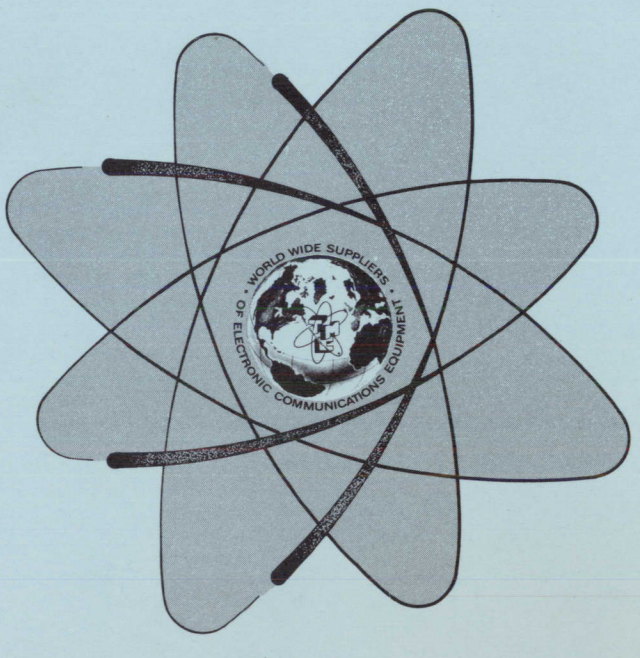
TECHNICAL MANUAL

for

SIDEBAND MULTI-CHANNEL EXCITER

MODEL SME-5C



THE TECHNICAL MATERIEL CORPORATION

MAMARONECK, N.Y. OTTAWA, ONTARIO

Printed in U.S.A.

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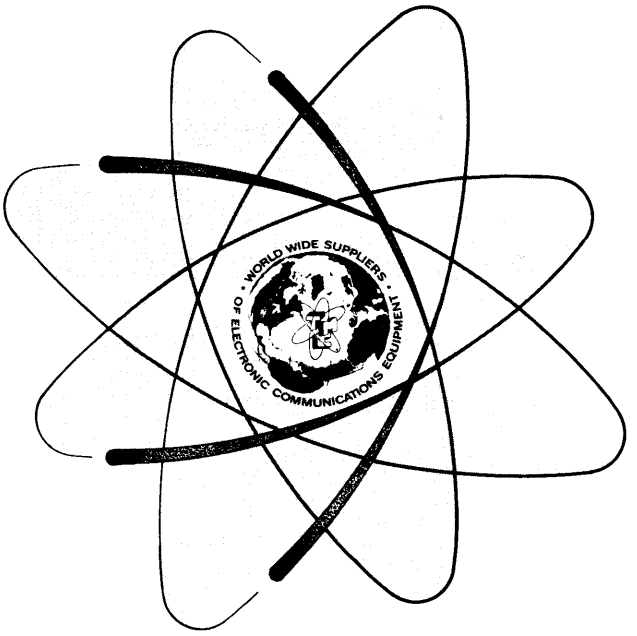

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IN Issue Date:

THE TECHNICAL MATERIEL CORPORATION
COMMUNICATIONS ENGINEERS
700 FENIMORE ROAD MAMARONECK, N. Y.

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2. That the defect is not the result of damage incurred in shipment from or to the factory.
3. That the equipment has not been altered in any way either as to design or use whether by replacement parts not supplied or approved by TMC, or otherwise.
4. That any equipment or accessories furnished but not manufactured by TMC, or not of TMC design shall be subject only to such adjustments as TMC may obtain from the supplier thereof.

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1. Model Number of Equipment.
2. Serial Number of Equipment.
3. TMC Part Number.
4. Nature of defect or cause of failure.
5. The contract or purchase order under which equipment was delivered.

PROCEDURE FOR ORDERING REPLACEMENT PARTS

When ordering replacement parts, the following information must be included in the order as applicable:

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2. TMC Part Number.
3. Equipment in which used by TMC or Military Model Number.
4. Brief Description of the Item.
5. The *Crystal Frequency* if the order includes crystals.

PROCEDURE IN THE EVENT OF DAMAGE INCURRED IN SHIPMENT

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All correspondence pertaining to Warranty Claims, return, repair, or replacement and all material or equipment returned for repair or replacement, within Warranty or otherwise, should be addressed as follows:

THE TECHNICAL MATERIEL CORPORATION
Engineering Services Department
700 Fenimore Road
Mamaroneck, New York

RECORD OF CORRECTIONS MADE

Change No.	Date of Change	Date Entered	Entered By

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SIDEBAND MULTI-CHANNEL EXCITER

Model SME-5C

Automated/Remote

1. INTRODUCTION

When the SME-5C exciter is used in a automated/remote controlled transmitter, the unit is modified. A printed circuit program board and associated wiring are added and two additional connections are made to J120. The exciter is then described as a Model SME-5C. The technical manual for the SME-5C Sideband Multi-Channel Exciter will apply to the Model SME-5C when the material in this addendum is incorporated. The wiring change for the addition of the program board is delineated on the schematic diagram (Figure 7-1) included in the manual.

2. PROGRAM BOARD

With the CHANNEL select switch (S4, Fig. 7-1) in the REMOTE position, 24 vdc is routed to the Extended Mode and Channel Select board A11 (Fig. 7-12). Here it actuates the appropriate relay when a particular channel is selected on the remote control. A 24 vdc signal is routed through the closed contacts of the relay to the added program board. The progarm board is so wired that the 24 vdc signal will actuate the band switches in the associated equipment properly positioning them to accommodate the frequency of the rf signal being generated on the specific channel.

The program board (A5615) is shown in addendum figure 1. The fine line connections in the illustration are on the reverse side of the board. From the illustration it will be seen that by strategic placement of jumper diodes from the vertical input terminal strips to the horizontal output terminal strips the bandswitch signal may be directed to the correct band for each channel frequency. The program board is factory wired to accommodate the frequencies specified by the customer.

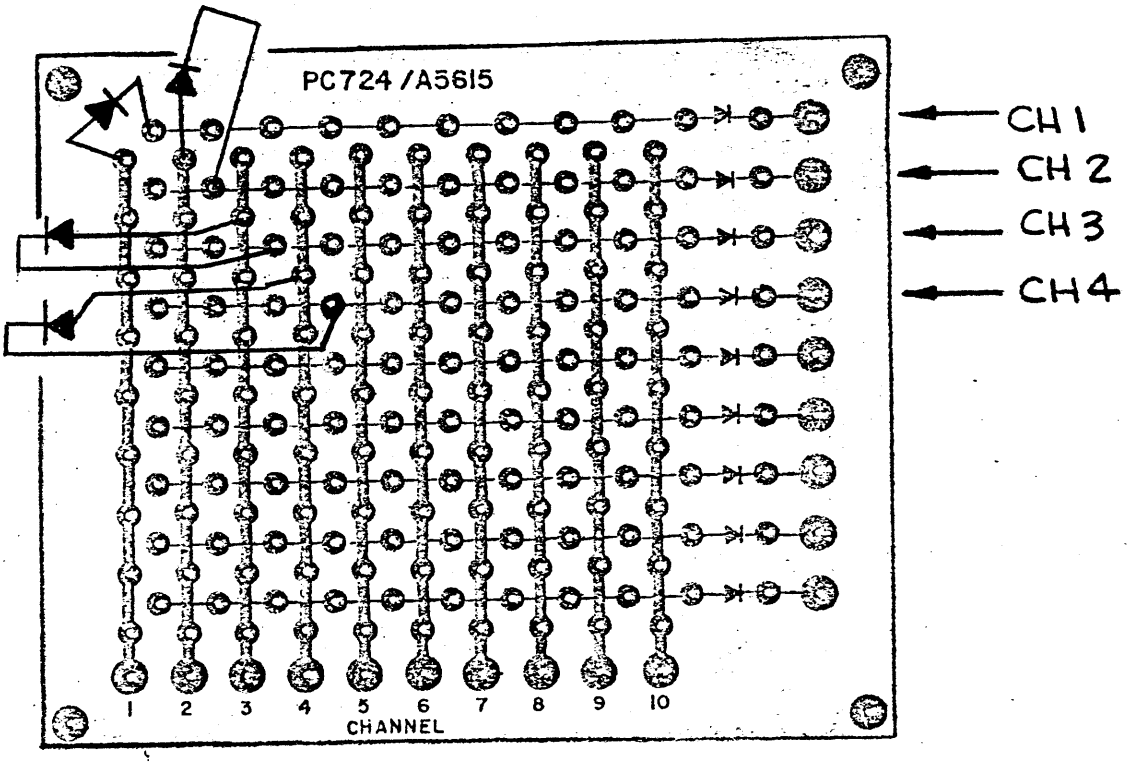

Figure 1

A5615 REMOTE PROGRAM ASSEMBLY		
REF SYMBOL	DESCRIPTION	TMC P/N
CR1 thru CR19	Semiconductor, Device, Diode	1N645

MULTICHANNEL EXCITER SME-5C

FIGURE 1-1

SECTION 1

GENERAL INFORMATION

1.1 FUNCTIONAL DESCRIPTION

The sideband multi-channel Exciter Model SME-5C (Figure 1-1) is a fully solid-state, four channel ISB Exciter with a frequency range of 2 to 26 MHz. It delivers up to 100 milliwatts PEP output power in the following modes: -

TYPE OF TRANSMISSION		CODE	REMARKS
Amplitude modulation equivalent (AME)		A3H	
Single sideband either upper or lower sideband.	(USB OR LSB)	A3J	

The SME-5C is designed to accept audio inputs from two (2) 600 ohm lines, a carbon microphone, a dynamic microphone (low Z and high Z). Two independent audio inputs may be provided for USB/LSB transmission. The SME-5C is capable of operating on any one of four preset channels within its frequency range. Operating frequencies are determined by tuned RF assemblies and oven-stabilized, crystal-controlled HF oscillators. The twelve available RF boards and their frequency ranges are listed in Table 1-1.

RF BOARD	FREQUENCY RANGE IN MHz
A10795-6	2 to 2.5
A10795-7	2.5 to 3
A10795-8	3 to 4
A10795-9	4 to 5
A10795-10	5 to 6
A10795-11	6 to 8
A10795-12	8 to 10
A10795-13	10 to 12
A10795-14	12 to 15
A10795-15	15 to 18
A10795-16	18 to 21
A10795-17	21 to 26

Table 1-1 RF Board Frequency Ranges

Optional Facilities can be provided for: -

1. EXTENDED LINE SELECT - By addition of a PC board, the functions of the LOWER SIDEBAND switch S1 and/or the UPPER SIDEBAND switch S2 can be extended for remote control.

2. EXTENDED MODE & CHANNEL SELECT - By addition of a PC board the functions of MODE switch S3 and the CHANNEL switch S4 can be extended for remote control. Since this option requires additional wirings, this should be factory installed.

The components supplied as loose items with the SME-5C are listed in Table 1-2.

NAME	DESIGNATION	FUNCTION	QTY.
Service Extension Board Assembly	A10869	Aid in maintaining procedures for the RF Boards.	1
Terminal Strip	TM105-9-AR	Connection strip for TB1 thru TB3.	3
Connector	MS3106A-16S-5S	Mating connector for J14	1
Connector	UG88	Mating connectors, J126 (EXT IF), J127 (ALDC), and J128 (RF OUT)	3
Clamp	MS3057-8	Strain relief for the power cable	1
Connector (provided when option fitted)	MS3102-28-11P	Mating connector for J119 (remote control)	1
Connector	MS3102-20-27P	Mating connector for J120	1

Table 1-2 Loose Items Supplied with the SME-5C

1.2 PHYSICAL DESCRIPTION

The SME-5C is designed for track-slide mounting in a standard nineteen-inch rack. All the operator's controls are mounted on the front panel of the unit. The remaining controls and all connectors and terminal strips are located on the rear panel.

The majority of the electronic components are mounted on printed circuit boards that plug into connectors on the main chassis. The remainder are chassis mounted.

1.3 TECHNICAL SPECIFICATIONS

Frequency Information

Range:	2.0 to 26 MHz
Presentation:	Channel Selector switch 1-4
Stability:	Temperature controlled crystal oscillators for Max Deviations of ± 10 Hz from 0°C to 50°C

Power Distortion & Noise

Power Output:	0 to 100 mw PEP
Output Impedance:	50 ohms nominal unbalanced.
Intermodulation Distortion:	At least 40 db below either tone of a two tone test at 100 mw PEP output.
Spurious Signal:	Better than 50 db down at full PEP output.
Harmonic suppression:	2nd order at least 45 db below full PEP
Hum & Noise:	Better than 50 db down at full PEP

Operational

Modes:	AME, USB, LSB
Tuning:	4 preset crystal controlled channels, covering any frequency in the range 2.0 to 26 MHz.
Metering:	Built-in meter permits monitoring of USB and LSB audio input levels.
ALDC:	Automatic Load & Drive Control accepts 0 to -11 volts d.c. from ALDC circuit of associated linear to deliver a relatively constant RF output level during high modulation peaks.

Carrier Insertion:	Level of carrier is continuously variable from 0 to -45 db, on AME.
Audio	
Response, sideband filters	Standard 300-3000 Hz ±1.5 db Other bandwidths can be supplied as a customer option.
Input Line:	Dual inputs - 20 to 10 dbm at 600 ohms balanced or unbalanced.
Microphone Input Control:	Microphone selection via USB or LSB switch control, for high and low impedance dynamic microphones or carbon microphone.
Installation & Environmental Data	
Environmental:	0°C TO 50° UP to 90% humidity.
Storage:	-40°C TO 85°C, 95% humidity
Size:	5-¼ inches (13.3 cm) high x 19 inches (48.25 cm) wide x 18 inches
Weight:	30 lbs. (14 kg.)
Primary Power:	110/220 volts, 50/60 Hz.
Component & Construction:	All equipment manufactured in accordance with JAN/MIL specifications, wherever practicable.

SECTION 2

INSTALLATION

2.1 UNPACKING AND HANDLING

The SME-5C is tested at the factory prior to shipment. When the SME-5C is received at the operating site, inspect container and contents for possible damage in transit. The equipment supplied with the SME-5C (Table 1-2) is packed in the box as loose items.

With respect to damage to the equipment for which the carrier is liable, TMC (Canada) Limited will assist in describing methods of repair and furnishing of replacements parts.

2.2 POWER REQUIREMENTS

The SME-5C is designed for 110/220 vac, 50/60 Hz single phase power operation. Unless specifically ordered, the unit is wired for 110 vac operation. To change to 220 vac operation, remove straps 1-3 and 2-4 on the power transformer, strap terminals 2-3, and connect AC wiring to terminals 1 and 4 (See figure 7-1).

2.3 MECHANICAL INSTALLATION

The SME-5C should be mounted in a location that will allow sufficient clearance for making connections to the rear panel and provide access to the operating controls on the front panel.

2.4 ELECTRICAL INSTALLATION

All electrical connections between the exciter and associated equipment are made at the rear of the unit (Figure 2-1). Table 2-1 lists the function of each input connection. Connector J119 is provided for connections of remote control options (See figure 7-1 for connections).

Panel Designation	Function
J14 (Power)	Power input for 110 vac or 220 vac line power.
J119	Optional input connector for remote control operation.
J120	Band Select outputs.

Table 2-1 Rear Panel Connections

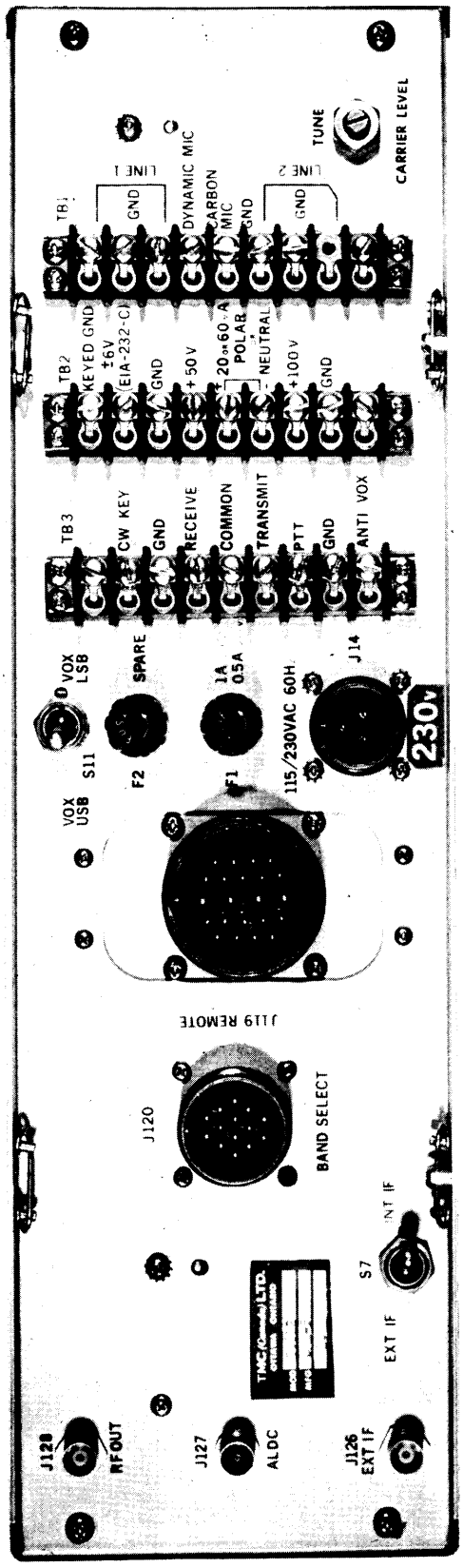

Figure 2-1, SME-5 REAR PANEL

Panel Designation	Function
J127	ALDC input from an associated linear amplifier to deliver a relatively constant RF output level during high modulation peaks.
J128	RF output, connector
TB1 Audio Inputs	
1, 2 -3	600 ohm balanced input line 1
4	Dyanmic Mike input
5	Carbon Mike input
6	GND
7-9	600 ohm balanced input line 2
TB2	
-1	Keyed ground connection
-2	±6V (EIA-232-C) input
-3	GND
-4	+50V
-5, -6	20 or 60 mA Polar or Neutral
-7	+100V
-8	GND
TB3	
-2	CW Key
-3	GND
-4, -5, -6	External control from PTT relay

Table 2-1 Rear Panel Connections (cont'd)

Panel Designation	Function
-8	GND
-7	PTT
-9	ANTI-VOX

Table 2-1 Rear Panel Connections (cont'd)

2.5 PERFORMANCE CHECK

After the SME-5C has been installed and all electrical connections have been made, it should be checked for proper operation. It is recommended that the operator should read Section 3 before proceeding with this check. For front panel controls refer to figure 3-1.

(a) With power switch S10 to its off position disconnect the RF output cable from J128 and connect a dummy load (47 ohm, ½ watt resistor) to it. Connect an oscilloscope across the dummy load. Switch on the primary power and carry out following for each channel: -

(b) Turn the LOWER SIDEBAND switch to OFF.

(c) Select the SUPP CARR mode. (SSB)

(d) Using the UPPER SIDEBAND switch, select LINE 1. With a line 1 audio input of -20dbm and the push-to-talk switch closed (or terminal 7 on TB3 grounded), check for the presence of an output signal on the oscilloscope. Repeat for all microphone and line inputs, setting the UPPER SIDEBAND switch to the appropriate position.

(e) Select in turn AME mode. Repeat step (d).

(f) Turn the UPPER SIDEBAND switch to OFF.

(g) Repeat steps (C) to (E) using the LOWER SIDEBAND switch to select the audio input.

(h) Turn the LOWER SIDEBAND switch to OFF.

SECTION 3

OPERATOR'S SECTION

3-1. CONTROLS AND INDICATORS

Before attempting to operate the SME-5C, the operator should become familiar with the controls and indicators of the unit. Table 3-1 gives the designation and a brief description of the function of each control and indicator.

DESIGNATION	FUNCTION
LOWER SIDEBAND switch (S1)	Selects the audio input for LSB operation; REMOTE, OFF, LINE 1, LINE 2, MIC/KEY.
UPPER SIDEBAND switch (S2)	As above for USB audio input.
MODE switch (S3)	Selects the mode of operation: SSB, AME
CHANNEL SELECT switch (S4)	Selects one of the available operating frequencies (1 to 4 channels), or REMOTE control of both channel and mode selection when this option is provided.
USB/LSB switch (S9)	Connects audio metering circuit to USB or LSB.
ON/OFF switch (S10)	Primary power switch.
LSB LEVEL control (R3)	Adjusts audio level to line amplifier.
USB LEVEL control (R4)	Adjusts audio level to line amplifier.

Table 3-1 SME-5C Controls and Indicators (continued)
See Figure 3-1 for pictorial representation.

DESIGNATION	FUNCTION
POWER Lamp (DS2)	Lights when primary power is present and S10 is ON.
PTT Lamp (DS1)	Lights when PTT circuit is activated.

Table 3-1. SME-5C Controls and Indicators (cont'd)

3.2 OPERATING PROCEDURES

This general operating procedure is given to aid the operator in the correct use of the controls.

(a) Turn on the primary power (S10).

(b) Select the desired operating frequency by setting the CHANNEL SELECT switch to one of channels 1 to 4.

(c) Select the desired mode of operation by setting the MODE switch to SSB (single sideband), AME (AM equivalent).

(d) For USB (upper sideband) operation, set the UPPER SIDEBAND switch for the desired audio input; LINE 1, LINE 2 or MIC/CW.

(e) For LSB (lower sideband) operation, set the LOWER SIDEBAND switch for the desired audio input.

(f) To activate the SME-5C on PTT (push-to-talk): press the PTT switch on the microphone or ensure that terminal 7 on TB-3 is grounded.

NOTE

The PTT relay must be released when changing channels.

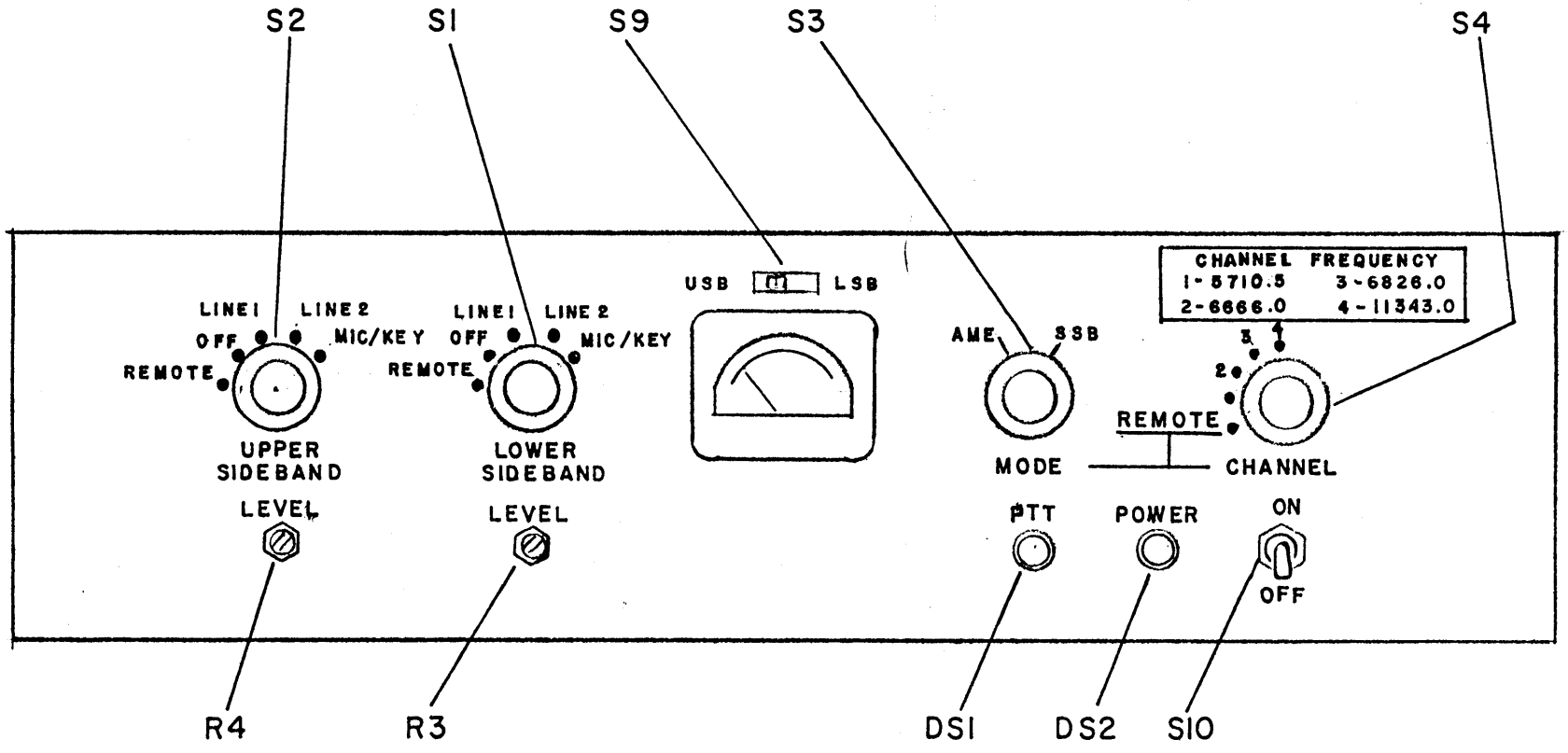

FIGURE 3-1, CONTROLS AND INDICATORS

SECTION 4

PRINCIPLES OF OPERATION

4.1 GENERAL

A simplified functional block description of SME-5C is given in para 4.2, followed by circuit description of individual modules as detailed below. The schematic diagrams of each section are given in Section 7.

