

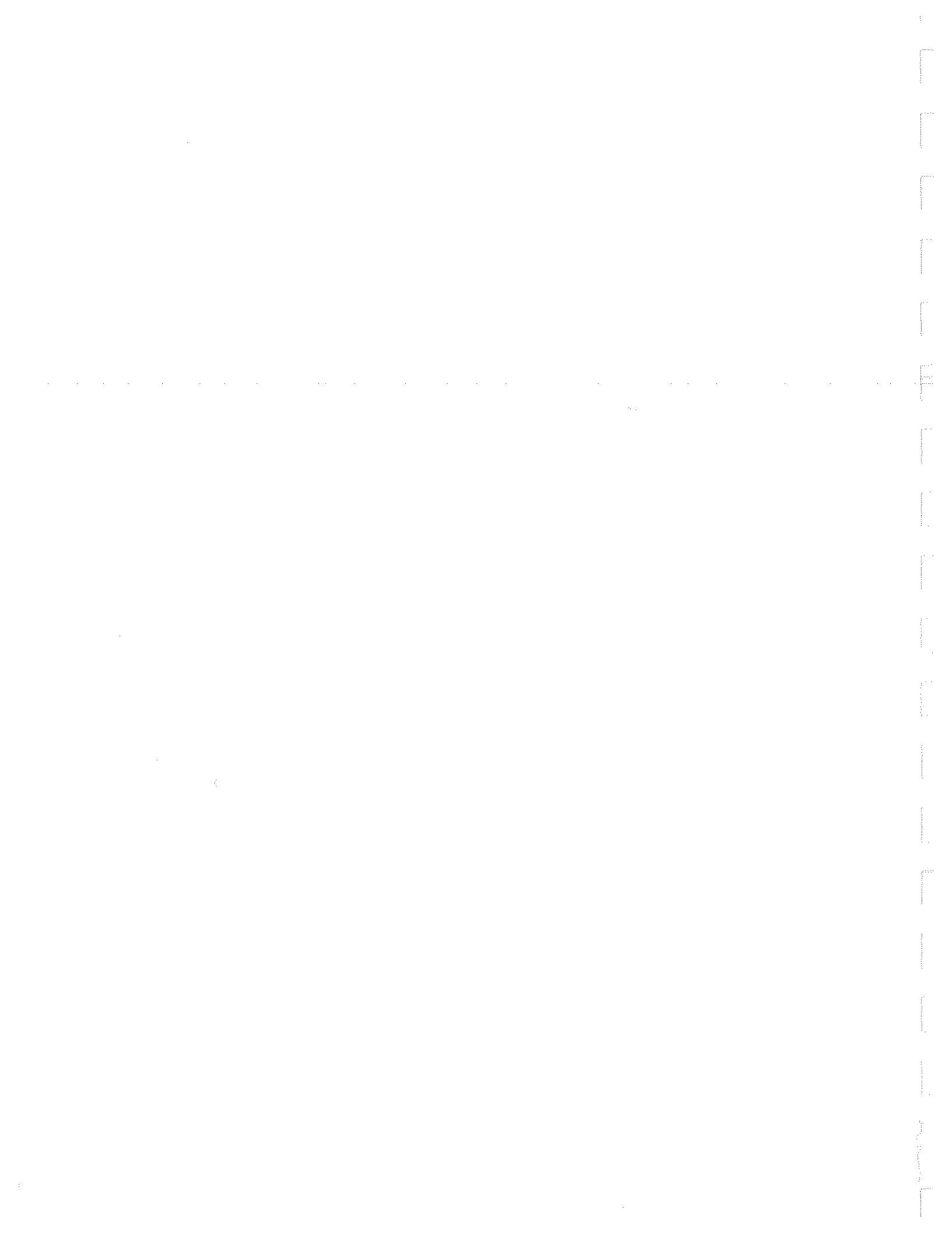
ENI[®]



5100L
Broadband Power Amplifier

PRODUCT

MANUAL





OPERATION & SERVICE MANUAL

5100L

Broadband Power Amplifier



HIGH RF VOLTAGES MAY BE PRESENT AT THE OUTPUT OF THIS UNIT. All operating personnel should use extreme caution in handling these voltages and be thoroughly familiar with this manual.



DO NOT USE ANY CFC (CHLOROFLUOROCARBON) SOLVENT IN THE MAINTENANCE OF THIS PRODUCT. In recognition of our responsibility to protect the environment, this product has been manufactured without the use of CFC's. The no-clean flux now used in all soldering operations may leave a small inert residue which will not affect the performance of the product. The use of CFC's for cleaning or maintenance may result in partial liquification of the no-clean flux residue, which will damage the unit and void the warranty.



This product is manufactured at ENI's Rochester NY plant, an ISO 9001 Quality System Certified Facility.

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Revision Level: D1

Manual Order Number: 5100L-TM-01

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Warranty

ENI warrants to the original purchaser for a period of one year from the date of delivery, each instrument to be free from defects in materials and workmanship. For a period of one year, ENI will, at its option, adjust, repair, or replace defective parts, without charge to the original purchaser, so that the instrument performs according to its specifications.

When warranty service is required, the instrument must be returned, transportation prepaid, to the factory or to one of ENI's designated service centers. If, in our opinion, the instrument has been damaged by accident, unreasonable use, buyer-supplied software or interfacing, improper site preparation or maintenance, or abnormal conditions of operation, repairs will be billed at standard rates. In this case, an estimate will be submitted before the work is started.

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Service And Technical Assistance

For Service or Repair contact the closest Customer Service Department with the following information:

- Model and serial number
- Purchase order number
- Detailed description of malfunction
- Your company's "Bill To" and "Ship To" address

You will receive a RMA (Return Materials Authorization) number, the warranty status of the unit to be returned and estimated repair charge, if any. The RMA number is your authorization number. Please type this number on your purchase order and shipping label. After ENI receives the unit, a firm quote and estimated date of completion will be given.

For Technical Assistance for your particular application, contact the nearest ENI Sales and Service Center. The following information will help us provide you with prompt and efficient service:

- All of the information contained on the unit's name plate.
 - Names and telephone numbers of important contacts.
 - Detailed description (i.e. physical damage and/or performance anomalies, quantitative and/or qualitative deviation from specifications), including miscellaneous symptoms, dates and times.
 - The environment and circumstances under which the issue developed
 - Supporting test data and/or records that can be provided.
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Sales & Service Locations

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Product and Applications information also available on the Internet at:

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Appendix B Schematics and Materials

This section contains the following board layouts, related schematics and parts list.

Schematics

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Introduction

The Model 5100L is a general purpose broadband amplifier capable of more than 100 watts of linear power output when driven by any laboratory signal or sweep generator from 1.5 to 400 MHz.

An ultra linear Class A design, the 5100L will "boost" the output of any signal source by a flat 50 dB (± 1.5 dB) and provide its full forward output power into any load impedance (from an open to a short circuit). Its output is a faithful reproduction of the input waveform for AM, FM, SSB, CATV, pulse and other complex modulations. Although specified only over the 1.5 to 400 MHz frequency range, full power output is typically available from 1 to 410 MHz.

The use of stud mounted UHF transistors on microstrip circuit boards makes the 5100L both reliable and easy to service. An integral power supply and cooling system permits operation over a wide band of temperature and AC line conditions.

This manual is divided into three sections. Please refer to the following descriptions to help you locate the information you need.

Chapter 1	Deals with precautionary details. Please read this section if you are unfamiliar with the 5100L or ENI's warranty procedures.
Chapter 2	Tells you how to install and power up the system for the first time.
Chapter 3	Describes operational details of the 5100L.
Chapter 4	
Chapter 5	
Chapter 6	This chapter provides troubleshooting solutions to common problems in operating the 5100L.
Appendix A	This appendix provides complete operating specifications for the 5100L.
Appendix B	This appendix provides a list of schematics and parts used in the 5100L.

Safety

1.1 Labels

Labels are provided to alert operating and service personnel to conditions that may cause personal injury or damage to the equipment from misuse or abuse. Please read the labels and understand their meaning.

1.1.1 Important Operating or Maintenance Cautions

CAUTION !

The caution label is used in this manual, to caution the reader to important operating or maintenance instructions which could adversely affect the equipment reliability.

1.1.2 Shock Hazard Warnings

WARNING 

The warning label is used in this manual to warn the reader of a procedure or practice which could result in personal injury if not followed carefully.

1.1.3 Service

CAUTION !

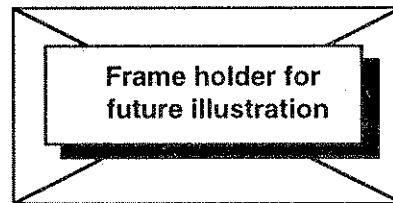
ENI is responsible for safety, reliability, and performance of the equipment only if:

WARNING ⚡

- *Assembly operations, extensions, readjustments, modifications, or repairs are carried out by authorized personnel.*
- *The electrical installation is made in accordance with the installation instructions provided and the room in which the equipment is installed complies with the environmental requirements.*
- *The equipment is used in accordance with the instructions for use.*

1.1.4 Name Plate

The (Product) can be identified by a name plate at the rear of the unit and contains the following information.



5100L Name Plate

Figure 1.1.4

A. Manufacturer:

ENI
Rochester, NY USA

B. Model:

The assembly number which uniquely identifies product configuration is contained on this line.

C. Serial #:

This line contains a number which is sequentially assigned as the product is manufactured.

D. Revision:

The revision letter identifying product configuration is contained on this line. Revision A is the initial revision level.

E. This line contains customer name and customer identification number.

F. Date:

Proper identification of the date of manufacture is contained on this line.

System Installation

2.1 Initial Inspection

2.1.1 Mechanical Inspection

If damage to the shipping carton is evident, request the carrier's agent be present when the unit is unpacked. Check for equipment damage and inspect the cabinet and panels for dents and scratches.

2.1.2 Claim for Damage

Please notify ENI directly or your authorized ENI representative if the 5100L is mechanically damaged or fails to meet specifications upon receipt. Retain our shipping carton and packing material for the carrier's inspection as well as for subsequent use to return the unit should this become necessary.

2.1.3 Packaging for Reshipment

Whenever possible, the original shipping carton and packing material should be used for reshipment. If the original packing material is not available, wrap the instrument in heavy paper or plastic. Use a strong shipping container. If a cardboard carton is used, it should be at least 200 lbs. test material.

Use shock-absorbing material around all sides of the instrument to provide a firm cushion and to prevent movement inside the container wall on each side. Protect the front panel by means of cardboard spacers inserted between the front panel and the shipping carton. Make sure that the instrument cannot move in the container during shipping. Seal the carton with a good grade of shipping tape and mark the container: **FRAGILE ELECTRONIC INSTRUMENT.**

CAUTION !

Drain water before shipment.

2.2 Preparation for Use

2.2.1 Power Requirements

The 5100L requires a 50-60Hz, single phase, power source capable of 2000 watts. The unit must be adjusted to accommodate the available AC line voltage. This is accomplished by connecting the AC line cord and jumpers to the correct terminals of the terminal strip TB-1, in accordance with Table 2.2.1.

Terminal strip TB-1 is mounted on the baseplate at the right front side of the 5100L and is accessible by removing the ten (10) #6-32 screws from the front panel and sliding it straight out.

Disconnect the line cord from the power main when adjusting the operating voltage. Failure to connect jumpers to their proper terminals may result in severe damage to the instrument.

Nominal Line Voltage	Line Hot (Black)	Line Common (White)	Jumpers		
			Yellow	White	Black
105	4	1	1-2	3-4	9-10
115	6	1	1-2	5-6	9-10
120	8	1	1-2	7-8	9-10
210	4	1	2-3		
230	6	1	2-5		
240	8	1	2-7	Remove White & Black Jumpers	

Line Voltage Connections

Table 2.2.1

NOTE: Use 25A fuse for 105, 115, and 120VAC. Use 15A fuse for 210, 230, and 240VAC.

2.2.2 Power Cable Ground Protection

To protect operating personnel, the ENI Model 5100L is equipped with a three conductor cable consisting of a black hot line, a white common line and a green chassis ground. For US. delivery, the 5100L is supplied with a two pole three wire grounding, 20A, 120V plug NEMA 5-20P. This plug must be inserted into a properly wired 20A, three wire grounding receptacle NEMA 5-20R.

2.2.3 Cooling

When the 5100L is enclosed by an external cabinet, provisions must be made to insure an adequate flow of cooling air to the unit. Ambient temperature of the air must not exceed 45°C.

2.3 Rack Mounting

In order to install the 5100L in a standard 19 inch relay rack mounting brackets must be attached to the cover as follows:

1. Remove the eight (8) #8-32 and two (2) #6-32 screws located on both sides of the cover and the twelve (12) Phillips head screws located on the top of the cover. Carefully lift the cover up.
2. Remove the side handles which are held by six (6) #8-32 screws and hardware per handle.
3. Replace the cover and its hardware with the exception of the four (4) #8-32 screws located at each side of the cover nearest the front panel.
4. Verify left and right rack mounting brackets by holding them next to the screw holes. Mounting bracket overhang should be at the bottom of the unit.
5. Attach mounting brackets to the sides of the unit by inserting the screws removed in Step 1 through the brackets.
6. Tighten all screws carefully, assuring that the unit is held firmly in place.
7. The six rubber feet on the baseplate may be unscrewed and removed if the minimum vertical of the relay rack is necessary.

