHz range is down converted to the 21.4 MHz first conversion IF frequency by the use of high side injection. The mixer is driven by an LO signal of typically -4 dBm. Typical current draw for the mixer is 100 mA. Typical conversion loss of mixer is 0 dB.
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3.3 Enhanced Synthesizer

3.3.1 Internal Power and Control (Digital Board)

Refer to "OS(R/T)-3(A/H) Digital Board Schematic Diagram" in section 6.13 of this manual.

The synthesizer operates from a +9.5 Vdc power source applied to connector pin P1-2. Total current draw is approximately 160 mA for FM synthesizers and 65 mA for AM synthesizers. POWER DOWN control line P2-4 controls the +5.0 Vdc microcontroller regulator U2 through power MOSFET switch U1. For receiver applications the synthesizer is always ON, with the enable line P2-4 directly connected to +9.5 Vdc. For transmitter applications, pin P2-4 is controlled by MT-3 Transmitter Board jumper J18 which selects the synthesizer standby mode. In Low Current Standby Mode, less than 14 mA current is drawn (for FM, < 4 mA for AM) however, a delay of approximately 50 ms from PTT activation to transmitter turn is then required to allow for synthesizer lock time. In Normal Mode, with the synthesizer ON continuously, less than 10 ms delay is encountered. This capability comes at the expense of additional standby current (160 mA for FM, 65 mA for AM).

3.3.2 Common Analog Board Circuitry

The Analog Board utilizes four optical receivers (U1 - U4) and one optical transmitter (U5) to provide an isolated data interface to the digital board. In normal operating modes, +9.5 Vdc Regulator IC U8 provides continuous +5.0 Vdc to the internal TCXO and power control optical receiver U1. This results in a standby current level of ≈ 14 mA for FM and 4 mA for AM. Primary power is controlled through activation of optical receiver U1 under control of the digital board micro controller U4. Regulator U6 provides switched +8.0 Vdc with regulator U7 providing switched +5.0 Vdc to all analog supply points. Power MOSFET IC U9 works as a clamping circuit to quickly discharge VCO filter capacitors C32 and C33 when powered down, resulting in immediate suppression of RF output from the VCO.

The heart of the OS-3A/H Enhanced Synthesizer is U10 - a low power, single chip synthesizer IC. A 9.6 MHz reference signal is provided either from the internal TCXO (JU1-B Analog Board) or from an external source via SMB connector J1 with jumper JU1-A (Analog Board) and jumper JU2 (AM Analog Board only) installed. The external reference source may be 9.6 MHz or 10.0 MHz and is selected via jumper JU2 on the Digital Board (9.6 MHz with JU2 not installed, 10.0 MHz with JU2 installed). If an external signal is used as the reference source, it must be a sinusoidal, low phase noise, high stability signal of 0 dBm ±3 dB level. A poor quality reference source will degrade receiver /transmitter performance to unacceptable levels. Transistor Q2 forms a buffer amplifier having 50Ω input impedance at 10.0 MHz.

The internal 9.6 MHz TCXO provides better than ±1 ppm frequency stability from -30°C to +60°C (-40°C to +60°C optional). Fine frequency adjustment is made through frequency control potentiometer RV1, which is accessible through the synthesizer top cover.

The 9.6 MHz reference source is divided down to establish a channel selection step size of 5.0/6.25, 12.5, or 25.0 kHz depending on the particular synthesizer model type. A third order passive loop filter comprised of C37, C38, C39, C45, C49, R36 and R32 is employed to achieve the required noise performance, modulation and worst case switching time of 50 ms. A small sample of RF energy is coupled from the VCO output buffer U16 on the FM analog board to the synthesizer IC U10 prescaler input (pin 11). FM modulation of the VCO from ≈ 100 Hz to 3 kHz is achieved through the baseband input pin P1-1 on the Digital Board. A 1 kHz sine wave with a level of approximately 400 mVrms at P1-1 provides FM deviation of 3.0 kHz. SMB connector J2 provides an RF output level of approximately +5 dBm into a 50Ω load.

An optional modulation input is provided through connector P1-18 (Digital Board) and routed to the Analog board via connector P3. This connection must be coupled to a low impedance, dc coupled source and provides a phase modulated bandwidth from 0 Hz (DC) to ≈ 50 Hz (PLL loop filter bandwidth) allowing for specialized applications such as paging or trunking where a separate low frequency digital/analog modulation channel is required. Phase modulation input pin P1-18 is routed to the transmitter audio processor spare pin P4-2 via JA4-2 on the MT-3 transmitter main board. It should be noted that any application of the direct TCXO modulation port transfers control of the synthesizer steady state frequency setting to the external modulating source. Frequency control potentiometer RV1 is then effectively removed from the frequency adjust circuitry.

A lock detect LED (LED1) indicates an unlocked PLL condition. An unlocked PLL condition normally indicates that the VCO is not tuned within the lock-in range of the desired channel frequency. In a transmitter, the loss of lock will prevent PTT from keying the power amplifier module, thus preventing transmission of a spurious output signal. Adjustment of tuning capacitor C24 will normally reestablish frequency lock within the synthesizer's frequency range. Optical transmitter U5 is additionally activated in unlocked conditions and enables the micro-controller (Digital Board) to respond to the unlocked PLL condition. Note that the 118 - 159.4 MHz and the 406 - 470 MHz Analog Boards do not incorporate a VCO tuning capacitor; the VCO covers the full frequency range without tuning. An unlocked condition in either of these synthesizers would indicate an attempt to synthesize an invalid channel frequency outside the installed VCO frequency range.

3.3.3 29 - 71.4 MHz Analog Board Circuitry

Refer to the "OS(R/T)-3H 29 - 71.4 MHz Analog Board Schematic Diagram" in section 6.

Field effect transistor Q5 forms part of the negative resistance VHF amplifier oscillator that is tuned on-frequency by the combination of resonator L5 and the total capacitive reactance presented across L5 through capacitors C62, C63, C64, C23 (Select), variable capacitor C24 and varactor diodes D1 and D2. Fine frequency adjustment is obtained via multi-turn trimmer capacitor C24 in conjunction with coarse frequency jumper selections JU2, JU3 and JU4. Select capacitor values are chosen to position the operating frequency in one of three bands: 29 - 38 MHz, 38 - 50 MHz or 50.4 - 71.4 MHz. Varactor diodes D1 and D2 provide oscillator frequency control. PLL feedback control voltage, at the output of the low-pass loop filter, controls the VCO frequency through the reverse biasing of varactor diodes D1 and D2. The PLL control voltage can range between ≈ +1.0 Vdc and +7.0 Vdc and is nominally set to ≈ +4.5 Vdc at the synthesizer centre frequency. Setting of the PLL control voltage set point (TP4) is achieved by adjusting fine frequency variable capacitor C24 combined with binary weighted lumped capacitor coarse frequency jumpers (JU2, JU3, JU4). External baseband frequency modulation is provided through connection P1 and a voltage divider network formed by R21 and R22. A large signal division ratio, established by the resistive dividers R21 and R22, allows low deviation (less than 5 kHz) direct frequency modulation of the VCO output signal.

The PLL low-pass filter is formed by SELECT components C37, C38, C39, C45, R32 and R36. The loop filter response is optimized for switching time, noise and modulation requirements specific to each sub-band within the 29 - 71.4 MHz frequency range. The SELECT components (including the loop filter) can be found in tabular format on the VHF OS-3H 29 - 71.4 MHz Analog Board Schematic diagram.

RF output power is taken from the source of Q5 and amplified/buffered by U11. U15 provides further amplification and isolation while delivering ≈ +10 dBm into a six-pole low-pass/notch output filter formed by C53, C57, C58, C59, L11 and L13. The six pole output filter, with a cutoff frequency of 50 MHz (OST-3H035, OST-3H045 TX) or 80 MHz (OSR-3H061 RX) effectively eliminates output harmonics. SMB connector J2 provides interconnection to the companion transmitter or receiver with an output level of ≈ +5 dBm.

3.3.4 Synthesizer Digital Circuitry (Digital Board)

Microcontroller U4 generates control signals utilized within the synthesizer module. U4 communicates with synthesizer IC U10, monitors the synthesizer lock detect, manages PTT input and output and determines the operating frequency by reading channel number information from either the four rotary Binary Coded Decimal (BCD) switches mounted on the main Transmitter and Receiver PCB, or by reading four externally driven CHANNEL SELECT lines. Microcontroller U4 is also designed to communicate with Daniels SYNTHESIZER CHANNEL PROGRAMMER (CP-SC-3) through I/O lines TX DATA (P1-17), RX DATA (P1-9) and BOOTSTRAP (P2-2). This external programmer places the operating program in non-volatile microprocessor memory and programs up to 15 user defined channel selections. An internal "watchdog" timer provides robust software protection in all operating modes.

Data communication between the digital and analog circuit boards is achieved through four optical transmitters (U5 through U8) and one optical receiver (U9). The optical interface provides a fully isolated inter-board data communications link designed to prevent digital noise from interfering with sensitive PLL circuitry.

3.4 Frequency Control

3.4.1 BCD Switch Frequency Control

Selection of the desired synthesizer output frequency is straightforward. If all four of the CHANNEL SELECT lines (CHAN SEL3 - CHAN SEL0) are pulled low (to GND), the synthesizer will scan the four BCD switches (FSW1 - FSW4) located on the receiver and transmitter main circuit boards via connections SW1 COM - SW4 COM and PC4 - PC7 and establish the operating frequency from these switches. The four CHANNEL SELECT lines, CHAN SEL3 - CHAN SEL0, are connected via the MT-3 transmitter or receiver main board module connector to the M3 motherboard subrack. These lines are by default normally pulled low (to GND) via jumpers located on the M3 motherboard subrack.

If any one of the CHANNEL SELECT lines are pulled high (to +9.5 Vdc), then the synthesizer's frequency of operation will be determined by the CHANNEL SELECT lines and not the BCD switches. Up to 15 separate channel frequencies can be pre-programmed into a 'table' in non-volatile microprocessor memory and accessed through binary interpretation of the CHANNEL SELECT lines. The most significant bit (MSB) in the CHANNEL SELECT binary code is represented by CHAN SEL3 and the least significant bit (LSB) is represented by CHAN SEL0. For example, if all CHANNEL SELECT lines are pulled high, (i.e. binary '1111') then the 15th frequency entry in the internal channel table will be selected. The channel table is normally pre-programmed at the factory to user specifications, but may be programmed in the field using Daniels SYNTHESIZER CHANNEL PROGRAMMER (CP-SC-3).

In transmitters, the synthesizer operating frequency is the transmitter operating frequency; however, for receivers, an IF Offset correction factor must be added to or subtracted from the synthesizer operating frequency in order to determine the actual receive frequency. For VHF and UHF Receivers, the IF Offset correction factor is 21.4 MHz, while for 800 and 900 MHz Receivers it is 45 MHz. Refer to Channel Designation Table documentation for simplified channel number and frequency information.

3.4.2 Synthesizer Base and Frequency Increment Table

The OS-3A/H Synthesizer operates in frequency increments of 5.0/6.25 kHz. The Base Frequency for any given synthesizer model is the lowest frequency generated.

Model Number	Freq. Range	Base Frequency	Freq. Increment
OST-3H035	29 - 38 MHz	29 MHz	5.0/6.25 kHz
OST-3H045	38 - 50 MHz	29 MHz	5.0/6.25 kHz
OSR-3H061	50.4 - 71.4 MHz	50.4 MHz	5.0/6.25 kHz

3.4.3 5.0/6.25 kHz Channelization.

All Daniels VHF synthesizers have been designed to generate frequencies in both 5.0 kHz and 6.25 kHz channel increments. BCD channel switch settings from **0000 to 4999** will therefore select operating frequencies with **5.0 kHz** increments, while BCD switch settings from **5000 to 9999** will select operating frequencies with **6.25 kHz** increments. Calculation of the operating frequency for VHF synthesizers capable of 5.0/6.25 kHz channelization is determined as follows:

- BCD switch settings from **0000 to 4999**: Multiply the switch setting by 5.0 kHz and add the result to the synthesizer base frequency.

  Example: An OST-3H141 synthesizer has a base frequency of 128 MHz. The selected channel number is 0988. The synthesizer output frequency is:

  ((988 x 5 kHz) + 128 MHz) = 132.940 MHz

- BCD switch settings from **5000 to 9999**: Subtract 5000 from the switch setting. Multiply the result by 6.25 kHz and add the result to the synthesizer base frequency.

  Example: An OSR-3H162 synthesizer has a base frequency of 150 MHz. The selected channel number is 7205. The synthesizer output frequency is:

  ((7205-5000) x 6.25 kHz) + 150 MHz) = 163.78125 MHz

4 RECEIVER ALIGNMENT

4.1 General

Receiver alignment is simplified by using an M-3 subrack, SM-3 system monitor, and RF extender card/cable to provide receiver power and signal interconnection. Alternatively, +9.5 Vdc may be applied directly to a receiver module through positive connection to pins B6 / Z6, and negative connection to pins B30 / Z30 / B32 / Z32. Receiver balanced audio (600 Ω) is available at pins B26 and Z26.

Throughout the alignment procedure reference is made to a "standard signal level". This refers to an external generator signal source with FM modulation, 1 kHz tone, and 60% system deviation connected to the receiver RF input type N connector (if a carrier frequency is not given, it can be assumed to be the selected receiver channel frequency). All audio distortion measurements are made at 1 kHz, and band limited from 300 Hz to 3.4 kHz.

Before proceeding with receiver alignment, check that the appropriate jumpers are installed. The standard jumper configuration given in section 5 is normally employed for receiver alignment.

The extruded receiver case should be removed to expose all receiver circuitry. In addition, the removal of the Front End is required for C130 second local oscillator frequency adjustment . All jumpers and test points are clearly marked. All adjustments to the IF / Audio Main Board, with the exception of C130, are made on the surface mount component side of the IF / Audio Main Board.

4.2 Repair Note

All radio modules employ a high percentage of surface mount components 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 Electro Static Dissipative (ESD) protection.

When removing Surface Mount Solder Jumpers, it is recommended to use clean solder wick braid in place of vacuum type desoldering tools. When connecting Surface Mount Solder Jumpers, use a minimal amount of solder on the pads. These precautions will help prevent damage to the circuit boards.

4.3 Printed Circuit Board Numbering Convention

To ease troubleshooting and maintenance procedures, Daniels Electronics Limited has adopted a printed circuit board (PCB) numbering convention in which the last two digits of the circuit board number represent the circuit board version. For example:

- PCB number 43-912010 indicates circuit board version 1.0;
- PCB number 50002-02 indicates circuit board version 2.0.

All PCB's manufactured by Daniels Electronics are identified by one of the above conventions.

4.4 Recommended Test Equipment

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

Power supply - Regulated +9.5 Vdc at 2 A. Phillips PM 2811
Oscilloscope / Multimeter - Fluke 97 Scopemeter
Spectrum Analyzer with Tracking Generator
Radio communications test set - Marconi Instruments 2955R
Radio communications test set - Marconi Instruments 2965A
Alignment Tool - Johanson 8764
Alignment Tool - Johanson 8766
Alignment Tool - Johanson 4192
Alignment Tool - Coilcraft 37-1409

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 local oscillator may be accurately set to within its ±1 ppm frequency tolerance.

4.5 Synthesizer OS-3, OS-3H)

For LOW BAND units (OSR-3H061 synthesizer):

- Change the select jumpers, JU2, 3, 4 (See Table below).

LOW BAND JUMPER TABLE

- Use only with Analog Board PCB 50038-03 (Version 03).
- Table to be used only as a guideline in choosing correct setting.

Binary	JU2	JU3	JU4	Freq. (Minimum) C24 In	Freq. (Center) C24 Middle	Freq. (Max) C24 Out
3	O	X	X	*50.4	52.4	54.5
2	O	X	O	52.9	56.45	59.1
1	O	O	X	56.5	60.95	64.3
0	O	O	O	61.7	67.6	72.3

* C24 is adjusted 2 turns from the bottom.

X = Installed O = Open

4.5.1 VHF OS(R/T)-3H 29 - 71.4 MHz VCO Alignment

Refer to the "OS(R/T)-3H 29 - 71.4 MHz Analog Board Component Layout" diagrams and the "OS(R/T)-3H 29 - 71.4 MHz Analog Board Schematic Diagram" in section 6 of this manual

Using a high impedance (10 MΩ) DC Voltmeter, measure the PLL control voltage at TP4 located on the synthesizer module analog board (top). Access to TP4 is available through the synthesizer top cover. Using a small standard blade screwdriver, carefully adjust the VCO fine frequency "TUNE" trimmer capacitor C24 until a test point (TP4) voltage of approximately +2.3 Vdc is obtained. PLL loop control voltages below approximately +0.5 Vdc and above approximately +4.5 Vdc will indicate an "out of lock" synthesizer condition.

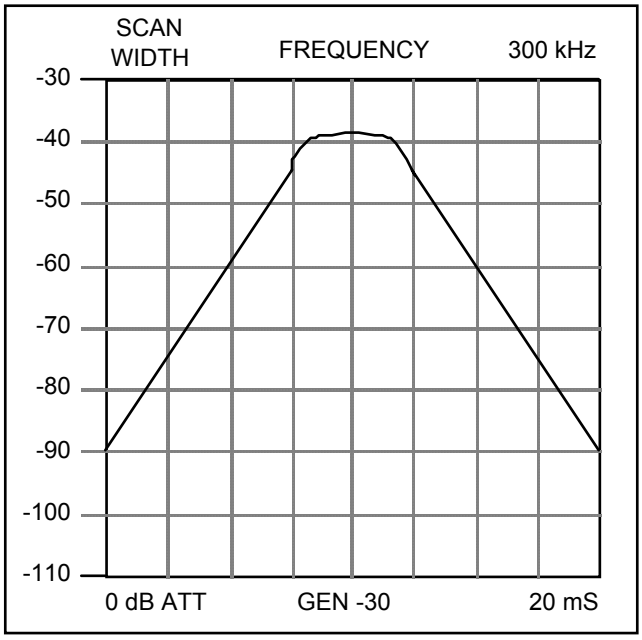
If a test point (TP4) reading of approximately +2.3 Vdc is unattainable through adjustment of C24, then the coarse frequency jumpers, JU2-JU4 require modification in order to pull the VCO tune range within the adjustment range of fine tuning capacitor C24. The top synthesizer cover must be removed in order to gain access to the coarse frequency jumpers. The coarse frequency jumpers (JU2-JU4) may be considered to be a selectable binary weighted capacitor element with JU2 being the most significant "bit" and JU4 being the least significant "bit". The tuning resolution size is ≈12 pF (JU4). If the tuning voltage remains higher than +2.3 Vdc, decrease the tuning jumper setting by 1 "bit" position and re-adjust C24 in an attempt to achieve +2.3 Vdc at TP4. For example, if coarse frequency jumpers JU2-JU4 are all installed and represented by 111 then a decrease by 1 "bit" position (12 pF) is represented by a binary jumper selection of 110; jumper JU4 is not installed and jumpers JU2, JU3 are installed.

Continue to decrease the jumper position one "bit" at a time until the synthesizer regains lock with TP4 adjusted (C24) for +2.3 Vdc. If the tuning voltage remains lower than +2.3 Vdc, increase the jumper setting by 1 "bit" position and re-adjust C24 in an attempt to achieve +2.3 Vdc at TP4. Repeat this procedure until +2.3 Vdc is achieved at TP4.

It is important to check the loop control voltage at TP4 when multiple synthesizer channels have been programmed. All channel selections should result in a TP4 voltage within a +1.0 to +4.0 Vdc range. Adjust the fine-tuning capacitor C24 to center multiple channel voltages symmetrically about +2.3 Vdc. Channel selections beyond the tuning range capability of the synthesizer will result in unlocked operation. The tuning range capability of all synthesizer models is listed in the Specifications section (1.4) of this manual.

4.6 Front End Tuning

- Attach the front-end assembly to the main board and solder the red wire to the 9.5V line (J6-2).
- Use a spectrum analyzer with Tracking Generator. Connect the generator O/P of the spectrum analyzer to the RF I/P of the front end. Connect the IF O/P of the front end to the analyzer I/P. Apply power to the Rx. Note that the LO input of front end must be disconnected.
- Spectrum analyzer set up: Generate a level of -30dBm and put -30dBm on the top of the y-axis using "RF ATTEN" key. Set the scan width to 10MHz/div. Enter in your Rx frequency.
- Tune the five variable inductors CCW, on the side of the front end, until they are within a few turns of being flush with the top. You should see a shape on the display that resembles a 'volcano.' Using the five variable inductors adjust the position of the 'volcano' until its center is aligned with the Rx frequency. The shape should look like this:



- Connect the IF output of the front end to the IF input on the main board. Connect the LO input of front end to synthesizer output.

4.7 Main Board Tuning

4.7.1 IF Amplifier Bias Current Adjustment

Monitor test point TP5 and adjust MOSFET bias potentiometer R13 until a DC level of +8.75 Vdc is achieved. This corresponds to an IF amplifier drain current of 7.5 mA, and prepares the IF amplifier for following alignment steps. Note that an incorrectly set bias point can add substantially to the overall receiver current consumption.

4.7.2 21.4MHz

- Connect the Rx main board to the power supply and place the switch on the front panel to the 'NORM' position.
- Place the Marconi test set into 'Tx Monitor' mode and monitor the radiated RF from X1 using a test probe or antenna with the 1 watt input. Tune C130 to achieve 21.855MHz ±20 Hz.
- Place the test set into 'Rx Test' and inject the receiver nominal frequency into the RF input of the front end. RF Level = –70 dBm, mod freq = 1kHz, deviation = 9kHz. Ensure the band-pass filter of 0.3–3.4kHz is selected.
- Measure TP5 and adjust R13 to achieve 8.75V ± 0.1V
- Adjust coil L5 for highest audio output.

4.7.3 Audio Levels

- Adjust R64 to get the 'AF VOLTS' to ~307mV ±5mV or –8dBm.
- Change the monitored audio O/P on the jig to the de-emphasis audio O/P. Tune R58 to achieve ~307mV ±5mV or –8dBm.
- Change the monitored audio O/P on the jig to the flat audio O/P. Tune R66 to achieve ~307mV ±5mV or –8dBm. Return the jig to monitor the standard balanced O/P.

4.7.4 Distortion and Sensitivity

- Adjust L2, C17, C27, and L5 to get lowest distortion. Experiment with L2 and C17 to get the best trade-off resulting in lowest distortion. Ensure distortion is < 3.0%. Expect ~ 1.5% or less for most units.
- To measure the sensitivity, decrease the generated RF level until the SINAD meter measures –12dB SINAD. This RF level is known as the 'sensitivity.' Slightly tune the five variable inductors if sensitivity is not within spec. Ensure you observe the shape of the filter to make sure it is still acceptable after you do this adjustment.

4.7.5 Second IF / Demodulation

Adjustment of the second local oscillator frequency (21.855 MHz) is most easily performed by employing the communications monitor as a sensitive receiver with the 21.855 MHz signal taken from a small loop antenna placed near crystal X1. A short length of wire connected to a coaxial cable works well. Adjust variable capacitor C130 until an oscillator frequency of 21.855 MHz is achieved.

If the squelch circuitry has been incorrectly adjusted, it may be necessary to depress the squelch override switch on the receiver front panel continuously (or ground pin Z14) for the following receiver adjustments.

Terminate the balanced audio output lines B26 and Z26 with a 600 Ω 1/4 watt resistor. Connect the communications monitor AF high impedance input across this resistor. Adjust potentiometer R64 (High level drive adjust) to approximately mid-range position. Maximum AF signal and minimum harmonic distortion should occur simultaneously. All distortion measurements should be made through a 300 Hz to 3.0 kHz band pass filter to remove low frequency noise originating from the RF communications monitor signal source. This filter is usually selectable on most communications monitors. Adjust the high level drive potentiometer (R64) to obtain -8 dBm (308 mVrms) across the external 600Ω termination resistor. A level of -8 dBm is the standard factory setting for the balanced output.

4.7.6 Squelch Window

- Generally, the **squelch hysterisis** is set to a window of 6dB centered around the 12dB SINAD sensitivity.
- Set the RF Gen level to 3dB above the sensitivity. Turn pot R88 CW until the Rx's audio O/P turns off. Slowly turn R88 CCW until the signal just comes on and stays on.
- Set the RF Gen level to 3dB below the sensitivity. Turn pot R115 CW while occasionally pressing the squelch disable button on the front panel until the signal remains on without having to press the button. Slowly turn R115 CCW until the signal just turns off and remains off.
- Check to ensure that the Rx opens and closes at the correct RF levels ±1dB. If not, repeat the previous two steps.

5 RECEIVER CONFIGURATION AND TEST POINTS

5.1 21.4 MHz IF / Audio Main Board Factory Settings

5.1.1 The 21.4 MHz IF/Audio Main Board Configuration:

- Audio de-emphasis response enabled (JU14).
- Flat audio response enabled (JU11).
- 600 Ω balanced de-emphasis high level drive (JU17, JU18, JU22 and JU35 [Narrow Band Only]).
- Noise based squelch (JU30).
- Squelch Override precedence (JU40).

5.1.2 The 21.4 MHz IF/Audio Main Board Configuration Jumper Settings

• Jumper JU1:	installed	Mixer bypass (mixer installed for older Front Ends only)
• Jumper JU2:	installed	Installed if L3 is not a transformer
• Jumper JU3:	installed	IF output disconnect (for testing purposes)
• Jumper JU4:	installed	Demod input disconnect (for testing purposes)
• Jumper JU5:	not installed	AC / DC couple amplified discriminator output
• Jumper JU6:	not installed	Subtone filter input enable
• Jumper JU7:	not installed	Subtone filter power enable
• Jumper JU8:	not installed	Voice band filter +9.5 Vdc power enable
• Jumper JU9:	not installed	Voice band filter +4.75 Vdc power enable
• Jumper JU10:	not installed	Unfiltered audio voice band filter input select
• Jumper JU11:	installed	Unfiltered flat audio select
• Jumper JU12:	not installed	Voice band filtered flat audio select
• Jumper JU13:	not installed	De-emphasized audio voice band filter input select
• Jumper JU14:	installed	De-emphasized audio select
• Jumper JU15:	not installed	Voice band filtered De-emphasized audio input select
• Jumper JU16:	not installed	Flat audio high level drive select
• Jumper JU17:	installed	De-emphasized audio high level drive select
• Jumper JU18:	installed	High level drive power enable
• Jumper JU19:	not installed	Auxiliary speaker output
• Jumper JU20:	not installed	Balanced audio, low level de-emphasized audio select
• Jumper JU21:	not installed	Balanced audio bypass
• Jumper JU22:	installed	Balanced audio, high level drive select
• Jumper JU23:	not installed	Balanced audio, low level flat audio select
• Jumper JU24:	not installed	Unbalanced audio output enable
• Jumper JU25:	not installed	Direct discriminator output enable

• Jumper JU26:	not installed	+6.0 Vdc COR pull-up
• Jumper JU27:	not installed	+9.5 Vdc COR pull-up
• Jumper JU28:	not installed	Opto-isolated COR enable
• Jumper JU29:	not installed	Relay COR enable
• Jumper JU30:	installed	Noise based squelch select
• Jumper JU31:	not installed	Signal strength squelch select
• Jumper JU32:	not installed	Squelch override zener diode bypass
• Jumper JU33:	not installed	Mute zener diode bypass
• Jumper JU34:	installed	OS-3 synthesizer mute control enable
• Jumper JU35:	installed	High level drive gain select (Narrow Band)
• Jumper JU35:	not installed	High level drive gain select (Wide Band)
• Jumper JU36:	installed	Fuse bypass
• Jumper JU37:	installed	Amplified Discriminator output enable
• Jumper JU38:	not installed	LPF discriminator output to Discriminator output routing
•Jumper JU39:	not installed	+6.0 / +9.5 Vdc Priority COR pull-up select
• Jumper JU40:	installed	Squelch override precedence enable
• Jumper JU41:	not installed	45 MHz IF narrow band matching
• Jumper JU42:	not installed	Installed for 45 MHz only
• Jumper JU43:	not installed	Squelched discriminator audio ENA
• Jumper JU44:	not installed	Squelched discriminator audio ENB

5.1.3 Test Points

- TP1 +6.0 Vdc ± 0.1 Vdc. U1 positive regulator output.
- TP2 -6.0 Vdc ± 0.1 Vdc. U12 negative regulator output.
- TP3 +4.75 Vdc ± 0.1 Vdc. Virtual ground reference source.
- TP4 21.4 MHz IF injection point.
- TP5 +8.75 Vdc ± 0.1 Vdc. MOSFET Q1 operating point.
- TP6 Second IF sample input / output.
- TP7 455 kHz Filter input / second mixer output.
- TP8 RSSI output. + 1.0 Vdc to +5.0 Vdc depending on received signal strength.
- TP9 Unfiltered, recovered audio. ≈ 200 mV pk-pk with standard input signal applied.
- TP10 COR internal logic line. ≈ -5.7 Vdc squelched, ≈ +8.5 Vdc unsquelched.
- TP11 Squelch noise temperature compensated amplifier output.
- TP12 Squelch noise power level. 0.0 to +1.5 Vdc (depending on signal strength).
- TP13 +2.50 Vdc ± 0.02 Vdc. U15 squelch threshold reference.

5.1.4 Power Supplies

A check of all DC power supply levels is recommended before receiver alignment is performed. All supply and reference voltages are fixed with no provision made for adjustment. The following test points and their respective levels apply: Note that total receiver current should be less than approximately 100 mA for a synthesized unit and 45 mA for a crystal controlled unit. Higher currents indicate that immediate corrective action/repair is required.

TP1 +6.0 Vdc ± 0.1 Vdc. U1 positive regulator output.
TP2 -6.0 Vdc ± 0.1 Vdc. U12 negative regulator output.
TP3 +4.75 Vdc ± 0.1 Vdc. Virtual ground reference source.
TP13 +2.50 Vdc ± 0.02 Vdc. U15 squelch threshold reference.

Note that incorrect bias adjustment (R13) of IF amplifier MOSFET Q1 can add significantly to the overall receiver current figure.

Total typical receiver current consumption of an enhanced synthesized receiver may be broken down as follows:

- IF / Audio Main Board approximately 22 mA;
- FE-3H Enhanced Front End approximately 160 mA;
- OS-3H Enhanced Synthesizer approximately 160 mA (Operate Mode);
- IF Enhanced Buffer Board approximately 30 mA

5.1.5 21.4 MHz IF / Audio Board Interconnect Pin Definitions

The IF / Audio Main Board employs a 48 pin Eurostandard connector for interfacing to all transmitter power, audio, and control functions. The following are the IF / Audio Main Board back plane connections to the M-3 Motherboard.

Pin	Name	Pin	Name	Pin	Name
D2	Relay 1, normally open	B2	+13.8 Vdc	Z2	+13.8 Vdc
D4	Relay 1, common	B4	Auxiliary Speaker Output	Z4	+6.0 Vdc Output
D6	Relay 1, normally closed	B6	+9.5 Vdc	Z6	+9.5 Vdc
D8	Relay 2, normally closed	B8	No Connect	Z8	No Connect
D10	Relay 2, common	B10	Disc Output (LPF)	Z10	Spare
D12	Relay 2, normally open	B12	COR (Normal)	Z12	COR (Normal)
D14	IMC1	B14	Disc Output (Buffered)	Z14	Squelch Override
D16	IMC2	B16	No Connect (MT-2 +9.5V)	Z16	No Connect (MT-2 +9.5V)
D18	IMC3	B18	COR (Opto-isolated)	Z18	COR (Opto-isolated)
D20	Channel Select 0 (LSB)	B20	De-emphasis Audio Output	Z20	No Connect
D22	Channel Select 1	B22	Flat Audio Output	Z22	Receiver I/O Spare
D24	Channel Select 2	B24	Signal Strength (RSSI)	Z24	Priority COR (MT-2 AFC)
D26	Channel Select 3 (MSB)	B26	Balanced Output 1	Z26	Balanced Output 2
D28	Synth Tx Data (Output)	B28	Mute	Z28	No Connect (MT-2 Hst Ovd)
D30	Synth Rx Data (Input)	B30	Ground	Z30	Ground
D32	Synth Bootstrap (Input)	B32	Ground	Z32	Ground

5.2 Enhanced Front End Test Points

Vsupply	+ 9.5 Vdc @ 160 mA
Vb of Q1	+ 7 Vdc
Vc of Q2	+ 7.5 Vdc
Vp of M1	+ 9.3 Vdc
Local Oscillator Frequency	RF Frequency + 21.4 MHz

5.3 OS(R/T)-3(A/H) Synthesizer Factory Configuration

The OS(R/T)-3(A/H) Synthesizer is factory configured as follows:

- Internal 9.6 MHz reference selected.
- VCO modulation (via audio processor) enabled (OST TX versions only)

The corresponding internal synthesizer jumper settings are:

Digital Board

- Jumper JU2 not installed 9.6 MHz internal frequency reference selected

  or
- Jumper JU2 installed 10.0 MHz internal frequency reference selected

Analog Board

- Jumper JU1: 'B' position Internal frequency reference selected
- Jumper JU2 not installed Internal frequency reference selected

5.3.1 Jumper Configuration

Solder jumpers are clearly marked on both synthesizer digital and analog circuit boards. Refer to the "OS(R/T)-3(A/H) Digital Board Component Layout (Bottom)" diagram and the applicable "OS(R/T)-3(A/H) Analog Board Component Layout (Top)" diagram in section 6 for jumper locations. The following list details the required jumper configuration for the two synthesizer operating modes:

1) Internal reference. Install jumper JU1-B, on the Analog Board (Standard). The internal temperature compensated crystal oscillator (TCXO) provides the reference signal with a stability of ±1 ppm from -30°C (Optional -40°C) to +60°C.

2) External reference input. Install jumper JU1-A and JU2 on the Analog Board. This mode is used in applications requiring better than ±1 ppm frequency stability. An external reference signal must be provided at synthesizer SMB connector J1.

3) Reference Frequency Select. Install jumper JU2 on the Digital Board to select a 10.0 MHz reference frequency. When not installed, the reference frequency is by default 9.6 MHz. JU2 must not be installed when using the internal 9.6 MHz TCXO reference. JU2 is used by the microcontroller to establish the correct reference frequency division ratio. (Located on the Digital Board; The Synthesizer module must be removed to change jumper JU2.)

Caution: Care must be exercised when reinstalling the synthesizer module on the Transmitter Main board or the IF/Audio board. Pay careful attention to pin alignment before pressing the synthesizer module into its mating sockets.

5.3.2 Synthesizer Test Points

Analog Board Component Layout (Top)
Common to all synthesizer family members.

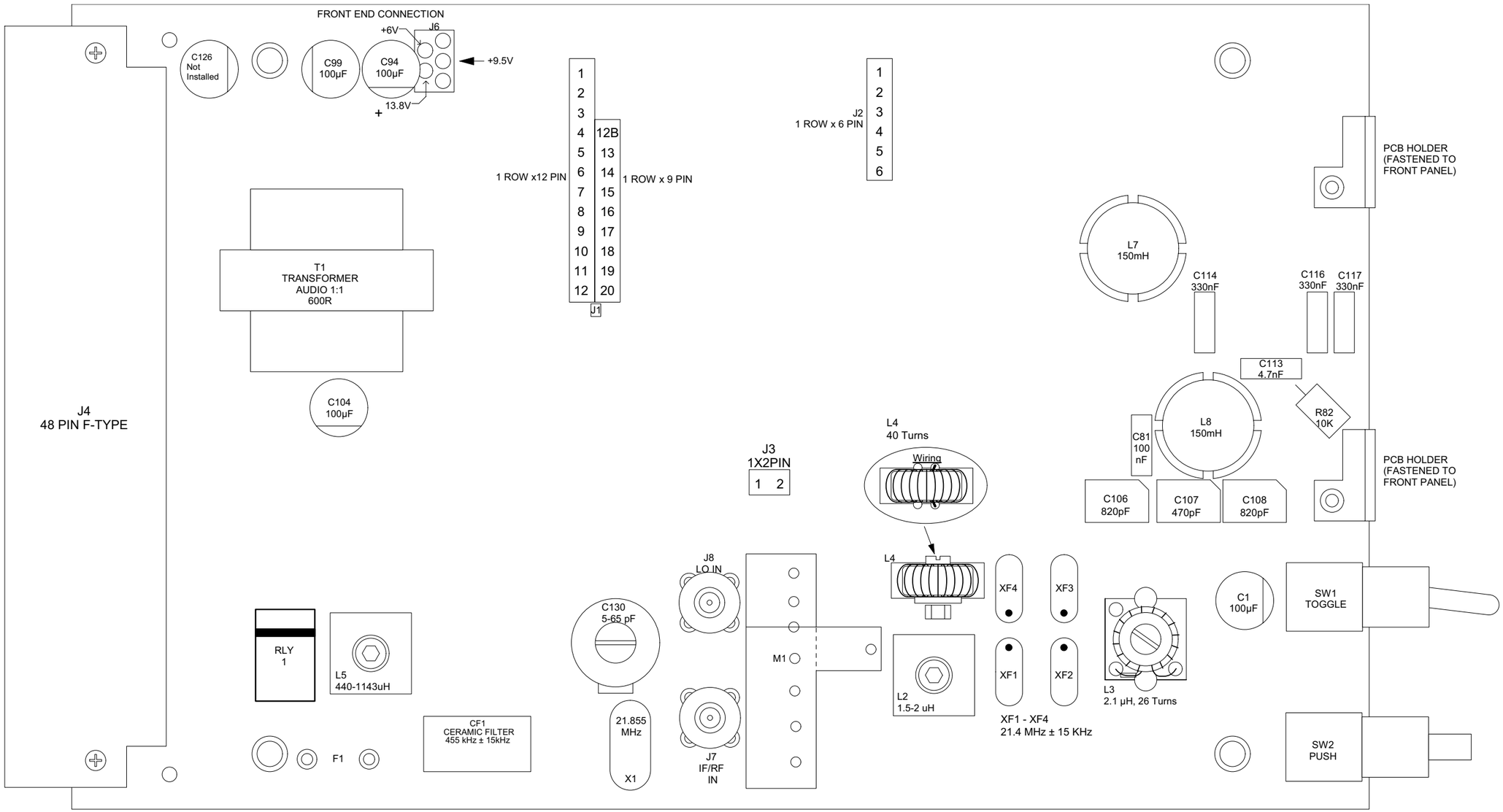
TP1 +8.0 ±0.3 Vdc. U6 positive regulator output.
TP2 +5.0 ±0.1 Vdc. U7 positive regulator output.
TP3 +5.0 ±0.1 Vdc. U8 positive regulator output (always on).
TP4 PLL error voltage. Normal range is +0.5 to +4.5 Vdc (depending on frequency). Nominally adjusted for +2.3 Vdc (via C24) for center channel.

Digital Board Component Layout (Bottom)

TP1 +5.0 ±0.1 Vdc. U2 positive regulator output (controlled via pin P2-4).
TP2 Microcontroller E clock. 2 MHz logic level square wave.

