

**### *hy-gain* V**  
by ***hy-gain***

**MODEL 2705  
CITIZENS TWO-WAY RADIO  
mobile**

**Manufactured and Distributed by  
Hy-Gain de Puerto Rico, Inc.  
P.O. Box 68 State Hwy 31, KM. 4.0  
Naguabo, Puerto Rico 00718**

EO-2705-A-001



First Printing, February, 1977  
Original Edition, February, 1977

## TABLE OF CONTENTS

	<b>page</b>
CHAPTER 1 — GENERAL INFORMATION .....	1
Introduction .....	1
Warranty Service Department .....	1
How to Ship Returns .....	1
Purchase of Parts .....	2
Specifications .....	2
CHAPTER 2 — THEORY OF OPERATION .....	3
General .....	3
Phase Locked Loop Frequency Synthesizer .....	3
Receiver .....	5
AM Receiver .....	5
USB and LSB Receiver .....	6
SSB AGC Circuitry .....	6
Transmitter .....	6
AM Transmitter .....	6
USB and LSB Transmitter .....	7
Noise Blanker .....	7
Regulated Power Supply (AVR) .....	8
CHAPTER 3 — ALIGNMENT .....	9
General .....	9
Recommended Tools and Equipment .....	9
Transmitter Alignment Procedure .....	9
Equipment Set-Up .....	9
Pre-Alignment Frequency Check .....	9
VCO Circuit Alignment .....	10
Driver Stage Alignment .....	10
SSB RF Power Amplifier Stage Alignment .....	11
AM RF Power Stage Alignment .....	11
AM Modulation Alignment .....	11
RF Power Meter Alignment .....	12
Lock-Out Circuit Check .....	12
Transmit Frequency Check .....	12
Receiver Alignment .....	13
Equipment Set-Up .....	13
AGC Alignment .....	13
Receiver Sensitivity Alignment .....	13
Squelch Circuit Alignment .....	13
S-Meter Adjustment .....	13
CHAPTER 4 — CHARTS AND DRAWINGS .....	17
Voltage Measurement Charts .....	19
Component Outline, Main P.C. Board .....	25
Component Outline, LED P.C. Board .....	29
Component Outline, Switch P.C. Board .....	33
Parts List .....	35
Schematic Diagram .....	51

## LIST OF ILLUSTRATIONS

<b>Figure</b>		<b>page</b>
2-1	Block Diagram of PLL Circuitry, Model 2705 .....	4
2-2	Block Diagram of AM Transmit Circuitry, Model 2705 .....	foldout
2-3	Block Diagram of USB Transmit Circuitry, Model 2705 .....	foldout
2-4	Block Diagram of LSB Transmit Circuitry, Model 2705 .....	foldout
2-5	Block Diagram of AM Receive Circuitry, Model 2705 .....	foldout
2-6	Block Diagram of USB Receive Circuitry, Model 2705 .....	foldout
2-7	Block Diagram of LSB Receive Circuitry, Model 2705 .....	foldout
3-1	Equipment Set-up, Transmitter Alignment .....	10
3-2	Waveforms .....	11
3-3	Modulation Waveform .....	12
3-4	Connection of Frequency Counter and Dummy Load .....	12
3-5	Test Equipment Set-up, Receiver Alignment .....	13
3-6	Components Adjusted for Transmitter Alignment .....	14
3-7	Components Adjusted for Receiver Alignment .....	15
4-1	Component Outline Main P.C. Board, Model 2705 .....	27
4-2	Component Outline LED P.C. Board, Model 2705 .....	31
4-3	Component Outline Switch P.C. Board, Model 2705 .....	35
4-4	Schematic Diagram, Model 2705 .....	foldout

## CHAPTER 1 — GENERAL INFORMATION

### Introduction

This service manual contains all the information needed to service and repair the Hy-Gain V (Model 2705) transceiver. It includes an explanation of the theory of operation and alignment procedures. Revision, addendum, and errata sheets will be published as needed. Insert them as required in the manual.

The Hy-Gain V is a full 40 channel AM/SSB transceiver. It is transmitter type accepted and receiver certified for Class D Citizens Radio Service as designated by the Federal Communications Commission (FCC).

It is a compact mobile unit, completely solid-state and highly reliable with low power consumption. Its Phase Locked Loop (PLL) frequency synthesizer provides immediate operation on all 40 channels. A Clarifier Control allows fine tuning of stations that are slightly off frequency. A built-in switchable Noise Blanker reduces undesirable impulse noises. A Squelch circuit reduces receiver noise between transmissions. Output jacks for an optional telephone-style handset and an external speaker are also included. The unit can be used for public address with the addition of a PA speaker. The unit is used with 12 VDC (nominal), either negative or positive ground.

### Warranty Service Department

For help with technical problems, for parts information, and information on local and factory repair facilities, contact the National Service Manager. When you write, please include all pertinent information that may be helpful in solving the problem. Address the letter to:

Hy-Gain Warranty Service Department  
4900 Superior Street  
Lincoln, Nebraska 68504  
ATTN: National Service Manager

The Warranty Service Department can repair any unit. Before shipping the unit contact the National Service Manager. Often a problem is field solvable with a little extra help. This can save lost time and shipping costs. Limit factory returns to the difficult problems.

### How to Ship Returns

To return a unit, get a return authorization. This is important. Handling of the unit may be delayed if shipped without it. If the unit must be shipped immediately, telephone or telex the National Service Manager for expeditious service.

When you request authorization, notification of repairs may also be requested. The notification will include a copy of the bill. Paying the bill before the return of the unit can save the cost of a COD fee.

For warranty repair, prepare a letter in duplicate containing the following information (for out-of-warranty repair delete items 2 and 3):

1. your name and address
2. purchaser's name and address
3. proof of purchase
4. serial number
5. complete description of the problem
6. the return authorization

Check the unit to see that all parts and screws are in place and attach an envelope containing a copy of the letter directly to it so this information is not overlooked. Wrap the unit and the envelope in heavy paper or put it in a plastic bag. If the original carton is not available, place the unit in a strong carton at least six inches larger in all three dimensions than the unit. Fill the carton equally around the unit with resilient packing material (shredded paper, excelsior, bubble pack, etc.). Seal the box with gummed paper tape, tie it

with a strong cord, and ship it by prepaid express, United Parcel Service, or insured parcel post to the address given previously. Mail the original of the letter in a second envelope to that same address.

It is important that the shipment be well-packed and fully-insured. Damage claims can delay repair and return of the unit. All claims must be settled between you and the carrier.

All shipments must be sent PREPAID. We *do not* accept collect shipments. After the unit has been repaired we will send it back COD unless the bill has been prepaid. Unclaimed or refused COD shipments will not be reshipped until the payment in full is received. These items become the property of Hy-Gain 60 days after refusal or return and will be sold for payment of charges due.

**Units with unauthorized field modifications cannot be accepted for repair.**

**Purchase of Parts**

Parts can be purchased from any Hy-Gain Service Center or from the factory Warranty Service Department. When ordering, please supply the following information:

- 1. unit model number
- 2. unit serial number
- 3. part description
- 4. part number

**Specifications**

*General*

Frequency .....Phase Locked Loop Synthesizer (PLL)  
 Channels .....40 channels  
 Mode of operation .....AM, LSB and USB  
 Power source voltage .....12 VDC, nominal  
 Speaker .....Built-in, 3" dynamic type  
 Microphone .....Dynamic type with PTT bar

*Receiver*

System .....SSB: Single conversion superheterodyne  
   AM: Dual conversion superheterodyne  
 Sensitivity.....SSB: 0.25  $\mu$ V for 10 dB S/N ratio  
   AM: 1  $\mu$ V for 10 dB S/N ratio  
 Selectivity .....SSB: 2.4 kHz at 6 dB down  
   AM: 6 kHz at 6 dB down  
 Clarifier..... $\pm$  600Hz  
 Audio output .....3 watts to 8 ohms  
 Squelch range .....SSB: 0.7  $\mu$ V to 20  $\mu$ V  
   AM: 1  $\mu$ V to 500  $\mu$ V  
 IF.....SSB: 10.695 MHz  
   AM: 1st-10.695 MHz  
   2nd-455 kHz

*Transmitter SSB*

Generation.....Double balanced modulator with crystal lattice filter  
 RF output power.....12 watts, (PEP FCC max.), at 13.8 VDC  
 Carrier suppression .....40 dB down  
 Unwanted sideband suppression .....60 dB down  
 Harmonic suppression .....60 dB down

*Transmitter AM*

Modulation.....High level class B, power IC  
 RF output power .....4 watts (FCC max.), at 13.8 VDC  
 Harmonic suppression .....60 dB

## CHAPTER 2 — THEORY OF OPERATION

### General

The theory of operation of the Hy-Gain V (Model 2705) transceiver is divided into three sections: the Phase Locked Loop Frequency Synthesizer, the Receiver, and the Transmitter. This material covers the functioning of the transceiver with a minimum of technical involvement. We have not attempted to explain the engineering techniques and approaches that arrived at these circuit designs.

### Phase Locked Loop Frequency Synthesizer

Refer to the block diagram, figure 2-1, for visual reference to the Phase Locked Loop Frequency Synthesizer.

The Phase Locked Loop (PLL) frequency synthesizer generates frequencies for use in both the transmitter and receiver sections. Its output determines the channel on which the transceiver is operating. The PLL circuitry incorporates two crystal oscillators to perform its frequency generating function.

The 10.240 MHz Oscillator, Q6, provides a reference for the PLL and an injection frequency for the Second Receiver Mixer, D22 and D23. The 10.0525 MHz Oscillator, Q3, provides a reference frequency for the VCO/Mixer, IC2.

The PLL circuit generates the operating frequencies needed for the transceiver in accordance with the code fed to the programmable divider, a portion of IC1, from the Channel Selector switch, SW-1a. Table A shows the following for each channel: the channel number, channel frequency, "N" digital code, VCO frequency (AM/USB,LSB), channel switch output, and the receiver first local oscillator frequency, (AM/USB, LSB).

For example, assume that channel 1 has been selected. The channel frequency is 26.965 MHz, the VCO frequency is 17.555 MHz (AM/USB), and the "N" code is 255. The Channel Selector switch programs the programmable divider for a division ratio of 255. The 10.24 MHz reference is fed to the PLL IC, IC1. It is divided internally by 1024, producing a 10 kHz reference signal. The output of the VCO Oscillator Block is mixed in the VCO/mixer portion of IC2 with the doubled output of the 10.0525 MHz Oscillator, Q3. The mixed and converted output difference frequency, 2.55 MHz, is then fed back to the PLL IC, IC1, through a buffer circuit located in the VCO/mixer IC, IC2. In the PLL IC, IC1, the output difference frequency goes through a buffer circuit to the programmable divider and is divided into a low frequency by the predetermined "N" code. In this case 2.55 MHz divided by 255 equals 10 kHz. The low frequency is fed to the phase detector and compared with the reference frequency.

The phase detector, which is internally located in the PLL IC, IC1, generates a DC output voltage corresponding to the phase difference between the two signals applied. The DC output is then applied to the VCO Oscillator Block through a low pass filter. The VCO frequency coincides with the reference frequency. In this case, the PLL IC output difference frequency divided by the "N" code 255 is 10 kHz and the divided reference frequency, 10.24 MHz, is 10 kHz, so there is no phase difference. The Phase Locked Loop circuitry will lock when the frequencies coincide with each other. When this happens, the VCO circuit provides stable frequencies over the band of 17.555 to 17.995 MHz (17.5535 to 17.9935 MHz for LSB) depending upon the "N" code or channel selected.

Assume that the channel is changed to channel 40. The Channel Selector switch now provides a code that will produce a division ratio of 211. At this instant the VCO frequency is at 17.555 MHz, which is mixed with the doubled output of the 10.0525 MHz Oscillator, Q3. Again the VCO/Mixer produces an output of 2.55 MHz. The 2.55 MHz signal is now divided by 211 to produce a frequency of 12.0853 kHz.

The 12.0853 kHz output, along with the 10 kHz obtained from the Reference Oscillator, Q6, is fed to the Phase Detector portion of IC1. The comparison of the two frequencies in the Phase Detector produces an error output which is a combined AC-DC voltage. The

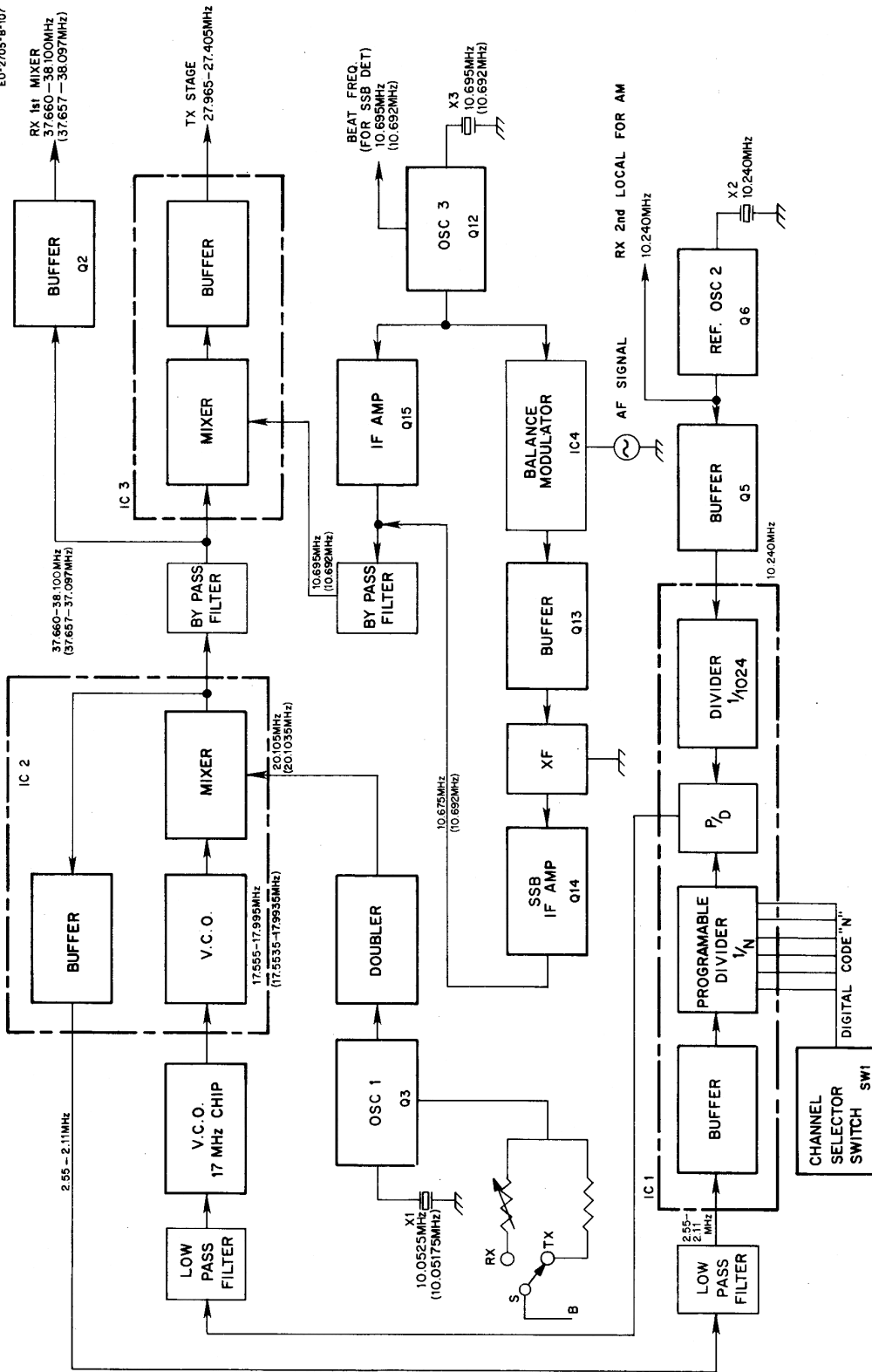
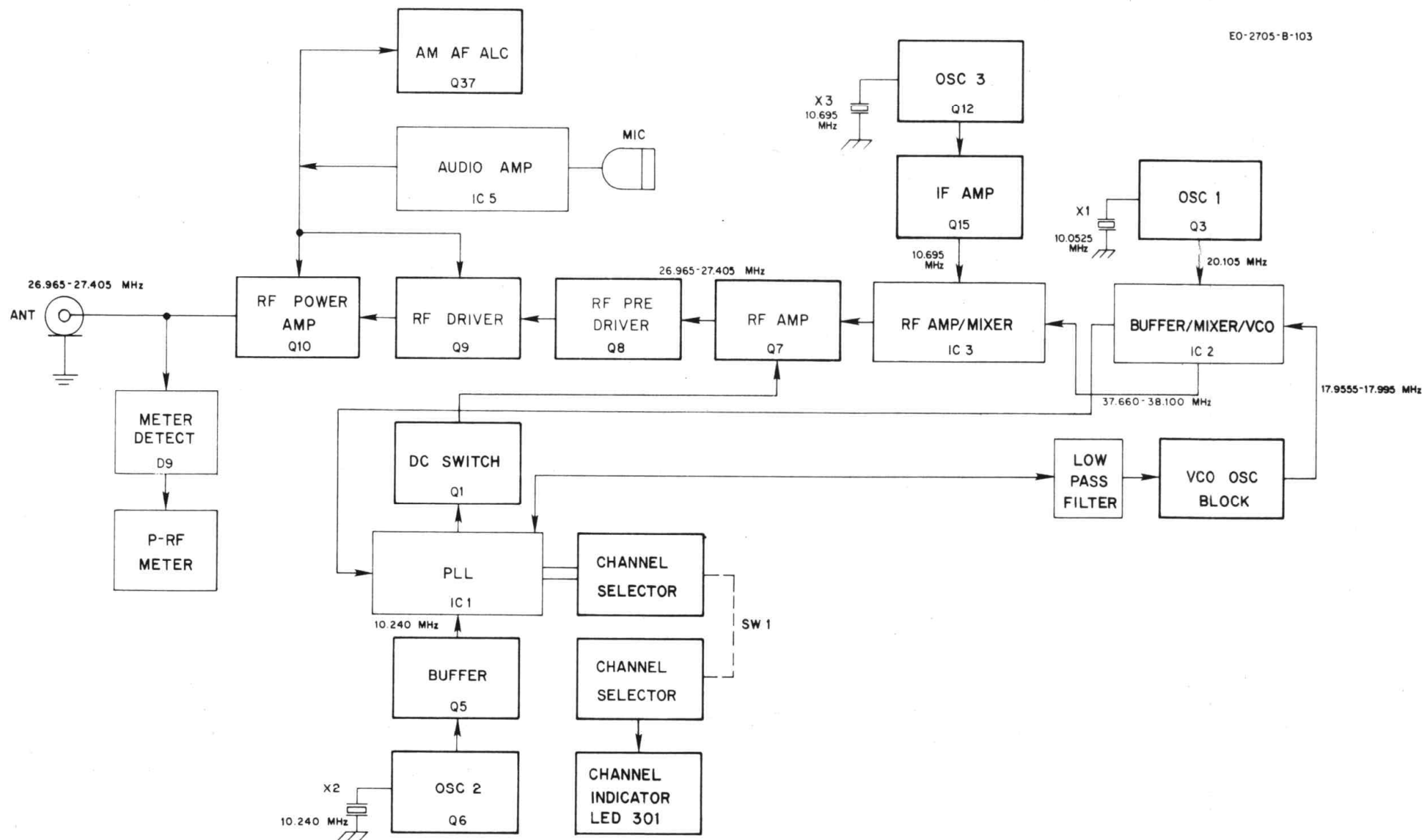
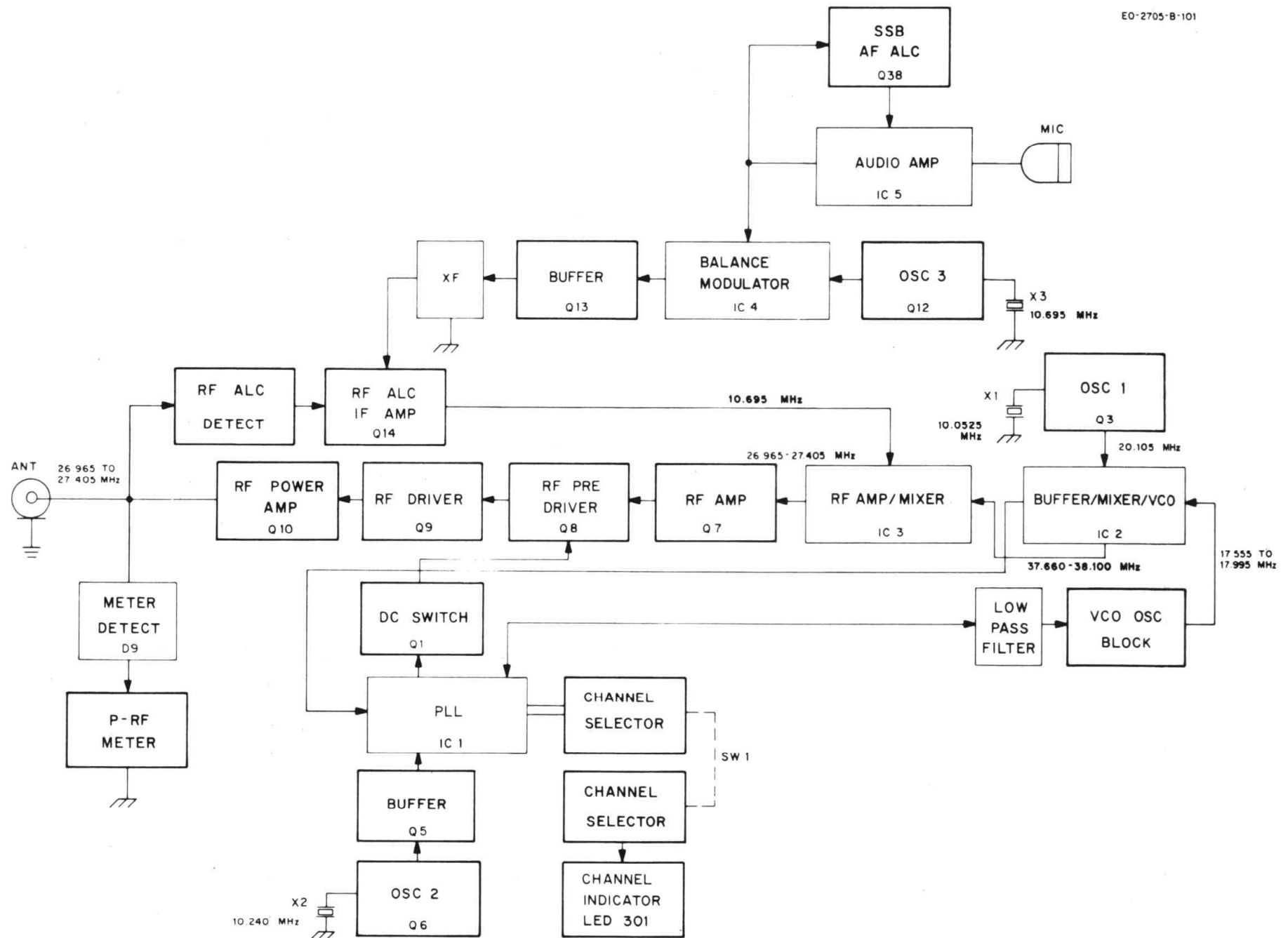


