



NT 30H



70W FM Exciter / Transmitter

Technical Manual



CONDITIONS OF CONTRACT

1. Any goods (at your request) not collected/dispatched, shall be stored at your expense and risk. Such goods may be sold or disposed of 30 days after the invoice date to cover the price and cost incurred thereby.
2. Delivery / completion shall be effected by agreement or any reasonable extension thereof, and no claim(s) shall lie against NicomUSA, Inc. for any reason save for negligence by NicomUSA, Inc.
3. Each and every installment delivery shall be considered as a separate contract and shall be subject to full payment prior to any further delivery(ies).
4. Delivery shall be F.O.B. National City, California. Shipment to consignee's chosen address and all carriage insurance shall be at consignee's expense.
5. Any price increases affecting the quoted price prior to delivery shall be increased accordingly.
6. All quoted prices at NicomUSA, Inc.'s sole discretion are subject to change/variation by virtue of any condition beyond their control. The price shall not include packing costs for shipping purposes or any taxes, duties, or transportation costs.
7. Any damage to the goods must be reported to the carrier in writing on the shipping receipt. Any discrepancy/damage discovered subsequent to delivery shall be reported to NicomUSA, Inc. within 5 days of its receipt.
8. NicomUSA, Inc. extends to the original end user purchaser all original manufacturers' warranties which are not transferable and all claims are to be made through your dealer or distributor as per indicated procedures.
9. All manufacturers' warranties will be supported by NicomUSA, Inc. to ensure precise and speedy service when possible.
10. NicomUSA, Inc. shall not be liable for damages of whatsoever nature arising out in connection with the product or its use thereof.
11. **NicomUSA's warranty shall not include:**
 - a) Cost of reshipment of the unit to NicomUSA, Inc. for repair purposes.
 - b) Any unauthorized repairs/modifications.
 - c) Repair of unit whose seal has been broken without Nicom's authorization.
 - d) Incidental/consequential damages as a result of any defect.
 - e) Nominal non-incidentals defects.
 - f) Free replacement of parts like vacuum tubes, amplifier tubes and cooling fans.
 - g) Free replacement of semiconductors (transistors, mosfets and IC's) which are not covered under any warranty.
 - h) Shipment costs or insurance of the unit or replacement units/parts from customer to NicomUsa and back from NicomUsa back to customer.
12. Warranty shall commence as of the invoice/shipment date and for the period of the manufacturer's warranty.
13. To claim your rights under this warranty:
 - A. Contact the dealer or distributor from whom this product was purchased. Describe the problem and ask if they have an easy solution. Dealers and distributors are supplied with information on problems which may occur and usually can repair the unit more quickly than by going directly to the factory. It is also often true that errors in installation or use will be discovered by your dealer.
 - B. If your dealer cannot help, they will contact Nicom and explain the problem. If it is determined that the unit needs to be returned to the factory, they will obtain from Nicom a return authorization and shipping instructions for you.
 - C. When you receive the return authorization, you can return the unit. Pack the unit(s) carefully for shipment. If possible, use the original packing materials and assume the shipping carton will be dropped several times during the transportation process. We recommend the use of UPS or similar freight services and would discourage the use of the postal system. If equipment is received inadequately packed, there will be a charge for re-packing the equipment for re-shipment. The risk of loss is assumed by you (NicomUSA, Inc. is not responsible for damage or loss) until the package is received at NicomUSA, Inc.. We advise you to take out insurance for the full replacement value of the unit. Ship the unit **PREPAID** to the address specified by NicomUSA, Inc. service manager on the return authorization. **DO NOT RETURN UNITS WITHOUT A RETURN AUTHORIZATION, AS THEY WILL NOT BE ACCEPTED.** Be sure to enclose a written descriptive statement of the problem experienced and a copy of your original invoice establishing the starting date of the warranty.
Please note in warranty returns where no fault is found, there will be a \$100 service fee plus return freight.
No work on repairs can be started until full payment is received. Any units submitted for repair and not paid for 30 days after submission will become the property of NicomUsa, Inc.
14. Terms shown on the front of invoice are from date of invoice and not contingent upon delivery. In the event buyer fails to fulfill the terms of payment hereunder, buyer promises to pay all costs and expenses of collection and reasonable attorney's fees incurred by NicomUSA, Inc. on account of collection, whether or not suit is filed thereon. NicomUSA, Inc. reserves the right to charge interest on all bills not paid at maturity.
15. As a condition of purchaser conducting business with NicomUSA, Inc., the parties agree that should any dispute arise under such transaction for any reason, that venue and jurisdiction, therefore, shall be San Diego Superior Court, Central Court District or Municipal Court of the County of San Diego, San Diego Judicial District.
16. Interest shall accrue at the rate of 2% per month on all balances incurred for whatever reason remaining unpaid thirty (30) days from the date of invoice.
17. If buyer has consigned goods to NicomUSA, Inc. for repair within or outside of warranty period, buyer may lease/rent replacement goods AS IS from NicomUSA, Inc., if available. Buyer agrees that any and all of its goods in possession of NicomUSA, Inc. for whatever purpose, shall constitute retained security for the timely return of said rental goods as well as timely payment for repair services performed by NicomUSA, Inc. who at its option, may require a deposit paid for any rental goods leased to buyer. Said deposit may be used by NicomUSA, Inc. as satisfaction of any amounts owed to it by buyer in the event of buyer's failure to make any payment required in a timely fashion.

First Aid

The personnel employed in the installation, use and maintenance of the device, shall be familiar with theory and practice of first aid.

1. Treatment of electrical shocks

1.2 If victim is not responsive

follow the A-B-C's of basic life support

- Place victim flat on his back on a hard surface.
- Open airway: lift up neck, push forehead back
- clear out mouth if necessary and observe for breathing
- if not breathing, begin artificial breathing (Figure 2): tilt head, pinch nostrils, make airtight seal, four quick full breaths. Remember mouth to mouth resuscitation must be commenced as soon as possible

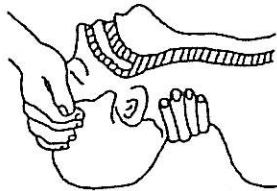


Figure 1



Figure 2

- Check carotid pulse (**Figure 3**); if pulse is absent, begin artificial circulation (**Figure 4**) depressing sternum 1 1/2" TO 2" (**Figure 5**).

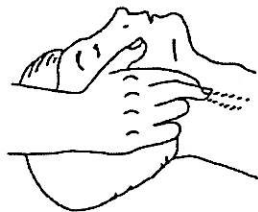


Figure 3

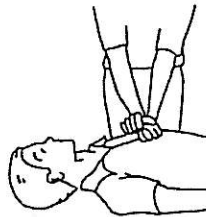


Figure 4



Figure 5

- APPROX. 80 SEC. : ONE RESCUER, 15 COMPRESSIONS
- APPROX. 60 SEC.: TWO RESCUERS, 5 COMPRESSIONS, 1 BREATH
- DO NOT INTERRUPT RHYTHM OF COMPRESSIONS WHEN SECOND PERSON IS GIVING BREATH
- Call for medical assistance as soon as possible.

2.1 If victim is responsive

- Keep them warm
- Keep them as quiet as possible
- Loosen their clothing (a reclining position is recommended)
- Call for medical help as soon as possible

2.2 Treatment of electrical Burns

2.2.1 Extensive burned and broken skin

- Cover area with clean sheet or cloth (Cleansed available cloth article).
- Do not break blisters, remove tissue, remove adhered particles of clothing, or apply any salve or ointment.
- Treat victim for shock as required.
- Arrange transportation to a hospital as quickly as possible.
- If arms or legs are affected keep them elevated

If medical help will not be available within an hour and the victim is conscious and not vomiting, give him a weak solution of salt and soda: 1 level teaspoonful of salt and 1/2 level teaspoonful of baking soda to each quart of water (neither hot or cold). Allow victim to sip slowly about 4 ounces (half a glass) over a period of 15 minutes. Discontinue fluid if vomiting occurs

Do not give alcohol

2.2.2 Less severe burns (1st and 2nd degree)

- Apply cool (not ice cold) compresses using the cleansed available cloth article.
- Do not break blisters, remove tissue, remove adhered particles of clothing, or apply salve or ointment.
- Apply clean dry dressing if necessary.
- Treat victim for shock as required.
- Arrange transportation to a hospital as quickly as possible
- If arms or legs are affected keep them elevated.

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GENERAL DESCRIPTION

NT 30H Transmitter Exciter

INTRODUCTION

The NT 30H FM Exciter is the latest in state of the art products available from Nicom. This Transmitter is designed with high reliability components and is intended to give many years of trouble free continuous service. This unit incorporates many features including a switching power supply and a PLL frequency synthesizer.

The latest SMD technology has allowed to make a more compact unit (only two rack spaces) and at the same time a very light unit (only 12 lbs).

INSTALLATION

After unpacking the module, check for any mechanical damage or loose parts inside. If there is any transportation damage, inform the supplier immediately and do not put the module into operation.

The voltage is normally set to 110 Volts unless differently specified.

Ensure that the station's ground system connections have a ground resistance of less than 5 ohms. The equipment's rack or cabinet must be effectively grounded.

Check that the transmitter's main switch is off.

Connect the power cord to the AC plug.

STARTING PROCEDURE

Connect the antenna cable to the 'N' connector on the back of the unit. The antenna system must be set up to operate at the transmitter's working frequency.

ATTENTION

Antenna matching is extremely crucial for FM transmitters. Operate this unit only after verifying good matching. Mismatching will decrease the communication distance and unduly stress the semiconductors.

Turn on the transmitter.

After 1 or 2 seconds the green LED "PLL LOCK" should turn on. This indicates that the frequency is locked on the programmed value.

After 1 more second the "RF ENABLE" green LED will come on. This indicates that RF power is being delivered to the output connector on the back.