Para 4.3 Power supply section

4.4 Audio inputs and circuits

4.5 IF circuits

4.6 Mixer/Doubler

4.7 HF Oscillator

4.8 RF Amplifier

4.9 Wideband Amplifier

4.11 Extended line select

4.12 Extended mode and channel select

4.2 FUNCTIONAL BLOCK DESCRIPTION OF SME-5C (Figure 4-1)

The principles of operation of both LSB and USB are identical. For ease of explanation only LSB operation is described. When following the USB operation, LSB switch S1 is replaced by USB switch S2. Audio input from an external source is fed through input filter A17 to the primary of transformer A20T1. The output is taken at the potentiometer A20R6 and fed to the LSB input selector switch S1. S1 routes the selected input through LSB LEVEL adjust potentiometer R3 to the transformer A20T2. The output of the transformer A20T2 is fed to the IF board A9. This output is also fed to a metering circuit A7, through meter switch S9. The meter M1 is mounted on the front panel and enables the operator to set the correct audio level. The IF board is a modulator-oscillator. It combines the audio signal with the local oscillator frequency of 1750 KHz. The modulated output of the IF board is fed to the mixer doubler A13. The mixer-doubler is controlled by channel switch S4. It doubles, under certain conditions, the input signal from the HF oscillator A12 and mixes it with the intermediate frequency supplied by the IF board A9. The HF oscillator is also controlled by channel switch S4. The output of the mixer-doubler A13 can be any one of the 4 channel frequencies selected by channel switch S4. The selected output of A13 is fed to the appropriate section of RF amplifier A14. The RF amplifier A14. The RF amplifier consists of four boards, only one of which is operative at a time as determined by the channel switch. The output of the RF amplifier is fed to the wideband amplifier A15, which delivers the maximum RF output of 100 mw PEP into a 50 ohm load.

The carbon microphone, the dynamic microphone input or the CW input, when selected are fed through an AF amplifier and oscillator board A20. The

output of A20, a 1000 Hz or compressed AF signal at a level of -20 dbm to +10 dbm is coupled to A9 as an audio input.

Extended line select board A5 is provided for remote control of the unit. When S1/S2 is in REMOTE position, +12 volts is supplied to the relay in A5 which in turn routes the selected input for transmitting in the usual manner.

Extended mode and channel select A11 (optional) is provided for selection of channel and/or mode from remote location. This board operates when S4 is in REMOTE position.

The unit can be operated from 110/220 volts ac. The power supply section consists of a transformer, a rectifier, and a regulator. The regulated supplies required for operation of SME-5C are +24 vdc and +12 vdc.

4.3 POWER SUPPLY SECTION (Figure 7-1 and Figure 7-2)

SME-5C can operate from 110/220 vac power source. Changeover from 110 vac or vice versa can be made by simple modification of the input power transformer wiring and changing of the fuse value. The rating of the fuse required for 220 vac operation is half of that required for 110 vac operation. AC power source is coupled to power connector J14. AC power supply from J14 is applied to the primary of transformer T1 through fuse F1, and switch S10. The output at the secondary of T1 is rectified by bridge rectifier CR2 and then smoothed by electrolytic capacitors C2, C3 and C4. This unregulated dc supply is applied to the regulator board A10. Transistor Q1 and transistor A10Q1 form a darlington pair and provide the voltage and current regulation. Transistor A10Q2 and Zener diode A10CR1 form a voltage level. The output at the emitter of Q1, a +24 volts regulated dc supply is applied to the various SME-5C circuits. +12 volts regulated supply is obtained from the 24 volts regulated supply through a dropping resistor R20 and regulating Zener diode CR5.

4.4 AUDIO INPUTS AND CIRCUITS

Audio inputs and circuits are explained in the following sub-paragraphs.

4.4.1 AF AMPLIFIER AND OSCILLATOR A20 (Figure 7-1 and Figure 7-3)

AF amplifier and oscillator A20 produces a 1000 Hz or compressed AF signal at a level of -20 to +10 dbm from a CW key input, a carbon microphone input or a dynamic microphone low Z or high Z input. In addition to the amplifier and oscillator circuits, it also contains level adjust potentiometers and line transformers.

When a carbon microphone is used, the signal is coupled through the input filter A17 to pin 2 of A20. Link 1 must be strapped on the printed circuit board, and link 2 must be open. The signal is then coupled to the gate of preamplifier A20Q2, through coupling capacitor A20C9, isolating resistor A20R11 and input level adjust potentiometer A20R14. The amplified signal is coupled through A20C12 to the input of gain controlled amplifier A20A2. The amplified signal at pin 5 of A20A2 is coupled through output at pin 2 of A20Q3 is fed through the agc level control potentiometer A20R19 to the input of agc generator A20A3. A20A3 is an agc generator which generates

a suitable agc voltage directly from the audio signal. In addition it provides a 'hold' period to maintain the agc level during pauses in speech, and is immune to noise interference. The agc voltage produced in A20A3 is a feedback potentiometer and sets the gain of A20A4. The amplified signal is coupled through A20C26 to pin 5 as compressed audio output at a level of -20 to +10 dbm. A20CR4, A20CR5 and associated components form a clipping circuit to prevent the accidental overloading of the transmitter. Clipping level is set by clipping level adjust potentiometer A20R37. The output signal at pin 5 of A20 is fed to the AF board A9 as audio input through front panel LSB/USB switch S1/S2.

When dynamic microphone low Z or high Z input is used, signal is coupled through the input filter A17 to pin A of A20. Link 1 for carbon microphone input is removed from its terminals and link 2 is connected to low Z microphone input terminals. For a high Z input neither of the two links are connected. The signal is then transmitted to the output pin 5 of A20 in the same manner as carbon microphone input.

A20T1 through A20T4 are audio transformers, two for LSB operation and two for USB operation. Line audio is connected through input filter A17 to the primary of A20T1 (A20T3). The output at the secondary of A20T1 (A20T3) through level adjust potentiometer A20R6 (A20R7) is fed to the LINE 1 (LINE 2) position on LSB (USB) LSB (USB) level potentiometer R3 (R4) and A20T2 (A20T4) to the input of IF assembly A9, as audio input.

4.4.2 METERING CIRCUIT A7 (figure 7-4)

Meter switch S9 connects either LSB or USB to the metering circuit A7. A7 is an amplifier detector. The signal is coupled to the base of A7Q1. The amplified output at the collector of A7Q1 is detected by diodes A7CR1 and A7CR2. The detected output a relative amplitude of the LSB or USB signal is monitored on the front panel meter M1. The potentiometer A7R5 provides the means of calibrating the meter M1.

4.5 IF BOARD - A9 (Figure 7-5)

NOTE

All 1800 series components are mounted on IF board A9.

Two balanced modulators, CR1801 - CR1804 and CR1805 - CR1808, combine the USB and LSB signals with the 1750 KHz signal from oscillator Z1801. RF switches Q1805 and Q1806 control the insertion of the oscillator signal. When the UPPER SIDEBAND switch S2 is in the OFF position, +12 volts is connected through wafer B of S2 to the IF board pin 5 to bias Q1805 off so that 1750 KHz is not inserted across modulator CR1805-CR1808, and the modulator output will not pass USB filter FL1802. For any but the OFF position of S2, the +12 volt supply is disconnected from Q1805. As a result, Q1805 conducts, inserting the 1750 KHz signal, and the frequency of the output from the modulator is then within the bandpass of FL1802 (1747.0 to 1749.7 KHz). Similarly, when the LOWER SIDEBAND switch S1 is in the OFF position, +12 volts is connected through wafer B os S1 to bias off Q1806, the 1750 KHz is not inserted across modulator CR1801-CR1804, and the output from the modulator does not pass LSB filter FL1801. For other positions of S1, +12 volts is not applied to Q1806, it conducts, 1750 KHz is inserted across the modulator, and the output is within the bandpass of FL1801 (1750.3 to 1753.0 KHz). The audio modulated IF signals

are amplified by 1st and 2nd IF amplifiers Q1801 and Q1802.

For operation, AME, it is necessary to insert carrier from oscillator Z1801 and 2nd IF amplifier Q1802. The amount of carrier inserted is controlled by carrier switch Q1807 and variable resistor R7. In AME the voltage set by R7 is similarly provided through S3 and CR3 to bias Q1807 on and determine carrier. In suppressed carrier and CW modes, Q1807 is biased off by +12 volts supplied through S3 and CR3.

Crystal Y1801 and capacitor C1813 form a notch which removes any undesirable carrier from the output of 2nd IF amplifier Q1802 during CW and suppressed carrier operations. Notch switch Q1808 disables Y1801 in the AME mode. When the carrier control input on terminal 7 is +12 volts, notch switch Q1808 is biased off, and the operation of Y1801 is not affected. An ALDC signal at terminal 9 on the IF board is connected to 2nd IF amplifier Q1802 through buffer Q1804 and ALDC amplifier Q1803. This signal reduces the IF output resulting from high level audio inputs, to prevent overloading the RF stages. It is a delayed signal derived from a portion of the RF output of a linear amplifier.

4.6 MIXER DOUBLER A13 (Figure 7-6)

The mixer doubler assembly A13 may be divided into three sections for explanation:

4.6.1 Programmer

4.6.2 Frequency doubler

4.6.3 Mixer

4.6.1 The programmer section controls power switching to the RF amplifiers, the HF oscillators, and the frequency doubler, depending on the channel selected and the programme strapping on this board. The CHANNEL switch S4 extends +24 volts to the appropriate terminal on the mixer doubler board for each channel selected. Using Channel 1 as an example, +24 volts is fed via RF filter A13L1/A13C1 and terminal 25 to the Channel 1 RF amplifier; via A13R1 and terminal 17 to terminal 33, 36 or 37 via the programme straps. Below 20 MHz the frequency doubler is not required and the terminals 17 and 33 are strapped. Between 20 MHz and 26.75 MHz, the frequency doubler is required. A13R13 is preset to provide a control voltage to A13CR14 for an output of frequency in the range of 20 - 26.75 MHz. To provide supply voltage to this circuit terminals 17 and terminals 36 are strapped to include A13R17 to provide the required preset voltage to A13CR14. Similarly strapping is made for each of the eight channels depending on frequency.

4.6.2 The frequency doubler consists of transistor A13Q1 and its bias circuitry. Inductor A13L10 and vari-cap A13CR14 form the high Q resonant collector load which is tuned to the required frequency band 20 - 26.75 MHz or 26.75 - 30 MHz by the pre-set potentiometers A13R13 and A13R17 respectively. A13Q3 is a buffer stage for the frequency doubler and A13Q2 is a buffer for signals not routed through the doubler path.

4.6.3 The gate of mixer A13Q4 receives the signal from either A13Q2 or A13Q3. The mixer load is transformer A13T1. The IF frequency is injected into the centre-top of the secondary of A13T1 switched by diodes A13CR16 and

and A13CR17. Potentiometer A13R29 and pre-set capacitor A13C27 are adjsuted to balance out the HF carrier frequency. The RF output is routed to RF amplifiers vai pin 41.

4.7 H.F. OVEN OSCILLATOR A12 (Figuree7-7, 7-8)

The HF oven oscillator consists of eight peparate oscillator circuits with common buffer stages, all housed in a temperature controlled oven. The oven control circuit A12A1 consists of thermistor A12A1RTT101 drivers A12A1Q101 and A12A1Q102 and heater transistor A12A1Q103.

Only one oscillator circuit is switched on, controlled via the programmer section of the Mixer/Doubler assembly A13 by CHANNEL switch S4.

Crystal frequencies are determined as follows: -

2 - 20 MHz $f_x = f_R + f_I$

20-30 MHz $f_x = f_{\frac{R}{2}} + f_I$

Where f_x = crystal frequency

f_R = Desired Receive Signal (Carrier Frequency)

f_I = 1750 KHz (the IF frequency)

4.8 RF AMPLIFIER A14 (Figure 7-9)

The RF signal from the Mixer/Doubler is paralleled to the inputs of up to eight RF amplifier assemblies. Only one RF amplifier is energized with +24 volts as determined by the position of Channel Switch S4 via the programme section of the Mixer/Doubler. The RF signal is amplified by stages A14Q1, 2 and 3. The basic RF amplifier assemblies are common, the operating frequecy band is determined by components A14C2, 4, 9, 15 and A14T1, 2, 3, 4. Frequency bands are detailed in Table 1-1, page 1-3.

4.9 WIDEBAND AMPLIFIER A15 (Figure 7-10)

The output of the RF amplifier is amplified in a wideband amplifier A15. A15 is a class "A" two stage amplifier with an input and output impedance of 50 ohms. A15T1 and A15T2 are wideband transformers. A15R4 adjusts the base current of the second stage A15Q2 to obtain the maximum linear response. The wideband amplifier delivers a maximum RF output of 100 mw PEP in 50 ohms load.

4.10 EXTENDED LINE SELECT (Ref. Figure 7-11)

The extended line select is used for remote control operation of USB/LSB inputs. This is accomplished by 2D2T contacts of K1 relay.

12 vdc is routed from terminal P (A5) to terminal 6 of A9 card (IF board). This voltage is used to turn OFF LSB operation. When K1 is energized 12V is then routed to terminal 5 of A9 card to turn OFF USB. The audio inputs are also controlled by K1 contacts and appear at terminals L, C, and H.

A ground signal from remote control is routed to terminal E (A5 card) for LSB operation. This ground turns OFF Q1 transistor thus Q2 is turned on energizing K1 relay.

For added reliability in the event of remote failure such as broken audio lines, SSB selection will automatically program USB (priority).

4,11 EXTENDED MODE AND CHANNEL SELECT A11 (Ref. Figure 7-12)

This pc card is used to remotely control channel operation and mode (AME, SSB). When channel switch on the SME-5C (S4) is switched to remote position +24v is applied to terminal 10 of A11 card, +24v is removed from local channel operation and will now be controlled by contact closures of K1, K2. AME voltage control is also routed thru terminal N of A11 card for remote AME or SSB operation.

Remote control of channel and mode are accomplished by ground signals supplied from the remote, both channel and mode are arranged to provide priority channel and SSB control in the event of remote failure (broken wire, etc.). Channel one is programmed automatically when ground signals are removed from terminals 4 (CH2), 5 (CH3) and 6 (CH4) SSB mode is automatic when ground is removed from terminal 12, 3. When ground is applied to base of Q5 transistor it is turned OFF thus turning ON Q4 transistor. This in turn energizes K1 relay allowing +24v to appear at terminal D (CH2). CH3 is controlled the same way turning OFF Q5 and allowing Q6 to energize K2 relay. Channel 4 operation is identical except Q8 transistor controls both K1, K2 relays thru CR3, and CR4.

RELAY CONTROL

Channel	K1	K2	+24 voltage Control
1	OFF	OFF	Terminal E
2	ON	OFF	Terminal D
3	OFF	ON	Terminal C
4	ON	ON	Terminal B

When terminal 3 is ungrounded Q1 transistor is conducting to ground and Q2 is turned OFF. Voltage at collector thru resistor divider R3, R9 is allowed thru CR2 to terminal N, (SSB Mode).

When terminal 3 is ungrounded (AME) Q1 is turned OFF and Q2 is turned ON. Voltage at R3 is grounded and voltage across resistors R4, R5 (AME Adjust R5) is present at terminal N. This voltage will now be controlled by R5 potentiometer from 0 to +24V.

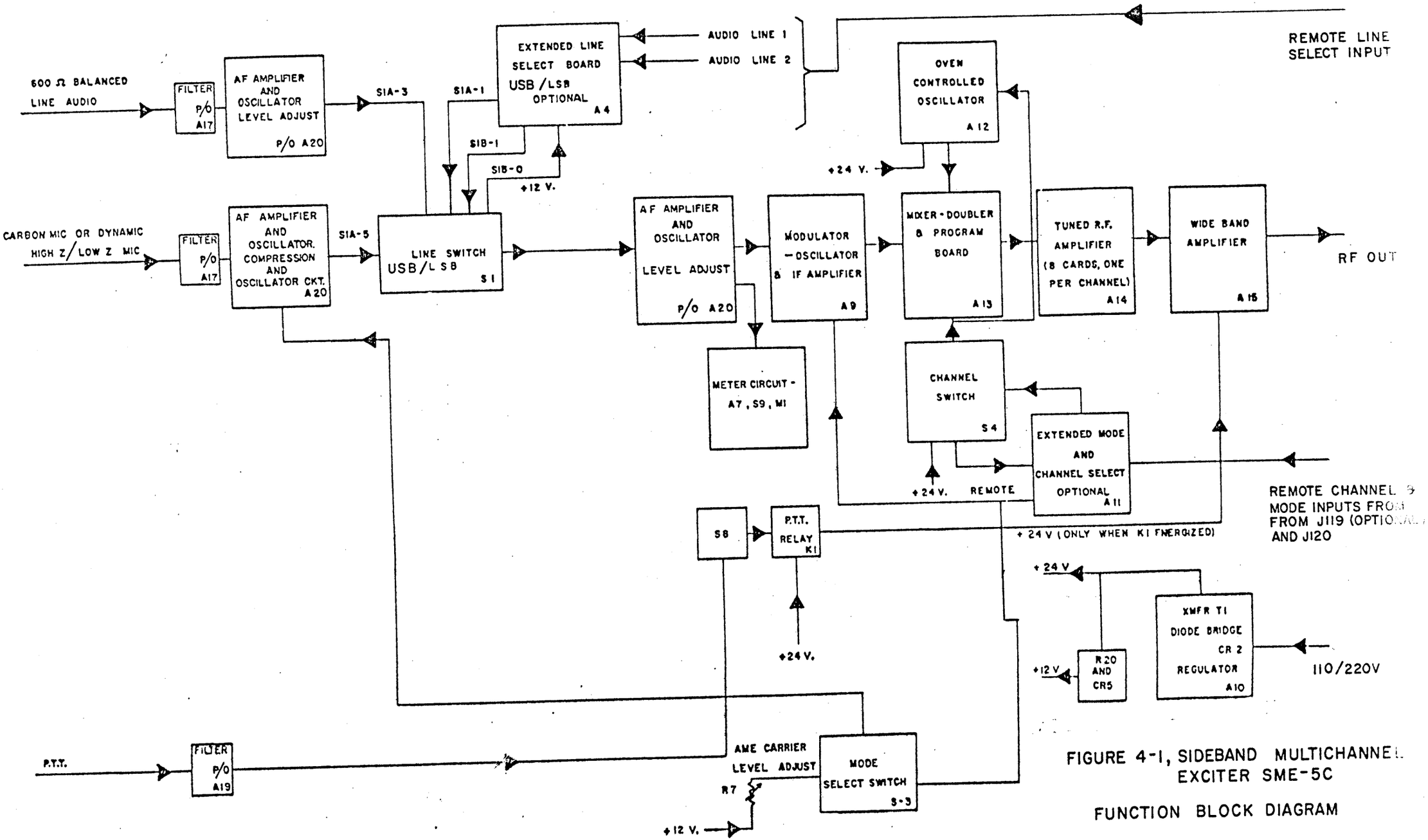

FIGURE 4-1, SIDEBAND MULTICHANNEL EXCITER SME-5C

FUNCTION BLOCK DIAGRAM

SECTION 5

MAINTENANCE

5.1 PREVENTIVE MAINTENANCE

Preventive maintenance of the SME-5C consists of routine inspection and cleaning. Cleaning is necessary because dust may accumulate on certain components and not only reduce efficiency of the exciter, but also increase component wear. Either a vacuum cleaner or a compressed air hose is the quickest and most effective method of cleaning the unit.

Visually checking the unit when it is opened for cleaning can prevent down-time to component failure. Often a deteriorating component will look bad before it actually affects the operation of the unit. Some indication of trouble are: discoloured components, leaking transformers and capacitors, dirty or pitted switch and relay contacts, warping printed circuit boards, and damaged wiring. Any components found in this condition should be replaced. In addition, all hardware should be checked for tightness.

5.2 TROUBLESHOOTING (For location of components. See figures 5-1 to 5-10).

(1) POWER SUPPLY SECTION

(a) When the primary input power is supplied and power ON/OFF switch S10 is switched ON, the POWER lamp (DS2) should come on. If it does not, check fuse F1. If it is intact, check the lamp DS2, transformer T1 and diode bridge CR2.

(b) Check for +24 volts at the emitter of Q1. If no voltage present, check Q1 and the regulator board A10. If the voltage measured at the emitter of Q1 is different from the required +24 volts, adjust potentiometer R4 on A10 to obtain the required voltage.

(c) Check for +12 volts at the cathode of CR5. If no voltage present or voltage is not as specified, check zener diode CR5.

(d) If there is a repeated failure of the fuse F1, check for a short circuit in the +24 volts line.

(2) AUDIO INPUTS AND CIRCUITS

(a) With the power supply switched OFF, disconnect all external wiring from TB1, 2 and 3.

(b) Disconnect RF cable from J128. Connect a 47 ohm 1/2W fixed carbon composition resistor across J128.

(c) Connect a two tone audio generator across terminals 2 and 4 of TB1 and adjust its output for a level of -20 dbm. Adjust R6 potentiometer on A20 for a maximum signal level out on pin S of A20. If there is no measurable audio output on pin S, check transformer T1 and resistor R6 on A20.

(d) Turn USB switch to OFF and LSB switch to LINE 1. Adjust LSB LEVEL potentiometer for a measurement of approximately -20 dbm audio level at pin 1 and 2 of IF board A9. If there is no audio present, check R3, LSB LEVEL potentiometer and transformer T2 on A20.

(e) Repeat steps (a) to (d) on the upper side band signal path.

(3) METERING CIRCUIT A7

(a) Set meter switch S9 to LSB.

(b) With -20 dbm at pins 1 and 2 of the IF board A9, adjust R5 potentiometer on the meter board A7 for a reading of 0 dbm on the red scale of the front panel meter. If the meter shows no deflection, check the amplifier Q1 and voltage doubling diodes CR1 and CR2 on A7.

(4) IF BOARD A9

(a) Turn LSB to LINE 1 and USB to OFF.