Note: *Due to the weight of the 5100L (102 lbs.) it is recommended that the unit be placed on a shelf attached to the inside of the rack.*

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5100L Operation

3.1 *Functional Description*

The ENI Model 5100L is a linear Class A amplifier capable of increasing the output of any signal generator, frequency synthesizer, sweep generator or laboratory signal source from 1.5 MHz to 400 MHz.

The 5100L is completely protected against damage due to load mismatch provided that the input RF level does not exceed 1 Vrms or 1.4V peak. If the attached signal source is capable of generating substantially more than this input will saturate well before the maximum input voltage and there will be no increase in output power at that point.

The 5100L is unconditionally stable. Any impedance can be connected to the input and output of the amplifier, without causing oscillation.

The 5100L will deliver its rated power to any load impedance regardless of match. Load mismatch will cause RF power to reflect back to the amplifier. The unit is designed to withstand 100% reflected power (a pure reactance open or short circuit load will cause 100% reflected power) continuously without damage.

3.2 Controls, Indicators and Connectors

3.2.1 Power Switch

Depressing this switch to the "ON" position connects the fans and the power supply to the main power source.

3.2.2 Input Connector

The input connector is a Type N connection of the driving generator. Input impedance is 50Ω . No more than 0.60V is required to obtain saturated output. Up to 1.4V peak can be supplied without causing damage; however, no additional power output can be expected.

3.2.3 Output Connector

The output connector is a Type N connection of amplifier output to load.

3.2.4 Fuse

Holder required 3 AG size, slow blow type fuse; 25A for 115VAC; 15A for 240VAC.

3.2.5 Line Cord

Three prong type plug with safety ground pin connected to cabinet. For US. delivery the 5100L is supplied with a 2 pole, 2 wire grounding, 20A, 120V plug NEMA 5-20P. This plug must be inserted into a properly wired grounding receptacle NEMA 5-20R.

3.3 *Operating Procedures*

Determine and adjust the voltage setting as described in the previous section 2.2.1 then proceed as follows:

1. Ensure that the input RF voltage from the signal source is not excessive. The 1Vrms indicated maximum input voltage is 5 times the level of the input signal required to achieve maximum output. Input voltages in excess of 2V peak may permanently damage the instrument.
2. Connect the input signal via a 50Ω coaxial lead to the input connector,
3. Connect the output via a 50Ω coaxial lead to the load.

3.4 Precautions

To ensure safe operation of the 5100L Amplifier, please keep the following precautions in mind:

- The input and output of the 5100L should not be connected together. This will cause oscillation and may damage the input preamplifier.
- The 5100L should not remain connected to an antenna when the unit is not in use. If thunderstorms are likely, it would be prudent to earth ground the case of the units in operation.
- When the input signal voltage of the signal source is unknown, insert an attenuator between it and the 5100L input.

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Technical Description

4.1 System Overview

The 5100L achieves its high level of power output by combining the power outputs of a number of individual transistor amplifiers. The hybrid combining technique permits each amplifier to operate independently of all others and to supply its power output contribution without regard to the other amplifier stages. This isolation is afforded by ferrite loaded transformer hybrids connected at the input and output of each transistor pair.

Each amplifier module is designed to have an input and output impedance of 50Ω . Therefore, the individual modules can be disconnected and tested independently.

Highly linear Class A transistors are used throughout the amplifier. Their linearity is augmented by negative feedback networks connected to each stage. The high power output transistors have high temperature film resistors deposited at their emitter terminals to increase linearity and reliability.

4.2 **Block Diagram Description**

Input signal from the rear panel type N connector is fed to the preamplifier assembly (P/N: 5100L-3431). The preamplifier has eight equal amplitude and phase outputs. Each preamplifier channel has an overall gain of 24dB and a minimum power of 1.5W. The preamplifier outputs are fed via coaxial cables to the eight power amplifier modules (P/N: 550L-4712).

Each power amplifier has a gain of 17dB and is capable of producing more than 20W of power at its output. These outputs are summed and isolated from each other in the output combiner assembly (P/N: 5100L-3432). RF output ID fed into the output type N connector located on the rear panel. The power distribution (P/N: 5100L-2431) provides cooling and DC power to the entire unit. The four regulated power supplies are each capable of supplying +26.4V to the preamplifier module and the eight power amplifier modules.

4.2.1 **Preamplifier Module**

The input RF signal is fed through connector J7 to the base of low noise transistor Q1 through the attenuator resistors R1, R2 and R3. The gain flatness of this low noise stage is adjusted by variable capacitor C5. The output of transistor Q1 is fed via capacitor C4 to the base of transistor Q2 which is similarly adjusted for gain flatness by capacitor C10. Additional amplification is picked up in transistors Q3 and Q4. The output of transistor Q4 is split into two equal gain and phased matched signals by transformer T2.

These signals are fed to the bases of the driver transistors Q5 and Q6. The power outputs of these driver transistors are split through their own four way splitter consisting of transformers T5, T7 and T8 and T6, T9 and T10. These signals are fed to the eight coaxial connectors located on the bottom of the preamplifier chassis.

In addition, the preamplifier module has a power limiting circuit which offers additional protection to the combiner and PA transistors. This limiting circuit monitors two things: core temperature of the final combining transformer of the output combiner and emitter voltage on the PA transistor with the highest emitter voltage. If either of the two components sampled exceeds a preset limit, then the input signal to the preamplifier first stage is held back to a point where either or both components remain within safe operating limits.

4.2.2 Power Amplifier Module

The outputs of the eight driver lines are fed through 50Ω coaxial cables to the inputs of the power amplifier modules (P/N: 550L-4712). The input signal at each of the four modules is matched and attenuated by resistors R1, R2 and R3 and fed to transformer T1, which is an input matching transformer. Capacitors C2, C40 and C41 match the reactive impedance of transistor Q1 to the primary of transformer T1. The output of this transistor is split into four equal amplitude and phase components by transformers T2, T3 and T4. Transformers T5, T6, T7 and T8 serve to reduce the driving point impedance at the base of transistors Q2, Q3, Q4, and Q5 respectively. Additional impedance matching for transistor Q2 is provided by capacitors C7, C8, C11 and C12. Capacitors C15, C16, C21 and C22 provide matching for transistor Q3. In addition, capacitors C23, C24, C27, and C28 provide matching for Q4 while C31, C32, C34, and C35 provide matching for transistor Q5. Resistors R16, R25, R34, and R43 provide negative feedback to level and match the gain of the output power stages.

The output power stages are matched by transformers T9, T10, T11, and T12. The equal phase and amplitude output power is then coupled through hybrid transformers T13, T14, and T15 to the output transformer T16. Additional output impedance matching is provided by capacitors C37 and C38.

4.2.3 Output Combiner Module

RF power is injected into the combiner at connectors J26 through J33 and is summed by hybrid transformers T5 through T10. The output of transformer T5 and T6 are matched by transformers T3 and T4. Transformer T2 combines the signals from transformers T3 and T4. The output of hybrid combiner T2 is matched by capacitors C1, C2 and transformer T1. The total summed output of all eight RF signals is available at connector J34 the final output of the combiner.

4.2.4 Power Distribution

The AC power is distributed from the terminal block TB1 to transformer T1. The yellow, white, and black jumpers on TB1 allow selection of line voltages for the primary of transformer T1 (see power connections, section 2.2.1 in the Operation manual). The secondary of T1 supplies voltage for 4 full wave bridge rectifiers CR1 through CR4 located on the baseplate assembly (P/N: 5100L-3437). The output of each rectifier is connected to capacitor C1 through C4 on the rear panel assembly (P/N: 5100L-3439), respectively. The outputs of CR1 through CR4 from the baseplate assembly are fed to the collectors of the power supply transistors.

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Maintenance and Calibration

5.1 Recommended Test Equipment

The following test equipment is required for accomplishing the 5100L performance tests. Equivalent substitutes for recommended models may be used.

Description	Recommended Type	Use
Oscilloscope	Tektronix Model T921	
Sweep/Signal Generator	Wavetek 2001	
50Ω Detector	Wavetek D151	
Calorimetric Power Meter	HP434A	
Spectrum Analyzer	HP140T Display Unit HP8554L	RF Section
	HP8552A Spectrum Analyzer	IF Section
Attenuator, 30dB, 500W	Bird 8325	
Attenuator, 30dB, 50W	Bird 8321	
Attenuator, 10dB, 75W	Engelman Microwave	

5.2 Performance Tests

There are three tests required to check the operation and performance of the 5100L. These tests are:

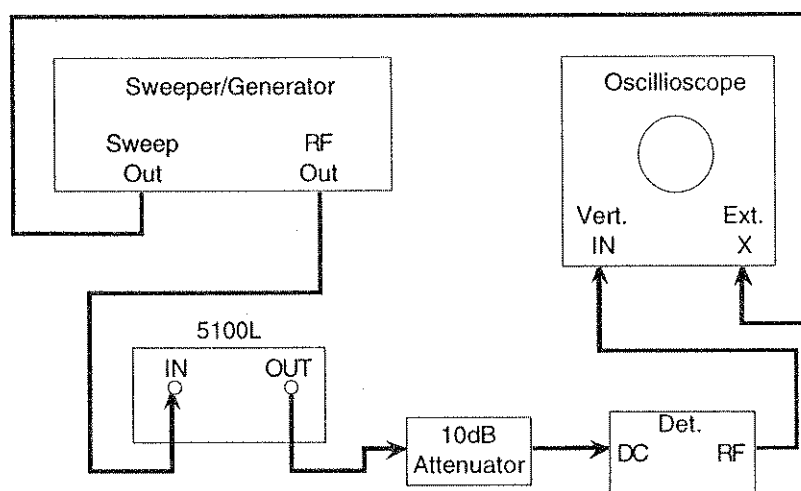
- Gain and Gain Variation Test
- RF Power Output Test
- RF Output Distortion Test

5.2.1 Gain and Gain Variation Test

The purpose of this test is to verify the gain and gain flatness versus frequency of the 5100L.

Calibration of Set Up

1. Set up the test equipment as shown below.



Gain and Gain Variation Test Set Up

Figure 5.2.1

2. Set the oscilloscope to DC, time/CM to Ext. X, and vertical gain to 10MV/CM.
3. Set the Sweeper/Generator to S/S model with the start frequency at 1.5 MHz and the stop Frequency at 400 MHz.
4. Disconnect the 5100L from the set-up and connect the Sweeper/Generator RF output directly to the 10 dB attenuator.
5. Adjust the output level of the Sweeper/Generator for full vertical deflection of the oscilloscope face.
6. Calibrate the scope face to show 3 dB in 1 dB steps and mark the traces with a grease pencil.

Calibration of Set Up (Cont'd)

7. Return Sweep/Generator output level to full deflection. Rotate the step attenuator on the Sweep/Generator counter-clockwise so that the output is reduced by 50 dB.
8. Reconnect the 5100L into the test set-up in Figure 5.2.1.

Measurement Procedure

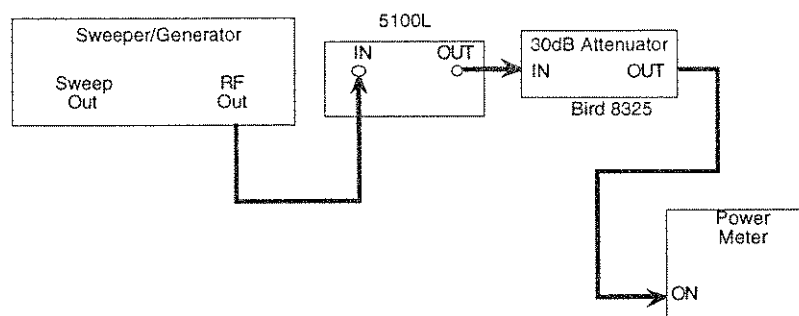
1. Turn on the 5100L power switch.
2. Observe the gain versus frequency sweep on the oscilloscope.
3. The average gain should be 50 dB.
4. The gain variation should be within the 3 dB markings as shown on the oscilloscope face.

5.2.2 RF Power Output Test

The purpose of the RF Power Output Test is to verify that the 5100L will deliver its rated power output over the frequency range of 1.5 MHz to 400 MHz.

Measurement Procedure

1. Set up the test equipment as shown below:



RF Power Output Power Test Set Up

Figure 5.2.2

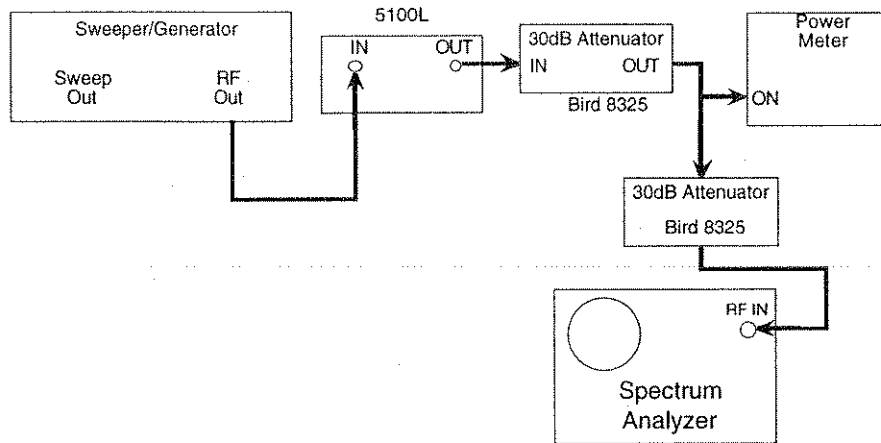
2. Set the calorimetric power meter to the .3W range. With the 30 dB series attenuator, this corresponds to a full scale deflection of 300W.
3. Set the Sweeper/Generator Wavetek Model 2001 to the CW mode, level to +10 dBm and frequency to 400 MHz.
4. Slowly decrease the frequency while observing the power meter. Note that at every frequency down to 200 MHz the power output is greater than 100W and greater than 200W at every frequency from 200 MHz to 1.5 MHz.