Now you can input modulation. For MONO operation connect your signal to the XLR connector following the connecting instructions printed on the back of the transmitter and then regulate the input level with the apposite trimmer. For stereo input, use the BNC connector labeled "MPX". Regulate the audio with the apposite trimmer.

Note: Be sure that the modulation level is close to but not more than 75KHz. 75KHz is 100% modulation. Lower modulation level will decrease the S/N value while over-modulation (>100%) will cause distortion at the receiver and it is against current regulations.

REMOTE CONTROL FEATURE

The NT 30 is equipped with a 9 pin RS 232 connector that allows all the mains telemetry functions. The software is supplied with the unit and with this CD rom it's possible to monitor and to change the main parameters of the NT 30 on the computer's screen.

The NT 30 is also supplied with the interlock connector that allows to switch the power on and off simply by grounding the inner conductor of the BNC.

NOTE:

The CD Rom supplied contains the remote control software and the complete instruction manual of the NT 30.

REMOTE CONTROL SOFTWARE INSTALLATION

The NT 30 comes with a Serial port RS 232. This port allows a Bi-Directional remote control of the unit from a PC.

INSTALLING THE SOFTWARE

1. Insert the NT 30 CD-ROM into the CD drive.
2. Run Setup.exe file found in the main folder of the CD-ROM. The installation will continue automatically asking only for the name of the folder of the hard drive where the program will be installed. It will be necessary to reboot the computer.
3. Once installed, the Tx_Nicom program icon can be recalled by clicking : Start - Programs - Tx_Nicom icon.

CONNECTING THE NT 30

The NT 30 is equipped with a Serial Port (RS232) in the rear panel. To connect the computer with the NT 30 we recommend standard serial cables Pin-to-Pin; the length of the cable must stay within 60 feet.

REMEMBER TO CLOSE THE PROGRAM BEFORE REMOVING THE CONNECTING CABLE

RUNNING THE PROGRAM

Once the program is running, from the main screen it is necessary to click the POWER ON button; the screen will light up and a message "COMMUNICATION IN PROGRESS" will appear. After few seconds, on the left side of the screen, the operating frequency will appear together with all the other parameters. If not, check the Communication port setting (COM1-COM 2). To change it, click the File menu and then select "set Port".

The other parameters shown on the screen are the following:

1. Temperature in Celsius (remember that Farheneit is Celsius x 1.8 + 20)
2. Lock Indicator showing that PLL circuit of the unit is locked
3. On the Air showing that the unit is transmitting
4. RF Forward giving the amount of Watts radiated
5. RF Reflected giving the amount of reflected power

On the right side of the screen there are four buttons that allow to modify the parameters:

- a. Send Button to be used after a change of frequency is made
- b. Set Frequency allows the change of frequency by clicking the new frequency on the keyboard on the left side of the screen
- c. Disconnect allows to disconnect the system
- d. RF On turns up and down the power

NT 30H PROGRAMMING

Connect a 50 ohm load or 50 ohm antenna to the RF output, connect the equipment into a mains supply (100÷240 VAC). The equipment is factory pre-set to 10 W.

Switch ON the power and the yellow V POWER LED will light.
The Display will show:

WAIT	<input type="checkbox"/>	PROGRAM
	<input type="checkbox"/>	SETTING

After 3 seconds the green PLL LOCK led will light and the Display will show an increasing bar. After a further 5 seconds the green ENABLE LED will light and there will be output power
At this point the Display will show the next parameter:

- Level Modulation (MOD >
- Forward Power (FRW 10W);
- Reflected Power (RFL 0.4W).

MOD > ■■■■■■ □ FRW 10W RFL 0.4W	<input type="checkbox"/>	PROGRAM
	<input type="checkbox"/>	SETTING

The default frequency is 98.000 MHz.
To display the frequency push the SETTING key.
In order to display the parameter push the SELECT key.

Display Password

The Password mode is factory set to enable, and is not possible change this setting.

The default password is **1 2 3**.

The way for changing the password is the following:

- Press the PROGRAM key for 3 seconds;

<p>PASSWORD <u>0</u> 1 2 3 4 5 6 7 8 9</p>	<input type="checkbox"/> PROGRAM <input type="checkbox"/> SETTING
--	--

- Press the PROGRAM key to move the underscore character position at the required digit, and press the SETTING key to confirm the digit.

<p>PASSWORD * 0 1 2 3 4 5 6 7 8 9</p>	<input type="checkbox"/> PROGRAM <input type="checkbox"/> SETTING
---	--

Repeat the same for the two remaining digits.

<p>PASSWORD * * * 0 1 2 3 4 5 6 7 8 9</p>	<input type="checkbox"/> PROGRAM <input type="checkbox"/> SETTING
---	--

- If the password is correct press the SETTING key to confirm, otherwise press the PROGRAM key to select again.

<p>CONFIRM (Y/N) ? N=SEL. Y=SET.</p>	<input type="checkbox"/> PROGRAM <input type="checkbox"/> SETTING
--	--

If the password is not correct an error is displayed

ERROR PASSWORD	<input type="checkbox"/> PROGRAM
	<input type="checkbox"/> SETTING

After a few seconds the display will show the parameters again.

When the password is correct, the display will show

NEW PASS . = SET. NEW FREQ . = PRG	<input type="checkbox"/> PROGRAM
	<input type="checkbox"/> SETTING

*To change the password press the SETTING key.
To change the frequency press the PROGRAM key.*

CHANGE OF PASSWORD

*The password is set at the factory and corresponds to the numbers 1 - 2 - 3.
However it is possible to set a new custom password.
The main purpose is to avoid somebody to enter your system and modify the
main parameters of your settings.*

Every new password has to be made with only three numbers.

*It is very important that you write somewhere the new password, because once that has been
set, it is not possible to change anymore or to make any change if the password is not entered.*

VERY IMPORTANT:

KEEP TRACK OF YOUR NEW PASSWORD !!!!

- For changing the password proceed with the same method for the required password:

NEW PASSWORD <u>0</u> 1 2 3 4 5 6 7 8 9	<input type="checkbox"/> PROGRAM
	<input type="checkbox"/> SETTING

The confirmation password will be required.

CONFIRMATION <u>0</u> 1 2 3 4 5 6 7 8 9	<input type="checkbox"/> PROGRAM
	<input type="checkbox"/> SETTING

If the password is correct the display will show:

STORED NEW PASSWORD	<input type="checkbox"/> PROGRAM
	<input type="checkbox"/> SETTING

If the confirmation password is wrong the display will show:

ERROR CONFIRMATION	<input type="checkbox"/> PROGRAM
	<input type="checkbox"/> SETTING

IMPORTANT NOTE

! BE CAREFUL !

Once the password is set, it must be remembered, otherwise neither the frequency nor the password can be reset and the unit has to be sent back to the factory.

Display Change of Frequency.

- Press the PROGRAM key for 3 seconds and enter the correct password. At this point press again the SELECT key:

NEW PASS . = SET. NEW FREQ . = PRG	<input type="checkbox"/> PROGRAM
	<input type="checkbox"/> SETTING

- Press the PROGRAM key to change the desired digit and press the SETTING key to confirm it.

FREQUENCY ? MHz <u>1</u>03.900	<input type="checkbox"/> PROGRAM
	<input type="checkbox"/> SETTING

The underscore character indicates which digit can be change.
To move the underscore character hit the PROGRAM key.

When the new frequency is chosen, then press the SETTING key confirm it.

After a "WAIT CYCLE", the display will show the parameters:

MOD > ■■■■■■ □ FRW 5.0W RFL 0.4W	<input type="checkbox"/> PROGRAM
	<input type="checkbox"/> SETTING

After 7 minutes the display light will switch off and the display will show:

NICOM MHz 103.900	<input type="checkbox"/> PROGRAM
	<input type="checkbox"/> SETTING

CHAPTER 2

ELECTRICAL SPECIFICATIONS

NT 30H TECHNICAL DATA

<i>Power output:</i>	<i>2 to 70 Watts continuously variable</i>
<i>Frequency of operation:</i>	<i>Sinthesized with TXCO crystal reference</i>
<i>RF output connector/ Impedance:</i>	<i>Type "N" Female / 50 Ohms</i>
<i>Frequency Stability:</i>	<i>Better than 5ppm (± 500 Hz) , 0 to 50° C.</i>
<i>Frequency Range:</i>	<i>87.5 - 108 Mhz</i>
<i>Frequency programming:</i>	<i>Digitally in 10 Khz increments.</i>
<i>Modulation type:</i>	<i>Direct FM at the carrier frequency</i>
<i>S/N Ratio (ref. to 50 Khz / 1000 Hz):</i>	<i>Mono > 70dB - Stereo > 65 dB.</i>
<i>Distortion, THD:</i>	<i>< 0.1 % , Typ. 0.05 %</i>
<i>Asynchronous AM S/N ratio:</i>	<i>65 dB below reference carrier with 100% AM modulation, 75 usec de-emphasis (no FM modulation present).</i>
<i>Synchronous AM S/N ratio:</i>	<i>60 dB below reference carrier with 100% AM modulation (FM modulation ± 75 Khz).</i>
<i>DC input power:</i>	<i>24 V VDC 6.5 A</i>
<i>AC input power:</i>	<i>Single phase 117 or 230 V internally switchable</i>
<i>Ambient Temperature Range:</i>	<i>0° to 50° C (+32° to +122° F)</i>
<i>Spurious and Harmonic or Subharmonic Emissions:</i>	<i>< -80 dB or better</i>
<i>Stereo Separation</i>	<i>55 dB @ 1 Khz</i>

