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TECHNICAL MANUAL

for

GENERAL PURPOSE TRANSMITTER

MODEL GPTR-2.5KE6-4

SYSTEM

Serial No. 4001

41001

**MASTER COPY
DO NOT DESTROY**



for Sales Order

35-3212

*(Remote Unit
to be supplied
at later date)*

*2 manuals shipped
Oct 5, 1971*

THE TECHNICAL MATERIEL CORPORATION

MAMARONECK, N.Y.

OTTAWA, ONTARIO



TECHNICAL MANUAL
for
GENERAL PURPOSE TRANSMITTER
MODEL GPTR-2.5KE6-4
SYSTEM

Serial No. 41001
4007



THE TECHNICAL MATERIEL CORPORATION
MAMARONECK, N. Y. OTTAWA, CANADA





THE TECHNICAL MATERIEL CORPORATION

C O M M U N I C A T I O N S E N G I N E E R S

700 FENIMORE ROAD

MAMARONECK, N. Y.

Warranty

The Technical Materiel Corporation, hereinafter referred to as TMC, warrants the equipment (except electron tubes,*fuses, lamps, batteries and articles made of glass or other fragile or other expendable materials) purchased hereunder to be free from defect in materials and workmanship under normal use and service, when used for the purposes for which the same is designed, for a period of one year from the date of delivery F.O.B. factory. TMC further warrants that the equipment will perform in a manner equal to or better than published technical specifications as amended by any additions or corrections thereto accompanying the formal equipment offer.

TMC will replace or repair any such defective items, F.O.B. factory, which may fail within the stated warranty period, PROVIDED:

1. That any claim of defect under this warranty is made within sixty (60) days after discovery thereof and that inspection by TMC, if required, indicates the validity of such claim to TMC's satisfaction.
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.

Electron tubes*furnished by TMC, but manufactured by others, bear only the warranty given by such other manufacturers. Electron tube warranty claims should be made directly to the manufacturer of such tubes.

TMC's obligation under this warranty is limited to the repair or replacement of defective parts with the exceptions noted above.

At TMC's option any defective part or equipment which fails within the warranty period shall be returned to TMC's factory for inspection, properly packed with shipping charges prepaid. No parts or equipment shall be returned to TMC, unless a return authorization is issued by TMC.

No warranties, express or implied, other than those specifically set forth herein shall be applicable to any equipment manufactured or furnished by TMC and the foregoing warranty shall constitute the Buyers sole right and remedy. In no event does TMC assume any liability for consequential damages, or for loss, damage or expense directly or indirectly arising from the use of TMC Products, or any inability to use them either separately or in combination with other equipment or materials or from any other cause.

*Electron tubes also include semi-conductor devices.

FOREWORD

TMC's General Purpose Transmitter, Model GPTR-2.5KE6-4, consists of two major components as follows:

SMER-6 Multi-Channel Exciter

PALA-2.5K Linear Amplifier

These two basic units are also included in various TMC transmitter systems as well as in the GPTR-2.5KE6-4. To satisfy this condition most practically, individual manuals on each unit are written, then combined, as required, to cover any of the GPTR-2.5's multi-channel transmitters. The GPTR-2.5KE6-4 manual is made up of individual manuals as described in Table of Contents of General Purpose Transmitter, Model GPTR-2.5KE6-4.

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GENERAL PURPOSE TRANSMITTER

MODEL GPTR-2.5KE6-4

<u>PART</u>	<u>TITLE</u>
1	Technical Manual for General Purpose Transmitter, Model GPTR-2.5KE6-4, System
2	Technical Manual for Linear Power Amplifier, PALA-2.5K
3	Technical Manual for Multi-Channel Exciter, Model SMER-6

NOTE

Information pertaining to maintenance, alignment, servo tuning adjustment, and replacement of parts for the Linear Amplifier or Exciter are found in the PALA-2.5K or SME-6 Technical Manuals.

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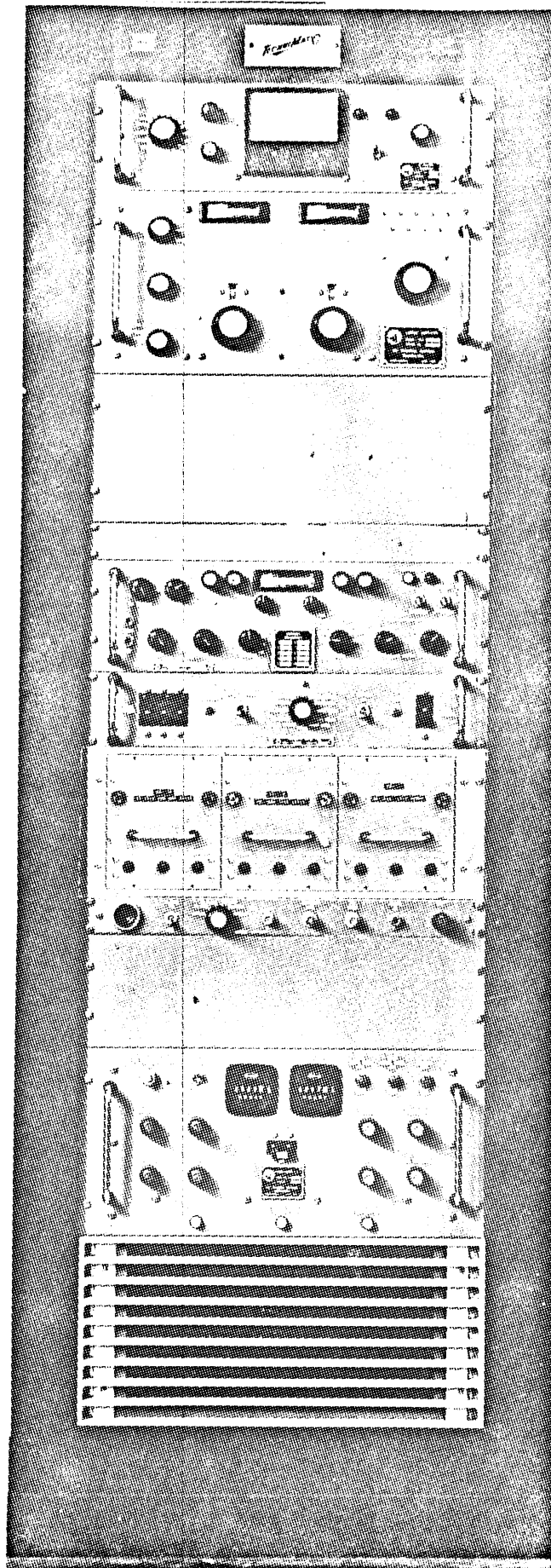


Figure 1-1. RADIO TRANSMITTER, MODEL GPTR-2.5KE6-4

SECTION 1

GENERAL INFORMATION

1-1. PURPOSE OF EQUIPMENT

Radio Transmitter, Model GPTR2.5KE6-4 (figure 1-1) is a multi-channel technimatic transmitter system providing 2500 watts peak envelope power (PEP) throughout the 2 to 30 megacycle (MHz) frequency range.

Operating modes include independent sideband (ISB), amplitude modulation equivalent (AME) and continuous wave (CW). Facsimile (FAX) and frequency-shift keying (FSK) may also be transmitted when used with additional equipment to provide FAX and FSK input signals.

Front-panel meter monitoring of all critical circuits and operational safety features are also provided. Safety features include mechanical/electrical interlocks, overload protective circuits for bias, plate current, screen current and transmission VSWR.

1-2. EQUIPMENT MAKE-UP

The transmitter major components are listed in table 1-1. See figure 1-1 for physical component mounting locations and paragraph 1-3 for component descriptions.

1-3. DESCRIPTION OF EQUIPMENT

a. RF Control and Indicator, SWCA-3K

The SWCA contains the dc controlled rotary solenoids for bandswitching. The unit also contains a power output meter that is calibrated in kilowatts; this meter also contains a second scale for measuring the transmission line SWR. An SWR switch is associated with the dual purpose output meter. The transmission line SWR is continuously monitored by a sensitive dc relay that will de-energize the transmitter should the SWR exceed the preset levels.

b. Linear Amplifier, TLAA-2.5K

The linear amplifier serves as a power amplifier between the exciter and the antenna. The TLAA contains the tune, loading and bandswitching circuits and all rf amplifier parts. The final tube (2.5 kilowatt amplifier) of the 3 stage amplifier is convection air-cooled by a blower within the rf section.

c. Low Voltage Power Supply, AP-128A/50

The low voltage power supply provides operating voltages to the linear amplifier. This unit also contains the overload protection circuit controls to adjust the overload relay sensitivity settings. The AP-128 provides bias, screen and filament voltages to the linear amplifier and voltages to the interlock and control circuits. The front panel contains filament and plate time meters and overload indicator lamps. All amplifier overload adjustments and bias controls are also front panel mounted.

d. High Voltage Power Supply, AP-129

The 5 kv high voltage power supply, mounted at the bottom of the equipment cabinet, contains the high voltage solid state rectifier stacks, filtering and the delta-wye step-up transformer.

This unit generates 5000 volts dc for the plate of the 2.5 kilowatt power amplifier tube. An automatic 60 second time delay circuit is integrally mounted inside the unit to delay the application of screen voltages to the linear amplifier.

e. Servo Amplifier Assembly, TCSA-1

The TCSA houses three servo amplifier units. These units, when controlled by the sense circuits of the linear amplifier, automatically tune and load the 2nd amplifier and PA portions of the transmitter.

f. Multi-Channel Exciter, SMER-6

The Model SMER-6 is a solid state exciter that provides CW operation

over a frequency range of 1.6 MHz to 30 MHz by the incorporation of nine plug-in coil assemblies. Rapid tuning within this frequency range is accomplished by front panel control selecting one of eight available preset crystal-controlled channels for CW, USB, LSB, ISB, AM, FSK, and FAX operation.

The SMER-6 is used to control the output frequency of the transmitter.

g. Transmitter Control Panel, TCP-1

The TCP controls the application of plate voltages to the 2.5 kilowatt power amplifier section and monitors all interlock circuits contained in the cabinet. The TCP also controls the primary ac power input to the cabinet. Other front panel controls include a reset push-button associated with the overload and bias relays in the low voltage power supply AP-128.

h. Alarm Panel, AX633

The AX633 is an alarm and monitor unit, providing connector receptacles for monitoring the PA output. An audio input jack, front panel mounted, provides for insertion of a two-tone test signal for testing the exciter unit. An audio alarm device, with its associated on/off toggle switch, and a dc line fuse are also front panel mounted. The alarm is activated when the transmitter's high voltage is removed. This action is controlled by the high voltage power supply circuit breaker.

i. Cabinet, Electrical Equipment, RAK-110

The RAK houses all the components comprising the transmitter, measuring 72 inches high by 25-1/4 inches wide by 30 inches deep. Rear and side access doors permit ease in maintenance and accessibility to hard-to reach components. The rf output is fed to the directional coupler mounted on the upper rear right-hand portion of the cabinet. Heavy power supply components are bolted at the bottom, where the primary power connections are also made. A harmonic filter AF107 (used to reject all frequencies above the 32 megacycle range) is mounted at the rear right-hand portion of the cabinet.

1-4. TECHNICAL CHARACTERISTICS

Frequency Range:	2 to 30 megacycles (MHz), bandswitched.
Output Power:	2500 watts PEP.
Operating Modes:	SSB, AME, CW, ISB, FAX, and FSK.
Tuning:	All tuning, loading and bandswitching controls on front panel.
Relative Humidity:	Up to 90%.
Ambient Temp. Range:	0° to 50°C.
Metering:	Front panel meters monitor operation of all critical circuits.
ALDC:	ALDC (automatic load and drive control) circuit provided to improve linearity, limit distortion, and deliver a relatively constant output during high modulation peaks or load changes. Front panel control allows adjustment of ALDC attack point or circuit disabling.
Output Impedance:	50 ohms, unbalanced.
Harmonic Suppression:	Second harmonics at least 50 db below full PEP when measured with standard two-tone test; all other harmonics down at least 55 db.
Signal/Distortion Ratio:	Distortion products are at least 35 db below either tone of a standard two-tone test at full PEP output.
Hum and Noise Level:	Hum at least 50 db below full PEP; all other noise down at least 70 db.
Cooling:	Forced air.
Operating Temperature:	Designed to operate in a 0° to 50°C ambient with relative humidity of up to 90%.
Power Input:	195/208/220/230/380/440 volts ac, 50/60 cps, 3 phase.
Heat Dissipation:	5000 watts.
Air Intake:	500 CFM.
Weight:	1035 lbs. (approximately)

TABLE 1-1. MAJOR COMPONENTS

TMC DESIGNATION

Cabinet, Electrical Equipment, RAK-110
Multi-Channel Exciter, Model SMER-6
Linear Amplifier, Model TLAA-2.5K
Servo Amplifier, Model TCSA-1
RF Control and Indicator, Model SWCA-3K
Linear Amplifier Control Panel, Model TCP-1
Low Voltage Power Supply, AP-128A/50
High Voltage Power Supply, AP-129/50
Alarm Panel, AX633

SECTION 2
INSTALLATION

2-1. GENERAL

The GPTR is tested at the factory and is carefully packaged to prevent damage during shipment. When it is delivered at the operating site, inspect the packing case and its content for damage that might have occurred during transit. Unpack the equipment carefully and inspect all packaging material for parts that may have been shipped as loose items. With respect to damage to the equipment for which the carrier is liable, The Technical Materiel Corporation will assist in describing methods of repair and furnishing of replacement parts.

2-2. ASSEMBLY

- a. Refer to figure 2-1, outlined dimensional drawing for transmitter location.
- b. Install the transmitter components into the rack as shown in figure 1-1.
- c. Intracomponent cabling is shipped pre-installed in the transmitter rack, refer to figure 2-2 and 2-3 for cable connections; follow outlined installation procedure in PALA-2.5K instruction manual (paragraphs 2-3 and 2-4).

NOTE

After the GPTR has been installed as per the installation sections of the PALA-2.5K Technical Manual, it is recommended a pre-operational exciter and system check be performed to ascertain transmitter operation prior to actual "on the air" transmissions.

2-3. PRE-OPERATIONAL CHECKOUT

NOTE

When performing the Pre-Operational Checkout, refer to figure 3-1 for controls and indicator location.

WARNING

INSURE THAT PRIMARY POWER TO GPTR IS OFF BEFORE TAKING RESISTANCE MEASUREMENTS.

A. Preliminary

With the Main Power Circuit breaker set at OFF, check for short circuits to ground.

(1) The 3 power input phases should read not less than 1 megohm to ground.

(2) The positive side of the high voltage circuit should read not less than 100K ohms, with the shorting relay open; with the shorting relay closed, the reading should be zero.

(3) Place transmitter MAIN POWER breaker (39) to the ON position and observe the following:

- a. TECHNIMATIC light (1) on the top of the transmitter must light.
- b. Main Blower on transmitter must start running.
- c. PA BIAS overload light must light. (PA BIAS overload light (79) will go out on completion of interlocks, and after the time delay has cycled).

NOTE

Set SSB/CW switch on AP-128 to SSB, RF OUTPUT on SME to max counterclockwise.

B. Bias Level Adjustments

(1) On the RF Linear Amplifier, Model TLAA, place the MULTIMETER switch (24) in the 1st AMP Ip position, and adjust the 1st AMP BIAS ADJ (82) located on the Low Voltage Power Supply, Model AP-128A for a plate current reading of 10 milliamps on MULTIMETER (20).

(2) On the TLAA place the MULTIMETER switch (24) in the 2ND AMP Ip position and adjust the 2ND AMP BIAS ADJ (81) located on the AP-128 for a plate current of 12 milliamps on MULTIMETER (20).

(3) Place MULTIMETER switch to the 1ST AMP Ep position.

(4) Preset transmitter TUNE and LOAD controls as per the sample tuning chart provided (table 3-2).

(5) Place LOW VOLTAGE breaker to the ON position (92). Set MODE switch (91) to SSB position (MODE switch located on AP-128).

(6) Check all positions on the interlock indicator switch, the indicator should be on for each position on the switch. Should the indicator be out in any position, this indicates an open protective interlock.

(7) On the TCP set the AUTO/MANUAL (41) switch to the MANUAL position. Set HIGH VOLTAGE breaker to ON position (42). Adjust PA BIAS control located on the AP-128 (80) for a PA Plate Current of 450ma indicated on the TLAA PLATE CURRENT Meter (14).

C. High Voltage Alarm and Plate Elapse Time Meter Check

(1) With the High Voltage on, the HIGH VOLTAGE Light (3) should be lit. Place the ALARM switch (68) to the ON position. The alarm will not sound. With the ALARM switch left in the ON position, turn OFF the High Voltage. The alarm should sound indicating that the High Voltage is OFF. Also, the HIGH VOLTAGE light should be OFF, set ALARM switch to OFF position. Observe PLATE TIME meter operation. When High Voltage is ON, the PLATE TIME Meter should operate. When High Voltage is OFF, PLATE TIME meter should stop.

(2) Place HIGH VOLTAGE breaker to the OFF position.

2-4. GPTR CONTROL SETTINGS

(Refer to GPTR CONTROL and INDICATOR Location Diagram, figure 3-1 and table 3-1.)

- a. Place GPTR MAIN POWER breaker to ON. (39)
- b. Place AUTO/MANUAL switch to MANUAL. (41)
- c. Place SERVO ON/OFF switch to OFF. (44)

2-5. SMER-6 PRE-OPERATIONAL CHECK

Set the exciter controls in the following manner and observe NORMAL indications. (Should indications be abnormal refer to modular unit Technical Manual).

STEP	OPERATION	NORMAL INDICATION
1	Place ON/STANDBY switch (32) to ON position.	POWER indicator and MONITOR meter will light.
2	Place EXCITER/ON-PTT/VOX (33) to EXCITER ON position.	NO INDICATION
3	Rotate meter knob thru Q1, Q2, and Q3 positions and observe monitor meter.	Meter needle should reflect to the engraved markings on the meter face. Q1, Q2, and Q3 respectively.
4	Select a channel frequency with the CHANNEL control.	NO INDICATION
5	Place the MODE switch to the LSB position.	NO INDICATION
6	Place meter knob to the CARRIER" position. Set CARR SUPPR (DB) switch to mid position. Adjust carrier knob (26) to the full mark on the monitor meter.	When meter switch has been placed in the CARRIER position, meter indicator should deflect to the FULL mark on meter face.
7	Set METER switch to RF position. Adjust RF OUTPUT control (31) for an output reading of mid-scale on the monitor meter.	MONITOR meter indicator will deflect to mid-scale indicating exciter RF output at the selected channel frequency.
8	Reduce exciter output to zero.	

