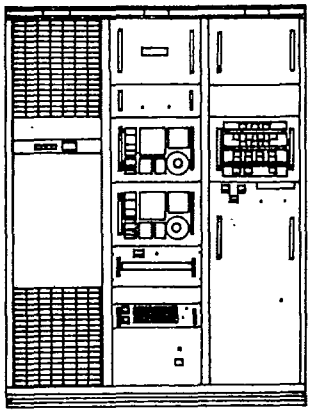
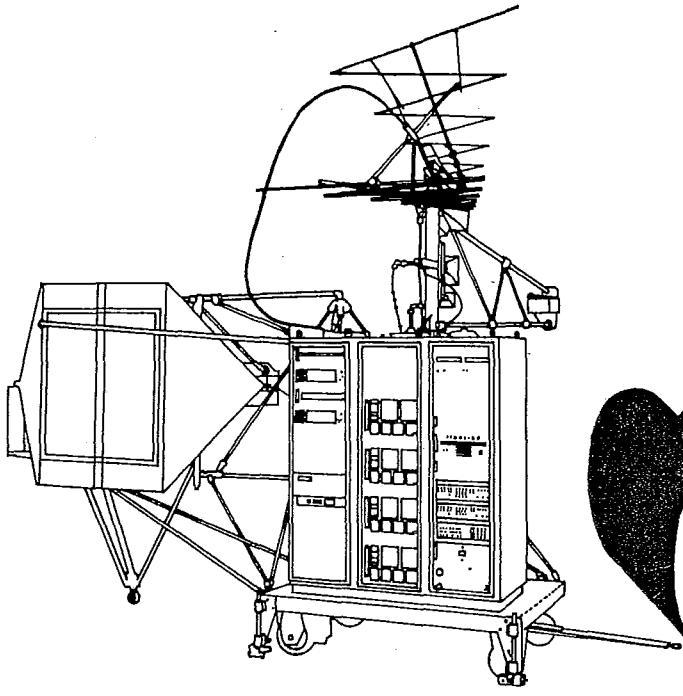




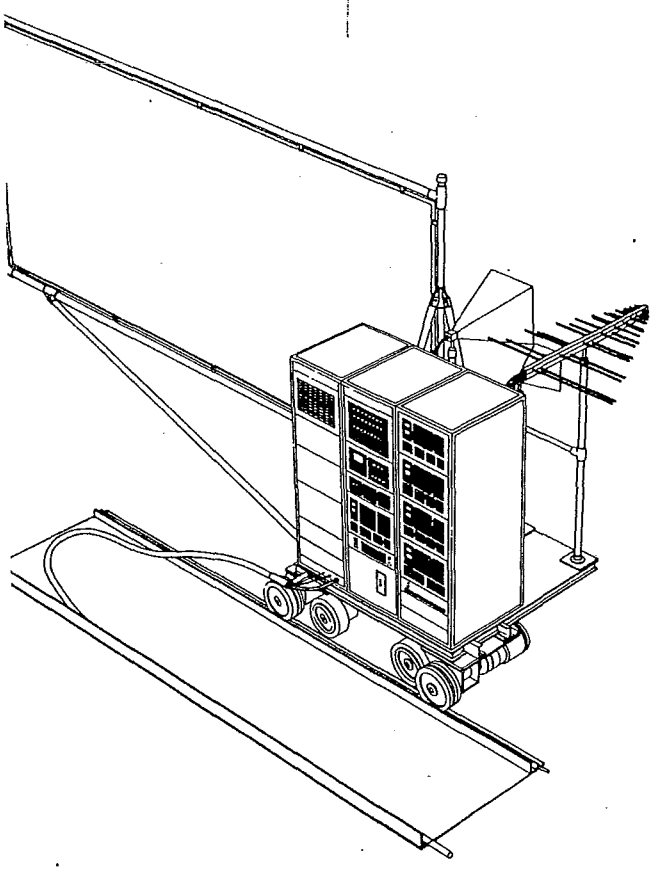
Logitek

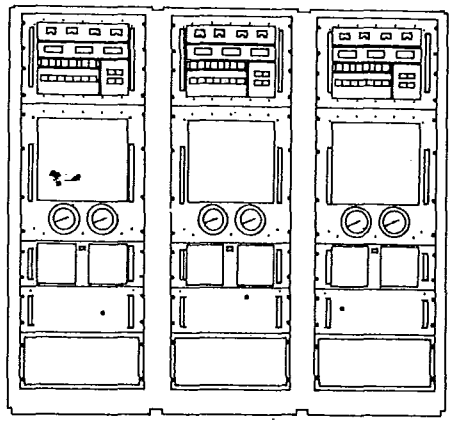
TECHNICAL MANUAL

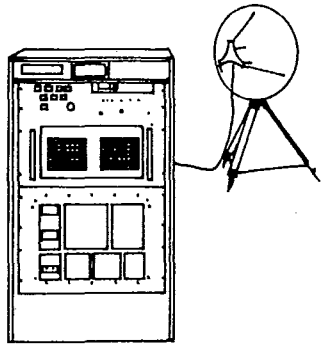
TRAVELING WAVE TUBE AMPLIFIERS
(TWTA)

MODELS: A230/240-330/340-350 SERIES

REV C







TECHNICAL MANUAL

TRAVELING WAVE TUBE AMPLIFIERS (TWTA)

MODELS: A230/240-330/340-350 SERIES

REV C

Prepared by:

LogiMetrics, Inc.
121-03 Dupont Street
Plainview, NY 11803 USA

Doc: A230SER.C / M089/090
Rev A - LED - 09-87
Rev B - 240/340 - 05-89
Rev C - 350 - 01-93

LogiMetrics, INC 121-03 DUPONT ST., PLAINVIEW, NY 11803 • (516) 349-1700 • TLX: 760-8152 LOGMETUC • FAX: 516-349-8552
Innovation in Instrumentation

QUALITY POLICY

LogiMetrics is a manufacturer of Traveling Wave Tube microwave amplifiers and Electronic Systems. ***LogiMetrics*** is committed to designing, building and assembling its products to its catalog specifications and/or to comply with special customer requirements, when specified, conforming to industry quality standards and delivery dates.

Murray H. Feigenbaum
President and CEO

107402

10/93

WARRANTY

All LogiMetrics, Inc. products are in warranty against defects in material and workmanship for a period of one year from date of shipment and, if properly used, will perform in full accordance with their applicable specifications.

Any instrument that proves to be defective during the warranty period will be repaired, or at our option, replaced without charge. The warranty is void if the inspection seals are broken without prior written authorization from the factory. Equipment returned to the factory is to be shipped prepaid by Buyer and will be returned F.O.B. Destination. C.O.D. returns will not be accepted by our Receiving Department.

No other warranty is expressed or implied. LogiMetrics is not liable for consequential damages incurred while using its products.

CAUTION

THIS EQUIPMENT SHOULD BE SERVICED ONLY BY QUALIFIED TECHNICAL PERSONNEL.

THE INSTRUMENT CONTAINS HIGH VOLTAGE. EXTREME CARE MUST BE TAKEN TO AVOID COMING INTO CONTACT WITH ANY HIGH VOLTAGE POINT. INJURY ON CONTACT WITH HIGH VOLTAGE CAN RESULT.

LOGIMETRICS, Inc., 121-03 Dupont Street, Plainview, NY 11803
Printed in USA
11-92

WARRANTY

LIMITED WARRANTY FOR LOGIMETRICS PRODUCTS

1. WARRANTY

a. Equipment components, and subsystems (i.e., "Products"), exclusive of microwave tubes, manufactured and sold by LogiMetrics, Inc. are warranted to be free of defects in material and workmanship for a period of one (1) year except as otherwise specified on LogiMetrics quotation or agreed to in writing by LogiMetrics. LogiMetrics' obligation under all warranties is limited in accordance with the periods of time and all other conditions stated in all provisions of this warranty.

b. This warranty applies only to defects in material and workmanship in products manufactured by LogiMetrics, including non-LogiMetrics parts, except microwave tubes.

c. Microwave tubes, which are supplied as an integral part of LogiMetrics products, are warranted only in accordance with the tube manufacturer's applicable warranty.

d. Power Supplies and passive components which include electromagnets, solenoids, filters, circulators, couplers, waveguides, diplexers, and other passive devices are warranted for one (1) year of unlimited hours of operation following the date of shipment thereof, unless otherwise specified.

e. Repair, or at LogiMetrics option, replacement of the LogiMetrics product or defective parts therein shall be the sole and exclusive remedy for all valid warranty claims; provided that under certain circumstances LogiMetrics may, as an alternative, elect to refund an equitable portion of the purchase price of the product.

2. WARRANTY PERIOD

The applicable warranty period shall commence on the date of shipment from LogiMetrics to the original purchaser and extend for the stated period following the date of shipment. The warranty period for microwave tubes shall commence on the date of shipment from LogiMetrics and extend for the specified time period or number of hours of operation in accordance with the terms of the applicable express written warranty of the tube manufacturer. Upon beginning of the applicable LogiMetrics warranty period, all customer's remedies shall be governed by the terms stated or referenced in this warranty. In-warranty repaired or replacement products or parts are warranted only for the remaining unexpired portion of the original warranty period applicable to the repaired or replaced products or parts. Repair or replacement of products or parts under warranty does not extend the original warranty period.

3. WARRANTY COVERAGE LIMITATIONS

a. The following are expressly **NOT COVERED** under warranty:

1. Any loss, damage, and/or malfunction relating in any way to shipping, storage, accident, abuse, alternation, misuse, neglect, failure to use products under normal operating conditions or within respective LogiMetrics specified ratings, failure to use products according to any operating instructions provided by LogiMetrics, lack of routine care and maintenance as indicated in any operating or maintenance instructions, or failure to use or take any proper precautions under the circumstance.

2. Products, items, parts, accessories, subassemblies, or components which are expendable in normal use or are of limited life, such as but not limited to bulbs, fuses, lamps, glassware, etc.

3. Microwave tubes have a one (1) year warranty from date of shipment from LogiMetrics.

a. At LogiMetrics sole option, it may furnish warranty replacement parts to the customer before the defective part is returned to and received by LogiMetrics. If LogiMetrics furnishes such parts in advance, the customer understands and agrees that it will return the replaced defective parts to LogiMetrics within sixty (60) days after LogiMetrics advance shipment. In the event defective parts are not returned and received by LogiMetrics with this sixty (60) day period, the advance replacement parts shall be deemed not furnished under warranty and customer agrees to pay LogiMetrics invoices for all such advance shipment replacement parts at their then current selling prices.

b. LogiMetrics will not make warranty adjustments for failures of products or parts which occur after the specified warranted hours of operations or after the specified maximum adjustment period. Unless otherwise agreed, failure shall be deemed to have occurred no more than seven (7) working days before the first date on which a notice of failure is received by LogiMetrics. Under no circumstances shall any warranty exceed the period stated above unless expressly agreed to in writing by LogiMetrics. In the event customers and/or users of any LogiMetrics products subject to this warranty fail to keep accurate records of the number of hours of operation or time period of use, LogiMetrics, at its sole discretion, may reject any such claims or determine probable usage for the equipment, component, or subsystem involved.

4. LIABILITY LIMITATIONS

a. THIS WARRANTY IS EXPRESSLY IN LIEU OF AND EXCLUDES ALL OTHER EXPRESS AND IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO WARRANTIES OF MERCHANTABILITY AND OF FITNESS FOR PARTICULAR PURPOSE, USE OR APPLICATION, AND ALL OTHER OBLIGATIONS OR LIABILITIES ON THE PART OF LOGIMETRICS, UNLESS SUCH OTHER WARRANTIES, OBLIGATIONS OR LIABILITIES ARE EXPRESSLY AGREED TO IN WRITING BY LOGIMETRICS.

b. All obligations of LogiMetrics under this warranty shall cease in the event its products or parts thereof have been subjected to accident, abuse, alteration, misuse or neglect, or which have not been operated and maintained in accordance with proper operating procedures.

c. IN NO EVENT SHALL LOGIMETRICS BE LIABLE FOR INCIDENTAL, CONSEQUENTIAL, SPECIAL, OR RESULTING LOSS OR DAMAGE OF ANY KIND HOWSOEVER CAUSED. LIABILITY FOR DAMAGES SHALL NOT EXCEED THE PAYMENT, IF ANY, RECEIVED BY LOGIMETRICS FOR THE UNIT OR PRODUCT OR SERVICE FURNISHED OR TO BE FURNISHED, AS THE CASE MAY BE, WHICH IS THE SUBJECT OR CLAIM OR DISPUTE.

d. No action, regardless of form, arising out of, or in any way connected with, the products, or services, furnished or to be furnished by LogiMetrics, may be brought by the customer more than one (1) year after the cause of action has accrued.

e. Statements made by any person, including representatives of LogiMetrics, which are inconsistent or in conflict with the terms of the warranty, shall not be binding upon LogiMetrics unless reduced to writing and approved by an officer of LogiMetrics.

RETURN PROCEDURES

5. WARRANTY CLAIM

All claims under warranty must be made promptly after occurrence of circumstances giving rise to the claim and must be received at LogiMetrics within the applicable warranty period. LogiMetrics reserves the right to reject any warranty claim not promptly reported. After expiration of the applicable warranty period, microwave tubes, power supplies, and components are not subject to adjustment.

6. WARRANTY INFORMATION

When a product is returned for repair and/or adjustment, a full description of the circumstances giving rise to the warranty claim should be included. Such information will help establish the cause of failure and expedite adjustment or repair.

7. TRANSPORTATION AND PACKAGING

Any product returned to LogiMetrics for examination must be properly packed and sent prepaid. LogiMetrics reserves the right to reject any warranty claim on any item where seals have been broken or that has been altered in the field without written LogiMetrics authorization. Returned products should be carefully packaged in the original container, and unless otherwise indicated, shipped to:

LogiMetrics, Inc.
101-32 Dupont Street
Plainview, NY 11803
Attention: Customer Service

8. AUTHORIZATION FOR EVALUATION

When any product is returned for examination and inspection, or for any other reason, customer and its shipping agency shall be responsible for all damage resulting from improper packing or handling, and for loss in transit, notwithstanding any defect or nonconformity in the product. By returning a product, the owner grants LogiMetrics permission to open and disassemble the product as required for evaluation. In all cases LogiMetrics has sole responsibility for determining the cause and nature of failure, and LogiMetrics determination with regard thereto shall be final.

If it is found that LogiMetrics' product has been returned without cause and is still serviceable, the customer will be notified and the product returned at its expense; in addition, a charge for testing and examination will be made on the product so returned.

EASTON PLANT

F-2268 Traveling Wave Tube

103650 A1

TUBE
SERIAL NO. 1297

SHEET 2 OF 3

6/14/84

TEST TITLE	TEST NO.	UNITS	LIMITS MIN.	LIMITS MAX.	SYMBOL	REF.	DATE 6825 DATA	REMARKS
Burn-In	1	Hours	10	-			12.0	
Voltages and Currents								
Heater Voltage	2	Volts	6.1	6.5			6.3	
Heater Current	3	Amps	-	1.2			0.97	
Collector Voltage	4	Volts	1900	2050			1950	
Helix Voltage	5	Volts	3800	4100			3900	
Cathode Current	6	ma	-	130			107	
Helix Current	7	ma	-	12			6.0	
Power Output vs Power Input with Po = 43 dBm								
Frequency = 7.9 GHz	8	dBm	-	6			5.9	
Frequency = 8.0 GHz	9	dBm	-	6			0.7	
Frequency = 9.0	10	dBm	-	6			-1.8	
Frequency = 10.0	11	dBm	-	6			-5.0	
Frequency = 11.0	12	dBm	-	6			-5.5	
Frequency = 12.0	13	dBm	-	6			-6.3	
Frequency = 13.0	14	dBm	-	6			-6.1	
Frequency = 14.0	15	dBm	-	6			-5.3	
Frequency = 15.0	16	dBm	-	6			-4.9	
Frequency = 16.0	17	dBm	-	6			-2.2	
Frequency = 17.0	18	dBm	-	6			-1.6	
Frequency = 18.0	19	dBm	-	6			1.8.0	

CUSTOMER T.I. MODEL A200/2J-434 S/N 4016

OPTIONS — JOB NO. NW5531 S/O —

RF DATA

FREQ (GHz)	GAIN DB AT 10 WATTS	SAT PWR +40.0 DBM	RF SAMPLE DBC	VSWR TRIP IN WATTS
11.0	42.8	42.6		
12.0	42.9	42.2		
13.0	42.2	42.2		
14.0	40.2	42.0		
15.0	40.2	41.8		
16.0	34.6	39.4		
17.0	35.1	39.5		
18.0	32.7	37.9		

TUBE MFG. ITT

TYPE F-2268

S/N 1297

SPECIFICATIONS:

MIN GAIN 10 W 30 DBM

MIN SAT PWR 40.0 DBM

RF SAMPLE N/A DBM

MAX PWR IN — DBM

REMARKS:

NOISE PWR

SPEC: -1.0 dbm

MEASURED -6.9 dbm

AUDIT DATA

FREQ (GHz)	GAIN DBM AT 10 WATTS	SAT PWR DBM	WSWR TRIP IN WATTS
11.0	43.2	43.0	
14.0	41.0	42.2	
18.0	33.4	38.4	

	SPEC	MEASURED
DC mV		400 mV
AC mV		4 mV
PCT		0.5%

DATE: 9/26/86 TESTED BY: D.O.L

LogiMetrics TWT Amplifier Operational Instructions

for

Options 10-1 and/or Option 10-2

IEEE-488 General Purpose Interface Bus (IEEE-488 GPIB)

The LogiMetrics Traveling Wave Tube Amplifiers (TWTAs) provide remote control operation via the IEEE-488 GENERAL PURPOSE INTERFACE BUS, (GPIB), conform to T, L, SH, AH interface functions and all mechanical specifications, as described by IEEE STD 488-1978.

Located on the rear panel of the unit is a 24 pin GPIB connector for electrical connections to external peripherals and an Address Select Switch used in selecting the amplifier's address.

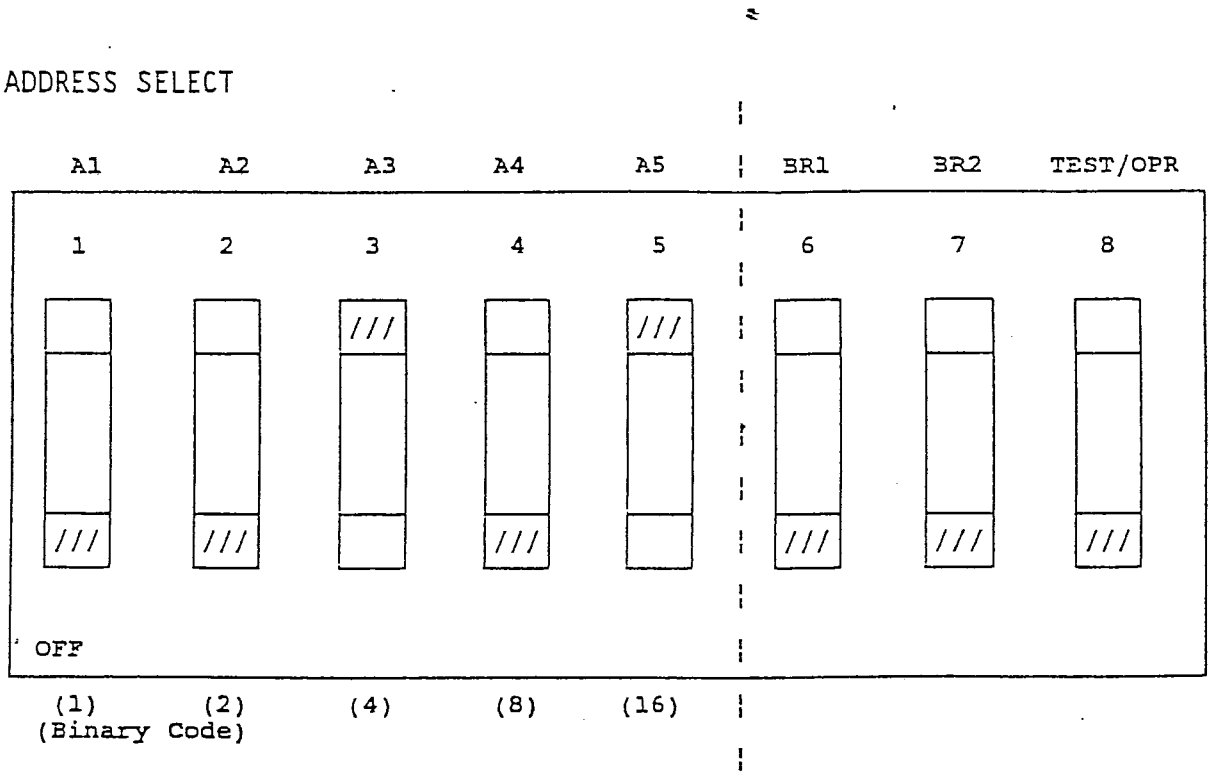
If the amplifier is to be controlled from a hot computer via the IEEE-488 GPIB, a standard IEEE-488 cable must be used. An address unique to the amplifier must be selected and commands issued using the Control Commands.

11-04-88
08-04-90/Rev A
07-19-91/Rev B
04-09-92/Rev C
07-23-93/Rev D

I. Address Switch Selection/Command Code

Table 1

IEEE-488, Address Switch (Location Rear Panel), Address 20 Selected



Shaded areas indicate switch depressions.

Example illustrates switch depressions for ADDRESS 20
(Binary code 4 + Binary Code 16 = 20)

I. Address Switch Selection/Command Code, continued

COMMAND CODES	DESCRIPTION
RESPONSE COMMANDS:	
PRINT @ 20: PWON, (CR), (LF)	Send power command to amplifier.
INPUT @ 20: S$ NOTE 1	Request from amplifier. S$ destination string variable for status responses.
HP BASIC EXAMPLE USING GPIB-488 INTERFACE:	
OUTPUT 720;"PWON" NOTES 3,4	Send command to amplifier.
ENTER 720;S$ NOTES 3,4	Return amplifier status.
STATUS COMMANDS:	
PRINT @ 20: COLV, (Cr), (Lf)	Requests unit to respond with collector voltage.
WAIT 1 NOTE 2	
INPUT @ 20: S$ NOTE 1	Command for string variable to display collector voltage.
NOTES:	
1. Address amplifier as talker.	
2. Allow unit to process status request.	
3. 7 = Address of GPIB card.	
4. 20 = Address of LogiMetrics' amplifier.	

II. Amplifier Control Commands Status Commands and Responses for Standard IEEE-488 GPIB

Table 2

Amplifier Commands	Command Codes	Amplifier Status
Control Command Codes:		
POWER OFF	PWOF, (Cr), (Lf)	AC applied, no high voltage or Filament voltage.
POWER ON (STANDBY)	PWON, (Cr), (Lf)	High voltage applied, time out sequence during warm-up period.
RFON (A330/340=RESET)	RFON, (Cr), (Lf)	RF Power On after warm-up period is complete.
RESET (A330/340 Not Valid)	RSET, (Cr), (Lf)	Resets instruments if fault occurs.
Diagnosis Command Codes (with Option 22 TWTAs Only):		
COLLECTOR VOLTAGE	COLV (Cr). (Lf)	Outputs Collector Voltage.
HELIX VOLTAGE	HLXV, (Cr), (Lf)	Outputs Helix Voltage.
HELIX CURRENT	HLXI, (Cr), (Lf)	Outputs Helix Current.
RF POWER OUT (WATTS)	PWRW, (Cr), (Lf)	Outputs Output Power in Watts.
RF POWER OUT (dBm)	PWRD, (Cr), (Lf)	Outputs Output Power in dBm.
**CATHODE VOLTAGE	CTHV, (Cr), (Lf)	Outputs Cathode Voltage.
**CATHODE CURRENT	CTHI, (Cr), (Lf)	Outputs Cathode Voltage
**RF POWER OUT (WATTS)	FPWT, (Cr), (Lf)	Outputs output Power Watts
**RF POWER OUT (dB)	FPDB, (Cr), (Lf)	Outputs Output Power dBm
STATUS RESPONSES FROM TWTA		
Control Responses	*Amplifier Condition*	
POWER OFF	AC applied, NO high voltage or filament voltage.	
AMP TIMING	Warm-up period after filament has been applied. (Typically 180 seconds).	
STANDBY	Amplifier is warmed up, ready to apply into "RFON" mode.	
RFON	High voltage applied - TRANSMIT mode.	
FAULT RESPONSE		
*THERMAL FAULT	TWT Thermal Overload.	
*COLLECTOR OVERCURRENT	TWT collector Current Overload.	
*HELIX OVERCURRENT	TWT Helix Current Overload.	
SYNTAX ERROR	Syntax error.	
* Certain amplifiers ONLY, otherwise "FAULT"		
**P-BAND ONLY		

III. Amplifier Control Commands, Status Command and Responses for CIIL/MATE Format

Table 3

Amplifier Commands	CIIL Codes	
POWER OFF	RST SGC :CH0, (Cr), (Lf)	
POWER ON (STANDBY)	FNC SGC :CH0 SET GAIN 50 SET VLST, (Cr), (Lf)	
RFON	FNC SGC :CH0 SET GAIN 50 SET VLON, (Cr), (Lf)	
RESET	RST SGC :CH0 (Cr), (Lf)	
OPEN (Disables Remote RFON)	OPN :CH0, (Cr), (Lf)	
CLOSE (Enables Remote RFON)	CLS :CH0, (Cr), (Lf)	
STATUS RESPONSES FROM TWTA		
Function	CIIL (Response)	Comment
POWER OFF	(sp) (cr) (lf)	AC applied no high voltage. No Filament voltage.
AMP TIMING	F06TWTA: AMP TIMING	Warm-up period after Filament has been applied.
STANDBY	(sp) (cr) (lf)	Amplifier is warmed up, ready for transmit mode.
RFON	(sp) (cr) (lf)	High voltage applied transmit mode.
FAULT RESPONSES		
*THERMAL FAULT	F07TWTA: THRM OVERLOAD	TWT Thermal Overload.
*COLLECTOR OVERCURRENT	F07TWTA: COLL OVERCURRENT	TWT Collector Current Overload.
*HELIX OVERCURRENT	F07TWTA: HELX OVERCURRENT	TWT Helix Current Overload.
SYNTAX ERROR	F07TWTA: SNTX ERROR	Syntax error.
**SOL/FIL FAULT	N/A	Solenoid/Filament Fault
**CATH OVERCURRENT	N/A	TWT Cathode Current Overload
**THRM OVERLOAD	N/A	TWT Thermal Overload
**VSWR OVERLOAD	N/A	VSWR Overload
*Certain amplifiers ONLY, otherwise "FAULT".		
**P-BAND ONLY		

Table 4

REMOTE TERMINAL SYNTAX FOR IEEE-488 (OPTION 10-1/2) AND RS232 (OPTION 10-3)

Item	Function	Syntax
1	Power On	"PWON"
2	Power Off	"PWOF"
3	RF ON	"RFON"
4	Amplifier Fault Reset	"RSET"
5	Status	"STA"
6	Standby	"PWON"

Table 5

STATUS INFORMATION FOR IEEE-488 (OPTION 10-1/2) AND RS232 (OPTION 10-3)

Item	Status	Description
1	POWER OFF	Amplifier in POWER OFF condition.
2	AMPLIFIER TIMING	Two (2) minute warm-up condition after POWER ON.
3	STANDBY	Amplifier in STANDBY condition (not transmitting).
4	RFON	Amplifier transmitting.
5	SYNTAX ERROR	Invalid command string sent by remote terminal.
* 6	BEAM CURRENT	Beam current overload amplifier fault.
* 7	DUTY CYCLE	Duty cycle amplifier fault.
* 8	PWS/TWT THERMAL	Power supply and TWT thermal amplifier fault.
* 9	WAVEGUIDE PRESSURE	Waveguide pressure amplifier fault.
*10	AIR FLOW	Airflow amplifier fault.
*11	VSWR FAULT	VSWR amplifier fault.
12	PARITY ERROR	RS232 ONLY (Option 10-3).
13	FRAME ERROR	RS232 ONLY (Option 10-3).
14	OVERRUN ERROR	RS232 ONLY (Option 10-3).

*Provided with A710/A750 Amplifiers.

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TABLE OF CONTENTS (Cont'd)

Section 1. INTRODUCTION

1.0 Introduction

1.1 Scope of Manual

This technical manual contains instructions for the use and maintenance of Model A230/240 Series, Model A330/340 Series and Model A350 Series of Traveling Wave Tube Amplifiers (TWTA) (herein referred to as Model TWTA) manufactured by ***LogiMetrics, Inc.***, Plainview, New York USA. This manual includes a general description of the amplifier, operating instructions, theory of operation, maintenance, schematics, parts list and wire list.

1.2 Purpose and Use of the Equipment

The LogiMetrics Model TWTA is used to amplify microwave signals.

The Model TWTA can be used with most microwave signal generators and modulators. Typical uses are general laboratory equipment to increase dynamic range measurements and as part of radar and communication systems.

1.3 General Description

The Model TWTA is a self-contained compact instrument suitable for bench or rack use. This amplifier consists of a panel, a chassis, and dust covers. The panel serves as a mounting for the controls, connectors, and monitoring meter. The dust covers enclose and protect the internal components of the equipment. Kits to rack and mount the amplifiers are optional.

1.4 Equipment Specifications

The following describes equipment specifications for the following Models:

Table 1-1. A230/240 Series TWTA
Table 1-2. A330/340 Series TWTA
Table 1-3. A350 Series TWTA

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TRAVELING WAVE TUBE AMPLIFIERS

LogiMetrics

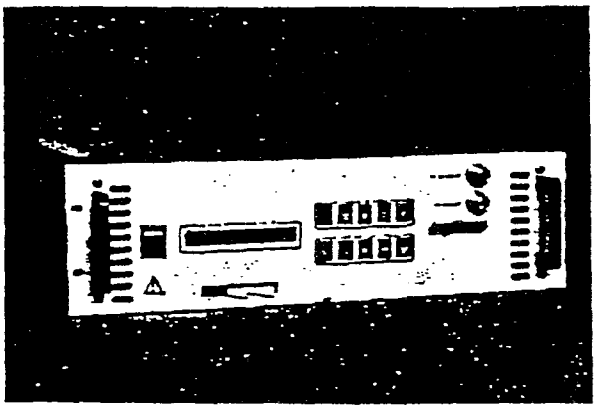


TABLE 1-1

A230/240 SERIES TWTA

MEDIUM POWER AMPLIFIERS

A230/240 SERIES 10 WATTS CW 1.0-18.0 GHz

DESCRIPTION

The Logimetrics 3.5" high A230 series and the 5.25" high A240 series of medium power microprocessor based instrumentation and subsystem amplifiers provide the user with proven reliable instrumentation for a wide variety of test and system applications.

The operating modes are selectable via front panel push button controls and the operating mode is displayed on an LED digital display. Additionally, salient power supply voltages, currents and fault indicators can be displayed.

Each amplifier is remote controllable via the standard IEEE-488 GPIB. Each amplifier features complete regulation of the helix , filament, and grid power supplies, thus providing stable operation and long life for the TWTs. The TWT is fully protected against power supply malfunctions such as helix overcurrent.

Optionally, the TWTA's can be supplied with complete input and output VSWR protection. These medium power TWTAs are compact and lightweight making them ideal for bench operation or rack mounting.

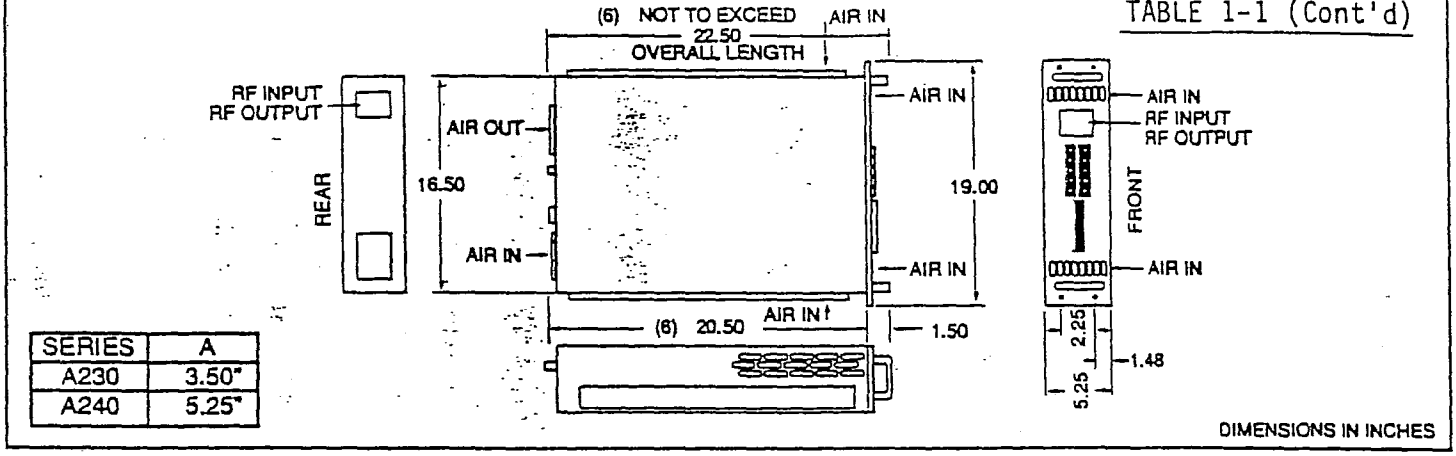
FEATURES

- Monitor-Digital Display
  Standby
  Faults
  Helix Voltage/Current
  Collector Voltage
  Power Out (option 30) in Watts and dBm
- Mode- Digital Display
  Power On/Off
  RF On
- Controls
  Power On
  Power Off
  RF On
  RF Off
  Local Select
- Ease of Maintenance
- Designed to meet the safety requirements of IEC-348 and Underwriters Laboratory of American Standards
- Broadband Coverage

APPLICATIONS

- EMC Susceptibility Testing
- Communications
- General Laboratory Instrumentation
- System Preamplifiers
- Threat Simulation
- Antenna Patterns Testing
- Component Testing

TABLE 1-1 (Cont'd)



SERIES	A
A230	3.50"
A240	5.25"

A230/240 SERIES

RF SPECIFICATIONS

Model Number	Frequency Range (GHz)	Min Pwr Out* (Watts)	Min Sat Gain* (dB)	Max NF (dB)
A230 SERIES-FULL RACK 3.50" H				
A230/L	1.0-2.0	10	30	35
A230/S	2.0-4.0	10	30	35
A230/C	4.0-8.0	10	30	35
A230/X	8.0-12.4	10	30	35
A230/U	12.4-18.0	10	30	35
A230/IJ	6.0-18.0	10	30	35
A240 SERIES-FULL RACK 5.25" H				
A240/L	1.0-2.0	10	30	35
A240/S	2.0-4.0	10	30	35
A240/C	4.0-8.0	10	30	35
A240/X	8.0-12.4	10	30	35
A240/U	12.4-18.0	10	30	35
A240/IJ	6.0-18.0	10	30	35

*Higher output power and gains available

Spurious: -40dBc (-50dBc available)
In/Out Impedance: 50 Ohms
In/Out VSWR: 2.5:1 Maximum
Residual AM: 1% Maximum (-40dBc)(3)
RF Connectors:

Frequency	Input	Output
1.0-18.0 GHz	Type N	Type N
Location:	Front Panel	Front Panel

PRIME POWER

A230 Series: Switchable 115 or 230 VAC, ±10%, Single Phase, 50-400 Hz, 750 VA maximum
A240 Series: Switchable 115 or 230 VAC, ±10%, Single Phase, 50-60 Hz,750 VA maximum

MECHANICAL

Dimensions:
A230 Series: 3.50" (88.9mm)Hx16.5" (419mm)Wx20.5" (521mm)D Rack Mount (4)
A240 Series: 5.25" (133mm)Hx16.5" (419mm)Wx20.5" (521mm)D Rack Mount (4)
Weight:
A230 Series: 38 pounds maximum (17.3 kg)
A240 Series: 38 pounds maximum (17.3 kg)
Cooling: Internal Forced Air

Air Intake	Air Exhaust
Rear Panel	Rear Panel

REMOTE OPERATION

Standard: Operating mode control and status monitoring via IEEE-488 GPIB.