COMPOSITE OPERATION

Composite inputs	four total, 1 for MPX and 3 for SCA
MPX input	1 unbalanced bnc connector
MPX input impedance	2 K ohms
MPX input level	3,5 V p-p (1,237 Vrms/3.64 dBm)
Composite FM unweighed S/N ratio	> 78 dB below ± 75 Khz deviation at 400 Hz measured in a 30 Hz - 100Khz bandwidth with 75 usec de-emphasis (RMS)
Composite Total Harmonic Distortion	0.05 % typical
Composite Intermodulation Distortion	0.05 %, measured with a 1 Khz and a 1.3 Khz tone, 1:1 ratio, at 100% modulation
Baseband	30 Hz - 60 Khz within 0.15 dB
Crosstalk	main to stereo subchannel and stereo subchannel to main > 55 dB (60 dB typical)
SCA Inputs	3 unbalanced BNC connectors
SCA Input Impedance	10 K Ohms
SCA Input Levels	0 dBm (775 mV rms/ 2.2 V p-p) nominal for ± 75 Khz deviation, adjustable
SCA Amplitude Response	± 0.8 dB, 40 Khz to 100 Khz
Crosstalk	67 Khz SCA to main or to stereo subchannel >65dB 92 Khz SCA to main or to stereo subchannel >70 dB

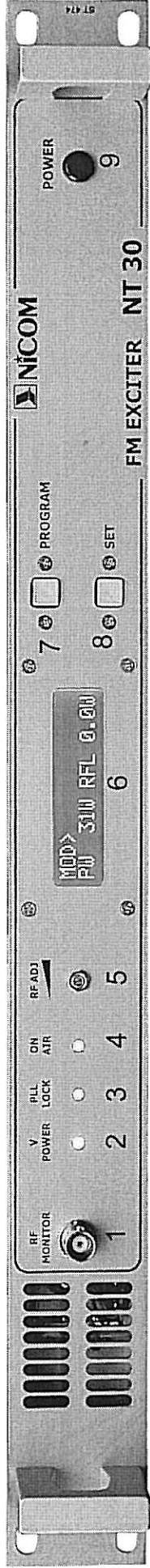
MONOAUURAL OPERATION

Audio Input Impedance	600 Ohms balanced or unbalanced; 50 dB common mode suppression
Audio Input Level	0 dBm (775 mV rms/ 2.2 V p-p) nominal for ± 75 Khz deviation, adjustable
FM S/N Ratio	> 70 dB below ± 75 Khz deviation at 400 Hz measured in a 30 Hz - 20Khz bandwidth with 75 usec de-emphasis (RMS)
Audio Frequency Response	± 0.8 dB, 30 Hz to 15 Khz
Intermodulation Distortion	0.05 %, measured with a 1 Khz and a 1.3 Khz tone, 1:1 ratio, at 100% modulation

MECHANICAL SPECIFICATIONS

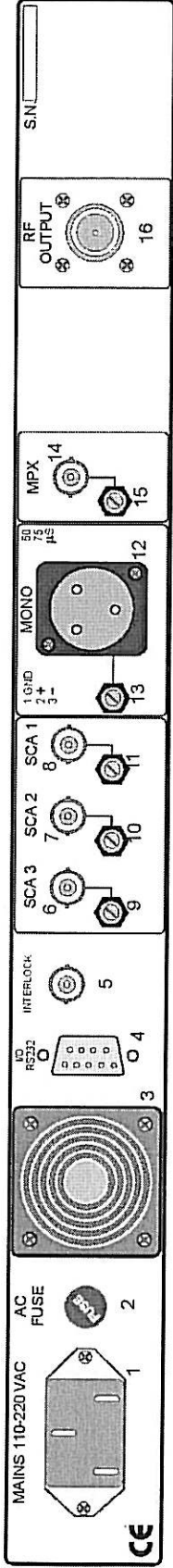
Chassis Dimensions:	41 mm (1.6") H 326 mm (12.83")D 445 mm (17.51) W
Front panel dimensions:	483 mm (19") W 41 mm (1.6") H
Ambient operating temperature:	from 0 to + 50 C (+32 to +122 F)
Humidity:	90% maximum, non condensing.
Weight:	11 Lbs (4.5 Kg)
Shipping Dimensions:	22" x 20" x 7"

NT 30H FRONT PANEL LAYOUT

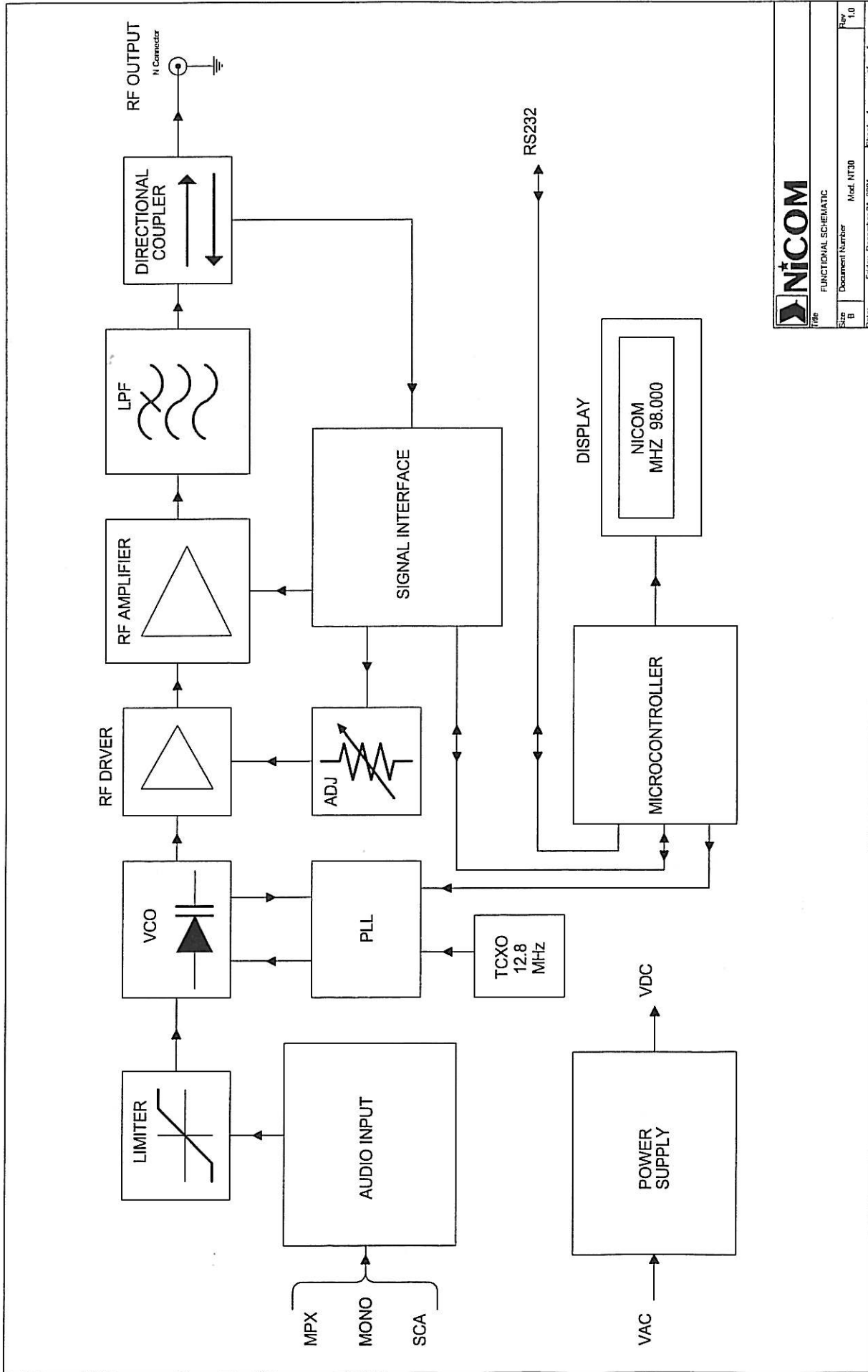


- 1-RF SAMPLER 30W OUT= 0dBm
- 2-POWER STAGE SUPPLY CORRECT OPERATION YELLOW INDICATOR
- 3-PLL LOCK FREQUENCY CONTROL CORRECT OPERATION CIRCUIT GREEN INDICATOR
- 4-PRESENCE OF RF POWER AT FREQUENCY SET ON OUTPUT CONNECTOR GREEN INDICATOR
- 5-RF OUTPUT POWER ADJUSTING FROM 0 TO OVER 20W
- 6-LCD MULTIMETER DISPLAY SHOWING: -operational frequency -modulation -forward reflected power
- 7-8- TWO PUSH BUTTONS ALLOW TO SELECT ON LCD DISPLAY THE FOLLOWING MENU: -display parameter -password -change of operational frequency
- 9-MAINS SWITCH