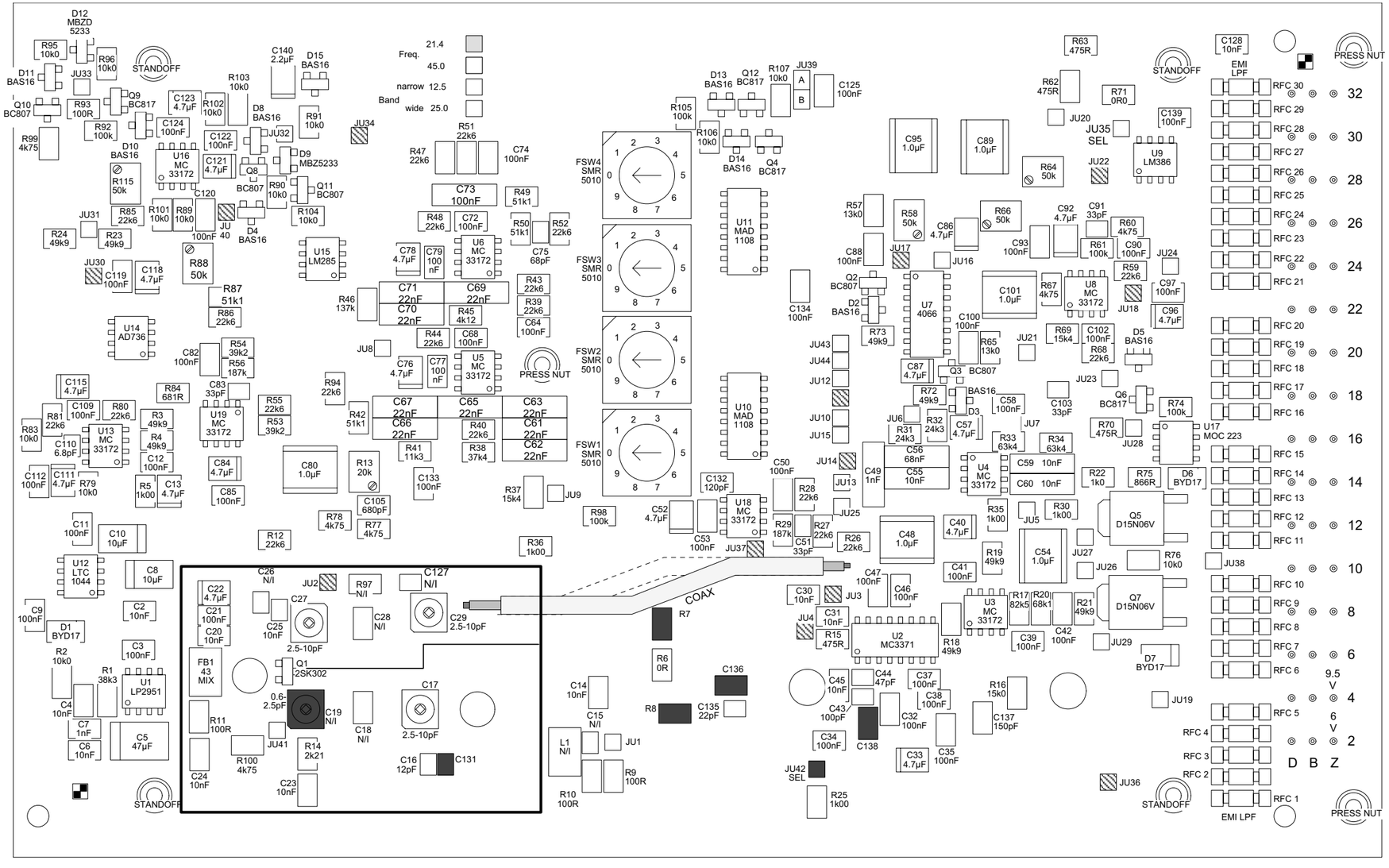
6 ILLUSTRATIONS AND SCHEMATIC DIAGRAMS

6.1 21.4 MHz FM IF / Audio Board Component Layout (Top) - Extra Wideband



DANIELS ™ ELECTRONICS LTD.	
TITLE: xR-3 RECEIVER 21.4 MHz IF BOARD TOP	
DATE: 11 JAN 96	BOARD NO: 43-910719A
DWG No: AB-T-02-01	REV DATE: 7 AUG 03

6.2 21.4 MHz FM IF / Audio Board Component Layout (Bottom) - Extra Wideband



DANIELS ™ ELECTRONICS LTD.	A A C B A
TITLE: xR-3 RECEIVER 21.4 MHz IF BOARD BOTTOM	
DATE: 27 FEB 96	BOARD NO: 43-910719A
DWG No: AB-B-03-01	REV DATE: 8 AUG 03

6.3 21.4 MHz FM IF / Audio Board Schematic Diagram - Extra Wideband

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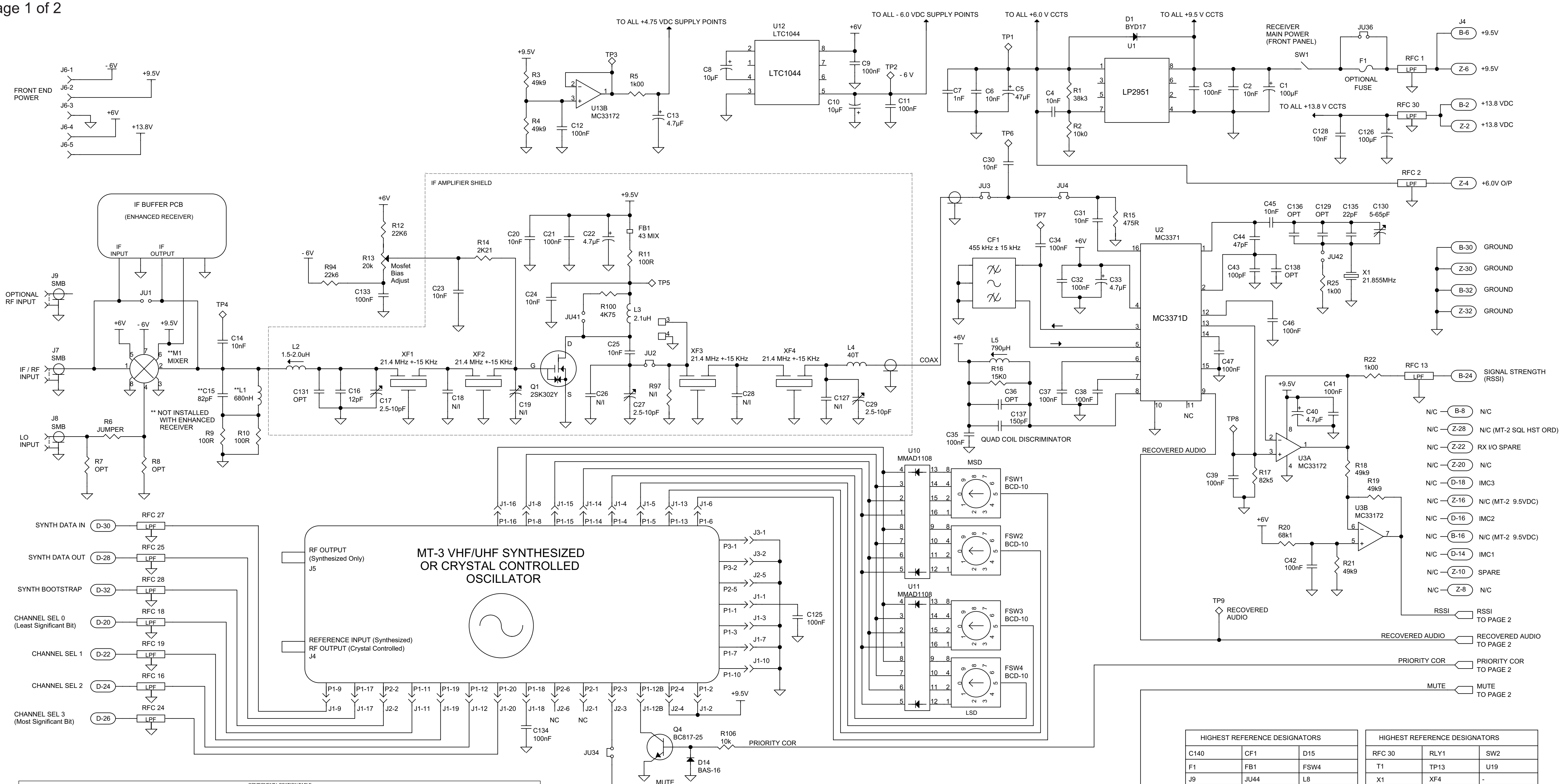


COMPONENT LOCATION TABLE

DES	PG	LC	DES	PG	LC	DES	PG	LC	DES	PG	LC
C1	1	M2	C36	1	K5	C70	2	D2	C105	2	C6
C2	1	M2	C37	1	K5	C71	2	D3	C106	2	D6
C3	1	L2	C38	1	L5	C72	2	D3	C107	2	D6
C4	1	K2	C39	1	M5	C73	2	E3	C108	2	D6
C5	1	K2	C40	1	M5	C74	2	E3	C109	2	E6
C6	1	J2	C41	1	N5	C75	2	F2	C110	2	E4
C7	1	J2	C42	1	N6	C76	2	C2	C111	2	E6
C8	1	H2	C43	1	M3	C77	2	C2	C112	2	E6
C9	1	I2	C44	1	M3	C78	2	E2	C113	2	B8
C10	1	I2	C45	1	M3	C79	2	E2	C114	2	B7
C11	1	J2	C46	1	M4	C80	2	B5	C115	2	B9
C12	1	G2	C47	1	M4	C81	2	C5	C116	2	B8
C13	1	G2	C48	2	J2	C82	2	D5	C117	2	B8
C14	1	C4	C49	2	K2	C83	2	D4	C118	2	C7
C16	1	E5	C50	2	K2	C84	2	D5	C119	2	C7
C17	1	E5	C51	2	K2	C85	2	D5	C120	2	D9
C18	1	F5	C52	2	L2	C86	2	H4	C121	2	D9
C19	1	F5	C53	2	L2	C87	2	H6	C122	2	E9
C20	1	F3	C54	2	L2	C88	2	I5	C123	2	D8
C21	1	G3	C55	2	K4	C89	2	K5	C124	2	D8
C22	1	G3	C56	2	K3	C90	2	K5	C125	1	I7
C23	1	F4	C57	2	J3	C91	2	L4	C126	1	N2
C24	1	F4	C58	2	K3	C92	2	L4	C127	1	I5
C25	1	G4	C59	2	L3	C93	2	L4	C128	1	N2
C26	1	G5	C60	2	L4	C94	2	M4	C129	1	N3
C27	1	G5	C61	2	B3	C95	2	J5	C130	1	N3
C28	1	H5	C62	2	B3	C96	2	K6	C131	1	D5
C29	1	I5	C63	2	B3	C97	2	K6	C132	2	J2
C30	1	K2	C64	2	B3	C99	2	L6	C133	1	E4
C31	1	L3	C65	2	C3	C100	2	I5	C134	1	F8
C32	1	K4	C66	2	C2	C101	2	J6	C135	1	N3
C33	1	L4	C67	2	C3	C102	2	K7	C136	1	M3
C34	1	K3	C68	2	C3	C103	2	K6	C137	1	K5
C35	1	J5	C69	2	D3	C104	2	L7	C138	1	M3

DES	PG	LC	DES	PG	LC	DES	PG	LC	DES	PG	LC
C139	2	L6	J1-6	1	H6	J4 B18	2	O6	J4 Z22	1	O5
C140	2	I8	J1-7	1	H7	J4 B20	2	O3	J4 Z24	2	O10
			J1-8	1	F6	J4 B22	2	O5	J4 Z26	2	O4
CF1	1	J3	J1-9	1	D8	J4 B24	1	O4	J4 Z28	1	O5
			J1-10	1	H7	J4 B26	2	O4	J4 Z30	1	O3
D1	1	L1	J1-11	1	E8	J4 B28	2	O9	J4 Z32	1	O4
D2	2	I6	J1-12	1	F8	J4 B30	1	O3			
D3	2	H6	J1-12B	1	G8	J4 B32	1	O4	J6-1	1	B2
D4	2	E8	J1-13	1	H6	J4 D2	2	O7	J6-2	1	B2
D5	2	L7	J1-14	1	G6	J4 D4	2	O8	J6-3	1	B2
D6	2	N7	J1-15	1	G6	J4 D6	2	O7	J6-4	1	B2
D7	2	L8	J1-16	1	F6	J4 D8	2	O8	J6-5	1	B2
D8	2	F9	J1-17	1	E8	J4 D10	2	O8			
D9	2	F9	J1-18	1	F8	J4 D12	2	O9	J7	1	B4
D10	2	F8	J1-19	1	E8	J4 D14	1	O6	J8	1	B5
D11	2	G7	J1-20	1	F8	J4 D16	1	O6	J9	1	B4
D12	2	H8				J4 D18	1	O5			
D13	2	I9	J2-1	1	G8	J4 D20	1	B7	JU1	1	C4
D14	1	H8	J2-2	1	E8	J4 D22	1	B7	JU2	1	G4
D15	2	H8	J2-3	1	G8	J4 D24	1	B7	JU3	1	K3
			J2-4	1	H8	J4 D26	1	B8	JU4	1	K3
F1	1	N2	J2-5	1	H6	J4 D28	1	B6	JU5	2	L2
			J2-6	1	G8	J4 D30	1	B6	JU6	2	J3
FB1	1	G3				J4 D32	1	B6	JU7	2	K3
FSW1	1	J5	J3-1	1	H6	J4 Z2	1	O2	JU8	2	B2
FSW2	1	J6	J3-2	1	H6	J4 Z4	1	O3	JU9	2	B4
FSW3	1	J7				J4 Z6	1	O2	JU10	2	G2
FSW4	1	J7	J4 B2	1	O2	J4 Z8	1	O6	JU11	2	G2
			J4 B4	2	O5	J4 Z10	1	O6	JU12	2	G2
J1-1	1	H7	J4 B8	1	O5	J4 Z12	2	O6	JU13	2	G3
J1-2	1	H8	J4 B10	2	O3	J4 Z14	2	O9	JU14	2	G3
J1-3	1	H7	J4 B12	2	O6	J4 Z16	1	O6	JU15	2	G3
J1-4	1	G6	J4 B14	2	O2	J4 Z18	2	O6	JU16	2	I5
J1-5	1	G6	J4 B16	1	O6	J4 Z20	1	O5	JU17	2	I5

DES	PG	LC	DES	PG	LC	DES	PG	LC	DES	PG	LC
JU18	2	L5	M1	1	C4	R20	1	M6	R54	2	C5
JU19	2	M5				R21	1	N6	R55	2	C5
JU20	2	M4	Q1	1	F4	R22	1	N4	R56	2	D4
JU21	2	N4	Q2	2	I6	R23	2	D7	R57	2	J3
JU22	2	M4	Q3	2	I6	R24	2	D7	R58	2	J4
JU23	2	M4	Q4	1	G8	R25	1	N4	R59	2	K5
JU24	2	N4	Q5	2	M7	R26	2	J2	R60	2	K5
JU25	2	K2	Q6	2	L7	R27	2	K2	R61	2	L4
JU26	2	M5	Q7	2	K8	R28	2	K2	R62	2	M4
JU27	2	N5	Q8	2	E9	R29	2	L1	R63	2	M4
JU28	2	M7	Q9	2	F8	R30	2	M2	R64	2	K6
JU29	2	L8	Q10	2	G8	R31	2	J4	R65	2	I5
JU30	2	C8	Q11	2	F9	R32	2	K4	R66	2	J6
JU31	2	D7	Q12	2	I9	R33	2	L3	R67	2	K6
JU32	2	F9				R34	2	L3	R68	2	J7
JU33	2	H8	R1	1	K2	R35	2	M3	R69	2	K6
JU34	1	G8	R2	1	K2	R36	2	A3	R70	2	M4
JU35	2	L5	R3	1	F2	R37	2	B3	R71	2	L6
JU36	1	N1	R4	1	F2	R38	2	B2	R72	2	H6
JU37	2	L2	R5	1	G2	R39	2	B3	R73	2	I6
JU38	2	N2	R6	1	B5	R40	2	C3	R74	2	L7
JU39	2	J9	R7	1	B5	R41	2	C3	R75	2	M7
JU40	2	E8	R8	1	C5	R42	2	C2	R76	2	N5
JU41	1	G4	R9	1	C5	R43	2	C3	R77	2	C6
JU42	1	N3	R10	1	D5	R44	2	D3	R78	2	C6
JU43	2	J2	R11	1	G3	R45	2	D3	R79	2	D6
JU44	2	J1	R12	1	E3	R46	2	D2	R80	2	E6
			R13	1	E3	R47	2	D3	R81	2	E5
L2	1	D4	R14	1	F3	R48	2	E3	R82	2	E5
L3	1	G4	R15	1	L3	R49	2	E3	R83	2	E5
L4	1	I4	R16	1	K5	R50	2	F3	R84	2	B8
L5	1	K4	R17	1	M5	R51	2	F3	R85	2	C8
L7	2	D6	R18	1	N5	R52	2	F3	R86	2	C8
L8	2	D6	R19	1	N6	R53	2	C5	R87	2	C8

DES	PG	LC	DES	PG	LC	DES	PG	LC	DES	PG	LC
R88	2	C9	RFC14	2	N6	TP10	2	G6	X1	1	N4
R89	2	C9	RFC15	2	N6	TP11	2	F4			
R90	2	F9	RFC16	1	C7	TP12	2	C8	XF1	1	E5
R91	2	G9	RFC17	2	N3	TP13	2	C8	XF2	1	F5
R92	2	E8	RFC18	1	C7				XF3	1	H5
R93	2	F8	RFC19	1	C7	U1	1	L2	XF4	1	I5
R94	1	D4	RFC20	2	N5	U2	1	L3			
R95	2	H8	RFC21	2	N10	U3A	1	M5			
R96	2	H8	RFC22	2	N4	U3B	1	N6			
R97	1	H5	RFC23	2	N4	U4A	2	K3			
R98	2	J2	RFC24	1	C8	U4B	2	L3			
R99	2	G8	RFC25	1	C6	U5A	2	B3			
R100	1	G4	RFC26	2	N9	U5B	2	C3			
R101	2	E8	RFC27	1	C6	U6A	2	F3			
R102	2	E7	RFC28	1	C6	U6B	2	E3			
R103	2	E8	RFC29	2	N9	U7	2	H4			
R104	2	E9	RFC30	1	N2	U8A	2	K7			
R105	2	I9				U8B	2	K5			
R106	1	H8	RLY1	2	L8	U9	2	L6			
R107	2	J9				U10	1	J5			
R115	2	F8	SW1	1	M2	U11	1	J7			
			SW2	2	M9	U12	1	H1			
RFC1	1	N2				U13A	2	E6			
RFC2	1	N3	T1	2	N4	U13B	1	G2			
RFC3	2	N7				U14	2	B7			
RFC4	2	N5	TP1	1	K1	U15	2	C9			
RFC5	2	N8	TP2	1	J2	U16A	2	D8			
RFC6	2	N7	TP3	1	G2	U16B	2	F7			
RFC7	2	N8	TP4	1	C4	U17	2	M6			
RFC8	2	N3	TP5	1	G4	U18A	2	L2			
RFC10	2	N9	TP6	1	K2	U18B	2	J2			
RFC11	2	N6	TP7	1	K3	U19A	2	D5			
RFC12	2	N2	TP8	1	M5	U19B	2	C4			
RFC13	1	O4	TP9	1	M7						

TP	LEVEL	FUNCTION
1	+6.00V+/-0.1V	SUPPLY
2	-6.00V+/-0.1V	SUPPLY
3	+4.75V+/-0.1V	SUPPLY
4	21.4 MHz	1st IF INPUT
5	+8.75V+/-0.1V	FET
6	IF SAMPLING / INJECTION	
7	455 KHZ FILTER SOURCE	
8	UNFILTERED RSSI	
9	UNFILTERED RECOVERED AUDIO	
10	COR LOGIC - INTERNAL	
11	SQUELCH NOISE SOURCE	
12	SQUELCH NOISE LEVEL	
13	+2.50V +/- 0.02V	SQ. TRIG REF

JUMPER FUNCTIONS	
JU1	ONBOARD MIXER BYPASS
JU2	IF TRANSFORMER BYPASS
JU3	IF AMPLIFIER CONNECT / DISCONNECT
JU4	2ND IF DEMOD CONNECT / DISCONNECT
JU5	DISCRIMINATOR OUTPUT AC / DC COUPLING
JU6	SUBTONE FILTER AUDIO CONNECT
JU7	SUBTONE FILTER ENABLE
JU8	VOICE BAND HIGH PASS FILTER ENABLE
JU9	VOICE BAND FILTER OFFSET ENABLE
JU10	FLAT AUDIO HIGH PASS FILTER CONNECT
JU11	NORMAL FLAT AUDIO O/P CONNECT
JU12	HIGH PASS FILTER OUT TO FLAT AUDIO
JU13	DE-EMPHASIS TO HIGH PASS FLTR CONN
JU14	NORMAL DE-EMPH AUDIO OUTPUT CONN
JU15	HPASS FLTR OUT TO DE-EMP AUDIO PATH
JU16	FLAT AUDIO HIGH LEVEL DRIVE
JU17	DE-EMPH AUDIO HIGH LEVEL CONNECT
JU18	HIGH LEVEL DRIVE SUPPLY ENABLE

JUMPER FUNCTIONS	
JU19	AUX SPEAKER OUTPUT CONNECT
JU20	DE-EMP AUDIO XFMR CONNECT
JU21	IF AMPLIFIER CONNECT / DISCONNECT
JU22	HIGH LEVEL DRIVE XFMR BYPASS
JU23	FLAT AUDIO XFMR CONNECT
JU24	XFMR OUTPUT UNBALANCED CONNECT
JU25	DIRECT DISCRIMINATOR
JU26	6 VOLT COR PULLUP CONNECT
JU27	9.5 VOLT COR PULLUP CONNECT
JU28	OPTO ISOLATOR ENABLE
JU29	RELAY DRIVER ENABLE
JU30	NOISE TRIGGERED SQUELCH CONNECT
JU31	RSSI TRIGGERED SQUELCH CONNECT
JU32	SQUELCH OVERRIDE LEVEL SHIFT
JU33	RX MUTE LEVEL SHIFT
JU34	OUT-OF-LOCK MUTE ENABLE
JU35	HIGH LEVEL DRIVE GAIN SELECT
JU36	FUSE BYPASS

JUMPER FUNCTIONS	
JU37	AMPLIFIED DISCRIMINATOR O/P SELECT
JU38	LPF DISCRIMINATOR O/P ROUTING
JU39	+6.0/9.5 V PRIORITY COR PULLUP SELECT
JU40	SQUELCH OVERRIDE PRECEDENCE ENABLE
JU41	45 MHz IF NARROW BAND MATCHING
JU42	INSTALLED FOR 45 MHz ONLY
JU43	SQUELCH DISCRIMINATOR AUDIO EN. A
JU44	SQUELCH DISCRIMINATOR AUDIO EN. B
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-

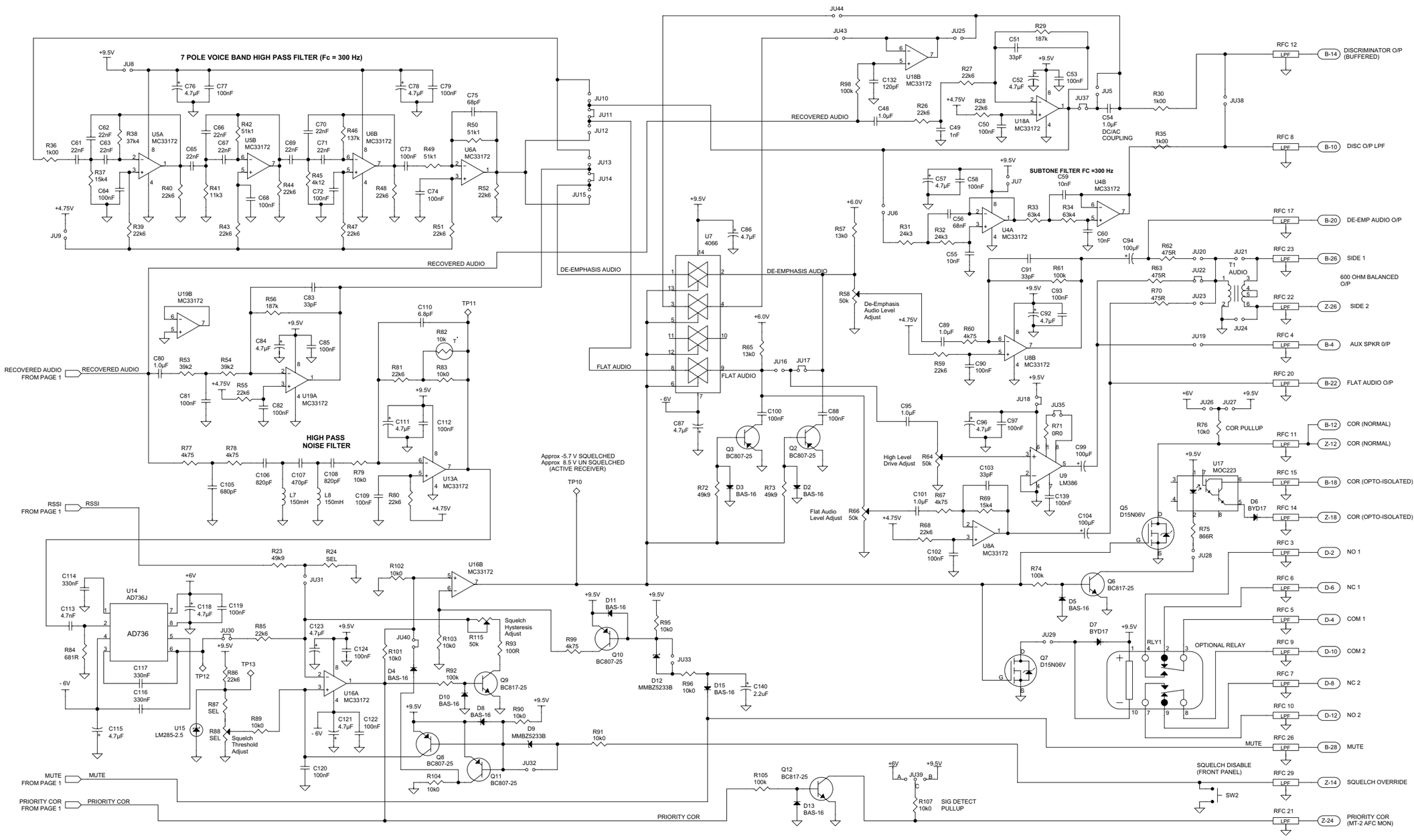
HIGHEST REFERENCE DESIGNATORS		
C140	CF1	D15
F1	FB1	FSW4
J9	JU44	L8
M1	Q12	R115
REFERENCE DESIGNATORS NOT USED		
L6	C98	R108-R114
J5	-	-
-	-	-
-	-	-

HIGHEST REFERENCE DESIGNATORS		
RFC 30	RLY1	SW2
T1	TP13	U19
X1	XF4	-
-	-	-
REFERENCE DESIGNATORS NOT USED		

DANIELS™ ELECTRONICS LTD — VICTORIA BC.

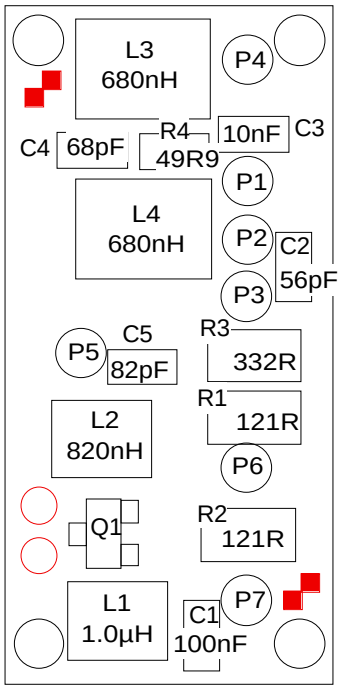
TITLE:	21.4 MHz FM IF/AUDIO MAIN BOARD SCHEMATIC DIAGRAM - Extra Wideband		
DATE: 18 FEB 91	DWN BY: S. SHANNON	APRVD:	
DWG No.: AB-S-03-01-1		REVISED BY: NIKKI BEREKOFF	
BOARD No.: 43-910719A	REV: 1.9A	DWG REV DATE: 7 AUG 03	

21.4 MHz FM IF / Audio Board Schematic Diagram - Extra Wideband



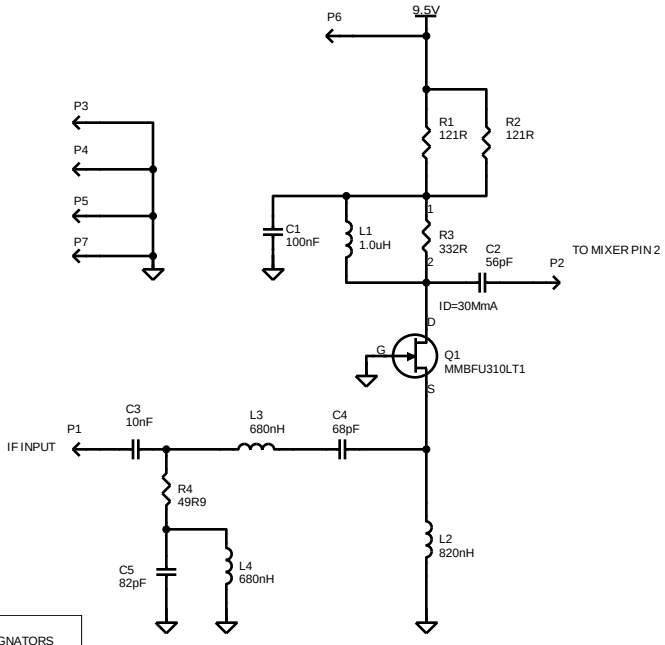
AB-S-03-01-1

6.4 21.4 MHz FM IF Buffer Component Layout



RX214M5

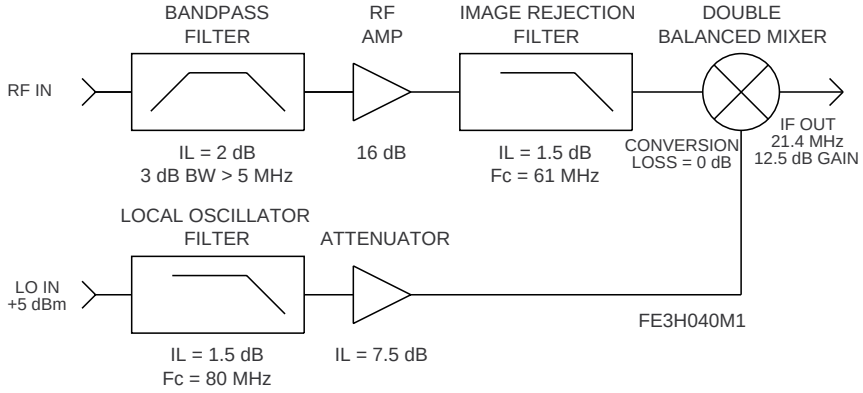
6.5 21.4 MHz FM IF Buffer Schematic Diagram



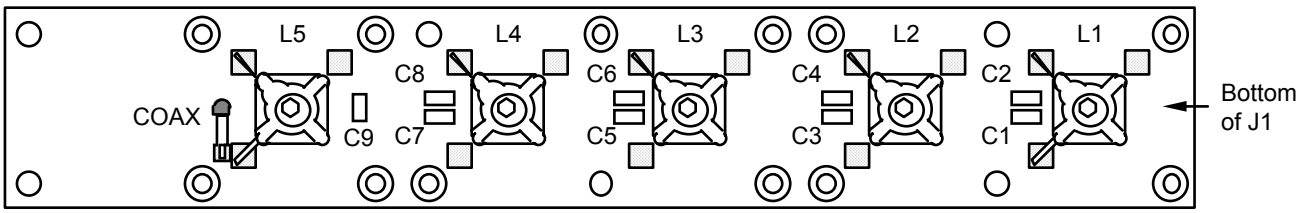
HIGHEST REFERENCE DESIGNATORS		
C5	L4	P7
Q1	R4	-----
-----	-----	-----
UNUSED REFERENCE DESIGNATORS		
-----	-----	-----
-----	-----	-----
-----	-----	-----

DE DANIELS ELECTRONICS		VICTORIA B.C.
TITLE: IF BUFFER		
DATE: 26 JULY 96	DWN BY: BRAD KOSIANCE	APRVD:
DWG No: RX214M6	DWG REV DATE:	
BOARD No: 50032-01	BOARD REV: 1.0	

6.6 Enhanced Front End Block Diagram

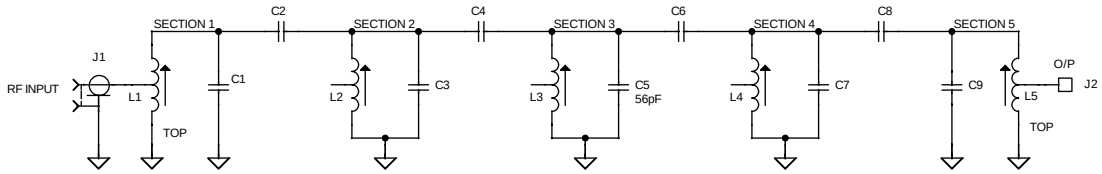


6.7 Bandpass filter Component Layout



FE3H040M2

6.8 BandPass filter Schematic Diagram

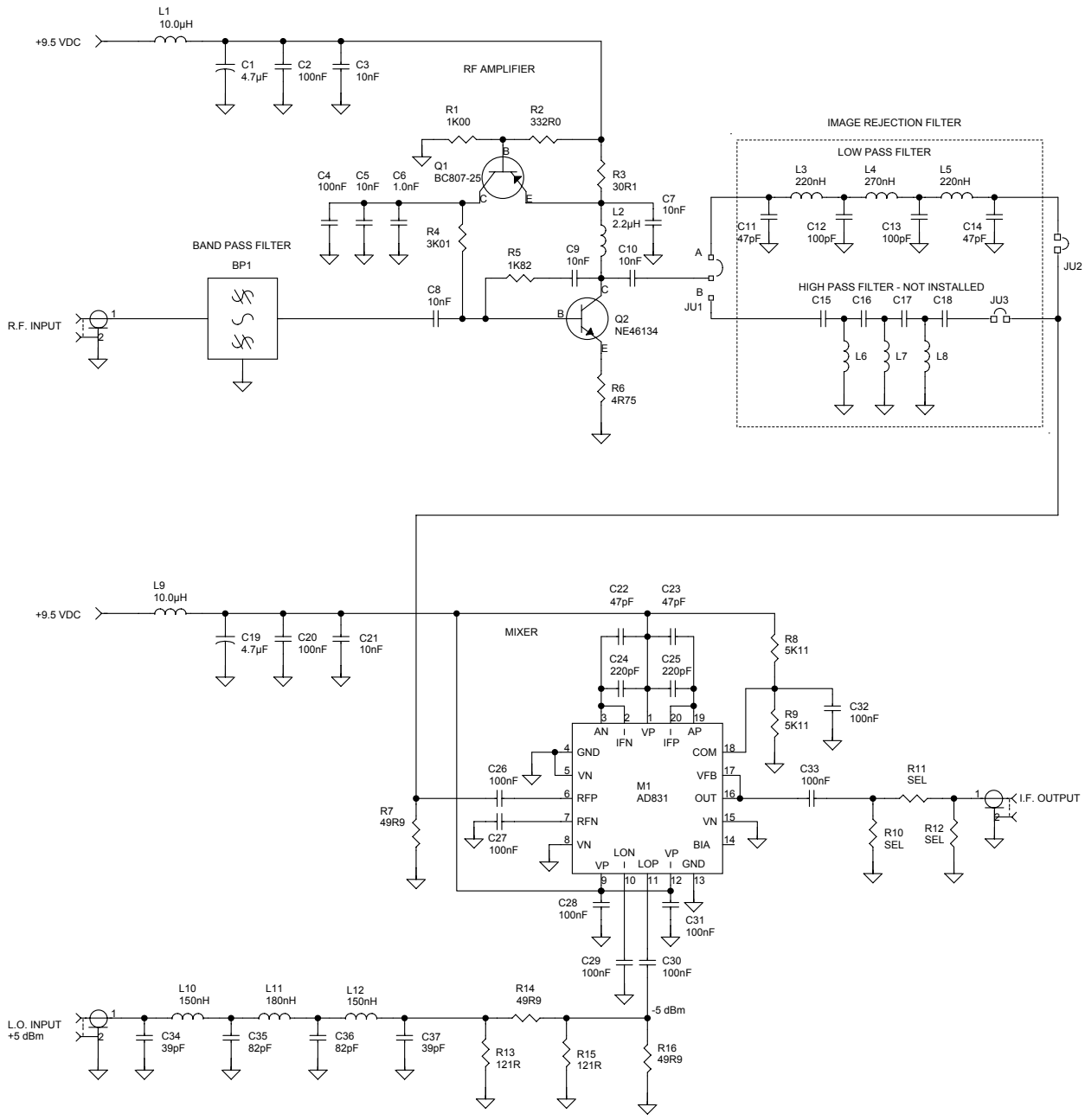


HIGHEST REFERENCE DESIGNATORS		
C9	L5	-----
-----	-----	-----
-----	-----	-----
UNUSED REFERENCE DESIGNATORS		
-----	-----	-----
-----	-----	-----
-----	-----	-----

	FE3H035	FE3H045
Designator	29.0-38.5 MHz	37.5-50.0 MHz
C1	82 pF	68 pF
C2	15 pF	10 pF
C3	68 pF	56 pF
C4	12 pF	8.2 pF
C5	82 pF	68 pF
C6	12 pF	8.2 pF
C7	68 pF	56 pF
C8	15 pF	10 pF
C9	82 pF	68 pF
L1	193-306 nH	162-252 nH
L2	193-306 nH	162-252 nH
L3	193-306 nH	162-252 nH
L4	193-306 nH	162-252 nH
L5	193-306 nH	162-252 nH

DE DANIELS ELECTRONICS		VICTORIA B.C.
TITLE: ENHANCED FRONT END BANDPASS FILTER FE3H0X5		
DATE: 06 FEBRUARY 1997	DWN BY: ROBERT FICHTNER	APRVD: RICK SMEGAL
DWG No: FE3H040M3	DWG REV DATE:	
BOARD No: 50034-01	BOARD REV: 1.0	

6.9 Enhanced Front End Schematic Diagram - Extra Wideband



HIGHEST REFERENCE DESIGNATORS		
C37	Q2	-----
L12	R16	-----
M1	JU3	-----
UNUSED REFERENCE DESIGNATORS		
C15-C18	L6 - L8	-----
-----	-----	-----
-----	-----	-----

DANIELS™ ELECTRONICS LTD		VICTORIA BC.
TITLE: VR-3H040 ENHANCED VHF FRONT END BOARD SCHEMATIC DIAGRAM-EXTRA WB		
DATE: 19 MAR 97	DWN BY: BRAD KOSIANCE	APRVD:
DWG No.: AB-S-01-01-1	REVISED BY:	WHOEVER
BOARD No.: 50041-01 REV: 01	DWG REV DATE:	24 APR 03

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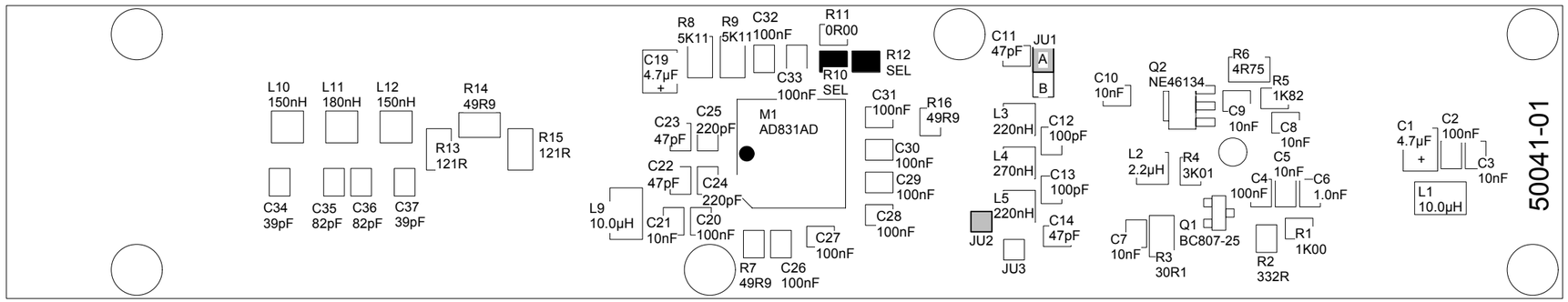
6.10 Enhanced Front End Component Layout - Extra Wideband



50041-01

AB-T-01-01-AAAAA

- INSTALL JUMPERS
- NOT INSTALLED

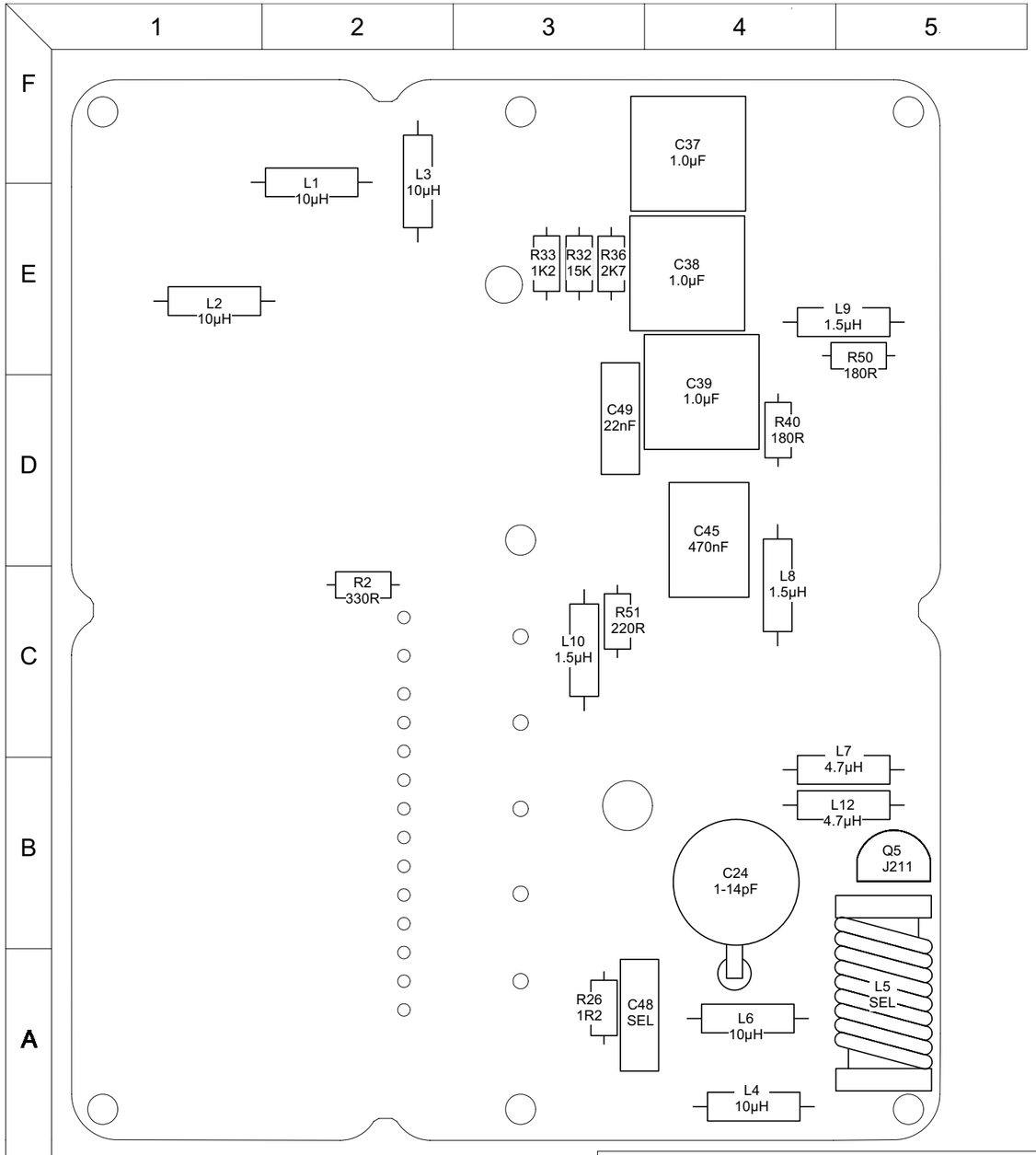
6.11 Synthesizer Analog Board Component Layout Bottom) - Extra Wideband