5.2.3 RF Output Distortion Test

The purpose of this test is to verify that the harmonic distortion of the 5100L and hence its linearity is within specified limits.

Measurement Procedure

1. Set up the test equipment as shown below:



RF Output Distortion Test Set Up

Figure 5.2.3

2. Set the calorimetric power meter to the .3W range. With the 30 dB series attenuator, this corresponds to a full scale deflection of 300W.
3. Set the Sweeper/Generator Wavetek Model 2001 to the CW mode, level to +10 dBm and frequency to 400 MHz.
4. Adjust the Sweeper/Generator output level so that the output power indicated on the power meter meter is 100W.
5. Disconnect the cable from the power meter and connect it to the spectrum analyzer through a 30 dB attenuator.
6. Observe that all harmonics are at least 25 dB below the fundamental.
7. Repeat steps 1 through 6 with the generator set at 350 MHz, 300 MHz, 250 MHz, 200 MHz, 150 MHz, 100 MHz, 50 MHz, and 1.5 MHz, in succession.

5.3 Locating a Faulty RF Module

The input and output impedance of each of the RF modules in the 5100L is 50Ω . Therefore, they can be disconnected from each other at any point and tested independently. The following sections provide a method of locating a faulty RF module.

5.3.1 Isolating the Amplifier Problem

1. Set up the test equipment as shown in Figure 2.2.2 for the RF power output test.
2. Set the RF generator to CW, the frequency to 10 MHz and output level to +1 dBm. If the 5100L output power is less than 100W, as indicated on the calorimetric power meter, a faulty RF module may exist.
3. With an output of 100W or less, disconnect the coaxial cable from J18 of the power amplifier module (P/N: 550L-4712) and observe the output power of the 5100L as indicated on the calorimetric power meter. The power will drop 24% ($\pm 4\%$) for a properly functioning power amplifier. Reconnect the coax cable to J18 and remove the coax cable from J19. Observe the power drop. Repeat the identical procedure for J20, J21, J22, J23, J24, and J25.

If the power output drops an equal amount (within 4%) as each cable is removed the fault is in either the eight way output combiner (P/N: 5100L-4432) or the preamplifier section (5100L-4431). Perform tests in the "Eight Way Combiner Test" and section 6.2.2, "Preamplifier Module."

If the output power does not drop or drops to less than normal, as each cable is removed, the fault is in the power amplifier associated with the cable. Perform the tests in the "RF Power Amplifier Module Test" section.

Eight Way Combiner Test

Set the low level Sweep/Generator to cover 1.5 to 400 MHz. Connect the output of the sweep generator to the output connector J34.

Connect the RF detector to jack J26 on the output combiner and seven 50Ω dummy loads to connectors J27 through J33. Measure the total loss through the combiner. If the measured response is 9.4 ± 0.4 dB, then the J26 channel is operating properly.

To check the remaining channels, connect the RF detector to each connector J27 through J33 successively while terminating all the remaining connectors with the seven 50Ω loads. Each channel should have the same loss response of 9.4 ± 0.4 dB as indicated for connector J26.

RF Power Amplifier Module Test

Two tests are required to test an RF power amplifier module. They are a bias voltage check and a low power sweep test. In order to perform these tests the following test equipment is required. Equivalent substitutes may be used for the recommended models.

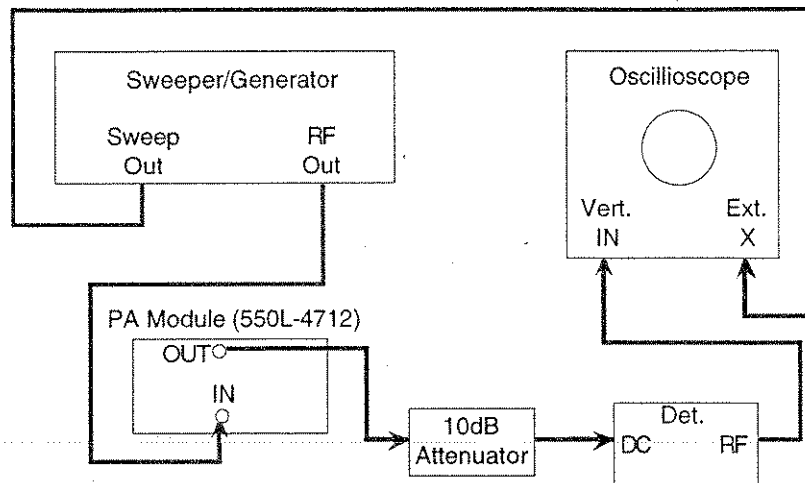
Description	Recommended Type
DVM	Fluke 8000A or Fluke 8100A
Sweeper/Generator	Wavetek 2001
Oscilloscope	Tektronix T921
50Ω Detector	Wavetek D151
Attenuator, 10 dB, 75W	Engelmann Microwave
Power Supply	Lambda LK-361-FM
Cooling Fan	Rotron Type 113

Bias Voltage Check

1. Adjust the power supply to +26.4V.
2. Connect the power supply minus (-) lead to the heatsink. Connect the power supply positive (+) lead to the power amplifier to be tested.
3. Position the cooling fan so that the cooling air is directed at the heatsink quadrant to which the power amplifier module under test is mounted.
4. Verify that the emitter voltage of Q1 is +3.0VDC \pm .15VDC and the emitter voltages of Q2 through Q5 are +2.80VDC \pm .15 VDC.
5. If all the voltages are within tolerance proceed to the low power sweep.

Low Power Sweep Test Set Up

1. Set up the test equipment as shown below:



Low Power Sweep Test Set Up

Figure 5.3.1

2. Set the oscilloscope to DC, Time/CM to Ext. X and vertical gain to 10 MV/CM.
3. Set the Sweeper/Generator to the S/S mode with the start frequency at 1.5 MHz and stop frequency at 400 MHz.
4. Disconnect the power amplifier module under test from test set-up and connect the sweeper/generator RF output directly to the 10 dB attenuator.
5. Adjust the output level of the sweeper/generator for full vertical deflection on the oscilloscope face.
6. Calibrate the scope face to show 3 dB in 1 dB steps and mark the traces with a grease pencil.
7. Return sweeper/generator output level to full deflection. Rotate the step attenuator on the sweeper/generator counter-clockwise so that the output is reduced by 10 dB; reduce the output an additional 7 dB with the vernier control.
8. Reconnect the power amplifier module under test per Figure 5.3.1.

Measurement Procedure

1. Turn on the power supply connected to the power amplifier module under test.
2. Observe the gain versus frequency sweep on the oscilloscope.
3. The average gain should be 17 dB.
4. The gain variation should be within the 3 dB markings as shown on the oscilloscope face.

5.3.2 Preamplifier Module

If the test in the "RF Power Amplifier Module Test" section shows that the power amplifier modules (P/N: 550L-4712) are not faulty and the eight way output combiner is not faulty, then the driver is suspect. A check of the power supply per section 2.4.1 should be performed to conclude positively that the driver amplifier module is faulty.

5.4 DC Power Supply

The following test and adjustment procedure should be performed after the replacement of the power supply assembly consisting of four regulator boards (P/N: 5100L-4435), three power amplifier power supplies (P/N: 5100L-3435) and a power amplifier/preamplifier power supply (P/N: 5100L-3436) or if the power supply voltage is out of adjustment.

The power supply adjustments are located under the snap plugs and are labeled voltage adjust. There are four adjustment points, two on each side of the RF horseshoe, each adjusting the supply voltage for two power amplifier modules.

5.4.1 Test Procedure

1. To test the power supply the following equipment is required. Equivalent substitutes may be used for the recommended models.

Description	Recommended Type
DVM	Fluke 8000A or Fluke 8100A
Oscilloscope	Tektronix T921

2. Disconnect all external cables from the 5100L.
3. Connect the minus (-) DVM lead to the chassis and the positive (+) lead to either of the power amplifier modules associated with power supply to be checked or adjusted. The DVM should indicate 26.4VDC.
4. Connect the oscilloscope to the power supply under test at the same point the voltage was tested. The ripple on the supply should be less than 25 millivolts.
5. Repeat steps 2 through 4 for the remaining power supplies.

5.5 Disassembly Procedures

The following disassembly procedures describe the recommended method of removing assemblies and printed circuit modules for the purpose of testing, repairing and/or replacing. Careful handling should be used to avoid damaging the boards.

5.5.1 Tools Required

The 5100L is assembled with standard hardware. The screw sizes range from #2-56 to #8-32 and are of the Phillips or slotted types. Standard tools are required for their removal.

5.5.2 Removal of Cover

1. Remove the sixteen (16) #8-32 and the four (4) #6-32 located on both sides of the cover and the twelve (12) #4-40 Phillips head screws located on top of the cover.
2. Carefully lift the cover up.

To replace the cover, simply reverse the procedure. When replacing the cover care should be taken that the cover does not come into contact with the internal cabling.

5.5.3 Preamplicifier Assembly

1. Remove the cover support brackets by removing four (4) #6-32 screws per bracket.
2. Remove the eight (8) #4-40 screws holding the assembly to the power amplifier heatsink assemblies.
3. Remove the input cable from J2 on the preamplifier module.
4. Remove the +26.4VDC input wire from the terminal block of the regulator board associated with the preamplifier module.
5. Remove the eight (8) output cables from J3 to J10.

5.5.4 Eight Way Output Combiner Assembly

1. Remove the cover support brackets by removing four (4) #6-32 screws per bracket.
2. Remove the eight (8) input cables from J26 through J33 and one output cable from J34.
3. Remove the six (6) #4-40 screws holding the assembly to the power amplifier heatsink assemblies.

5.5.5 Power Amplifier Heatsink Assemblies

1. To remove either of the heatsink assemblies (P/N: 5100L-3433 or 5100L-3434) it is necessary to remove the preamplifier assembly (P/N: 5100L-3431) and the eight way combiner assembly (P/N: 5100L-3432) per sections 5.5.3 and 5.5.4.
2. Disconnect the Molex connectors associated with the heatsink assembly being removed.
3. Remove the five (5) #8-32 mounting screws from the bottom of the baseplate of the heatsink assembly being removed and lift the heatsink assembly straight up.

5.5.6 Power Amplifier Module

1. Remove the heatsink assembly as per section 5.5.5 above.
2. Remove the red power supply lead of the power amplifier module being removed.
3. Remove the four (4) #4-40 screws and nuts which hold the module in the heatsink.
4. Remove the five (5) #8-32 reduced nuts which hold the transistors to the heatsink.
5. Carefully lift the board from the heatsink.
6. During reassembly, care must be taken to insure proper alignment of the transistors and that all the wires are properly dressed.

5.5.7 Power Amplifier Regulator Board

1. Remove the heatsink assembly associated with the power supply regulator to be removed. See section 5.5.5.
2. Remove the two red power leads from the regulator board terminal block.
3. Remove the four (4) #4-40 mounting screws from the power supply regulator board.

5.5.8 Power Amplifier Power Supply

1. Drop the rear panel by releasing its ten (10) #6-32 screws.
2. Unsolder the red wire from the turret terminal of the supply to be removed.
3. Disconnect its associated Molex connector.
4. Remove the two (2) #6-32 screws holding the assembly to the baseplate.

5.5.9 Power Amplifier/Preamplifier Power Supply

1. Drop the rear panel by releasing its ten (10) #6-32 screws.
2. Unsolder the red wire from the turret terminal of the supply to be removed.
3. Disconnect its associated Molex connector.
4. Remove the two (2) #6-32 screws holding the assembly to the baseplate.

Troubleshooting

The first step in isolating a malfunction is to review the conditions under which the symptoms were observed and check that it was not caused by the external cabling or associated test equipment. Before proceeding to the detailed test procedure, a complete visual inspection of the 5100L should be accomplished.

Check for burnt or discolored components and broken wires and note any details which might localize the malfunction.

Commonly found symptoms together with their probable cause and troubleshooting recommendations are listed in the Troubleshooting Guide on the next page.