Figure 2-1. Block Diagram of PLL Circuitry, Model 2705





**Figure 2-2. Block Diagram of AM Transmit Circuitry, Model 2705**



**Figure 2-3. Block Diagram of USB Transmit Circuitry, Model 2705**

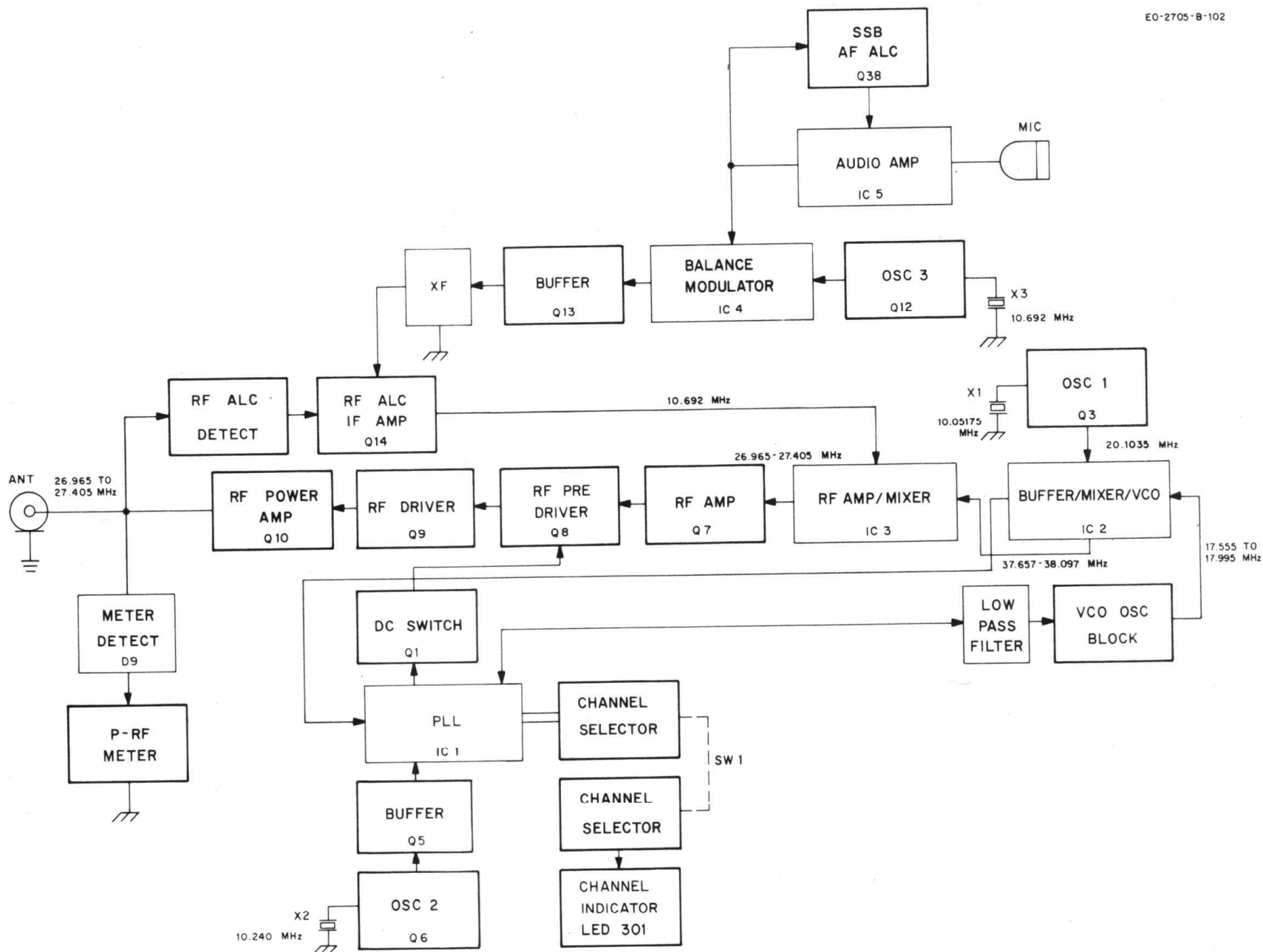
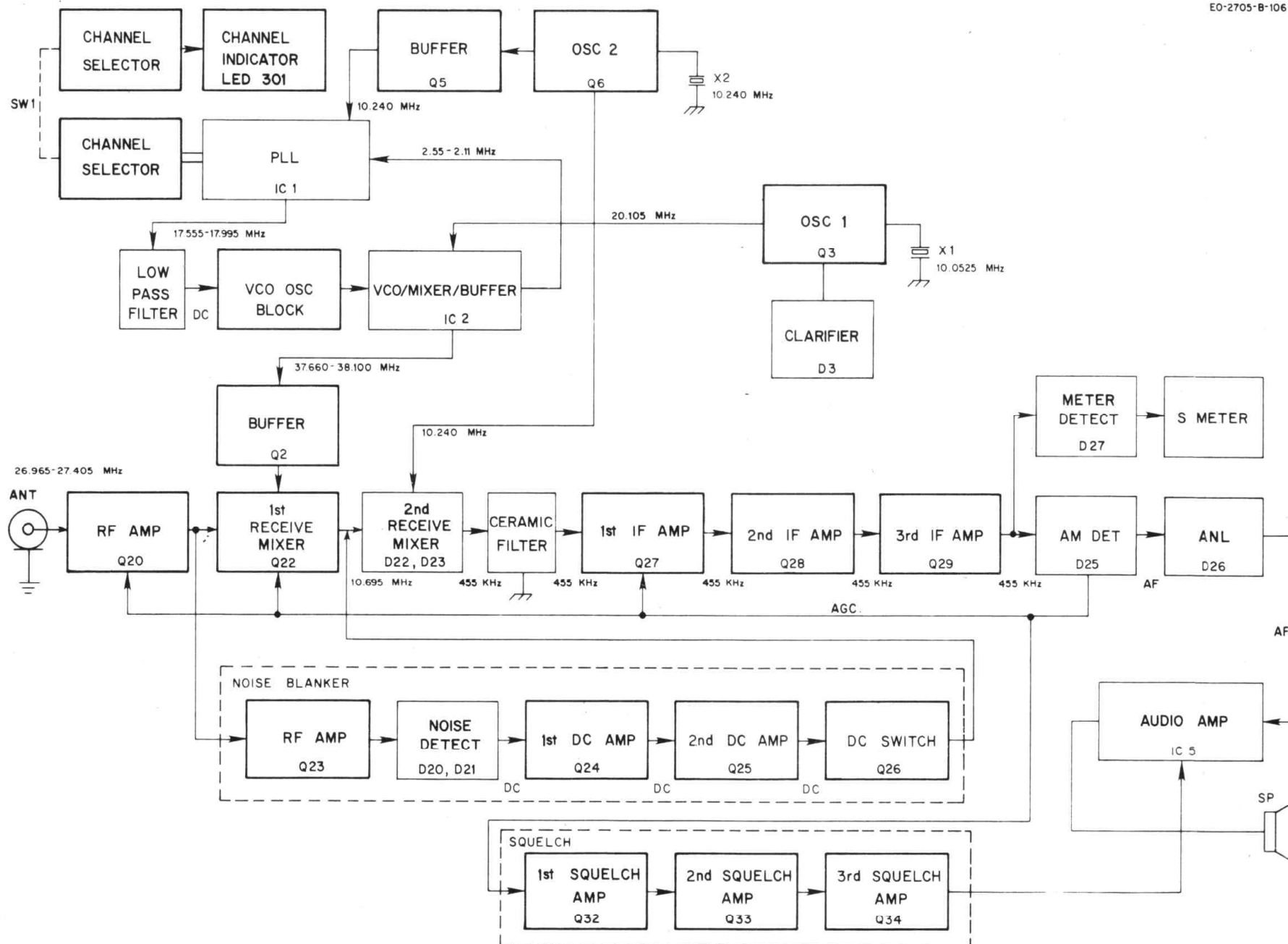
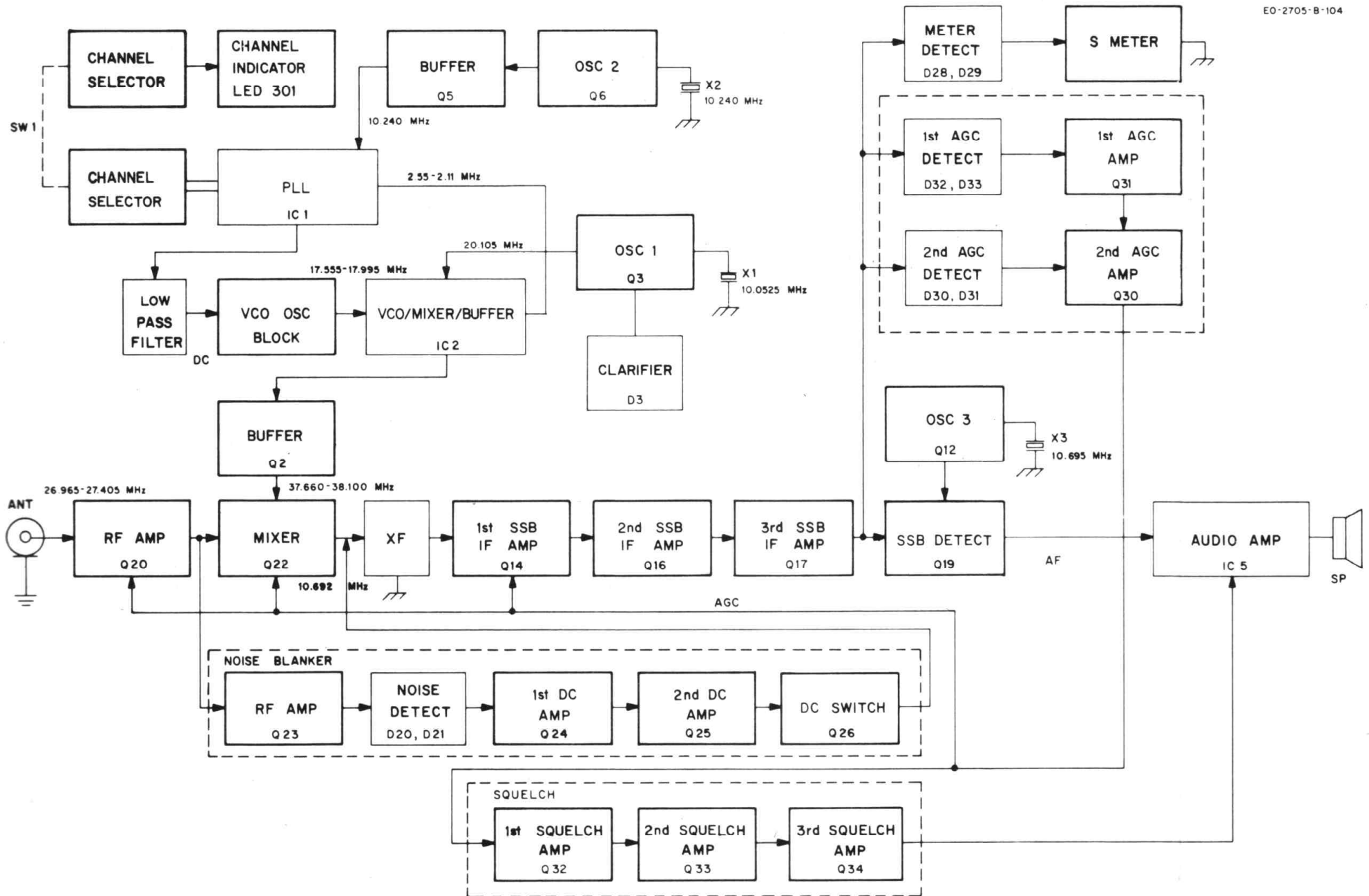


