T.O. 31R2-2URC-113

TECHNICAL MANUAL

MAINTENANCE INSTRUCTIONS
WITH ILLUSTRATED PARTS BREAKDOWN
(DEPOT)

ANTENNA COUPLER, CU-2310/URC,
P/N 10094-0000

HARRIS CORPORATION, RF COMMUNICATIONS GROUP
F04606-82-D-0079

BASIC AND ALL CHANGES HAVE BEEN MERGED TO MAKE THIS A COMPLETE PULICATION

Published under authority of the Secretary of the Air Force

15 JANUARY 1986
CHANGE 5 - 25 OCTOBER 1999

LIST OF EFFECTIVE PAGES

INSERT LATEST CHANGED PAGES. DESTROY SUPERSEDED PAGES.

NOTE: The portion of the text affected by the changes is indicated by a vertical line in the outer margins of the page. Changes to illustrations are indicated by miniature pointing hands. Changes to wiring diagrams are indicated by shaded areas.

Dates of issue for original and changed pages are:

Original ..... 0 ..... 15 January 1986
Change ..... 1 ..... 18 October 1988
Change ..... 2 ..... 2 October 1991
Change ..... 3 ..... 29 May 1992
Change ..... 4 ..... 8 March 1995
Change ..... 5 ..... 25 October 1999

TOTAL NUMBER OF PAGES IN THIS PUBLICATION IS 86, CONSISTING OF THE FOLLOWING:

*Zero in this column indicates an original page

SAFETY SUMMARY

The following are general safety precautions that are not related to any specific procedures and therefore do not appear elsewhere in this publication. These are recommended precautions that personnel must understand and apply during many phases of operation and maintenance.

KEEP AWAY FROM LIVE CIRCUITS

Operating personnel must at all times observe all safety regulations. Do not replace components with the power supply turned on. Under certain conditions, dangerous potentials may exist when the power control is in the off position, due to charges retained by capacitors. To avoid casualties, always remove power and discharge circuits to ground before touching any circuit components. Remove watches and rings before performing any maintenance procedures.

DO NOT SERVICE OR ADJUST ALONE

Under no circumstances should any person reach into or enter the enclosure for the purpose of servicing or adjusting the equipment except in the presence of someone who is capable of rendering aid.

RESUSCITATION

Personnel working with or near high voltages should be familiar with modern methods of resuscitation. Cardiopulmonary resuscitation procedures are outlined in T.O. 31-1-141-1, and annual refresher training requirements are outlined in AFOSH STD 127-50.

The following warnings appear in the text in this volume, and are repeated here for emphasis.

WARNING

Dangerous voltages exist in this radio equipment. Before removing any covers, disconnect the primary power and the RF source.

WARNING

High RF voltages may be present in the coupler during this alignment.

HANDLING OF ELECTROSTATIC DISCHARGE SENSITIVE DEVICES (EDSD)

Electrostatic Discharge Sensitive Devices (EDSD) must be handled with certain precautions that must be followed to minimize the effect of static build-up. Consult T.O. 00-25-234, DOD Std-1686, and DOD HDBK 263. EDSD devices are identified in this technical order by the following symbol:

TABLE OF CONTENTS

Section/Para **Page**

NOTE

For chapters 1-5, see the On-Equipment Manual, T.O. 31R2-2URC-111.

LIST OF ILLUSTRATIONS

Figure Page

CHAPTER 6. MAINTENANCE

CHAPTER 7. ILLUSTRATED PARTS BREAKDOWN

CHAPTER 8. FOLDOUT DRAWINGS

LIST OF TABLES

GLOSSARY

A	Ampere(s)
A/D	Analog-to-Digital (Converter)
AFSK	Audio frequency shift keying; a baseband modulation scheme in which two audio frequencies are used to represent binary coded data; the frequency is shifted to one frequency to represent a 1 (mark) and to the other to represent a 0 (space).
AGC	Automatic gain control
ALE	Address latch enable
AM	Amplitude modulation; a modulation scheme in which the carrier is made to vary in amplitude in accordance with the modulating signal.
AME	Amplitude modulation equivalent
ANTIVOX	Prevents false VOX operation; see VOX
BFO	Beat Frequency Oscillator, used in SSB detection circuits
BIT	Built-in Test
BIU	Bus interface unit
BW	Bandwidth
CPU	Central processing unit
CREV	Converter reverse
CW	Continuous wave; a wave that does not vary in amplitude or frequency and is turned on and off to carry intelligence, e.g., Morse Code
D/A	Digital-to-Analog (Converter)
dB	Decibel(s)
dBm	Decibel(s) relative to one milliwatt
EMI	Electromagnetic interference
EPROM	Erasable programmable read-only memory
EU	Execution unit
HF	High frequency; a radio frequency band extending from about 3 MHz to 30 MHz; in this manual, HF includes 1.6 to 30 MHz.
HV	High voltage
IF	Intermediate frequency
IM	Intermodulation (distortion)
I/O	Input/Output
KREV	Keyer reverse
LCD	Liquid crystal display
LED	Light emitting diode
LPA	Linear power amplifier
LSB	Lower sideband; a modulation scheme in which the intelligence is carried on the first sideband below the carrier frequency; see SSB
MIC	Microphone
mA	Milliampere(s)
mV	Millivolt(s)
NBSV	Narrow band secure voice
PEP	Peak envelope power
PPC	Peak power control
PWB	Printed wiring board
RAM	Random access memory
rms	Root mean square
RTC	Real time clock
RX	Receive

GLOSSARY (Continued)

S TONE	Sidetone
SSB	Single sideband; a modulation scheme in which the intelligence is carried by one of the carrier sidebands, the other side band and the carrier center frequency being suppressed
TGC	Transmitter gain control
TX	Transmit
uA	Microampere(s)
uP	Microprocessor
USB	Upper sideband; a modulation scheme in which the intelligence is carried on the first sideband above the carrier frequency; see SSB
uV	Microvolt(s)
Vac	Volts, alternating current
VCO	Voltage controlled oscillator
Vdc	Volts, direct current
VOX	Voice operated transmission
VSWR	Voltage standing wave ratio; the ratio of the maximum to the minimum voltage of a standing wave on a radio frequency transmission line
W	Watt(s)

INTRODUCTION

The purpose of this manual is to provide information necessary for the depot-level maintenance of Coupler, Antenna, CU-2310/URC, manufactured by the RF Communications Group of Harris Corporation, Rochester, New York. The manual is divided into three chapters. The contents of each chapter are briefly described in the following paragraphs.

NOTE

This manual only contains three chapters, because chapters 1-5 are contained in the On-Equipment Manual, T.O. 31R2-2URC-111. For a description of the contents of these chapters, see the INTRODUCTION in T.O. 31R2-2URC-111.

Chapter 6 describes the depot-level maintenance procedures. The maintenance procedures in this chapter are based on performance testing and trouble analysis of the subassembly or PWB to locate and replace faulty parts at the lowest replaceable unit level (LRU).

Chapter 7 contains the Illustrated Parts Breakdown (IPB) information at the depot level. This includes assemblies and parts that may be replaced at the depot location.

Chapter 8 contains foldout (FO) drawings, which consist of the schematic diagrams for all the PWB assemblies. A cross reference list is also provided. The diagrams are numbered FO-1, FO-2, etc. They are printed on sheets with page-size blank aprons to permit viewing the diagram with the rest of the book closed or opened to another page.

The following specifications, standards, and publications were used in the preparation of this manual.

APPLICABLE SPECIFICATIONS

SPECIFICATION	NAME
MIL-M-38798B, para. 3.4	Combined Operation and Maintenance Instructions Manual (Equipment).
MIL-M-38807, Amend. 4	Preparation of Illustrated Parts Breakdown.
MIL-M-38790 and MIL-M-38784A	General Requirements for Preparation of Technical Manuals.

APPLICABLE STANDARDS

STANDARD	NAME
MIL-STD-12	Abbreviations for use on Drawings and in Technical Type Publications.
MIL-STD-15-1A	Graphic Symbols for Electrical Components.
MIL-STD-17-1	Mechanical Symbols.
MIL-STD-806	Graphic Symbols for Logic Diagrams.

APPLICABLE PUBLICATIONS

PUBLICATION	NAME
DOD 5200.20	Distribution Statements on Technical Documents.
USAS Y14.15-1966	Electrical and Electronic Diagrams.
USAS Y32.16-1968	Electrical and Electronic Reference Designations.
T.O. 31-1-141 (Series)	Technical Manual-Basic Electronic Technology and Testing Practices.

CHAPTER 6

MAINTENANCE

WARNING

Dangerous voltages exist in this radio equipment. Before removing any covers, disconnect the primary power and the RF source.

Section I. INTRODUCTION

6-1. CHAPTER ORGANIZATION. This chapter is divided into four sections. Section I tells how the chapter is organized. Section II contains alignment procedures for replaceable modules. This information is also contained in the On-Equipment Manual, T.O. 31R2-2URC-111, and is repeated here for convenience. Section III consists of diagnostic procedures which will enable you to troubleshoot faulty modules to the component level. These procedures are based on use of the BIT feature. For more information on BIT, as well as removal/replacement procedures and periodic maintenance procedures, see the On-Equipment Manual, T.O. 31R2-2URC-111. Section IV contains removal/replacement procedures for the variable coil, variable capacitor, and servo drive assemblies.

Section II. ALIGNMENT PROCEDURES

6-2. INTRODUCTION. This section contains instructions for checking and adjusting the replaceable subassemblies in the 100/500 Watt Antenna Coupler. This section also contains illustrations to help you identify the components that can be adjusted. To do the procedures described in this section, you need the test equipment listed in Table 6-1.

Table 6-1. Test Equipment*

Generic Name	Military Designation	Manufacturer Model No.	National Stock No.	Required Range
Digital Multimeter		Fluke, Model 8012A	6625-01-140-0221	10 mV to 13.6 Vdc; 0 to infinity ohms
Dummy Load		Bird, Model 8833	6625-00-225-9074	500 W (pk), 250 W (avg), 50 ohms
Electronic Voltmeter w/ AC Probe & T-connector		Hewlett Packard Model 410C Model 11036A Model 11042A	6625-00-469-2258 6625-00-910-5973 5985-00-713-4356	10 to 100 V rms; 1.6 to 30 MHz (peak reading)
100 Watt Transceiver	RT-1446/URC	RF Communications Model RF-350	5820-01-162 3406	
Feeler gauge				2.3-2.5 mm
Antenna Coupler	CU-2310/URC	RF Communications Model RF-351	5985-01-161-1724ZX	

*NOTE: Equivalent Items Authorized

6-3. ALIGNMENT PROCEDURES.

a. Logic PWB Assembly A1, (see figure 6-2).

C31, Reflected Power Adjustment
R71, Phase Error Adjustment
C36, Load Error Adjustment

WARNING

High RF voltages may be present in the coupler during this alignment.

NOTE

These adjustments are interrelated and should always be done together.

(1) Connect a dummy load to the RF output connector of the antenna coupler.

(2) Turn on the transceiver. Set the frequency to 29.999 MHz in CW mode.

(3) Tune the antenna coupler either with a momentary closure of the CW key or by pressing [2ND] [TX KEY] [2ND] [TX KEY]. The coupler will either (a) attempt to tune twice and then fault, going into the BYPASS mode, or (b) tune properly.

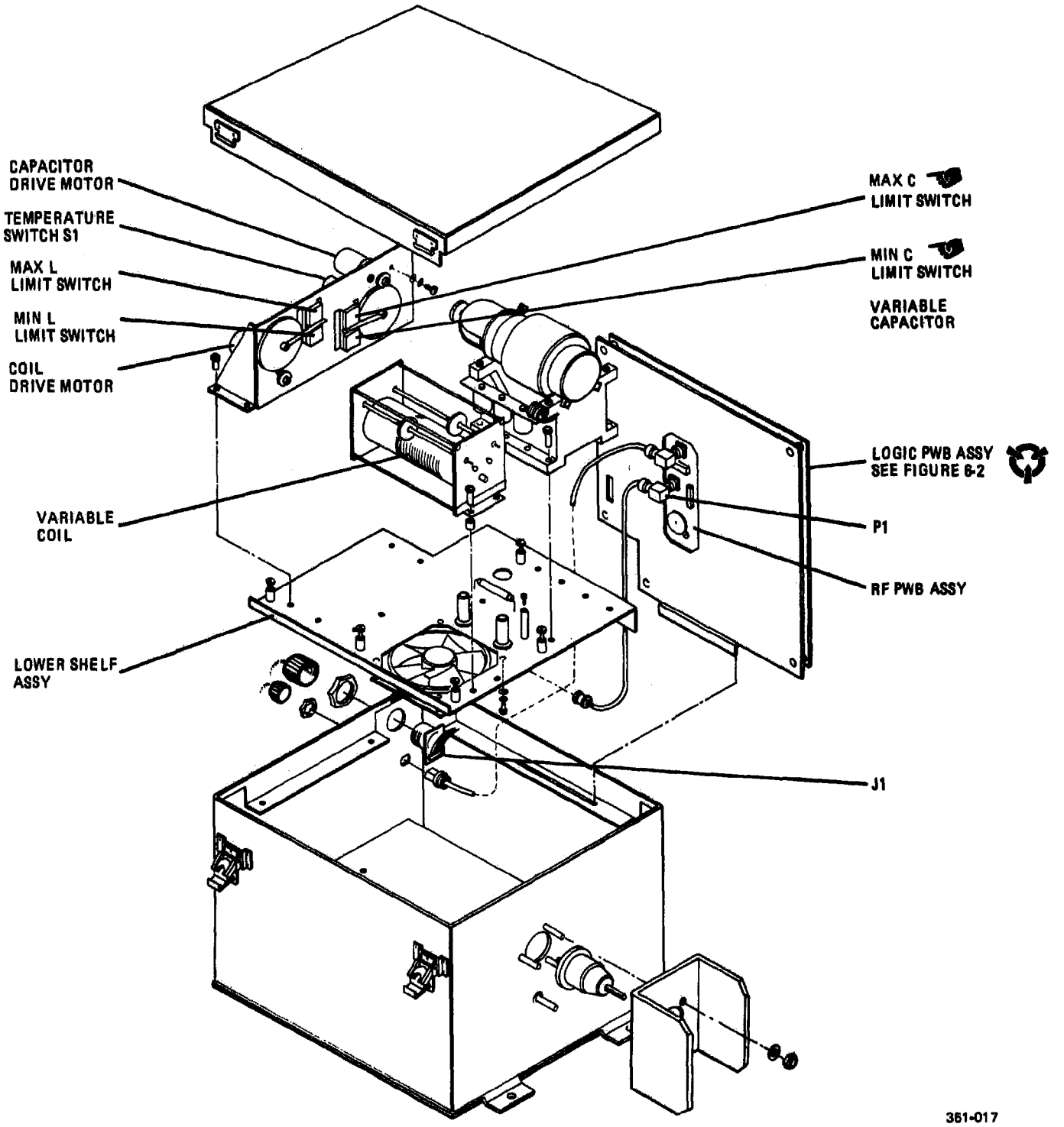


Figure 6-1. 100/500 Watt Antenna Coupler

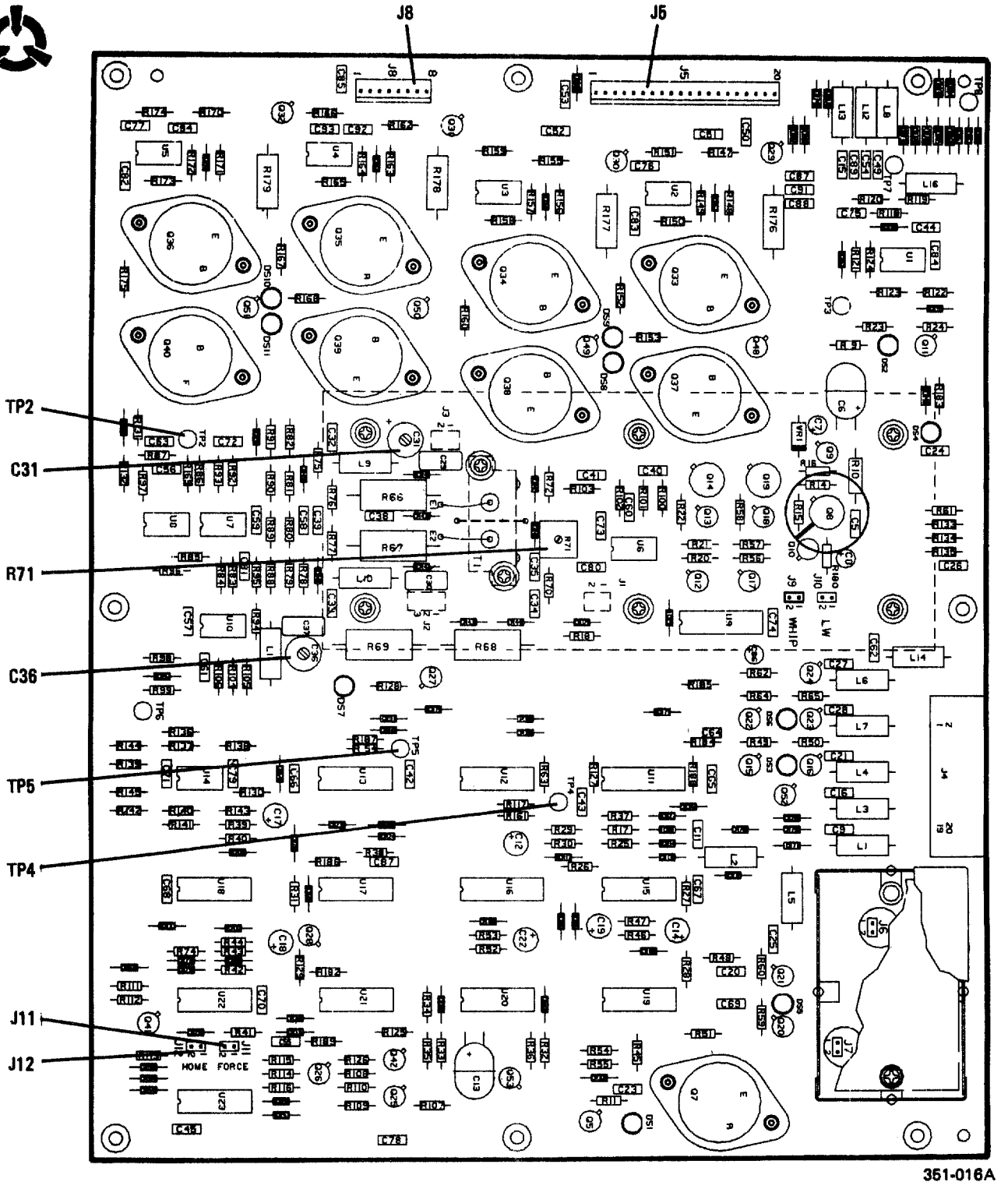


Figure 6-2. Logic PWB Assy Component Layout

(4) Remove the top cover of the coupler.

(5) Loosen the five captive screws and raise the top shelf to its upright position.

(6) Using a jumper, short the temperature switch (S1) output to ground (this is an insulated standoff on the outboard side of the motor mounting plate (see figure 6-1). This will place the coupler into BYPASS mode.

(7) Disconnect the RF output coax connector P1 from J2 on the RF PWB Assembly. See figure 6-1.

(8) Connect a 50 ohm dummy load to J2 on the RF PWB Assembly.

(9) Connect an HP410C (DC volt range) voltmeter between TP2 and ground on the Logic PWB Assembly (see figure 6-2). Use 0.5 Vdc scale.

(10) Key the transceiver with the CW key.

(11) Adjust C31 on the Logic PWB Assembly for a voltage null (a dip in the meter reading).

NOTE

Since the capacitor can be rotated a full 360 degrees (that is, from minimum capacitance to maximum capacitance and back to minimum capacitance), be careful not to mistake the capacitor null for a voltage null. A capacitor null is when the voltage null occurs at either maximum or minimum capacitance. (Figure 6-3 shows how the capacitor looks at either minimum or maximum capacitance).

(12) Connect the HP410C voltmeter between TP5 and ground. Use 1.5 Vdc scale.

(13) Adjust C36 for 0 Vdc ±200 mV.

(14) Connect the voltmeter between TP4 and ground. Use 5 Vdc scale.

(15) Adjust R71 for +0.0 Vdc ± 100 mv.

(16) Unkey the transceiver, disconnect the load from J2, connect the RF output coax connector P1, disconnect the jumper from S1, lower the top shelf, and replace the top cover, making sure that all hardware is secure.

(17) Turn system OFF to reset from coupler BYPASS Mode (enabled in step 6-3 a (6)).

b. Lower Shelf Assembly, A2

NOTE

The following procedures are done with the Lower Shelf Assembly out of the antenna coupler.