NOTE

The preceding paragraph 2-4 indicates normal exciter operation for CARRIER mode of operation. Should any abnormalities occur, refer to the SMER-6 manual supplied.

2-6. SYSTEM PRE-OPERATIONAL CHECK (MANUAL TUNING)

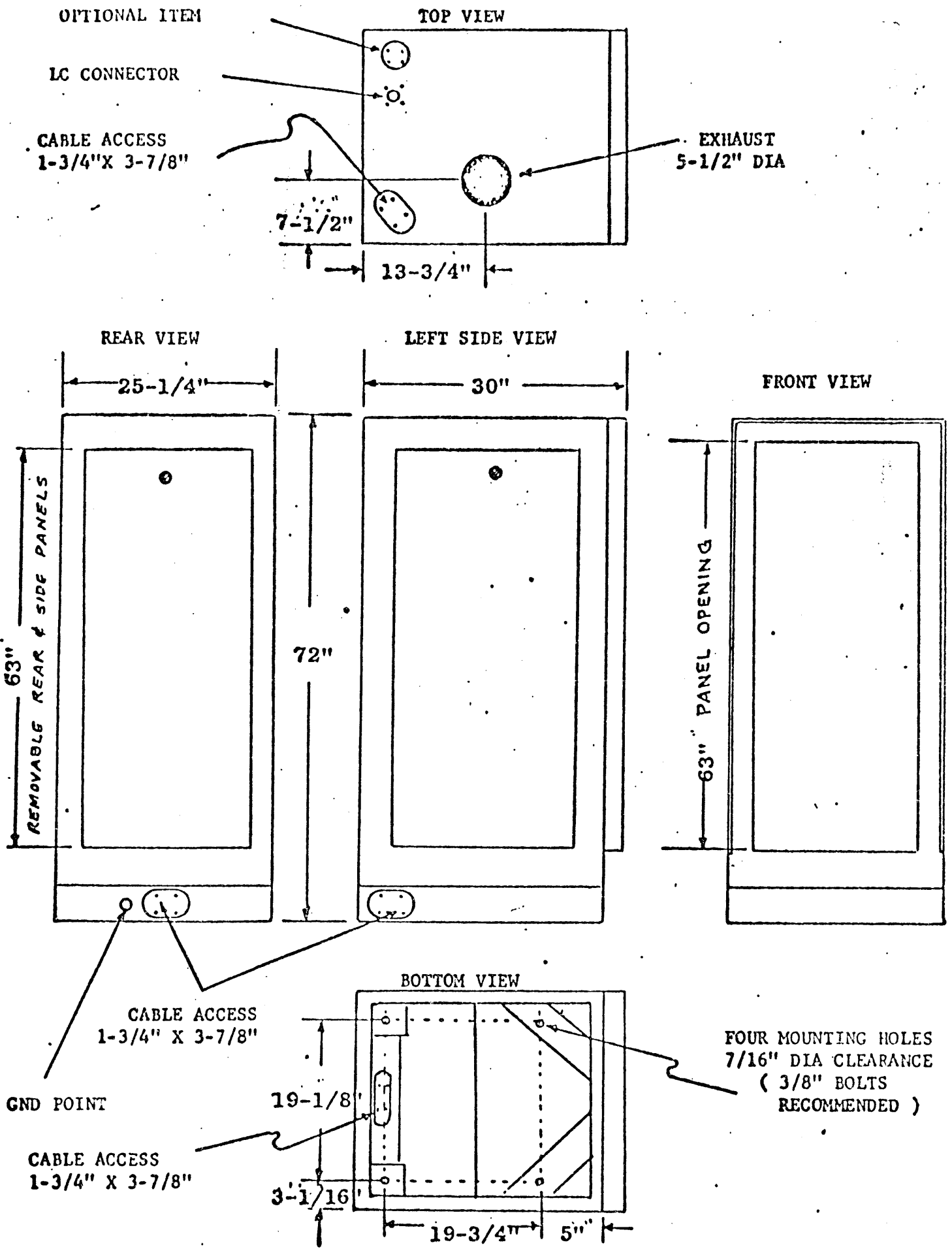
- a. Place Main POWER breaker and LOW VOLTAGE breaker to ON.
- b. Select desired channel frequency with CHANNEL control (29).
- c. Place AUTO/MANUAL switch to AUTO (41).
- d. Place SERVO ON/OFF switch to OFF (44).
- e. After BAND switch has prepositioned, set AUTO/MANUAL switch to MANUAL.
- f. Preset PA TUNE (25) and PA LOAD (18) controls as per tuning chart provided in table 3-2.
- g. Adjust exciter RF OUTPUT control for approximately 2 on MONITOR meter (exciter should be set up as per paragraph 2-5).
- h. Place MULTIMETER switch (24) to the 2ND AMPL Ep position. Adjust RF GAIN control (located on SWCA-3K) for an indication on TLAA-2.5K multimeter (20). (Do not exceed 20 on multimeter).
- i. Rotate the 2ND AMPL Tuning control (22) and observe a peak on MULTIMETER (20).
- j. Adjust RF GAIN control (11) to maximum counter-clockwise position.
- k. Adjust UPPER LIMIT control (13) for 2.7 Kw indication on kilowatt OUTPUT meter. Adjust LOW Limit control for desired output Level.
- l. Place HIGH VOLTAGE breaker to the ON position (42).
- m. Rotate RF GAIN control (11) for an increase in PA PLATE CURRENT (14) and adjust TUNE control (25) for a dip in plate current indication. Adjust the LOAD control (18) until output is obtained. Retune plate to resonance after adjusting the LOAD control (18).

NOTE

When adjusting the PA TUNE control a dip in PA Plate current should be observed on the PA PLATE CURRENT meter. Once a dip has been observed adjust the PA LOAD capacitor for maximum PA output as indicated on OUTPUT METER (4).

n. Adjust RF GAIN control (11) for the desired amount of PA output. When preset output level has been reached the READY indicator will light indicating the GPTR has been initially tuned to the desired Channel Frequency and ready for intelligence.

o. Depress the KW/REFL switch and determine the value of SWR. Should the SWR be excessive check the transmission line or the antenna (this must be performed with H.V. OFF). Reduce the PA output to zero and place the HIGH VOLTAGE breaker to the OFF position.



400B-4.

Figure 2-1 Outline Dimensional Diagram

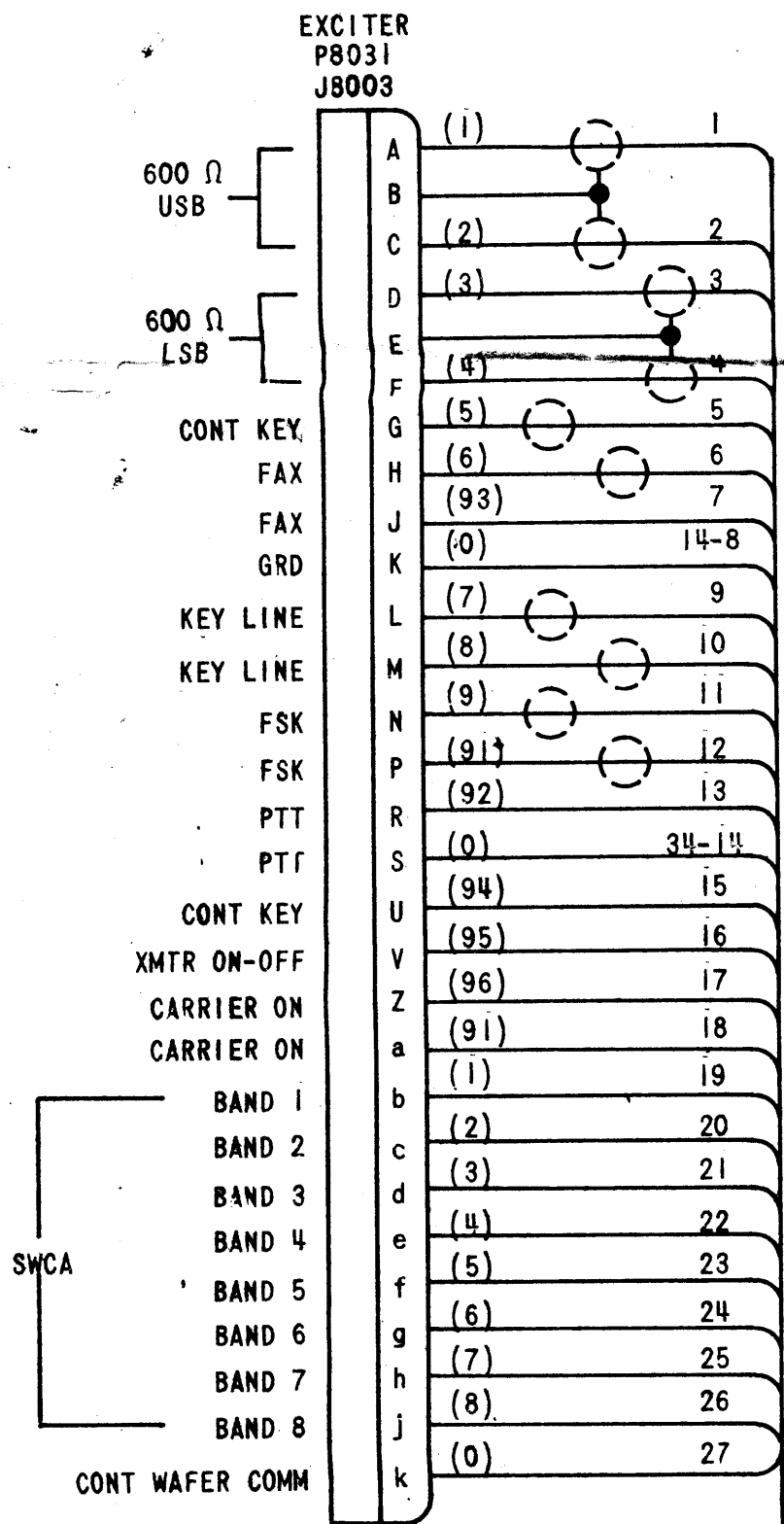
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SME-6

C

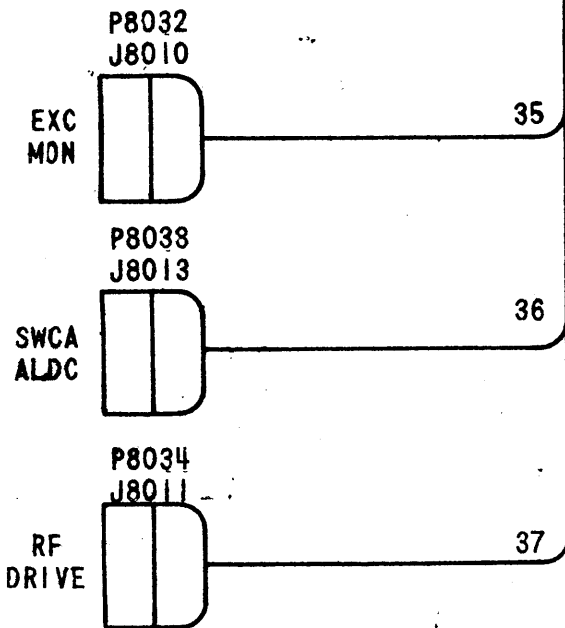
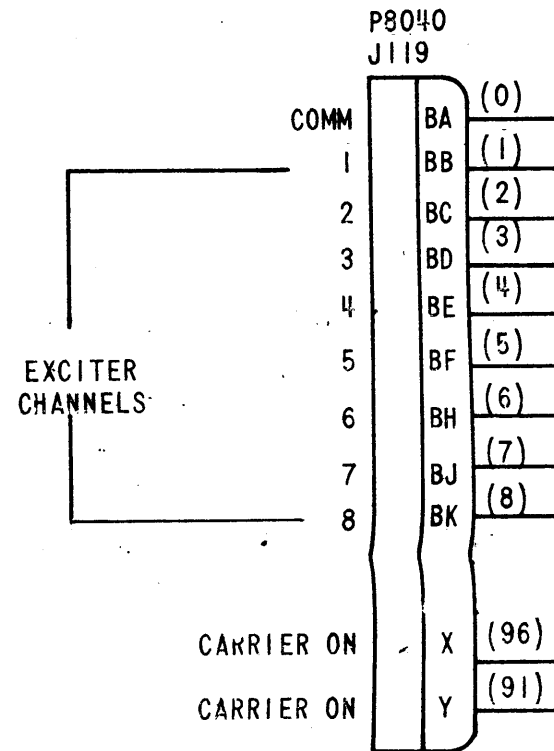
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A



WIRE COLOR CODE

10	91
WIRE IDENTIFICATION NUMBER	COLOR CODE

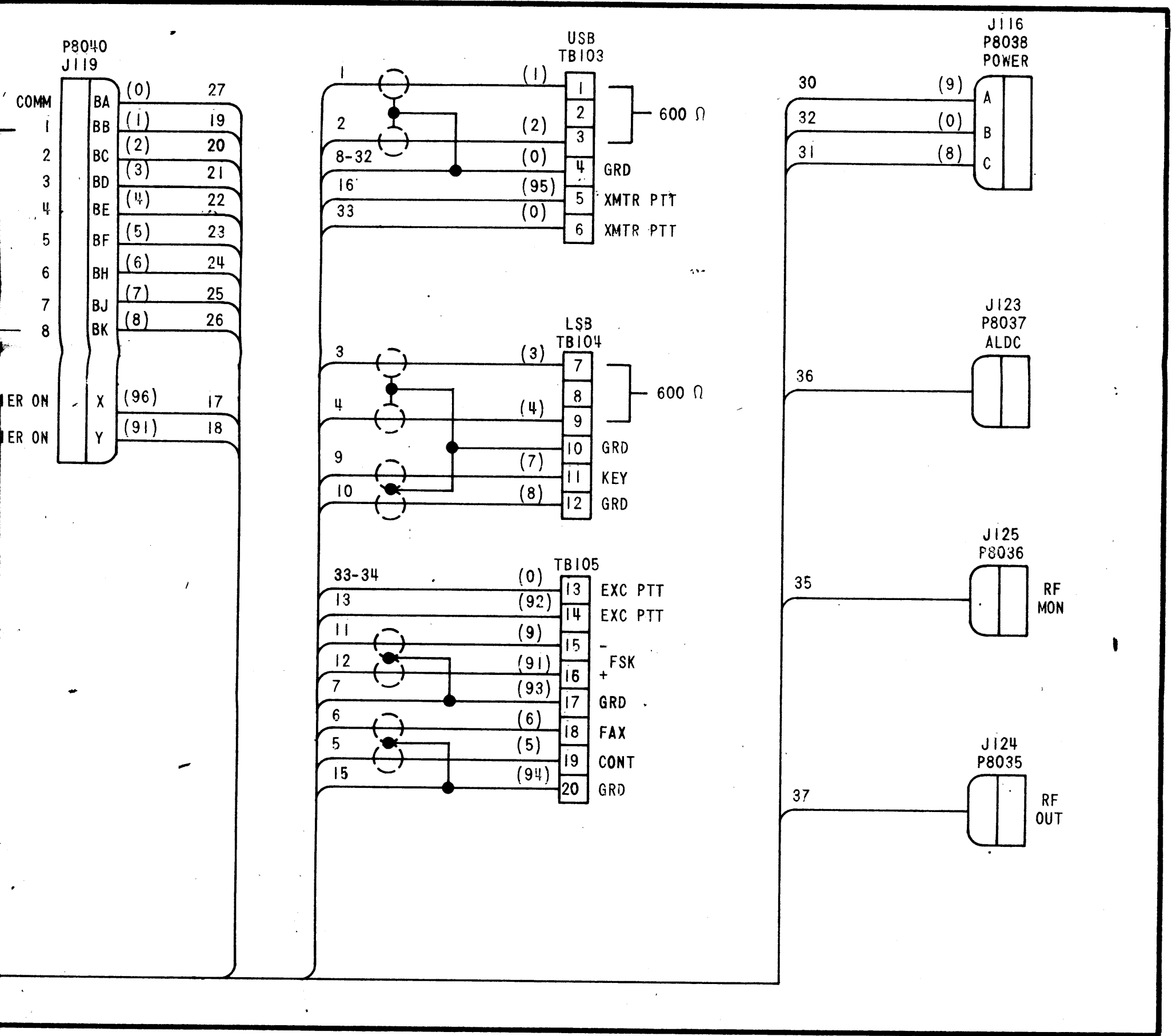


GPTR-2.5 KE6-4		
QTY / UNIT	MODEL USED ON	ASS'Y NO.
APPLICATION		
CODE		

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UNLESS OTHERWISE SPECIFIED, DIMENSIONS AND INCLUDE C OR PLAT
 TOLER
 DECIMALS
 .X ± .05
 .XX ± .01
 .XXX ± .005
 MATERIAL
 FINISH

REVISIONS						
ZONE	LTR	DESCRIPTION	DATE	E.M.N.NO	DRAFT	CHKD APPD
	X	EXPERIMENTAL RELEASE	9/18/71		GE	



QTY. REQ.	ITEM	PART# NO.	DESCRIPTION	SYMBOL
LIST OF MATERIAL				
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE CHEMICALLY APPLIED OR PLATED FINISHES		FINAL APPROVAL	DATE	THE TECHNICAL MATERIEL CORP. MAMARONECK, NEW YORK
TOLERANCES ON		MECH. DES	DATE	
		ELECT. DES	DATE	
DECIMALS	FRACTIONS	CHECKED	DATE	
.X ± .05	± 1/64	DRAWN	DATE	
.XX ± .01	ANGLES			
.XXX ± .005	± 0° -30'			
MATERIAL				
FINISH				

Figure 2-2
EXCITER INTERCONNECT WIRING DIAGRAM

D

C

CK 1903

B

A

AS
REQ { AX633
AX646
AX647 ALARM

TCP-(

E9000

76 (98)	1
109 (7)	2
110 (2)	3
115 (94)	4
116 (913)	5
229 (96)	6
9 (1)	7
113 (5)	8
114 (6)	9
149 (4)	10
143 (0)	11
111 (1)	12
112 (2)	13
	14