Figure 2-4. Block Diagram of LSB Transmit Circuitry, Model 2705



**Figure 2-5. Block Diagram of AM Receive Circuitry, Model 2705**



**Figure 2-6. Block Diagram of USB Receive Circuitry, Model 2705**

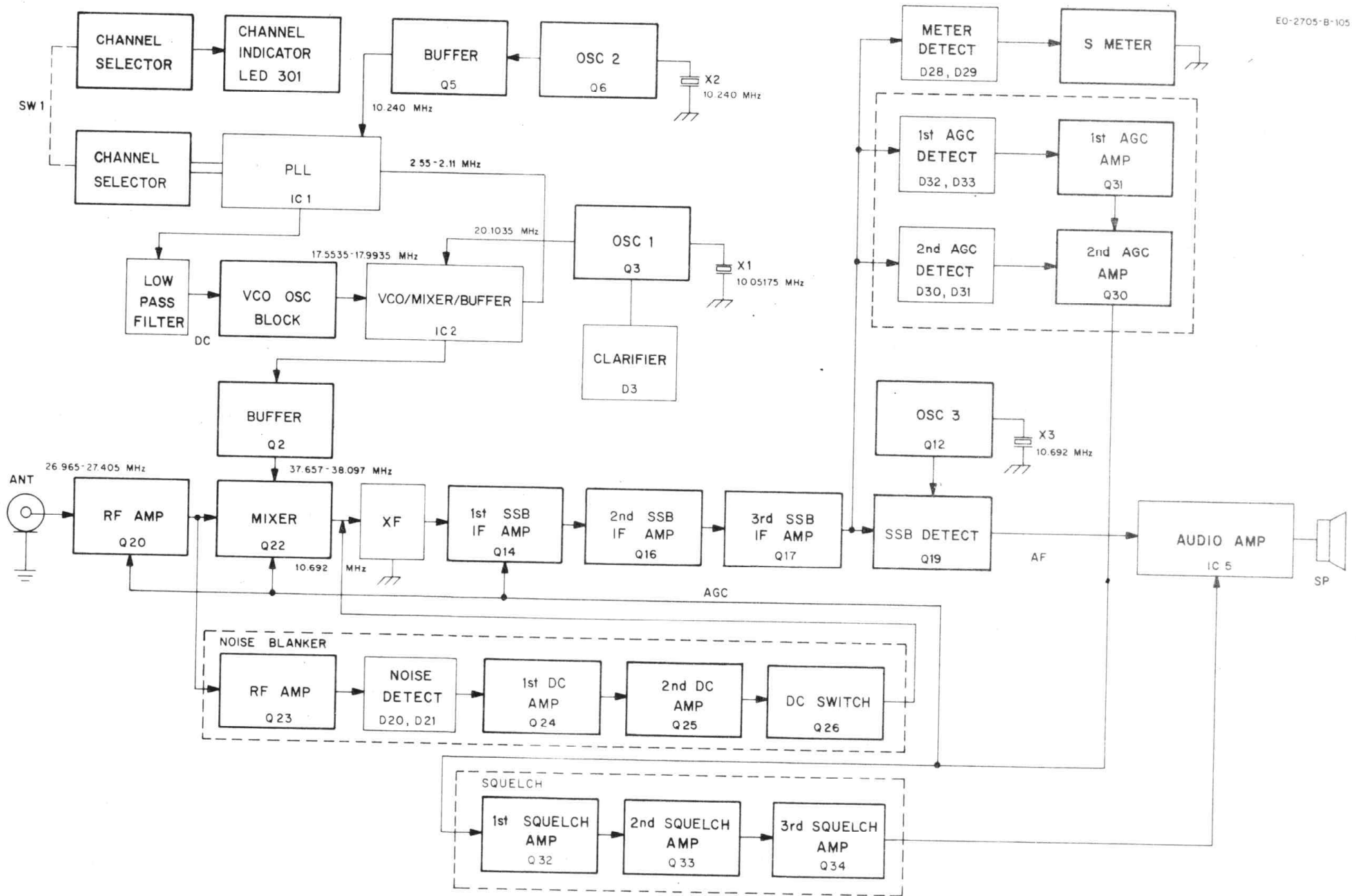


Figure 2-7. Block Diagram of LSB Receive Circuitry, Model 2705

low pass filter removes the AC component and allows only the DC voltage to be fed to the VCO Oscillator Block.

The error voltage will change the VCO frequency until the output of the programmable divider is again 10 kHz (2.11 MHz divided by 211) and the error voltage output of the phase detector is zero.

There is now a new DC voltage set up to tune the VCO frequency to 17.995 MHz. When this occurs the loop is considered locked. With the channel selector at 40, the following outputs of the PLL circuitry are produced: the 17.995 MHz VCO output is mixed with 20.105 MHz doubled output from the 10.0525 MHz Oscillator, Q3, to produce 38.100 MHz which is fed to the First Receiver Mixer, Q22; and in the transmit mode, the 38.100 MHz is mixed with the 10.695 MHz output of Oscillator 3 in the Mixer IC, IC3, to produce a transmit frequency of 27.405 MHz.

## **Receiver**

### *AM Receiver*

The receiver is a dual-conversion superheterodyne receiving AM signals from 26.965 MHz to 27.405 MHz. The operating channel is determined by the PLL frequency synthesizer which provides the local oscillator frequency to the First Receiver Mixer, Q22. A variable squelch circuit is included to quiet the receiver between transmissions. The squelch circuit is composed of Squelch Amplifier, Q32, First DC Amplifier, Q33, and the Second DC Amplifier, Q34.

Radio signals are received by the antenna and enter the radio at the antenna jack. The filter formed by C56, C57, L11, L12 and L13 matches the antenna impedance to the RF Amplifier, Q20, and its tuned circuit, C100 and T7. D18 and D19 are a signal overload protective circuit.

The output of the RF Amplifier, Q20, and the 37.660 to 38.100 MHz output from the VCO/Mixer, IC2, which was fed through Buffer, Q2, are applied to the First Receiver Mixer, Q22. The combined frequencies produce an output of 10.695 MHz which is the first IF.

The first IF passes through tuned circuits T10 and T13. It is then applied to the Second Receiver Mixer, D22 and D23, which has a second input of 10.240 MHz from the 10.240 MHz Oscillator, Q6. The output of the Second Receiver Mixer is 455 kHz, which is the second IF.

The second IF passes through the Ceramic Filter, CF1 and is amplified by the First, Second, and Third IF Amplifiers, Q27, Q28 and Q29. The amplified signal is then fed to the Detector, D25. The recovered audio signal is then applied to the AF Amplifier, IC5, through the Automatic Noise Limiter, D26.

Three stages of Automatic Gain Control loops are provided, one each at Q20, Q22 and Q27, to prevent signal overload distortion whenever the receiver is subjected to a strong signal.

The squelch functions in the following manner: in the receive mode, depending on where the Squelch Switch, VR2, is set, the Squelch Amplifier, Q32, will be turned on by low AGC voltage from Q27 applied to the base of Q32, and the voltage applied to the emitter of Q32 from VR2. Q34, the Second DC Amplifier, is on all the time supplying voltage to IC5 (Audio Amplifier, IC5). When Q32 turns on the First DC Amplifier, Q33, will turn on. With Q33 turned on, Q34 will be biased off, disabling the Audio Amplifier, IC5, and no signal will be heard.

The final amplified audio signal from the Audio Amplifier, IC5, passes through the Audio Transformer, T16, and is applied to the external speaker jacks and the speaker.

Q21 is a DC Switch which short circuits the primary of T9 during the transmit mode disabling the receiver circuit. With the transmitter on, a DC voltage is supplied to the base

of DC Switch, Q21, from pin 6 of the Transmit Mixer, IC3.

#### *USB and LSB Receiver*

SSB radio signals are received by the antenna and enter the radio at the antenna jack. The filter formed by C56, C57, L11, L12 and L13 matches the antenna impedance to the RF Amplifier, Q20, and its tuned circuit, C100 and T7. D18 and D19 are a signal overload protective circuit.

The output of the RF Amplifier, Q20, and the 37.660 to 38.100 MHz (37.657 to 38.097 MHz for LSB) output for the VCO/Mixer, IC2, which was fed through the Buffer, Q2, are applied to the First Receiver Mixer, Q22. The combined frequencies produce an output of 10.695 MHz (10.692 MHz for LSB) which is the first IF.

The first IF passes through the tuned circuit, T10, and is applied to the Crystal Filter, XF. It is then applied to the First SSB IF Amplifier, Q14. The signal is further amplified by the Second SSB IF Amplifier, Q16, and the Third SSB IF Amplifier, Q17. The amplified signal is then fed to the base of the SSB Detector, Q19. Also applied to the emitter of Q19 is a 10.695 MHz signal (10.692 MHz for LSB). From Q19 the detected audio signal goes to the Audio Amplifier, IC5. The amplified audio signal is applied to the external speaker jack and the internal speaker.

The DC Switch, Q18, prevents undesirable noise that is generated by the microphone PTT switch from entering the SSB AGC circuit.

#### *SSB AGC Circuitry*

To prevent signal overload distortion whenever the receiver is subjected to a strong signal, a peak value AGC circuit is employed. The SSB IF signal goes from the secondary of T12 in the collector circuit of Q17 to the SSB AGC Circuit. The signal is applied to detectors D30, D31, D32 and D33. The detected signal from D32 and D33 is amplified and applied to the emitter of the SSB AGC Amplifier, Q30. The other detected signal from D30 and D31 is applied directly to the emitter of Q30. From Q30 the amplified voltage goes to two places: one side is used to drive the squelch circuit and is an input to the base of Q32. The other side is used as a bias voltage for the RF Amplifier, Q20, the First Receiver Mixer, Q22, and the First SSB IF Amplifier, Q14.

The Squelch circuit functions the same in SSB as the AM Receiver squelch circuit.

## **Transmitter**

#### *AM Transmitter*

The operating channel is determined by the PLL Frequency Synthesizer, IC1. The VCO frequency is mixed in IC2 with the 20.105 MHz signal from the doubled output of the 10.0525 MHz Oscillator, Q3, to yield a 37.660 to 38.100 MHz signal which is applied to RF Amplifier/Mixer, IC3. In IC3 the signal is mixed with a 10.695 MHz signal from the 10.695 Oscillator, Q12, applied through the AM IF Amplifier, Q15, to pin 1 of IC3. The difference frequency of 26.965 to 27.405 MHz is the transmit frequency. The transmit frequency from IC3 passes through the filter circuits of T4 and T5 and is applied to the base of RF Amplifier, Q7. The amplified signal is then applied to the base of RF Pre-driver, Q8. From Q8, the signal is passed through filter T6 and is applied to the RF Driver, Q9. The amplified RF signal is then applied to the final stage, the RF Power Amplifier, Q10. This is a current amplifier that raises the transmit signal to an output of four watts. Its output is applied to a filter, consisting of L11, C54, C55, L12, C57 and L13, and then to the antenna jack.

The transmit signal is modulated in the following manner: the microphone output is applied to the Audio Amplifier, IC5. From IC5, the amplified audio signal goes through transformer T6 and diode D43 to the collectors of Q9 and Q10 and modulates the transmit carrier frequency.



Control voltages for the Automatic Level Control circuit (ALC), composed of Q37 and Q35, come from the diode D43. Transistor Q35 is the Automatic Level Control provided to suppress the audio input level to IC5. To avoid overmodulation Q37, the AM AF ALC, obtains its input from the audio output circuit through D43. Q37's output controls Q35, thus keeping the modulation signal level at a relatively constant level.

During transmit, when the PLL circuit is locked on frequency, a voltage from pin 6 of the PLL IC, IC1, will turn on Q7 and allow the RF drive sequence to operate. During receive Q1 keeps the RF drive turned off. This prevents feedback through the receiver circuits.

#### *USB and LSB Transmitter*

Switching to the SSB transmit mode is accomplished in the following manner: when the Mode Selector switch, S2, is placed in the U or L (USB or LSB) position, and the PTT switch is closed, the operating channel is determined by the PLL frequency synthesizer, IC1. The VCO frequency is mixed in IC2 with the 20.105 MHz signal from the doubled output of the 10.0525 MHz Oscillator, Q3, to yield a 37.660 to 38.100 MHz (37.657 to 38.097 MHz LSB) signal which is applied to RF Amplifier/Mixer, IC3. At the same time, a 10.695 MHz, (10.692 MHz LSB) generated by the 10.695 MHz Oscillator, Q12, is fed to the Balanced Modulator, IC4. IC4 also has as another input, the amplified audio signal from IC5 whenever there is an audio input from the microphone. The output from IC4 with both inputs is a carrier suppressed double side band signal. The double side band signal then goes through Buffer, Q13, to Crystal Filter, XF. At the crystal filter the desired sideband is separated from the double sideband signal. The sideband signal then goes to the SSB IF Amplifier, Q14, is amplified, then fed to pin 1 of IC3. Mixer. At the Mixer, IC3, the 10.695 MHz (10.692 MHz LSB) SSB signal is mixed with the 37.660 to 38.100 MHz signal (37.657 to 38.097 MHz LSB) from the VCO/Mixer, IC3, to produce the 26.965 to 27.405 MHz transmit signal. The 26.965 to 27.405 MHz SSB signal is then fed to the base of RF Amplifier, Q7. The amplified signal is then applied to the base of RF Pre-driver, Q8. From Q8, the signal is passed through filter T6 and is applied to the RF Driver, Q9. The amplified RF signal is then applied to the final stage RF Power Amplifier, Q10. The signal then goes through the filter comprised of L11, C54, C55, L12, C57 and L13, then to the antenna jack.

To avoid over-modulation, an ALC circuit, consisting of Automatic Level Control, Q35, and SSB AF ALC, Q38, is provided in the SSB microphone amplifier circuit. The SSB AF ALC, Q38, obtains its input from the audio output circuit of IC5. Q38's output controls the Automatic Level Control, Q35, thus keeping the modulation signal level at a relatively constant level.

Another ALC circuit is employed in the RF circuit to reduce the distortion in the RF stages. A feedback loop is provided from the RF Power Amplifier, Q10, through the RF ALC Detector, D8, to the SSB IF Amplifier, Q14.

Transistors Q36 and Q39 are DC switching circuits that operate the Audio Amplifier, IC5, as a SSB microphone amplifier. Q36 and Q39 are turned on, enabling IC5, when power switch S1 is turned on and either Upper or Lower sideband operation is selected by S2.

#### **Noise Blanker**

Any impulse signal (noise) along with received RF signals will be amplified by RF Amplifier, Q23, and applied to the Noise Blanker Detector, D21. The rectified positive portion of the impulse is then applied to Voltage Amplifiers, Q24 and Q25. Q24 and Q25 amplify the positive pulse to a high enough level to gate DC Switch, Q26, on for the duration of the impulse. When this occurs, the primary of T10 is grounded to the chassis through C121 and the emitter collector of Q26, preventing a mixer output during the pulse period.

Detector, D20, controls the bias voltage of Q24, keeping it turned off during the reception of normal received signals.

**Regulated Power Supply (AVR)**

The Automatic Voltage Regulator circuit consists of Q44 and D50. D50 is a zener diode and will break down when any voltage spikes occur. This circuit supplies the regulated voltage through switching transistors Q40, Q41, Q42 and Q43. The various switching transistors operate depending on the mode of operation selected by S2.

**N CODE — FREQUENCY CORRELATION CHART**

CHANNEL NO.	CHANNEL FREQ. (MHz)	"N" CODES	VCO FREQUENCY		CHANNEL SWITCH OUTPUT (PLL Inputs)					
			AM/USB	LSB	P0	P1	P2	P3	P4	P5
1	26.965	255	17.555	17.5535	1	1	1	1	1	1
2	26.975	254	17.575	17.5735	0	1	1	1	1	1
3	26.985	253	17.575	15.5735	1	0	1	1	1	1
4	27.005	251	17.595	17.5935	1	1	0	1	1	1
5	27.015	250	17.605	17.6035	0	1	0	1	1	1
6	27.025	249	17.615	17.6135	1	0	0	1	1	1
7	27.035	248	17.625	17.6235	0	0	0	1	1	1
8	27.055	246	17.645	17.6435	0	1	1	0	1	1
9	27.065	245	17.655	17.6535	1	0	1	0	1	1
10	27.075	244	17.665	17.6635	0	0	1	0	1	1
11	27.085	243	17.675	17.6735	1	1	0	0	1	1
12	27.105	241	17.695	17.6935	1	0	0	0	1	1
13	27.115	240	17.705	17.7035	0	0	0	0	1	1
14	27.125	239	17.715	17.7135	1	1	1	1	0	1
15	27.135	238	17.725	17.7235	0	1	1	1	0	1
16	27.155	236	17.745	17.7435	0	0	1	1	0	1
17	27.165	235	17.755	17.7535	1	1	0	1	0	1
18	27.175	234	17.765	17.7635	0	1	0	1	0	1
19	27.185	233	17.775	17.7735	1	0	0	1	0	1
20	27.205	231	17.795	17.7935	1	1	1	0	0	1
21	27.215	230	17.805	17.8035	0	1	1	0	0	1
22	27.225	229	17.815	17.8135	1	0	1	0	0	1
23	27.255	226	17.845	17.8435	0	1	0	0	0	1
24	27.235	228	17.825	17.8235	0	0	1	0	0	1
25	27.245	227	17.835	17.8335	1	1	0	0	0	1
26	27.265	225	17.855	17.8535	1	0	0	0	0	1
27	27.275	224	17.865	17.8635	0	0	0	0	0	1
28	27.285	223	17.875	17.8735	1	1	1	1	1	0
29	27.295	222	17.885	17.8835	0	1	1	1	1	0
30	27.305	221	17.895	17.8935	1	0	1	1	1	0
31	27.315	220	17.905	17.9035	0	0	1	1	1	0
32	27.325	219	17.915	17.9135	1	1	0	1	1	0
33	27.335	218	17.925	17.9235	0	1	0	1	1	0
34	27.345	217	17.935	17.9335	1	0	0	1	1	0
35	27.355	216	17.945	17.9435	0	0	0	1	1	0
36	27.365	215	17.955	17.9535	1	1	1	0	1	0
37	27.375	214	17.965	17.9635	0	1	1	0	1	0
38	27.385	213	17.975	17.9735	1	0	1	0	1	0
39	27.395	212	17.995	17.9935	0	0	1	0	1	0
40	27.405	211	17.995	17.9935	1	1	0	0	1	0

## CHAPTER 3 — ALIGNMENT

### General

These procedures must be followed to align the Hy-Gain V transceiver (Model 2705). Alignment should not be undertaken unless the technician has adequate test equipment and a full understanding of the circuitry of the transceiver.