(1) Variable Coil L1 Limit Switch Adjustment

CAUTION

In the next step, do not rotate the coil beyond the limit switch activation point (audible click is heard), or the switch activation lever may be bent.

(a) Using finger contact on the non-metallic coil surface, rotate the variable coil L1 clockwise (as viewed from the driven end of the coil) toward minimum inductance until the MIN L limit switch (figure 6-1) actuates (an audible click should be heard). The mechanical end stop of the coil should be between 5/8 and 3/4 of a turn clockwise from this point.

(b) If the mechanical end stop is more than 3/4 of a turn or less than 5/8 of a turn clockwise from this point, do steps (c) - (f).

(c) Adjust the coil so that it is 5/8 of a turn from the mechanical end stop.

(d) Loosen the screw securing the coil limit switch assembly.

(e) Move the switch assembly slightly in the appropriate direction and retighten the screw.

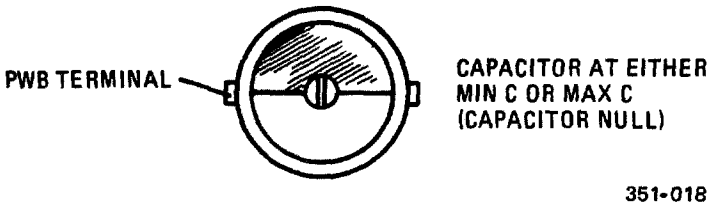


Figure 6-3. Capacitor C31

NOTE

If the initial setting was less than 5/8 of a turn from the mechanical end stop, rotate the limit switch assembly upwards. If the initial setting was greater than 3/4 of a turn, rotate the switch assembly downwards.

(f) Recheck where the limit switch actuates and repeat this procedure if necessary.

(2) Variable Coil Roller Alignment

(a) There should be 18 turns of the coil between the TUNE roller and the FOLLOWER roller. Refer to figure 6-4 for the correct alignment. If the alignment is not correct, do steps (b) - (d).

(b) Adjust the coil so that the tune roller is one turn away from the mechanical end stop at MIN L.

(c) Adjust the follower roller by carefully lifting the roller off the coil and sliding it to the 20th turn from the mechanical end stop.

(d) Carefully engage the roller on the coil wire.

(3) Variable Capacitor C1 Limit Switch Adjustment

CAUTION

In the next step, do not rotate the capacitor beyond the limit switch activation point (audible click is heard), or the switch activation lever may be bent.

(a) Rotate the variable capacitor shaft counterclockwise (as viewed from the driven end of the capacitor) until the MAX C limit switch (see figure 6-1) actuates (an audible click should be heard). At this time, the blue end bell on the capacitor should be tight.

(b) Rotating the capacitor shaft an additional 1/4 to 1/2 turn should cause the end bell to become loose. If the end bell becomes loose at the same time as or before the limit switch actuates or if the end bell is still tight after an additional half turn after the limit switch actuates, then do steps (c) - (e).

(c) Loosen the screw securing the capacitor limit switch assembly.

(d) Move the switch assembly slightly in the appropriate direction and retighten the screw.

NOTE

If the end bell became loose before the additional 1/4 turn, rotate the switch assembly slightly downwards. If the end bell did not become loose until after the additional 1/2 turn, move the limit switch assembly slightly upwards.

(e) Retighten the screw securing the switch assembly and repeat steps (a) and (b) above.

c. Case Assembly

Ball Gap Assembly Adjustment

The gap between the acorn nut and the brass standoff on the antenna terminal should be 0.090 to 0.100 inch (2.3 to 2.5 mm). If not, adjust the acorn nut as required to obtain this specification. See figure 6-5.

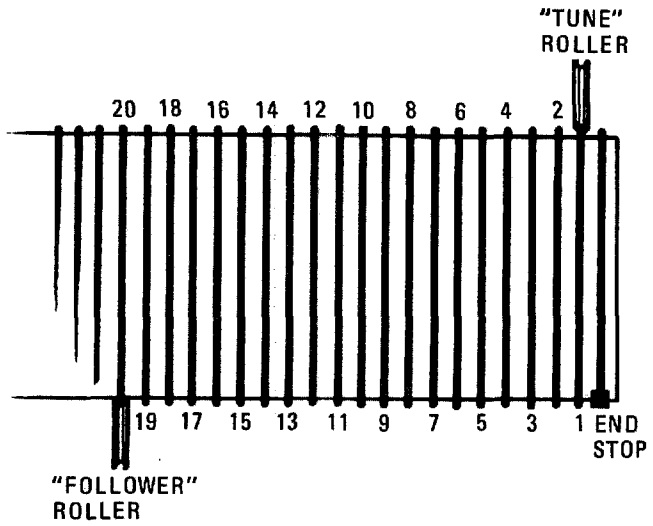


Figure 6-4. Variable Coil Roller Alignment

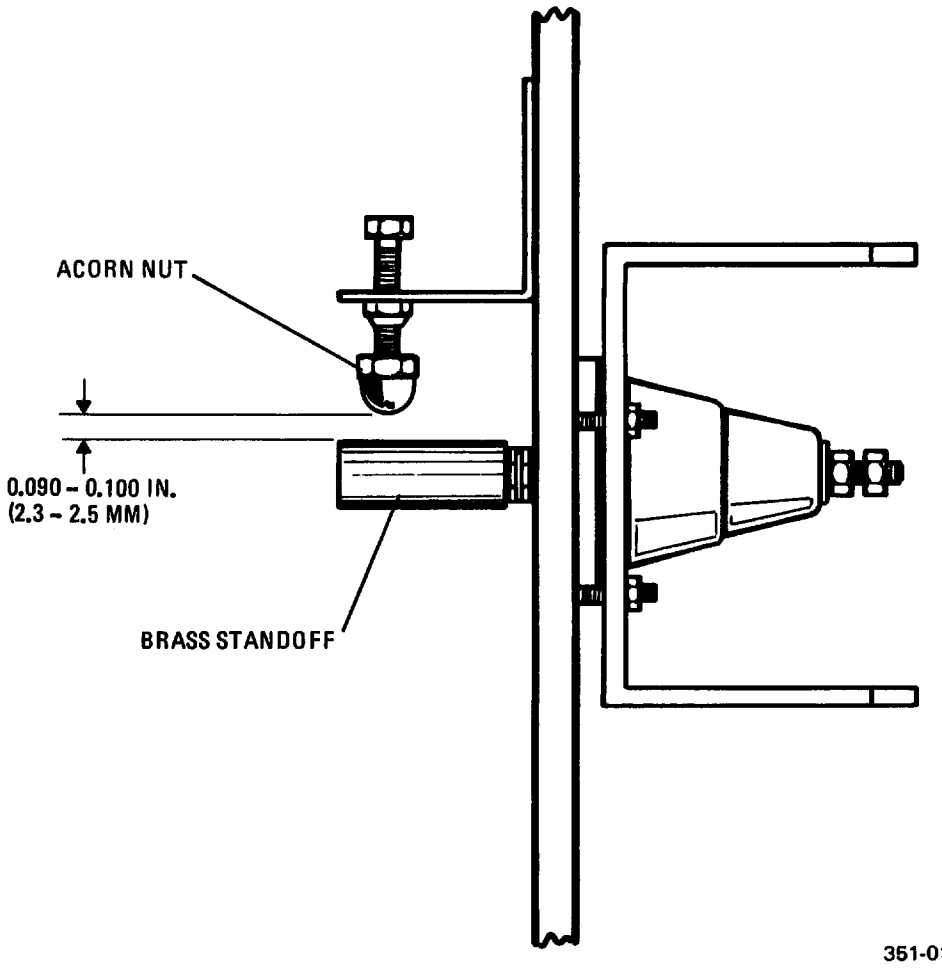


Figure 6-5. Ball Gap Assy Adjustment

Section III. DIAGNOSTIC PROCEDURES

6-4. DEPOT MAINTENANCE PHILOSOPHY. The maintenance procedures presented in this chapter assume that equipment problems have already been isolated to one of the replaceable subassemblies listed below. This has been accomplished in the field using the BIT (Built-In Test) troubleshooting approach. (For a detailed description of BIT, see Chapter 6 in the On-Equipment Manual for the 100/500 Watt Antenna Coupler, T.O. 31R2-2URC-111). As a depot maintenance technician, your job is to take these defective subassemblies returned from the field, swap them with known good subassemblies in a properly functioning 100/500 Watt Antenna Coupler (the "test bed"), and troubleshoot the defective subassemblies to the component level. Once you have identified and replaced the faulty component (resistor, capacitor, transistor, etc.), you will then perform whatever adjustment or alignment procedures are required to restore the subassembly to peak operating condition. To accomplish these tasks, you will need the procedures contained in this chapter, a complete set of schematics (in Chapter 8 of this manual), and the test equipment listed in Table 6-1. The following is a list of the subassemblies covered in Section III:

NOTE

In order to find the location of components on circuit boards, refer to the circuit board layout drawings in the Alignments section of this chapter or in the Illustrated Parts Breakdown in chapter 7.

6-5. LOGIC PWB ASSY, A1.

a. Preliminary Procedure.

(1) Remove the good Logic PWB Assy from the test-bed 100/500 Watt Antenna Coupler, and replace it with the faulty Logic PWB Assy. Leave the coupler cover off, and prop up the Logic PWB Assy in its test position.

(2) Connect a dummy load to the output (J5) of the 100/500 Watt Antenna Coupler.

(3) Power up the 100/500 Watt Antenna Coupler from the front panel of the 100 Watt Transceiver.

(4) Check for the presence of the following voltages on the Logic PWB Assy:

Voltage:	Measure at:
+13.6 Vdc	+ side of C6
+10 Vdc	+ side of C8
-10 Vdc	U1, pin 4

(a) If the +13.6 Vdc is bad, check for a problem with the input connector J4. If the circuit breaker in the 100 Watt Transceiver trips out, look for a shorted capacitor (e.g., C5, C6, C89).

(b) If the +10 Vdc is bad, look for a problem with Q8-Q10, VR1, or their associated components.

(c) If the -10 Vdc is bad, look for a problem in the -10 V Converter PWB Assy. This is a standard switching power supply circuit which takes the +10 Vdc from the Logic PWB Assy, feeds it into an oscillator consisting of Q1, Q2, and the primary of T1, and then rectifies out the positive half cycles in the secondary with CR2 and CR3. The resulting negative ripple voltage is filtered by C5, C6, C8, and L3, producing the -10 Vdc.

(4) If the voltages check good, run the receive-transmit BIT test.

b. Interpreting the BIT Codes. Use the fault codes listed below as a guide in troubleshooting the Logic PWB Assy. Refer to the section corresponding to the fault code you get. In the event that the test runs without generating a fault code, start at the beginning of the following procedures and work your way through to the end.

3-01

This fault code indicates that the 100/500 Watt Antenna Coupler was not able to achieve a VSWR less than 2:1 within 20 seconds after a tune cycle was initiated. In normal operation (i.e., after a successful tune), this fault code indicates that the VSWR has become 2:1 or greater.

(1) Check the operation of the motor drive circuits as follows:

(a) Short the J12 posts together with a screwdriver. The coil motor should move toward MIN L, and the capacitor motor should move toward MAX C. LEDs DS8 and DS11 should be illuminated while the motors are turning and should go off when the motors reach their end stops.

i. If the coil motor malfunctions, look for a problem either in the driver transistors (Q33, Q38, or their associated components), in the amplifiers (U14, U2, U3, or their associated components), or in the driver switch (Q29 or its associated components).

ii. If the capacitor motor malfunctions, look for a problem either in the driver transistors (Q35, Q40, or their associated components), in the amplifiers (U14, U4, U5, or their associated components), or in the driver switch (Q31 or its associated components).

When the J12 posts are shorted, you should see the following signal levels:

High	Low
CR54-A,-K	U14-7
U3-1	U3-5
U2-5	U3-7
U2-7	U2-1

If both motors function correctly, proceed to step b. If neither motor functions correctly, check for a problem with L/C Home Switch Q41, CR56, servo disable buffer U11, servo disable switch Q27, or their associated components (if the servos are disabled, LED DS7 should be on).

(b) Short the J11 posts together with the screwdriver. The motors should now move in the opposite direction (toward MAX L and MIN C). LEDs DS9 and DS10 should be illuminated while the motors are turning and should go off when the motors reach their end stops (and when the screwdriver is removed from J11).

i. If the coil motor malfunctions, look for a problem either in the driver transistors (Q34, Q37, or their associated components), in the L Force Switch (Q25, Q42, U21B, CR57, or their associated components), or in the driver switch (Q30 or its associated components).

ii. If the capacitor motor malfunctions, look for a problem either in the driver transistors (Q36, Q39, or their associated components), in the C Force Switch (Q26 or its associated components), or in the driver switch (Q32 or its associated components).

When the J11 posts are shorted, you should see the following signal levels:

Low	High
CR54-A,-K	U14-7
U14-6	U3-5
U3-1	U3-7
U2-5	U2-1
U2-7	

If both motors function correctly, proceed to step 2.

(2) Check the output of the sawtooth generator at TP3. You should see a sawtooth wave varying from 0 V to +3 Vdc. If this signal is not correct, look for a problem in U1, CR60, or their associated components.

(3) Momentarily apply a ground to the cathode of CR13. This should generate a TUNE PULSE, which should cause the following

things to happen:

(a) All the flip flops on the Logic PWB Assy should be reset. Look for the following voltage levels:

High at U17-11 (Homing Flip Flop)
High at U13-10 (RF Present Flip Flop)
High at U13-4 (Ready Flip Flop)
High at U15-3 (Tune Time Fault Flip Flop)
Low at U19-3 (Tune 1/Tune 2 Flip Flop)

(b) The momentary high at U17-11 is the HOMING signal, which turns on Q22, LED DS6, and Q23, sending a KEY DISABLE signal (low) to the 100 Watt Transceiver.

(c) The low at U17-10 is the HOME signal, which turns on L/C Home Switch Q41 and causes the servo motors to move to their home positions (MIN L, MAX C).

(d) The high at U13-10 is applied through CR11 to U9-14, which causes U9-15 to go low, turning off Q12-Q14, turning on Q11, causing the Bypass Relay on the Lower Shelf Assy to deenergize and LED DS2 to illuminate.

(e) The high at U13-4 turns on Q20, LED DS5, and Q21, causing a TUNE PWR REQUEST signal (low) to be sent to the 100 Watt Transceiver.

If none of the above events takes place, look for a problem in U15 and its associated components. If only one or two of the events fail to occur, trace the signal lines leading to and from the flip flop controlling the event. For example, if the Tune Time Fault Flip Flop fails to reset, suspect Q53, U20, U19, or their associated components. Or, if the KEY DISABLE LED DS6 fails to come on, suspect U17, CR22, Q22, or one of their associated components.

(4) When the servo motors reach their home positions, as indicated by LEDs DS8 and DS11 going out, check for the following:

(a) Pins 1 and 2 of U17 go low, generating a high at U17-3. This high should cause the Homing Flip Flop to change state (U17-11 should go low and U17-10 should go high).

(b) The low on U17-11 should cause the KEY DISABLE LED DS6 to go out.

(5) If all the above events take place as described, make a 5 MHz change in the frequency and key the transceiver in CW mode. Then check whether the following events occur:

(a) Both inputs (pins 1 and 2) to NAND-gate U22A should go high (the KEY line, which is low, is inverted by U11B; the RF ON signal is high, indicating the presence of RF at the FWD PWR Detector--check for a high at TP6), which produces a low at its output. This low does two things: it latches U9A through U16F, causing the Bypass Relay to remain deenergized; and it, along with the ground at U18-8, causes the output of U18C (pin 10) to go high.

(b) After a 150 ms delay, the high at U18-10 causes the RF Present Flip Flop to change state. The low at U13-10 removes the high from U9-14; but since U9A is latched, the Bypass Relay remains deenergized.

(c) The high at U18-10 is also applied to one input of NAND-gates U22B-U22D. If the other input to NAND-gate U22C is also high, which it should be if the Phase Polarity Detector Q28 is switched off, indicating a phase angle of zero or less (capacitive), the output of U22C is a low. This low, combined with the low from the MAX C limit switch, produces a high at the output of U18D. This high is called the COIL FORCE signal, which when applied to U21-5 causes the coil drive motor to start moving away from its home position.

NOTE

This situation, where the Phase Polarity Detector is switched off, causing the coil drive motor to start moving away from its home position, occurs only at low frequencies (approximately 1.6 to 3.0 MHz).

(d) The low at U13-10 also causes the BYPASS signal to go low at U9-14, which causes the output of exclusive-OR-gate U12C to go high, initiating another KEY DISABLE (DS6 comes on again).

(e) The KEY DISABLE causes the output of U22A-3 to change state, which unlatches U9A through U16F, causing U9-15 to go high. This energizes the Bypass Relay and causes DS2 to go off. At the same time, U9-1 goes low, causing the output of U12C to go low, which removes the KEY DISABLE (DS6 goes off).

If any of the above events fails to occur, trace out the corresponding signal path.

(6) At this point, if everything has proceeded according to plan, the coupler should be attempting a Tune 1 tuning cycle. The motors should be under the control of the Load Detector Amplifier (U10A) and the Phase Detector Amplifier (U6B). Check the outputs of these amplifiers at TP5 and TP4, respectively. These should be DC voltages between -10 and +10 V, which may be positive or negative depending on the output of the phase detector circuits. These voltages should decrease as the motors move toward their tune point. If either of these voltages seems incorrect, check the inputs to the amplifiers, specifically the voltage divider networks. Check the adjustment of R71 and C36 (see the alignment procedures in Section II of this chapter).

(7) Check the outputs of the 2:1 VSWR and 1.2:1 VSWR Threshold Detectors, U8A and U8B respectively. U8-1 should be low if the VSWR is 2:1 or greater; U8-7 should be high if the VSWR is 1.2:1 or greater. These levels should switch as the motors approach their tune point.

(a) Check the voltage at TP2. This voltage should go less positive as the tune point is approached. If it doesn't, look for a problem in the Refld Pwr Buffer (U7B and its associated components) or in the Refld Pwr Detector (CR41 and its associated components). Check the adjustment of C31 (see the alignment procedures in Section II of this chapter).

(b) Check the output of Fwd Pwr Buffer U7A (pin 1). The voltage here should go more positive as the tune point is approached. (The Fwd Pwr Buffer and the Fwd Pwr Detector circuitry should be good, or the RF ON signal at TP6 probably wouldn't have been generated earlier in this procedure).

(8) If all of these circuits appear to be good, then look for a problem on the RF PWB Assy or in the interconnecting wiring between the RF PWB Assy and the Logic PWB Assy. If you have a known good RF PWB Assy, swap it with the one on the faulty Logic PWB Assy and see if that corrects the problem. Make sure that when the Bypass Relay energizes, K1 on the RF PWB Assy also energizes. Otherwise, the coupler will never be able to tune because the variable coil and capacitor will not be switched in the RF path.

(9) The coupler should tune successfully on its first attempt (this is accomplished if the output of the 2:1 VSWR Detector goes high, which causes the output of the Ready Flip Flop to go low and disables the Tune Time Fault Flip Flop by keeping Q53 turned on with a high at U17-4). If it doesn't, then the procedure outlined above should uncover the problem. However, if you want to check the operation of the coupler during a Tune 2 cycle, look for the following actions to occur:

(a) The coil motor keeps driving until it reaches the MAX L position. At this point, the MAX L limit switch closes, placing a ground at pin 7 of U11C. This causes U11-6 to go high, which places a high at U19-6, causing the Tune 1/Tune 2 Flip Flop to change state, which generates the positive TUNE 2 pulse at U19-3.

(b) The TUNE 2 pulse (which is applied to U15-13 through inverter U16C) does the same things as the TUNE 1 pulse, except that it does not reset the RF Present Flip Flop. This enables the

coupler to continue trying to tune without interruption during the whole Tune 1/Tune 2 tuning process.

(c) The high at U19-3 is also applied to U9-7, which causes U9-10 to go high. This turns on Q17-Q19, energizing the Long Wire Relay and causing DS4 to illuminate.

CODE 2

This fault code indicates that the internal temperature of the 100/500 Watt Antenna Coupler has reached 95 ° C.

This fault code is declared when Q13 conducts, placing a ground on the collector, which is fed back to the transceiver as the THERMAL FAULT signal. Q13 is turned on by a high at U20-10, which in turn is caused by a low at U20-8 (since U20-9 is tied high). U20-8 is normally held high through pullup resistor R61 but goes low when the thermal switch in the Lower Shelf Assy closes. Since we know that the fault is in the Logic PWB Assy, there can be only two causes:

(a) A failure in one of the components mentioned above, which causes the fault to be declared without the thermal switch closing; or

(b) Failure of the fan to turn on when the coupler is being used with a 500 Watt Linear Power Amplifier, which can be traced to a problem with fan driver Q7, NOR-gate U21D, CR75, or one of their associated components. The presence of the 500 Watt Linear Power Amplifier can be simulated by grounding the cathode of CR75. Keying the transceiver in CW mode should then cause the fan to turn on and cause LED DS1 to illuminate.