COMPONENT LOCATION TABLE

DES	LC	SD	DES	LC	SD	DES	LC	SD	DES	LC	SD	DES	LC	SD
C1	F1	T	C41	C5	T	L1	F2	B	R19	B2	T	TP1	F3	T
C2	E1	T	C42	E4	T	L2	E2	B	R20	A4	T	TP2	D1	T
C3	E2	T	C43	D4	T	L3	E2	B	R21	A4	T	TP3	C1	T
C4	A3	T	C44	C4	T	L4	A4	B	R22	A4	T	TP4	B3	T
C5	C2	T	C45	D4	B	L5	A5	B	R23	E2	T	U1	C3	T
C6	E1	T	C46	E5	T	L6	A4	B	R24	D1	T	U2	A3	T
C7	E1	T	C47	C4	T	L7	B5	B	R25	A4	T	U3	B3	T
C8	A1	T	C48	A3	B	L8	C4	B	R26	A3	B	U4	B3	T
C9	A3	T	C49	D3	B	L9	E5	B	R27	B5	T	U5	C3	T
C10	A2	T	C50	D5	T	L10	C3	B	R28	D3	T	U6	E2	T
C11	C2	T	C51	D5	T	L11	E5	T	R29	D3	T	U7	D1	T
C12	E1	T	C52	E5	T	L12	B5	B	R30	C5	T	U8	D1	T
C13	D1	T	C53	E5	T	L13	F4	T	R31	C5	T	U9	C1	T
C14	A2	T	C54	D3	T				R32	E3	B	U10	E2	T
C15	D1	T	C55	C4	T	LED1	E3	T	R33	E3	B	U11	C4	T
C16	A1	T	C56	C3	T				R34	E2	T	U15	E5	T
C17	A3	T	C57	E4	T	Q1	F2	T	R35	E2	T	U16	C4	T
C18	B2	T	C58	E4	T	Q2	A2	T	R36	E3	B			
C19	E2	T	C59	E4	T	Q3	C2	T	R37	E3	T			
C20	D2	T	C61	A4	T	Q4	B2	T	R38	B4	T			
C21	D2	T	C62	A5	T	Q5	B5	B	R39	B4	T			
C22	D2	T	C63	A5	T				R40	D4	B			
C23	A4	T	C64	B5	T	R1	A3	T	R41	D4	T			
C24	B4	B				R2	C2	B	R44	D4	T			
C25	A4	T	D1	A4	T	R3	F2	T	R45	D4	T			
C26	C2	T	D2	A4	T	R4	E2	T	R46	D5	T			
C27	C1	T	D3	B4	T	R5	A1	T	R47	D4	T			
C28	B5	T	D4	C5	T	R6	A2	T	R48	C4	T			
C29	D3	T	D5	B2	T	R7	A2	T	R49	C4	T			
C30	D3	T				R8	A3	T	R50	E5	B			
C31	D3	T	JU1	B2	T	R9	A2	T	R51	C3	B			
C32	C5	T	JU2	A5	T	R10	C2	T	R52	C3	T			
C33	D5	T	JU3	A5	T	R11	B2	T	R53	B3	T			
C34	B4	T	JU4	A5	T	R12	C2	T	R54	F4	T			
C35	C5	T	JU5	D3	T	R13	F1	T	R55	E4	T			
C36	C4	T	JU6	F3	T	R14	F1	T	R56	F4	T			
C37	E4	B	JU7	F3	T	R15	C1	T						
C38	E4	B	JU8	F3	T	R16	A1	T	RV1	A1	T			
C39	E4	B				R17	A1	T						
C40	B4	T				R18	C2	T	TCXO1	C1	T			

DES - Designation
LC - Location
SD - Side
B - Bottom
T - Top

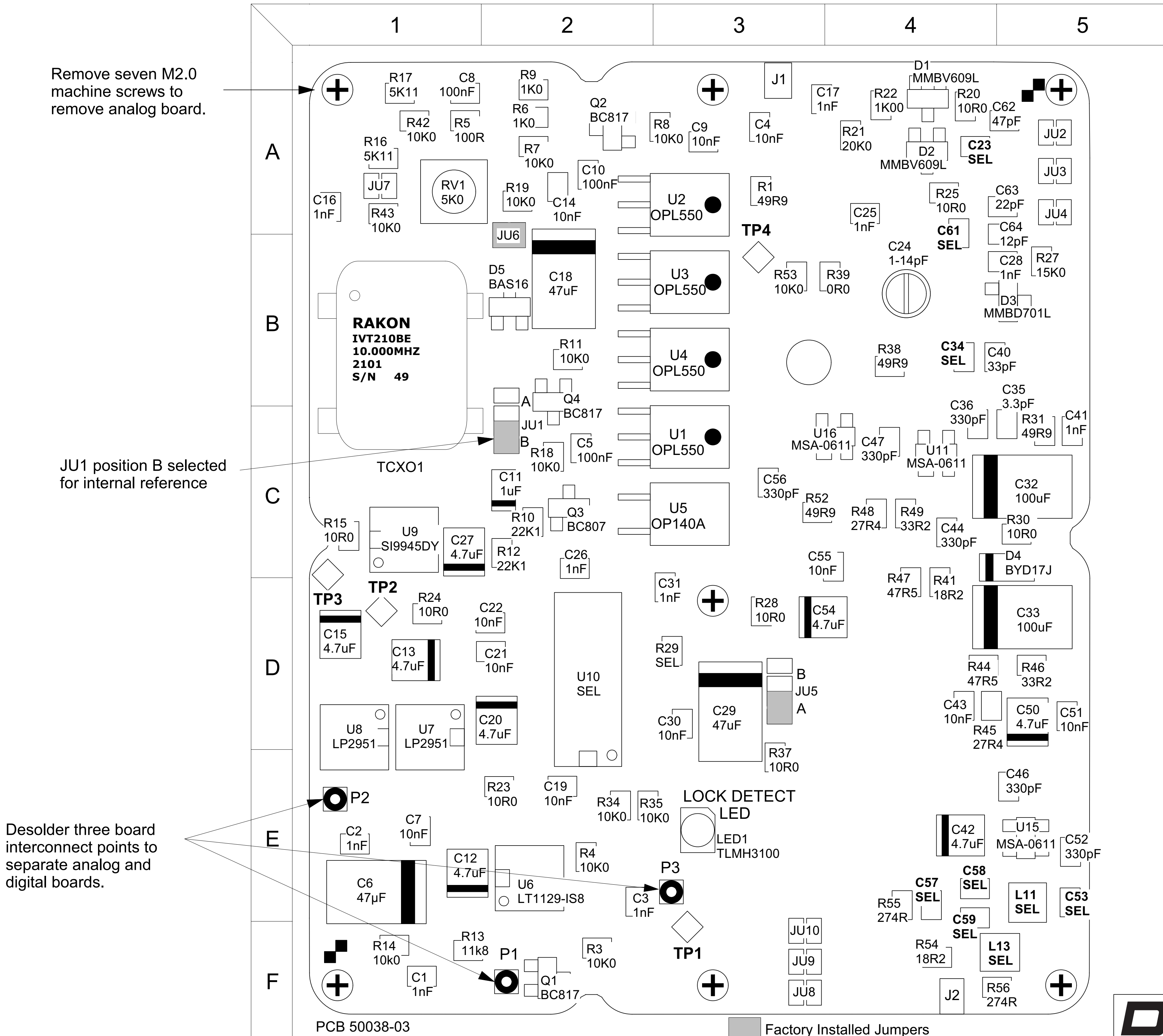
	TRANSMITTER		RECEIVER
DESIG.	TX 29 - 40 MHz OST - 3H035	TX 39 - 50 MHz OST - 3H045	RX 50.4 - 71.4 MHz OSR - 3H061
C48	68 nF Leads shorted (1016-4A683K63)	68 nF Leads shorted (1016-4A683K63)	Not Installed
L5	260 nH (1253-A1352603)	197 nH (1253-A1151971)	138 nH (1253-A0951389)



DANIELS ™ ELECTRONICS LTD.

TITLE: 29-71.4 MHz ANALOG BOARD BOARD LAYOUT - BOTTOM - EXTRA WIDEBAND	
DATE: 18 SEPT 02	BOARD NO: 50038-03
DWG No: AB-B-01-01	REV DATE: 25 APRIL 03

6.12 Synthesizer Analog Board Component Layout (Top) - Extra Wideband



DESIG.	TRANSMITTER		RECEIVER
	TX 29 - 40 MHz OST - 3H035	TX 39 - 50 MHz OST - 3H045	RX 50.4 - 71.4 MHz OSR - 3H061
C23	150 pF	68 pF	27 pF
C34	56 pF	47 pF	33 pF
C53	56 pF	56 pF	Not Installed
C57	15 pF	15 pF	68 pF
C58	33 pF	33 pF	68 pF
C59	33 pF	33 pF	100 pF
C61	150 pF	100 pF	56 pF
L11	100 nH	100 nH	120 nH
L13	100 nH	100 nH	120 nH
R29	See U10 Sel Table	See U10 Sel Table	See U10 Sel Table
U10	MC145191 or MC145192	MC145191, MC145192 or MC145193	MC145191, MC145192 or MC145193

U10 SELECT TABLE		
	MC145191F or MC145192F	MC145193F
R29	18k2	3k92

SELECT COMPONENTS		
	Rakon TCVCXO IVT210BE	Saronix TCVCXO S2045-9.6 MHz
JU7	Not installed	Installed

COMPONENT LOCATION TABLE

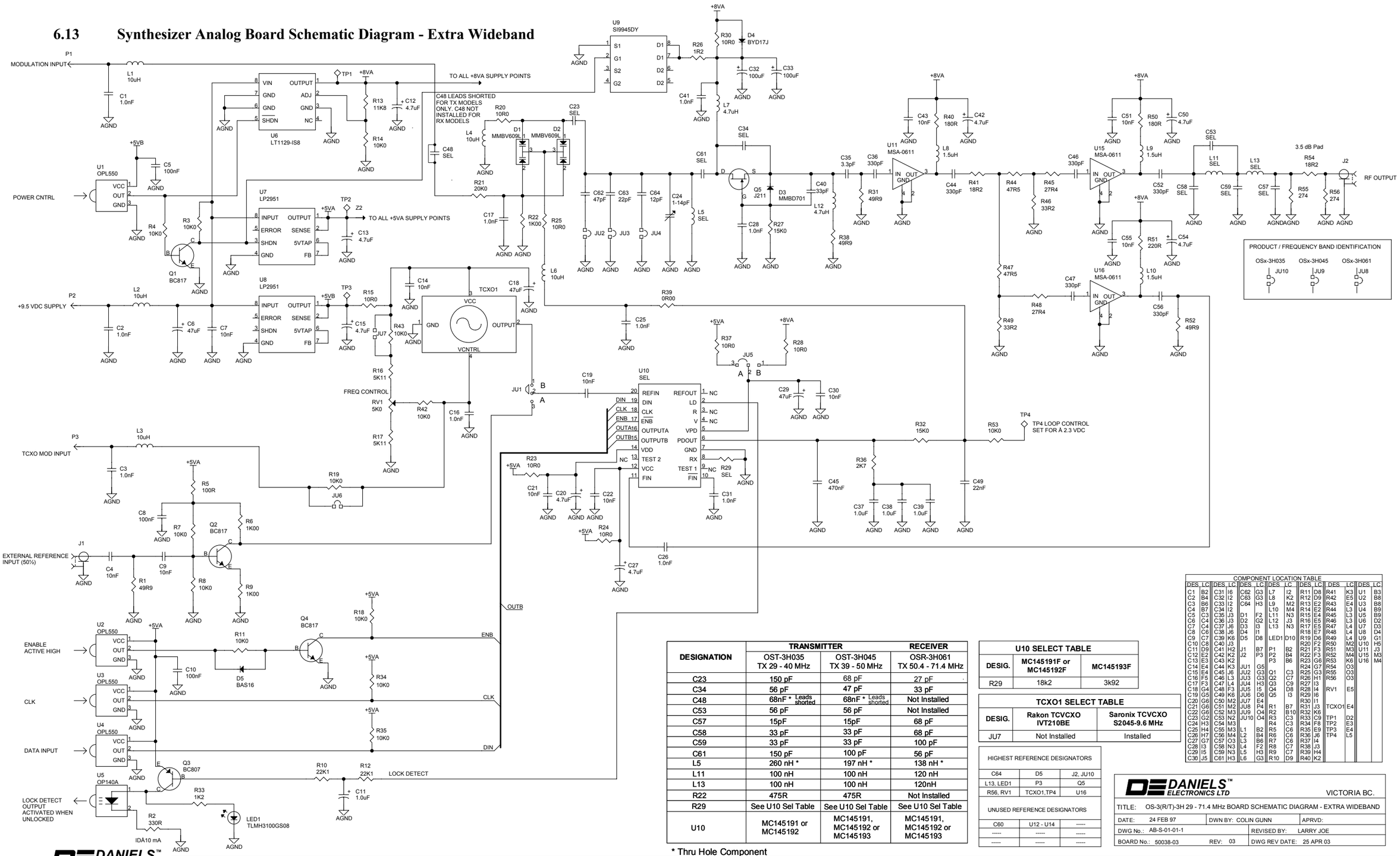
DES	LC	SD	DES	LC	SD	DES	LC	SD	DES	LC	SD	DES	LC	SD
C1	F1	T	C41	C5	T	L1	F2	B	R19	A2	T	TCXO1	C1	T
C2	E1	T	C42	E4	T	L2	E2	B	R20	A4	T			
C3	E2	T	C43	D4	T	L3	E2	B	R21	A4	T	TP1	F3	T
C4	A3	T	C44	C4	T	L4	A4	B	R22	A4	T	TP2	D1	T
C5	C2	T	C45	D4	B	L5	A5	B	R23	E2	T	TP3	C1	T
C6	E1	T	C46	E5	T	L6	A4	B	R24	D1	T	TP4	B3	T
C7	E1	T	C47	C4	T	L7	B5	B	R25	A4	T	U1	C3	T
C8	A1	T	C48	A3	B	L8	C4	B	R26	A3	B	U2	A3	T
C9	A3	T	C49	D3	B	L9	E5	B	R27	B5	T	U3	B3	T
C10	A2	T	C50	D5	T	L10	C3	B	R28	D3	T	U4	B3	T
C11	C2	T	C51	D5	T	L11	E5	T	R29	D3	T	U5	C3	T
C12	E1	T	C52	E5	T	L12	B5	B	R30	C5	T	U6	E2	T
C13	D1	T	C53	E5	T	L13	F4	T	R31	C5	T	U7	D1	T
C14	A2	T	C54	D3	T				R32	E3	B	U8	D1	T
C15	D1	T	C55	C4	T	LED1	E3	T	R33	E3	B	U9	C1	T
C16	A1	T	C56	C3	T				R34	E2	T	U10	E2	T
C17	A3	T	C57	E4	T	Q1	F2	T	R35	E2	T	U11	C4	T
C18	B2	T	C58	E4	T	Q2	A2	T	R36	E3	B	U15	E5	T
C19	E2	T	C59	E4	T	Q3	C2	T	R37	E3	T	U16	C4	T
C20	D2	T	C61	A4	T	Q4	B2	T	R38	B4	T			
C21	D2	T	C62	A5	T	Q5	B5	B	R39	B4	T			
C22	D2	T	C63	A5	T				R40	D4	B			
C23	A4	T	C64	B5	T	R1	A3	T	R41	D4	T			
C24	B4	B				R2	C2	B	R42	A1	T			
C25	A4	T	D1	A4	T	R3	F2	T	R43	A1	T			
C26	C2	T	D2	A4	T	R4	E2	T	R44	D4	T			
C27	C1	T	D3	B4	T	R5	A1	T	R45	D4	T			
C28	B5	T	D4	C5	T	R6	A2	T	R46	D5	T			
C29	D3	T	D5	B2	T	R7	A2	T	R47	D4	T			
C30	D3	T				R8	A3	T	R48	C4	T			
C31	D3	T	JU1	B2	T	R9	A2	T	R49	C4	T			
C32	C5	T	JU2	A5	T	R10	C2	T	R50	E5	B			
C33	D5	T	JU3	A5	T	R11	B2	T	R51	C3	B			
C34	B4	T	JU4	A5	T	R12	C2	T	R52	C3	T			
C35	C5	T	JU5	D3	T	R13	F1	T	R53	B3	T			
C36	C4	T	JU6	B2	T	R14	F1	T	R54	F4	T			
C37	E4	B	JU7	A1	T	R15	C1	T	R55	E4	T			
C38	E4	B	JU8	F3	T	R16	A1	T	R56	F4	T			
C39	E4	B	JU9	F3	T	R17	A1	T						
C40	B4	T	JU10	F3	T	R18	C2	T	RV1	A1	T			

DES - Designation
LC - Location
SD - Side
B - Bottom
T - Top

DANIELS ™ ELECTRONICS LTD.

TITLE: 29-71.4 MHz ANALOG BOARD BOARD LAYOUT - TOP - EXTRA WIDEBAND	
DATE: 18 SEPT 02	BOARD NO: 50038-03
DWG No: 01-T-01-01	REV DATE: 21 APRIL 03

6.13 Synthesizer Analog Board Schematic Diagram - Extra Wideband



DESIGNATION	TRANSMITTER		RECEIVER
	OST-3H035 TX 29 - 40 MHz	OST-3H045 TX 39 - 50 MHz	OSR-3H061 TX 50.4 - 71.4 MHz
C23	150 pF	68 pF	27 pF
C34	56 pF	47 pF	33 pF
C48	68nF * Leads shorted	68nF * Leads shorted	Not Installed
C53	56 pF	56 pF	Not Installed
C57	15pF	15pF	68 pF
C58	33 pF	33 pF	68 pF
C59	33 pF	33 pF	100 pF
C61	150 pF	100 pF	56 pF
L5	260 nH *	197 nH *	138 nH *
L11	100 nH	100 nH	120 nH
L13	100 nH	100 nH	120nH
R22	475R	475R	Not Installed
R29	See U10 Sel Table	See U10 Sel Table	See U10 Sel Table
U10	MC145191 or MC145192	MC145191, MC145192 or MC145193	MC145191, MC145192 or MC145193

* Thru Hole Component

U10 SELECT TABLE		
DESIG.	MC145191F or MC145192F	MC145193F
R29	18k2	3k92

TCXO1 SELECT TABLE		
DESIG.	Rakon TCVCXO IVT210BE	Saronix TCVCXO S2045-9.6 MHz
JU7	Not Installed	Installed

HIGHEST REFERENCE DESIGNATORS		
C64	D5	J2, JU10
L13, LED1	P3	Q5
R56, RV1	TCXO1,TP4	U16

UNUSED REFERENCE DESIGNATORS		
C60	U12 - U14	-----
-----	-----	-----
-----	-----	-----

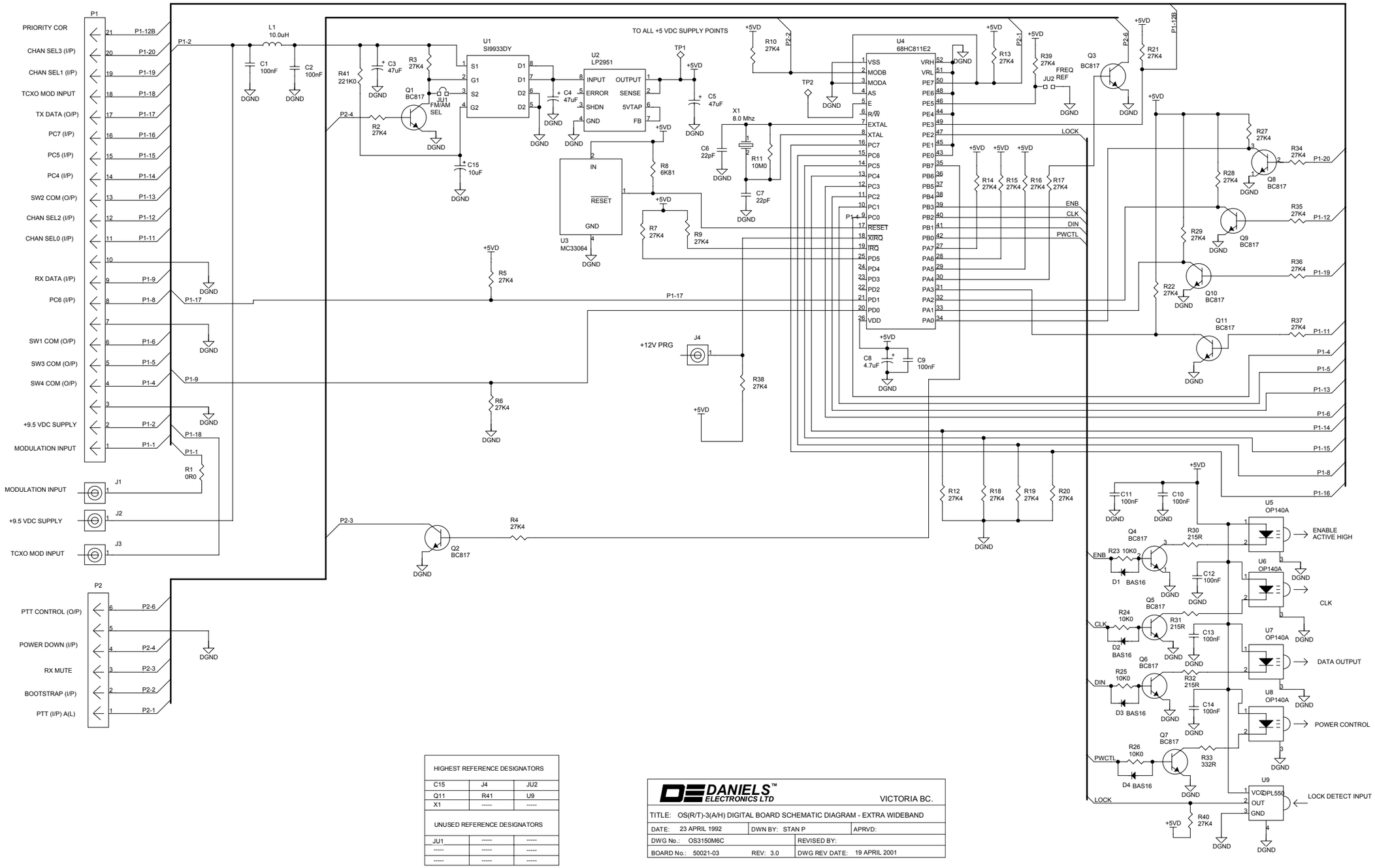
COMPONENT LOCATION TABLE

DES	LC	DES	LC	DES	LC	DES	LC	DES	LC	DES	LC	DES	LC	DES	LC	DES	LC
C1	B2	C31	I6	C62	G3	L7	I2	R11	D8	R41	K3	U1	B3				
C2	B4	C32	I2	C63	G3	L8	K2	R12	D9	R42	E5	U2	B8				
C3	B6	C33	I2	C64	H3	L9	M2	R13	E2	R43	E4	U3	B8				
C4	B7	C34	I2			L10	M4	R14	E2	R44	L3	U4	B9				
C5	C3	C35	J3	D1	F2	L11	N3	R15	E4	R45	L3	U5	B9				
C6	C4	C36	J3	D2	G2	L12	J3	R16	E5	R46	L3	U6	D2				
C7	C4	C37	J6	D3	I3	L13	N3	R17	E5	R47	L4	U7	D3				
C8	C6	C38	J6	D4	I1			R18	E7	R48	L4	U8	D4				
C9	C7	C39	K6	D5	D8	LED1	D10	R19	D6	R49	L4	U9	G1				
C10	C8	C40	J3					R20	F2	R50	M2	U10	H5				
C11	D9	C41	H2	J1	B7	P1	B2	R21	F3	R51	M3	U11	J3				
C12	E3	C42	K2	J2	P3	P2	B4	R22	F3	R52	M4	U15	M3				
C13	E3	C43	K2			P3	B6	R23	G6	R53	K6	U16	M4				
C14	E4	C44	K3	JU1	G5			R24	G7	R54	O3						
C15	E4	C45	J6	JU2	G3	Q1	C3	R25	G3	R55	O3						
C16	F5	C46	L3	JU3	G3	Q2	C7	R26	H1	R56	O3						
C17	F3	C47	L4	JU4	H3	Q3	C9	R27	I3								
C18	G4	C48	F3	JU5	I5	Q4	D8	R28	I4	RV1	E5						
C19	G5	C48	K6	JU6	D6	Q5	I3	R29	I6								
C20	G6	C50	M2	JU7	E4			R30	I1								
C21	G6	C51	M2	JU8	P4	R1	B7	R31	J3	TCXO1	E4						
C22	G6	C52	M3	JU9	O4	R2	B10	R32	K6								
C23	G2	C53	N2	JU10	O4	R3	C3	R33	C9	TP1	D2						
C24	H3	C54	M3			R4	C3	R34	F8	TP2	E3						
C25	H4	C55	M3	L1	B2	R5	C6	R35	E9	TP3	E4						
C26	H7	C56	M4	L2	B4	R6	C6	R36	J6	TP4	L5						
C27	G7	C57	O3	L3	B6	R7	C6	R37	I4								
C28	I3	C58	N3	L4	F2	R8	C7	R38	I3								
C29	I5	C59	N3	L5	H3	R9	C7	R39	H4								
C30	J5	C61	H3	L6	G3	R10	D9	R40	K2								

DANIELS™ ELECTRONICS LTD VICTORIA BC.

TITLE:	OS-3(R/T)-3H 29 - 71.4 MHz BOARD SCHEMATIC DIAGRAM - EXTRA WIDEBAND	
DATE: 24 FEB 97	DWN BY: COLIN GUNN	APRVD:
DWG No.: AB-S-01-01-1		REVISED BY: LARRY JOE
BOARD No.: 50038-03 REV: 03		DWG REV DATE: 25 APR 03

6.14 Synthesizer Digital Board Schematic Diagram - Extra Wideband

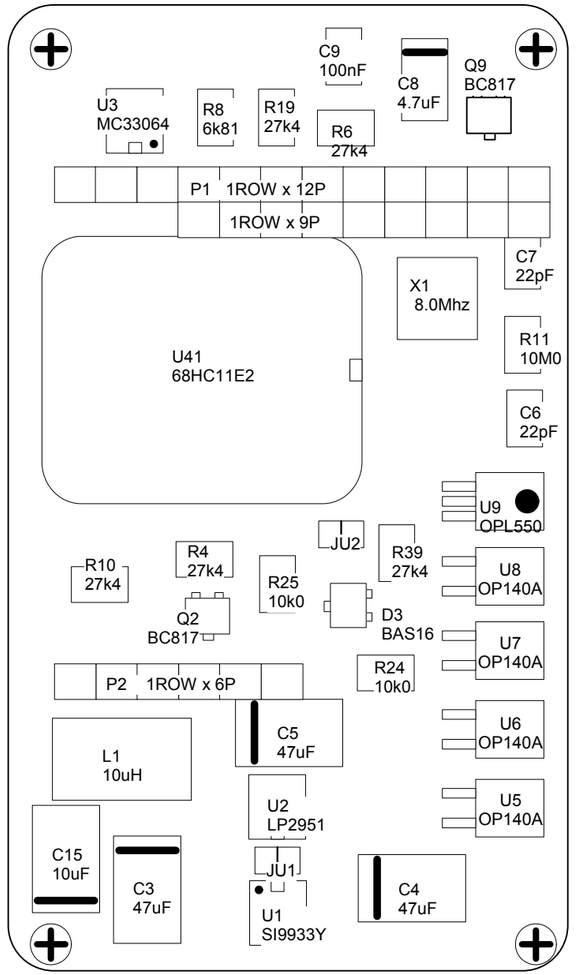


HIGHEST REFERENCE DESIGNATORS		
C15	J4	JU2
Q11	R41	U9
X1	-----	-----
UNUSED REFERENCE DESIGNATORS		
JU1	-----	-----
-----	-----	-----
-----	-----	-----

DANIELS™ ELECTRONICS LTD VICTORIA BC.

TITLE: OS(R/T)-3(A/H) DIGITAL BOARD SCHEMATIC DIAGRAM - EXTRA WIDEBAND		
DATE: 23 APRIL 1992	DWN BY: STAN P	APRVD:
DWG No.: OS3150M6C	REVISED BY:	
BOARD No.: 50021-03 REV: 3.0	DWG REV DATE: 19 APRIL 2001	

6.15 Synthesizer Digital Board Component Layout (Bottom) - Extra Wideband

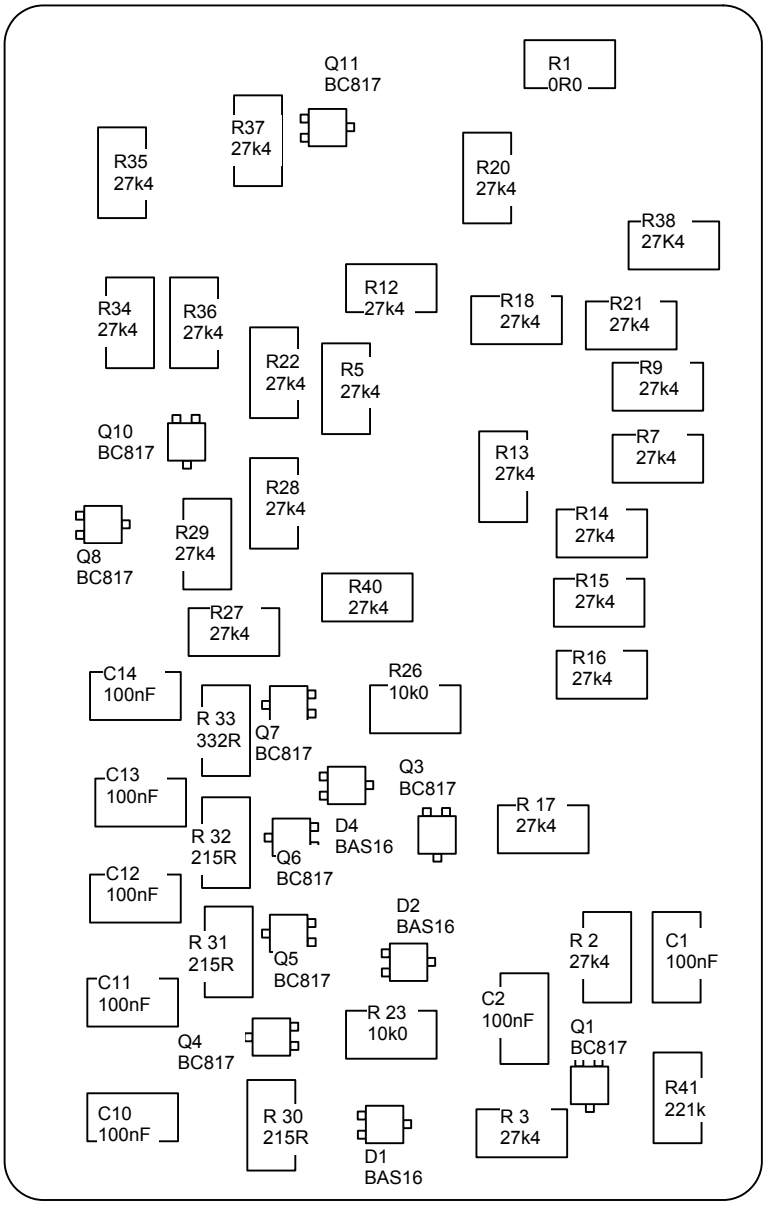


PCB 50021-03 OS3150M4A

	OSx-3H 29-470 MHz	OSx-3A 118-159.6 MHz
JU1	NOT INSTALLED	INSTALLED

	9.6 MHz REFERENCE	10 MHz REFERENCE
JU2	NOT INSTALLED	INSTALLED

6.16 Synthesizer Digital Board Component Layout (Top) - Extra Wideband



PCB 50021-03 OS3150M5B

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7 PARTS LISTS

7.1 Electrical Parts Lists

7.1.1 21.4 MHz IF/Audio Main Board

Ref. Desg.	Description	Part Numbers	VT-3H035-SWA	VT-3H045-SWA
C1	CAP., 100uF DIP. TANT.,20%,20V	1054-7M107M20	●	●
C2	CAP., SM, 10nF CER., 1206, X7R	1008-4B103K5R	●	●
C3	CAP., SM, 100nF CER., 1206,X7R	1008-5B104K5R	●	●
C4	CAP., SM, 10nF CER., 1206, X7R	1008-4B103K5R	●	●
C5	CAP., SM, 47uF TANT., 20%, 16V	1055-6D476M16	●	●
C6	CAP., SM, 10nF CER., 1206, X7R	1008-4B103K5R	●	●
C7	CAP., SM, 1nF CER., 1206, C0G	1008-3B102K1G	●	●
C8	CAP., SM, 10uF TANT., 20%, 16V	1055-6C106M16	●	●
C9	CAP., SM, 100nF CER., 1206,X7R	1008-5B104K5R	●	●
C10	CAP., SM, 10uF TANT., 20%, 16V	1055-6C106M16	●	●
C11	CAP., SM, 100nF CER., 1206,X7R	1008-5B104K5R	●	●
C12	CAP., SM, 100nF CER., 1206,X7R	1008-5B104K5R	●	●
C13	CAP., SM, 4.7uF TANT., 10%,16V	1055-5B475K16	●	●
C14	CAP., SM, 10nF CER., 1206, X7R	1008-4B103K5R	●	●
C15	CAP., SM, 82pF CER., 0805, C0G	1008-1A820J1G	●	●
C16	CAP., SM, 22pF CER., 0805, C0G	1008-1A220J1G	●	●
C17	CAP., SM TRIMMER, 2.5-10pF	1088-1A2R510R	●	●
C18	CAP., SM, 6.8pF CER., 0805,C0G	1008-0A689J1G	●	●
C19	CAP., SM TRIMMER, 0.6-2.5pF	1088-1A0R62R5	●	●
C20	CAP., SM, 10nF CER., 1206, X7R	1008-4B103K5R	●	●
C21	CAP., SM, 100nF CER., 1206,X7R	1008-5B104K5R	●	●
C22	CAP., SM, 4.7uF TANT., 10%,16V	1055-5B475K16	●	●
C23	CAP., SM, 10nF CER., 1206, X7R	1008-4B103K5R	●	●
C24	CAP., SM, 10nF CER., 1206, X7R	1008-4B103K5R	●	●
C25	CAP., SM, 56pF CER., 0805, C0G	1008-1A560J1G	●	●
C26	CAP., SM, 22pF CER., 0805, C0G	1008-1A220J1G	●	●
C27	CAP., SM TRIMMER, 2.5-10pF	1088-1A2R510R	●	●
C28	CAP., SM, 6.8pF CER., 0805,C0G	1008-0A689J1G	●	●
C29	CAP., SM TRIMMER, 2.5-10pF	1088-1A2R510R	●	●
C30	CAP., SM, 10nF CER., 1206, X7R	1008-4B103K5R	●	●
C31	CAP., SM, 10nF CER., 1206, X7R	1008-4B103K5R	●	●
C32	CAP., SM, 100nF CER., 1206,X7R	1008-5B104K5R	●	●
C33	CAP., SM, 4.7uF TANT., 10%,16V	1055-5B475K16	●	●
C34	CAP., SM, 100nF CER., 1206,X7R	1008-5B104K5R	●	●
C35	CAP., SM, 100nF CER., 1206,X7R	1008-5B104K5R	●	●
C37	CAP., SM, 100nF CER., 1206,X7R	1008-5B104K5R	●	●
C38	CAP., SM, 100nF CER., 1206,X7R	1008-5B104K5R	●	●
C39	CAP., SM, 100nF CER., 1206,X7R	1008-5B104K5R	●	●
C40	CAP., SM, 4.7uF TANT., 10%,16V	1055-5B475K16	●	●

Ref. Desg.	Description	Part Numbers	VT-3H035-SWA	VT-3H045-SWA
C41	CAP., SM, 100nF CER., 1206,X7R	1008-5B104K5R	●	●
C42	CAP., SM, 100nF CER., 1206,X7R	1008-5B104K5R	●	●
C43	CAP., SM, 100pF CER., 0805,C0G	1008-2A101J1G	●	●
C44	CAP., SM, 47pF CER., 0805, C0G	1008-1A470J1G	●	●
C45	CAP., SM, 10nF CER., 1206, X7R	1008-4B103K5R	●	●
C46	CAP., SM, 100nF CER., 1206,X7R	1008-5B104K5R	●	●
C47	CAP., SM, 100nF CER., 1206,X7R	1008-5B104K5R	●	●
C48	CAP., SM,1.0uF,CER/2225,50,X7R	1008-6H105J5R	●	●
C49	CAP., 1nF FILM, MMK5, 10%, 63V	1016-3A102K63	●	●
C50	CAP., SM, 100nF CER., 1206,X7R	1008-5B104K5R	●	●
C51	CAP., SM, 33pF CER., 0805, C0G	1008-1A330J1G	●	●
C52	CAP., SM, 4.7uF TANT., 10%,16V	1055-5B475K16	●	●
C53	CAP., SM, 100nF CER., 1206,X7R	1008-5B104K5R	●	●
C54	CAP., SM,1.0uF,CER/2225,50,X7R	1008-6H105J5R	●	●
C55	CAP., 10nF FILM, MMK5, 10%,63V	1016-4A103K63	●	●
C56	CAP., 68nF FILM, MMK5, 10%,63V	1016-4A683K63	●	●
C57	CAP., SM, 4.7uF TANT., 10%,16V	1055-5B475K16	●	●
C58	CAP., SM, 100nF CER., 1206,X7R	1008-5B104K5R	●	●
C59	CAP., 10nF FILM, MMK5, 10%,63V	1016-4A103K63	●	●
C60	CAP., 10nF FILM, MMK5, 10%,63V	1016-4A103K63	●	●
C61	CAP., 22nF FILM, MMK5, 10%,63V	1016-4A223K63	●	●
C62	CAP., 22nF FILM, MMK5, 10%,63V	1016-4A223K63	●	●
C63	CAP., 22nF FILM, MMK5, 10%,63V	1016-4A223K63	●	●
C64	CAP., SM, 100nF CER., 1206,X7R	1008-5B104K5R	●	●
C65	CAP., 22nF FILM, MMK5, 10%,63V	1016-4A223K63	●	●
C66	CAP., 22nF FILM, MMK5, 10%,63V	1016-4A223K63	●	●
C67	CAP., 22nF FILM, MMK5, 10%,63V	1016-4A223K63	●	●
C68	CAP., SM, 100nF CER., 1206,X7R	1008-5B104K5R	●	●
C69	CAP., 22nF FILM, MMK5, 10%,63V	1016-4A223K63	●	●
C70	CAP., 22nF FILM, MMK5, 10%,63V	1016-4A223K63	●	●
C71	CAP., 22nF FILM, MMK5, 10%,63V	1016-4A223K63	●	●
C72	CAP., SM, 100nF CER., 1206,X7R	1008-5B104K5R	●	●
C73	CAP., 100nF FILM, MMK5,10%,63V	1016-5A104K63	●	●
C74	CAP., SM, 100nF CER., 1206,X7R	1008-5B104K5R	●	●
C75	CAP., SM, 68pF CER., 0805, C0G	1008-1A680J1G	●	●
C76	CAP., SM, 4.7uF TANT., 10%,16V	1055-5B475K16	●	●
C77	CAP., SM, 100nF CER., 1206,X7R	1008-5B104K5R	●	●
C78	CAP., SM, 4.7uF TANT., 10%,16V	1055-5B475K16	●	●
C79	CAP., SM, 100nF CER., 1206,X7R	1008-5B104K5R	●	●
C80	CAP., SM,1.0uF,CER/2225,50,X7R	1008-6H105J5R	●	●
C81	CAP., 100nF FILM, MMK5,10%,63V	1016-5A104K63	●	●
C82	CAP., SM, 100nF CER., 1206,X7R	1008-5B104K5R	●	●
C83	CAP., SM, 33pF CER., 0805, C0G	1008-1A330J1G	●	●
C84	CAP., SM, 4.7uF TANT., 10%,16V	1055-5B475K16	●	●