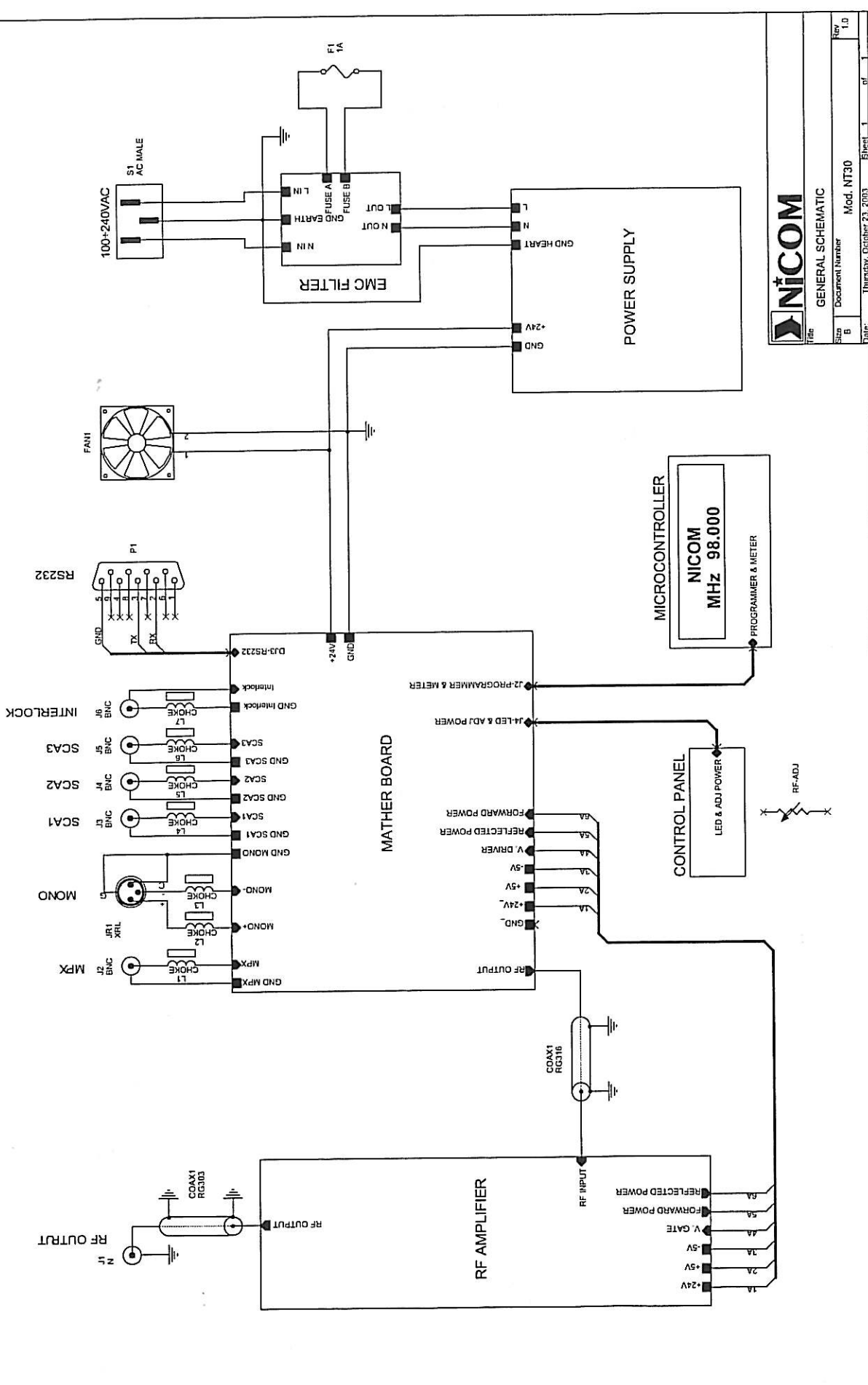
NT 30H REAR PANEL LAYOUT



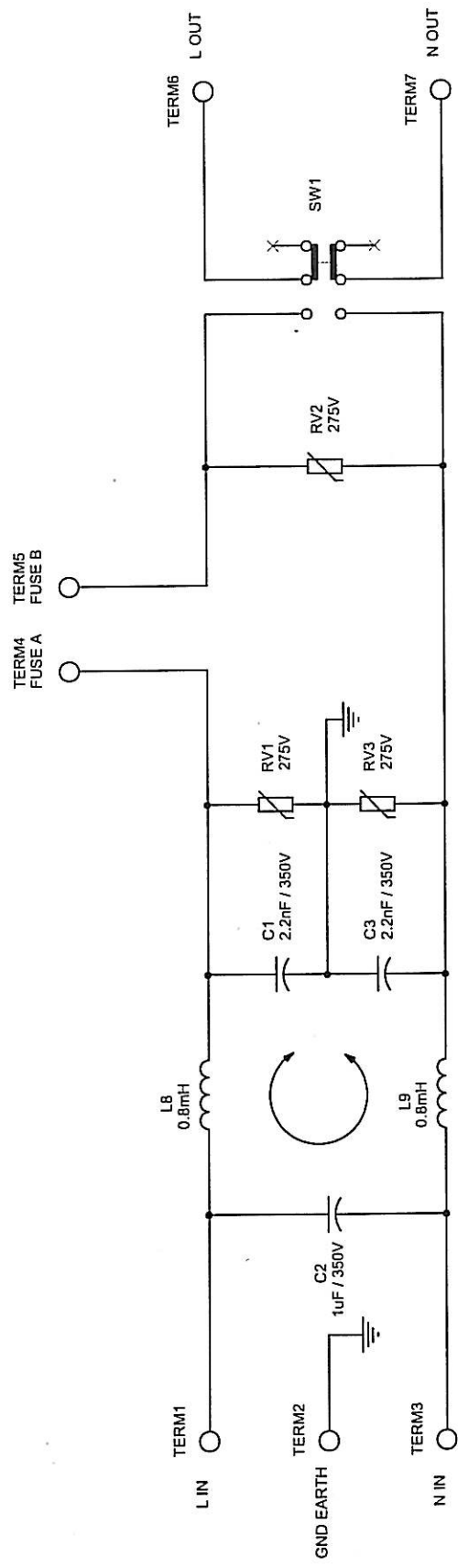
- 1- MAIN SUPPLY CONNECTOR
- 2- AC FUSE 1 A
- 3- FAN
- 4- DB 9 PIN INPUT – OUTPUT CONNECTOR FOR TELEMETRY
- 5- BNC FEMALE FOR CONNECTION OF THE INTERLOCK LOOP (CONNECTION TO GROUND WILL INHIBIT THE RF POWER)
- 6- BNC FEMALE SUBCARRIER 3
- 7- BNC FEMALE SUBCARRIER 2
- 8- BNC FEMALE SUBCARRIER 1
- 9- SCA 3 INPUT ADJUSTING LEVEL
- 10- SCA 2 INPUT ADJUSTING LEVEL
- 11- SCA 1 INPUT ADJUSTING LEVEL
- 12- XLR FEMALE BALANCED MODE MONO AUDIO INPUT
- 13- MONO INPUT ADJUSTING LEVEL
- 14- BNC FEMALE FOR THE COMPOSITE MPX INPUT
- 15- MPX INPUT ADJUSTING LEVEL
- 16- N FEMALE FOR THE RF OUTPUT POWER



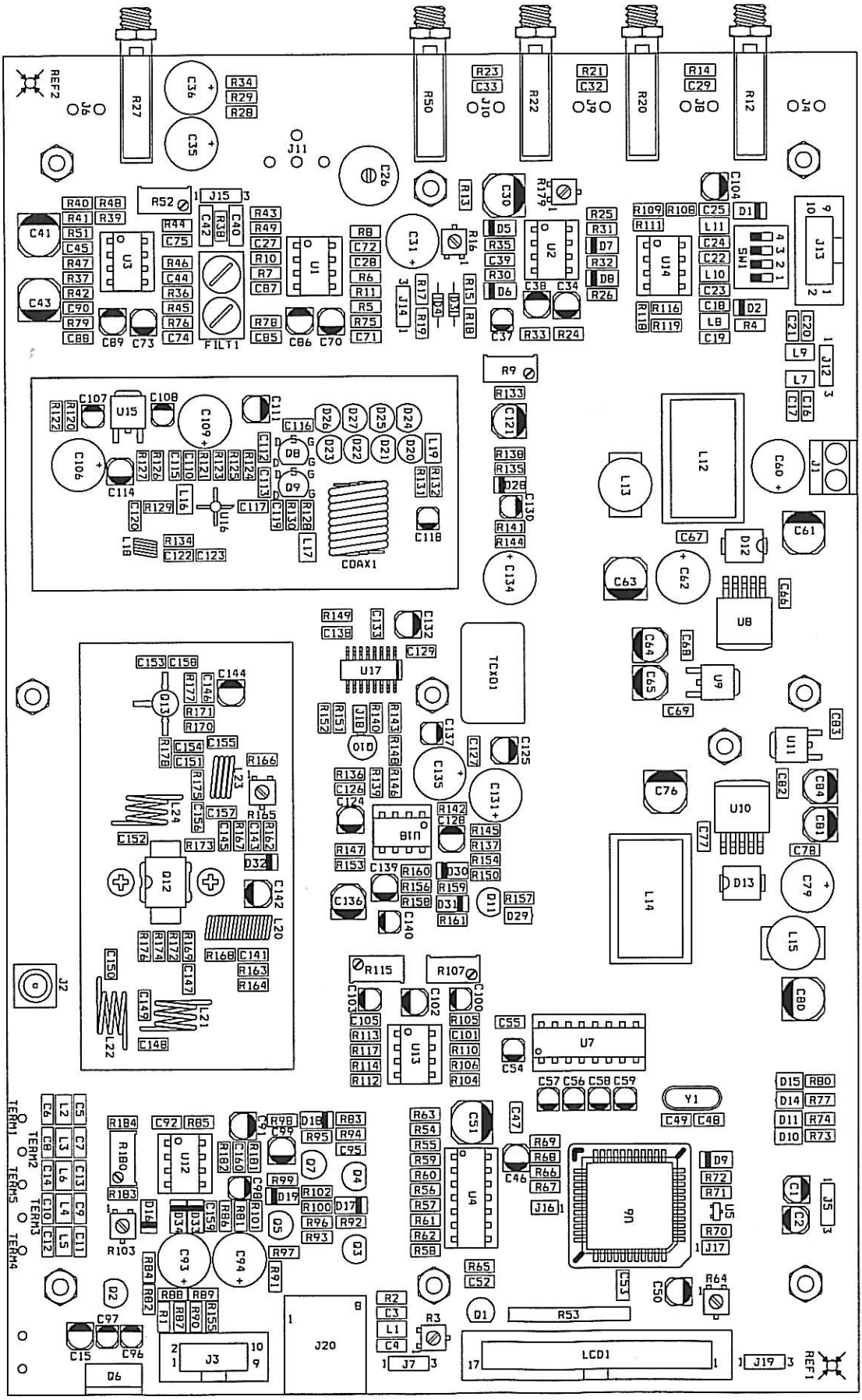
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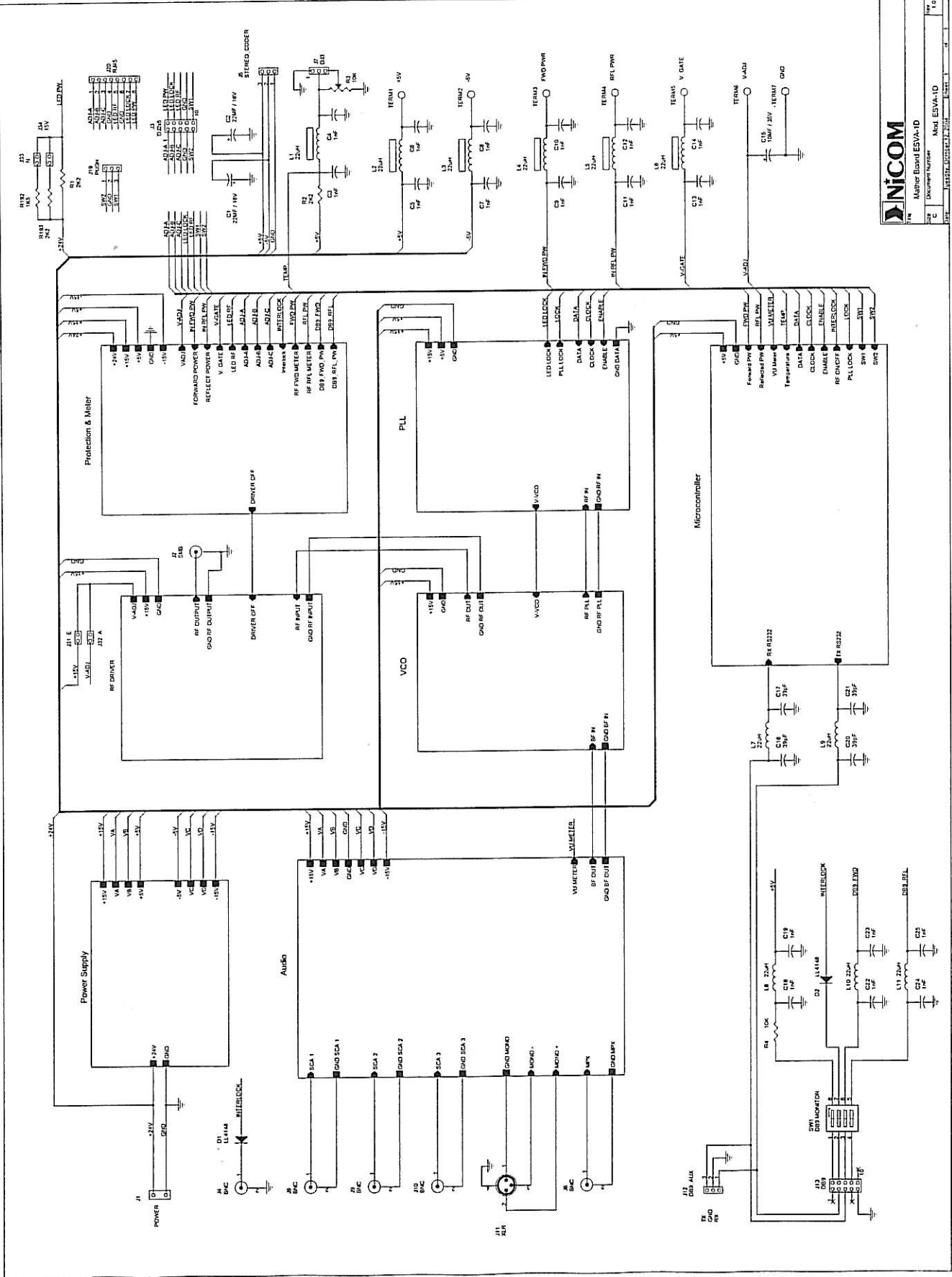