**IMPORTANT:** Tuning adjustment of this transceiver "shall be made by or under the immediate supervision and responsibility of a person holding a first or second-class commercial radio operator's license", as stipulated in Part 95.97 (b) of the FCC Rules and Regulations.

The procedures are divided into two main sections: Transmitter Alignment and Receiver Alignment. See *Equipment* below for a complete list of recommended equipment.

These procedures assume that proper voltages are present at all points in the unit, if not, troubleshoot before continuing.

**NOTE:** The ferrite cores in the tuned coils are easily chipped or broken. Always use care when inserting an alignment tool in the coil: insert it straight into the core.

### Recommended Tools and Equipment

The following equipment is recommended for use in aligning the Hy-Gain V transceiver.

- Audio Signal Generator, 20Hz to 20 kHz
- AC VTVM, 1 mV measurable
- DC Ampere Meter, 2A
- Variable Regulated Power Supply, 8-15 VDC, 2A
- Frequency Counter, 0 to 40 MHz, high input impedance type
- VTVM with RF probe
- Oscilloscope, 30 MHz, high input impedance
- Low capacitance RF probe, capacitance not to exceed 7 pF.
- RF wattmeter and 50 ohm, 5W dummy load
- Standard RF signal generator, 27 MHz CB band
- Speaker dummy resistor, 8 ohm, 5W
- VOM 20k ohm/V

All test equipment should be properly calibrated.

**NOTE:** Test voltage is 13.8 VDC unless otherwise specified.

### Transmitter Alignment Procedure

#### **Equipment Set-up**

Refer to figure 3-1 for the test equipment set-up. Refer to figure 3-6 for location of components to be adjusted for transmitter alignment.

#### **Pre-Alignment Frequency Check**

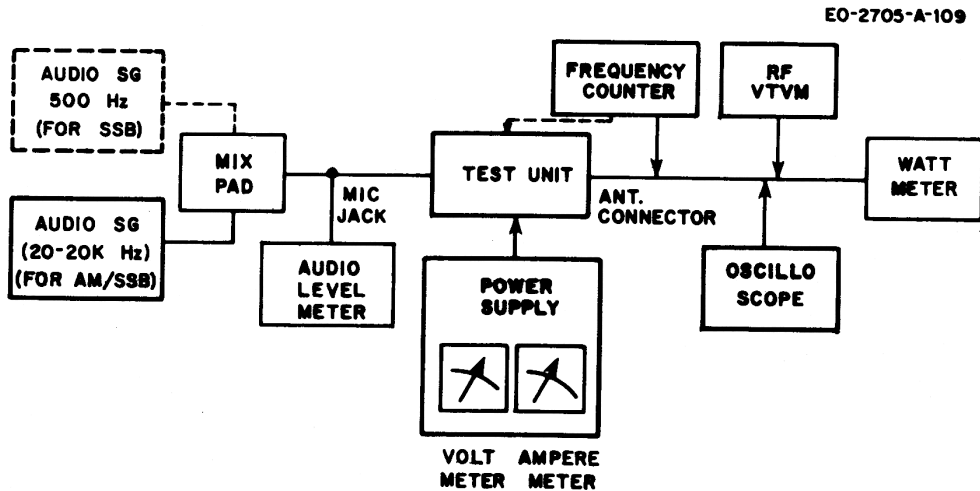
Before alignment, use the frequency counter through a 1000 pF coupling capacitor connected in series with the counter input probe to check the operating frequencies at the following points.

1. Place the Mode switch, S2, in the USB position; the Channel Selector to channel 19. Connect the frequency counter to TP2 and adjust the Trimmer Capacitor, CT3, for a reading of 10.24000 MHz.

2. Connect both an RF VTVM with an RF probe and the frequency counter to TP3. Adjust the core of T3 for a maximum indication on the RF VTVM. Adjust Trimmer Capacitor, CT1, for a reading of 20.105 MHz  $\pm$  40Hz.

3. Return the Mode Switch, S2, to the USB position. Connect the frequency counter to TP5 and adjust CT5 for a reading of  $10.695 \text{ MHz} \pm 50\text{Hz}$ . Place the Mode Switch, S2, in the LSB position and adjust CT4 to read  $10.692 \text{ MHz} \pm 50\text{Hz}$ .

Connect all test equipment as shown below:



**Figure 3-1. Equipment Set-up, Transmitter Alignment**

#### ***VCO Circuit Alignment***

1. Place the Channel Selector in the channel 1 position.
2. Connect the VOM (12 VDC range) between ground and TP4.
3. Adjust the core provided in the VCO Block to obtain a reading of  $3.6\text{V} \pm 0.1\text{V}$ , starting from top to bottom when turning the core.
4. Place the Channel Selector to the channel 40 position. The reading should be within 1.4 to 2.3V.

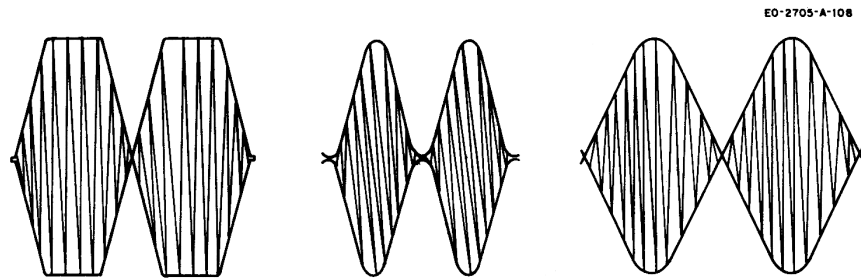
#### ***Driver Stage Alignment***

1. Apply a 2.4 kHz, 2.5 mV audio signal to the MIC input.
2. Place the Channel Selector in the channel 40 position and the Mode Switch, S2, in the USB position.
3. Connect an oscilloscope and 50 ohm dummy load across the ANT connector.
4. Adjust T1 for maximum amplitude on the oscilloscope display.
5. Place the Channel Selector in the channel 1 position and adjust T2 for maximum amplitude.
6. Connect an ampere meter between the emitter of Q10 and chassis ground. Adjust RV1 to obtain a bias current of  $35 \text{ mA} \pm 10 \text{ mA}$ .
7. Place the Channel Selector in the channel 40 position and adjust T4 for maximum amplitude.

8. Place the Channel Selector in the channel 1 position and adjust T5 for maximum amplitude.

### **SSB RF Power Amplifier Stage Alignment**

1. Place the Channel Selector in the channel 19 position and the Mode switch in the USB position.
2. Feed a 2.4 kHz, 25 mV audio signal to the microphone input.
3. Connect an oscilloscope to the emitter of Q7 and adjust T11 for a maximum amplitude display on the oscilloscope.
4. Turn T6 core fully upward, then adjust RV11 to obtain a reading of 150 mV (peak to peak) on the oscilloscope.
5. Connect the oscilloscope to the ANT connector in parallel with the wattmeter.
6. Temporarily adjust RV2 fully counterclockwise and adjust the core of L13 so that the core top is flush with the top of the coil bobbin.
7. Adjust T6, T11, L7 and L11 for maximum power output.
8. Decrease the audio signal to the microphone input to zero and adjust RV4 and RV5 for minimum amplitude of carrier leakage on the oscilloscope display.
9. Feed two signals, 500Hz to 2400Hz, of 25 mV to the microphone input and adjust RV2 to obtain 10 watts of PEP power. Make sure the PEP power output at each channel is within 9 to 11 watts. The waveshape displayed on the oscilloscope should conform to the waveshape shown in figure 3-2.
10. Place the Mode switch in the LSB position. Check to see that the AM/USB alignments are not affected, and that similar results are obtained in this mode of operation.



**Figure 3-2. Waveforms**

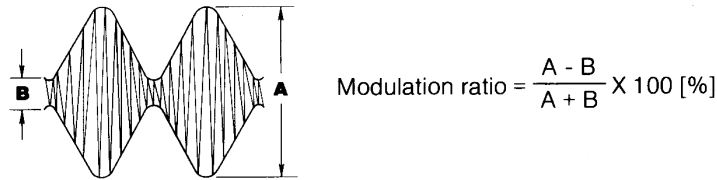
### **AM RF Power Stage Alignment**

1. Place the Mode switch in the AM position and the Channel Selector in channel 19 position.
2. Adjust VR5 for an RF power output of 3.7 watts as indicated on the wattmeter.

### **AM Modulation Alignment**

1. Apply a 2.5 kHz, 25 mV audio input signal to the MIC circuit.
2. Adjust RV12 so that the modulation depth is 80% to 95%.
3. Decrease the signal input to 2.5 mV and check that the modulation depth is 30% or higher.

**NOTE:** To figure modulation percentage use the formula in figure 3-3.



**Figure 3-3. Modulation Waveform**

**RF Power Meter Alignment**

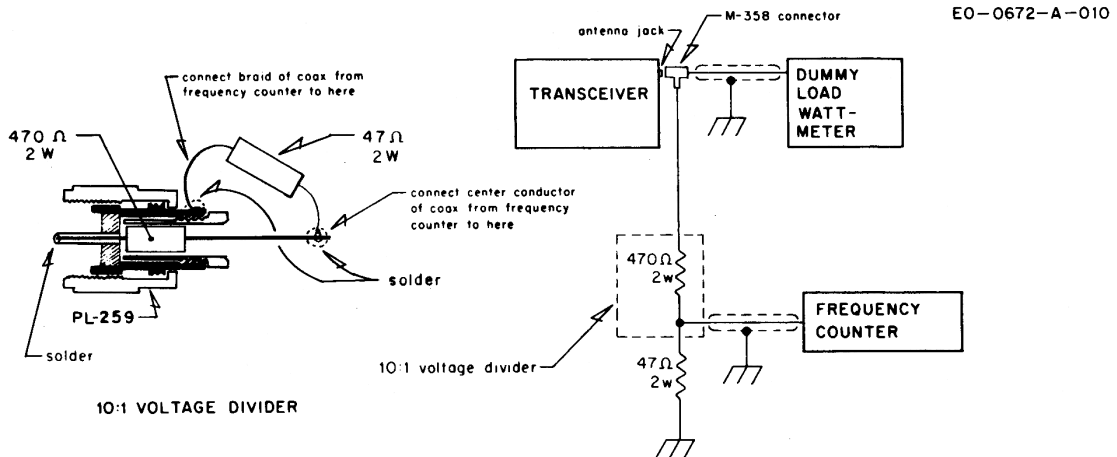
Adjust RV3 so that the P-RF meter provided on the front panel of the equipment indicates the same wattage as the wattmeter.

**Lock-Out Circuit Check**

Place the Channel Selector in the open channel (detent) position. Check the voltage at the base of Q1 using a VOM. The voltage should be within 0.05 to 0.4V.

**Transmit Frequency Check**

1. Place the transceiver into transmit AM mode with no modulation.
2. Connect the frequency counter to the antenna connector as shown in figure 3-4. Read the frequency at each channel. The frequency should be within  $\pm 800\text{Hz}$  from each center channel frequency as tabulated in the frequency table.



**Figure 3-4. Connection of Frequency Counter and Dummy Load**

**CHANNEL FREQUENCY**

Channel	MHz	Channel	MHz	Channel	MHz	Channel	MHz
1	26.965	11	27.085	21	27.215	31	27.315
2	26.975	12	27.105	22	27.225	32	27.325
3	26.985	13	27.115	23	27.255	33	27.335
4	27.005	14	27.125	24	27.235	34	27.345
5	27.015	15	27.135	25	27.245	35	27.355
6	27.025	16	27.155	26	27.265	36	27.365
7	27.035	17	27.165	27	27.275	37	27.375
8	27.055	18	27.175	28	27.285	38	27.385
9	27.065	19	27.185	29	27.295	39	27.395
10	27.075	20	27.205	30	27.305	40	27.405

## Receiver Alignment

### Equipment Set-up

Refer to figure 3-5 for the test equipment set-up. Refer to figure 3-7 for the location of components to be adjusted for transmitter alignment.

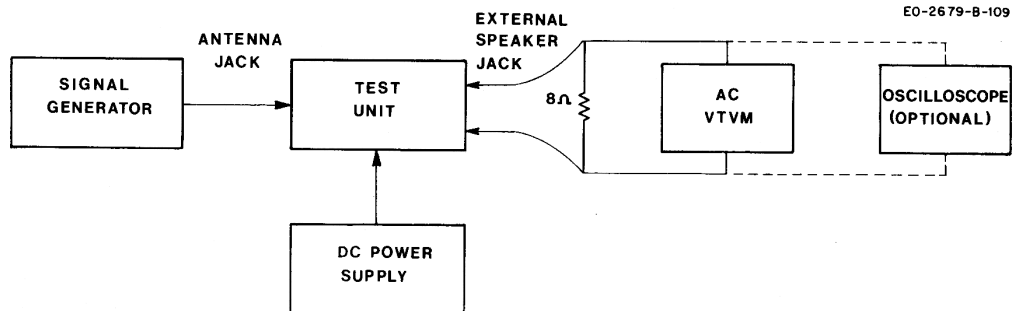


Figure 3-5. Test Equipment Set-Up, Receiver Alignment

### AGC Alignment

1. Connect the VOM to terminal number 15 on the main p.c. board and chassis ground.
2. Place the Mode switch in the AM position.
3. Adjust RV8 to obtain a reading of 2V.

### Receiver Sensitivity Alignment

To put the transceiver into the receive mode, short pins 3 and 5 of the MIC jack on the front panel together.

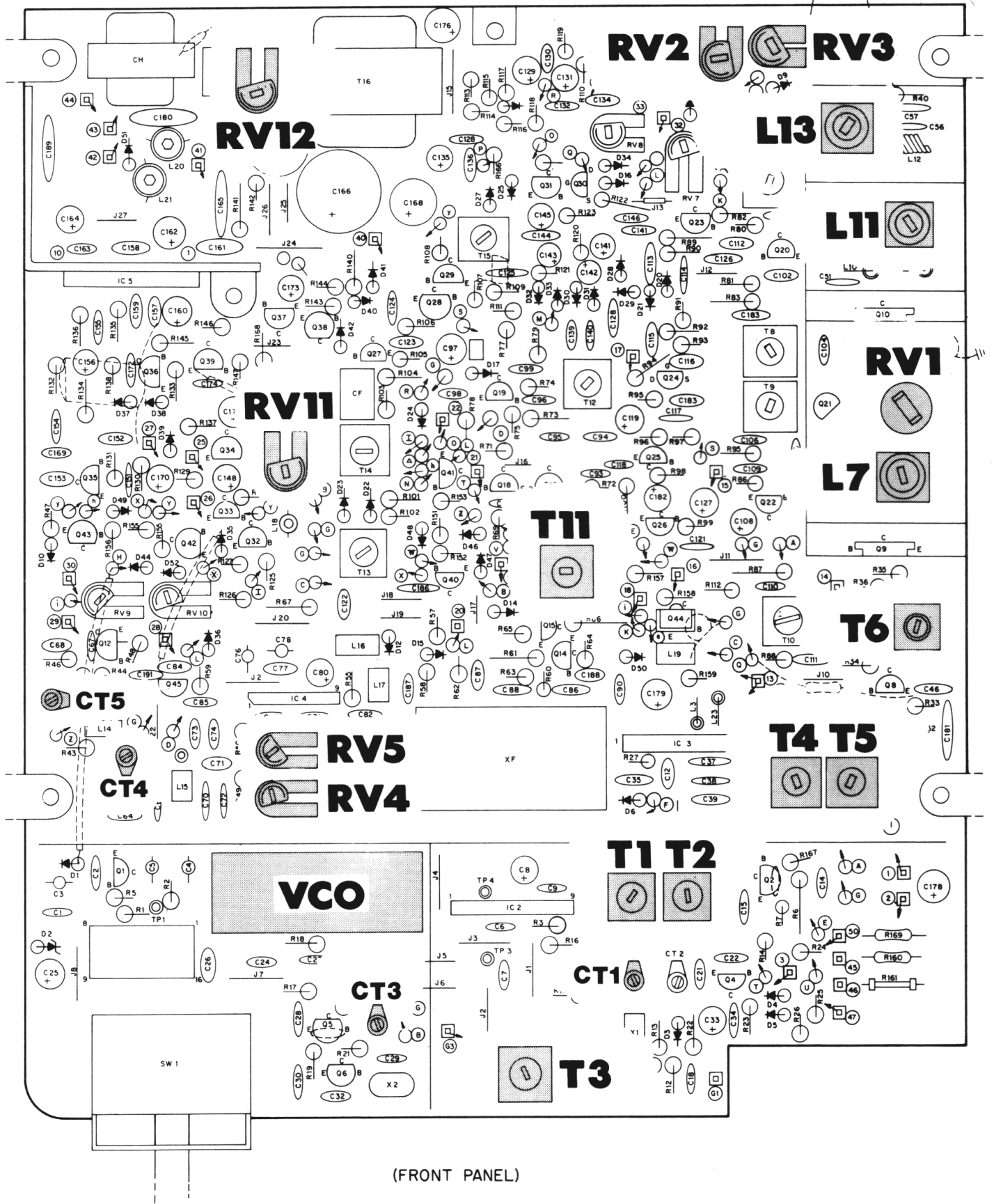
1. Set the signal generator to 27.185 MHz, 1 kHz, 30% modulation and set the transceiver to channel 19. **NOTE:** This alignment should be performed with an extremely small signal input from the signal generator to avoid inaccurate alignment due to AGC action.
2. Adjust T7, T8, T9, T10, T13, T14 and T15 for maximum audio output as indicated on the AC VTVM (or oscilloscope, if used).
3. Turn the core of T7 one turn clockwise.

### Squelch Circuit Alignment

1. Place the Mode switch in the AM position.
2. Set the signal generator to provide an RF input signal of 50  $\mu$ V, 1 kHz, 30% modulation.
3. Rotate the squelch control fully clockwise.
4. Adjust RV9 so that the squelch just breaks with the 50  $\mu$ V signal input.
5. Place the Mode switch in the USB position and adjust RV10 so that the squelch just breaks with the 50  $\mu$ V signal input.

