INSTRUCTION MANUAL

Colt Excalibur SSB

Model 1200

By ummarc

INTRODUCTION

Thank you for your confidence in selecting Colt two-way radio equipment. We know you'll find your transceiver as exciting as it is practical. Many years of valuable experience designing electronic products are behind our two-way communications systems. Only the highest quality components are incorporated into Colt radios to assure reliability and maximum performance.

Installing and operating the Colt *Excalibur SSB* is not complicated, but the flexibility provided by its numerous operating features may not be fully appreciated until a little time is spent becoming familiar with its controls and connections.

It will be to your advantage to save all the packing materials -- cartons, fillers, cushoning, etc., they will prove valuable in preventing damage should you ever have occasion to transport or ship the Colt *Excalibur SSB.*

INSTRUCTION MANUAL

FOR

COLT *Excalibur SSB*

SINGLE SIDEBAND 40 CHANNEL

CITIZENS BAND 2-WAY RADIO

COLT *Excalibur SSB* SPECIFICATIONS

GENERAL

Channels	40 – AM/Single sideband
Frequency Range	26.965 to 27.405 MHz
Frequency Control	Phase locked synthesizer
Frequency Tolerance	±0.005%
Frequency Stability	±0.003%
Operating Temperature Range	–30°C to +50°C
Microphone	Plug-in [4-pin], 600 Ohm dynamic
AC Input Voltage	220 V, 50 Hz
DC Input Voltage	10.5 to 16V (13.8 V nominal)
AC Power Consumption	75W
DC Current Drain	1.5A [at maximum audio] 0.5A [at standby, no signal]
Antenna Connectors [A and B]	Standard American [SO-239] type
Semiconductors	5 ICs, 2 FETs, 51 Transistors
Meter #1	Indicates relative RF power output/antenna SWR,
Meter #2	Indicates received signal strength

TRANSMITTER

Power Output	4W – AM, 12W [PEP] – Single sideband at 13.8V DC or 220V AC
SSB Generation	Dual balanced modulation
AM Modulation	High and low level class B amplitude modulation
AM Modulation Capability	95% typically
Harmonic Suppression and Spurious Emission	Better than 60 dB
AM Frequency Response	400 to 5000 Hz
SSB Frequency Response	400 to 3000 Hz
Output Impedances [A and B]	50 Ohms, unbalanced
Output Indicators	RF Meter shows relative RF output power

RECEIVER

AM Sensitivity	1 μV for 10 dB S/N
SSB Sensitivity	0.3 μV for 10 dB S/N
AM Selectivity	5 dB at 4 kHz, 50 dB at 10 kHz
SSB Selectivity	5 dB at 2 kHz
Image Rejection	More than 50 dB
IF Rejection	More than 80 dB at 455 kHz
AGC	Change in audio output less than 12 dB from 10 μV to 0.4V
Squelch	Adjustable – threshold less than 0.7 μV
Audio Frequency Response	400 to 2500 Hz
Distortion	Less than 10% at 3 watts output
Adjacent Channel Rejection	More than 75 dB at 0.3 μV
Cross Modulation	More than 50 dB
Intermediate Frequency	10.695 MHz [AM-1st, SSB], 455 kHz [AM-2nd]
Clarifier	±800 Hz
Noise Blanker	IF single gate type

Audio Output Power	More than 3 watts into 8 ohms
Built-in Speaker	8 ohms, dynamic
External Speaker [optional]	Disables internal speaker when connected

PUBLIC ADDRESS [PA] SYSTEM

Power Output	3 watts into external speaker
External Speaker for PA [optional]	When PA switch is in PA mode, the unit functions as a public address system

SECTION I
INSTALLATION

LOCATION

The transceiver should be placed in a convenient operating location close to an AC power outlet and the antenna lead-in cable(s). To prevent fire or shock hazard, do not expose this appliance to rain or moisture.

CONNECTION

The transceiver is supplied with the detachable AC and DC power cords. Proceed as follows to complete all necessary connections to the transceiver.

1. Your transceiver has two standard antenna connectors of type SO-239 located on rear panel, for easy connection to standard PL-259 coax plugs. If the coax antenna cable must be made longer, use coax cable with impedance of 50 ohms, frequency ratings for 27 MHz, and use only enough cable to suit your needs. This will insure a proper impedance match and maximum power transfer from the transmitter to the antenna.
2. **AC Power Operation:** Use 220 volts AC power for base station operation. Plug AC power cord into AC power socket on rear panel and other end into a working 220 volts household outlet. This unit may also be operated on 12 volts DC from a motor vehicle using the power cord supplied and DC jack. See below.
3. **DC Power Operation:** Disconnect AC Power cord from unit. This transceiver is designed for 12 volts DC use with negative ground electrical system **only.** Most US and fereign-made cars and small trucks made since 1956 use a negative ground system, while some older cars and newer heavy 18-wheeler trucks have a positive ground system. Connect plus [+=red] power cord to fuse block, solenoid, voltage regulator [marked BATT.], cigarette lighter, or directly to the battery. Usually the most convenient location for connecting power is either to the fuse block [normally located under the dash at left or right side of steering column], or directly to the battery. Be sure minus [—=black] wire is connected to the metal, as many under dash and side-paneled parts are made of non-conductive plastic. Good ground is essential for satisfactory operation.

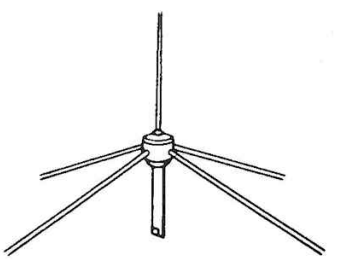
NOISE INTERFERENCE

There are several kinds of noise interferring you may encounter in base station operation. Some of these noise sources are; fluorescent buzz, nearby commercial broadcast, electrical appliance, lawnmower, and electrical storms, etc. Commercial products are avaialable to reduce interference from these sources. Consult your dealer or CB/amateur radio supply shops.

ANTENNAS

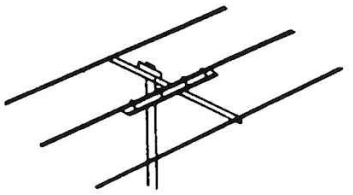
For best transmission and reception, your CB transceiver should use an antenna especially designed for a frequency of 27 MHz. Antennas are purchased separately and include installation instructions. Numerous types of CB antennas are available that range from emphasis on ease of installation to emphasis on performance. Often the difference in performance between many of the antenna is modest. You can connect 2 antennas to your CB, or 1 antenna and one dummy load.

1. **Vertical Ground Plane Antennas.**
   These are omnidirectional antennas that provide optimum performance for contracting other fixed stations using vertical type antennas in addition to all mobile stations. For medium-long range communications work.



GROUND PLANE

2. **Directional Beam Antennas.**
Highly efficient and directional antennas generally intended for fixed-to-fixed very long range communications.



DIRECTIONAL BEAM ANTENNA

REMOTE SPEAKER

The external speaker jack (EXT. SP) on the rear panel is used for remote receiver monitoring. The external speaker should have 8 ohms impedance and be able to handle at least 3 watts. When the external speaker is plugged in, the internal speaker is disconnected.

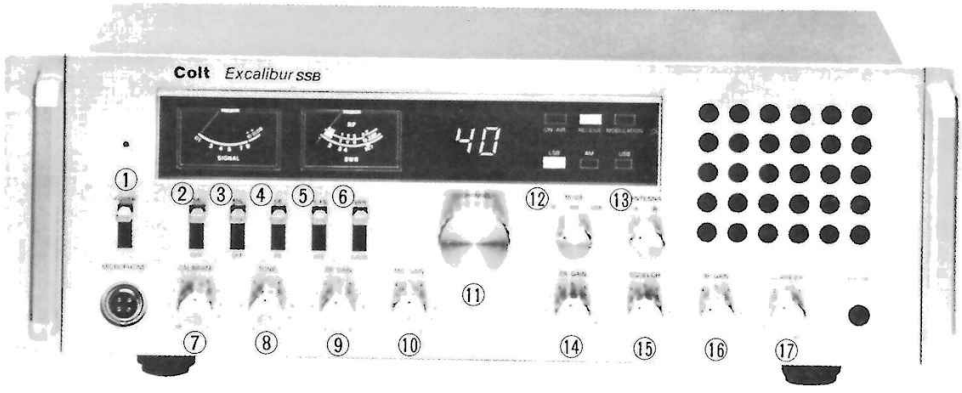
PUBLIC ADDRESS

An external 8 ohm, 3 watt speaker must be connected to the PA SP jack located on the rear panel when the transceiver is used as a public address system. The speaker should be directed away from the microphone to prevent acoustic feedback. Physical separation or isolation of the microphone and speaker is important when operating the PA at high output levels.

SECTION II
OPERATION

CONTROLS AND INDICATORS

There are 17 controls and 10 indicators on the front panel of your Colt *Excalibur SSB.*



A. CONTROL FUNCTIONS

1. POWER/ON-OFF
Place in POWER (lever up) position to apply power to the unit [for both AC and DC operation].

2. NB SWITCH
This switch activates the noise blanker circuit when placed in NB (lever up) position. The noise blanker is very effective for repetitive impulse noise such as ignition interference.

3. ANL SWITCH
When this switch is placed in the ANL (lever up) position, the automatic noise limiter in the audio is activated. The ANL may be used when noises generated from such sources as atmospheric discharge, electronic machinery etc., are present.

4. CB-PA SWITCH
This switch selects the public address mode of the transceiver. The PA function should not be used unless an external speaker is connected to the PA SP jack on the rear panel. See the Public Address Operation in page 7.

5. HIGH FREQUENCY FILTER
This switch is used to remove high frequency noise from received signal.

6. SWR-CALIBRATE SWITCH
This switch changes the SWR meter function in two ways:
- **CALIB (lever down):** Used to calibrate the SWR Meter before measuring your antenna SWR ratio.
- **SWR (lever up):** Used to directly read the SWR of antenna connected to the unit. See Accessory Circuit Operation.

7. CALIBRATE CONTROL
This control is used for calibrating the SWR meter for accurate SWR measuring in conjunction with the SWR-CALIB Switch 6).

8. TONE CONTROL
This changes tonal sound quality when receiving. Clockwise rotation will emphasize the high tone.

9. RF GAIN
This control is used primarily to optimize reception in strong signal areas. Under normal operating conditions the control should be turned fully clockwise. When strong overload or distorted signals are received rotate this control counterclockwise to reduce gain. Note: The Squelch Control 15) may require readjustment with reduced RF Gain control.

10. MIC (MICROPHONE) GAIN
A preamplifier circuit is built into this unit to increase microphone gain. Experiment with this control for the setting that will best suit your individual use.

11. CHANNEL
This control selects any one of the 40 citizens band channels desired. The selected channel is digitally displayed in the window directly above the Channel Selector knob. Channels 1 through 8 and 10 through 40 may be used for communications between stations

operating under the same license. Channel 9 has been reserved for emergency communications involving the immediate safety of life of individuals or immediate protection of property. Channel 9 may also be used to render assistance to a motorist.

12. MODE

This control selects the mode of operation in either standard AM, upper sideband, or lower sideband. Transmissions in the AM or sideband modes can only be communicated to stations operating in the same mode.

13. ANTENNA

For switching between two types of antennas or dummy load that may be connected to the unit. You may connect a ground plane antenna which is non-directional to Antenna A Receptacle, and a beam type antenna that is highly directional to the Antenna B Receptacle for long-range communications.

14. PA GAIN

The PA gain is adjustable by this control when operating the PA function of the unit.

15. SQUELCH.

This control is used to cut off or eliminate receiver background noise in the absence of an incoming signal. For maximum receiver sensitivity it is desired that the control be adjusted only to the point where the receiver background noise or ambient background noise is eliminated. Turn fully counterclockwise then slowly clockwise until the receiver noise just disappears. Any signal to be received must now be slightly stronger than the average received noise. Further clockwise rotation will increase the threshold lever which a signal must overcome in order to be heard. Only strong signals will be heard at a maximum clockwise setting.

16. AF GAIN

Permits you to adjust the listening level when receiving.

17. CLARIFIER

This control provides precise tuning of the receiver. On regular AM reception, this will permit adjustment of off-frequency transmissions. In the SSB mode this control is used as a voice clarifier to adjust for clearer voice reception.

B. INDICATORS

1. S [signal] METER

The left hand meter provides a relative indication of the signal strength of a received signal in S units during reception. Note that SSB signals will respond this meter only during voice modulation. This being due to the fact that SSB transmissions do not contain a continuous RF carrier as is found on AM.

2. POWER/SWR METER

Used for two purposes – to indicate relative transmitter power when transmitting and to indicate antenna SWR [standing wave ratio]. Note that the power meter has separate scales for AM and SSB transmission, respectively.

3. CHANNEL READOUT

This is an LED [light emitting diode] digital readout which indicates the channel selected by the Channel selector 11).

4. FUNCTION INDICATORS

LED indicators located in the LED area permit you to know instantly the mode with which the unit has been engaged.

- **On Air:** Lights up during transmit mode indicating you are on-the-air.
- **Receive:** Lights up during receiving mode of the unit.
- **Modulation:** This lights up during transmitting. The intensity will vary according to the strength of your voice modulation.
- **LSB-AM-USB:** Indicates a mode selected by the Mode selector 12).