EXC. MON
P8016-J9001

152

PA MON
P8015-J9002

151

E9001

1
2
3
4
5
6
7
8
9
10

P8000-J40

2 (9)	A
3 (8)	B
4 (7)	C
5 (9)	D
6 (8)	E
7 (7)	F

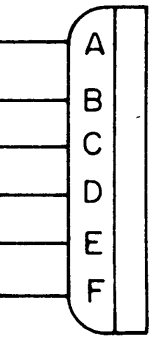
P8003-J40

76 (98)	A
77 (6)	B
78 (1)	C
79 (96)	D
80 (900)	E
81 (916)	F
82 (917)	G
20 (92)	H
39 (914)	J
83 (918)	K
84 (922)	L
85 (925)	M
12 (2)	N
13 (3)	P
86 (926)	Q
14 (4)	R
87 (944)	S
88 (932)	T
89 (942)	U
90 (946)	V
91 (954)	W
92,93 (3)	X
94 (955)	Y
144 (0)	Z
95 (8)	a
96 (812)	b
97 (834)	c
98 (98)	d
16 (5)	e
22 (93)	f
30 (94)	g
29 (7)	h
23 (4)	j
36 (913)	k
35 (90)	l
40 (915)	m
32 (95)	n
34 (0)	p
224 (964)	r
233 (9)	s
234 (845)	t
236 (853)	u

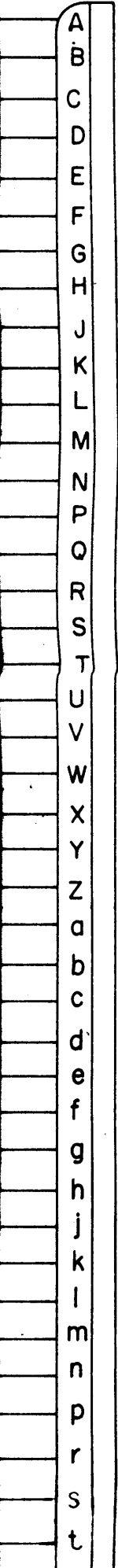
TCP-()

TLA()-2.5K

P8000-J4000



P8003-J4001



151	
150	
1	
99 (97)	A
42(9)	B
43(1)	C
44(2)	D
45(3)	E
46(4)	F
47(4)	G
56(91)	H
55(1)	J
57(91)	K
58(2)	L
59(92)	M
60(92)	N
50(5)	P
51(91)	R
52(92)	S
53(93)	T
61(95)	U
145(0)	V
62(96)	W
63(90)	X
65(917)	Z
66(918)	a
100(1)	b
68(922)	c
64(916)	d
101(2)	e
54(94)	f
48(5)	g
49(6)	h
102(3)	j
103(4)	k
104(90)	m
105(91)	n
106(93)	p
107(95)	r
108(96)	s

RF IN

J2000



RF OUT

J2009



RF MON

P8010-J2010



ALDC
P8011-J2011



H. V.
P8012-J2012



P8007-J2001



J2003



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105,104,103,102
101,100,99,98,97

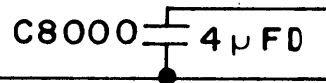
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126(6)

99(97)

75(9)

41(7)



94,124 (955)

133(926)

93,136,137(3)

133,86(926)

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131(918)

138,139(3)

131,83(918)

130(96)

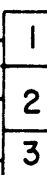
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(96)

(942)

(3)

E8009



FILTER

S8002

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129(942)

140(3)

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128(932)

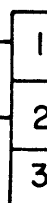
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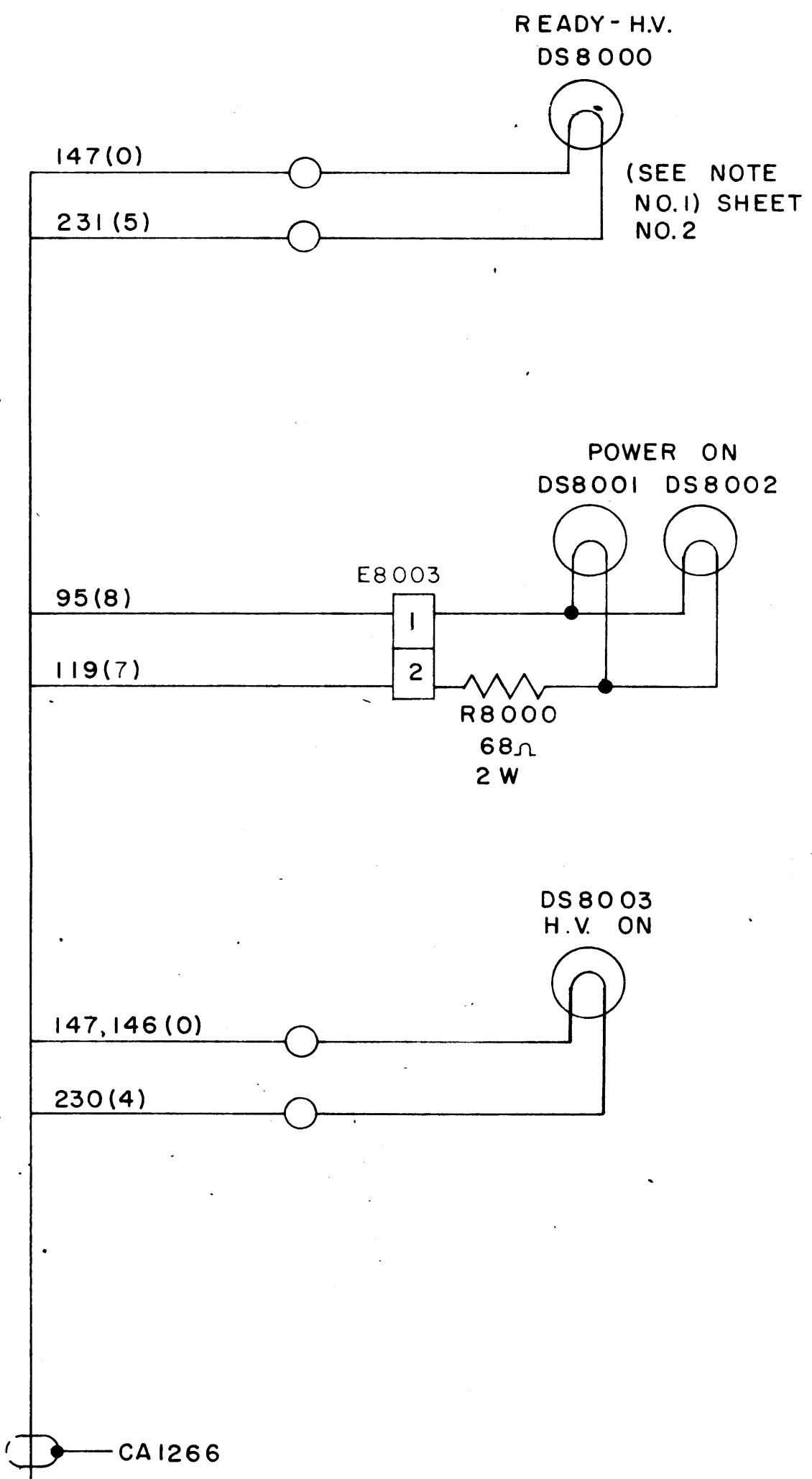
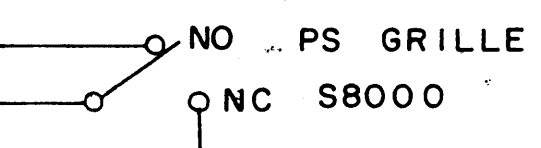
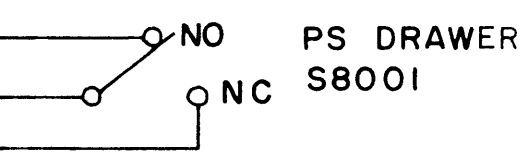
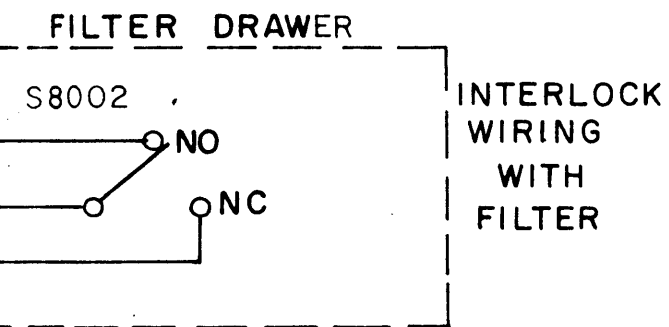
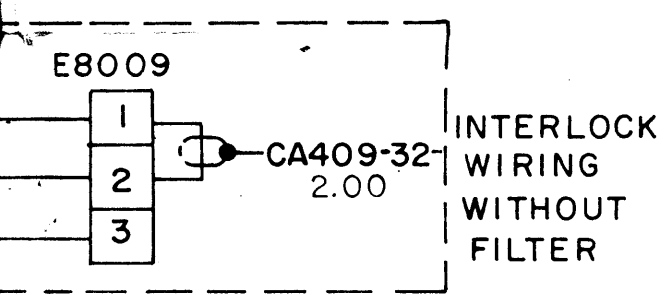
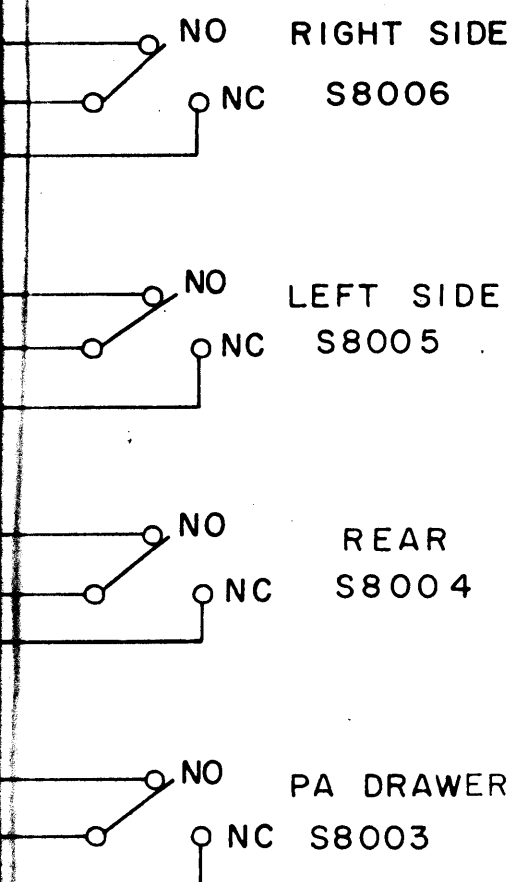
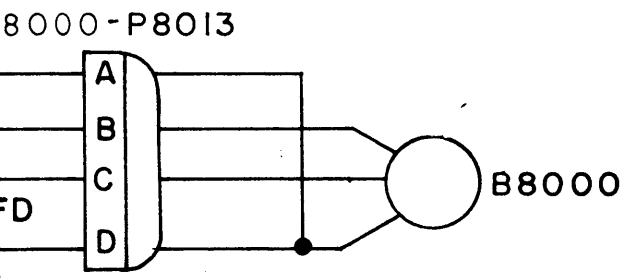
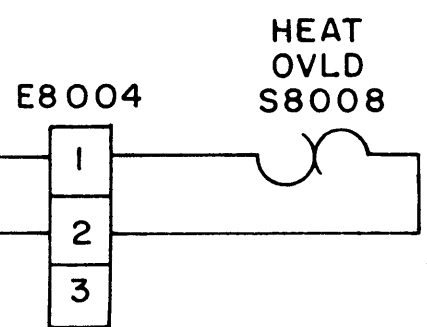
E8000



J8000-P8



REVISIONS						
ZONE	LTR	DESCRIPTION	DATE	E.M.N. NO	DRAFT	CHKD APPD
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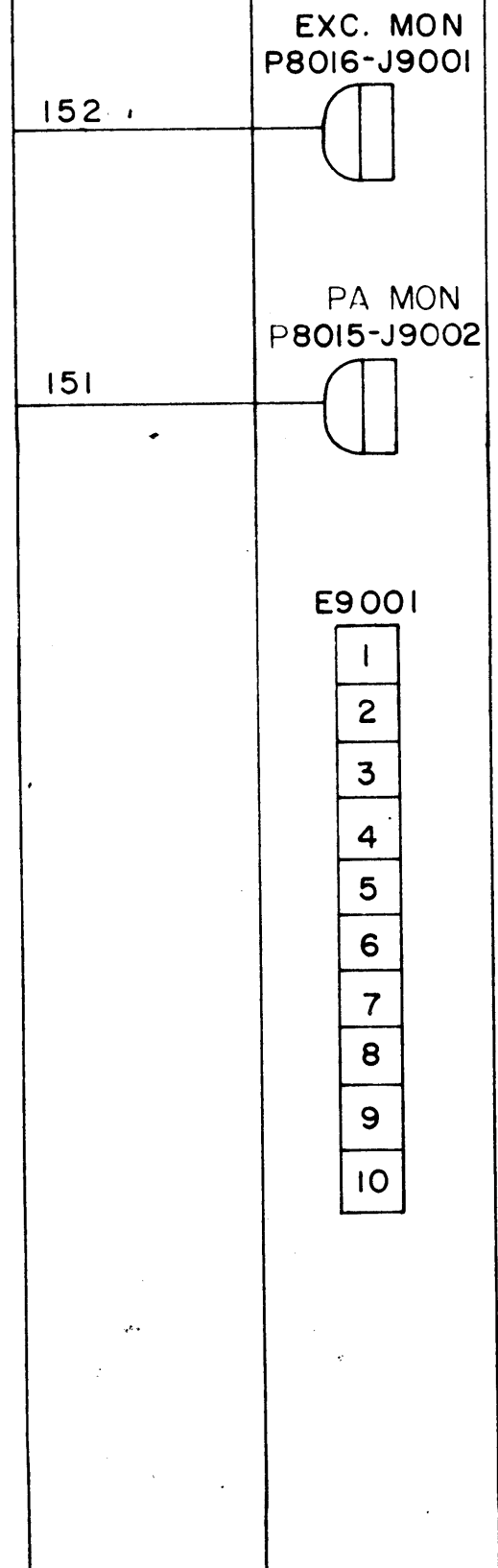
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1498
A

C

B

A

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114 (6)	9
149 (4)	10
143 (0)	11
111 (1)	12
112 (2)	13
	14



76(98)	P8003-J40
77(6)	A
78(1)	B
79(96)	C
80(900)	D
81(916)	E
82(917)	F
20(92)	G
39(914)	H
83(918)	J
84(922)	K
85(925)	L
12(2)	M
13(3)	N
86(926)	P
14(4)	Q
87(944)	R
88(932)	S
89(942)	T
90(946)	U
91(954)	V
92,93(3)	W
94(955)	X
144(0)	Y
95(8)	Z
96(812)	a
97(834)	b
98(98)	c
16(5)	d
22(93)	e
30(94)	f
29(7)	g
23(4)	h
36(913)	j
35(90)	k
40(915)	l
32(95)	m
34(0)	n
224(964)	p
233(9)	r
234(845)	s
236(853)	t

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115,114,113,112
111,110,109,9

76,143,151

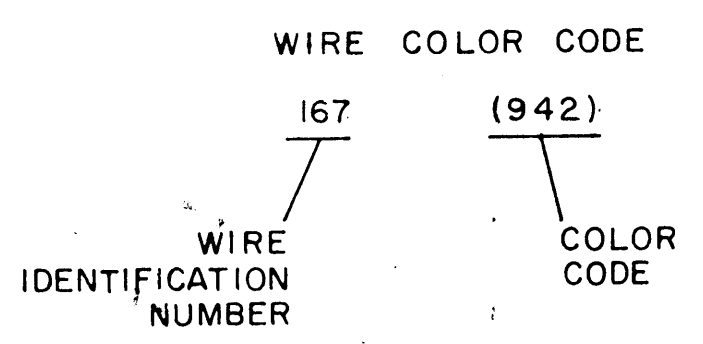
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79,83,86,87

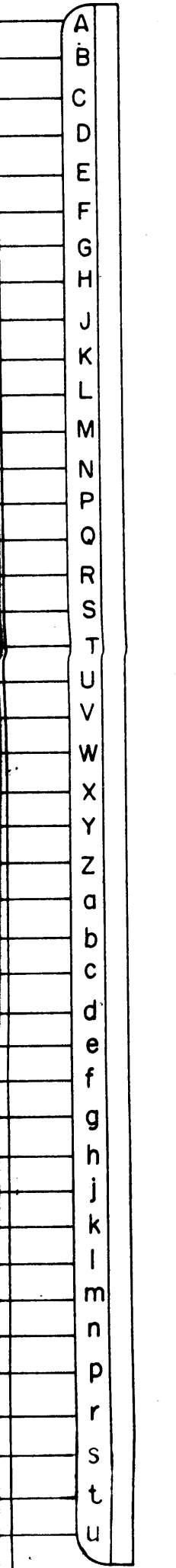
TO SHEET 2

CA1266

148,144,14



P8003-J4001



H. V.
P8012-J2012

P8007-J2001

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- 42(9)
- 43(1)
- 44(2)
- 45(3)
- 46(4)
- 47(4)
- 56(91)
- 55(1)
- 57(91)
- 58(2)
- 59(92)
- 60(92)
- 50(5)
- 51(91)
- 52(92)
- 53(93)
- 61(95)
- 145(0)
- 62(96)
- 63(90)
- 65(917)
- 66(918)
- 100(1)
- 68(922)
- 64(916)
- 101(2)
- 54(94)
- 48(5)
- 49(6)
- 102(3)
- 103(4)
- 104(90)
- 105(91)
- 106(93)
- 107(95)
- 108(96)



J2003



151,150
145,108,107,106
105,104,103,102
101,100,68,66,65
64,63,62,61,60,59
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99

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94,124(955)

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130(96)

139,140(3)

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(942)

(3)

E800

1
2
3

FILTE

S8002

130,79(96)

129(942)

140(3)

129,89(942)

128(932)

135(3)

128,88(932)

87,127(944)

134,135(3)

148,144,143,142

145,146



GPT() 2.5() RAK/102J

QTY / UNIT

MODEL USED ON

ASSY NO.