### S-Meter Adjustment

1. Set the signal generator to provide a 30  $\mu$ V signal input and place the Mode switch in the USB position.
2. Adjust RV7 so that the S-meter indicates "9".
3. Place the Mode switch in the AM position and retune the signal generator slightly to obtain maximum audio output.
4. Adjust RV6 so that the S-meter indicates "9".



(FRONT PANEL)

Figure 3-6. Components Adjusted for Transmitter Alignment



TO ANT. JACK

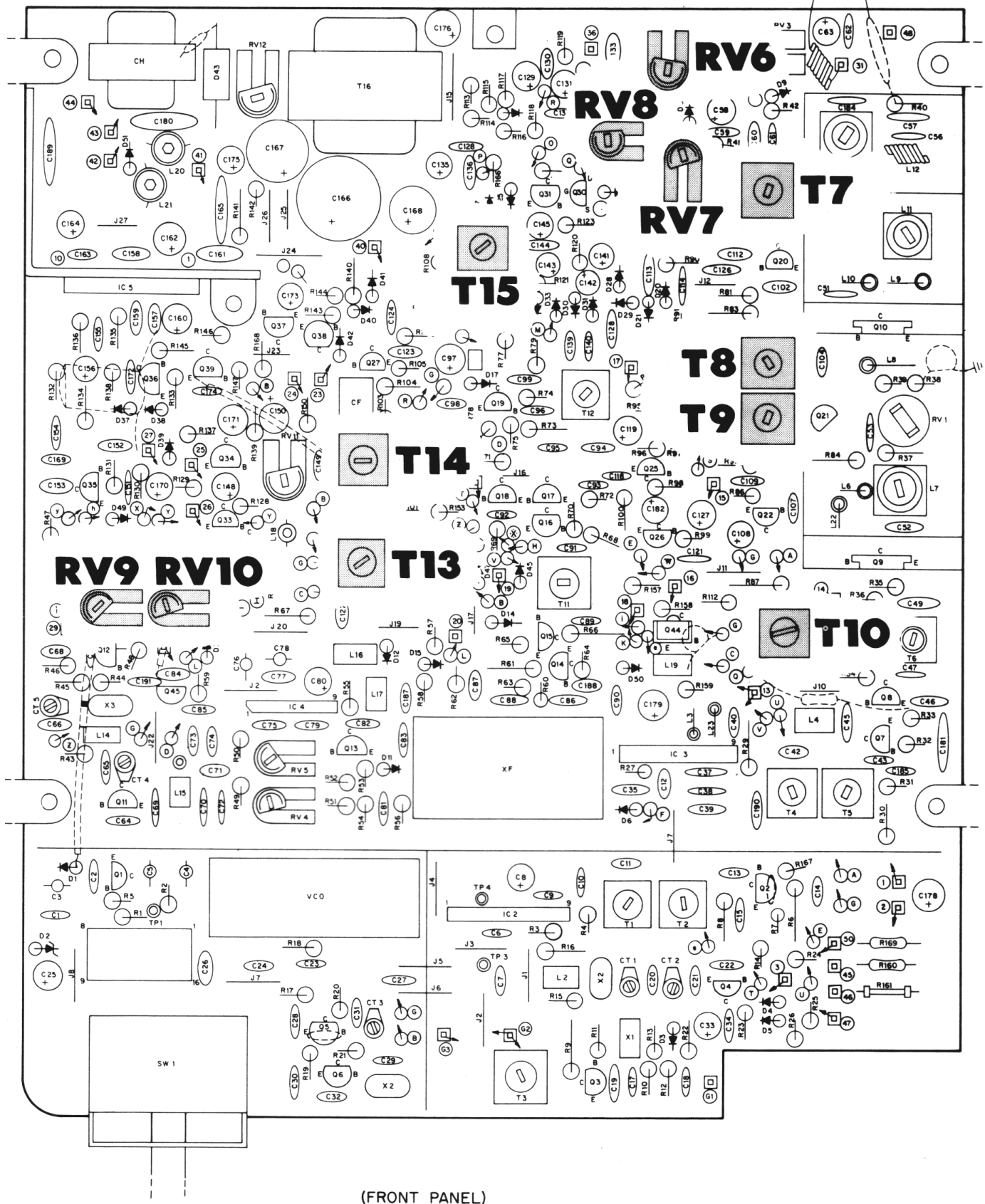


Figure 3-7. Components Adjusted for Receiver Alignment

## CHAPTER 4 — CHARTS AND DRAWINGS

## VOLTAGE MEASUREMENT CHARTS

**(AM Receive-Transmit)**

Ref. Desig.		E	B	C
Q1	Rx	3.8	.25	5.6
	Tx	3.8	.25	5.6
Q2	Rx	1	1.5	9.3
	Tx	0	0	9.3
Q3	Rx	1.08	1.5	9.2
	Tx	1.08	1.5	9.2
Q4	Rx	0	0	0
	Tx	0	0	0
Q5	Rx	.5	.82	5.6
	Tx	.5	.82	5.6
Q6	Rx	0	.6	.82
	Tx	0	.6	.82
Q7	Rx	0	.7	0
	Tx	1.5	.7	7.2
Q8	Rx	0	0	13.8
	Tx	.76	1.55	13
Q9	Rx	0	0	13.8
	Tx	0	.7	5.6
Q10	Rx	0	0	13.8
	Tx	0	.6	5.4
Q11	Rx	0	0	0
	Tx	0	0	0
Q12	Rx	2.8	3.2	9.4
	Tx	2.5	3.0	8.0
Q13	Rx	0	0	0
	Tx	0	0	0
Q14	Rx	0	0	9.4
	Tx	1.05	0	3.2
Q15	Rx	0	0	9.4
	Tx	1.05	1.63	3.2
Q16	Rx	0	0	0
	Tx	0	0	0

**AM Receive-Transmit**

Ref. Desig.		E	B	C
Q17	Rx	0	0	0
	Tx	0	0	0
Q18	Rx	0	0	0
	Tx	0	.75	0
Q19	Rx	0	0	0
	Tx	0	0	0
Q20	Rx	1.45	1.85	10.8
	Tx	.4	.45	10.8
Q21	Rx	0	0	0
	Tx	0	.75	0
Q22	Rx	1.5	1.75	12.2
	Tx	.2	.4	13
Q23	Rx	0	4.7	13
	Tx	0	4.7	13
Q24	Rx	0	.65	7.8
	Tx	0	0	0
Q25	Rx	8.6	7.6	3.4
	Tx	0	0	0
Q26	Rx	0	0	0
	Tx	0	0	0
Q27	Rx	.6	.87	8
	Tx	0	0	13
Q28	Rx	0	.65	2
	Tx	0	0	.25
Q29	Rx	1.35	2	11
	Tx	0	.25	13
Q30	Rx	0	0	0
	Tx	0	0	0
Q31	Rx	0	0	0
	Tx	0	0	0
Q32 Squelched	Rx	1.7	1.7	0
	Tx	.9	.2	.7

**AM Receive-Transmit**

Ref. Desig		E	B	C
Q32 Unsquelled	Rx	2.7	1.8	.7
	Tx	1.6	.5	.7
Q33 Unsquelled	Rx	0	.7	0
	Tx	0	.7	0
Q33 Squelched	Rx	0	0	.7
	Tx	0	.7	0
Q34 Unsquelled	Rx	0	0	3.3
	Tx	0	0	3.3
Q34 Squelched	Rx	0	.65	0
	Tx	0	0	3.3
Q35	Rx	0	0	0
	Tx	0	0	0
Q36	Rx	0	.7	0
	Tx	0	.7	0
Q37	Rx	1.5	4.4	0
	Tx	1.5	4.3	0
Q38	Rx	1.5	6.9	0
	Tx	1.5	6.6	0
Q39	Rx	0	0	7.6
	Tx	0	0	7.3
Q40	Rx	0	0	0
	Tx	0	0	0
Q41	Rx	0	0	0
	Tx	0	0	0
Q42	Rx	9.2	9.1	0
	Tx	9.1	8.4	9
Q43	Rx	8.6	9.2	9.4
	Tx	.35	.8	9.3

**USB Receive-Transmit**

Ref. Desig.		E	B	C
Q2	Rx	1	1.5	9.3
	Tx	0	0	9.3
Q3	Rx	1.08	1.5	9.2
	Tx	1.08	1.5	9.2
Q4	Rx	0	0	0
	Tx	0	0	0
Q5	Rx	.5	.82	5.6
	Tx	.5	.82	5.6
Q6	Rx	0	.6	.82
	Tx	0	.6	.82
Q7	Rx	0	.7	0
	Tx	1.65	.7	7.2
Q8	Rx	0	0	13.8
	Tx	.76	1.7	13.5
Q9	Rx	0	0	13.8
	Tx	0	.7	13.8
Q10	Rx	0	0	13.8
	Tx	0	.6	13.8
Q11	Rx	0	0	0
	Tx	0	0	0
Q12	Rx	2.5	3	8
	Tx	2.5	3	8
Q13	Rx	0	0	0
	Tx	4	4.7	6.8
Q14	Rx	.97	.83	8.2
	Tx	.6	1.1	8.6
Q15	Rx	.97	0	8.2
	Tx	.6	0	8.6
Q16	Rx	0	.7	1.9
	Tx	0	0	0
Q17	Rx	1.1	1.9	6
	Tx	0	0	.2
Q18	Rx	0	0	1.9
	Tx	0	.75	0

**USB Receive-Transmit**

Ref. Desig.		E	B	C
Q1	Rx	3.8	.25	5.6
	Tx	3.8	.25	5.6

**USB Receive-Transmit**

Reg. Desig.		E	B	C
Q19	Rx	0	.5	5.6
	Tx	0	0	0
Q20	Rx	1.25	1.85	13.2
	Tx	.5	.45	13.2
Q21	Rx	0	0	0
	Tx	0	.75	0
Q22	Rx	1.3	1.75	12.8
	Tx	.2	.45	13.5
Q23	Rx	0	4.9	13.5
	Tx	0	4.9	13.5
Q24	Rx	0	.65	7.8
	Tx	0	0	0
Q25	Rx	8.6	7.6	3.4
	Tx	0	0	0
Q26	Rx	0	0	0
	Tx	0	0	0
Q27	Rx	0	0	13.5
	Tx	0	0	13.5
Q28	Rx	0	0	0
	Tx	0	0	0
Q29	Rx	0	0	13.5
	Tx	0	0	13.5
Q30	Tx	1.5	2.2	7.7
	Tx	0	0	0
Q31	Rx	.1	1.5	2.05
	Tx	0	0	0
Q32 Unsquelled	Rx	2.7	1.8	.7
	Tx	1.6	.5	.7
Q32 Squelched	Rx	1.7	1.7	0
	Tx	.9	.2	.7
Q33 Unsquelled	Rx	0	.7	0
	Tx	0	.7	0
Q33 Squelched	Rx	0	0	.7
	Tx	0	.7	0

**USB Receive-Transmit**

Ref. Desig.		E	B	C
Q34 Unsquelled	Rx	0	0	3.3
	Tx	0	0	3.3
Q34 Squelched	Rx	0	.65	0
	Tx	0	0	3.3
Q35	Rx	0	0	0
	Tx	0	0	0
Q36	Rx	0	.7	0
	Tx	0	0	0
Q37	Rx	1.5	4.4	0
	Tx	1.5	4.4	0
Q38	Rx	1.5	6.9	0
	Tx	1.5	1.5	0
Q39	Rx	0	0	7.6
	Tx	0	.75	0
Q40	Rx	8.4	8.2	0
	Tx	8.2	7.4	8
Q41	Rx	7.5	8.1	8.4
	Tx	.2	.7	8.2
Q42	Rx	0	0	0
	Tx	0	0	0
Q43	Rx	0	0	0
	Tx	0	0	0

**LSB Receive-Transmit**

Ref. Desig.		E	B	C
Q1	Rx	3.8	.25	5.6
	Tx	3.8	.25	5.6
Q2	Rx	1	1.5	9.3
	Tx	0	0	9.3
Q3	Rx	1.08	1.5	9.2
	Tx	1.08	1.5	9.2
Q4	Rx	0	.77	0
	Tx	0	.77	0

LSB Receive-Transmit

Ref. Desig		E	B	C
Q5	Rx	.5	.82	5.6
	Tx	.5	.82	5.6
Q6	Rx	0	.6	.82
	Tx	0	.6	.82
Q7	Rx	0	.7	0
	Tx	1.65	.7	7.2
Q8	Rx	0	0	13.8
	Tx	.76	1.7	13.5
Q9	Rx	0	0	13.8
	Tx	0	.7	13.8
Q10	Rx	0	0	13.8
	Tx	0	.6	13.8
Q11	Rx	0	.7	0
	Tx	0	.7	0
Q12	Rx	2.5	3	8
	Tx	2.5	3	8
Q13	Rx	0	0	0
	Tx	4	4.7	6.8
Q14	Rx	.97	.95	8.2
	Tx	.6	1.1	8.2
Q15	Rx	.97	0	8.2
	Tx	.6	0	8.2
Q16	Rx	0	.7	1.9
	Tx	0	0	0
Q17	Tx	1.1	1.9	6
	Tx	0	0	.2
Q18	Rx	0	0	1.9
	Tx	0	.75	0
Q19	Rx	0	.5	5.6
	Tx	0	0	0
Q20	Rx	1.25	1.85	13.2
	Tx	.5	.45	13.2
Q21	Rx	0	0	0
	Tx	0	.75	0

LSB Receive-Transmit

Ref. Desig.		E	B	C
Q22	Rx	1.3	1.75	12.8
	Tx	.2	.45	13.5
Q23	Rx	0	4.9	13.5
	Tx	0	4.9	13.5
Q24	Rx	0	.65	7.8
	Tx	0	0	0
Q25	Rx	8.6	7.6	3.4
	Tx	0	0	0
Q26	Rx	0	0	0
	Tx	0	0	0
Q27	Rx	0	0	13.5
	Tx	0	0	13.5
Q28	Rx	0	0	0
	Tx	0	0	0
Q29	Rx	0	0	13.5
	Tx	0	0	13.5
Q30	Rx	1.5	2.2	7.7
	Tx	0	0	0
Q31	Rx	.1	1.5	2.05
	Tx	0	0	0
Q32 Unsquelled	Rx	2.7	1.8	.7
	Tx	1.6	.5	.7
Q32 Squelched	Rx	1.7	1.7	0
	Tx	.9	.2	.7
Q33 Unsquelled	Rx	0	.7	0
	Tx	0	.7	0
Q33 Squelched	Rx	0	0	.7
	Tx	0	.7	0
Q34 Unsquelled	Rx	0	0	3.3
	Tx	0	0	3.3
Q34 Squelched	Rx	0	.65	0
	Tx	0	0	3.3
Q35	Rx	0	0	0
	Tx	0	0	0

**LSB Receive-Transmit**

Ref. Desig.		E	B	C
Q36	Rx	0	.7	0
	Tx	0	0	0
Q37	Rx	1.5	4.4	0
	Tx	1.5	4.4	0
Q38	Rx	1.5	6.9	0
	Tx	1.5	1.5	0
Q39	Rx	0	0	7.6
	Tx	0	.75	0
Q40	Rx	8.4	8.2	0
	Tx	8.2	7.4	8
Q41	Rx	7.5	8.1	8.4
	Tx	.2	.7	8.2
Q42	Rx	0	0	0
	Tx	0	0	0
Q43	Rx	0	0	0
	Tx	0	0	0

**IC 1 (P.L.L. 02)**

Pin No.	Voltage	Channels Selected
1	5.6	N/A
2	1.8	N/A
3	.15	N/A
4	5.3	N/A
5	No Pin	
6	1.5 - 3.5	40 - 1
7	0	N/A
8	5.6	N/A
9	5.6	N/A
10	5.6	1,2,3,4,5,6,7,8,9,10,11,12,13,14, 15,16,17,18,19,20,21,22,23,24,25, 26,27
11	5.6	1,2,3,4,5,6,7,8,9,10,11,12,13,25, 29,30,31,32,33,34,35,36,37,38,39,40
12	5.6	1,2,3,4,5,6,7,14,15,16,17,18,19,28, 29,30,31,32,33,34,35
13	5.6	1,2,3,8,9,10,14,15,16,20,21,22, 24,28,29,30,31,36,37,38,39
14	5.6	1,2,4,5,8,11,14,15,17,18,20,21,23, 25,28,29,32,33,36,37,40
15	5.6	1,3,4,6,9,11,12,14,17,19,20,22,25, 26,28,30,32,34,36,38,40
16	0	N/A

**NOTE:** All voltage readings are taken with the power source set at exactly 13.8 VDC.

**IC 2**

Pin No.		1	2	3	4	5	6	7	8	9
Voltage	Rx	2.5	2	1.3	2.3	0	8.4	2.1	4.4	5.5
	Tx	2.5	2	1.3	2.3	0	8.4	2.1	4.4	5.5

**IC 3**

Pin No.		1	2	3	4	5	6	7	8	9
Voltage	Rx	0	0	0	0	0	0	0	0	0
	Tx	2.6	2	1.3	2.7	0	7.2	2	7.3	6.8

**IC 4**

Pin No.		1	2	3	4	5	6	7
Voltage	Rx	0	0	0	0	0	0	0
	Tx	3.1	3.4	3.5	0	6.3	8.3	4.7

**IC 5**

Pin No.		1	2	3	4	5	6	7	8	9	10
Voltage squelched		13.8	12.5	2.5	12	.4	1.6	1.5	0	0	11
Voltage unsquelched		13.8	12.5	4	8.4	1.3	3.8	3.5	1.3	0	7.1