Troubleshooting Guide

Symptom	Probable Cause	Recommendation
Power Lamp does not light	Burned out bulb	Check for 26.4V across bulb.
	Defective power supply	Perform test in section 5.4.1
	Thermal switch open	If TS1 contacts do not close after unit has cooled, replace thermal switch.
	Defective power switch	Replace switch (S1).
	Blown Fuse	Replace fuse per section 3.2.4.
Power Lamp dim	Power supply out of adjustment	Perform power supply adjustment Section 2.2.1.
	TB3 wired incorrectly	Check section 2.2.1.
Blown fuse	Defective power supply	Perform test in section 2.4.1
	Wrong fuse	Check per section 3.2.4.
	Defective line cord or AC wiring	Visually inspect for signs of insulation breakdown.
No RF output or gain	Broken input or output type N connector	Visually inspect connectors for broken pins.
	Defective input or output internal cables.	Visually inspect cables at input and output connectors.
Low RF Output or Gain	Defective input cables.	Visually inspect cables.
	Faulty power supply adment.	Perform power supply adjustment Section 2.2.1.
	Defective RF amplifier module.	Perform procedure for locating faulty RF module, section 2.3.
Excessive Distortion	Defective power amplifier module.	Perform procedure for locating faulty RF module, section 2.3.

Troubleshooting Guide (Cont'd)		
Symptom	Probable Cause	Recommendation
Amplifier Overheating	Defective fan	Check that the fan is operating properly.
	Ambient air is above specifications.	Measure the ambient temperature.
	Defective power supply	Perform test in section 2.4.1.
Excessive ripple on gain versus frequency sweep of amplifier.	Ripple on power supply.	Perform DC power supply test, section 2.4.1.

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5100L Specifications

The following appendix lists complete physical and operations specification for the 5100L.

5100L Specifications

Revision Level: B

Frequency Coverage	1.5-400 MHz
Gain	50dB nominal
Gain Variation	±1.5dB from 1.5 to 400MHz
Maximum Class A Linear Power Output	100 Watts
Maximum Power Output	200 Watts CW & Pulse, 2.0-180 MHz
AC Power Requirements	105/115/120VAC ±8% at 22A 210/230/240VAC ±8% at 11A single phase 50/60Hz
RF Input	Type N
RF Output	Type N
Harmonic Distortion	All harmonics greater than 25dB down at maximum linear power output, lower at reduced power.
Typical Third Order Intercept Point	+62dBm
Input / Output Impedance	50Ω
Stability	Unconditionally stable; Continuous operation into any load or source impedance.
Input VSWR	1.8:1 maximum
Output VSWR	2.8:1 maximum
Noise Figure	12dB maximum
Protection	Unit will withstand a +13dBm input signal (1.0Vrms) for all output load conditions, including short and open circuit loads.
Cooling System	Forced air

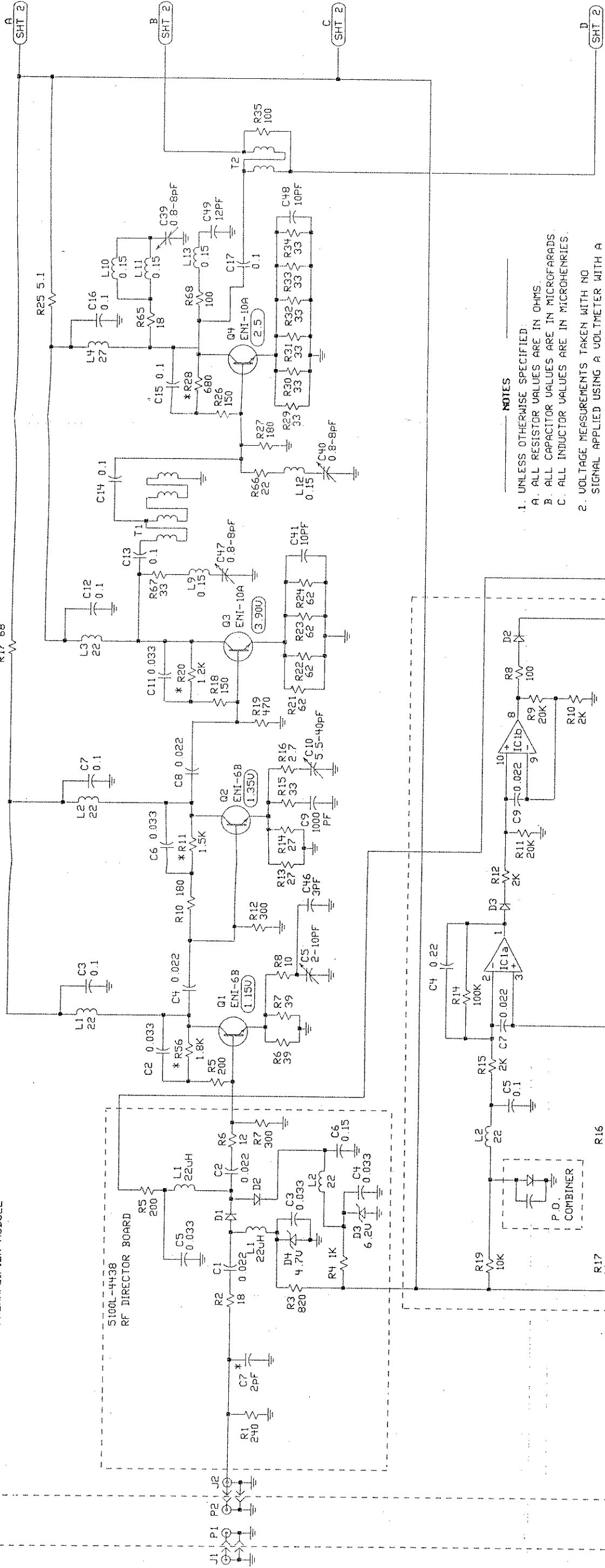
Operating Temperature	0 to 45°C
Front Panel Indicator	AC On
Rear Panel Connectors	AC line RF Input RF Output
Weight	102 lbs. (46.3 kg)
Size (H x W x D)	15.7 x 17.1 x 23" (39.9 x 43.4 x 58.4 cm)
Rack Mounting	19-inch adapters provided.

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Service Appendix

This service appendix contains schematics and a parts list for the 5100L Broadband Power Amplifier.

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- NOTES**
1. UNLESS OTHERWISE SPECIFIED:
A. ALL RESISTOR VALUES ARE IN OHMS.
B. ALL CAPACITOR VALUES ARE IN MICROFARADS.
C. ALL INDUCTOR VALUES ARE IN MICROHENRIES.
 2. VOLTAGE MEASUREMENTS TAKEN WITH NO SIGNAL APPLIED USING A VOLTMETER WITH A HIGH INPUT IMPEDENCE. (10 MEG OR GREATER)
 3. * INDICATES VARIABLE VALUE.
 4. VALUES OF: (APPLIES TO 4431 ONLY)
R5,10 AND 18 ARE ADJUSTED FOR RF GAIN IN TEST
R11,20 AND 56 ARE ADJUSTED FOR DC BIAS IN TEST
L9,10,11,12 AND 13 ARE ADJUSTED FOR TUNING PURPOSES
C9,21,24,27,31,34,35,41,46,47,48 AND 49 ARE ADJUSTED FOR TUNING PURPOSES

ENI
A DIVISION OF ASTEC AMERICA, INC.
100 HIGHPOWER ROAD
ROCHESTER, NEW YORK 14623

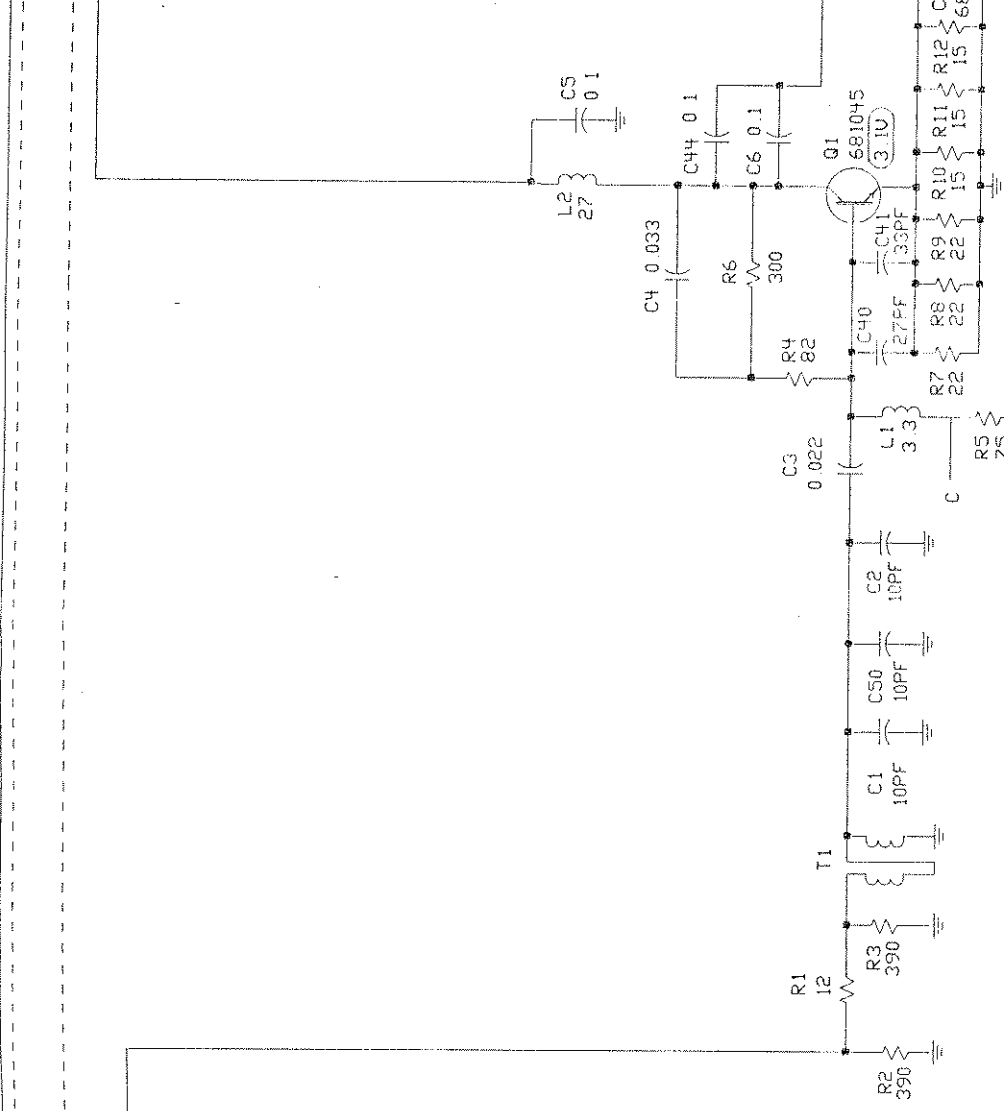
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FILE NAME: 5100LK03.SCH

REV	DESCRIPTION	APPROVED	DATE	REV	DESCRIPTION	APPROVED	DATE
F	ECO 5525	FUC R SPEAR	16/8/93	A	ECN 1004	JMG	10/10/85
G	ECO 5567	FUC R SPEAR	6/9/93	B	ECN 1075	JMG	6/8/85
H	ECO 5742	FUC R SPEAR	9/93	C	ECN 1364	ZINNI	9/16/87
J	ECO 6125	FUC P J HOLMES	14/94	D	ECO 3135	FUC T BAUIS	12/3/92
K	ECO 6261	FUC P J HOLMES	7/9/94	E	ECO 4883	FUC T BAUIS	14/3/92