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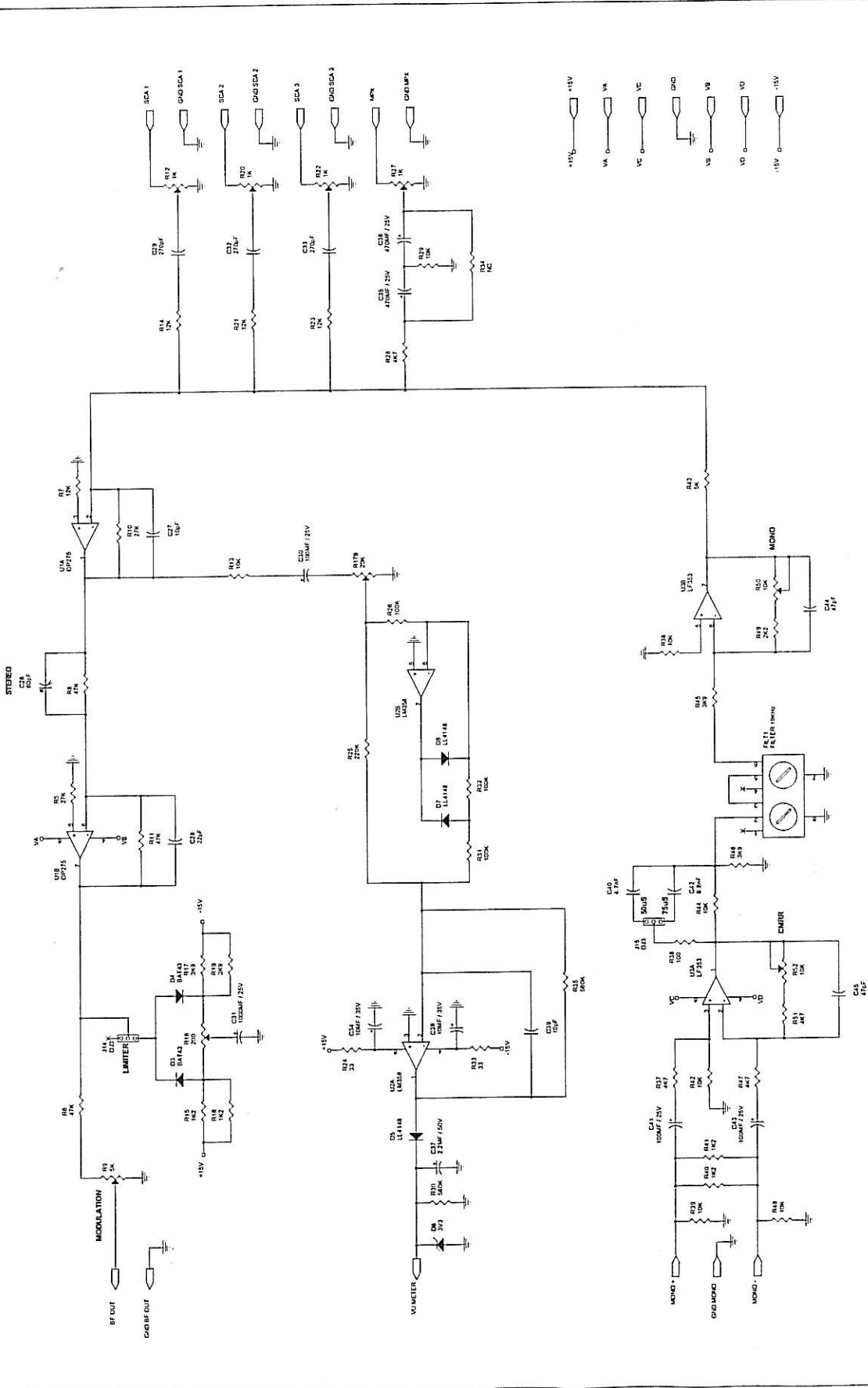


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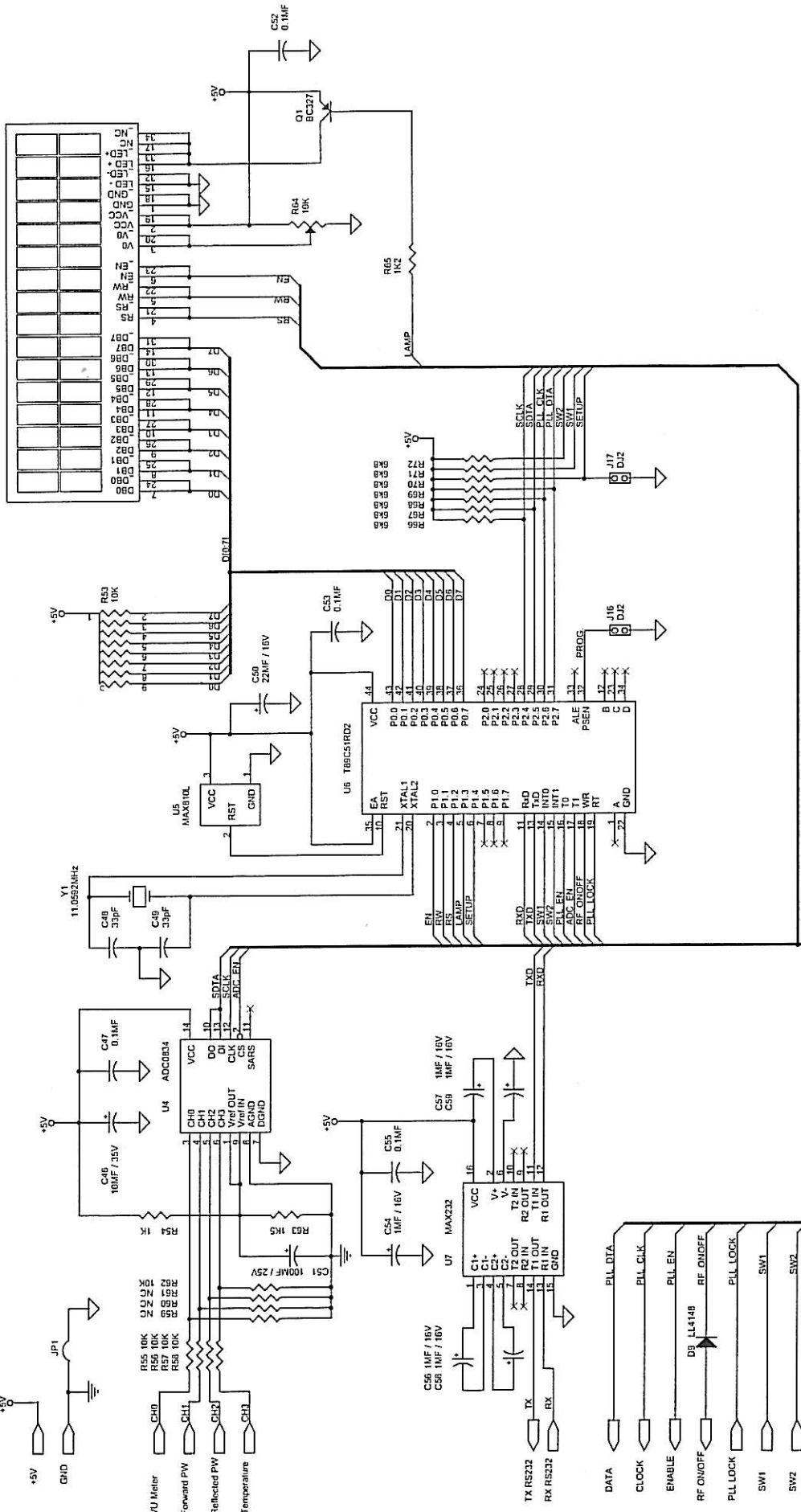