Ref. Desg.	Description	Part Numbers	VT-3H035-SWA	VT-3H045-SWA
C85	CAP., SM, 100nF CER., 1206,X7R	1008-5B104K5R	●	●
C86	CAP., SM, 4.7uF TANT., 10%,16V	1055-5B475K16	●	●
C87	CAP., SM, 4.7uF TANT., 10%,16V	1055-5B475K16	●	●
C88	CAP., SM, 100nF CER., 1206,X7R	1008-5B104K5R	●	●
C89	CAP., SM,1.0uF,CER/2225,50,X7R	1008-6H105J5R	●	●
C90	CAP., SM, 100nF CER., 1206,X7R	1008-5B104K5R	●	●
C91	CAP., SM, 33pF CER., 0805, C0G	1008-1A330J1G	●	●
C92	CAP., SM, 4.7uF TANT., 10%,16V	1055-5B475K16	●	●
C93	CAP., SM, 100nF CER., 1206,X7R	1008-5B104K5R	●	●
C94	CAP., 100uF DIP. TANT.,20%,20V	1054-7M107M20	●	●
C95	CAP., SM,1.0uF,CER/2225,50,X7R	1008-6H105J5R	●	●
C96	CAP., SM, 4.7uF TANT., 10%,16V	1055-5B475K16	●	●
C97	CAP., SM, 100nF CER., 1206,X7R	1008-5B104K5R	●	●
C99	CAP., 100uF DIP. TANT.,20%,20V	1054-7M107M20	●	●
C100	CAP., SM, 100nF CER., 1206,X7R	1008-5B104K5R	●	●
C101	CAP., SM,1.0uF,CER/2225,50,X7R	1008-6H105J5R	●	●
C102	CAP., SM, 100nF CER., 1206,X7R	1008-5B104K5R	●	●
C103	CAP., SM, 33pF CER., 0805, C0G	1008-1A330J1G	●	●
C104	CAP., 100uF DIP. TANT.,20%,20V	1054-7M107M20	●	●
C105	CAP., SM, 680pF CER., 1206,C0G	1008-2B681J1G	●	●
C106	CAP., 820pF FILM, KP, 1%, 400V	1018-2A8201FD	●	●
C107	CAP., 470pF FILM, KP, 1%, 630V	1018-2A4701FE	●	●
C108	CAP., 820pF FILM, KP, 1%, 400V	1018-2A8201FD	●	●
C109	CAP., SM, 100nF CER., 1206,X7R	1008-5B104K5R	●	●
C110	CAP., SM, 6.8pF CER., 0805,C0G	1008-0A689J1G	●	●
C111	CAP., SM, 4.7uF TANT., 10%,16V	1055-5B475K16	●	●
C112	CAP., SM, 100nF CER., 1206,X7R	1008-5B104K5R	●	●
C113	CAP., 4.7nF FILM, MMK5,10%,63V	1016-3A472K63	●	●
C114	CAP., 330nF FILM, MMK5,10%,50V	1016-5B334K50	●	●
C115	CAP., SM, 4.7uF TANT., 10%,16V	1055-5B475K16	●	●
C116	CAP., 330nF FILM, MMK5,10%,50V	1016-5B334K50	●	●
C117	CAP., 330nF FILM, MMK5,10%,50V	1016-5B334K50	●	●
C118	CAP., SM, 4.7uF TANT., 10%,16V	1055-5B475K16	●	●
C119	CAP., SM, 100nF CER., 1206,X7R	1008-5B104K5R	●	●
C120	CAP., SM, 100nF CER., 1206,X7R	1008-5B104K5R	●	●
C121	CAP., SM, 4.7uF TANT., 10%,16V	1055-5B475K16	●	●
C122	CAP., SM, 100nF CER., 1206,X7R	1008-5B104K5R	●	●
C123	CAP., SM, 4.7uF TANT., 10%,16V	1055-5B475K16	●	●
C124	CAP., SM, 100nF CER., 1206,X7R	1008-5B104K5R	●	●
C125	CAP., SM, 100nF CER., 1206,X7R	1008-5B104K5R	●	●
C127	CAP., SM, 6.8pF CER., 0805,C0G	1008-0A689J1G	●	●
C128	CAP., SM, 10nF CER., 1206, X7R	1008-4B103K5R	●	●
C130	CAP.,TRIM. 5-65pF, YELLOW 250V	1081-B5R065Q2	●	●

Ref. Desg.	Description	Part Numbers	VT-3H035-SWA	VT-3H045-SWA
C132	CAP., SM, 120pF CER., 1206,C0G	1008-2B121J1G	●	●
C133	CAP., SM, 100nF CER., 1206,X7R	1008-5B104K5R	●	●
C134	CAP., SM, 100nF CER., 1206,X7R	1008-5B104K5R	●	●
C135	CAP., SM, 22pF CER., 0805, C0G	1008-1A220J1G	●	●
C137	CAP., SM, 120pF CER., 1206,C0G	1008-2B121J1G	●	●
C139	CAP., SM, 100nF CER., 1206,X7R	1008-5B104K5R	●	●
C140	CAP., SM, 2.2uF TANT., 10%,20V	1055-5B225K20	●	●
CF1	FILTER,CF/BP,455kHz,+-10,6ELEM	1340-500C455D	●	●
D1	DIODE, BYD17J, RECTIFIER,SOD87	2101-BYD17J00	●	●
D2	DIODE, BAS16, SWITCHING, SOT23	2100-BAS16000	●	●
D3	DIODE, BAS16, SWITCHING, SOT23	2100-BAS16000	●	●
D4	DIODE, BAS16, SWITCHING, SOT23	2100-BAS16000	●	●
D5	DIODE, BAS16, SWITCHING, SOT23	2100-BAS16000	●	●
D6	DIODE, BYD17J, RECTIFIER,SOD87	2101-BYD17J00	●	●
D7	DIODE, BYD17J, RECTIFIER,SOD87	2101-BYD17J00	●	●
D8	DIODE, BAS16, SWITCHING, SOT23	2100-BAS16000	●	●
D9	DIODE, MBZ5233B,6.0V ZEN.SOT23	2102-MBZ5233B	●	●
D10	DIODE, BAS16, SWITCHING, SOT23	2100-BAS16000	●	●
D11	DIODE, BAS16, SWITCHING, SOT23	2100-BAS16000	●	●
D12	DIODE, MBZ5233B,6.0V ZEN.SOT23	2102-MBZ5233B	●	●
D13	DIODE, BAS16, SWITCHING, SOT23	2100-BAS16000	●	●
D14	DIODE, BAS16, SWITCHING, SOT23	2100-BAS16000	●	●
D15	DIODE, BAS16, SWITCHING, SOT23	2100-BAS16000	●	●
FB1	FERRITE BEAD, SM,43MIX,.18x.12	1213-43181200	●	●
L1	INDUCTOR, SM, 680nH, 10%, 1812	1255-2GR6800M	●	●
L2	INDUCT/VAR., 1.5-2.0uH,SHIELD.	1262-113C017S	●	●
L3	INDUCT./TOROID,26T,28AWG,T37-6	1290-84260028	●	●
L4	INDUCT./TOROID,40T,28AWG,T37-6	1290-84400028	●	●
L5	INDUCTOR/VAR., 440-1143uH,SHLD	1262-115F790S	●	●
L7	INDUCTOR, AUD. 150mH,FERR/CORE	1242-8RPC154K	●	●
L8	INDUCTOR, AUD. 150mH,FERR/CORE	1242-8RPC154K	●	●
PCB	PCB, IF/AUDIO,MT-3 FM RECEIVER	4311-10910719	●	●
Q1	MOSFET, 2SK302Y, RF AMP.,SOT23	2143-2SK302Y0	●	●
Q2	TRANSISTOR, BC807-25,PNP,SOT23	2120-BC807025	●	●
Q3	TRANSISTOR, BC807-25,PNP,SOT23	2120-BC807025	●	●
Q4	TRANSISTOR, BC817-25,NPN,SOT23	2120-BC817025	●	●
Q5	MOSFET, D15N06V, N-CHAN., DPAK	2144-D15N06V0	●	●
Q6	TRANSISTOR, BC817-25,NPN,SOT23	2120-BC817025	●	●
Q7	MOSFET, D15N06V, N-CHAN., DPAK	2144-D15N06V0	●	●
Q8	TRANSISTOR, BC807-25,PNP,SOT23	2120-BC807025	●	●
Q9	TRANSISTOR, BC817-25,NPN,SOT23	2120-BC817025	●	●
Q10	TRANSISTOR, BC807-25,PNP,SOT23	2120-BC807025	●	●
Q11	TRANSISTOR, BC807-25,PNP,SOT23	2120-BC807025	●	●
Q12	TRANSISTOR, BC817-25,NPN,SOT23	2120-BC817025	●	●

Ref. Desg.	Description	Part Numbers	VT-3H035-SWA	VT-3H045-SWA
R1	RES., SM, 38K3 1206, 1%,100ppm	1150-4B3832FP	●	●
R2	RES., SM, 10K0 1206, 1%,100ppm	1150-4B1002FP	●	●
R3	RES., SM, 49K9 1206, 1%,100ppm	1150-4B4992FP	●	●
R4	RES., SM, 49K9 1206, 1%,100ppm	1150-4B4992FP	●	●
R5	RES., SM, 1K00 1206, 1%,100ppm	1150-3B1001FP	●	●
R6	RES., SM, ZERO OHM JUMPER,1206	1150-0B0R0000	●	●
R9	RES., SM, 100R 1206, 1%,100ppm	1150-2B1000FP	●	●
R10	RES., SM, 100R 1206, 1%,100ppm	1150-2B1000FP	●	●
R11	RES., SM, 100R 1206, 1%,100ppm	1150-2B1000FP	●	●
R12	RES., SM, 22K6 1206, 1%,100ppm	1150-4B2262FP	●	●
R13	POT.,SM/4mmSQ,20K,MULT/TRN,TOP	1174-DM3203W0	●	●
R14	RES., SM, 1K50 1206, 1%,100ppm	1150-3B1501FP	●	●
R15	RES., SM, 475R 1206, 1%,100ppm	1150-2B4750FP	●	●
R16	RES., SM, 33K2 1206, 1%,100ppm	1150-4B3322FP	●	●
R17	RES., SM, 82K5 1206, 1%,100ppm	1150-4B8252FP	●	●
R18	RES., SM, 49K9 1206, 1%,100ppm	1150-4B4992FP	●	●
R19	RES., SM, 49K9 1206, 1%,100ppm	1150-4B4992FP	●	●
R20	RES., SM, 68K1 1206, 1%,100ppm	1150-4B6812FP	●	●
R21	RES., SM, 49K9 1206, 1%,100ppm	1150-4B4992FP	●	●
R22	RES., SM, 1K00 1206, 1%,100ppm	1150-3B1001FP	●	●
R23	RES., SM, 49K9 1206, 1%,100ppm	1150-4B4992FP	●	●
R24	RES., SM, 49K9 1206, 1%,100ppm	1150-4B4992FP	●	●
R25	RES., SM, 1K00 1206, 1%,100ppm	1150-3B1001FP	●	●
R26	RES., SM, 22K6 1206, 1%,100ppm	1150-4B2262FP	●	●
R27	RES., SM, 22K6 1206, 1%,100ppm	1150-4B2262FP	●	●
R28	RES., SM, 22K6 1206, 1%,100ppm	1150-4B2262FP	●	●
R29	RES., SM, 187K 1206, 1%,100ppm	1150-5B1873FP	●	●
R30	RES., SM, 1K00 1206, 1%,100ppm	1150-3B1001FP	●	●
R31	RES., SM, 24K3 1206, 1%,100ppm	1150-4B2432FP	●	●
R32	RES., SM, 24K3 1206, 1%,100ppm	1150-4B2432FP	●	●
R33	RES., SM, 63K4 1206, 1%,100ppm	1150-4B6342FP	●	●
R34	RES., SM, 63K4 1206, 1%,100ppm	1150-4B6342FP	●	●
R35	RES., SM, 1K00 1206, 1%,100ppm	1150-3B1001FP	●	●
R36	RES., SM, 1K00 1206, 1%,100ppm	1150-3B1001FP	●	●
R37	RES., SM, 15K4 1206, 1%,100ppm	1150-4B1542FP	●	●
R38	RES., SM, 37K4 1206, 1%,100ppm	1150-4B3742FP	●	●
R39	RES., SM, 22K6 1206, 1%,100ppm	1150-4B2262FP	●	●
R40	RES., SM, 22K6 1206, 1%,100ppm	1150-4B2262FP	●	●
R41	RES., SM, 11K3 1206, 1%,100ppm	1150-4B1132FP	●	●
R42	RES., SM, 51K1 1206, 1%,100ppm	1150-4B5112FP	●	●
R43	RES., SM, 22K6 1206, 1%,100ppm	1150-4B2262FP	●	●
R44	RES., SM, 22K6 1206, 1%,100ppm	1150-4B2262FP	●	●
R45	RES., SM, 4K12 1206, 1%,100ppm	1150-3B4121FP	●	●

Ref. Desg.	Description	Part Numbers	VT-3H035-SWA	VT-3H045-SWA
R46	RES., SM, 137K 1206, 1%,100ppm	1150-5B1373FP	●	●
R47	RES., SM, 22K6 1206, 1%,100ppm	1150-4B2262FP	●	●
R48	RES., SM, 22K6 1206, 1%,100ppm	1150-4B2262FP	●	●
R49	RES., SM, 51K1 1206, 1%,100ppm	1150-4B5112FP	●	●
R50	RES., SM, 51K1 1206, 1%,100ppm	1150-4B5112FP	●	●
R51	RES., SM, 22K6 1206, 1%,100ppm	1150-4B2262FP	●	●
R52	RES., SM, 22K6 1206, 1%,100ppm	1150-4B2262FP	●	●
R53	RES., SM, 39K2 1206, 1%,100ppm	1150-4B3922FP	●	●
R54	RES., SM, 39K2 1206, 1%,100ppm	1150-4B3922FP	●	●
R55	RES., SM, 22K6 1206, 1%,100ppm	1150-4B2262FP	●	●
R56	RES., SM, 187K 1206, 1%,100ppm	1150-5B1873FP	●	●
R57	RES., SM, 13K0 1206, 1%,100ppm	1150-4B1302FP	●	●
R58	POT.,SM/4mmSQ,50K,MULT/TRN,TOP	1174-DM3503W0	●	●
R59	RES., SM, 22K6 1206, 1%,100ppm	1150-4B2262FP	●	●
R60	RES., SM, 4K75 1206, 1%,100ppm	1150-3B4751FP	●	●
R61	RES., SM, 100K 1206, 1%,100ppm	1150-5B1003FP	●	●
R62	RES., SM, 475R 1206, 1%,100ppm	1150-2B4750FP	●	●
R63	RES., SM, 475R 1206, 1%,100ppm	1150-2B4750FP	●	●
R64	POT.,SM/4mmSQ,50K,MULT/TRN,TOP	1174-DM3503W0	●	●
R65	RES., SM, 13K0 1206, 1%,100ppm	1150-4B1302FP	●	●
R66	POT.,SM/4mmSQ,50K,MULT/TRN,TOP	1174-DM3503W0	●	●
R67	RES., SM, 4K75 1206, 1%,100ppm	1150-3B4751FP	●	●
R68	RES., SM, 22K6 1206, 1%,100ppm	1150-4B2262FP	●	●
R69	RES., SM, 15K4 1206, 1%,100ppm	1150-4B1542FP	●	●
R70	RES., SM, 475R 1206, 1%,100ppm	1150-2B4750FP	●	●
R71	RES., SM, ZERO OHM JUMPER,1206	1150-0B0R0000	●	●
R72	RES., SM, 49K9 1206, 1%,100ppm	1150-4B4992FP	●	●
R73	RES., SM, 49K9 1206, 1%,100ppm	1150-4B4992FP	●	●
R74	RES., SM, 100K 1206, 1%,100ppm	1150-5B1003FP	●	●
R75	RES., SM, 866R 1206, 1%,100ppm	1150-2B8660FP	●	●
R76	RES., SM, 10K0 1206, 1%,100ppm	1150-4B1002FP	●	●
R77	RES., SM, 4K75 1206, 1%,100ppm	1150-3B4751FP	●	●
R78	RES., SM, 4K75 1206, 1%,100ppm	1150-3B4751FP	●	●
R79	RES., SM, 10K0 1206, 1%,100ppm	1150-4B1002FP	●	●
R80	RES., SM, 22K6 1206, 1%,100ppm	1150-4B2262FP	●	●
R81	RES., SM, 22K6 1206, 1%,100ppm	1150-4B2262FP	●	●
R82	THERMISTOR, 10K, NTC,10%,AXIAL	1180-4RDG103K	●	●
R83	RES., SM, 10K0 1206, 1%,100ppm	1150-4B1002FP	●	●
R84	RES., SM, 681R 1206, 1%,100ppm	1150-2B6810FP	●	●
R85	RES., SM, 49K9 1206, 1%,100ppm	1150-4B4992FP	●	●
R86	RES., SM, 22K6 1206, 1%,100ppm	1150-4B2262FP	●	●
R87	RES., SM, 51K1 1206, 1%,100ppm	1150-4B5112FP	●	●
R88	POT.,SM/4mmSQ,50K,MULT/TRN,TOP	1174-DM3503W0	●	●
R89	RES., SM, 10K0 1206, 1%,100ppm	1150-4B1002FP	●	●

Ref. Desg.	Description	Part Numbers	VT-3H035-SWA	VT-3H045-SWA
R90	RES., SM, 10K0 1206, 1%,100ppm	1150-4B1002FP	●	●
R91	RES., SM, 10K0 1206, 1%,100ppm	1150-4B1002FP	●	●
R92	RES., SM, 100K 1206, 1%,100ppm	1150-5B1003FP	●	●
R93	RES., SM, 100R 1206, 1%,100ppm	1150-2B1000FP	●	●
R94	RES., SM, 22K6 1206, 1%,100ppm	1150-4B2262FP	●	●
R95	RES., SM, 10K0 1206, 1%,100ppm	1150-4B1002FP	●	●
R96	RES., SM, 10K0 1206, 1%,100ppm	1150-4B1002FP	●	●
R98	RES., SM, 100K 1206, 1%,100ppm	1150-5B1003FP	●	●
R99	RES., SM, 4K75 1206, 1%,100ppm	1150-3B4751FP	●	●
R100	RES., SM, 4K75 1206, 1%,100ppm	1150-3B4751FP	●	●
R101	RES., SM, 10K0 1206, 1%,100ppm	1150-4B1002FP	●	●
R102	RES., SM, 10K0 1206, 1%,100ppm	1150-4B1002FP	●	●
R103	RES., SM, 10K0 1206, 1%,100ppm	1150-4B1002FP	●	●
R104	RES., SM, 10K0 1206, 1%,100ppm	1150-4B1002FP	●	●
R105	RES., SM, 100K 1206, 1%,100ppm	1150-5B1003FP	●	●
R106	RES., SM, 10K0 1206, 1%,100ppm	1150-4B1002FP	●	●
R107	RES., SM, 10K0 1206, 1%,100ppm	1150-4B1002FP	●	●
R115	POT.,SM/4mmSQ,50K,MULT/TRN,TOP	1174-DM3503W0	●	●
RFC30	FILTER, SM, EM1/LPF, 360pF,FER	1306-T361F2D5	●	●
RLY1	RELAY, 9VDC, 2 FORM C,PCB MNT.	5310-2C09P005	●	●
T1	TRANSFORMER, AUDIO,600R,1:1	1280-600P6005	●	●
U1	IC, LP2951,PROG. VOLT REG,SO-8	2305-29510N08	●	●
U2	IC, MC3371, FM RX W/RSSI,SO-16	2351-33710N16	●	●
U3	IC, MC33172, DUAL OP AMP, SO-8	2302-33172N08	●	●
U4	IC, MC33172, DUAL OP AMP, SO-8	2302-33172N08	●	●
U5	IC, MC33172, DUAL OP AMP, SO-8	2302-33172N08	●	●
U6	IC, MC33172, DUAL OP AMP, SO-8	2302-33172N08	●	●
U7	IC, 4066, QUAD ANLG. SW, SO-14	2375-40660N14	●	●
U8	IC, MC33172, DUAL OP AMP, SO-8	2302-33172N08	●	●
U9	IC, LM386, L/V AUDIO AMP.,SO-8	2323-386M1N08	●	●
U10	IC, MMAD1108,8 DIODE/ARY.,SO16	2331-11080N16	●	●
U11	IC, MMAD1108,8 DIODE/ARY.,SO16	2331-11080N16	●	●
U12	IC,ICL7660S,VOLT. CONVTR.,SO-8	2312-10440N08	●	●
U13	IC, MC33172, DUAL OP AMP, SO-8	2302-33172N08	●	●
U14	IC, AD736J,RMS-DC CONVTR.,SO-8	2314-73600N08	●	●
U15	IC, LM285-2.5,2.5VDC REF.,SO-8	2306-28525N08	●	●
U16	IC, MC33172, DUAL OP AMP, SO-8	2302-33172N08	●	●
U17	IC, MOC223, OPTOCOUPLER, SO-8	2335-22300N08	●	●
U18	IC, MC33172, DUAL OP AMP, SO-8	2302-33172N08	●	●
U19	IC, MC33172, DUAL OP AMP, SO-8	2302-33172N08	●	●
X1	CRYSTAL, FUND/21.855MHz, 20ppm	1505-21855020	●	●

7.1.2 IF Buffer Board

Ref. Desg.	Description	Part Numbers	VT-3H035-SWA	VT-3H045-SWA
C1	CAP., SM,100nF CER,0805,X7R,50	1008-5A104K5R	●	●
C2	CAP., SM, 56pF CER., 0805, C0G	1008-1A560J1G	●	●
C3	CAP., SM,10nF CER,0805,X7R,50V	1008-4A103K5R	●	●
C4	CAP., SM, 68pF CER., 0805, C0G	1008-1A680J1G	●	●
C5	CAP., SM, 82pF CER., 0805, C0G	1008-1A820J1G	●	●
L1	INDUCTOR,SM,1.0uH CER,10%,1008	1256-3B1R000K	●	●
L2	INDUCTOR,SM,820nH CER,10%,1008	1256-2BR8200K	●	●
L3	INDUCTOR, SM, 680nH, 10%, 1812	1255-2GR6800M	●	●
L4	INDUCTOR, SM, 680nH, 10%, 1812	1255-2GR6800M	●	●
P1-3	INTERCONNECT/LP,1ROW x 3PIN,Au	5015-IL103G07	●	●
P4	INTERCONNECT/LP,1ROW x 1PIN,Au	5015-IL101G07	●	●
P5	INTERCONNECT/LP,1ROW x 1PIN,Au	5015-IL101G07	●	●
P6	INTERCONNECT/LP,1ROW x 1PIN,Au	5015-IL101G07	●	●
P7	INTERCONNECT/LP,1ROW x 1PIN,Au	5015-IL101G07	●	●
PCB	PCB, IF BUFFER, MT-3 RECEIVER	4311-13500321	●	●
Q1	JFET, MMBFU310L,RF,N-CH,SOT-23	2141-MBFU310L	●	●
R1	RES., SM, 121R 1206, 1%,100ppm	1150-2B1210FP	●	●
R2	RES., SM, 121R 1206, 1%,100ppm	1150-2B1210FP	●	●
R3	RES., SM, 332R 1206, 1%,100ppm	1150-2B3320FP	●	●
R4	RES., SM, 49R9 0805, 1%,100ppm	1150-1A49R9FP	●	●

7.1.3 Enhanced Front End

Ref. Desg.	Description	Part Numbers	VT-3H035-SWA	VT-3H045-SWA
C1	CAP., SM, 4.7uF TANT., 10%,16V	1055-5B475K16	●	●
C2	CAP., SM,100nF CER,0805,X7R,50	1008-5A104K5R	●	●
C3	CAP., SM,10nF CER,0805,X7R,50V	1008-4A103K5R	●	●
C4	CAP., SM,100nF CER,0805,X7R,50	1008-5A104K5R	●	●
C5	CAP., SM,10nF CER,0805,X7R,50V	1008-4A103K5R	●	●
C6	CAP., SM, 1nF CER,0805,X7R,50V	1008-3A102K5R	●	●
C7	CAP., SM,10nF CER,0805,X7R,50V	1008-4A103K5R	●	●
C8	CAP., SM,10nF CER,0805,X7R,50V	1008-4A103K5R	●	●
C9	CAP., SM,10nF CER,0805,X7R,50V	1008-4A103K5R	●	●
C10	CAP., SM,10nF CER,0805,X7R,50V	1008-4A103K5R	●	●
C11	CAP., SM, 47pF CER., 0805, C0G	1008-1A470J1G	●	●
C12	CAP., SM, 100pF CER., 0805,C0G	1008-2A101J1G	●	●
C13	CAP., SM, 100pF CER., 0805,C0G	1008-2A101J1G	●	●
C14	CAP., SM, 47pF CER., 0805, C0G	1008-1A470J1G	●	●
C19	CAP., SM, 4.7uF TANT., 10%,16V	1055-5B475K16	●	●
C20	CAP., SM,100nF CER,0805,X7R,50	1008-5A104K5R	●	●
C21	CAP., SM,10nF CER,0805,X7R,50V	1008-4A103K5R	●	●
C22	CAP., SM, 47pF CER., 0805, C0G	1008-1A470J1G	●	●

C23	CAP., SM, 47pF CER., 0805, C0G	1008-1A470J1G	●	●
C24	CAP., SM, 220pF CER., 0805,C0G	1008-2A221J1G	●	●
C25	CAP., SM, 220pF CER., 0805,C0G	1008-2A221J1G	●	●
C26	CAP., SM,100nF CER,0805,X7R,50	1008-5A104K5R	●	●
C27	CAP., SM,100nF CER,0805,X7R,50	1008-5A104K5R	●	●
C29	CAP., SM,100nF CER,0805,X7R,50	1008-5A104K5R	●	●
C30	CAP., SM,100nF CER,0805,X7R,50	1008-5A104K5R	●	●
C31	CAP., SM,100nF CER,0805,X7R,50	1008-5A104K5R	●	●
C32	CAP., SM,100nF CER,0805,X7R,50	1008-5A104K5R	●	●
C33	CAP., SM,100nF CER,0805,X7R,50	1008-5A104K5R	●	●
C34	CAP., SM, 39pF CER., 0805, C0G	1008-1A390J1G	●	●
C35	CAP., SM, 82pF CER., 0805, C0G	1008-1A820J1G	●	●
C36	CAP., SM, 82pF CER., 0805, C0G	1008-1A820J1G	●	●
C37	CAP., SM, 39pF CER., 0805, C0G	1008-1A390J1G	●	●
L1	INDUCTOR, SM, 10.0uH, 10%,1812	1255-4G10000K	●	●
L2	INDUCTOR,SM,2.2uH CER,10%,1008	1256-3B2R200K	●	●
L3	INDUCTOR,SM,220nH CER,10%,1008	1256-2BR2200K	●	●
L4	INDUCTOR,SM,270nH CER,10%,1008	1256-2BR2700K	●	●
L5	INDUCTOR,SM,220nH CER,10%,1008	1256-2BR2200K	●	●
L9	INDUCTOR, SM, 10.0uH, 10%,1812	1255-4G10000K	●	●
L10	INDUCTOR,SM,150nH CER,10%,1008	1256-2BR1500K	●	●
L11	INDUCTOR,SM,180nH CER,10%,1008	1256-2BR1800K	●	●
L12	INDUCTOR,SM,150nH CER,10%,1008	1256-2BR1500K	●	●
M1	IC, AD831AP, MIXER-L/D, PLCC20	2360-83100P20	●	●
PCB	PCB, FRONT END AMP/MIX.,LB VHF	4310-72500411	●	●
Q1	TRANSISTOR, BC807-25,PNP,SOT23	2120-BC807025	●	●
Q2	TRANSISTOR, NE46134, RF,SOT-89	2127-NE461340	●	●
R1	RES., SM, 1K00 0805, 1%,100ppm	1150-3A1001FP	●	●
R2	RES., SM, 332R 0805, 1%,100ppm	1150-2A3320FP	●	●
R3	RES., SM, 30R1 1206, 1%,100ppm	1150-1B30R1FP	●	●
R4	RES., SM, 3K01 0805, 1%,100ppm	1150-3A3011FP	●	●
R5	RES., SM, 1K82 0805, 1%, 100ppm	1150-3A1821FP	●	●
R6	RES., SM, 4R75 1206, 1%,400ppm	1150-0B4R75FG	●	●
R7	RES., SM, 49R9 0805, 1%,100ppm	1150-1A49R9FP	●	●
R8	RES., SM, 5K11 1206, 1%,100ppm	1150-3B5111FP	●	●
R9	RES., SM, 5K11 1206, 1%,100ppm	1150-3B5111FP	●	●
R11	RES., SM, ZERO OHM JUMPER,0805	1150-0A0R0000	●	●
R13	RES., SM, 121R 1206, 1%,100ppm	1150-2B1210FP	●	●
R14	RES., SM, 49R9 1206, 1%,100ppm	1150-1B49R9FP	●	●
R15	RES., SM, 121R 1206, 1%,100ppm	1150-2B1210FP	●	●
R16	RES., SM, 49R9 0805, 1%,100ppm	1150-1A49R9FP	●	●

7.1.4 FE BandPass Filter

Ref. Desg.	Description	Part Numbers	VT-3H035-SWA	VT-3H045-SWA
C1	CAP., SM, 68pF CER., 0805, C0G	1008-1A680J1G		●
C1	CAP., SM, 82pF CER., 0805, C0G	1008-1A820J1G	●	
C2	CAP., SM, 10pF CER., 0805, C0G	1008-1A100J1G		●
C2	CAP., SM, 15pF CER., 0805, C0G	1008-1A150J1G	●	
C3	CAP., SM, 56pF CER., 0805, C0G	1008-1A560J1G		●
C3	CAP., SM, 68pF CER., 0805, C0G	1008-1A680J1G	●	
C4	CAP., SM, 8.2pF CER., 0805,C0G	1008-0A829J1G		●
C4	CAP., SM, 12pF CER., 0805, C0G	1008-1A120J1G	●	
C5	CAP., SM, 68pF CER., 0805, C0G	1008-1A680J1G		●
C5	CAP., SM, 82pF CER., 0805, C0G	1008-1A820J1G	●	
C6	CAP., SM, 8.2pF CER., 0805,C0G	1008-0A829J1G		●
C6	CAP., SM, 12pF CER., 0805, C0G	1008-1A120J1G	●	
C7	CAP., SM, 56pF CER., 0805, C0G	1008-1A560J1G		●
C7	CAP., SM, 68pF CER., 0805, C0G	1008-1A680J1G	●	
C8	CAP., SM, 10pF CER., 0805, C0G	1008-1A100J1G		●
C8	CAP., SM, 15pF CER., 0805, C0G	1008-1A150J1G	●	
C9	CAP., SM, 68pF CER., 0805, C0G	1008-1A680J1G		●
C9	CAP., SM, 82pF CER., 0805, C0G	1008-1A820J1G	●	
L1	INDUCT/VAR.,162-252uH,TAP3+3/8	1263-10C05U27		●
L1	INDUCT/VAR.,193-306uH,TAP4+3/8	1263-10C06U35	●	
L2	INDUCTOR/VAR.,162-252nH,UNSHLD	1262-110C207U		●
L2	INDUCTOR/VAR.,193-306nH,UNSHLD	1262-110C250U	●	
L3	INDUCTOR/VAR.,162-252nH,UNSHLD	1262-110C207U		●
L3	INDUCTOR/VAR.,193-306nH,UNSHLD	1262-110C250U	●	
L4	INDUCTOR/VAR.,162-252nH,UNSHLD	1262-110C207U		●
L4	INDUCTOR/VAR.,193-306nH,UNSHLD	1262-110C250U	●	
L5	INDUCT/VAR.,162-252uH,TAP3+3/8	1263-10C05U27		●
L5	INDUCT/VAR.,193-306uH,TAP4+3/8	1263-10C06U35	●	
PCB	PCB, FRONT END/COIL MTG,LB VHF	4310-75500341	●	●

7.1.5 Enhanced Synthesizer Analog Board

Ref. Desg.	Description	Part Numbers	VT-3H035-SWA	VT-3H045-SWA
C1	CAP., SM, 1nF CER,0805,X7R,50V	1008-3A102K5R	●	●
C2	CAP., SM, 1nF CER,0805,X7R,50V	1008-3A102K5R	●	●
C3	CAP., SM, 1nF CER,0805,X7R,50V	1008-3A102K5R	●	●
C4	CAP., SM,10nF CER,0805,X7R,50V	1008-4A103K5R	●	●
C5	CAP., SM,100nF CER,0805,X7R,50	1008-5A104K5R	●	●
C6	CAP., SM, 47uF TANT., 20%, 16V	1055-6D476M16	●	●
C7	CAP., SM,10nF CER,0805,X7R,50V	1008-4A103K5R	●	●
C8	CAP., SM,100nF CER,0805,X7R,50	1008-5A104K5R	●	●
C9	CAP., SM,10nF CER,0805,X7R,50V	1008-4A103K5R	●	●
C10	CAP., SM,100nF CER,0805,X7R,50	1008-5A104K5R	●	●
C11	CAP., SM, 1.0uF TANT., 20%,16V	1055-5A105M16	●	●
C12	CAP., SM, 4.7uF TANT., 10%,16V	1055-5B475K16	●	●
C13	CAP., SM, 4.7uF TANT., 10%,16V	1055-5B475K16	●	●
C14	CAP., SM,10nF CER,0805,X7R,50V	1008-4A103K5R	●	●
C15	CAP., SM, 4.7uF TANT., 10%,16V	1055-5B475K16	●	●
C16	CAP., SM, 1nF CER,0805,X7R,50V	1008-3A102K5R	●	●
C17	CAP., SM, 1nF CER,0805,X7R,50V	1008-3A102K5R	●	●
C18	CAP., SM, 47uF TANT., 20%, 16V	1055-6D476M16	●	●
C19	CAP., SM,10nF CER,0805,X7R,50V	1008-4A103K5R	●	●
C20	CAP., SM, 4.7uF TANT., 10%,16V	1055-5B475K16	●	●
C21	CAP., SM,10nF CER,0805,X7R,50V	1008-4A103K5R	●	●
C22	CAP., SM,10nF CER,0805,X7R,50V	1008-4A103K5R	●	●
C23	CAP., SM, 27pF CER., 0805, C0G	1008-1A270J1G	●	●
C24	CAP.,TRIM. 1-14pF, STAND. >6T	1082-A1R0014J	●	●
C25	CAP., SM, 1nF CER,0805,X7R,50V	1008-3A102K5R	●	●
C26	CAP., SM, 1nF CER,0805,X7R,50V	1008-3A102K5R	●	●
C27	CAP., SM, 4.7uF TANT., 10%,16V	1055-5B475K16	●	●
C28	CAP., SM, 1nF CER,0805,X7R,50V	1008-3A102K5R	●	●
C29	CAP., SM, 47uF TANT., 20%, 16V	1055-6D476M16	●	●
C30	CAP., SM,10nF CER,0805,X7R,50V	1008-4A103K5R	●	●
C31	CAP., SM, 1nF CER,0805,X7R,50V	1008-3A102K5R	●	●
C32	CAP., SM, 100uF TANT., 20%,16V	1055-7D107M16	●	●
C33	CAP., SM, 100uF TANT., 20%,16V	1055-7D107M16	●	●
C34	CAP., SM, 33pF CER., 0805, C0G	1008-1A330J1G	●	●
C35	CAP., SM, 3.3pF CER., 0805,C0G	1008-0A339J1G	●	●
C36	CAP., SM, 330pF CER., 0805,C0G	1008-2A331J1G	●	●
C37	CAP., 1.0uF FILM, MMK5,10%,50V	1016-6D105K50	●	●
C38	CAP., 1.0uF FILM, MMK5,10%,50V	1016-6D105K50	●	●
C39	CAP., 1.0uF FILM, MMK5,10%,50V	1016-6D105K50	●	●
C40	CAP., SM, 33pF CER., 0805, C0G	1008-1A330J1G	●	●
C41	CAP., SM, 1nF CER,0805,X7R,50V	1008-3A102K5R	●	●
C42	CAP., SM, 4.7uF TANT., 10%,16V	1055-5B475K16	●	●
C43	CAP., SM,10nF CER,0805,X7R,50V	1008-4A103K5R	●	●

C44	CAP., SM, 330pF CER., 0805,C0G	1008-2A331J1G	●	●
C45	CAP., 470nF FILM, MMK5,10%,63V	1016-5D474K63	●	●
C46	CAP., SM, 330pF CER., 0805,C0G	1008-2A331J1G	●	●
C47	CAP., SM, 330pF CER., 0805,C0G	1008-2A331J1G	●	●
C49	CAP., 22nF FILM, MMK5, 10%,63V	1016-4A223K63	●	●
C50	CAP., SM, 4.7uF TANT., 10%,16V	1055-5B475K16	●	●
C51	CAP., SM,10nF CER,0805,X7R,50V	1008-4A103K5R	●	●
C52	CAP., SM, 330pF CER., 0805,C0G	1008-2A331J1G	●	●
C54	CAP., SM, 4.7uF TANT., 10%,16V	1055-5B475K16	●	●
C55	CAP., SM,10nF CER,0805,X7R,50V	1008-4A103K5R	●	●
C56	CAP., SM, 330pF CER., 0805,C0G	1008-2A331J1G	●	●
C57	CAP., SM, 68pF CER., 0805, C0G	1008-1A680J1G	●	●
C58	CAP., SM, 68pF CER., 0805, C0G	1008-1A680J1G	●	●
C59	CAP., SM, 100pF CER., 0805,C0G	1008-2A101J1G	●	●
C61	CAP., SM, 56pF CER., 0805, C0G	1008-1A560J1G	●	●
C62	CAP., SM, 47pF CER., 0805, C0G	1008-1A470J1G	●	●
C63	CAP., SM, 22pF CER., 0805, C0G	1008-1A220J1G	●	●
C64	CAP., SM, 12pF CER., 0805, C0G	1008-1A120J1G	●	●
D1	DIODE, MMBV609L,VARICAP,SOT-23	2106-MMBV609L	●	●
D2	DIODE, MMBV609L,VARICAP,SOT-23	2106-MMBV609L	●	●
D3	DIODE, MMBD701,HOT CARR.,SOT23	2105-MMBD7010	●	●
D4	DIODE, BYD17J, RECTIFIER,SOD87	2101-BYD17J00	●	●
D5	DIODE, BAS16, SWITCHING, SOT23	2100-BAS16000	●	●
L1	CHOKE, RF/MOLDED,10uH,10%,.25"	1251-4A00100K	●	●
L2	CHOKE, RF/MOLDED,10uH,10%,.25"	1251-4A00100K	●	●
L3	CHOKE, RF/MOLDED,10uH,10%,.25"	1251-4A00100K	●	●
L4	CHOKE, RF/MOLDED,10uH,10%,.25"	1251-4A00100K	●	●
L5	INDUCTOR, 9.5T/138nH,MOLD.,WHT	1253-A0951389	●	●
L6	CHOKE, RF/MOLDED,10uH,10%,.25"	1251-4A00100K	●	●
L7	CHOKE, RF/MOLDED,4.7uH,10%,.25	1251-3A004R7K	●	●
L8	CHOKE, RF/MOLDED,1.5uH,10%,.25	1251-3A001R5K	●	●
L9	CHOKE, RF/MOLDED,1.5uH,10%,.25	1251-3A001R5K	●	●
L10	CHOKE, RF/MOLDED,1.5uH,10%,.25	1251-3A001R5K	●	●
L11	INDUCTOR,SM,120nH CER,10%,1008	1256-2BR1200K	●	●
L12	CHOKE, RF/MOLDED,4.7uH,10%,.25	1251-3A004R7K	●	●
L13	INDUCTOR,SM,120nH CER,10%,1008	1256-2BR1200K	●	●
LED1	LED/SM,PLCC-3.2X2.8,TOP,CL/RED	2111-T3228CRD	●	●
PCB	PCB, ANALOG,OS-3H VHF 30-50MHz	4309-26500383	●	●
Q1	TRANSISTOR, BC817-25,NPN,SOT23	2120-BC817025	●	●
Q2	TRANSISTOR, BC817-25,NPN,SOT23	2120-BC817025	●	●
Q3	TRANSISTOR, BC807-25,PNP,SOT23	2120-BC807025	●	●
Q4	TRANSISTOR, BC817-25,NPN,SOT23	2120-BC817025	●	●
Q5	JFET, J211, RF, N-CHAN., TO-92	2041-J2110000	●	●
R1	RES., SM, 49R9 0805, 1%,100ppm	1150-1A49R9FP	●	●
R2	RES., 330R METAL FILM, 5%,0.5W	1101-2A0331JP	●	●
R3	RES., SM, 10K0 0805, 1%,100ppm	1150-4A1002FP	●	●