**NOTE:** All voltage measurements are taken with the power supply set at exactly 13.8 VDC.





**Component Outline  
Main P.C. Board**

**MAIN P.C. BOARD  
WIRING CHART**

PIN NO.	WIRING CONNECTIONS
1	yellow/white wire to PA jack
2	gray wire to CB/PA switch
3	brown wire to clarifier switch
4	no wire
5	to channel selector
6	to channel selector
7	no wire
8	to channel selector
9	to channel selector
10	no wire
11	no wire
12	no pin
13	one orange wire to LSB/USB/AM switch
14	one orange wire to VR5
15	orange/white wire to RF gain
16	green wire to MIC jack
17	gray wire with green tip and white wire - white portion to NB switch
18	white wire to LSB/USB/AM switch
19	brwn wire to LSB/USB/AM switch
20	no wire
21	purple wire to LSB/USB/AM switch
22	blue wire to RF gain switch
23	purple wire to EXT SP jack
24	green wire to speaker
25	gray wire with brown tip and white wire - white portion to ON/OFF switch
26	gray wire with brown tip - brown tip to ON/OFF switch, gray wire with white tip - white tip to MIC jack
27	white wire to CB/PA switch gray wire with white tip and white wire - white wire to MIC jack
28	purple wire to squelch switch
29	pink wire to squelch switch
30	blue/white wire to LSB/USB/AM switch
31	coiled wire to ANT jack
32	orange/white wire to meter
33	no wire
34	gray wire with blue tip and white wire - white portion to ON/OFF switch
35	gray wire with blue tip - blue tip to ON/OFF switch
36	no wire
37	no pin
38	one pink wire to PA jack
39	yellow wire to VR5
40	red wire to ON/OFF switch
41	green wire to LSB/USB/AM switch
42	black wire to DC power jack
43	red wire to DC power jack
44	orange wire to ON/OFF switch
45	no wire
46	no wire
47	pink wire to pin 38
48	no wire
49	no wire
50	brown/white wire to RF gain switch
X	blue wire to R41
G1	no wire
G2	one black wire to clarifier switch one black wire to pin 2 on switch p.c. board

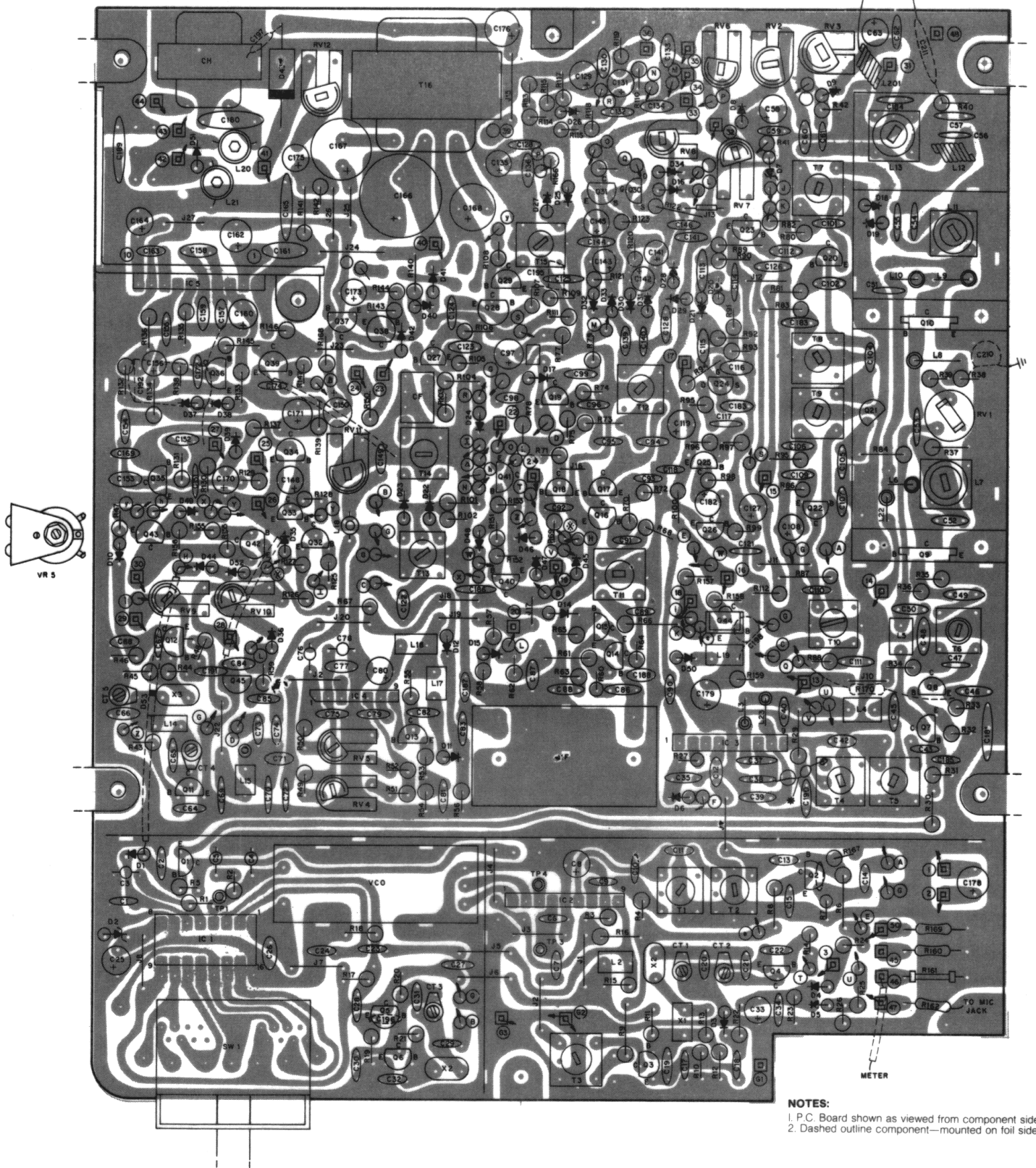
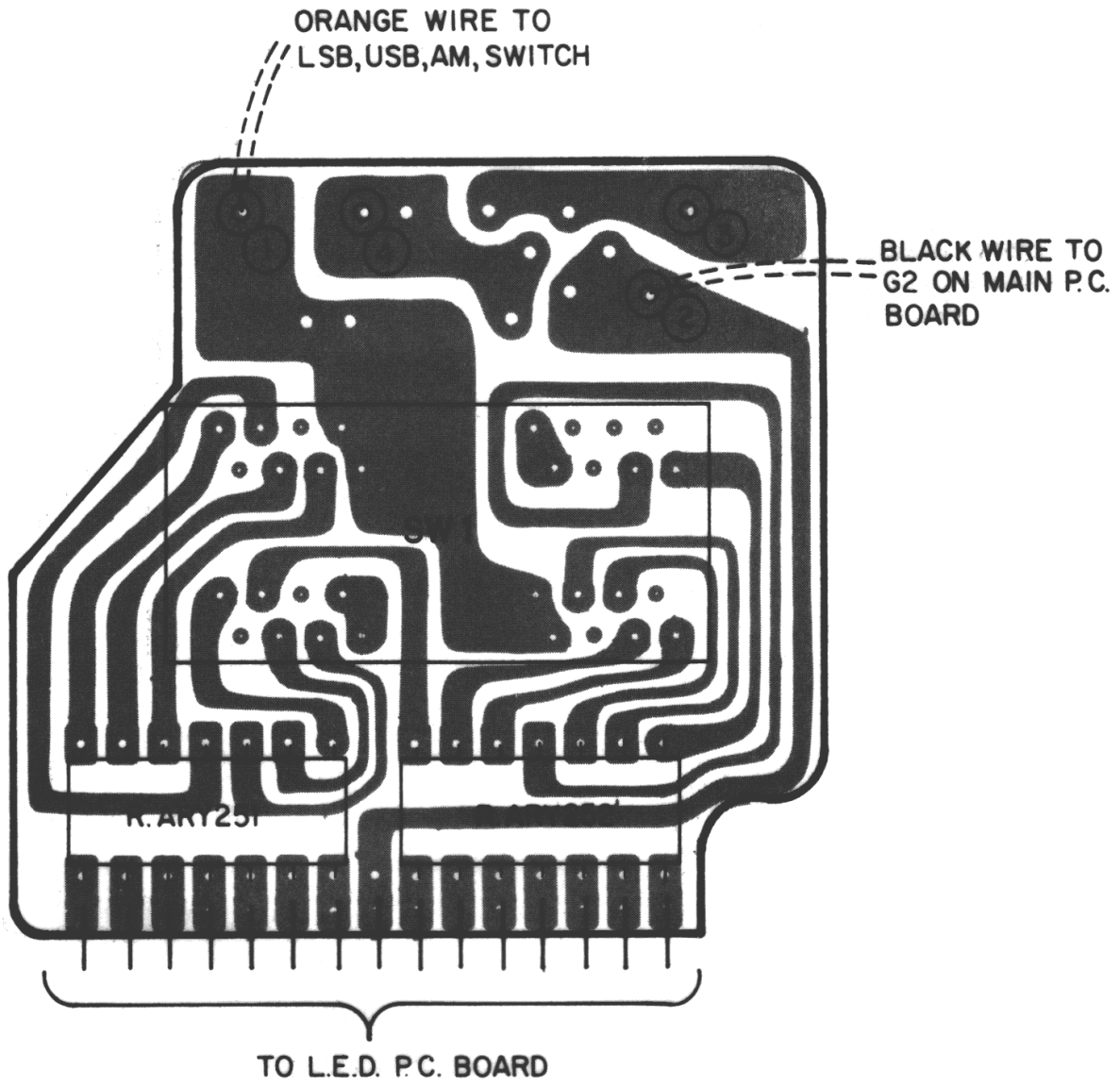


Figure 4-1. Component Outline Main P.C. Board, Model 2705



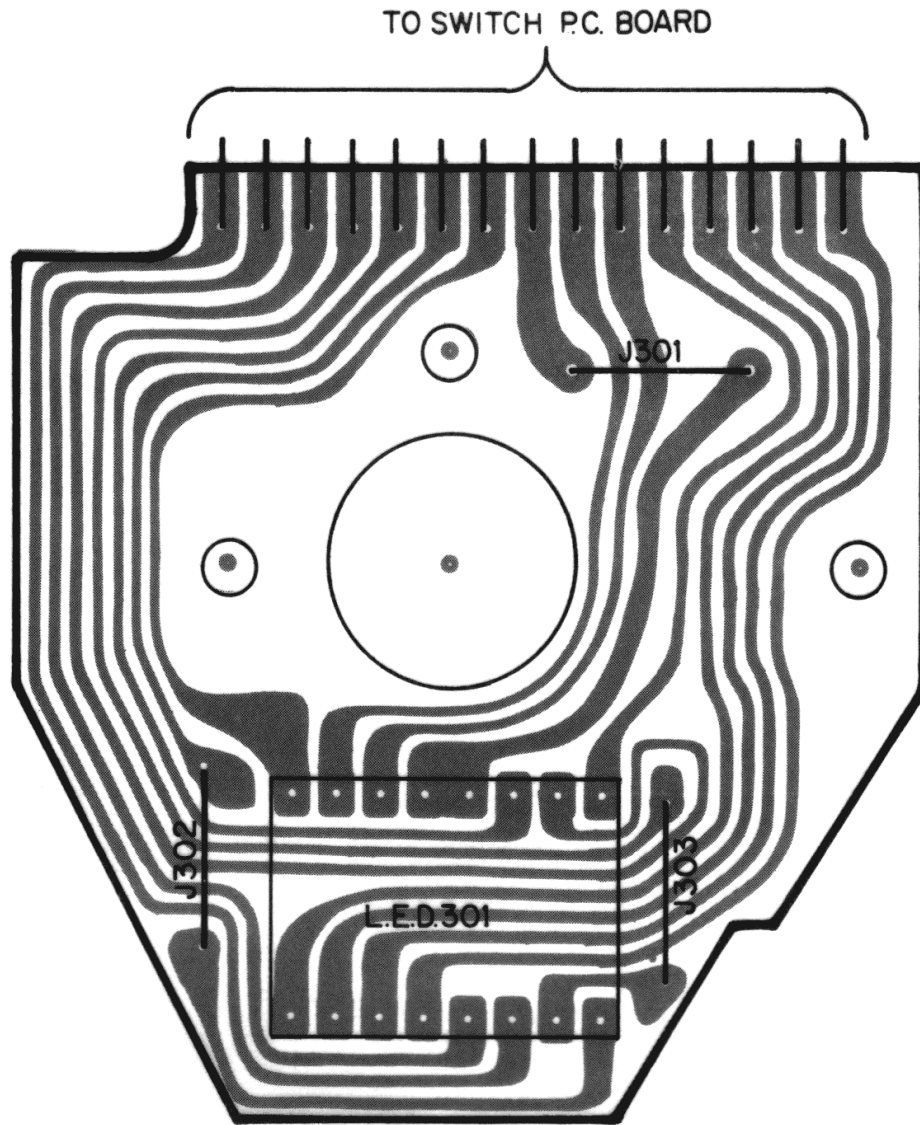
**Component Outline  
L.E.D. P.C. Board**



**Figure 4-2. Component Outline LED P.C. Board, Model 2705**



**Component Outline  
Switch P.C. Board**



**Figure 4-3. Component Outline Switch P.C. Board, Model 2705**

**Parts List**



## MAIN P.C. BOARD

Reference Designator	Description	Part No.
	main p.c. board, complete .....	AP-TBM048CA
	main p.c. board, plate and drilled .....	PT-BM048AOX
C1	4700pF, 50V, mylar .....	CQ-MB472KCH
C2	.022uF, 50V, mylar .....	CQ-MB223KCH
C3	.1uF, 35V, tantalum .....	CS-SF0R1MLC
C4	.22uF, 35V, tantalum .....	CS-SFR22MLC
C5	10uF, 16V, tantalum .....	CS-SD100MLC
C6	33pF, 50V, ceramic .....	CC-CB330KPM
C7	12pF, 50V, ceramic .....	CC-CB120KPM
C8	1uF, 50V, electrolytic .....	CE-EG010ALN
C9	1000pF, 50V, mylar .....	CQ-MB102KCH
C10	1200F, 50V, mylar .....	CQ-MB122KCH
C11	2pF, 50V, ceramic .....	CC-CB020CPM
C12	33pF, 50V, ceramic .....	CC-CB330KPM
C13	33pF, 50V, ceramic .....	CC-CB330KPM
C14	10pF, 50V, ceramic .....	CC-CB100DPM
C15	.01uF, 50V, mylar .....	CQ-MB103KCH
C16	.01uF, 50V, mylar .....	CQ-MB103KCH
C17	33pF, 50V, ceramic .....	CC-CB330KPM
C18	1000pF, 50V, mylar .....	CQ-MB102KCH
C19	220pF, 50V, ceramic .....	CC-CB221KPM
C20	22pF, 50V, ceramic .....	CC-CB220KCM
C21	15pF, 50V, ceramic .....	CC-CB150KCM
C22	.01uF, 50V, mylar .....	CQ-MB103KCH
C23	1000pF, 50V, mylar .....	CQ-MB102KCH
C24	68pF, 50V, ceramic .....	CC-CB680KPM
C25	47uF, 6.3V, electrolytic .....	CE-EB470ALN
C26	.047uF, 50V, mylar .....	CQ-MB473KCH
C27	.01uF, 50V, mylar .....	CQ-MB103KCH
C28	1000pF, 50V, mylar .....	CQ-MB102KCH
C29	5pF, 50V, mylar .....	CC-CB050DPM
C30	68pF, 50V, mylar .....	CC-CB680KPM
C31	27pF, 50V, mylar .....	CC-CB270KCM
C32	560pF, 50V, mylar .....	CC-CB561KOM
C33	1uF, 50V, electrolytic .....	CE-EG010ALN
C34	.01uF, 50V, mylar .....	CQ-MB103KCH
C35	.01uF, 50V, mylar .....	CQ-MB103KCH
C36	150pF, 50V, ceramic .....	CC-CB151KPM
C37	82pF, 50V, ceramic .....	CC-CB820KPM
C38	120pF, 50V, ceramic .....	CC-CB121KPM
C39	.01uF, 50V, mylar .....	CQ-MB103KCH
C40	.01uF, 50V, mylar .....	CQ-MB103KCH
C41	(not used)	
C42	3pF, 50V, ceramic .....	CC-CB030CPM
C43	47pF, 50V, ceramic .....	CC-CB470KPM
C44	(not used)	
C45	.01uF, 50V, mylar .....	CQ-MB103KCH
C46	.01uF, 50V, mylar .....	CQ-MB103KCH
C47	47pF, 50V, ceramic .....	CC-CB470KPM
C48	.01uF, 50V, mylar .....	CQ-MB103KCH
C49	330pF, 50V, ceramic .....	CC-CB331KOK
C50	.01uF, 50V, mylar .....	CQ-MB103KCH
C51	.047uF, 50V, mylar .....	CQ-MB473KCH
C52	82pF, 50V, ceramic .....	CC-CB820KPM
C53	180pF, 50V, ceramic .....	CC-CB181KPM
C54	150pF, 50V, ceramic .....	CC-CB151KPM
C55	560pF, 50V, ceramic .....	CC-CB561KOK
C56	47pF, 50V, ceramic .....	CC-CB470KPM
C57	470pF, 50V, ceramic .....	CC-CB471KOK
C58	.22uF, 35V, tantalum .....	CS-SFR22MLC
C59	.01uF, 50V, mylar .....	CQ-MB103KCH
C60	5pF, 50V, ceramic .....	CC-CB050DPM