ENVIRONMENTAL

Operating Temperature: 0-50°C (40°C @ 10,000 Feet)
Relative Humidity: 95% (noncondensing)
Operating Altitude: 10,000 feet maximum
NonOperating Temp.: -20 To 70°C
NonOperating Altitude: 50,000 feet maximum

COMMON OPTIONS

Option 04-XX Alternate Prime Power (2)
Option 07 Input Pin Diode Pulse Modulator with 40dB isolation; 15ns rise/fall times
Option 08 Integral Output Circulator (1)
Option 09 Integral Input Isolator (1)
Option 12 RF sample of the output (-30dBc) (1)
Option 13 Chassis Slides for 19" Rack Mounting
Option 14 Internal Preamp for rated power @ less than 0 dBm input
Option 15 Input Attenuator; 20dB Range (1)
Option 18 RF Input/Output Connectors on the Rear Panel
Option 22 Internal System Diagnostics
Option 30 RF Output Power displayed on Digital Front Panel display (1)
Other options available (2)

NOTES
(1) Option may effect rated output power and gain
(2) Consult factory for features and other functions
(3) Typically -46dBc AM; -55dBc FM
(4) Add 2" to depth for "L" Band
Specifications subject to change without notice

LogiMetrics

Warranty: One full year from date of shipment non-prorated for both the TWT and power supply.

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TRAVELING WAVE TUBE AMPLIFIERS

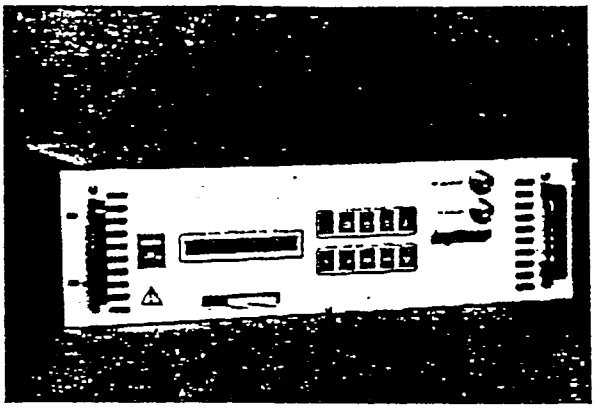


TABLE 1-2

A330/340 SERIES TWTA

MEDIUM POWER AMPLIFIERS

A330/340 SERIES 20 WATTS CW 1.0-18.0 GHz

DESCRIPTION

The Logimetrics 3.5" high A330 Series and the 5.25" high A340 Series of medium power microprocessor based instrumentation and subsystem amplifiers provide the user with proven reliable instrumentation for a wide variety of test and system applications.The operation modes are selectable via front panel push button controls and the operation mode is displayed on an LED digital display. Additionally, salient power supply voltages, currents and fault indicators can be displayed.

Each amplifier is remote controllable via the standard IEEE-488 GPIB. Each amplifier features complete regulation of the helix, filament, and grid power supplies, thus providing stable operation and long life for the TWTs. The TWT is fully protected against power supply malfunctions such as helix overcurrent.

Optionally, the TWTAs can be supplied with complete input and output VSWR protection. These medium power TWTAs are compact and lightweight making them ideal for bench operation or rack mounting.

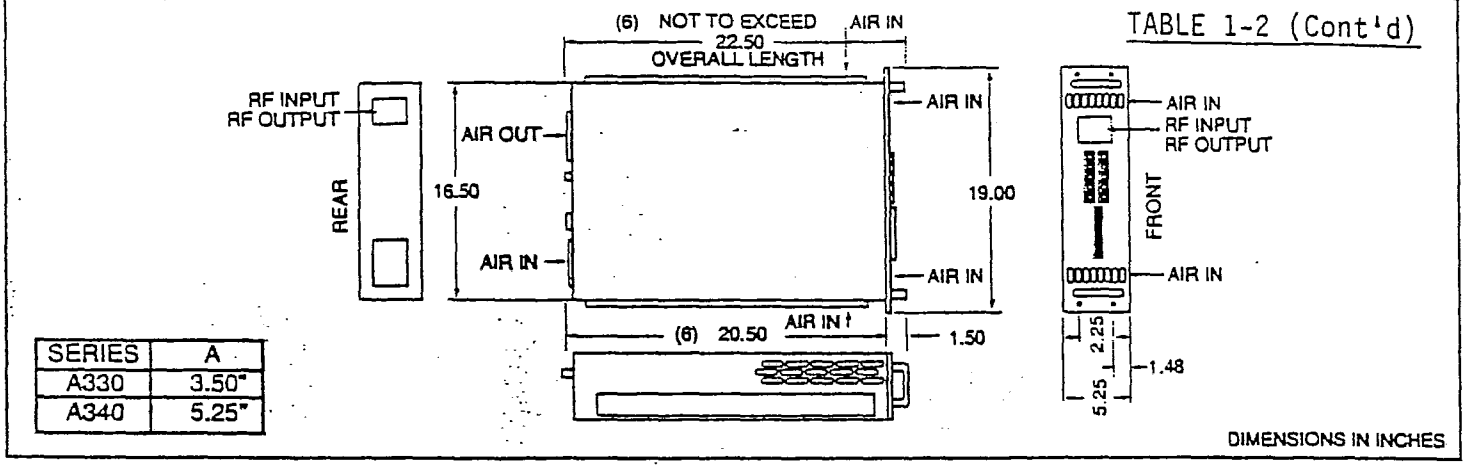
FEATURES

- Monitor-Digital Display
  Standby
  Faults
  Helix Voltage/Current
  Collector Voltage
  Power Out (option 30) in Watts and dBm
- Mode- Digital Display
  Power On/Off
  RF On
- Controls
  Power On
  Power Off
  RF On
  RF Off
  Local Select
- Ease of Maintenance
- Designed to meet the safety requirements of IEC-348 and Underwriters Laboratory of American Standards
- Broadband Coverage

APPLICATIONS

- EMC Susceptibility Testing
- Communications
- General Laboratory Instrumentation
- System Preamplifiers
- Threat Simulation
- Antenna Patterns Testing
- Component Testing

TABLE 1-2 (Cont'd)



SERIES	A
A330	3.50"
A340	5.25"

A330/340 SERIES

RF SPECIFICATIONS

Model Number	Frequency Range (GHz)	Min Pwr Out* (Watts)	Min Sat Gain* (dB)	Max NF (dB)
A330 SERIES-FULL RACK 3.50" H				
A330/L	1.0-2.0	20	33	35
A330/S	2.0-4.0	20	33	35
A330/C	4.0-8.0	20	33	35
A330/CJ	4.0-4.5	10	30	35
	4.5-18.0	20	33	35
A330/X	8.0-12.4	20	33	35
A330/U	12.4-18.0	20	33	35
A330/IJ	6.0-18.0	20	33	35
A340 SERIES-FULL RACK 5.25" H				
A340/L	1.0-2.0	20	33	35
A340/S	2.0-4.0	20	33	35
A340/C	4.0-8.0	20	33	35
A340/CJ	4.0-4.5	10	30	35
	4.5-18.0	20	33	35
A340/X	8.0-12.4	20	33	35
A340/U	12.4-18.0	20	33	35
A340/IJ	6.0-18.0	20	33	35

*Higher output power and gains available

Spurious:	-40dBc (-50dBc available)
In/Out Impedance:	50 Ohms
In/Out VSWR:	2.5:1 Maximum
Residual AM:	1% Maximum (-40dBc) (3)

RF Connectors:

Frequency	Input	Output
1.0-18.0 GHz	Type N	Type N
Location:	Front Panel	Front Panel

PRIME POWER

A330 Series: Switchable 115 or 230 VAC, ±10%, Single Phase, 50-400 Hz, 750 VA maximum

A340 Series: Switchable 115 or 230 VAC, ±10%, Single Phase, 50-60 Hz,750 VA maximum

MECHANICAL

Dimensions:

A330 Series: 3.50" (89mm)Hx16.5" (419mm)Wx20.5" (521mm)D Rack Mount (6)

A340 Series: 5.25" (133mm)Hx16.5" (419mm)Wx20.5" (521mm)DRack Mount (6)

Weight:

A330 Series: 38 pounds maximum (17.3 kg)

A340 Series: 38 pounds maximum (17.3 kg)

Cooling: Internal Forced Air

	Air Intake	Air Exhaust
A330/340:	Rear Panel	Rear Panel

REMOTE OPERATION

Standard: Operating mode control and status monitoring via IEEE-488 GPIB.

ENVIRONMENTAL

Operating Temperature:	0-50°C (40°C @ 10,000 Feet)
Relative Humidity:	95% (noncondensing)
Operating Altitude:	10,000 feet maximum
NonOperating Temp.:	-20 To 70°C
NonOperating Altitude:	50,000 feet maximum

COMMON OPTIONS

Option 03	Reflected Power Cutoff VSWR Protection (1) (4)
Option 04-XX	Alternate Prime Power (2)
Option 07	Input Pin Diode Pulse Modulator with 40dB Isolation; 15ns rise/fall times
Option 08	Integral Output Circulator (1) (5)
Option 09	Integral Input Isolator (1) (5)
Option 12	RF sample of the output (-30dBc) (1)
Option 13	Chassis Slides for 19" Rack Mounting
Option 14	Internal Preamp for rated power @ less than 0 input
Option 15	Input Attenuator; 20dB Range (1)
Option 18	RF Input/Output Connectors on the Rear Panel
Option 22	Internal System Diagnosis
Option 30	RF Output Power displayed on Digital Front Panel Display (1)

Other options available (2)

NOTES

(1) Option may effect rated output power and gain
(2) Consult factory for features and other functions
(3) Typically -46dBc AM; -55dBc FM
(4) Applies to Models A330, 340CJ
(5) Not available on Model CJ
(6) Add 2" to depth for "L" Band

Specifications subject to change without notice

LogiMetrics

Warranty: One full year from date of shipment non-prorated for both the TWT and power supply.

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TRAVELING WAVE TUBE AMPLIFIERS

LOGIMETRICS

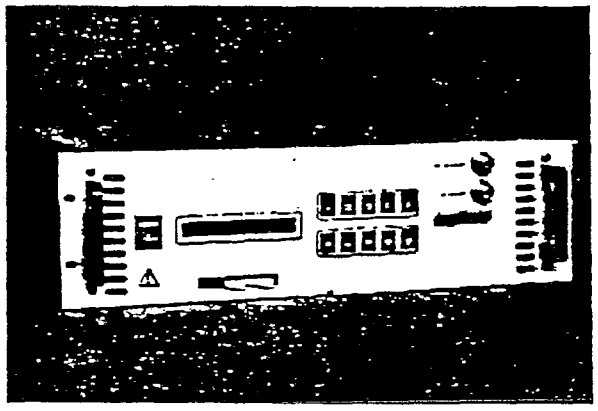


TABLE 1-3

A350 SERIES TWTA

MEDIUM POWER AMPLIFIERS

A350 SERIES 50 WATTS CW 4.0-18.0 GHz

DESCRIPTION

The Logimetrics A350 Series of medium power, linear broadband microwave amplifiers provide the user with proven reliable instrumentation for a wide variety of test and system applications.The operational modes are selectable via front panel push button controls and the operation mode is displayed on an LED digital display. Additionally, salient power supply voltages, currents and fault indicators can be displayed.

Each amplifier is remote controllable via the standard IEEE-488 GPIB. Each amplifier features complete regulation of the helix, filament, and grid power supplies, thus providing stable operation and long life for the TWTs. The TWT is fully protected against power supply malfunctions such as helix overcurrent.

Optionally, the TWTAs can be supplied with complete input and output VSWR protection. These medium power TWTAs are compact and lightweight making them ideal for bench operation or rack mounting.

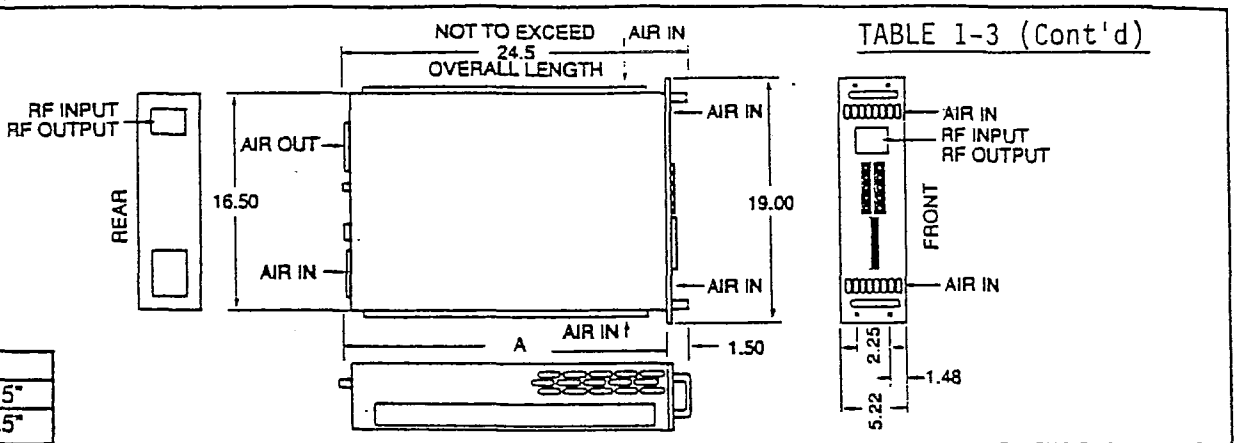
FEATURES

- Monitor-Digital Display
  Standby
  Faults
  Helix Voltage/Current
  Collector Voltage
  Power Out (option 30) in Watts and dBm
- Mode- Digital Display
  Power On/Off
  RF On
- Controls
  Power On
  Power Off
  RF On
  RF Off
  Local Select
- Ease of Maintenance
- Designed to meet the safety requirements of IEC-348 and Underwriters Laboratory of American Standards
- Broadband Coverage

APPLICATIONS

- EMC Susceptibility Testing
- Communications
- General Laboratory Instrumentation
- System Preamplifiers
- Threat Simulation
- Antenna Patterns Testing
- Component testing

TABLE 1-3 (Cont'd)



MODEL	A
A350/C	22.5"
A350IJ,IJX	20.5"

DIMENSIONS IN INCHES

A350 SERIES

RF SPECIFICATIONS

Model Number	Frequency Range (GHz)	Min Pwr Out* (Watts)	Min Sat Gain* (dB)	Max NF (dB)
A350/C	4.0-8.0	50	40	35
A350/IJ	8.0-18.0	50	35	35
A350/IJX	6.0-18.0	40	35	35

*Higher output power and gains available

Spurious: -40dBc (-50dBc available)
In/Out Impedance: 50 Ohms
In/Out VSWR: 2.5:1 Maximum
Residual AM: 1% Maximum (-40dBc) (3)
RF Connectors:

Frequency	Input	Output
4.0-18.0 GHz	Type N	Type N
Location:	Front Panel	Front Panel

PRIME POWER

A350 Series: Switchable 115 or 230 VAC, ±10%, single phase, 50-60 Hz, 750 VA maximum

MECHANICAL

Dimensions:
A350/C: 5.25" (133mm)Hx16.5" (419mm)Wx22.5" (571mm)DRack Mount
A350/IJX 5.25" (133mm)Hx16.5" (419mm)Wx20.5" (521mm)D Rack Mount
Weight: 38 pounds maximum (17.3 kg)
Cooling: Internal Forced Air

Air Intake	Air Exhaust
Rear Panel	Rear Panel

REMOTE OPERATION

Standard: Operating mode control and status monitoring via IEEE-488 GPIB.

ENVIRONMENTAL

Operating Temperature: 0-50°C (40°C @ 10,000 Feet)
Relative Humidity: 95% (noncondensing)
Operating Altitude: 10,000 feet maximum
NonOperating Temp.: -20 To 70°C
NonOperating Altitude: 50,000 feet maximum

COMMON OPTIONS

Option 03 Reflected Power Cutoff, VSWR protection (1)
Option 04-XX Alternate Prime Power (2)
Option 07 Input Pin Diode Pulse Modulaor with 40dB Isolation; 15 ns rise/fall times (1)
Option 09 Integral Input Isolator (1)
Option 12 RF sample of the output (-30dBc) (1)
Option 13 Chassis Slides for 19" Rack Mounting
Option 14 Internal Preamp for rated power @ less than 0 dBm input
Option 15 Input Attenuator; 20dB range (1)
Option 22 Internal System Diagnostics
Option 30 RF Output Power displayed on Digital Front Panel display (1)

Other options available (2)

NOTES
(1)Option may effect rated output power and gain
(2)Consult factory for features and other functions
(3)Typically -46dBc AM; -55dBc FM
Specifications subject to change without notice

LogiMetrics

Warranty: One full year from date of shipment non-prorated for both the TWT and power supply.

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Section 2. OPERATION

2.0 Operation

2.1 General

The amplifier is shipped complete and ready to operate; no special or permanent installation procedures are required. The amplifier should be unpacked upon receipt observing the usual customary precautions when unpacking electronic equipment.

2.2 Installation

After unpacking the amplifier, plan its installation. The required space is shown in Figure 2-1 for the Model A230/240 and Figure 2-1A for the Model A330/340. If the amplifier is to be rack mounted, the rack mounting hardware must be installed. The amplifier requires 115 volts, single phase 50-60 Hz AC power.

> **NOTE**
>
> The amplifier is shipped ready for 115 volt operation. If the amplifier is to be operated from a 230 Volt source, RESET line programming card in Line Filter Assembly on rear panel, and change fuse to 3 Amp, 230 VAC.

Connect the power cable of the amplifier to an AC receptacle. If the AC receptacle is not a grounding type, use an adapter and connect the green lead to ground.

2.3 Operating Procedures

The operating procedures for the Model TWTA are described in paragraphs 2.4 and 2.5.

2.4 Operating Controls, Indicators, and Connectors

The operating controls and indicators of the amplifier are located on its front panel, and their functions are listed in Table 2-1 and shown in Figure 2-2 and Figure 2-2A.

2.5 Connection and Preliminary Operation

To operate the amplifier, proceed as follows:

a. Connect the RF OUTPUT connector to a 50 ohm load. The TWTs produce a saturated power output in excess of the nominal value. Check data sheet supplied with unit and use a load with a continuous rating in excess of the equipment's full power output.

> **CAUTION**
>
> THE TWT USED IN THE AMPLIFIER CAN BE PERMANENTLY DAMAGED IF THE AMPLIFIER'S RF OUTPUT IS NOT PROPERLY TERMINATED. ALWAYS RETURN THE RF POWER SWITCH TO THE OFF POSITION WHEN CHANGING THE RF LOAD. THIS PRECAUTION SHOULD BE OBSERVED EVEN IF NO RF POWER IS APPLIED TO THE RF INPUT CONNECTOR.

b. Connect a signal source to the RF INPUT having the required frequency range, power level, and impedance.

c. Depress AC line switch to ON position and LCL (LOCAL switch) on front panel.

d. Depress PWR ON switch and allow the unit to warm-up. This warm-up period is timed automatically in the unit and upon completion will indicate STANDBY on the LED display.

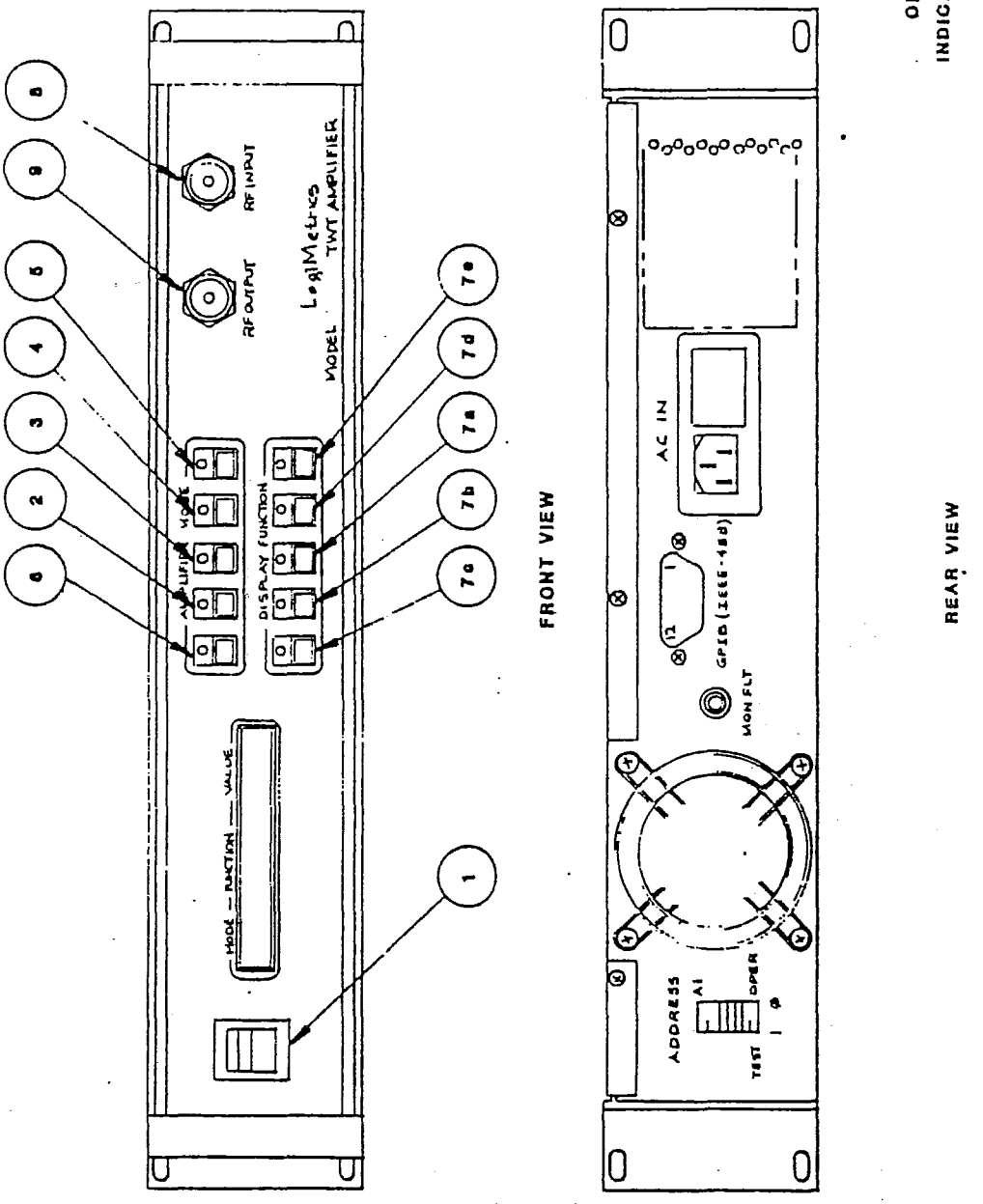
> **NOTE**
>
> The time delay circuitry will automatically lock out any of the other operating circuits. It is suggested that the RF ON switch not be depressed while the unit is timing out.

e. Depress the RF ON switch. The LED display will indicate an RF ON condition indicating that the TWT is in operating condition and the precautions on the RF OUTPUT termination should be observed even if RF signal is not present in the RF INPUT connector.

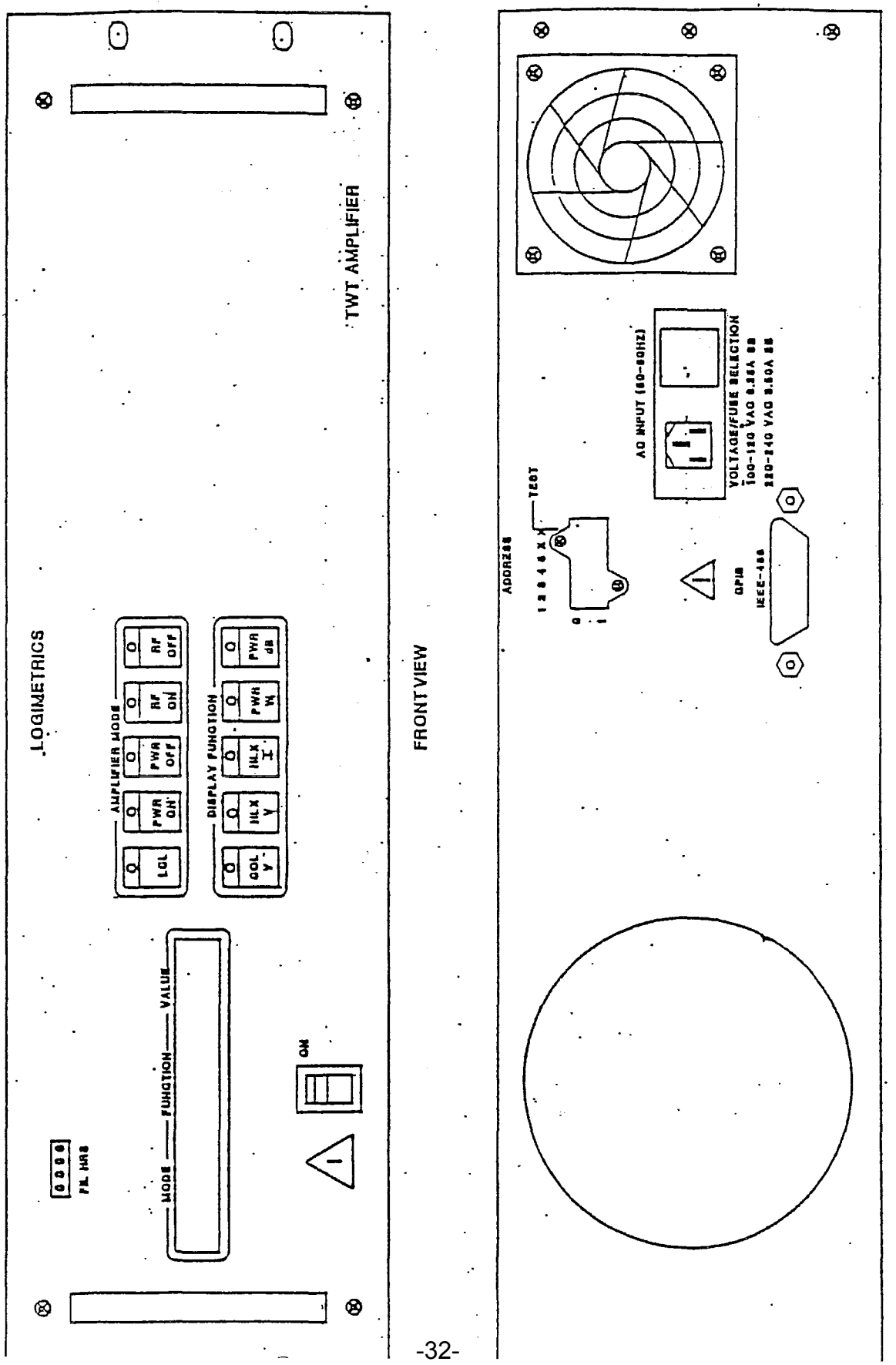
Table 2-1
Operating Controls, Indicators & Connectors - Front Panel

Fig 2-2 & 2-2A Index No.	Control Indicator or Connector	Function
1	Line Power	Controls the application of AC power and illuminates to indicate the AC power applied to amplifier.
2	Power ON	Controls the application of filament power to the TWT and initiates timing circuitry.
3	Power OFF	Controls the removal of all supplies from the TWT and resets the warm-up timer.
4	RF ON	Controls the application of the high voltage power supplies to the TWT (Transmit mode). 5 RF OFF. Remove the high voltage (except filament) from the TWT (No Transmit in Standby).
6	LOCAL	Places amplifier in LOCAL mode of operation. Illuminates to indicate local operation. When unit is in external computer controlled mode, the LOCAL switch will not be illuminated. Unit may be brought into local operation by depressing the LOCAL switch at any time during operation.
7	TWT Monitors: (Standard)	
	a. Helix Current	Displays the actual TWT helix current on the LED display.
	b. Helix Voltage	Displays the actual TWT cathode voltage with respect to ground.
	c. Collector	Displays the actual TWT collector voltage. Voltage with respect to ground.
	d. RF Power (Watts)	Displays the RF output in Watts.
	e. RF Power (dB)	Displays the RF output power in dBm.

Table 2-1 (Cont'd) Operating Controls, Indicators & Connectors - Front Panel		
Fig 2-2 & 2-2A Index No.	Control Indicator or Connector	Function
8	RF Input Connector	A connector for applying the RF signal input.
9	RF Output Connector	A connector for applying the RF signal output to a load.



OPERATING CONTROLS, INDICATORS AND CONNECTORS
FIGURE 2-2



A240/340AC01

FIGURE 2-2A

Section 3. THEORY OF OPERATION

3.0 Theory of Operation

3.1 General

This section contains a simplified description of the operating principle of a microwave amplifier. The microwave amplifier is composed of a Traveling Wave Tube (TWT) and its associated power supplies. The TWT and power supplies are connected as shown in Figure 3-1.

3.2 Traveling Wave Tube (TWT)

The Traveling Wave Tube (TWT) is a device for amplifying microwave signals. It is characterized by wide instantaneous band widths, high gain, and high dynamic ranges. The TWT consists of an electron gun, a grid (or grids), a helix structure, and a collector located in a magnetic structure. These are arranged as shown in Figure 3-1.

3.2.1 DC Operation

Electrons leaving the electron gun are accelerated through the helix structure to the collector by the high voltage from the power supplies. This electron beam is focused by the external periodic permanent magnet structure into a fine beam. Very few electrons strike the helix structure; most electrons pass through the helix and strike the collector element. Typically, the collector current is greater than 90% of the cathode current. The kinetic energy of the beam is dissipated in the collector structure as heat, and care must be taken to properly cool this structure.

3.2.2 RF Operation

When an RF signal is applied to the input of the helix structure, it causes alternately accelerating and decelerating electric fields along the helix structure. Electrons passing through the helix will either speed up or slow down, depending on which part of the field they are in. Electrons that are slowed down meet with electrons that are accelerated by the preceding field. Therefore, the input RF signal interacts with the electron beam, causing it to bunch up. This process grows exponentially as the beam travels through the helix and the amplitude of the RF wave associated with the bunched electrons increases. This amplified RF wave is coupled to the RF Output connector of the TWT. The length of the traveling wave tubes usually increases for higher gain tubes and decreased with increasing frequency (or shorter wave lengths).

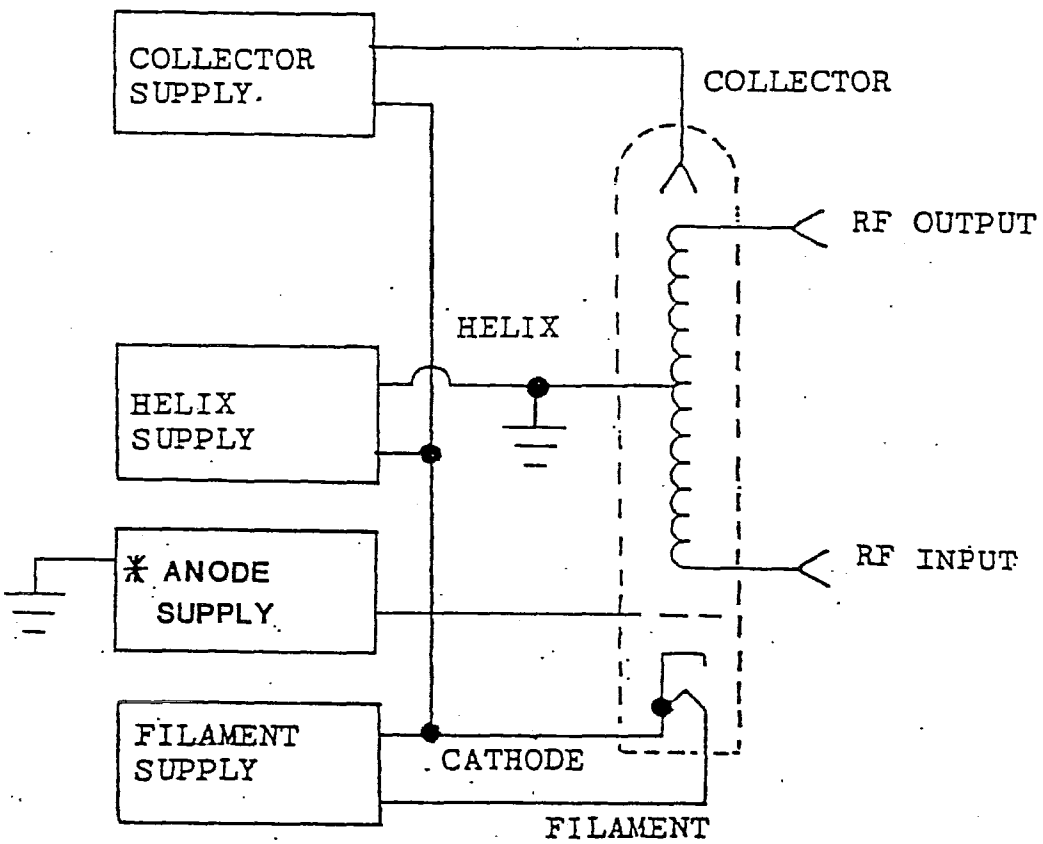


FIGURE 3-1

SIMPLIFIED BLOCK DIAGRAM OF TWT AMPLIFIER

A230/A330AC03

* APPLIES ONLY TO TWT CONTAINING AN ANODE OR GRID CIRCUIT

3.2.3 Characteristics of Traveling Wave Tubes

The input/output characteristic is shown in Figure 3-2. The small signal region is characterized by linear operation, low intermodulation products, and low harmonic generation. The saturation region is characterized by maximum power output, high intermodulation products, and harmonic generation. The gain of a TWT is usually 6 to 8 dB lower at saturation than the small signal gain, and decreases further in the overdrive region. For this reason, a TWT is usually operated in the small signal region or up to the maximum output point. The saturated power for a TWT is specified to maintain the minimum gain specification.