APPLICATION

CODE

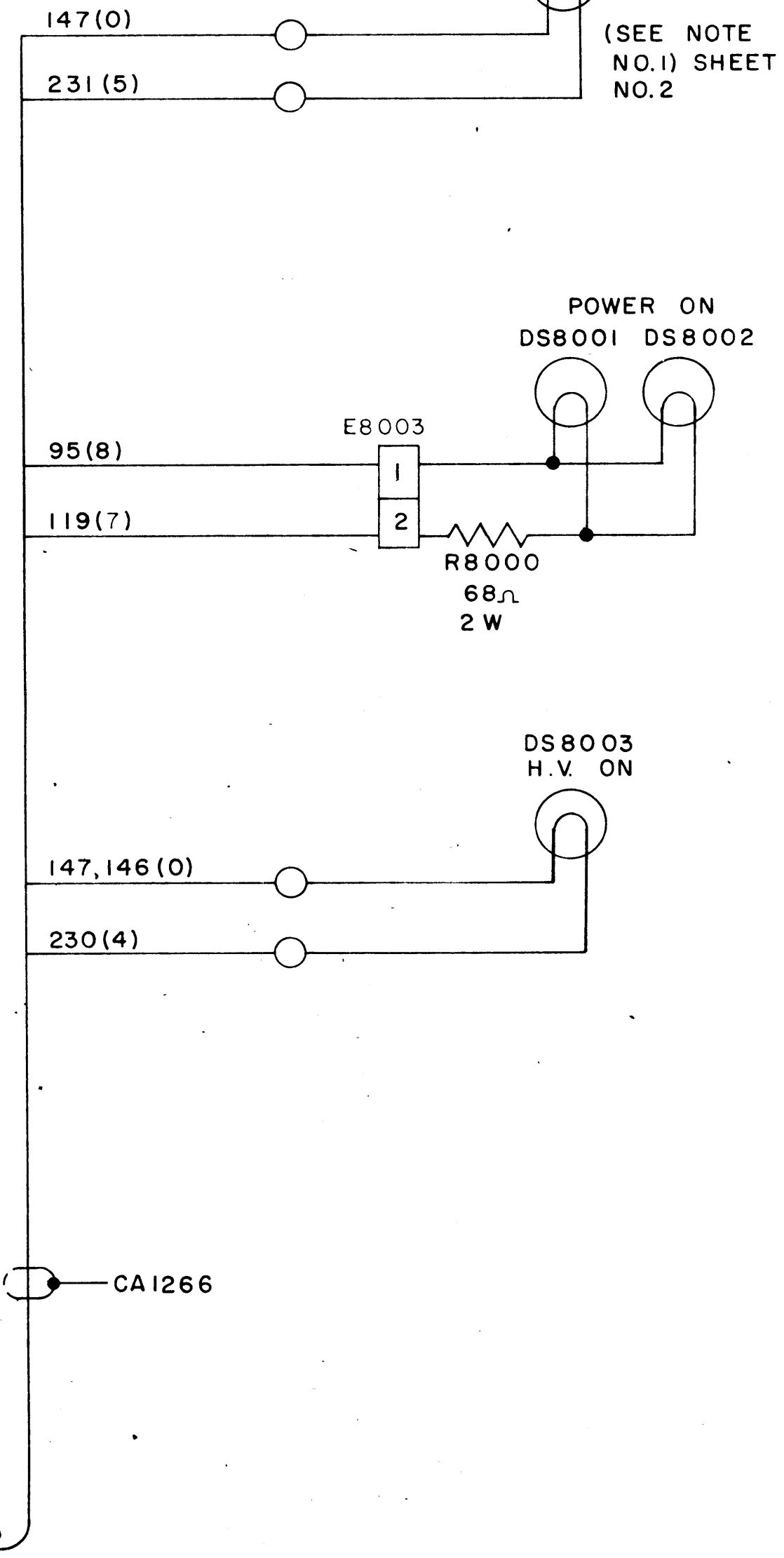
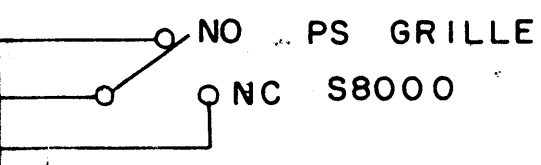
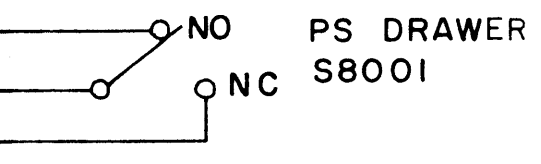
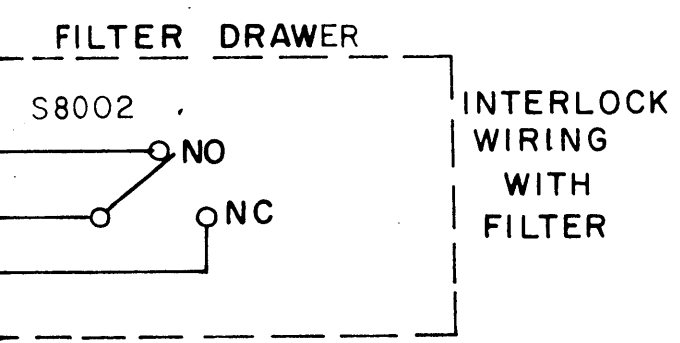
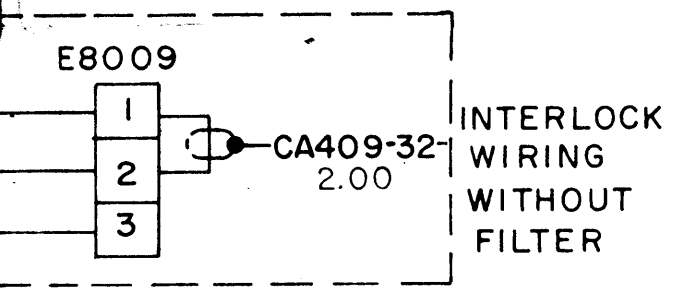
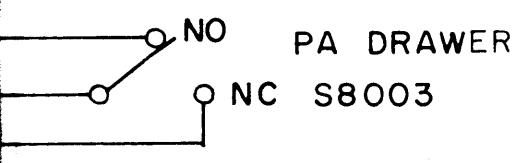
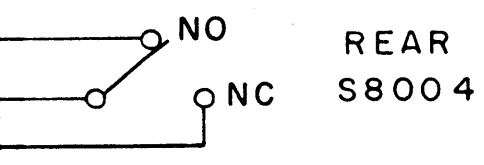
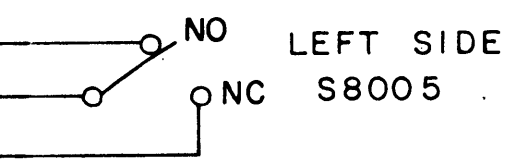
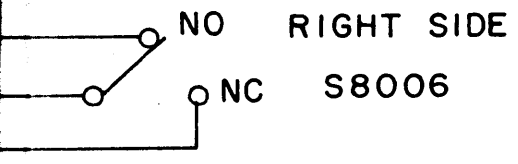
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5



4



QTY. REQ.	ITEM	PART NO.	DESCRIPTION	SYMBOL
-----------	------	----------	-------------	--------

LIST OF MATERIAL

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

DATE 9-10-61

DATE 9-10-61

DATE 9/5/61

Figure 2-3
RAK WIRING DIAGRAM
Sheet 1 of 3

2-1012-11

3

2

1

C
B
1498
A

J8001

11 (97)	225(97)	A
117(8)		B
	226(8)	C
120 (7)		D
153 (94)		E
70 (912)		F
21,203 (92)		G
38 (914)		H
67 (5)		J
81,189 (916)		K
84 (922)		L
96,209 (812)		M
100(1)		N
102(3)		P
103(4)		Q
104(90)		R
105(91)		S
106(93)		T
107(95)		U
108(96)		V
101(2)		W
154(6)		X
125,217(5)		Y
121(3)		Z
122(93)		a
155(1)		b
156(2)		c
157(90)		d
158(914)		e
159(915)		f
160(916)		g
161(917)		h
162(918)		i
163(922)		j
164(925)		k
165(926)		l
113(5)		m
114(6)		n
115(94)		p
116(913)		r
149(4)		s
166(932)		t
167(942)		u
169		v
170		w
168(0)		x
233(9)		y
234(845)		z
236(853)		2
153(94)		3
10,235(1)		4
33,229(96)		5
74(6)		6
204(93)		7
207(96)		8
126,208(6)		9
123,230(4)		10
125(5)		
71(944)		
232(926)		

Ø3 TO TCSA
 Ø3 TO TLAA
 Ø2 TO TLAA AND TCSA
 Ø2 TO SWCA
 Ø3 TO SWCA
 60VDC OR 24 VDC METER RELAY
 26VDC TO SWCA
 SERVO ON
 SERVO MANUAL
 BAND SW CONT. WAFER
 TUNE SW
 OVLD RESET
 OVLD IND.

OVLD LINE
 BAND 1-9

CARRIER ON CONT.
 READY IND.

AUX. CONT. TO TCSA
 AUX. CONT. TO TCSA
 EXC. CHAN 9
 TUNE-OPER CONTACT COM.
 EXC. CHAN 10

EXC. CHAN 1-8

ANT. SW 1
 ANT. SW 2
 ANT. 1 IND
 ANT. 2 IND
 26 VDC ANT SW
 FAULT IND.
 METER RELAY CONT.
 FWD. PWR
 REFL. PWR

GRD
 ALDC DISABLE
 ANT SW DISABLE
 LOAD SW

E8007	
NO	FUNCTION
1	26 VDC
2	5VAC
3	26VDC TO FILTER
4	60VDC FR. LRCA 24 VDC TO LRCF
5	OVLD LINE
6	OVLD LINE
7	H.V. LIGHT
8	READY LIGHT
9	PTT LINE
10	PTT LINE

1	XXXXXX
2	SEE NOTE NO.2
3	
4	
5	SEE NOTE NO. 1
6	
7	
8	XXXXXXXX
9	
10	

E8007 SEE NOTENO.3

5,26,227,228 (9)
6,25,117,118(8)
7,24,109,119,120(7)
27(5)
28(95)
123(4)
31(94)
121(3)
122(93)
15(9)
227(9)
110(2)
228(9)
98(98)
141(0)
124(955)
18,77(6)
17(9)
118(8)
8(97)
37(9)
2(9)
4(7)

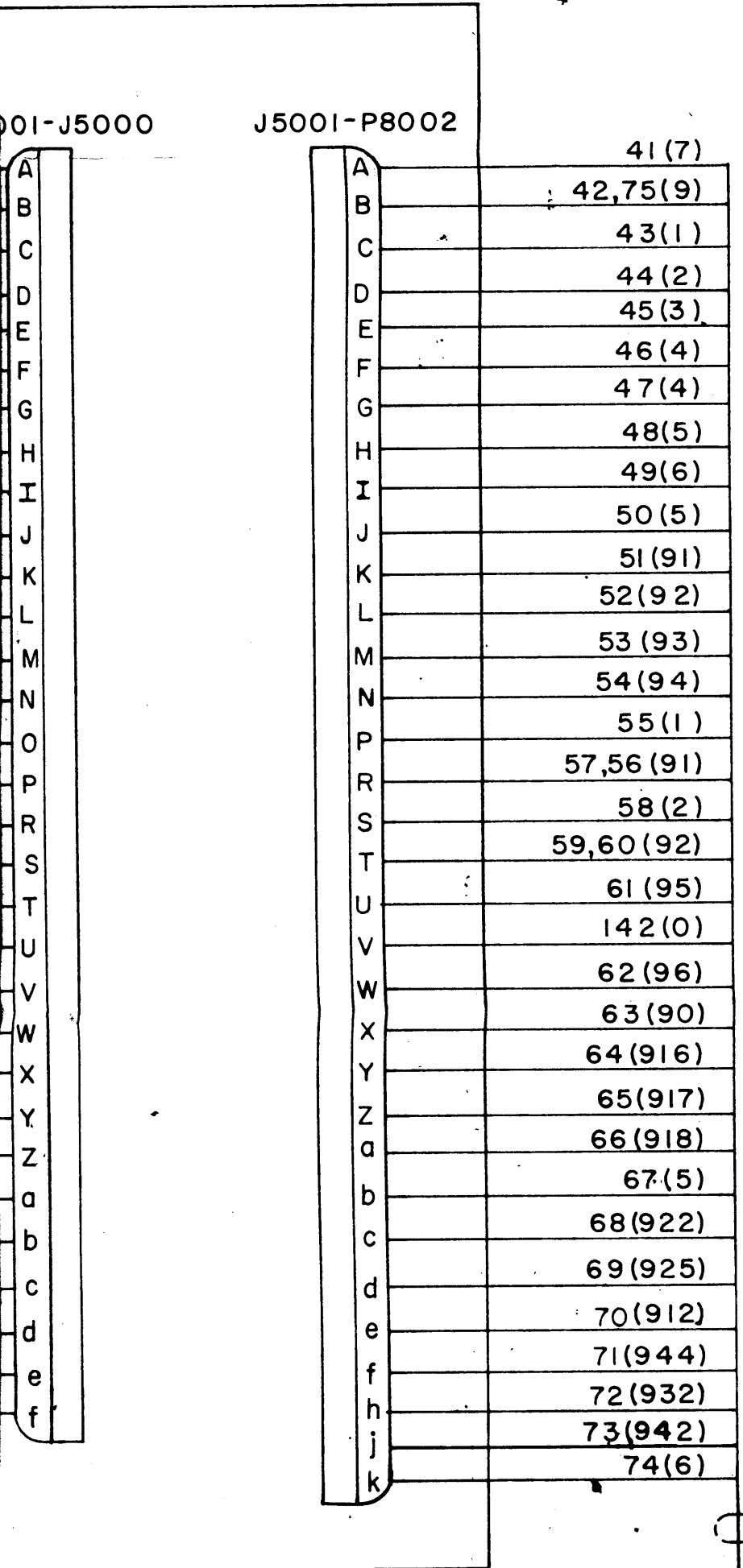
D

C

B

REVISIONS						
ZONE	LTR	DESCRIPTION	DATE	E.M.N.NO	DRAFT	CHKD APPD
	X	EXP. RELEASE				
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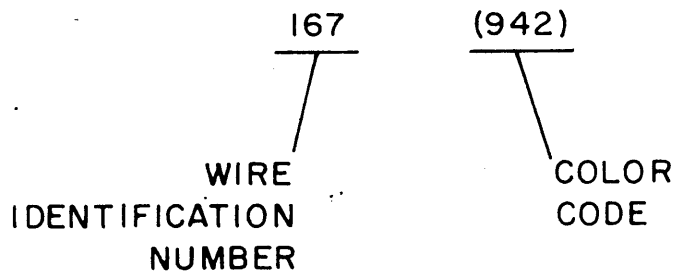
AP-128AL.V.



NOTES:

1. MANUAL TRANSMITTER DS8000 IS H.V. ON IND. IT. 231 CONNECTED TO E8007-7 SERVO TUNED TRANSMITTER DS8000 IS READY IND IT. 231 CONN TO E8007-8
2. IT 153 CONN TO E8007-1 FOR LOCAL OR SHORT WIRE REMOTE OPERATION. CONN TO E8007-4 WHEN USING LRCA.
3. ADD JUMPER FOR MANUAL TRANSMITTER ONLY.

WIRE COLOR CODE



CA1266

61,62,63,64 65,66,68,75,142
 51,52,53,54,55,56,57,58,59,60
 41,42,43,44,45,46,47,48,49,50,

74
 73,72,71,70,69,67

TO SHEET 1

0
2,23,29,30

CK 1498 A

C

B

A

103 (91)	T
106 (93)	U
107 (95)	V
108 (96)	W
101 (2)	X
154 (6)	Y
125,217 (5)	Z
121 (3)	a
122 (93)	b
155 (1)	c
156 (2)	d
157 (90)	e
158 (914)	f
159 (915)	g
160 (916)	h
161 (917)	i
162 (918)	j
163 (922)	k
164 (925)	l
165 (926)	m
113 (5)	n
114 (6)	p
115 (94)	r
116 (913)	s
149 (4)	t
166 (932)	u
167 (942)	v
169	w
170	x
	y
	z
168 (0)	2
233(9)	3
234(845)	4
236(853)	5
153 (94)	6

OVLD LINE
BAND 1-9

CARRIER ON CONT.
READY IND.

AUX. CONT. TO TCSA
AUX. CONT. TO TCSA
EXC. CHAN 9

TUNE-OPER CONTACT COM.
EXC. CHAN 10

EXC. CHAN 1-8

ANT. SW 1
ANT. SW 2
ANT. 1 IND
ANT. 2 IND
26 VDC ANT SW
FAULT IND.
METER RELAY CONT.
FWD. PWR

REFL. PWR

10,235 (1)	1	XXXXXX
33,229 (96)	2	SEE
74 (6)	3	NOTE NO.2
204 (93)	4	-----
207 (96)	5	SEE
126,208 (6)	6	NOTE NO. 1
123,230 (4)	7	-----
125 (5)	8	XXXXXXXX
71 (944)	9	-----
232 (926)	10	-----

E8007	
NO	FUNCTION
1	26 VDC
2	5VAC
3	26VDC TO FILTER
4	60VDC FR. LRCA 24 VDC TO LRCA
5	OVLD LINE
6	OVLD LINE
7	H.V. LIGHT
8	READY LIGHT
9	PTT LINE
10	PTT LINE