Reference Designator	Description	Part No.
C61	2pF, 50V, ceramic	CC-CB020KPM
C62	.01uF, 50V, mylar	CQ-MB103KCH
C63	1uF, 50V, electrolytic	CE-EG010ALN
C64	.01uF, 50V, mylar	CQ-MB103KCH
C65	47pF, 50V, ceramic	CC-CB470KCM
C66	10pF, 50V, ceramic	CC-CB100DCM
C67	1000pF, 50V, mylar	CQ-MB102KCH
C68	22pF, 50V, ceramic	CC-CB220KPM
C69	220pF, 50V, ceramic	CC-CB221KPM
C70	220pF, 50V, ceramic	CC-CB221KPM
C71	8pF, 50V, ceramic	CC-CB080DPM
C72	100pF, 50V, ceramic	CC-CB101KPM
C73	15pF, 50V, ceramic	CC-CB150KPM
C74	22pF, 50V, ceramic	CC-CB220KPM
C75	.01uF, 50V, mylar	CQ-MB103KCH
C76	4.7uF, 25V, electrolytic	CE-EE4R7ALN
C77	.01uF, 50V, mylar	CQ-MB103KCH
C78	10uF, 16V, electrolytic	CE-ED100ALN
C79	.01uF, 50V, mylar	CQ-MB103KCH
C80	10uF, 16V, electrolytic	CE-ED100ALN
C81	.01uF, 50V, mylar	CQ-MB103KCH
C82	.01uF, 50V, mylar	CQ-MB103KCH
C83	.01uF, 50V, mylar	CQ-MB130KCH
C84	.01uF, 50V, mylar	CQ-MB103KCH
C85	.01uF, 50V, mylar	CQ-MB103KCH
C86	.01uF, 50V, mylar	CQ-MB103KCH
C87	.22uF, 35V, tantalum	CS-SFR22MLC
C88	.01uF, 50V, mylar	CQ-MB103KCH
C89	.01uF, 50V, mylar	CQ-MB103KCH
C90	.01uF, 50V, mylar	CQ-MB103KCH
C91	.01uF, 50V, mylar	CQ-MB103KCH
C92	.01uF, 50V, mylar	CQ-MB103KCH
C93	.01uF, 50V, mylar	CQ-MB103KCH
C94	.01uF, 50V, mylar	CQ-MB103KCH
C95	.01uF, 50V, ceramic	CC-CB030CPM
C96	33pF, 50V, ceramic	CC-CB330KPM
C97	33uF, 6.3V, electrolytic	CE-EB330ALN
C98	1000pF, 50V, mylar	CQ-MB102KCH
C99	.01uF, 50V, mylar	CQ-MB103KCH
C100	33pF, 50V, ceramic	CC-CB330KPM
C101	.01uF, 50V, mylar	CQ-MB103KCH
C102	.01uF, 50V, mylar	CQ-MB103KCH
C103	.01uF, 50V, mylar	CQ-MB103KCH
C104	3pF, 50V, ceramic	CC-CB030CPM
C105	.01uF, 50V, mylar	CQ-MB103KCH
C106	.01uF, 50V, mylar	CQ-MB103KCH
C107	39pF, 50V, ceramic	CC-CB390KPM
C108	1uF, 50V, electrolytic	CE-EG010ALN
C109	.01uF, 50V, mylar	CQ-MB103KCH
C110	.01uF, 50V, mylar	CQ-MB103KCH
C111	.01uF, 50V, mylar	CQ-MB103KCH
C112	5pF, 50V, ceramic	CC-CB050DPM
C113	220pF, 50V, ceramic	CC-CB221KPM
C114	4700pF, 50V, mylar	CQ-MB472KCH
C115	1000pF, 50V, mylar	CQ-MB102KCH
C116	.033uF, 50V, mylar	CQ-MB333KCH
C117	4700pF, 50V, mylar	CQ-MB472KCH
C118	.01uF, 50V, mylar	CQ-MB103KCH
C119	10uF, 16V, electrolytic	CE-ED100ALN
C120	(not used)	
C121	1000F, 50V, mylar	CQ-MB102KCH
C122	27pF, 50V, ceramic	CC-CB270KPM
C123	.033uF, 50V, mylar	CQ-MB333KCH
C124	.01uF, 50V, mylar	CQ-MB103KCH
C125	.033uF, 50V, mylar	CQ-MB333KCH

Reference Designator	Description	Part No.
C126	.01uF, 50V, mylar	CQ-MB103KCH
C127	10uF, 10V, electrolytic	CE-ED100ALN
C128	4700pF, 50V, mylar	CQ-MB472KCH
C129	3.3uF, 25V, electrolytic	CE-EE3R3ALN
C130	.033uF, 50V, mylar	CQ-MB333KCH
C131	4.7uF, 25V, electrolytic	CE-EE4R7ALN
C132	4700pF, 50V, mylar	CQ-MB472KCH
C133	220pF, 50V, ceramic	CC-CB221KOM
C134	8200pF, 50V, mylar	CQ-MB822KCH
C135	1uF, 50V, electrolytic	CE-EG010ALN
C136	.01uF, 50V, mylar	CQ-MB103KCH
C137	.01uF, 50V, mylar	CQ-MB103KCH
C138	100pF, 50V, ceramic	CC-CB101KPM
C139	22pF, 50V, ceramic	CC-CB220KPM
C140	5pF, 50V, ceramic	CC-CB050DPM
C141	1uF, 25V, tantalum	CS-SE010MLC
C142	.01uF, 50V, mylar	CQ-MB103KCH
C143	1uF, 25V, tantalum	CS-SE010MLC
C144	.01uF, 50V, mylar	CQ-MB103KCH
C145	10uF, 16V, electrolytic	CE-ED100ALN
C146	.01uF, 50V, mylar	CQ-MB103KCH
C147	(not used)	
C148	10uF, 16V, electrolytic	CE-ED100ALN
C149	.01uF, 50V, mylar	CQ-MB103KCH
C150	4.7uF, 25V, electrolytic	CE-EE4R7ALN
C151	2200pF, 50V, mylar	CQ-MB222KCH
C152	.022uF, 50V, mylar	CQ-MB223KCH
C153	220pF, 50V, ceramic	CC-CB221KOM
C154	.01uF, 50V, mylar	CQ-MB103KCH
C155	2200pF, 50V, mylar	CQ-MB222KCH
C156	3.9uF, 10V, tantalum	CS-SC3R9LMC
C157	68pF, 50V, ceramic	CC-CB680KOM
C158	150pF, 50V, ceramic	CC-CB151KOM
C159	68pF, 50V, ceramic	CC-CB680KOM
C160	33uF, 6.3V, electrolytic	CE-EB330ALN
C161	.068uF, 50V, mylar	CQ-MB683KCH
C162	47uF, 16V, electrolytic	CE-ED470ALN
C163	100pF, 50V, ceramic	CC-CB101KOM
C164	1uF, 50V, electrolytic	CE-EG010ALN
C165	.047uF, 50V, ceramic	CK-CB473ZFM
C166	2200uF, 16V, electrolytic	CE-ED222AUN
C167	330uF, 16V, electrolytic	CE-ED331ALN
C168	100uF, 16V, electrolytic	CE-ED101ALN
C169	.01uF, 50V, mylar	CQ-MB103KCH
C170	10uF, 16V, electrolytic	CE-ED100ALN
C171	47uF, 6.3V, electrolytic	CE-EB470ALN
C172	.01uF, 50V, mylar	CQ-MB103KCH
C173	1uF, 50V, electrolytic	CE-EG010ALN
C174	.01uF, 50V, mylar	CQ-MB103KCH
C175	2.2uF, 25V, electrolytic	CE-EE2R2ALN
C176	47uF, 16V, electrolytic	CE-ED470ALN
C177	(not used)	
C178	33uF, 16V, electrolytic	CE-ED330ALN
C179	47uF, 16V, electrolytic	CE-ED470ALN
C180	.047uF, 50V, ceramic	CK-CB473ZFM
C181	.047uF, 50V, ceramic	CK-CB473ZFM
C182	.47uF, 50V, electrolytic	CE-EGR47ALN
C183	1000pF, 50V, mylar	CQ-MB102KCH
C184	270pF, 50V, ceramic	CC-CB271KOK
C185	39pF, 50V, ceramic	CC-CB390KPM
C186	220pF, 50V, ceramic	CC-CB221KPM
C187	18pF, 50V, ceramic	CC-CB180KPM
C188	18pF, 50V, ceramic	CC-CB180KPM
C189	.047uF, 50V, ceramic	CK-CB473ZFM
C190	.01uF, 50V, mylar	CQ-MB103KCH

Reference Designator	Description	Part No.
C191	.01uF, 50V, mylar .....	CQ-MB103KCH
C192	.047uF, 50V, mylar .....	CQ-MB473KCH
C193	(not used)	
C194	47pF, 50V, ceramic .....	CC-CB470KPM
CF	ceramic filter 455 kHz .....	FB-R455A13M
CH	choke coil .....	LJ-119H004W
CT1	20pF, trimmer .....	CT-Z7200H01
CT2	20pF, trimmer .....	CT-Z7200H01
CT3	20pF, trimmer .....	CT-Z7200H01
CT4	20pF, trimmer .....	CT-Z7200H01
CT5	20pF, trimmer .....	CT-Z7200H01
D1	MA150, silicon .....	QD-SMA150XN
D2	MZ205, zener .....	QD-ZMZ205XE
D3	ITT310, silicon .....	QD-CTT310XQ
D4	MA150, silicon .....	QD-SMA150XN
D5	MA150, silicon .....	QD-SMA150XN
D6	MA150, silicon .....	QD-SMA150XN
D7	MZ205, zener .....	QD-ZMZ205XE
D8	MA150, silicon .....	QD-SMA150XN
D9	1N60, germanium .....	QD-G1N20XXT
D10	MA150, silicon .....	QD-SMA150XN
D11	MA150, silicon .....	QD-SMA150XN
D12 through D13	(not used)	
D14	MA150, silicon .....	QD-SMA150XN
D15	MA150, silicon .....	QD-SMA150XN
D16	MA150, silicon .....	QD-SMA150XN
D17	MA150, silicon .....	QD-SMA150XN
D18	MA150, silicon .....	QD-SMA150XN
D19	MA150, silicon .....	QD-SMA150XN
D20	1N60, germanium .....	QD-G1N60XXT
D21	MA150, silicon .....	QD-SMA150XN
D22	MA150, silicon .....	QD-SMA150XN
D23	MA150, silicon .....	QD-SMA150XN
D24	1S32, germanium .....	QD-G1S32XXT
D25	1N60, germanium .....	QD-G1N60XXT
D26	MA150, silicon .....	QD-SMA150XN
D27	1N60, germanium .....	QD-G1N60XXT
D28	1N60, germanium .....	QD-G1N60XXT
D29	1N60, germanium .....	QD-G1N60XXT
D30	MA150, silicon .....	QD-SMA150XN
D31	1N60, germanium .....	QD-G1N60XXT
D32	MA150, silicon .....	QD-SMA150XN
D33	1N60, germanium .....	QD-G1N60XXT
D34	1S32, germanium .....	QD-G1S32XXT
D35	MA150, silicon .....	QD-SMA150XN
D36	MA150, silicon .....	QD-SMA150XN
D37	MA150, silicon .....	QD-SMA150XN
D38	MA150, silicon .....	QD-SMA150XN
D39	MA150, silicon .....	QD-SMA150XN
D40	MA150, silicon .....	QD-SMA150XN
D41	MA150, silicon .....	QD-SMA150XN
D42	MA150, silicon .....	QD-SMA150XN
D43	GP25G, germanium .....	QD-SGP25GAG
D44	MA150, silicon .....	QD-SMA150XN
D45	MA150, silicon .....	QD-SMA150XN
D46	MA150, silicon .....	QD-SMA150XN
D47	MA150, silicon .....	QD-SMA150XN
D48	MA150, silicon .....	QD-SMA150XN

Reference Designator	Description	Part No.
D49	MA150, silicon	QD-SMA150XN
D50	ITT310, silicon	QD-CTT310XQ
D51	1S1885, silicon	QD-SS1885XT
D52	MA150, silicon	QD-SMA150XN
IC1	PLL02A	QQ-OPLL02AN
IC2	C3001A (TA731OP)	QQ-MC3001AT
IC3	C3001A (TA731OP)	QQ-MC3001AT
IC4	AN612	QQ-MAN612AN
IC5	TA7205P	QQ-MO7205AT
L1	rf coil	LF-2RKD01N
L2	rf coil	LF-680KD01N
L3	rf coil	LD-ADA3538G
L4	rf coil	LF-2R2KD01N
L5	rf coil	LF-2R2KD01N
L6	rf coil	LD-ADA3038J
L7	rf coil	TR-10CZ003S
L8	rf coil	LD-ADB3524M
L9	rf coil	LD-ADB4024B
L10	rf coil	LD-ADB3524M
L11	rf coil	TR-10CZ005S
L12	rf coil	LA-1JG1004A
L13	rf coil	TR-10CZ004S
L14	rf coil	LF-4R7KD01N
L15	rf coil	LF-2R2KD01N
L16	rf coil	LF-1R0KD01N
L17	rf coil	LF-680KD01N
L18	rf coil	LF-102KB01S
L19	rf coil	LF-680KD01N
L20	rf coil	LB-BJE1008A
L21	rf coil	LB-BJE1008A
L22	rf coil	LD-ADB4024B
L23	rf coil	LD-ADB4024B
MXF	metal crystal filter 10.6935 MHz	FF-10R7S01G
Q1	2SC900 (F)	QT-C0900XBA
Q2	2SC710C	QT-C0710XAE
Q3	2SC710D	QT-C0710XBE
Q4	2SC710D	QT-C0710XBE
Q5	2SC710D	QT-C0710XBE
Q6	2SC710D	QT-C0710XBE
Q7	2SC710D	QT-C0710XBE
Q8	2SC460 (A)	QT-C0460XBB
Q9	2SC2166	QT-C2166XAE
Q10	2SC1969	QT-C1969XAE
Q11	2SC710D	QT-C0710XBE
Q12	2SC710D	QT-C0710XBE
Q13	2SC710C	QT-C0710XAE
Q14	2SC710C	QT-C0710XAE
Q15	2SC710C	QT-C0710XAE
Q16	2SC710C	QT-C0710XAW
Q17	2SC710C	QT-C0710XAE
Q18	2SC710D	QT-C0710XBE
Q19	2SC945 (A-Q)	QT-C0945ABA
Q20	2SC710C	QT-C0710XAE
Q21	2SC710D	QT-C0710XBE
Q22	2SC710C	QT-C0710XAE
Q23	2SC763D	QT-C0763XAE
Q24	2SK34 (C) or (D)	QT-K0034XAE
Q25	2SA733 (Q)	QT-A0733XAA

Reference Designator	Description	Part No.
Q26	2SC763D	QT-C0763XAE
Q27	2SC710C	QT-C0710XAE
Q28	2SC710C	QT-C0710XAE
Q29	2SC710D	QT-C0710XBE
Q30	2SK34	QT-K0034XBE
Q31	2SC945 (A-Q)	QT-C0945ABA
Q32	2SA733	Qt-A0733XAA
Q33	2SC945 (A-Q)	QT-C0945ABA
Q34	2SC945 (A-Q)	QT-C0945ABA
Q35	2SC900U	QT-C0900XCA
Q36	2SC945 (A-Q)	QT-C0945ABA
Q37	2SA719Q	QT-A0719XAN
Q38	2SA719Q	QT-A0719XAN
Q39	2SC945 (A-Q)	QT-C0945ABA
Q40	2SA683 (R)	QT-A0683XBN
Q41	2SC1383 (R)	QT-C1383ZDN
Q42	2SA683 (R)	QT-A0683XBN
Q43	2SC1383 (R)	QT-C1383XDN
Q44	2SC1847 (Q)	QT-C1847XAN
R1	3.3k, ¼W, carbon	RD-25VJ332N
R2	680, ¼W, carbon	RD-25VJ681N
R3	82, ¼W, carbon	RD-25VJ820N
R4	470, ¼W, carbon	RD-25VJ471N
R5	1M, ¼W, carbon	RD-25VJ104N
R6	15k, ¼W, carbon	RD-25VJ153N
R7	1.2k, ¼W, carbon	RD-25VJ122N
R8	100, ¼W, carbon	RD-25VJ101N
R9	100, ¼W, carbon	RD-25VJ101N
R10	560, ¼W, carbon	RD-25VJ561N
R11	5.6k, ¼W, carbon	RD-25VJ562N
R12	2.2k, ¼W, carbon	RD-25VJ222N
R13	1k, ¼W, carbon	RD-25VJ102N
R14	3.3k, ¼W, carbon	RD-25VJ332N
R15	2.2k, ¼W, carbon	RD-25VJ222N
R16	82, ¼W, carbon	RD-25VJ820N
R17	470k, ¼W, carbon	RD-25VJ474N
R18	470k, ¼W, carbon	RD-25VJ474N
R19	470, ¼W, carbon	RD-25VJ471N
R20	3.3k, ¼W, carbon	RD-25VJ332N
R21	100k, ¼W, carbon	RD-25VJ104N
R22	100k, ¼W, carbon	RD-25VJ104N
R23	33k, ¼W, carbon	RD-25VJ333N
R24	18k, ¼W, carbon	RD-25VJ183N
R25	18k, ¼W, carbon	RD-25VJ183N
R26	10k, ¼W, carbon	RD-25VJ103N
R27	1.5k, ¼W, carbon	RD-25VJ152N
R28	(not used)	
R29	100, ¼W, carbon	RD-25VJ101N
R30	8.2k, ¼W, carbon	RD-25VJ822N
R31	10k, ¼W, carbon	RD-25VJ103N
R32	220, ¼W, carbon	RD-25VJ221N
R33	68, ¼W, carbon	RD-25VJ680N
R34	10, ¼W, carbon	RD-25VJ100N
R35	33, ¼W, carbon	RD-25VJ330N
R36	270, ¼W, carbon	RD-25VJ271N
R37	560, ½ metal oxide film	RG-HANJ561N
R38	10, ¼W, carbon	RD-25VJ100N
R39	100, ¼W, carbon	RD-25VJ101N
R40	4.7k, ¼W, carbon	RD-25VJ472N
R41	100k, ¼W, carbon	RD-25VJ104N
R42	1.5k, ¼W, carbon	RD-25VJ152N
R43	3.3k, ¼W, carbon	RD-25VJ332N