6-6. LOWER SHELF ASSY, A2.

a. Preliminary Procedure.

(1) Remove the good Lower Shelf Assy from the test-bed 100/500 Watt Antenna Coupler, and replace it with the faulty Lower Shelf Assy. Leave the coupler cover off, and prop up the Logic PWB Assy in its test position.

(2) Connect a dummy load to the output (E1/E2) of the 100/500 Watt Antenna Coupler.

(3) Power up the 100/500 Watt Antenna Coupler from the front panel of the 100 Watt Transceiver.

(4) Run the receive-transmit BIT test.

b. Interpreting the BIT Codes. Use the fault codes listed below as a guide in troubleshooting the Lower Shelf Assy. Refer to the section corresponding to the fault code you get. In the event that the test runs without generating a fault code, start at the beginning of the following procedures and work your way through to the end.

3-01

This fault code indicates that the 100/500 Watt Antenna Coupler was not able to achieve a VSWR less than 2:1 within 20 seconds after a tune cycle was initiated. In normal operation (i.e., after a successful tune), this fault code indicates that the VSWR has become 2:1 or greater.

(1) Check the operation of the motor drive circuits as follows:

(a) Short the J12 posts together with a screwdriver. The coil motor should move toward MIN L, and the capacitor motor should move toward MAX C. LEDs DS8 and DS11 should be illuminated while the motors are turning and should go off when the motors reach their end stops.

i. If one motor moves but the other doesn't, the motor may be faulty or there may be an open in the wiring.

ii. If either LED fails to go off when the motors reach their home positions, suspect a problem with the MAX C or MIN L limit switch.

If both motors function correctly, proceed to step b.

(b) Short the J11 posts together with the screwdriver. The motors should now move in the opposite direction (toward MAX L and MIN C). LEDs DS9 and DS10 should be illuminated while the motors are turning and should go off when the motors reach their end stops. If either LED fails to go off when the motors reach their end stops, look for a problem with the MIN C or MAX L limit switch.

In both the above cases, check for any mechanical binding in the motors that might be slowing them down. If both motors function correctly, proceed to step 2.

(2) Check the operation of the Long Wire Adapter Relay K1 by applying a ground to the anode of CR40 on the Logic PWB Assy. The relay should energize, inserting the Capacitor Assy in series with the signal path. DS4 should illuminate when this happens.

(3) Check the operation of the Bypass Relay K2 by applying a ground to the cathode of CR7 on the Logic PWB Assy. This should cause the relay to deenergize, shorting the input of the coupler to the output and causing DS2 to illuminate.

CODE 3-02

This fault code indicates that the temperature inside the coupler reached 95 ° C.

(1) This fault code usually indicates a failure in the fan B1. The fan should come on only if a 500 Watt Linear Power Amplifier is connected to the coupler and only if the system is keyed. If you have a 500 Watt Linear Power Amplifier connected, key the system and check that the fan comes on. If you don't have a 500 Watt Linear Power Amplifier connected, you can simulate one by grounding the cathode of CR75 on the Logic PWB Assy. If the fan fails to come on, the problem could be either the fan itself or the connecting wiring. Try connecting the fan directly to a DC power supply (+13.5 Vdc) and see if it will run.

(2) If the fan appears to be working properly, check for a problem with thermal switch S1. S1 could be permanently shorted, or it could be closing at too low a temperature.

Section IV. REMOVAL/REPLACEMENT PROCEDURES

6-7. REMOVAL/REPLACEMENT PROCEDURES. The following removal/replacement procedures are for the internal components of the Lower Shelf Assy only. Removal/replacement procedures for the Lower Shelf Assy itself and for the Logic PWB Assy are contained in the On-Equipment Manual, T.O. 31R2-2URC-111.

NOTE

The following procedures assume that the Lower Shelf Assy is removed from the coupler chassis.

(1) Variable Coil L1

Removal:

(a) Manually (or, if possible, using the J12 shorting posts) move the variable coil to its home position. This is the position of minimum inductance, in which the coil rollers should be in their maximum clockwise position (toward the rear of the coil).

(b) Lift the four clips on the coupling.

(c) Remove the nut at the rear of the variable coil. Disconnect the uninsulated silver wire (going to the variable capacitor) and the white wire (going to the Long Wire Capacitor Assy).

(d) Remove the four Phillips mounting screws holding the variable coil to the Lower Shelf Assy.

(e) Remove and keep the spacer blocks at each end of the coil.

(f) Carefully pull the variable coil to the rear and remove it.

Replacement:

(f) Manually move the coil rollers to their maximum clockwise position (toward the rear of the coil).

(g) Adjust the coil rollers for 20 turns spacing. See the alignment procedures in Section II of this chapter.

(h) Mate the coil side of the coupling to the motor side of the coupling.

NOTE

Check the alignment of the coil shaft and the motor shaft before tightening the mounting screws.

(i) Position the variable coil on the Lower Shelf Assy, and secure it with the four Phillips mounting screws.

(j) Connect the uninsulated silver wire and the white wire to the post at the rear of the variable coil, and secure them with the nut.

(k) Check the tension on the end plate contact with a gram gauge. The tension should be 25-50 grams.

(l) Do the following adjustment procedures (see Section II):

Variable Coil L1 Limit Switch Adjustment
Variable Coil Roller Alignment

(2) Variable Capacitor C1

Removal:

(a) Manually (or, if possible, using the J12 shorting posts) move the variable coil to its home position. This is the position of maximum capacitance, in which the capacitor shaft should be fully clockwise.

(b) Lift the four clips on the coupling.

(c) Loosen the nuts securing the white wire to the RF PWB Assy and the uninsulated silver wire to the variable coil assembly.

(d) Remove the two nuts holding the clamp at the shaft end of the variable capacitor. Slide the clamp forward.

(e) Remove the capacitor by tilting the shaft end up and sliding the capacitor out of the rear clamp. (The rear clamp should be loose because you loosened the nut in step c. If necessary, loosen--but do not remove--the other two nuts holding the clamp to the mount.)

(f) Remove the clamp (with the white wire still attached) from the shaft end of the capacitor.

Replacement:

(g) Manually rotate the capacitor shaft to its maximum clockwise position. You can use the coupling as a knob.

(h) Slip the clamp (with the white wire from the RF PWB Assy attached) onto the shaft end of the capacitor.

(i) Set the capacitor into its mounts, sliding the rear end into the rear clamp and orienting the capacitor so that the ceramic nipple protruding from its side is facing the variable coil assembly. Make sure that the ceramic nipple is at least 1 inch away from the long wire capacitor assembly.

(j) Mate the capacitor side of the coupling to the motor side of the coupling and snap the clips.

NOTE

Check the alignment of the capacitor shaft and the motor shaft before tightening the mounting screws.

(k) Install the nuts securing the front (shaft end) capacitor clamp to the mount.

(l) Tighten all the nuts on the capacitor clamps.

(m) Do the following adjustment procedure (see Section II):

Variable Capacitor C1 Limit Switch Adjustment

(3) Servo Drive Motors

Removal:

(a) Lift the four clips on both motor drive couplings.

(b) Remove the four Phillips screws holding the Servo Drive Assy to the Lower Shelf Assy.

(c) Carefully disengage the Servo Drive Assy from the variable coil and capacitor assemblies.

NOTE

Once the Servo Drive Assy is separated from the variable coil and capacitor assemblies, be careful not to disturb the positions of the gears. This will ensure that the limit switch settings do not change.

(d) Unsolder the appropriate motor leads.

(e) Remove the three motor mounting screws.

(f) Remove the motor from the Servo Drive Assy mounting plate.

Replacement:

(g) Reverse the order of the above steps.

(h) Check the following adjustments (see Section II):

Variable Coil L1 Limit Switch Adjustment
Variable Capacitor C1 Limit Switch Adjustment

(4) Limit Switches

Removal:

(a) Unsolder the appropriate switch leads.

(b) The limit switches for the variable capacitor can be removed from their

mounting bracket by simply removing the two mounting screws. To remove the limit switches for the variable coil, however, you may need to remove the Servo Drive Assy (see section 3 above), unless you have an offset Phillips screwdriver.

Replacement:

(c) Reverse the order of the above steps.

(d) Check the following adjustments (see Section II):

Variable Coil L1 Limit Switch Adjustment
Variable Capacitor C1 Limit Switch Adjustment

(5) Long Wire Capacitor Assy

Removal:

(a) Unsolder the four leads from the end capacitors. Also, unsolder the 100 megohm resistor.

(b) Remove the two Phillips screws (and nuts) holding the Long Wire Capacitor Assy to the variable capacitor mounts.

(c) Remove the Long Wire Capacitor Assy.

NOTE

The capacitors in the Long Wire Capacitor Assy may also be removed individually by removing the appropriate Phillips mounting screw and, if necessary, unsoldering the lead wires.

CHAPTER 7

ILLUSTRATED PARTS BREAKDOWN

Section 1. INTRODUCTION

7-1. PURPOSE. This chapter lists, illustrates, and describes the detail parts for the 100/500 Watt Antenna Coupler. Its purpose is for the identification, requisitioning, and issuance of parts at the depot level.

7-2. SCOPE. Bulk electrical items, such as terminals, wire, heat shrink tubing, etc., are not listed in this manual. Common hardware items, such as screws, washers, nuts, etc., when used to attach structural components that are not normally removed or disassembled, are also not listed. In general, the parts installed at the time the 100/500 Watt Antenna Coupler was manufactured are listed and identified in this chapter. When a part (including vendor items), which is different from the original, was installed during the manufacture of later items, series, or blocks, all parts are listed (and "Usable-On" coded). However, when the original part does not have continued application (no spares of the original were procured or such spares are no longer authorized for replacement), only the preferred part is listed. Also, when a part was installed during modification, and the original does not have continued application, only the preferred item is listed. Interchangeable and substitute parts, subsequently authorized by the Government, are not listed in this chapter; such items are identified by information available through the Interchangeable and Substitute (I & S) Data Systems. Refer to T.O. 00-25-184. When a standard size part can be replaced with an oversize or undersize part, the latter parts, showing sizes, are also listed. Repair Parts Kits and Quick Change Units are listed when they are available for replacement.

7-3. CHAPTER ORGANIZATION. This chapter is divided into two sections. Section I, INTRODUCTION, explains the purpose, scope, and organization of the chapter. Section II, MAINTENANCE PARTS LIST, consists of illustrations, in which the detail parts of the 100/500 Watt Antenna Coupler are identified by numbers (called index numbers), followed by lists which contain parts numbers, descriptions, and other relevant data for the items identified on the illustrations. Section II also contains two other lists: A numerical index, which lists the parts in alphanumerical sequence; and a reference designator index, which lists the electrical parts in alphabetical sequence by their reference designators.

7-4. SOURCE, MAINTENANCE, AND RECOVERABILITY (SMR) CODES. This chapter contains Air Force Peculiar In-Being Source and Repair Codes only. Definitions of these SMR codes, as well as detailed coding criteria and transposition matrices for each coding method, may be obtained from T.O. 00-25-195. Refer to page 7-13.

7.5. FEDERAL SUPPLY CODES FOR MANUFACTURERS (FSCM). The codes used in this chapter are as follows. The first list is in numerical order by FSCM; the second is in alphabetical order by manufacturer name.

JOINT MILITARY SERVICES UNIFORM SMR CODING MATRIX T.O. 00-25-195

SOURCE				MAINTENANCE USE		MAINTENANCE REPAIR		RECOVERABILITY		ERRC CODE	
1st Position		2nd Position		3rd Position		4th Position		5th Position		6th Position	
P	Procurable	A	Stocked	O	Remove/ Replace at Organizational Level	Z	No Repair	Z	Nonreparable Condemn at 3rd Position Level	N	Nonrecoverable XB3 Condemn at Any Level
		B	Insurance								
		C	Deteriorative								
		E	Support Equipment, Stocked								
		F	Support Equipment, Nonstocked			B	No Repair Recondition	O	Reparable Condemn at Organizational	P	Recoverable XF3 Condemn at Field
		G	Sustained Life Support							C	Recoverable XD1 (SCARS) Condemn at Depot
K	Component of a Repair Kit	F	Intermediate Kit	F	Remove/ Replace at Intermediate Level	O	Repair at Organizational	F	Reparable Condemn at Intermediate		
		D	Depot Kit							T	Recoverable XD2 Condemn at Depot
		B	In Both Kits			F	Repair at Intermediate				
M	Manufacture	O	Organization								
		F	Intermediate								
		D	Depot	D	Remove/Replace at Depot Level	D	Limited Repair at O or F Level	D	Reparable Condemn at Depot	S	Nonexpendable Support Equipment, Depot ND2
A	Assemble	O	Organization								
		F	Intermediate				Overhaul at Depot				
		D	Depot							U	Nonexpendable Support Equipment, Organizational and Intermediate NF2
X	Nonprocured	A	Requisition NHA			L	Repair at Depot	A	Special Handling		
		B	Reclamation from IM								
		C	Mfg Drawings								

Section II. MAINTENANCE PARTS LIST

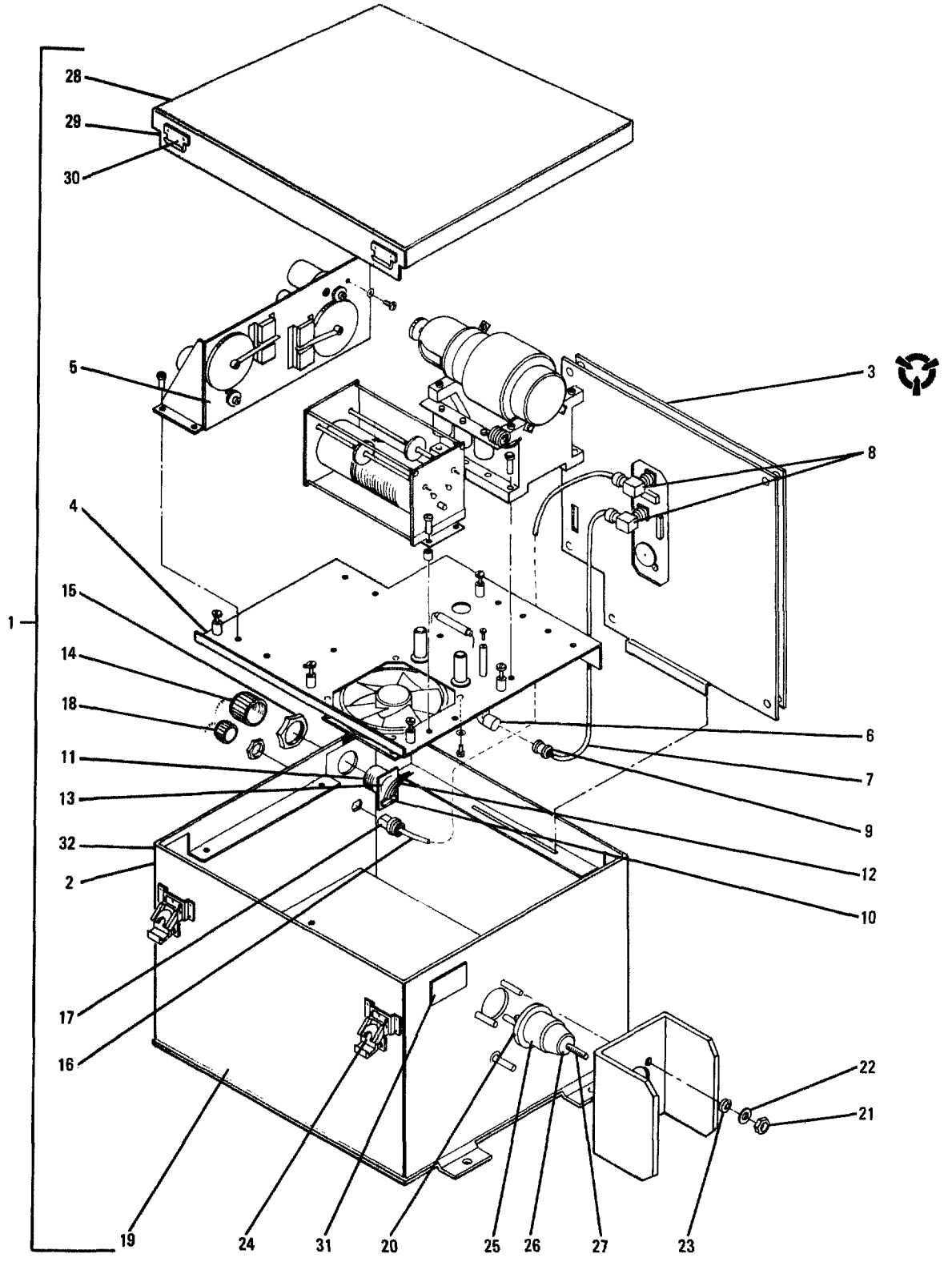


Figure 7-1. 100/500 Watt Antenna Coupler, CU-2310/URC, Exploded View

Figure & Index Number	Part Number	FSCM	Description 1 2 3 4 5 6 7	Units Per Assy	Usable On Code	SMR Code
7-1 -	10094-0000	14304	COUPLER,ANTENNA*	1		PEODD
- 1	10094-0100	14304	. COUPLER,ANTENNA	1		PAODD
- 2	10094-0002	14304	. PLATE IDENTIFICATN	1		XB
- 3	10094-3000	14304	. CIRCUIT CARD ASSY,A1	1		PAODD
- 4	10094-0120	14304	. LOWER SHELF ASSY,A2	1		PAODD
- 5	10094-1000	14304	. SERVOMECHANISM,A2A1	1		XA
- 6	KC-79-110	91836	. CONNECTOR,RCPT,ELEC	1		PADZZ
- 7	10094-0550	14304	. CABLE ASSY,RF,A2W2	1		MDO
- 8	KC-59-105	91836	. CONNECTOR,RCPT,ELEC	1		PAOZZ
- 9	M39012/16-0014	81349	. CONNECTOR,RCPT,ELEC	1		PAOZZ
- 10	10094-0140	14304	. CABLE ASSY,RF,A3	1		PAOZZ
- 11	10-74720-27P	77820	. CONNECTOR,RCPT,ELEC	1		XA
- 12	10094-0560	14304	. CABLE ASSY,RF,A3W1	1		XA
- 13	10094-0149	14304	. CIRCUIT CARD	1		XA
- 14	10-37087-20	77820	. CAP,PROT,DUMR SEAL	1		XA
- 15	1960-1151	14304	. WASHER,FLAT (AP)	1		PADZZ
- 16	10094-0540	14304	. CABLE ASSY,RF,W1	1		MDO
- 17	M39012/03-0503	81349	. CONNECTOR,RCPT,ELEC	1		PAOZZ
- 18	M39012/25-0012	81349	. CAP,PROT,DUMR SEAL	1		PAOZZ
- 19	10094-0502	14304	. CASE ANTENNA CPLR	1		XB
- 20	423-0015	14304	. GASKET	1		MDD
- 21	8045NP	73734	. NUT,PLAIN,HEX (AP)	6		PAOZZ
- 22	3242513	21340	. WASHER,FLAT (AP)	6		PAOZZ
- 23	1390	73734	. WASHER,LOCK (AP)	4		PAOZZ
- 24	H-6611	14304	. CATCH,CLAMPING	4		XB
- 25	SA-17546	57074	. INSULATOR BOWL	1		XB
- 26	423-0012	14304	. GASKET	1		MDD
- 27	423-0049	14304	. ROD,MODIFIED	1		XB
- 28	10094-0510	14304	. COVER,ACCESS	1		XB
- 29	10094-0521	14304	. GASKET	4		MDD
- 30	H-6612	14304	. STRIKE,CATCH	4		XB
- 31	MP-0745	14304	. PLATE IDENT	1		MDO
- 32	10094-0071	14304	. PLATE IDENTIFICATIO	1		MDO

*Includes Installation Kit 10094-0060. See figure 7-2.