(b) With -20 dbm of audio at pins 1 and 2 of the IF board check for a two tone IF signal at pin 8. Adjust R1813, C1806 and C1813 for maximum carrier rejection. Adjust C1812 for maximum output. The carrier rejection should be at least 50 db and the output 500 mv peak to peak. If these conditions are not met, check modulation diodes CR1801-CR1804 and IF amplifiers Q1801 and Q1802.

(c) Repeat steps (b) above for the upper sideband.

(5) HF OVEN A12

(a) Connect a frequency counter across terminal 34 of mixer doubler board A13.

(b) Set CHANNEL SELECT switch to Channel 1. Check that the frequency as measured on the counter is same as marked on the crystal Y11. If no output is observed, check oscillator circuit (Q11 and Y11) and buffer amplifiers Q101 and Q102.

(c) Repeat steps (b) above for channel 2 through 8 in turn.

(6) MIXER-DOUBLER BOARD A13

(a) Connect a two tone balanced audio signal at terminals 1 and 3 of TB1.

(b) Turn MODE switch to SUPP CARR, LOWER SIDE BAND switch to LINE 1 and UPPER SIDE BAND switch to OFF.

(c) Connect a ground to terminal 7 of TB2.

(d) Select a channel whose operating frequency is below 20 MHz. Check for +24 volts on pin 38 and pins 1, 3, 5, 7, 9, 11, 13 or 15 of A13 depending on the channel selected. Check also for approximately +18 volts on pins 2, 4, 6, 8, 10, 12, 14 or 16 depending on the channel selected. If these requirements are not met, check wiring to the board A13.

(e) Check for correct programme jumpers from pins 17 through pin 24 to pins 33, 36 or 37. (See paragraph 4.6 for details).

(f) Check for the presence of the HF oven signal at the drain of Q2. If no signal is observed check Q2 and associated buffer components.

(g) Connect an oscilloscope at terminal 41. If no RF signal is observed, check CR16, CR17 and Q4.

(h) Select a channel with an operating frequency of between 20 and 26.75 MHz. Check for +24 volts at pin 36. If no voltage is present, check jumper connections (see paragraph 4.6 for details).

(i) Connect an oscilloscope with X10 probe at the gate of Q4. Check for a signal equivalent to the second harmonic frequency of the crystal frequency. Adjust R13 to give a clean signal. If no signal is present, check Q1, Q3 and CR14.

(j) Repeat step (g).

(k) Select a channel with an operating frequency of 26.75 to 30 MHz. Check for +24 volts on pin 37. If no voltage is present, check jumper connections (see paragraph 4.6 for details).

(l) Repeat step (i) and then (g).

(7) RF STAGES A14 AND WIDEBAND AMPLIFIER A15

(a) With the audio generator set to deliver a line 1 input as in paragraph (6) (a), select channel 1.

(b) Check for the presence of an RF signal at terminal 2 of the channel 1 RF board. If no signal is observed, check Q1, Q2, T1, T2, T3 and T4 on A14.

(c) Repeat steps (a) and (b) for channels 2 through 8 in turn.

(d) Check for the presence of an RF signal at terminal 4 of wideband amplifier A15. If no signal is observed check Q401 and Q402 on A15.

5.3 REPAIR

In most cases, the repair of the SME-5C will consist of the replacement of an electrical component. The following precautions should be observed:

(1) Replace a defective component with its exact duplicate.

(2) Place a new component in the same position as the one it replaces. In general, do not change the existing chassis layout, whether in the routing of wiring or component placement.

(3) Do not use a soldering iron with a power rating of more than 100 watts. Use a pair of long-nose pliers as a heat sink to protect components while soldering.

(4) Exercise caution when replacing components of printed circuit boards. Excessive heat applied to a board might cause the printed wiring to lift off.

(5) Double check any solder joints made. Cold or loose solder connections will cause trouble.

5.4 TUNING PROCEDURE FOR CHANGING OPERATING FREQUENCIES

(1) With the power supply switched OFF, disconnect all external wiring from TB1, TB2 and TB3.

(2) Disconnect the RF output cable from J128 and connect a 47 ohm, 1/2 watt resistor across J128.

(3) Jumper terminal 7 of TB3 to ground.

(4) Determine the frequencies of the new crystals required in the HF oscillator (A12), using the following equations:

(a) for operating frequencies below 22 MHz

$$f_X = f_R + f_I$$

(b) for operating frequencies above 22 MHz

$$f_X = \frac{f_R + f_I}{2}$$

where f_X = crystal frequency

f_R = operating frequency

f_I = 1750 KHz

5.5 ALIGNMENT PROCEDURE

(1) GENERAL

NOTE

Alignment procedure is described for model SME(RC)-5U/L. For models SME(RC)-5U and SME(RC)-5L, alignment is required for operation in the appropriate sideband only.

(a) Disconnect all external wiring from TB1, TB2, TB3, J119 and J120.

(b) Connect two jumper wires, one to terminal 9 of TB3, and other to terminal 7 of TB3.

(2) AUDIO CIRCUITS

(a) LINE AUDIO INPUT

(1) Connect an AF signal generator to terminal 1 and 3 of TB1. Set output to 1 KHz at a level of 78 mv (-20 dbm).

(2) Set the power switch to ON.

(3) Turn USB switch to LINE 1. Rotate R6 on A20 and USB LEVEL control on front panel fully clockwise.

(4) The VTVM connected across pin 1 and 2 of IF board A9 should indicate a level of 78 mv.

(5) Turn USB switch to OFF and LSB switch to LINE 1.

(6) Repeat step 3 and 4 above with LSB LEVEL control on front panel fully clockwise.

(7) Repeat steps 1 to 6 above with AF generator connected to terminals 7 and 9 of TB1 and the sideband switches to LINE 2. In step 3 turn R7 on A20 fully clockwise.

(b) MICROPHONE INPUT

(1) Turn USB switch to MIC/KEY and LSB switch to OFF. Turn MODE switch to AME, or SSB.

(2) Connect AF signal generator to terminal 5 of TB1. Set its output to 1 KHz at a level of -55 dbm as measured on an audio VTVM.

(3) Connect an oscilloscope to gate 3 of A2OQ2. Connect link 1 (CARBON MIC) to its terminals on AF board A2O.

(4) Adjust A2OR14 for a maximum signal as measured on the oscilloscope.

(5) Connect a dc voltmeter to TP1 on A2O and adjust A2OR19 for a minimum reading on the voltmeter.

(6) Connect an audio VTVM to pin 5 of A2O. Adjust A2OR33 for an output level of -20 dbm as measured on VTVM.

(7) Adjust R19 on AF board A2O until the output, as measured in step (6) above just begins to drop.

(8) Increase signal generator level. The output as measured on VTVM should remain constant at -20 dbm.

(9) Remove oscilloscope from the gate of A2OQ2 and connect it to pin 5 of A2O.

(10) Switch the signal generator off and then switch it on. The oscilloscope should indicate a spike in the output signal.

(11) Repeat step (10) a few times while adjusting A2OR37 until the spike in the output signal as noted on the oscilloscope is reduced to a minimum. Note that the output level as measured on the VTVM remains constant at -20 dbm.

(12) Repeat steps (1) to (11) above with USB switch in the OFF position and LSB switch in the MIC/KEY position.

(c) METER CALIBRATION

(1) Set USB/LSB switch to LSB.

(2) Adjust R5 on the meter board A7 for an indication of 0 on the red scale.

(3) IF BOARD A9

(a) Turn LSB switch to LINE 2 and USB switch to its OFF position. Turn MODE switch to SSB.

(b) Connect a two tone AF generator to terminal 7 and 9 of TB1. Adjust its level to give -20 dbm.

(c) Connect an oscilloscope to pin 8 of IF board A9.

(d) Adjust C1812 on A9 for maximum two tone output as measured on the oscilloscope.

(e) Disconnect the AF generator. With the oscilloscope on its most sensitive range, adjust C1813 for a minimum signal.

(f) Reconnect AF generator and note the two tone waveform on the oscilloscope. Distortion or jitters along the edge of the waveform is caused by carrier leakage and an improperly balanced bridge. Adjust R1813 and C1806 until the waveform is clean. Proper alignment will occur with R1813 approximately in mid-range.

(g) Repeat step (f) above with LSB switch in OFF position and USB switch in LINE 2 position. Adjust R1814 and C1808 for a clean waveform.

(h) Repeat steps (e), (f), and (g) above, until waveform is stable in both LSB and USB modes.

(i) Readjust C1812 trimming for equal amplitude both in USB and LSB modes.

(j) Turn USB switch to AME and LSB switch to OFF.

(k) Switch the AF generator connected between terminals 7 and 9 of TB1 to give a single tone output.

(l) Adjust R7 on the main chassis to give a clear two tone output. The envelope displayed on the oscilloscope should not be less than 400 mv peak to peak.

(m) Repeat steps (j), (k), and (1) with LSB switch turned to AME and USB switch to OFF.

(4) MIXER AND PROGRAMME BOARD A13 and RF CIRCUITS

NOTE

Before aligning the Mixer and Programme board, check that programming straps on the board are placed correctly. See principle of operation for strapping details.

(a) Connect a 50 ohm resistive load to J128 (RF OUT) on the rear panel. Connect an oscilloscope across J128.

(b) Select the channel that operates on the highest frequency. Connect the other end of the jumper wire attached to pin 7 on TB2 to ground.

(c) Tune the transformers T1 through T4 on the selected card of RF amplifier A14 to the operating frequency (crystal frequency minus the IF frequency). Disconnect oscilloscope and connect a spectrum analyzer across the output jack.

(d) Adjust the spectrum analyzer to monitor the crystal frequency. Adjust C27 and R29 on the mixer doubler board for minimum amplitude.

(e) Connect oscilloscope across pin 39 of mixer doubler board A13 and adjust R18 on the main chassis for a level of 50 mw input signal as indicated on the oscilloscope.

(f) Connect oscilloscope and a VTVM across J128. Repeat step (c) and (d) above for the remaining channels, adjusting the potentiometer on each selected card of RF amplifier A14 to obtain an RF output of 2.2V RMS.

(g) With the spectrum analyzer adjusted to monitor the operatng frequency, adjust R4 on the wideband amplifier A15 for best intermodulation distortion.

(5) HF OVEN A12

(a) Set the power to ON and allow a one hour warm-up period.

(b) Connect a frequency counter across pin 34 of A13.

(c) Select channel 1 and adjust the capacitor corresponding to that channel on the HF oven board A12 for a frequency counter reading of the selected crystal frequency within ±5Hz.

(d) Repeat step (c) above for the remaining channels.

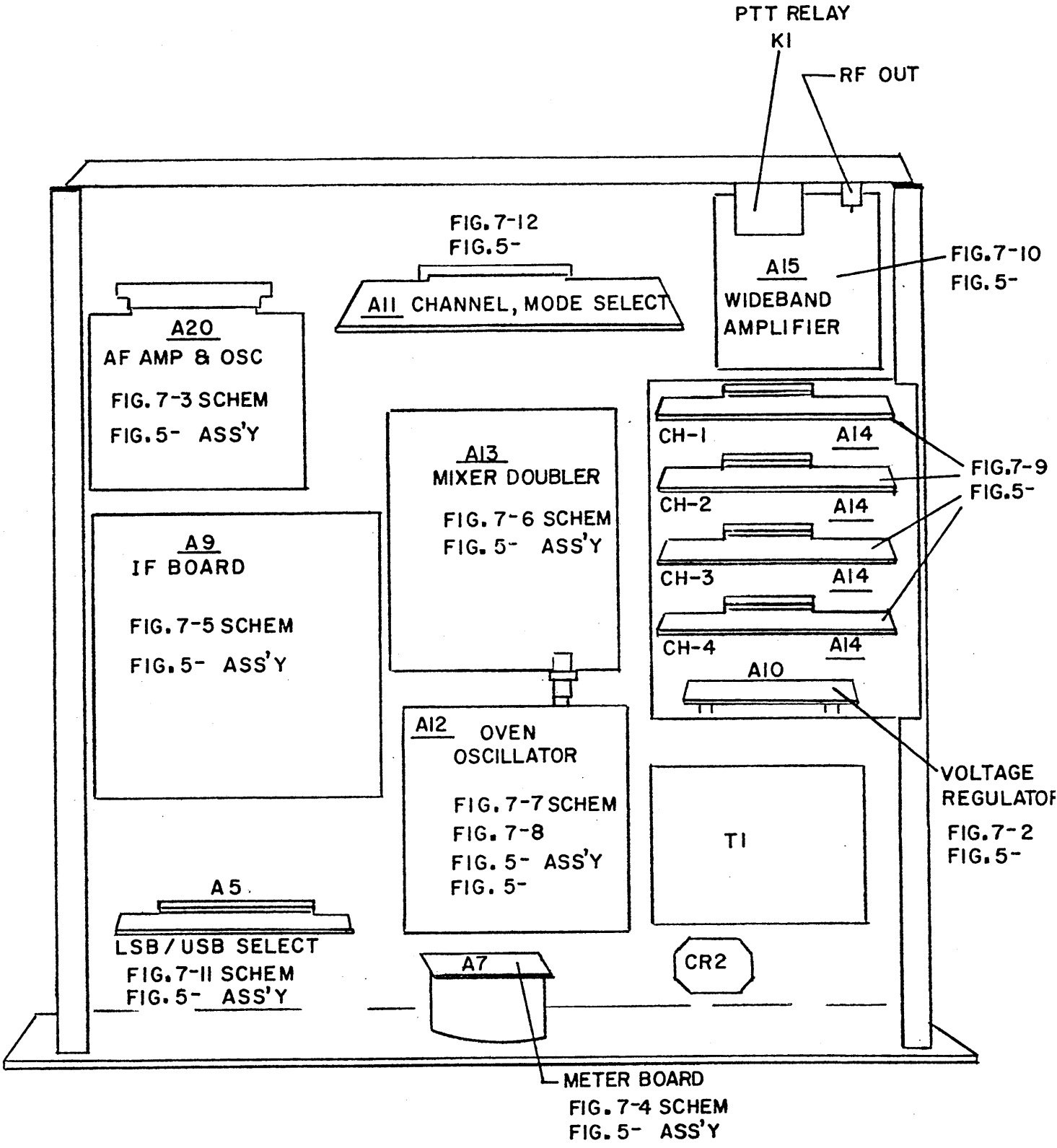

FIGURE 5-1, SME-5C TOP VIEW (LOCATIONS)

SECTION 6

PARTS LIST

6-1 INTRODUCTION

Reference designations have been assigned to identify all electrical parts. These designations are marked on the equipment adjacent to the parts that they identify and are included on all drawings, diagrams and part lists. The letters of a reference designation indicate the generic group of the part, such as capacitor, resistor, transistor, etc. The numeral differentiates between parts of the same generic group. Sockets associated with any particular plug-in device, such as a transistor of fuse, are identified by a reference designation which incorporates the designation used for that device as well as a prefix symbol. To expedite delivery when ordering replacement parts, specify the TMC part number and the name and model number of the equipment.

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
A5	PRINTED CIRCUIT BOARD: LSB/USB extended line select.	A5655
A7	PRINTED CIRCUIT BOARD: Meter	A10992-5
A9	PRINTED CIRCUIT BOARD: IF	A10914-5
A10	PRINTED CIRCUIT BOARD: Regulator Voltage	A10778-5
A11	PRINTED CIRCUIT BOARD: Extended mode and channel select	A5654
A12	PRINTED CIRCUIT BOARD: HF oscillator	AO-10006
A13	PRINTED CIRCUIT BOARD: Mixer-Doubler	A10900-5
A14	PRINTED CIRCUIT BOARDS: RF Amplifier	A10795-6 to 18
A15	PRINTED CIRCUIT BOARD: Wide band amplifier	A10934-5
A17	PRINTED CIRCUIT BOARD: Input filter	A10975-5
A18	PRINTED CIRCUIT BOARD: Input filter	A10976-5
A19	PRINTED CIRCUIT BOARD: Input filter	A10977-5
A20	PRINTED CIRCUIT BOARDL AF amplifier and oscillator	A11020-5
C2, C3, C4	CAPACITOR: elec, 1500 uF, 40W VDC, polar	CE10011
C5	CAPACITOR: flat, foil, 20uf, $\pm$5%, 150VDC	CC10011-16
C6, C7	CAPACITOR: fixed ceramic	CC100-32

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
CR1	DIODE	1N538
CR2	DIODE, network	NW10007
CR3	DIODE	1N914
CR4	Same as CR3	
CR5	DIODE, Zener, 12V, 10W	1N2976
CR6, CR7	DIODE	1N538
DS1	LAMP: incand, 28V, 0.04 amp	B1110-7
DS2	Same as DS1	
F1	FUSE: slo-blo, 115 VAC, 1 amp	FU102-1
* F2	FUSE: slo-blo, 235 VAC, 0.5 amp	FU102-0.5
J1	CONNECTOR: PC Bd, 15 contact	JJ10010-015-01-101
J2	Same as J1	
J3	CONNECTOR: PC Bd, 22 contact	JJ319-22DPE
J4, J5	Same as J3	
J6	CONNECTOR: PC Bd, 10 contact	JJ10010-010-01-101
J7 thru J13	Same as J6	
J14	CONNECTOR	MS3102A-16S-5P
J15	CONNECTOR: RF	UG625B-2U
J16	CONNECTOR: PC Bd, 15 contact	JJ319A-15DPE
J119	CONNECTOR: 22 Pin	MS3102-28-11P
J126 thru J128	Same as J15	

* Required for 220 vac operation only

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
K1	RELAY: arm 24 VDC	RL116DC3C24A
L1, L2	COIL: rf	CL240-120
M1	METER: audio, special	MR194
Q1	TRANSISTOR	2N3055
Q2	TRANSISTOR	2N3375
R3	RESISTOR: var, comp, 10K ohms, ±10%, ½W	RV106UX10C103A
R4	Same as R3	
R7	RESISTOR: var, comp, 50K ohms, ±10%	RV4LAYSA503A
R9	RESISTOR: fxd, comp, 270 ohms, ±5%, ½W	RC20GF271J
R10	RESISTOR: fxd, w/w, 3 ohms, 5W	RW107-4
R12	RESISTOR: var, comp, 250 K ohms, ±10%	RV4NAYSA254AYY
R13	RESISTOR: var, comp, 10 K ohms, ±10%	RV4NAYSA103AYY
R15	RESISTOR: fxd, comp, 100 ohms, +5% -5%, 1W	RC32GF101J
R16	RESISTOR: fxd, comp, 100 ohms, ±5%, ½W	RC20GF101J
R19	RESISTOR: var, comp, 50 K ohms, ±10%	RV4LAYSA503A
R20	RESISTOR: fxd, w/w, 25 ohms, 25W	RW111-6
R21	RESISTOR: fxd, comp, 470 ohms, ±5%, ½W	RC20GF471J

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
S1	SWITCH: rotary, special	SW10059
S2, S3	Same as S1	
S4	SWITCH: rotary, special	SW10063
S9	SWITCH: slide, double pole	SW163
S10	SWITCH: toggle, double pole	ST22K
T1	TRANSFORMER: power	TF10071
TB1	TERMINAL STRIP: barrier, lug	TM100-9
TB2 THRU TB3	Same as TB1	
XF1	HOLDER: fuse	FH100-1
XF2	Same as XF1	
XDS1	LIGHT INDICATOR: sub-mini, yellow	TS153-3
XDS2	LIGHT INDICATOR: sub-mini, white	TS153-5
XQ1	SOCKET: semi-conductor	TS166-1

A5655 (A5)

ASS'Y LSB/USB SWITCHING

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
C1	CAPACITOR, FXD, CER	CC131-39
CR1	DIODE	1N645
CR2	SAME AS CR1	
CR3	SAME AS CR1	
K1	RELAY	RL143
R1	RESISTOR, FXD, COMP.	RC07GF103J
R3	SAME AS R1	
R2	RESISTOR, FXD, COMP.	RC07GF472J
Q1	TRANSISTOR,	2N3646
Q2	TRANSISTOR,	2N1711

A7, METERING BOARD

TMC PART NO. A10992-5

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
C1	CAPACITOR: fxd, elec, mini, 2 uF, 15 WVDC	CE105-2-15
C2	Same as C1	
C3	CAPACITOR: fxd, elec, mini, 25 uF, 15WVDC	CE105-25-15
CR1	DIODE	1N34A
CR2	Same as CR1	
Q1	TRANSISTOR	2N3904
R1	RESISTOR: fxd, comp, 100 K, ohms, ±5%, ¼W	RC07GF104J
R2	RESISTOR: fxd, comp, 2.2 K, ohms, ±5%, ¼W	RC07GF222J
R3	RESISTOR: fxd, comp, 15 K, ohms, ±5%, ¼W	RC07GF153J
R4	RESISTOR: fxd, comp, 120 ohms, ±5%, ¼W	RC07GF121J
R5	RESISTOR: var, w/w. 10 K ohms	RV10005-7P

A9, TRANSMITTER IF BOARD

TMC PART NO. A10914-5

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
C1801	CAPACITOR: fxd, cer, .01 uF, 500W VDC	CC100-16
C1802 THRU C1804	Same as C1801	
C1805	CAPACITOR: fxd, mica, 22 pF, ±5%, 500W VDC	CM111C220J1S
C1806	CAPACITOR: var, cer, 9-35 pF, 100W VDC	CV112-2
C1807	SAME as C1805	
C1808	Same as C1806	
C1809	CAPACITOR: fxd, mica, 1000 pF, ±5%, 500 W VDC	CM111C102J1S
C1810	Same as C1809	
C1811	CAPACITOR: fxd, mica, 47 pF, ±5%, 500W VDC	CM111C470J1S
C1812	CAPACITOR: var, cer, 10-75 pF, 350W VDC	CV109-8
C1813	Same as C1812	
C1814	CAPACITOR: fxd, cer, 0.2 uF, +80% -20%, 25W VDC	CC100-33
C1815	Same as C1809	
C1816	Same as C1801	
C1817, C1818	Same as C1809	
C1819	Same as C1814	
C1820	Same as C1809	
CR1801 THRU CR1808	DIODE	1N542
FL1801	FILTER, USB: 1750.3-1753.0 KHz	FX10014-1F

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
FL1802	FILTER, LSB: 1747.0-1749.7 KHz	FX10014-2F
L1801 THRU L1805	COIL, RF: Fxd, 1000 uH	CL275-102
Q1801 THRU Q1803	TRANSISTOR	2N3904
Q1804 THRU Q1808	TRANSISTOR	2N5459
R1801 THRU R1812	RESISTOR: fxd, comp. 1K ohms, ±5%, ½W	RC20GF102J
R1813	RESISTOR: var, comp, 500 ohms, ±10%	RV111U501A
R1814	SAME AS R1813	
R1815 THRU R1818	RESISTOR: fxd, comp, 10 ohms, ±5%, ½W	RC20GF100J
R1819	RESISTOR: fxd, comp, 4.7 K ohms, ±5%, ½W	RC20GF472J
R1820	SAME AS R1819	
R1821	RESISTOR: fxd, comp, 470 K ohms, ±5%, ½W	RC20GF474J
R1822	RESISTOR: fxd, comp, 47 ohms, ±5%, ½W	RC20GF470J
R1823	RESISTOR: fxd, comp, 100 K ohms, ±5%, ½W	RC20GF104J
R1824	RESISTOR: fxd, comp, 15 K ohms, ±5%, ½W	RC20GF153J
R1825	RESISTOR: fxd, comp, 3.3 K ohms, ±5%, ½W	RC20GF332J
R1826	SAME AS R1822	
R1827	RESISTOR: fxd, comp, 6.8 K ohms, ±5%, ½W	RC20GF682J