Reference Designator	Description	Part No.
R44	18k, ¼W, carbon	RD-25VJ183N
R45	10k, ¼W, carbon	RD-25VJ103N
R46	560, ¼W, carbon	RD-25VJ561N
R47	1k, ¼W, carbon	RD-25VJ102N
R48	330, ¼W, carbon	RD-25VJ331N
R49	47k, ¼W, carbon	RD-25VJ473N
R50	100k, ¼W, carbon	RD-25VJ104N
R51	330, ¼W, carbon	RD-25VJ331N
R52	3.3k, ¼W, carbon	RD-25VJ332N
R53	120, ¼W, carbon	RD-25VJ121N
R54	1k, ¼W, carbon	RD-25VJ102N
R55	560, ¼W, carbon	RD-25VJ561N
R56	5.6k, ¼W, carbon	RD-25VJ562N
R57	12k, ¼W, carbon	RD-25VJ123N
R58	3.3k, ¼W, carbon	RD-25VJ332N
R59	3.3k, ¼W, carbon	RD-25VJ332N
R60	150, ¼W, carbon	RD-25VJ151N
R61	820, ¼W, carbon	RD-25VJ821N
R62	4.7k, ¼W, carbon	RD-25VJ472N
R63	560, ¼W, carbon	RD-25VJ561N
R64	220, ¼W, carbon	RD-25VJ221N
R65	4.7k, ¼W, carbon	RD-25VJ472N
R66	470, ¼W, carbon	RD-25VJ471N
R67	18k, ¼W, carbon	RD-25VJ183N
R68	100, ¼W, carbon	RD-25VJ101N
R69	3.3k, ¼W, carbon	RD-25VJ332N
R70	15k, ¼W, carbon	RD-25VJ153N
R71	1.5k, ¼W, carbon	RD-25VJ152N
R72	150, ¼W, carbon	RD-25VJ151N
R73	100, ¼W, carbon	RD-25VJ101N
R74	15k, ¼W, carbon	RD-25VJ153N
R75	100k, ¼W, carbon	RD-25VJ104N
R76	100, ¼W, carbon	RD-25VJ101N
R77	1k, ¼W, carbon	RD-25VJ102N
R78	4.7k, ¼W, carbon	RD-25VJ472N
R79	(not used)	
R80	1k, ¼W, carbon	RD-25VJ102N
R81	4.7k, ¼W, carbon	RD-25VJ472N
R82	47k, ¼W, carbon	RD-25VJ473N
R83	220, ¼W, carbon	RD-25VJ221N
R84	3.3k, ¼W, carbon	RD-25VJ332N
R85	4.7k, ¼W, carbon	RD-25VJ472N
R86	470, ¼W, carbon	RD-25VJ471N
R87	220, ¼W, carbon	RD-25VJ221N
R88	3.3k, ¼W, carbon	RD-25VJ332N
R89	100k, ¼W, carbon	RD-25VJ104N
R90	1k, ¼W, carbon	RD-25VJ102N
R91	470k, ¼W, carbon	RD-25VJ474N
R92	10k, ¼W, carbon	RD-25VJ103N
R93	1.5M, ¼W, carbon	RD-25VJ155N
R94	5.6k, ¼W, carbon	RD-25VJ562N
R95	5.6k, ¼W, carbon	RD-25VJ562N
R96	100k, ¼W, carbon	RD-25VJ104N
R97	1M, ¼W, carbon	RD-25VJ105N
R98	10k, ¼W, carbon	RD-25VJ103N
R99	5.6k, ¼W, carbon	RD-25VJ562N
R100	330, ¼W, carbon	RD-25VJ331N
R101	56k, ¼W, carbon	RD-25VJ563N
R102	5.6k, ¼W, carbon	RD-25VJ562N
R103	1k, ¼W, carbon	RD-25VJ102N
R104	47k, ¼W, carbon	RD-25VJ473N
R105	390, ¼W, carbon	RD-25VJ391N
R106	3.3k, ¼W, carbon	RD-25VJ332N
R107	39k, ¼W, carbon	RD-25VJ393N

Reference Designator	Description	Part No.
R108	10k, ¼W, carbon	RD-25VJ103N
R109	150, ¼W, carbon	RD-25VJ151N
R110	33k, ¼W, carbon	RD-25VJ333N
R111	47, ¼W, carbon	RD-25VJ470N
R112	47, ¼W, carbon	RD-25VJ470N
R113	22k, ¼W, carbon	RD-25VJ223N
R114	47k, ¼W, carbon	RD-25VJ473N
R115	270k, ¼W, carbon	RD-25VJ274N
R116	33k, ¼W, carbon	RD-25VJ333N
R117	68k, ¼W, carbon	RD-25VJ683N
R118	47k, ¼W, carbon	RD-25VJ473N
R119	(not used)	
R120	1k, ¼W, carbon	RD-25VJ102N
R121	1M, ¼W, carbon	RD-25VJ105N
R122	680, ¼W, carbon	RD-25VJ681N
R123	1k, ¼W, carbon	RD-25VJ102N
R124	10k, ¼W, carbon	RD-25VJ103N
R125	10k, ¼W, carbon	RD-25VJ103N
R126	2.2k, ¼W, carbon	RD-25VJ222N
R127	1k, ¼W, carbon	RD-25VJ102N
R128	22k, ¼W, carbon	RD-25VJ223N
R129	27k, ¼W, carbon	RD-25VJ273N
R130	5.6k, ¼W, carbon	RD-25VJ562N
R131	5.6k, ¼W, carbon	RD-25VJ562N
R132	10k, ¼W, carbon	RD-25VJ103N
R133	4.7k, ¼W, carbon	RD-25VJ472N
R134	560, ¼W, carbon	RD-25VJ561N
R135	820, ¼W, carbon	RD-25VJ821N
R136	47, ¼W, carbon	RD-25VJ470N
R137	1k, ¼W, carbon	RD-25VJ102N
R138	150, ¼W, carbon	RD-25VJ151N
R139	10k, ¼W, carbon	RD-25VJ103N
R140	1k, ¼W, carbon	RD-25VJ102N
R141	4.7k, ¼W, carbon	RD-25VJ472N
R142	2.2k, ¼W, carbon	RD-25VJ222N
R143	2.2k, ¼W, carbon	RD-25VJ222N
R144	4.7k, ¼W, carbon	RD-25VJ472N
R145	3.3k, ¼W, carbon	RD-25VJ332N
R146	1k, ¼W, carbon	RD-25VJ102N
R147	3.3k, ¼W, carbon	RD-25VJ332N
R148	(not used)	
R149	(not used)	
R150	18 ¼W metal oxide film	RX-2ANJ180B
R151	2.7k, ¼W, carbon	RD-25VJ272N
R152	2.7k, ¼W, carbon	RD-25VJ272N
R153	2.7k, ¼W, carbon	RD-25VJ272N
R154	2.7k, ¼W, carbon	RD-25VJ272N
R155	2.7k, ¼W, carbon	RD-25VJ272N
R156	2.7k, ¼W, carbon	RD-25VJ272N
R157	390 ½W metal oxide film	RG-HANJ391B
R158	10 2W metal oxide film	RX-2ANJ100B
R159	470 ¼W carbon	RD-25VJ471N
R160	270 ½W metal oxide film	RG-HANJ271N
R161	150 1W metal oxide film	RG-1ANJ151B
R162	270 ½W metal oxide film	RG-HANJ271B
R165	220k ¼W carbon	RD-25VJ224N
R166	1k, ¼W, carbon	RD-25VJ102N
R167	3.3k, ¼W, carbon	RD-25VJ332N
R168	5.6k, ¼W, carbon	RD-25VJ562N
R169	56K, ¼W, carbon	RD-25TJ563N
RV1	100, semi-fixed	RP-GNB10101



Reference Designator	Description	Part No.
RV2	.5k, semi-fixed .....	RP-GNB50201
RV3	20k, semi-fixed .....	RP-GNB20301
RV4	1k, semi-fixed .....	RP-GNB10201
RV5	10k, semi-fixed .....	RP-GNB10301
RV6	10k, semi-fixed .....	RP-GNB10301
RV7	10k, semi-fixed .....	RP-GNB10301
RV8	5k, semi-fixed .....	RP-GNB50201
RV9	20k, semi-fixed .....	RP-GNB20301
RV10	100k, semi-fixed .....	RP-GNB10401
RV11	500, semi-fixed .....	RP-GNB50101
RV12	2k, semi-fixed .....	RP-GNB20201
SW	rotary switch .....	SR-2040302
T1	rf transformer .....	TR-10MB003T
T2	rf transformer .....	TR-10MB005S
T3	if transformer .....	TR-10B002S
T4	rf transformer .....	TR-10CA006T
T5	rf transformer .....	TR-10CB003T
T6	rf transformer .....	TR-10CP006S
T7	rf transformer .....	TR-10MP003T
T8	rf transformer .....	TR-10CA006T
T9	rf transformer .....	TR-10CB001S
T10	if transformer .....	TR-10MA013S
T11	if transformer .....	TR-10MA015S
T12	if transformer .....	TR-10MA015S
T13	if transformer .....	TR-10MA014S
T14	if transformer .....	TR-10LA021S
T15	if transformer .....	TR-10LA022S
T16	audio transformer .....	TB-G28A004W
VCO	vco oscillator block .....	ZZ-Z0000017
X1	crystal oscillator, 10.0525 .....	XA-S1C1001T
X2	crystal oscillator, 10.24 .....	XA-S1B9001T
X3	crystal oscillator, 10.692 .....	XA-Z1A8001T

Part No	Description	Qty
ML-565AD001	heat sink, TA7205P .....	1
MS-327AD004	heat sink, TA7205P .....	1
MQ-531AD001	heat sink, 2SC2166 .....	1
MX-653AD001	heat sink, 2SC1969 .....	1
BS-PB3006NN	screw, bind head, M3x6 .....	6
BS-PP3006NT	screw, pan head, M3x6 .....	3

#### LED P.C. Board

Reference Designator	Description	Part No.
	LED p.c. board, complete .....	AP-TLD010AA
	LED p.c. board, drilled and plated .....	PT-LD010COX
LED	SL122 .....	QL-#SL1222C

**SW P.C. Board**

<b>Reference Designator</b>	<b>Description</b>	<b>Part No.</b>
	SW p.c. board, complete.....	AP-TSW020AA
	SW p.c. board, drilled and plated .....	PT-SW020COX
	1.8k, ¼w. x7. resistor array.....	ra-C182M07N

**CHASSIS—MOUNTED COMPONENTS**

<b>Reference Designator</b>	<b>Description</b>	<b>Part No.</b>
C201	39pF, 50V, ceramic .....	CC-DB390KPM
C202	.01uF, 50V, ceramic .....	CK-DB103PEM
C203	.01uF, 50V, ceramic .....	CK-DB103PEM
C204	.001uF, 50V, ceramic .....	CK-DB102PEM
C205	.0047uF, 50V, ceramic .....	CK-EB473ZFM
C206	.0047uF, 50V, ceramic .....	CK-EB473ZFM
C207	.01uF, 50V, ceramic .....	CK-DB103PEM
C208	.001uF, 50V, ceramic .....	CK-DB102PEM
C209	.01uF, 50V, ceramic .....	CK-DB103PEM
C210	.0047uF, 50V, ceramic .....	CK-EB473ZFM
C211	.0047uF, 50V, ceramic .....	CK-EB473ZFM
J1	jack, 2 pin, antenna .....	YJ-C02S009Z
J2	jack, 3 pin, pa .....	YJ-T03S003Z
J3	jack, 3 pin, external speaker .....	YJ-T03S003Z
J4	jack, 2 pin, dc .....	YJ-B02S001U
J5	jack, 5 pin din .....	YJ-D05S002Z
L201	rf coil .....	LA-2TG1503A
M/PL1	meter 500uA .....	ZM-J2030N04
SP	speaker .....	ZO-A0770802
S2	switch, rotary, function .....	SR-0303102E
S3	switch, toggle, cb pa .....	ST-020201AM
S4	switch, toggle, nb .....	ST-020201AM
VR1/S1	potentiometer, 50k (volume control w/power switch .....	RV-NB503A05
VR2	potentiometer, 50k, squelch .....	RV-NA503B08
VR3	potentiometer, 50k, rf gain .....	RV-NA503B08
VR4	potentiometer, 50k, clarifier .....	RV-NA503A06
VR5	control, 10, 10W, wire wound.....	RW-VA100B01

**MECHANICAL PARTS**

<b>Part No.</b>	<b>Description</b>	<b>Qty</b>
AC-DC035GEA	dc cord, power .....	1
MB-762SZ051	panel, front .....	1
MU-242SZ005	bracket, meter mount .....	1
ML-681SZ013	panel, right side .....	1
ML-332SZ008	bracket, power control .....	1
ML-681SZ012	panel, left side .....	1

**MECHANICAL PARTS**

<b>Part No.</b>	<b>Description</b>	<b>Qty</b>
MS-767SZ004	panel, rear .....	1
ML-122SZ004	bracket, L shaped, main p.c. board mount .....	1
AM-2705##01	escutcheon .....	1
VN-176SB007	knob, channel selector .....	1
VN-276SM001	knob .....	5
MU-874SM013	case, top .....	1
MU-874SM014	case, bottom .....	1
ML-121SZ007	bracket, speaker .....	1
BS-PB2608NB	screw, bind head, case M2.6x8 .....	2
BS-PL3006NB	screw, bind head, case M3x6 .....	4

**ACCESSORY PARTS**

<b>Part No.</b>	<b>Description</b>	<b>Qty</b>
ZG-AAZ50111	microphone .....	1
MU-576SM003	bracket, unit mount .....	1
MZ-331SZ002	hanger, mike .....	1
MF-284SN001	thumb screw, unit mount .....	2
BT-PT5013AZ	screw, self-tapping M5x13 .....	4
BW-G50A06SW	washer, outside tooth M5 .....	4
BT-PP4010BN	screw, self-tapping M4x10 .....	2
BW-U40855SW	washer, inside tooth M4 .....	2
BT-PW3008BZ	screw, self-tapping, mike hanger .....	2



**Schematic Diagram**

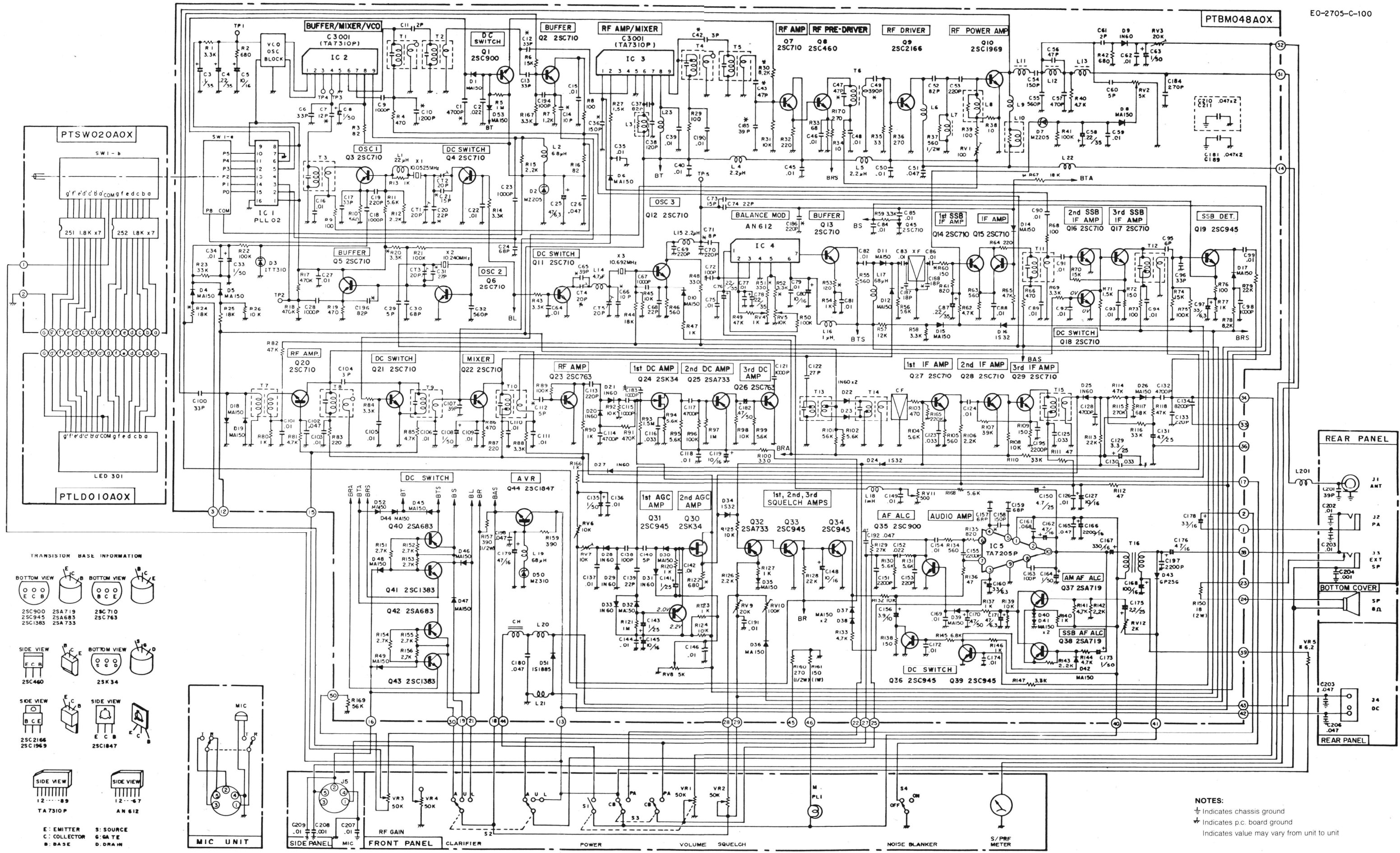


Figure 4-4. Schematic Diagram, Model 2705

**HY-GAIN DE PUERTO RICO, INC.**

P.O. Box 68 State Hwy 31, Km. 4.0  
Naguabo, Puerto Rico 00718