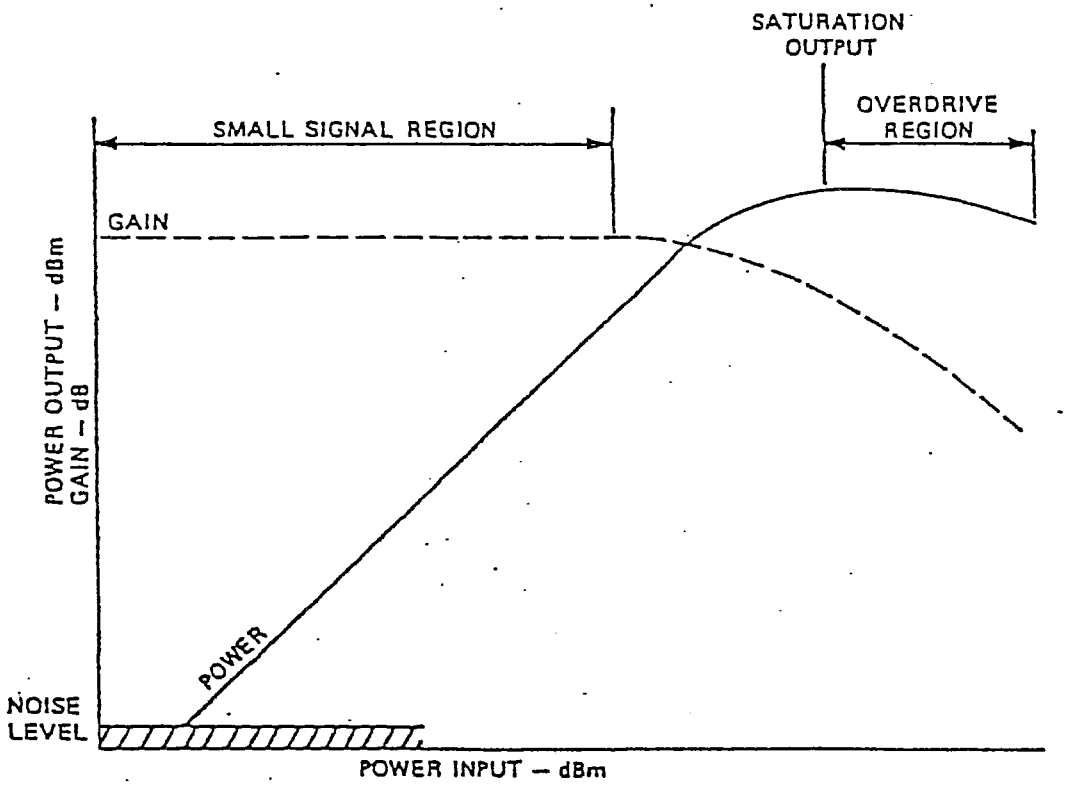


FIGURE 3-2

INPUT/OUTPUT CHARACTERISTICS OF TWT

A230/A330AC04

3.3 RF Block

The RF Block Diagram is shown in Figure 3-3.

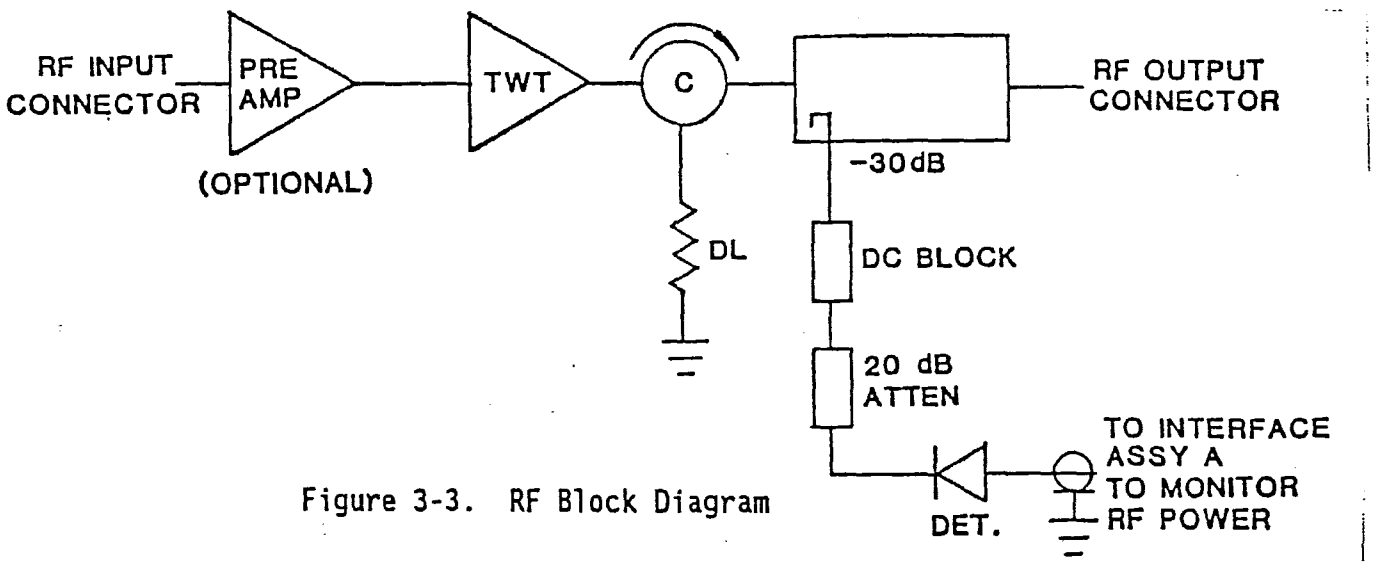


Figure 3-3. RF Block Diagram

3.3.1 The RF input cable is connected to a small gain preamp and the output of the preamp is connected to the RF input of the TWT and the output of the TWT is then connected to the input of a circulator and load combination to protect the TWT from excessive external VSWR.

3.3.2 Port 2 of the circulator is then connected to the input of a 30 dB directional coupler, the output of which is connected to the RF output connector.

3.3.3 The coupled port of the coupler is connected to a DC block, the output of which is connected to a 20 dB attenuator, the output is connected to a detector. The output of the detector is then connected to the RF monitor circuit on the interface assembly. The signal is processed to provide display of RF power in Watts or dBm.

3.4 Power Supply Theory

The following paragraphs (3.4.1 through 3.9) should be read in conjunction with the schematics contained in Section 6 of this manual.

3.4.1 AC (line voltage selectable) is fused and filtered by the input connector-filter assembly A1J1. The AC power is applied to A1T1 and rectifier-capacitor network, through main switch A1S1, on the front panel. The connections to the bridge capacitor network, whichever AC line voltage selected, will provide approximately 300 VDC for the switching regulator.

3.4.2 Outputs from the transformer are applied to the secondary/auxiliary switching assembly A1A2 where they are rectified and filtered and post regulated by three various terminal regulators to provide:

1. Separate isolated +12 VDC (for the switching and inverter circuits), a +15 VDC (for the preamp and fan).

2. A (+)12 VDC and a (-)12 VDC at ground potential (for the control and monitoring circuitry), and an isolated +5V supply (for all the logic circuitry), [interface and microprocessor assemblies.]

A separate isolated secondary from A1T1 is applied to the filament supply (part of the HV Assembly) A1A4 where it is rectified, filtered, switched and post regulated to approximately 6.3 VDC which will be at cathode potential.

3.5 Switching and Inverter Circuits A1A2.

A1A2U12 provides clock and drive signals with dead time to drive the inverters at approximately 30 kHz. Added outputs of A1A2U13 with A1A2Q4 provides switching drive at approximately 60 kHz. Slow start is accomplished with A1A2Q5 and A1A2C27. DC feedback from the HV Control Assembly A1A4

controls the pulse width of the output of U13. An inhibit signal is also provided from the HV Control Assembly A1A4. This inhibit signal (current limited) is series connected to A1A2U7, A1A2U8, A1A2U9, A1A2U10 opto-couplers and prevents any signal input to FET driver IC's A1A2U8 and A1A2U7, and the outputs of A1A2U12 drives opto-couplers A1A2U9 and A1A2U10.

When a power on signal is commanded into the HV Control Assembly A1A4 from the Interface Control Board A1A1, the filament circuit A1A4, through an opto-coupler, is turned on (operation of this circuit will be discussed in paragraph 3.6) and the inhibit signal is removed allowing the drive signal to feed the inverting FET transistors. Since there is no applied voltage to A1T2 and source of these transistors, (The switching regulator is held off with the inhibit and slow start signals). After warm-up timing has been completed and RFON has been commanded, the signal will arrive to A1A2Q5 to allow the slow start (minimum pulse width to maximum until the feedback signal takes control of the pulse width) to come up.

A1A2Q1 with A1A2CR4, A1A2L2, A1A2C3 and A1A2C4 are connected as a switching regulator and apply voltage to the inverter circuit. The chopped signal is then applied to A1T2. The A1T2 steps up the voltage which is then fed back through a divider to A1A2U13 for regulation.

3.6 HV and Control Assembly A1A4

Input commands from the interface assembly are current sources to A1A4U12 opto-coupler. The power on function output of A1A4U12 is inverted by A1A4U16 which in turn drives A1A4Q5 PNP transistor via anti-bounce circuit consisting of parts of A1A4U16 and A1A4U11 which in turn drives A1A4Q4, A1A4Q1 and A1A4Q2 to provide the inhibit signal. The output of A1A4U12 also drives A1A4U7, and in turn A1A4U16 hex inverter with open collectors to drive the A1A4U14 fiber optic driver. The opto receiver A1A4U15 is connected to a Darlington pair of transistors A1A4Q6 and A1A4Q7 to pass an unregulated voltage from the filament bridge rectifier and filter cap to A1A4U17 5V regulator. A1A4U17 in series with 2 diodes A1A4CR18 and A1A4CR19, provide the approximately 6.3 VDC regulated filament voltage.

The RF ON/RESET function output pf A1A4U12 is inverted by A1A4U7E, and A1A4U7B and is also applied to the input of A1A4U8B. The leading edge of the output of A1A4U7E is used to clock (reset) A1A4U9A or B if they were previously latched by a fault. The output of A1A4U7B on the trailing edge (RF OFF) with discrete components trigger A1A4U19A (4 second timer), the output of which is applied to A1A4U8B. This insures that there is a 4 second interval between RF OFF and RF ON in case of microprocessor control or computer control malfunction.

3.7 Collector and Helix Supplies

One A1T2 secondary is applied to a HV bridge rectifier A1A4CR1 to A1A4CR4 and is filtered by A1A4C1 and A1A4C2 with bleed resistors A1A4R2 and A1A4R3. In series with the (+) output of this supply is a resistor zener diode network with a fiber optic driver A1A4U1. This network emits a fault signal if the collector current exceeds approximately 150 mA. The output of this network is supplied to the TWT collector. The negative side of this supply is supplied to the cathode of the TWT and is connected to the negative side of the helix supply by isolating resistor A1A4R13 and two HV resistor divider strings, one from the (+) if the collector supply and one from the cathode end of this supply. The output of these dividers drive current driver circuits A1A4U2, A and B then go to the interface assembly for processing and display of helix and collector voltages.

The other A1T2 secondary is applied to a voltage doubler circuit A1A4CR5, A1A4CR6, A1A4C6, and A1A4C7 with bleeder resistor A1A4R19 and A1A4R20. The negative of this supply is applied to isolating resistor A1A4R13 and resistive HV divider A1A4R14, A1A4R15 and A1A4R24 which is compared to a reference level set by trimmer A1A4R51. The error signal is amplified by and compensated by A1A4U3 circuitry. The output is used as the feedback signal to control the pulse width of A1A4U13 of the Auxiliary Switcher Assembly (A2).

The positive side of the voltage doubler circuit is feed through A1A4R21 to a low resistance resistor divider. The voltage generated by the current through this divider is compared to reference levels for a slow (normal level) current trip and a fast (high level) current trip comparitors (low level A1A4U4A, high level A1A4U5) to sense excessive current possibly drawn by the TWT. A1A4U4B is also connected to this divider and is connected to provide current drive to the interface assembly for processing the helix current display.

3.8 Faults

3.8.1 Collector Fault

Collector Fault (overcurrent) creates an optical signal from A1A4U1 into A1A4U13. The output of A1A4U13 drives through A1A4U7C to A1A4UBA, then to A1A4U9A and drives inhibit circuit for shutdown. A1A4U13 output also presets A1A4U9B "D" Flip-Flop. "Q" output of A1A4U9B goes to A1A4U16. This output will drive an opto-coupler on the interface assembly for status indication. The "Q" output of A1A4U9A through A1A4U8B sets up a slow start/inhibit signal and thereby latching off the high voltage. The "Q" output of A1AU9A is "RED" with the output of A1A4U16B via A1A4CR14 to drive the inhibit circuit into inhibit mode during any fault.

3.8.2 Thermal Fault

Thermal fault is derived from a thermal sensitive switch that is mounted in the TWT and connected via A1A4J6, A1A4U7E inverts this signal, this output is applied to input of NORGATE A1A4U8A, and as with the collector fault, the slow start/inhibit circuit shuts down the high voltage.

The output of A1A4U7E is also applied to A1A4U16. This output will drive an opto-coupler on the interface assembly for status indication.

3.8.3 Helix Fault

The resistor network from the helix supply (+) to ground is used to sense the current drawn from the helix supply. The slow fault section is slowed by a long time constant RC network, the output is applied to the (-) input of an op amp A1A4U4A. The (+) input of A1A4U4A is connected to a potentiometer A1A4R52 which can be set, so that the trip will occur at a predicted safe current level (max). A1A4U4A output pulls down the (+) input of A1A4U5 comparitor, which drives the inhibit drive circuit as well as to A1A4U7D input. The output of A1A4U7D is then applied to one input of NORGATE A1A4U8A and as previously described sets up a slow start/inhibit signal latch, as well as a status drive to the Interface Assembly. The fast (high current surge) is sensed the same as the slow circuit, but without the slow time constants and is set up to a higher level of current for tripping. A pulse stretching network is connected in the circuitry surrounding A1A4U5, to compensate for the quickness of the spike.

3.9 Switch/Interface Assembly, Theory of Operation
Reference: Schematic, Dwg. No. 106401, Rev. J
Interface and Switch Circuit, 330/IJ

The following numbered paragraphs correspond to the numbered blocks on the Switch/Interface schematic Dwg. No. 106401. The paragraphs are broken down to: Function Title; Inputs; Outputs and Description of Function.

1. ***Function Title*** - I/O Port Decoding

   Inputs - High order address bus, IORQ

   Outputs - Port addresses 00-07 and 1X (See Figure 3-4 for port descriptions.

   Description - U1 and U2 are 74LS138, 3 to 8 line decoders/demultiplexers. U1 receives the 4 MSBs of the address bus and outputs 1 of 8 possible decode lines which yield the most significant digit of the port number, in this case it outputs a decode at U1-15 which corresponds to A12-A15 low ("0") or port number 0X. U2 in turn receives the lower order address bits to yield the least significant digit of the port number (e.g., U2-12 is low when A15-A8 are as follows: 00000011 or hex 03).

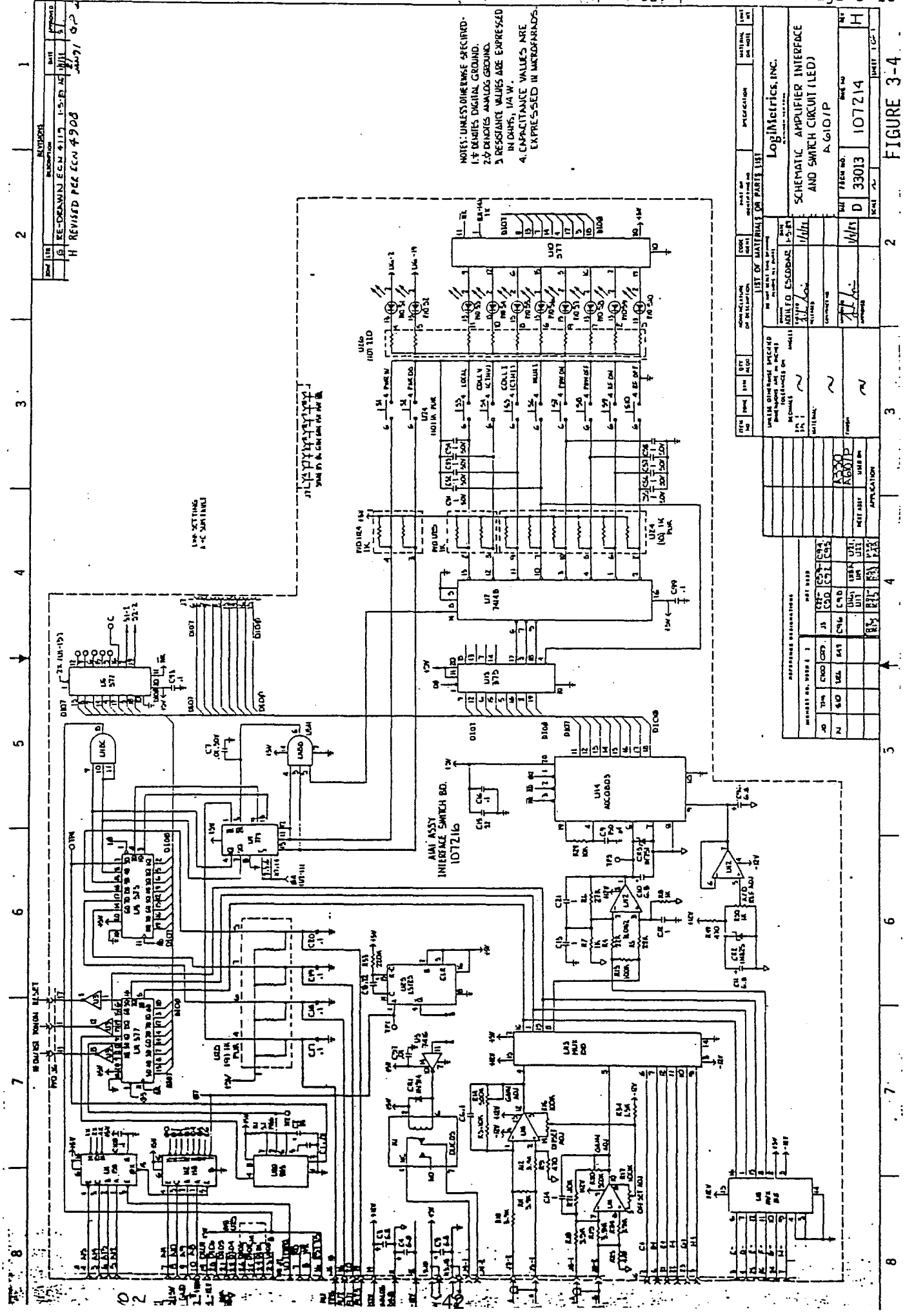

NOTES: UNLESS OTHERWISE SPECIFIED-
1. ⏚ DENOTES DIGITAL GROUND.
2. ⏚ DENOTES ANALOG GROUND.
3. RESISTANCE VALUES ARE EXPRESSED IN OHMS, 1/4 W.
4. CAPACITANCE VALUES ARE EXPRESSED IN MICROFARADS.
REVISED PER ECN 4908
RE-DRAWN ECN 4113
LogiMetrics, INC.
SCHEMATIC AMPLIFIER INTERFACE AND SWITCH CIRCUIT (LED)
A 6101P
33013
107214
AIAI ASSY INTERFACE SWITCH BD. 107216
LIST OF MATERIALS OR PARTS LIST

FIGURE 3-4

2. *Function Title* - Amplifier Control Port (03)

   Inputs - Data bus, Decode 03 WR (write)

   Outputs - 8 control lines for various amplifier functions (See Figure 3-5 for bit-by-bit breakdown.)

   Description - U4 is an octal D-type Flip-Flop, depending on the state of the data bus when decode 03 is low ("0") and on the rising edge of the WR (write) pulse the output 1Q-8Q latch accordingly. U3 is an open collector-high voltage output inverter which commands other amplifier assemblies.

3. *Function Title* - Amplifier Status Port (01)

   Inputs - Decode 01, RD (read), various amplifier statuses (See Figure 3-5 for description) decode 01, RD (read).

   Outputs - Status onto data bus.

   Description - U5 is a tri-state output octal latch, which receives various amplifier status at its inputs, 1D-8D, and latches it onto data bus when decode 01 is low on the rising edge of the RD (read) pulse.

4. *Function Title* - Timer

   Inputs - TMR STR, (U20-2) TMR RST (U20-4)

   Outputs - AMP TMG (U20-3)

   Description - U20 is a 555 timer used as a presettable, 2 minute one-shot. When the amplifier is commanded to POWER-ON, it requires a warm-up period and not until the warm-up period is over, can high voltage be applied to the amplifier tube. This output (U20-3) is applied to the amplifier status port where the software monitors it for completion.

FIGURE 3-5
I/O PORT DESCRIPTION

#	D7	D6	D5	D4	D3	D2	D1	D0
00	LCL	COLL VLT	HLX VLT	HLX CURR	PWR ON	PWR OFF	RF ON	RF READ OFF
01	SUM/HLX FLT	THRM FLT	COLL FLT	FAULT INT	SWITCH INT	AMP TMNG	PWR WATTS	PWR READ DB
02	PARAMETER DATA							READ/ WRITE
03	TMR STRT	TMR STOP	LCL RST	MUX A0	MUX A1	RFON CMD	PWR ON CMD	WRITE
04	INTERRUPT RESET							WRITE
05	DISPLAY DATA							WRITE
06	DISP R/W	DISP RS	DISP DE		SWITCH RST	WATTS LED	DB LED	WRITE
07	MONITOR FAULT TRIGGER							WRITE
1X	LCL LED COLL V LED	HLX V LED	HLX I LED	PWR ON LED	PWR OFF LED	RF ON LED	RF OFF LED	WRITE

5. *Function Title* - Interrupt Latch

   Inputs - Sum Fault, Switch Interrupt

   Output - RST 7.5

   Description - The software which supports this assembly is interrupt driven that is on the occurrence of certain events (e.g., switch closure or amplifier fault). The main body program is interrupted to handle such an event. U9 which is an R/S latch is set by an amplifier fault @ U9-1 or a front panel switch closure @ U9-5. These latched outputs are applied to U5 system status port and U18. U18-8 goes to the RST 7.5 line of the 8085 CPU on the CPU Assembly, it interrupts the main body program. The first step in the interrupt routine is to look at the system status port and determine whether it was an amplifier fault or a switch closure.

6. *Function Title* - Fault Receiver

   Inputs - Sum/Hlx Flt, Thermal Flt, Coll Flt.

   Outputs - TTL level version of above signals

   Description - I.C.'s U21 and U22 are dual opto-couplers used to isolate the faults coming from the amplifier. The opto-couplers convert an open collector output to a 0-5V TTL compatible signal. The faults are coded as such: Sum/Hlx Flt is a negative going pulse, if the Interface Assembly receives only this pulse then the amplifier has a Helix Fault. If Thermal Flt is active with this pulse, then the amplifier has a thermal fault. Likewise, if both Sum/Hlx Flt and Coll Flt are active then there is a collector fault.

7. *Function Title* - "Watch Dog" Timer

   Inputs - Decode 07.

   Outputs - Relay open or relay close (Monitor Flt)

   Description - U23, an LS123, is a retriggable one-shot triggered by the 07 decode from U2-7. The software generates a 07 decode on a periodic bases while the program is running. this decode keeps the output of U23 timing at an active low, inverted at U3, therefore no current through the coil of K1, yielding the output normally close. If the program were to stop running, the user of the amplifier would be alerted by an open at the Monitor Flt signal.

8. *Function Title* - Amplifier Parameter Samples

   Input - Det RF Power, Coll Voltage, Helix Voltage, Helix Current

   Output - Scaled versions of the above from 0-5V.

   Description - U11 is an inverting amplifier with gain and offset adjustments to convert the approximate voltage of 0 to -100 mV from the RF detector to a voltage of 0, to U12.A, B and C are buffer amplifiers which converts the floating samples of the amplifier power supply to referenced voltage of 0 to +5V.

9. *Function Title* - Analog-to-Digital Conversion

   Inputs - Parameter Samples; Coll Voltage, Helix Voltage, Helix Current and Detected Video, MUX Address.

   Description - U13, an AD7502, is an analog multiplexer which selects one of the four amplifier parameters to be Converted. The Multiplexer is addressed by two-bits from U4 when the corresponding switch on the front panel is depressed. U14 is an ADC0804 8-bit analog-to-digital converter. Conversion begins on the software issuance of WR (write) pulse and after an approximate conversion time of 100 usec, the converted voltage may be read via port 02. A precision reference is applied at U14-9 to establish a scale factor.

10. *Function Title* - Front Panel Switch Controller

    Inputs - Summed Switch Closure, Switch Depressions Outputs - LED drive lines.

    Description - The following circuit description will be written for one switch example, but applicable to all. On depression of S7 (PWR ON), simultaneously a closure to ground generates a summed switch closure pulse at U18-6 and sets U17-4. The closure pulse generates an interrupt and the interrupt routine will read port 00 (U15) and detect that U15-8 (U17-4) is set, therefore the software will execute a PWR ON routine. Part of the PWR ON routine will provide drive to the PWR ON switch LED at U10-9.

3.10 Central Processor Unit, (CPU) Assembly, Theory of Operation

The CPU Functional Block Diagram is shown in Figure 3-6. The 8085A Central Processor Unit (CPU) executes GPIB and serial driver routines, processes interrupts, and executes general system software. It is capable of directly accessing 64K of memory, and 256 I/O ports. The 8085A is driven by a 6.144 MHz clock. It can process interrupts from virtually any source on the interface bus, IEEE 488 bus, or the two serial ports.

The on-board ROM memory is a single PROM socket that can hold 2K, 4K, or 8K of EPROM or PROM. PROM's and EPROM's with only 24 pins are always installed away from pins 1, 2, 27 and 28 at socket position U10. The PROM socket is memory mapped starting at location 0000. The 8085A CPU jumps to this starting location on power-up. 1K of the RAM is provided on-board for scratchpad and program development.

3.10.1 Serial Interface

The WD8250 serial communications interface (J5) provides all the hardware to generate synchronous or asynchronous serial communications. The WD8250 also provide MODEM control signals. The WD8250 is mapped onto the CPU I/O system and requires eight ports to access ten on-chip registers. The second serial port, called the DEBUG port, is implemented by the 8085A CPU Serial In and Serial Out lines. Also part of J5.

3.10.2 GPIB Controller

The GPIB controller provides all the hardware to control the IEEE 488 bus. The controller is also mapped onto the CPU I/O system and requires eight ports to access thirteen on-chip registers. The GPIB controller may be programmed to control up to fifteen addition devices or instruments. The controller may also be programmed to be a GPIB Talker/Listener.

3.10.3 Buffers, Drivers and Transceivers

The CPU Assembly is fully buffered at every I/O and memory interface. Every accessible line on the Interface bus (J2 & J3) connector is properly buffered to meet the drive and isolation requirements for normal bus expansion. Both serial ports are buffered with RS-232C drivers for true +/-12 Volt serial communications. The GPIB signal is buffered with IEEE 4888 standard three-state transceivers, capable of driving fifteen more GPIB devices. The GPIB drivers may be used in open-collector mode.

J1 supports the GPIB. LogiMetrics provides a cable, which plugs into the 24 pin rectangular connector J1 at the card side and a GPIB panel mount connector.

LogiMetrics provides a rear panel switch to select addresses and addressing modes.

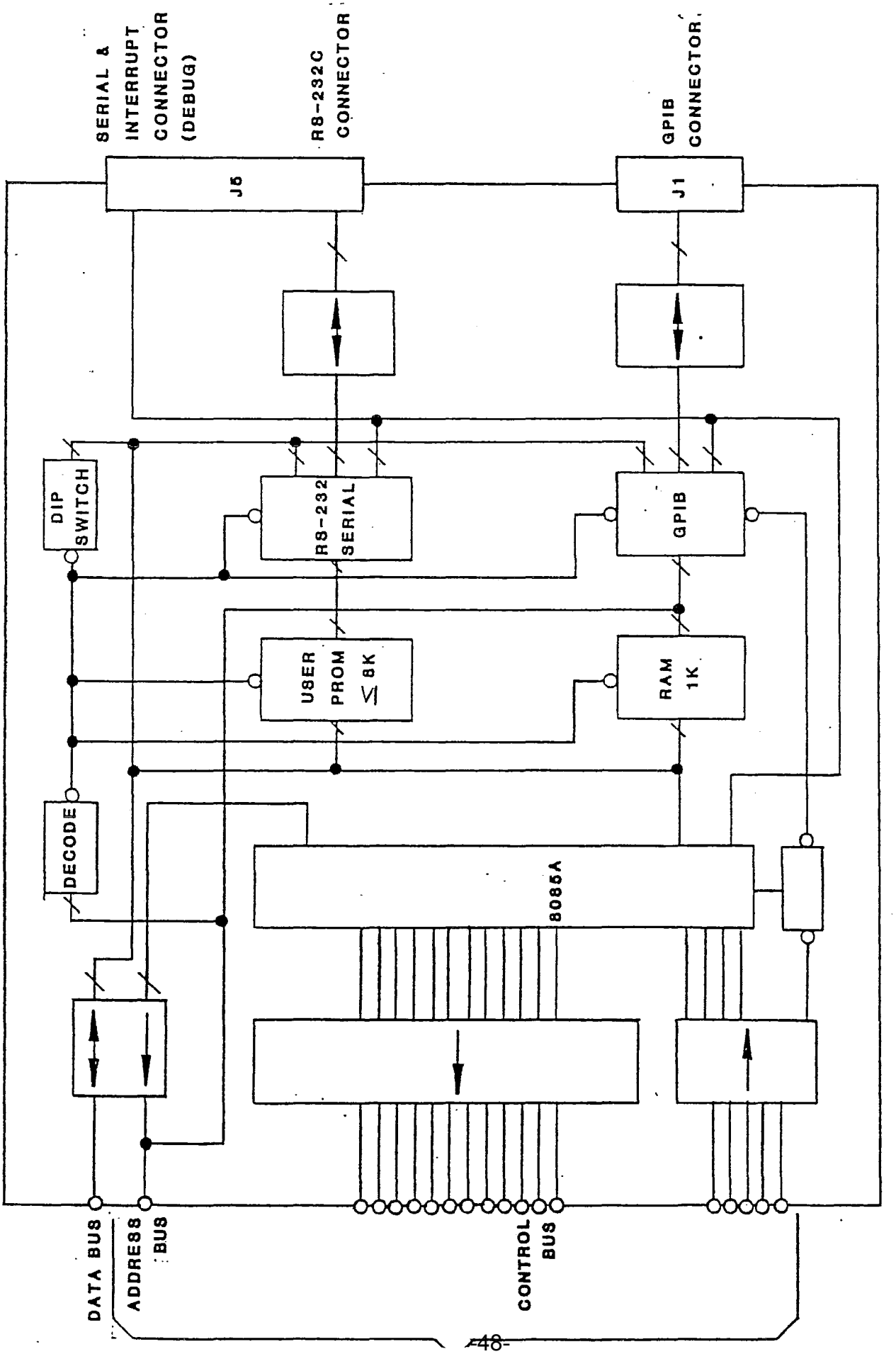


FIGURE 3-6
FUNCTIONAL BLOCK DIAGRAM,CPU ASSEMBLY

3.10.4 On-Board Address Decoders

The address decoders put the on-board PROM starting at memory location 0000. On power-up and reset, the CPU begins executing at the first PROM location. The 1K RAM is located at 3C00H to 3FFFH. The TMS 9914A GPIB controller is mapped at I/O ports 30H to 37H. The DIP switch is read at port 34H. The TMS 9914A allows this location to be used for an external address port. The WD8250 serial controller is mapped at I/O ports 38H to 3FH.

The CPU (A3), Front Panel Interface Board (A1A1), and the Display Board (A1DS1) are interactive and require extremely sophisticated test equipment to debug an troubleshoot. Field maintenance of these assemblies should be done on a board level basis. The following list describes the symptom and the recommended board to be replaced.

Board Number	Symptom	Corrective Action
A1DS1	Amplifier operational on board local and remote controls, but no display.	Replace Display Board
A1A1	Operation via computer, but no local control panel.	Replace Interface Board
A3	No operation from local control panel nor computer commands.	Replace CPU Board

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Section 4. MAINTENANCE

4.0 Maintenance

4.1 Assembly and Disassembly Procedures

4.1.1 Removal of Cover

4.1.2 Removal of Traveling Wave Tube

a) Disconnect RF cables connected at TWT J1 and J2 and voltage connector J3.

b) Remove four (4) Philip head screws attaching 1/4 inch right angle heatsink from collector end of TWT. Remove four (4) socket head screws connecting 1/4 inch heatsink from main air-cooled heatsink.

c) Loosen two (2) socket head screws from both ends of TWT. Carefully slide TWT off heatsink. Reinstallation is reverse of this procedure.

NOTE: Install fresh thermal compound one (1) mil thick when installing the TWT.

4.1.3 To remove A1A2, Auxiliary Switching Assembly, remove top cover on bottom of chassis. Remove three (3) Philip screws, then detach three (3) connectors on board and remove.

Reinstallation is reverse of this procedure.

NOTE: All P.C. boards, TWTs and other accessories should not be repaired in the field, but sent back to manufacturer for evaluation and/or repairs.

4.2 Test and Alignment Procedures

(Ref. Auxiliary Switch, Dwg. #106389 & HV, Dwg. #106392)

4.3 Required Equipment

Equipment	Number
Digital Multimeter	2
HV Probe Calibrator	1
Resistive Load Box	1
Variac 10 Amp	1
Current Probe	1
0-300 VDC Supply @ 3A Capacity	1
Test Fixture	1

4.3.1 With no power applied, measure leakage resistance from A1A2C9 (+) and A1A2C9 (-) to chassis also drain (case of A1A2Q1) to chassis more than or equal to 10 megohms. Measure from (+) case of A1A2Q2 to (-) case of A1A2Q1 approximately 20 kilohms. Measure from (+) A1A2C9 to (-) A1A2C9 approximately 50 kilohms.

4.3.2 Remove plug from A1A2, A1A2J3. Remove plug from A1A4J2. Connect test fixture into A1A4J2. Remove plug from A1A4J3 and connect resistor load box to A1A4J3.

NOTE: Line voltage selection is for 115V operation and a 6.25 amp fuse is in place. Apply AC into input power connected through variac (turned down). On front panel, place S1 into the "ON" position. Monitor (+) and (-) 12V supplies, pin 2 and 6 to pin 1 GND of A1A2J1 across A1A2C10 and A1A2C11. Monitor each of the isolated +12V supplies.

4.3.3 Monitor +15V supply across input to preamp on assembly A1. Preset all potentiometers to approximately 10 turns from CCW end position.

4.3.4 Slowly increase variac setting, making sure that these voltages regulate and are within tolerance.

All: 12V +/- 0.3V
15V +/- 0.3V

NOTE: Operation of fan, circulating air from inside to out.

4.3.5 With oscilloscope, check output of A1A2U12, pins 11 and 14.

At least a 10V squarewave signal at approximately 30 kHz rate with approximately 45% duty cycle (+ signal to period).

Inhibit signal A1A4E8 from either emitter of A1A4Q1 is approximately (-)11 VDC.

4.3.6 With oscilloscope, note no drive at gate to source of A1A2Q2 and A1A2Q3 (across) A1A2VR6 and A1A2VR7). Also note emitter of A1A2Q4 is at approximately ground potential and that there is no drive to A1A2Q1 (across A1A2VR9).

4.3.7 Check that there is no filament voltage across 5 ohm 10W load resistor (resistor load box) or from pin 1 to pin 2 of A1A4J3.

4.3.8 On test fixture, place POWER ON switch to the ON position.

NOTE: Approximately 6.3V filament supply is now on. With oscilloscope, note gate drive to A1A2Q2 and A1A2Q3.