C. PUSH-TO-TALK MICROPHONE

The receiver and transmitter are controlled by the Push-to-Talk switch on the microphone. Press the switch and the transmitter is activated; release the switch to receive. When transmitting, hold the microphone two inches from the mouth and speak clearly in a normal voice. The radio comes complete with the low impedance dynamic microphone (supplied). Note: Depressing the Push-to-Talk switch on the microphone is also required to activate the PA system. (See Accessory Circuit Operation.)

D. OPERATING PROCEDURE TO RECEIVE

IMPORTANT: Make sure antenna, power source, and microphone are connected before you operate.

1. Set the CB-PA switch 4) to CB position.
2. Turn the unit on by setting the Power Switch 1) to On position. Now the meters, Channel Indicator, and Function Indicators will be illuminated.
3. Temporarily, set the Mode Switch 12) in AM position.
4. Set the Squelch Control 15) in fully counterclockwise position and adjust the AF Gain control 16) for a comfortable listening level.
5. Listen to the background noise from the speaker. Turn the Squelch Control 15) slowly clockwise until the noise just disappears (no signal should be present). Leave the Squelch Control at this setting. The Squelch Control is now properly adjusted. The receiver will remain quiet until a signal is actually received. Do not advance the Squelch Control too far clockwise or some of the weaker signals will not be heard.
6. Set the Clarifier 17) to the center (12 o'clock) posi-

tion.

7. Select a desired mode of operation, AM, LSB, or USB, and adjust the Clarifier 17) for advanced operation.

E. OPERATING PROCEDURE TO TRANSMIT

1. Select the desired channel and mode of transmission.
2. If the channel is clear, depress the Push-to-Talk switch on the microphone. Speak in a normal tone of voice.

F. ACCESSORY CIRCUITS OPERATION

1. **PUBLIC ADDRESS OPERATION:** To use this feature of the transceiver, a speaker having a voice coil impedance of 8 to 16 ohms and a power handling capability of at least 3 watts should be connected to the PA SP jack on the rear panel. Be sure that there is physical separation between the microphone and the PA speaker itself. If the PA speaker is located very close to the microphone, acoustic feedback will result when the PA amplifier is operated at high volume (or when used indoors).

2. **SWR MEASUREMENT:** Most antennas are factory tuned, but the antenna efficiency may be peaked by slightly adjusting th length of antenna using the SWR meter built into the unit. This adjustment may improve the antenna standing wave ratio (SWR). The SWR permits you to determine how well matched the antenna and its cables are to your transceiver.
   1. Set the unit in the receive mode as instructed under the Operating Procedure to Receive section.
   2. Set the Mode switch 12) to AM position; the SWR-Cal 6) switch to the Cal position.
   3. Pressing the Push-to-Talk switch on the microphone and turn the Calibrate Control 7) clockwise (past click) so that the SWR meter pointer exactly coincides with the Set mark on the scale. Release the Push-to-Talk switch.
   4. Set the SWR-Cal switch to the SWR position and depress the Push-to-Talk switch again. The SWR of your antenna is read directly on the scale.
      Note: An SWR below 2 or less is desired as this indicates that over 95% of the transmitted power is broadcast into the air.

SECTION III
MAINTENANCE AND ADJUSTMENT

The transceiver is specifically designed for the environment encountered in the base or mobile station use. The use of fully solid state circuitry and its rugged style result in high reliability. Should a failure occur, however, replace parts only with identical parts. Do not substitute. Refer to the Schmatic Diagram and Replacement Parts List in this manual.

ANTENNA IMPEDANCE ADJUSTMENT

The transceiver is factory aligned and should not require any adjustments when used with a 50 Ohm antenna. If antenna other than 50 Ohm impedance is used, adjustment of this transmitter output circuit may be made to obtain optimum transfer to the antenna. This adjustment should be made only by qualified personnel using a high quality in-line RF watt-meter which will not produce standing waves when inserted in the antenna cable.

NOTE

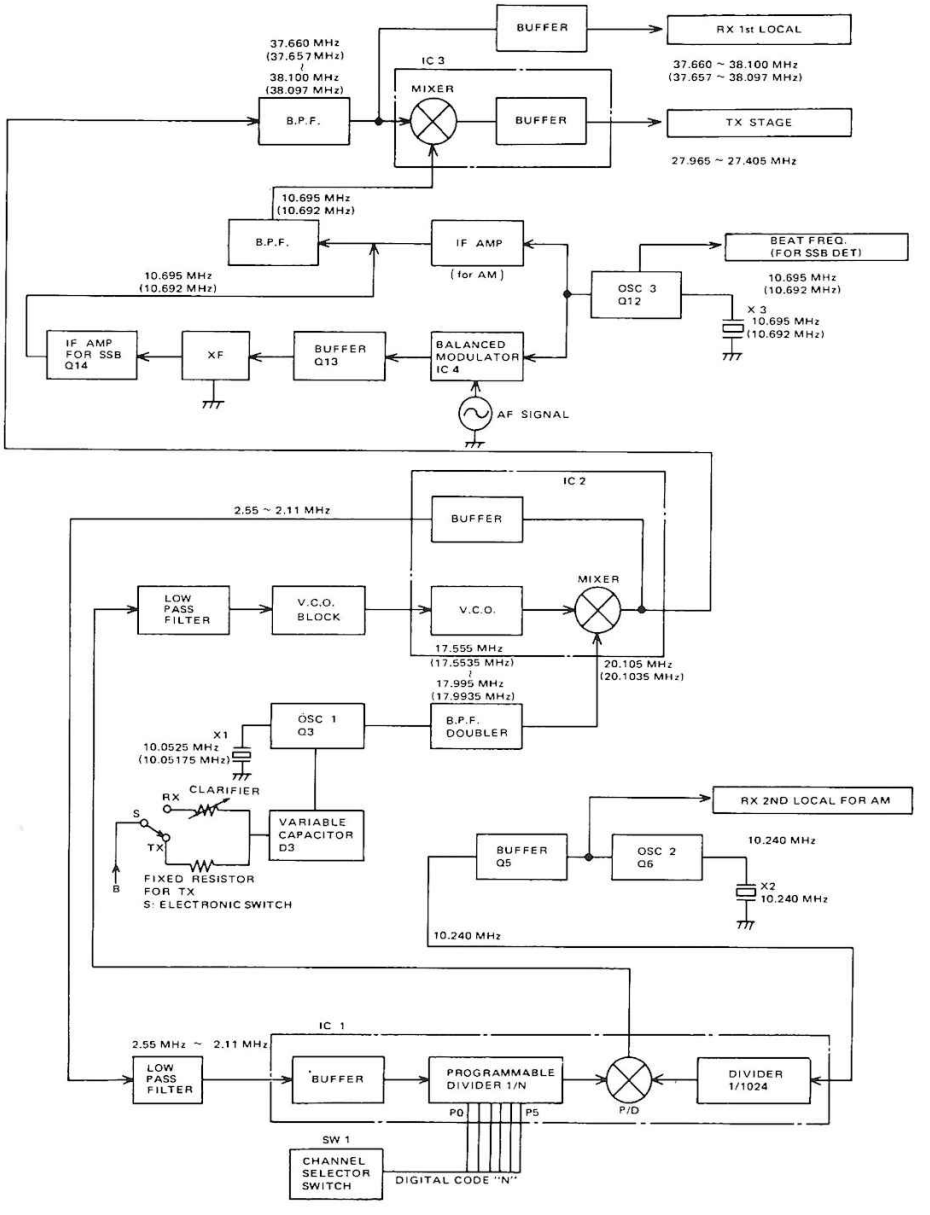
If the performance described in the OPERATION section is not obtained, review the INSTALLATION section to insure that proper procedures were followed.

CIRCUIT DESCRIPTION

The transceiver is the 40 channel CB radio which uses a phase locked loop [PLL] system of frequency synthesization to produce the crystal controlled channel and IF signals used in operation of the transmitter and receiver sections of the unit. The basic PLL system is comprised of a free-running voltage controlled oscillator (part of IC2), a phase detector, a reference crystal oscillator (Q6) and a programmable divider (IC1), as seen in PLL block diagram.

A. PLL THEORY: The voltage controlled oscillator [VCO] operates in the frequency range of 17.555 to 17.995 MHz in the AM/USB mode and 17.5535 to 17.9935 MHz in the LSB mode, and is used to produce two output signals: #1; 37.660 to 38.100 MHz in the AM/USB mode and 37.657 to 38.097 MHz in the LSB mode, #2; at 2.55 to 2.11 MHz. Reference frequency oscillator Q3, which is crystal controlled, operates at a frequency of 10.0525 MHz [10.05175 MHz in LSB mode only]. Its output is fed through the band-pass filter [BPF]/doubler resulting in an output signal, 20.105 MHz in the AM/USB mode and 20.1035 MHz in the LSB mode. This signal beats with the VCO 17 MHz free-running signal producing a 37.66 to 38.1 MHz in the AM/USB mode and 37.657 to 38.097 MHz in the LSB mode, which is fed to the receiver first mixer [Q21] and also to IC3, the transmitter mixer. The second VCO output signal, at 2.55 to 2.11 MHz is fed to the programmable divider in IC1. Simultaneously the 10.24 MHz output of Q6 [through the buffer Q5] is applied to the programmable divider in IC1 and is divided down in 10 kHz steps. As a channel is chosen by the Channel Selector switch [SW-1], and **N** code signal is applied to

the terminals [pins No. 10 to 15 of IC1] on the programmable divider in IC1, to preset the divider. The two signals, the crystal oscillated signal [10.24 MHz] from Q6, and the signal from the VCO via the lowpass filter [LPF] and buffer [in the IC1], are compared in the phase detector of IC1 and the phase detector produces a DC output voltage derived from the phase difference in the signals fed to it. This DC output is applied through an LPF to the VCO, forming the phase loop. This DC voltage applied to the VCO causes it to shift frequency until its output signal locks up with the count-down frequency provided from reference oscillator Q6 [when two signals are in phase] at which point no DC output is produced in the phase detector, and the VCO remains **locked** on frequency. When a new channel is selected a new **N** code is applied to the programmable devider. The VCO is no longer locked because of the resulting phase difference in the phase detector, and it again shifts frequency to a locked condition, in turn producing 37 MHz output signals corresponding to the new channel programmed by the new N code. In summary it will be seen that a range of stable VCO frequencies in the 17 MHz range will be produced, each specific frequency being determined by the N code selected by the Channel Selector switch.

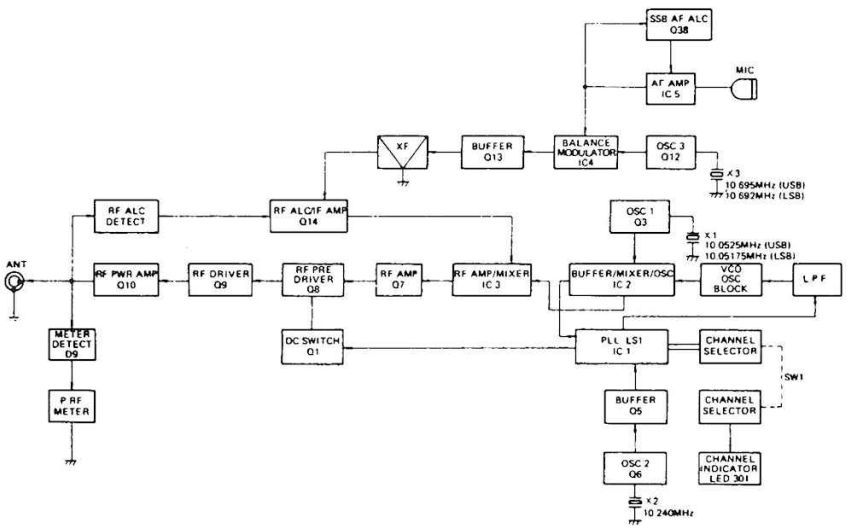


PLL BLOCK DIAGRAM

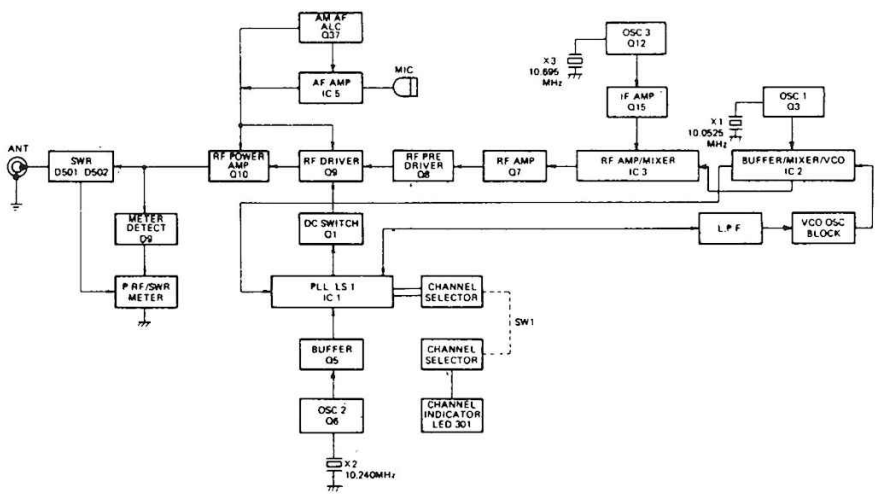
B. TRANSMITTER: The transmitter crystal oscillator, Q12, is operating at 10.695 MHz in the AM/USB mode, and 10.692 MHz in the LSB mode, controlled by the crystal, X3. This signal is #1; in the AM mode of transmission, fed to the IC3 to be mixed with the first TX local oscillator frequency and result in 27 MHz transmitter frequencies, and #2; in the SSB modes of transmission, modulated through the balanced modulator IC4 with the audio output signal from the microphone amplifier, IC4. The resultant output of the balanced modulator is a double sideband, suppressed carrier signal. The crystal filter, XF, pass band is retricted to 3.5 kHz so that it allows only one sideband to pass through its output terminals, either USB or LSB mode, depending upon the Mode Selector switch selection. The exact frequency of which was determined by the Channel Selector switch selection and the PLL circuitry, as previously outlined, the resultant frequency, therefore, that is fed to the RF amplifier in IC3, is the channel frequency on the channel selected [channel 1 through 40; between 26.965 to 27.405 MHz]. See the PLL Frequency Chart in page 14.