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
R1828	Same as R1815	
R1829	Same as R1801	
R1830	Same as R1825	
R1831	Same as R1824	
R1832	RESISTOR: fxd, comp, 330 ohms, ±5%, ½W	RC20GF331J
R1833	RESISTOR: fxd, comp, 100 ohms, ±5%, ½W	RC07GF101J
T1801	TRANSFORMER: RF	TZ10001
Y1801	CRYSTAL: 1.75 MHz	CR10008-1.750000

A10, REGULATOR BOARD

TMC PART NO. A10778-5

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
CR1	DIODE: Zener, 10.0V, 400mW, 5%	1N758A
Q1	TRANSISTOR	TX10001
Q2	TRANSISTOR	2N3904
R1	RESISTOR: fxd, comp, 1.8 K ohms, ±5%, ½W	RC20GF182J
R2	RESISTOR: fxd, comp, 4.7 K ohms, ±5%, ½W	RC20GF472J
R3	RESISTOR: fxd, comp, 2.7 K ohms, ±5%, ½W	RC20GF272J
R4	RESISTOR: var, w/w, 500 ohms,	RV10005-3P
R5	RESISTOR: fxd, comp, 1.5 K ohms, ±5%, ½W	RC20GF152J

A5654 (
ASSY REMOTE CHANNEL CONTROL

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
C1 Thru C4	CAPACITOR, FXD, CER	CC131-39
CR1 Thru CR7	SCOND, DIODE	1N645
K1	RELAY	RL143-3
K2	SAME AS K1	
R1	RESISTOR: Fxd, comp.	RC07GF223J
R2	SAME AS R1	
R3	RESISTOR: Fxd, comp,	RC07GF102J
R4	SAME AS R3	
R5		RV119-1-102A
R6	RESISTOR: Fxd, comp.	RC07GF472J
R7	SAME AS R2	
R8	SAME AS R7	
R9	SAME AS R4	
R10	SAME AS R8	
R11	SAME AS R10	
R12	SAME AS R6	
R13	SAME AS R11	
R14	SAME AS R12	
R15	SAME AS R13	
R16	SAME AS R16	
Q1	TRANSISTOR	2N3646
Q2	TRANSISTOR	2N1711
Q3	SAME AS Q1	
Q4	SAME AS Q2	
Q5	SAME AS Q3	
Q6	SAME AS Q4	
Q7	SAME AS Q5	
Q8	SAME AS Q6	

A12 HF OVEN OSCILLATOR ASSEMBLY

TMC PART NO. A10765-5

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
A1	PRINTED CIRCUIT BOARD: HF oven control assembly	A10767-5
C11	CAPACITOR: fxd, mica, 18 pF, ±5%, 100W VDC	CM111E180J1S
C12	CAPACITOR: var, cer, 15-60 pF, 100W VDC	CV112-9
C13	CAPACITOR: fxd, mica, 110 pF, ±5%, 100W VDC	CM111E111J1S
C14	CAPACITOR: fxd, mica, 5 pF, ±5%, 100W VDC	CM111C050J1S
C21, 31, 41, 51, 61, 71, 81	Same as C11	
C22, 32, 42, 52, 62, 72, 82	Same as C12	
C23, 33, 43, 53, 63, 73, 83	Same as C13	
C24, 34, 44, 54, 64, 74, 84	Same as C14	
C103	CAPACITOR: fxd, cer, 0.01 uF, +80% -20%, 25W VDC	CC100-41
C104	Same as C103	
C105	Not used	
C106	Same as C13	
C107, C108	Same as C103	
C109	CAPACITOR: fxd, mica, 33 pF, ±5%, 500W VDC	CM111E330J5S
CR103	DIODE: Zener, 10.0V, 400mW, 5%	1N961B
Q11	TRANSISTOR	TX10003

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
Q21, 31, 41, 51, 61, 71, 81	Same as Q11	
Q101, Q102	Same as Q11	
R11	RESISTOR: fxd, comp, 150 K ohms, ±5%, ½W	RC07GF154J
R12	RESISTOR: fxd, comp, 18 K ohms, ±5%, ½W	RC07GF183J
R13	RESISTOR: fxd, comp, 47 ohms, ±5%, ½W	RC07GF470J
R21, 31, 41, 51, 61, 71, 81	Same as R11	
R22, 32, 42, 52, 62, 72, 82	Same as R12	
R23, 33, 43, 53, 63, 73, 83	Same as R13	
R102	RESISTOR: fxd, comp, 1 M ohms, ±5%, ½W	RC07GF105J
R103	RESISTOR: fxd, comp, 1 K ohms, ±5%, ½W	RC07GF102J
R104	RESISTOR: fxd, comp, 5.6 K ohms, ±5%, ½W	RC07GF562J
R105	Same as R103	
R106	RESISTOR: fxd, comp, 560 ohms, ±5%, ½W	RC07GF561J
R107	RESISTOR: fxd, comp, 3.3 K ohms, ±5%, ½W	RC07GF332J
R108	Same as R103	
R109	RESISTOR: fxd, comp, 120 ohms, ±5%, ½W	RC07GF121J

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
R110	Same as R109	
R111	Same as R103	
Y11, 21, 31, 41, 51, 61, 71, 81	CRYSTAL: for desired frequency	CR27A/U

A12A1, HF OVEN CONTROL ASSEMBLY

TMC PART NO. A10767-5

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
CR101	DIODE	1N4002
CR102	Same as CR101	
Q101	TRANSISTOR	2N2219A
Q102	Same as Q101	
Q103	TRANSISTOR	TX10002
R101	RESISTOR: fxd, comp, 620 ohms, ±5%, ½W	RC07GF621J
R101A	RESISTOR: fxd, comp, value selected on test: 12 K ohms, ±5%, ½W 2.2 K ohms, ±5%, ½W 6.8 K ohms, ±5%, ½W	 RC07GF123J RC07GF222J RC07GF682J
R102	RESISTOR: fxd, comp, 2.2 K ohms, ±5%, ½W	RC07GF222J
R103	RESISTOR: fxd, comp, 3.9 K ohms, ±5%, ½W	RC07GF392J
R104	Same as R102	
R105	RESISTOR: fxd, comp, 1.8 K ohms, ±5%, ½W	RC07GF182J
R106	Same as R102	
R107	RESISTOR: fxd, comp, 150 K ohms, ±5%. ½W	RC07GF154J
RVT101	THERMISTOR	RR10005

A13, MIXER-DOUBLER ASSEMBLY

TMC PART NO A10900

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
C1	CAPACITOR: fxd, cer, 0.02 uF, +80% -20%, 25W VDC	CC100-40
C2 THRU C8	Same as C1	
C9	CAPACITOR: fxd, cer, 0.01 uF, +80% -20%, 25W VDC	CC100-41
C10	Same as C9	
C11	CAPACITOR: fxd, cer, 560 pF, 300W VDC	CM111F561J3S
C12 THRU C25	Same as C9	
C26	CAPACITOR: fxd, cer, 0.2 pF, +80% -20%, 25W VDC	CC100-33
C27	CAPACITOR: var, cer, 15-60 pF	CV112-5
C28	CAPACITOR: fxd, cer, 220 pF, ±5%, 500 W VDC	CM111E221J5S
C29	CAPACITOR: fxd, cer, 180 pF, ±5%, 500W VDC	CM111E181J5S
C30	Same as C9	
CR1 THRU CR13	DIODE	1N914
CR14	DIODE: var, cap	MV1404
CR15	DIODE: Zener, 12V, 5%, 1W	1N3022B
CR16	DIODE	1N34A
CR17	Same as CR16	
L1	COIL: RF, fxd, 220 uH, ±10%	CL275-221
L2 THRU L8	Same as L1	
L9	COIL: RF, fxd, 470 uH, ±10%	CL275-471

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
L10	COIL: RF, fxd, 0.68 uH, ±20%	CL275-0R68
L11	COIL: RF, fxd, 33 uH, ±10%	CL275-330
L12	COIL: RF, fxd, 10 uH, ±10%	CL275-100
Q1	TRANSISTOR	2N2219A
Q2 THRU Q4	TRANSISTOR	2N3823
R1 THRU R8	RESISTOR: fxd, comp, 68 K ohms, ±5%, ½W	RC20GF683J
R9	RESISTOR: fxd, comp, 150 K ohms, ±5%, ¼W	RC07GF154J
R10	RESISTOR: fxd, comp, 470 ohms, ±5%, ¼W	RC07GF471J
R11	RESISTOR: fxd, comp, 1.2 K ohms, ±5%, ¼W	RC07GF122J
R12	RESISTOR: fxd, comp, 15 K ohms, ±5%, ¼W	RC07GF153J
R13	RESISTOR: var, comp, 10 K ohms, ±5%	RV111U103A
R14	Same as R11	
R15	Same as R12	
R16	RESISTOR: fxd, comp, 18 K ohms, ±5%, ¼W	RC07GF183J
R17	Same as R13	
R18	Same as R11	
R19	Same as R9	
R20	RESISTOR: fxd, comp, 680 K ohms, ±5%, ½W	RC20GF681J
R21	Same as R16	

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
R22	RESISTOR: fxd, comp, 220 K ohms, ±5%, ½W	RC07GF224J
R23	RESISTOR: fxd, comp, 330 K ohms, ±5%, ½W	RC07GF334J
R24	RESISTOR: fxd, comp, 220 ohms, ±5%, ½W	RC07GF221J
R25	Same as R16	
R26	Same as R9	
R27	RESISTOR: fxd, comp, 270 ohms, ±5%, ½W	RC07GF271J
R28	RESISTOR: fxd, comp, 1 K ohms, ±5%, ½W	RC07GF102J
R29	RESISTOR: var, comp, 500 ohms, ±10%	RV111U501A
R30	RESISTOR: fxd, comp, 820 ohms, ±5%, ½W	RC07GF821J
R31	RESISTOR: fxd, comp, 100 ohms, ±5%, ½W	RC07GF101J
T1	TRANSFORMER: RF	TF10070

A14, TRANSMIT RF ASSEMBLY

A10795-6 THRU A10795-18

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
C1	CAPACITOR: fxd, cer, 0.02 uF, +80% -20%, 25 W VDC	CC100-40
C2	CAPACITOR: fxd, mica, ±5%, 50 W VDC	
	A10795-6; 200 pF	CM111E201J5S
	A10795-7; 200 pF	CM111E201J5S
	A10795-8; 180 pF	CM111E181J5S
	A10795-9; 150 pF	CM111E151J5S
	A10795-10; "	"
	A10795-11; "	"
	A10795-12; "	"
	A10795-13; 91 pF	CM111E910J5S
	A10795-14; 82 pF	CM111E820J5S
	A10795-15; 68 pF	CM111E680J5S
	A10795-16; 56 pF	CM111E560J5S
	A10795-17; 51 pF	CM111E510J5S
	A10795-18; 47 pF	CM111E470J5S
C3	Same as C1	
C4	Same as C2	
C5 THRU C8	Same as C1	
C9	Same as C2	
C10 THRU C14	Same as C1	
C15	Same as C2	
CR1	DIODE	1N914
CR2	Same as CR1	
L1	COIL: fxd, RF, 33 uH, ±10%	CL275-330
L2	COIL: fxd, RF, 120 uH, ±10%	CL240-120
L3	COIL: FXD, RF, 33 uH, ±10%	CL240-33

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
Q1	TRANSISTOR	3N142
Q2	Same as Q1	
Q3	TRANSISTOR	2N4427
R1	RESISTOR: fxd, comp, 100 K ohms, ±5%, ½W	RC07GF104J
R4	RESISTOR: fxd, comp, 330 ohms, ±5%, ½W	RC07GF331J
R5	Same as R1	
R6	RESISTOR: fxd, comp, 680 ohms, ±5%, ½W	RC07GF681J
R7	Same as R4	
R8	RESISTOR: fxd, comp	S.O.T.
R9	RESISTOR: fxd, comp, 1.5 K ohms, ±5%, ½W	RC07GF152J
R10	RESISTOR: fxd, comp, 120 ohms, ±5%, ½W	RC07GF121J
R11	RESISTOR: fxd, comp, 30 ohms, ±5%, ½W	RC20GF300J
R12	RESISTOR: var, 1000 ohms, ±10%	RV10005-4P
R13	RESISTOR: fxd, comp, 8.2 K ohms, ±5%, ½W	RC07GF822J
T1	TRANSFORMER: variable A10795-6 A10795-7 A10795-8 A10795-9 A10795-10 A10795-11 A10795-12	TT298-6 TT298-10 TT298-14 TT298-18 TT298-22 TT298-26 TT298-30

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
T1	TRANSFORMER: variable	
	A10795-13	TT298-34
	A10795-14	TT298-38
	A10795-15	TT298-42
	A10795-16	TT298-46
	A10795-17	TT298-50
	A10795-18	TT298-54
T2	TRANSFORMER: variable	
	A10795-6	TT298-5
	A10795-7	TT298-9
	A10795-8	TT298-13
	A10795-9	TT298-17
	A10795-10	TT298-21
	A10795-11	TT298-25
	A10795-12	TT298-29
	A10795-13	TT298-33
	A10795-14	TT298-37
	A10795-15	TT298-41
	A10795-16	TT298-45
	A10795-17	TT298-49
	A10795-18	TT298-53
T3	TRANSFORMER: variable	
	A10795-6	TT298-7
	A10795-7	TT298-11
	A10795-8	TT298-15
	A10795-9	TT298-19
	A10795-10	TT298-23
	A10795-11	TT298-27
	A10795-12	TT298-31
	A10795-13	TT298-35
	A10795-14	TT298-39
	A10795-15	TT298-43
	A10795-16	TT298-47
	A10795-17	TT298-51
	A10795-18	TT298-55
T4	TRANSFORMER: variable	
	A10795-6	TT298-8
	A10795-7	TT298-12
	A10795-8	TT298-16
	A10795-9	TT298-20
	A10795-10	TT298-24
	A10798-11	TT298-28
	A10795-12	TT298-32

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
T4	TRANSFORMER: variable	
	A10795-13	TT298-36
	A10795-14	TT298-40
	A10795-15	TT298-44
	A10795-16	TT298-48
	A10795-17	TT298-52
	A10795-18	TT298-56

A15, WIDE BAND AMPLIFIER ASSEMBLY

TMC PART NO. A10934-5

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
C1	CAPACITOR: fxd, elec. 1 uF, 25 W VDC	CE105-1-25
C2	CAPACITOR: fxd, cer, 0.01 uF, +80% -20%, 25 W VDC	CC100-41
C3, C4	Same as C2	
C5	Same as C1	
C6 THRU C13	Same as C2	
CR1	DIODE	1N4002
CR2	Same as CR1	
L1	COIL, RF: fxd, 150 uH, ±10%	CL275-151
L2	COIL, RF: fxd, 15 uH, ±10%	CL275-150
L3	COIL, RF: fxd, 33 uH, ±10%	CL240-33
L4	COIL, RF: fxd, 220 uH, ±10%	CL275-221
Q1	TRANSISTOR	2N3866
Q2	TRANSISTOR	2N3375
R1	RESISTOR: fxd, comp, 1 K ohms, ±5%, ½W	RC07GF102J
R2	RESISTOR: fxd, comp, 150 ohms, ±5%, ½W	RC07GF151J
R3	RESISTOR: fxd, comp, 1.2 K ohms, ±5%, ½W	RC07GF122J
R4	RESISTOR: var, comp, 5 K ohms, ±20%	RV111U502B
R5	RESISTOR: fxd, comp, 2.2 K ohms, ±5%, ½W	RC07GF222J

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
R6	RESISTOR: fxd, comp, 220 ohms, ±5%, 2W	RC42GF221J
R7	RESISTOR: fxd, comp, 33 ohms, ±5%, ½W	RC20GF330J
R8	RESISTOR: fxd, comp, 1.5 K ohms, ±5%, ¼W	RC07GF152J
R9	RESISTOR: fxd, comp, 15 ohms, ±5%, 1W	RC32GF150J
R10	Same as R7	
R11	RESISTOR: fxd, comp, 100 ohms, ±5%, 1W	RC32GF101J
R12	RESISTOR: fxd, comp, 820 ohms	RC20GF821J
R13	RESISTOR: fxd, comp, 1.8 K ohms, ±5%, ¼W	RC07GF182J
R14	RESISTOR: fxd, comp, 3.3 K ohms, ±5%, ¼W	RC07GF332J
T1	TRANSFORMER: RF	TF10069
T2	Same as T1	

A17 FILTER ASSEMBLY

A10975-5

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
C1	CAPACITOR: fxd, cer, 0.001 uf GMV, 500 WVDC	CC100-29
C2 THRU C8	Same as C1	
L1	COIL: RF, 150 uH, ±10%	CL275-151
L2 THRU L4	Same as L1	

A18 FILTER ASSEMBLY,

A10976-5

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
C1	CAPACITOR: fxd, cer, 0.001 uf GMV, 500 WVDC	CC100-29
C2 THRU C14	Same as C1	
L1	COIL: RF, 150 uH, ± 10%	CL275-151
L2 THRU L7	Same as L1	

A19 FILTER ASSEMBLY

A10977-5

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
C1	CAPACITOR: fxd, cer, 0.001 uf GMV, 500 WVDC	CC100-29
C2 THRU C6	Same as C1	
L1	COIL: RF, 150 uH, ±10%	CL275-151
L2 THRU L3	Same as L1	

TMC PART NO. - A11020-5

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
A1	INTEGRATED CIRCUIT	MC1741CP
A2	INTEGRATED CIRCUIT	MC1590G
A3	INTEGRATED CIRCUIT	NW10011
A4	Same as A1	
C1	CAPACITOR: solid, tant , 1uF	CE10014-1.0-35
C2, C3	CAPACITOR: fxd, cer, 0.01 uF	CC100-43
C4	CAPACITOR: solid, tant, 10 uF	CE10014-10-35
C5	CAPACITOR: fxd, cer, 0.47 uF	CC10026-17
C9	CAPACITOR: solid, tant, 0.47 uF	CE10014-0.47-35
C10, C11	Same as C2	
C12	Same as C5	
C13,C14	Same as C9	
C15	CAPACITOR: fxd, cer, 2.2 uF	CE10014-2.2-25
C16, C17, C18	CAPACITOR: solid, tant, 47 uF	CE10014-47-63
C19	Same as C2	
C20	Same as C9	
C21	Same as C1	
C22	Same as C2	
C23	CAPACITOR: elect, min, 100 uF	CE10017-100-35-B
C24, C25	Same as C4	
C26	Same as C1	
C27	CAPACITOR: fxd, cer, 0.1 uF	CC100-28
C28 THRU C31	Same as C16	

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
CR1	DIODE	1N5341A
CR2	DIODE	1N914B
CR3	Same as CR1	
CR4, CR5	Same as CR2	
L1	COIL, RF: fxd 47 mH ± 100%	CL10058
Q1	TRANSISTOR	2N3904
Q2	TRANSISTOR	2N5459
Q3	TRANSISTOR	2N5361
R1	RESISTOR: fxd, comp, 1.8K ohms ± 5%, 1/4 W	RC07GF182J
R2	RESISTOR: fxd, comp, 470 ohms, ± 5%, 1/2 W	RC20GF471J
R3	RESISTOR: fxd, comp, 82K ohms, ± 5%, 1/4 W	RC07GF823J
R4	RESISTOR: fxd, comp, 120K ohms ± 5%, 1/4 W	RC07GF124J
R5	RESISTOR: fxd, comp, 1K ohms, ± 5%, 1/4 W	RC07GF102J
R6, R7	RESISTOR: var, comp, 500 ohms ± 10%	RV111A501A
R8	Same as R5	
R10	Same as R2	
R11	RESISTOR: fxd, comp, 22K ohms ± 5%, 1/4 W	RC07GF223J
R12	Same as R5	
R13	RESISTOR: fxd, comp, 470 ohms ± 5%, 1/4 W	RC07GF471J
R14	RESISTOR: var, W/W, 50K ohms	RV124-2-503
R15	Same as R5	

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
R16	RESISTOR: fxd, comp 270 ohms ± 5%, 1/4 W	RC07GF271J
R17	Same as R5	
R18	RESISTOR: fxd, comp 10K ohms ± 5%, 1/4 W	RC07GF103J
R19, R20	RESISTOR: var, W/W, 1K ohms	RV124-2-102
R21	RESISTOR: fxd, comp 220 ohms ± 5%, 1/2 W	RC20GF221J
R22	RESISTOR: fxd, comp,3.3K ohms ± 5%, 1/4 W	RC07GF332J
R23	Same as R1	
R24	Same as R13	
R25	Same as R1	
R26	RESISTOR: fxd, comp, 4.7K ohms± 5%, 1/4 W	RC07GF472J
R30, R31	Same as R26	
R32	RESISTOR: fxd, comp, 2.2 K ohms ± 5%, 1/4 W	RC07GF222J
R33	RESISTOR: var, w/w 20 K ohms	RV124-2-203
R34	RESISTOR: fxd, comp, 330 ohms ± 5%, 1/4 W	RC07GF331J
R35, R36	RESISTOR: fxd, comp, 330 ohms ± 5%, 1/2 W	RC20GF331J
R37	RESISTOR: var, comp, 1K ohms ± 10%	RV111U102B
R38	Same as R18	
T1 THRU T4	TRANSFORMER	TF10081-4

SECTION 7

SCHEMATIC DIAGRAMS

REVISIONS						
E.M.N.O	DRAFT	CHKD	ZONE	LTR	DESCRIPTION	DATE	APPROVED
			+C	X1	[illegible]	[illegible]	
				X2	REVISED & UPDATED	12.20.76	

TB2 GND; 13.6V (EIA-232-C); +5CV; 20 OR 60 MA * (POLAR OR NAT'L); +100 V; KEYED G.D; GND

TB1 LINE 1; LINE 2; DYNAMIC MIC; CARBON MIC; GND

TB3 CW KEY; ANTI VOX; PTT

A18; A17

J117 CARBON MIKE; HIGH OR LOW Z DYNAMIC MIC; PTT

MIC KEY; FSK; S1-A; S2-A; OFF; REMOTE

R3 10K LSB LEVEL ADJ

R8 10K USB LEVEL ADJ

TO J119 T&N

J2; A5 USB, LSB EXTENDED CK-2144

J16; A20 AF AMPLIFIER/OSC A11020-5 CK 10844

LINE 1; LINE 2; MIC KEY; FSK; S1-B; S2-B; REMOTE; +12V

S9 LSB; USB

L3 39 uH

A9 IF BOARD A10914-5 CK 10781

R8 15K FACTORY ADJ

TO A15 PIN 1

A11 (TB1); E14; R17 470, 1/2W +12V; +24V E15

A12 H.F OVEN 40-10006 CK10=17; J15

A13 MIXER-DOUBLER A10900-5 CK10779; CHAN 1; CHAN 2; CHAN 3; CHAN 4

J6; J8; J10; J12

J5E CH1; J5D CH2; J5C CH3; J5B CH4

S4-A; +24V

M1 M2194

A7 METER BD A10992-5 CK10830; +12V

CR3 IN914

S3 AME; SSB

A11 EXTENDED MODE & CHANNEL SELECT CK 4143

+24V; +12V; J5

S4-B; FOR REMOTE CHANNEL LOCAL MODE SELECT JUMPER PINS 1 & 2; +12V; REMOTE

R7 50K

E21 E22

Q2 2N3375; A15 A10934-5 CK10796; J128 R.F. OUT

USE WITH GPT-1K SERIES

PC724/A5615; CH1; CH2; CH3; CH4; J120-A; J120-B; J120-C; J120-D; CHANNEL

* WHEN USING PC 724, CONNECTIONS ARE MADE AS SHOWN BY ---- LINES AND CONNECTIONS TO PINS A, B, C & D OF J120 ARE REMOVED.