Inhibit signal reads approximately +12 VDC A1A4E8. At positive end of helix supply, junction (A1A4R21) 470 ohm, (A1A4R43) 390 ohm, and (A1A4R39) 3.9K, inject a positive voltage 0-10 VDC monitoring the current into this network set at 5 mA. Adjust (A1A4R49), so that the meter on the test fixture monitoring the helix current will read approximately 33% of full scale (.033A).

NOTE: Selector switch set to helix current (I) metering.

4.3.9 Adjust helix slow current trim potentiometer A1A4R52 fully clockwise, increase input voltage (0-10 VDC) until 12 mA (consult TWT data sheet) of current is being supplied. Adjust trim potentiometer A1A4R52 counter clockwise until helix/sum fault just occurs and is indicated on the test fixture.

NOTE: Inhibit signal A1A4E8 is approximately -10 VDC. Reduce input voltage to zero.

4.3.10 With an oscilloscope, monitor gate drive on A1A2Q1. On test fixture, place RF ON switch to the RF ON position. Note: Fault clearing (reset) inhibit signal A1A4E8 is at +12V. Slow start signal A1A2J1, pin 4 is now at logic "0" (OV).

NOTE: Slow start of drive signal to gate of A1A2Q1 from minimum pulse width to maximum. With potentiometer A1A2R9, set maximum pulse width to 60% (at approximately 60 kHz).

4.3.11 Short A1A4TP1 to ground E9 (effective input to A1A4U4). Increase input current to 40 mA. St A1A4R53 CCW until helix/sum fault is just indicated. Remove input current.

NOTE: Inhibit signal A1A4E8 emitter approximately -10V and slow start signal at a logic "1" (5V). Remove ground at A1A4TP1. On test fixture, press reset, helix/sum fault should be extinguished.

4.3.12 At (+) end of collector supply, apply 0-20V supply across (+) to A1A4R4 and A1A4R3 and (-) to A1A4E14 collector output. Slowly increase power supply and note that the current, the collector fault and helix/sum fault illuminate is greater than 130 mA, and less than 160 mA. Select RX (A1A4R81) to adjust this trip.

4.3.13 Reduce power supply to zero and press reset on text fixture.

NOTE: Fault indicator extinguishes.

4.3.14 With a clip lead, short out (A1A4J6, 1 and 2), thermal fault and helix/sum fault should light up. Remove short and press reset.

NOTE: Fault indicator extinguishes.

4.3.15 Inject a -4.75V signal into A1A4U2 Pin 2 and adjust A1A4R30 for helix metering on test fixture, reads 4KV (.08mA).

NOTE: Selector switch to collector metering.

4.3.16 Inject a -4.75V signal into A1A4U2 Pin 6 and adjust A1AR32 for helix metering on test fixture, reads 4KV (.08mA).

NOTE: Selector switch to helix voltage metering.

4.4 HV TEST

The Resistive Load Network diagram is shown in Figure 4-1 and Test Fixture for HV Test diagram is shown in Figure 4-2.

4.4.1 Connect A1A2J3 to HV test fixture. Connect plug from A1A2J3 into HV Test fixture as shown in Figure 4-2.

4.4.2 On test fixture, put RF ON switch to RF ON position.

4.4.3 With scope monitor emitter A1A2Q4 (A1A2TP4) to ground.

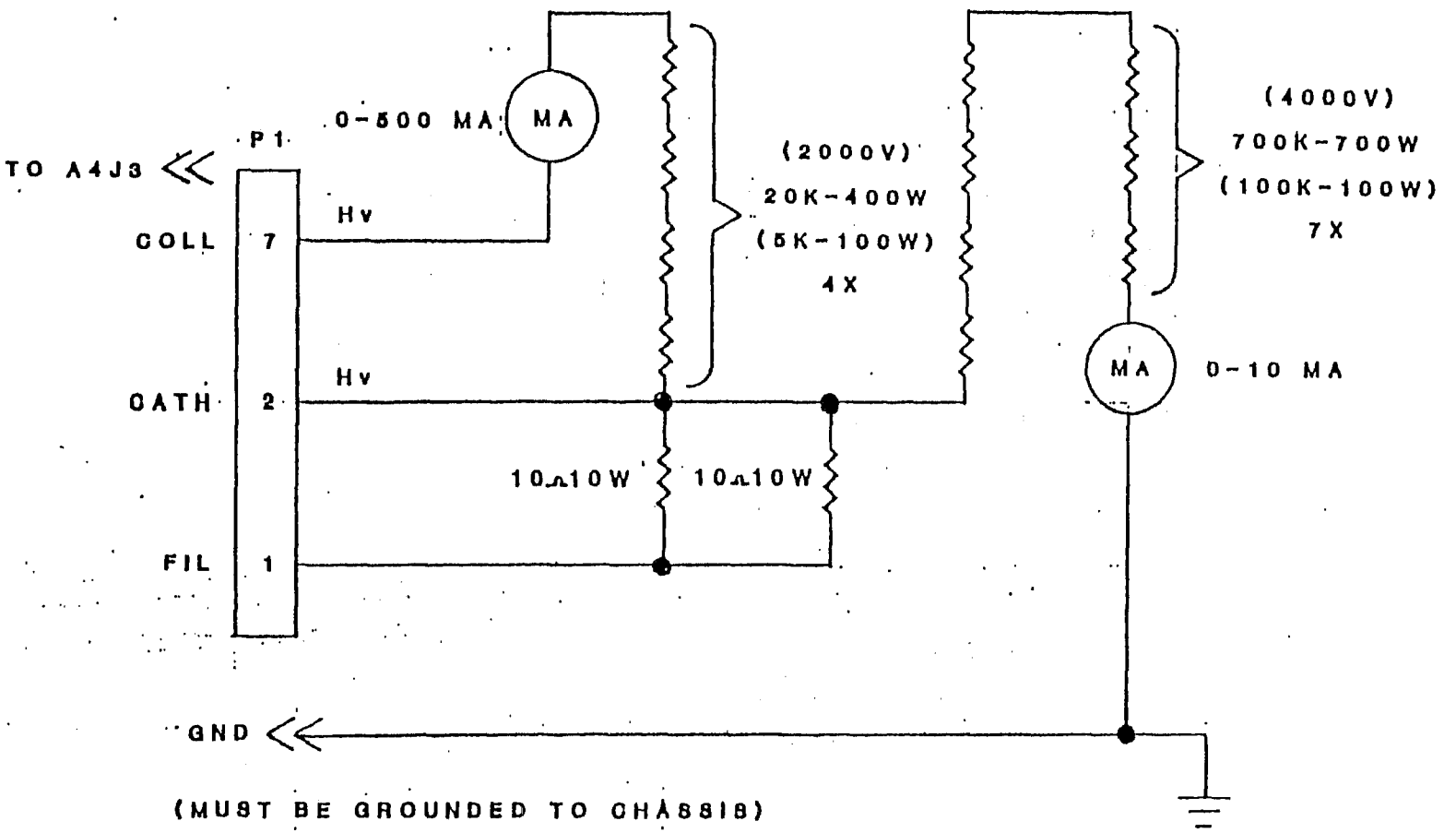


Figure 4-1. Resistive Load Network

A230/A330AC05

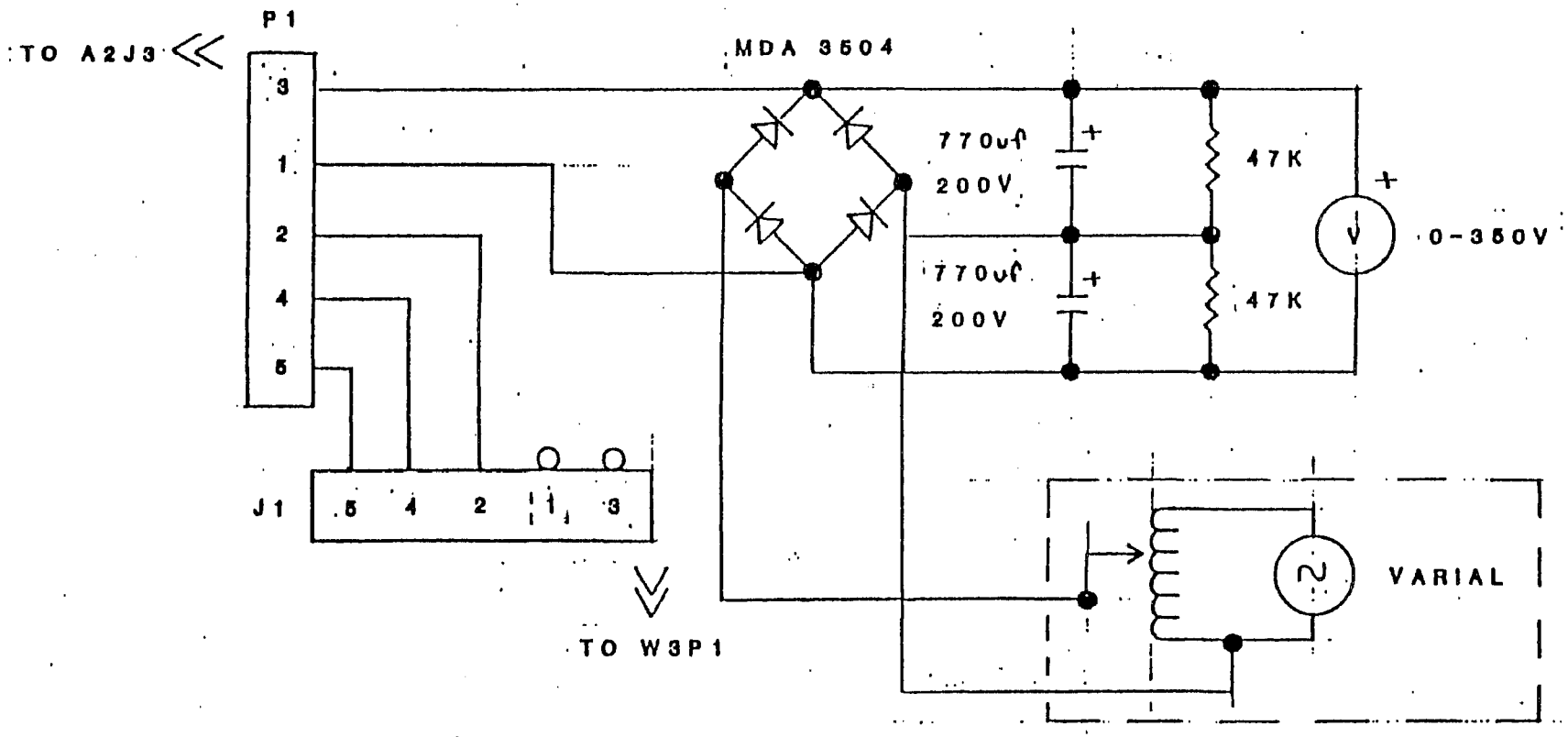


Figure 4-2. Test Fixture for HV Test

A230/A330AC06

4.4.4 Slowly increase variac and monitor cathode potential with HV DC probe. Continue to increase variac until waveform on scope starts to decrease in pulse width.

NOTE: Cathode potential will start regulating on A1A4 Assembly, adjust A1A4R51 clockwise and increase variac setting until regulated voltage is approximately 3.90 KV. Arc down cathode supply with 100 ohm resistor. Helix overcurrent displayed, press RF ON, measure ripple with high voltage, scope probe should be less than 30V p-p.

4.4.5 Measure collector voltage (cathode voltage to GND minus collector voltage to GND) should be minimum -1.8 KV, maximum -2.0 KV. Continue to increase variac until 320 VDC is across bridge rectifier capacitor network.

NOTE: Meter reading for helix current.

4.4.6 Switch to helix voltage on test fixture. Adjust (A1A4R32) so that meter reads .076 mA (3.8KV). Switch to collector voltage on test fixture adjust (A1A4R30) so that meter reads nominally .038 mA (approximately 2KV) to coincide with collector to ground potential.

4.4.7 Put RF ON switch to RF OFF.

NOTE: HV decreased to zero.

4.4.8 Put RF ON switch to RF ON.

NOTE: Slow rise and stabilization of HV on meter with HV probe.

4.4.9 Decrease variac and shut down (front panel switch to OFF). Test fixture to OFF mode. (Do not remove variac and test fixture from J3 of auxiliary switch assembly. Remove A1A4J2 from high voltage assembly).

4.5.0 Connect ribbon cable from interface assembly front panel to A1A4J2 high voltage assembly.

4.5.1 Switch power ON and note fans turning, local LED ON and power OFF LED ON.

4.5.2 Press Power ON and note filament voltage across filament load on H.V. load test fixture and display reads PWR ON and timing from 120 seconds down, and power ON LED ON and RF OFF LED ON.

4.5.3 The scope monitor E8 of H.V. control assembly in reference to GND and monitor TP4 if auxiliary switch assembly E8 should be approximately +10V and when timing is complete, display should read PWR ON standby.

4.5.4 Press RF ON and note switching waveform at TP4 of auxiliary switch assembly. Display should read RF ON.

4.5.5 Press collector voltage, LED should illuminate and display should read collector volts 00.0 KV, approximately.

4.5.6 Press helix voltage, and LED should illuminate and collector LED extinguishes. Display should read helix volts 00.0 KV, approximately.

4.5.7 Press helix I (current) and LED should illuminate and helix voltage should extinguish. Display should read helix current 00.0 mA, approximately.

4.5.8 Connect Power Supply approximately 600 VDC with (-) to GND and momentarily connect to junction R21 and R43 of high voltage control board.

NOTE: Switching waveform goes to 0 volts and E8 goes to (-10V) and stays there. Display should read helix overcurrent and RF OFF LED illuminates.

4.5.9 Press RF ON waveform on auxiliary switcher returns and E8 goes from -10V to +10V approximately, and RF ON LED illuminates.

4.6.0 Set power supply to approximately 10V connect (-) to E14 and momentarily connect (+) to junction R3 and R4 of the H.V. control assembly.

NOTE: Switcher waveform goes to 0V and E8 goes to (-10V) and stays there. RF OFF LED illuminates and display reads collector overcurrent.

4.6.1 Press RF ON and waveform at TP4 of switcher should return and E8 should go from -10V to +10V approximately, and display should read RF ON.

4.6.2 Increase variac while monitoring the cathode potential until there is 320 VDC across bridge rectifier in test fixture.

4.6.3 Check TWT data sheet for specified cathode voltage, adjust RS1 for approximately 3.9 KV (IJ) or specified cathode voltage. Press helix voltage on front panel. Adjust A1A4R32 so that front panel metering agrees with high voltage probe measurement.

4.6.4 Now consult TWT data sheet for collector voltage and verify that it is within specified range by measuring the collector (refer to GND) and subtracting from the cathode (refer to GND) to get the actual collector voltage.

V Cathode - V Collector = Actual Collector Voltage

4.6.5 Press collector voltage front panel. Adjust A1A4R30 so that front panel metering agrees with the actual collector voltage.

4.6.6 Press helix current and adjust A1AR49 so that it agrees with helix meter in test fixture.

NOTE: If TWT has anode proceed to step 4.7.1.

4.6.7 Turn variac down and turn test fixture OFF. Turn unit OFF by pressing PWR OFF and turn OFF Breaker S1. Disconnect test fixtures and remove dummy load.

4.6.8 Connect TWT to J3 of high voltage control board and connect P1 of harness to A2J3 of auxiliary switches assembly. Terminate input and output of amplifier.

4.6.9 Turn on supply, S1 Breaker press power ON - countdown 120 seconds to standby begins. After time out, press RF ON.

Display should read RF ON.

NOTE: Display readings if I/O band:

Collector Voltage is pressed --- 1.94 KV
Helix Voltage is pressed ------- 3.90 KV
Helix Current is pressed ------- 1 to 4 mA

4.7.0 Press RF OFF. Turn unit OFF and setup RF equipment for RF data and alignment. Refer to Figure 4-3A.

4.7.1 If TWT has anode to select resistor for voltage divider, use the following formula:

Let the TWT manufacturers nominal cathode voltage = X

Let the TWT manufacturers nominal anode voltage = Y

Then the anode voltage divider will be equal to:

$$\frac{Y}{X-Y} \times 5 \text{ Meg ohms}$$

Example: Cathode Voltage = 3 KV
Anode Voltage = -400 V

$$\frac{400}{3000 - 400} = \frac{400}{2600} \times 5 \text{ Meg} = 769\text{K ohms}$$

NOTE: Install resistor and adjust pot on anode board to TWT spec. Proceed back to step 4.6.7.

4.7.2 Refer to Figure 4.3A for a suggested equipment connection to be used for measuring the amplifier performance. All components must be capable of handling the rated power output of the amplifier and provide an impedance match over the frequency band of operation. The amplifier is rated at 10 Watts, +40 dBm for the A230 amplifier and 20 Watts, +43 dBm for the A330 amplifier. Both model amplifiers have a saturated power capability of more than +3 dB above rated power output.

4.7.3 The minimum gain of the A230 is 30 dB and A330 series amplifiers is 33 dB, therefore, the RF signal generator must have a capability of at least +20 dBm to supply sufficient power to drive the amplifier into power saturation.

CAUTION

DO NOT OPERATE THE AMPLIFIER
WITHOUT AN OUTPUT RF TERMINATION.

4.7.4 Connect all AC power and RF test equipment to the amplifier. Turn power ON and after the 2 minute time delay, turn unit to RF ON. Apply RF power to the input and take measurement data for a minimum of 5 frequencies across the band.

NOTE: It may be necessary to slightly readjust the helix voltage if gain difficulties are experienced at the band edges.

RF Noise Measurement

4.7.5 Refer to Figure 4.3B and arrange the RF measurement equipment as shown.

4.7.6 Turn ON the amplifier. The power as indicated on the RF milliwatt meter plus the 40 dB attenuation figure is the actual noise generated by the amplifier. Is the actual noise generated by the amplifier.

Example: -27 dBm meter indication + 40 dB attenuation
(-27 dBm + 40 dB = +13 dBm or 11.3 mW)

LogiMetrics, INC

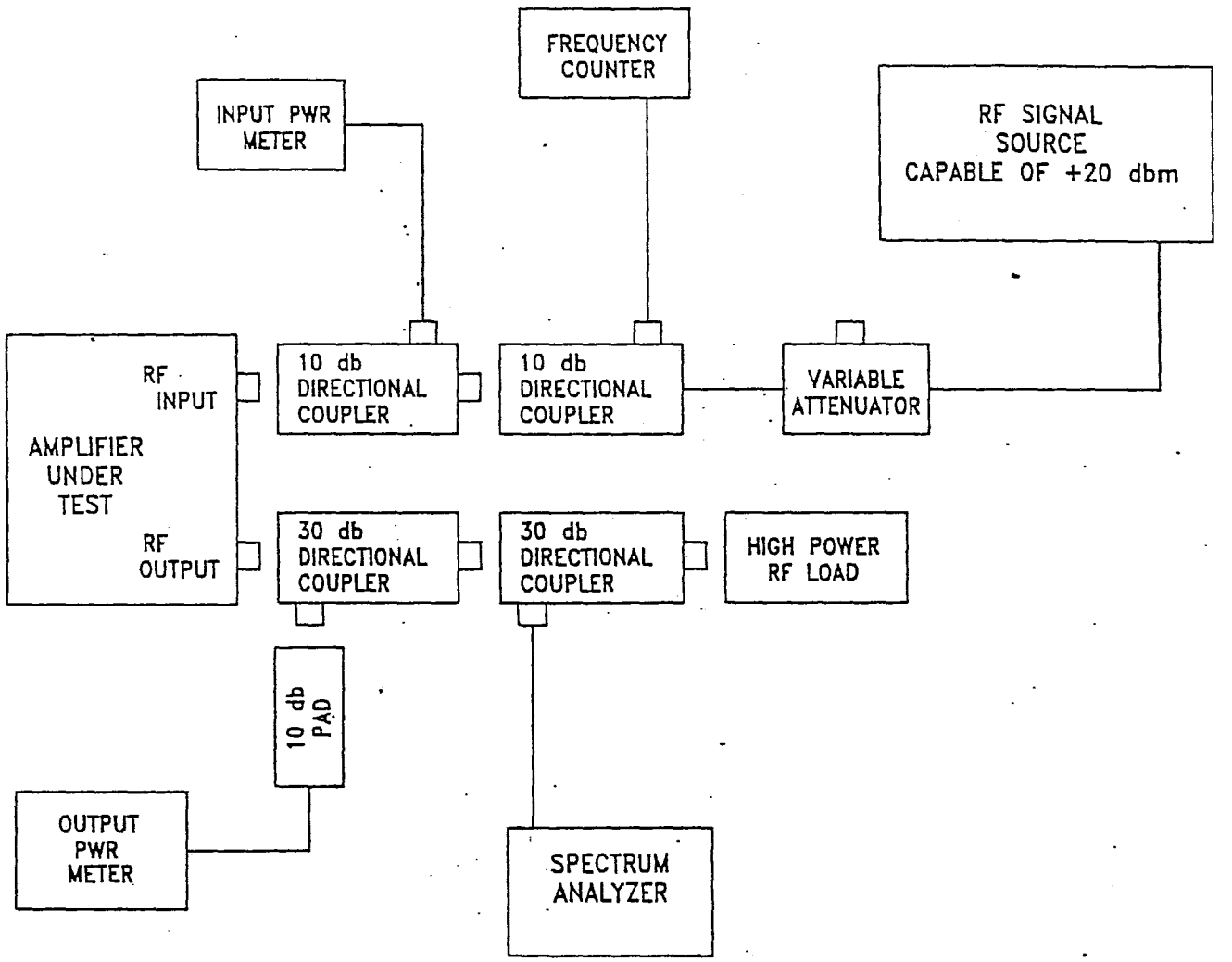


FIGURE 4.3-A

TYPICAL RF MEASUREMENT
TEST SET UP

A230/330AC08

RES. DISC NO. 70/1

LogiMetrics, INC

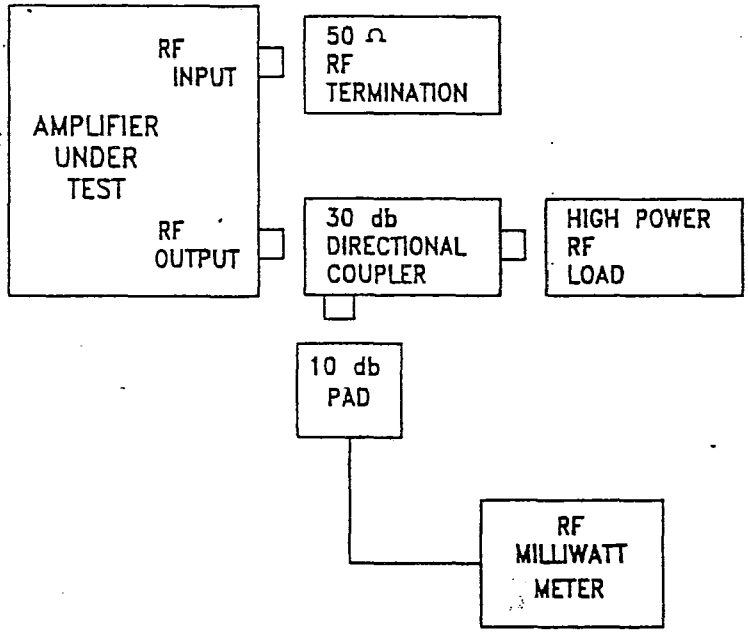


FIGURE 4.3-B

NOISE POWER
TEST

A230/330AC09

RES. DISC NO. 70/1

A.M. Noise Measurement

4.7.7 Refer to Figure 4.3B and adjust the signal generator for midband operation with the amplifier operating at rated power output.

4.7.8 Disconnect the milliwatt RF power meter head from the 10 dB attenuator and insert the diode in its place. With the oscilloscope connected to the diode output, measure the DC output voltage and the AC peak-to-peak voltage.

4.7.9 Using the formula $\frac{A.C.(-P)}{2 \times (D.C.)} \times 100\%$ noise

Calculate the noise figure of the amplifier.

Power Monitor Calibration

4.8 Set the RF signal generator at midband of the operating range of the unit being tested. Turn the RF OFF from signal generator and leave unit in RF ON mode.

4.8.1 Press PWR ON button and adjust R16 of interface board until display just reads 0 Watts.

4.8.2 Turn RF ON at signal generator and adjust RF drive for 43 dBm out as indicated on an external power meter.

4.8.3 Now adjust R14 on interface board to have display indicate 20 Watts. Press power dBm button and verify it reads 43 dBm.

4.8.4 Lower RF drive from signal generator to get 1W out (30 dBm) as indicated on Ext power meter. Adjust R16 on interface board to read 30 dBm.

4.8.5 Repeat if necessary and scan RF band and balance R14 and R16 for a balance across RF operating range.

Section 5. TROUBLESHOOTING DIAGRAMS

5.0 Troubleshooting Diagrams

This section contains the Troubleshooting Diagrams that will assist in the maintenance of A230/240-330/340-350 Series.

5.1 Required Equipment

1. DMM with current metering
2. Power Supply 0-20V 100 mA
3. Oscilloscope
4. High Voltage probe with meter to 5 KV

5.2 Top Cover Removal

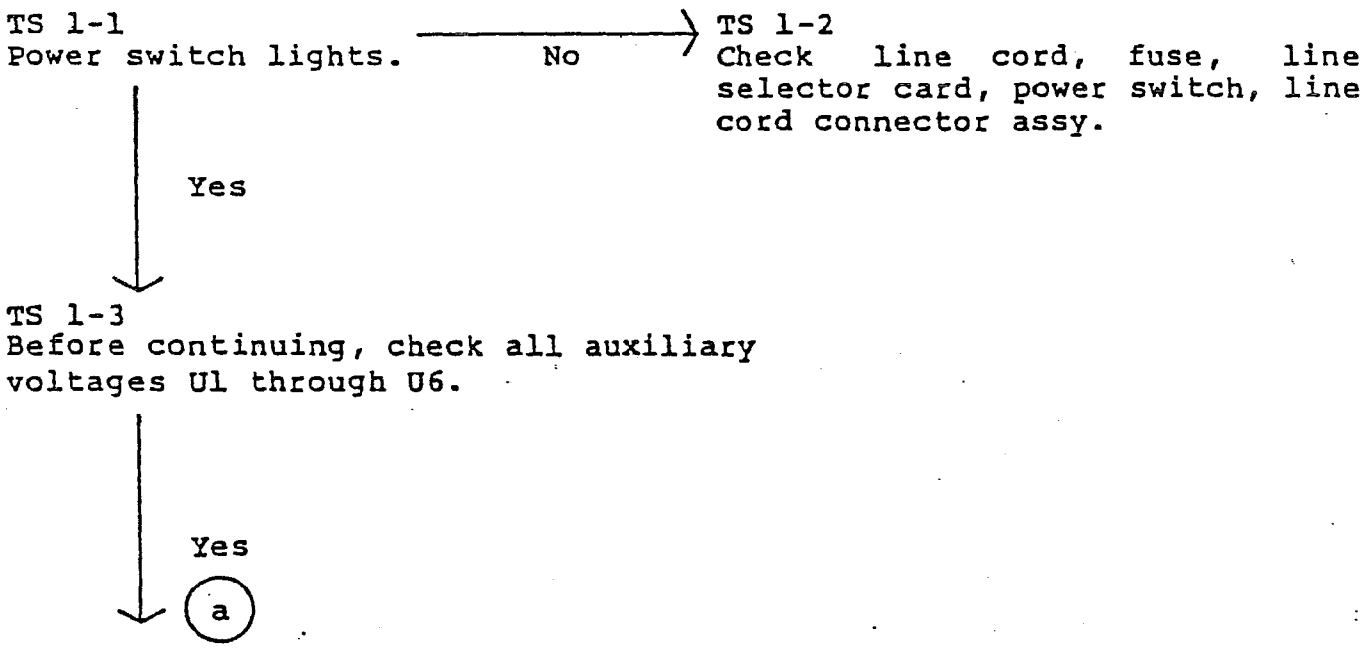
5.3 Troubleshooting Diagram Index

T.S. NO.	TITLE
1-1 thru 7-1	Preliminary Calibration and Logic Troubleshooting Diagram (No. H.V.)
8-1 thru 19-1	Inhibit Troubleshooting Diagram
20-1 thru 23-8	Slow Start Troubleshooting Diagram
24-1 thru 26-7	Helix Fault with H.V. Troubleshooting Diagram
Figure 5-1	H.V. Testing and Troubleshooting
27-1 thru 29-1	Thermal Fault with H.V. Troubleshooting Diagram
30-1 thru 33-1	No/Low Filament Voltage Troubleshooting Diagram
34-1 thru 37-1	No/Low Cathode Voltage with H.V. Troubleshooting Diagram
38-1 thru 39-1	Collector Fault with H.V. Troubleshooting Diagram
40-1 thru 43-1	Inaccurate Metering with H.V. Troubleshooting Diagram

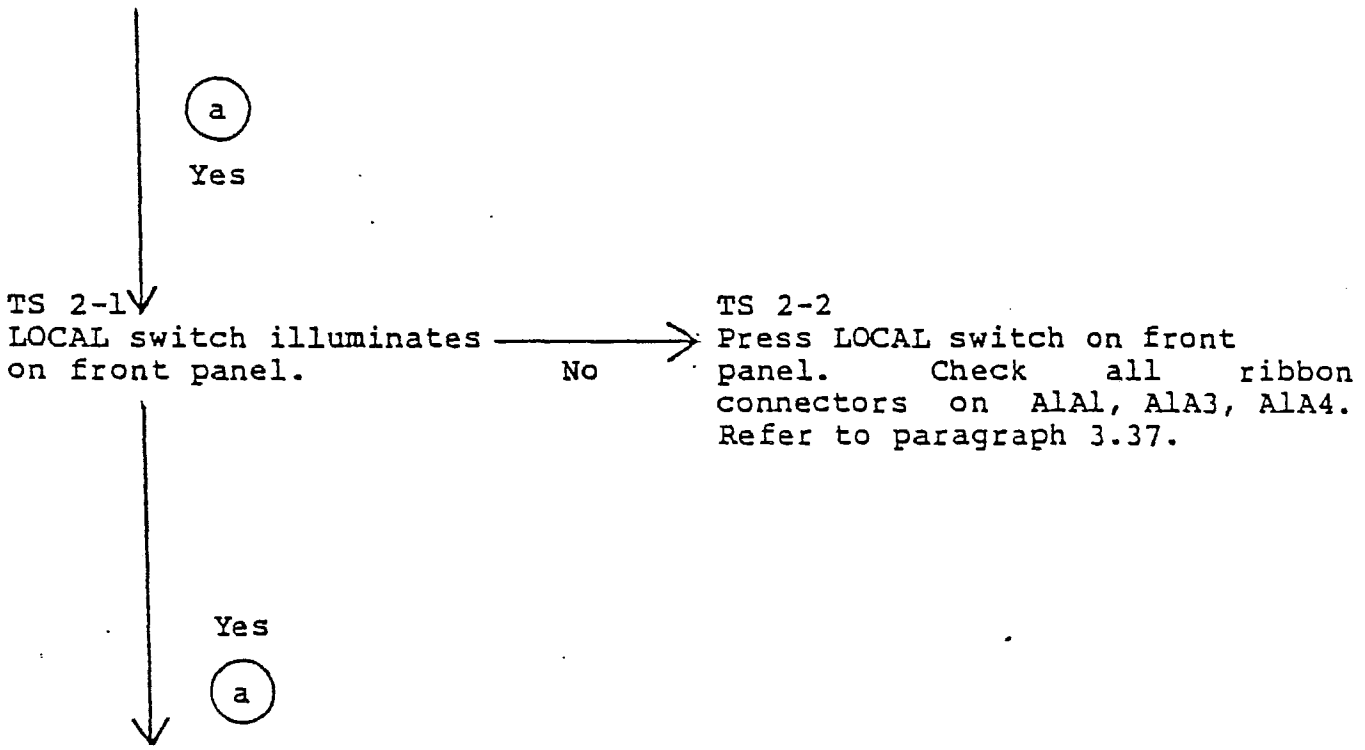
Unplug connector P1 from A1A2J3.

Unplug connector from tube to A1A4J3.

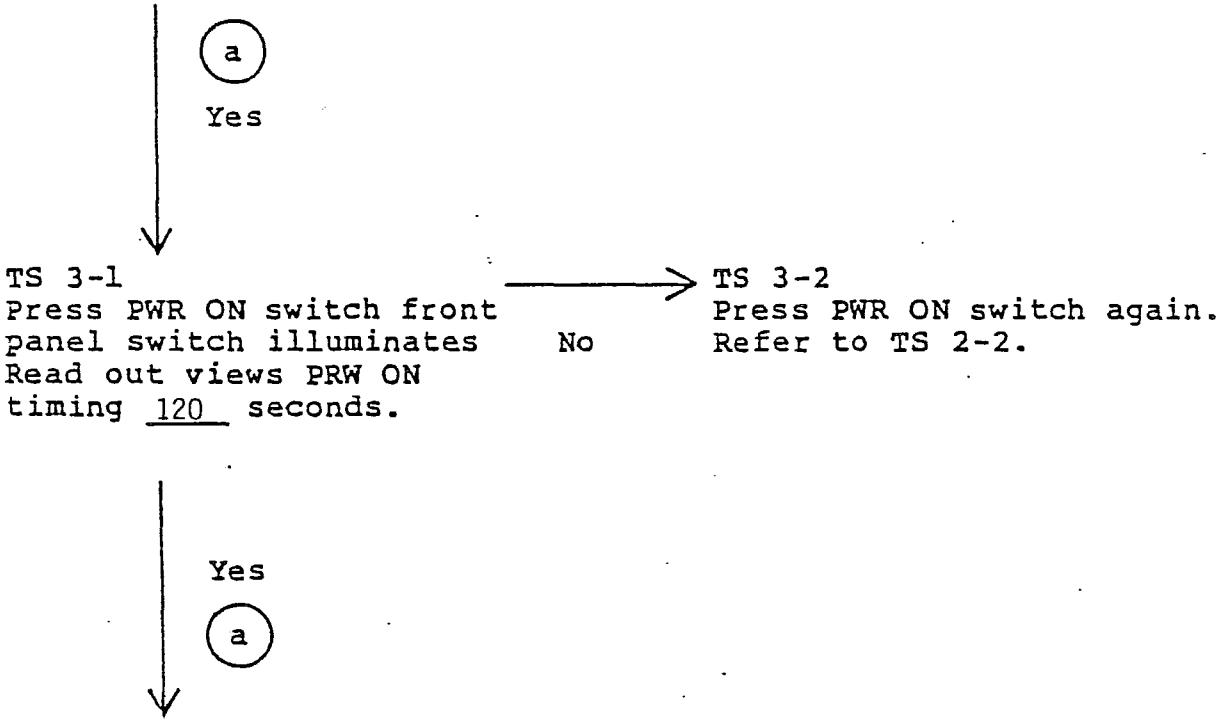
Reconnect line cord and place power switches to ON position.