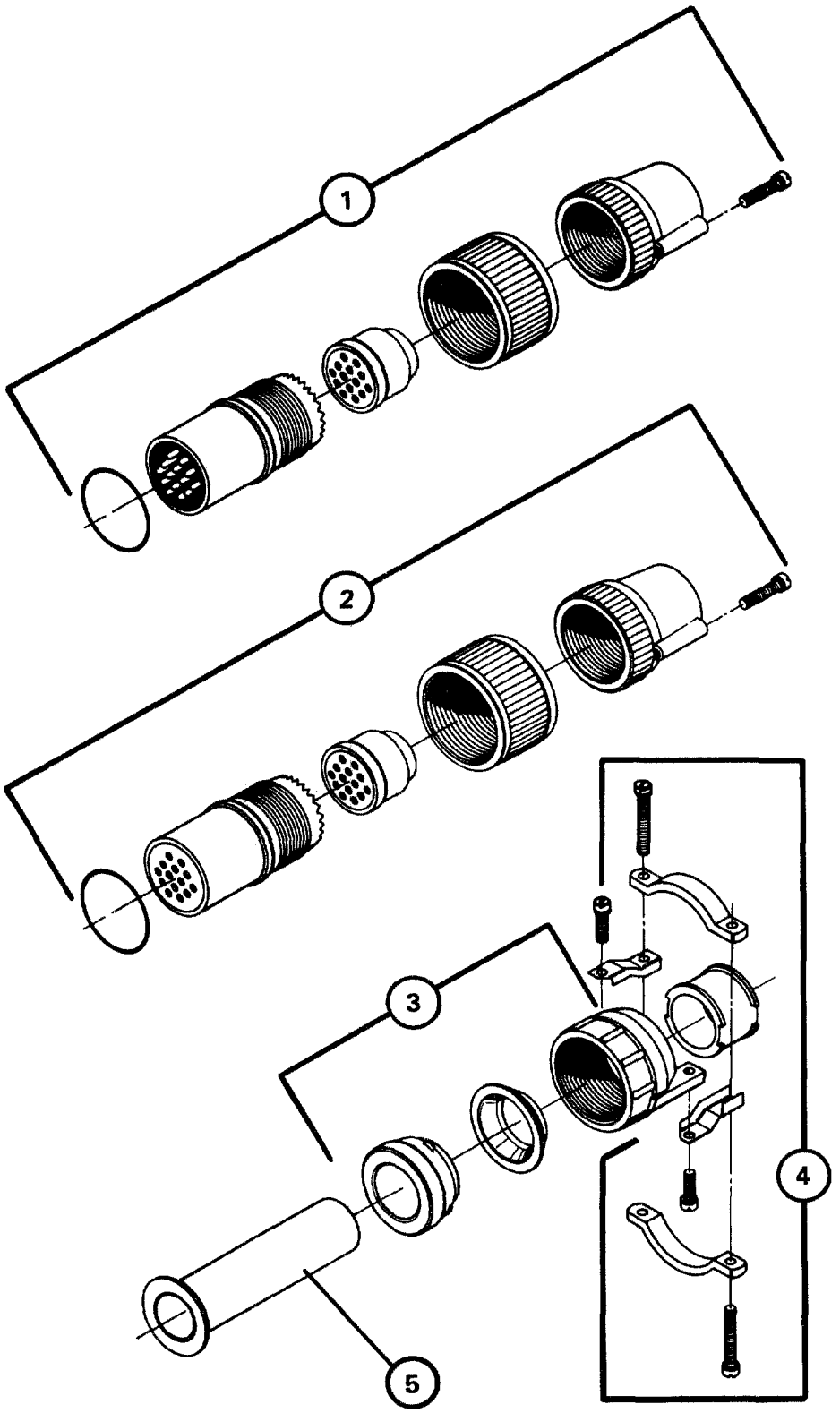


Figure 7-2. Installation Kit for 100/500 Watt Antenna Coupler

Figure & Index Number	Part Number	FSCM	Description 1 2 3 4 5 6 7	Units Per Assy	Usable On Code	SMR Code
7-2 -	10094-0060	14304	INSTALLATION KIT	1		XB
- 1	MS3106A20-27P	81349	. CONNECTOR,PLUG,ELEC	1		PAOZZ
- 2	MS3106A20-27S	96906	. CONNECTOR,RCPT,ELEC	1		PAOZZ
- 3	M85049/1-12B	81349	. CLAMP,CABLE	2		PAOZZ
- 4	10-36233-243	77820	. CLAMP,CABLE	2		PAOZZ
- 5	MS3420-12B	96906	. BUSHING,ELECTRICAL	2		XB

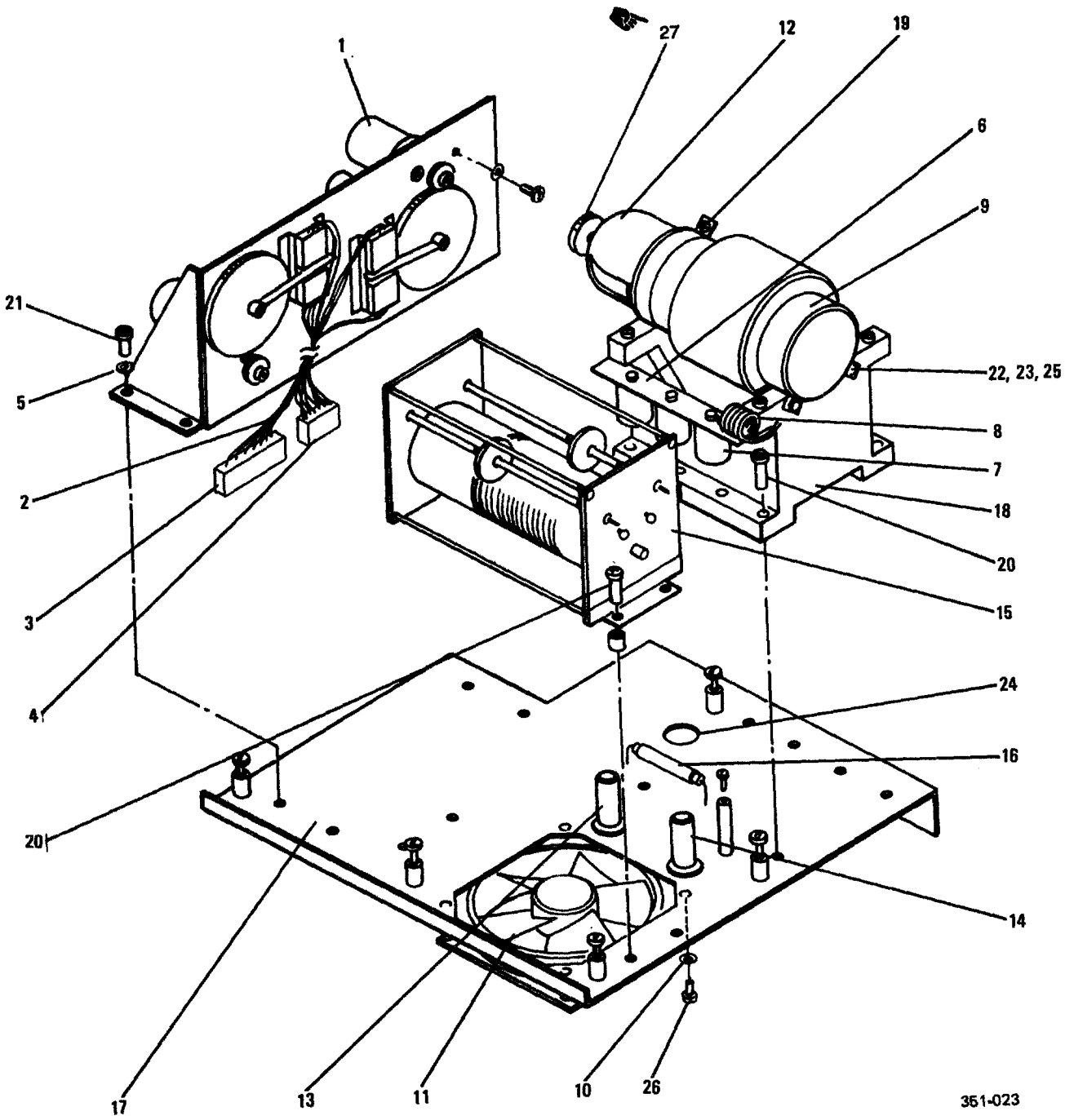


Figure 7-3. Lower Shelf Assy, A2

FIG & INDEX NO.	PART NUMBER	FSCM	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE	SMR CODE
7-3-	10094-0120	14304	LOWER SHELF ASSY, A2	1		PAODD
-1	10094-2030	14304	. MOTOR ASSY, ELEC	2		PADZZ
-2	10094-0570	14304	. CABLE ASSY, RF, A2A1W1	1		PAOZZ
-3	22-01-3207	27264	. CONNECTOR, PLUG, ELEC	1		XA
-4	22-01-3087	27264	. CONNECTOR, PLUG, ELEC	1		XA
-5	MS35338-137	96906	. WASHER, LOCK (AP)	4		PAOZZ
-6	10094-0130	14304	. CIRCUIT CARD ASSY, A2A3	1		XA
-7	HT50V400JA	21052	. CAPACITOR, FXD, CE	3		PADZZ
-8	10094-0135	14304	. COIL, RF	1		PADZZ
-9	10094-0134	14304	. STRAP, RETAINER	2		XB
-10	MS35338-136	96906	. WASHER, LOCK (AP)	4		PADZZ
-11	028868	82877	. FAN, TUBEAXIAL	1		PAOZZ
-12	C95-0001-000REVF	14304	. CAPACITOR, VARIABLE	1		PADZZ
-13	RF56D-12S	73905	. RELAY	1		PADZZ
-14	RF65D-12S	73905	. RELAY	1		PADZZ
-15	10094-2000	14304	. COIL, RF	1		PADLD
-16	MVX2-100MEG	75042	. RESISTOR, FXD, COMP	1		PADZZ
-17	10094-0121	14304	. BRACKET, SHELF	1		XB
-18	1960-1132	14304	. BRACKET	2		XB
-19	1960-1133	14304	. RETAINER, CAPACITOR	2		XB
-20	MS51957-48	96906	. SCREW, MACHINE (AP)	13		PAOZZ
-21	MS51957-45	96906	. SCREW, MACHINE (AP)	9		PAOZZ
-22	MS35338-138	96906	. WASHER, LOCK (AP)	8		PAOZZ
-23	MS35650-304	96906	. NUT, PLAIN, HEX (AP)	8		PAOZZ
-24	MS21266-2N	96906	. GROMMET	5		PADZZ
-25	MS51958-66	96906	. SCREW, MACHINE (AP)	4		PAOZZ
-26	MS51957-31	96906	. SCREW, MACHINE (AP)	4		PADZZ
-27	Z06-0011-006	14304	FLEX COUPLER	1		PAFZZ

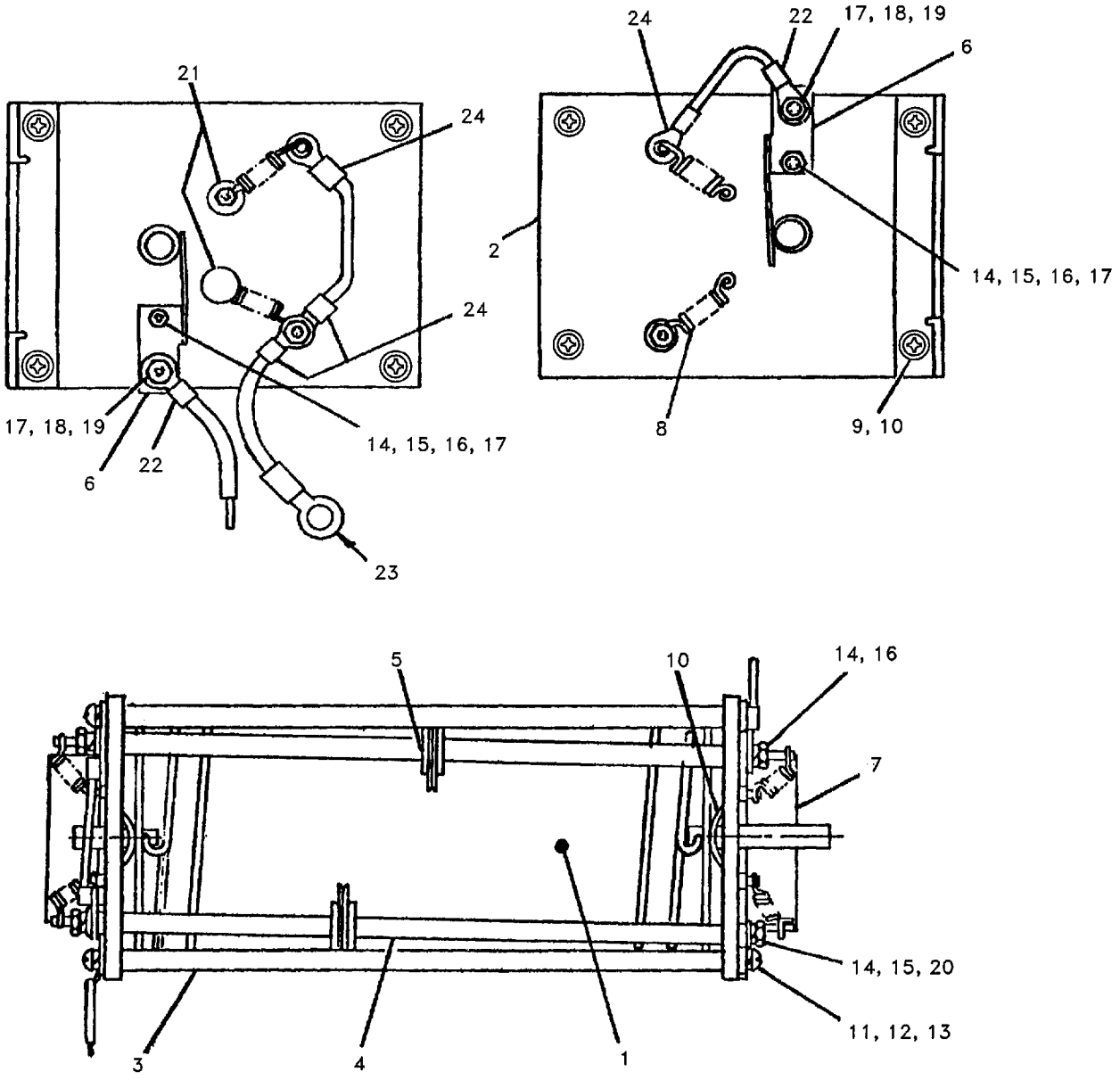


Figure 7-4. RF Coil Assy

Figure & Index Number	Part Number	FSCM	Description 1 2 3 4 5 6 7	Units Per Assy	Usable On Code	SMR Code
7-4 -	10094-2000	14304	COIL,RF	1		PADLD
- 1	10094-2015	14304	. COIL FORM ASSY	1		PADZZ
- 2	1960-1111	14304	. PLATE END	2		XB
- 3	1960-1113	14304	. SPACER	4		XB
- 4	1960-1114	14304	. SHAFT	2		XB
- 5	1960-1115	14304	. CONTACT ELECTRICAL	2		XB
- 6	1960-1119	14304	. CONTACT SPRING	2		XB
- 7	1960-1112	14304	. BRACKET MTG	2		XB
- 8	LE-016A-001	84830	. SPRING	4		XB
- 9	MS24693-C29	96906	. SCREW,MACHINE (AP)	4		PAOZZ
- 10	5804-128-1	86928	. WASHER,SPRING,TNSN	2		PADZZ
- 11	MS35338-136	96906	. WASHER,LOCK (AP)	4		PADZZ
- 12	MS15795-805	96906	. WASHER,FLAT (AP)	4		PADZZ
- 13	MS51957-31	96906	. SCREW,MACHINE (AP)	4		PAOZZ
- 14	8034	73734	. NUT,PLAIN,HEX (AP)	6		PAOZZ
- 15	MS35338-97	96906	. WASHER,LOCK (AP)	6		PAOZZ
- 16	MS15795-903	96906	. WASHER,FLAT (AP)	2		PAOZZ
- 17	MS35196-14	96906	. SCREW,MACHINE (AP)	2		PAOZZ
- 18	MS35338-98	96906	. WASHER,LOCK (AP)	2		PAOZZ
- 19	8037	73734	. NUT,PLAIN,HEX (AP)	2		PAOZZ
- 20	MS15795-804	96906	. WASHER,FLAT (AP)	1		PADZZ
- 21	75535	73734	. NUT,PLAIN,HEX (AP)	2		PAOZZ
- 22	61306	79061	. TERMINAL LUG	2		PADZZ
- 23	MS25036-153	96906	. TERMINAL LUG	1		PADZZ
- 24	61304	79061	. TERMINAL LUG	4		PADZZ

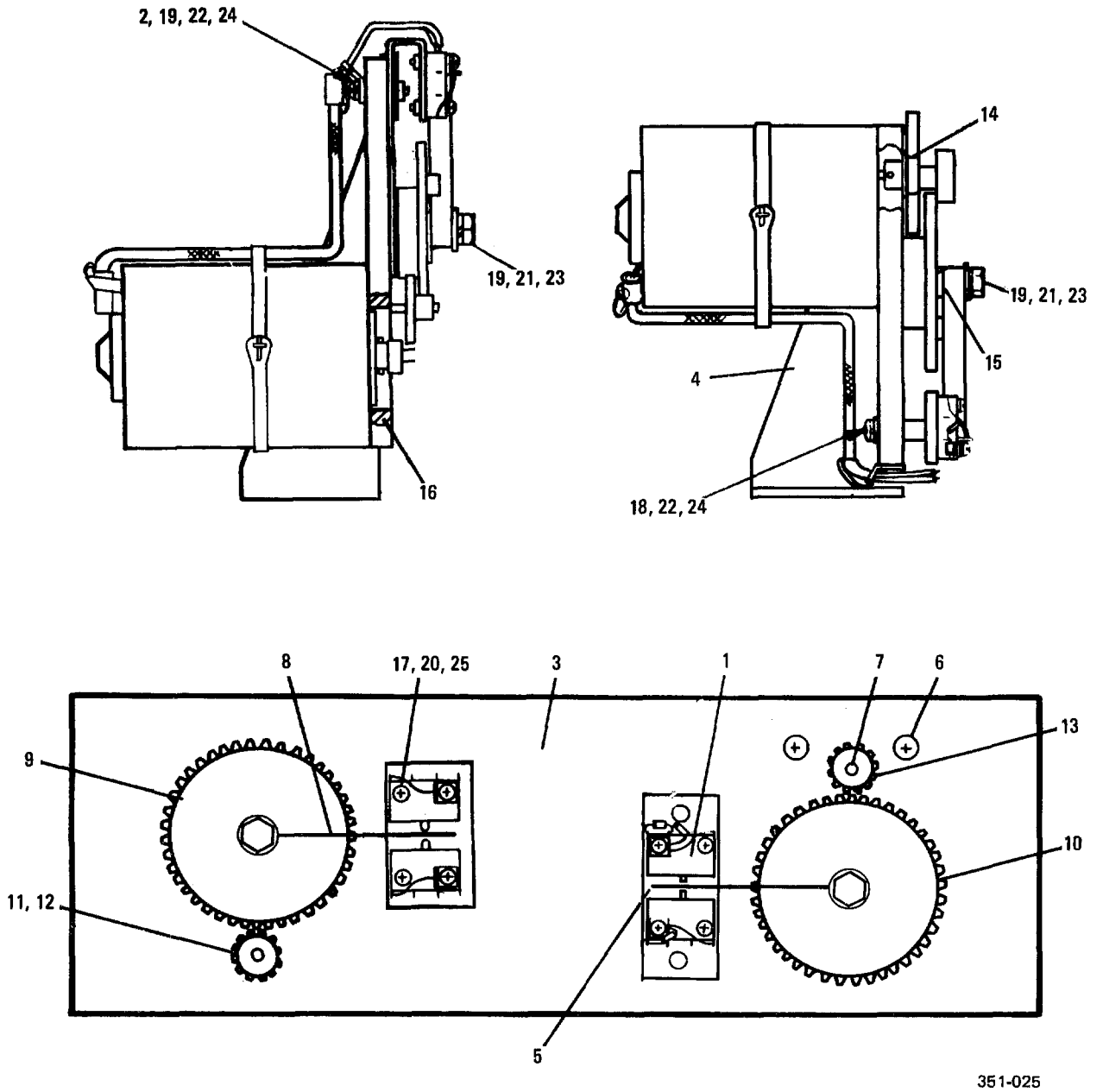


Figure 7-5. Servomechanism, A2A1

Figure & Index Number	Part Number	FSCM	Description 1 2 3 4 5 6 7	Units Per Assy	Usable On Code	SMR Code
7-5 -	10094-1000	14304	SERVOMECHANISM,A2A1	1		XA
- 1	MS27217-1	96906	. SWITCH SENSITIVE	4		PADZZ
- 2	C11EE2000A-175A	82415	. SWITCH	1		PADZZ
- 3	10094-0123	14304	. BRACKET	1		XB
- 4	10094-0124	14304	. BRACKET	2		XB
- 5	10094-0122	14304	. BRACKET	2		XB
- 6	MS51957-13	96906	. SCREW,MACHINE (AP)	2		PAOZZ
- 7	T16-5	00141	. SHAFT	2		XB
- 8	1960-1127	14304	. ARM	2		XB
- 9	1960-1147	14304	. GEAR	1		XB
- 10	1960-1146	14304	. GEAR	1		XB
- 11	1960-1168	14304	. GEAR	1		XB
- 12	1960-1169	14304	. GEAR	1		PADZZ
- 13	1960-1170	14304	. GEAR	1		XB
- 14	5804-128-1	86928	. WASHER,SPRING,TNSN	2		XB
- 15	5710-61-16-P	86928	. SHIM	2		XB
- 16	2308-14-1	17117	. STANDOFF	1		XB
- 17	MS51957-7	96906	. SCREW,MACHINE (AP)	8		PAOZZ
- 18	MS51957-46	96906	. SCREW,MACHINE (AP)	4		PAOZZ
- 19	MS51957-30	96906	. SCREW,MACHINE (AP)	2		PAOZZ
- 20	MS35338-134	96906	. WASHER,LOCK (AP)	8		PAOZZ
- 21	MS35338-135	96906	. WASHER,LOCK (AP)	11		PADZZ
- 22	MS35338-136	96906	. WASHER,LOCK (AP)	2		PAOZZ
- 23	MS15795-804	96906	. WASHER,FLAT (AP)	2		PAOZZ
- 24	MS15795-805	96906	. WASHER,FLAT (AP)	6		PAOZZ
- 25	MS15795-802	96906	. WASHER,FLAT (AP)	8		PAOZZ