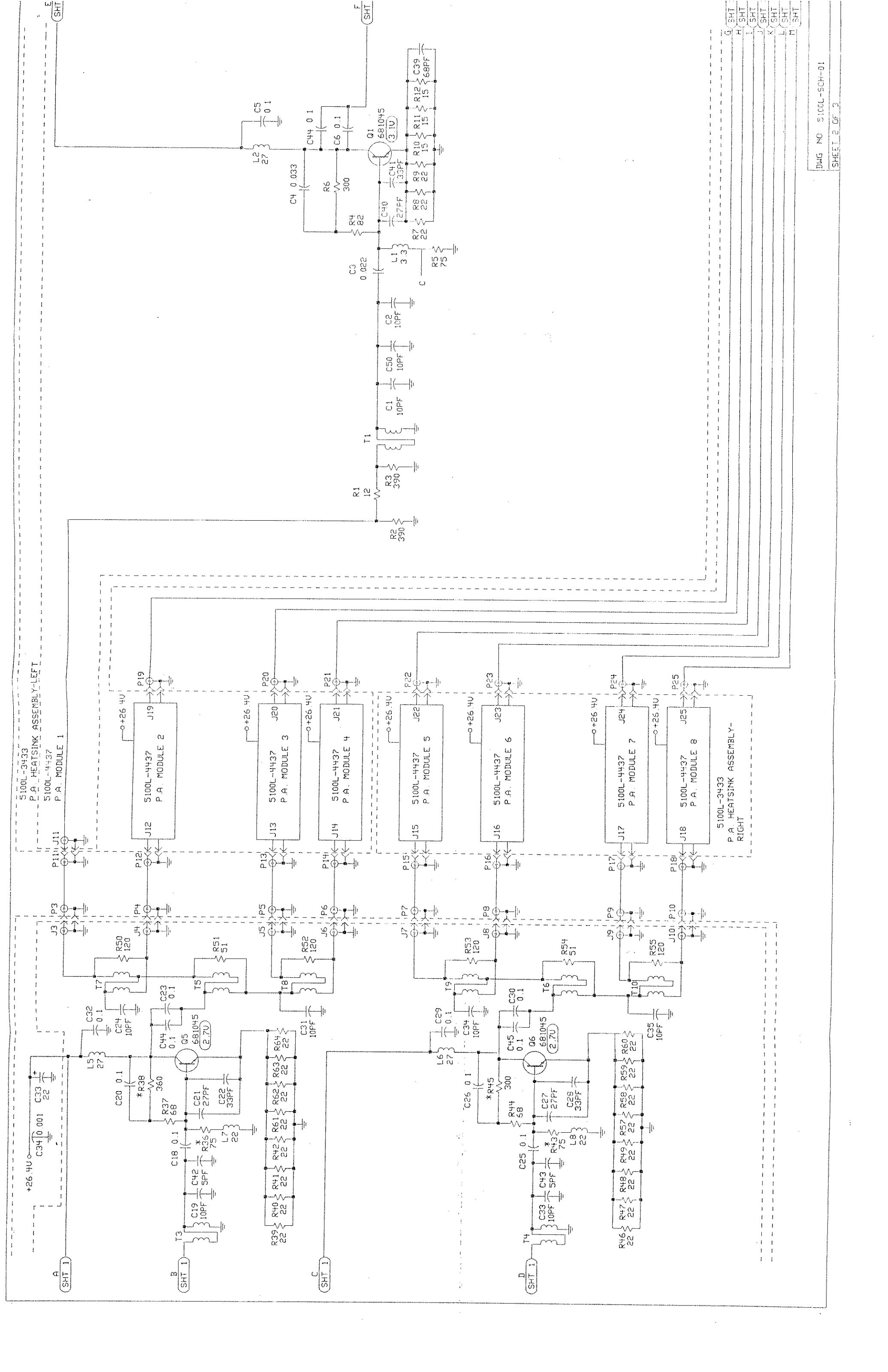
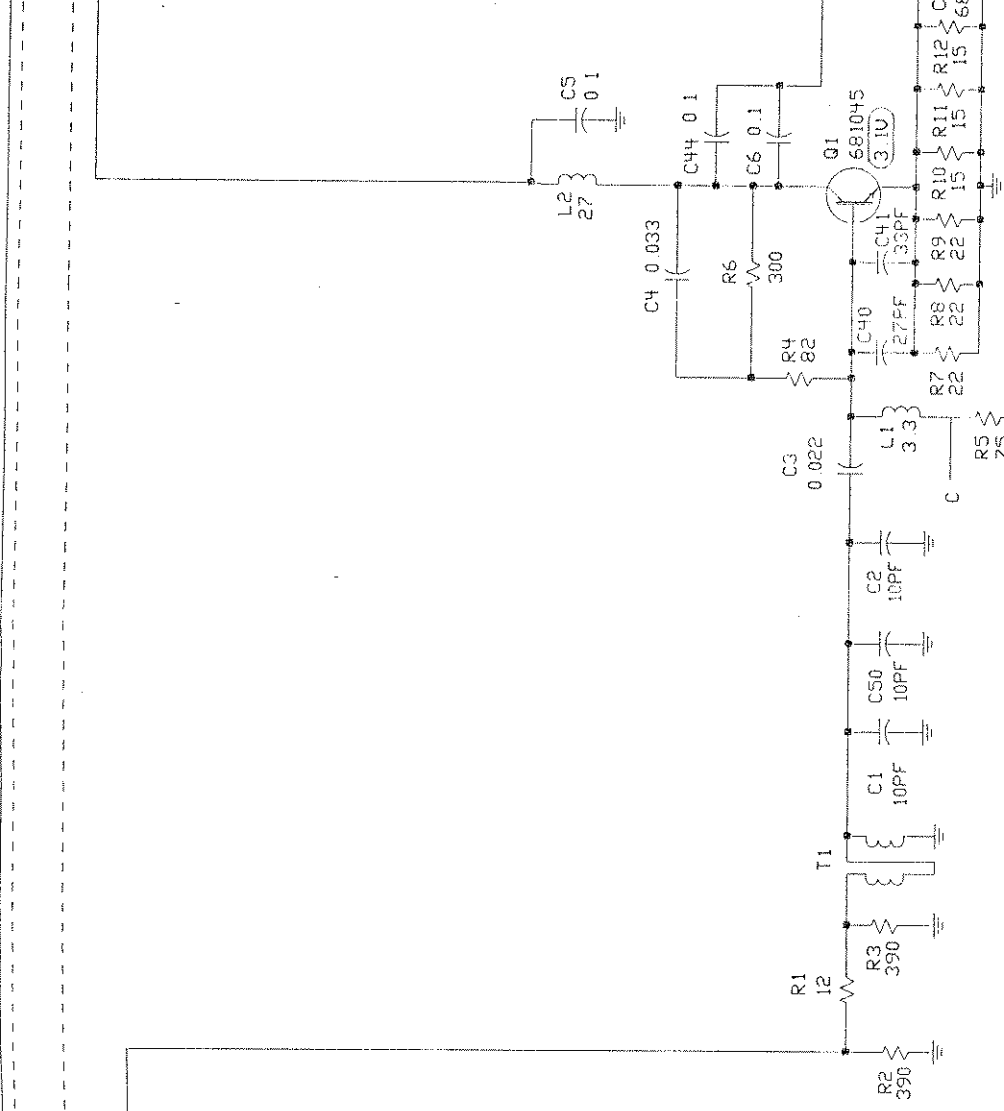
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2/92	T BAUIS	2/92	T BAUIS

DATE: 9/85
DRAWN: RJR
CHK: T BAUIS
ENG: T BAUIS
APP: T BAUIS
SHEET 1 OF 3

S100L-3433
P.A. HEATSINK ASSEMBLY-LEFT
S100L-4437
P.A. MODULE 1



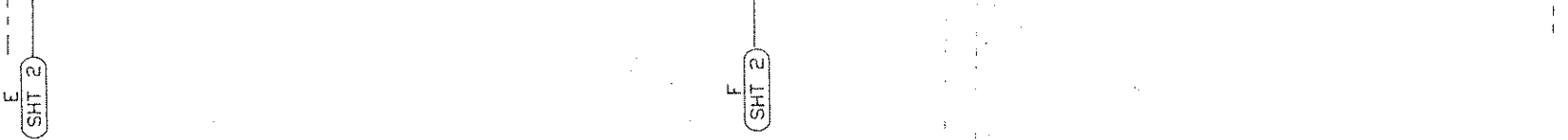
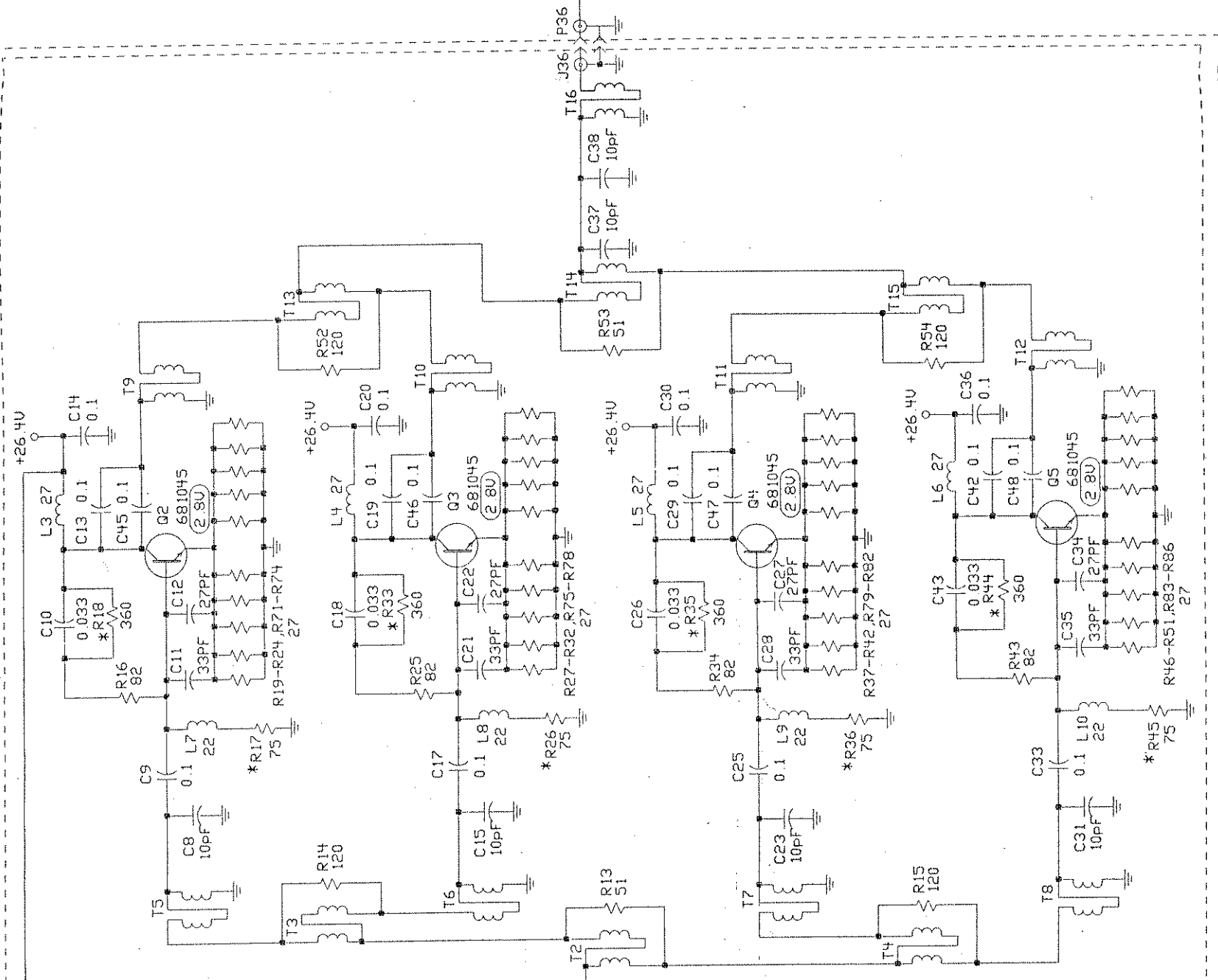
S100L-3433
P.A. HEATSINK ASSEMBLY-RIGHT



G SHT
H SHT
I SHT
J SHT
K SHT
L SHT
M SHT

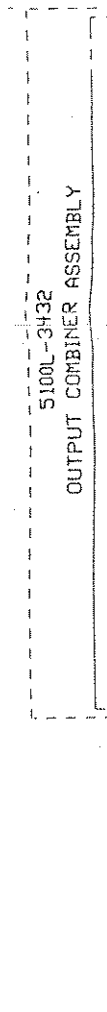
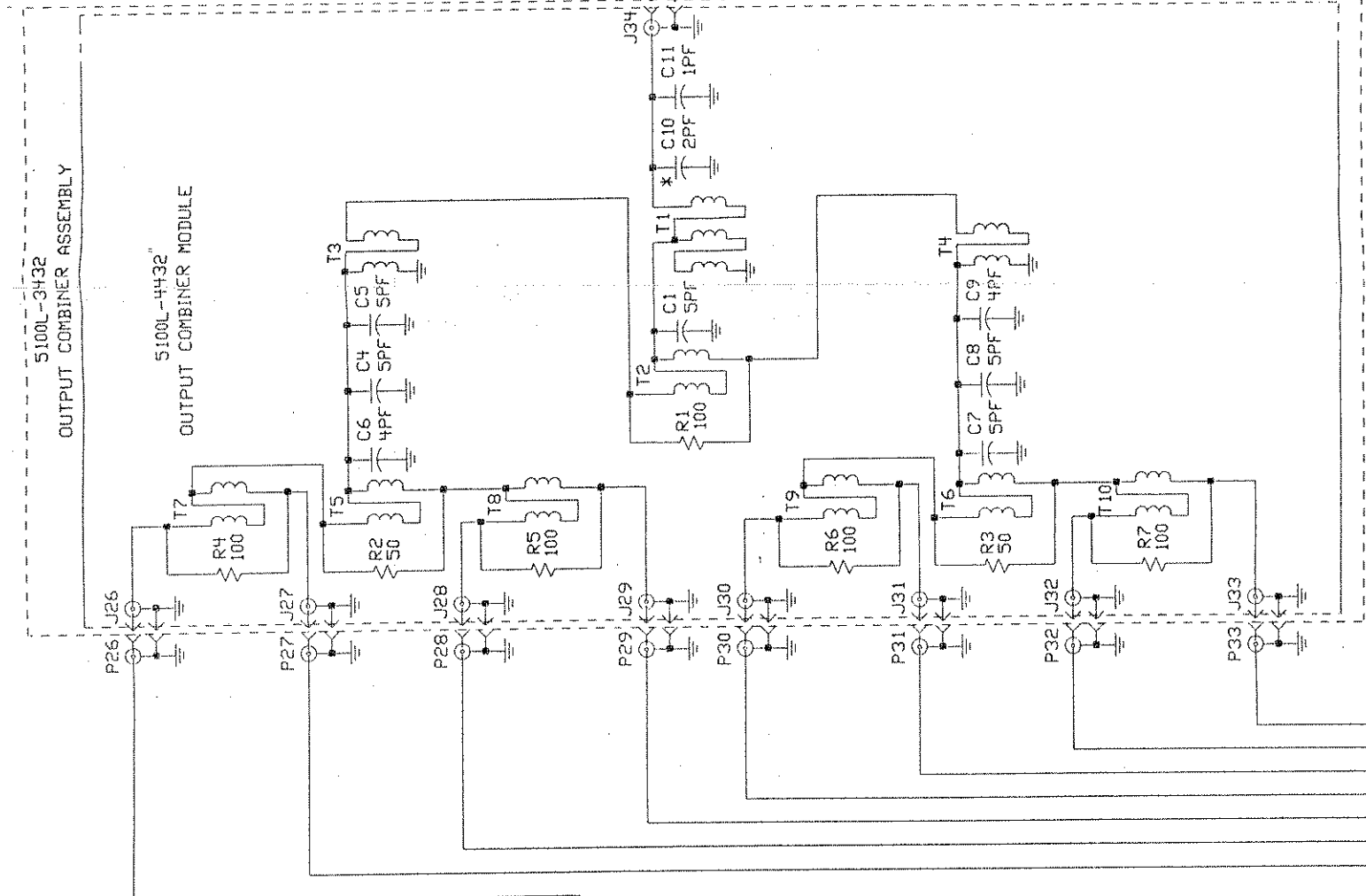
SHT 2