231(5) E8007 SEE NOTENO.3

CA409-32-2.00

233,234,236

116,117,120,121,122,123,126,149,229,230,231

102,103,104,105,106,107,108,113,114,115

10,11,21,33,38,67,70,71,74,81,84,96,100,101

123,122

121,120,117

235,232,217

209,208,207,204,203

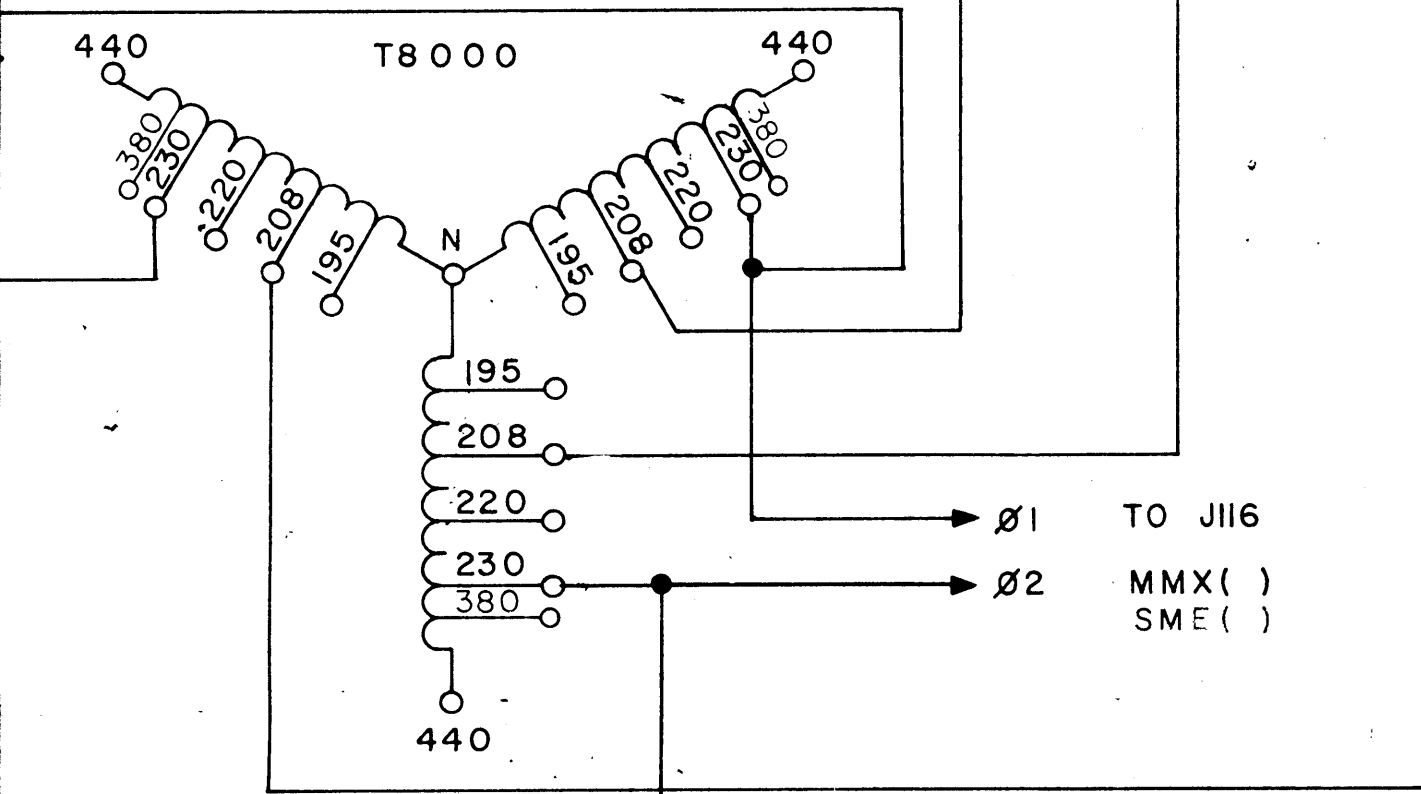
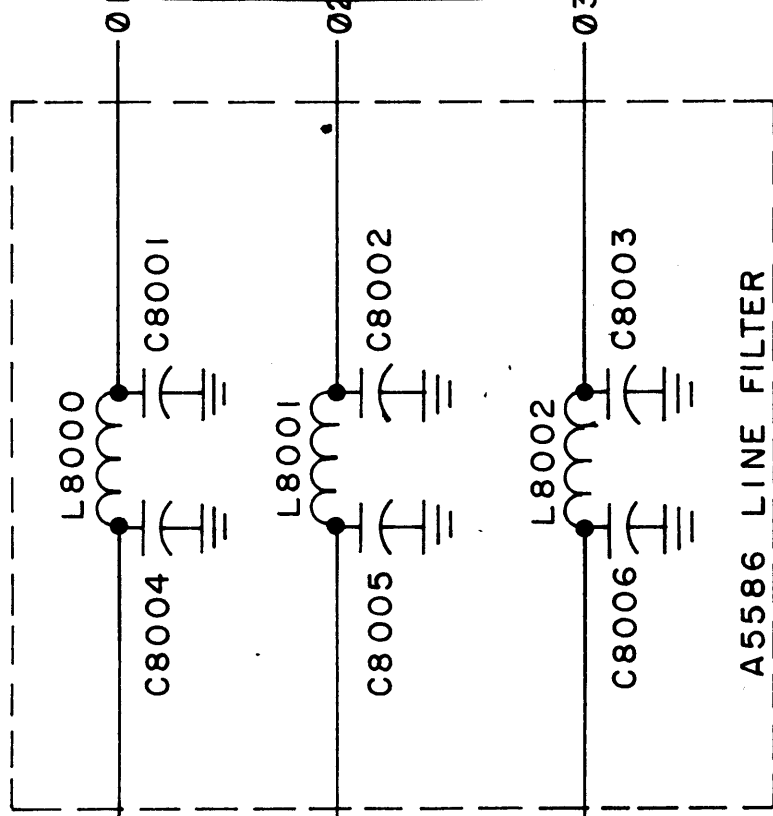
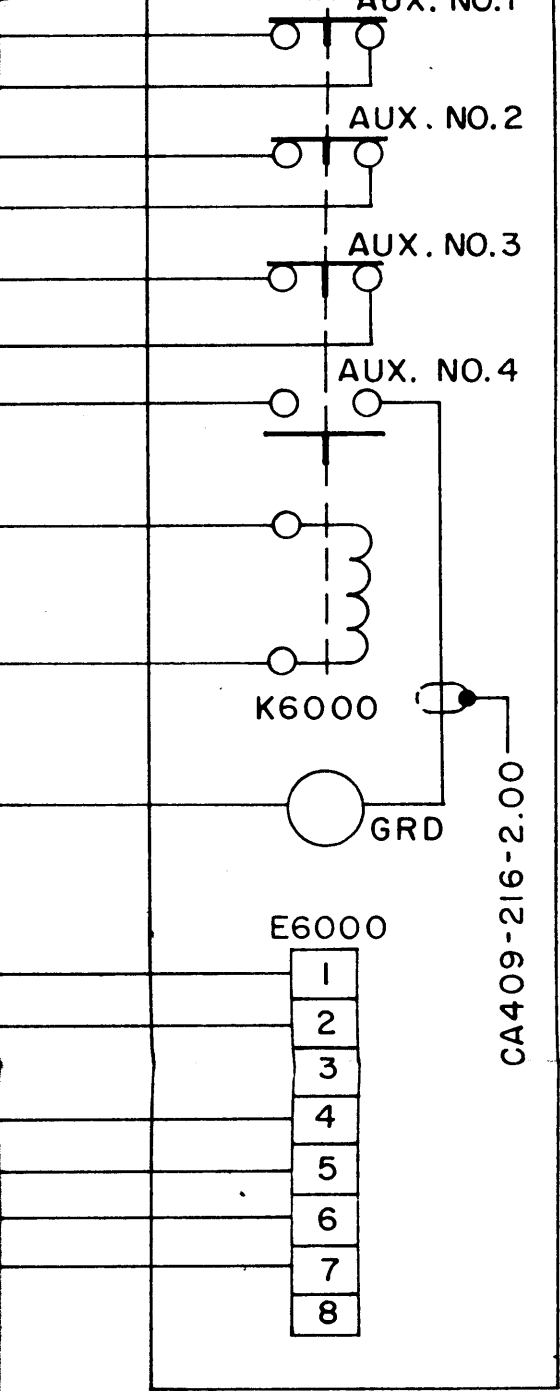
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165,164,163,162,161,160

159,158,157,156,155,154

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122(93)
15(9)
227(9)
110(2)
228(9)
98(98)
141(0)
124(955)
18,77(6)
17(9)
118(8)
8(97)
37(9)
2(9)
4(7)
110,119,124, 141
26,27,28,31,37,77,
1,2,4,5,6,7,8,15,17,18,2

TO SHEET 3



CA1244
CONNECT TO
APPROPRIATE
TAPS

9,10(1)	A
11(97)	B
12(2)	C
13(3)	D
14(4)	E
14I(0)	F
15(9)	G
16(5)	H
17(9)	I
18(6)	J
19(91)	K
20,21(92)	L
22(93)	M
23(4)	N
24(7)	O
25(8)	P
26(9)	R
27(5)	S
28(95)	T
29(7)	U
30,31(94)	V
32(95)	W
33(96)	X
34(0)	Y
35(90)	Z
36(913)	a
37(9)	b
38,39(914)	c
40(915)	d
92,134(3)	e
	f

32,34,35,36,39,40
9,12,13,14,16,20,22,23,29,30

141
37,77, 98,109
15,17,18,24,25

92,134
141,38,37,33,31,28,27,26
25,24,21,19,18,17,15,11,10,8

CA1266

GPTA-2.5() RAK/102J		
QTY / UNIT	MODEL USED ON	ASS'Y NO.
APPLICATION		
CODE		
NOTICE TO PERSONS RECEIVING THIS DRAWING		
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UNL
DIM
AND IN

DEC
.X
.XX
.XXX

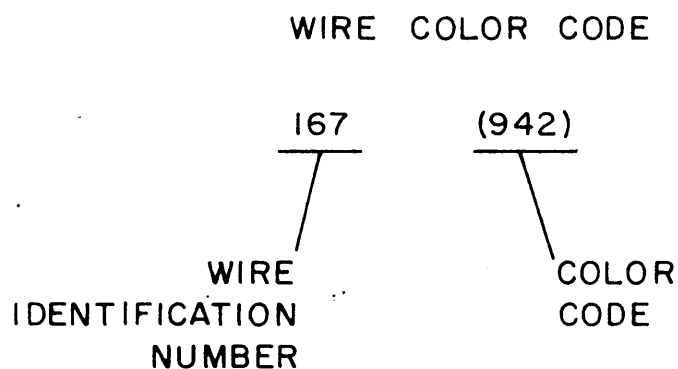
MATER

FINISH

A	
B	42,75(9)
C	43(1)
D	44(2)
E	45(3)
F	46(4)
G	47(4)
H	48(5)
I	49(6)
J	50(5)
K	51(91)
L	52(92)
M	53(93)
N	54(94)
P	55(1)
R	57,56(91)
S	58(2)
T	59,60(92)
U	61(95)
V	142(0)
W	62(96)
X	63(90)
Y	64(916)
Z	65(917)
a	66(918)
b	67(5)
c	68(922)
d	69(925)
e	70(912)
f	71(944)
h	72(932)
j	73(942)
k	74(6)

NOTES:

1. MANUAL TRANSMITTER DS8000 IS H.V. ON IND. IT. 231 CONNECTED TO E8007-7 SERVO TUNED TRANSMITTER DS8000 IS READY IND IT. 231 CONN TO E8007-8
2. IT 153 CONN TO E8007-1 FOR LOCAL OR SHORT WIRE REMOTE OPERATION. CONN TO E8007-4 WHEN USING LRCA.
3. ADD JUMPER FOR MANUAL TRANSMITTER ONLY.



CA1266

61,62,63,64 65,66,68,75,142
 51,52,53,54,55,56,57,58,59,60
 41,42,43,44,45,46,47,48,49,50,

74
 73,72,71,70,69,67

TO SHEET 1

23,29,30

CK 1498 A

QTY. REQ.	ITEM	PART NO.	DESCRIPTION	SYMBOL
-----------	------	----------	-------------	--------

LIST OF MATERIAL

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'

FINAL APPROVED	DATE
<i>[Signature]</i>	9-10-68
MECH.	DATE
<i>[Signature]</i>	9-10-68
ELEC.	DATE
<i>[Signature]</i>	9-10-68
CHECKED	DATE
<i>[Signature]</i>	3/1/69
DRAWN	DATE
<i>[Signature]</i>	11/1/68

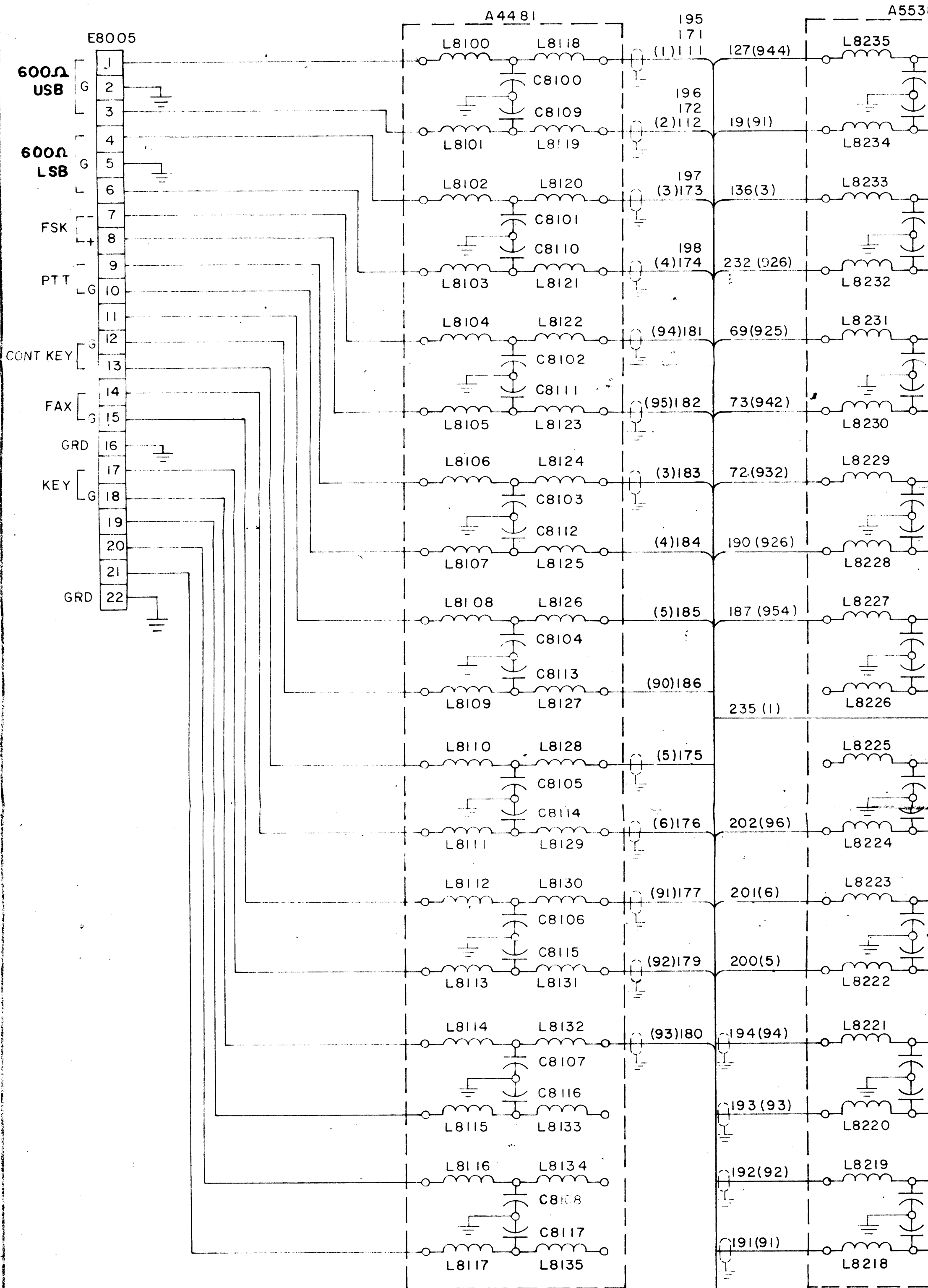
THE TECHNICAL MATERIEL CORP.
 MAMARONECK, NEW YORK

Figure 2-3
 RAK WIRING DIAGRAM
 Sheet 2 of 3

D

C

B



E8005

A4481

195

A553

600Ω
USB

600Ω
LSB

FSK

PTT

CONT KEY

FAX

GRD

KEY

GRD

L8100

L8118

C8100

C8109

L8101

L8119

L8102

L8120

C8101

C8110

L8103

L8121

L8104

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C8102

C8111

L8105

L8123

L8106

L8124

C8103

C8112

L8107

L8125

L8108

L8126

C8104

C8113

L8109

L8127

L8110

L8128

C8105

C8114

L8111

L8129

L8112

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C8106

C8115

L8113

L8131

L8114

L8132

C8107

C8116

L8115

L8133

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L8134

C8108

C8117

L8117

L8135

(1)171

(2)172

(3)173

(4)174

(94)181

(95)182

(3)183

(4)184

(5)185

(90)186

(5)175

(6)176

(91)177

(92)179

(93)180

(93)186

(91)177

(92)179

(93)180

(93)186

(91)177

(92)179

(93)180

(93)186

(91)177

(92)179

(93)180

(93)186

(91)177

(92)179

(93)180

127(944)

19(91)

136(3)

232(926)

69(925)

73(942)

72(932)

190(926)

187(954)

235(1)

202(96)

201(6)

200(5)

194(94)

193(93)

192(92)

191(91)

L8235

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L8231

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L8223

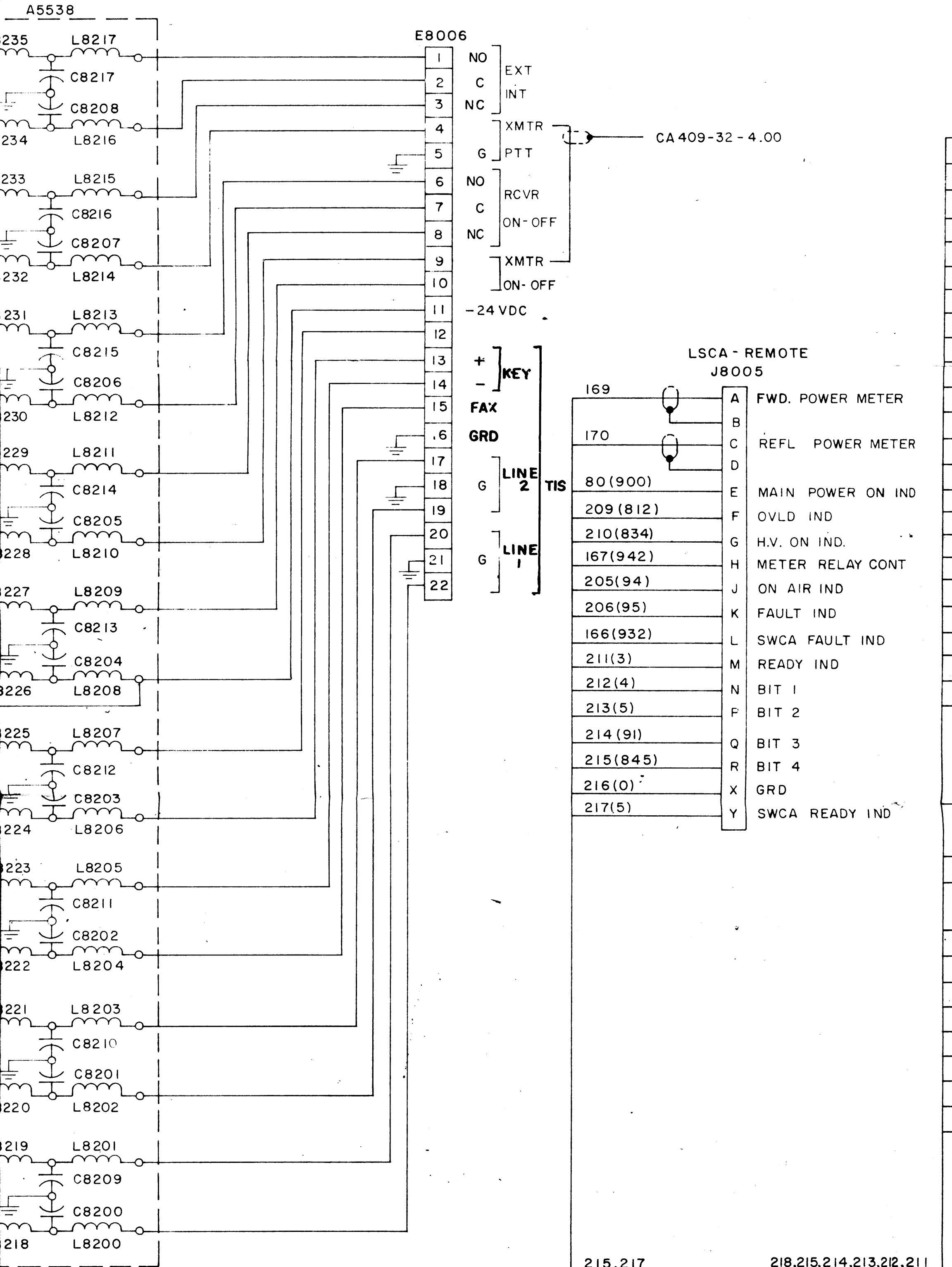
L8222

L8221

L8220

L8219

L8218



CA 409-32-4.00

LSCA - REMOTE J8005

169	A	FWD. POWER METER
	B	
170	C	REFL. POWER METER
	D	
80(900)	E	MAIN POWER ON IND
209(812)	F	OVLD IND
210(834)	G	H.V. ON IND.
167(942)	H	METER RELAY CONT
205(94)	I	ON AIR IND
206(95)	J	FAULT IND
166(932)	K	SWCA FAULT IND
211(3)	L	READY IND
212(4)	M	BIT 1
213(5)	N	BIT 2
214(91)	O	BIT 3
215(845)	P	BIT 4
216(0)	Q	GRD
217(5)	R	SWCA READY IND
	X	
	Y	