The 27 MHz RF amplifier output is coupled to RF pre-driver transistors, Q7, 8, through T4, 5. The predrivers serve to isolate the oscillator and mixer stages from the output amplifiers, and at the same time provide a certain amount of power gain. Q8 output is applied to the base input of Q9, the RF driver stage and in turn to the Q10, the RF power output stage of the transmitter. These stages amplify the 27 MHz RF signal resulting in an output at L13 of 4 watts in the AM mode and 12 watts PEP [peak envelope power] in the SSB mode.

SSB TRANSMITTER



AM TRANSMITTER



C. MODULATION CIRCUIT: The microphone feeds audio through IC5 to the output transformer T16 and to the collectors of Q9 and Q10 thereby amplitude-modulating the transmitter in the AM mode of transmission. In the SSB transmit mode, the output of IC5 is fed directly to the balanced modulator, IC4, and result in suppressed carrier double sideband signal, and in turn supplied to the crystal filter as outlined previously.

D. ALC: An audio ALC [automatic level control] voltage

derived from the audio signal at Q35 is fed to IC5 to control the output of audio amplifier to prevent over-modulation. In the AM mode of transmission, the output of Q35 is led to Q37 and is used to control the **output** of T16, whereas in the SSB transmit mode, the output of Q35 is fed to Q38 and is connected to the primary side of T16. This being due to the fact that the output of IC5 [modulation signal] is fed [to modulate the RF signal] from the secondary side of T16 in the AM mode, and from the primary side of T16 in the SSB mode of transmission.

The transceiver is also equipped with the RF ALC circuit utilizing the RF output induced at the input of L12 [in the SSB mode only]. The minus voltage detected through D8 is applied to the DC plus bias circuit [pin number 7 of IC3, TX mixer] thus reducing the gain of the TX mixer as high level RF signal is observed at L12. This circuit is disabled in the AM mode of transmission. In summary of the ALC circuit description, it should be noted that the ALC circuit [both audio and RF] accomplishes very important function, not only preventing overmodulation, but in the view of harmonic and spurious suppression [especially in the SSB transmit mode].

E. ANTENNA TRANSMISSION LINE: The lowpass filter between the antenna and collector of Q10 serves to pass the 27 MHz signals, attenuating higher frequency signals. It also serves to match the antenna impedance to the output impedance of the transmitter output stage, this nominally being 50 Ohm.

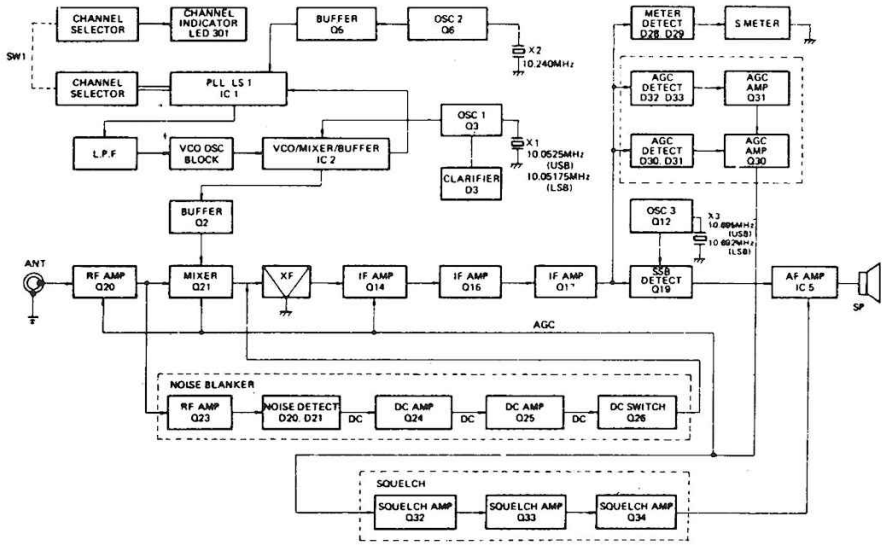
F. RECEIVER: The RF signal, at a frequency between 26.965 to 27.405 MHz, feeds from the antenna through L13, 12, 11, and T7 to the 27 MHz RF amplifier Q20. Then the amplifier output signal from Q20 is coupled through T9 to first mixer Q22 where it is beat with an injection signal from the VCO, IC2, through the VCO buffer Q2.

The frequency of the injection signal from IC2 depends on the channel being received, as a signal of the 37 MHz range is programmed by the Channel Selector. The output of Q22 is therefore, 10.695 MHz in the AM/USB modes, and 10.692 MHz in the LSB mode, the first intermediate frequency and is the result of the RF input and mixing of IC2 VCO signals.

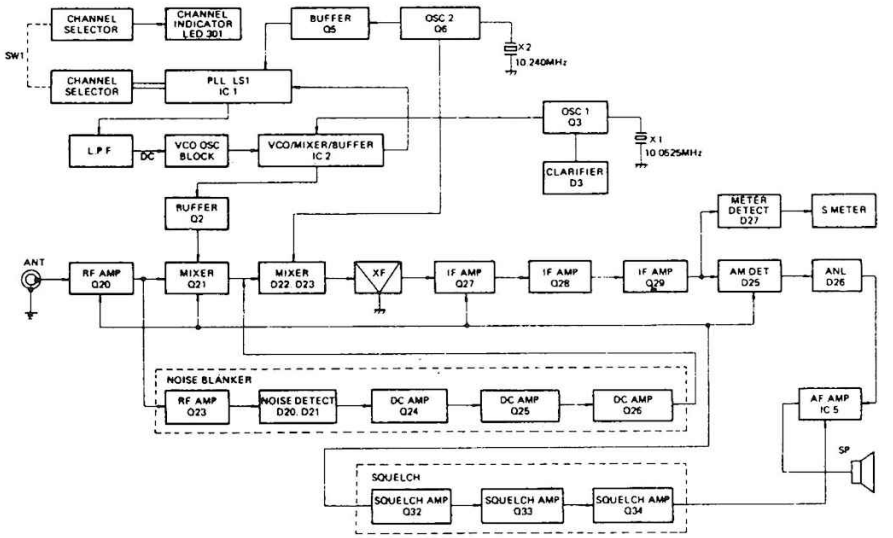
In case of the AM receive mode, this 10.695 MHz first IF signal is then fed to the second mixer, balanced D22 and D23. Also fed to the second mixer is the second local oscillator signal, 10.24 MHz, from Q6. Mixing of these two signals result in a signal at a frequency of 455 kHz in T14. This is the second intermediate frequency for AM mode of reception. The 455 kHz signal passes through the ceramic bandpass filter CF, and feeds the 455 kHz signal to IF amplifiers, Q27, 28, and 29, which include IF transformers T15. The output of Q29 is applied to D25, the AM diode detector. In the SSB mode of reception, the signal obtained as a result of the mixing of the RF input and IC2 VCO signals, 10.695 MHz in the USB, and 10.692 MHz in the LSB mode, is not converted down to lower intermediate frequency, but is passed thru the crystal filter, XF, and fed to the SSB IF amplifier stages, Q14, 16, and 17, which includes T11, and 12. The signal at the secondary side of T12 is fed to Q19, the product SSB detector and beat with the BFO [beat frequency oscillator] signal from the Q12 and finally rectified to audio frequency signal.

The audio signal output from each detector for AM [D25] and SSB [Q19], is passed through the AF Gain Control, VR1, to the input of the audio amplifier, IC5. The audio output is transformer-coupled to the internal speaker, or to an external speaker through External Speaker jack, J4.

SSB RECEIVER



AM RECEIVER



F. SQUELCH: Q32, 33, and 34 are the squelch amplifier transistors. At low [or no] signal levels Q34 collector conducts to ground and its output connected to pin number 6 of IC 5 results in no signal output from the audio amplifier. As the incoming RF signal increases it results in opening up the AF amplifier and output is activated. The point at which Q34 cuts off is determined by setting the Squelch Control, VR2.

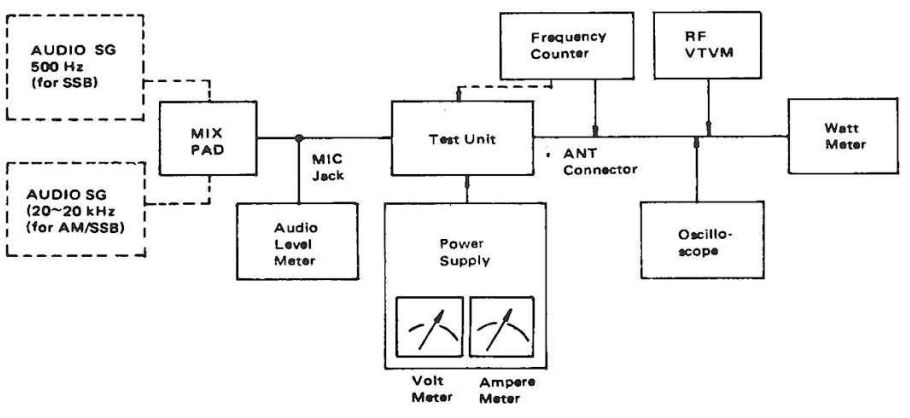
G. NOISE BLANKER: The noises contained in the RF signal at the output of RF amplifier, Q20, is fed through C112 to the base of Q23. The amplified signal output of Q20 is rectified by diodes D20 and 21. The resulting DC voltage turns on Q24 [FET] which in turn turns on Q25 and 26. This causes the IF signal [10.695 or 10.692 MHz] at T10 to be conducted to ground through C121 and Q26 during the presence of the noise impulses, blanking out the noise at the receiver output.

H. CLARIFIER: The Clarifier circuitry is employed in the 10.0525 MHz oscillator, Q3. The Clarifier volume VR7 acts to vary the plus voltage bias of D3 [voltage variable capacitor] so that the crystal [X1] frequency is pulled above [as VR7 rotated clockwise] or below [as VR7 rotated counterclockwise] its normal operating frequency.

I. PUBLIC ADDRESS: Switching provision is made in the audio input circuit of the transceiver to provide a PA function by utilizing the microphone output. In the PA mode, the transceiver serves as a public address amplifier providing 3 watts output to an external PA Speaker jack, J3. The other function of the transceiver are deactivated in the PA mode per FCC Rules and Regulations.

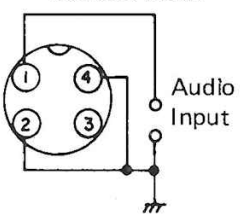
TRANSMITTER ALIGNMENT

Connect test equipment to the transceiver as shown below.

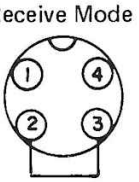


DUMMY PLUGS

Transmit Mode



Receive Mode



TEST EQUIPMENT

The following test equipment is required and recommended for servicing the transceiver satisfactorily.

1. A 50 Ohm resistive antenna load with a power capability of 5 watts or more.
2. A frequency counter operable in the required CB range.
3. A HF signal generator which operates in the 50 kHz to 65 MHz frequency range with ±1% accuracy.
4. An oscilloscope capable of accurate monitoring of 27 MHz range AM signals.
5. A digital voltmeter.
6. Dummy plugs to activate the transceiver in receive or transmit mode without using microphone, wired as shown in page 11.
7. An 8 Ohm 5 watt resistive dummy speaker road.
8. An audio signal generator, 10 Hz to 20 kHz.
9. An RF voltmeter.
10. A regulated power DC power supply capable of supplying 0 to 20V DC, at least 3 amperes.
11. DC ammeter with 0 to 3 ampere scale.
12. DC voltmeter with 20 kOhm/V rating.
13. A 220 volt 50 Hz AC source.

TUNE-UP AND ALIGNMENT

Before performing any adjustments, check visually all jacks, plugs and solder joints for good connection. Shown in the schematics are nominal test voltage values for the transceiver transistors and ICs. For tune-up and servicing identical procedures may be employed for all circuits. Although the transceiver is designed primarily for AC-powered base station, use of DC regulated power supply is highly recommended when servicing.

To activate the transmitter without using the microphone, use the dummy microphone plug. This plug is also used to introduce a modulating audio signal to the microphone input circuit as described in the following procedure.