+26.4V



SHT 2

F



S100L-3432
OUTPUT COMBINER ASSEMBLY

S100L-4432
OUTPUT COMBINER MODULE

OUTPUT

J34 P34 P35 J35

G
SHT 2
H
SHT 2
I
SHT 2
J
SHT 2
K
SHT 2
L
SHT 2
M
SHT 2

GLOSSARY OF ABBREVIATIONS

A.....	AMPERES
AMP.....	AMPERES
ASSY.....	ASSEMBLY
BR.....	BRIDGE
CAP.....	CAPACITOR
CER.....	CERSMIC
DESIG.....	DESIGNATION
ELECT.....	ELECTROLYTIC
FWD.....	FORWARD
IC.....	INTEGRATED CIRCUIT
K.....	KILOHMS
KO.....	KILOHMS
mV.....	MILLIVOLTS
pF.....	PICOFARAD
PIV.....	PEAK INVERSE VOLTAGE
PWR.....	POWER
POT.....	POTENTIOMETER
REF.....	REFERENCE
REQ.....	REQUIRED
RFL.....	REFLECTED
RES.....	RESISTOR
S.B.....	SLOW BLOW
uF.....	MICROFARAD
µF.....	MICROFARAD
uH.....	MICROHENRY
µH.....	MICROHENRY
V.....	VOLTS
VDCW.....	DC WORKING VOLTAGE
W.....	WATTS
WW.....	WIRE WOUND

PART NUMBER	DESCRIPTION	QTY	REFERENCE DESIGNATORS
5100L-TM-01	MANUAL 5100L	1.000	
5100L-1431-C1	INPUT CABLE ASSEMBLY	0.000	
5100L-1431-C2	OUTPUT CABLE ASS'Y	0.000	
5100L-1431-C3	P.A. OUTPUT CABLE	0.000	
10900	CABLE ASSY CA4-9 24.563"	8.000	
5100L-005-H50	HARNESS GROUP	1.000	
5100L-008	BRACKET COVER SUPPORT	2.000	
5100L-015	COVER, PREAMPLIFIER	1.000	
5100L-016-1	BRACKET RACK MTG	1.000	
5100L-016-2	BRACKET REAR MTG WELD,MILL,SQ	1.000	
5100L-019	SUPPORT PANEL	2.000	
5100L-2431	POWER DISTRIBUTION	1.000	
5100L-3431	PREAMPLIFIER ASSY	1.000	
5100L-3432	OUTPUT COMBINER ASSY	1.000	
5100L-3433	PA HEATSINK ASSY RIGHT	1.000	
5100L-3434	PA HEATSINK ASSY LEFT	1.000	
5100L-3440	COVER ASSEMBLY	1.000	
10145	CHOKES, IRON, 22UH, Q75, 2.5MHZ	1.000	
10224	CORE C TOROID	5.000	
10236	CORE Q TOROID WHITE	1.000	
4014	BOX 20 1/4 X 22 X 27	1.000	
6048	LG. CORNERS ETHAFOAM	8.000	

PART NUMBER	DESCRIPTION	QTY	REFERENCE DESIGNATORS
5100L-3431-WL	WIRE LIST, PRE-AMPLIFIER	1.000	
5100L-3433-WL	WIRE LIST, P.A. HEATSINK (R)	1.000	
5100L-3434-WL	WIRE LIST, P.A. HEATSINK (L)	1.000	
5100L-3437-WL	WIRE LIST, BASEPLATE	1.000	
5100L-3438-WL	WIRE LIST, FRONT PANEL	1.000	
5100L-3439-WL	WIRE LIST, REAR PANEL	1.000	
5100L-4433-WL	WIRE LIST, P.C. WIRING BD.	3.000	
5100L-4434-WL	WIRE LIST, P.C. WIRING BD.	1.000	
5100L-4435-WL	WIRE LIST, P.S. REG. BD.	4.000	
5100L-4436-WL	WIRE LIST, CONTROL BD.	1.000	
5100L-1431-C1	INPUT CABLE ASSEMBLY	1.000	
5100L-1431-C2	OUTPUT CABLE ASS'Y	1.000	
5100L-1431-C3	P.A. OUTPUT CABLE	8.000	

PART NUMBER	DESCRIPTION	QTY	REFERENCE DESIGNATORS
5100L-020	COVER PLATE	1.000	
A300-017	COVER PLATE	1.000	
5100L-3437	BASEPLATE ASSY	1.000	
5100L-3438	FRONT PANEL ASSY	1.000	
5100L-3439	REAR PANEL ASSY	1.000	
2372	STANDOFF HEX BRASS 4-40 X .50	2.000	
8331	STANDOFF RND AL 4-40 X 2	2.000	

PART NUMBER	DESCRIPTION	QTY	REFERENCE DESIGNATORS
5100L-012	PREAMPLIFIER HEATSINK	1.000	
5100L-013	PREAMPLIFIER BOX (WELD, SQ)	1.000	
5100L-014	BRACKET PREAMPLIFIER MTG	1.000	
5100L-4431	PREAMPLIFIER BRD	1.000	
5100L-4436	CONTROL BOARD	1.000	
5100L-4438	RF DIRECTOR BOARD	1.000	
10051	CAP .001 UF 357-000-X5UD-102M	3.000	C38, 44, 45
10099	CAP 2 PF DM5CC020D	1.000	C7
10107	CAP 22MF, 50V ELEC. AXIAL	1.000	C33
10767	CAP 27 PF 100B-270-KP500	2.000	C21, 27
10768	CAP 33pF ATC 100B-330-KP500	2.000	C22, 28
10802	CAP 1000 PF 50V CER CHIP	1.000	C9
11850	CAP 0.1 MF ATC200B104KP50 CER	9.000	
151018	CAP .022 MF C2225C223K5GAC	2.000	C4, 8
151024	CAP 12 PF 300V VAC DIPMICA	1.000	C49
151334	CAPACITOR, VARIABLE 0.8-8PF	3.000	C39, C40, C47
10132	CHOKE .15 UHY	5.000	L11, 12, 9, 10, 13
221117	CONN. "SMB" REAR MOUNT SOLDER	9.000	
140006	RES C-FILM 18 OHM 1/4W 5% C7	1.000	R65
140007	RES C-FILM 22 OHM 1/4W 5% C7	1.000	R66
140010	RES C-FILM 33 OHM 1/4W 5% C7	2.000	R15, R67
140018	RES C-FILM 100 OHM 1/4W 5% C7	1.000	R68
180001	RES 12 OHM 1/8W 5% C7	1.000	R6
180002	RES 18 OHM 1/8W 5% C7	1.000	R2
180009	RES 240 OHM 1/8W 5% C7	1.000	R1
180010	RES 300 OHM 1/8W 5% C7	1.000	R7
10685	TRANSISTOR ENI-6E	2.000	Q1, 2
10686	TRANSISTOR ENI-10A	2.000	Q3, 4
681045	TRANSISTOR BIPOLAR 4W 7DB 23V	2.000	Q5, 6
10222	CORE A TOROID	1.000	
2331	STANDOFF HEX BRASS 4-40 X .375	2.000	

PART NUMBER	DESCRIPTION	QTY	REFERENCE DESIGNATORS
5100L-011	MTG BRACKET COMBINER	1.000	
5100L-026	CONNECTOR BRACKET	1.000	
5100L-4432	OUTPUT COMBINER BRD	1.000	
10098	CAP 1 PF DM5CC020D	1.000	C11
10099	CAP 2 PF DM5CC020D	1.000	C10
10101	CAP MICA 4PF 300V .5%	2.000	C6,9
10102	CAP 5 PF DM5CC050D	5.000	C1,4,5,7,8
10177	CONN RCPT N PNL 50 OHM	1.000	J34

PART NUMBER	DESCRIPTION	QTY	REFERENCE DESIGNATORS
5100L-005	P A HEATSINK RIGHT	1.000	
5100L-007-1	BRACKET HEATSINK MTG	1.000	
550L-004	HEATSINK MOUNTING BRACKET	1.000	
5100L-4435	P S REGULATOR BOARD	2.000	
5100L-4437	POWER AMPLIFIER BOARD	4.000	
10103	CAP 10PF DM5CC100A	8.000	C37,38
10767	CAP 27 PF 100B-270-KP500	20.000	C12,22,27,34,40
10768	CAP 33pF ATC 100B-330-KP500	20.000	C11,21,28,35,41
10805	CAP 68 PF 100B-680-KP500	4.000	C39
11850	CAP 0.1 MF ATC200B104KP50 CER	60.000	C3,6,9,13,17,19,25,29,33,42 46,47,48
10839	CONN PLUG 2 POS IN LINE	1.000	
2000010	RES MTL FILM 51 OHM 2W 5%	4.000	R53
10634	SWITCH 3450-088-175 ELMSSENSORS	1.000	
681045	TRANSISTOR BIPOLAR 4W 7DB 23V	20.000	Q1,2,3,4,5
10226	CORE E BALUM YELLOW	4.000	
10304	GROMMET	3.000	
11112	SNAP BUSHING	1.000	
2100L-009	HTSK FIN	1.000	
2371	STANDOFF RND BRASS 4-40 X .375	8.000	

PART NUMBER	DESCRIPTION	QTY	REFERENCE DESIGNATORS
5100L-004	P A HEATSINK LEFT (MILL, SQ)	1.000	
5100L-007-2	BRACKET HEATSINK MTG	1.000	
550L-004	HEATSINK MOUNTING BRACKET	1.000	
5100L-4435	P S REGULATOR BOARD	2.000	
5100L-4437	POWER AMPLIFIER BOARD	4.000	
10103	CAP 10PF DM5CC100A	8.000	C37, 38
10767	CAP 27 PF 100B-270-KP500	20.000	C12, 22, 27, 34, 40
10768	CAP 33pF ATC 100B-330-KP500	20.000	C11, 21, 28, 35, 41
10805	CAP 68 PF 100B-680-KP500	4.000	C39
11850	CAP 0.1 MF ATC200B104KP50 CER	60.000	C3, 6, 9, 13, 17, 19, 25, 29, 33, 42 44, 45, 46, 47, 48
2000010	RES MTL FILM 51 OHM 2W 5%	4.000	R53
681045	TRANSISTOR BIPOLAR 4W 7DB 23V	20.000	Q1, 2, 3, 4, 5
10226	CORE E BALUM YELLOW	4.000	
10304	GROMMET	3.000	
11112	SNAP BUSHING	1.000	
2100L-009	HTSK FIN	1.000	
2371	STANDOFF RND BRASS 4-40 X .375	8.000	

PART NUMBER	DESCRIPTION	QTY	REFERENCE DESIGNATORS
5100L-006	COVER	1.000	
10308	HANDLE BLACK ANODIZED	2.000	

PART NUMBER	DESCRIPTION	QTY	REFERENCE DESIGNATORS
1326	TERM SPADE #2	1.000	
2625	WIRE STRN 20AWG TFL REN	10.500	

PART NUMBER	DESCRIPTION	QTY	REFERENCE DESIGNATORS
1473	TERM PIN MOLEX REEL	2.000	
2613	WIRE STRN 18AWG TFL BLK	14.000	

PART NUMBER	DESCRIPTION	QTY	REFERENCE DESIGNATORS
1326	TERM SPADE #2	8.000	
2625	WIRE STRN 20AWG TFL REN	56.000	

PART NUMBER	DESCRIPTION	QTY	REFERENCE DESIGNATORS
1329	TERM RING #6 BLU	11.000	
1331	TERM RING #6 RED	10.000	
1334	TERM RING #10 BLU	1.000	
1472	TERM PIN MOLEX REEL	2.000	
2531	WIRE STRN 18AWG TFL YEL	3.000	
2548	WIRE STRN 16AWG TFL WHT	80.000	
2549	WIRE STRN 18AWG TFL WHT	1.500	
2550	WIRE STRN 20AWG TFL WHT	6.250	
2587	WIRE STRN 16AWG TFL BLK	93.250	
2596	WIRE STRN 14AWG TFL WHT	3.000	
2597	WIRE STRN 14AWG TFL BLK	7.500	
2613	WIRE STRN 18AWG TFL BLK	46.500	