R4	RES., SM, 10K0 0805, 1%,100ppm	1150-4A1002FP	●	●
R5	RES., SM, 100R 0805, 1%,100ppm	1150-2A1000FP	●	●
R6	RES., SM, 1K00 0805, 1%,100ppm	1150-3A1001FP	●	●
R7	RES., SM, 10K0 0805, 1%,100ppm	1150-4A1002FP	●	●
R8	RES., SM, 10K0 0805, 1%,100ppm	1150-4A1002FP	●	●
R9	RES., SM, 1K00 0805, 1%,100ppm	1150-3A1001FP	●	●
R10	RES., SM, 22K1 0805, 1%,100ppm	1150-4A2212FP	●	●
R11	RES., SM, 10K0 0805, 1%,100ppm	1150-4A1002FP	●	●
R12	RES., SM, 22K1 0805, 1%,100ppm	1150-4A2212FP	●	●
R13	RES., SM, 11K8 0805, 1%,100ppm	1150-4A1182FP	●	●
R14	RES., SM, 10K0 0805, 1%,100ppm	1150-4A1002FP	●	●
R15	RES., SM, 10R0 0805, 1%,100ppm	1150-1A10R0FP	●	●
R16	RES., SM, 5K11 0805, 1%,100ppm	1150-3A5111FP	●	●
R17	RES., SM, 5K11 0805, 1%,100ppm	1150-3A5111FP	●	●
R18	RES., SM, 10K0 0805, 1%,100ppm	1150-4A1002FP	●	●
R19	RES., SM, 10K0 0805, 1%,100ppm	1150-4A1002FP	●	●
R20	RES., SM, 10R0 0805, 1%,100ppm	1150-1A10R0FP	●	●
R21	RES., SM, 20K0 0805, 1%,100ppm	1150-4A2002FP	●	●
R22	RES., SM, 1K00 0805, 1%,100ppm	1150-3A1001FP	●	●
R23	RES., SM, 10R0 0805, 1%,100ppm	1150-1A10R0FP	●	●
R24	RES., SM, 10R0 0805, 1%,100ppm	1150-1A10R0FP	●	●
R25	RES., SM, 10R0 0805, 1%,100ppm	1150-1A10R0FP	●	●
R26	RES., 1R2 METAL FILM, 5%, 0.5W	1101-0A01R2JI	●	●
R27	RES., SM, 15K0 0805, 1%,100ppm	1150-4A1502FP	●	●
R28	RES., SM, 10R0 0805, 1%,100ppm	1150-1A10R0FP	●	●
R29	RES., SM, 18K2 0805, 1%,100ppm	1150-4A1822FP	●	●
R30	RES., SM, 10R0 0805, 1%,100ppm	1150-1A10R0FP	●	●
R31	RES., SM, 49R9 0805, 1%,100ppm	1150-1A49R9FP	●	●
R32	RES., 15K METAL FILM, 5%, 0.5W	1101-4A0153JP	●	●
R33	RES., 1K2 METAL FILM, 5%, 0.5W	1101-3A0122JP	●	●
R34	RES., SM, 10K0 0805, 1%,100ppm	1150-4A1002FP	●	●
R35	RES., SM, 10K0 0805, 1%,100ppm	1150-4A1002FP	●	●
R36	RES., 2K7 METAL FILM, 5%, 0.5W	1101-3A0272JP	●	●
R37	RES., SM, 10R0 0805, 1%,100ppm	1150-1A10R0FP	●	●
R38	RES., SM, 49R9 0805, 1%,100ppm	1150-1A49R9FP	●	●
R39	RES., SM, ZERO OHM JUMPER,0805	1150-0A0R0000	●	●
R40	RES., 180R METAL FILM, 5%,0.5W	1101-2A0181JP	●	●
R41	RES., SM, 18R2 0805, 1%,100ppm	1150-1A18R2FP	●	●
R42	RES., SM, 10K0 0805, 1%,100ppm	1150-4A1002FP	●	●
R43	RES., SM, 10K0 0805, 1%,100ppm	1150-4A1002FP	●	●
R44	RES., SM, 47R5 0805, 1%,100ppm	1150-1A47R5FP	●	●
R45	RES., SM, 27R4 0805, 1%,100ppm	1150-1A27R4FP	●	●
R46	RES., SM, 33R2 0805, 1%,100ppm	1150-1A33R2FP	●	●
R47	RES., SM, 47R5 0805, 1%,100ppm	1150-1A47R5FP	●	●
R48	RES., SM, 27R4 0805, 1%,100ppm	1150-1A27R4FP	●	●
R49	RES., SM, 33R2 0805, 1%,100ppm	1150-1A33R2FP	●	●

R50	RES., 180R METAL FILM, 5%,0.5W	1101-2A0181JP	●	●
R51	RES., 220R METAL FILM, 5%,0.5W	1101-2A0221JP	●	●
R52	RES., SM, 49R9 0805, 1%,100ppm	1150-1A49R9FP	●	●
R53	RES., SM, 10K0 0805, 1%,100ppm	1150-4A1002FP	●	●
R54	RES., SM, 18R2 0805, 1%,100ppm	1150-1A18R2FP	●	●
R55	RES., SM, 274R 0805, 1%,100ppm	1150-2A2740FP	●	●
R56	RES., SM, 274R 0805, 1%,100ppm	1150-2A2740FP	●	●
RV1	POT., SM/4mm SQ,5K,SINGLE TURN	1174-AS2502J1	●	●
TCXO1	TCVCXO,SMT,10MHz,1ppm,0-3V,4PN	2641-10000AM7	●	●
U1	DIODE, I/R SENSOR,TTL O/P,PLST	2014-1L18230T	●	●
U2	DIODE, I/R SENSOR,TTL O/P,PLST	2014-1L18230T	●	●
U3	DIODE, I/R SENSOR,TTL O/P,PLST	2014-1L18230T	●	●
U4	DIODE, I/R SENSOR,TTL O/P,PLST	2014-1L18230T	●	●
U5	LED, I/R,GaAs,.81 x .23,PLAST.	2013-1G18230A	●	●
U6	IC, LT1129I,PROG. VOLT REG,SO8	2305-11290N08	●	●
U7	IC, LP2951,PROG. VOLT REG,SO-8	2305-29510N08	●	●
U8	IC, LP2951,PROG. VOLT REG,SO-8	2305-29510N08	●	●
U9	MOSFET, SI9945AEY,N CHAN.,SO-8	2142-SI9945DY	●	●
U10	IC, 45191,PLL FREQ/SYNTH,SO-20	2355-45191N20	●	●
U11	IC, MSA-0611, MMIC AMP,SOT-143	2354-MSA06110	●	●
U15	IC, MSA-0611, MMIC AMP,SOT-143	2354-MSA06110	●	●
U16	IC, MSA-0611, MMIC AMP,SOT-143	2354-MSA06110	●	●

7.1.6 Enhanced Synthesizer Digital Board

Ref. Desg.	Description	Part Numbers	VT-3H035-SWA3	VT-3H045-SWA3
C1	CAP., SM,100nF CER,0805,X7R,50	1008-5A104K5R	●	●
C2	CAP., SM,100nF CER,0805,X7R,50	1008-5A104K5R	●	●
C3	CAP., SM, 47uF TANT., 20%, 16V	1055-6D476M16	●	●
C4	CAP., SM, 47uF TANT., 20%, 16V	1055-6D476M16	●	●
C5	CAP., SM, 47uF TANT., 20%, 16V	1055-6D476M16	●	●
C6	CAP., SM, 22pF CER., 0805, C0G	1008-1A220J1G	●	●
C7	CAP., SM, 22pF CER., 0805, C0G	1008-1A220J1G	●	●
C8	CAP., SM, 4.7uF TANT., 10%,16V	1055-5B475K16	●	●
C9	CAP., SM,100nF CER,0805,X7R,50	1008-5A104K5R	●	●
C10	CAP., SM,100nF CER,0805,X7R,50	1008-5A104K5R	●	●
C11	CAP., SM,100nF CER,0805,X7R,50	1008-5A104K5R	●	●
C12	CAP., SM,100nF CER,0805,X7R,50	1008-5A104K5R	●	●
C13	CAP., SM,100nF CER,0805,X7R,50	1008-5A104K5R	●	●
C14	CAP., SM,100nF CER,0805,X7R,50	1008-5A104K5R	●	●
C15	CAP., SM, 10uF TANT., 20%, 16V	1055-6C106M16	●	●
D1	DIODE, BAS16, SWITCHING, SOT23	2100-BAS16000	●	●
D2	DIODE, BAS16, SWITCHING, SOT23	2100-BAS16000	●	●
D3	DIODE, BAS16, SWITCHING, SOT23	2100-BAS16000	●	●
D4	DIODE, BAS16, SWITCHING, SOT23	2100-BAS16000	●	●
L1	INDUCTOR, SM, 10.0uH, 10%,1812	1255-4G10000K	●	●

P1	INTERCONNECT/STD,1ROW x 12P,Au	5015-IS112G21	●	●
P1	INTERCONNECT/STD,1ROW x9PIN,Au	5015-IS109G21	●	●
P2	INTERCONNECT/STD,1ROW x6PIN,Au	5015-IS106G21	●	●
PCB	PCB, DIGITAL, OS-3H H/P SYNTH.	4309-26500213	●	●
Q1-Q11	TRANSISTOR, BC817-25,NPN,SOT23	2120-BC817025	●	●
R1	RES., SM, ZERO OHM JUMPER,0805	1150-0A0R0000	●	●
R2	RES., SM, 27K4 0805, 1%,100ppm	1150-4A2742FP	●	●
R3	RES., SM, 27K4 0805, 1%,100ppm	1150-4A2742FP	●	●
R4	RES., SM, 27K4 0805, 1%,100ppm	1150-4A2742FP	●	●
R5	RES., SM, 27K4 0805, 1%,100ppm	1150-4A2742FP	●	●
R6	RES., SM, 27K4 0805, 1%,100ppm	1150-4A2742FP	●	●
R7	RES., SM, 27K4 0805, 1%,100ppm	1150-4A2742FP	●	●
R8	RES., SM, 6K81 0805, 1%,100ppm	1150-3A6811FP	●	●
R9	RES., SM, 27K4 0805, 1%,100ppm	1150-4A2742FP	●	●
R10	RES., SM, 27K4 0805, 1%,100ppm	1150-4A2742FP	●	●
R11	RES., SM, 10M0 1206, 5%,400ppm	1151-7B0106JG	●	●
R12	RES., SM, 27K4 0805, 1%,100ppm	1150-4A2742FP	●	●
R13	RES., SM, 27K4 0805, 1%,100ppm	1150-4A2742FP	●	●
R14	RES., SM, 27K4 0805, 1%,100ppm	1150-4A2742FP	●	●
R15	RES., SM, 27K4 0805, 1%,100ppm	1150-4A2742FP	●	●
R16	RES., SM, 27K4 0805, 1%,100ppm	1150-4A2742FP	●	●
R17	RES., SM, 27K4 0805, 1%,100ppm	1150-4A2742FP	●	●
R18	RES., SM, 27K4 0805, 1%,100ppm	1150-4A2742FP	●	●
R19	RES., SM, 27K4 0805, 1%,100ppm	1150-4A2742FP	●	●
R20	RES., SM, 27K4 0805, 1%,100ppm	1150-4A2742FP	●	●
R21	RES., SM, 27K4 0805, 1%,100ppm	1150-4A2742FP	●	●
R22	RES., SM, 27K4 0805, 1%,100ppm	1150-4A2742FP	●	●
R23	RES., SM, 10K0 0805, 1%,100ppm	1150-4A1002FP	●	●
R24	RES., SM, 10K0 0805, 1%,100ppm	1150-4A1002FP	●	●
R25	RES., SM, 10K0 0805, 1%,100ppm	1150-4A1002FP	●	●
R26	RES., SM, 10K0 0805, 1%,100ppm	1150-4A1002FP	●	●
R27	RES., SM, 27K4 0805, 1%,100ppm	1150-4A2742FP	●	●
R28	RES., SM, 27K4 0805, 1%,100ppm	1150-4A2742FP	●	●
R29	RES., SM, 27K4 0805, 1%,100ppm	1150-4A2742FP	●	●
R30	RES., SM, 215R 0805, 1%,100ppm	1150-2A2150FP	●	●
R31	RES., SM, 215R 0805, 1%,100ppm	1150-2A2150FP	●	●
R32	RES., SM, 215R 0805, 1%,100ppm	1150-2A2150FP	●	●
R33	RES., SM, 332R 0805, 1%,100ppm	1150-2A3320FP	●	●
R34	RES., SM, 27K4 0805, 1%,100ppm	1150-4A2742FP	●	●
R35	RES., SM, 27K4 0805, 1%,100ppm	1150-4A2742FP	●	●
R36	RES., SM, 27K4 0805, 1%,100ppm	1150-4A2742FP	●	●
R37	RES., SM, 27K4 0805, 1%,100ppm	1150-4A2742FP	●	●
R38	RES., SM, 27K4 0805, 1%,100ppm	1150-4A2742FP	●	●
R39	RES., SM, 27K4 0805, 1%,100ppm	1150-4A2742FP	●	●
R40	RES., SM, 27K4 0805, 1%,100ppm	1150-4A2742FP	●	●
R41	RES., SM, 221K 0805, 1%,100ppm	1150-5A2213FP	●	●

U1	MOSFET, SI9933ADY,P CHAN.,SO-8	2142-SI9933DY	●	●
U2	IC, LP2951,PROG. VOLT REG,SO-8	2305-29510N08	●	●
U3	IC, MC33064,UNDR/VOLT SEN.SO-8	2308-33064N08	●	●
U4	IC, 68HC711E9, MIC/CTR, PLCC52	2380-68711P52	●	●
U5	LED, I/R,GaAs,.81 x .23,PLAST.	2013-1G18230A	●	●
U6	LED, I/R,GaAs,.81 x .23,PLAST.	2013-1G18230A	●	●
U7	LED, I/R,GaAs,.81 x .23,PLAST.	2013-1G18230A	●	●
U8	LED, I/R,GaAs,.81 x .23,PLAST.	2013-1G18230A	●	●
U9	DIODE, I/R SENSOR,TTL O/P,PLST	2014-1L18230T	●	●
X1	RESONATOR, SM, 8.0MHz, CERAMIC	1575-8001816A	●	●

7.2 Mechanical Parts

7.2.1 21.4 MHz IF/Audio Main Board

Description	Part Number	Qty
COAX, CONFORMABLE,50 OHM,0.083	7482-5024T083	47 mm
CONN., SMB, JACK,PC MNT,STRHT.	5122-J20S00BG	1
CONN., SMB, JACK,PC MNT,STRHT.	5122-J20S00BG	1
CONNECTOR, F/48 MALE, R/A PCB	3720-6048M0RA	1
DIVIDER, MT-3 RX IF,COMP. SIDE	3702-67301020	1
DIVIDER, MT-3 RX IF,SOLDR.SIDE	3702-67301010	1
FILTER, XTAL,21.4MHz,+-6.0,PR.	1332-2144120F	2
FILTER, XTAL,21.4MHz,+-6.0,PR.	1332-2144120F	2
NUT, M3,HEX,5.5mm FLATS, NYLON	5813-3M0HX55P	2
NUT, M3,HEX,5.5mm FLATS, NYLON	5813-3M0HX55P	2
NUT, PRESS,M2.5,5.6mmOD,PC MNT	5833-T2M55615	3
NUT, PRESS,M2.5,5.6mmOD,PC MNT	5833-T2M55615	3
PAD, MTG.,.25"T/H,.424"ID,NYL.	5624-5250104N	2
SCREW, M2.5 x 12 PAN/PHIL, A2	5812-2M5PP12S	2
SCREW, M3 x 10, PAN/SLOT,NYLON	5812-3M0PS10P	2
SCREW, M3 x 10, PAN/SLOT,NYLON	5812-3M0PS10P	2
SOCK. STRIP-L/P,1ROW x 2PIN,Au	5016-SL102G08	1
SOCK. STRIP-L/P,1ROW x 6PIN,Au	5016-SL106G08	1
SOCK. STRIP-L/P,1ROW x 9PIN,Au	5016-SL109G08	1
SOCK. STRIP-L/P,1ROW x12PIN,Au	5016-SL112G08	1
STANDOFF, 7/32OD,1/4L,M3,SWAGE	5917-7B4BM30T	4
SWITCH, PB, SPDT/MOM., PCB-R/A	5234-310A01TB	1
SWITCH, SM, BCD-10 STEPS,5 PIN	5274-10BCD005	4
SWITCH, TOG./SPDT,O-N-O,PCB/RA	5215-T1011A02	1

Description	Part Number	Qty
TUBING, TFE-260C,24AWG T/W,CLR	7610-260C24TW	4 mm
WASHER, FLAT,M3,9.0mm OD,NYLON	5814-3M0FL90P	3
WASHER, FLAT,M3,9.0mm OD,NYLON	5814-3M0FL90P	3

7.2.2 Enhanced Front End

Description	Part Number	Qty
BRACKET, CAP. MTG,V/UHF 5P F/E	3702-65001005	1
CABLE, CONFORM., 28mm/4mm/9mm	7489-C1055600	1
CABLE,SMB PLUG-OPEN,RG316,15CM	7910-WP007015	1
CABLE,SMB PLUG-OPEN,RG316,19CM	7910-WP008019	1
CABLE,SMB STR/PL-N(CSK)JK,21CM	7910-WS7NJ021	1
CASE, LB VHF, RF AMP/HELICAL	3702-65801050	1
CONN., SMB, JACK,BULKHEAD,REAR	5121-J1SC01BG	1
LOCKWASHER,M2.5,SPLIT,A2 STEEL	5814-2M5LK00S	18
NUT, PRESS,M2.5,5.6mmOD,PC MNT	5833-T2M55615	12
SCREW, M2.5 x 25 PAN/PHIL., A2	5812-2M5PP25S	18
SCREW, M3 X 6, FLAT/PHIL., A2	5812-3M0FP06S	4
SHIELD, V/UHF F/E AMP-LO DIVDR	3702-67301122	1
SHIELD, V/UHF F/E AMP-RF DIVDR	3702-67301123	1
SHIELD, V/UHF F/END AMP - WALL	3702-67301120	1
STANDOFF,5.56mmOD,4mmL,M2.5,SW	5927-5S4BM25T	6
WIRE, TFE/STRAND., 24AWG, RED	7121-24S19362	1

7.2.3 Enhanced Synthesizer

Description	Part Number	Qty
CASE, OS-3H SYNTH. MODULE,ALUM	3702-66100920	1
CONN., SMB, JACK,2 HOLE FLANGE	5120-J2SC01BG	2
LID, CASE,OS-3H SYNTH/MODL.,AL	3702-66100921	1
PIN, 2 x 10mm, GROOVED W/PILOT	5876-D1470210	4
SCREW, M2 X 4, PAN/PHILLIPS,A2	5812-2M0PP04S	15
SCREW, M2.0 x 4, FLAT/PHIL, A2	5812-2M0FP04S	8
SCREW,M2.5x24.5mm,FLAT/PHIL,A2	5812-2M5FP24S	1
WASHER, TFE,0.036ID,1/8OD,.02T	5805-T3612F20	6

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8 CHANNEL DESIGNATION TABLES

8.1 Channel Designation Table: 29-50 MHz, 5kHz Increments

Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)
0000	29.00000	0055	29.27500	0110	29.55000	0165	29.82500	0220	30.10000	0275	30.37500
0001	29.00500	0056	29.28000	0111	29.55500	0166	29.83000	0221	30.10500	0276	30.38000
0002	29.01000	0057	29.28500	0112	29.56000	0167	29.83500	0222	30.11000	0277	30.38500
0003	29.01500	0058	29.29000	0113	29.56500	0168	29.84000	0223	30.11500	0278	30.39000
0004	29.02000	0059	29.29500	0114	29.57000	0169	29.84500	0224	30.12000	0279	30.39500
0005	29.02500	0060	29.30000	0115	29.57500	0170	29.85000	0225	30.12500	0280	30.40000
0006	29.03000	0061	29.30500	0116	29.58000	0171	29.85500	0226	30.13000	0281	30.40500
0007	29.03500	0062	29.31000	0117	29.58500	0172	29.86000	0227	30.13500	0282	30.41000
0008	29.04000	0063	29.31500	0118	29.59000	0173	29.86500	0228	30.14000	0283	30.41500
0009	29.04500	0064	29.32000	0119	29.59500	0174	29.87000	0229	30.14500	0284	30.42000
0010	29.05000	0065	29.32500	0120	29.60000	0175	29.87500	0230	30.15000	0285	30.42500
0011	29.05500	0066	29.33000	0121	29.60500	0176	29.88000	0231	30.15500	0286	30.43000
0012	29.06000	0067	29.33500	0122	29.61000	0177	29.88500	0232	30.16000	0287	30.43500
0013	29.06500	0068	29.34000	0123	29.61500	0178	29.89000	0233	30.16500	0288	30.44000
0014	29.07000	0069	29.34500	0124	29.62000	0179	29.89500	0234	30.17000	0289	30.44500
0015	29.07500	0070	29.35000	0125	29.62500	0180	29.90000	0235	30.17500	0290	30.45000
0016	29.08000	0071	29.35500	0126	29.63000	0181	29.90500	0236	30.18000	0291	30.45500
0017	29.08500	0072	29.36000	0127	29.63500	0182	29.91000	0237	30.18500	0292	30.46000
0018	29.09000	0073	29.36500	0128	29.64000	0183	29.91500	0238	30.19000	0293	30.46500
0019	29.09500	0074	29.37000	0129	29.64500	0184	29.92000	0239	30.19500	0294	30.47000
0020	29.10000	0075	29.37500	0130	29.65000	0185	29.92500	0240	30.20000	0295	30.47500
0021	29.10500	0076	29.38000	0131	29.65500	0186	29.93000	0241	30.20500	0296	30.48000
0022	29.11000	0077	29.38500	0132	29.66000	0187	29.93500	0242	30.21000	0297	30.48500
0023	29.11500	0078	29.39000	0133	29.66500	0188	29.94000	0243	30.21500	0298	30.49000
0024	29.12000	0079	29.39500	0134	29.67000	0189	29.94500	0244	30.22000	0299	30.49500
0025	29.12500	0080	29.40000	0135	29.67500	0190	29.95000	0245	30.22500	0300	30.50000
0026	29.13000	0081	29.40500	0136	29.68000	0191	29.95500	0246	30.23000	0301	30.50500
0027	29.13500	0082	29.41000	0137	29.68500	0192	29.96000	0247	30.23500	0302	30.51000
0028	29.14000	0083	29.41500	0138	29.69000	0193	29.96500	0248	30.24000	0303	30.51500
0029	29.14500	0084	29.42000	0139	29.69500	0194	29.97000	0249	30.24500	0304	30.52000
0030	29.15000	0085	29.42500	0140	29.70000	0195	29.97500	0250	30.25000	0305	30.52500
0031	29.15500	0086	29.43000	0141	29.70500	0196	29.98000	0251	30.25500	0306	30.53000
0032	29.16000	0087	29.43500	0142	29.71000	0197	29.98500	0252	30.26000	0307	30.53500
0033	29.16500	0088	29.44000	0143	29.71500	0198	29.99000	0253	30.26500	0308	30.54000
0034	29.17000	0089	29.44500	0144	29.72000	0199	29.99500	0254	30.27000	0309	30.54500
0035	29.17500	0090	29.45000	0145	29.72500	0200	30.00000	0255	30.27500	0310	30.55000
0036	29.18000	0091	29.45500	0146	29.73000	0201	30.00500	0256	30.28000	0311	30.55500
0037	29.18500	0092	29.46000	0147	29.73500	0202	30.01000	0257	30.28500	0312	30.56000
0038	29.19000	0093	29.46500	0148	29.74000	0203	30.01500	0258	30.29000	0313	30.56500
0039	29.19500	0094	29.47000	0149	29.74500	0204	30.02000	0259	30.29500	0314	30.57000
0040	29.20000	0095	29.47500	0150	29.75000	0205	30.02500	0260	30.30000	0315	30.57500
0041	29.20500	0096	29.48000	0151	29.75500	0206	30.03000	0261	30.30500	0316	30.58000
0042	29.21000	0097	29.48500	0152	29.76000	0207	30.03500	0262	30.31000	0317	30.58500
0043	29.21500	0098	29.49000	0153	29.76500	0208	30.04000	0263	30.31500	0318	30.59000
0044	29.22000	0099	29.49500	0154	29.77000	0209	30.04500	0264	30.32000	0319	30.59500
0045	29.22500	0100	29.50000	0155	29.77500	0210	30.05000	0265	30.32500	0320	30.60000
0046	29.23000	0101	29.50500	0156	29.78000	0211	30.05500	0266	30.33000	0321	30.60500
0047	29.23500	0102	29.51000	0157	29.78500	0212	30.06000	0267	30.33500	0322	30.61000
0048	29.24000	0103	29.51500	0158	29.79000	0213	30.06500	0268	30.34000	0323	30.61500
0049	29.24500	0104	29.52000	0159	29.79500	0214	30.07000	0269	30.34500	0324	30.62000
0050	29.25000	0105	29.52500	0160	29.80000	0215	30.07500	0270	30.35000	0325	30.62500
0051	29.25500	0106	29.53000	0161	29.80500	0216	30.08000	0271	30.35500	0326	30.63000
0052	29.26000	0107	29.53500	0162	29.81000	0217	30.08500	0272	30.36000	0327	30.63500
0053	29.26500	0108	29.54000	0163	29.81500	0218	30.09000	0273	30.36500	0328	30.64000
0054	29.27000	0109	29.54500	0164	29.82000	0219	30.09500	0274	30.37000	0329	30.64500

Channel Designation Table: 29-50 MHz, 5kHz Increments - Continued

Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)
0330	30.65000	0395	30.97500	0460	31.30000	0525	31.62500	0590	31.95000	0655	32.27500
0331	30.65500	0396	30.98000	0461	31.30500	0526	31.63000	0591	31.95500	0656	32.28000
0332	30.66000	0397	30.98500	0462	31.31000	0527	31.63500	0592	31.96000	0657	32.28500
0333	30.66500	0398	30.99000	0463	31.31500	0528	31.64000	0593	31.96500	0658	32.29000
0334	30.67000	0399	30.99500	0464	31.32000	0529	31.64500	0594	31.97000	0659	32.29500
0335	30.67500	0400	31.00000	0465	31.32500	0530	31.65000	0595	31.97500	0660	32.30000
0336	30.68000	0401	31.00500	0466	31.33000	0531	31.65500	0596	31.98000	0661	32.30500
0337	30.68500	0402	31.01000	0467	31.33500	0532	31.66000	0597	31.98500	0662	32.31000
0338	30.69000	0403	31.01500	0468	31.34000	0533	31.66500	0598	31.99000	0663	32.31500
0339	30.69500	0404	31.02000	0469	31.34500	0534	31.67000	0599	31.99500	0664	32.32000
0340	30.70000	0405	31.02500	0470	31.35000	0535	31.67500	0600	32.00000	0665	32.32500
0341	30.70500	0406	31.03000	0471	31.35500	0536	31.68000	0601	32.00500	0666	32.33000
0342	30.71000	0407	31.03500	0472	31.36000	0537	31.68500	0602	32.01000	0667	32.33500
0343	30.71500	0408	31.04000	0473	31.36500	0538	31.69000	0603	32.01500	0668	32.34000
0344	30.72000	0409	31.04500	0474	31.37000	0539	31.69500	0604	32.02000	0669	32.34500
0345	30.72500	0410	31.05000	0475	31.37500	0540	31.70000	0605	32.02500	0670	32.35000
0346	30.73000	0411	31.05500	0476	31.38000	0541	31.70500	0606	32.03000	0671	32.35500
0347	30.73500	0412	31.06000	0477	31.38500	0542	31.71000	0607	32.03500	0672	32.36000
0348	30.74000	0413	31.06500	0478	31.39000	0543	31.71500	0608	32.04000	0673	32.36500
0349	30.74500	0414	31.07000	0479	31.39500	0544	31.72000	0609	32.04500	0674	32.37000
0350	30.75000	0415	31.07500	0480	31.40000	0545	31.72500	0610	32.05000	0675	32.37500
0351	30.75500	0416	31.08000	0481	31.40500	0546	31.73000	0611	32.05500	0676	32.38000
0352	30.76000	0417	31.08500	0482	31.41000	0547	31.73500	0612	32.06000	0677	32.38500
0353	30.76500	0418	31.09000	0483	31.41500	0548	31.74000	0613	32.06500	0678	32.39000
0354	30.77000	0419	31.09500	0484	31.42000	0549	31.74500	0614	32.07000	0679	32.39500
0355	30.77500	0420	31.10000	0485	31.42500	0550	31.75000	0615	32.07500	0680	32.40000
0356	30.78000	0421	31.10500	0486	31.43000	0551	31.75500	0616	32.08000	0681	32.40500
0357	30.78500	0422	31.11000	0487	31.43500	0552	31.76000	0617	32.08500	0682	32.41000
0358	30.79000	0423	31.11500	0488	31.44000	0553	31.76500	0618	32.09000	0683	32.41500
0359	30.79500	0424	31.12000	0489	31.44500	0554	31.77000	0619	32.09500	0684	32.42000
0360	30.80000	0425	31.12500	0490	31.45000	0555	31.77500	0620	32.10000	0685	32.42500
0361	30.80500	0426	31.13000	0491	31.45500	0556	31.78000	0621	32.10500	0686	32.43000
0362	30.81000	0427	31.13500	0492	31.46000	0557	31.78500	0622	32.11000	0687	32.43500
0363	30.81500	0428	31.14000	0493	31.46500	0558	31.79000	0623	32.11500	0688	32.44000
0364	30.82000	0429	31.14500	0494	31.47000	0559	31.79500	0624	32.12000	0689	32.44500
0365	30.82500	0430	31.15000	0495	31.47500	0560	31.80000	0625	32.12500	0690	32.45000
0366	30.83000	0431	31.15500	0496	31.48000	0561	31.80500	0626	32.13000	0691	32.45500
0367	30.83500	0432	31.16000	0497	31.48500	0562	31.81000	0627	32.13500	0692	32.46000
0368	30.84000	0433	31.16500	0498	31.49000	0563	31.81500	0628	32.14000	0693	32.46500
0369	30.84500	0434	31.17000	0499	31.49500	0564	31.82000	0629	32.14500	0694	32.47000
0370	30.85000	0435	31.17500	0500	31.50000	0565	31.82500	0630	32.15000	0695	32.47500
0371	30.85500	0436	31.18000	0501	31.50500	0566	31.83000	0631	32.15500	0696	32.48000
0372	30.86000	0437	31.18500	0502	31.51000	0567	31.83500	0632	32.16000	0697	32.48500
0373	30.86500	0438	31.19000	0503	31.51500	0568	31.84000	0633	32.16500	0698	32.49000
0374	30.87000	0439	31.19500	0504	31.52000	0569	31.84500	0634	32.17000	0699	32.49500
0375	30.87500	0440	31.20000	0505	31.52500	0570	31.85000	0635	32.17500	0700	32.50000
0376	30.88000	0441	31.20500	0506	31.53000	0571	31.85500	0636	32.18000	0701	32.50500
0377	30.88500	0442	31.21000	0507	31.53500	0572	31.86000	0637	32.18500	0702	32.51000
0378	30.89000	0443	31.21500	0508	31.54000	0573	31.86500	0638	32.19000	0703	32.51500
0379	30.89500	0444	31.22000	0509	31.54500	0574	31.87000	0639	32.19500	0704	32.52000
0380	30.90000	0445	31.22500	0510	31.55000	0575	31.87500	0640	32.20000	0705	32.52500
0381	30.90500	0446	31.23000	0511	31.55500	0576	31.88000	0641	32.20500	0706	32.53000
0382	30.91000	0447	31.23500	0512	31.56000	0577	31.88500	0642	32.21000	0707	32.53500
0383	30.91500	0448	31.24000	0513	31.56500	0578	31.89000	0643	32.21500	0708	32.54000
0384	30.92000	0449	31.24500	0514	31.57000	0579	31.89500	0644	32.22000	0709	32.54500
0385	30.92500	0450	31.25000	0515	31.57500	0580	31.90000	0645	32.22500	0710	32.55000
0386	30.93000	0451	31.25500	0516	31.58000	0581	31.90500	0646	32.23000	0711	32.55500
0387	30.93500	0452	31.26000	0517	31.58500	0582	31.91000	0647	32.23500	0712	32.56000
0388	30.94000	0453	31.26500	0518	31.59000	0583	31.91500	0648	32.24000	0713	32.56500
0389	30.94500	0454	31.27000	0519	31.59500	0584	31.92000	0649	32.24500	0714	32.57000
0390	30.95000	0455	31.27500	0520	31.60000	0585	31.92500	0650	32.25000	0715	32.57500
0391	30.95500	0456	31.28000	0521	31.60500	0586	31.93000	0651	32.25500	0716	32.58000
0392	30.96000	0457	31.28500	0522	31.61000	0587	31.93500	0652	32.26000	0717	32.58500
0393	30.96500	0458	31.29000	0523	31.61500	0588	31.94000	0653	32.26500	0718	32.59000
0394	30.97000	0459	31.29500	0524	31.62000	0589	31.94500	0654	32.27000	0719	32.59500

Channel Designation Table: 29-50 MHz, 5kHz Increments - Continued

Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)
0720	32.60000	0785	32.92500	0850	33.25000	0915	33.57500	0980	33.90000	1045	34.22500
0721	32.60500	0786	32.93000	0851	33.25500	0916	33.58000	0981	33.90500	1046	34.23000
0722	32.61000	0787	32.93500	0852	33.26000	0917	33.58500	0982	33.91000	1047	34.23500
0723	32.61500	0788	32.94000	0853	33.26500	0918	33.59000	0983	33.91500	1048	34.24000
0724	32.62000	0789	32.94500	0854	33.27000	0919	33.59500	0984	33.92000	1049	34.24500
0725	32.62500	0790	32.95000	0855	33.27500	0920	33.60000	0985	33.92500	1050	34.25000
0726	32.63000	0791	32.95500	0856	33.28000	0921	33.60500	0986	33.93000	1051	34.25500
0727	32.63500	0792	32.96000	0857	33.28500	0922	33.61000	0987	33.93500	1052	34.26000
0728	32.64000	0793	32.96500	0858	33.29000	0923	33.61500	0988	33.94000	1053	34.26500
0729	32.64500	0794	32.97000	0859	33.29500	0924	33.62000	0989	33.94500	1054	34.27000
0730	32.65000	0795	32.97500	0860	33.30000	0925	33.62500	0990	33.95000	1055	34.27500
0731	32.65500	0796	32.98000	0861	33.30500	0926	33.63000	0991	33.95500	1056	34.28000
0732	32.66000	0797	32.98500	0862	33.31000	0927	33.63500	0992	33.96000	1057	34.28500
0733	32.66500	0798	32.99000	0863	33.31500	0928	33.64000	0993	33.96500	1058	34.29000
0734	32.67000	0799	32.99500	0864	33.32000	0929	33.64500	0994	33.97000	1059	34.29500
0735	32.67500	0800	33.00000	0865	33.32500	0930	33.65000	0995	33.97500	1060	34.30000
0736	32.68000	0801	33.00500	0866	33.33000	0931	33.65500	0996	33.98000	1061	34.30500
0737	32.68500	0802	33.01000	0867	33.33500	0932	33.66000	0997	33.98500	1062	34.31000
0738	32.69000	0803	33.01500	0868	33.34000	0933	33.66500	0998	33.99000	1063	34.31500
0739	32.69500	0804	33.02000	0869	33.34500	0934	33.67000	0999	33.99500	1064	34.32000
0740	32.70000	0805	33.02500	0870	33.35000	0935	33.67500	1000	34.00000	1065	34.32500
0741	32.70500	0806	33.03000	0871	33.35500	0936	33.68000	1001	34.00500	1066	34.33000
0742	32.71000	0807	33.03500	0872	33.36000	0937	33.68500	1002	34.01000	1067	34.33500
0743	32.71500	0808	33.04000	0873	33.36500	0938	33.69000	1003	34.01500	1068	34.34000
0744	32.72000	0809	33.04500	0874	33.37000	0939	33.69500	1004	34.02000	1069	34.34500
0745	32.72500	0810	33.05000	0875	33.37500	0940	33.70000	1005	34.02500	1070	34.35000
0746	32.73000	0811	33.05500	0876	33.38000	0941	33.70500	1006	34.03000	1071	34.35500
0747	32.73500	0812	33.06000	0877	33.38500	0942	33.71000	1007	34.03500	1072	34.36000
0748	32.74000	0813	33.06500	0878	33.39000	0943	33.71500	1008	34.04000	1073	34.36500
0749	32.74500	0814	33.07000	0879	33.39500	0944	33.72000	1009	34.04500	1074	34.37000
0750	32.75000	0815	33.07500	0880	33.40000	0945	33.72500	1010	34.05000	1075	34.37500
0751	32.75500	0816	33.08000	0881	33.40500	0946	33.73000	1011	34.05500	1076	34.38000
0752	32.76000	0817	33.08500	0882	33.41000	0947	33.73500	1012	34.06000	1077	34.38500
0753	32.76500	0818	33.09000	0883	33.41500	0948	33.74000	1013	34.06500	1078	34.39000
0754	32.77000	0819	33.09500	0884	33.42000	0949	33.74500	1014	34.07000	1079	34.39500
0755	32.77500	0820	33.10000	0885	33.42500	0950	33.75000	1015	34.07500	1080	34.40000
0756	32.78000	0821	33.10500	0886	33.43000	0951	33.75500	1016	34.08000	1081	34.40500
0757	32.78500	0822	33.11000	0887	33.43500	0952	33.76000	1017	34.08500	1082	34.41000
0758	32.79000	0823	33.11500	0888	33.44000	0953	33.76500	1018	34.09000	1083	34.41500
0759	32.79500	0824	33.12000	0889	33.44500	0954	33.77000	1019	34.09500	1084	34.42000
0760	32.80000	0825	33.12500	0890	33.45000	0955	33.77500	1020	34.10000	1085	34.42500
0761	32.80500	0826	33.13000	0891	33.45500	0956	33.78000	1021	34.10500	1086	34.43000
0762	32.81000	0827	33.13500	0892	33.46000	0957	33.78500	1022	34.11000	1087	34.43500
0763	32.81500	0828	33.14000	0893	33.46500	0958	33.79000	1023	34.11500	1088	34.44000
0764	32.82000	0829	33.14500	0894	33.47000	0959	33.79500	1024	34.12000	1089	34.44500
0765	32.82500	0830	33.15000	0895	33.47500	0960	33.80000	1025	34.12500	1090	34.45000
0766	32.83000	0831	33.15500	0896	33.48000	0961	33.80500	1026	34.13000	1091	34.45500
0767	32.83500	0832	33.16000	0897	33.48500	0962	33.81000	1027	34.13500	1092	34.46000
0768	32.84000	0833	33.16500	0898	33.49000	0963	33.81500	1028	34.14000	1093	34.46500
0769	32.84500	0834	33.17000	0899	33.49500	0964	33.82000	1029	34.14500	1094	34.47000
0770	32.85000	0835	33.17500	0900	33.50000	0965	33.82500	1030	34.15000	1095	34.47500
0771	32.85500	0836	33.18000	0901	33.50500	0966	33.83000	1031	34.15500	1096	34.48000
0772	32.86000	0837	33.18500	0902	33.51000	0967	33.83500	1032	34.16000	1097	34.48500
0773	32.86500	0838	33.19000	0903	33.51500	0968	33.84000	1033	34.16500	1098	34.49000
0774	32.87000	0839	33.19500	0904	33.52000	0969	33.84500	1034	34.17000	1099	34.49500
0775	32.87500	0840	33.20000	0905	33.52500	0970	33.85000	1035	34.17500	1100	34.50000
0776	32.88000	0841	33.20500	0906	33.53000	0971	33.85500	1036	34.18000	1101	34.50500
0777	32.88500	0842	33.21000	0907	33.53500	0972	33.86000	1037	34.18500	1102	34.51000
0778	32.89000	0843	33.21500	0908	33.54000	0973	33.86500	1038	34.19000	1103	34.51500
0779	32.89500	0844	33.22000	0909	33.54500	0974	33.87000	1039	34.19500	1104	34.52000
0780	32.90000	0845	33.22500	0910	33.55000	0975	33.87500	1040	34.20000	1105	34.52500
0781	32.90500	0846	33.23000	0911	33.55500	0976	33.88000	1041	34.20500	1106	34.53000
0782	32.91000	0847	33.23500	0912	33.56000	0977	33.88500	1042	34.21000	1107	34.53500
0783	32.91500	0848	33.24000	0913	33.56500	0978	33.89000	1043	34.21500	1108	34.54000
0784	32.92000	0849	33.24500	0914	33.57000	0979	33.89500	1044	34.22000	1109	34.54500