NiCOM
 Mother Board ESVA-1D
 Document Number: Mod. ESVA-1D
 Rev. 1.0



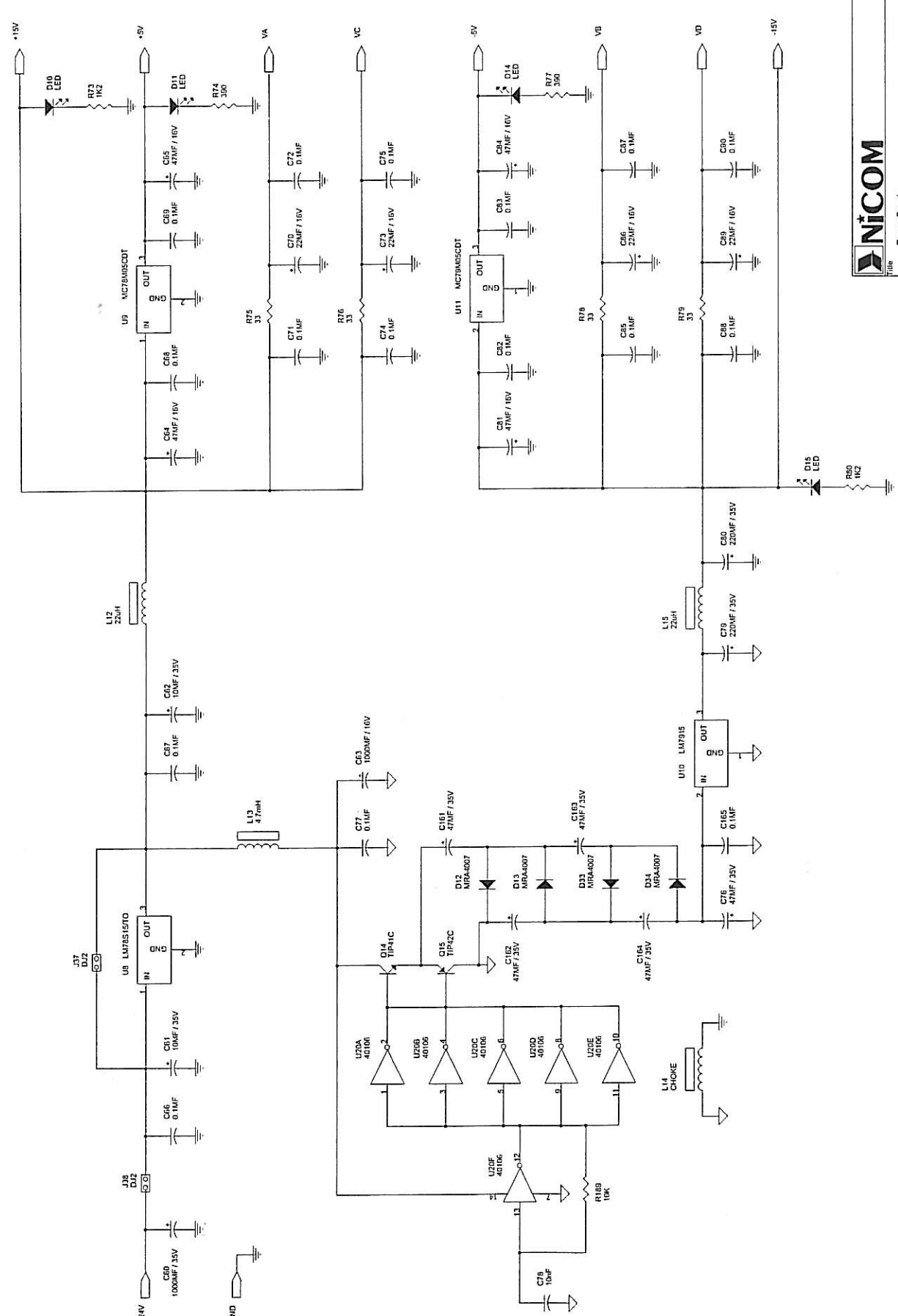
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- VF
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- VH
- VI
- 15V

LCD1 DISPLAY V20350

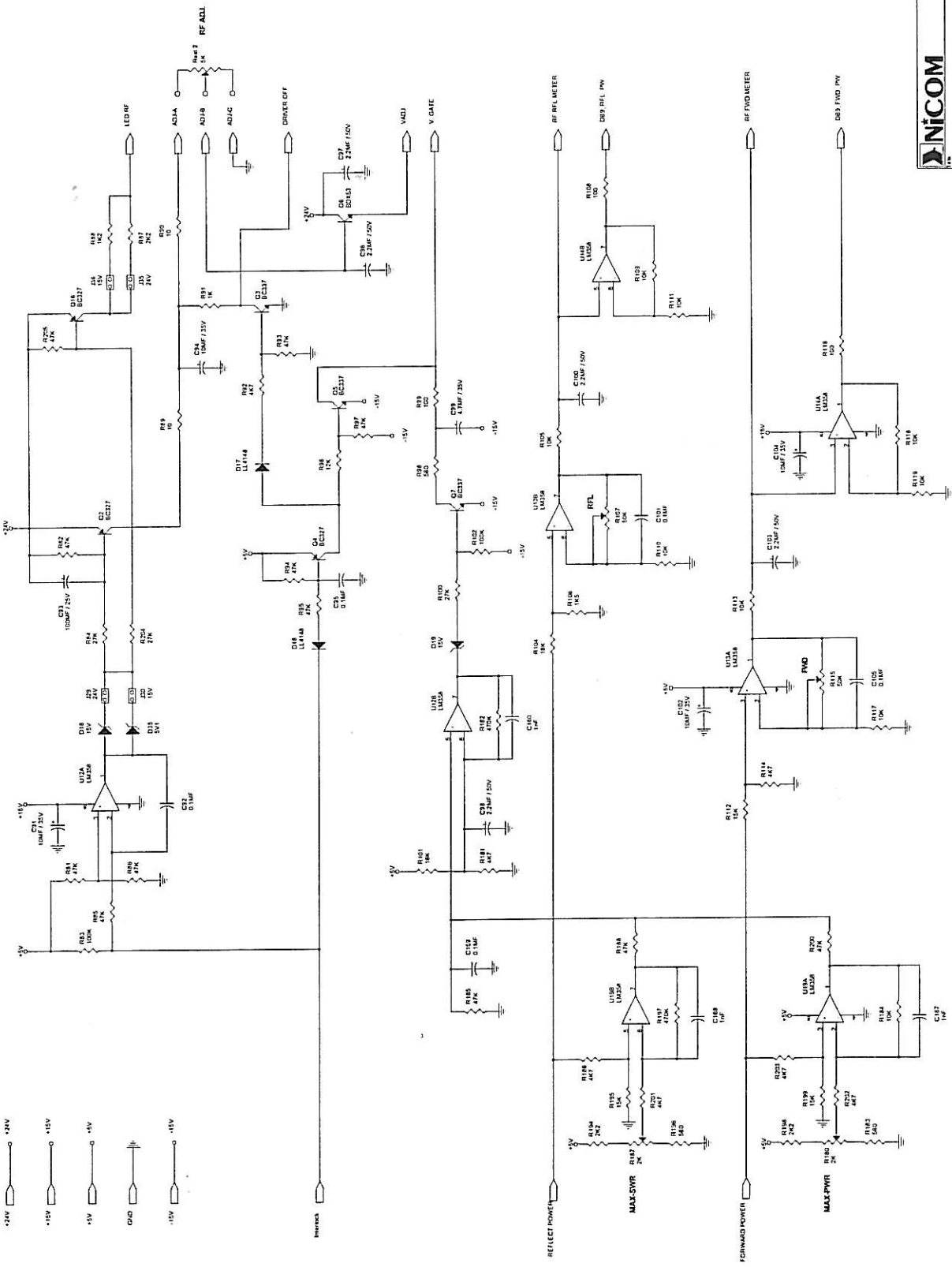
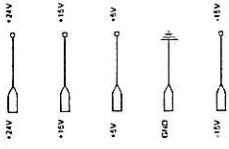