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PART NUMBER      DESCRIPTION      QTY      REFERENCE DESIGNATORS
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2550             WIRE STRN 20AWG TFL WHT      26.000
2625             WIRE STRN 20AWG TFL REN      35.000
2626             WIRE STRN 20AWG TFL BLK      33.500
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PART NUMBER      DESCRIPTION      QTY      REFERENCE DESIGNATORS
-----
1329             TERM RING #6 BLU              10.000
1331             TERM RING #6 RED               2.000
1333             TERM RING #10 RED              4.000
1334             TERM RING #10 BLU             18.000
2534             WIRE STRN 16AWG TFL BLU       62.250
2548             WIRE STRN 16AWG TFL WHT       16.500
2550             WIRE STRN 20AWG TFL WHT       51.500
2587             WIRE STRN 16AWG TFL BLK       118.500
2596             WIRE STRN 14AWG TFL WHT       18.000
2597             WIRE STRN 14AWG TFL BLK       32.000
2620             WIRE STRN 18AWG TFL RED       70.250
2626             WIRE STRN 20AWG TFL BLK       52.500
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PART NUMBER	DESCRIPTION	QTY	REFERENCE DESIGNATORS
1472	TERM PIN MOLEX REEL	4.000	
2622	WIRE STRN 22AWG TFL WHT	6.750	
2623	WIRE STRN 22AWG TFL GRN	8.500	
2624	WIRE STRN 22AWG TFL BLU	4.500	
2628	WIRE STRN 22AWG TFL RED	7.000	

PART NUMBER	DESCRIPTION	QTY	REFERENCE DESIGNATORS
1472	TERM PIN MOLEX REEL	4.000	
2622	WIRE STRN 22AWG TFL WHT	6.750	
2623	WIRE STRN 22AWG TFL GRN	8.500	
2624	WIRE STRN 22AWG TFL BLU	4.500	
2628	WIRE STRN 22AWG TFL RED	7.000	

PART NUMBER	DESCRIPTION	QTY	REFERENCE DESIGNATORS
1473	TERM PIN MOLEX REEL	4.000	
2622	WIRE STRN 22AWG TFL WHT	7.500	
2623	WIRE STRN 22AWG TFL GRN	8.750	
2624	WIRE STRN 22AWG TFL BLU	7.500	
2628	WIRE STRN 22AWG TFL RED	8.500	

PART NUMBER	DESCRIPTION	QTY	REFERENCE DESIGNATORS
2628	WIRE STRN 22AWG TFL RED	3.000	
2629	WIRE STRN 22AWG TFL BLK	3.000	
2631	WIRE STRN 22AWG TFL ORN	4.500	

PART NUMBER	DESCRIPTION	QTY	REFERENCE DESIGNATORS
011055	DWG COAX ASSY BNC MALE/SMB FM	0.000	
221290	CONN SMB STRAIGHT PLUG	1.000	ITEM 1
481023	PLUG, BNC FGR RG188 DBL SHIELD	1.000	ITEM 2
751021	LABEL, CABLE MARKER .08-.13 DIA	3.000	ITEM 2
2700	COAX CABLE RG-188 DBL SHLD	35.000	ITEM 4

PART NUMBER	DESCRIPTION	QTY	REFERENCE DESIGNATORS
011143	CABLE ASSM N RT ANG/N RT ANG	0.000	
221313	CONNECTOR RT ANG N FOR RG214	2.000	ITEM 1
1584	CABLE COAX RG214	12.500	ITEM 3

PART NUMBER	DESCRIPTION	QTY	REFERENCE DESIGNATORS
10218	CONN PLUG COAX 50 OHM GOLD	1.000	
10219	CONN 142-0262-006	1.000	
2570	CABLE COAX 50 OHM RG58	23.438	

PART NUMBER	DESCRIPTION	QTY	REFERENCE DESIGNATORS
350L-011	SUPPORT COVER	2.000	
5100L-001	BASEPLATE	1.000	
A300-015	FRONT PANEL SUPPORT	2.000	
5100L-3435	PS HEATSINK ASSY	3.000	
5100L-3436	PS HEATSINK ASSY	1.000	
10838	CONN HSNR RCPT 2 POS PNL MT	1.000	
10526	RELAY AC SPST 30A 120V	1.000	K1
10604	RES 2K OHM 10W	1.000	R1
671054	TRANSFORMER A300	1.000	
121007	BRIDGE 35A 400V	4.000	
10276	FEET PLASTIC 760-3572	6.000	
10649	TERM BLK 10 TERM 10-140	1.000	
10653	MARK STRIP 10 TERMS SERIES 140	1.000	

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PART NUMBER      DESCRIPTION      QTY      REFERENCE DESIGNATORS
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5100L-002        FRONT PANEL      1.000
5100L010-1       CORNER BRACKET FRONT 1.000
5100L010-2       CORNER BRACKET FRONT 1.000
641049           SWITCH - LIGHTED PUSHBTN (SP) 1.000
10781            HANDLE BRUSHED CHROME PLATED 2.000

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PART NUMBER      DESCRIPTION      QTY      REFERENCE DESIGNATORS
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5100L-003        REAR PANEL      1.000
5100L-009-1       CORNER BRACKET REAR 1.000
5100L-009-2       CORNER BRACKET REAR 1.000
5100L-025        FAN COVER      (WELD, SQ) 1.000
A300-016         CAPACITOR CLAMP 4.000
10111            CAP 3900 MF 50V ALEL 1.000 C5
151346           CAP 15000MF 75V ALUM ELEC. RAD 4.000 C1-4
10165            CONN PLUG COAX PNL PLUG-PLUG 1.000
10172            CONN UG-606/U 1.000 J1
10256            FAN TUBEAXIAL 6.9"SQ 280 CFM 1.000 B2
10261            FAN TUBEAXIAL 4.68"SQ 113CFM 1.000 B1
10294            FUSE 3AB CER SLOBLO 25A 250V 1.000 F1
10299            FUSE HOLDER SOLDER PNL 1.000
11264            LINECORD 10/3 6.500
10401            PLUG 30A 125V 2P3W TWIST LOCK 1.000
10125            CLAMP,CAPACITOR,1.375"-1.875" 1.000
10267            FAN GRILL 4.5" MTG 1.000
10268            FAN GRILL 8.5" MTG 1.000
10349            CLAMP LINECORD 1.000

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PART NUMBER	DESCRIPTION	QTY	REFERENCE DESIGNATORS
141072	COAX SEMIRIGID 50 OHM 0.034	3.000	
10054	CAP CER TRIM 2-10PF 250VDC@85C	1.000	C5
10055	CAP 5.5-45PF TRIM 9304	1.000	C10
10063	CAP .033MF 100V CER RAD LEAD	3.000	
10065	CAP .1 MF 50V CER RAD	6.000	C3,7,12,16,29,32
10065	CAP .1 MF 50V CER RAD	3.000	
10102	CAP 5 PF DM5CC050D	2.000	C42,43
10103	CAP 10PF DM5CC100A	6.000	C19,24,31,33,34,35
10145	CHCKE, IRON, 22UH, Q75, 2.5MHZ	5.000	L1,2,3,7,8
10146	CHCKE, IRON, 27UH, 10%, Q45, 2.5MHZ	3.000	L4,5,6
10892	PRE AMP PCB A-185	1.000	
120005	RES C-FILM 22 OHM 1/2W 5% C7	16.000	R39-42, 46-49, 57-64
140001	RES C-FILM 2.7 OHM 1/4W 5% C7	1.000	R16
140003	RES C-FILM 10 OHM 1/4W 5% C7	1.000	R8
140010	RES C-FILM 33 OHM 1/4W 5% C7	6.000	R29-34
140013	RES C-FILM 51 OHM 1/4W 5% C7	2.000	P51,54
140014	RES C-FILM 62 OHM 1/4W 5% C7	4.000	R21,22,23,24
140016	RES C-FILM 75 OHM 1/4W 5% C7	2.000	R36,43
140018	RES C-FILM 100 OHM 1/4W 5% C7	1.000	R35
140019	RES C-FILM 120 OHM 1/4W 5% C7	4.000	R50,52,53,55
140020	RES C-FILM 150 OHM 1/4W 5% C7	1.000	
140021	RES C-FILM 180 OHM 1/4W 5% C7	2.000	R10,27
140022	RES C-FILM 200 OHM 1/4W 5% C7	1.000	
140029	RES C-FILM 470 OHM 1/4W 5% C7	1.000	R19
140036	RES C-FILM 1.2K OHM 1/4W 5% C7	1.000	
140037	RES C-FILM 1.5K OHM 1/4W 5% C7	1.000	
140039	RES C-FILM 1.8K OHM 1/4W 5% C7	1.000	
180003	RES 27 OHM 1/8W 5% C7	2.000	R13,14
180004	RES 39 OHM 1/8W 5% C7	2.000	R6,7
180010	RES 300 OHM 1/8W 5% C7	1.000	R12
1000018	RES MTL FILM 680 OHM 1W 5%	1.000	
1000024	RES MTL FILM 150 OHM 1W 5%	1.000	
2000011	RES MTL FILM 68 OHM 2W 5%	2.000	
2000018	RES MTL FILM 300 OHM 2W 5%	2.000	
3000002	RES MTL FILM 68 OHM 3W 5% MO	1.000	R17
10588	RES 5.1 OHM 5W 5%	1.000	R25

PART NUMBER	DESCRIPTION	QTY	REFERENCE DESIGNATORS
10222	CORE A TOROID	2.000	T3,4
10226	CORE E BALUM YELLOW	1.000	T1
10230	CORE I BALUM YELLOW	7.000	T2, T5,6 T7,8,9,10

PART NUMBER	DESCRIPTION	QTY	REFERENCE DESIGNATORS
10065	CAP .1 MF 50V CER RAD	4.000	C1, 3, 5, 6
10118	CAP .022 MF 50V CER CHIP	2.000	C7, 9
10735	CAP .22MF, 50V CERAMIC RAD.	2.000	C4, C2
10145	CHOKE, IRON, 22UH, Q75, 2.5MHZ	2.000	L1, L2
10239	DIODE, SILICON SWITCHING 1N914B	3.000	D1, 2, 3
11065	IC LM224J	1.000	IC1
10413	RES POT 10K OHM 72PLR10K	2.000	R4, R16
11454	CONTROL PCB A-326	1.000	
140018	RES C-FILM 100 OHM 1/4W 5% C7	2.000	R8, R7
140040	RES C-FILM 2K OHM 1/4W 5% C7	7.000	R3, 1, 10, 12, 15, 18, 20
140055	RES C-FILM 9.1K OHM 1/4W 5% C7	1.000	R6
140056	RES C-FILM 10K OHM 1/4W 5% C7	1.000	R19
140057	RES C-FILM 12K OHM 1/4W 5% C7	1.000	R5
140062	RES C-FILM 30K OHM 1/4W 5% C7	1.000	R17
140070	RES C-FILM 100K OHM 1/4W 5% C7	1.000	R14
140082	RES C-FILM 20K OHM 1/4W 5% C7	2.000	R9, 11
140083	RES C-FILM 51K OHM 1/4W 5% C7	1.000	R2
10912	SOCKET DIP 14 PINS 414 AG 49	1.000	

PART NUMBER	DESCRIPTION	QTY	REFERENCE DESIGNATORS
10063	CAP .033MF 100V CER RAD LEAD	3.000	C3, 4, 5
10804	CAP .15 MF 50V CHIP	1.000	C6
151677	CAPACITOR 0.022UF 50V 10% SMT	2.000	C1-2
10145	CHOKE, IRON, 22UH, Q75, 2.5MHZ	3.000	L1, L2, L3
10238	6.2 ZENER DIODE 1N753A	1.000	D3
11102	4.7V ZENER DIODE 1N4688	1.000	D4
11689	DIODE	2.000	D1, D2
11725	RF DIRECTOR PCB A-344	1.000	
120025	RES C-FILM 1K OHM 1/2W 5% C7	1.000	R4
140022	RES C-FILM 200 OHM 1/4W 5% C7	1.000	R5
1000026	RES MFL FILM 820 OHM 1W 5%	1.000	R3

PART NUMBER	DESCRIPTION	QTY	REFERENCE DESIGNATORS
141071	COAX CABLE 25 OHM	21.000	
10063	CAP .033MF 100V CER RAD LEAD	1.000	
11549	CONN RCPT COAX RTANG PC MT SMA	8.000	J24-33
10242	50V GEN.PURPOSE DIODE 1N4001	1.000	D1
10891	OUTPUT COMBINER PCB A-184	1.000	
10578	RES 50 OHM 50W 1%	2.000	R2,3
10579	RES 100 OHM 50W 1%	5.000	R1,4,5,6,7
10224	CORE C TOROID	1.000	T2
10230	CORE I BALUM YELLOW	6.000	T5,6, T7,8,9,10
10234	CORE N TOROID WHITE	8.000	T3,T4
10237	CORE R BALUM GREEN	8.000	
231007	CORE AF BALUM RED	4.000	T1
1666	BRAID, TUBULAR 1/16IN TINNED	4.000	