PC724 5.8; PC724 4.5; PC724 2.6-3; PC724 2.2.8

S4C-2; S4C-3; S4C-4; S4C-5; S4C-W; SEE NOTE *

M L G F E D C B A J120

S4-C

R15 100, 1W; E16; R16 100, 1/2W; DS1 P.T.T. INDICATOR; P.T.T RELAY K1

R9 270, 1/2W DS2 PWR ON

Q1 2N3055; R11 25, 25W +12V; CR5 IN2976; C5 2.0

A10 A10778-6 CK10724

CR7 IN538

J14 115/230V AC 60Hz; F1 SEE NOTE 2; L1 120uH; C6 .1; L2 120uH; C7 .1; S10; T1 TF-1007/ SEE NOTE 2

Z1 MW10007; BLK; YEL; RED; R10 3, 10W

C2 1500; C3 1500; C4 1500

TB3; A19

RECEIVE; COMMON; TRANSMIT; GND

+24V; NC; NO; P10 J120; K11

CR8 IN645

ALDC J127; L4 10MH

TO A5 E; J119 W V U T N R P S I K J M L A B C D E F G H X; LINE 1 USB, LSB

J5-8; J5-12; J5-9; J5-14; J5-13; J5-3; J5-4; J5-5; J5-6; J5-R; J5-S; J5-7; J5-U

J120; S4-C

SME-5C

QTY / UNIT	MODEL USED ON	ASS'Y NO.
APPLICATION		
	CODE	

NOTICE TO PERSONS RECEIVING THIS DRAWING

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UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE CHEMICALLY APPLIED OR PLATED FINISHES

TOLERANCES ON

DECIMALS	FRACTIONS
.X ± .05	± 1/64
.XX ± .01	ANGLES
.XXX ± .005	± 0° 30'

MATERIAL

FINISH

CK2140
(SME-5-C)
SIDEBAND MULTICHANNEL
EXCITER-SCHEMATIC

Figure 7-1

Revised 10-77

IF IT IS FOUND DESIRABLE TO CHANGE ANY TOLERANCE OR OTHER DETAIL SPECIFIED ON THIS DRAWING NOTIFY THE PURCHASER PROMPTLY.

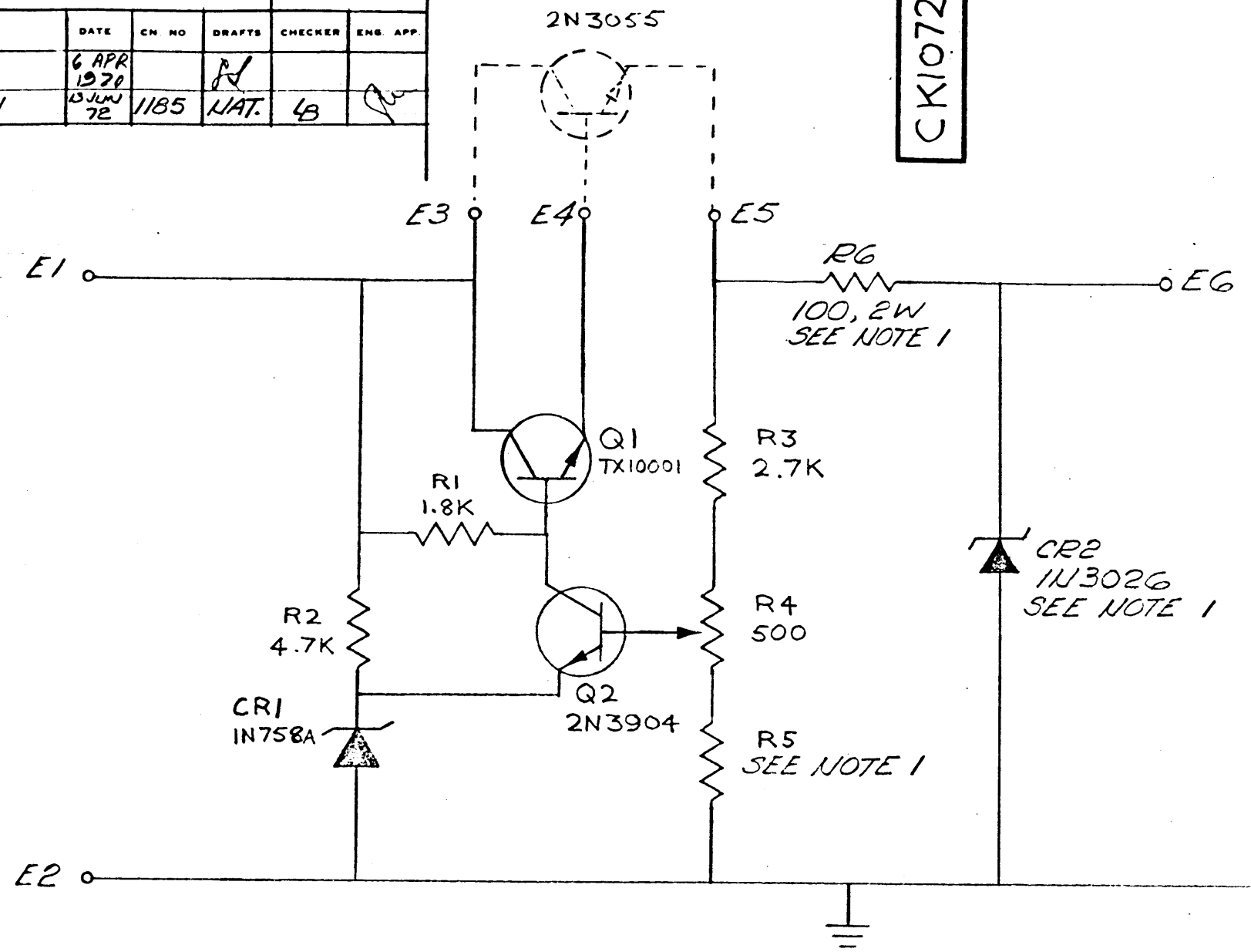
MAXIMUM ALLOWABLE TOLERANCES HAVE BEEN DETERMINED AND DEVIATIONS WILL BE CAUSE FOR REJECTION REMOVE ALL BURRS AND SHARP EDGES

DIMENSIONS IN INCHES UNLESS OTHERWISE SPECIFIED

ISSUE	ITEM	CHANGED FROM	DATE	CN NO	DRAFTS	CHECKER	ENG. APP.
Ø		PROD RELEASE	6 APR 1970		RL		
A		REV. PER CEMN	13 JUN 72	1185	NAT.	LB	

CK10724 A

REQ	ITEM	PART NO	DESCRIPTION	SYMBOL



2. ALL RESISTANCE TO BE IN OHMS
1 R6 & CR2 TO BE USED FOR A10778-5 ONLY.
VALUE OF R5 TO BE: 1.5K FOR A10778-5
2.2K FOR A10778-6

NOTES

REF: A10778-6
REF: A10778-5

TOLERANCES UNLESS OTHERWISE SPECIFIED			SCALE ~11~
ALL THERS	DEC DIM ±	.X = .05	DRILL, PUNCH, COMMERCIAL STOCK SIZES AND MANUFACTURERS TOLERANCES ARE NOT INCLUDED.
	FRAC. DIM. ± 1/64	.XX = .01	
	ANGULAR DIM. ± 0°30'	.XXX=.005	

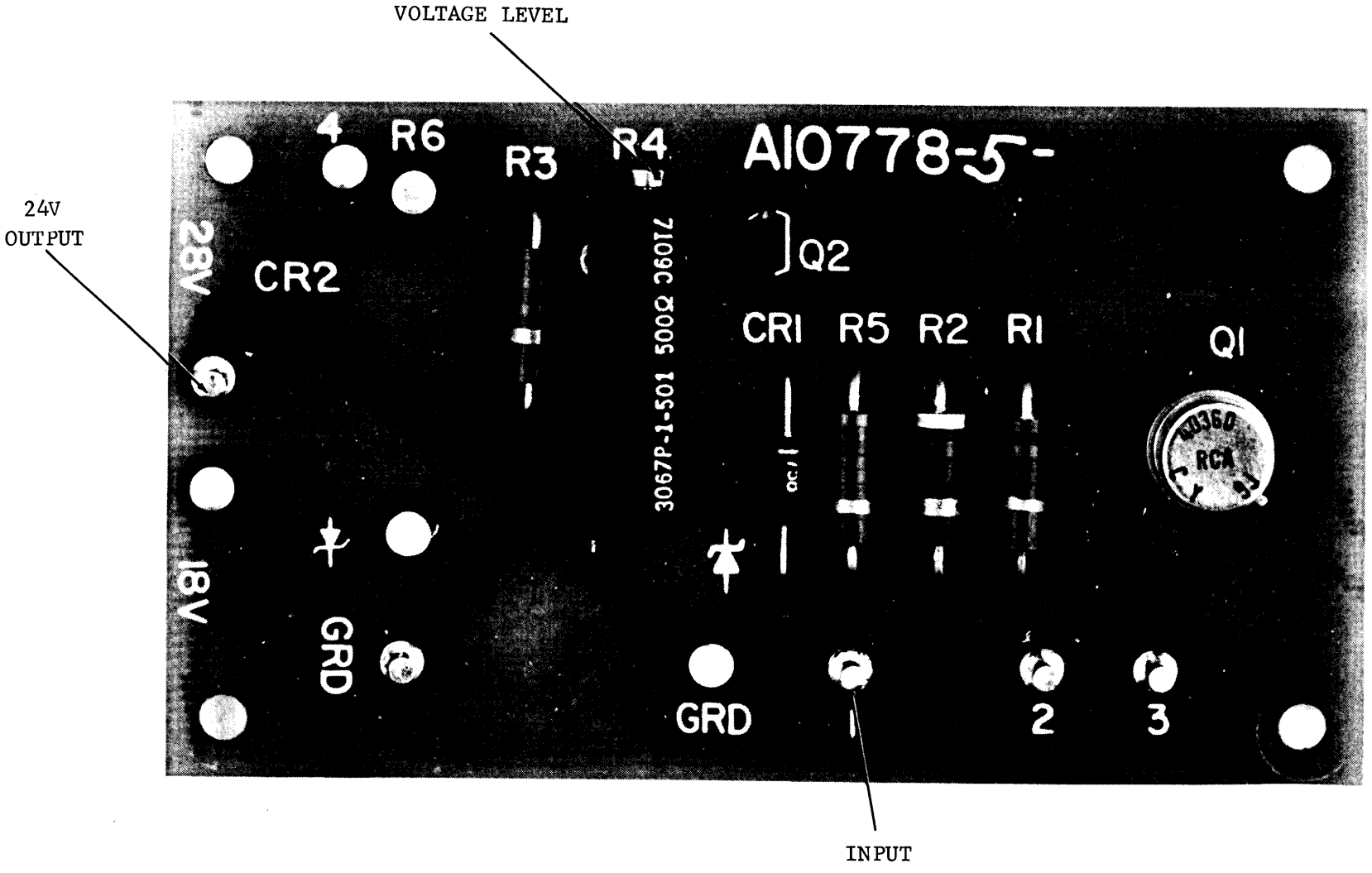
MODEL	PROJECT NO.	ASS'Y. NO.	DATE
SME 5		A10778-6	13 JUNE 72
MCU-16		A10778-5	SEPT 17-69

USED ON

STOCK
MATERIAL
TYPE
HEAT TR
FINISH

CK10724
SCHEMATIC, DIAGRAM
VOLTAGE REGULATOR

FORM -128

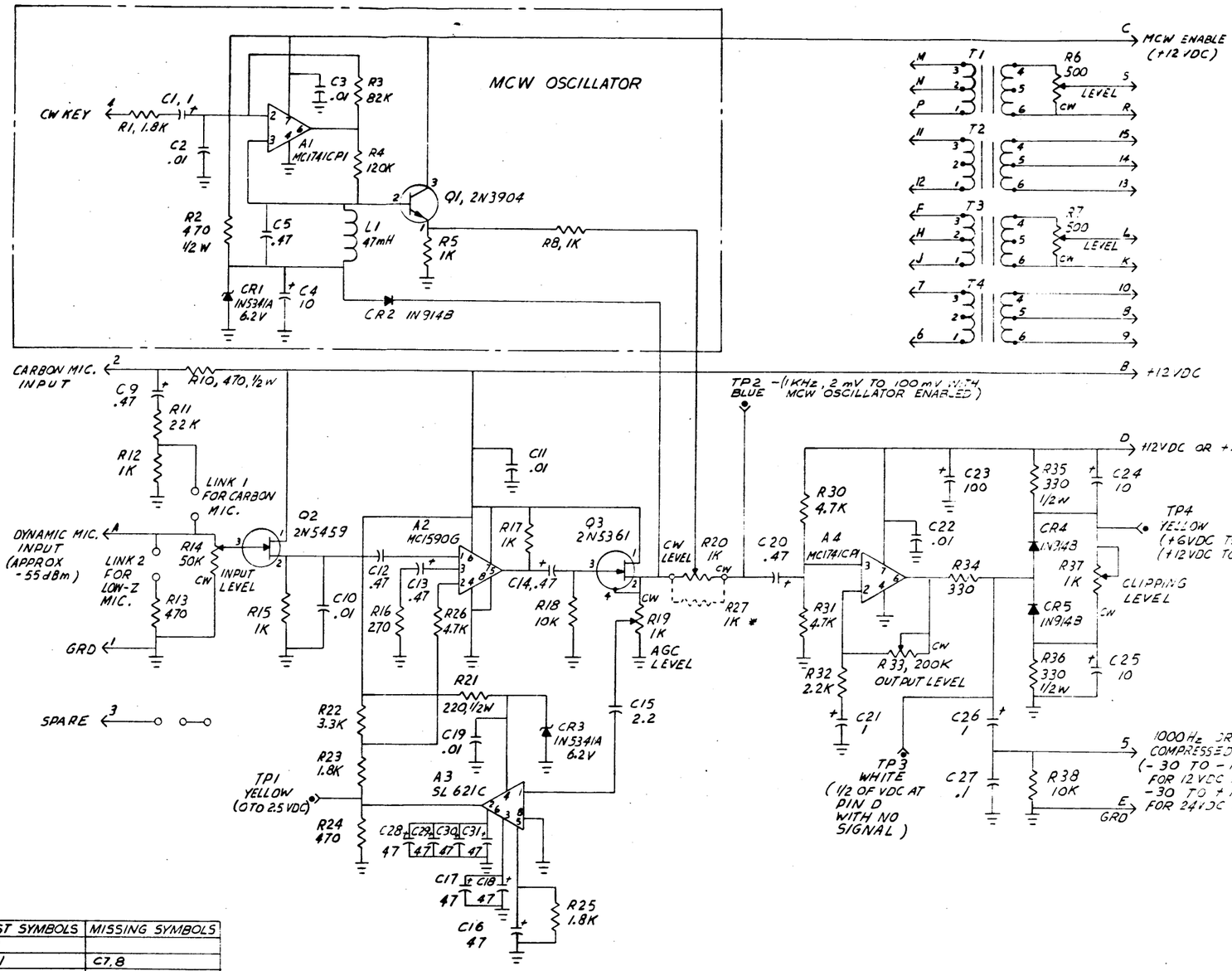


Regulator board A10 parts location

IF IT IS FOUND DESIRABLE TO CHANGE ANY TOLERANCE OR OTHER DETAIL SPECIFIED ON THIS DRAWING NOTIFY THE PURCHASER PROMPTLY					DIMENSIONS IN INCHES UNLESS OTHERWISE SPECIFIED
MAXIMUM ALLOWABLE TOLERANCES HAVE BEEN DETERMINED AND DEVIATIONS WILL BE CAUSE FOR REJECTION REMOVE ALL BURRS AND SHARP EDGES					
ISSUE	ITEM	CHANGED FROM	DATE	CN NO	DRAFTS	CHECKER	ENG APP
2		REDRAWN & REVISED	22 MAR 72		48		

CK10844 X2

REQ	ITEM	PART NO	DESCRIPTION	SYMBOL



7. MICROPHONE AMPLIFIER
   FREQUENCY RESPONSE: 300 Hz to 6 KHz NOMINAL
   AGC DYNAMIC RANGE = 40db
   OUTPUT IMPEDANCE = 600 OHM

6. ENABLING THE MCW OSCILLATOR CUTS OFF THE COMPRESSION AMPLIFIER BY BIASING Q3.

5. FOR AN OUTPUT OF -30 to -10 dbm, PIN D TO BE SUPPLIED WITH 12 VDC. FOR AN OUTPUT OF -30 to +10 dbm, PIN D TO BE SUPPLIED WITH 24 VDC.

4. MCW OSCILLATOR (THESE COMPONENTS MOUNTED ONLY IF REQUIRED).
   f = 1000 Hz ± 150 Hz.

3. WHEN THE MCW OSCILLATOR IS NOT MOUNTED ON THE BOARD REPLACE R20 WITH R27.

2. TRANSFORMERS: (ONLY THOSE TRANSFORMERS REQUIRED ARE MOUNTED).

   T1, T3: 600 OHM BALANCE TO UNBALANCE
   T2, T4: 600 OHM BALANCE

PERFORMANCE DATA

1. CAPACITANCE IN MICROFARDS.
   RESISTANCE IN OHMS, ½W.
   UNLESS OTHERWISE SPECIFIED.

NOTES:

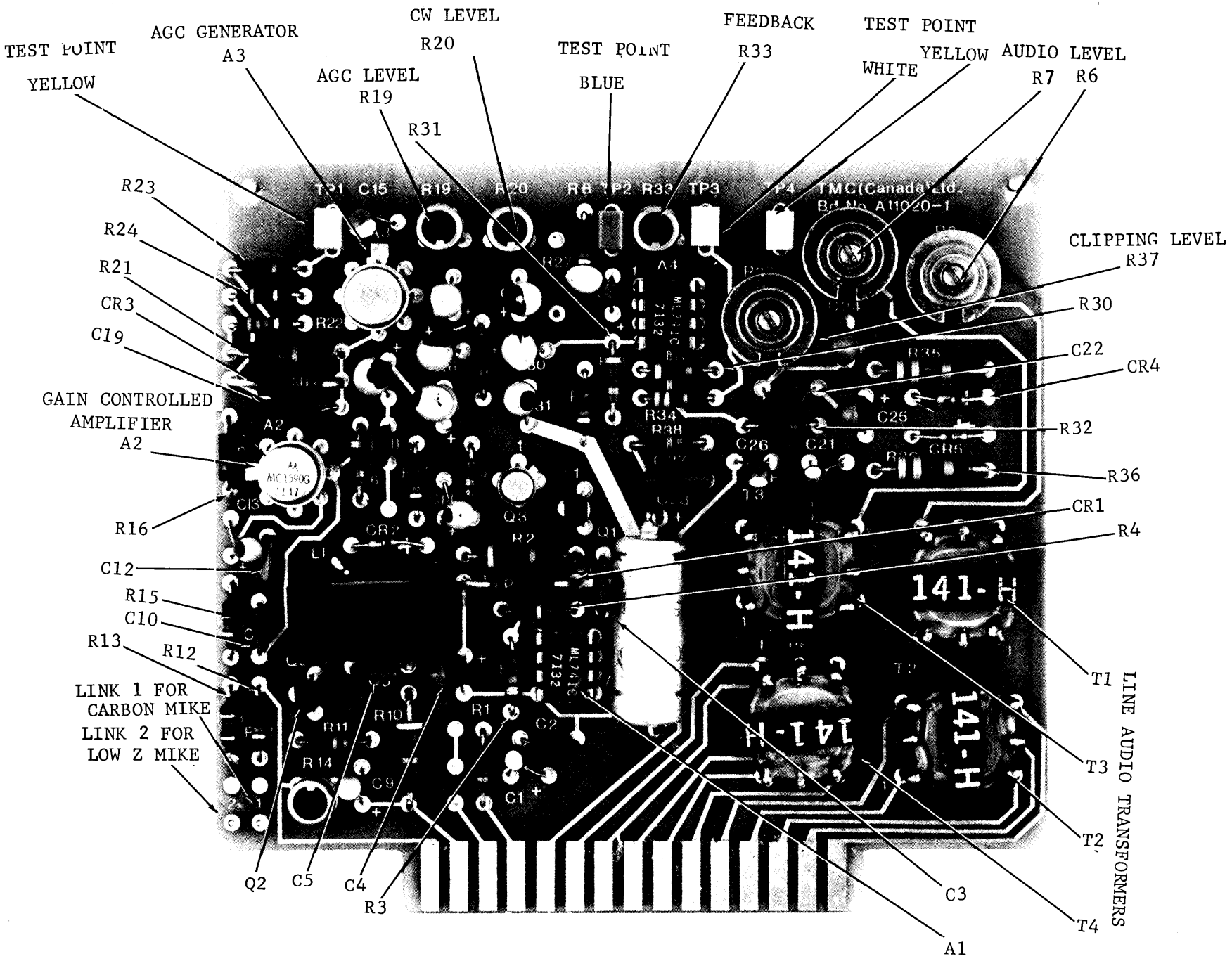
LAST SYMBOLS	MISSING SYMBOLS
A4	
C31	C7,8
CR5	
L1	
Q3	
R38	R9,28,29
T4	
TP4	

REFERENCE ASSEMBLY A11020

TOLERANCES UNLESS OTHERWISE SPECIFIED			SCALE
ALL OTHERS	DEC DIMS ±	.X ± .05	DRILL PUNCH COMMERCIAL STOCK SIZES AND MANUFACTURERS TOLERANCES ARE NOT INCLUDED
	FRAC DIMS ± 1/64	.XX ± .01	
	ANGULAR DIMS ± 0° 30'	.XXX ± .005	

SME 5			22 MAR 72
MODEL	PROJECT NO	ASS'Y NO	DATE
USED ON			

CK10844
SCHEMATIC, DIAGRAM
AF AMPLIFIER/OSCILLATOR



AF amplifier and oscillator A20 parts location

IF IT IS FOUND DESIRABLE T CHANGE ANY T LERANCE R OTHER DETAIL SPECIFIED N THIS DRAWING NOTIFY THE PURCHASER PROMPTLY.