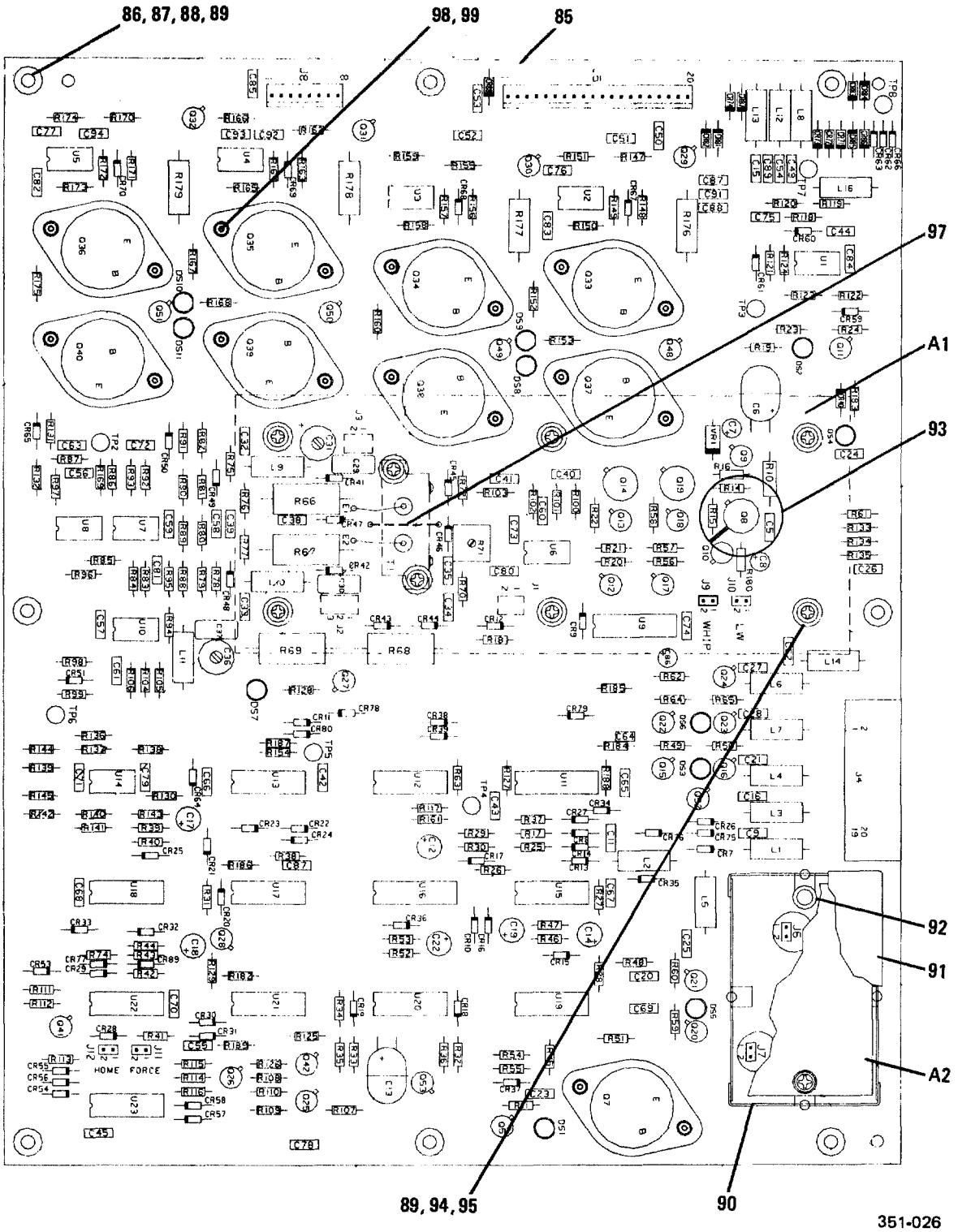


Figure 7-6. Logic PWB Assy, A1

NOTE

To find Index numbers for circuit board components, use the reference designator index at the end of this chapter. The complete reference designator for a circuit board component consists of "1," followed by the assembly designator (A1, A2, etc.), then the reference designator on the illustration. For example, the complete reference designator for R25 on the Logic PWB Assy is 1A1 R25.

Figure & Index Number	Part Number	FSCM	Description 1 2 3 4 5 6 7	Units Per Assy	Usable On Code	SMR Code
7-6 -	10094-3000	14304	CIRCUIT CARD ASSY,A1	1		PAODD
- 1	10094-3500	14304	. CIRCUIT CARD ASSY,A1A1	1		XA
- 2	10094-3020	14304	. CIRCUIT CARD ASSY,A1A2	1		XA
- 3	CK06BX104K	81349	. CAPACITOR,FXD,CER	3		PADZZ
- 4	T392E476M025AS	31433	. CAP,FXD,ELCTLT	2		PADZZ
- 5	T392C106M025AS	31433	. CAP,FXD,ELCTLT	3		PADZZ
- 6	CK06BX103K	81349	. CAPACITOR,FXD,CER	55		PADZZ
- 7	T392B155M035AS	31433	. CAP,FXD,ELCTLT	6		PADZZ
- 8	CMR05E470G0DR	81349	. CAPACITOR,FXD,MICA	1		PADZZ
- 9	CMR05F181G0DR	81349	. CAPACITOR,FXD,MICA	2		PADZZ
- 10	CV31D350	81349	. CAPACITOR,VARIABLE	2		PADZZ
- 11	CK05BX102K	81349	. CAPACITOR,FXD,CER	7		PADZZ
- 12	CMR05F161G0DR	81349	. CAPACITOR,FXD,MICA	1		PADZZ
- 13	M39014/02-1318	81349	. CAPACITOR,FXD,CER	1		PADZZ
- 14	M39014/02-1360	81349	. CAPACITOR,FXD,CER	3		PADZZ
- 15	CK06BX474K	81349	. CAPACITOR,FXD,CER	2		PADZZ
- 16	JAN1N4454	81349	. SEMICOND DEVICE,DIO	69		PADZZ
- 17	JAN1N3611	81349	. SEMICOND DEVICE,DIO	13		PADZZ
- 18	HLMP-3301	50434	. LED	11		PADZZ
- 19	HLMP	50434	. LED	10		PADZZ
- 20	66951-002	22526	. CONNECTOR,RCPT,ELEC	2		PADZZ
- 21	66951-003	22526	. CONNECTOR,RCPT,ELEC	1		PADZZ
- 22	1251-8273	28480	. CONNECTOR,PLUG,ELEC	1		PADZZ
- 23	22-11-2202	27264	. CONNECTOR,PLUG,ELEC	1		PADZZ
- 24	22-03-2021	27264	. CONNECTOR,PLUG,ELEC	6		PADZZ
- 25	22-11-2082	27264	. CONNECTOR,PLUG,ELEC	1		PADZZ
- 26	MS14046-8	96906	. COIL,RF	12		PADZZ
- 27	MS90539-15	96906	. COIL,RF	3		PADZZ
- 28	JAN2N2222A	81349	. TRANSISTOR	24		PADZZ
- 29	JAN2N6383	81349	. TRANSISTOR	5		PADZZ
- 30	JANTX2N3439	81349	. TRANSISTOR	1		PADZZ
- 31	JAN2N2219A	81349	. TRANSISTOR	2		PADZZ
- 32	JAN2N6648	81349	. TRANSISTOR	4		PADZZ
- 33	JAN2N2907A	81349	. TRANSISTOR	6		PADZZ
- 34	352-1130-010	13499	. TRANSISTOR	1		PADZZ
- 35	CF07-1R0J	78488	. RESISTOR,FXD,COMP	1		PADZZ
- 36	CF07-222J	78488	. RESISTOR,FXD,COMP	37		PADZZ
- 37	CF07-3R3J	78488	. RESISTOR,FXD,COMP	2		PADZZ
- 38	CF07-102J	78488	. RESISTOR,FXD,COMP	8		PADZZ
- 39	CF07-472J	78488	. RESISTOR,FXD,COMP	24		PADZZ
- 40	CF07-103J	78488	. RESISTOR,FXD,COMP	31		PADZZ
- 41	CF07-105J	78488	. RESISTOR,FXD,COMP	3		PADZZ
- 42	CF07-224J	78488	. RESISTOR,FXD,COMP	1		PADZZ
- 43	OK4745	44655	. RESISTOR,FXD,FILM	2		PADZZ
- 44	CF07-333J	78488	. RESISTOR,FXD,COMP	2		PADZZ

Figure & Index Number	Part Number	FSCM	Description 1 2 3 4 5 6 7	Units Per Assy	Usable On Code	SMR Code
- 45	CF07-273J	78488	. RESISTOR,FXD,COMP	14		PADZZ
- 46	CF07-564J	78488	. RESISTOR,FXD,COMP	1		PADZZ
- 47	CF07-101J	78488	. RESISTOR,FXD,COMP	2		PADZZ
- 48	CF07-104J	78488	. RESISTOR,FXD,COMP	8		PADZZ
- 49	CF07-473J	78488	. RESISTOR,FXD,COMP	9		PADZZ
- 50	CF07-272J	78488	. RESISTOR,FXD,COMP	2		PADZZ
- 51	CF07-474J	78488	. RESISTOR FXD,COMP	1		PADZZ
- 52	RNC6H4993DS	81349	. RESISTOR,FXD,COMP	2		PADZZ
- 53	RCR42G150JM	81349	. RESISTOR,FXD,COMP	1		PADZZ
- 54	RCR42G750JS	81349	. RESISTOR,FXD,COMP	2		PADZZ
- 55	RCR42G750JM	81349	. RESISTOR,FXD,COMP	1		PADZZ
- 56	3386F-1-103	32997	. RESISTOR,VARIABLE	1		PADZZ
- 57	CF07-393J	78488	. RESISTOR,FXD,COMP	2		PADZZ
- 58	CF07-153J	78488	. RESISTOR,FXD,COMP	2		PADZZ
- 59	CF07-223J	78488	. RESISTOR,FXD,COMP	4		PADZZ
- 60	CF07-752J	78488	. RESISTOR,FXD,COMP	1		PADZZ
- 61	CF07-302J	78488	. RESISTOR,FXD,COMP	1		PADZZ
- 62	CF07-682J	78488	. RESISTOR,FXD,COMP	1		PADZZ
- 63	CF07-122J	78488	. RESISTOR,FXD,COMP	4		PADZZ
- 64	CF07-563J	78488	. RESISTOR,FXD,COMP	2		PADZZ
- 65	CF07-822J	78488	. RESISTOR,FXD,COMP	1		PADZZ
- 66	CF07-332J	78488	. RESISTOR,FXD,COMP	1		PADZZ
- 67	1240S-0.22-10	00213	. RESISTOR,FXD,COMP	4		PADZZ
- 68	10094-3511	14304	. TRANSFORMER	1		PADZZ
- 69	105-0852-001	74970	. JACK,TIP	1		PADZZ
- 70	1168004P6	94117	. JACK,TIP	1		PADZZ
- 71	105-0857-001	74970	. JACK,TIP	1		PADZZ
- 72	105-0854	74970	. JACK,TIP	1		PADZZ
- 73	105-0860-001	74970	. JACK,TIP	1		PADZZ
- 74	105-0862-001	74970	. JACK,TIP	1		PADZZ
- 75	360-489-100	13499	. JACK,TIP	1		PADZZ
- 76	MC1558U	04713	. MICROCIRCUIT	10		PADZZ
- 77	CD4042BF	49671	. MICROCIRCUIT	1		PADZZ
- 78	CD4049UBF	02735	. MICROCIRCUIT	2		PADZZ
- 79	CD4030BF	02735	. MICROCIRCUIT	1		PADZZ
- 80	CD4001BF	02735	. MICROCIRCUIT	6		PADZZ
- 81	CD4011BF	02735	. MICROCIRCUIT	2		PADZZ
- 82	CD4049BF	81349	. MICROCIRCUIT	2		PADZZ
- 83	CD4093BF	02735	. MICROCIRCUIT	1		PADZZ
- 84	JAN1N759A	81349	. SEMICOND DEVICE,DIO	1		PADZZ
- 85	10094-3009	14304	. CIRCUIT CARD	1		XA
- 86	6611-0135	14304	. RETAINER	8		XB
- 87	10085-5156	14304	. SPACER	8		XB
- 88	MS51957-17	96906	. SCREW,MACHINE (AP)	8		PAOZZ
- 89	MS35338-135	96906	. WASHER,LOCK (AP)	18		PAOZZ
- 90	10094-3007	14304	. COVER	1		XB
- 91	10094-3008	14304	. COVER	1		XB
- 92	18092B-B0440-14	46384	. SPACER	2		XB
- 93	2228B	13103	. HEATSINK,ELEC,CMPNT	1		XB
- 94	MS15795-803	96906	. WASHER,FLAT (AP)	10		PADZZ
- 95	MS51957-13	96906	. SCREW,MACHINE (AP)	10		PAOZZ

Figure & Index Number	Part Number	FSCM	Description 1 2 3 4 5 6 7	Units Per Assy	Usable On Code	SMR Code
- 96	65474-001	00779	. SHUNTING BAR	1		XB
- 97	755017A8618	14304	. SPACER	1		XB
- 98	MS51957-28	96906	. SCREW,MACHINE (AP)	18		PAOZZ
- 99	H-6768	14304	. NUT,PLAIN,HEX (AP)	18		XB

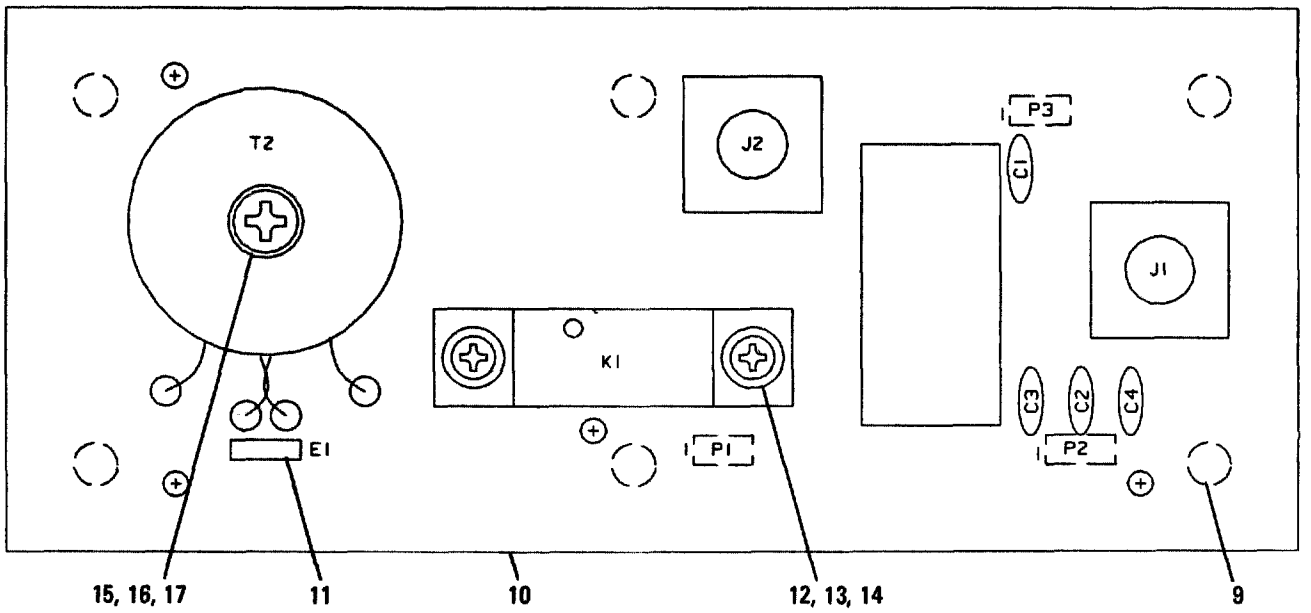


Figure 7-7. RF PWB Assy, A1A1

NOTE

To find index numbers for circuit board components, use the reference designator index at the end of this chapter. The complete reference designator for a circuit board component consists of "1," followed by the assembly designator (A1, A2, etc.), then the reference designator on the illustration. For example, the complete reference designator for R25 on the Logic PWB Assy is 1A1 R25.

Figure & Index Number	Part Number	FSCM	Description 1 2 3 4 5 6 7	Units Per Assy	Usable On Code	SMR Code
7-7 -	10094-3500	14304	CIRCUIT CARD ASSY,A1A1	1		XA
- 1	C6610	14304	. CAPACITOR,FXD,CER	1		PADZZ
- 2	C-6614	14304	. CAPACITOR,FXD,CER	3		PADZZ
- 3	TC519-NP0-102C	22701	. CAPACITOR,FXD,CER	3		PADZZ
- 4	KC-79-07	91836	. CONNECTOR,PLUG,ELEC	2		PADZZ
- 5	2T-4603-1	02289	. RELAY,ELECTROMECH	1		PADZZ
- 6	65499-102	22526	. CONNECTOR RCPT ELEC	2		PADZZ
- 7	65499-103	22526	. CONNECTOR RCPT ELEC	1		PADZZ
- 8	10094-3512	14304	. TRANSFORMER,RF	1		PADZZ
- 9	18097B-B0440-14	46384	. SPACER	6		XB
- 10	10094-3509	14304	. CIRCUIT CARD	1		XA
- 11	62409-1	00779	. TAB,PCB FAST ON	1		XB
- 12	MS51957-14	96906	. SCREW,MACHINE (AP)	2		PAOZZ
- 13	MS15795-803	96906	. WASHER,FLAT (AP)	4		PAOZZ
- 14	H-6769	14304	. NUT,PLAIN,HEX (AP)	2		XB
- 15	MS51957-49	96906	. SCREW,MACHINE (AP)	1		PAOZZ
- 16	MS15795-807	96906	. WASHER,FLAT (AP)	1		PAOZZ
- 17	H-6767	14304	. NUT,PLAIN,HEX (AP)	1		XB

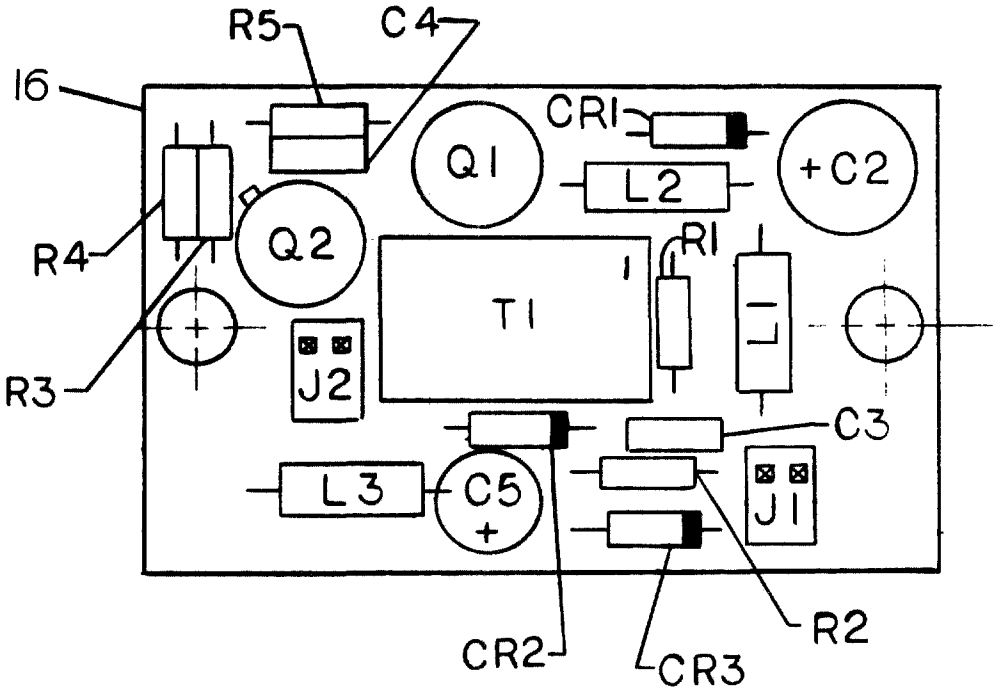


Figure 7-8. ± 10 V Power Supply PWB Assy, A1A2

NOTE

To find index numbers for circuit board components, use the reference designator index at the end of this chapter. The complete reference designator for a circuit board component consists of "1," followed by the assembly designator (A1, A2, etc.), then the reference designator on the illustration. For example, the complete reference designator for R25 on the Logic PWB Assy is 1A1 R25.