Channel Designation Table: 29-50 MHz, 5kHz Increments - Continued

Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)
1110	34.55000	1175	34.87500	1240	35.20000	1305	35.52500	1370	35.85000	1435	36.17500
1111	34.55500	1176	34.88000	1241	35.20500	1306	35.53000	1371	35.85500	1436	36.18000
1112	34.56000	1177	34.88500	1242	35.21000	1307	35.53500	1372	35.86000	1437	36.18500
1113	34.56500	1178	34.89000	1243	35.21500	1308	35.54000	1373	35.86500	1438	36.19000
1114	34.57000	1179	34.89500	1244	35.22000	1309	35.54500	1374	35.87000	1439	36.19500
1115	34.57500	1180	34.90000	1245	35.22500	1310	35.55000	1375	35.87500	1440	36.20000
1116	34.58000	1181	34.90500	1246	35.23000	1311	35.55500	1376	35.88000	1441	36.20500
1117	34.58500	1182	34.91000	1247	35.23500	1312	35.56000	1377	35.88500	1442	36.21000
1118	34.59000	1183	34.91500	1248	35.24000	1313	35.56500	1378	35.89000	1443	36.21500
1119	34.59500	1184	34.92000	1249	35.24500	1314	35.57000	1379	35.89500	1444	36.22000
1120	34.60000	1185	34.92500	1250	35.25000	1315	35.57500	1380	35.90000	1445	36.22500
1121	34.60500	1186	34.93000	1251	35.25500	1316	35.58000	1381	35.90500	1446	36.23000
1122	34.61000	1187	34.93500	1252	35.26000	1317	35.58500	1382	35.91000	1447	36.23500
1123	34.61500	1188	34.94000	1253	35.26500	1318	35.59000	1383	35.91500	1448	36.24000
1124	34.62000	1189	34.94500	1254	35.27000	1319	35.59500	1384	35.92000	1449	36.24500
1125	34.62500	1190	34.95000	1255	35.27500	1320	35.60000	1385	35.92500	1450	36.25000
1126	34.63000	1191	34.95500	1256	35.28000	1321	35.60500	1386	35.93000	1451	36.25500
1127	34.63500	1192	34.96000	1257	35.28500	1322	35.61000	1387	35.93500	1452	36.26000
1128	34.64000	1193	34.96500	1258	35.29000	1323	35.61500	1388	35.94000	1453	36.26500
1129	34.64500	1194	34.97000	1259	35.29500	1324	35.62000	1389	35.94500	1454	36.27000
1130	34.65000	1195	34.97500	1260	35.30000	1325	35.62500	1390	35.95000	1455	36.27500
1131	34.65500	1196	34.98000	1261	35.30500	1326	35.63000	1391	35.95500	1456	36.28000
1132	34.66000	1197	34.98500	1262	35.31000	1327	35.63500	1392	35.96000	1457	36.28500
1133	34.66500	1198	34.99000	1263	35.31500	1328	35.64000	1393	35.96500	1458	36.29000
1134	34.67000	1199	34.99500	1264	35.32000	1329	35.64500	1394	35.97000	1459	36.29500
1135	34.67500	1200	35.00000	1265	35.32500	1330	35.65000	1395	35.97500	1460	36.30000
1136	34.68000	1201	35.00500	1266	35.33000	1331	35.65500	1396	35.98000	1461	36.30500
1137	34.68500	1202	35.01000	1267	35.33500	1332	35.66000	1397	35.98500	1462	36.31000
1138	34.69000	1203	35.01500	1268	35.34000	1333	35.66500	1398	35.99000	1463	36.31500
1139	34.69500	1204	35.02000	1269	35.34500	1334	35.67000	1399	35.99500	1464	36.32000
1140	34.70000	1205	35.02500	1270	35.35000	1335	35.67500	1400	36.00000	1465	36.32500
1141	34.70500	1206	35.03000	1271	35.35500	1336	35.68000	1401	36.00500	1466	36.33000
1142	34.71000	1207	35.03500	1272	35.36000	1337	35.68500	1402	36.01000	1467	36.33500
1143	34.71500	1208	35.04000	1273	35.36500	1338	35.69000	1403	36.01500	1468	36.34000
1144	34.72000	1209	35.04500	1274	35.37000	1339	35.69500	1404	36.02000	1469	36.34500
1145	34.72500	1210	35.05000	1275	35.37500	1340	35.70000	1405	36.02500	1470	36.35000
1146	34.73000	1211	35.05500	1276	35.38000	1341	35.70500	1406	36.03000	1471	36.35500
1147	34.73500	1212	35.06000	1277	35.38500	1342	35.71000	1407	36.03500	1472	36.36000
1148	34.74000	1213	35.06500	1278	35.39000	1343	35.71500	1408	36.04000	1473	36.36500
1149	34.74500	1214	35.07000	1279	35.39500	1344	35.72000	1409	36.04500	1474	36.37000
1150	34.75000	1215	35.07500	1280	35.40000	1345	35.72500	1410	36.05000	1475	36.37500
1151	34.75500	1216	35.08000	1281	35.40500	1346	35.73000	1411	36.05500	1476	36.38000
1152	34.76000	1217	35.08500	1282	35.41000	1347	35.73500	1412	36.06000	1477	36.38500
1153	34.76500	1218	35.09000	1283	35.41500	1348	35.74000	1413	36.06500	1478	36.39000
1154	34.77000	1219	35.09500	1284	35.42000	1349	35.74500	1414	36.07000	1479	36.39500
1155	34.77500	1220	35.10000	1285	35.42500	1350	35.75000	1415	36.07500	1480	36.40000
1156	34.78000	1221	35.10500	1286	35.43000	1351	35.75500	1416	36.08000	1481	36.40500
1157	34.78500	1222	35.11000	1287	35.43500	1352	35.76000	1417	36.08500	1482	36.41000
1158	34.79000	1223	35.11500	1288	35.44000	1353	35.76500	1418	36.09000	1483	36.41500
1159	34.79500	1224	35.12000	1289	35.44500	1354	35.77000	1419	36.09500	1484	36.42000
1160	34.80000	1225	35.12500	1290	35.45000	1355	35.77500	1420	36.10000	1485	36.42500
1161	34.80500	1226	35.13000	1291	35.45500	1356	35.78000	1421	36.10500	1486	36.43000
1162	34.81000	1227	35.13500	1292	35.46000	1357	35.78500	1422	36.11000	1487	36.43500
1163	34.81500	1228	35.14000	1293	35.46500	1358	35.79000	1423	36.11500	1488	36.44000
1164	34.82000	1229	35.14500	1294	35.47000	1359	35.79500	1424	36.12000	1489	36.44500
1165	34.82500	1230	35.15000	1295	35.47500	1360	35.80000	1425	36.12500	1490	36.45000
1166	34.83000	1231	35.15500	1296	35.48000	1361	35.80500	1426	36.13000	1491	36.45500
1167	34.83500	1232	35.16000	1297	35.48500	1362	35.81000	1427	36.13500	1492	36.46000
1168	34.84000	1233	35.16500	1298	35.49000	1363	35.81500	1428	36.14000	1493	36.46500
1169	34.84500	1234	35.17000	1299	35.49500	1364	35.82000	1429	36.14500	1494	36.47000
1170	34.85000	1235	35.17500	1300	35.50000	1365	35.82500	1430	36.15000	1495	36.47500
1171	34.85500	1236	35.18000	1301	35.50500	1366	35.83000	1431	36.15500	1496	36.48000
1172	34.86000	1237	35.18500	1302	35.51000	1367	35.83500	1432	36.16000	1497	36.48500
1173	34.86500	1238	35.19000	1303	35.51500	1368	35.84000	1433	36.16500	1498	36.49000
1174	34.87000	1239	35.19500	1304	35.52000	1369	35.84500	1434	36.17000	1499	36.49500

Channel Designation Table: 29-50 MHz, 5kHz Increments - Continued

Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)
1500	36.50000	1565	36.82500	1630	37.15000	1695	37.47500	1760	37.80000	1825	38.12500
1501	36.50500	1566	36.83000	1631	37.15500	1696	37.48000	1761	37.80500	1826	38.13000
1502	36.51000	1567	36.83500	1632	37.16000	1697	37.48500	1762	37.81000	1827	38.13500
1503	36.51500	1568	36.84000	1633	37.16500	1698	37.49000	1763	37.81500	1828	38.14000
1504	36.52000	1569	36.84500	1634	37.17000	1699	37.49500	1764	37.82000	1829	38.14500
1505	36.52500	1570	36.85000	1635	37.17500	1700	37.50000	1765	37.82500	1830	38.15000
1506	36.53000	1571	36.85500	1636	37.18000	1701	37.50500	1766	37.83000	1831	38.15500
1507	36.53500	1572	36.86000	1637	37.18500	1702	37.51000	1767	37.83500	1832	38.16000
1508	36.54000	1573	36.86500	1638	37.19000	1703	37.51500	1768	37.84000	1833	38.16500
1509	36.54500	1574	36.87000	1639	37.19500	1704	37.52000	1769	37.84500	1834	38.17000
1510	36.55000	1575	36.87500	1640	37.20000	1705	37.52500	1770	37.85000	1835	38.17500
1511	36.55500	1576	36.88000	1641	37.20500	1706	37.53000	1771	37.85500	1836	38.18000
1512	36.56000	1577	36.88500	1642	37.21000	1707	37.53500	1772	37.86000	1837	38.18500
1513	36.56500	1578	36.89000	1643	37.21500	1708	37.54000	1773	37.86500	1838	38.19000
1514	36.57000	1579	36.89500	1644	37.22000	1709	37.54500	1774	37.87000	1839	38.19500
1515	36.57500	1580	36.90000	1645	37.22500	1710	37.55000	1775	37.87500	1840	38.20000
1516	36.58000	1581	36.90500	1646	37.23000	1711	37.55500	1776	37.88000	1841	38.20500
1517	36.58500	1582	36.91000	1647	37.23500	1712	37.56000	1777	37.88500	1842	38.21000
1518	36.59000	1583	36.91500	1648	37.24000	1713	37.56500	1778	37.89000	1843	38.21500
1519	36.59500	1584	36.92000	1649	37.24500	1714	37.57000	1779	37.89500	1844	38.22000
1520	36.60000	1585	36.92500	1650	37.25000	1715	37.57500	1780	37.90000	1845	38.22500
1521	36.60500	1586	36.93000	1651	37.25500	1716	37.58000	1781	37.90500	1846	38.23000
1522	36.61000	1587	36.93500	1652	37.26000	1717	37.58500	1782	37.91000	1847	38.23500
1523	36.61500	1588	36.94000	1653	37.26500	1718	37.59000	1783	37.91500	1848	38.24000
1524	36.62000	1589	36.94500	1654	37.27000	1719	37.59500	1784	37.92000	1849	38.24500
1525	36.62500	1590	36.95000	1655	37.27500	1720	37.60000	1785	37.92500	1850	38.25000
1526	36.63000	1591	36.95500	1656	37.28000	1721	37.60500	1786	37.93000	1851	38.25500
1527	36.63500	1592	36.96000	1657	37.28500	1722	37.61000	1787	37.93500	1852	38.26000
1528	36.64000	1593	36.96500	1658	37.29000	1723	37.61500	1788	37.94000	1853	38.26500
1529	36.64500	1594	36.97000	1659	37.29500	1724	37.62000	1789	37.94500	1854	38.27000
1530	36.65000	1595	36.97500	1660	37.30000	1725	37.62500	1790	37.95000	1855	38.27500
1531	36.65500	1596	36.98000	1661	37.30500	1726	37.63000	1791	37.95500	1856	38.28000
1532	36.66000	1597	36.98500	1662	37.31000	1727	37.63500	1792	37.96000	1857	38.28500
1533	36.66500	1598	36.99000	1663	37.31500	1728	37.64000	1793	37.96500	1858	38.29000
1534	36.67000	1599	36.99500	1664	37.32000	1729	37.64500	1794	37.97000	1859	38.29500
1535	36.67500	1600	37.00000	1665	37.32500	1730	37.65000	1795	37.97500	1860	38.30000
1536	36.68000	1601	37.00500	1666	37.33000	1731	37.65500	1796	37.98000	1861	38.30500
1537	36.68500	1602	37.01000	1667	37.33500	1732	37.66000	1797	37.98500	1862	38.31000
1538	36.69000	1603	37.01500	1668	37.34000	1733	37.66500	1798	37.99000	1863	38.31500
1539	36.69500	1604	37.02000	1669	37.34500	1734	37.67000	1799	37.99500	1864	38.32000
1540	36.70000	1605	37.02500	1670	37.35000	1735	37.67500	1800	38.00000	1865	38.32500
1541	36.70500	1606	37.03000	1671	37.35500	1736	37.68000	1801	38.00500	1866	38.33000
1542	36.71000	1607	37.03500	1672	37.36000	1737	37.68500	1802	38.01000	1867	38.33500
1543	36.71500	1608	37.04000	1673	37.36500	1738	37.69000	1803	38.01500	1868	38.34000
1544	36.72000	1609	37.04500	1674	37.37000	1739	37.69500	1804	38.02000	1869	38.34500
1545	36.72500	1610	37.05000	1675	37.37500	1740	37.70000	1805	38.02500	1870	38.35000
1546	36.73000	1611	37.05500	1676	37.38000	1741	37.70500	1806	38.03000	1871	38.35500
1547	36.73500	1612	37.06000	1677	37.38500	1742	37.71000	1807	38.03500	1872	38.36000
1548	36.74000	1613	37.06500	1678	37.39000	1743	37.71500	1808	38.04000	1873	38.36500
1549	36.74500	1614	37.07000	1679	37.39500	1744	37.72000	1809	38.04500	1874	38.37000
1550	36.75000	1615	37.07500	1680	37.40000	1745	37.72500	1810	38.05000	1875	38.37500
1551	36.75500	1616	37.08000	1681	37.40500	1746	37.73000	1811	38.05500	1876	38.38000
1552	36.76000	1617	37.08500	1682	37.41000	1747	37.73500	1812	38.06000	1877	38.38500
1553	36.76500	1618	37.09000	1683	37.41500	1748	37.74000	1813	38.06500	1878	38.39000
1554	36.77000	1619	37.09500	1684	37.42000	1749	37.74500	1814	38.07000	1879	38.39500
1555	36.77500	1620	37.10000	1685	37.42500	1750	37.75000	1815	38.07500	1880	38.40000
1556	36.78000	1621	37.10500	1686	37.43000	1751	37.75500	1816	38.08000	1881	38.40500
1557	36.78500	1622	37.11000	1687	37.43500	1752	37.76000	1817	38.08500	1882	38.41000
1558	36.79000	1623	37.11500	1688	37.44000	1753	37.76500	1818	38.09000	1883	38.41500
1559	36.79500	1624	37.12000	1689	37.44500	1754	37.77000	1819	38.09500	1884	38.42000
1560	36.80000	1625	37.12500	1690	37.45000	1755	37.77500	1820	38.10000	1885	38.42500
1561	36.80500	1626	37.13000	1691	37.45500	1756	37.78000	1821	38.10500	1886	38.43000
1562	36.81000	1627	37.13500	1692	37.46000	1757	37.78500	1822	38.11000	1887	38.43500
1563	36.81500	1628	37.14000	1693	37.46500	1758	37.79000	1823	38.11500	1888	38.44000
1564	36.82000	1629	37.14500	1694	37.47000	1759	37.79500	1824	38.12000	1889	38.44500

Channel Designation Table: 29-50 MHz, 5kHz Increments - Continued

Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)
1890	38.45000	1955	38.77500	2020	39.10000	2085	39.42500	2150	39.75000	2215	40.07500
1891	38.45500	1956	38.78000	2021	39.10500	2086	39.43000	2151	39.75500	2216	40.08000
1892	38.46000	1957	38.78500	2022	39.11000	2087	39.43500	2152	39.76000	2217	40.08500
1893	38.46500	1958	38.79000	2023	39.11500	2088	39.44000	2153	39.76500	2218	40.09000
1894	38.47000	1959	38.79500	2024	39.12000	2089	39.44500	2154	39.77000	2219	40.09500
1895	38.47500	1960	38.80000	2025	39.12500	2090	39.45000	2155	39.77500	2220	40.10000
1896	38.48000	1961	38.80500	2026	39.13000	2091	39.45500	2156	39.78000	2221	40.10500
1897	38.48500	1962	38.81000	2027	39.13500	2092	39.46000	2157	39.78500	2222	40.11000
1898	38.49000	1963	38.81500	2028	39.14000	2093	39.46500	2158	39.79000	2223	40.11500
1899	38.49500	1964	38.82000	2029	39.14500	2094	39.47000	2159	39.79500	2224	40.12000
1900	38.50000	1965	38.82500	2030	39.15000	2095	39.47500	2160	39.80000	2225	40.12500
1901	38.50500	1966	38.83000	2031	39.15500	2096	39.48000	2161	39.80500	2226	40.13000
1902	38.51000	1967	38.83500	2032	39.16000	2097	39.48500	2162	39.81000	2227	40.13500
1903	38.51500	1968	38.84000	2033	39.16500	2098	39.49000	2163	39.81500	2228	40.14000
1904	38.52000	1969	38.84500	2034	39.17000	2099	39.49500	2164	39.82000	2229	40.14500
1905	38.52500	1970	38.85000	2035	39.17500	2100	39.50000	2165	39.82500	2230	40.15000
1906	38.53000	1971	38.85500	2036	39.18000	2101	39.50500	2166	39.83000	2231	40.15500
1907	38.53500	1972	38.86000	2037	39.18500	2102	39.51000	2167	39.83500	2232	40.16000
1908	38.54000	1973	38.86500	2038	39.19000	2103	39.51500	2168	39.84000	2233	40.16500
1909	38.54500	1974	38.87000	2039	39.19500	2104	39.52000	2169	39.84500	2234	40.17000
1910	38.55000	1975	38.87500	2040	39.20000	2105	39.52500	2170	39.85000	2235	40.17500
1911	38.55500	1976	38.88000	2041	39.20500	2106	39.53000	2171	39.85500	2236	40.18000
1912	38.56000	1977	38.88500	2042	39.21000	2107	39.53500	2172	39.86000	2237	40.18500
1913	38.56500	1978	38.89000	2043	39.21500	2108	39.54000	2173	39.86500	2238	40.19000
1914	38.57000	1979	38.89500	2044	39.22000	2109	39.54500	2174	39.87000	2239	40.19500
1915	38.57500	1980	38.90000	2045	39.22500	2110	39.55000	2175	39.87500	2240	40.20000
1916	38.58000	1981	38.90500	2046	39.23000	2111	39.55500	2176	39.88000	2241	40.20500
1917	38.58500	1982	38.91000	2047	39.23500	2112	39.56000	2177	39.88500	2242	40.21000
1918	38.59000	1983	38.91500	2048	39.24000	2113	39.56500	2178	39.89000	2243	40.21500
1919	38.59500	1984	38.92000	2049	39.24500	2114	39.57000	2179	39.89500	2244	40.22000
1920	38.60000	1985	38.92500	2050	39.25000	2115	39.57500	2180	39.90000	2245	40.22500
1921	38.60500	1986	38.93000	2051	39.25500	2116	39.58000	2181	39.90500	2246	40.23000
1922	38.61000	1987	38.93500	2052	39.26000	2117	39.58500	2182	39.91000	2247	40.23500
1923	38.61500	1988	38.94000	2053	39.26500	2118	39.59000	2183	39.91500	2248	40.24000
1924	38.62000	1989	38.94500	2054	39.27000	2119	39.59500	2184	39.92000	2249	40.24500
1925	38.62500	1990	38.95000	2055	39.27500	2120	39.60000	2185	39.92500	2250	40.25000
1926	38.63000	1991	38.95500	2056	39.28000	2121	39.60500	2186	39.93000	2251	40.25500
1927	38.63500	1992	38.96000	2057	39.28500	2122	39.61000	2187	39.93500	2252	40.26000
1928	38.64000	1993	38.96500	2058	39.29000	2123	39.61500	2188	39.94000	2253	40.26500
1929	38.64500	1994	38.97000	2059	39.29500	2124	39.62000	2189	39.94500	2254	40.27000
1930	38.65000	1995	38.97500	2060	39.30000	2125	39.62500	2190	39.95000	2255	40.27500
1931	38.65500	1996	38.98000	2061	39.30500	2126	39.63000	2191	39.95500	2256	40.28000
1932	38.66000	1997	38.98500	2062	39.31000	2127	39.63500	2192	39.96000	2257	40.28500
1933	38.66500	1998	38.99000	2063	39.31500	2128	39.64000	2193	39.96500	2258	40.29000
1934	38.67000	1999	38.99500	2064	39.32000	2129	39.64500	2194	39.97000	2259	40.29500
1935	38.67500	2000	39.00000	2065	39.32500	2130	39.65000	2195	39.97500	2260	40.30000
1936	38.68000	2001	39.00500	2066	39.33000	2131	39.65500	2196	39.98000	2261	40.30500
1937	38.68500	2002	39.01000	2067	39.33500	2132	39.66000	2197	39.98500	2262	40.31000
1938	38.69000	2003	39.01500	2068	39.34000	2133	39.66500	2198	39.99000	2263	40.31500
1939	38.69500	2004	39.02000	2069	39.34500	2134	39.67000	2199	39.99500	2264	40.32000
1940	38.70000	2005	39.02500	2070	39.35000	2135	39.67500	2200	40.00000	2265	40.32500
1941	38.70500	2006	39.03000	2071	39.35500	2136	39.68000	2201	40.00500	2266	40.33000
1942	38.71000	2007	39.03500	2072	39.36000	2137	39.68500	2202	40.01000	2267	40.33500
1943	38.71500	2008	39.04000	2073	39.36500	2138	39.69000	2203	40.01500	2268	40.34000
1944	38.72000	2009	39.04500	2074	39.37000	2139	39.69500	2204	40.02000	2269	40.34500
1945	38.72500	2010	39.05000	2075	39.37500	2140	39.70000	2205	40.02500	2270	40.35000
1946	38.73000	2011	39.05500	2076	39.38000	2141	39.70500	2206	40.03000	2271	40.35500
1947	38.73500	2012	39.06000	2077	39.38500	2142	39.71000	2207	40.03500	2272	40.36000
1948	38.74000	2013	39.06500	2078	39.39000	2143	39.71500	2208	40.04000	2273	40.36500
1949	38.74500	2014	39.07000	2079	39.39500	2144	39.72000	2209	40.04500	2274	40.37000
1950	38.75000	2015	39.07500	2080	39.40000	2145	39.72500	2210	40.05000	2275	40.37500
1951	38.75500	2016	39.08000	2081	39.40500	2146	39.73000	2211	40.05500	2276	40.38000
1952	38.76000	2017	39.08500	2082	39.41000	2147	39.73500	2212	40.06000	2277	40.38500
1953	38.76500	2018	39.09000	2083	39.41500	2148	39.74000	2213	40.06500	2278	40.39000
1954	38.77000	2019	39.09500	2084	39.42000	2149	39.74500	2214	40.07000	2279	40.39500

Channel Designation Table: 29-50 MHz, 5kHz Increments - Continued

Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)
2280	40.40000	2345	40.72500	2410	41.05000	2475	41.37500	2540	41.70000	2605	42.02500
2281	40.40500	2346	40.73000	2411	41.05500	2476	41.38000	2541	41.70500	2606	42.03000
2282	40.41000	2347	40.73500	2412	41.06000	2477	41.38500	2542	41.71000	2607	42.03500
2283	40.41500	2348	40.74000	2413	41.06500	2478	41.39000	2543	41.71500	2608	42.04000
2284	40.42000	2349	40.74500	2414	41.07000	2479	41.39500	2544	41.72000	2609	42.04500
2285	40.42500	2350	40.75000	2415	41.07500	2480	41.40000	2545	41.72500	2610	42.05000
2286	40.43000	2351	40.75500	2416	41.08000	2481	41.40500	2546	41.73000	2611	42.05500
2287	40.43500	2352	40.76000	2417	41.08500	2482	41.41000	2547	41.73500	2612	42.06000
2288	40.44000	2353	40.76500	2418	41.09000	2483	41.41500	2548	41.74000	2613	42.06500
2289	40.44500	2354	40.77000	2419	41.09500	2484	41.42000	2549	41.74500	2614	42.07000
2290	40.45000	2355	40.77500	2420	41.10000	2485	41.42500	2550	41.75000	2615	42.07500
2291	40.45500	2356	40.78000	2421	41.10500	2486	41.43000	2551	41.75500	2616	42.08000
2292	40.46000	2357	40.78500	2422	41.11000	2487	41.43500	2552	41.76000	2617	42.08500
2293	40.46500	2358	40.79000	2423	41.11500	2488	41.44000	2553	41.76500	2618	42.09000
2294	40.47000	2359	40.79500	2424	41.12000	2489	41.44500	2554	41.77000	2619	42.09500
2295	40.47500	2360	40.80000	2425	41.12500	2490	41.45000	2555	41.77500	2620	42.10000
2296	40.48000	2361	40.80500	2426	41.13000	2491	41.45500	2556	41.78000	2621	42.10500
2297	40.48500	2362	40.81000	2427	41.13500	2492	41.46000	2557	41.78500	2622	42.11000
2298	40.49000	2363	40.81500	2428	41.14000	2493	41.46500	2558	41.79000	2623	42.11500
2299	40.49500	2364	40.82000	2429	41.14500	2494	41.47000	2559	41.79500	2624	42.12000
2300	40.50000	2365	40.82500	2430	41.15000	2495	41.47500	2560	41.80000	2625	42.12500
2301	40.50500	2366	40.83000	2431	41.15500	2496	41.48000	2561	41.80500	2626	42.13000
2302	40.51000	2367	40.83500	2432	41.16000	2497	41.48500	2562	41.81000	2627	42.13500
2303	40.51500	2368	40.84000	2433	41.16500	2498	41.49000	2563	41.81500	2628	42.14000
2304	40.52000	2369	40.84500	2434	41.17000	2499	41.49500	2564	41.82000	2629	42.14500
2305	40.52500	2370	40.85000	2435	41.17500	2500	41.50000	2565	41.82500	2630	42.15000
2306	40.53000	2371	40.85500	2436	41.18000	2501	41.50500	2566	41.83000	2631	42.15500
2307	40.53500	2372	40.86000	2437	41.18500	2502	41.51000	2567	41.83500	2632	42.16000
2308	40.54000	2373	40.86500	2438	41.19000	2503	41.51500	2568	41.84000	2633	42.16500
2309	40.54500	2374	40.87000	2439	41.19500	2504	41.52000	2569	41.84500	2634	42.17000
2310	40.55000	2375	40.87500	2440	41.20000	2505	41.52500	2570	41.85000	2635	42.17500
2311	40.55500	2376	40.88000	2441	41.20500	2506	41.53000	2571	41.85500	2636	42.18000
2312	40.56000	2377	40.88500	2442	41.21000	2507	41.53500	2572	41.86000	2637	42.18500
2313	40.56500	2378	40.89000	2443	41.21500	2508	41.54000	2573	41.86500	2638	42.19000
2314	40.57000	2379	40.89500	2444	41.22000	2509	41.54500	2574	41.87000	2639	42.19500
2315	40.57500	2380	40.90000	2445	41.22500	2510	41.55000	2575	41.87500	2640	42.20000
2316	40.58000	2381	40.90500	2446	41.23000	2511	41.55500	2576	41.88000	2641	42.20500
2317	40.58500	2382	40.91000	2447	41.23500	2512	41.56000	2577	41.88500	2642	42.21000
2318	40.59000	2383	40.91500	2448	41.24000	2513	41.56500	2578	41.89000	2643	42.21500
2319	40.59500	2384	40.92000	2449	41.24500	2514	41.57000	2579	41.89500	2644	42.22000
2320	40.60000	2385	40.92500	2450	41.25000	2515	41.57500	2580	41.90000	2645	42.22500
2321	40.60500	2386	40.93000	2451	41.25500	2516	41.58000	2581	41.90500	2646	42.23000
2322	40.61000	2387	40.93500	2452	41.26000	2517	41.58500	2582	41.91000	2647	42.23500
2323	40.61500	2388	40.94000	2453	41.26500	2518	41.59000	2583	41.91500	2648	42.24000
2324	40.62000	2389	40.94500	2454	41.27000	2519	41.59500	2584	41.92000	2649	42.24500
2325	40.62500	2390	40.95000	2455	41.27500	2520	41.60000	2585	41.92500	2650	42.25000
2326	40.63000	2391	40.95500	2456	41.28000	2521	41.60500	2586	41.93000	2651	42.25500
2327	40.63500	2392	40.96000	2457	41.28500	2522	41.61000	2587	41.93500	2652	42.26000
2328	40.64000	2393	40.96500	2458	41.29000	2523	41.61500	2588	41.94000	2653	42.26500
2329	40.64500	2394	40.97000	2459	41.29500	2524	41.62000	2589	41.94500	2654	42.27000
2330	40.65000	2395	40.97500	2460	41.30000	2525	41.62500	2590	41.95000	2655	42.27500
2331	40.65500	2396	40.98000	2461	41.30500	2526	41.63000	2591	41.95500	2656	42.28000
2332	40.66000	2397	40.98500	2462	41.31000	2527	41.63500	2592	41.96000	2657	42.28500
2333	40.66500	2398	40.99000	2463	41.31500	2528	41.64000	2593	41.96500	2658	42.29000
2334	40.67000	2399	40.99500	2464	41.32000	2529	41.64500	2594	41.97000	2659	42.29500
2335	40.67500	2400	41.00000	2465	41.32500	2530	41.65000	2595	41.97500	2660	42.30000
2336	40.68000	2401	41.00500	2466	41.33000	2531	41.65500	2596	41.98000	2661	42.30500
2337	40.68500	2402	41.01000	2467	41.33500	2532	41.66000	2597	41.98500	2662	42.31000
2338	40.69000	2403	41.01500	2468	41.34000	2533	41.66500	2598	41.99000	2663	42.31500
2339	40.69500	2404	41.02000	2469	41.34500	2534	41.67000	2599	41.99500	2664	42.32000
2340	40.70000	2405	41.02500	2470	41.35000	2535	41.67500	2600	42.00000	2665	42.32500
2341	40.70500	2406	41.03000	2471	41.35500	2536	41.68000	2601	42.00500	2666	42.33000
2342	40.71000	2407	41.03500	2472	41.36000	2537	41.68500	2602	42.01000	2667	42.33500
2343	40.71500	2408	41.04000	2473	41.36500	2538	41.69000	2603	42.01500	2668	42.34000
2344	40.72000	2409	41.04500	2474	41.37000	2539	41.69500	2604	42.02000	2669	42.34500

Channel Designation Table: 29-50 MHz, 5kHz Increments - Continued

Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)
2670	42.35000	2735	42.67500	2800	43.00000	2865	43.32500	2930	43.65000	2995	43.97500
2671	42.35500	2736	42.68000	2801	43.00500	2866	43.33000	2931	43.65500	2996	43.98000
2672	42.36000	2737	42.68500	2802	43.01000	2867	43.33500	2932	43.66000	2997	43.98500
2673	42.36500	2738	42.69000	2803	43.01500	2868	43.34000	2933	43.66500	2998	43.99000
2674	42.37000	2739	42.69500	2804	43.02000	2869	43.34500	2934	43.67000	2999	43.99500
2675	42.37500	2740	42.70000	2805	43.02500	2870	43.35000	2935	43.67500	3000	44.00000
2676	42.38000	2741	42.70500	2806	43.03000	2871	43.35500	2936	43.68000	3001	44.00500
2677	42.38500	2742	42.71000	2807	43.03500	2872	43.36000	2937	43.68500	3002	44.01000
2678	42.39000	2743	42.71500	2808	43.04000	2873	43.36500	2938	43.69000	3003	44.01500
2679	42.39500	2744	42.72000	2809	43.04500	2874	43.37000	2939	43.69500	3004	44.02000
2680	42.40000	2745	42.72500	2810	43.05000	2875	43.37500	2940	43.70000	3005	44.02500
2681	42.40500	2746	42.73000	2811	43.05500	2876	43.38000	2941	43.70500	3006	44.03000
2682	42.41000	2747	42.73500	2812	43.06000	2877	43.38500	2942	43.71000	3007	44.03500
2683	42.41500	2748	42.74000	2813	43.06500	2878	43.39000	2943	43.71500	3008	44.04000
2684	42.42000	2749	42.74500	2814	43.07000	2879	43.39500	2944	43.72000	3009	44.04500
2685	42.42500	2750	42.75000	2815	43.07500	2880	43.40000	2945	43.72500	3010	44.05000
2686	42.43000	2751	42.75500	2816	43.08000	2881	43.40500	2946	43.73000	3011	44.05500
2687	42.43500	2752	42.76000	2817	43.08500	2882	43.41000	2947	43.73500	3012	44.06000
2688	42.44000	2753	42.76500	2818	43.09000	2883	43.41500	2948	43.74000	3013	44.06500
2689	42.44500	2754	42.77000	2819	43.09500	2884	43.42000	2949	43.74500	3014	44.07000
2690	42.45000	2755	42.77500	2820	43.10000	2885	43.42500	2950	43.75000	3015	44.07500
2691	42.45500	2756	42.78000	2821	43.10500	2886	43.43000	2951	43.75500	3016	44.08000
2692	42.46000	2757	42.78500	2822	43.11000	2887	43.43500	2952	43.76000	3017	44.08500
2693	42.46500	2758	42.79000	2823	43.11500	2888	43.44000	2953	43.76500	3018	44.09000
2694	42.47000	2759	42.79500	2824	43.12000	2889	43.44500	2954	43.77000	3019	44.09500
2695	42.47500	2760	42.80000	2825	43.12500	2890	43.45000	2955	43.77500	3020	44.10000
2696	42.48000	2761	42.80500	2826	43.13000	2891	43.45500	2956	43.78000	3021	44.10500
2697	42.48500	2762	42.81000	2827	43.13500	2892	43.46000	2957	43.78500	3022	44.11000
2698	42.49000	2763	42.81500	2828	43.14000	2893	43.46500	2958	43.79000	3023	44.11500
2699	42.49500	2764	42.82000	2829	43.14500	2894	43.47000	2959	43.79500	3024	44.12000
2700	42.50000	2765	42.82500	2830	43.15000	2895	43.47500	2960	43.80000	3025	44.12500
2701	42.50500	2766	42.83000	2831	43.15500	2896	43.48000	2961	43.80500	3026	44.13000
2702	42.51000	2767	42.83500	2832	43.16000	2897	43.48500	2962	43.81000	3027	44.13500
2703	42.51500	2768	42.84000	2833	43.16500	2898	43.49000	2963	43.81500	3028	44.14000
2704	42.52000	2769	42.84500	2834	43.17000	2899	43.49500	2964	43.82000	3029	44.14500
2705	42.52500	2770	42.85000	2835	43.17500	2900	43.50000	2965	43.82500	3030	44.15000
2706	42.53000	2771	42.85500	2836	43.18000	2901	43.50500	2966	43.83000	3031	44.15500
2707	42.53500	2772	42.86000	2837	43.18500	2902	43.51000	2967	43.83500	3032	44.16000
2708	42.54000	2773	42.86500	2838	43.19000	2903	43.51500	2968	43.84000	3033	44.16500
2709	42.54500	2774	42.87000	2839	43.19500	2904	43.52000	2969	43.84500	3034	44.17000
2710	42.55000	2775	42.87500	2840	43.20000	2905	43.52500	2970	43.85000	3035	44.17500
2711	42.55500	2776	42.88000	2841	43.20500	2906	43.53000	2971	43.85500	3036	44.18000
2712	42.56000	2777	42.88500	2842	43.21000	2907	43.53500	2972	43.86000	3037	44.18500
2713	42.56500	2778	42.89000	2843	43.21500	2908	43.54000	2973	43.86500	3038	44.19000
2714	42.57000	2779	42.89500	2844	43.22000	2909	43.54500	2974	43.87000	3039	44.19500
2715	42.57500	2780	42.90000	2845	43.22500	2910	43.55000	2975	43.87500	3040	44.20000
2716	42.58000	2781	42.90500	2846	43.23000	2911	43.55500	2976	43.88000	3041	44.20500
2717	42.58500	2782	42.91000	2847	43.23500	2912	43.56000	2977	43.88500	3042	44.21000
2718	42.59000	2783	42.91500	2848	43.24000	2913	43.56500	2978	43.89000	3043	44.21500
2719	42.59500	2784	42.92000	2849	43.24500	2914	43.57000	2979	43.89500	3044	44.22000
2720	42.60000	2785	42.92500	2850	43.25000	2915	43.57500	2980	43.90000	3045	44.22500
2721	42.60500	2786	42.93000	2851	43.25500	2916	43.58000	2981	43.90500	3046	44.23000
2722	42.61000	2787	42.93500	2852	43.26000	2917	43.58500	2982	43.91000	3047	44.23500
2723	42.61500	2788	42.94000	2853	43.26500	2918	43.59000	2983	43.91500	3048	44.24000
2724	42.62000	2789	42.94500	2854	43.27000	2919	43.59500	2984	43.92000	3049	44.24500
2725	42.62500	2790	42.95000	2855	43.27500	2920	43.60000	2985	43.92500	3050	44.25000
2726	42.63000	2791	42.95500	2856	43.28000	2921	43.60500	2986	43.93000	3051	44.25500
2727	42.63500	2792	42.96000	2857	43.28500	2922	43.61000	2987	43.93500	3052	44.26000
2728	42.64000	2793	42.96500	2858	43.29000	2923	43.61500	2988	43.94000	3053	44.26500
2729	42.64500	2794	42.97000	2859	43.29500	2924	43.62000	2989	43.94500	3054	44.27000
2730	42.65000	2795	42.97500	2860	43.30000	2925	43.62500	2990	43.95000	3055	44.27500
2731	42.65500	2796	42.98000	2861	43.30500	2926	43.63000	2991	43.95500	3056	44.28000
2732	42.66000	2797	42.98500	2862	43.31000	2927	43.63500	2992	43.96000	3057	44.28500
2733	42.66500	2798	42.99000	2863	43.31500	2928	43.64000	2993	43.96500	3058	44.29000
2734	42.67000	2799	42.99500	2864	43.32000	2929	43.64500	2994	43.97000	3059	44.29500

Channel Designation Table: 29-50 MHz, 5kHz Increments - Continued

Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)
3060	44.30000	3125	44.62500	3190	44.95000	3255	45.27500	3320	45.60000	3385	45.92500
3061	44.30500	3126	44.63000	3191	44.95500	3256	45.28000	3321	45.60500	3386	45.93000
3062	44.31000	3127	44.63500	3192	44.96000	3257	45.28500	3322	45.61000	3387	45.93500
3063	44.31500	3128	44.64000	3193	44.96500	3258	45.29000	3323	45.61500	3388	45.94000
3064	44.32000	3129	44.64500	3194	44.97000	3259	45.29500	3324	45.62000	3389	45.94500
3065	44.32500	3130	44.65000	3195	44.97500	3260	45.30000	3325	45.62500	3390	45.95000
3066	44.33000	3131	44.65500	3196	44.98000	3261	45.30500	3326	45.63000	3391	45.95500
3067	44.33500	3132	44.66000	3197	44.98500	3262	45.31000	3327	45.63500	3392	45.96000
3068	44.34000	3133	44.66500	3198	44.99000	3263	45.31500	3328	45.64000	3393	45.96500
3069	44.34500	3134	44.67000	3199	44.99500	3264	45.32000	3329	45.64500	3394	45.97000
3070	44.35000	3135	44.67500	3200	45.00000	3265	45.32500	3330	45.65000	3395	45.97500
3071	44.35500	3136	44.68000	3201	45.00500	3266	45.33000	3331	45.65500	3396	45.98000
3072	44.36000	3137	44.68500	3202	45.01000	3267	45.33500	3332	45.66000	3397	45.98500
3073	44.36500	3138	44.69000	3203	45.01500	3268	45.34000	3333	45.66500	3398	45.99000
3074	44.37000	3139	44.69500	3204	45.02000	3269	45.34500	3334	45.67000	3399	45.99500
3075	44.37500	3140	44.70000	3205	45.02500	3270	45.35000	3335	45.67500	3400	46.00000
3076	44.38000	3141	44.70500	3206	45.03000	3271	45.35500	3336	45.68000	3401	46.00500
3077	44.38500	3142	44.71000	3207	45.03500	3272	45.36000	3337	45.68500	3402	46.01000
3078	44.39000	3143	44.71500	3208	45.04000	3273	45.36500	3338	45.69000	3403	46.01500
3079	44.39500	3144	44.72000	3209	45.04500	3274	45.37000	3339	45.69500	3404	46.02000
3080	44.40000	3145	44.72500	3210	45.05000	3275	45.37500	3340	45.70000	3405	46.02500
3081	44.40500	3146	44.73000	3211	45.05500	3276	45.38000	3341	45.70500	3406	46.03000
3082	44.41000	3147	44.73500	3212	45.06000	3277	45.38500	3342	45.71000	3407	46.03500
3083	44.41500	3148	44.74000	3213	45.06500	3278	45.39000	3343	45.71500	3408	46.04000
3084	44.42000	3149	44.74500	3214	45.07000	3279	45.39500	3344	45.72000	3409	46.04500
3085	44.42500	3150	44.75000	3215	45.07500	3280	45.40000	3345	45.72500	3410	46.05000
3086	44.43000	3151	44.75500	3216	45.08000	3281	45.40500	3346	45.73000	3411	46.05500
3087	44.43500	3152	44.76000	3217	45.08500	3282	45.41000	3347	45.73500	3412	46.06000
3088	44.44000	3153	44.76500	3218	45.09000	3283	45.41500	3348	45.74000	3413	46.06500
3089	44.44500	3154	44.77000	3219	45.09500	3284	45.42000	3349	45.74500	3414	46.07000
3090	44.45000	3155	44.77500	3220	45.10000	3285	45.42500	3350	45.75000	3415	46.07500
3091	44.45500	3156	44.78000	3221	45.10500	3286	45.43000	3351	45.75500	3416	46.08000
3092	44.46000	3157	44.78500	3222	45.11000	3287	45.43500	3352	45.76000	3417	46.08500
3093	44.46500	3158	44.79000	3223	45.11500	3288	45.44000	3353	45.76500	3418	46.09000
3094	44.47000	3159	44.79500	3224	45.12000	3289	45.44500	3354	45.77000	3419	46.09500
3095	44.47500	3160	44.80000	3225	45.12500	3290	45.45000	3355	45.77500	3420	46.10000
3096	44.48000	3161	44.80500	3226	45.13000	3291	45.45500	3356	45.78000	3421	46.10500
3097	44.48500	3162	44.81000	3227	45.13500	3292	45.46000	3357	45.78500	3422	46.11000
3098	44.49000	3163	44.81500	3228	45.14000	3293	45.46500	3358	45.79000	3423	46.11500
3099	44.49500	3164	44.82000	3229	45.14500	3294	45.47000	3359	45.79500	3424	46.12000
3100	44.50000	3165	44.82500	3230	45.15000	3295	45.47500	3360	45.80000	3425	46.12500
3101	44.50500	3166	44.83000	3231	45.15500	3296	45.48000	3361	45.80500	3426	46.13000
3102	44.51000	3167	44.83500	3232	45.16000	3297	45.48500	3362	45.81000	3427	46.13500
3103	44.51500	3168	44.84000	3233	45.16500	3298	45.49000	3363	45.81500	3428	46.14000
3104	44.52000	3169	44.84500	3234	45.17000	3299	45.49500	3364	45.82000	3429	46.14500
3105	44.52500	3170	44.85000	3235	45.17500	3300	45.50000	3365	45.82500	3430	46.15000
3106	44.53000	3171	44.85500	3236	45.18000	3301	45.50500	3366	45.83000	3431	46.15500
3107	44.53500	3172	44.86000	3237	45.18500	3302	45.51000	3367	45.83500	3432	46.16000
3108	44.54000	3173	44.86500	3238	45.19000	3303	45.51500	3368	45.84000	3433	46.16500
3109	44.54500	3174	44.87000	3239	45.19500	3304	45.52000	3369	45.84500	3434	46.17000
3110	44.55000	3175	44.87500	3240	45.20000	3305	45.52500	3370	45.85000	3435	46.17500
3111	44.55500	3176	44.88000	3241	45.20500	3306	45.53000	3371	45.85500	3436	46.18000
3112	44.56000	3177	44.88500	3242	45.21000	3307	45.53500	3372	45.86000	3437	46.18500
3113	44.56500	3178	44.89000	3243	45.21500	3308	45.54000	3373	45.86500	3438	46.19000
3114	44.57000	3179	44.89500	3244	45.22000	3309	45.54500	3374	45.87000	3439	46.19500
3115	44.57500	3180	44.90000	3245	45.22500	3310	45.55000	3375	45.87500	3440	46.20000
3116	44.58000	3181	44.90500	3246	45.23000	3311	45.55500	3376	45.88000	3441	46.20500
3117	44.58500	3182	44.91000	3247	45.23500	3312	45.56000	3377	45.88500	3442	46.21000
3118	44.59000	3183	44.91500	3248	45.24000	3313	45.56500	3378	45.89000	3443	46.21500
3119	44.59500	3184	44.92000	3249	45.24500	3314	45.57000	3379	45.89500	3444	46.22000
3120	44.60000	3185	44.92500	3250	45.25000	3315	45.57500	3380	45.90000	3445	46.22500
3121	44.60500	3186	44.93000	3251	45.25500	3316	45.58000	3381	45.90500	3446	46.23000
3122	44.61000	3187	44.93500	3252	45.26000	3317	45.58500	3382	45.91000	3447	46.23500
3123	44.61500	3188	44.94000	3253	45.26500	3318	45.59000	3383	45.91500	3448	46.24000
3124	44.62000	3189	44.94500	3254	45.27000	3319	45.59500	3384	45.92000	3449	46.24500