A. PLL ALIGNMENT

1) Set the Channel Selector to channel 19, and Mode Switch to USB position.
2) Connect a frequency counter to test point TP2 through a 1000 pF capacitor.
3) Adjust the trimming capacitor CT3 for reading of 10.24 MHz ± 50 Hz.
4) Connect both oscilloscope and frequency counter to test point TP3 [pin number 4 of IC2] and adjust the core of T3 for maximum amplitude of scope display [10.0525 x 2 MHz], then adjust CT1 to obtain 20.10500 MHz ± 40 Hz.
5) Set the Mode switch to LSB and adjust CT2 to obtain the reading of 20.103500 MHz ± 40 Hz.
6) Connect frequency counter to TP5 and adjust CT5 to read 10.695 MHz ± 50 Hz in the USB mode of operation. Set the Mode switch to LSB and adjust CT4 to read 10.692 MHz ± 50 Hz.

B. VCO ALIGNMENT

1) Set the Channel Selector to channel 1.
2) Connect a digital voltmeter [or a circuit tester, DC 12V range] between ground and TP4.
3) Adjust the core provided in the VCO block to obtain 3.6V ± 0.1V, starting from top to bottom when turning the core [the circuit tester used in this procedure should be calibrated and have an input impedance of 20 kOhm/V or higher].
4) Next, set the Channel Selector to channel 40 and verify that the reading is 1.4 to 2.3V.

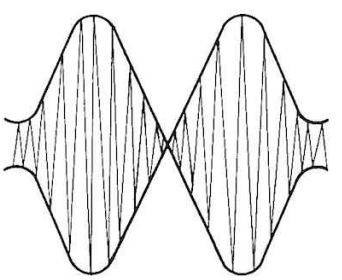
C. RF AMPLIFIER BIAS

1) Connect an amperemeter between the Q10 emitter and chassis ground.
2) Adjust RV1 to obtain bias current of 35 mA ± 10 mA.

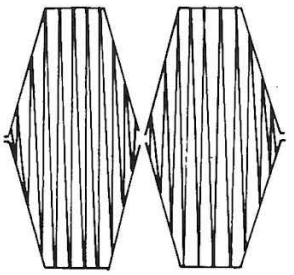
D. SSB RF POWER AMPLIFIER STAGE

1) Set the Channel Selector to channel 19, and the Mode switch to USB.
2) Connect oscilloscope to pin number 4 of IC3.
3) Feed 2.4 kHz, 10 mV audio signal to the microphone input circuit.
4) Adjust cores of T1 and 2 for maximum amplitude of scope display, 27.185 MHz.
5) Set the Channel Selector to channel 40.
6) Connect the oscilloscope to the collector of Q8 and adjust T4 and 5 for maximum amplitude of scope display.
7) Reset Channel Selector to channel 19 and connect the oscilloscope to the Antenna terminal in parallel with the wattmeter.
8) Adjust T6, 11, 12, and 13 for maximum power output on the wattmeter.
9) Decrease audio signal input to the microphone circuit to zero and adjust RV4 and RV5 for minimum amplitude of carrier leakage on the scope display.
10) Feed two tones, 500 Hz and 2,400 Hz signals of 100 mV to the microphone circuit and adjust RV11 to obtain 11 watts PEP power. In this condition verify that the PEP power output at each channel is within 10 to 12 watts. Verify that the scope display of correct output wave shape shown below is obtained.
11) Set the Mode switch to LSB and verify that the above alignment, steps 7 to 10, are not upset and similar results are obtained in this mode of operation.

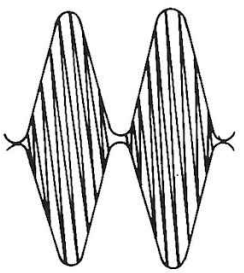
CORRECT



INCORRECT



INCORRECT



E. AM RF POWER STAGE

1) Set the Mode switch to AM position, and the Channel Selector to channel 19.
2) Adjust VR9 for RF output of 3.7 watts on the wattmeter.

F. MODULATION ALIGNMENT

1) Apply 2.5 kHz, 7 mV audio signal input to the microphone input circuit.
2) Adjust RV12 for modulation depth of 80%.
3) Increase the signal input to 70 mV and verify that modulation depth is 90% or less.

G. RF POWER METER

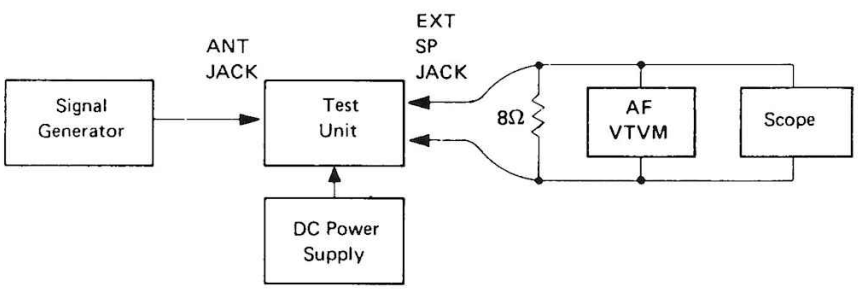
1) Compare RF power meter on the transceiver and wattmeter externally connected in prior set-up.
2) Adjust RV3 so that the RF power meter provided on the unit indicates the same wattage as obtained on the wattmeter.

H. TRANSMIT FREQUENCY

1) Set the transceiver to the transmit mode with no modulation condition.
2) Set the Mode switch to AM position.
3) Connect frequency counter to the antenna connector and read frequency at each channel. Verify that frequency is within 800 Hz of center channel frequency as tabulated in the PLL Frequency Table in page 14.

RECEIVER ALIGNMENT

Connect test equipment to the transceiver as shown below. To activate the receiver section without using the microphone, use the dummy microphone plug wired as shown in page 11.



A. AGC

1) Connect digital voltmeter [or circuit tester] to terminal 15 (Q20, 22 bias) on the PC board and chassis ground.
2) Set the Mode switch to AM and RF Gain to max.
3) Adjust RV8 to obtain reading of 2V.

B. RECEIVER SENSITIVITY

1) Set the signal generator to 27.185 MHz, 1 kHz 30% modulated.
2) Set the transceiver to tune on channel 19.
3) Adjust T7, 8, 9, 10, 13, 14, and 15 for maximum audio output across 8 Ohm dummy load resistor. This alignment should be performed with very small signal input from the signal generator to avoid inaccurate alignment due to AGC action.
4) After completion of step 3), rotate the T7 core, so that the audio output decreases by 2 dB.

C. SQUELCH

1) Set the Mode switch to AM.
2) Set the signal generator to provide RF input signal of 300 μV, 1 kHz 30% modulated and rotate the Squelch control to the fully clockwise position.
3) Adjust RV9 so that the audio just appears on scope display.

D. S METER

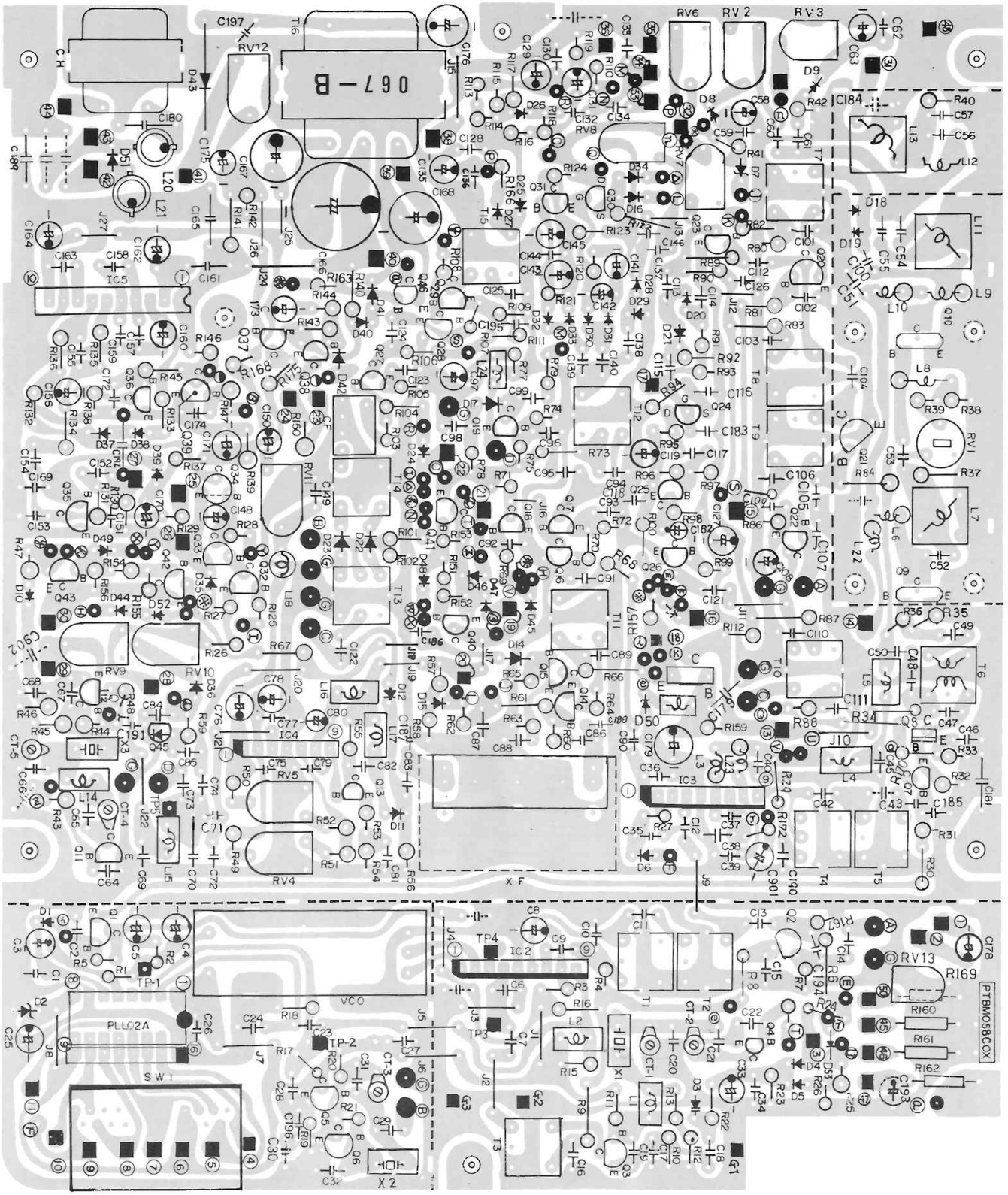
1) Set the signal generator to provide 100 μV output and set the Mode switch to USB.
2) Adjust RV7 so that the S meter pointer indicates 9 on the front panel S meter [left hand].

PLL FREQUENCY TABLE

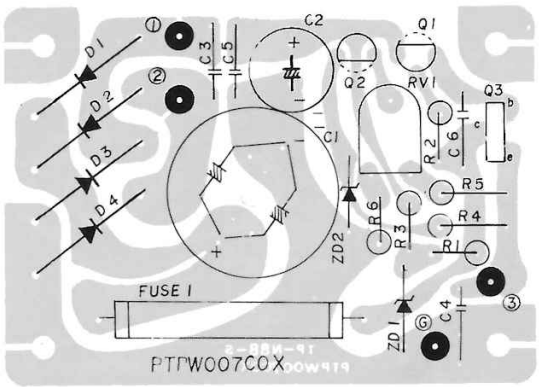
Channel No.	Channel Freq. (MHz)	"N" Digital Code	VCO Freq. (MHz)		Channel Sw. Output						RX 1st Local	
			AM/USB	LSB	P0	P1	P2	P3	P4	P5	AM/USB	LSB
1	26.965	255	17.555	17.5535	1	1	1	1	1	1	37.66	37.657
2	26.975	254	17.565	17.5635	0	1	1	1	1	1	37.67	37.667
3	26.985	253	17.575	17.5735	1	0	1	1	1	1	37.68	37.677
4	27.005	251	17.595	17.5935	1	1	0	1	1	1	37.70	37.697
5	27.015	250	17.605	17.6035	0	1	0	1	1	1	37.71	37.707
6	27.025	249	17.615	17.6135	1	0	0	1	1	1	37.72	37.717
7	27.035	248	17.625	17.6235	0	0	0	1	1	1	37.73	37.727
8	27.055	246	17.645	17.6435	0	1	1	0	1	1	37.75	37.747
9	27.065	245	17.655	17.6535	1	0	1	0	1	1	37.76	37.757
10	27.075	244	17.665	17.6635	0	0	1	0	1	1	37.77	37.767
11	27.085	243	17.675	17.6735	1	1	0	0	1	1	37.78	37.777
12	27.105	241	17.695	17.6935	1	0	0	0	1	1	37.80	37.797
13	27.115	240	17.705	17.7035	0	0	0	0	1	1	37.81	37.807
14	27.125	239	17.715	17.7135	1	1	1	1	0	1	37.82	37.817
15	27.135	238	17.725	17.7235	0	1	1	1	0	1	37.83	37.827
16	27.155	236	17.745	17.7435	0	0	1	1	0	1	37.85	37.847
17	27.165	235	17.755	17.7535	1	1	0	1	0	1	37.86	37.857
18	27.175	234	17.765	17.7635	0	1	0	1	0	1	37.87	37.867
19	27.185	233	17.775	17.7735	1	0	0	1	0	1	37.88	37.877
20	27.205	231	17.795	17.7935	1	1	1	0	0	1	37.90	37.897
21	27.215	230	17.805	17.8035	0	1	1	0	0	1	37.91	37.907
22	27.225	229	17.815	17.8135	1	0	1	0	0	1	37.92	37.917
23	27.255	226	17.845	17.8435	0	1	0	0	0	1	37.95	37.947
24	27.235	228	17.825	17.8235	0	0	1	0	0	1	37.93	37.927
25	27.245	227	17.835	17.8335	1	1	0	0	0	1	37.94	37.937
26	27.265	225	17.855	17.8535	1	0	0	0	0	1	37.96	37.957
27	27.275	224	17.865	17.8635	0	0	0	0	0	1	37.97	37.967
28	27.285	223	17.875	17.8735	1	1	1	1	1	0	37.98	37.977
29	27.295	222	17.885	17.8835	0	1	1	1	1	0	37.99	37.987
30	27.305	221	17.895	17.8935	1	0	1	1	1	0	38.00	37.997
31	27.315	220	17.905	17.9035	0	0	1	1	1	0	38.01	38.007
32	27.325	219	17.915	17.9135	1	1	0	1	1	0	38.02	38.017
33	27.335	218	17.925	17.9235	0	1	0	1	1	0	38.03	38.027
34	27.345	217	17.935	17.9335	1	0	0	1	1	0	38.04	38.037
35	27.355	216	17.945	17.9435	0	0	0	1	1	0	38.05	38.047
36	27.365	215	17.955	17.9535	1	1	1	0	1	0	38.06	38.057
37	27.375	214	17.965	17.9635	0	1	1	0	1	0	38.07	38.067
38	27.385	213	17.975	17.9735	1	0	1	0	0	1	38.08	38.077
39	27.395	212	17.985	17.9835	0	0	1	0	1	0	38.09	38.087
40	27.405	211	17.995	17.9935	1	1	0	0	1	0	38.10	38.097