Figure & Index Number	Part Number	FSCM	Description 1 2 3 4 5 6 7	Units Per Assy	Usable On Code	SMR Code
7-8 -	10094-3020	14304	CIRCUIT CARD ASSY,A1A2	1		XA
- 1	T392D226M025AS	31433	. CAP,FXD,ELCTLT	1		PADZZ
- 2	M39014/02-1338	81349	. CAPACITOR,FXD,CER	1		PADZZ
- 3	M39014/01-1357	81349	. CAPACITOR,FXD,CER	1		PADZZ
- 4	JAN1N4942	81349	. SEMICOND DEVICE,DIO	3		PADZZ
- 5	22-14-2024	27264	. CONNECTOR,PLUG,ELEC	2		PADZZ
- 6	A-4455-B-22-14-2	27264	. CONNECTOR,PLUG,ELEC	2		PADZZ
- 7	MS90538-08	96906	. COIL,RF	2		PADZZ
- 8	MS14046-4	96906	. COIL,RF	1		PADZZ
- 9	MS90538-8	96906	. COIL,RF	2		PADZZ
- 10	JAN2N2219A	81349	. TRANSISTOR	2		PADZZ
- 11	CF07-102J	78488	. RESISTOR,FXD,COMP	1		PADZZ
- 12	CF07-151J	78488	. RESISTOR,FXD,COMP	1		PADZZ
- 13	CF07-2R7J	78488	. RESISTOR,FXD,COMP	2		PADZZ
- 14	CF07-100J	78488	. RESISTOR,FXD,COMP	1		PADZZ
- 15	10094-3025	14304	. TRANSFORMER,RF	1		PADZZ
- 16	10094-3029	14304	. CIRCUIT CARD	1		XA
- 17	T392D226M025AS	31433	. CAP,FXD,ELCTLT	1		PADZZ

Section III. NUMERICAL INDEX

Part Number	Fig No.	Index No.	Qty per End Item
A-4455-B-22-14-2	7-8	6	2
C-6614	7-7	2	3
C11EE2000A-175A	7-5	2	1
C6610	7-7	1	1
C95-0001-000REVF	7-3	12	1
CD4001BF	7-6	80	6
CD4011BF	7-6	81	2
CD4030BF	7-6	79	1
CD4042BF	7-6	77	1
CD4049BF	7-6	82	2
CD4049UBF	7-6	78	2
CD4093BF	7-6	83	1
CF07-100J	7-8	14	1
CF07-101J	7-6	47	2
CF07-102J	7-8	11	9
CF07-103J	7-6	40	31
CF07-104J	7-6	48	8
CF07-105J	7-6	41	3
CF07-122J	7-6	63	4
CF07-151J	7-8	12	1
CF07-153J	7-6	58	2
CF07-1R0J	7-6	35	1
CF07-222J	7-6	36	37
CF07-223J	7-6	59	4
CF07-224J	7-6	42	1
CF07-272J	7-6	50	2
CF07-273J	7-6	45	14
CF07-2R7J	7-8	13	2
CF07-302J	7-6	61	1
CF07-332J	7-6	66	1
CF07-333J	7-6	44	2
CF07-393J	7-6	57	2
CF07-3R3J	7-6	37	2
CF07-472J	7-6	39	24
CF07-473J	7-6	49	9
CF07-474J	7-6	51	2
CF07-563J	7-6	64	2
CF07-564J	7-6	46	1
CF07-682J	7-6	62	1
CF07-752J	7-6	60	1
CF07-822J	7-6	65	1
CK05BX102K	7-6	11	9
CK06BX103K	7-6	6	57
CK06BX104K	7-6	3	5
CK06BX474K	7-6	15	2
CMR05E470G0DR	7-6	8	1
CMR05F161G0DR	7-6	12	1
CMR05F181G0DR	7-6	9	2
CV31D350	7-6	10	2
H-6611	7-1	24	4
H-6612	7-1	30	4
H-6767	7-7	17	1
H-6768	7-6	99	18
H-6769	7-7	14	2
HLMP	7-6	19	2
HLMP-3301	7-6	18	11
HT50V400JA	7-3	7	3
JAN1N3611	7-6	17	13
JAN1N4454	7-6	16	69
JAN1N4942	7-8	4	3
JAN1N759A	7-6	84	1
JAN2N2219A	7-8	10	4
JAN2N2222A	7-6	28	24
JAN2N2907A	7-6	33	6
JAN2N6383	7-6	29	5
JAN2N6648	7-6	32	4
JANTX2N3439	7-6	30	1
KC-59-105	7-1	8	2
KC-79-07	7-7	4	2
KC-79-110	7-1	6	1
LE-016A-001	7-4	8	4
M39012/03-0503	7-1	17	1
M39012/16-0014	7-1	9	1
M39012/25-0012	7-1	18	1
M39014/01-1357	7-8	3	9
M39014/02-1318	7-6	13	1
M39014/02-1338	7-8	2	56
M39014/02-1360	7-6	14	3
M85049/1-12B	7-2	3	2
MC1558U	7-6	76	10
MP-0745	7-1	31	1
MS14046-4	7-8	8	1

Part Number Item	Fig No.	Index No.	Qty per End
MS14046-8	7-6	26	12
MS15795-802	7-5	25	8
MS15795-803	7-7	13	18
MS15795-804	7-5	23	7
MS15795-805	7-5	24	27
MS15795-807	7-7	16	19
MS15795-903	7-4	16	2
MS21266-2N	7-3	24	5
MS24693-C29	7-4	9	4
MS25036-153	7-4	23	1
MS27217-1	7-5	1	4
MS3106A20-27P	7-2	1	1
MS3106A20-27S	7-2	2	1
MS3420-12B	7-2	5	2
MS35196-14	7-4	17	2
MS35338-134	7-5	20	8
MS35338-135	7-6	89	39
MS35338-136	7-5	22	14
MS35338-137	7-3	5	29
MS35338-138	7-3	22	8
MS35338-97	7-4	15	6
MS35338-98	7-4	18	2
MS35650-304	7-3	23	8
MS51957-13	7-6	95	12
MS51957-14	7-7	12	8
MS51957-17	7-6	88	8
MS51957-28	7-6	98	21
MS51957-30	7-5	19	2
MS51957-31	7-4	13	8
MS51957-45	7-3	21	9
MS51957-46	7-5	18	9
MS51957-48	7-3	20	13
MS51957-49	7-7	15	1
MS51957-7	7-5	17	8
MS51958-66	7-3	25	4
MS90538-08	7-8	7	2
MS90538-8	7-8	9	2
MS90539-15	7-6	27	3
MVX2-100MEG	7-3	16	1
RCR42G150JM	7-6	53	2
RCR42G750JM	7-6	55	2
RCR42G750JS	7-6	54	2
RF56-12S	7-3	14	1
RF65-12S	7-3	13	1
RNC6H4993DS	7-6	52	2
SA-17546	7-1	25	1
T16-5	7-5	7	2
T392B155M035AS	7-6	7	6
T392C106M025AS	7-6	5	3
T392D226M025AS	7-8	1	1
T392E476M025AS	7-6	4	2
TC519-NP0-102C	7-7	3	2
Z06-001-006	7-3	27	1
028868	7-3	11	1
OK4745	7-6	43	2
10-36233-243	7-2	4	2
10-37087-20	7-1	14	1
10-74720-27P	7-1	11	1
10085-5156	7-6	87	8
10094-0000	7-1		1
10094-0002	7-1	2	1
10094-0060	7-2		1
10094-0071	7-1	32	1
10094-0100	7-1	1	1
10094-0120	7-1	4	1
10094-0121	7-3	17	1
10094-0122	7-5	5	2
10094-0123	7-5	3	1
10094-0124	7-5	4	2
10094-0130	7-3	6	1
10094-0134	7-3	9	2
10094-0135	7-3	8	1
10094-0140	7-1	10	1
10094-0149	7-1	13	1
10094-0502	7-1	19	1
10094-0510	7-1	28	1
10094-0521	7-1	29	4
10094-0540	7-1	16	1
10094-0550	7-1	7	1
10094-0560	7-1	12	1
10094-0570	7-3	2	1
10094-1000	7-1	5	1
10094-2000	7-3	15	1
10094-2015	7-4	1	1
10094-2030	7-3	1	2

Part Number	Fig No.	Index No.	Qty per End Item	Part Number	Fig No.	Index No.	Qty per End Item
10094-3000	7-1	3	1				
10094-3007	7-6	90	1				
10094-3008	7-6	91	1				
10094-3009	7-6	85	1				
10094-3020	7-6	2	1				
10094-3025	7-8	15	1				
10094-3029	7-8	16	1				
10094-3500	7-6	1	1				
10094-3509	7-7	10	1				
10094-3511	7-6	68	1				
10094-3512	7-7	8	1				
105-0852-001	7-6	69	1				
105-0854	7-6	72	1				
105-0857-001	7-6	71	1				
105-0860-001	7-6	73	1				
105-0862-001	7-6	74	1				
1168004P6	7-6	70	1				
1240S-0.22-10	7-6	67	4				
1251-8273	7-6	22	1				
1390	7-1	23	4				
18092B-B0440-14	7-6	92	2				
18097B-B0440-14	7-7	9	6				
1960-1111	7-4	2	2				
1960-1112	7-4	7	2				
1960-1113	7-4	3	4				
1960-1114	7-4	4	2				
1960-1115	7-4	5	2				
1960-1119	7-4	6	2				
1960-1127	7-5	8	2				
1960-1132	7-3	18	2				
1960-1133	7-3	19	2				
1960-1146	7-5	10	1				
1960-1147	7-5	9	1				
1960-1151	7-1	15	1				
1960-1168	7-5	11	1				
1960-1169	7-5	12	1				
1960-1170	7-5	13	1				
22-01-3087	7-3	4	1				

Part Number	Fig No.	Index No.	Qty per End Item
22-01-3207	7-3	3	1
22-03-2021	7-6	24	6
22-11-2082	7-6	25	1
22-11-2202	7-6	23	1
22-14-2024	7-8	5	2
2228B	7-6	93	1
2308-14-1	7-5	16	1
2T-4603-1	7-7	5	1
3242513	7-1	22	6
3386F-1-103	7-6	56	1
352-1130-010	7-6	34	1
360-489-100	7-6	75	1
423-0012	7-1	26	1
423-0015	7-1	20	1
423-0049	7-1	27	1
5710-61-16-P	7-5	15	2
5804-128-1	7-5	14	4
61304	7-4	24	4
61306	7-4	22	2
62409-1	7-7	11	1
65474-001	7-6	96	1
65499-102	7-7	6	2
65499-103	7-7	7	1
6611-0135	7-6	86	8
66951-002	7-6	20	2
66951-003	7-6	21	1
755017A8618	7-6	97	1
75535	7-4	21	2
8034	7-4	14	6
8037	7-4	19	2
8045NP	7-1	21	6

Section IV. REFERENCE DESIGNATOR INDEX

Reference Designation	Fig No.	Index No.
1A1	7-1	3
1A1A1	7-6	1
1A1A1C1	7-7	1
1A1A1C2	7-7	2
1A1A1C3	7-7	3
1A1A1C4	7-7	3
1A1A1J1	7-7	4
1A1A1J2	7-7	4
1A1A1K1	7-7	5
1A1A1P1	7-7	6
1A1A1P2	7-7	7
1A1A1P3	7-7	6
1A1A1T2	7-7	8
1A1A2	7-6	2
1A1A2C2	7-8	1
1A1A2C3	7-8	2
1A1A2C4	7-8	3
1A1A2C5	7-8	1
1A1A2CR1	7-8	4
1A1A2CR2	7-8	4
1A1A2CR3	7-8	4
1A1A2J1	7-8	5
1A1A2J2	7-8	6
1A1A2L1	7-8	7
1A1A2L2	7-8	8
1A1A2L3	7-8	9
1A1A2Q1	7-8	10
1A1A2Q2	7-8	10
1A1A2R1	7-8	11
1A1A2R2	7-8	12
1A1A2R3	7-8	13
1A1A2R4	7-8	13
1A1A2R5	7-8	14
1A1A2T1	7-8	15
1A1C5	7-6	3
1A1C6	7-6	4
1A1C7	7-6	5
1A1C8	7-6	5
1A1C9	7-6	6
1A1C11	7-6	6
1A1C12	7-6	7
1A1C13	7-6	4
1A1C14	7-6	7
1A1C15	7-6	6
1A1C16	7-6	6
1A1C17	7-6	7
1A1C18	7-6	7
1A1C19	7-6	7
1A1C20	7-6	3
1A1C21	7-6	6
1A1C22	7-6	7
1A1C23	7-6	3
1A1C24	7-6	6
1A1C25	7-6	6
1A1C26	7-6	6
1A1C27	7-6	6
1A1C28	7-6	6
1A1C29	7-6	8
1A1C30	7-6	9
1A1C31	7-6	10
1A1C32	7-6	11
1A1C33	7-6	11
1A1C34	7-6	11
1A1C35	7-6	11
1A1C36	7-6	10
1A1C37	7-6	12
1A1C38	7-6	11
1A1C39	7-6	11
1A1C40	7-6	13
1A1C41	7-6	6
1A1C42	7-6	6
1A1C43	7-6	6
1A1C44	7-6	14
1A1C45	7-6	6
1A1C49	7-6	6
1A1C50	7-6	6
1A1C51	7-6	6
1A1C52	7-6	6
1A1C53	7-6	6
1A1C54	7-6	6
1A1C55	7-6	6
1A1C56	7-6	6
1A1C57	7-6	6
1A1C58	7-6	15
1A1C59	7-6	15
1A1C60	7-6	6
1A1C61	7-6	11
1A1C62	7-6	6
1A1C63	7-6	6
1A1C64	7-6	11
1A1C65	7-6	6
1A1C66	7-6	6
1A1C67	7-6	6
1A1C68	7-6	6
1A1C69	7-6	6
1A1C70	7-6	6
1A1C71	7-6	6
1A1C72	7-6	6
1A1C73	7-6	6
1A1C74	7-6	6
1A1C75	7-6	6
1A1C76	7-6	6
1A1C77	7-6	6
1A1C78	7-6	6
1A1C79	7-6	6
1A1C80	7-6	6
1A1C81	7-6	6
1A1C82	7-6	6
1A1C83	7-6	6
1A1C84	7-6	6
1A1C85	7-6	6
1A1C86	7-6	5
1A1C87	7-6	6
1A1C88	7-6	6
1A1C89	7-6	6
1A1C90	7-6	6
1A1C91	7-6	6
1A1C92	7-6	6
1A1C93	7-6	6
1A1C94	7-6	6
1A1CR7	7-6	16
1A1CR8	7-6	16
1A1CR9	7-6	16
1A1CR10	7-6	16
1A1CR11	7-6	16
1A1CR12	7-6	16
1A1CR13	7-6	16
1A1CR14	7-6	16
1A1CR15	7-6	16
1A1CR16	7-6	16
1A1CR17	7-6	16
1A1CR18	7-6	16
1A1CR19	7-6	16
1A1CR20	7-6	16
1A1CR21	7-6	16
1A1CR22	7-6	16
1A1CR23	7-6	16
1A1CR24	7-6	16
1A1CR25	7-6	16
1A1CR26	7-6	16
1A1CR27	7-6	16
1A1CR28	7-6	16
1A1CR29	7-6	16
1A1CR30	7-6	16
1A1CR31	7-6	16
1A1CR32	7-6	16
1A1CR33	7-6	16
1A1CR34	7-6	16
1A1CR35	7-6	16
1A1CR36	7-6	16
1A1CR37	7-6	16

Reference Designation	Fig No.	Index No.
1A1CR38	7-6	16
1A1CR39	7-6	16
1A1CR40	7-6	17
1A1CR41	7-6	16
1A1CR42	7-6	16
1A1CR43	7-6	16
1A1CR44	7-6	16
1A1CR45	7-6	16
1A1CR46	7-6	16
1A1CR47	7-6	16
1A1CR48	7-6	16
1A1CR49	7-6	16
1A1CR50	7-6	16
1A1CR51	7-6	16
1A1CR53	7-6	16
1A1CR54	7-6	16
1A1CR55	7-6	16
1A1CR56	7-6	16
1A1CR57	7-6	16
1A1CR58	7-6	16
1A1CR59	7-6	16
1A1CR60	7-6	16
1A1CR61	7-6	16
1A1CR62	7-6	16
1A1CR63	7-6	16
1A1CR64	7-6	16
1A1CR65	7-6	16
1A1CR66	7-6	16
1A1CR67	7-6	16
1A1CR68	7-6	16
1A1CR69	7-6	16
1A1CR70	7-6	16
1A1CR71	7-6	17
1A1CR72	7-6	17
1A1CR73	7-6	17
1A1CR74	7-6	17
1A1CR75	7-6	16
1A1CR76	7-6	16
1A1CR77	7-6	16
1A1CR78	7-6	16
1A1CR79	7-6	16
1A1CR80	7-6	16
1A1CR81	7-6	17
1A1CR82	7-6	17
1A1CR83	7-6	17
1A1CR84	7-6	17
1A1CR85	7-6	17
1A1CR86	7-6	17
1A1CR87	7-6	17
1A1CR88	7-6	17
1A1CR89	7-6	16

Reference Designation	Fig No.	Index No.
1A1DS1	7-6	18
1A1DS2	7-6	19
1A1DS3	7-6	19
1A1DS4	7-6	19
1A1DS5	7-6	19
1A1DS6	7-6	19
1A1DS7	7-6	19
1A1DS8	7-6	19
1A1DS9	7-6	19
1A1DS10	7-6	19
1A1DS11	7-6	19
1A1J1	7-6	20
1A1J2	7-6	21
1A1J3	7-6	20
1A1J4	7-6	22
1A1J5	7-6	23
1A1J6	7-6	24
1A1J7	7-6	24
1A1J8	7-6	25
1A1J9	7-6	24
1A1J10	7-6	24
1A1J11	7-6	24
1A1J12	7-6	24
1A1L1	7-6	26
1A1L2	7-6	26
1A1L3	7-6	26
1A1L4	7-6	26
1A1L5	7-6	26
1A1L6	7-6	26
1A1L7	7-6	26
1A1L8	7-6	26
1A1L9	7-6	27
1A1L10	7-6	27
1A1L11	7-6	27
1A1L12	7-6	26
1A1L13	7-6	26
1A1L14	7-6	26
1A1L16	7-6	26
1A1Q5	7-6	28
1A1Q7	7-6	29
1A1Q8	7-6	30
1A1Q9	7-6	28
1A1Q10	7-6	28
1A1Q11	7-6	28
1A1Q12	7-6	28
1A1Q13	7-6	28
1A1Q14	7-6	31
1A1Q15	7-6	28
1A1Q16	7-6	28
1A1Q17	7-6	28
1A1Q18	7-6	28

Reference Designation	Fig No.	Index No.
1A1Q19	7-6	31
1A1Q20	7-6	28
1A1Q21	7-6	28
1A1Q22	7-6	28
1A1Q25	7-6	28
1A1Q24	7-6	28
1A1Q25	7-6	28
1A1Q26	7-6	28
1A1Q27	7-6	28
1A1Q28	7-6	28
1A1Q29	7-6	28
1A1Q30	7-6	28
1A1Q31	7-6	28
1A1Q32	7-6	28
1A1Q33	7-6	32
1A1Q34	7-6	32
1A1Q35	7-6	32
1A1Q36	7-6	32
1A1Q37	7-6	29
1A1Q38	7-6	29
1A1Q39	7-6	29
1A1Q40	7-6	29
1A1Q41	7-6	33
1A1Q42	7-6	33
1A1Q48	7-6	33
1A1Q49	7-6	33
1A1Q50	7-6	33
1A1Q51	7-6	33
1A1Q52	7-6	34
1A1Q53	7-6	28
1A1R10	7-6	35
1A1R11	7-6	36
1A1R14	7-6	36
1A1R15	7-6	37
1A1R16	7-6	38
1A1R17	7-6	36
1A1R18	7-6	36
1A1R19	7-6	36
1A1R20	7-6	36
1A1R21	7-6	39
1A1R22	7-6	39
1A1R23	7-6	40
1A1R22	7-6	36
1A1R25	7-6	36
1A1R26	7-6	41
1A1R27	7-6	42
1A1R28	7-6	41
1A1R29	7-6	43
1A1R30	7-6	44
1A1R31	7-6	45
1A1R32	7-6	36