PART NUMBER	DESCRIPTION	QTY	REFERENCE DESIGNATORS
10063	CAP .033MF 100V CER RAD LEAD	3.000	C2, C6, C7
10065	CAP .1 MF 50V CER RAD	1.000	C9
10086	CAP 150 PF 300V 5% MICA RAD	1.000	C4
10093	CAP 560 PF 300V 5% MICA RAD	1.000	C1
10108	CAP 47 MF 63V	1.000	C8
10118	CAP .022 MF 50V CER CHIP	1.000	C3
11041	CAP 6800 PF,50V CHIP CAP	1.000	C5
10137	CHOKE, PHEN, .47UH,20%,Q45,25MHZ	1.000	L1
10840	CONN PLUG 4 POS IN LINE	1.000	
10327	IC POS ADJ OUTPUT VLTG REG ICKT	1.000	IC1
10408	RES POT 200 OHM 72PLR200	2.000	R2, R4
10801	PS REGULATOR PCB A-162	1.000	
140049	RES C-FILM 5.1K OHM 1/4W 5% C7	1.000	R1
10569	RES M-FILM 2.7K OHM 1/2W 2%	1.000	R5
10572	RES M-FILM 7.5K OHM 1/2W 2%	1.000	R3
10787	CORE S TOROID WHITE	4.000	
10645	TERM BLK 4 TERM 411-Z4	1.000	

PART NUMBER	DESCRIPTION	QTY	REFERENCE DESIGNATORS
141071	COAX CABLE 25 OHM	4.250	
10063	CAP .033MF 100V CER RAD LEAD	5.000	C4,10,18,26,43
10065	CAP .1 MF 50V CER RAD	5.000	C5,14,20,30,36
10103	CAP 10PF DM5CC100A	7.000	C1,C2,C8,C15,C23,C31,C50
10145	CHOKE, IRON, 22UH, Q75, 2.5MHZ	5.000	L1,7,8,9,10
10146	CHOKE, IRON, 27UH, 10%, Q45, 2.5MHZ	5.000	L2,3,4,5,6
11550	CONN 1 PIN 142-0701-211	1.000	J7
221116	CONN. "SME" VERTICAL PCB MOUNT	1.000	
10789	POWER AMP PCB A-155	1.000	
120002	RES C-FILM 12 OHM 1/2W 5% C7	1.000	R1
120003	RES C-FILM 15 OHM 1/2W 5% C7	3.000	R10,11,12
120005	RES C-FILM 22 OHM 1/2W 5% C7	3.000	R7,8,9
120006	RES C-FILM 27 OHM 1/2W 5% C7	40.000	R19-24, 27-32, 37-42, 46-56, 71-86
120007	RES C-FILM 51 OHM 1/2W 5% C7	1.000	R13
120017	RES C-FILM 390 OHM 1/2W 5% C7	2.000	R2,3
120036	RES C-FILM 75 OHM 1/2W 5% C7	1.000	R5
140016	RES C-FILM 75 OHM 1/4W 5% C7	4.000	R17,36,45,26
140019	RES C-FILM 120 OHM 1/4W 5% C7	2.000	R14,15
2000012	RES MTL FILM 82 OHM 2W 5%	5.000	R4,R16,R34,R43,R25
2000014	RES MTL FILM 120 OHM 2W 5%	2.000	R52,54
2000018	RES MTL FILM 300 OHM 2W 5%	1.000	R6
2000032	RES MTL FILM 360 OHM 2W 5%	4.000	R18, 33, 35, 44
10222	CORE A TOROID	5.000	T1,5,6,7,8
10229	CORE H BALUM GREEN	4.000	T9,10,11,12
10230	CORE J BALUM YELLOW	6.000	T3,4,13,15, T2,14
10237	CORE R BALUM GREEN	4.000	T16
621009	SFACER RND BRS PCB	4.000	

PART NUMBER	DESCRIPTION	QTY	REFERENCE DESIGNATORS
10063	CAP .033MF 100V CER RAD LEAD	3.000	C2, C6, C7
10065	CAP .1 MF 50V CER RAD	1.000	C9
10086	CAP 150 PF 300V 5% MICA RAD	1.000	C4
10093	CAP 560 PF 300V 5% MICA RAD	1.000	C1
10108	CAP 47 MF 63V	1.000	C8
10118	CAP .022 MF 50V CER CHIP	1.000	C3
11041	CAP 6800 PF, 50V CHIP CAP	1.000	C5
10137	CHOKE, PHEN, .47UH, 20%, Q45, 25MHZ	1.000	L1
10840	CONN PLUG 4 POS IN LINE	1.000	
10327	IC POS ADJ OUTPUT VLTG REG 1CKT	1.000	IC1
10408	RES POT 200 OHM 72PLR200	2.000	R2, R4
10801	PS REGULATOR PCB A-162	1.000	
140049	RES C-FILM 5.1K OHM 1/4W 5% C7	1.000	R1
10569	RES M-FILM 2.7K OHM 1/2W 2%	1.000	R5
10572	RES M-FILM 7.5K OHM 1/2W 2%	1.000	R3
10787	CORE S TOROID WHITE	4.000	
10645	TERM BLK 4 TERM 411-24	1.000	

PART NUMBER	DESCRIPTION	QTY	REFERENCE DESIGNATORS
141071	COAX CABLE 25 OHM	4.250	
10063	CAP .033MF 100V CER RAD LEAD	5.000	C4,10,18,26,43
10065	CAP .1 MF 50V CER RAD	5.000	C5,14,20,30,36
10103	CAP 10PF DM5CC100A	7.000	C1,C2,C8,C15,C23,C31,C50
10145	CHCKE, IRON, 22UH, Q75, 2.5MHZ	5.000	L1,7,8,9,10
10146	CHCKE, IRON, 27UH, 10%, Q45, 2.5MHZ	5.000	L2,3,4,5,6
11550	CONN 1 PIN 142-0701-211	1.000	J7
221116	CONN. "SMB" VERTICAL PCB MOUNT	1.000	
10789	POWER AMP PCB A-155	1.000	
120002	RES C-FILM 12 OHM 1/2W 5% C7	1.000	R1
120003	RES C-FILM 15 OHM 1/2W 5% C7	3.000	R10,11,12
120005	RES C-FILM 22 OHM 1/2W 5% C7	3.000	R7,8,9
120006	RES C-FILM 27 OHM 1/2W 5% C7	40.000	R19-24, 27-32, 37-42, 46-56, 71-86
120007	RES C-FILM 51 OHM 1/2W 5% C7	1.000	R13
120017	RES C-FILM 390 OHM 1/2W 5% C7	2.000	R2,3
120036	RES C-FILM 75 OHM 1/2W 5% C7	1.000	R5
140016	RES C-FILM 75 OHM 1/4W 5% C7	4.000	R17,36,45,26
140019	RES C-FILM 120 OHM 1/4W 5% C7	2.000	R14,15
2000012	RES MTL FILM 82 OHM 2W 5%	5.000	R4,R16,R34,R43,R25
2000014	RES MTL FILM 120 OHM 2W 5%	2.000	R52,54
2000018	RES MTL FILM 300 OHM 2W 5%	1.000	R6
2000032	RES MTL FILM 360 OHM 2W 5%	4.000	R18, 33, 35, 44
10222	CORE A TOROID	5.000	T1,5,6,7,8
10229	CORE H BALUM GREEN	4.000	T9,10,11,12
10230	CORE I BALUM YELLOW	6.000	T3,4,13,15, T2,14
10237	CORE R BALUM GREEN	4.000	T16
621009	SPACER RND BRS PCB	4.000	

PART NUMBER	DESCRIPTION	QTY	REFERENCE DESIGNATORS
A300-012	POWER SUPPLY HEATSINK	1.000	
5100L-4433	PC WIRING BRD	1.000	
10678	TRANSISTOR 2N4233A	1.000	Q1
681053	TRANSISTOR MJ15024	4.000	
10310	HEATSINK 170-HC	4.000	
10311	HEATSINK 172-HC	1.000	

PART NUMBER	DESCRIPTION	QTY	REFERENCE DESIGNATORS
A300-012	POWER SUPPLY HEATSINK	1.000	
5100L-4434	PC WIRING BRD	1.000	
10678	TRANSISTOR 2N4233A	1.000	Q1
681053	TRANSISTOR MJ15024	4.000	Q2-5
10310	HEATSINK 170-HC	4.000	
10311	HEATSINK 172-HC	1.000	

PART NUMBER	DESCRIPTION	QTY	REFERENCE DESIGNATORS
10841	CONN HSNQ RCPT 4 POS PNL MT	1.000	
10503	P C WIRING PCB A-189	1.000	
10581	RES MTL FILM .16 OHM 2W 5%	4.000	R1-4

PART NUMBER	DESCRIPTION	QTY	REFERENCE DESIGNATORS
10841	CONN HENG RCPT 4 POS PNL MT	1.000	
10903	P C WIRING PCB A-189	1.000	
10580	RES MTL FILM .1 OHM 2W 10%	4.000	R1-4

05/18/01 INDEX FOR 5100L-1431 5100L POWER AMPLIFIER

PAGE	PART NUMBER	DESCRIPTION	QTY
	10900	CABLE ASSY CA4-9 24.563"	8.000
2	5100L-005-H50	HARNES GROUP	1.000
9	5100L-3431-WL	WIRE LIST, PRE-AMPLIFIER	1.000
10	5100L-3433-WL	WIRE LIST, P.A. HEATSINK (R)	1.000
11	5100L-3434-WL	WIRE LIST, P.A. HEATSINK (L)	1.000
12	5100L-3437-WL	WIRE LIST, BASEPLATE	1.000
13	5100L-3438-WL	WIRE LIST, FRONT PANEL	1.000
14	5100L-3439-WL	WIRE LIST, REAR PANEL	1.000
15	5100L-4433-WL	WIRE LIST, P.C. WIRING BD.	3.000
16	5100L-4434-WL	WIRE LIST, P.C. WIRING BD.	1.000
17	5100L-4435-WL	WIRE LIST, P.S. REG. BD.	4.000
18	5100L-4436-WL	WIRE LIST, CONTROL BD.	1.000
19	5100L-1431-C1	INPUT CABLE ASSEMBLY	1.000
20	5100L-1431-C2	OUTPUT CABLE ASS'Y	1.000
21	5100L-1431-C3	P.A. OUTPUT CABLE	8.000
	5100L-008	BRACKET COVER SUPPORT	2.000
	5100L-015	COVER, PREAMPLIFIER	1.000
	5100L-016-1	BRACKET RACK MTG	1.000
	5100L-016-2	BRACKET REAR MTG WELD, MILL, SQ	1.000
	5100L-019	SUPPCRT PANEL	2.000
3	5100L-2431	POWER DISTRIBUTION	1.000
	5100L-020	COVER PLATE	1.000
	A300-017	COVER PLATE	1.000
22	5100L-3437	BASEPLATE ASSY	1.000
	35GL-011	SUPPORT COVER	2.000
	5100L-001	BASEPLATE	1.000
	A300-015	FRONT PANEL SUPPORT	2.000
34	5100L-3435	PS HEATSINK ASSY	3.000
	A300-012	POWER SUPPLY HEATSINK	1.000
36	5100L-4433	PC WIRING BRD	1.000
35	5100L-3436	PS HEATSINK ASSY	1.000
	A300-012	POWER SUPPLY HEATSINK	1.000
37	5100L-4434	PC WIRING BRD	1.000
23	5100L-3438	FRONT PANEL ASSY	1.000
	5100L-002	FRONT PANEL	1.000
	5100L010-1	CORNER BRACKET FRONT	1.000

PAGE	PART NUMBER	DESCRIPTION	QTY
	5100L010-2	CORNER BRACKET FRONT	1.000
24	5100L-3439	REAR PANEL ASSY	1.000
	5100L-003	REAR PANEL	1.000
	5100L-009-1	CORNER BRACKET REAR	1.000
	5100L-009-2	CORNER BRACKET REAR	1.000
	5100L-025	FAN COVER (WELD, SQ)	1.000
	A300-016	CAPACITOR CLAMP	4.000
4	5100L-3431	PREAMPLIFIER ASSY	1.000
	5100L-012	PREAMPLIFIER HEATSINK	1.000
	5100L-013	PREAMPLIFIER BOX (WELD, SQ)	1.000
	5100L-014	BRACKET PREAMPLIFIER MTG	1.000
25	5100L-4431	PREAMPLIFIER BRD	1.000
27	5100L-4436	CONTROL BOARD	1.000
28	5100L-4438	RF DIRECTOR BOARD	1.000
5	5100L-3432	OUTPUT COMBINER ASSY	1.000
	5100L-011	MTG BRACKET COMBINER	1.000
	5100L-026	CONNECTOR BRACKET	1.000
29	5100L-4432	OUTPUT COMBINER BRD	1.000
6	5100L-3433	PA HEATSINK ASSY RIGHT	1.000
	5100L-005	P A HEATSINK RIGHT	1.000
	5100L-007-1	BRACKET HEATSINK MTG	1.000
	550L-004	HEATSINK MOUNTING BRACKET	1.000
30	5100L-4435	P S REGULATOR BOARD	2.000
31	5100L-4437	POWER AMPLIFIER BOARD	4.000
7	5100L-3434	PA HEATSINK ASSY LEFT	1.000
	5100L-004	P A HEATSINK LEFT (MILL, SQ)	1.000
	5100L-007-2	BRACKET HEATSINK MTG	1.000
	550L-004	HEATSINK MOUNTING BRACKET	1.000
32	5100L-4435	P S REGULATOR BOARD	2.000
33	5100L-4437	POWER AMPLIFIER BOARD	4.000
8	5100L-3440	COVER ASSEMBLY	1.000
	5100L-006	COVER	1.000