Note: 1, High Level = 4.5–5.5V
0, Low Level = 0.05–0.4V

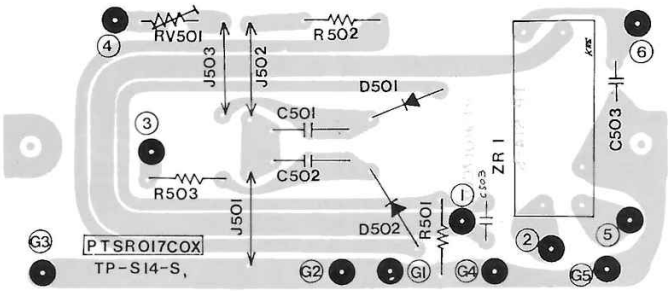
PC BOARDS



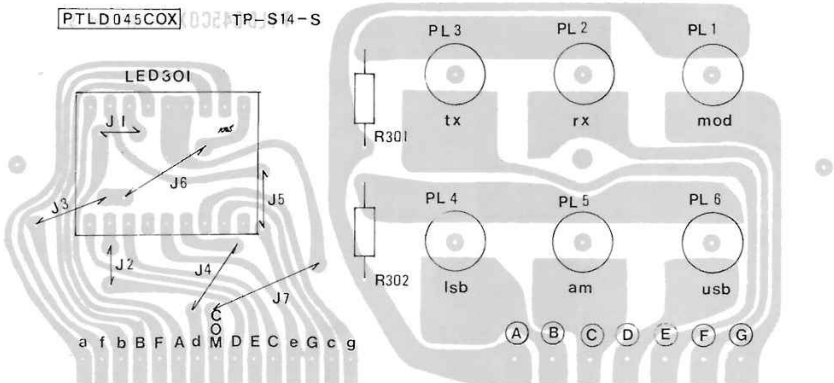
TX, RX, IF, AF [PTBM058COX]



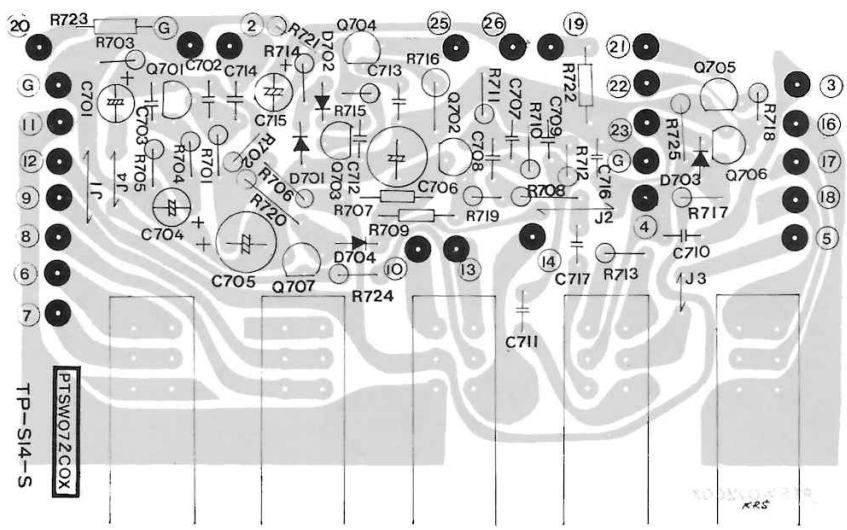
Power Supply [PTPW007COX]



SWR [PTSR017COX]



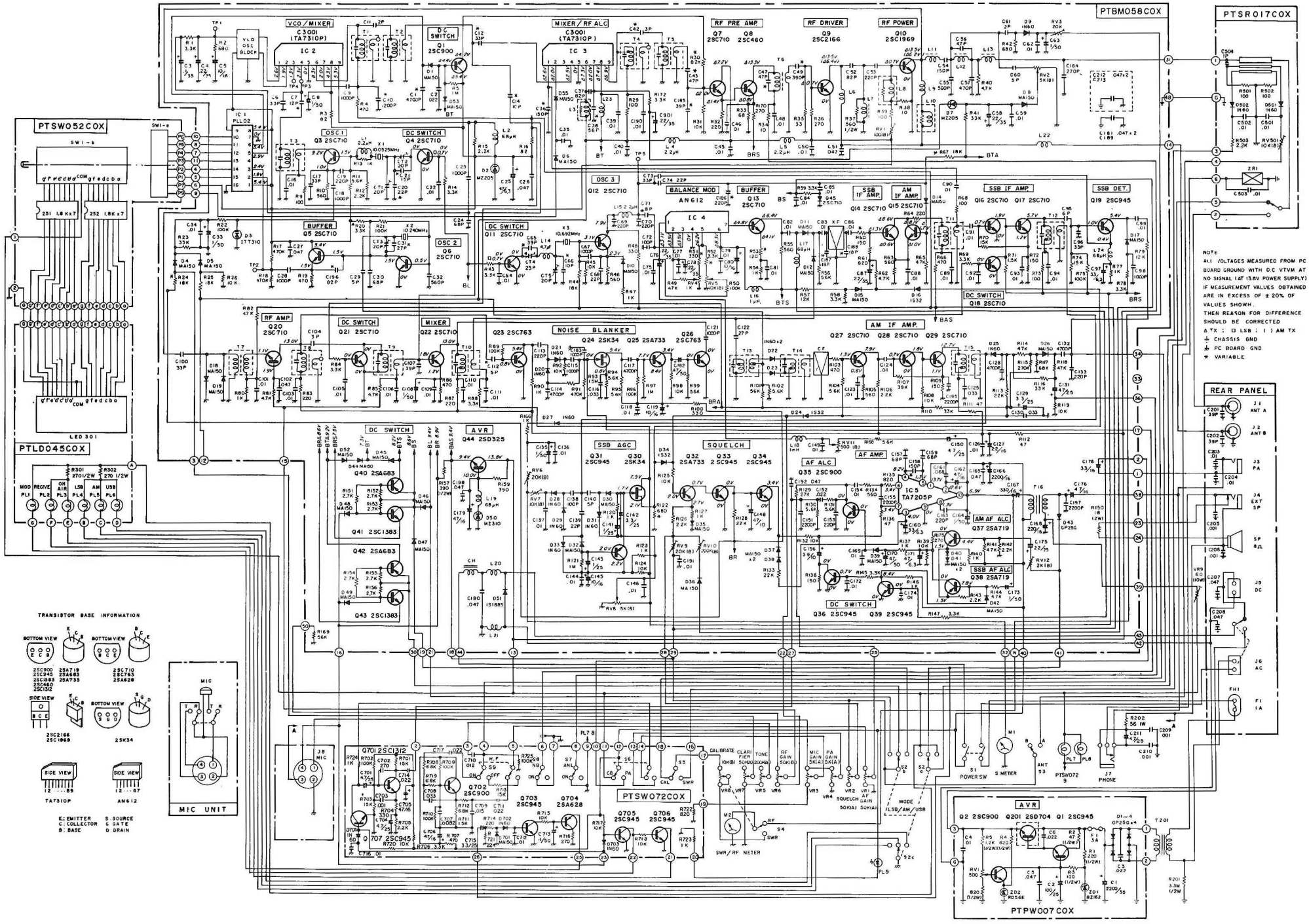
Channel LED [PTLD045COX]



Lever Switches [PTSW072COX]

Channel Selector [PTSW052COX]

SCHEMATIC DIAGRAM



PART NAME	PART CODE
ELEC. ELEMENTS	SBA33AEGBLL

PART CODE	STOCK NUMBER	PART NAME	SPECIFICATIONS	SYMBOLIC OR EXPLODED VIEW NO.				Q'TY USED
APTPM059QA		P.W.BOARD ASSY.						1
APTLJ045AA		P.W.BOARD ASSY.						1
APTPWC07EA		P.W.BOARD ASSY.						1
APTSR017AA		P.W.BOARD ASSY.						1
APTSW052BA		P.W.BOARD ASSY.						1
APTSW072AA		P.W.BOARD ASSY.						1
BSPB3C06YN		MIND HEAD SCREW	(+)BIT, M3 X 6 S-NI					1
CCCH330KPH		CERAMIC CAP.	33PF 50V -10, +10% PH	C201	C202			2
CEAE4R7NLX		ELYT. CAPACITOR	4.7MFD 25V NON-POLAR	C211				1
CKDR102PEH		CERAMIC CAP.	1000PF 50V -0, +100% E	C205	C206	C209	C213	4
CKDR103PEH		CERAMIC CAP.	0.01MFD 50V -0, +100% E	C203	C204			2
CKDB473ZEH		CERAMIC CAP.	0.047MFD 50V -20, +20% E	C207	C208	C212	C214	4
GCT1200A01		WIRES KIT						1
QLA3139SR		L.E.D.	G04-209RD RED 1.7V	PL9				1
QTD0704XAE		TRANSISTOR	2SD704 D,E-RANK	Q211				1
RC12GX335X		FIXED CARBON R.	1/2W 3.3M OHM 10%	R201				1
RG1ANJ560R		M-OXIDE FILM R.	1W 56 OHM 5%	R202				1
RVNA204A03		VR.		VR5				1
RVNA502A05		VR.		VR3	VR4			2
RVNA503A13		VR.		VR1	VR2	VR7		3
RVNA503B13		VR.		VR6				1
RVNC103B02		VR.		S4/VR8				1
RWVA060B02		VR.	6 OHM A-CURVE	VR9				1

PART NAME	PART CODE
ELEC. ELEMENTS	SBA33AEGBLL

PART CODE	STOCK NUMBER	PART NAME	SPECIFICATIONS	SYMBOLIC OR EXPLODED VIEW NO.				Q'TY USED
SL020201CA		LEVER SWITCH		S1				1
SR0402102H		ROTARY SWITCH		S3				1
SR0403107H		ROTARY SWITCH		S2				1
TPJ74E001Y		PWR.TRANSFORMER		T201				1
VF164DN003		BUSHING						1
VS223RH002		SILICON SHEET						1
YHF1S3001U		FUSE HOLDER						1
YJA02S001U		AC JACK		J6				1
YJB02S009U		DC JACK		J5				1
YJC02S015Z		ANT JAK		J1	J2			2
YJS03S018Z		PHONE JACK		J7				1
YJT03S003Z		3P JACK		J3	J4			2
YJZ04S004Z		MIC JACK		J8				1
YLL038XXZS		LUG TERMINAL						1
YSZ020001U		LED SOKET						1
ZEB050103Z		FUSE						1
ZMJ1050N03		METER		M1				1
ZMJ1050N06		METER		M2				1
ZPA1681?2U		LAMP		PL7	PL8			2
ZQA0920902		SPEAKER		SP				1