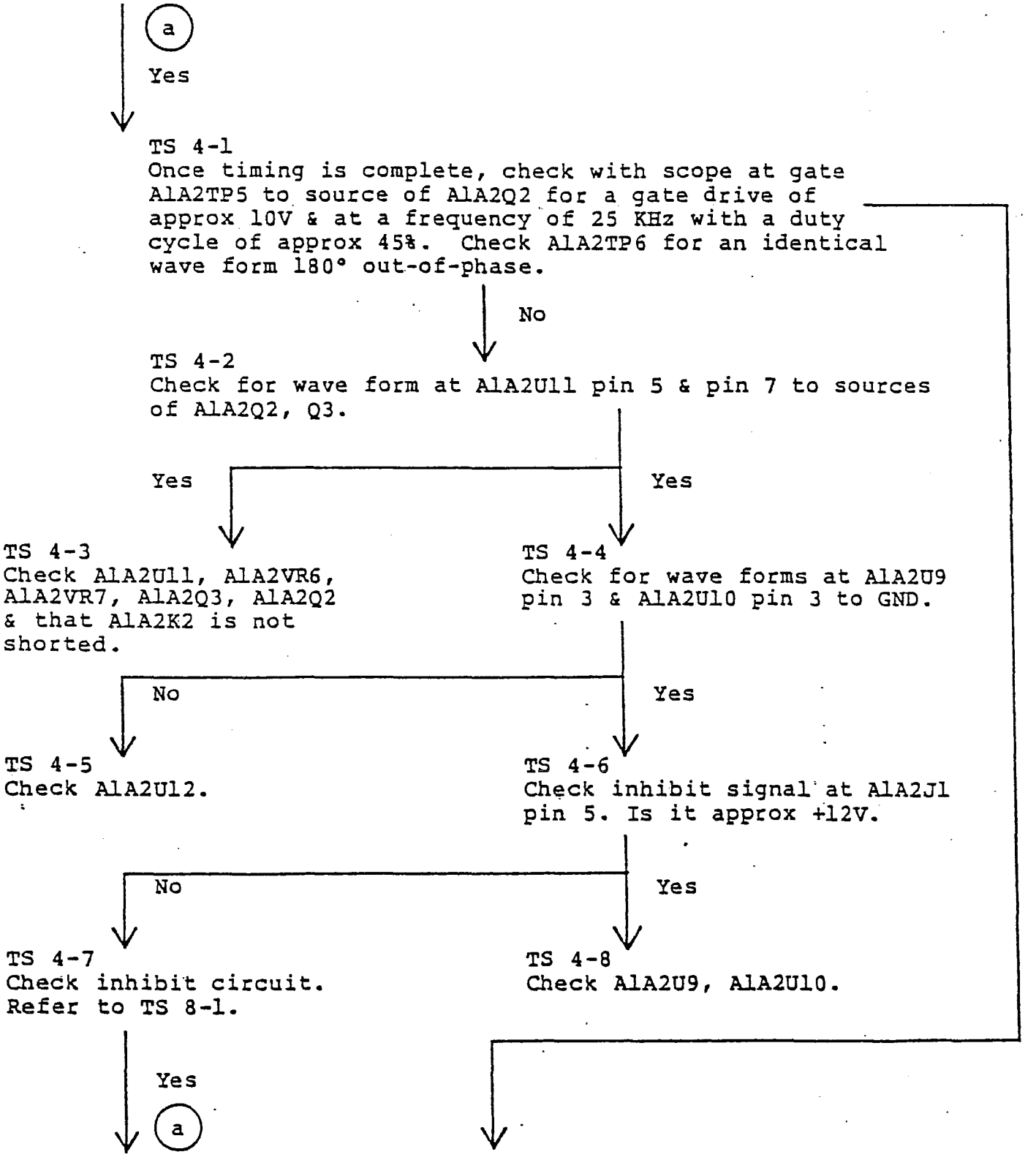
TS 1-1/1-3. Preliminary Calibration & Logic Troubleshooting Diagram (No H.V.)



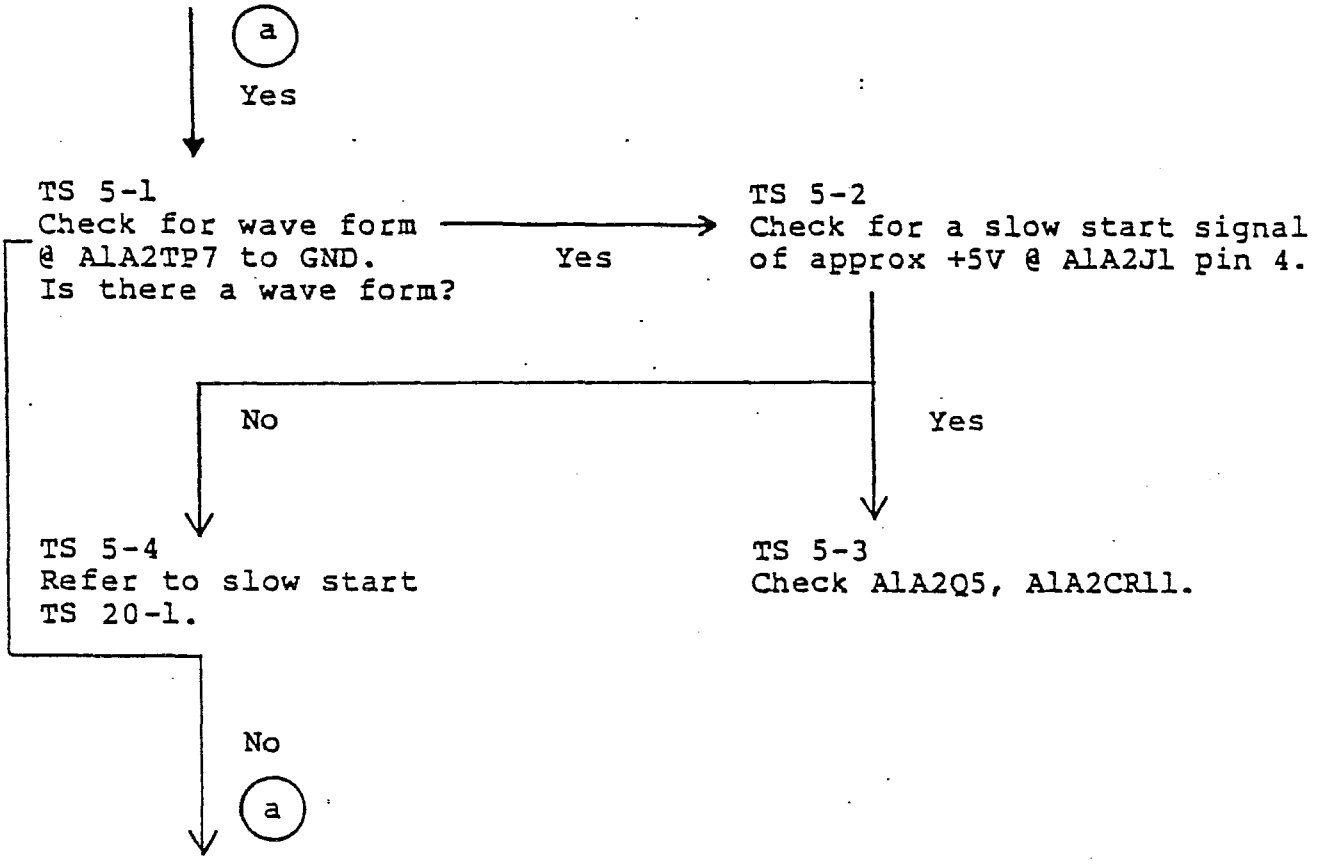
TS 2-1/2-2. Preliminary Calibration & Logic Troubleshooting Diagram (No H.V.)



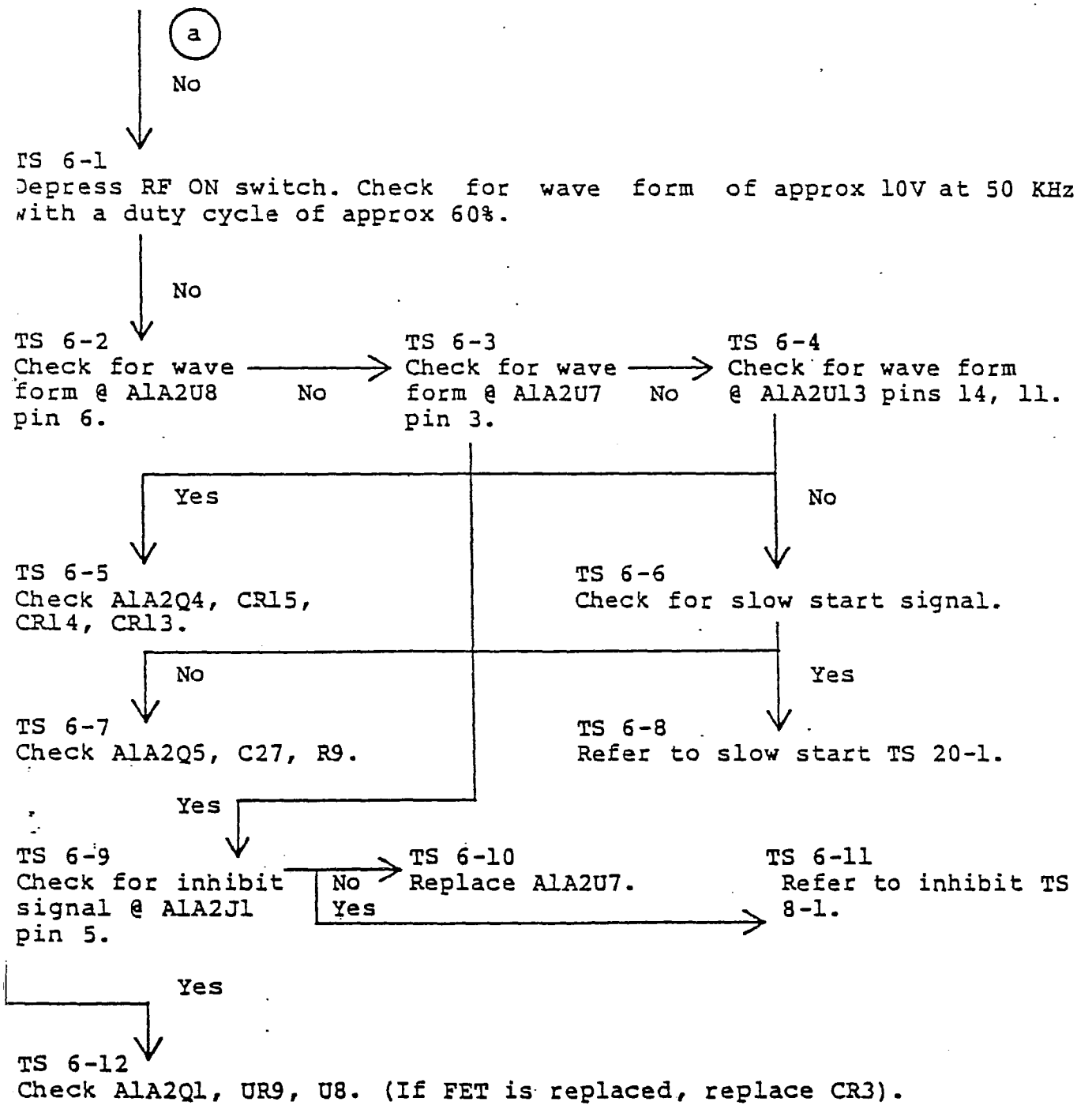
TS 3-1/3-2. Preliminary Calibration & Logic Troubleshooting Diagram (No H.V.)



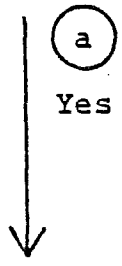
TS 4-1/4-8. Preliminary Calibration & Logic Troubleshooting Diagram (No H.V.)



TS 5-1/5-4. Preliminary Calibration & Logic Troubleshooting Diagram (No H.V.)



TS 6-1/6-12. Preliminary Calibration & Logic Troubleshooting Diagram (No H.V.)



TS .7-1
Depress PWR OFF button.

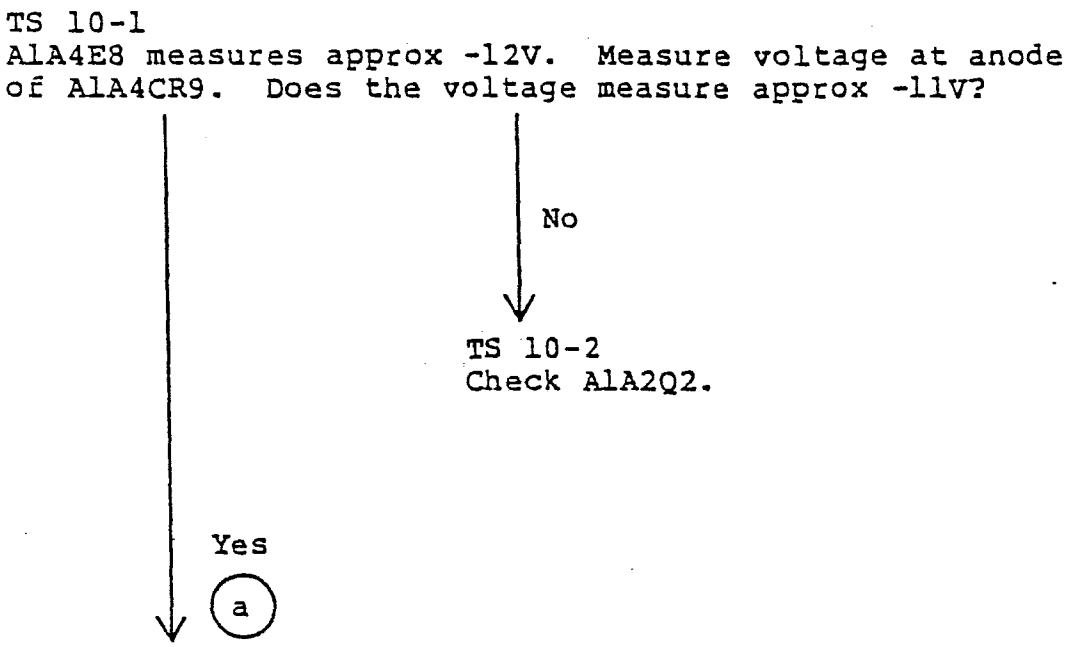
TS 7-1. Preliminary Calibration & Logic Troubleshooting Diagram (No H.V.)

TS 8-1
Normal inhibit signal (no fault) is -11.5V.
For inhibit or fault +11.5V, measure @
A1A4E8 to GND.

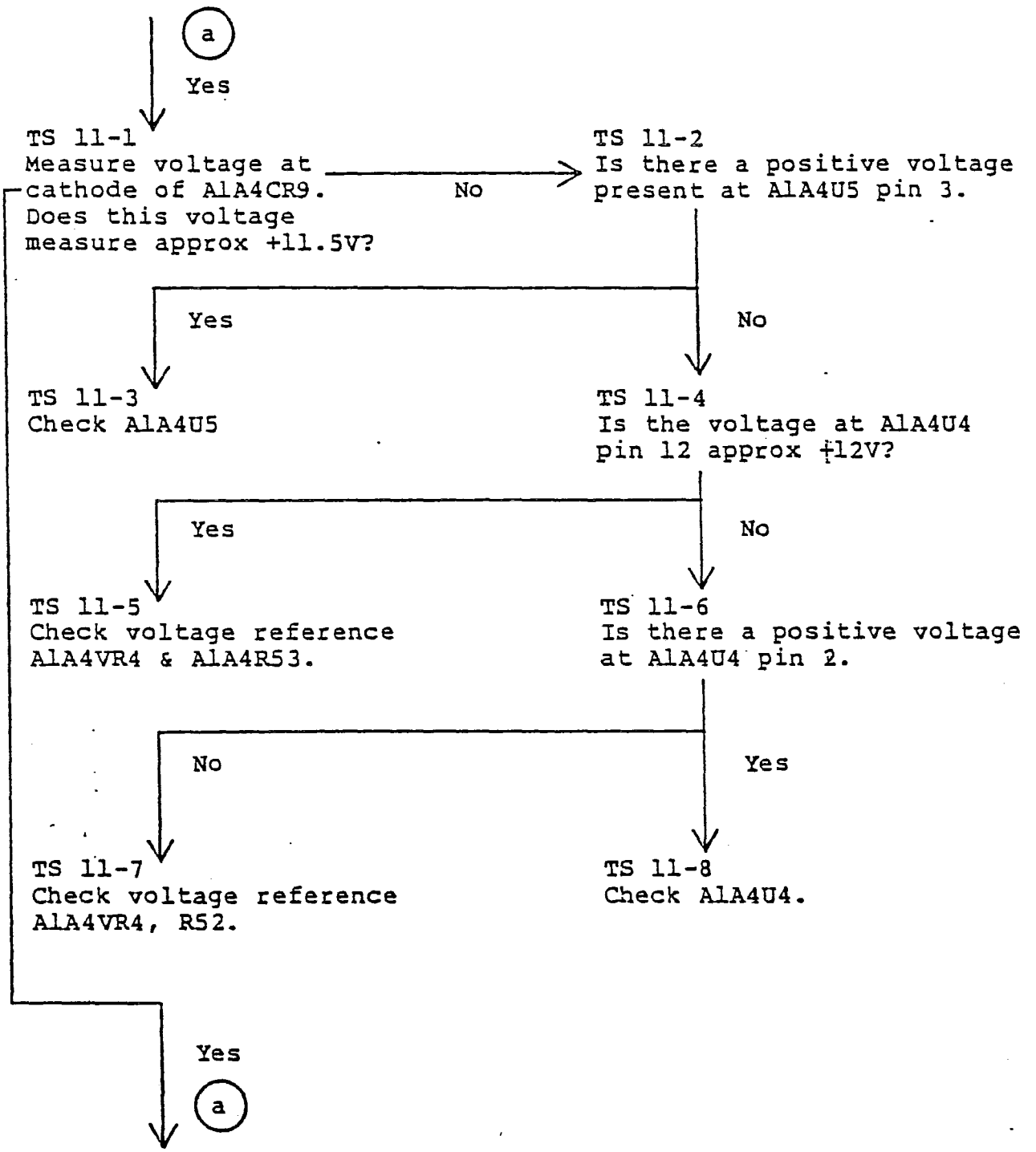
TS 8-1. Inhibit Troubleshooting Diagram

TS 9-1
To troubleshoot a fault or inhibit condition when no fault exists.

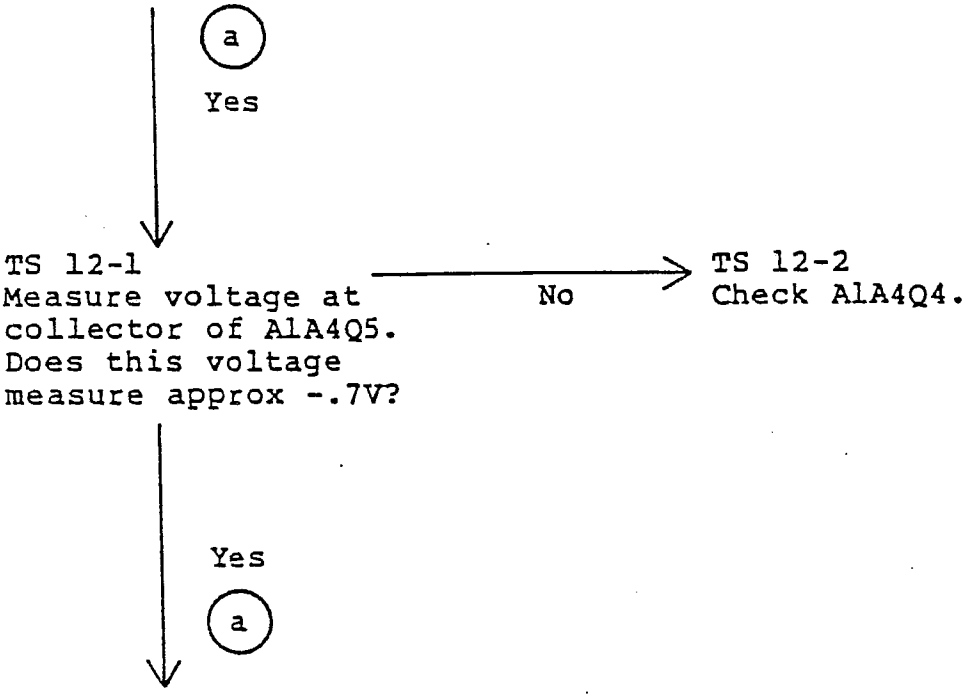
TS 9-1. Inhibit Troubleshooting Diagram



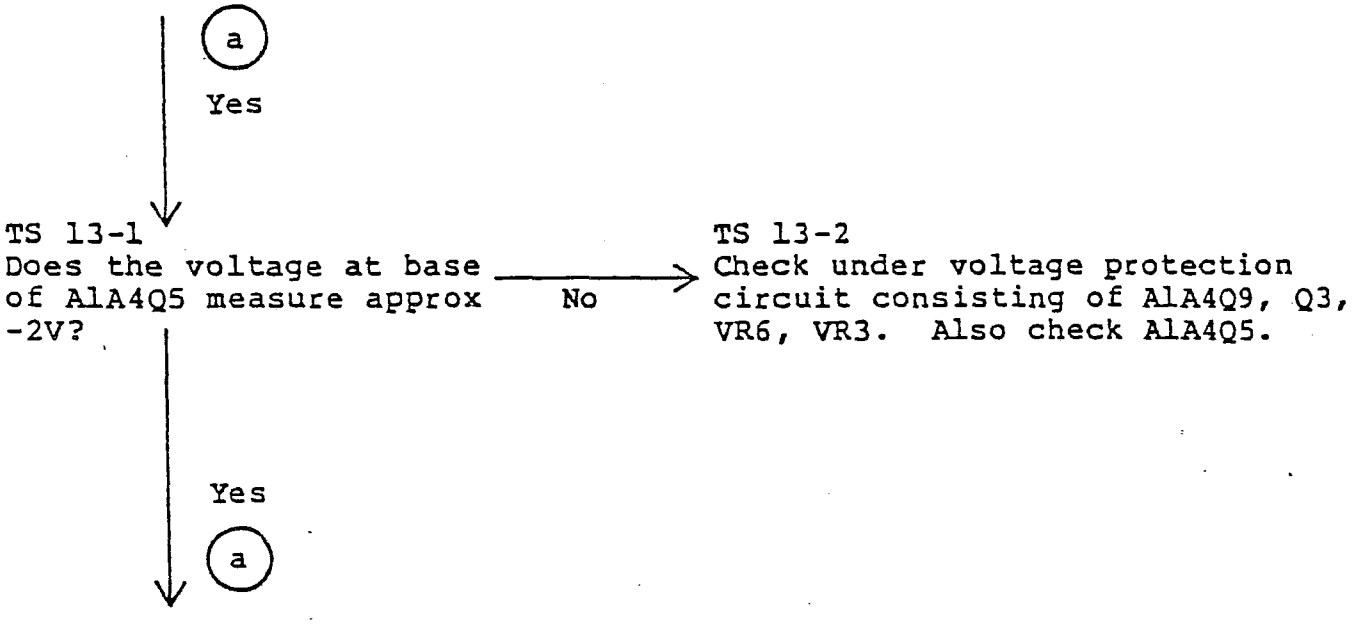
TS 10-1/10-2. Inhibit Troubleshooting Diagram



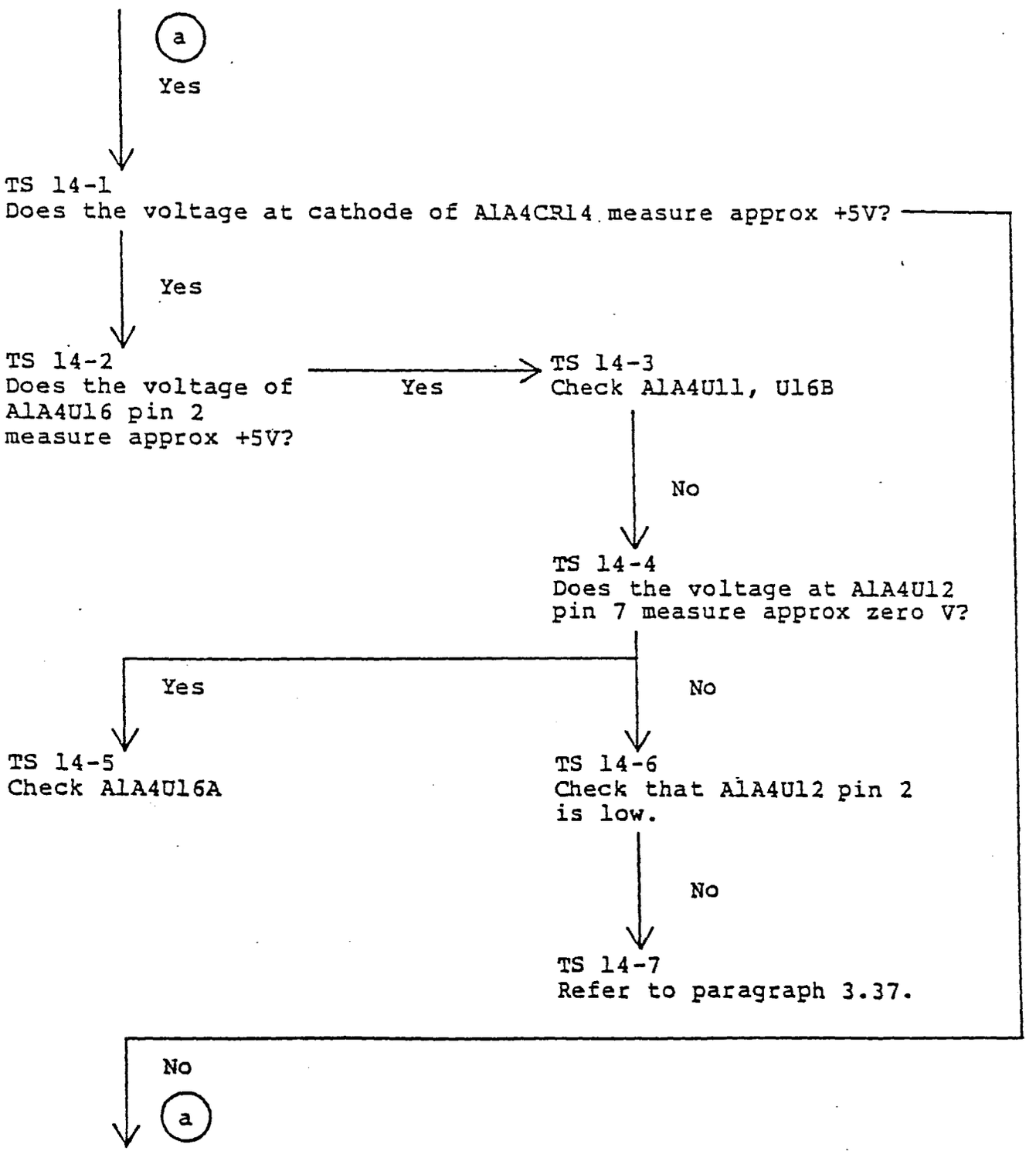
TS 11-1/11-8. Inhibit Troubleshooting Diagram



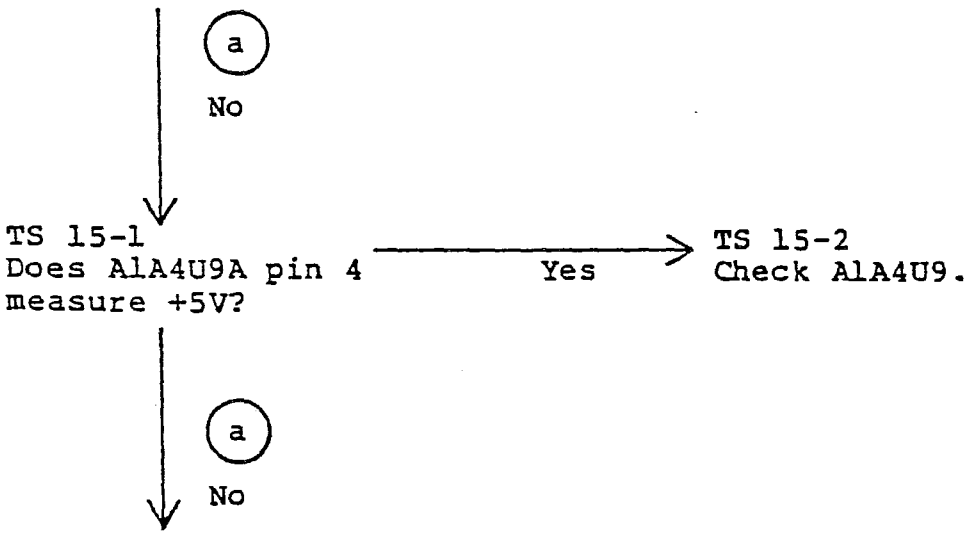
TS 12-1/12-2. Inhibit Troubleshooting Diagram



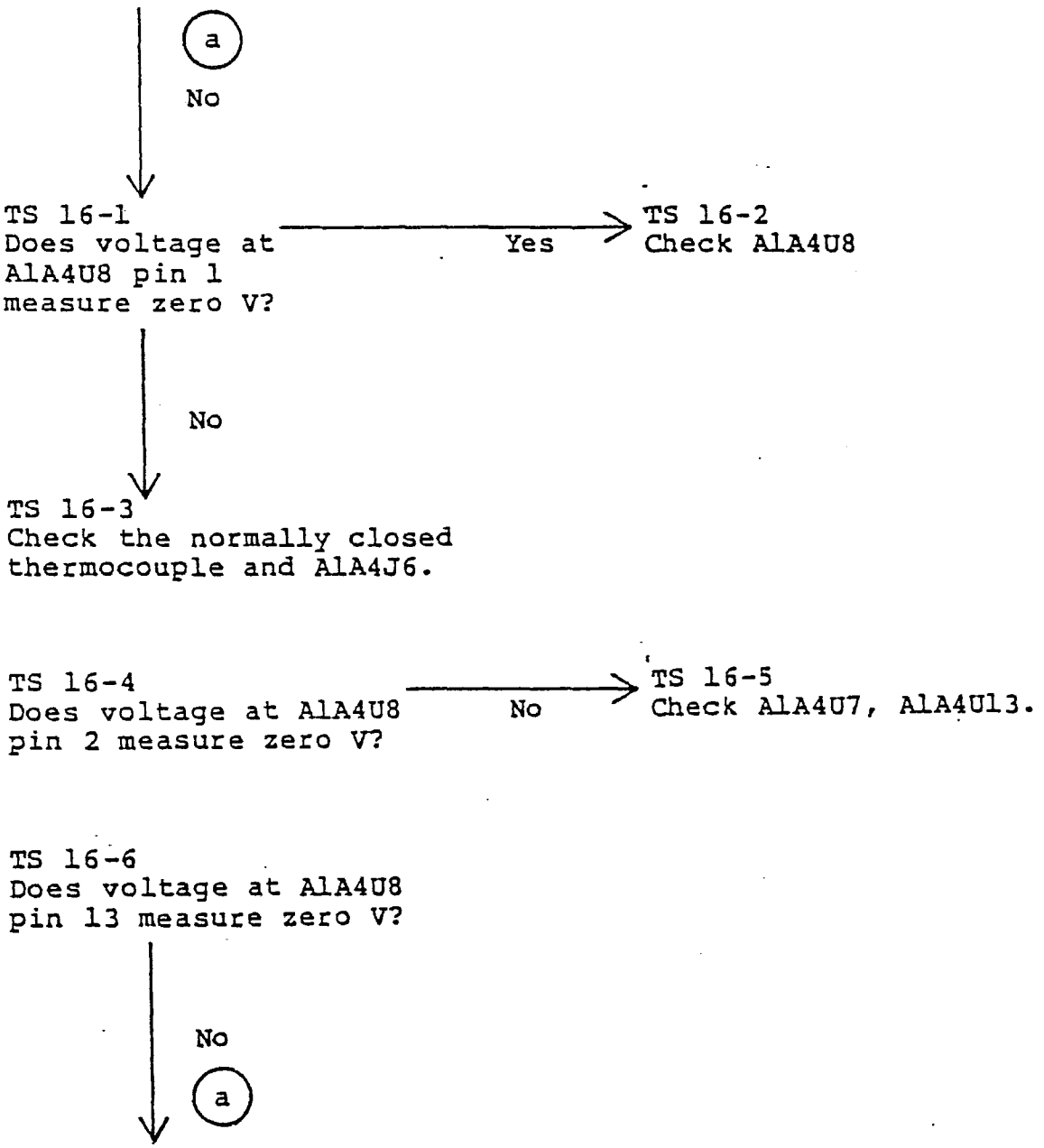
TS 13-1/13-2. Inhibit Troubleshooting Diagram



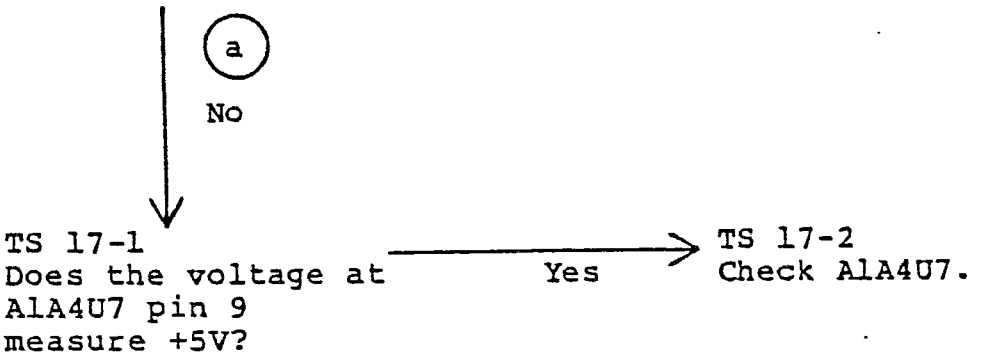
TS 14-1/14-7. Inhibit Troubleshooting Diagram



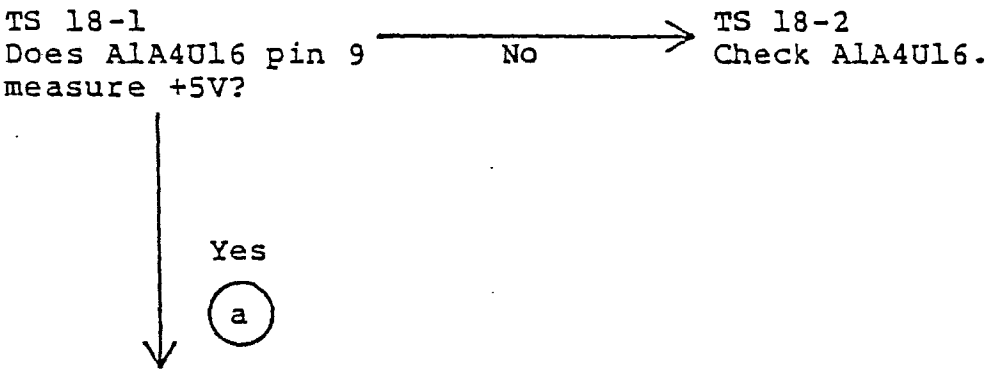
TS 15-1/15-2. Inhibit Troubleshooting Diagram



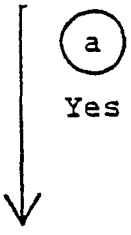
TS 16-1/16-6. Inhibit Troubleshooting Diagram



TS 17-1/17-2 Inhibit Troubleshooting Diagram



TS 18-1/18-2 Inhibit Troubleshooting Diagram



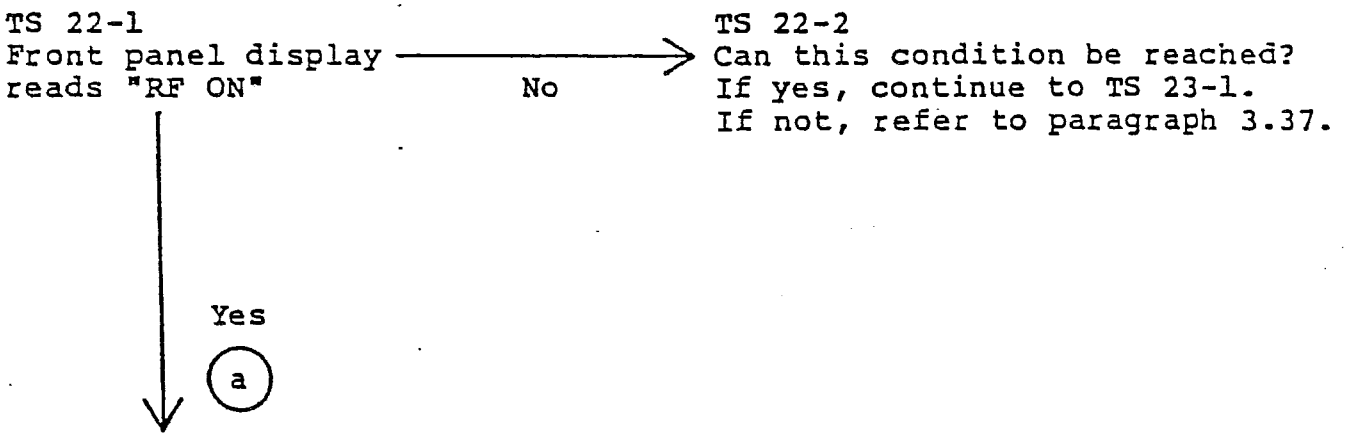
TS 19-1
Check A1A4U19, Q10.