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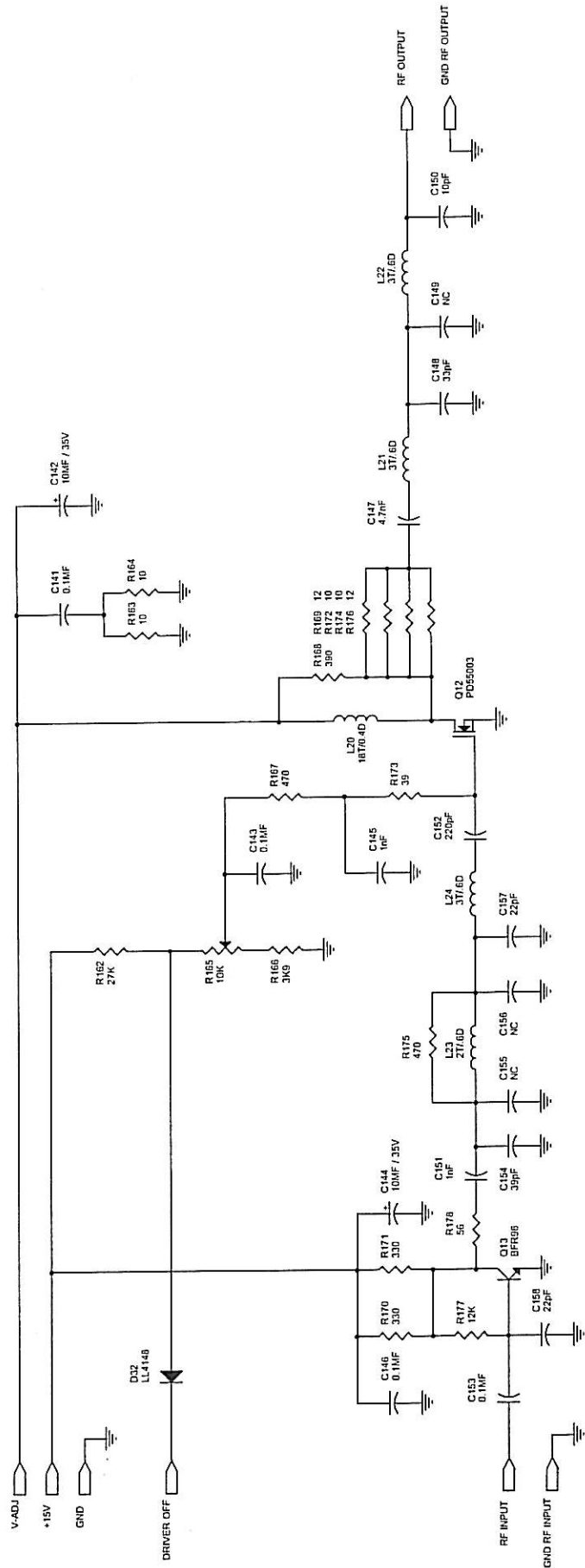
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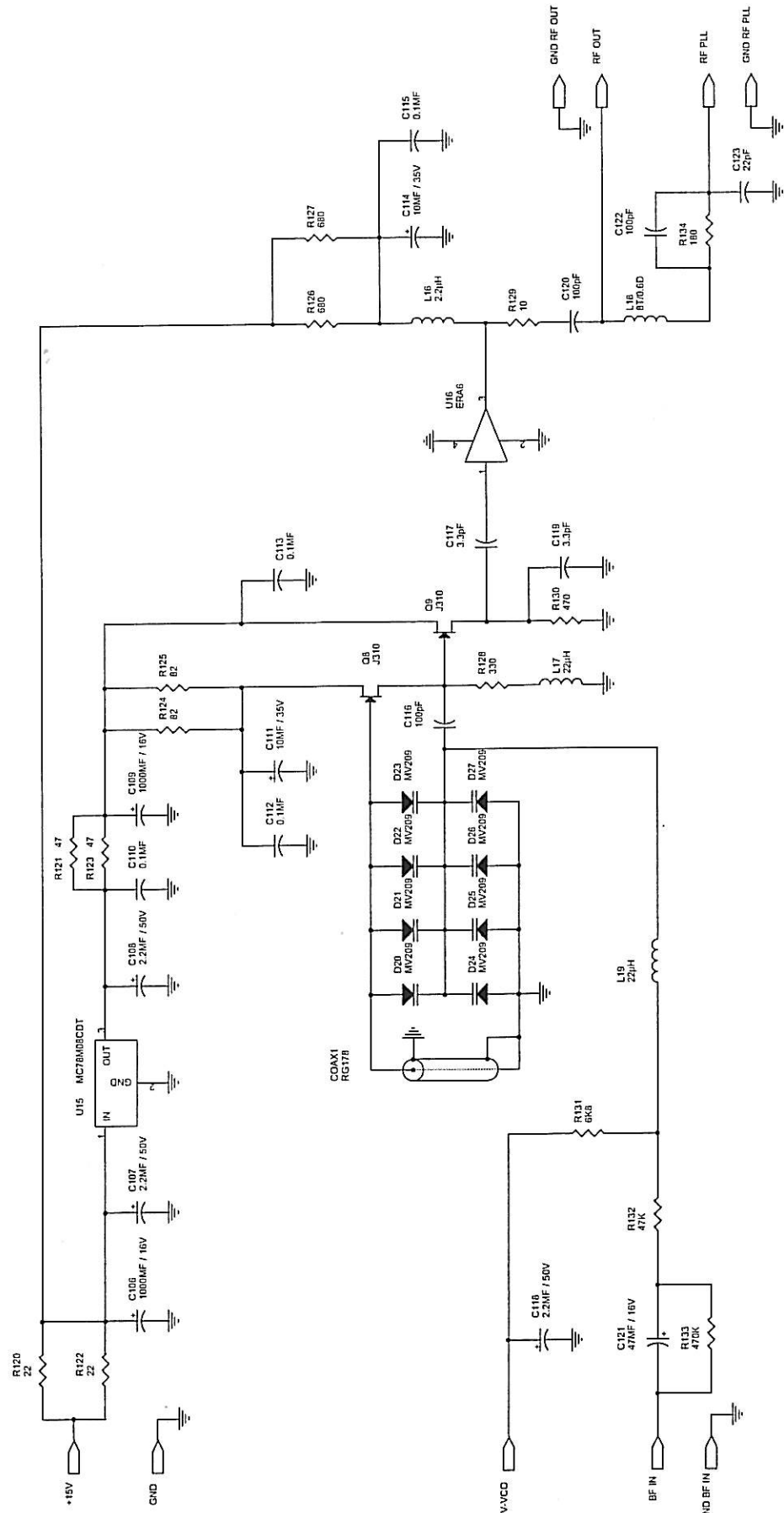
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 Document Number
 Part Tuesday, October 12, 2005 8:00 AM



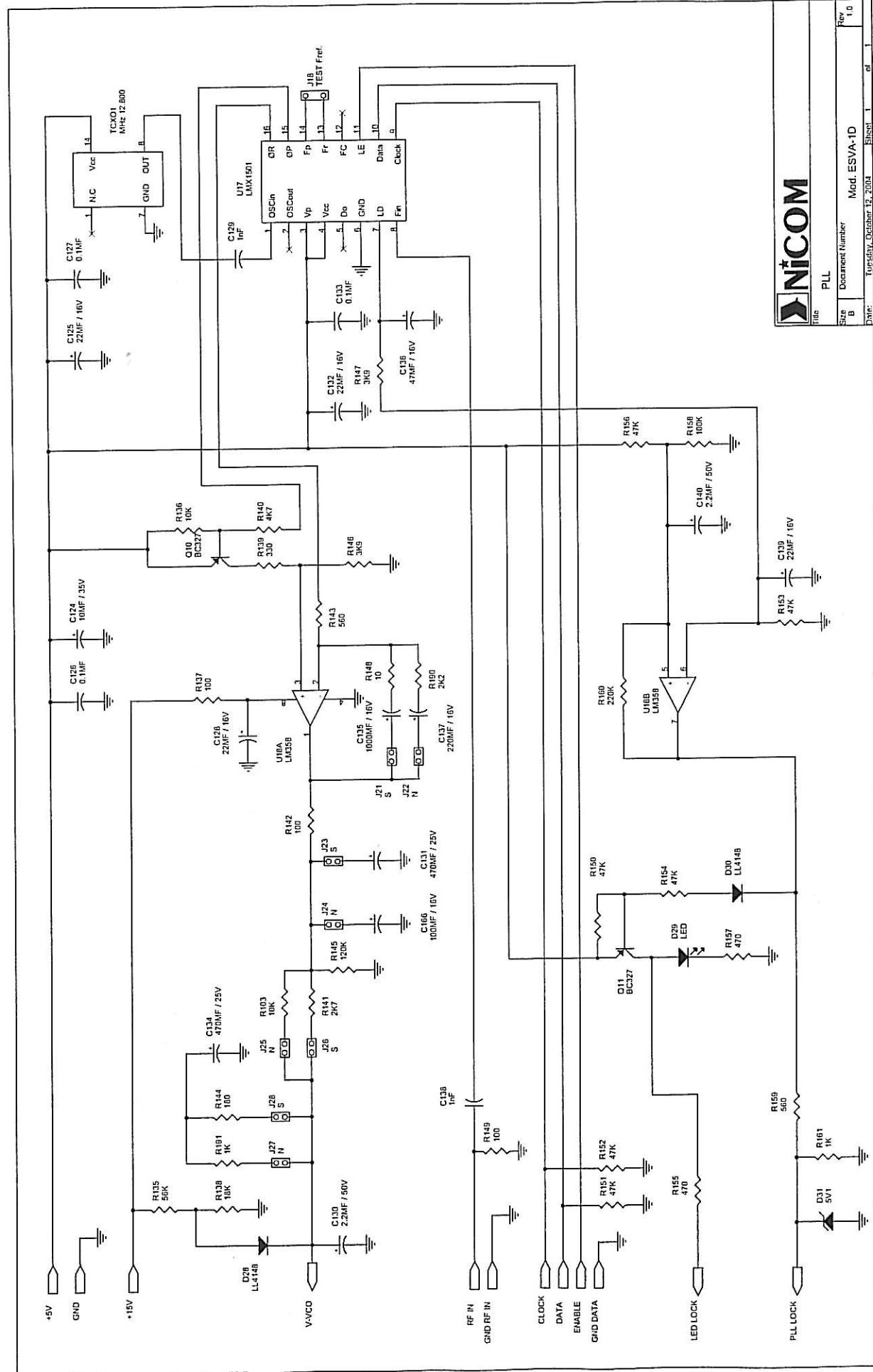
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 Protection & Meter
 Document Number
 Mod. ESVA-1D
 Rev. 1.0