Channel Designation Table: 29-50 MHz, 5kHz Increments - Continued

Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)
3450	46.25000	3515	46.57500	3580	46.90000	3645	47.22500	3710	47.55000	3775	47.87500
3451	46.25500	3516	46.58000	3581	46.90500	3646	47.23000	3711	47.55500	3776	47.88000
3452	46.26000	3517	46.58500	3582	46.91000	3647	47.23500	3712	47.56000	3777	47.88500
3453	46.26500	3518	46.59000	3583	46.91500	3648	47.24000	3713	47.56500	3778	47.89000
3454	46.27000	3519	46.59500	3584	46.92000	3649	47.24500	3714	47.57000	3779	47.89500
3455	46.27500	3520	46.60000	3585	46.92500	3650	47.25000	3715	47.57500	3780	47.90000
3456	46.28000	3521	46.60500	3586	46.93000	3651	47.25500	3716	47.58000	3781	47.90500
3457	46.28500	3522	46.61000	3587	46.93500	3652	47.26000	3717	47.58500	3782	47.91000
3458	46.29000	3523	46.61500	3588	46.94000	3653	47.26500	3718	47.59000	3783	47.91500
3459	46.29500	3524	46.62000	3589	46.94500	3654	47.27000	3719	47.59500	3784	47.92000
3460	46.30000	3525	46.62500	3590	46.95000	3655	47.27500	3720	47.60000	3785	47.92500
3461	46.30500	3526	46.63000	3591	46.95500	3656	47.28000	3721	47.60500	3786	47.93000
3462	46.31000	3527	46.63500	3592	46.96000	3657	47.28500	3722	47.61000	3787	47.93500
3463	46.31500	3528	46.64000	3593	46.96500	3658	47.29000	3723	47.61500	3788	47.94000
3464	46.32000	3529	46.64500	3594	46.97000	3659	47.29500	3724	47.62000	3789	47.94500
3465	46.32500	3530	46.65000	3595	46.97500	3660	47.30000	3725	47.62500	3790	47.95000
3466	46.33000	3531	46.65500	3596	46.98000	3661	47.30500	3726	47.63000	3791	47.95500
3467	46.33500	3532	46.66000	3597	46.98500	3662	47.31000	3727	47.63500	3792	47.96000
3468	46.34000	3533	46.66500	3598	46.99000	3663	47.31500	3728	47.64000	3793	47.96500
3469	46.34500	3534	46.67000	3599	46.99500	3664	47.32000	3729	47.64500	3794	47.97000
3470	46.35000	3535	46.67500	3600	47.00000	3665	47.32500	3730	47.65000	3795	47.97500
3471	46.35500	3536	46.68000	3601	47.00500	3666	47.33000	3731	47.65500	3796	47.98000
3472	46.36000	3537	46.68500	3602	47.01000	3667	47.33500	3732	47.66000	3797	47.98500
3473	46.36500	3538	46.69000	3603	47.01500	3668	47.34000	3733	47.66500	3798	47.99000
3474	46.37000	3539	46.69500	3604	47.02000	3669	47.34500	3734	47.67000	3799	47.99500
3475	46.37500	3540	46.70000	3605	47.02500	3670	47.35000	3735	47.67500	3800	48.00000
3476	46.38000	3541	46.70500	3606	47.03000	3671	47.35500	3736	47.68000	3801	48.00500
3477	46.38500	3542	46.71000	3607	47.03500	3672	47.36000	3737	47.68500	3802	48.01000
3478	46.39000	3543	46.71500	3608	47.04000	3673	47.36500	3738	47.69000	3803	48.01500
3479	46.39500	3544	46.72000	3609	47.04500	3674	47.37000	3739	47.69500	3804	48.02000
3480	46.40000	3545	46.72500	3610	47.05000	3675	47.37500	3740	47.70000	3805	48.02500
3481	46.40500	3546	46.73000	3611	47.05500	3676	47.38000	3741	47.70500	3806	48.03000
3482	46.41000	3547	46.73500	3612	47.06000	3677	47.38500	3742	47.71000	3807	48.03500
3483	46.41500	3548	46.74000	3613	47.06500	3678	47.39000	3743	47.71500	3808	48.04000
3484	46.42000	3549	46.74500	3614	47.07000	3679	47.39500	3744	47.72000	3809	48.04500
3485	46.42500	3550	46.75000	3615	47.07500	3680	47.40000	3745	47.72500	3810	48.05000
3486	46.43000	3551	46.75500	3616	47.08000	3681	47.40500	3746	47.73000	3811	48.05500
3487	46.43500	3552	46.76000	3617	47.08500	3682	47.41000	3747	47.73500	3812	48.06000
3488	46.44000	3553	46.76500	3618	47.09000	3683	47.41500	3748	47.74000	3813	48.06500
3489	46.44500	3554	46.77000	3619	47.09500	3684	47.42000	3749	47.74500	3814	48.07000
3490	46.45000	3555	46.77500	3620	47.10000	3685	47.42500	3750	47.75000	3815	48.07500
3491	46.45500	3556	46.78000	3621	47.10500	3686	47.43000	3751	47.75500	3816	48.08000
3492	46.46000	3557	46.78500	3622	47.11000	3687	47.43500	3752	47.76000	3817	48.08500
3493	46.46500	3558	46.79000	3623	47.11500	3688	47.44000	3753	47.76500	3818	48.09000
3494	46.47000	3559	46.79500	3624	47.12000	3689	47.44500	3754	47.77000	3819	48.09500
3495	46.47500	3560	46.80000	3625	47.12500	3690	47.45000	3755	47.77500	3820	48.10000
3496	46.48000	3561	46.80500	3626	47.13000	3691	47.45500	3756	47.78000	3821	48.10500
3497	46.48500	3562	46.81000	3627	47.13500	3692	47.46000	3757	47.78500	3822	48.11000
3498	46.49000	3563	46.81500	3628	47.14000	3693	47.46500	3758	47.79000	3823	48.11500
3499	46.49500	3564	46.82000	3629	47.14500	3694	47.47000	3759	47.79500	3824	48.12000
3500	46.50000	3565	46.82500	3630	47.15000	3695	47.47500	3760	47.80000	3825	48.12500
3501	46.50500	3566	46.83000	3631	47.15500	3696	47.48000	3761	47.80500	3826	48.13000
3502	46.51000	3567	46.83500	3632	47.16000	3697	47.48500	3762	47.81000	3827	48.13500
3503	46.51500	3568	46.84000	3633	47.16500	3698	47.49000	3763	47.81500	3828	48.14000
3504	46.52000	3569	46.84500	3634	47.17000	3699	47.49500	3764	47.82000	3829	48.14500
3505	46.52500	3570	46.85000	3635	47.17500	3700	47.50000	3765	47.82500	3830	48.15000
3506	46.53000	3571	46.85500	3636	47.18000	3701	47.50500	3766	47.83000	3831	48.15500
3507	46.53500	3572	46.86000	3637	47.18500	3702	47.51000	3767	47.83500	3832	48.16000
3508	46.54000	3573	46.86500	3638	47.19000	3703	47.51500	3768	47.84000	3833	48.16500
3509	46.54500	3574	46.87000	3639	47.19500	3704	47.52000	3769	47.84500	3834	48.17000
3510	46.55000	3575	46.87500	3640	47.20000	3705	47.52500	3770	47.85000	3835	48.17500
3511	46.55500	3576	46.88000	3641	47.20500	3706	47.53000	3771	47.85500	3836	48.18000
3512	46.56000	3577	46.88500	3642	47.21000	3707	47.53500	3772	47.86000	3837	48.18500
3513	46.56500	3578	46.89000	3643	47.21500	3708	47.54000	3773	47.86500	3838	48.19000
3514	46.57000	3579	46.89500	3644	47.22000	3709	47.54500	3774	47.87000	3839	48.19500

Channel Designation Table: 29-50 MHz, 5kHz Increments - Continued

Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)
3840	48.20000	3905	48.52500	3970	48.85000	4035	49.17500	4100	49.50000	4165	49.82500
3841	48.20500	3906	48.53000	3971	48.85500	4036	49.18000	4101	49.50500	4166	49.83000
3842	48.21000	3907	48.53500	3972	48.86000	4037	49.18500	4102	49.51000	4167	49.83500
3843	48.21500	3908	48.54000	3973	48.86500	4038	49.19000	4103	49.51500	4168	49.84000
3844	48.22000	3909	48.54500	3974	48.87000	4039	49.19500	4104	49.52000	4169	49.84500
3845	48.22500	3910	48.55000	3975	48.87500	4040	49.20000	4105	49.52500	4170	49.85000
3846	48.23000	3911	48.55500	3976	48.88000	4041	49.20500	4106	49.53000	4171	49.85500
3847	48.23500	3912	48.56000	3977	48.88500	4042	49.21000	4107	49.53500	4172	49.86000
3848	48.24000	3913	48.56500	3978	48.89000	4043	49.21500	4108	49.54000	4173	49.86500
3849	48.24500	3914	48.57000	3979	48.89500	4044	49.22000	4109	49.54500	4174	49.87000
3850	48.25000	3915	48.57500	3980	48.90000	4045	49.22500	4110	49.55000	4175	49.87500
3851	48.25500	3916	48.58000	3981	48.90500	4046	49.23000	4111	49.55500	4176	49.88000
3852	48.26000	3917	48.58500	3982	48.91000	4047	49.23500	4112	49.56000	4177	49.88500
3853	48.26500	3918	48.59000	3983	48.91500	4048	49.24000	4113	49.56500	4178	49.89000
3854	48.27000	3919	48.59500	3984	48.92000	4049	49.24500	4114	49.57000	4179	49.89500
3855	48.27500	3920	48.60000	3985	48.92500	4050	49.25000	4115	49.57500	4180	49.90000
3856	48.28000	3921	48.60500	3986	48.93000	4051	49.25500	4116	49.58000	4181	49.90500
3857	48.28500	3922	48.61000	3987	48.93500	4052	49.26000	4117	49.58500	4182	49.91000
3858	48.29000	3923	48.61500	3988	48.94000	4053	49.26500	4118	49.59000	4183	49.91500
3859	48.29500	3924	48.62000	3989	48.94500	4054	49.27000	4119	49.59500	4184	49.92000
3860	48.30000	3925	48.62500	3990	48.95000	4055	49.27500	4120	49.60000	4185	49.92500
3861	48.30500	3926	48.63000	3991	48.95500	4056	49.28000	4121	49.60500	4186	49.93000
3862	48.31000	3927	48.63500	3992	48.96000	4057	49.28500	4122	49.61000	4187	49.93500
3863	48.31500	3928	48.64000	3993	48.96500	4058	49.29000	4123	49.61500	4188	49.94000
3864	48.32000	3929	48.64500	3994	48.97000	4059	49.29500	4124	49.62000	4189	49.94500
3865	48.32500	3930	48.65000	3995	48.97500	4060	49.30000	4125	49.62500	4190	49.95000
3866	48.33000	3931	48.65500	3996	48.98000	4061	49.30500	4126	49.63000	4191	49.95500
3867	48.33500	3932	48.66000	3997	48.98500	4062	49.31000	4127	49.63500	4192	49.96000
3868	48.34000	3933	48.66500	3998	48.99000	4063	49.31500	4128	49.64000	4193	49.96500
3869	48.34500	3934	48.67000	3999	48.99500	4064	49.32000	4129	49.64500	4194	49.97000
3870	48.35000	3935	48.67500	4000	49.00000	4065	49.32500	4130	49.65000	4195	49.97500
3871	48.35500	3936	48.68000	4001	49.00500	4066	49.33000	4131	49.65500	4196	49.98000
3872	48.36000	3937	48.68500	4002	49.01000	4067	49.33500	4132	49.66000	4197	49.98500
3873	48.36500	3938	48.69000	4003	49.01500	4068	49.34000	4133	49.66500	4198	49.99000
3874	48.37000	3939	48.69500	4004	49.02000	4069	49.34500	4134	49.67000	4199	49.99500
3875	48.37500	3940	48.70000	4005	49.02500	4070	49.35000	4135	49.67500	4200	50.00
3876	48.38000	3941	48.70500	4006	49.03000	4071	49.35500	4136	49.68000		
3877	48.38500	3942	48.71000	4007	49.03500	4072	49.36000	4137	49.68500		
3878	48.39000	3943	48.71500	4008	49.04000	4073	49.36500	4138	49.69000		
3879	48.39500	3944	48.72000	4009	49.04500	4074	49.37000	4139	49.69500		
3880	48.40000	3945	48.72500	4010	49.05000	4075	49.37500	4140	49.70000		
3881	48.40500	3946	48.73000	4011	49.05500	4076	49.38000	4141	49.70500		
3882	48.41000	3947	48.73500	4012	49.06000	4077	49.38500	4142	49.71000		
3883	48.41500	3948	48.74000	4013	49.06500	4078	49.39000	4143	49.71500		
3884	48.42000	3949	48.74500	4014	49.07000	4079	49.39500	4144	49.72000		
3885	48.42500	3950	48.75000	4015	49.07500	4080	49.40000	4145	49.72500		
3886	48.43000	3951	48.75500	4016	49.08000	4081	49.40500	4146	49.73000		
3887	48.43500	3952	48.76000	4017	49.08500	4082	49.41000	4147	49.73500		
3888	48.44000	3953	48.76500	4018	49.09000	4083	49.41500	4148	49.74000		
3889	48.44500	3954	48.77000	4019	49.09500	4084	49.42000	4149	49.74500		
3890	48.45000	3955	48.77500	4020	49.10000	4085	49.42500	4150	49.75000		
3891	48.45500	3956	48.78000	4021	49.10500	4086	49.43000	4151	49.75500		
3892	48.46000	3957	48.78500	4022	49.11000	4087	49.43500	4152	49.76000		
3893	48.46500	3958	48.79000	4023	49.11500	4088	49.44000	4153	49.76500		
3894	48.47000	3959	48.79500	4024	49.12000	4089	49.44500	4154	49.77000		
3895	48.47500	3960	48.80000	4025	49.12500	4090	49.45000	4155	49.77500		
3896	48.48000	3961	48.80500	4026	49.13000	4091	49.45500	4156	49.78000		
3897	48.48500	3962	48.81000	4027	49.13500	4092	49.46000	4157	49.78500		
3898	48.49000	3963	48.81500	4028	49.14000	4093	49.46500	4158	49.79000		
3899	48.49500	3964	48.82000	4029	49.14500	4094	49.47000	4159	49.79500		
3900	48.50000	3965	48.82500	4030	49.15000	4095	49.47500	4160	49.80000		
3901	48.50500	3966	48.83000	4031	49.15500	4096	49.48000	4161	49.80500		
3902	48.51000	3967	48.83500	4032	49.16000	4097	49.48500	4162	49.81000		
3903	48.51500	3968	48.84000	4033	49.16500	4098	49.49000	4163	49.81500		
3904	48.52000	3969	48.84500	4034	49.17000	4099	49.49500	4164	49.82000		

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8.2 Channel Designation Table: 29-50 MHz, 6.25kHz Increments

Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)
5000	29.00000	5060	29.37500	5120	29.75000	5180	30.12500	5240	30.50000	5300	30.87500
5001	29.00625	5061	29.38125	5121	29.75625	5181	30.13125	5241	30.50625	5301	30.88125
5002	29.01250	5062	29.38750	5122	29.76250	5182	30.13750	5242	30.51250	5302	30.88750
5003	29.01875	5063	29.39375	5123	29.76875	5183	30.14375	5243	30.51875	5303	30.89375
5004	29.02500	5064	29.40000	5124	29.77500	5184	30.15000	5244	30.52500	5304	30.90000
5005	29.03125	5065	29.40625	5125	29.78125	5185	30.15625	5245	30.53125	5305	30.90625
5006	29.03750	5066	29.41250	5126	29.78750	5186	30.16250	5246	30.53750	5306	30.91250
5007	29.04375	5067	29.41875	5127	29.79375	5187	30.16875	5247	30.54375	5307	30.91875
5008	29.05000	5068	29.42500	5128	29.80000	5188	30.17500	5248	30.55000	5308	30.92500
5009	29.05625	5069	29.43125	5129	29.80625	5189	30.18125	5249	30.55625	5309	30.93125
5010	29.06250	5070	29.43750	5130	29.81250	5190	30.18750	5250	30.56250	5310	30.93750
5011	29.06875	5071	29.44375	5131	29.81875	5191	30.19375	5251	30.56875	5311	30.94375
5012	29.07500	5072	29.45000	5132	29.82500	5192	30.20000	5252	30.57500	5312	30.95000
5013	29.08125	5073	29.45625	5133	29.83125	5193	30.20625	5253	30.58125	5313	30.95625
5014	29.08750	5074	29.46250	5134	29.83750	5194	30.21250	5254	30.58750	5314	30.96250
5015	29.09375	5075	29.46875	5135	29.84375	5195	30.21875	5255	30.59375	5315	30.96875
5016	29.10000	5076	29.47500	5136	29.85000	5196	30.22500	5256	30.60000	5316	30.97500
5017	29.10625	5077	29.48125	5137	29.85625	5197	30.23125	5257	30.60625	5317	30.98125
5018	29.11250	5078	29.48750	5138	29.86250	5198	30.23750	5258	30.61250	5318	30.98750
5019	29.11875	5079	29.49375	5139	29.86875	5199	30.24375	5259	30.61875	5319	30.99375
5020	29.12500	5080	29.50000	5140	29.87500	5200	30.25000	5260	30.62500	5320	31.00000
5021	29.13125	5081	29.50625	5141	29.88125	5201	30.25625	5261	30.63125	5321	31.00625
5022	29.13750	5082	29.51250	5142	29.88750	5202	30.26250	5262	30.63750	5322	31.01250
5023	29.14375	5083	29.51875	5143	29.89375	5203	30.26875	5263	30.64375	5323	31.01875
5024	29.15000	5084	29.52500	5144	29.90000	5204	30.27500	5264	30.65000	5324	31.02500
5025	29.15625	5085	29.53125	5145	29.90625	5205	30.28125	5265	30.65625	5325	31.03125
5026	29.16250	5086	29.53750	5146	29.91250	5206	30.28750	5266	30.66250	5326	31.03750
5027	29.16875	5087	29.54375	5147	29.91875	5207	30.29375	5267	30.66875	5327	31.04375
5028	29.17500	5088	29.55000	5148	29.92500	5208	30.30000	5268	30.67500	5328	31.05000
5029	29.18125	5089	29.55625	5149	29.93125	5209	30.30625	5269	30.68125	5329	31.05625
5030	29.18750	5090	29.56250	5150	29.93750	5210	30.31250	5270	30.68750	5330	31.06250
5031	29.19375	5091	29.56875	5151	29.94375	5211	30.31875	5271	30.69375	5331	31.06875
5032	29.20000	5092	29.57500	5152	29.95000	5212	30.32500	5272	30.70000	5332	31.07500
5033	29.20625	5093	29.58125	5153	29.95625	5213	30.33125	5273	30.70625	5333	31.08125
5034	29.21250	5094	29.58750	5154	29.96250	5214	30.33750	5274	30.71250	5334	31.08750
5035	29.21875	5095	29.59375	5155	29.96875	5215	30.34375	5275	30.71875	5335	31.09375
5036	29.22500	5096	29.60000	5156	29.97500	5216	30.35000	5276	30.72500	5336	31.10000
5037	29.23125	5097	29.60625	5157	29.98125	5217	30.35625	5277	30.73125	5337	31.10625
5038	29.23750	5098	29.61250	5158	29.98750	5218	30.36250	5278	30.73750	5338	31.11250
5039	29.24375	5099	29.61875	5159	29.99375	5219	30.36875	5279	30.74375	5339	31.11875
5040	29.25000	5100	29.62500	5160	30.00000	5220	30.37500	5280	30.75000	5340	31.12500
5041	29.25625	5101	29.63125	5161	30.00625	5221	30.38125	5281	30.75625	5341	31.13125
5042	29.26250	5102	29.63750	5162	30.01250	5222	30.38750	5282	30.76250	5342	31.13750
5043	29.26875	5103	29.64375	5163	30.01875	5223	30.39375	5283	30.76875	5343	31.14375
5044	29.27500	5104	29.65000	5164	30.02500	5224	30.40000	5284	30.77500	5344	31.15000
5045	29.28125	5105	29.65625	5165	30.03125	5225	30.40625	5285	30.78125	5345	31.15625
5046	29.28750	5106	29.66250	5166	30.03750	5226	30.41250	5286	30.78750	5346	31.16250
5047	29.29375	5107	29.66875	5167	30.04375	5227	30.41875	5287	30.79375	5347	31.16875
5048	29.30000	5108	29.67500	5168	30.05000	5228	30.42500	5288	30.80000	5348	31.17500
5049	29.30625	5109	29.68125	5169	30.05625	5229	30.43125	5289	30.80625	5349	31.18125
5050	29.31250	5110	29.68750	5170	30.06250	5230	30.43750	5290	30.81250	5350	31.18750
5051	29.31875	5111	29.69375	5171	30.06875	5231	30.44375	5291	30.81875	5351	31.19375
5052	29.32500	5112	29.70000	5172	30.07500	5232	30.45000	5292	30.82500	5352	31.20000
5053	29.33125	5113	29.70625	5173	30.08125	5233	30.45625	5293	30.83125	5353	31.20625
5054	29.33750	5114	29.71250	5174	30.08750	5234	30.46250	5294	30.83750	5354	31.21250
5055	29.34375	5115	29.71875	5175	30.09375	5235	30.46875	5295	30.84375	5355	31.21875
5056	29.35000	5116	29.72500	5176	30.10000	5236	30.47500	5296	30.85000	5356	31.22500
5057	29.35625	5117	29.73125	5177	30.10625	5237	30.48125	5297	30.85625	5357	31.23125
5058	29.36250	5118	29.73750	5178	30.11250	5238	30.48750	5298	30.86250	5358	31.23750
5059	29.36875	5119	29.74375	5179	30.11875	5239	30.49375	5299	30.86875	5359	31.24375

Channel Designation Table: 29-50 MHz, 6.25kHz Increments - Continued

Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)
5360	31.25000	5420	31.62500	5480	32.00000	5540	32.37500	5600	32.75000	5660	33.12500
5361	31.25625	5421	31.63125	5481	32.00625	5541	32.38125	5601	32.75625	5661	33.13125
5362	31.26250	5422	31.63750	5482	32.01250	5542	32.38750	5602	32.76250	5662	33.13750
5363	31.26875	5423	31.64375	5483	32.01875	5543	32.39375	5603	32.76875	5663	33.14375
5364	31.27500	5424	31.65000	5484	32.02500	5544	32.40000	5604	32.77500	5664	33.15000
5365	31.28125	5425	31.65625	5485	32.03125	5545	32.40625	5605	32.78125	5665	33.15625
5366	31.28750	5426	31.66250	5486	32.03750	5546	32.41250	5606	32.78750	5666	33.16250
5367	31.29375	5427	31.66875	5487	32.04375	5547	32.41875	5607	32.79375	5667	33.16875
5368	31.30000	5428	31.67500	5488	32.05000	5548	32.42500	5608	32.80000	5668	33.17500
5369	31.30625	5429	31.68125	5489	32.05625	5549	32.43125	5609	32.80625	5669	33.18125
5370	31.31250	5430	31.68750	5490	32.06250	5550	32.43750	5610	32.81250	5670	33.18750
5371	31.31875	5431	31.69375	5491	32.06875	5551	32.44375	5611	32.81875	5671	33.19375
5372	31.32500	5432	31.70000	5492	32.07500	5552	32.45000	5612	32.82500	5672	33.20000
5373	31.33125	5433	31.70625	5493	32.08125	5553	32.45625	5613	32.83125	5673	33.20625
5374	31.33750	5434	31.71250	5494	32.08750	5554	32.46250	5614	32.83750	5674	33.21250
5375	31.34375	5435	31.71875	5495	32.09375	5555	32.46875	5615	32.84375	5675	33.21875
5376	31.35000	5436	31.72500	5496	32.10000	5556	32.47500	5616	32.85000	5676	33.22500
5377	31.35625	5437	31.73125	5497	32.10625	5557	32.48125	5617	32.85625	5677	33.23125
5378	31.36250	5438	31.73750	5498	32.11250	5558	32.48750	5618	32.86250	5678	33.23750
5379	31.36875	5439	31.74375	5499	32.11875	5559	32.49375	5619	32.86875	5679	33.24375
5380	31.37500	5440	31.75000	5500	32.12500	5560	32.50000	5620	32.87500	5680	33.25000
5381	31.38125	5441	31.75625	5501	32.13125	5561	32.50625	5621	32.88125	5681	33.25625
5382	31.38750	5442	31.76250	5502	32.13750	5562	32.51250	5622	32.88750	5682	33.26250
5383	31.39375	5443	31.76875	5503	32.14375	5563	32.51875	5623	32.89375	5683	33.26875
5384	31.40000	5444	31.77500	5504	32.15000	5564	32.52500	5624	32.90000	5684	33.27500
5385	31.40625	5445	31.78125	5505	32.15625	5565	32.53125	5625	32.90625	5685	33.28125
5386	31.41250	5446	31.78750	5506	32.16250	5566	32.53750	5626	32.91250	5686	33.28750
5387	31.41875	5447	31.79375	5507	32.16875	5567	32.54375	5627	32.91875	5687	33.29375
5388	31.42500	5448	31.80000	5508	32.17500	5568	32.55000	5628	32.92500	5688	33.30000
5389	31.43125	5449	31.80625	5509	32.18125	5569	32.55625	5629	32.93125	5689	33.30625
5390	31.43750	5450	31.81250	5510	32.18750	5570	32.56250	5630	32.93750	5690	33.31250
5391	31.44375	5451	31.81875	5511	32.19375	5571	32.56875	5631	32.94375	5691	33.31875
5392	31.45000	5452	31.82500	5512	32.20000	5572	32.57500	5632	32.95000	5692	33.32500
5393	31.45625	5453	31.83125	5513	32.20625	5573	32.58125	5633	32.95625	5693	33.33125
5394	31.46250	5454	31.83750	5514	32.21250	5574	32.58750	5634	32.96250	5694	33.33750
5395	31.46875	5455	31.84375	5515	32.21875	5575	32.59375	5635	32.96875	5695	33.34375
5396	31.47500	5456	31.85000	5516	32.22500	5576	32.60000	5636	32.97500	5696	33.35000
5397	31.48125	5457	31.85625	5517	32.23125	5577	32.60625	5637	32.98125	5697	33.35625
5398	31.48750	5458	31.86250	5518	32.23750	5578	32.61250	5638	32.98750	5698	33.36250
5399	31.49375	5459	31.86875	5519	32.24375	5579	32.61875	5639	32.99375	5699	33.36875
5400	31.50000	5460	31.87500	5520	32.25000	5580	32.62500	5640	33.00000	5700	33.37500
5401	31.50625	5461	31.88125	5521	32.25625	5581	32.63125	5641	33.00625	5701	33.38125
5402	31.51250	5462	31.88750	5522	32.26250	5582	32.63750	5642	33.01250	5702	33.38750
5403	31.51875	5463	31.89375	5523	32.26875	5583	32.64375	5643	33.01875	5703	33.39375
5404	31.52500	5464	31.90000	5524	32.27500	5584	32.65000	5644	33.02500	5704	33.40000
5405	31.53125	5465	31.90625	5525	32.28125	5585	32.65625	5645	33.03125	5705	33.40625
5406	31.53750	5466	31.91250	5526	32.28750	5586	32.66250	5646	33.03750	5706	33.41250
5407	31.54375	5467	31.91875	5527	32.29375	5587	32.66875	5647	33.04375	5707	33.41875
5408	31.55000	5468	31.92500	5528	32.30000	5588	32.67500	5648	33.05000	5708	33.42500
5409	31.55625	5469	31.93125	5529	32.30625	5589	32.68125	5649	33.05625	5709	33.43125
5410	31.56250	5470	31.93750	5530	32.31250	5590	32.68750	5650	33.06250	5710	33.43750
5411	31.56875	5471	31.94375	5531	32.31875	5591	32.69375	5651	33.06875	5711	33.44375
5412	31.57500	5472	31.95000	5532	32.32500	5592	32.70000	5652	33.07500	5712	33.45000
5413	31.58125	5473	31.95625	5533	32.33125	5593	32.70625	5653	33.08125	5713	33.45625
5414	31.58750	5474	31.96250	5534	32.33750	5594	32.71250	5654	33.08750	5714	33.46250
5415	31.59375	5475	31.96875	5535	32.34375	5595	32.71875	5655	33.09375	5715	33.46875
5416	31.60000	5476	31.97500	5536	32.35000	5596	32.72500	5656	33.10000	5716	33.47500
5417	31.60625	5477	31.98125	5537	32.35625	5597	32.73125	5657	33.10625	5717	33.48125
5418	31.61250	5478	31.98750	5538	32.36250	5598	32.73750	5658	33.11250	5718	33.48750
5419	31.61875	5479	31.99375	5539	32.36875	5599	32.74375	5659	33.11875	5719	33.49375

Channel Designation Table: 29-50 MHz, 6.25kHz Increments - Continued

Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)
5720	33.50000	5780	33.87500	5840	34.25000	5900	34.62500	5960	35.00000	6020	35.37500
5721	33.50625	5781	33.88125	5841	34.25625	5901	34.63125	5961	35.00625	6021	35.38125
5722	33.51250	5782	33.88750	5842	34.26250	5902	34.63750	5962	35.01250	6022	35.38750
5723	33.51875	5783	33.89375	5843	34.26875	5903	34.64375	5963	35.01875	6023	35.39375
5724	33.52500	5784	33.90000	5844	34.27500	5904	34.65000	5964	35.02500	6024	35.40000
5725	33.53125	5785	33.90625	5845	34.28125	5905	34.65625	5965	35.03125	6025	35.40625
5726	33.53750	5786	33.91250	5846	34.28750	5906	34.66250	5966	35.03750	6026	35.41250
5727	33.54375	5787	33.91875	5847	34.29375	5907	34.66875	5967	35.04375	6027	35.41875
5728	33.55000	5788	33.92500	5848	34.30000	5908	34.67500	5968	35.05000	6028	35.42500
5729	33.55625	5789	33.93125	5849	34.30625	5909	34.68125	5969	35.05625	6029	35.43125
5730	33.56250	5790	33.93750	5850	34.31250	5910	34.68750	5970	35.06250	6030	35.43750
5731	33.56875	5791	33.94375	5851	34.31875	5911	34.69375	5971	35.06875	6031	35.44375
5732	33.57500	5792	33.95000	5852	34.32500	5912	34.70000	5972	35.07500	6032	35.45000
5733	33.58125	5793	33.95625	5853	34.33125	5913	34.70625	5973	35.08125	6033	35.45625
5734	33.58750	5794	33.96250	5854	34.33750	5914	34.71250	5974	35.08750	6034	35.46250
5735	33.59375	5795	33.96875	5855	34.34375	5915	34.71875	5975	35.09375	6035	35.46875
5736	33.60000	5796	33.97500	5856	34.35000	5916	34.72500	5976	35.10000	6036	35.47500
5737	33.60625	5797	33.98125	5857	34.35625	5917	34.73125	5977	35.10625	6037	35.48125
5738	33.61250	5798	33.98750	5858	34.36250	5918	34.73750	5978	35.11250	6038	35.48750
5739	33.61875	5799	33.99375	5859	34.36875	5919	34.74375	5979	35.11875	6039	35.49375
5740	33.62500	5800	34.00000	5860	34.37500	5920	34.75000	5980	35.12500	6040	35.50000
5741	33.63125	5801	34.00625	5861	34.38125	5921	34.75625	5981	35.13125	6041	35.50625
5742	33.63750	5802	34.01250	5862	34.38750	5922	34.76250	5982	35.13750	6042	35.51250
5743	33.64375	5803	34.01875	5863	34.39375	5923	34.76875	5983	35.14375	6043	35.51875
5744	33.65000	5804	34.02500	5864	34.40000	5924	34.77500	5984	35.15000	6044	35.52500
5745	33.65625	5805	34.03125	5865	34.40625	5925	34.78125	5985	35.15625	6045	35.53125
5746	33.66250	5806	34.03750	5866	34.41250	5926	34.78750	5986	35.16250	6046	35.53750
5747	33.66875	5807	34.04375	5867	34.41875	5927	34.79375	5987	35.16875	6047	35.54375
5748	33.67500	5808	34.05000	5868	34.42500	5928	34.80000	5988	35.17500	6048	35.55000
5749	33.68125	5809	34.05625	5869	34.43125	5929	34.80625	5989	35.18125	6049	35.55625
5750	33.68750	5810	34.06250	5870	34.43750	5930	34.81250	5990	35.18750	6050	35.56250
5751	33.69375	5811	34.06875	5871	34.44375	5931	34.81875	5991	35.19375	6051	35.56875
5752	33.70000	5812	34.07500	5872	34.45000	5932	34.82500	5992	35.20000	6052	35.57500
5753	33.70625	5813	34.08125	5873	34.45625	5933	34.83125	5993	35.20625	6053	35.58125
5754	33.71250	5814	34.08750	5874	34.46250	5934	34.83750	5994	35.21250	6054	35.58750
5755	33.71875	5815	34.09375	5875	34.46875	5935	34.84375	5995	35.21875	6055	35.59375
5756	33.72500	5816	34.10000	5876	34.47500	5936	34.85000	5996	35.22500	6056	35.60000
5757	33.73125	5817	34.10625	5877	34.48125	5937	34.85625	5997	35.23125	6057	35.60625
5758	33.73750	5818	34.11250	5878	34.48750	5938	34.86250	5998	35.23750	6058	35.61250
5759	33.74375	5819	34.11875	5879	34.49375	5939	34.86875	5999	35.24375	6059	35.61875
5760	33.75000	5820	34.12500	5880	34.50000	5940	34.87500	6000	35.25000	6060	35.62500
5761	33.75625	5821	34.13125	5881	34.50625	5941	34.88125	6001	35.25625	6061	35.63125
5762	33.76250	5822	34.13750	5882	34.51250	5942	34.88750	6002	35.26250	6062	35.63750
5763	33.76875	5823	34.14375	5883	34.51875	5943	34.89375	6003	35.26875	6063	35.64375
5764	33.77500	5824	34.15000	5884	34.52500	5944	34.90000	6004	35.27500	6064	35.65000
5765	33.78125	5825	34.15625	5885	34.53125	5945	34.90625	6005	35.28125	6065	35.65625
5766	33.78750	5826	34.16250	5886	34.53750	5946	34.91250	6006	35.28750	6066	35.66250
5767	33.79375	5827	34.16875	5887	34.54375	5947	34.91875	6007	35.29375	6067	35.66875
5768	33.80000	5828	34.17500	5888	34.55000	5948	34.92500	6008	35.30000	6068	35.67500
5769	33.80625	5829	34.18125	5889	34.55625	5949	34.93125	6009	35.30625	6069	35.68125
5770	33.81250	5830	34.18750	5890	34.56250	5950	34.93750	6010	35.31250	6070	35.68750
5771	33.81875	5831	34.19375	5891	34.56875	5951	34.94375	6011	35.31875	6071	35.69375
5772	33.82500	5832	34.20000	5892	34.57500	5952	34.95000	6012	35.32500	6072	35.70000
5773	33.83125	5833	34.20625	5893	34.58125	5953	34.95625	6013	35.33125	6073	35.70625
5774	33.83750	5834	34.21250	5894	34.58750	5954	34.96250	6014	35.33750	6074	35.71250
5775	33.84375	5835	34.21875	5895	34.59375	5955	34.96875	6015	35.34375	6075	35.71875
5776	33.85000	5836	34.22500	5896	34.60000	5956	34.97500	6016	35.35000	6076	35.72500
5777	33.85625	5837	34.23125	5897	34.60625	5957	34.98125	6017	35.35625	6077	35.73125
5778	33.86250	5838	34.23750	5898	34.61250	5958	34.98750	6018	35.36250	6078	35.73750
5779	33.86875	5839	34.24375	5899	34.61875	5959	34.99375	6019	35.36875	6079	35.74375

Channel Designation Table: 29-50 MHz, 6.25kHz Increments - Continued

Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)
6080	35.75000	6140	36.12500	6200	36.50000	6260	36.87500	6320	37.25000	6380	37.62500
6081	35.75625	6141	36.13125	6201	36.50625	6261	36.88125	6321	37.25625	6381	37.63125
6082	35.76250	6142	36.13750	6202	36.51250	6262	36.88750	6322	37.26250	6382	37.63750
6083	35.76875	6143	36.14375	6203	36.51875	6263	36.89375	6323	37.26875	6383	37.64375
6084	35.77500	6144	36.15000	6204	36.52500	6264	36.90000	6324	37.27500	6384	37.65000
6085	35.78125	6145	36.15625	6205	36.53125	6265	36.90625	6325	37.28125	6385	37.65625
6086	35.78750	6146	36.16250	6206	36.53750	6266	36.91250	6326	37.28750	6386	37.66250
6087	35.79375	6147	36.16875	6207	36.54375	6267	36.91875	6327	37.29375	6387	37.66875
6088	35.80000	6148	36.17500	6208	36.55000	6268	36.92500	6328	37.30000	6388	37.67500
6089	35.80625	6149	36.18125	6209	36.55625	6269	36.93125	6329	37.30625	6389	37.68125
6090	35.81250	6150	36.18750	6210	36.56250	6270	36.93750	6330	37.31250	6390	37.68750
6091	35.81875	6151	36.19375	6211	36.56875	6271	36.94375	6331	37.31875	6391	37.69375
6092	35.82500	6152	36.20000	6212	36.57500	6272	36.95000	6332	37.32500	6392	37.70000
6093	35.83125	6153	36.20625	6213	36.58125	6273	36.95625	6333	37.33125	6393	37.70625
6094	35.83750	6154	36.21250	6214	36.58750	6274	36.96250	6334	37.33750	6394	37.71250
6095	35.84375	6155	36.21875	6215	36.59375	6275	36.96875	6335	37.34375	6395	37.71875
6096	35.85000	6156	36.22500	6216	36.60000	6276	36.97500	6336	37.35000	6396	37.72500
6097	35.85625	6157	36.23125	6217	36.60625	6277	36.98125	6337	37.35625	6397	37.73125
6098	35.86250	6158	36.23750	6218	36.61250	6278	36.98750	6338	37.36250	6398	37.73750
6099	35.86875	6159	36.24375	6219	36.61875	6279	36.99375	6339	37.36875	6399	37.74375
6100	35.87500	6160	36.25000	6220	36.62500	6280	37.00000	6340	37.37500	6400	37.75000
6101	35.88125	6161	36.25625	6221	36.63125	6281	37.00625	6341	37.38125	6401	37.75625
6102	35.88750	6162	36.26250	6222	36.63750	6282	37.01250	6342	37.38750	6402	37.76250
6103	35.89375	6163	36.26875	6223	36.64375	6283	37.01875	6343	37.39375	6403	37.76875
6104	35.90000	6164	36.27500	6224	36.65000	6284	37.02500	6344	37.40000	6404	37.77500
6105	35.90625	6165	36.28125	6225	36.65625	6285	37.03125	6345	37.40625	6405	37.78125
6106	35.91250	6166	36.28750	6226	36.66250	6286	37.03750	6346	37.41250	6406	37.78750
6107	35.91875	6167	36.29375	6227	36.66875	6287	37.04375	6347	37.41875	6407	37.79375
6108	35.92500	6168	36.30000	6228	36.67500	6288	37.05000	6348	37.42500	6408	37.80000
6109	35.93125	6169	36.30625	6229	36.68125	6289	37.05625	6349	37.43125	6409	37.80625
6110	35.93750	6170	36.31250	6230	36.68750	6290	37.06250	6350	37.43750	6410	37.81250
6111	35.94375	6171	36.31875	6231	36.69375	6291	37.06875	6351	37.44375	6411	37.81875
6112	35.95000	6172	36.32500	6232	36.70000	6292	37.07500	6352	37.45000	6412	37.82500
6113	35.95625	6173	36.33125	6233	36.70625	6293	37.08125	6353	37.45625	6413	37.83125
6114	35.96250	6174	36.33750	6234	36.71250	6294	37.08750	6354	37.46250	6414	37.83750
6115	35.96875	6175	36.34375	6235	36.71875	6295	37.09375	6355	37.46875	6415	37.84375
6116	35.97500	6176	36.35000	6236	36.72500	6296	37.10000	6356	37.47500	6416	37.85000
6117	35.98125	6177	36.35625	6237	36.73125	6297	37.10625	6357	37.48125	6417	37.85625
6118	35.98750	6178	36.36250	6238	36.73750	6298	37.11250	6358	37.48750	6418	37.86250
6119	35.99375	6179	36.36875	6239	36.74375	6299	37.11875	6359	37.49375	6419	37.86875
6120	36.00000	6180	36.37500	6240	36.75000	6300	37.12500	6360	37.50000	6420	37.87500
6121	36.00625	6181	36.38125	6241	36.75625	6301	37.13125	6361	37.50625	6421	37.88125
6122	36.01250	6182	36.38750	6242	36.76250	6302	37.13750	6362	37.51250	6422	37.88750
6123	36.01875	6183	36.39375	6243	36.76875	6303	37.14375	6363	37.51875	6423	37.89375
6124	36.02500	6184	36.40000	6244	36.77500	6304	37.15000	6364	37.52500	6424	37.90000
6125	36.03125	6185	36.40625	6245	36.78125	6305	37.15625	6365	37.53125	6425	37.90625
6126	36.03750	6186	36.41250	6246	36.78750	6306	37.16250	6366	37.53750	6426	37.91250
6127	36.04375	6187	36.41875	6247	36.79375	6307	37.16875	6367	37.54375	6427	37.91875
6128	36.05000	6188	36.42500	6248	36.80000	6308	37.17500	6368	37.55000	6428	37.92500
6129	36.05625	6189	36.43125	6249	36.80625	6309	37.18125	6369	37.55625	6429	37.93125
6130	36.06250	6190	36.43750	6250	36.81250	6310	37.18750	6370	37.56250	6430	37.93750
6131	36.06875	6191	36.44375	6251	36.81875	6311	37.19375	6371	37.56875	6431	37.94375
6132	36.07500	6192	36.45000	6252	36.82500	6312	37.20000	6372	37.57500	6432	37.95000
6133	36.08125	6193	36.45625	6253	36.83125	6313	37.20625	6373	37.58125	6433	37.95625
6134	36.08750	6194	36.46250	6254	36.83750	6314	37.21250	6374	37.58750	6434	37.96250
6135	36.09375	6195	36.46875	6255	36.84375	6315	37.21875	6375	37.59375	6435	37.96875
6136	36.10000	6196	36.47500	6256	36.85000	6316	37.22500	6376	37.60000	6436	37.97500
6137	36.10625	6197	36.48125	6257	36.85625	6317	37.23125	6377	37.60625	6437	37.98125
6138	36.11250	6198	36.48750	6258	36.86250	6318	37.23750	6378	37.61250	6438	37.98750
6139	36.11875	6199	36.49375	6259	36.86875	6319	37.24375	6379	37.61875	6439	37.99375