Reference Designation	Fig No.	Index No.
1A1R33	7-6	36
1A1R34	7-6	46
1A1R55	7-6	47
1A1R36	7-6	39
1A1R37	7-6	36
1A1R38	7-6	45
1A1R39	7-6	48
1A1R40	7-6	39
1A1R41	7-6	49
1A1R42	7-6	49
1A1R43	7-6	41
1A1R44	7-6	39
1A1R45	7-6	50
1A1R46	7-6	48
1A1R47	7-6	40
1A1R48	7-6	38
1A1R49	7-6	36
1A1R50	7-6	49
1A1R51	7-6	45
1A1R52	7-6	51
1A1R53	7-6	44
1A1R54	7-6	40
1A1R55	7-6	45
1A1R56	7-6	36
1A1R57	7-6	39
1A1R58	7-6	39
1A1R59	7-6	36
1A1R60	7-6	49
1A1R61	7-6	38
1A1R62	7-6	45
1A1R63	7-6	49
1A1R64	7-6	36
1A1R65	7-6	49
1A1R66	7-6	52
1A1R67	7-6	53
1A1R68	7-6	54
1A1R69	7-6	55
1A1R70	7-6	39
1A1R71	7-6	56
1A1R72	7-6	39
1A1R74	7-6	45
1A1R75	7-6	48
1A1R76	7-6	40
1A1R77	7-6	40
1A1R78	7-6	48
1A1R79	7-6	48
1A1R80	7-6	45
1A1R81	7-6	45
1A1R82	7-6	48
1A1R83	7-6	57
1A1R84	7-6	58
1A1R85	7-6	59
1A1R86	7-6	60
1A1R87	7-6	61
1A1R88	7-6	48
1A1R89	7-6	45
1A1R90	7-6	45
1A1R91	7-6	48
1A1R92	7-6	57
1A1R93	7-6	58
1A1R94	7-6	50
1A1R95	7-6	59
1A1R96	7-6	38
1A1R97	7-6	38
1A1R98	7-6	38
1A1R99	7-6	45
1A1R100	7-6	62
1A1R101	7-6	63
1A1R102	7-6	49
1A1R103	7-6	40
1A1R104	7-6	40
1A1R105	7-6	40
1A1R106	7-6	64
1A1R107	7-6	39
1A1R108	7-6	40
1A1R109	7-6	63
1A1R110	7-6	38
1A1R111	7-6	40
1A1R112	7-6	40
1A1R113	7-6	63
1A1R114	7-6	40
1A1R115	7-6	38
1A1R116	7-6	63
1A1R117	7-6	39
1A1R118	7-6	64
1A1R119	7-6	40
1A1R120	7-6	59
1A1R121	7-6	36
1A1R122	7-6	65
1A1R123	7-6	40
1A1R124	7-6	39
1A1R125	7-6	40
1A1R126	7-6	36
1A1R127	7-6	49
1A1R128	7-6	36
1A1R129	7-6	40
1A1R130	7-6	40
1A1R131	7-6	59
1A1R132	7-6	66
1A1R133	7-6	40
1A1R134	7-6	40
1A1R135	7-6	40
1A1R136	7-6	39
1A1R137	7-6	40
1A1R138	7-6	39
1A1R139	7-6	39
1A1R140	7-6	39
1A1R141	7-6	40
1A1R142	7-6	39
1A1R143	7-6	39
1A1R144	7-6	39
1A1R145	7-6	39
1A1R147	7-6	36
1A1R148	7-6	36
1A1R149	7-6	40
1A1R150	7-6	40
1A1R151	7-6	39
1A1R152	7-6	36
1A1R153	7-6	36
1A1R154	7-6	36
1A1R155	7-6	36
1A1R156	7-6	36
1A1R157	7-6	40
1A1R158	7-6	40
1A1R159	7-6	39
1A1R160	7-6	36
1A1R161	7-6	36
1A1R162	7-6	36
1A1R163	7-6	36
1A1R164	7-6	40
1A1R165	7-6	40
1A1R166	7-6	39
1A1R167	7-6	36
1A1R168	7-6	36
1A1R169	7-6	36
1A1R170	7-6	36
1A1R171	7-6	36
1A1R172	7-6	40
1A1R173	7-6	40
1A1R174	7-6	39
1A1R175	7-6	36
1A1R176	7-6	67
1A1R177	7-6	67
1A1R178	7-6	67
1A1R179	7-6	67
1A1R180	7-6	37
1A1R182	7-6	36
1A1R183	7-6	36
1A1R184	7-6	49
1A1R185	7-6	47
1A1R186	7-6	45
1A1R187	7-6	45
1A1R188	7-6	40

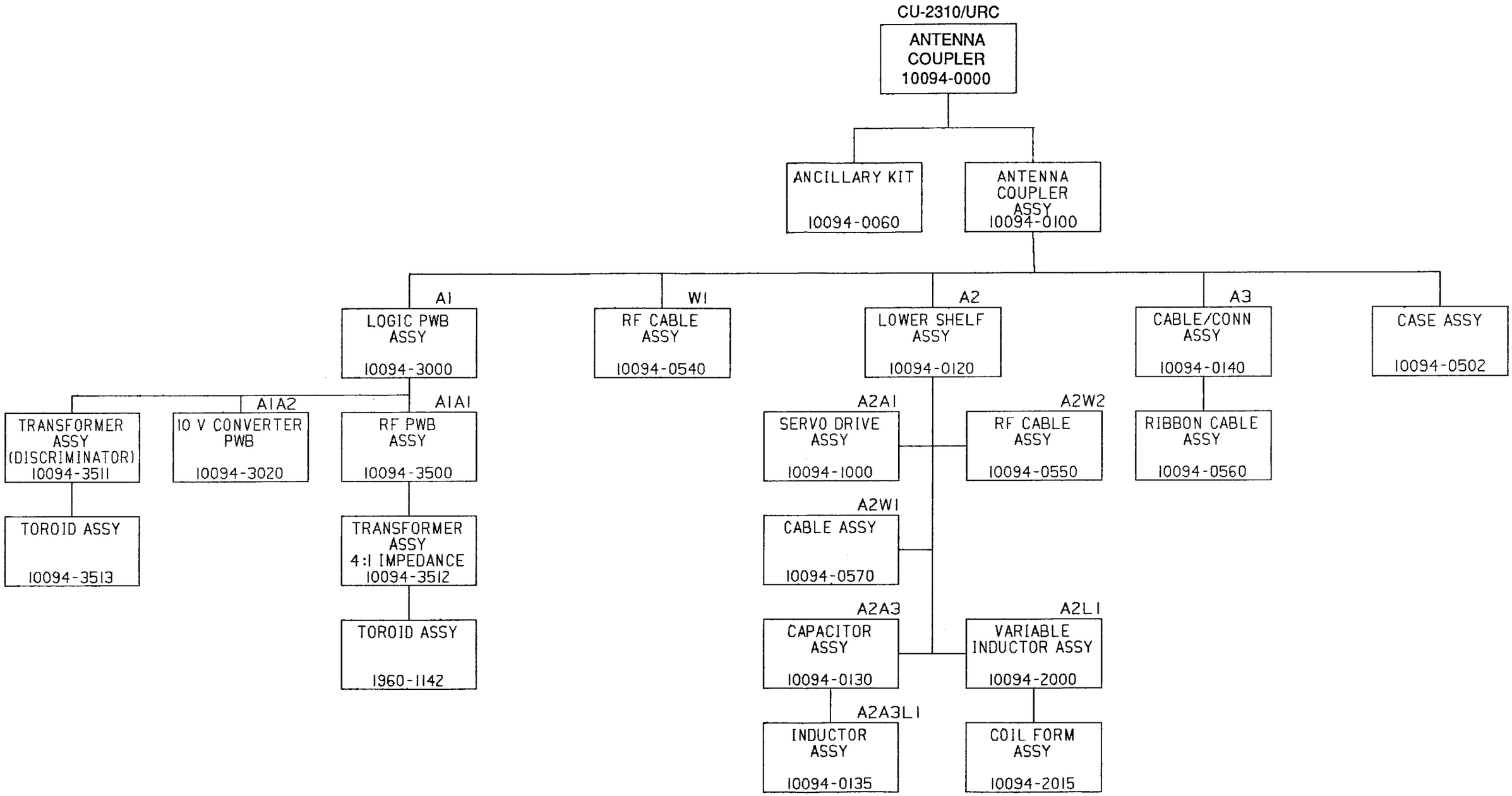
Reference Designation	Fig No.	Index No.
1A1R189	7-6	45
1A1T1	7-6	68
1A1TP2	7-6	69
1A1TP3	7-6	70
1A1TP4	7-6	71
1A1TP5	7-6	72
1A1TP6	7-6	73
1A1TP7	7-6	74
1A1TP8	7-6	75
1A1U1	7-6	76
1A1U2	7-6	76
1A1U3	7-6	76
1A1U4	7-6	76
1A1U5	7-6	76
1A1U6	7-6	76
1A1U7	7-6	76
1A1U8	7-6	76
1A1U9	7-6	77
1A1U10	7-6	76
1A1U11	7-6	78
1A1U12	7-6	79
1A1U13	7-6	80
1A1U14	7-6	76
1A1U15	7-6	81
1A1U16	7-6	82
1A1U17	7-6	80
1A1U18	7-6	80
1A1U19	7-6	80
1A1U20	7-6	83
1A1U21	7-6	80
1A1U22	7-6	81
1A1U23	7-6	80
1A1VR1	7-6	84
1A2	7-1	4
1A2A1	7-1	5
1A2A1B1	7-3	1
1A2A1S1	7-5	1
1A2A1S2	7-5	1
1A2A1S3	7-5	1
1A2A1S4	7-5	1
1A2A1S5	7-5	2
1A2A1W1	7-3	2
1A2A1W1P1	7-3	3
1A2A1W1P2	7-3	4
1A2A3	7-3	6
1A2A3C1	7-3	7
1A2A3C2	7-3	7
1A2A3C3	7-3	7
1A2A3L1	7-3	8
1A2B1	7-3	11
1A2C1	7-3	12
1A2J1	7-1	6
1A2K1	7-3	13
1A2K2	7-3	14
1A2L1	7-3	15
1A2R1	7-3	16
1A2W2	7-1	7
1A2W2P1	7-1	8
1A2W2P2	7-1	9
1A3	7-1	10
1A3P1	7-1	11
1A3W1	7-1	12
1W1	7-1	16

CHAPTER 8

FOLDOUT DRAWINGS

LIST OF 100/500 WATT ANTENNA COUPLER FOLDOUT DRAWINGS

☆ U.S. Government Printing Office: 1987 785-000/60015



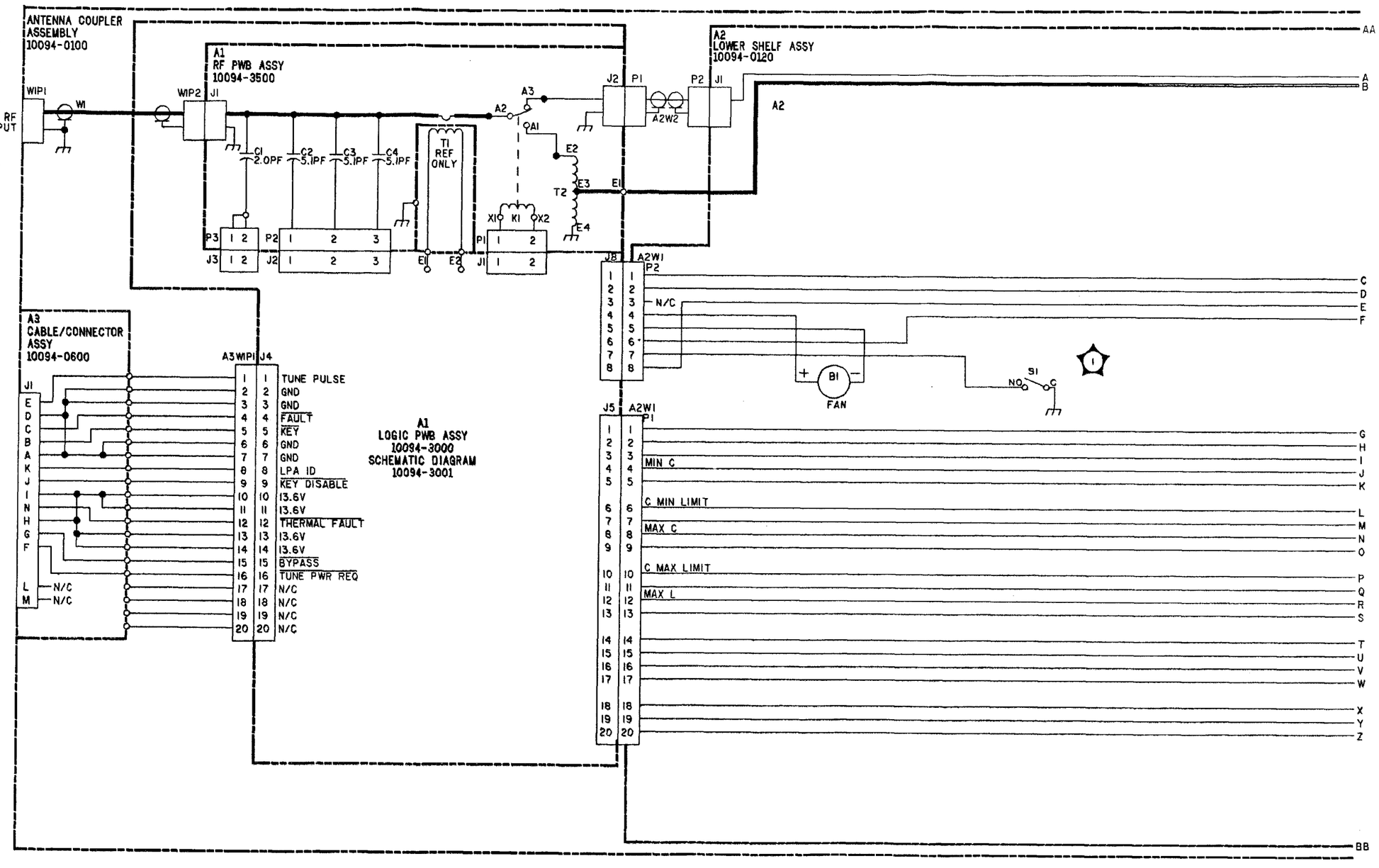
FO-1. Family Tree 100/500 Watt Antenna Coupler

NOTE: UNLESS OTHERWISE SPECIFIED:

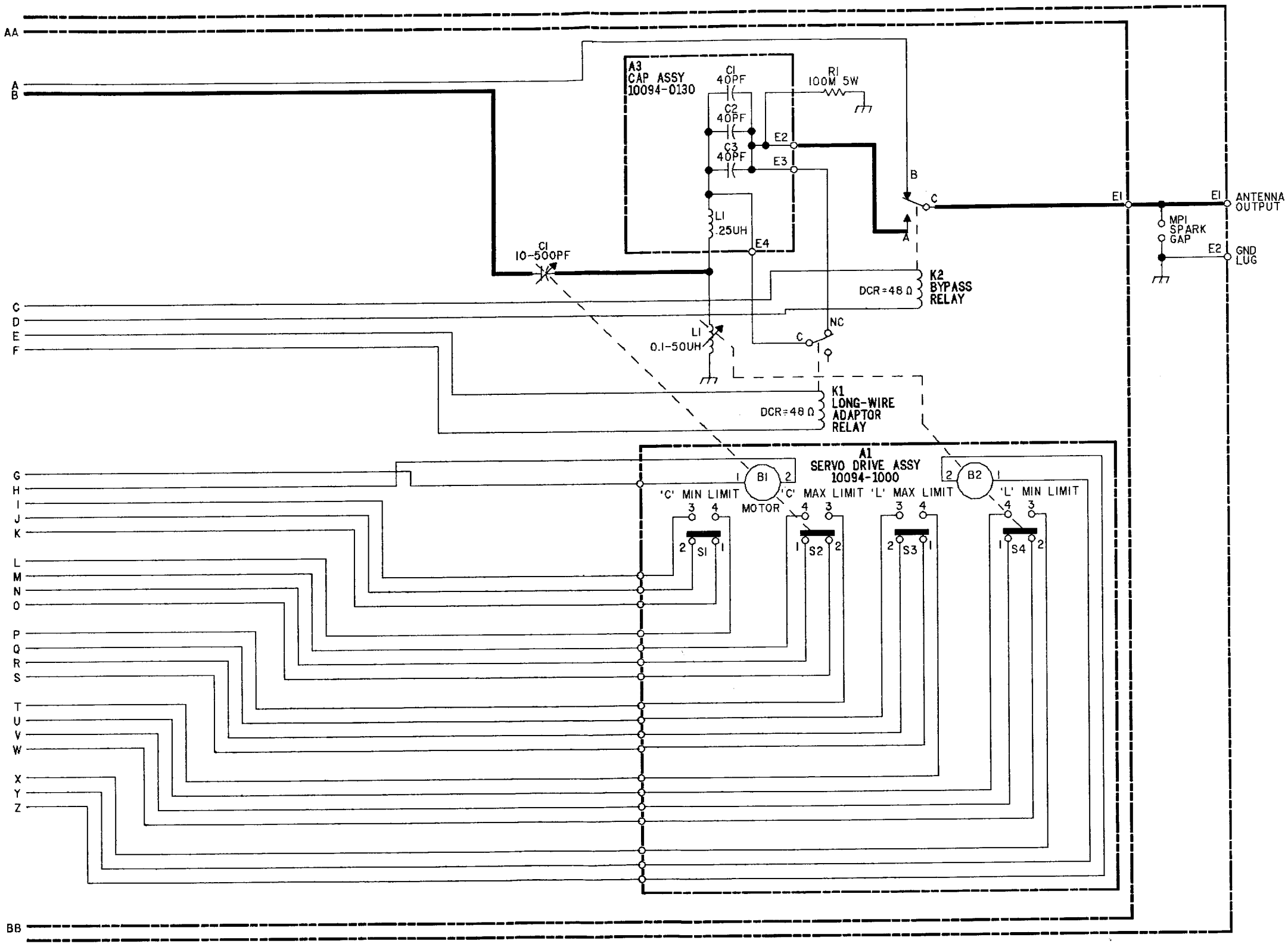
1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN FOR DETAIL PARTS. PREFIX THESE WITH UNIT NO. AND/OR ASSEMBLY DESIGNATIONS SHOWN ON DRAWING TO OBTAIN COMPLETE DESIGNATIONS.
2. ALL RESISTOR VALUES ARE IN OHMS, 1/4W, ±5%.
3. ALL CAPACITOR VALUES ARE IN MICROFARADS (µF).
4. ALL INDUCTANCE VALUES ARE IN MICROHENRIES (µH).
5. VENDOR PART NO. CALLOUTS ARE FOR REFERENCE ONLY. COMPONENTS ARE SUPPLIED PER PART NO. IN PARTS LIST.
6. DC RESISTANCES OF INDUCTIVE ELEMENTS (CHOKES, COILS, MOTOR WINDINGS, ETC.,) ARE LESS THAN 1 OHM.
7. PANEL DECALS ARE INDICATED BY BOLD TYPE IN A BOLD BOX, E.G., **ON/OFF**
8. ALL RELAYS ARE SHOWN IN THE DE-ENERGIZED STATE.