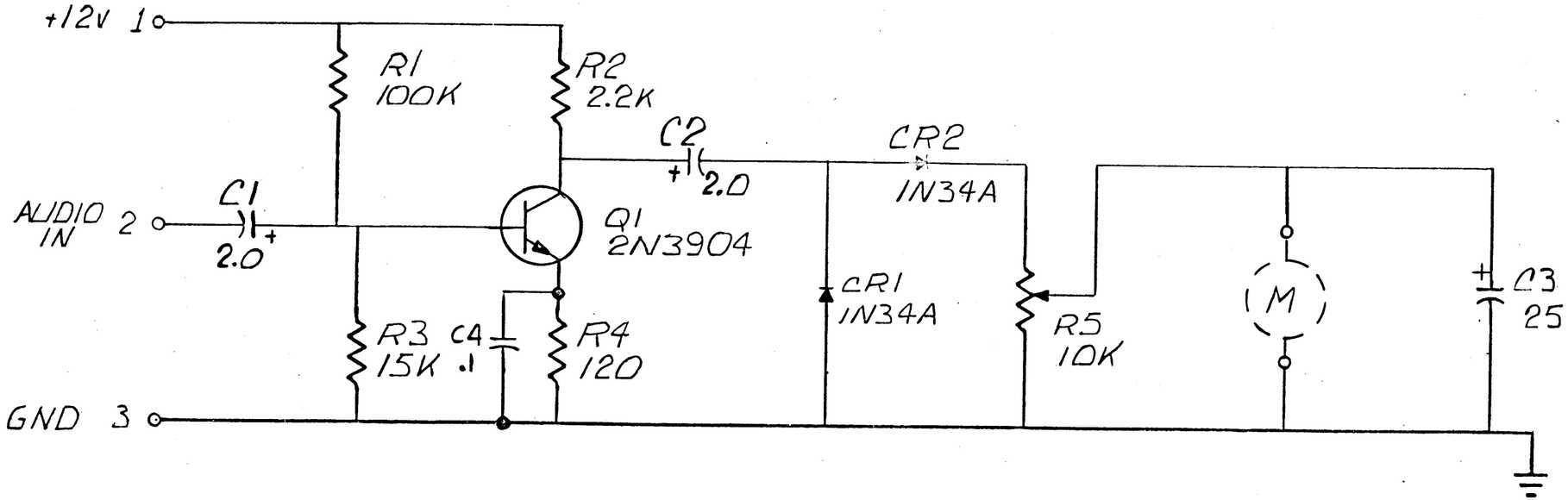
MAXIMUM ALL WABLE T LERANCES HAVE BEEN DETERMINED AND DEVIATIONS WILL BE CAUSE F R REJECTI N REMOVE ALL BURRS AND SHARP EDGES

DIMENSI NS IN INCHES UNLESS OTHERWISE SPECIFIED

ISSUE	ITEM	CHANGED FROM	DATE	CN NO	DRAFTS	CHECKER	ENG. APP.
X		ENG RELEASE	JUNE 4'71		AR		
A		CA ADD	12-10-76	21492	G.O.L		

CK10830 A

REQ	ITEM	PART N	DESCRIPTI N	SYMBOL



NOTE: UNLESS OTHERWISE SPECIFIED
RESISTANCE IN Ω, 1/4W
CAPACITANCE IN μF
LAST COMPONENTS USED C3, CR2, Q1, R5

REF: ASSY A10992-5

TOLERANCES UNLESS OTHERWISE SPECIFIED			SCALE ~
ALL OTHERS	DEC. DIM. ±	.X = .05 .XX = .01 .XXX = .005	DRILL, PUNCH, C MMERCIAL STOCK SIZES AND MANUFACTURERS T LERANCES ARE N T INCLUDED
	FRAC. DIM. ± 1/64		
	AN ULAR DIM. ± 0°30'		

M DEL	PR JECT NO	ASS Y. N	DATE
SME-5	125/71		4 JUNE 71

USED ON

STOCK SIZE —
MATERIAL — WEIGHT —
TYPE & TEMPER —
HEAT TREAT SPEC —
FINISH & SPEC NO —

CK10830
SCHEMATIC, DIAGRAM
P.C. BD., METER

FORM 128

IF IT IS FOUND DESIRABLE TO CHANGE ANY TOLERANCE OR OTHER DETAIL SPECIFIED ON THIS DRAWING NOTIFY THE PURCHASER PROMPTLY.

MAXIMUM ALLOWABLE TOLERANCES HAVE BEEN DETERMINED AND DEVIATIONS WILL BE CAUSE FOR REJECTION. REMOVE ALL BURRS AND SHARP EDGES

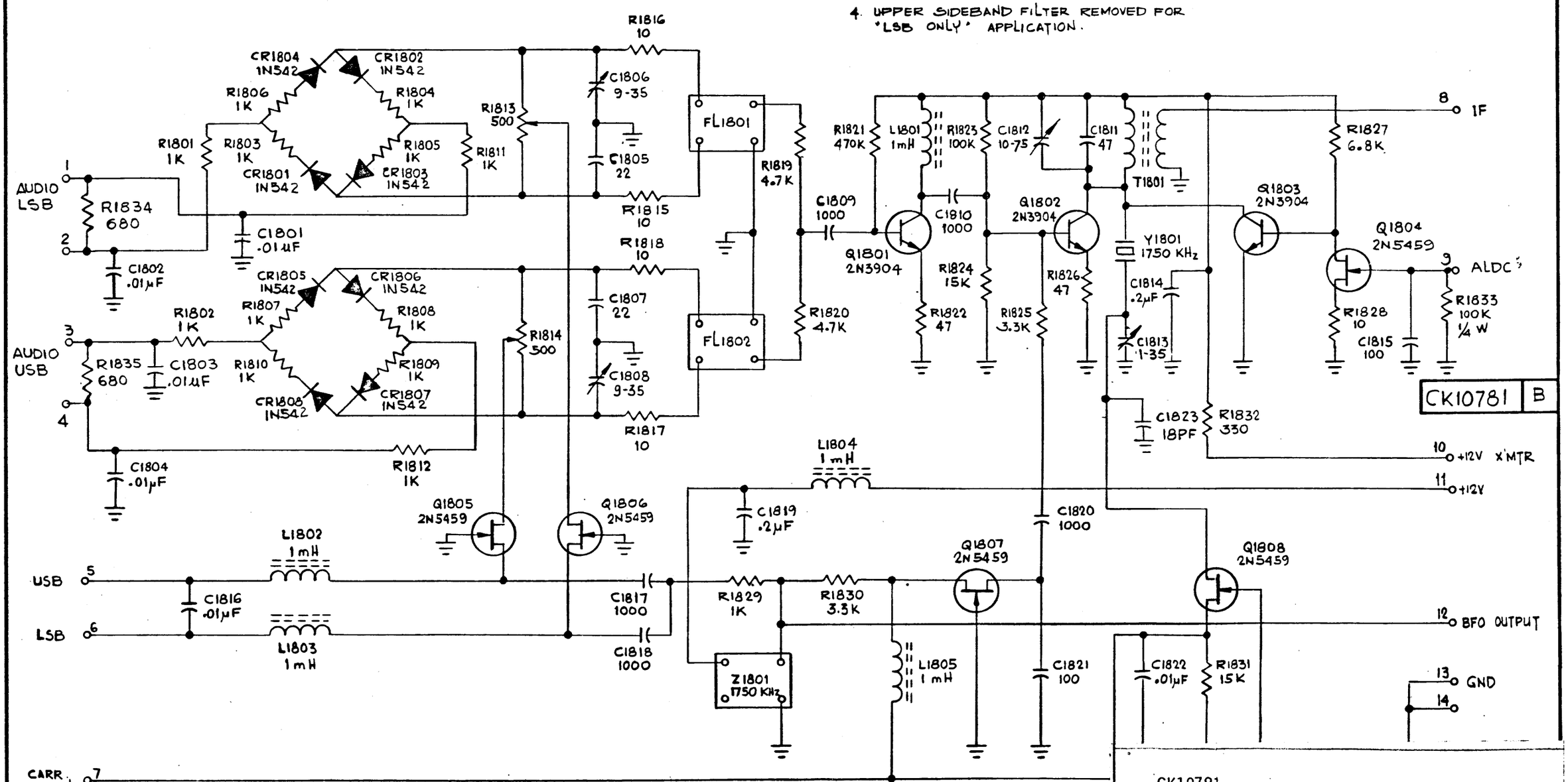
DIMENSIONS IN INCHES UNLESS OTHERWISE SPECIFIED

ISSUE	ITEM	CHANGED FROM	DATE	EN NO.	DRAFTS	CHECKED	ENG. APP.
A		REV PER CEMN	APR 2031	952	JR	GT	
B		CR1801-CR1808 TYP WAS IN 34. C1813 WAS 10-75 -C1823 ADD	12-10-76	21494	GDL		

REQ.	ITEM	PART NO	DESCRIPTION	SYMBOL

NOTES:-

1. FL1801 IS FX 10014 - 1D
2. FL1802 IS FX 10014 - 2D
3. LOWER SIDEBAND FILTER REMOVED FOR "USB ONLY" APPLICATION.
4. UPPER SIDEBAND FILTER REMOVED FOR "LSB ONLY" APPLICATION.



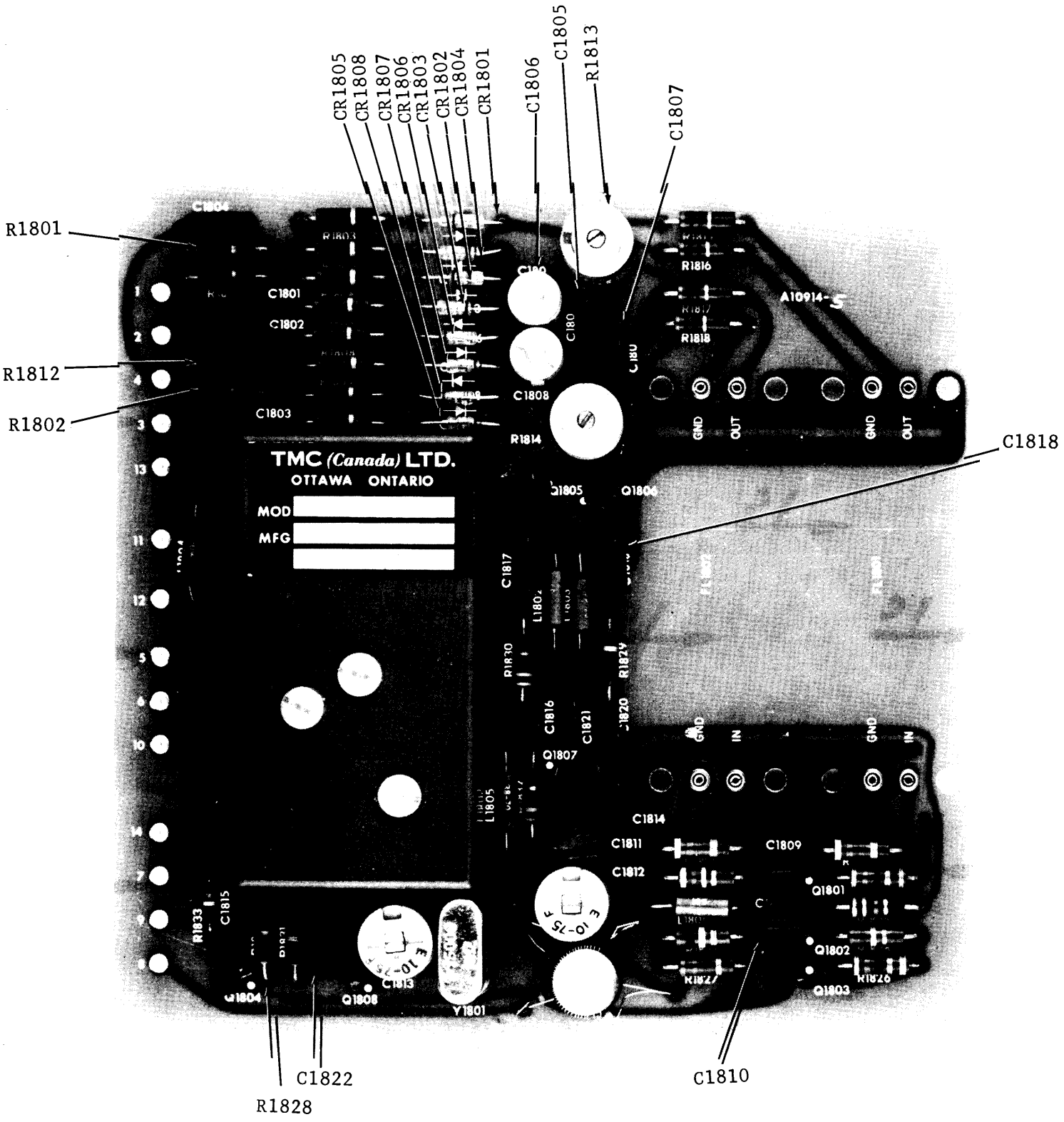
CK10781 | B

UNLESS OTHERWISE SPECIFIED :
CAPACITANCE IN PICO FARAD
RESISTANCE IN OHMS, 1/2 WATT

CK10781
SCHEMATIC, DIAGRAM
TRANSMIT IF BOARD

TOLERANCES		SCALE
ALL OTHERS	DEC. DIM. ± .XX=.05; FRAC. DIM. ± 1/64 .XX=.01; ANGULAR DIM. ± 0° 30' .XXX=.005	DRILL, PUNCH, COMMERCIAL STOCK SIZES AND MANUFACTURERS TOLERANCES ARE NOT INCLUDED

SME-5	107/70	A10914-5	12 NOV-
MODEL	PROJECT NO.	ASS'Y. NO.	DAT
USED ON			



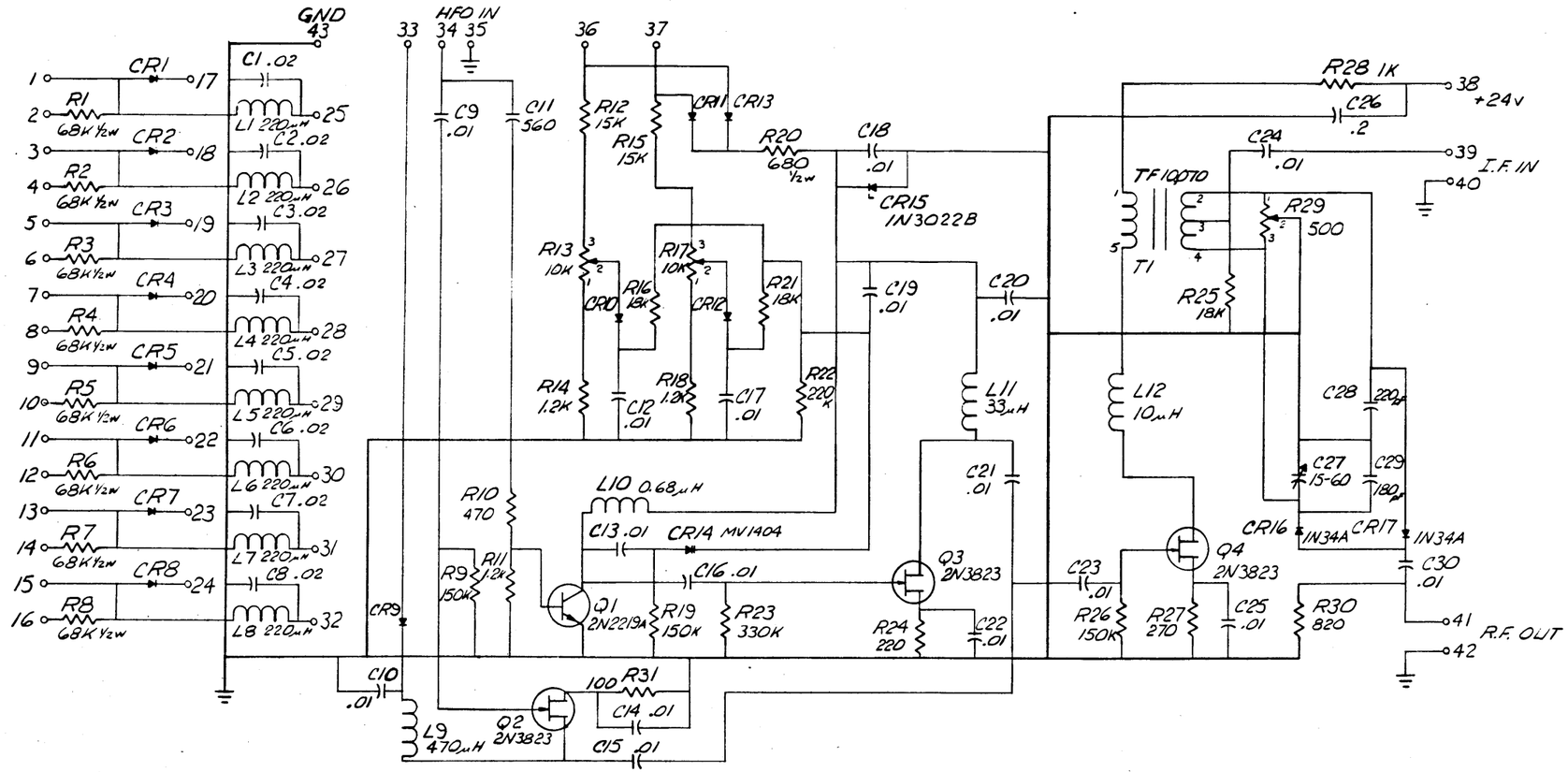
XMIT IF board A9 parts location

IF IT IS FOUND DESIRABLE TO CHANGE ANY TOLERANCE OR OTHER DETAIL SPECIFIED ON THIS DRAWING, NOTIFY THE PURCHASER PROMPTLY.	DIMENSIONS IN INCHES UNLESS OTHERWISE SPECIFIED
MAXIMUM ALLOWANCE TOLERANCES HAVE BEEN DETERMINED AND DEVIATIONS WILL BE CAUSE FOR REJECTION. REMOVE ALL BURRS AND SHARP EDGES.	

ISSUE	ITEM	CHANGES FROM	DATE	CN NO	DRAFTS	CHECKED	ENG. APP.
Ø		PROD RELEASE	FEB 9 '71		JDP		
A		PER LEMN	APR 16 '71	950	HR		

CK10779 A

REQ	ITEM	PART NO	DESCRIPTION	SYMBOL



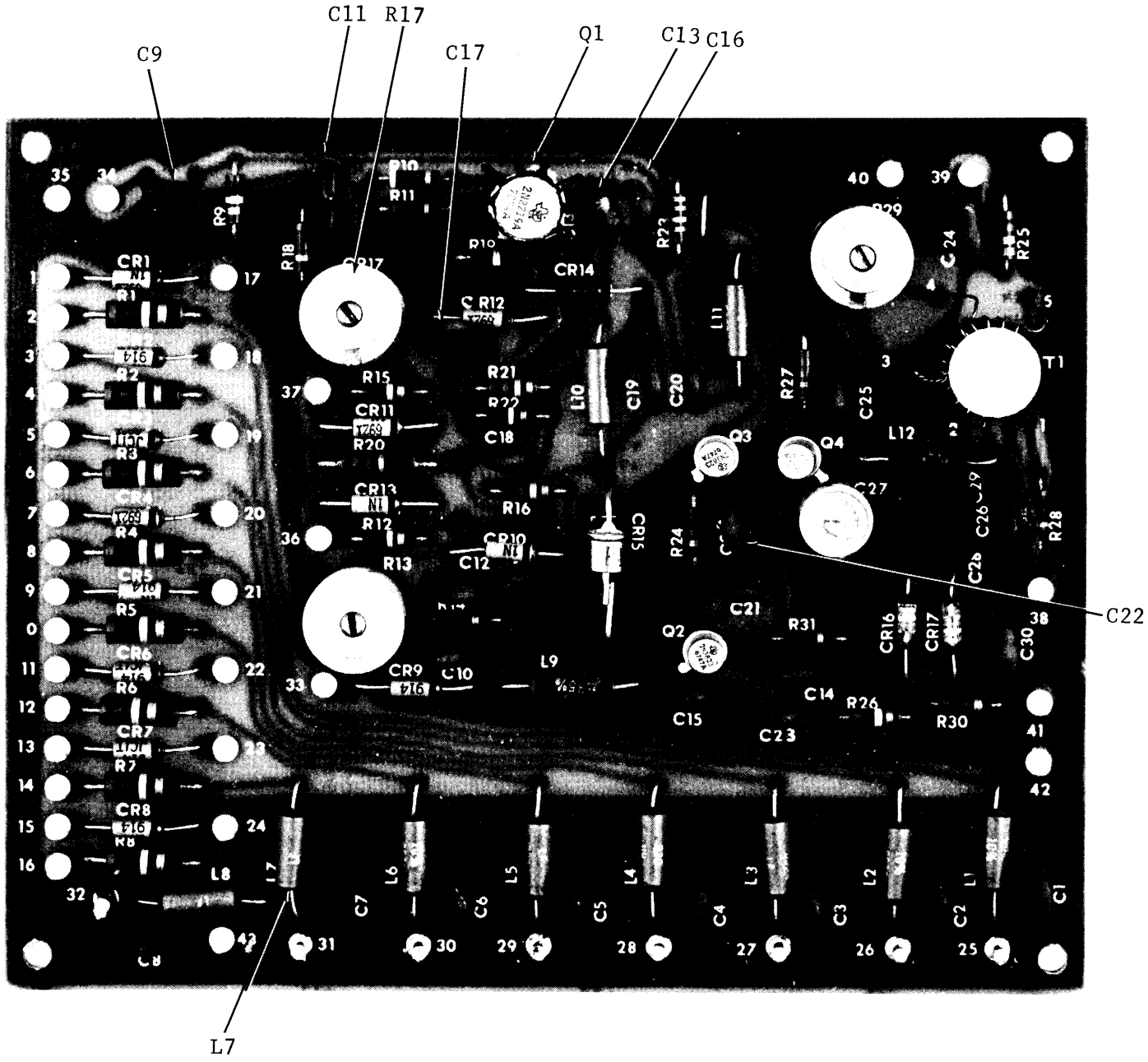
NOTE: UNLESS OTHERWISE SPECIFIED;
RESISTANCE IN Ω ±5%, ¼W;
CAPACITANCE IN µF;
DIODES 1N914.