Channel Designation Table: 29-50 MHz, 6.25kHz Increments - Continued

Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)
6440	38.00000	6500	38.37500	6560	38.75000	6620	39.12500	6680	39.50000	6740	39.87500
6441	38.00625	6501	38.38125	6561	38.75625	6621	39.13125	6681	39.50625	6741	39.88125
6442	38.01250	6502	38.38750	6562	38.76250	6622	39.13750	6682	39.51250	6742	39.88750
6443	38.01875	6503	38.39375	6563	38.76875	6623	39.14375	6683	39.51875	6743	39.89375
6444	38.02500	6504	38.40000	6564	38.77500	6624	39.15000	6684	39.52500	6744	39.90000
6445	38.03125	6505	38.40625	6565	38.78125	6625	39.15625	6685	39.53125	6745	39.90625
6446	38.03750	6506	38.41250	6566	38.78750	6626	39.16250	6686	39.53750	6746	39.91250
6447	38.04375	6507	38.41875	6567	38.79375	6627	39.16875	6687	39.54375	6747	39.91875
6448	38.05000	6508	38.42500	6568	38.80000	6628	39.17500	6688	39.55000	6748	39.92500
6449	38.05625	6509	38.43125	6569	38.80625	6629	39.18125	6689	39.55625	6749	39.93125
6450	38.06250	6510	38.43750	6570	38.81250	6630	39.18750	6690	39.56250	6750	39.93750
6451	38.06875	6511	38.44375	6571	38.81875	6631	39.19375	6691	39.56875	6751	39.94375
6452	38.07500	6512	38.45000	6572	38.82500	6632	39.20000	6692	39.57500	6752	39.95000
6453	38.08125	6513	38.45625	6573	38.83125	6633	39.20625	6693	39.58125	6753	39.95625
6454	38.08750	6514	38.46250	6574	38.83750	6634	39.21250	6694	39.58750	6754	39.96250
6455	38.09375	6515	38.46875	6575	38.84375	6635	39.21875	6695	39.59375	6755	39.96875
6456	38.10000	6516	38.47500	6576	38.85000	6636	39.22500	6696	39.60000	6756	39.97500
6457	38.10625	6517	38.48125	6577	38.85625	6637	39.23125	6697	39.60625	6757	39.98125
6458	38.11250	6518	38.48750	6578	38.86250	6638	39.23750	6698	39.61250	6758	39.98750
6459	38.11875	6519	38.49375	6579	38.86875	6639	39.24375	6699	39.61875	6759	39.99375
6460	38.12500	6520	38.50000	6580	38.87500	6640	39.25000	6700	39.62500	6760	40.00000
6461	38.13125	6521	38.50625	6581	38.88125	6641	39.25625	6701	39.63125	6761	40.00625
6462	38.13750	6522	38.51250	6582	38.88750	6642	39.26250	6702	39.63750	6762	40.01250
6463	38.14375	6523	38.51875	6583	38.89375	6643	39.26875	6703	39.64375	6763	40.01875
6464	38.15000	6524	38.52500	6584	38.90000	6644	39.27500	6704	39.65000	6764	40.02500
6465	38.15625	6525	38.53125	6585	38.90625	6645	39.28125	6705	39.65625	6765	40.03125
6466	38.16250	6526	38.53750	6586	38.91250	6646	39.28750	6706	39.66250	6766	40.03750
6467	38.16875	6527	38.54375	6587	38.91875	6647	39.29375	6707	39.66875	6767	40.04375
6468	38.17500	6528	38.55000	6588	38.92500	6648	39.30000	6708	39.67500	6768	40.05000
6469	38.18125	6529	38.55625	6589	38.93125	6649	39.30625	6709	39.68125	6769	40.05625
6470	38.18750	6530	38.56250	6590	38.93750	6650	39.31250	6710	39.68750	6770	40.06250
6471	38.19375	6531	38.56875	6591	38.94375	6651	39.31875	6711	39.69375	6771	40.06875
6472	38.20000	6532	38.57500	6592	38.95000	6652	39.32500	6712	39.70000	6772	40.07500
6473	38.20625	6533	38.58125	6593	38.95625	6653	39.33125	6713	39.70625	6773	40.08125
6474	38.21250	6534	38.58750	6594	38.96250	6654	39.33750	6714	39.71250	6774	40.08750
6475	38.21875	6535	38.59375	6595	38.96875	6655	39.34375	6715	39.71875	6775	40.09375
6476	38.22500	6536	38.60000	6596	38.97500	6656	39.35000	6716	39.72500	6776	40.10000
6477	38.23125	6537	38.60625	6597	38.98125	6657	39.35625	6717	39.73125	6777	40.10625
6478	38.23750	6538	38.61250	6598	38.98750	6658	39.36250	6718	39.73750	6778	40.11250
6479	38.24375	6539	38.61875	6599	38.99375	6659	39.36875	6719	39.74375	6779	40.11875
6480	38.25000	6540	38.62500	6600	39.00000	6660	39.37500	6720	39.75000	6780	40.12500
6481	38.25625	6541	38.63125	6601	39.00625	6661	39.38125	6721	39.75625	6781	40.13125
6482	38.26250	6542	38.63750	6602	39.01250	6662	39.38750	6722	39.76250	6782	40.13750
6483	38.26875	6543	38.64375	6603	39.01875	6663	39.39375	6723	39.76875	6783	40.14375
6484	38.27500	6544	38.65000	6604	39.02500	6664	39.40000	6724	39.77500	6784	40.15000
6485	38.28125	6545	38.65625	6605	39.03125	6665	39.40625	6725	39.78125	6785	40.15625
6486	38.28750	6546	38.66250	6606	39.03750	6666	39.41250	6726	39.78750	6786	40.16250
6487	38.29375	6547	38.66875	6607	39.04375	6667	39.41875	6727	39.79375	6787	40.16875
6488	38.30000	6548	38.67500	6608	39.05000	6668	39.42500	6728	39.80000	6788	40.17500
6489	38.30625	6549	38.68125	6609	39.05625	6669	39.43125	6729	39.80625	6789	40.18125
6490	38.31250	6550	38.68750	6610	39.06250	6670	39.43750	6730	39.81250	6790	40.18750
6491	38.31875	6551	38.69375	6611	39.06875	6671	39.44375	6731	39.81875	6791	40.19375
6492	38.32500	6552	38.70000	6612	39.07500	6672	39.45000	6732	39.82500	6792	40.20000
6493	38.33125	6553	38.70625	6613	39.08125	6673	39.45625	6733	39.83125	6793	40.20625
6494	38.33750	6554	38.71250	6614	39.08750	6674	39.46250	6734	39.83750	6794	40.21250
6495	38.34375	6555	38.71875	6615	39.09375	6675	39.46875	6735	39.84375	6795	40.21875
6496	38.35000	6556	38.72500	6616	39.10000	6676	39.47500	6736	39.85000	6796	40.22500
6497	38.35625	6557	38.73125	6617	39.10625	6677	39.48125	6737	39.85625	6797	40.23125
6498	38.36250	6558	38.73750	6618	39.11250	6678	39.48750	6738	39.86250	6798	40.23750
6499	38.36875	6559	38.74375	6619	39.11875	6679	39.49375	6739	39.86875	6799	40.24375

Channel Designation Table: 29-50 MHz, 6.25kHz Increments - Continued

Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)
6800	40.25000	6860	40.62500	6920	41.00000	6980	41.37500	7040	41.75000	7100	42.12500
6801	40.25625	6861	40.63125	6921	41.00625	6981	41.38125	7041	41.75625	7101	42.13125
6802	40.26250	6862	40.63750	6922	41.01250	6982	41.38750	7042	41.76250	7102	42.13750
6803	40.26875	6863	40.64375	6923	41.01875	6983	41.39375	7043	41.76875	7103	42.14375
6804	40.27500	6864	40.65000	6924	41.02500	6984	41.40000	7044	41.77500	7104	42.15000
6805	40.28125	6865	40.65625	6925	41.03125	6985	41.40625	7045	41.78125	7105	42.15625
6806	40.28750	6866	40.66250	6926	41.03750	6986	41.41250	7046	41.78750	7106	42.16250
6807	40.29375	6867	40.66875	6927	41.04375	6987	41.41875	7047	41.79375	7107	42.16875
6808	40.30000	6868	40.67500	6928	41.05000	6988	41.42500	7048	41.80000	7108	42.17500
6809	40.30625	6869	40.68125	6929	41.05625	6989	41.43125	7049	41.80625	7109	42.18125
6810	40.31250	6870	40.68750	6930	41.06250	6990	41.43750	7050	41.81250	7110	42.18750
6811	40.31875	6871	40.69375	6931	41.06875	6991	41.44375	7051	41.81875	7111	42.19375
6812	40.32500	6872	40.70000	6932	41.07500	6992	41.45000	7052	41.82500	7112	42.20000
6813	40.33125	6873	40.70625	6933	41.08125	6993	41.45625	7053	41.83125	7113	42.20625
6814	40.33750	6874	40.71250	6934	41.08750	6994	41.46250	7054	41.83750	7114	42.21250
6815	40.34375	6875	40.71875	6935	41.09375	6995	41.46875	7055	41.84375	7115	42.21875
6816	40.35000	6876	40.72500	6936	41.10000	6996	41.47500	7056	41.85000	7116	42.22500
6817	40.35625	6877	40.73125	6937	41.10625	6997	41.48125	7057	41.85625	7117	42.23125
6818	40.36250	6878	40.73750	6938	41.11250	6998	41.48750	7058	41.86250	7118	42.23750
6819	40.36875	6879	40.74375	6939	41.11875	6999	41.49375	7059	41.86875	7119	42.24375
6820	40.37500	6880	40.75000	6940	41.12500	7000	41.50000	7060	41.87500	7120	42.25000
6821	40.38125	6881	40.75625	6941	41.13125	7001	41.50625	7061	41.88125	7121	42.25625
6822	40.38750	6882	40.76250	6942	41.13750	7002	41.51250	7062	41.88750	7122	42.26250
6823	40.39375	6883	40.76875	6943	41.14375	7003	41.51875	7063	41.89375	7123	42.26875
6824	40.40000	6884	40.77500	6944	41.15000	7004	41.52500	7064	41.90000	7124	42.27500
6825	40.40625	6885	40.78125	6945	41.15625	7005	41.53125	7065	41.90625	7125	42.28125
6826	40.41250	6886	40.78750	6946	41.16250	7006	41.53750	7066	41.91250	7126	42.28750
6827	40.41875	6887	40.79375	6947	41.16875	7007	41.54375	7067	41.91875	7127	42.29375
6828	40.42500	6888	40.80000	6948	41.17500	7008	41.55000	7068	41.92500	7128	42.30000
6829	40.43125	6889	40.80625	6949	41.18125	7009	41.55625	7069	41.93125	7129	42.30625
6830	40.43750	6890	40.81250	6950	41.18750	7010	41.56250	7070	41.93750	7130	42.31250
6831	40.44375	6891	40.81875	6951	41.19375	7011	41.56875	7071	41.94375	7131	42.31875
6832	40.45000	6892	40.82500	6952	41.20000	7012	41.57500	7072	41.95000	7132	42.32500
6833	40.45625	6893	40.83125	6953	41.20625	7013	41.58125	7073	41.95625	7133	42.33125
6834	40.46250	6894	40.83750	6954	41.21250	7014	41.58750	7074	41.96250	7134	42.33750
6835	40.46875	6895	40.84375	6955	41.21875	7015	41.59375	7075	41.96875	7135	42.34375
6836	40.47500	6896	40.85000	6956	41.22500	7016	41.60000	7076	41.97500	7136	42.35000
6837	40.48125	6897	40.85625	6957	41.23125	7017	41.60625	7077	41.98125	7137	42.35625
6838	40.48750	6898	40.86250	6958	41.23750	7018	41.61250	7078	41.98750	7138	42.36250
6839	40.49375	6899	40.86875	6959	41.24375	7019	41.61875	7079	41.99375	7139	42.36875
6840	40.50000	6900	40.87500	6960	41.25000	7020	41.62500	7080	42.00000	7140	42.37500
6841	40.50625	6901	40.88125	6961	41.25625	7021	41.63125	7081	42.00625	7141	42.38125
6842	40.51250	6902	40.88750	6962	41.26250	7022	41.63750	7082	42.01250	7142	42.38750
6843	40.51875	6903	40.89375	6963	41.26875	7023	41.64375	7083	42.01875	7143	42.39375
6844	40.52500	6904	40.90000	6964	41.27500	7024	41.65000	7084	42.02500	7144	42.40000
6845	40.53125	6905	40.90625	6965	41.28125	7025	41.65625	7085	42.03125	7145	42.40625
6846	40.53750	6906	40.91250	6966	41.28750	7026	41.66250	7086	42.03750	7146	42.41250
6847	40.54375	6907	40.91875	6967	41.29375	7027	41.66875	7087	42.04375	7147	42.41875
6848	40.55000	6908	40.92500	6968	41.30000	7028	41.67500	7088	42.05000	7148	42.42500
6849	40.55625	6909	40.93125	6969	41.30625	7029	41.68125	7089	42.05625	7149	42.43125
6850	40.56250	6910	40.93750	6970	41.31250	7030	41.68750	7090	42.06250	7150	42.43750
6851	40.56875	6911	40.94375	6971	41.31875	7031	41.69375	7091	42.06875	7151	42.44375
6852	40.57500	6912	40.95000	6972	41.32500	7032	41.70000	7092	42.07500	7152	42.45000
6853	40.58125	6913	40.95625	6973	41.33125	7033	41.70625	7093	42.08125	7153	42.45625
6854	40.58750	6914	40.96250	6974	41.33750	7034	41.71250	7094	42.08750	7154	42.46250
6855	40.59375	6915	40.96875	6975	41.34375	7035	41.71875	7095	42.09375	7155	42.46875
6856	40.60000	6916	40.97500	6976	41.35000	7036	41.72500	7096	42.10000	7156	42.47500
6857	40.60625	6917	40.98125	6977	41.35625	7037	41.73125	7097	42.10625	7157	42.48125
6858	40.61250	6918	40.98750	6978	41.36250	7038	41.73750	7098	42.11250	7158	42.48750
6859	40.61875	6919	40.99375	6979	41.36875	7039	41.74375	7099	42.11875	7159	42.49375

Channel Designation Table: 29-50 MHz, 6.25kHz Increments - Continued

Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)
7160	42.50000	7220	42.87500	7280	43.25000	7340	43.62500	7400	44.00000	7460	44.37500
7161	42.50625	7221	42.88125	7281	43.25625	7341	43.63125	7401	44.00625	7461	44.38125
7162	42.51250	7222	42.88750	7282	43.26250	7342	43.63750	7402	44.01250	7462	44.38750
7163	42.51875	7223	42.89375	7283	43.26875	7343	43.64375	7403	44.01875	7463	44.39375
7164	42.52500	7224	42.90000	7284	43.27500	7344	43.65000	7404	44.02500	7464	44.40000
7165	42.53125	7225	42.90625	7285	43.28125	7345	43.65625	7405	44.03125	7465	44.40625
7166	42.53750	7226	42.91250	7286	43.28750	7346	43.66250	7406	44.03750	7466	44.41250
7167	42.54375	7227	42.91875	7287	43.29375	7347	43.66875	7407	44.04375	7467	44.41875
7168	42.55000	7228	42.92500	7288	43.30000	7348	43.67500	7408	44.05000	7468	44.42500
7169	42.55625	7229	42.93125	7289	43.30625	7349	43.68125	7409	44.05625	7469	44.43125
7170	42.56250	7230	42.93750	7290	43.31250	7350	43.68750	7410	44.06250	7470	44.43750
7171	42.56875	7231	42.94375	7291	43.31875	7351	43.69375	7411	44.06875	7471	44.44375
7172	42.57500	7232	42.95000	7292	43.32500	7352	43.70000	7412	44.07500	7472	44.45000
7173	42.58125	7233	42.95625	7293	43.33125	7353	43.70625	7413	44.08125	7473	44.45625
7174	42.58750	7234	42.96250	7294	43.33750	7354	43.71250	7414	44.08750	7474	44.46250
7175	42.59375	7235	42.96875	7295	43.34375	7355	43.71875	7415	44.09375	7475	44.46875
7176	42.60000	7236	42.97500	7296	43.35000	7356	43.72500	7416	44.10000	7476	44.47500
7177	42.60625	7237	42.98125	7297	43.35625	7357	43.73125	7417	44.10625	7477	44.48125
7178	42.61250	7238	42.98750	7298	43.36250	7358	43.73750	7418	44.11250	7478	44.48750
7179	42.61875	7239	42.99375	7299	43.36875	7359	43.74375	7419	44.11875	7479	44.49375
7180	42.62500	7240	43.00000	7300	43.37500	7360	43.75000	7420	44.12500	7480	44.50000
7181	42.63125	7241	43.00625	7301	43.38125	7361	43.75625	7421	44.13125	7481	44.50625
7182	42.63750	7242	43.01250	7302	43.38750	7362	43.76250	7422	44.13750	7482	44.51250
7183	42.64375	7243	43.01875	7303	43.39375	7363	43.76875	7423	44.14375	7483	44.51875
7184	42.65000	7244	43.02500	7304	43.40000	7364	43.77500	7424	44.15000	7484	44.52500
7185	42.65625	7245	43.03125	7305	43.40625	7365	43.78125	7425	44.15625	7485	44.53125
7186	42.66250	7246	43.03750	7306	43.41250	7366	43.78750	7426	44.16250	7486	44.53750
7187	42.66875	7247	43.04375	7307	43.41875	7367	43.79375	7427	44.16875	7487	44.54375
7188	42.67500	7248	43.05000	7308	43.42500	7368	43.80000	7428	44.17500	7488	44.55000
7189	42.68125	7249	43.05625	7309	43.43125	7369	43.80625	7429	44.18125	7489	44.55625
7190	42.68750	7250	43.06250	7310	43.43750	7370	43.81250	7430	44.18750	7490	44.56250
7191	42.69375	7251	43.06875	7311	43.44375	7371	43.81875	7431	44.19375	7491	44.56875
7192	42.70000	7252	43.07500	7312	43.45000	7372	43.82500	7432	44.20000	7492	44.57500
7193	42.70625	7253	43.08125	7313	43.45625	7373	43.83125	7433	44.20625	7493	44.58125
7194	42.71250	7254	43.08750	7314	43.46250	7374	43.83750	7434	44.21250	7494	44.58750
7195	42.71875	7255	43.09375	7315	43.46875	7375	43.84375	7435	44.21875	7495	44.59375
7196	42.72500	7256	43.10000	7316	43.47500	7376	43.85000	7436	44.22500	7496	44.60000
7197	42.73125	7257	43.10625	7317	43.48125	7377	43.85625	7437	44.23125	7497	44.60625
7198	42.73750	7258	43.11250	7318	43.48750	7378	43.86250	7438	44.23750	7498	44.61250
7199	42.74375	7259	43.11875	7319	43.49375	7379	43.86875	7439	44.24375	7499	44.61875
7200	42.75000	7260	43.12500	7320	43.50000	7380	43.87500	7440	44.25000	7500	44.62500
7201	42.75625	7261	43.13125	7321	43.50625	7381	43.88125	7441	44.25625	7501	44.63125
7202	42.76250	7262	43.13750	7322	43.51250	7382	43.88750	7442	44.26250	7502	44.63750
7203	42.76875	7263	43.14375	7323	43.51875	7383	43.89375	7443	44.26875	7503	44.64375
7204	42.77500	7264	43.15000	7324	43.52500	7384	43.90000	7444	44.27500	7504	44.65000
7205	42.78125	7265	43.15625	7325	43.53125	7385	43.90625	7445	44.28125	7505	44.65625
7206	42.78750	7266	43.16250	7326	43.53750	7386	43.91250	7446	44.28750	7506	44.66250
7207	42.79375	7267	43.16875	7327	43.54375	7387	43.91875	7447	44.29375	7507	44.66875
7208	42.80000	7268	43.17500	7328	43.55000	7388	43.92500	7448	44.30000	7508	44.67500
7209	42.80625	7269	43.18125	7329	43.55625	7389	43.93125	7449	44.30625	7509	44.68125
7210	42.81250	7270	43.18750	7330	43.56250	7390	43.93750	7450	44.31250	7510	44.68750
7211	42.81875	7271	43.19375	7331	43.56875	7391	43.94375	7451	44.31875	7511	44.69375
7212	42.82500	7272	43.20000	7332	43.57500	7392	43.95000	7452	44.32500	7512	44.70000
7213	42.83125	7273	43.20625	7333	43.58125	7393	43.95625	7453	44.33125	7513	44.70625
7214	42.83750	7274	43.21250	7334	43.58750	7394	43.96250	7454	44.33750	7514	44.71250
7215	42.84375	7275	43.21875	7335	43.59375	7395	43.96875	7455	44.34375	7515	44.71875
7216	42.85000	7276	43.22500	7336	43.60000	7396	43.97500	7456	44.35000	7516	44.72500
7217	42.85625	7277	43.23125	7337	43.60625	7397	43.98125	7457	44.35625	7517	44.73125
7218	42.86250	7278	43.23750	7338	43.61250	7398	43.98750	7458	44.36250	7518	44.73750
7219	42.86875	7279	43.24375	7339	43.61875	7399	43.99375	7459	44.36875	7519	44.74375

Channel Designation Table: 29-50 MHz, 6.25kHz Increments - Continued

Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)
7520	44.75000	7580	45.12500	7640	45.50000	7700	45.87500	7760	46.25000	7820	46.62500
7521	44.75625	7581	45.13125	7641	45.50625	7701	45.88125	7761	46.25625	7821	46.63125
7522	44.76250	7582	45.13750	7642	45.51250	7702	45.88750	7762	46.26250	7822	46.63750
7523	44.76875	7583	45.14375	7643	45.51875	7703	45.89375	7763	46.26875	7823	46.64375
7524	44.77500	7584	45.15000	7644	45.52500	7704	45.90000	7764	46.27500	7824	46.65000
7525	44.78125	7585	45.15625	7645	45.53125	7705	45.90625	7765	46.28125	7825	46.65625
7526	44.78750	7586	45.16250	7646	45.53750	7706	45.91250	7766	46.28750	7826	46.66250
7527	44.79375	7587	45.16875	7647	45.54375	7707	45.91875	7767	46.29375	7827	46.66875
7528	44.80000	7588	45.17500	7648	45.55000	7708	45.92500	7768	46.30000	7828	46.67500
7529	44.80625	7589	45.18125	7649	45.55625	7709	45.93125	7769	46.30625	7829	46.68125
7530	44.81250	7590	45.18750	7650	45.56250	7710	45.93750	7770	46.31250	7830	46.68750
7531	44.81875	7591	45.19375	7651	45.56875	7711	45.94375	7771	46.31875	7831	46.69375
7532	44.82500	7592	45.20000	7652	45.57500	7712	45.95000	7772	46.32500	7832	46.70000
7533	44.83125	7593	45.20625	7653	45.58125	7713	45.95625	7773	46.33125	7833	46.70625
7534	44.83750	7594	45.21250	7654	45.58750	7714	45.96250	7774	46.33750	7834	46.71250
7535	44.84375	7595	45.21875	7655	45.59375	7715	45.96875	7775	46.34375	7835	46.71875
7536	44.85000	7596	45.22500	7656	45.60000	7716	45.97500	7776	46.35000	7836	46.72500
7537	44.85625	7597	45.23125	7657	45.60625	7717	45.98125	7777	46.35625	7837	46.73125
7538	44.86250	7598	45.23750	7658	45.61250	7718	45.98750	7778	46.36250	7838	46.73750
7539	44.86875	7599	45.24375	7659	45.61875	7719	45.99375	7779	46.36875	7839	46.74375
7540	44.87500	7600	45.25000	7660	45.62500	7720	46.00000	7780	46.37500	7840	46.75000
7541	44.88125	7601	45.25625	7661	45.63125	7721	46.00625	7781	46.38125	7841	46.75625
7542	44.88750	7602	45.26250	7662	45.63750	7722	46.01250	7782	46.38750	7842	46.76250
7543	44.89375	7603	45.26875	7663	45.64375	7723	46.01875	7783	46.39375	7843	46.76875
7544	44.90000	7604	45.27500	7664	45.65000	7724	46.02500	7784	46.40000	7844	46.77500
7545	44.90625	7605	45.28125	7665	45.65625	7725	46.03125	7785	46.40625	7845	46.78125
7546	44.91250	7606	45.28750	7666	45.66250	7726	46.03750	7786	46.41250	7846	46.78750
7547	44.91875	7607	45.29375	7667	45.66875	7727	46.04375	7787	46.41875	7847	46.79375
7548	44.92500	7608	45.30000	7668	45.67500	7728	46.05000	7788	46.42500	7848	46.80000
7549	44.93125	7609	45.30625	7669	45.68125	7729	46.05625	7789	46.43125	7849	46.80625
7550	44.93750	7610	45.31250	7670	45.68750	7730	46.06250	7790	46.43750	7850	46.81250
7551	44.94375	7611	45.31875	7671	45.69375	7731	46.06875	7791	46.44375	7851	46.81875
7552	44.95000	7612	45.32500	7672	45.70000	7732	46.07500	7792	46.45000	7852	46.82500
7553	44.95625	7613	45.33125	7673	45.70625	7733	46.08125	7793	46.45625	7853	46.83125
7554	44.96250	7614	45.33750	7674	45.71250	7734	46.08750	7794	46.46250	7854	46.83750
7555	44.96875	7615	45.34375	7675	45.71875	7735	46.09375	7795	46.46875	7855	46.84375
7556	44.97500	7616	45.35000	7676	45.72500	7736	46.10000	7796	46.47500	7856	46.85000
7557	44.98125	7617	45.35625	7677	45.73125	7737	46.10625	7797	46.48125	7857	46.85625
7558	44.98750	7618	45.36250	7678	45.73750	7738	46.11250	7798	46.48750	7858	46.86250
7559	44.99375	7619	45.36875	7679	45.74375	7739	46.11875	7799	46.49375	7859	46.86875
7560	45.00000	7620	45.37500	7680	45.75000	7740	46.12500	7800	46.50000	7860	46.87500
7561	45.00625	7621	45.38125	7681	45.75625	7741	46.13125	7801	46.50625	7861	46.88125
7562	45.01250	7622	45.38750	7682	45.76250	7742	46.13750	7802	46.51250	7862	46.88750
7563	45.01875	7623	45.39375	7683	45.76875	7743	46.14375	7803	46.51875	7863	46.89375
7564	45.02500	7624	45.40000	7684	45.77500	7744	46.15000	7804	46.52500	7864	46.90000
7565	45.03125	7625	45.40625	7685	45.78125	7745	46.15625	7805	46.53125	7865	46.90625
7566	45.03750	7626	45.41250	7686	45.78750	7746	46.16250	7806	46.53750	7866	46.91250
7567	45.04375	7627	45.41875	7687	45.79375	7747	46.16875	7807	46.54375	7867	46.91875
7568	45.05000	7628	45.42500	7688	45.80000	7748	46.17500	7808	46.55000	7868	46.92500
7569	45.05625	7629	45.43125	7689	45.80625	7749	46.18125	7809	46.55625	7869	46.93125
7570	45.06250	7630	45.43750	7690	45.81250	7750	46.18750	7810	46.56250	7870	46.93750
7571	45.06875	7631	45.44375	7691	45.81875	7751	46.19375	7811	46.56875	7871	46.94375
7572	45.07500	7632	45.45000	7692	45.82500	7752	46.20000	7812	46.57500	7872	46.95000
7573	45.08125	7633	45.45625	7693	45.83125	7753	46.20625	7813	46.58125	7873	46.95625
7574	45.08750	7634	45.46250	7694	45.83750	7754	46.21250	7814	46.58750	7874	46.96250
7575	45.09375	7635	45.46875	7695	45.84375	7755	46.21875	7815	46.59375	7875	46.96875
7576	45.10000	7636	45.47500	7696	45.85000	7756	46.22500	7816	46.60000	7876	46.97500
7577	45.10625	7637	45.48125	7697	45.85625	7757	46.23125	7817	46.60625	7877	46.98125
7578	45.11250	7638	45.48750	7698	45.86250	7758	46.23750	7818	46.61250	7878	46.98750
7579	45.11875	7639	45.49375	7699	45.86875	7759	46.24375	7819	46.61875	7879	46.99375

Channel Designation Table: 29-50 MHz, 6.25kHz Increments - Continued

Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)
7880	47.00000	7940	47.37500	8000	47.75000	8060	48.12500	8120	48.50000	8180	48.87500
7881	47.00625	7941	47.38125	8001	47.75625	8061	48.13125	8121	48.50625	8181	48.88125
7882	47.01250	7942	47.38750	8002	47.76250	8062	48.13750	8122	48.51250	8182	48.88750
7883	47.01875	7943	47.39375	8003	47.76875	8063	48.14375	8123	48.51875	8183	48.89375
7884	47.02500	7944	47.40000	8004	47.77500	8064	48.15000	8124	48.52500	8184	48.90000
7885	47.03125	7945	47.40625	8005	47.78125	8065	48.15625	8125	48.53125	8185	48.90625
7886	47.03750	7946	47.41250	8006	47.78750	8066	48.16250	8126	48.53750	8186	48.91250
7887	47.04375	7947	47.41875	8007	47.79375	8067	48.16875	8127	48.54375	8187	48.91875
7888	47.05000	7948	47.42500	8008	47.80000	8068	48.17500	8128	48.55000	8188	48.92500
7889	47.05625	7949	47.43125	8009	47.80625	8069	48.18125	8129	48.55625	8189	48.93125
7890	47.06250	7950	47.43750	8010	47.81250	8070	48.18750	8130	48.56250	8190	48.93750
7891	47.06875	7951	47.44375	8011	47.81875	8071	48.19375	8131	48.56875	8191	48.94375
7892	47.07500	7952	47.45000	8012	47.82500	8072	48.20000	8132	48.57500	8192	48.95000
7893	47.08125	7953	47.45625	8013	47.83125	8073	48.20625	8133	48.58125	8193	48.95625
7894	47.08750	7954	47.46250	8014	47.83750	8074	48.21250	8134	48.58750	8194	48.96250
7895	47.09375	7955	47.46875	8015	47.84375	8075	48.21875	8135	48.59375	8195	48.96875
7896	47.10000	7956	47.47500	8016	47.85000	8076	48.22500	8136	48.60000	8196	48.97500
7897	47.10625	7957	47.48125	8017	47.85625	8077	48.23125	8137	48.60625	8197	48.98125
7898	47.11250	7958	47.48750	8018	47.86250	8078	48.23750	8138	48.61250	8198	48.98750
7899	47.11875	7959	47.49375	8019	47.86875	8079	48.24375	8139	48.61875	8199	48.99375
7900	47.12500	7960	47.50000	8020	47.87500	8080	48.25000	8140	48.62500	8200	49.00000
7901	47.13125	7961	47.50625	8021	47.88125	8081	48.25625	8141	48.63125	8201	49.00625
7902	47.13750	7962	47.51250	8022	47.88750	8082	48.26250	8142	48.63750	8202	49.01250
7903	47.14375	7963	47.51875	8023	47.89375	8083	48.26875	8143	48.64375	8203	49.01875
7904	47.15000	7964	47.52500	8024	47.90000	8084	48.27500	8144	48.65000	8204	49.02500
7905	47.15625	7965	47.53125	8025	47.90625	8085	48.28125	8145	48.65625	8205	49.03125
7906	47.16250	7966	47.53750	8026	47.91250	8086	48.28750	8146	48.66250	8206	49.03750
7907	47.16875	7967	47.54375	8027	47.91875	8087	48.29375	8147	48.66875	8207	49.04375
7908	47.17500	7968	47.55000	8028	47.92500	8088	48.30000	8148	48.67500	8208	49.05000
7909	47.18125	7969	47.55625	8029	47.93125	8089	48.30625	8149	48.68125	8209	49.05625
7910	47.18750	7970	47.56250	8030	47.93750	8090	48.31250	8150	48.68750	8210	49.06250
7911	47.19375	7971	47.56875	8031	47.94375	8091	48.31875	8151	48.69375	8211	49.06875
7912	47.20000	7972	47.57500	8032	47.95000	8092	48.32500	8152	48.70000	8212	49.07500
7913	47.20625	7973	47.58125	8033	47.95625	8093	48.33125	8153	48.70625	8213	49.08125
7914	47.21250	7974	47.58750	8034	47.96250	8094	48.33750	8154	48.71250	8214	49.08750
7915	47.21875	7975	47.59375	8035	47.96875	8095	48.34375	8155	48.71875	8215	49.09375
7916	47.22500	7976	47.60000	8036	47.97500	8096	48.35000	8156	48.72500	8216	49.10000
7917	47.23125	7977	47.60625	8037	47.98125	8097	48.35625	8157	48.73125	8217	49.10625
7918	47.23750	7978	47.61250	8038	47.98750	8098	48.36250	8158	48.73750	8218	49.11250
7919	47.24375	7979	47.61875	8039	47.99375	8099	48.36875	8159	48.74375	8219	49.11875
7920	47.25000	7980	47.62500	8040	48.00000	8100	48.37500	8160	48.75000	8220	49.12500
7921	47.25625	7981	47.63125	8041	48.00625	8101	48.38125	8161	48.75625	8221	49.13125
7922	47.26250	7982	47.63750	8042	48.01250	8102	48.38750	8162	48.76250	8222	49.13750
7923	47.26875	7983	47.64375	8043	48.01875	8103	48.39375	8163	48.76875	8223	49.14375
7924	47.27500	7984	47.65000	8044	48.02500	8104	48.40000	8164	48.77500	8224	49.15000
7925	47.28125	7985	47.65625	8045	48.03125	8105	48.40625	8165	48.78125	8225	49.15625
7926	47.28750	7986	47.66250	8046	48.03750	8106	48.41250	8166	48.78750	8226	49.16250
7927	47.29375	7987	47.66875	8047	48.04375	8107	48.41875	8167	48.79375	8227	49.16875
7928	47.30000	7988	47.67500	8048	48.05000	8108	48.42500	8168	48.80000	8228	49.17500
7929	47.30625	7989	47.68125	8049	48.05625	8109	48.43125	8169	48.80625	8229	49.18125
7930	47.31250	7990	47.68750	8050	48.06250	8110	48.43750	8170	48.81250	8230	49.18750
7931	47.31875	7991	47.69375	8051	48.06875	8111	48.44375	8171	48.81875	8231	49.19375
7932	47.32500	7992	47.70000	8052	48.07500	8112	48.45000	8172	48.82500	8232	49.20000
7933	47.33125	7993	47.70625	8053	48.08125	8113	48.45625	8173	48.83125	8233	49.20625
7934	47.33750	7994	47.71250	8054	48.08750	8114	48.46250	8174	48.83750	8234	49.21250
7935	47.34375	7995	47.71875	8055	48.09375	8115	48.46875	8175	48.84375	8235	49.21875
7936	47.35000	7996	47.72500	8056	48.10000	8116	48.47500	8176	48.85000	8236	49.22500
7937	47.35625	7997	47.73125	8057	48.10625	8117	48.48125	8177	48.85625	8237	49.23125
7938	47.36250	7998	47.73750	8058	48.11250	8118	48.48750	8178	48.86250	8238	49.23750
7939	47.36875	7999	47.74375	8059	48.11875	8119	48.49375	8179	48.86875	8239	49.24375

Channel Designation Table: 29-50 MHz, 6.25kHz Increments - Continued

Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)	Chan. Num.	Freq. (MHz)
8240	49.25000	8260	49.37500	8280	49.50000	8300	49.62500	8320	49.75000	8340	49.87500
8241	49.25625	8261	49.38125	8281	49.50625	8301	49.63125	8321	49.75625	8341	49.88125
8242	49.26250	8262	49.38750	8282	49.51250	8302	49.63750	8322	49.76250	8342	49.88750
8243	49.26875	8263	49.39375	8283	49.51875	8303	49.64375	8323	49.76875	8343	49.89375
8244	49.27500	8264	49.40000	8284	49.52500	8304	49.65000	8324	49.77500	8344	49.90000
8245	49.28125	8265	49.40625	8285	49.53125	8305	49.65625	8325	49.78125	8345	49.90625
8246	49.28750	8266	49.41250	8286	49.53750	8306	49.66250	8326	49.78750	8346	49.91250
8247	49.29375	8267	49.41875	8287	49.54375	8307	49.66875	8327	49.79375	8347	49.91875
8248	49.30000	8268	49.42500	8288	49.55000	8308	49.67500	8328	49.80000	8348	49.92500
8249	49.30625	8269	49.43125	8289	49.55625	8309	49.68125	8329	49.80625	8349	49.93125
8250	49.31250	8270	49.43750	8290	49.56250	8310	49.68750	8330	49.81250	8350	49.93750
8251	49.31875	8271	49.44375	8291	49.56875	8311	49.69375	8331	49.81875	8351	49.94375
8252	49.32500	8272	49.45000	8292	49.57500	8312	49.70000	8332	49.82500	8352	49.95000
8253	49.33125	8273	49.45625	8293	49.58125	8313	49.70625	8333	49.83125	8353	49.95625
8254	49.33750	8274	49.46250	8294	49.58750	8314	49.71250	8334	49.83750	8354	49.96250
8255	49.34375	8275	49.46875	8295	49.59375	8315	49.71875	8335	49.84375	8355	49.96875
8256	49.35000	8276	49.47500	8296	49.60000	8316	49.72500	8336	49.85000	8356	49.97500
8257	49.35625	8277	49.48125	8297	49.60625	8317	49.73125	8337	49.85625	8357	49.98125
8258	49.36250	8278	49.48750	8298	49.61250	8318	49.73750	8338	49.86250	8358	49.98750
8259	49.36875	8279	49.49375	8299	49.61875	8319	49.74375	8339	49.86875	8359	49.99375
										8360	50.00000

9 REVISION HISTORY

Issue	Issue Date:	Revised:	Details
1	Jan 2003		Revision 1 • This manual covers the synthesized Low Band VHF Extra Wideband Receiver (29 to 50 MHz.) Converted for 50kHz channel spacing Current information was extracted from the following documents to create an Instruction Manual specific to the VT-3H040 Receiver, converted for 50 KHz channel spacing: IM10-RX214 IM10-OS3AH IM10-FE3H040 IM10-VR3H040CT
1-1-0	Aug 2003		ECO 767 Revised parts list PCB 43-91079A Updated Component Layout and Schematic Diagrams

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