HIGHEST REFERENCE DESIGNATION				
REFERENCE DESIGNATIONS NOT USED				

① CLOSES @ 95°C



FO-2. Interconnection Diagram (Sheet 1 of 2)

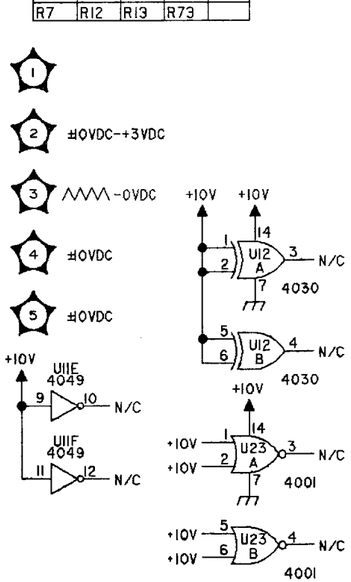


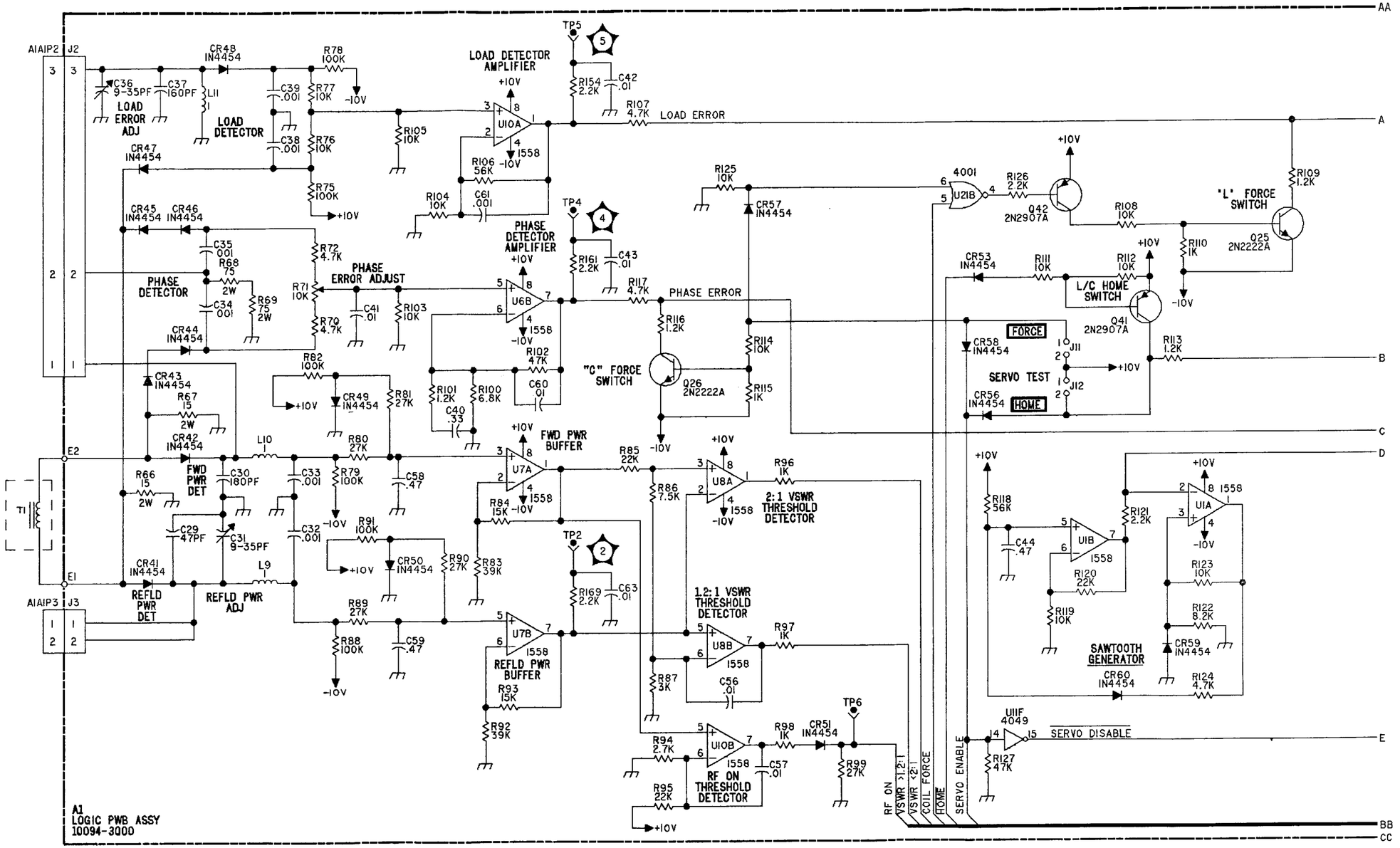
FO-2. Interconnection Diagram (Sheet 2 of 2)

NOTE: UNLESS OTHERWISE SPECIFIED:

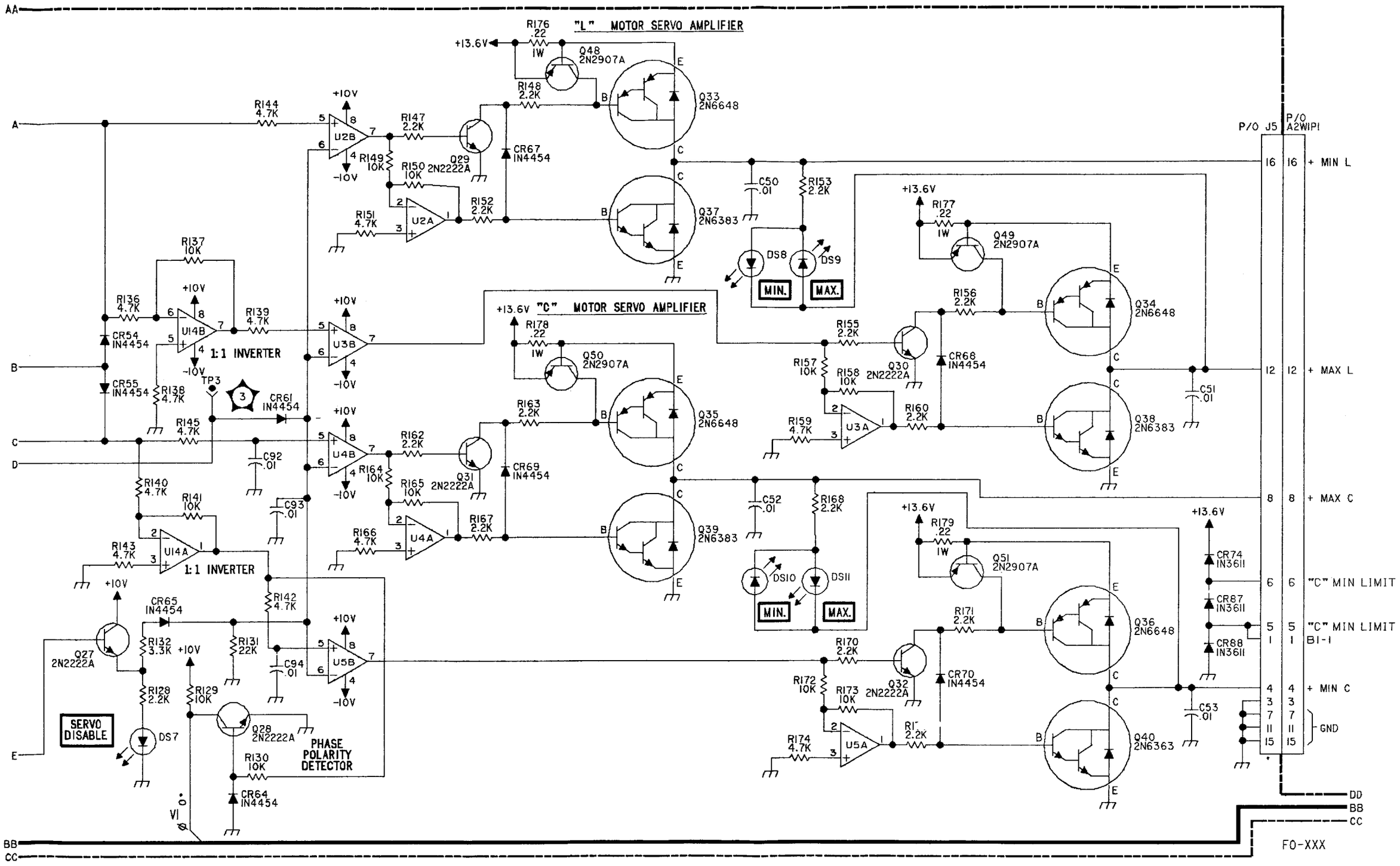
1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN FOR DETAIL PARTS. PREFIX THESE WITH UNIT NO. AND/OR ASSEMBLY DESIGNATIONS SHOWN ON DRAWING TO OBTAIN COMPLETE DESIGNATIONS.
2. ALL RESISTOR VALUES ARE IN OHMS, 1/4W, ±5%.
3. ALL CAPACITOR VALUES ARE IN MICROFARADS (μF).
4. ALL INDUCTANCE VALUES ARE IN MICROHENRIES (μH).
5. VENDOR PART NO. CALLOUTS ARE FOR REFERENCE ONLY. COMPONENTS ARE SUPPLIED PER PART NO. IN PARTS LIST.
6. DC RESISTANCES OF INDUCTIVE ELEMENTS (CHOKES, COILS, MOTOR WINDINGS, ETC.,) ARE LESS THAN 1 OHM.
7. PANEL DECALS ARE INDICATED BY BOLD TYPE IN A BOLD BOX, E.G., **ON/OFF**
8. ALL RELAYS ARE SHOWN IN THE DE-ENERGIZED STATE.

HIGHEST REFERENCE DESIGNATION				
C92	CR89	D511	J12	L16
Q53	R189	T1	TP8	U23
VR1				
REFERENCE DESIGNATIONS NOT USED				
C1	C2	C3	C4	C10
C46	C47	C48	CR1	CR2
CR3	CR4	CR5	CR6	Q1
Q2	Q3	Q4	Q6	Q43
Q44	Q45	Q46	Q47	R1
R2	R3	R4	R5	R6
R7	R12	R13	R73	

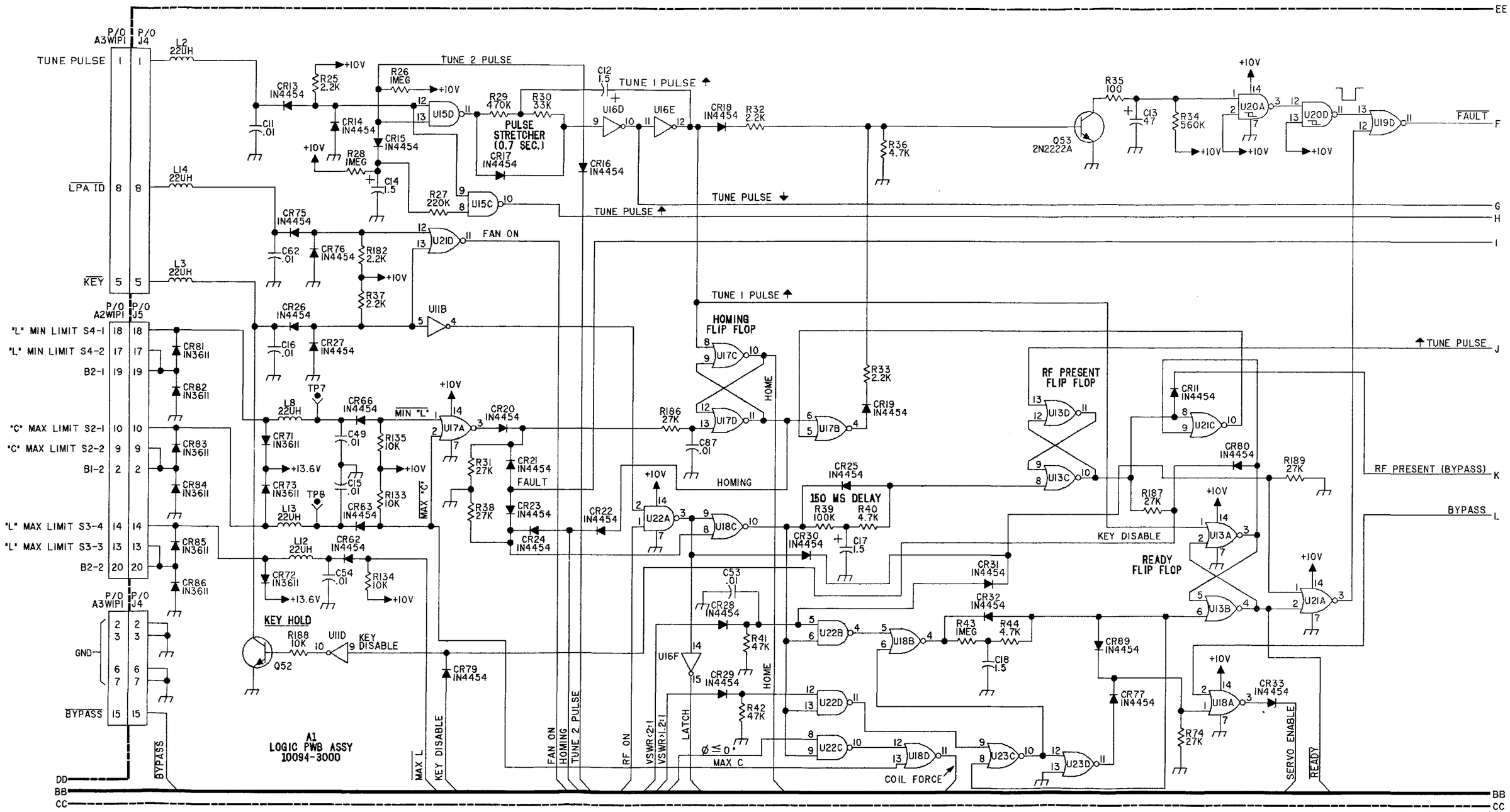




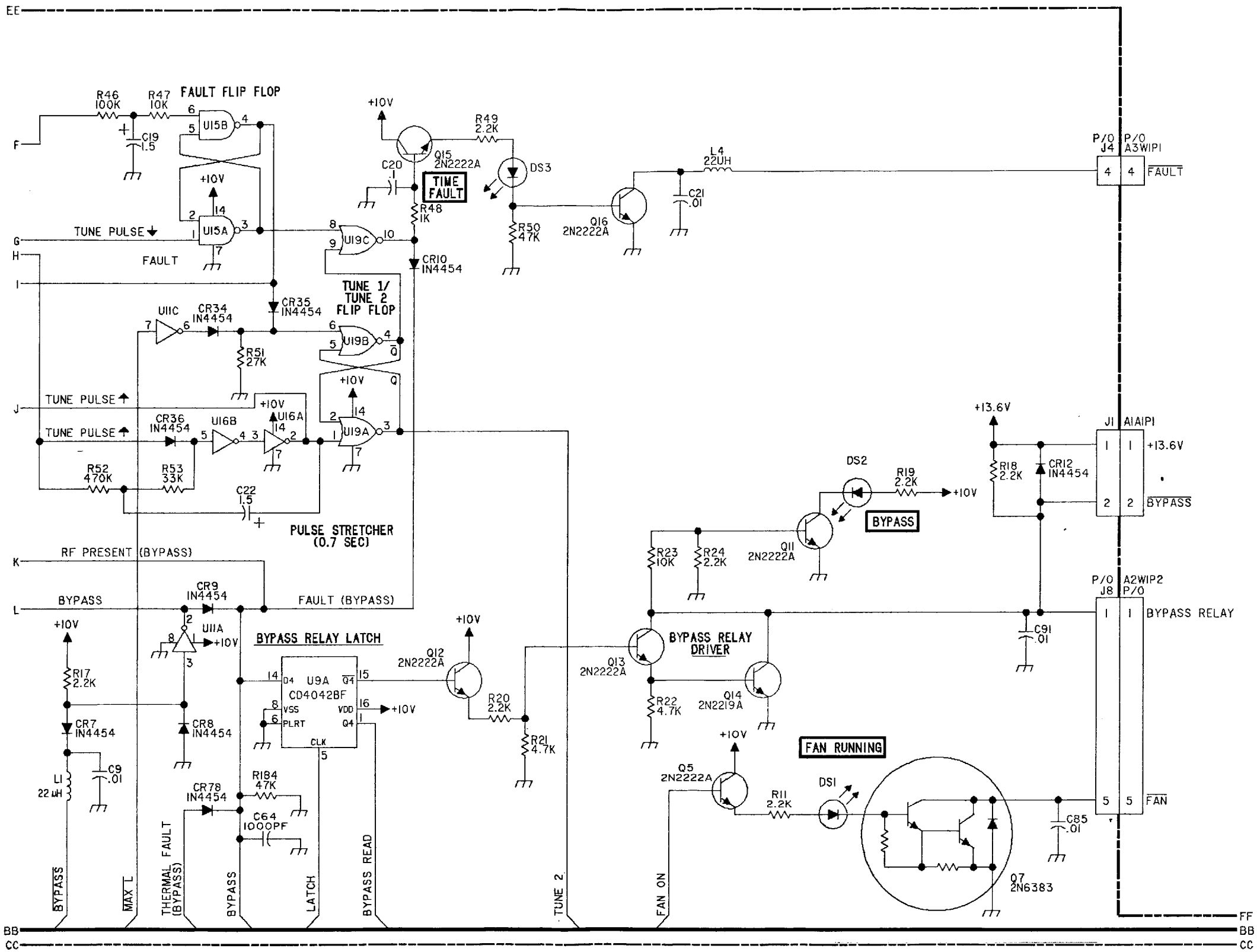
FO-3. Logic PWB Assy, A1 (Sheet 1 of 5)



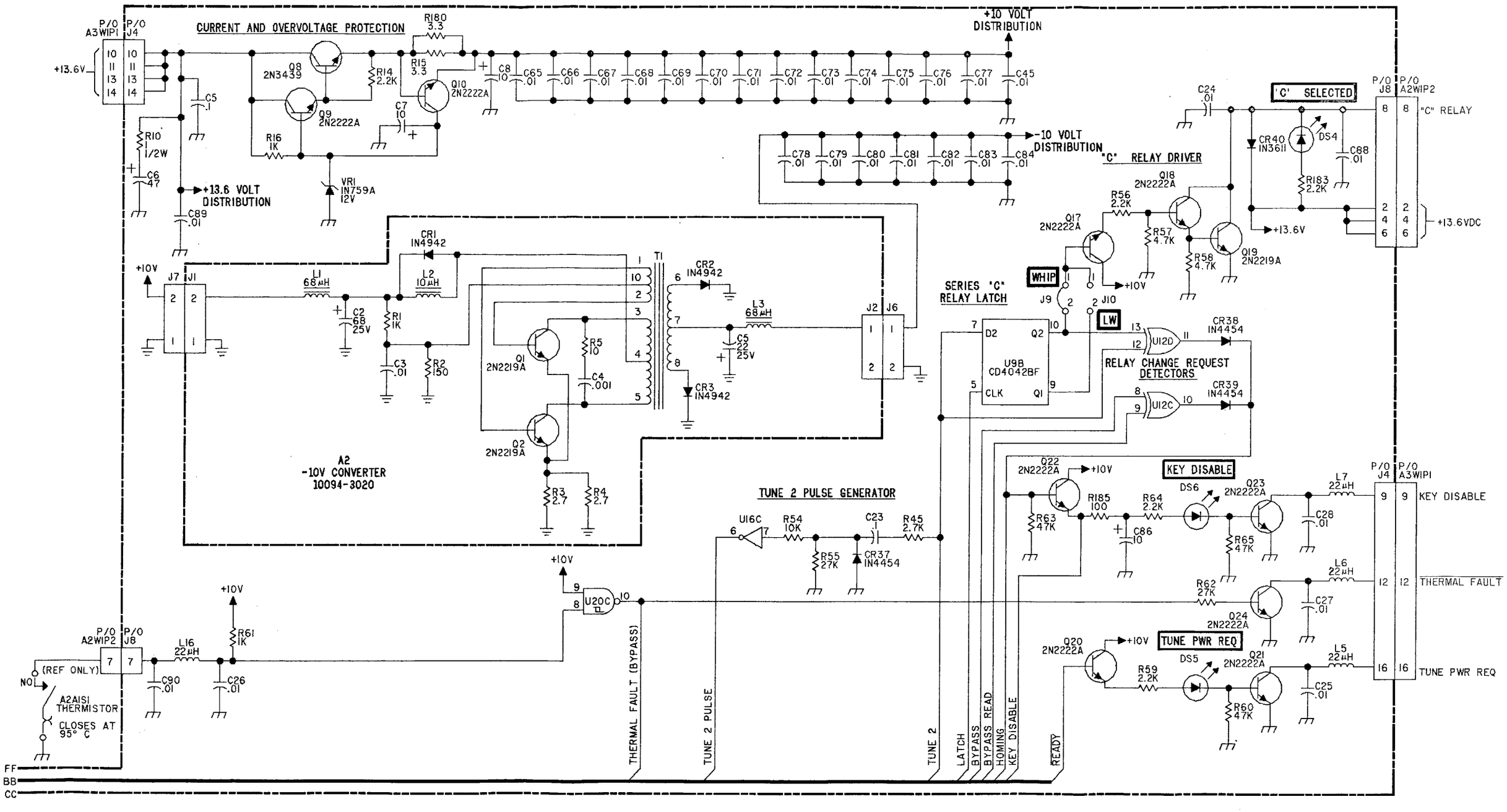
FO-3. Logic PWB Assy, A1 (Sheet 2 of 5)



FO-3. Logic PWB Assy, A1 (Sheet 3 of 5)



FO-3. Logic PWB Assy, A1 (Sheet 4 of 5)



FO-3. Logic PWB Assy, A1 (Sheet 5 of 5)