CK10779
SCHEMATIC, DIAGRAM
MIXER/DOUBLER

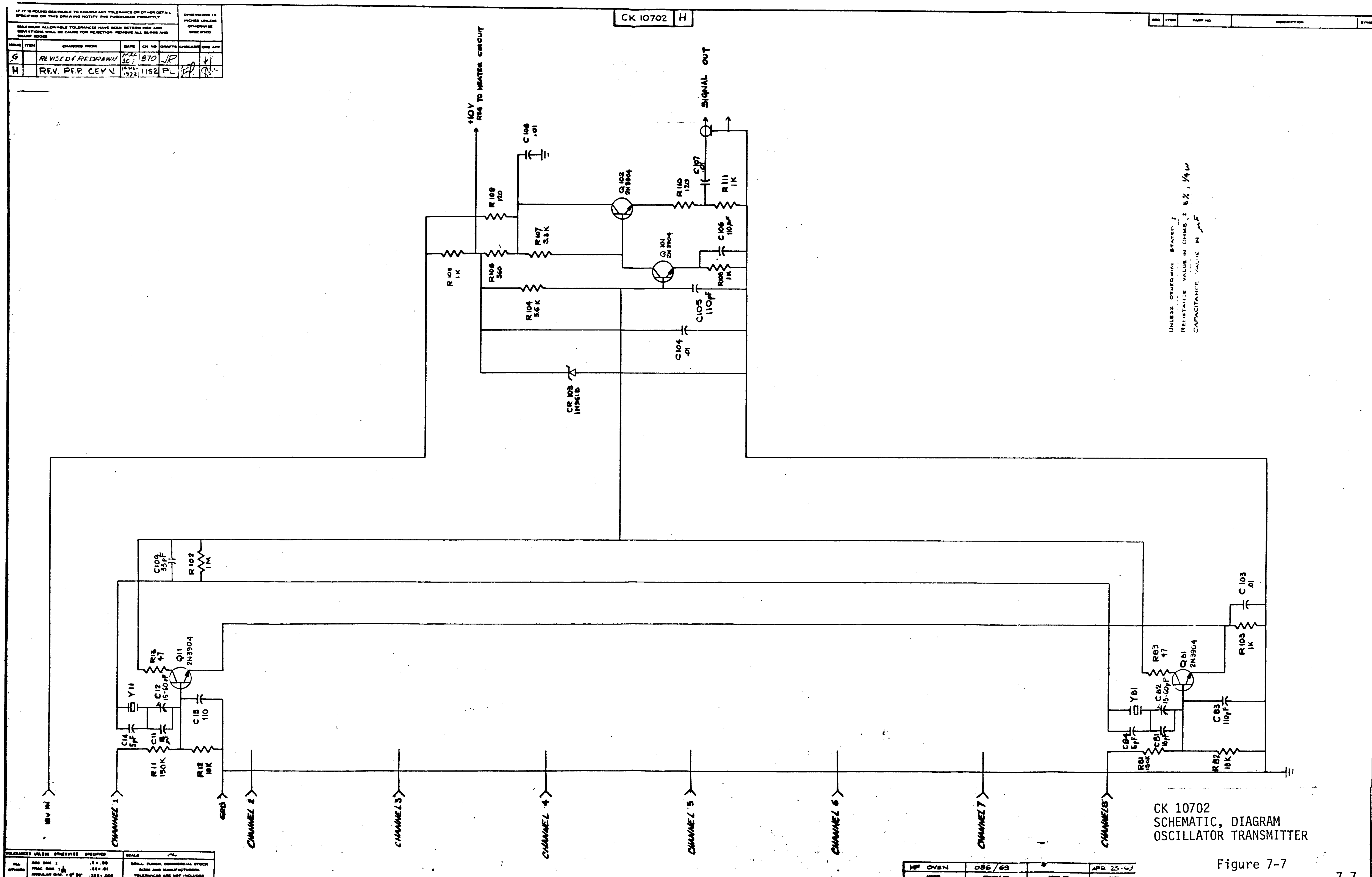
TOLERANCES UNLESS OTHERWISE SPECIFIED		SCALE ~
ALL DIMENSIONS	SEE DIM: ± .X ± .03 FRAC DIM: ± 1/64 ANGULAR DIM: ± 0° 30'	.XX ± .01 .XXX ± .005
	DRILL PUNCH: COMMERCIAL STOCK SIZES AND MANUFACTURERS TOLERANCES ARE NOT INCLUDED	

SME-5	10
MODEL	#

FORM 139

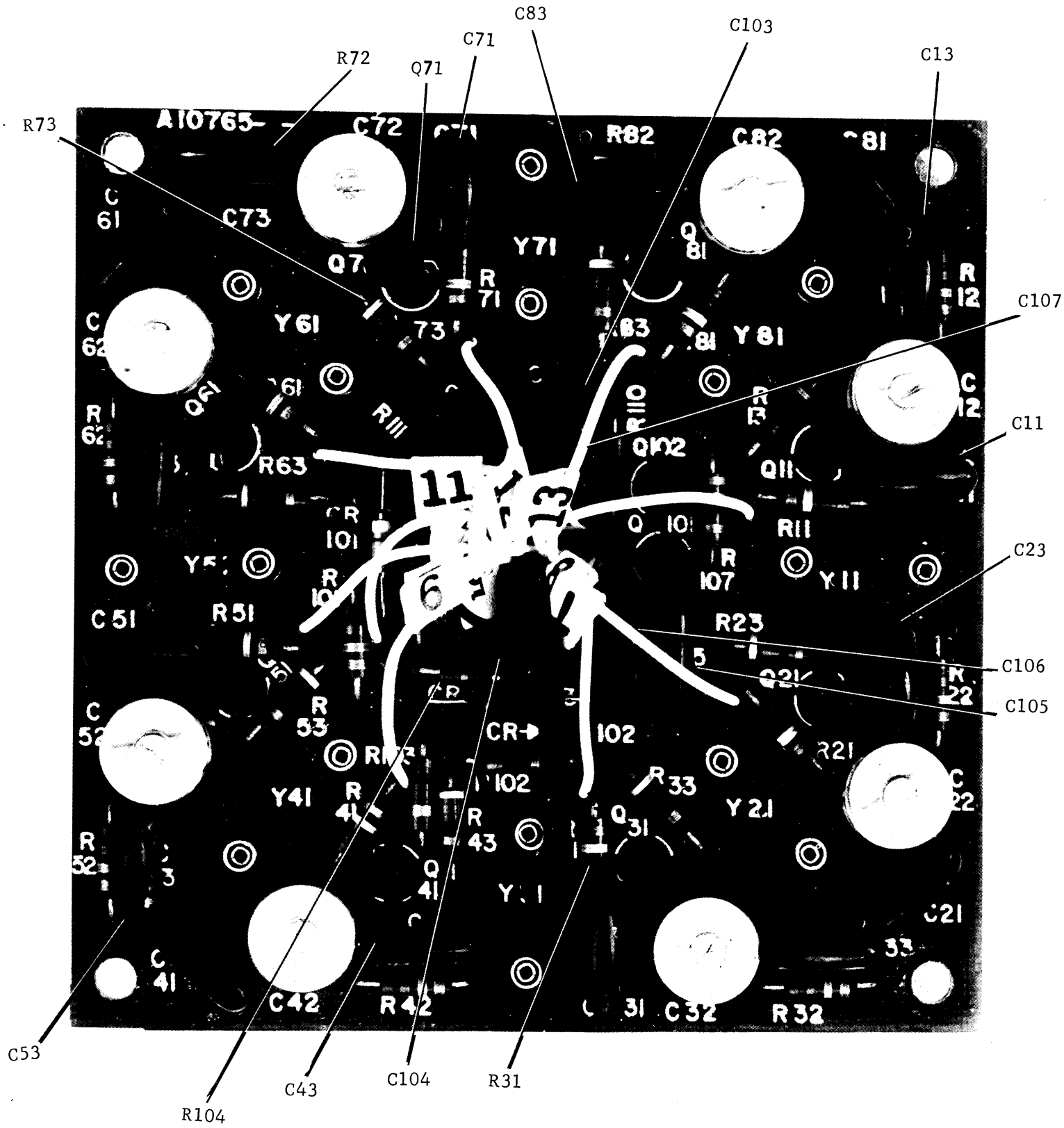


Mixer-doubler A13 parts location



CK 10702
SCHEMATIC, DIAGRAM
OSCILLATOR TRANSMITTER

Figure 7-7

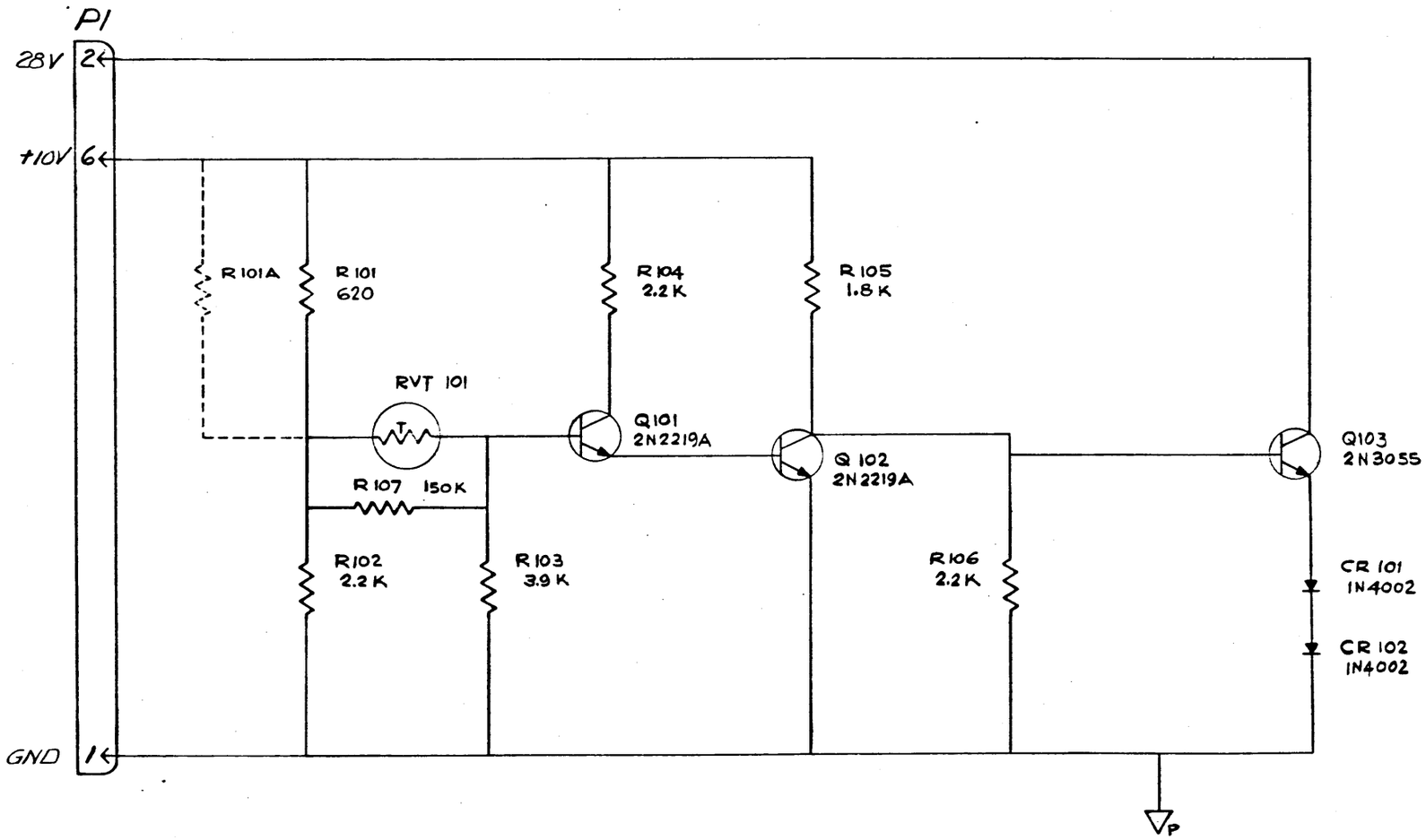


HF oscillator A12 parts location

IF IT IS FOUND DESIRABLE TO CHANGE ANY TOLERANCE OR OTHER DETAIL SPECIFIED ON THIS DRAWING NOTIFY THE PURCHASER PROMPTLY.	DIMENSIONS IN INCHES UNLESS OTHERWISE SPECIFIED
MAXIMUM ALLOWABLE TOLERANCES HAVE BEEN DETERMINED AND DEVIATIONS WILL BE CAUSE FOR REJECTION REMOVE ALL BURRS AND SHARP EDGES	

SERIAL	ITEM	CHANGED FROM	DATE	CH. NO.	DRAFTS	CHECKED	ENG. APP.
Ø		PROD RELEASE	6 APR 1 70		M		

REQ.	ITEM	PART NO.	DESCRIPTION	SYMBOL



CK 10703 | Ø

UNLESS OTHERWISE STATED :

RESISTANCE VALUE IN OHMS ± 5% .25 WATT
CAPACITANCE VALUE IN PICOFARADS - WHOLE NUMBERS.
MICROFARADS - DECIMAL NUMBERS.

▽P DENOTES POWER GROUND, SUPPLIED ONLY THROUGH J1.

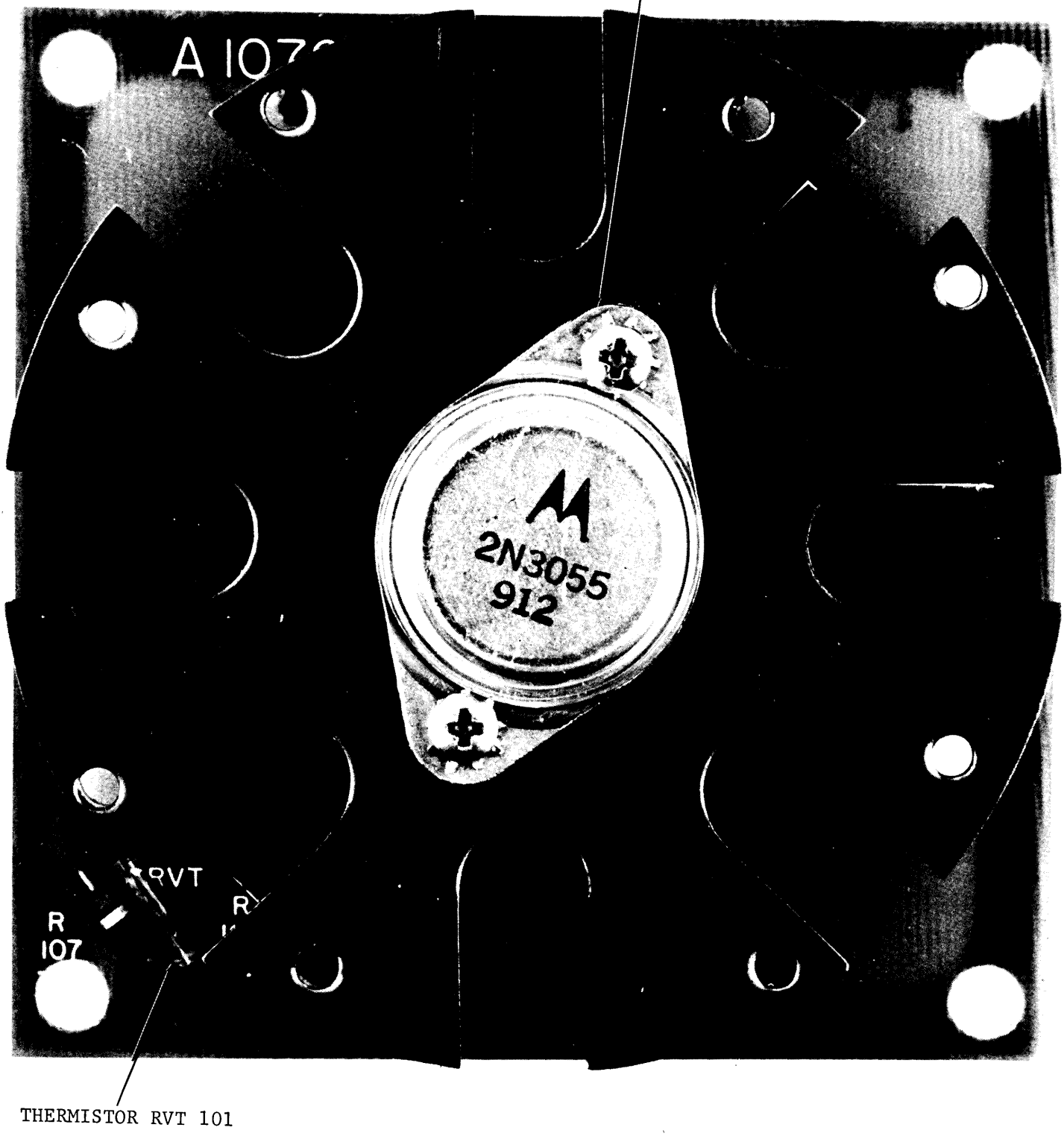
ALL COMPONENTS ARE 3100 SERIES

TOLERANCES		SCALE
ALL OTHERS	DEC. DIM. ± .X=.05; FRAC. DIM. ± 1/64 .XX=.01; ANGULAR DIM. ± 0° 30' .XXX=.005	DRILL, PUNCH, COMMERCIAL STOCK SIZES AND MANUFACTURERS TOLERANCES ARE NOT INCLUDED.

HP CYEN	086 / 69	
MODEL	PROJECT NO.	
USED ON		

CK10703
SCHEMATIC, DIAGRAM
CONTROL BAORD

Figure 7-8



Oven control assembly A12A1 parts location

IF IT IS F UND DESIRABLE TO CHANGE ANY TOLERANCE R THER DETAIL SPECIFIED ON THIS DRAWING NOTIFY THE PURCHASER PROMPTLY.

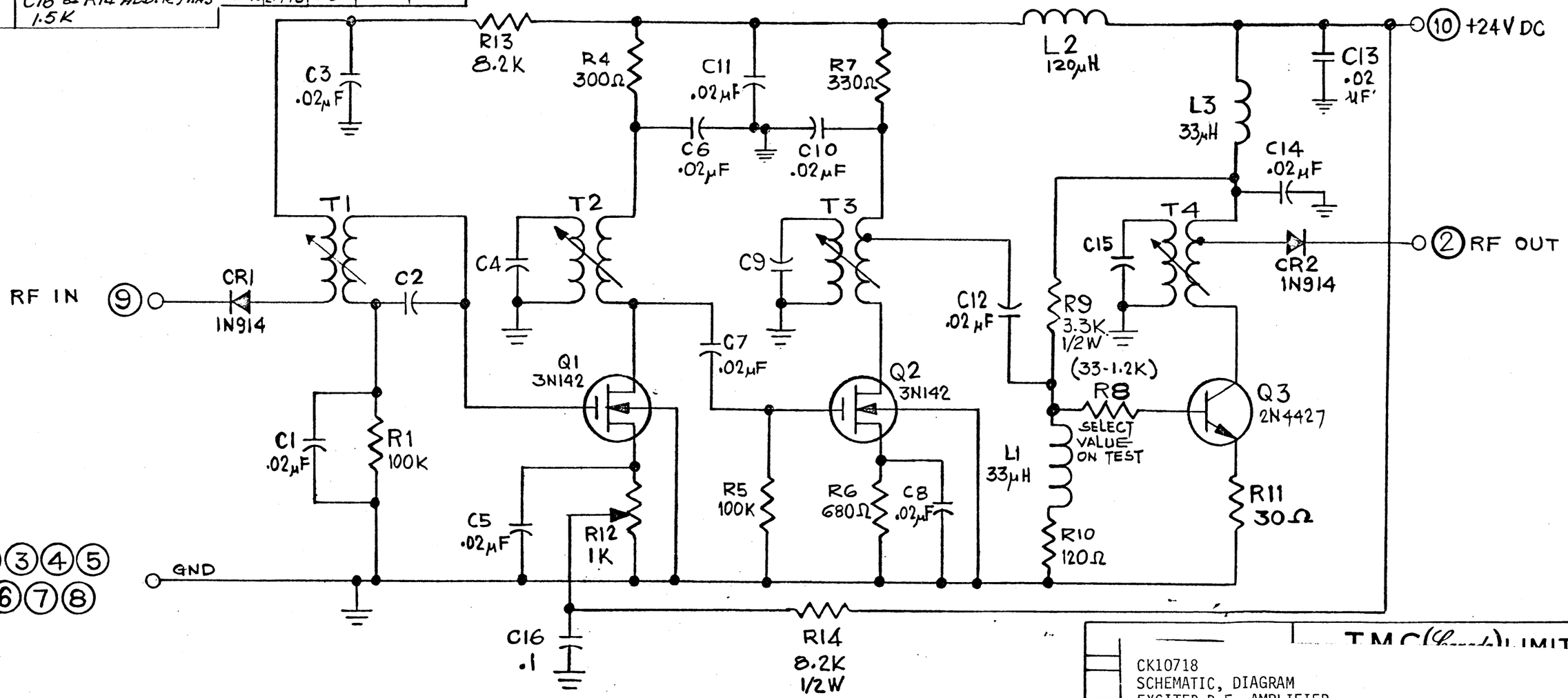
MAXIMUM ALL WABLE TOLERANCES HAVE BEEN DETERMINED AND DEVIATIONS WILL BE CAUSE F R REJECTI N REMOVE ALL BURRS AND SHARP EDGES

DIMENSI NS IN INCHES UNLESS OTHERWISE SPECIFIED

ISSUE	ITEM	CHANGED FROM	DATE	CN NO	DRAFTS	CHECKER	ENG. APP.
Ø		PROD RELEASE	6 APR 1970		M		
A		REV TO CEMN	18 Nov 70	856	AR.		
B		REV TO CEMN	9 Dec 70	869	AR.		
C		REV TO CEMN	AUG 30 71	975	AR		
D		C16 & R14 ADD. R9 WAS 1.5K	11-10-76	21493	G.D.L		

CK10718 D

REQ	ITEM	PART NO	DESCRIPTI N	SYMBOL



TMC (Canada) LIMITED

CK10718
SCHEMATIC, DIAGRAM
EXCITER R.F. AMPLIFIER

TOLERANCES UNLESS OTHERWISE SPECIFIED			SCALE
ALL OTHERS	DEC DIM ±	.X = .05 .XX = .01 .XXX = .005	DRILL, PUNCH, COMMERCIAL STOCK SIZES AND MANUFACTURERS T LERANCES ARE N T INCLUDED.
	FRAC. DIM. ± 1/64		
	AN ULAR DIM. ± 0°30'		

MODEL	PROJECT N	ASS Y NO.	DATE
SME-5	107/70	A10795-5	18 Nov '70
MTR-100	D87/69'		July 7, 69'

USED ON

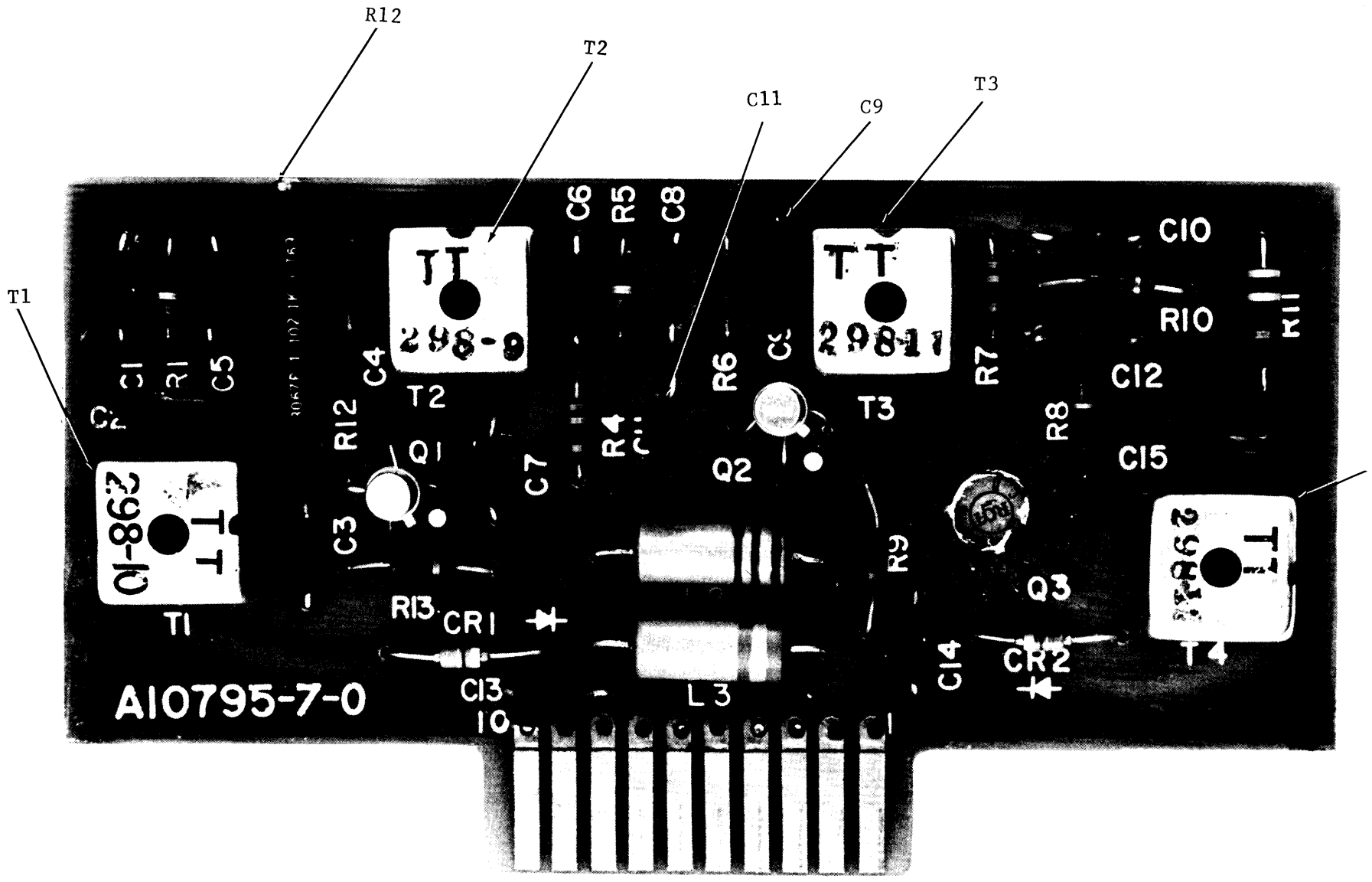
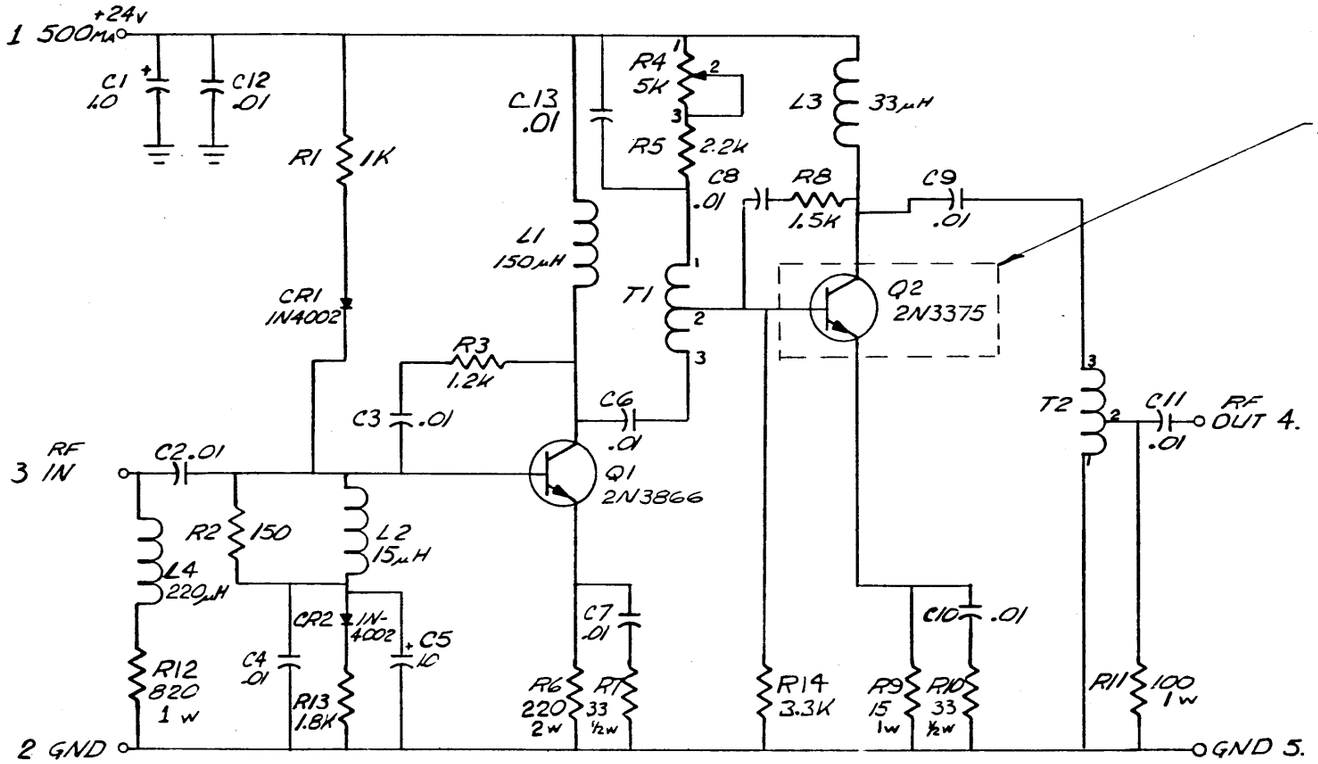