PART NAME	PART CODE
MECH. ELEMENTS	SBA33AEG9L2

PART CODE	STOCK NUMBER	PART NAME	SPECIFICATIONS	SYMBOLIC OR EXPLODED VIEW NO.	QTY USED
AMCT120001		ESCUTCHEON ASSY			1
BRT2635CAX		THIN HEAD RIVET	2.6 X 3.5 ALMINUM		2
BSPB2606NB		BIND HEAD SCREW	(+)BIT, M2.6 X 6 S-BLACK		2
BSPB2608NB		BIND HEAD SCREW	(+)BIT, M2.6 X 8 S-BLACK		2
BSPB3006NN		BIND HEAD SCREW	(+)BIT, M3 X 6 S-NI		2
BSPB5010NB		BIND HEAD SCREW	(+)BIT, M5 X 10 S-BLACK		4
BSPB5010NN		BIND HEAD SCREW	(+)BIT, M5 X 10 S-NI		4
BSPC3006N7		CEMS SCREW	(+)BIT, M3 X 6 S-ZNCR		12
BSPC4010N7		CEMS SCREW	(+)BIT, M4 X 10 S-ZNCR		2
BSPL3006NB		BIND NAIL SCREW	(+)BIT, M3 X 6 S-BLACK		4
BSPP3006NT		PAN HEAD SCREW	(+)BIT, M3 X 6 PLASTIC		8
BSPS3005NN		FLAT HEAD SCREW	(+)BIT, M3 X 5 S-NI		4
BSPS5012NB		FLAT HEAD SCREW	(+)BIT, M5 X 12 S-BLACK		4
BTPB4008TZ		BIND TAP SCREW	(+)BIT, M4 X 8 S-ZNCR (FULL TITE)		4
BTPB4010BZ		BIND TAP SCREW	(+)BIT, M4 X 10 S-ZNCR		2
BTPL3008BB		NAIL TAP SCREW	(+)BIT, M3 X 8 S-BLACK		4
BTPW3008BB		BRAS. TAP SCREW	(+)BIT, M3 X 8 S-BLACK		2
BTPW3008BJ		BRAS. TAP SCREW			5
BTPW3008BZ		BRAS. TAP SCREW	(+)BIT, M3 X 8 S-ZNCR		42
BTPW3014BZ		BRAS. TAP SCREW	(+)BIT, M3 X 14 S-ZNCR		4
BTPX3008B7		I.T BT SCREW	(+)BIT, M3 X 8 S-ZNCR		11
BWM30805SZ		FLAT L. WASHER	FLAT LARGE, 8 M/M S-ZNCR		4
BWM50C08SB		FLAT L. WASHER	FLAT LARGE, 5 M/M S-BLACK		4

CYBERNET PART NAME	CYBERNET PART CODE	CUSTOMER STOCK NO.
MECH. ELEMENTS	SBA33AEG9L2	

CYBERNET PART CODE	CUSTOMER'S PART, STOCK NUMBER	CYBERNET PART NAME	SPECIFICATIONS	SYMBOLIC OR EXPLODED VIEW NO.	QTY USED
BWM50C08SN		FLAT L. WASHER	FLAT LARGE, 5 M/M S-NI		4
BWU26583SW		IT. LOCK WASHER	INSIDE TOOTHED, 2.6M/M S-ZN		2
MB874SZ003		FRONT PANEL			1
MB882SZ001		CHASSIS			1
MB972SE055		REAR PANEL			1
MC341SN001		BRACKET			1
MC471SZ002		BRACKET			2
ME86PSE001		ESCUTCHEON			1
ML121SZ009		BRACKET			4
ML522BN001		TERMINAL			1
ML622BN001		TERMINAL			1
ML744AA002		BRACKET			2
MN276AA104		KNOB			12
MN386AA027		CH KNOB			1
MS317SZ004		PLATE			2
MS317SZ006		PLATE			2
MS635SX004		SHIELD			1
MS886SZ041		BOTTM PLATE			1
MT213A0023		SUPPORT			1
MU274M003		HANDLE			2
MU351SZ002		BRACKET L			1
MU351SZ003		BRACKET R			1
MU654A0002		HEAT SINK			1

PART NAME	PART CODE	
MECH. ELEMENTS	SBA33AEG3L2	

PART CODE	STOCK NUMBER	PART NAME	SPECIFICATIONS	SYMBOLIC OR EXPLODED VIEW NO.	Q'TY USED
MU862S7C08		BRACKET			1
MU897SM07		COVER			1
MVSCT12002		SER. NO. PLATE			1
MX615SZ002		CLAMPER			1
V8532AW001		LAMP HOUSE			1
VE176DN002		WASHER			2
VK1644X001		INDICATOR			1
VK1648X001		LAMP GUIDE			1
VM1659X003		HOLDER			2
VM2855B001		FOOT			4
VN210SM001		KNOB			1
VS2268B001		SHEET			4
VS423YB002		SHEET			1
VS605EB001		BARRIER			2
VS647AX001		FILTER			1
VS665FN001		BARRIER			1
VVL311GF12		LABEL			1
VVL311GF23		FUSE LABEL			1
VVL411GF14		LABEL			1
VVL631UL03		LABEL			1
VVL631UL04		UL. LABEL			1

PART NAME	PART CODE	
PRINTED MATTERS	SBA33AEGBL3	

PART CODE	STOCK NUMBER	PART NAME	SPECIFICATIONS	SYMBOLIC OR EXPLODED VIEW NO.	Q'TY USED
KTCT120FXX		OWNER'S MANUAL			1

PART NAME	PART CODE
PACKING MATERIAL	SBA28AUCTL4

PART CODE	STOCK NUMBER	PART NAME	SPECIFICATIONS	SYMBOLIC OR EXPLODED VIEW NO.	QTY USED
KE0526??E4		POLY BUG			1
KE0917??E4		POLY BUG			1
KE2015??E4		POLY BUG			1
KE2434??E4		POLY BUG			1
KE5474??A6		POLY BUG			1
KKCT120002		DISPLAY BOX			1
KNCT120001		PARTITIONER			1
KNCT120002		PARTITIONER			1
KNCT120003		PARTITIONER			1
KNCT120004		PARTITIONER			1
KNCT120005		PARTITIONER			1
KSCT120001		OUTER CARTON			1

PART NAME	PART CODE
ACCESSORIES	SBA33AEG3L5

PART CODE	STOCK NUMBER	PART NAME	SPECIFICATIONS	SYMBOLIC OR EXPLODED VIEW NO.	QTY USED
ACAC031ULA		AC CORD ASSY.			1
ACDC053ULA		DC.CORD. ASSY			1
BTPP4010BN		PAN TAP SCREW	(+)BIT, M4 X 10 S-NI		2
BTPW3008BZ		BBAS. TAP SCREW	(+)BIT, M3 X 8 S-ZNCR		2
BWU40855SW		IT. LOCK WASHER	INSIDE TOOTHED, 4 M/M S-ZN		2
MZ331SZ002		HOLDER			1
YPA02S001Z		AC PLUG			1
ZFBQ501103Z		FUSE			1
ZGAAZ60114		MICROPHONE			1

PART NAME	PART CODE
ESCUTCHEON ASSY	AMCT120221

PART CODE	STOCK NUMBER	PART NAME	SPECIFICATIONS	SYMBOLIC OR EXPLODED VIEW NO.	QTY USED
MF97EA0287		ESCUTCHEON			1
VK1325S0024		BUSH			2
VK2355M001		FRAME			1
VS765Y0002		SHEET			1
VS868G0003		PLATE			1

PART NAME	PART CODE
P.W.BOARD ASSY.	APTBM0582A

PART CODE	STOCK NUMBER	PART NAME	SPECIFICATIONS	SYMBOLIC OR EXPLODED VIEW NO.	QTY USED
BNH 26NBN		NUT	M2.6, BS-NI, THIN-TYPE		2
BSPB 006NN		BIND HEAD SCREW	(+)BIT, M3 X 6 S-NI		7
BSPP3 06NT		PAN HEAD SCREW	(+)BIT, M3 X 6 PLASTIC		2
BWU26A33SW		IT. LOCK WASHER	INSIDE TOOTHED, 2.6M/M S-ZN		2
BWU306 5SW		IT. LOCK WASHER	INSIDE TOOTHED, 3 M/M S-ZN		5
CCCB220DPM		CERAMIC CAP.	PK 22PF 50V -0.25, +0.25PF	C11 C61	2
CCCB330DPM		CERAMIC CAP.	PJ 33PF 50V -0.25, +0.25PF	C104 C42	2
CCCB0509B3		CERAMIC CAP.	PH 5PF 50V -0.5, +0.5PF	C112 C140 C29 C60	4
CCCB3609DPMS		CERAMIC CAP.	PH 6PF 50V -0.5, +0.5PF	C95	1
CCCB0809DPM		CERAMIC CAP.	PH 8PF 50V -0.5, +0.5PF	C71	1
CCCB1009DCM		CERAMIC CAP.	CH 10PF 50V -0.5, +0.5PF	C65	1
CCCB1009DPM		CERAMIC CAP.	PH 10PF 50V -0.5, +0.5PF	C14	1
CCCB101KPM		CERAMIC CAP.	100PF 50V -10, +10% PH	C138 C72	2
CCCB120KPM		CERAMIC CAP.	12PF 50V -10, +10% PH	C7	1
CCCB150KCM		CERAMIC CAP.	15PF 50V -10, +10% CH	C21	1
CCCB150KPM		CERAMIC CAP.	15PF 50V -10, +10% PH	C188	1
CCCB151KPM		CERAMIC CAP.	150PF 50V -10, +10% PH	C36 C54	2
CCCB151KSM		CERAMIC CAP.	150PF 50V -10, +10% SL	C158 C196	2
CCCB180KPM		CERAMIC CAP.	18PF 50V -10, +10% PH	C137 C188	2
CCCB220KCM		CERAMIC CAP.	22PF 50V -10, +10% CH	C20	1
CCCB220KPM		CERAMIC CAP.	22PF 50V -10, +10% PH	C139 C68 C74	3
CCCB221KPM		CERAMIC CAP.	220PF 50V -10, +10% PH	C113 C184 C19 C53	
				C69 C70	

PART NAME	PART CODE
P.W.BOARD ASSY.	AP1BM0589A

PART CODE	STOCK NUMBER	PART NAME	SPECIFICATIONS	SYMBOLIC OR EXPLODED VIEW NO.	QTY USED
CCCB221KDM		CERAMIC CAP.	220PF 50V -10, +10% SL	C133 C154 C163	3
CCCB270KCM		CERAMIC CAP.	27PF 50V -10, +10% CH	C31	1
CCCB270KPM		CERAMIC CAP.	27PF 50V -10, +10% PH	C122	1
CCCB271KDM		CERAMIC CAP.	270PF 50V -10, +10% SL	C134	1
CCCB330KPM		CERAMIC CAP.	33PF 50V -10, +10% PH	C100 C16 C17 C6	4
				C73 C96	
CCCB390KCM		CERAMIC CAP.	39PF 50V -10, +10% CH	C65	1
CCCB390KPM		CERAMIC CAP.	39PF 50V -10, +10% PH	C107 C165	2
CCCB391KDT		CERAMIC CAP.	390PF 50V -10, +10% SL	C49	1
CCCB470KPM		CERAMIC CAP.	47PF 50V -10, +10% PH	C43 C47 C56	3
CCCB471KDT		CERAMIC CAP.	470PF 50V -10, +10% SL	C57	1
CCCB561KDM		CERAMIC CAP.	560PF 50V -10, +10% SL	C32	1
CCCB561KDT		CERAMIC CAP.	560PF 50V -10, +10% SL	C55	1
CCCB680KPM		CERAMIC CAP.	68PF 50V -10, +10% PH	C24 C30	2
CCCB682KDM		CERAMIC CAP.	6800PF 50V -10, +10% SL	C157 C159	2
CCCB820KPM		CERAMIC CAP.	82PF 50V -10, +10% PH	C37 C52	2
CCCB560KPM		CERAMIC CAP.	56PF 50V -10, +10% PH	C38	1
CEAB330ALX		ELYT. CAPACITOR	33MFD 6.3V	C160 C97	2
CEAB470ALX		ELYT. CAPACITOR	47MFD 6.3V	C171 C25	2
CEAC470ALX		ELYT. CAPACITOR	47MFD 10V	C148	1
CEAD100ALX		ELYT. CAPACITOR	10MFD 16V	C119 C145 C80	3
CEAD221ALX		ELYT. CAPACITOR	220MFD 16V	C168	1
CEAD222ALX		ELYT. CAPACITOR	2200MFD 16V	C166	1

PART NAME	PART CODE
P.W.BOARD ASSY.	AP1BM0589A

PART CODE	STOCK NUMBER	PART NAME	SPECIFICATIONS	SYMBOLIC OR EXPLODED VIEW NO.	QTY USED
CEAD330ALX		ELYT. CAPACITOR	33MFD 16V	C178	1
CEAD331ALX		ELYT. CAPACITOR	330MFD 16V	C167	1
CEAD470ALX		ELYT. CAPACITOR	47MFD 16V	C162 C176 C179	3
CEAE2R2ALX		ELYT. CAPACITOR	2.2MFD 25V	C175	1
CEAE3R3ALX		ELYT. CAPACITOR	3.3MFD 25V	C129 C142	2
CEAE4R7ALX		ELYT. CAPACITOR	4.7MFD 25V	C131 C150	2
CEAGR47ALX		ELYT. CAPACITOR	0.47MFD 50V	C170 C182	2
CEAG010ALX		ELYT. CAPACITOR	1MFD 50V	C108 C135 C164 C173	7
				C33 C63 C8	
CKCB222KBM		CERAMIC CAP.	2200PF 50V -10, +10% B	C197	1
CKCB473ZFM		CERAMIC CAP.	0.047MFD 50V -20, +80% F	C165 C180 C181 C183	4
CKDB473ZFM		CERAMIC CAP.	0.047MFD 50V -20, +80% F	C198 C27	2
CQMB102KCH		MYLAR CAPACITOR	1000PF 50V -10, +10%	C115 C121 C13 C133	8
				C23 C28 C67 C9	
				C98	
CQMB103KCH		MYLAR CAPACITOR	0.01MFD 50V -10, +10%	C101 C103 C105 C135	52
				C109 C110 C111 C113	
				C123 C124 C126 C139	
				C137 C144 C146 C149	
				C154 C16 C169 C172	
				C174 C180 C181 C22	
				C34 C35 C39 C41	
				C45 C46 C49 C52	