TS 19-1 Inhibit Troubleshooting Diagram

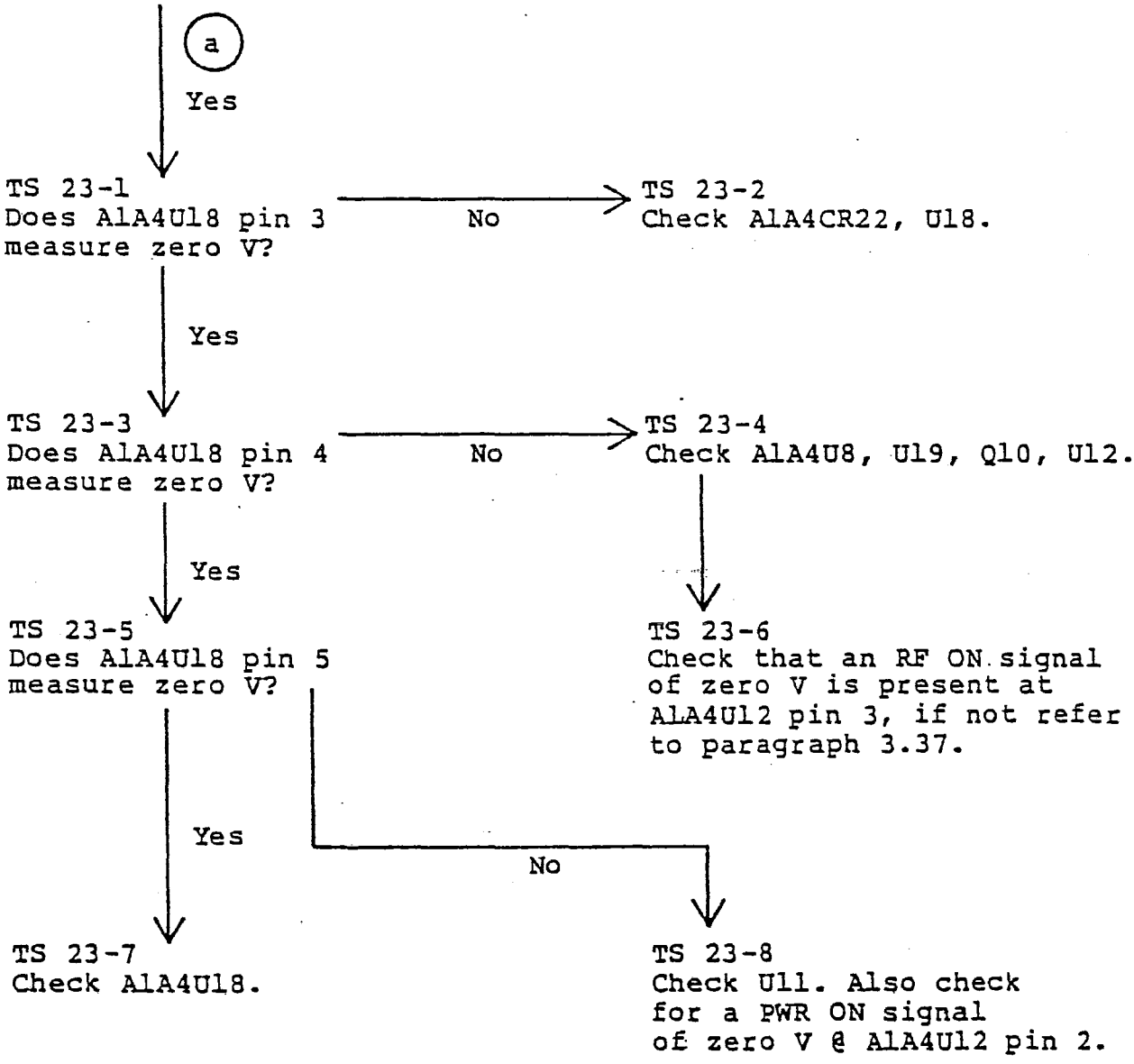
TS 20-1
For slow start to begin, the voltage at A1A4J1 pin 4 will go from +5V to zero V.

TS 21-1
To troubleshoot an inhibit slow start when one is not desired.

TS 20-1, 21-1 Slow Start Troubleshooting Diagram



TS 22-1/22-2 Slow Start Troubleshooting Diagram

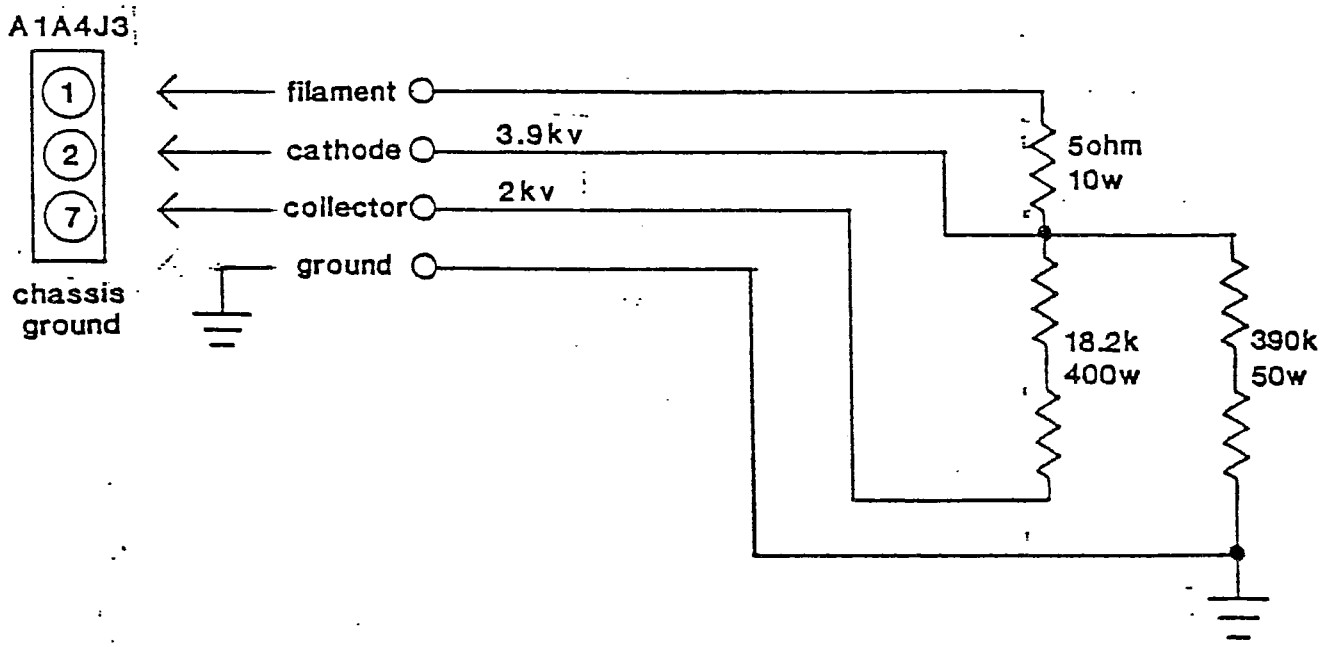


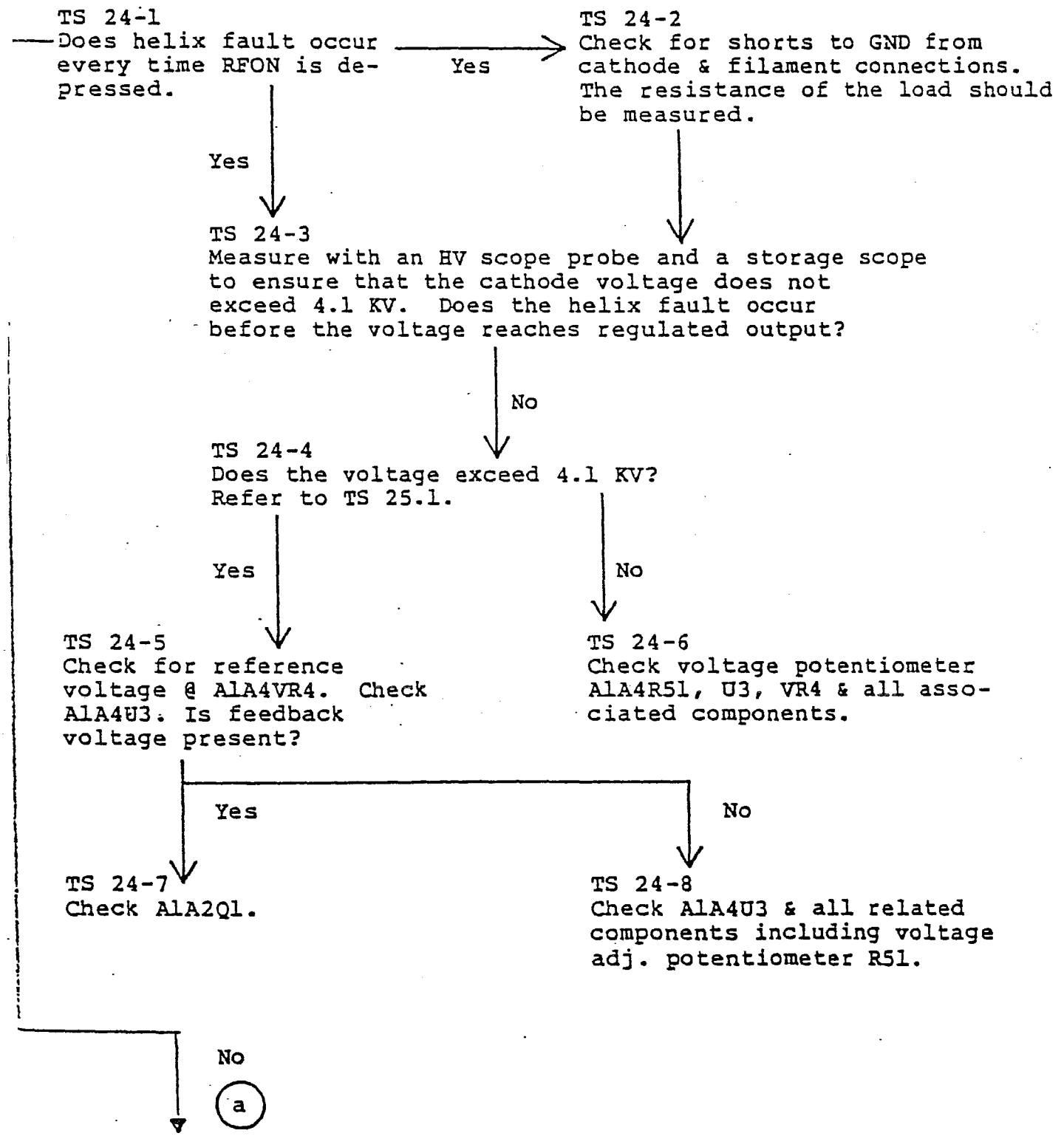
TS 23-1/23-8 Slow Start Troubleshooting Diagram

24.0 H.V. Testing and Troubleshooting

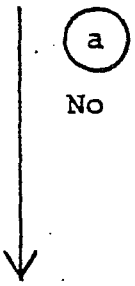
An H. V. load will be needed when troubleshooting to be sure tube is not damaged.

Figure 5-1. H.V. Testing and Troubleshooting





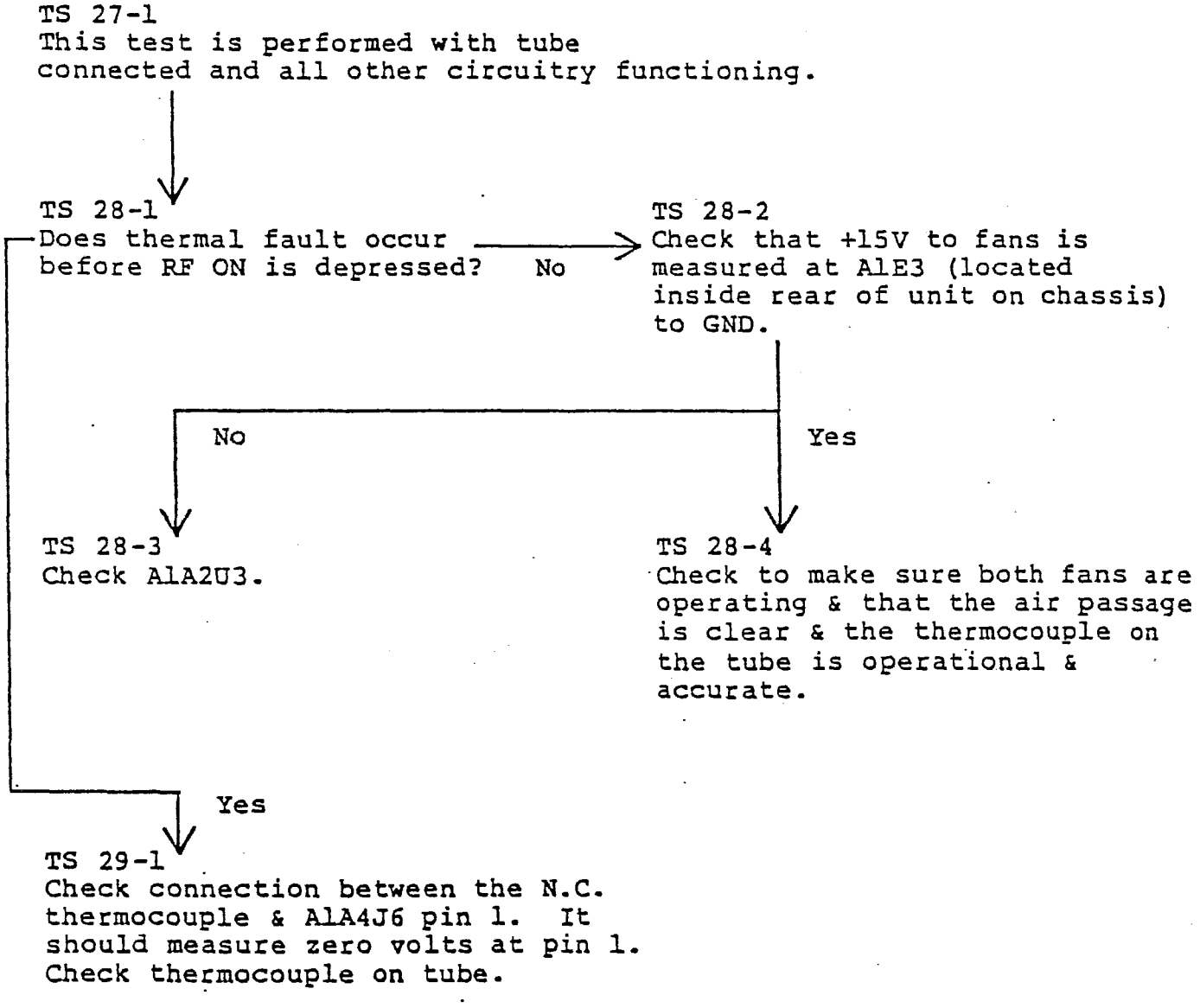
TS 24-1/24-8 Helix Fault with H.V. Troubleshooting Diagram



TS 25-1
Check that fast O.C. IC A1A4U5 pin 3 is at approx 5V and that slow O.C. A1A4U4 pin 2 is at approx 2.5V, if so check A1A4R43, R42, U5, U4.

TS 26-1
Adjust A1A4R53 to get 5V at A1A4U5 pin 3 and adjust A1A4R52 to get 2.5V at A1A4U4 pin 2.

TS 25-1/26-7 Helix Fault with H.V. Troubleshooting Diagram



TS 27-1/29-1 Thermal Fault with H. V. Troubleshooting Diagram

TS 30-1
H. V. does not need to be On when checking filament supply.
Unplug A1A2P1.

TS 31-1
First check to see if a light signal is present on the light fiber by unplugging it from A1A4U15 with the front panel. Display reading PWR ON or RF ON or STANDBY. Is the light fibre illuminated.

No → TS 31-2
Check that A1A3U14 pin 2, 3, is low or zero V. Check U16 U7A, U12 for a PWR ON signal.

Yes ↓

TS 32-1
Check that A1A4U15 pin 8 is pulled down to GND when light fibre is inserted into U15.

No → TS 32-2
Check A1A4U15.

Yes ↓

TS 33-1
Check for AC voltage from T1. Check Z1, C29, Q6, Q7, U17, CR18, CR19.

TS 30-1/33-1 No/or Low Filament Voltage Troubleshooting Diagram

CAUTION

H.V. PRESENT WHILE TESTING. DISCONNECT TUBE AND CONNECT DUMMY LOAD AS PER DIAGRAM

TS 34-1
Check A1A2TP7 to source of A1A2Q1. Check A1A2TP5 to source of A1A2Q2. Check A1A2TP6 to source of A1A2Q3. All should have drive Q1 at 50 KHz and Q2, Q3 at 25 KHz. If not, refer to preliminary calibration TS 1-1/7-1.

TS 35-1
Voltage across R37 (E4, E7) should measure approx. 150 VDC. Is voltage correct?

High → TS 35-2
If output cathode voltage is low & voltage across R37 is high, check A1A2Q2, A1A2Q3.

Low → TS 35-3
If output cathode voltage is low and voltage across R37 is low check cathode voltage. Check setting on A1A4R51.

Yes

TS 36-1
Similar waveforms should appear across Q2, Q3 of approx 350V & approx duty cycle.

No → TS 36-2
Check Q2, Q3. Check snubber circuits consisting of VR2-VR5 C1, C2, R16-R19, CR16, CR17.

Yes

TS 37-1
Check high voltage doubler and bridge. Check all H.V. output components.

TS 34-1/37-1 No/Low Cathode Voltage with H.V. Troubleshooting Diagram

CAUTION

H.V. PRESENT THROUGHOUT COLLECTOR
FAULT CIRCUIT TO LIGHT FIBRE.

TS 38-1
Disconnect light fiber pipe connected to A1A4U1. Does collector fault occur with dummy load connected?

Yes ↓

TS 39-1
Check A1A4U13, R69.

No ↓

TS 38-2
Check A1A4U1VR1, R77, R81, C3 and light fiber.

TS 38-1/39-1 Collector Fault with H.V. Troubleshooting Diagram

TS 40-1
Attempt to adjust A1A4R32, R30, R49
to acquire proper reading of meters.

TS 41-1
With correct cathode voltage check to see helix E output A1A4J2 pins 4, & 6 can be adjusted from zero V to 5V.

Yes → TS 41-2
Refer to paragraph 3.37

No

TS 42-1
Check A1A4U2, R32.

TS 43-1
For collector voltage and helix current, follow same procedure as TS 41-1, checking for voltage adjustment on corresponding pins.

TS 40-1/43-1 Inaccurate Metering with H.V. Troubleshooting Diagram

Section 6. DRAWINGS - SCHEMATICS, ASSEMBLIES AND PARTS LIST

6.0 Drawings - Schematics, Assemblies and Parts List

This section contains the schematic and assembly drawings that are essential aids in the maintenance of the A230/240-330/340-350 Series.

BUILD/TEST

NUAL REQUEST FORM

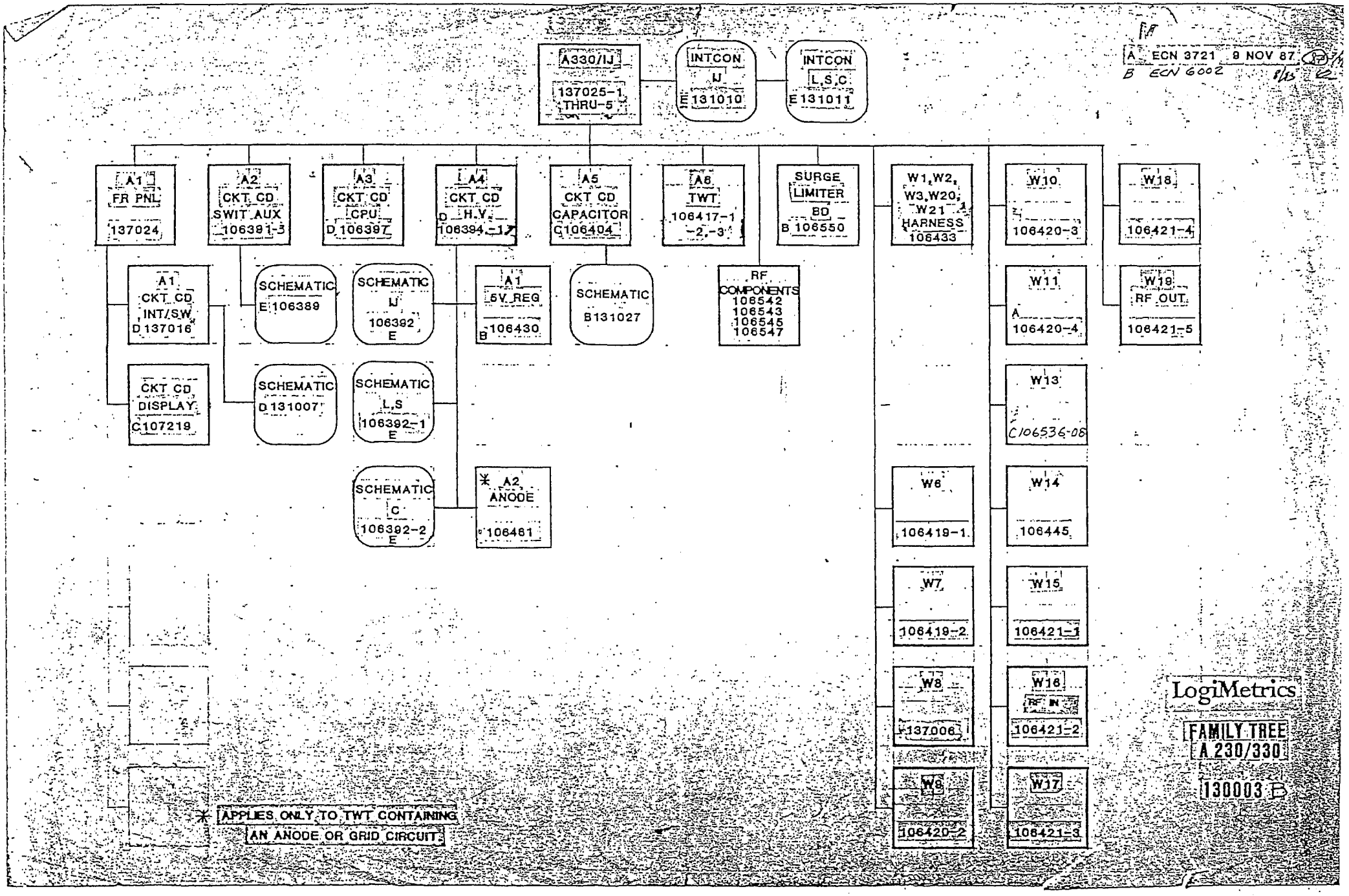
A330/C 097100

SIZE	DRAWING #	P/L	DESCRIPTION	MANUAL FOLD
B	130003		FAMILY TREE	**
E	106389		SCHEMATIC AUX SW	**
E	106392-2		SCHEMATIC H.V. CKT	**
D	131007		SCHEMATIC INT/SW	**
E	131011		SCHM INTERCONNECT A330 C	**
B	131027		SCHM CAP BD	**
D	106394-2	**	ASSY CKT CARD H.V.	**
D	106397	**	ASSY CKT CARD CPU	**
C	106404	**	ASSY CAPACITOR CARD	**
B	106430	**	ASSY 5 VOLT REG	**
C	106461	**	ASSY ANODE BD	**
B	106550	**	ASSY SURGE LIMITER	**
C	107219	**	ASSY CKT CD DISPLAY	**
D	137016	**	ASSY INT SW	**

REQUEST J.F.S DATE: _____

RECEIVED BY: _____ DATE: _____

COMPLETED BY: _____ DATE: _____


A330/IJ
137025-1 THRU-5
INTCON IJ E131010
INTCON L,S,C E131011
A ECN 3721 9 NOV 87
B ECN 6002
A1 FR PNL 137024
A2 CKT CD SWIT AUX 106391-3
A3 CKT CD CPU D 106397
A4 CKT CD D H.V. 106394-1
A5 CKT CD CAPACITOR C106404
A6 TWT 106417-1 -2, -3
SURGE LIMITER BD B 106550
W1,W2, W3,W20, W21 HARNESS 106433
W10 106420-3
W18 106421-4
A1 CKT CD INT/SW D 137016
SCHEMATIC E 106389
SCHEMATIC IJ 106392 E
A1 5V REG B 106430
SCHEMATIC B131027
RF COMPONENTS 106542 106543 106545 106547
W11 A 106420-4
W19 RF OUT 106421-5
CKT CD DISPLAY C 107219
SCHEMATIC D 131007
SCHEMATIC L,S 106392-1 E
W13 C106536-08
SCHEMATIC C 106392-2 E
* A2 ANODE 106461
W6 106419-1
W14 106445
W7 106419-2
W15 106421-1
W8 137006
W16 RF IN 106421-2
W9 106420-2
W17 106421-3
* APPLIES ONLY TO TWT CONTAINING AN ANODE OR GRID CIRCUIT
LogiMetrics
FAMILY TREE
A 230/330
130003 B

		LogiMetrics, INC. 121-03 DUPONT ST., PLAINVIEW, NEW YORK 11803	33013	PL 106394-2	F
			FSCM NO.	SHEET 1 OF 7	REV
		H. V. BOARD A4 C BAND	MODEL	PREPARED M. ROCHE DATE 6-24-86	
			SPECIFICATION	CHECKED REL. LW DATE 5-14-85	
NEXT ASSY	A330C USED ON			APPROVED QF DATE 11-5-90	

SHT	LTR	ECN	REVISION	DATE	APPROVED
	A	2820	Assy Dwg	9-14-85	LW
	B	3752	It. 88 AP	12-9-87	
	C	4156	Assy Dwg Only	12-14-88	LW
	D	4234	It. 78 AE	5-22-89	
	E	4681	It. 114, 115 BB	4 MAY 90	LW
	F		It. 100, 105, 106	8-19-92	

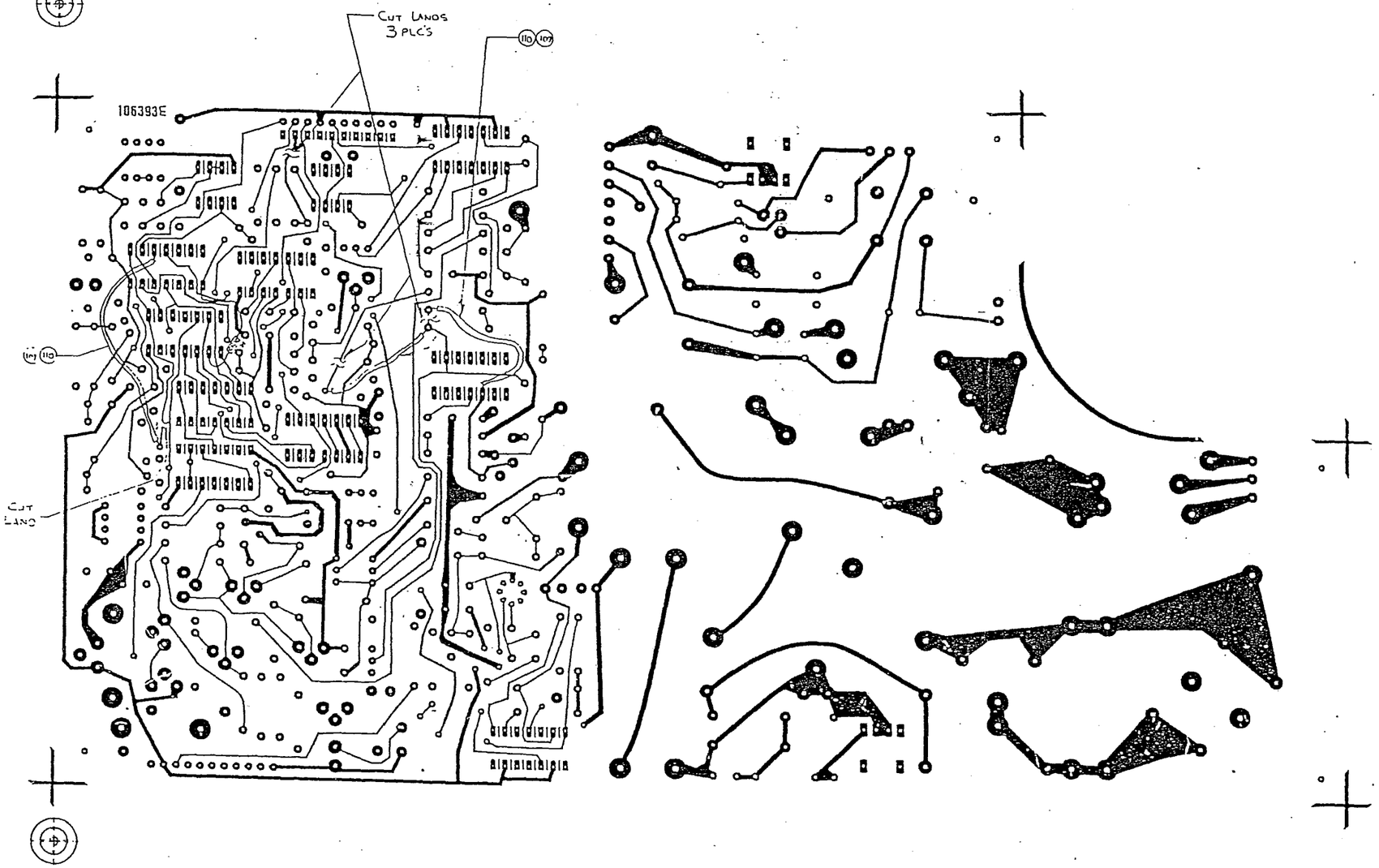
SHT	LTR	ECN	REVISION	DATE	APPROVED

*PARTIAL DESIGNATIONS ARE SHOWN. FOR COMPLETE DESIGNATION PREFIX THE PARTIAL DESIGNATION WITH UNIT NUMBER

ITEM NO.	REF. DES.	DWG SIZE	PART NO.	QTY REQD	DESCRIPTION	MFR. PART NO OR SPECIFICATION	MFR.
		D	106394-2		Circuit Card Assy		
		E	106392-2	REF	Schematic		
1		D	106393	1	Printed Wiring Bd		
2							
3							
4	J1		901510-11	1	Wafer 11 Pin .041 - .049	22-23-2111	Molex
5	J2		901518-20	1	Header Male 20 Pin .035 ± .003	609-2028	TB Ansley
6	J3		900339-7	1	Wafer 7 Pin .061/.068 .220 - .250 Pad	09-65-1071	Molex
7	J4, J6		900339-2	2	Wafer 2 Pin .061/.068 .220 - .250 Pad	09-65-1021	Molex

ARESCO, HICKSVILLE, N.Y.

REDUCE TO 12.000 ± .005



DIP SIDE

MODIFY. ACTIVE L
106393 REV F

H.V. CONTROL BOARD	LOGIMETRICS NO. 2			
	SIZE D	FSCM NO 33013	DWG NO 106394-2	REV F
DRAWN M. ROCHE.	SCALE 2/1		SHEET 2 OF 2	
ISSUED				

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A	REVISED PER ECN 2870	7/11/85	C.W.
	B	REVISED PER ECN 3757 AP	11-9-87	
	C	REVISED PER ECN 4156 CDG	12-14-88	
	D	REVISED PER ECN 4234 REE-22-89	7-6-89	
	E	REVISED PER ECN 4694 RB	4 MAY 90	C.L.
	F	ADDED ITEM 105, 106	8-18-92	ER

105

11 ROLL OVER FARSIDE SOLDER ALL AROUND BOTH SIDES

14 9 REQD U2, U4, U5, U7, U8, U9, U16, U18, U19

15 2 REQD U11, U12

J2

A1

19, 113, 114, 115, 116

13 39 REQD

J6 JUMPER SHOWN

TO ANODE BD. E1

TO ANODE BD. E2

TO E10

TO E14

TO E14 TO E16

J1

17 9 REQD Q1-Q5, Q7, Q9, Q10

9, 10, 117, 114, 115, 116

TO ANODE BOARD E3

12 2 REQD ROLL OVER FARSIDE SOLDER ALL AROUND BOTH SIDES E8, E9

1

111 TYP 2 PLCS

10 5 REQD R4, R21, R77, R81, R13

16

109, 110 TYP 3 PLCS

106

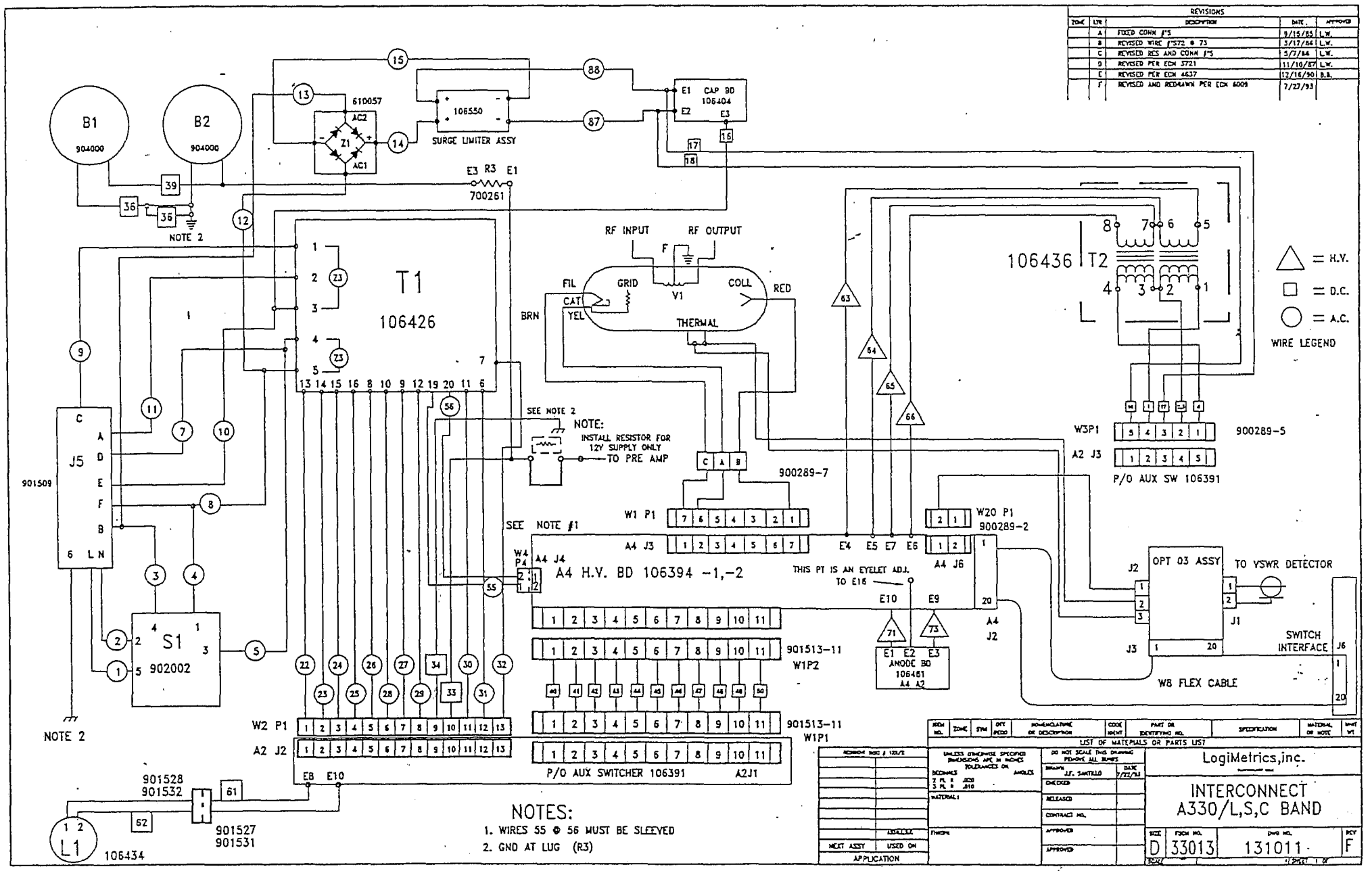
MODIFICATIONS:
1. USE PWB 106393 REV E.
2. ADD COMPONENT TO DIP SIDE OF PWB SEE SHEET 2.
3. CUT LANDS ON DIP SIDE.