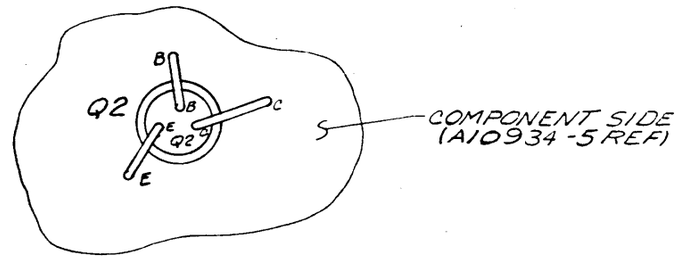
Figure 5-4 RF amplifier A14 parts location

IF IT IS FOUND DESIRABLE TO CHANGE ANY TOLERANCE OR OTHER DETAIL SPECIFIED ON THIS DRAWING NOTIFY THE PURCHASER PROMPTLY.	DIMENSIONS IN INCHES UNLESS OTHERWISE SPECIFIED
MAXIMUM ALLOWABLE TOLERANCES HAVE BEEN DETERMINED AND DEVIATIONS WILL BE CAUSE FOR REJECTION REMOVE ALL BURRS AND SHARP EDGES	

ISSUE	ITEM	CHANGED FROM	DATE	CH. NO.	DRAFTS	CHECKED	ENG. APP.
ϕ		PROD. RELEASE	FEB 3/71		JDR		
A		REV PER CEMN	APR 19-71	950	JR		
B		REV PER CEMN	JUNE 14-71	1006	HK		
C		REV PER CEMN	AUG 30-71	975	JR		

DEG.	ITEM	PART NO.	DESCRIPTION	SYMBOL





CK10796 C

NOTE: UNLESS OTHERWISE SPECIFIED;
RESISTANCE IN Ω, 1/4W;
CAPACITANCE IN µF.

LAST USED COMPONENT DESIGNATIONS: Q2
C13
R14
T2
L4
CR2

TOLERANCES		SCALE
ALL OTHERS	DEC. DIM. ± .X= .05 FRAC. DIM. ± 1/64 .XX=.01 ANGULAR DIM. ± 0° 30' .XXX=.005	DRILL, PUNCH, COMMERCIAL STOCK SIZES AND MANUFACTURERS TOLERANCES ARE NOT INCLUDED.

SME-5	107170	A10934-5	4 No
MODEL	PROJECT NO.	ASS'Y. NO.	
USED ON			

CK10796
SCHEMATIC, DIAGRAM
WIDE BAND AMP.

FORM 179

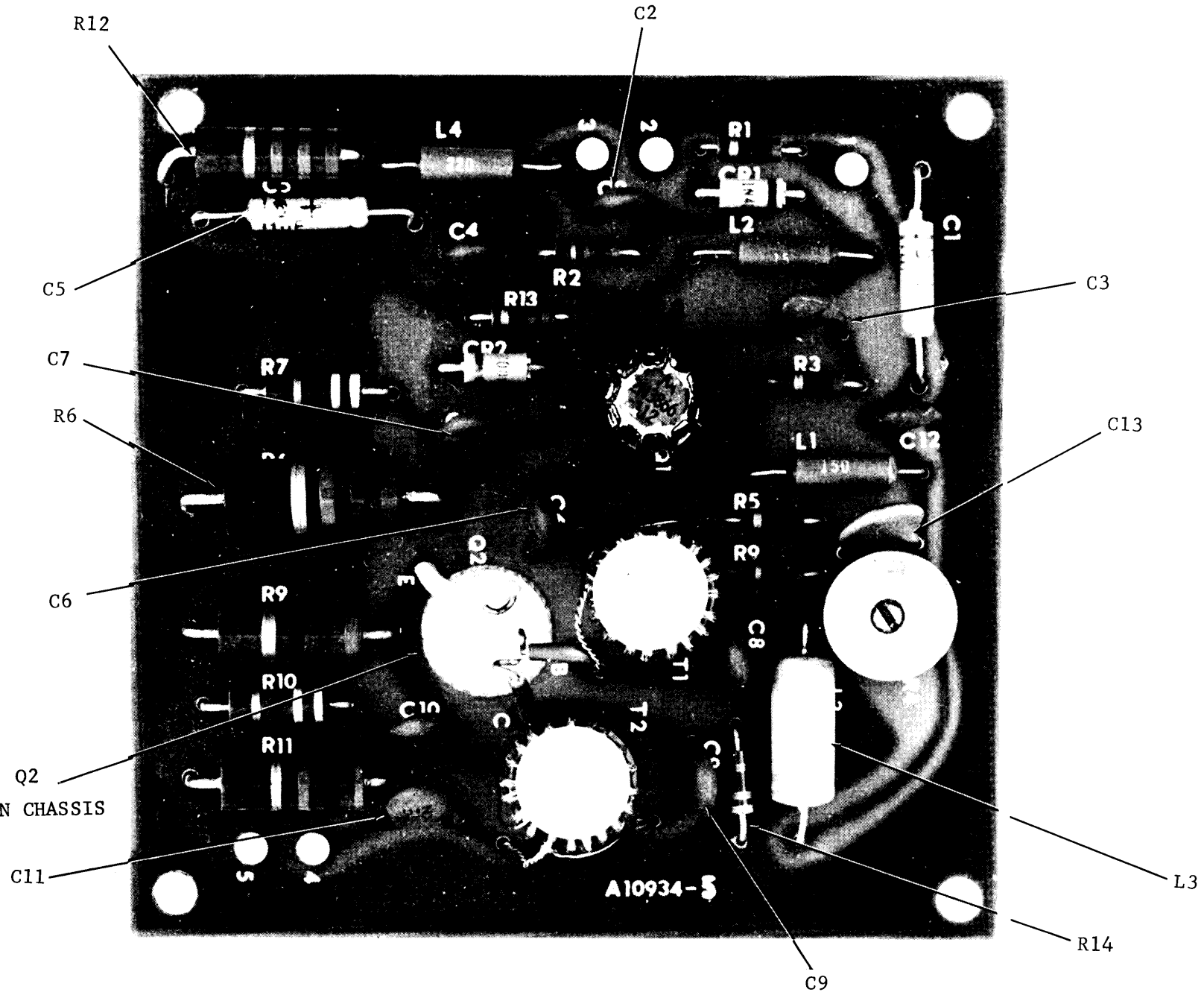
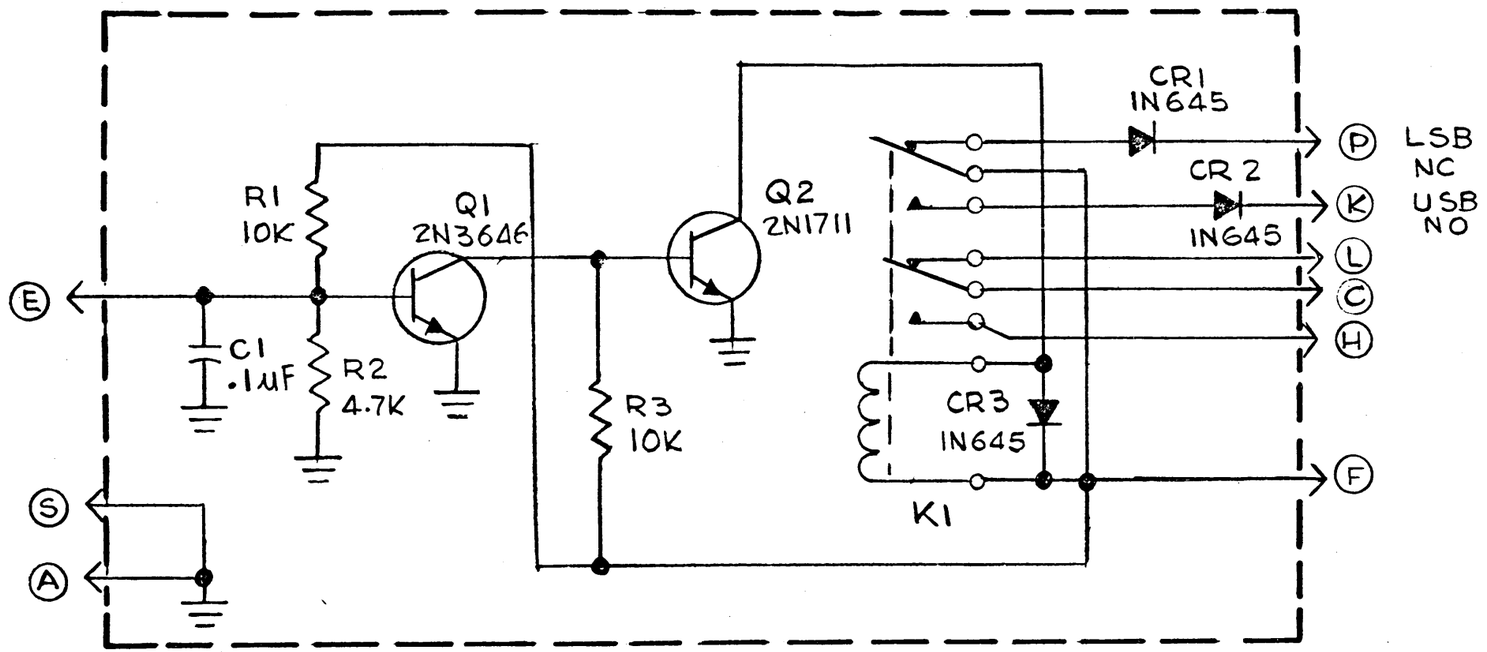


Figure 5-5 Wideband amplifier A15 parts location

REVISIONS							
E.M.N. NO.	DRAFT	CHKD	ZONE	LTR	DESCRIPTION	DATE	APPROVED
				X1	R1 & R3 WAS 22K CONNECTION MODIF.	12-28-70	



PC756 A5655

QTY / UNIT	MODEL USED ON	ASS'Y NO.
1	SME-5C	

APPLICATION

CODE

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE CHEMICALLY APPLIED OR PLATED FINISHES

DECIMALS		FRACTIONS
.X ± .05	TOLS.	1/64
.XX ± .01		ANGLES
.XXX ± .005		0° 30'

MATERIAL

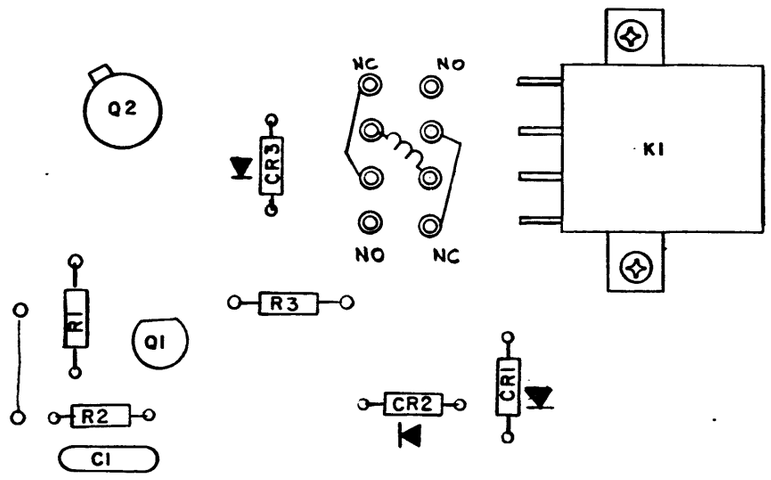
FINISH

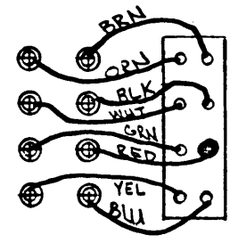
FINAL APPROVAL	
MECH. DES.	
ELECT. DES.	
CHECKED	
DRAWN	G.D.L.

REQ'D	ITEM	PART NUMBER	DESCRIPTION	SYM
			A5655 SCHEMATIC, DIAGRAM ASSY PRINTED CIRCUIT BD.	7-11
			Figure 7-11	
			USB, LSB SWITCHING	7-11A
			Figure 7-11A	

REVISIONS							
ZONE	LTR	DESCRIPTION	DATE	E.M.N.NO	DRAFT	CHKD	APPD
	X1	CR1 REVERSED, SIDE VIEW Added	12-7-76				

PC756-
A5655





ASSEMBLY NOTES

1. TO MOUNT COMPONENTS INSERT LEADS THROUGH HOLES.
2. CAUTION, WHEN APPLYING HEAT & SOLDER TO LEAD & FOIL.
3. CLEAN & INSPECT AS PER SPEC S676.
4. FOR ELECTRICAL COMPONENT PART NUMBERS REFER TO NPL A
5. USE SYMBOL NUMBERS FOR ASSY. P"

REF: CK 4144

	SME-5C	
QTY / UNIT	MODEL USED ON	ASS'Y NO.

APPLICATION

CODE

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE CHEMICALLY APPLIED OR PLATED FINISHES

TOLERANCES ON

DECIMALS	FRACTIONS
.X ± .05	± 1/64
.XX ± .01	ANGLES
.XXX ± .005	± 0° 30'

MATERIAL

FINISH

X	2	BS 100	SOLDER TIN ALLOY

A5655
SCHEMATIC, DIAGRAM
ASSY PRINTED CIRCUIT BD. 7-11

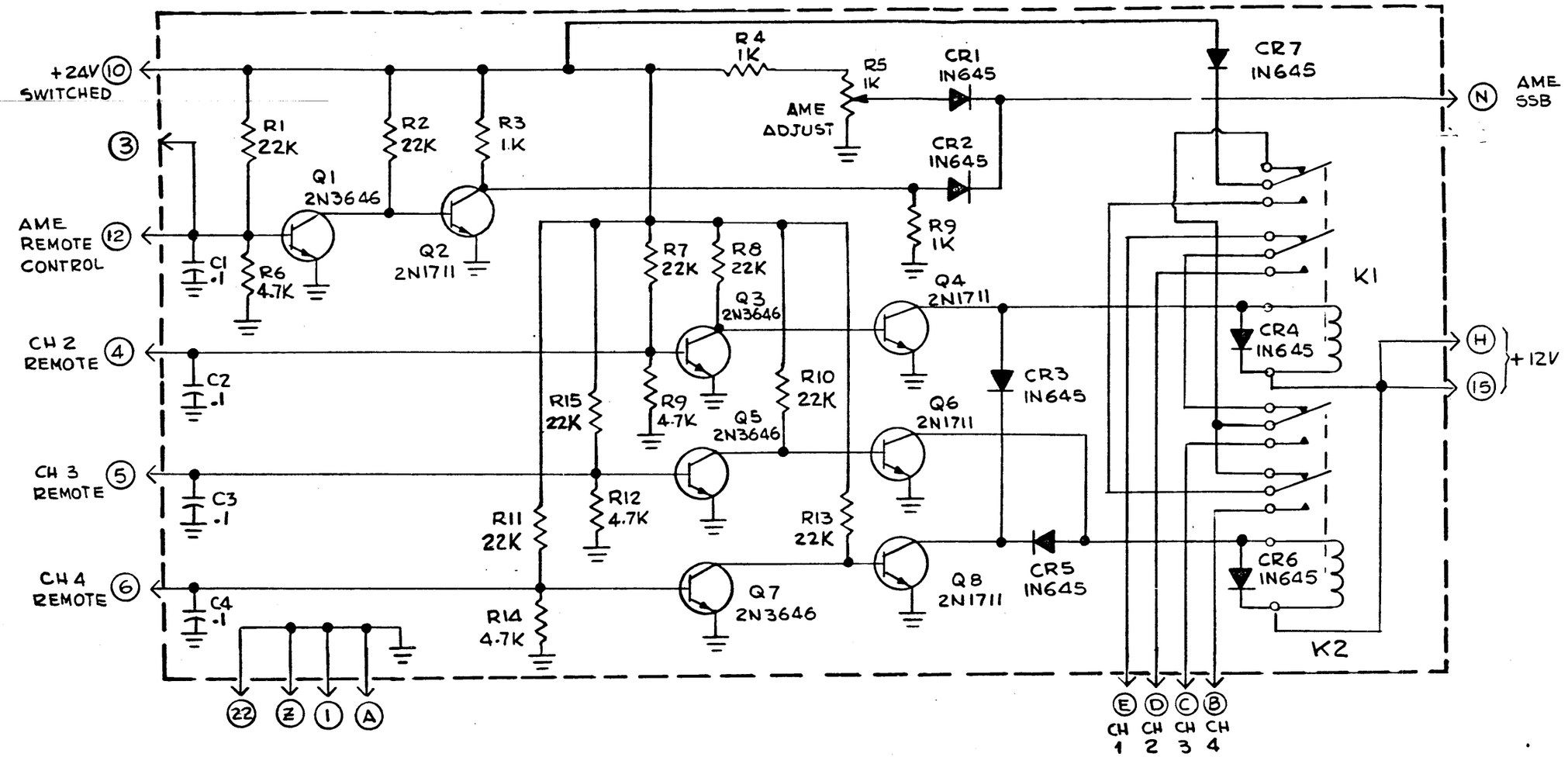
Figure 7-11

USB, LSB SWITCHING 7-11A

Figure 7-11A

PCI-10-170 (10-66)

REVISIONS							
ZONE	LTR	DESCRIPTION	DATE	E.M.N.NO	DRAFT	CHKD	APPD
	X1	R15, K1, C1-C4 MODIFIED					
	X2	K1, K2 CONNECTIONS MODIFIED	12-26-76				
	X3	CR7 ADDED	2-28-76		JD		
	X4	PIN 3 CONNECTED TO PIN 12	1-11-76				



PC755/A5654

NOTE:
UNLESS OTHERWISE SPECIFIED
RESISTANCE VALUES ARE IN OHMS 1/4W-

1	SME-5C	A5654
QTY / UNIT	MODEL USED ON	ASS'Y NO.

APPLICATION

CODE

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE CHEMICALLY APPLIED OR PLATED FINISHES

TOLERANCES ON

DECIMALS	FRACTIONS
.X ± .05	± 1/64
.XX ± .01	ANGLES
.XXX ± .005	± 0° 30'

MATERIAL

FINISH

CK4143
SCHEMATIC, DIAGRAM
REMOTE CHANNEL CONTROL

7-12

Figure 7-12

PRINTED CIRCUIT BD.

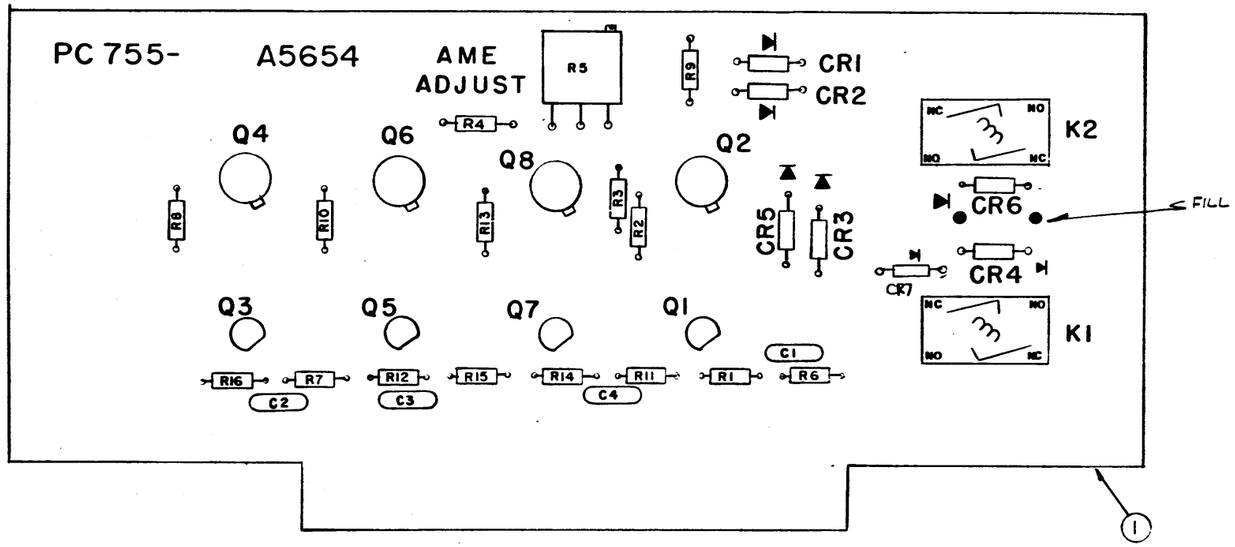
7-12A

Figure 7-12A

PC1-10-170 (10-66)

REVISIONS						
E.M.N.NO	DRAFT	CHKD	ZONE	LTR	DESCRIPTION	DATE	APPROVED
				X1	CR7 ADDED	12-27-5	

STAKE TO PC BOARD



ASSEMBLY NOTES

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4. FOR ELECTRICAL COMPONENT PART NUMBERS REFER TO NPL A
5. USE SYMBOL NUMBERS FOR ASSY. REF.

1	SME-SC	
QTY / UNIT	MODEL USED ON	ASS'Y NO.
APPLICATION		
	CODE	

CK4143
SCHEMATIC, DIAGRAM
REMOTE CHANNEL CONTROL

Figure 7-12

PRINTED CIRCUIT BD.

Figure 7-12A