REVISIONS					
ZON	TR	DESCRIPTION	DATE	BY	CHKD
A		ADD. BANDS 9&10 TO LRCA-REMOTE	22069/1987	GE	FB

LRCA-REMOTE
J8004

EXCITER
J8003

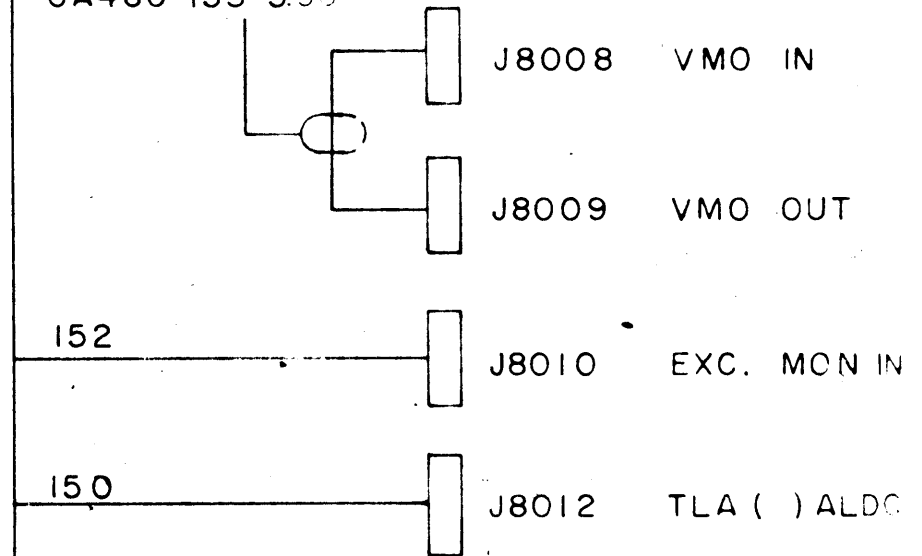
78(1)	A	
188-189(916)	B	TUNE SWITCH
82(917)	C	OVLD RESET
203(92)	D	SERVO ON-OFF
155(1)	E	BAND 9 SWCA
156(2)	F	TUNE OPER. CONTACT COMM.
157(90)	G	BAND 10 SWCA
204(93)	H	60VDC FROM LRCA-24VDC TD
205(94)	J	ON AIR IND.
206(95)	K	FAULT IND
207(96)	L	H.V. ON-OF
208(6)	M	H.V. ON-OFF
85(925)	N	H.V. OFF IND
97-210(834)	P	H.V. ON IND
211(3)	Q	READY IND
212(4)	R	BIT 1
213(5)	S	BIT 2
214(91)	T	BIT 3
215(845)	U	BIT 4
218(0)	V	GRD-COMM
219(932)	W	EXC CONT 1
220(942)	X	EXC CONT 2
221(944)	Y	EXC CONT 3
222(946)	Z	EXC CONT 4

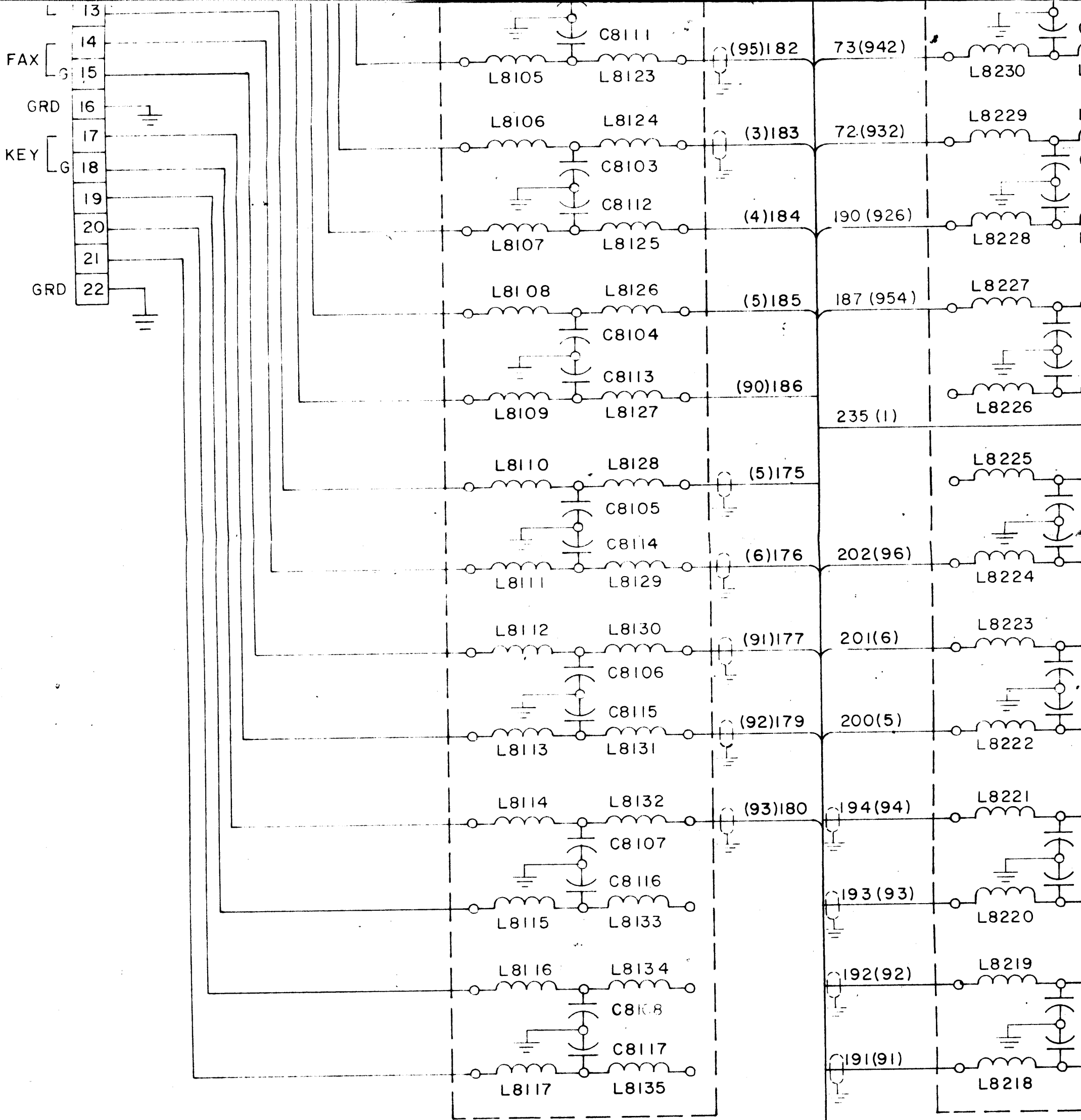
171(1)	A	
	B	600Ω USB
172(2)	C	
173(3)	D	600Ω LSB
	E	
174(4)	F	
175(5)	G	CONT KEY
176(6)	H	FAX
177(91)	J	FAX
178(0)	K	GRD
179(92)	L	KEY LINE
180(93)	M	KEY LINE
181(94)	N	FSK
182(95)	P	FSK
183(3)	R	PTT
184(4)	S	PTT
185(5)	T	
186(90)	U	CONT KEY
190(926)	V	XMTR ON-OFF
187(954)	W	XMTR ON-OFF
188(916)	X	TUNE SWITCH
154(6)	Z	CARRIER ON CONT
224(964)	a	CARRIER ON RETURN
158(914)	b	BAND 1
159(915)	c	BAND 2
160(916)	d	BAND 3
161(917)	e	BAND 4
162(918)	f	BAND 5
163(922)	g	BAND 6
164(925)	h	BAND 7
165(926)	j	BAND 8
223(0)	k	CONT WAFER COMM.
219(932)	m	BIT 1
220(942)	n	BIT 2
221(944)	p	BIT 3
222(946)	r	BIT 4

TIS
J8007

191(91)	A	LINE 1
	B	
192(92)	C	LINE 1
193(93)	D	LINE 2
	E	
194(94)	F	LINE 2
199(0)	K	GRD
200(5)	L	FAX
195(1)	M	CH 1
196(2)	N	CH 1
197(3)	P	CH 2
198(4)	R	CH 2
201(6)	S	KEY LINE (-)
202(96)	T	KEY LINE (+)

CA480-133-5.00

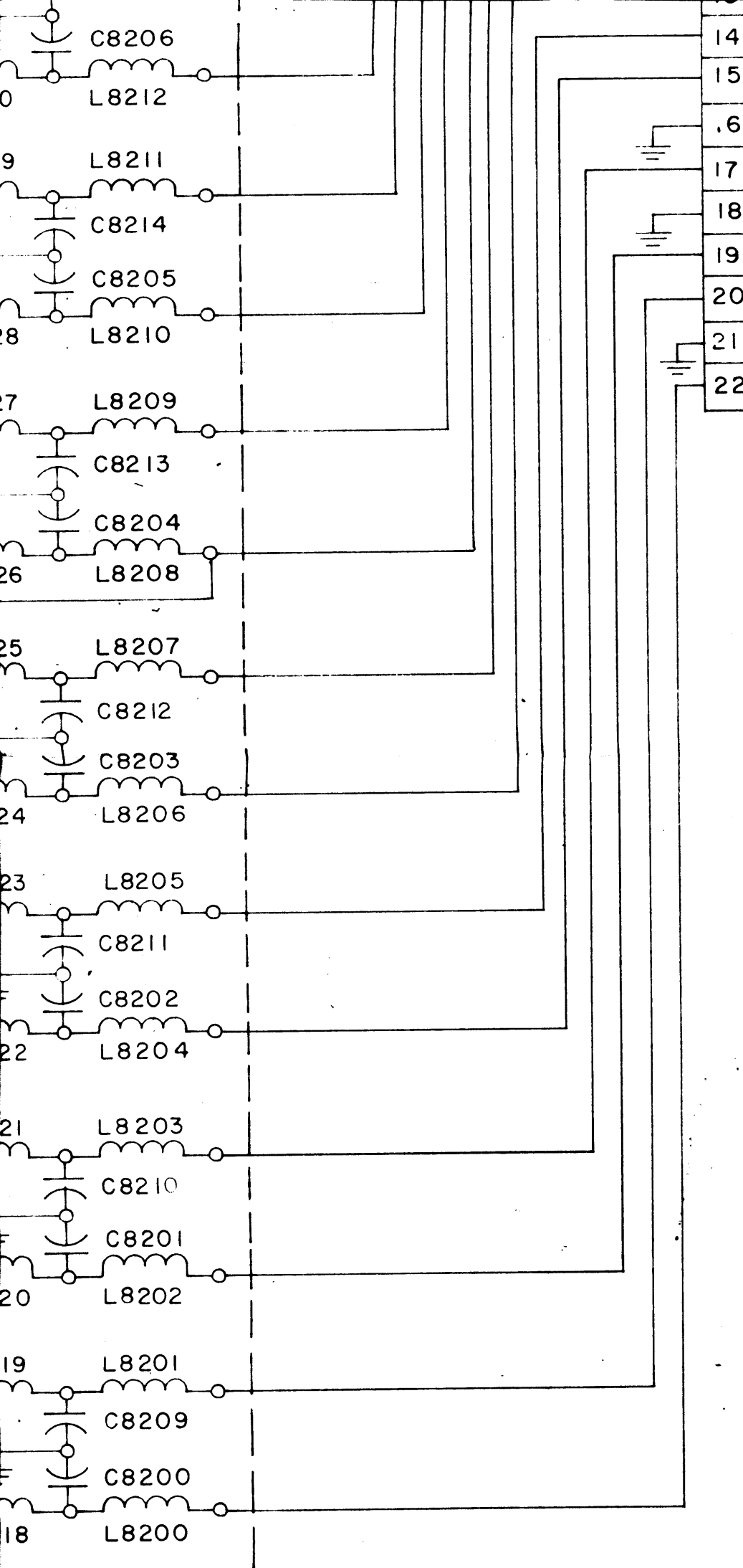




L8100 - L8135
 L8200 - L8235 10 μ H
 C8100 - C8117
 C8200 - C8217 510 pF

197, 198, 200, 201, 202, 23
 185, 186, 187, 190, 191, 192, 193
 174, 175, 176, 177, 178, 1
 19, 69, 72, 73, 111, 112, 127, 13

148, 168, 178,
 199, 216, 218, 223



KEY
 - FAX
 GRD
 G LINE 2 TIS
 G LINE 1

J8005

169	A	FWD. POWER METER
	B	
170	C	REFL POWER METER
	D	
80(900)	E	MAIN POWER ON IND
209(812)	F	OVLD IND
210(834)	G	H.V. ON IND.
167(942)	H	METER RELAY CONT
205(94)	J	ON AIR IND
206(95)	K	FAULT IND
166(932)	L	SWCA FAULT IND
211(3)	M	READY IND
212(4)	N	BIT 1
213(5)	F	BIT 2
214(91)	Q	BIT 3
215(845)	R	BIT 4
216(0)	X	GRD
217(5)	Y	SWCA READY IND

202, 232, 235
 192, 193, 194, 195, 196
 178, 180, 181, 182, 183, 184
 127, 136, 171, 172, 173

215, 217
 211, 212, 213, 214
 205, 206, 209, 210
 80, 166, 167, 169, 170

218, 215, 214, 213, 212, 211
 210, 206, 205, 202, 201
 200, 199, 198, 197, 196
 195, 194, 193, 192, 191

GPT() 2.5(), RAK 110-2J

QTY	UNIT	MODEL USED ON	ASSY TO
APPLICATION			
CODE			
NOTICE TO PERSONS RECEIVING THIS DRAWING THE TECHNICAL MATERIEL CORPORATION provides design and engineering services to the U.S. Government and other agencies. This drawing is issued in confidence for the government's use and may be classified as such. Any unauthorized disclosure of this drawing to the public is prohibited. The user of this drawing is bound for mutual assistance and is requested to report any changes to the original design.			

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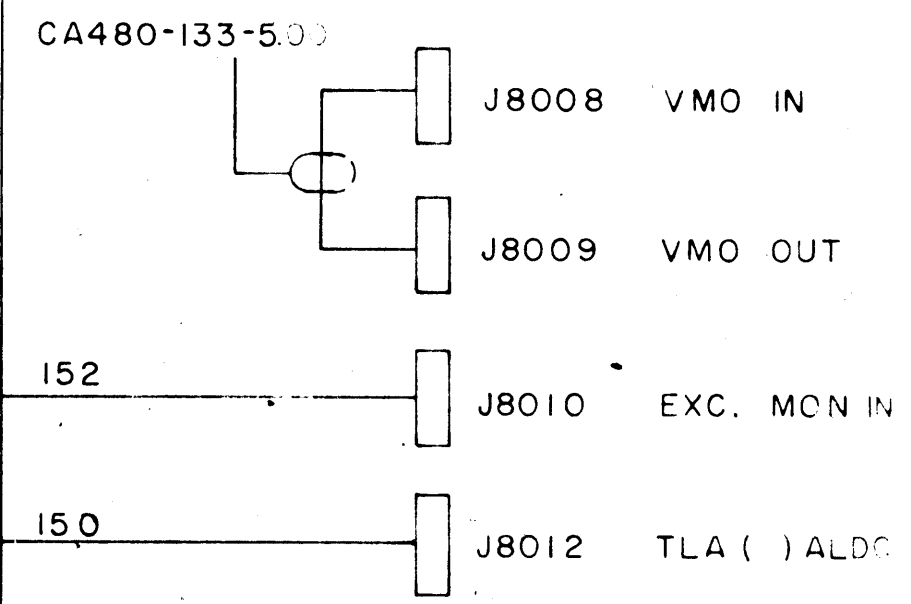
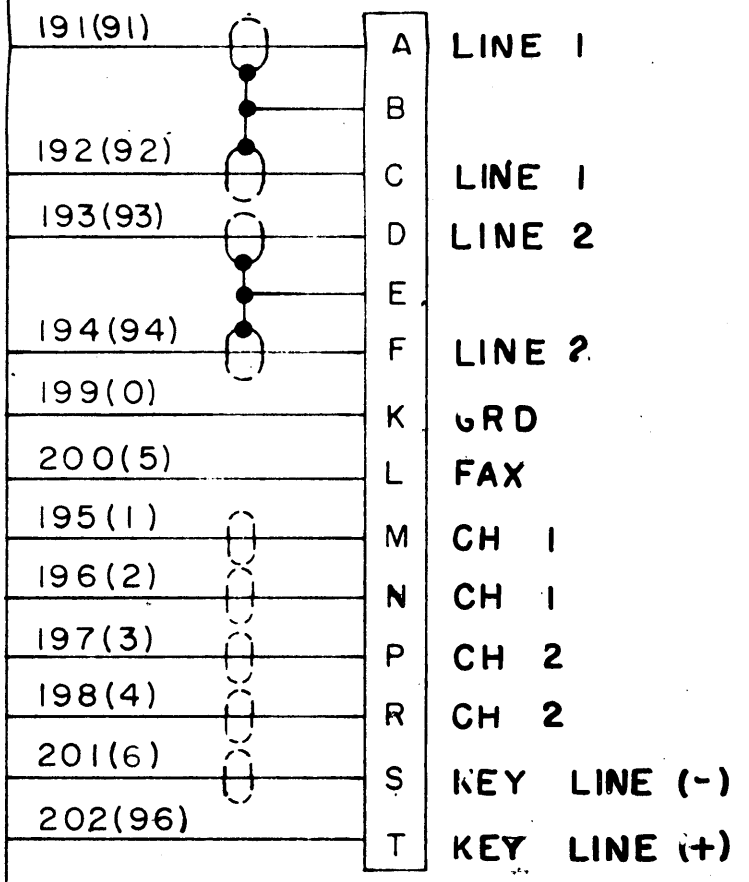