CAUTION
THIS DWG IS IN PROCESS OF BEING CHANGED SEE ECN(S)
ECN 4035

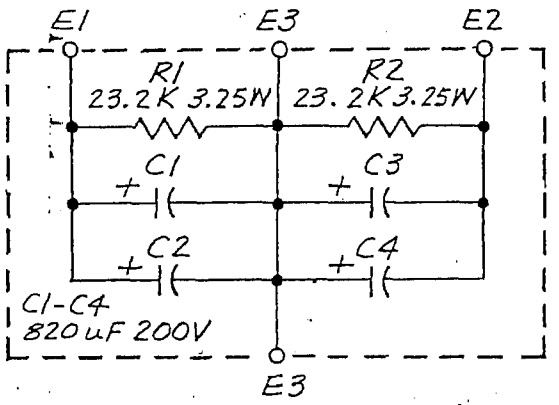
NOTES:
1. ASSEMBLE BD AS SHOWN
2. INSTALL JUMPER WIRES AS SHOWN
3. MARK S/N & LATEST REV IN 3/32 HIGH CHARACTERS USING WHITE EPOXY INK.
4. TRIM ALL LEADS .06 FROM BOTTOM OF PWB.

SEE SEPARATE PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS ± DECIMALS ± ANGLES ±	CONTRACT NO.	LogiMetrics, INC. PLAINVIEW, NEW YORK		
	APPROVALS:	DATE	CIRCUIT CARD ASSEMBLY H.V. CONTROL BOARD (MODIFICATION) C BAND	
MATERIAL	DRAWN M. ROCHE	5-24-85		
A330 C	CHECKED		SIZE D	FSCM NO. 33013
NEXT ASSY USED ON	ISSUED		DWG. NO. 106504-2	REV F
APPLICATION	PROD ACT SCHED DRAWING	5/24/85	SCALE 4/1 F.J. RDC MIL COPY	SHEET 1 OF 2


REVISIONS
ZONE LTR DESCRIPTION DATE APPROVED
A FIXED CONN #'S 9/15/85 L.W.
B REVISED WIRE #'S72 & 73 3/17/86 L.W.
C REVISED RCS AND CONN #'S 5/7/86 L.W.
D REVISED PER ECN 3721 11/10/87 L.W.
E REVISED PER ECN 4637 12/16/90 B.B.
F REVISED AND REDRAWN PER ECN 6009 7/27/93
B1 904000
B2 904000
610057
Z1
106550
SURGE LIMITER ASSY
CAP BD 106404
E1 E2 E3
E3 R3 E1 700261
NOTE 2
T1 106426
RF INPUT
RF OUTPUT
FIL
GRID
CAT
YEL
V1
COLL
RED
BRN
THERMAL
106436 T2
= H.V.
= D.C.
= A.C.
WIRE LEGEND
J5 901509
SEE NOTE 2
NOTE: INSTALL RESISTOR FOR 12V SUPPLY ONLY TO PRE AMP
900289-7
W1 P1
A4 J3
SEE NOTE #1
W4 P4
A4 J4
A4 H.V. BD 106394 -1,-2
THIS PT IS AN EYELET ADJ. TO E16
W20 P1
900289-2
A4 J6
W3P1
A2 J3
900289-5
P/O AUX SW 106391
OPT 03 ASSY
TO VSWR DETECTOR
J1
J2
J3
SWITCH INTERFACE
J6
W8 FLEX CABLE
A4 J2
S1 902002
901513-11
W1P2
ANODE BD 106451 A4 A2
W2 P1
A2 J2
901513-11
W1P1
P/O AUX SWITCHER 106391 A2J1
901528
901532
901527
901531
L1 106434
NOTES:
1. WIRES 55 & 56 MUST BE SLEEVED
2. GND AT LUG (R3)
LIST OF MATERIALS OR PARTS LIST
LogiMetrics,inc.
INTERCONNECT
A330/L,S,C BAND
SIZE D
FSCM NO. 33013
DWG NO. 131011
REV F

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED



CAPACITOR BD ASSY 106404

NEXT ASSY	USED ON
	A240/A340
	A330
	A340 K SERIES
	A600 115V 1Φ
	A500 115V 1Φ

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON DECIMALS ANGLES
2 PL ± —
3 PL ± —
MATERIAL: —
FINISH: —

DO NOT SCALE THIS DRAWING
REMOVE ALL BURRS
DRAWN C. WALLACE DATE 19NOV80
CHECKED
RELEASED
CONTRACT NO.
APPROVED 11/20/80
APPROVED

LogiMetrics, INC.
PLAINVIEW, NEW YORK

SCHEMATIC, DIAGRAM
CAPACITOR BOARD ASSY

SIZE	FSCM NO.	DWG. NO.	REV
B	33013	131027	

SCALE NONE SHEET 1 OF 1

ARESCO, HICKSVILLE, N.Y.-OGILVIE 036401

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	U	REDRAWN	9JAN91	
	V	REVISED PER ECN 5154	7MAR93	
	W	REVISED PER ECN 6075	8JUN94	
	X	REVISED PER MRCAP 018	2/16/95	

TO 106422 (L2)

ISOLATED +12VDC(A)

ISOLATED +12VDC(B)

AUX +12VDC

AUX -12VDC

12V RET(A)

12V RET(B)

15V COM

+15V

+300VDC INPUT

CENTER TAP OUTPUT

300V COM

CHOPPER OUTPUT 1

CHOPPER OUTPUT 2

CHOPPER SNUBBER NETWORK

ISOLATED CKTS (FLOATING AT LINE POTENTIAL)

DISABLE RELAYS

BUCK REG OPTO COUPLER

BUCK REG SWITCH DRIVER

CATCH DIODE

FET CHOPPER CIRCUIT

CHOPPER OPTO COUPLERS

CHOPPER SW DRIVER U11 SG1627

PWM HV REG

SQ WAVE CHOPPER DRIVER

BUCK REG OPTO DRVR

SLOW START RESET

SLOW START ENABLE

FEEDBACK

NOTES: UNLESS OTHERWISE SPECIFIED:

1. RESISTANCE VALUES ARE EXPRESSED IN OHMS, 1/4W.
2. CAPACITANCE VALUES ARE EXPRESSED IN MICROFARADS.
3. SEE PL FOR COMPONENT PART NO'S.
   GENERIC PART NO'S ARE SHOWN ON THIS DOCUMENT.

ASSY 106391-3

REFERENCE DESIGNATIONS

HIGHEST NO. USED				NOT USED			
C58	CR101	E17	J3	C1,2,3	C33-50	C57	CR133
K2	R102	TP7	U13	C28-10	CR19	CR24-100	E9
VR10	Z5	L3	Q5	R11,14,15	R29,34,35	C55	R38-59
S1	R105	CR105		R44-99	TP2	L1,L2	

LIST OF MATERIALS OR PARTS LIST

ITEM NO.	ZONE	SYM	QTY REQD	NOMENCLATURE OR DESCRIPTION	CODE IDENT	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTE
				A 240 I J				
				A 330 L S				
				C I J				

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON: DECIMALS ANGLES MATERIAL FINISH NEXT ASSY USED ON APPLICATION

DO NOT SCALE THIS DRAWING REMOVE ALL BURRS

DRAWN L. WALLACE DATE 9JAN91
CHECKED QF 2/11/93
RELEASED
CONTRACT NO.
APPROVED 7/11/95

LogiMetrics, INC.
SCHEMATIC DIAGRAM
AUX SWITCHING CKT

SIZE D | FSCM NO. 33013 | DWG NO. 106389 | SCALE NU | SHEET 1 OF 1

LogiMetrics, INC. 121-03 DUPONT ST . PLAINVIEW, NEW YORK 11803	H.V. BOARD	33013 FSCM NO.	PL 106394-2 SHEET 2 OF 7	F REV

ITEM NO.	REF. DES.	DWG SIZE	PART NO.	QTY REQD	DESCRIPTION	MFR. PART NO. OR SPECIFICATION	MFR.
8	J5		900339-3	1	WAFER 3PIN .062 - .070 .220 - .250 PAD	09-65-1031	MOLEX
9			550125	A/R	SILICON COMPOUND		
10			550349	1	HEAT SINK U6		
11	TP1		550079	1	TEST POINT (TERMINAL SOLDER)		
12	E8, E9		550117	2	TERMINAL SOLDER .114 ± .002 .000	160-1724-02-01	CAMBION
13	E1 THRU E7 E1 THRU E16		550404	39	TERMINAL SOLDER .118 ± .002	T100-3	BEAD CHAIN COIL
14			900231	9	SOCKET 14 PIN		
15			900307	2	SOCKET 8 PIN U11, U12		
16			900308	1	SOCKET 8 PIN U3		
17			550358	8	MTG. PAD		
18			101295	5	MTG. PAD		
19	A1		106430	1	BRACKET ASSY		
20							
21							
22							
23							
24							
25							
26	A2	B	106461	1	ANODE BOARD ASSY		
27							
28							

ARGOLD, MILLSVILLE, N. J. - USA

FORM L102

CODE IDENT 33013 P/L 106394-2 PAGE 3 OF 7 REV. F

ITEM #	REF. DES.	DWG SIZE	PART #	QTY REQD	DESCRIPTION	MFR. PART # OR SPEC.	MFR.
29	R83, R84		700449	2	470K 1/4W		
30	R4		700691	1	33 OHM , 2W		
31	R2, R3, R19, R20		700685	4	1.5 M OHM 4W		
32	R5, 6		700139	2	47 OHM , 1/4W		
33	R77		700042	1	68 OHM , 1W		
34	R75		700116	1	100 OHM , 1/4W		
35	R72, 54, 37		700122	3	2.2K, 1/4W		
36	R21. R13		700074	2	470 OHM , 1W		
37	R29, 69, 61, 56, 64, 65 74		700103	7	1K, 1/4W		
38							
39	R8, 9, 10, 11, 14, 15		700281	6	3M, 3W, 1%		
40	R16, 17, 24		700253	3	7.15K 1%, 1/2W		
41	R23, 71		700068	2	560 OHM 1/2W		
42	R22, 55, 59, 63, 87, 80, 82, 85, 70		700121	9	4.7K, 1/4W		
43	R78, R44		700166	2	27K, 1/4W		

ITEM #	REF. DES.	DWG SIZE	PART #	QTY REQD	DESCRIPTION	MFR. PART # OR SPEC.	MFR.
44	R32,49, 51,52, 30		700237	5	5K POT TOP ADJUST	INSTALL JUMPER R53 2 TO 3	
45	R31,33,39, 45,57,34, 48,35 , 47		700181	9	3.9K, 1/4W		
46	R38		700165	1	10K,1/4W		
47	R28		700184	1	8.2K,1/4W		
48	R25		700189	1	6.8K,1/4W		
49	R26		700448	1	510K,1/4W		
50	R27		700277	1	51K,1/4W		
51	R40,46		700203	2	2.7K,1/4W		
52	R41, R60		700150	2	220 OHM ,1/4W		
53	R86		700179	1	18K,1/4W		
54	R50		700016	1	470 OHM , 1/2W		
55	R42, R43		700144	2	150 OHM ,1/4W		
56	R66,67		700151	2	820 OHM ,1/4W		
57	R62		700234	1	1M,1/4W		
58							
59	R36,58, ,73		700119	3	470 OHM .1/4W		
60	R81			1	1W,S.I.T		
61	C1,2		800311	2	.05uf,3KV		
62	C3,15,32,47, 23,25,26,27, 46		800122	9	1MFD 50V		

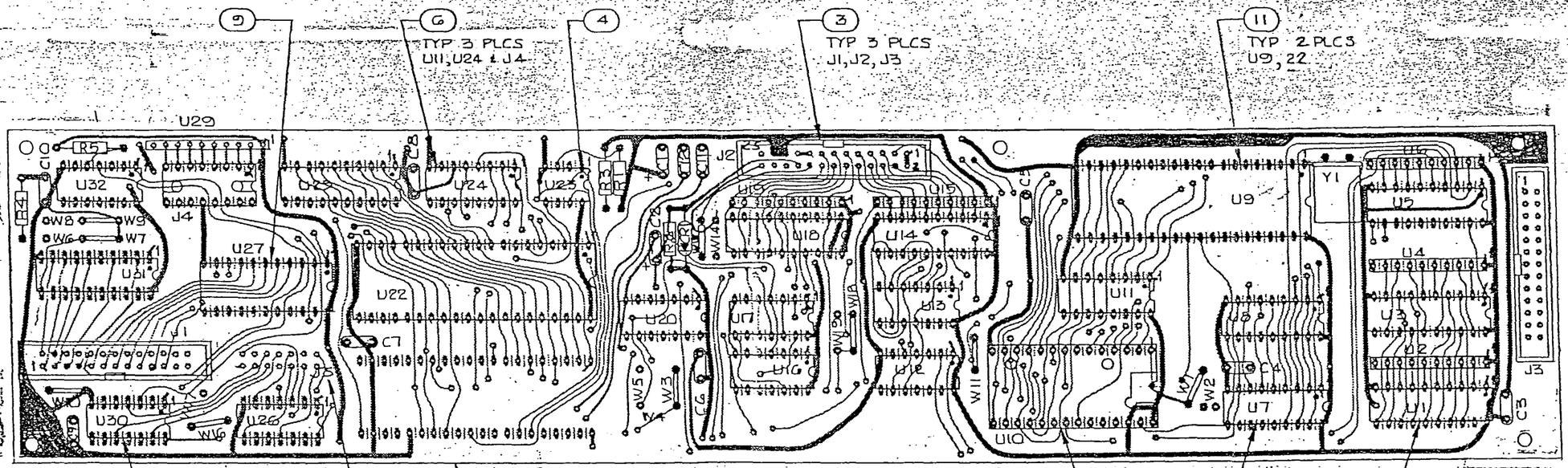
8

ITEM #	REF. DES.	DWG SIZE	PART #	QTY REQD	DESCRIPTION	MFR. PART # OR SPEC.	MFR.
63	C8, C33, C34		800023	3	.01, 50V		
64	C29		800421	1	4700uf, 16V		
65	C11, 12, 13, 40, 20, 21, 22, 30, 31		800128	9	6.8uf, 35V		
66	C6, 7		800132	2	.01, 3KV		
67	C4		800428	1	.05uf, 5 KV		
68	C10 C41 THRU C45		800002	6	.47uf, 50V		
69	C14		800165	1	110pf, 500V		
70	C16, 19		800259	2	.047uf, 100V		
71	C17		800003	1	470pf, 200V		
72	C18		800026	1	.0018, 50V		
73	C24, 28, 35, 37, 38, 39		800001	6	0.1uf, 100V		
74	C36		800397	1	100uf, 10V		
75	CR1, 2, 3, 4		610161	4	HVF2500		
76	CR5, 6		610085	2	RK600		
77	CR18, 19		610006	2	IN4002		
78	CR8, 9, 7, 11, 12, 22		610001	6	IN914		
79	CR13, 14, 15, 16, 10, 17, 20, 21		610065	8	HP2800		

CODE IDENT 33013			P/L 106394-2		PAGE 6 OF 7	REV. F
ITEM #	REF. DES.	DWG SIZE	PART #	QTY REQD	DESCRIPTION	MFR. PART # OR SPEC.	MFR.
80	C49, C50		800124	2	10uf		
81	C51		800188	1	220pf		
82	VR1, VR2, VR6		610060	3	IN5337 ZENER		
83	VR5		610053	1	IN5339		
84	VR4		610028	1	IN751		
85	VR3		610014	1	IN757		
86							
87	U1, U14		901146-1	2	HFBR1500		
88	C53		800064	1	01uf 1KV		
89	U5		670039	1	LM311		
90	U2, U4		670061	2	LM747		
91	U3		670112	1	LM301AH TO 5		
92	U6		670072	1	LM7805CT ON H.S.		
93	U7		670133	1	74LS04N		
94	U11		670096	1	LM555CN		
95	U12		670233	1	HCPL2730		
96	U16		670303	1	SN7416		
97	U9		670002	1	SN7474		
98	U8, U18		670065	2	7427		
99	U15, U13		901146-2	2	HFBR25000		
100							

CODE IDENT 33013			P/L 106394-2		PAGE 7 OF 7		Rev. F
ITEM #	REF. DES.	DWG SIZE	PART #	QTY REQD	DESCRIPTION	MFR. PART # OR SPEC.	MFR.
101	U19		670178	1	LM556		
102	Q6		640012	1	MJE2955		
103	Q2, Q5, Q9, Q7, Q3, Q10		640031	6	2N3906		
104	Q1, Q4		640007	2	2N4410		
105			187175-6	1	FIBER OPTIC CABLE ASS'Y		
106			187175-7	1	FIBER OPTIC CABLE ASS'Y		
107	Z1		610039	1	VH447 BRIDGE		
108							
109				A/R	WIRE #20 AWG		
110				A/R	SLEEVING		
111			901162	A/R	WIRE H.V. 18AWG	F01B060	
112							
113			510103	2	SCREW PAN HD. 4-40X5/16		
114			500501	3	WASHER FLAT #4		
115			500251	3	WASHER SPLIT #4		
116			500002	3	NUT HEX 4-40		
117			510104	1	SCREW, PAN HD 4-40X3/8		
118							
119							
120							
121							

ZONE	REV	DESCRIPTION	DATE	APPROVED
	D	REVISED PER ECN 2354	10-84	
	E	REVISED PER ECN 2412	1-30-85	
	F	REVISED PER ECN 2426	5-10-85	
	G	REVISED PER ECN 2654	5-10-85	
	H	REVISED PER ECN 2885	12-2-85	
	J	REVISED P/L PER ECN 3366 RPD	1-14-87	



9

6 TYP 3 PLCS U11, U24 & J4

4

3 TYP 3 PLCS J1, J2, J3

11 TYP 2 PLCS U9, 22

5 TYP 8 PLCS U12, 13, 16, 17, 20, 26, 30, 32

SEE NOTE 2

1

10

7 TYP 2 PLCS U7, U8

8 TYP 7 PLCS U1, 3, 5, 14, 18, 25, 31

NOTES:
1. INSTALL JUMPERS: W1, W5, W7, W9, W10, W11, W15, W16, W18
2. INSTALL J5 FOR TEST ONLY. 901511-14 MFG P/N 609-1427

SEE SEPARATE PARTS LIST

PROPRIETARY INFORMATION

147203	050000	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS ± 1/32 DECIMALS .XX ± .02 .XXX ± .010 ANGLES ± 2° MATERIAL	CONTRACT NO.	APPROVALS	DATE
106422	457000			DRAWN J. MURRAY	10-12-84
NEXT ASSY %	USED ON			CHECKED	
APPLICATION		DO NOT SCALE DRAWING		ISSUED LOU ALLCACE	10-12-84
				APPROVED J. D.	10-12-84

LogiMetrics, INC.
CIRCUIT CARD ASSEMB
CPU
A3

SIZE D | PROD NO. 33013 | DWG NO. 106391
SCALE 2/1 | SHEET 1 OF

147201-718	564000
147203	050000
137060	A340K
107368	A61DP
106422	457000
NEXT ASSY	USED ON

LogiMetrics, INC.
121-03 DUPONT ST., PLAINVIEW, NEW YORK 11803

CIRCUIT CARD ASSY
CPU A3

CODE IDENT NO	33013	PL 106397	J
SHEET	1 OF 4		REV
MODEL	PREPARED	RK	DATE 5/15
SPECIFICATION	CHECKED	L.W.	DATE 11JUN84
	APPROVED	T.L.	DATE 4/19

SHT	LTR	ECN	REVISION	DATE	APPROVED
	A				
	B	2378	ITEMS 47, 51, 56 & 58	21SEP84	L.W.
	C	2387	SEE ASSY.	26SEP84	L.W.
	D	2394	ITEMS 2, 3, 21	12OCT84	L.W.
	E	2412	ITEM 2	10/30/84	L.W.
	F	2496	ASSY ONLY	19FEB85	L.W.
	G	2656	IT. 11, 44, 47	10MAY85	L.W.
	H	2885	ITEM 22	20DEC85	G.H.
			FORMERLY SE2537A		

SHT	LTR	ECN	REVISION	DATE	APPROVED
M	J	3366	IT. 4,5,7,8,9,10,11 RED	14-87	

PROPRIETARY INFORMATION

*PARTIAL DESIGNATIONS ARE SHOWN. FOR COMPLETE DESIGNATION PREFIX THE PARTIAL DESIGNATION WITH UNIT NUMBER A3

ITEM NO.	REF. DES.	DWG SIZE	PART NO.	QTY REQD	DESCRIPTION	MFR. PART NO OR SPECIFICATION	MFR.
		D	106397		CIRCUIT CARD ASSY		
		C	106395	REF	SCHEMATIC		
1		D	106396	1	PRINTED WIRING BOARD		
2							
3	J1, J2, J3		901519-26	3	CONNECTOR, HEADER PWB 26 CONTACTS	609-2627	TBANSLEY
4	XU23		900307	1	SOCKET 8PIN	ICA-083-S-T	ROBINSON NUGENT
5	XU12,13,16,17 20,26,30,32		900231	8	SOCKET 14 PIN	ICA-143-S-T	ROBINSON NUGENT
6	XJ4,U11,U24		900348	3	SOCKET 16 PIN	ICA-163-S-T	ROBINSON NUGENT
7	XU7,8		900477	2	SOCKET 18 PIN	ICA-183-S-T	ROBINSON NUGENT

BRUNING 40-21 30631-4
FORM L101

LogiMetrics, INC. 121-03 DUPONT ST., PLAINVIEW, NEW YORK 11803	CIRCUIT CARD ASSY CPU	33013 CODE IDENT NO	PL 106397 SHEET 2 OF 4	J REV

ITEM NO.	REF. DES.	DWG SIZE	PART NO.	QTY REQD	DESCRIPTION	MFR. PART NO. OR SPECIFICATION	MFR.
8	XU1,3,5,14 19,25,31		901703-1	7	SOCKET, IC 20 PIN DUAL-IN-LINE	70620-11	SCANBE
9	XU27		901700	1	SOCKET, IC 22 PIN DUAL-IN-LINE	ICA-224-S-T	ROBINSON NUGENT
10	XU10		901701	1	SOCKET, IC 28 PIN DUAL-IN-LINE	ICA-286-S-T	ROBINSON NUGENT
11	XU9,22		901702	2	SOCKET, IC 40 PIN DUAL-IN-LINE	ICA-406-S-T	ROBINSON NUGENT
12							
13							
14							
15							
16							
17							
18							
19							
20	C11 C12		800246	2	CAPACITOR .01 uf, 200V		
21	C3-C10		800295	8	CAPACITOR 0.1 uf, 100V		
22	C1 C2		800283	2	CAPACITOR 47 uf, 35V		
23							
24	Y1		901800	1	CRYSTAL, MICROPROCESSOR 6.144MHZ	MP061	CTS KNIGHT
25							
26	CR1		610001	1	DIODE	1N914	
27							
28							

BRUNING 40-21 30631

FORM L102

LogiMetrics, INC. 121-03 DUPONT ST., PLAINVIEW, NEW YORK 11803	CIRCUIT CARD ASSY CPU	33013 CODE IDENT NO	PL 106397 SHEET 3 OF 4	J REV

ITEM NO.	REF. DES.	DWG SIZE	PART NO.	QTY REQD	DESCRIPTION	MFR. PART NO. OR SPECIFICATION	MFR.
29	U12		670090	1	I.C. QUAD 2 INPUT NAND	74LS00	
30	U20		670131	1	I.C. QUAD 2 INPUT NOR	74LS02	
31	U13, U32		670133	2	I.C. HEX INVERTER	74LS04	
32	U16		670134	1	I.C. QUAD 2 INPUT AND	74LS08	
33	U17		670216	1	I.C. QUAD 2 INPUT OR	74LS32	
34	U24, U11		670140	2	I.C. 3 BIT TO OCTAL DEC	74LS138	
35	U3		670170	1	I.C. OCTAL TRANSPARENT LATCH	74LS373	
36	U25, U14 U18		670287	3	I.C. OCTAL TRANSCEIVER	74LS640	
37	U1, U5		670286	2	I.C. BUFFER	74LS645-1	
38	U31		670288	1	I.C. GPIB DRIVER	75160	
39	U27		670289	1	I.C. GPIB DRIVER	75162	
40	U26		670290	1	I.C. GPIB DRIVER	75188	
41	U30		670291	1	I.C. GPIB DRIVER	75189	
42	U23		670292	1	I.C. GPIB DRIVER	75454BP	
43	U9		670293	1	I.C. 8 BIT MICROPROCESSOR	8085	
44	U21				USED WITH RS232 ONLY		
45	U22		670294	1	I.C. LSI GPIB	TMS 9914A	
46	U8, U7		670285	2	I.C. RAM 4 x 1024	2114	
47							
48							
49							

BRUNING 40-21 30631

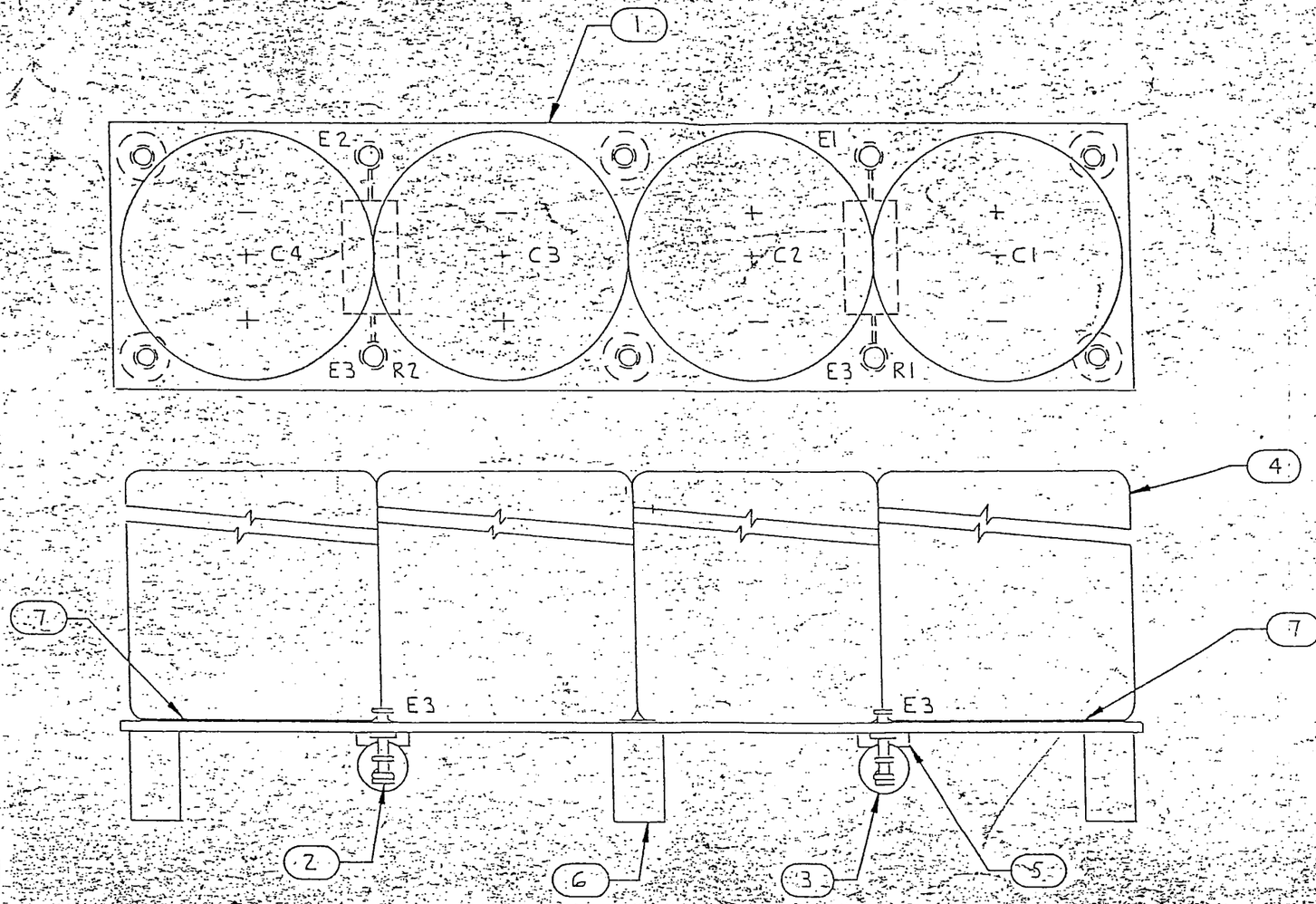
FORM L102

LogiMetrics, INC. 121-03 DUPONT ST., PLAINVIEW, NEW YORK 11803	CIRCUIT CARD ASSY CPU	33013 CODE IDENT NO	PL 106397 SHEET 4 OF 4	J REV

ITEM NO.	REF. DES.	DWG SIZE	PART NO.	QTY REQD	DESCRIPTION	MFR. PART NO. OR SPECIFICATION	MFR.
50	R1,R3,R4, R5		700121	4	RESISTOR 4.7K Ω, 1/4 W		
51							
52	R6		700329	1	RESISTOR 39K Ω, 1/4 W		
53	U29		670308	1	RESISTOR 9X10K Ω SIP	110A103	ALLEN BRADLEY
54	U2,U4,U6, U15,U19		670309	5	RESISTOR 9X4.7K Ω SIP	110A472	ALLEN BRADLEY
55							
56							
57							
58							
59							
60							
61							
62							
63							
64							
65							
66							
67							
68							
69							
70							

ORM L102

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	REVISED & REDRAWN ECN 2381 JM	21 SEPT 84	L.W.
	B	REVISED PER ECN 2921	1-31-86	L.W.
M	C	REVISED PER ECN 3073	5-5-86	L.W.



REF DOCUMENT
SCHEM DIAG: 131027

SEE SEPARATE PARTS LIST

ITEM NO.	ZONE	SYM	QTY REQD	NOMENCLATURE OR DESCRIPTION	CODE IDENT	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTE

LIST OF MATERIALS OR PARTS LIST

1.37060	A 340 K1
1.0647	+57000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON DECIMALS 2 PL ± .4 3 PL ± .4 ANGLES ±
MATERIAL: ±
FINISH: ±

DO NOT SCALE THIS DRAWING
REMOVE ALL BURRS

		DATE
DRAWN	J. MIREO	21 SEPT 84
CHECKED		
RELEASED	L. WALLACE	27 SEPT 84
CONTRACT NO.		
APPROVED	J.D.	27 SEPT 84
APPROVED		12/8/86

LogiMetrics, INC.
PLAINVIEW, NEW YORK

CIRCUIT CARD ASSY
CAPACITOR BOARD
A5

SIZE	FSCM NO.	DWG NO.	REV
C	33013	106404	C

SCALE 2/1 SHEET 1 OF 1

		LogiMetrics, INC.	33013	PL 106404	C
		121-03 DUPONT ST., PLAINVIEW, NEW YORK 11803	CODE IDENT NO	SHEET 1 OF 1	REV
137060	A340K	CIRCUIT CARD ASSY	MODEL	PREPARED RK	DATE 6/5
	347000	CAPACITOR BD		CHECKED	DATE 6
106422	457000	A5	SPECIFICATION	APPROVED	DATE
NEXT ASSY	USED ON				

SHT	LTR	ECN	REVISION	DATE	APPROVED
	A	2381	REVISED PER ECN	21 Sept 84	C.W.
	B	2921	IT, 7	1-31-86	C.W.
	C	3073	IT, 6	5-5-86	C.W.

FORMERLY SK2541

SHT	LTR	ECN	REVISION	DATE	APPROVED

*PARTIAL DESIGNATIONS ARE SHOWN. FOR COMPLETE DESIGNATION PREFIX THE PARTIAL DESIGNATION WITH UNIT NUMBER A5

ITEM NO.	REF. DES.	DWG SIZE	PART NO.	QTY REQD	DESCRIPTION	MFR. PART NO OR SPECIFICATION	MFR.
		C	106404	—	CIRCUIT CARD ASSY		
		B	131027	REF	SCHEMATIC		
1		C	106403	1	PWB FABRICATION		
2	E1,E2 E3,E4		550306	4	TERMINAL, SOLDER	160-1042-02-01	CAMBION
3		A	101295	2	COMP. SPACING PAD (R1,R2)		
4	C1,C2 C3,C4		800424	4	CAPACITOR, 820uf, 200V	ECE-S2DH821U	PANASONIC
5	R1,R2		700689	2	RESISTOR, 23.2K 3.25W	RS-2C	DALE
6			550419	6	STANDOFF, SWAGE 6-32 x 1/2 LG 1/4 ROUND	9537B-A-0632-16	AMATOM
7		A	106552	2	CAP BOARD INSU.		