PART NAME	PART CODE
P.W.BOARD ASSY.	AFTRM0580A

PART CODE	STOCK NUMBER	PART NAME	SPECIFICATIONS	SYMBOLIC OR EXPLODED VIEW NO.	Q'TY USED
				C59 C62 C64 C75	
				C77 C79 C81 C82	
				C83 C84 C85 C86	
				C88 C89 C90 C91	
				C92 C93 C94 C99	
CQMB122KCH		MYLAR CAPACITOR	1200PF 50V -10, +10%	C10	1
CQMB222KCH		MYLAR CAPACITOR	2200PF 50V -10, +10%	C151 C155 C195	3
CQMB223KCH		MYLAR CAPACITOR	0.022MFD 50V -10, +10%	C152 C2	2
CQMB333KCH		MYLAR CAPACITOR	0.033MFD 50V -10, +10%	C116 C125 C130	3
CQMB472KCH		MYLAR CAPACITOR	4700PF 50V -10, +10%	C1 C114 C117 C121	5
				C132	
CQMB473KCH		MYLAR CAPACITOR	0.047MFD 50V -10, +10%	C102 C192 C26 C61	4
CQMB683KCH		MYLAR CAPACITOR	0.068MFD 50V -10, +10%	C161	1
CSSC3R9MDC		TANTALUM CAP.	3.9MFD 10V -20, +20%	C156	1
CSSD100MDC		TANTALUM CAP.	10MFD 16V -20, +20%	C5	1
CSSD220MDC		TANTALUM CAP.	22MFD 16V -20, +20%	C127	1
CSSE010MDC		TANTALUM CAP.	1MFD 25V -20, +20%	C141 C143	2
CSSE22MDC		TANTALUM CAP.	0.22MFD 35V -20, +20%	C4 C58 C76 C78	4
				C87 C901	
CSSE01MDC		TANTALUM CAP.	0.1MFD 35V -20, +20%	C3	1
CT76200H01		TRIMMER CAP.		CT1 CT2 CT3 CT5	4
CT77250H01		TRIMMER CAP.		CT4	1
FB8455A17M		CERAMIC FILTER			1

PART NAME	PART CODE
P.W.BOARD ASSY.	AFTRM0580A

PART CODE	STOCK NUMBER	PART NAME	SPECIFICATIONS	SYMBOLIC OR EXPLODED VIEW NO.	Q'TY USED
FF10875015		XTAL FILTER		MXF	1
LA1JG1004A		COIL		L12	1
LBBJF1008A		CHOKE COIL		L20 L21	2
LDADA3038J		RF COIL		L6	1
LDADA3538G		COIL		L3	1
LDAD935244		R.F.C.		L10 L8	2
LDADB40248		RF COIL		L22 L23 L9	3
LF089K001N		PEAKING COIL		L16	1
LF102KB01S		RF COIL		L18	1
LF282K001N		RF COIL		L1 L15 L4 L5	4
LF487K001N		R.F.C.		L14	1
LF680K001N		RF COIL		L17 L19 L2 L24	4
LJ119H004W		CHOKE COIL		CH	1
MB654SX001		SHIELD			1
ML321A0001		HEAT SINK			1
ML565A0001		HEAT SINK			1
MQ531A0001		HEAT SHINK			1
MS327A0004		HEAT SINK			1
MS425SX001		SHIELD			1
MS535X0001		SHEILD			1
MS765X0001		SHEILD			1
MW2018S004		TERMINAL			51
MW401CX001		SHORT JUMPER			17

PART NAME	PART CODE
P.W.BOARD ASSY.	APTBM0580A

PART CODE	STOCK NUMBER	PART NAME	SPECIFICATIONS	SYMBOLIC OR EXPLODED VIEW NO.				QTY USED
MW401CX002		SHORT JUMPER						2
MW401CX003		SHORT JUMPER						4
MW401CX004		SHORT JUMPER						4
MX653AD001		HEAT SHINK						1
PTBM058C0X		PRINTED W.BOARD						1
QDCTT310X0		VARI-CAP. DIODE	1TT310 12V NO-RANK 26MIN	D3				1
QDGIN60XXT		GERMANIUM DIODE	NO-RANK	D20	D21	D22	D23	11
				D25	D27	D28	D29	
				D31	D33	D9		
QDG1S32XXT		GERMANIUM DIODE	1S22 VR=60VNO-RANK 25MIN	D16	D24	D34		3
QDSGP25GXG		SILICON DIODE	GP35G 400V NO-RANK	D43				1
QDSMA150XN		SILICON DIODE	MA150 VF=1.2V,VR=35V NO-RANK 24MIN	D1	D10	D11	D12	33
				D14	D15	D17	D18	
				D19	D26	D30	D32	
				D35	D36	D37	D38	
				D39	D4	D40	D41	
				D42	D44	D45	D46	
				D47	D48	D49	D5	
				D52	D53.	D55	D6	
				D8				
QDSS1885XT		SILICON DIODE	1S1185 VRM=100 VFM=1.2 26MIN	D51				1
QDZMZ205XE		ZENER DIODE	MZA205 VZ=5.1-5.6V A-RANK 25MIN	D2	D7			2
QDZMZ310XE		ZENER DIODE	MZ310 NO-RANK	D50				1

PART NAME	PART CODE
P.W.BOARD ASSY.	APTBM0580A

PART CODE	STOCK NUMBER	PART NAME	SPECIFICATIONS	SYMBOLIC OR EXPLODED VIEW NO.				QTY USED
QQMAN612AN		I.C.	AN612 7-PIN BALANCED-MOD.	IC4				1
QQMC3001AN		I.C.	AN103 O-RANK C3001-O	IC3				1
QQMC3001AT		I.C.	TA7310P O-RANK C3001A-O 9-PIN	IC2				1
QQM07205BT		I.C.	TA7205AP5.8W AUDIO-POWER-AMP	IC5				1
QQPLL02AN		I.C.	PLL02A(MN6040)	IC1				1
QTA0683XBN		TRANSISTOR	2SA683 R-RANK	Q40	Q42			2
QTA0719XAN		TRANSISTOR	2SA719 Q-RANK	Q37	Q38			2
QTA0733XAA		TRANSISTOR	2SA733 Q-RANK	Q25	Q32			2
QTC0460XBB		TRANSISTOR	2SC460 A,B-RANK	Q8				1
QTC0710XAE		TRANSISTOR	2SC710 C-RANK	Q13	Q14	Q15	Q16	10
				Q17	Q20	Q22	Q27	
				Q29	Q45			
QTC0710XBE		TRANSISTOR	2SC710 D-RANK	Q11	Q12	Q18	Q21	10
				Q28	Q3	Q4	Q5	
				Q6	Q7			
QTC0763XAE		TRANSISTOR	2SC763 C,D-RANK	Q23	Q26			2
QTC0900XBA		TRANSISTOR	2SC900 E-RANK	Q1				1
QTC0900XCA		TRANSISTOR	2SC900 D-RANK	Q35				1
QTC0945ABA		TRANSISTOR	2SC945A Q-RANK	Q10	Q31			2
QTC0945AEA		TRANSISTOR	2SC945A P,Q-RANK	Q33	Q34	Q36	Q39	4
QTC1383XQN		TRANSISTOR	2SC1383 R-RANK	Q41	Q43			2
QTC1969XBE		TRANSISTOR	2SC1969 B,C,D-RANK	Q12				1
QTC2166XAE		TRANSISTOR	2SC2166 NO-RANK	Q9				1

PART NAME	PART CODE
P.W.BOARD ASSY.	APTRM0580A

PART CODE	STOCK NUMBER	PART NAME	SPECIFICATIONS	SYMBOLIC OR EXPLODED VIEW NO.				Q'TY USED
QTD0325XCC		TRANSISTOR	2SD325 C,E-RANK	Q44				1
QTK0034XAE		TRANSISTOR	2SK34 C,D-RANK	Q24				1
QTK0034XBE		TRANSISTOR	2SK34 E-RANK	Q30				1
RD25TJ563X		CARBON FILM R.	0.25W 56K OHM 5%	R169				1
RD25VJ100X		CARBON FILM R.	0.25W 10 OHM 5%	R34	R38			2
RD25VJ101X		CARBON FILM R.	0.25W 100 OHM 5%	R29	R39	R68	R73	5
				R90				
RD25VJ102X		CARBON FILM R.	0.25W 1K OHM 5%	R120	R123	R127	R13	13
				R137	R140	R146	R166	
				R47	R54	R77	R80	
				R30				
RD25VJ103X		CARBON FILM R.	0.25W 10K OHM 5%	R108	R119	R124	R125	11
				R132	R139	R26	R31	
				R45	R92	R98		
RD25VJ104X		CARBON FILM R.	0.25W 100K OHM 5%	R21	R22	R50	R75	6
				R39	R96			
RD25VJ105X		CARBON FILM R.	0.25W 1M OHM 5%	R121	R5	R97		3
RD25VJ121X		CARBON FILM R.	0.25W 120 OHM 5%	R53				1
RD25VJ123X		CARBON FILM R.	0.25W 12K OHM 5%	R57	R79			2
RD25VJ151X		CARBON FILM R.	0.25W 150 OHM 5%	R109	R138	R60	R72	4
RD25VJ152X		CARBON FILM R.	0.25W 1.5K OHM 5%	R71				1
RD25VJ153X		CARBON FILM R.	0.25W 15K OHM 5%	R70	R74			2
RD25VJ155X		CARBON FILM R.	0.25W 1.5M OHM 5%	R93				1

PART NAME	PART CODE
P.W.BOARD ASSY.	APTRM0580A

PART CODE	STOCK NUMBER	PART NAME	SPECIFICATIONS	SYMBOLIC OR EXPLODED VIEW NO.				Q'TY USED
RD25VJ183X		CARBON FILM R.	0.25W 18K OHM 5%	R24	R25	R44	R67	4
RD25VJ221X		CARBON FILM R.	0.25W 220 OHM 5%	R32	R64	R83	R87	4
RD25VJ222X		CARBON FILM R.	0.25W 2.2K OHM 5%	R106	R12	R126	R142	6
				R143	R15			
RD25VJ223X		CARBON FILM R.	0.25W 22K OHM 5%	R113	R128	R133		3
RD25VJ271X		CARBON FILM R.	0.25W 270 OHM 5%	R170	R175	R36		3
RD25VJ272X		CARBON FILM R.	0.25W 2.7K OHM 5%	R151	R152	R153	R154	6
				R155	R156			
RD25VJ273X		CARBON FILM R.	0.25W 27K OHM 5%	R129				1
RD25VJ274X		CARBON FILM R.	0.25W 270K OHM 5%	R115				1
RD25VJ330X		CARBON FILM R.	0.25W 33 OHM 5%	R35				1
RD25VJ331X		CARBON FILM R.	0.25W 330 OHM 5%	R100	R48	R51		3
RD25VJ332X		CARBON FILM R.	0.25W 3.3K OHM 5%	R1	R14	R145	R147	14
				R172	R20	R43	R52	
				R58	R59	R65	R73	
				R84	R88			
RD25VJ333X		CARBON FILM R.	0.25W 33K OHM 5%	R110	R116	R23	R41	4
RD25VJ391X		CARBON FILM R.	0.25W 390 OHM 5%	R159				1
RD25VJ393X		CARBON FILM R.	0.25W 39K OHM 5%	R107				1
RD25VJ470X		CARBON FILM R.	0.25W 47 OHM 5%	R111	R112	R136		3
RD25VJ471X		CARBON FILM R.	0.25W 470 OHM 5%	R103	R19	R4	R66	5
				R96				
RD25VJ472X		CARBON FILM R.	0.25W 4.7K OHM 5%	R141	R144	R40	R62	7

PART NAME	PART CODE
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PART CODE	STOCK NUMBER	PART NAME	SPECIFICATIONS	SYMBOLIC OR EXPLODED VIEW NO.	QTY USED
				R65 R81 R85	
RD25VJ473X		CARBON FILM R.	0.25W 47K OHM 5%	R114 R116 R49 R82	4
RD25VJ474X		CARBON FILM R.	0.25W 470K OHM 5%	R17 R18 R91	3
RD25VJ561X		CARBON FILM R.	0.25W 560 OHM 5%	R10 R105 R134 R46	4
				R55 R63	
RD25VJ562X		CARBON FILM R.	0.25W 5.6K OHM 5%	R102 R104 R11 R137	10
				R131 R168 R56 R94	
				R95 R99	
RD25VJ563X		CARBON FILM R.	0.25W 56K OHM 5%	R101	1
RD25VJ680X		CARBON FILM R.	0.25W 68 OHM 5%	R33	1
RD25VJ681X		CARBON FILM R.	0.25W 680 OHM 5%	R122 R2 R42	3
RD25VJ683X		CARBON FILM R.	0.25W 68K OHM 5%	R117	1
RD25VJ820X		CARBON FILM R.	0.25W 82 OHM 5%	R16 R3	2
RD25VJ821X		CARBON FILM R.	0.25W 820 OHM 5%	R135 R61	2
RD25VJ822X		CARBON FILM R.	0.25W 8.2K OHM 5%	R30	1
RGHANJ391B		M-OXIDE FILM R.	1/2W 390 OHM 5%	R157	1
RGHANJ561B		M-OXIDE FILM R.	1/2W 560 OHM 5%	R37	1
RPGNB10201		SEMI-FIXED VR.	1K OHM B-CURVE	RV4	1
RPGNB10301		SEMI-FIXED VR.	10K OHM B-CURVE	RV5 RV7	2
RPGNB20201		SEMI-FIXED VR.	2K OHM B-CURVE	RV12	1
RPGNB20301		SEMI-FIXED VR.	20K OHM B-CURVE	RV3 RV6 RV9	3
RPGNB20401		SEMI-FIXED VR.	200K OHM B-CURVE	RV10	1
RPGNB50101		SEMI-FIXED VR.	500 OHM B-CURVE	RV11	1