4

207(96)	K	FAULT IND
208(6)	L	H.V. ON-OFF
85(925)	M	H.V. ON-OFF
97-210(834)	N	H.V. OFF IND
211(3)	P	H.V. ON IND
212(4)	Q	READY IND
213(5)	R	BIT 1
214(91)	S	BIT 2
215(845)	T	BIT 3
218(0)	U	BIT 4
219(932)	V	GRD-COMM
220(942)	W	EXC CONT 1
221(944)	X	EXC CONT 2
222(946)	Y	EXC CONT 3
	Z	EXC CONT 4

179(92)	L	KEY LINE
180(93)	M	KEY LINE
181(94)	N	FSK
182(95)	P	FSK
183(3)	R	PTT
184(4)	S	PTT
185(5)	T	
186(90)	U	CONT KEY
190(926)	V	XMTR ON-OFF
187(954)	W	XMTR ON-OFF
188(916)	X	TUNE SWITCH
154(6)	Z	CARRIER ON CONT
224(964)	a	CARRIER ON RETURN
158(914)	b	BAND 1
159(915)	c	BAND 2
160(916)	d	BAND 3
161(917)	e	BAND 4
162(918)	f	BAND 5
163(922)	g	BAND 6
164(925)	h	BAND 7
165(926)	j	BAND 8
223(0)	k	CONT WAFER COMM.
219(932)	m	BIT 1
220(942)	n	BIT 2
221(944)	p	BIT 3
222(946)	r	BIT 4

TIS
J8007



2,211	221, 222	223, 222, 221, 220, 219, 190
2,201	207, 208, 219, 220,	188, 187, 186, 185, 184, 183
7,196	157, 188, 189, 203, 204	182, 181, 180, 179, 178, 177
2,191	78, 82, 85, 97, 155, 156	176, 175, 174, 173, 172, 171

165, 224	
160, 161, 162, 163, 164	
150, 152, 154, 158, 159	

TO SHEET 2

REV	DATE	DESCRIPTION	BY
LIST OF MATERIAL			
<p>Figure 2-3 RAK WIRING DIAGRAM Sheet 3 of 3</p>			
2-14/2-15			

SECTION 3
OPERATOR'S SECTION

3-1. GENERAL

This section has been prepared for technicians having experience on similar or related equipment. Before operating the transmitter, the operator should familiarize himself with the controls and indicators illustrated in Figure 3-1 and described in Table 3-1. Refer to Section 1 of this manual for information regarding the transmitter modular units. Table 3-2 provides typical tuning information. Insure that the necessary interface connections have been made to the rear panel of the GPTR and antenna or dummy load connected to output connector.

3-2. TUNE-UP PROCEDURE FOR GPTR-2.5KE6-4 (MANUAL OPERATION)

STEP	OPERATION	NORMAL INDICATIONS
1	Set MAIN POWER circuit breaker (39) to the ON position.	The Technimatic light (1) must come on, PA blower and top fan must operate.
2	Set AUTO/MANUAL switch (41) to MANUAL and SERVO ON/OFF switch to OFF (44).	NO INDICATIONS.
3	Place EXCITER/PTT and ON/STANDBY switches to ON (33) (32).	MONITOR meter must light on exciter, POWER lamp must be lit.
4	Select the desired channel operating frequency (29). Place RF OUTPUT control (31) to its extreme counter-clockwise position.	CAUTION CHANNEL switch and MODE switch MUST BE ROTATED in a CLOCKWISE direction ONLY.
5	Set AUTO/MANUAL switch to AUTO, set SERVO ON/OFF switch to ON. After TLAA bandswitch has automatically rotated to the correct position, place AUTO/MANUAL switch and SERVO switch to MANUAL and OFF positions respectively.	BANDSWITCH(e)S on TLAA and SWCA-3K will rotate to correct band for channel frequency selected.

STEP	OPERATION	NORMAL INDICATIONS
6	Place the Low Voltage breaker (located on the AP-128, Low Voltage Power Supply) to the ON position.(92)	
7	Place SSB/CW-FSK switch (91) to SSB position.	
<u>NOTE</u>		
At this time it is advisable to check the plate currents of the 1st and 2nd RF amplifier tubes. They should be checked in the following manner:		
(1) Place the MULTIMETER switch (24) to the 1ST AMP Ip position and observe a reading of "10" on MULTIMETER (20). Should meter reading indicate some other value, adjust 1ST AMP BIAS adjust (82) (location on the Low Voltage Power Supply) for "10" on MULTIMETER.		
(2) Place MULTIMETER switch (24) to the 2ND AMP Ip position and observe a reading of "12" on the MULTIMETER (20). Should the meter reading indicate some other value, adjust 2ND AMP BIAS adjust (located on the Low Voltage Power Supply) for "12" on the multimeter.		
8	Set Exciter controls as follows: CARR-SUPPR (DB) switch (35) - to mid-position and rotate CARR control clockwise until MONITOR meter indicates at the FULL mark when METER switch is in CARR position. Mode switch (34) - USB Meter switch (37) - RF USB/LSB - "0" VOX switch (30) - OFF RF OUTPUT control (31) - adjust to 100 milliwatts. (approx. 2 on MONITOR)	Meter on Exciter will read "FULL" when meter switch is in carrier position. When in "RF" position meter will read between 1 and 2.
9	On TLAA, place MULTIMETER switch (24) to the 2ND AMP Ep position.	No indications at this time. (However when excitation from exciter is applied to RF input of P.A. multimeter will indicate RF drive).
10	Advance RF GAIN control on SWCA-3K clockwise for a slight indication on the MULTIMETER (20).	Indication will be noted on MULTIMETER as RF GAIN control (11) has been advanced.

STEP	OPERATION	NORMAL INDICATIONS
11	Adjust 2ND AMPL TUNING control (22) for a peak indication on MULTIMETER (20).	Peak indication will be noted on MULTIMETER (20).
12	Reduce RF output (rotate RF GAIN Control on SWCA (11) to its extreme counterclockwise position).	Indication on MULTIMETER should indicate zero.
13	Place HIGH VOLTAGE breaker (39) to ON position.	High Voltage Lamp (3) must light, PA PLATE CURRENT meter (14) should indicate 450 ma. (Should some other value be noted, adjust the PA BIAS ADJUST (80) located on the Low Voltage Power Supply for a reading of 450 ma on the PA PLATE CURRENT meter (14).
14	Rotate RF GAIN control clockwise on the SWCA-3K to a point where the PA plate current increases.	PA PLATE CURRENT meter indication increases from quiescent value.
15.	Adjust the PA TUNE control (25) until a resonant dip is obtained on the PA PLATE CURRENT meter (14).	Observe resonant dip in PA Plate current.
16	Adjust the PA LOAD control (18) until PA is properly loaded. After each change in loading the PA TUNE control (25) must be returned to resonance.	Proper loading will occur when maximum output is obtained on KILOWATT meter (4). At a power level of 2.5 kilowatt the PA Plate current should be between .6 and .85 Amps depending on the frequency.
17	Rotate RF GAIN control clockwise on SWCA-3K (11) until KILOWATT meter reaches predetermined power level.	PA KILOWATT meter will indicate desired power output level.
18	Reduce power output by turning the RF GAIN control on the SWCA-3K (11) to its extreme counterclockwise position.	KILOWATT meter indicates zero.
19	Place H.V. breaker to the OFF position (42).	HIGH VOLTAGE lamp will go out PA PLATE CURRENT meter will indicate zero.

The transmitter at this time has been initially tuned up on a channel frequency. The desired mode of operation will be determined by control settings of the SMER-6.

3-3. SERVO TUNING PROCEDURE

STEP	OPERATION	NORMAL INDICATIONS
1	Set MAIN POWER circuit breaker (39) to the ON position.	The TECHNIMATIC light (1) must come on. PA blower and top fan must start running.
2	Set AUTO/MANUAL switch (41) to AUTO and SERVO ON/OFF switch to ON.	Prepares transmitter circuits for servo tuning.
3	Place EXCITER PPT/VOX and ON/STANDBY switches to ON (33) (32).	MONITOR meter and POWER lamp must light on SMER-6.
4	Select desired channel frequency and place RF OUTPUT control (31) to its extreme counterclockwise position. (CHANNEL switch clockwise only).	Sets pre-positioning information for automatic bandswitching and automatic tune and load controls presetting.
5	Place LOW LIMIT POWER indicator on SWCA-3K to the desired power level.	No indications (power level control operates to control transmitter RF output in the servo-tune mode of operation).
6	Press Tune button (43).	Activates servo circuitry to cause automatic bandswitching, tune and load pre-positioning to take place.
7	Set exciter controls as follows: METER Switch (37) - RF MODE Switch (34) - USB (clockwise only) Carrier Control - FULL mark on MONITOR meter. USB and LSB Gain Controls (32) (33) - "0" RF OUTPUT control (31) - 100 mw (approximately "2" on MONITOR meter).	With the controls set in this manner, the RF output will be monitored at the end of transmitters tuning cycle.
8	Place HIGH VOLTAGE breaker and LOW VOLTAGE breaker ON. Press TUNE button (43).	HIGH VOLTAGE indicator lamp will light. Transmitter will servo tune automatically. The tuning sequence is as follows: a. 2ND AMPL TUNING control will rotate and stop. (Indications are green SEARCH and OPERATE lamps come on). b. PA TUNE capacitor will rotate and stop. (Indications are green SEARCH and OPERATE lamps will come on).

STEP	OPERATION	NORMAL INDICATIONS
		c. PA LOAD capacitor will rotate and stop. (Indications are green SEARCH and OPERATE lamps will come on).
		d. Transmitter will then automatically drive-up to preset output level and decrease its output to zero. The "Ready" lamp will then come on. This indicates the transmitter has been initially tuned on a pilot carrier, at the desired frequency, to a preset power output level. Mode of operation at this point be determined by the exciter controls.

NOTE

(1) Automatic Transmitter Operation

All initial exciter control adjustments should be performed with High Voltage OFF. Once the desired mode of emission has been determined and exciter controls adjusted accordingly, place the High Voltage breaker to ON and press the TUNE BUTTON, transmitter will automatically tune to the desired frequency; mode of operation and output level.

(2) Manual Operation

The transmitter must first be tuned manually to the desired frequency and output level as per paragraph 3-2. Exciter controls must be adjusted for the desired mode of emission (paragraph 3-4 thru 3-9). The RF Gain Control (located on SWCA-3K) must be adjusted for desired output level.

3-4. SINGLE SIDEBAND WITH ANY DEGREE OF CARRIER INSERTION

- a. Set SSB/CW Switch (91) to SSB. (Switch located on AP-128).
- b. EXCITER switch (33) should be set to ON position when using either the USB or LSB 600 ohm line inputs, or to PTT position when using MIKE input.
- c. Select desired sideband with MODE switch (34). (MODE switch rotation clockwise only).
- d. Select desired operating frequency with CHANNEL selection switch (29). (CHANNEL switch rotation clockwise only).
- e. Turn METER switch (37) at the desired sideband.

- f. Connect a Mike to the front panel MIKE jack if used.
- g. Adjust the GAIN control of sideband used to appropriate level as indicated on MONITOR (38).

NOTE

DO NOT ENTER RED REGION. When mike input is used, adjust level so as not to exceed red region with highest input from microphone.

- h. Turn METER switch (37) to CARR position. Set CAR SUPPR (DB) control (35) to center position. Adjust DB control (35) to the desired level as indicated on MONITOR meter (38).
- i. Turn METER switch (37) to RF position. Adjust RF OUTPUT control (31) for 100 milliwatts RF output (approx. "2" on MONITOR meter (38)).

NOTE

Turn RF OUTPUT control (31) fully CCW before selecting different modes of operation.

3-5. INDEPENDENT SIDEBAND WITH ANY DEGREE OF CARRIER

- a. Set ON/STANDBY switch (32) to ON position.
- b. Set EXCITER switch (33) to ON position when using either the USB or LSB 600 ohm line inputs. Set EXCITER switch (33) to PTT position when using MIKE input.
- c. Set USB (28) and LSB (27) controls to zero.
- d. Select ISB position on MODE switch (34).
- e. Select desired operating frequency with CHANNEL selection switch (29).
- f. Turn METER switch (37) to LSB position. Adjust the LSB GAIN control (27) for a MONITOR meter (38) indication of up to but not to exceed the red region.
- g. Turn METER switch (37) position. Adjust USB GAIN control (28) for a MONITOR METER (38) indication of up to but not to exceed the red region.

h. Turn METER switch (37) to the CARR position. Set CARR SUPPR (DB) control (35) to center position. Adjust control (35) to full or the desired level as indicated on MONITOR meter (38).

i. Turn METER switch (37) to the RF position and adjust RF OUTPUT control (31) for 100 milliwatts RF output indicated on MONITOR meter (38). (100 milliwatts indicated by approximately 2 on meter.)

3-6. CONVENTIONAL AM OPERATION

a. Set ON/STANDBY switch (32) to ON position.

b. Set EXCITER switch (33) to ON position when using either the USB or LSB 600 ohm line input. Set EXCITER switch to PTT position when using MIKE input.

c. Set MODE switch (34) to AM position.

d. Select desired operating frequency with CHANNEL selection switch (29).

e. Turn METER switch (37) to AM position.

f. Connect a mike to the front panel MIKE jack if used.

g. Adjust the MIKE control (36) of sideband used to appropriate level as indicated on MONITOR meter (38).

NOTE

DO NOT ENTER RED REGION. When mike input is used, adjust level so as not to exceed red region with highest input from microphone.

h. Turn METER switch (37) to RF position and adjust RF OUTPUT control (31) for 100 milliwatts RF output ("2" indicated on MONITOR meter (38)).

3-7. FREQUENCY SHIFT TELEGRAPH OPERATION

a. Set ON/STANDBY switch (32) to ON position.

b. Set EXCITER switch (33) to ON position.

c. Turn MODE switch (34) to FSK position.

d. Set CHANNEL switch (29) to desired position.

- e. Select appropriate FSK operation by setting switches S110 and S111 (S110 and S111 located on rear chassis of SME-6).
- f. Place SENSE switch S109 (located on rear of SME-6) to desired sense (+) or (-).
- g. Place METER switch (37) to the RF position. Adjust RF OUTPUT control for 100 milliwatts (approximately "2" on MONITOR meter).

3-8. FACSIMILE (FAX) OPERATION

- a. Set ON/STANDBY switch (32) to ON position.
- b. Set EXCITER switch (33) to ON position.
- c. Turn MODE switch (34) to FAX position.
- d. Set CHANNEL switch (29) to the desired frequency.
- e. Place METER switch (37) to the RF position. Adjust RF OUTPUT control for 100 milliwatt output (100 milliwatt indication approximately "2" on MONITOR meter (38)).

3-9. CW TELEGRAPH OPERATION

- a. Set ON/STANDBY switch (32) to ON position.
- b. Set MODE switch (34) to CW position.
- c. Connect key to KEY jack (located on SME-6 panel).
- d. Set CHANNEL switch (29) to the desired frequency.
- e. Place METER switch (37) to the RF position. Adjust RF OUTPUT control for 100 milliwatts RF output (100 milliwatt indication approximately "2" on MONITOR meter (38)).

TABLE 3-1. CONTROLS AND INDICATORS

MODULAR UNIT	ITEM NO. (Fig. 3-1)	DESIGNATION	FUNCTION
RAK	1	TECHNIMATIC lamp	Indicates when primary circuit breaker (39) is set at ON position.
	2	READY lamp	Indicates transmitter is ready for operation.
	3	HIGH VOLTAGE lamp	Indicates when high voltage circuit breaker (42) is set at ON position.
Standing Wave Ratio Indicator SWCA	4	Power Meter	Indicates forward and reflected power (KW).
	5	24V DC fuse	Protective fuse for control circuits; lights to indicate fuse has blown.
	6	Frequency Selector switch (no panel designation)	Selects frequencies in the 2- to 30-mc range.
	7	230V AC fuse	Protective fuse for power output meter circuits; lights to indicate fuse has blown.
	8	Power Limit Control (no panel designation)	Used for setting minimum r-f power output of transmitter.
	9	SWR OVLD lamp	Lights when standing wave ratio is excessive.
	10	FAULT lamp	Lights to indicate transmitter failed to tune in specified time.
	11	RF GAIN control	Adjusts excitation level to the TLAA (higher level in INCR arrow direction).
	12	KW/REFL switch	Activates meter (4) for forward or reflected power indication.
	13	Power Limit control (no panel designation).	Used for setting maximum r-f power output of transmitter.

TABLE 3-1. CONTROLS AND INDICATORS

MODULAR UNIT	ITEM NO. (Fig. 3-1)	DESIGNATION	FUNCTION
Linear Amplifier TLAA	14	IPA PLATE CURRENT indicator	Indicates intermediate power amplifier plate current.
	15	ALDC ADJ control	Adjusts level of negative feedback applied to the exciter.
	16	PA BANDSWITCH switch	Selects 2- to 30-mc range in 9 increments.
	17	Indicator (no panel designation)	Veeder indicator for LOAD control (18).
	18	LOAD control	Adjusts the loading of the final PA.
	19	RF trig control (no panel designation)	PA plate trigger adjustment for sensing circuit (factory adjusted).
	20	MULTIMETER indicator	Indicates 1st amplifier plate current, 2nd amplifier plate current, 2nd amplifier r-f plate voltage, and power amplifier r-f plate voltage.
	21	2ND AMPL BAND-SWITCH switch	Selects 2- to 30-mc range in 9 increments.
	22	2ND AMPL TUNING control	Adjusts resonance of the 2nd amplifier.
	23	Indicator (no panel designation)	Veeder indicator for TUNE control (25).
	24	MULTIMETER switch	Selects circuit for MULTIMETER (20).
	25	TUNE control	Adjusts resonance of the final PA.
Multi Channel Exciter SME-6	26	CARR SUPPR control	Permits carrier suppression of 0, -6, -26, FULL, or continuously adjustable when set to mid position.
	27	LSB control	Adjust LSB gain.
	28	USB control	Adjust USB gain.
	29	CHANNEL switch	Permits the selection of one of ten preset channels.