FORM L101

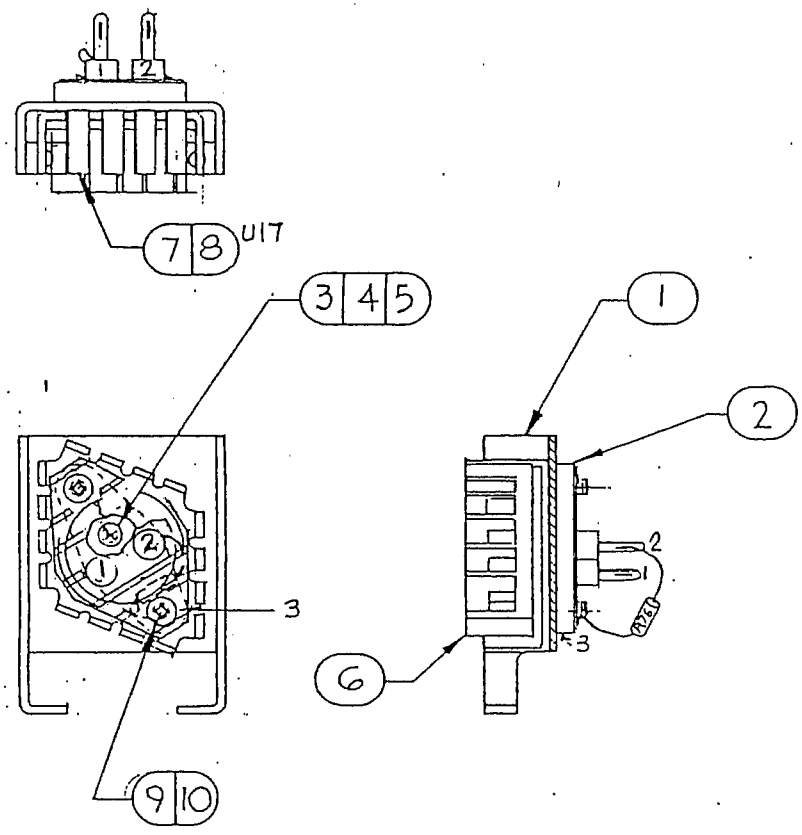
LogiMetrics, INC. 121-03 DUPONT ST., PLAINVIEW, NEW YORK 11803	5V REGULATOR ASSY	33013 CODE IDENT NO	PL 106430 SHEET 2 OF 2	C REV

ITEM NO.	REF. DES.	DWG SIZE	PART NO.	QTY REQD	DESCRIPTION	MFR. PART NO. OR SPECIFICATION	MFR.
8	U17		670152	1	I.C., 5V REGULATOR	LAS1905B	LAMBDA
9			MS51957-31	2	SCREW, PN HD #6-32x5/8	ST. STL	
10			MS35338-136	2	L'WASHER, SPLIT #6	ST. STL	
11	R76	1	700144	1	RESISTOR 150Ω 1/4W	RCR07	

BRUNING 40-21 30631

FORM L102

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	REVISED PER ECN 2453	12/7/84	C.W.
	B	REVISED PER ECN 2514 JM	3 APR 85	C.W.
M	C	REVISED PER ECN 2873	18 NOV 85	C.W.



SEE SEPARATE PARTS LIST

NOTE:
TIE R-76 BETWEEN PINS 2 & 3

106394	457000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON DECIMALS 2 PL ± 3 PL ± ANGLES
MATERIAL:
FINISH:

DO NOT SCALE THIS DRAWING REMOVE ALL BURRS
DRAWN J. MIRRO DATE 8/3/84
CHECKED
RELEASED 406 C. WALLACE 2 AUG 84
CONTRACT NO.
APPROVED J.D/AH 8-8-84
APPROVED

LogiMetrics, INC.
PLAINVIEW, NEW YORK

5V REGULATOR ASSY

SIZE	CODE IDENT NO.	DWG. NO.	REV
B	33013	106430	C

SCALE FULL SHEET 1 OF 1

BRUNING 40-21 30631-5

		LogiMetrics, INC. 121-03 DUPONT ST., PLAINVIEW, NEW YORK 11803	33013	PL 106430	C
			CODE IDENT NO	SHEET 1 OF 2	REV
		5V REGULATOR ASSY A4A1	MODEL	PREPARED J MIRED	DATE 8-8-84
				CHECKED 406 C.WALLACE	DATE 9 AUG 84
			SPECIFICATION	APPROVED	DATE 9/23/84
106394	457000				
NEXT ASSY	USED ON				

SHT	LTR	ECN	REVISION	DATE	APPROVED
	A	2453	I.T. 11	12/7/84	C.W.
M	B	2514	SEE ASSY DWG JM	3 APR 85	C.W.
	C	2873			

SHT	LTR	ECN	REVISION	DATE	APPROVED

*PARTIAL DESIGNATIONS ARE SHOWN. FOR COMPLETE DESIGNATION PREFIX THE PARTIAL DESIGNATION WITH UNIT NUMBER A4A1

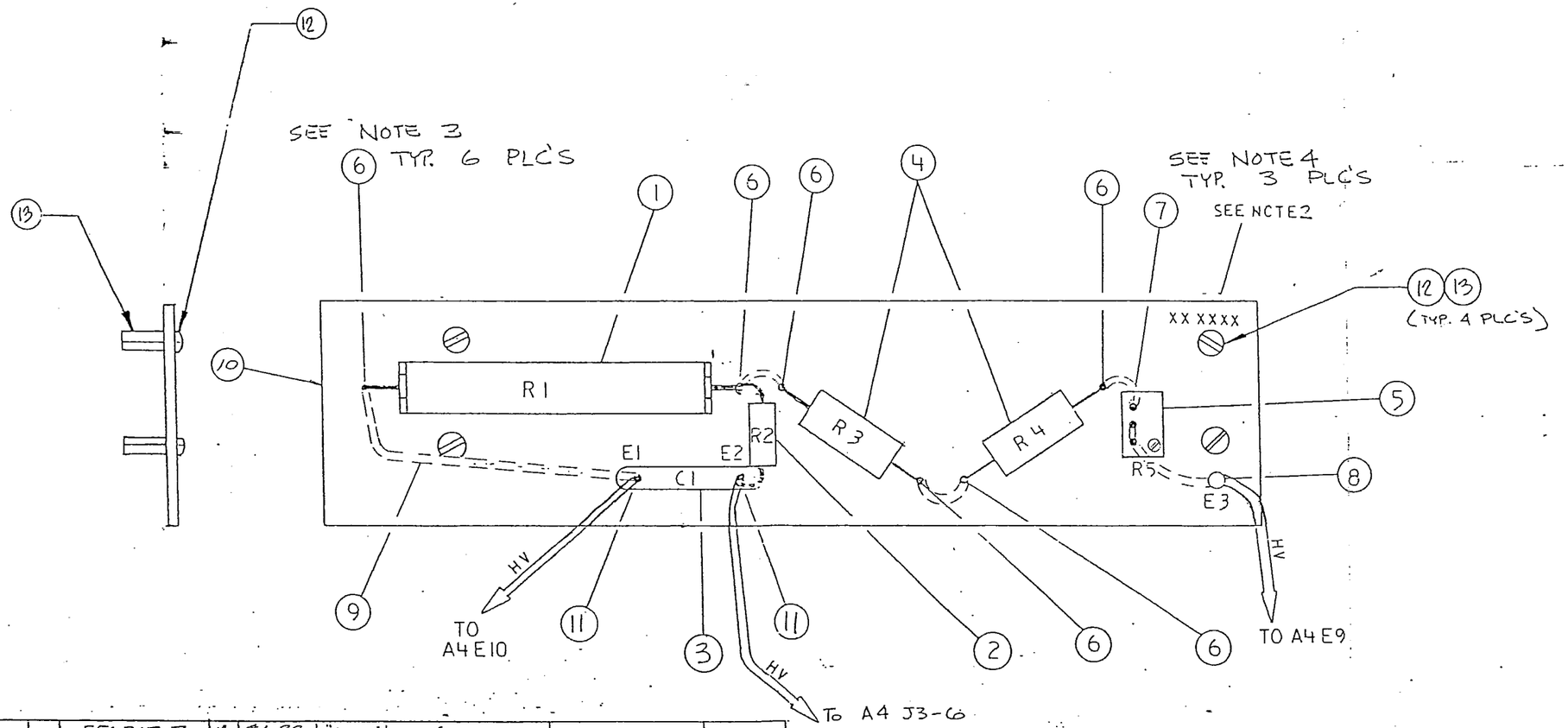
ITEM NO.	REF. DES.	DWG SIZE	PART NO.	QTY REQD	DESCRIPTION	MFR. PART NO OR SPECIFICATION	MFR.
		B	106430	REF	5V REGULATOR ASSY		
1		B	106429	1	BRACKET		
2			900081	1	SOCKET, TRANSISTOR	9866-15-01	EBY
3			NAS662C2R5	1	SCREW FLT HD 100°	#2-56 x 5/16 LG	ST. STL
4			MS35338-134	1	L'WASHER SPLIT #2	ST. STL	
5			MS35649-224	1	NUT HX HD #2-56	ST. STL	
6			550854-3	1	HEATSINK	5423B	AAVID
7			550611	1	HEATSINK	6013	THERMALLOY

BRUNING 40-21 30631-4

FORM L101

BISHOP GRAPHICS, INC.
REORDER NO 1845

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A	REVISED PER ECN 2680	7-22-85	C.W.
	B	REVISED PER ECN 3093	5-23-86	C.W.



ITEM	REF. DES.		PART NO.	QTY	DESCRIPTION	MFG. PART NO	MFG.
13			550315-7	4	#6-32 ½" LONG NYLON STANDOFF		
12				4	#6-32 ½" LONG NYLON PAN HD. SCREW		
11	E1, E2		550996	2	TERMINAL, SWAGE FEED THRU	160-2141-02-01	CAMBION
9			N/A	6	22AWG BUSS W/TEFLON SLEEVE		
8	E3		550234	1	TERMINAL, SWAGE	160-1043-02-01	CAMBION
7			550807-1	3	TERMINAL, SWAGE - FEEDTHRU	180-1461-02-05	"
6			550993	6	TERMINAL, SWAGE - FEED THRU	160-1512-02-05	"
5	R5		700410	1	500K POTENTIOMETER		BOURNE
4	R3, R4		N/A	2	SELECT IN TEST 1 WATT		
3	C1		800132	1	.01 μF 3KV		
2	R2		700093	1	27K 1/2 WATT		
1	R1		700257	1	5 MEG 15%		DALE
10		B	106460	1	BOARD, ANODE		

NOTES:

1) ADD MARKINGS FOR E DES. AND COMP DES.
2) ADD PART NO MARKING APPROX WHERE SHOWN.
3) ITEM No 6 SHOULD BE INSTALLED WITH TURRET ON BOTTOM SIDE
4) ITEM No 7 SHOULD BE INSTALLED WITH TURRET ON BOTTOM SIDE.

106594-2 FORMERLY PE1525
106594-1 NEXT ASSY

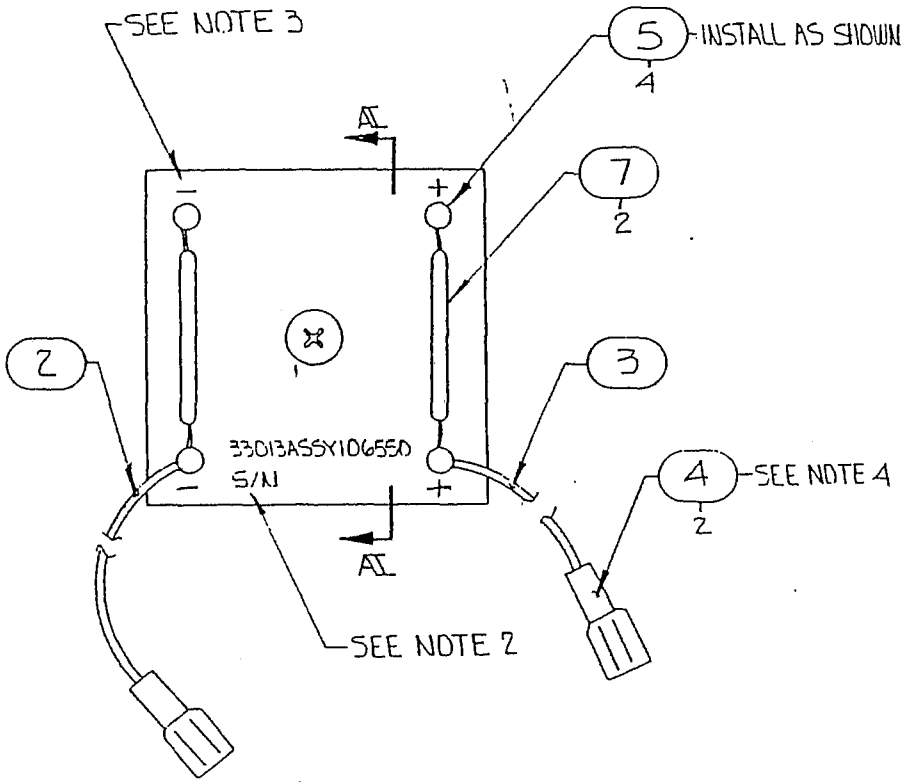
LogiMetrics, INC.
PLAINVIEW, NEW YORK

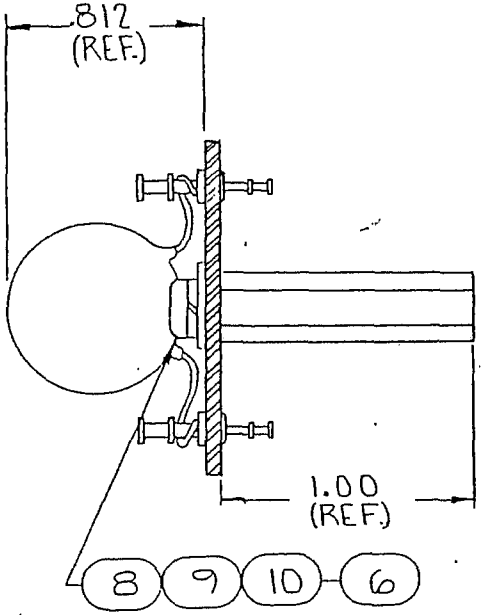
SCALE: 2:1 APPROVED BY: FS
DATE: 5-26-85
DRAWN BY M. ROCHE
REVISED

A330/L,S,C ANODE BOARD ASS'Y. A4A2

SIZE C DRAWING NUMBER 106461 B

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	C	RE-DRAWN & REVISED PER ECN 4205 NS	16 MAY 89	C W
	D	(+)(-) MARKING ECN 4912	1/28/91	D.P.Z.





SECTION A-A

NOTES: UNLESS OTHERWISE SPECIFIED

1. ASSEMBLE PER LOGIMETRICS WORKMANSHIP MANUAL 105327.
2. PIECEMARK 33013ASSY106550 AND LATEST REV USING 1/8" HIGH BLACK CHARACTERS, LOCATE APPROX AS SHOWN
3. MARK POS. & NEG SYMBOLS APPROX AS SHOWN.
4. SLEEVE LUG AFTER CRIMP & SOLDER.

SEE SEPARATE PARTS LIST

	A300
	A200
137060	A340K
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON DECIMALS 2 PL ± 3 PL ± ANGLES ±
MATERIAL:
FINISH:

DO NOT SCALE THIS DRAWING
REMOVE ALL BURRS

DRAWN ADOLFO E. DATE 5-16-89
CHECKED C. WACCACE 16 MAY 89
RELEASED C. WACCACE 16 MAY 89
CONTRACT NO.
APPROVED
APPROVED C. WACCACE 6 NOV 89

LogiMetrics, INC.
PLAINVIEW, NEW YORK

SURGE LIMITER BOARD ASSY

SIZE	FSCM NO.	DWG. NO.	REV
B	33013	106550	D

SCALE 2:1 SHEET 1 OF 1

ARESCO, HICKSVILLE, N.Y. - OGILVIE

LogiMetrics, INC.
121-03 DUPONT ST., PLAINVIEW, NEW YORK 11803

33013	PL 106550		D
CODE IDENT NO	SHEET 1 OF 2		REV
MODEL	PREPARED	J. SCOTT	DATE 7 OCT 85
	CHECKED	C. W	DATE 7 OCT 85
SPECIFICATION	APPROVED	J. D	DATE 7 OCT 85

13-060 | A370K | NEXT ASSY
A200/A300 | USED ON

SURGE LIMITER BOARD ASSY

SHT	LTR	ECN	REVISION	DATE	APPROVED
	A	2845	IT 1,2,3,4 & 5	10-2-85	C.W.
M	B	3009	IT 5	4-10-86	C.W.
	C	4205		16 MAY 89	C.W.
	D	4911	Add markings	1/28/91	J.L.

SHT	LTR	ECN	REVISION	DATE	APPROVED

*PARTIAL DESIGNATIONS ARE SHOWN. FOR COMPLETE DESIGNATION PREFIX THE PARTIAL DESIGNATION WITH UNIT NUMBER

ITEM NO.	REF. DES.	DWG SIZE	PART NO.	QTY REQD	DESCRIPTION	MFR. PART NO OR SPECIFICATION	MFR.
		B	106550	-	SURGE LIMITER BOARD ASSY		
1		A	106549	1	BOARD SURGE LIMITER		
2				1	WIRE, 20AWG (V10) 3" LG.		
3				1	WIRE 20AWG (RED) 3" LG.		
4				2	LUG	D10-250-D	PANDUIT
5			550234	4	TERMINAL, SOLDER	160-2040-02-01-00	CAMBION
6			550779-1C		STANDOFF, 1/4" HEX 1" LG 8-32 THREAD	8220SS-0832-7	AMATOM
7			700722	2	THERMISTOR	CL-40	

BRUNING 40-21 30631-4
FORM L101

LogiMetrics, INC. 121-03 DUPONT ST . PLAINVIEW, NEW YORK 11803	SURGE LIMITER BOARD ASSY	33013 FSCM NO.	PL 106550 SHEET 2 OF 2	D. REV

ITEM NO.	REF. DES.	DWG SIZE	PART NO.	QTY REQD	DESCRIPTION	MFR. PART NO. OR SPECIFICATION	MFR.
8			MS51957-41	1	SCREW, PAN HD	NO. 3-32 x .1/4 LG	
9			MS35338-138	1	WASHER, LOCK	NO. 8	
10			MS15795-807	1	WASHER, FLAT	NO. 8	
11							
12							
13							
14							
15							
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26							
27							
28							

FORM L102

147209-668	665000
147202-713	564000
147206	050000
370-51	A370K
107364	A610P
NEXT ASSY	USED ON

LogiMetrics, INC.

121-03 DUPONT ST., PLAINVIEW, NEW YORK 11803

CIRCUIT CARD ASSY
DISPLAY

33013	PL 107219		H
CODE IDENT NO	SHEET 1 OF 2		REV
MODEL	PREPARED	L. WALLACE	DATE 15APR86
	CHECKED	J.L.	DATE 4-15-86
SPECIFICATION	APPROVED	J.D.	DATE 4-23-86

SHT	LTR	ECN	REVISION	DATE	APPROVED
	A	3166	SEE ASSY	15AUG86	C.W.
	B	3325	DWG ONLY	11-14	
	C	3414	ITEM 2 AP	3-87	
	D	3539	SEE ASSY RD	6-26-87	
	E	3824	REVISED PER ECN AE 2-17-88	2-19-88	
	F	3917	DWG ONLY AP	5-17-88	
	G		DWG ONLY	6-10-92	
	H	6188	ADDED IT. 11	1/16/96	

SHT	LTR	ECN	REVISION	DATE	APPROVED

*PARTIAL DESIGNATIONS ARE SHOWN. FOR COMPLETE DESIGNATION PREFIX THE PARTIAL DESIGNATION WITH UNIT NUMBER

ITEM NO.	REF. DES.	DWG SIZE	PART NO.	QTY REQD	DESCRIPTION	MFR. PART NO OR SPECIFICATION	MFR.
		C	107219		CIRCUIT CARD ASSY DISPLAY		
		B	107217	REF	SCHEMATIC DIAGRAM		
1		C	107218	1	PWB DISPLAY		
2							
3	C1, C3, C4		800295	3	CAPACITOR 0.1uF 100V	C062C104K1X5CA	KEMET
4	C2		800363	1	CAPACITOR 6.8uF 35V	T370E685M035AS	KEMET
5	U1		670073	1	I.C.	SN7404N	
6	U2-U5		901428	4	DISPLAY	HPDL-2416	

FORM L101

LogiMetrics, INC. 121-03 DUPONT ST., PLAINVIEW, NEW YORK 11803	CIRCUIT CARD ASSY DISPLAY	33013 CODE IDENT NO	PL 107219 SHEET 2 OF 2	H REV

ITEM NO.	REF. DES.	DWG SIZE	PART NO.	QTY REQD	DESCRIPTION	MFR. PART NO. OR SPECIFICATION	MFR.
7	U6, U7		670165	2	I.C.	74LS377	
8		A	106420-7	1	CABLE ASSY		
9				AR	WIRE, 22 AWG		
10				AR	SLEEVING, TEFLON		
11	C5		800250	1	CAP, 1000 pf, 200V	CK05BX102K	
12							
13							
14							
15							
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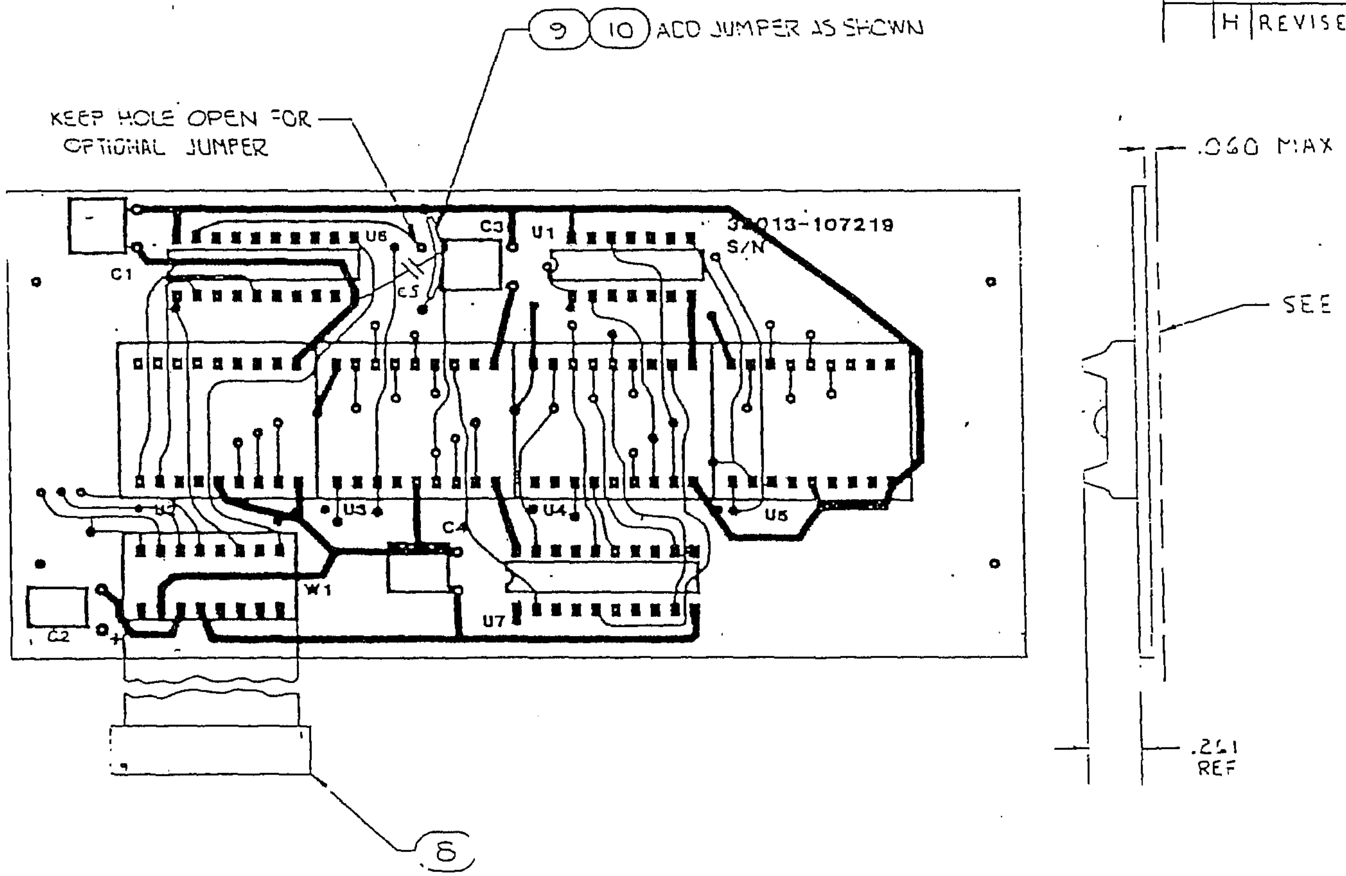
21							
22							
23							
24							
25							
26							
27							

FORM L102

ZONE	LTR	DESCRIPTION	DATE	APPROVED
	D	REPLACES REV C WITH CHANGES PER ECN [illegible]	[illegible]	[illegible]
	E	REVISED PER ECN [illegible]	[illegible]	[illegible]
	F	REVISED PER ECN [illegible] AP	[illegible]	[illegible]
	G	REVISED PER MFG CHANGE	[illegible]	[illegible]
	H	REVISED PER ECN 6188	1/16/[illegible]	[illegible]



NOTES:
1. ASSEMBLE BOARD IN ACCORDANCE WITH MIL-STD-275.
2. MARK S/N, DASH NO., AND REV IN 1/8 HIGH CHARACTERS USING WT. EPOXY INK.
3. CUT ALL LEADS .060 MAX

SEE SEPARATE PARTS LIST

ITEM NO.	ZONE	SYM	QTY REQD	NOMENCLATURE OR DESCRIPTION	CODE IDENT	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTE	UNIT WT

LIST OF MATERIALS OR PARTS LIST

NEXT ASSY	USED ON
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON DECIMALS ANGLES

MATERIAL

FINISH

DO NOT SCALE THIS DRAWING REMOVE ALL BURRS

DRAWN [illegible] DATE [illegible]

CHECKED

RELEASED

CONTRACT NO

APPROVED

APPROVED

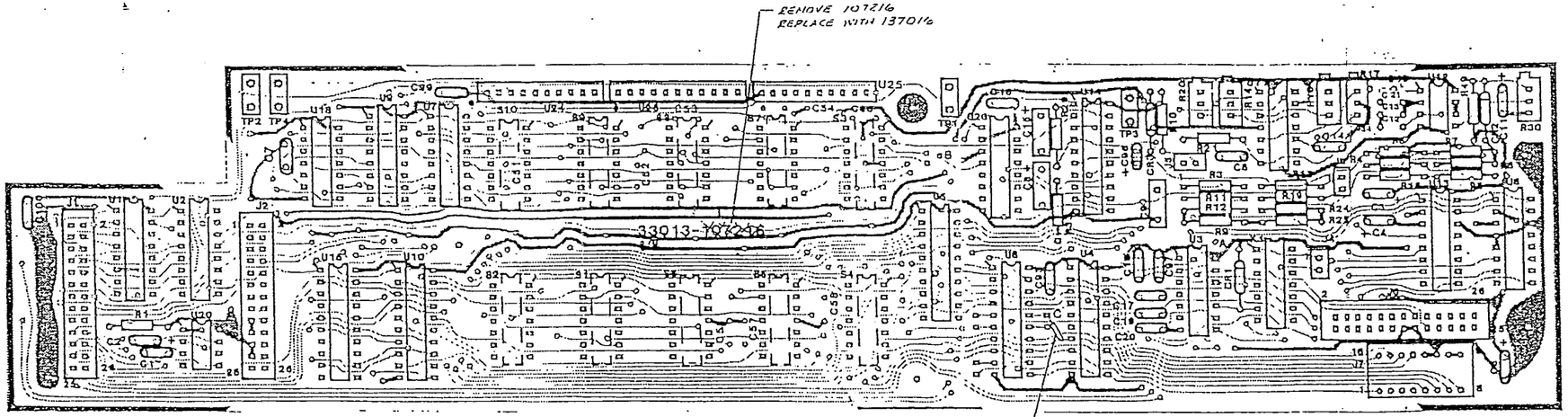
LogiMetrics, INC.

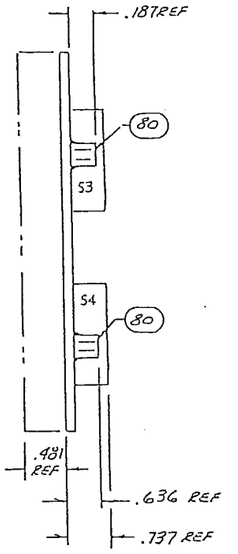
CIRCUIT CARD DISPLAY ASSEMBLY

SIZE	CODE IDENT NO	DWG NO	REV
C	33013	107219	H

SCALE SHEET

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	REVISED AND REDRAWN PER ECN 3730	11/NOV/87	
	B	REVISED PER ECN 3942 RE 2-17-88	2-19-88	
	C	REVISED IT, S6 P/L ONLY	5/26/92	
	D	REVISED PER ECN 7006	1/2/96	
	E	REVISED PER ECN 6163	1/13/96	





A: (20) (21)
SEE LINK SETTING CHART

REFERENCE DOCUMENTS:
SCHEM DIAG D131007

LINK SETTING		
FAULTS	PIN CONFIGURATIONS	JUMPERS
SUM FAULTS	U5 PIN 11 TO U6 PIN 16	A — C

NOTES:
1. ASSEMBLE BOARD IN ACCORDANCE WITH MIL-STD-275.
2. MARK S/N AND REV IN 1/8 HIGH CHARACTERS USING WHT EPOXY INK.
3. PWB ARTWORK SHOWN REPRESENTS 107216 REV E

SEE SEPARATE PARTS LIST

ITEM NO	ZONE	SYM	QTY REQD	NOMENCLATURE OR DESCRIPTION	CODE IDENT	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTE	UNIT WT

LIST OF MATERIALS OR PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON DECIMALS ANGLES
2 PL ± —
3 PL ± —
MATERIAL: —
FINISH: —
A300/C-297
NEXT ASSY | USED ON
APPLICATION

DO NOT SCALE THIS DRAWING REMOVE ALL BURRS

	NAME	DATE
DRAWN	L. WALLACE	11/NOV/87
CHECKED		11-14-87
RELEASED	L. WALLACE	18/NOV/87
CONTRACT NO.		
APPROVED		11/16/87
APPROVED		

LogiMetrics, INC.
WAPPINGERS, NEW YORK

CIRCUIT CARD ASSEMBLY
AMPLIFIER, INTERFACE AND SWITCH BOARD
A300/C-297

SIZE	FSCM NO.	DWG NO.	REV
D	33013	137016	E

SCALE 2/1 | D.V. | SHEET 1 OF 1

		LogiMetrics, INC.	33013	PL 137016	E
		121-03 DUPONT ST., PLAINVIEW, NEW YORK 11803	CODE IDENT NO	SHEET 1 OF 5	REV
137052	A3401		MODEL	PREPARED L.WALLACE	DATE 22 APR 87
	A330	CIRCUIT CARD ASSEMBLY		CHECKED J. LANGSTRAND 572	DATE 4/23/87
137034	A350	AMPLIFIER	SPECIFICATION	APPROVED	DATE 4/23/87
	A300/C-337	INTERFACE AND SWITCH BD			
NEXT ASSY	USED ON				

SHT	LTR	ECN	REVISION	DATE	APPROVED
	A	3730	SEE ASSY DWG LW	11NOV87	
	B	3842	ITEM 25 AE 2-17-88	2-19-87	
	C		IT 56	5-26-92	J.F.S.
	D	7006	REVISED DWG ONLY	1-2-96	
	E	6163	REVISED IT. 40	1-3-96	

SHT	LTR	ECN	REVISION	DATE	APPROVED

*PARTIAL DESIGNATIONS ARE SHOWN. FOR COMPLETE DESIGNATION PREFIX THE PARTIAL DESIGNATION WITH UNIT NUMBER

ITEM NO.	REF. DES.	DWG SIZE	PART NO.	QTY REQD	DESCRIPTION	MFR. PART NO OR SPECIFICATION	MFR.
		D	137016	—	CIRCUIT CARD ASSY		
		D	131007	REF	SCHEMATIC DIAGRAM		
		E	T20018	1	FIXTURE, SOCKET ALIGNMENT		

BRUNING 40 21 30631-4

FORM L101

LogiMetrics, INC. 1-03 DUPONT ST., PLAINVIEW, NEW YORK 11803	CIRCUIT CARD ASSY INTERFACE & SWITCH	33013 CODE IDENT NO	PL 137016 SHEET 4 OF 5	E REV

ITEM NO.	REF. DES.	DWG SIZE	PART NO.	QTY REQD	DESCRIPTION	MFR. PART NO. OR SPECIFICATION	MFR.
3	U7		670141	1	I.C. 16 PIN DIP	74148	
4	U8, 13		670337	2	16 PIN DIP	MUX88EQ	
5	U9		670146	1	16 PIN DIP	74LS279	
6	U11		670338	1	14 PIN DIP	TL083CN	
7	U12		670339	1	8 PIN DIP	TL082CP	
8	U14		670298	1		ADC0803LCN	NAT'L
9	U18		670249	1		74LS11	
10	U20		670096	1		LM555	
11	U23		670052	1	I.C.	74123N	
12	U24 25		670336	2	RESISTOR NETWORK (9) 1K	110A102	A.B.
13	U26		670335	1	RESISTOR NETWORK (10) 220Ω	CSC11A01221G	DALE
14							
15							
16	TP1-4		550967-3	4	TEST POINT	6050	KEYSTONE
17							
18							
19			900307	2	SOCKET 8PIN U20, U12	508-AG11D	AUGAT
20			900231	4	14 U3,11,18, K1	514-AG11D	
21			900348	8	16 U1,2,9,13,23,7,8,17	516-AG 11D	
22			901703-1	6	20 PIN U4-6, 14, 15, U10	520-AG-11D	AUGAT
23			901709	10	SOCKET S1-S10		SCANBE

LogiMetrics, INC.	CIRCUIT CARD ASSY INTERFACE & SWITCH	33013	PL 13706	E
1-03 DUPONT ST., PLAINVIEW, NEW YORK 11803		CODE IDENT NO	SHEET 5 OF 5	REV

ITEM NO.	REF. DES.	DWG SIZE	PART NO.	QTY REQD	DESCRIPTION	MFR. PART NO. OR SPECIFICATION	MFR.
4		-D	107215	1	PWB		
5							
6							
7	S1		902001-1	1	SWITCH (PWR W)	SEAUOA0502R	SHADOW
8	S2		-2	1	(PWR dB)		
9	S3		-3	1	(LCL)		
10	S4		-4	1	(COL V)		
11	S5		-5	1	(HLX V)		
12	S6		-6	1	(HLX I)		
13	S7		-7	1	(PWR ON)		
14	S8		-8	1	(PWR OFF)		
15	S9		-9	1	(RF ON)		
16	S10		-10	1	SWITCH (RF OFF)	SEAUOA0502R	SHADOW
17			902001-99	AR	BULB, REPLACEMENT		
18		A	106427	REF	SWITCH MARKING		
19							
30			5504607	2	SPACERS, SWAGE # 4 X 3/16 LG		
31							
32							
33							
34							