PART NAME	PART CODE
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PART CODE	STOCK NUMBER	PART NAME	SPECIFICATIONS	SYMBOLIC OR EXPLODED VIEW NO.	QTY USED
RPGNB50201		SEMI-FIXED VR.	5K OHM B-CURVE	RV2 RV8	2
RPJNB10101		SEMI-FIXED VR.	100 OHM B-CURVE	RV1	1
RX2ANJ180B		M-OXIDE FILM R.	2W 18 OHM 5%	R150	1
TBG28A004W		AF OPT		T16	1
TR10CA006T		RF COIL		T4 T8	2
TR10CB001S		RF COIL		T9	1
TR10CB003T		R.F.T.		T5	1
TR10CP006S		RF COIL		T6	1
TR10CZ003S		RF COIL		L7	1
TR10CZ004S		RF COIL		L13	1
TR10CZ005S		RF COIL		L11	1
TR10DB002S		RF COIL		T3	1
TR10LA021S		IFT		T14	1
TR10LA022S		IFT		T15	1
TR10MA013S		IFT		T10	1
TR10MA014S		IFT		T13	1
TR10MA015S		IFT		T11 T12	2
TR10MB003T		I.F.T.		T1	1
TR10MB005S		RF COIL		T2	1
TR10MP003T		RF COIL		T7	1
VK111SC001		SPACER			2
VS223RH002		SILICON SHEET			2
VS311XX001		BARRIER			1

PART NAME	PART CODE
P.W.BOARD ASSY.	APTBM0580A

PART CODE	STOCK NUMBER	PART NAME	SPECIFICATIONS	SYMBOLIC OR EXPLODED VIEW NO.	QTY USED
WDD8147002		COAXIAL CABLE		1	1
WDD8157004		COAXIAL CABLE		3	1
WDD8177004		COAXIAL CABLE		4	1
WDD8192002		COAXIAL CABLE		2	1
WUG113EEXX		HI-WRAP WIRE		27 33	2
WUG210EEXX		HI-WRAP WIRE		12 22	2
WUG213EEXX		HI-WRAP WIRE		21 30	2
WUG309EEXX		HI-WRAP WIRE		15 36	2
WUG313EEXX		HI-WRAP WIRE		26 32	2
WUG318EEXX		HI-WRAP WIRE		8	1
WUG411EEXX		HI-WRAP WIRE		20	1
WUG413EEXX		HI-WRAP WIRE		14	1
WUG415EEXX		HI-WRAP WIRE		25	1
WUG511EEXX		HI-WRAP WIRE		23	1
WUG513EEXX		HI-WRAP WIRE		18	1
WUG514EEXX		HI-WRAP WIRE		10 5	2
WUG520EEXX		HI-WRAP WIRE		42	1
WUG612EEXX		HI-WRAP WIRE		17 28	2
WUG615EEXX		HI-WRAP WIRE		9	1
WUG621EEXX		HI-WRAP WIRE		40	1
WUG623EEXX		HI-WRAP WIRE		6	1
WUG708EEXX		HI-WRAP WIRE		41	1
WUG715EEXX		HI-WRAP WIRE		13 7	2

PART NAME	PART CODE
P.W.BOARD ASSY.	APTBM0580A

PART CODE	STOCK NUMBER	PART NAME	SPECIFICATIONS	SYMBOLIC OR EXPLODED VIEW NO.	QTY USED
WUG816EEXX		HI-WRAP WIRE		19	1
WUG908EEXX		HI-WRAP WIRE		24	1
WUG915EEXX		HI-WRAP WIRE		11	1
WUG916EEXX		HI-WRAP WIRE		16	1
WYN004AAAA		STRANDED WIRE		35 37	2
XAS1B9001X		XTAL OSCILLATOR		X2	1
XAS1C1001X		XTAL OSCILLATOR		X1	1
XAZ1A8001X		XTAL OSCILLATOR		X3	1
YFL09C0001		FERRITE CORD			1
ZZZ0D00017		VCO OSC BLOCK		VCO	1

PART NAME	PART CODE
P.W.BOARD ASSY.	AP TLD045AA

PART CODE	STOCK NUMBER	PART NAME	SPECIFICATIONS	SYMBOLIC OR EXPLODED VIEW NO.	QTY USED
MW401CX001		SHORT JUMPER		J3 J4	2
MW401CX002		SHORT JUMPER		J6 J8 J9	3
MW401CX003		SHORT JUMPER		J5	1
MW401CX004		SHORT JUMPER		J1 J2	2
MW401CX005		SHORT JAMPER		J7	1
PTLD045C0X		PRINTED W.BOARD			1
QL#LN526RN		L.E.D.	LN526RA/PKRED 2.1V COM-K.	LED301	1
ZPB1681017		LAMP		PL1 PL2 PL3 PL4	6
				PL5 PL6	
ZZZ0000032		P.C. JOINT			1

PART NAME	PART CODE
P.W.BOARD ASSY.	AP TPW007EA

PART CODE	STOCK NUMBER	PART NAME	SPECIFICATIONS	SYMBOLIC OR EXPLODED VIEW NO.	QTY USED
CEAE101ALX		ELYT. CAPACITOR	100MFD 25V	C502	1
CET1F22201		ELYT. CAPACITOR		C501	1
CKDB103PEM		CERAMIC CAP.	0.01MFD 50V -0, +100% E	C504	1
CKDB223PEM		CERAMIC CAP.	0.022MFD 50V -0, +100% E	C503 C506	2
CKDB473ZFM		CERAMIC CAP.	0.047MFD 50V -20, +20% F	C505	1
MW201BS005		TERMINAL			4
PTPW007C0X		PRINTED W.BOARD			1
QDSGP25GXG		SILICON DIODE	GP25G 400V NO-RANK	D501 D502 D503 D504	4
QDZBZ162XJ		ZENER DIODE	BZ162 VR=14V 29MIN	ZD501	1
QDZRD56EAA		ZENER DIODE	RD5.6E 5.6-6.3V A-RANK	ZD502	1
QTC0900XBA		TRANSISTOR	2SC900 F-RANK	Q502	1
QTC0945AAA		TRANSISTOR	2SC945A P-RANK	Q501	1
RD12FJ101X		CARBON FILM R.	1/2W 100 OHM 5%	R503	1
RD12FJ122X		CARBON FILM R.	1/2W 1.2K OHM 5%	R505	1
RD12FJ221X		CARBON FILM R.	1/2W 220 OHM 5%	R501	1
RD12FJ470X		CARBON FILM R.	1/2W 47 OHM 5%	R502	1
RD12FJ821X		CARBON FILM R.	1/2W 820 OHM 5%	R504 R506	2
RPGNB501Q1		SEMI-FIXED VR.	500 OHM B-CURVE	RV501	1
ZFAQ3D202U		FUSE		F501	1
ZZZ0000004		FUSE CAP			2

PART NAME	PART CODE
P.W.BOARD ASSY.	APTSP017AA

PART CODE	STOCK NUMBER	PART NAME	SPECIFICATIONS	SYMBOLIC OR EXPLODED VIEW NO.				Q'TY USED
CCDB010CPM		CERAMIC CAP.	PK 1PF 50V -0.25, +0.25PF	C504				1
CKDB103PEM		CERAMIC CAP.	0.01MFD 50V -0, +100% E	C503				1
CKUB103NXY		CERAMIC CAP.	0.01MFD 50V -30, +30%	C501	C502			2
MW2018S003		TERMINAL						4
MW401CX002		SHORT JUMPER		J501	J502	J503		3
PTSR017C0X		PRINTED W.BOARD						1
QDG1N60XXT		GERMANIUM DIODE	NO-RANK	D501	D502			2
RD25TJ101X		CARBON FILM R.	0.25W 100 OHM 5%	R501	R502			2
RD25TJ222X		CARBON FILM R.	0.25W 2.2K OHM 5%	R503				1
RPPN810201		SEMI-FIXED VR.	10K OHM B-CURVE	RV501				1
ZRA134102U		RELAY		ZR1				1

PART NAME	PART CODE
P.W.BOARD ASSY.	APTSW0529A

PART CODE	STOCK NUMBER	PART NAME	SPECIFICATIONS	SYMBOLIC OR EXPLODED VIEW NO.				Q'TY USED
MW401CX001		SHORT JUMPER						1
PTSW052C0X		PRINTED W.BOARD						1
RAC182M07N		RESISTOR ARRY						2
SR2140603H		ROTARY SWITCH		SW				1

PART NAME	PART CODE
P.W.BOARD ASSY.	APTSW072AA

PART CODE	STOCK NUMBER	PART NAME	SPECIFICATIONS	SYMBOLIC OR EXPLODED VIEW NO.	QTY USED
CCCB271K0M		CERAMIC CAP.	270PF 50V -10, +10% SL	C722	1
CEAD470ALX		ELYT. CAPACITOR	47MFD 16V	C705 C706	2
CEAE3R3ALX		ELYT. CAPACITOR	3.3MFD 25V	C715	1
CEAE4R7ALX		ELYT. CAPACITOR	4.7MFD 25V	C701 C704	2
CEEG0R1ZMN		ELYT. CAPACITOR	0.1MFD 50V MS	C713	1
CQMB102KEH		MYLAR CAPACITOR	1000PF 50V -10, +10%	C703	1
CQMB103KEH		MYLAR CAPACITOR	0.01MFD 50V -10, +10%	C712 C716	2
CQMB123KEH		MYLAR CAPACITOR	0.012MFD 50V -10, +10%	C710	1
CQMB153KEH		MYLAR CAPACITOR	0.015MFD 50V -10, +10%	C709	1
CQMB223KEH		MYLAR CAPACITOR	0.022MFD 50V -10, +10%	C711 C714 C717	3
CQMB333KEH		MYLAR CAPACITOR	0.033MFD 50V -10, +10%	C708	1
CQMB822KEH		MYLAR CAPACITOR	8200PF 50V -10, +10%	C707	1
MW201BS003		TERMINAL			26
MW401CX001		SHORT JUMPER		J1 J2	2
MW401CX003		SHORT JUMPER		J4	1
MW401CX004		SHORT JUMPER		J3 J5	2
PTSW072C0X		PRINTED W.BOARD			1
QDG1N60XXT		GERMANIUM DIODE	NO-RANK	D702 D703 D704	3
QDSMA150XN		SILICON DIODE	MA150 VF=1.2V,VR=35V NO-RANK 24MIN	D701 D705	2
QTA0628XAE		TRANSISTOR	2SA628 F-RANK	Q704	1
QTC0900XBA		TRANSISTOR	2SC900 F-RANK	Q702	1
QTC0945AAA		TRANSISTOR	2SC945A P-RANK	Q703 Q705 Q706 Q707	4
QTC1312XAE		TRANSISTOR	2SC1312 G-RANK	Q701	1

PART NAME	PART CODE
P.W.BOARD ASSY.	APTSW072AA

PART CODE	STOCK NUMBER	PART NAME	SPECIFICATIONS	SYMBOLIC OR EXPLODED VIEW NO.	QTY USED
RD25TJ102X		CARBON FILM R.	0.25W 1K OHM 5%	R723	1
RD25TJ104X		CARBON FILM R.	0.25W 100K OHM 5%	R709	1
RD25TJ471X		CARBON FILM R.	0.25W 470 OHM 5%	R707	1
RD25TJ821X		CARBON FILM R.	0.25W 820 OHM 5%	R722	1
RD25VJ102X		CARBON FILM R.	0.25W 1K OHM 5%	R724	1
RD25VJ103X		CARBON FILM R.	0.25W 10K OHM 5%	R717 R718 R720	3
RD25VJ104X		CARBON FILM R.	0.25W 100K OHM 5%	R702 R710 R725	3
RD25VJ152X		CARBON FILM R.	0.25W 1.5K OHM 5%	R711	1
RD25VJ153X		CARBON FILM R.	0.25W 15K OHM 5%	R701 R703 R713	3
RD25VJ221X		CARBON FILM R.	0.25W 220 OHM 5%	R714	1
RD25VJ222X		CARBON FILM R.	0.25W 2.2K OHM 5%	R705	1
RD25VJ223X		CARBON FILM R.	0.25W 22K OHM 5%	R721	1
RD25VJ331X		CARBON FILM R.	0.25W 330 OHM 5%	R704 R715	2
RD25VJ332X		CARBON FILM R.	0.25W 3.3K OHM 5%	R706	1
RD25VJ682X		CARBON FILM R.	0.25W 6.8K OHM 5%	R708 R712 R719	3
SL0202067B		LEVER SWITCH		S5 S6 S7 S8 S9	5

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