TABLE 3-1. CONTROLS AND INDICATORS

MODULAR UNIT	ITEM NO. (Fig. 3-1)	DESIGNATION	FUNCTION	
Multi Channel Exciter SME-6 (CONT'D)	30	VOX control	Regulates the sensitivity of the voice control circuit.	
	31	RF OUTPUT control	Adjust rf output level.	
	32	ON/STANDBY switch	When positioned to ON, applies 12 & 24 vdc to modules. When positioned to Standby removes dc voltages from modules and illuminates STANDBY indicator.	
	33	EXCITER ON/PTT switch	Set to ON for all modes of operation using inputs other than MIKE. Set to PTT when using MIKE input.	
	34	MODE switch (seven positions)	Establishes one of seven operating modes, depending upon options supplied: AM, USB, LSB, ISB, CW, FSK, or FAX.	
	35	(DB) control	Continuously adjustable from 0 db to at least -55 db below PEP when CARR SUPPR control is set to mid position.	
	36	MIKE GAIN control	Adjust gain of mike input.	
	37	METER switch (seven position):		
		Q1	Displays rf output transistor Q1 collector current (350 ma) on MONITOR meter.	
		Q2	Displays rf output transistor Q2 collector current (130 ma) on MONITOR meter.	
		Q3	Displays rf output transistor Q3 collector current (65 ma) on MONITOR meter.	
		LSB	Displays LSB output level on MONITOR meter.	
		USB	Displays USB output level on MONITOR meter.	
CARR		Displays carrier level on MONITOR meter.		
RF	Displays RF level on MONITOR meter.			

TABLE 3-1. CONTROLS AND INDICATORS

MODULAR UNIT	ITEM NO. (Fig. 3-1)	DESIGNATION	FUNCTION
Multi Channel Exciter SME-6 (CONT'D)	38	MONITOR METER	Monitors circuit selected by METER switch
Linear Amplifier Control Panel TCP	39	MAIN POWER circuit breakers	Controls application of power to all units of the transmitter, excluding SME-6.
	40	OVLD RESET switch	Resets the overload relays.
	41	XMTR TUNING AUTO/MANUAL switch	When set at AUTO, allows automatic operation of transmitter; when set at MANUAL, allows the transmitter to be tuned manually.
	42	HIGH VOLTAGE switch	Control application of power to high voltage power supply AP-129.
	43	TUNE switch	When depressed, initiates automatic tuning and loading.
	44	SERVO ON/OFF switch	When set at ON, enables activation of automatic band switching and tuning circuits.
	45	Interlock switch (no panel designation)	Used to locate open interlock switches (indicated by indicator lamp 46).
	46	Interlock Indicator lamp (no panel designation)	When lit, indicates interlock switch is closed.
Servo Amplifier TCSA (Used only when transmitter is automated..)	47	AC fuse	Protects output circuit of supply.
	48	DC fuse	Protects output circuit of supply.
	49	AC fuse	Same as item 47.
	50	DC fuse	Same as item 48.
	51	DC fuse	Same as item 48.
	52	AC fuse	Same as item 47.
	53	R.F.P.O.	R-F Power On adjustment (factory adjusted).
	54	OPERATE lamp	Lights when PA stage has completed loading.

TABEL 3-1. CONTROLS AND INDICATORS

MODULAR UNIT	ITEM NO. (Fig. 3-1)	DESIGNATION	FUNCTION
Servo Amplifier TCSA (CONT'D)	55	SEARCH lamp	Lights when PA stage is being loaded.
	56	AC ON lamp	Lights when servo amplifiers are tuning.
	57	OPERATE lamp	Lights when PA has completed tuning.
	58	SEARCH lamp	Lights when final amplifier is tuning.
	59	AC ON lamp	Same as item 56.
	60	AC ON lamp	Same as item 56.
	61	SEARCH lamp	Lights when 2nd amplifier is tuning.
	62	OPERATE lamp	Lights when 2nd amplifier completes tuning.
Alarm Panel AX633	63	DC fuse	Protective fuse for alarm device circuit.
	64	AUDIO IN jack	Provides for audio test signal to be applied (during maintenance procedures).
	65	PA MON jack	Provides PA monitoring outlet for test procedures.
	66	EXCITER MON jack	Provides exciter monitoring outlet (for test purposes).
	67	Alarm Device (no panel designation)	Alarm sounds if primary power to high voltage power supply is interrupted.
	68	ALARM ON/OFF switch	Activates alarm device circuit when set at ON position.
	69	SENSE switch	Provides for the selection of circuits (as marked) for test purposes.
	70	SENSE jack	Provides monitoring outlet for the sensing positions of SENSE switch 69.

Table 3-1. CONTROLS AND INDICATORS

MODULAR UNIT	ITEM NO. (Page 3-9)	DESIGNATION	FUNCTION
Low Voltage Power Supply AP128	71	PA PLATE OVLD ADJ potentiometer	Used to set plate overload.
	72	PA SCREEN OVLD ADJ potentiometer	Used to set screen overload.
	73	FILAMENT TIME meter	Registers filament operation time.
	74	IPA BANDSWITCH fuse	Protective fuse.
	75	PA BANDSWITCH fuse	Protective fuse.
	76	INTERLOCK fuse	Protective fuse.
	77	INTERLOCK fuse	Protective fuse.
	78	IPA SCREEN fuse	Protective fuse.
	79	PA BIAS OVLD lamp	Overload indicator light.
	80	PA BIAS ADJ potentiometer.	Adjust PA grid bias.
	81	2ND AMPL BIAS ADJ potentiometer	Adjust 2nd amplifier grid bias.
	82	1ST AMPL BIAS ADJ potentiometer	Adjust 1st amplifier grid bias.
	83	FILAMENT fuse	Protective fuse.
	84	PLATE TIM meter	Registers final PA plate operation time.
	85	LOW VOLTAGE fuse	Protective fuse.
	86	BLOWER fuse	Protective fuse.
	87	BIAS fuse	Protective fuse.
	88	PA SCREEN fuse	Protective fuse.
	89	PA SCREEN OVLD lamp	Overload indicator light.
	90	PA PLATE OVLD lamp	Overload indicator light.
	91	Single Sideband CW Switch	Increases bias voltage in CW mode.
	92	Low Voltage Breaker	Provides protection to low voltage circuits.

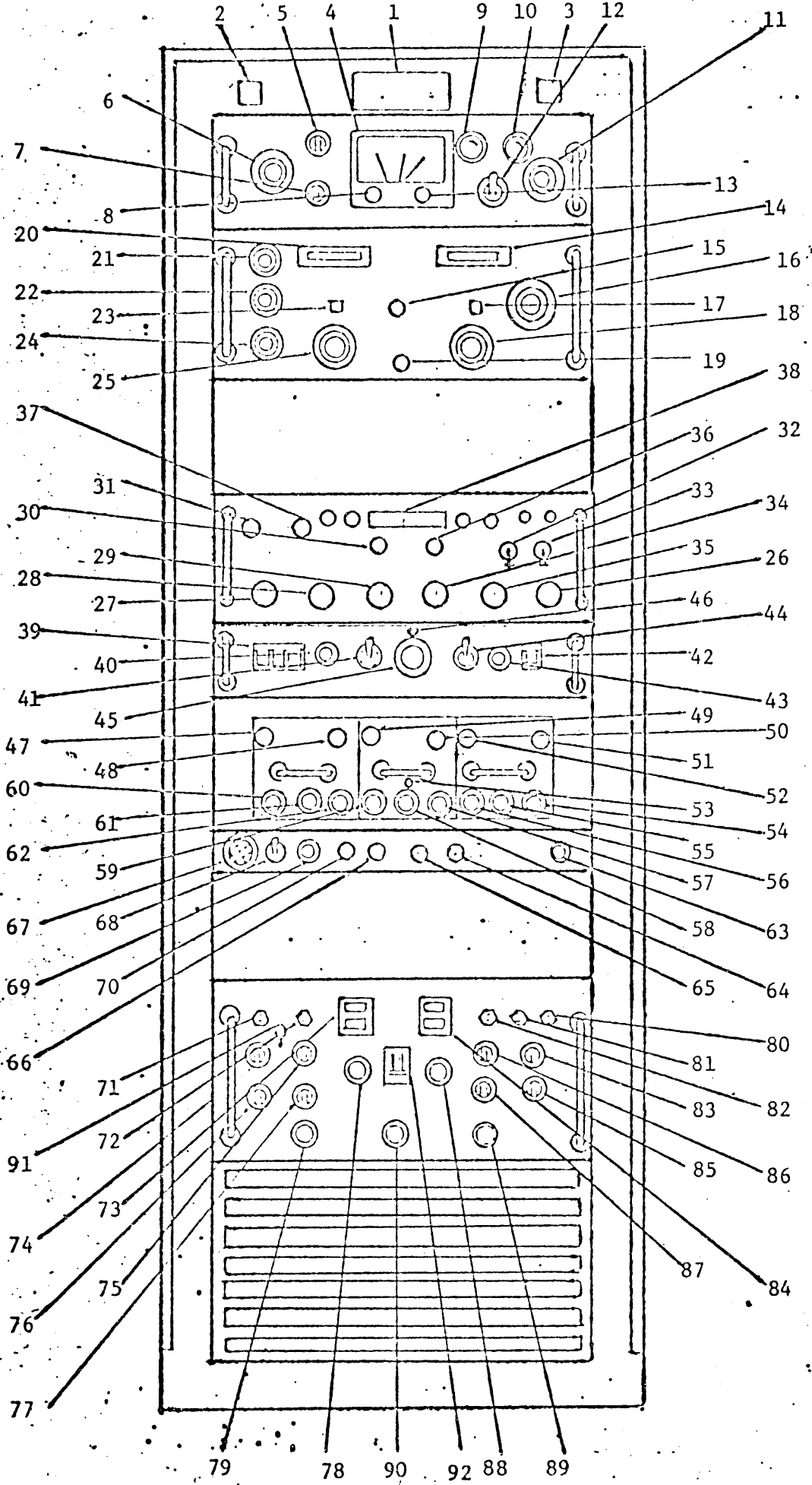


Figure 3-1. Controls and Indicators

TABLE 3-2. SAMPLE TUNING CHART

FREQ. OUT mc	CONTROL SETTINGS				INDICATOR READINGS			
	PA BAND	PA TUNE	PA LOAD	PA IP ma	P out KW PEP	DIST. dB		
2.0	2-2.5	142	168	700	2.5	43		
2.5	2-2.5	109	072	780	2.5	42		
2.5	2.5-3.0	118	138	750	2.5	41		
3.0	2.5-3.0	101	077	840	2.5	43		
3.0	3.0-5.0	110	137	720	2.5	39		
5.0	3.0-5.0	084	046	780	2.5	40		
5.0	5.0-7.0	091	075	750	2.5	45		
7.0	5.0-7.0	077	043	750	2.5	37		
7.0	7.0-11.0	091	074	750	2.5	37		
11.0	7.0-11.0	074	038	660	2.5	37		
11.0	11.0-15.0	084	065	720	2.5	36		
15.0	11.0-15.0	075	039	750	2.5	35		
15.0	15.0-19.0	078	061	750	2.5	35		
19.0	15.0-19.0	069	045	630	2.5	45		
19.0	19.0-24.0	075	050	660	2.5	43		
24.0	19.0-24.0	039	043	660	2.5	46		
24.0	24.0-30.0	075	056	660	2.5	43		
30.0	24.0-30.0	061	039	720	2.5	41		

SECTION 4
PRINCIPLES OF OPERATION

4-1. GENERAL

The transmitter operates in the frequency range of 2 to 32 megacycles (MHz). The 2 to 32 megacycles frequency range is separated into eight selectable channels. Each channel is a fixed-tuned, frequency preselected coil assembly. The transmitter circuitry provides automatic pre-positioning of the linear amplifier bandswitches, electro-mechanical safety features, an audible High Voltage alarm circuit and a series of critical circuit metering and indicating devices. The final transmitter output is amplified to a 2.5 kilowatt output level which is applied to a directional coupler for antenna connection. Forward and reflected power indications are visually monitored on a front panel meter.

4-2. FUNCTIONAL ANALYSIS

a. General

The transmitter comprises 8 major sections as follows:

1. Multi-Channel Exciter, SMER-6
2. Linear Amplifier, TLAA-2.5K
3. Servo Amplifier, TCSA-1
4. RF Control and Indicator, SWCA-3K
5. Linear Amplifier Control Panel, TCP-1
6. Low Voltage Power Supply, AP-128A/50
7. High Voltage Power Supply, AP-129/50
8. Alarm Panel, AX633

b. Block Diagram Analysis

Transmitter channel selection is accomplished by setting the exciter channel selector switch to any one of the eight channel positions. Each

channel position (1 through 8) represents a fixed-tuned, pre-selected rf frequency.

Setting the exciter channel selector switch to any desired position will initiate a pre-position signal. This pre-position signal is applied to the SWCA where it is processed by a master pre-position stepping switch and routed to the motor-controlled bandswitch in the linear amplifier. The resulting action causes the linear amplifier bandswitch to position itself to the proper bandswitch setting in relation to the selected frequency channel. Thus, the exciter is now set at the desired frequency range with the linear amplifier at its corresponding setting.

Audio input and push-to-talk control signals are applied to the exciter audio section. The audio is amplified, routed through an if section, through an RF GAIN control potentiometer, to the input of the selected fixed-tuned rf frequency channel. The rf output is then preamplified and routed to an RF GAIN control in the rf control and indicator SWCA.

The exciter rf output is extended, via the RF GAIN control of the SWCA, to the linear power amplifier TLAA where the exciter output level is increased to 2.5 kw. Low level rf signals applied to the linear amplifier are routed through a broadband amplifier, a tuned second amplifier and a tuned final amplifier to the rf output jack at the rear of the TLAA. The second and final amplifier band switches are automatically pre-positioned by a switch located on the SWCA. Front panel meters provide the required indications for tuning and loading the amplifier stages. Operating power for the linear amplifier is furnished by power supplies AP-128 and AP-129.

The 2.5 kw output of the linear amplifier is coupled to the antenna via a directional coupler which provides the forward and reflected power indication to the SWCA.

The SWCA comprises an RF GAIN control that adjusts the rf excitation to

the linear amplifier, a pre-position switch that sets the linear amplifier bandswitches to the proper band segment, and a front panel meter that provides a forward and reflected transmitter power output indication. The rf output of the exciter is applied to the SWCA RF GAIN control and routed out to the TLAA. The pre-positioning switch receives its operating voltage from the power supply AP-128. When the MANUAL/AUTO switch is set at AUTO, contacts of a relay in the AP-128 supply the voltage required to activate the stepping switches attached to the second and final PA bandswitches. The power meter circuit is configured to permit selection of forward or reflected power indications depending upon the setting of the FWD/REFL switch. The reflected power is monitored in a separate circuit that trips the overload relay when the SWR reaches 2:1 or 3:1 depending on the setting of the rear panel switch.

The low voltage power supply AP-128 provides filament voltage and bias for all amplifier stages in the transmitter, plate and screen voltages for the first two amplifier stages, screen voltages for the PA stage, and 24 vac for the interlock circuits. The AP-128 contains overload relays that open interlocks, cutting off all voltages to the 2.5 kw PA stage when preset overload levels are exceeded. The protective circuits sample the PA plate and screen currents and bias supply voltages and activate the overload relay of the SWCA when any of these currents are excessive.

The high voltage power supply AP-129 supplies the 5000 vdc for the operation of the final power amplifier of the TLAA. The AP-129 receives its operating power from a high voltage contactor that is energized by phase-two voltage supplied by the interlock relay, and phase-three voltage that is supplied by the HIGH VOLTAGE switch in the TCP.

Automatic transmitter tuning and loading is accomplished by servo amplifiers driving the tuning and loading controls. This is accomplished by the exciter channel selector switch, when set to its pre-determined channel po-

sition, driving a pre-position wafer switch. The exciter pre-position wafer switch supplies a pre-position signal to the master pre-position stepping switch in the SWCA. The SWCA pre-position stepping switch routes the pre-position reference signal to a PA tune servo amplifier AZ112 and a PA load servo amplifier AZ111 in the linear amplifier. The PA tune and PA load servo amplifiers in turn, drive the PA tune and PA load servo controls in the linear amplifier. Both PA tune and PA load servos are also controlled by the linear amplifier sense circuits.

The linear amplifier bandswitch control is directly controlled by the SWCA pre-position stepping switch.

4-3. TECHNIMATIC CIRCUIT ANALYSIS

Band switches and tuning and loading elements in the transmitter rf circuits are automatically positioned after application of appropriate control signals from the pre-position switch in the exciter.

The exciter pre-position switch controls the positioning of a master stepping switch located in the SWCA.

The transmitter frequency range (2 to 32 mc) is divided into 10 segments. The master stepping switch is positioned to one of its 10 positions which corresponds to that segment of the 2 to 32 mc frequency range to which the exciter is tuned.

The bandswitch in the linear amplifier is positioned in accordance with control signals from the master stepping switch assembly. The inductive component of the linear amplifier tuned circuit is therefore adjusted for operation in the selected frequency range.

The three tuning and loading capacitors in the transmitter (2nd AMPL TUNE, PA TUNE, and PA LOAD) are set at pre-position settings when the associated servo amplifiers are initially turned on. The capacitors (all except 2nd AMPL TUNING) are positioned according to reference signals from the master stepping switch

assembly. The capacitor settings are therefore dependent on the selected output frequency. Tuning time is thus minimized.

The linear amplifier sensing circuit generates input signals for the 2nd AMPL servo amplifier. The input for the 2nd AMPL servo amplifier is dependent on tube plate current. Since tube plate current increases with excitation, and excitation is dependent on the input circuit resonance, the 2nd AMP tuning capacitor is adjusted until the required tube plate current is reached.

The linear amplifier sensing circuits generate outputs that are dependent on PA tube plate current, pi-input reactance, and pi-input impedance. When excitation is applied to the PA, plate current increases, and a signal from the sensing circuits trigger the PA TUNE servo amplifier into operation. The PA tuning capacitor is adjusted so as to minimize pi-input impedance to a predetermined value. After tuning and loading of the PA is accomplished, a Drive-up signal is applied to the SWCA level control circuits from the PA LOAD servo amplifier.

Upon reception of the tuning completion signal, the relay circuits in the SWCA level control circuits disable the servo amplifier and bandswitch control circuits. The level control circuits also disconnects the level control circuit. The linear level control assembly supplies a changing control signal to the exciter so that excitation is increased. The directional coupler generates a signal proportional to transmitter power output; when output power reaches a pre-determined point (usually 1.25 kw), the excitation level control signal is stabilized.