RF Driver	
Doc	Document Number
Rev	Mod. ESVA-1D
1.0	
Date:	Tuesday, October 12, 2004
Sheet	1 of 1



Title		VCO
Size	Document Number	Mod. ESVA-1D
Rev	1.0	
Date	Tuesday, October 17, 2001	Sheet 1 of 1



Title	PLL
Size	B
Document Number	Mod. ESVA-1D
Date	Tuesday, October 12, 2004
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NICOM

Rif.	Value	Remarks	Description	Code
C103	2.2MF / 50V		SMD Aluminium Electrolytic Capacitor	
C104	10MF / 35V		SMD Aluminium Electrolytic Capacitor	
C105	0.1MF		SMD Multilayer Ceramic Capacitor	
C106	1000MF / 16V		Aluminium Electrolytic Capacitor	
C107	2.2MF / 50V		SMD Aluminium Electrolytic Capacitor	
C108	2.2MF / 50V		SMD Aluminium Electrolytic Capacitor	
C109	1000MF / 16V		Aluminium Electrolytic Capacitor	
C110	0.1MF		SMD Multilayer Ceramic Capacitor	
C111	10MF / 35V		SMD Aluminium Electrolytic Capacitor	
C112	0.1MF		SMD Multilayer Ceramic Capacitor	
C113	0.1MF		SMD Multilayer Ceramic Capacitor	
C114	10MF / 35V		SMD Aluminium Electrolytic Capacitor	
C115	0.1MF		SMD Multilayer Ceramic Capacitor	
C116	100pF		SMD Multilayer Ceramic Capacitor	
C117	3.3pF		SMD Multilayer Ceramic Capacitor	
C118	2.2MF / 50V		SMD Aluminium Electrolytic Capacitor	
C119	3.3pF		SMD Multilayer Ceramic Capacitor	
C120	100pF		SMD Multilayer Ceramic Capacitor	
C121	47MF / 16V		SMD Aluminium Electrolytic Capacitor	
C122	100pF		SMD Multilayer Ceramic Capacitor	
C123	22pF		SMD Multilayer Ceramic Capacitor	
C124	10MF / 35V		SMD Multilayer Ceramic Capacitor	
C125	22MF / 16V		SMD Aluminium Electrolytic Capacitor	
C126	0.1MF		SMD Multilayer Ceramic Capacitor	
C127	0.1MF		SMD Multilayer Ceramic Capacitor	
C128	22MF / 16V		SMD Aluminium Electrolytic Capacitor	
C129	1nF		SMD Multilayer Ceramic Capacitor	
C130	2.2MF / 50V		SMD Aluminium Electrolytic Capacitor	
C131	100MF / 35V		Aluminium Electrolytic Capacitor	
C132	22MF / 16V		SMD Aluminium Electrolytic Capacitor	
C133	0.1MF		SMD Multilayer Ceramic Capacitor	
C134	470MF / 16V		Aluminium Electrolytic Capacitor	
C135	220MF / 25V		Aluminium Electrolytic Capacitor	
C136	47MF / 16V		SMD Aluminium Electrolytic Capacitor	
C137	0.47MF / 50V		SMD Aluminium Electrolytic Capacitor	
C138	1nF		SMD Multilayer Ceramic Capacitor	
C139	22MF / 16V		SMD Aluminium Electrolytic Capacitor	
C140	2.2MF / 50V		SMD Aluminium Electrolytic Capacitor	
C141	0.1MF		SMD Multilayer Ceramic Capacitor	
C142	10MF / 35V		SMD Aluminium Electrolytic Capacitor	
C143	0.1MF		SMD Multilayer Ceramic Capacitor	
C144	10MF / 35V		SMD Aluminium Electrolytic Capacitor	
C145	1nF		SMD Multilayer Ceramic Capacitor	
C146	0.1MF		SMD Multilayer Ceramic Capacitor	
C147	4.7nF		SMD Multilayer Ceramic Capacitor	
C148	33pF		SMD Multilayer Ceramic Capacitor	
C149	NC			
C150	10pF		SMD Multilayer Ceramic Capacitor	
C151	1nF		SMD Multilayer Ceramic Capacitor	
C152	220pF		SMD Multilayer Ceramic Capacitor	
C153	0.1MF		SMD Multilayer Ceramic Capacitor	
C154	39pF		SMD Multilayer Ceramic Capacitor	
C155	NC			

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Rif.	Value	Remarks	Description	Code
C156	NC			
C157	22pF		SMD Multilayer Ceramic Capacitor	
C158	22pF		SMD Multilayer Ceramic Capacitor	
C159	0.1MF		SMD Multilayer Ceramic Capacitor	
C160	1nF		SMD Multilayer Ceramic Capacitor	
L1	22uH		SMD Inductor	
L2	22uH		SMD Inductor	
L3	22uH		SMD Inductor	
L4	22uH		SMD Inductor	
L5	22uH		SMD Inductor	
L6	22uH		SMD Inductor	
L7	22uH		SMD Inductor	
L8	22uH		SMD Inductor	
L9	22uH		SMD Inductor	
L10	22uH		SMD Inductor	
L11	22uH		SMD Inductor	
L12	150uH		Toroidal Inductor	
L13	22uH		Suppression Choke	
L14	150uH		Toroidal Inductor	
L15	22uH		Suppression Choke	
L16	2.2uH		SMD Inductor	
L17	22uH		SMD Inductor	
L18	8T/0.6D		Enamelled Copper Wire	
L19	22uH		SMD Inductor	
L20	18T/0.4D		Enamelled Copper Wire	
L21	3T/.6D		Tinned Copper Wire	
L22	3T/.6D		Tinned Copper Wire	
L23	2T/.6D		Enamelled Copper Wire	
L24	3T/.6D		Tinned Copper Wire	
R1	1K	1/4W	SMD Thick Film Resistor	
R2	2K2	1/4W	SMD Thick Film Resistor	
R3	10K	1/4W	SMD Cermet Skeleton Trimmer Resistor	
R4	10K	1/4W	SMD Thick Film Resistor	
R5	27K	1/4W	SMD Thick Film Resistor	
R6	47K	1/4W	SMD Thick Film Resistor	
R7	12K	1/4W	SMD Thick Film Resistor	
R8	47K	1/4W	SMD Thick Film Resistor	
R9	5K	1/4W	SMD Thick Film Resistor	
R10	27K	1/4W	SMD Thick Film Resistor	
R11	47K	1/4W	SMD Thick Film Resistor	
R12	1K	1/4W	Multi Turn Cermet Trimmer Resistor Panel Mount	
R13	10K	1/4W	SMD Thick Film Resistor	
R14	12K	1/4W	SMD Thick Film Resistor	
R15	1K2	1/4W	SMD Thick Film Resistor	
R16	200	1/4W	SMD Cermet Skeleton Trimmer Resistor	
R17	3K9	1/4W	SMD Thick Film Resistor	
R18	1K2	1/4W	SMD Thick Film Resistor	
R19	3K9	1/4W	SMD Thick Film Resistor	
R20	1K	1/4W	Multi Turn Cermet Trimmer Resistor Panel Mount	
R21	12K	1/4W	SMD Thick Film Resistor	
R22	1K	1/4W	Multi Turn Cermet Trimmer Resistor Panel Mount	

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Rif.	Value	Remarks	Description	Code
R23	12K	1/4W	SMD Thick Film Resistor	
R24	33	1/4W	SMD Thick Film Resistor	
R25	220K	1/4W	SMD Thick Film Resistor	
R26	100K	1/4W	SMD Thick Film Resistor	
R27	1K	1/4W	Multi Turn Cermet Trimmer Resistor Panel Mount	
R28	4K7	1/4W	SMD Thick Film Resistor	
R29	10K	1/4W	SMD Thick Film Resistor	
R30	560K	1/4W	SMD Thick Film Resistor	
R31	100K	1/4W	SMD Thick Film Resistor	
R32	100K	1/4W	SMD Thick Film Resistor	
R33	33	1/4W	SMD Thick Film Resistor	
R34	NC	1/4W	SMD Thick Film Resistor	
R35	560K	1/4W	SMD Thick Film Resistor	
R36	10K	1/4W	SMD Thick Film Resistor	
R37	4K7	1/4W	SMD Thick Film Resistor	
R38	100	1/4W	SMD Thick Film Resistor	
R39	10K	1/4W	SMD Thick Film Resistor	
R40	1K2	1/4W	SMD Thick Film Resistor	
R41	1K2	1/4W	SMD Thick Film Resistor	
R42	10K	1/4W	SMD Thick Film Resistor	
R43	10K	1/4W	SMD Thick Film Resistor	
R44	10K	1/4W	SMD Thick Film Resistor	
R45	3K9	1/4W	SMD Thick Film Resistor	
R46	3K9	1/4W	SMD Thick Film Resistor	
R47	4K7	1/4W	SMD Thick Film Resistor	
R48	10K	1/4W	SMD Thick Film Resistor	
R49	2K2	1/4W	SMD Thick Film Resistor	
R50	10K	1/4W	Multi Turn Cermet Trimmer Resistor Panel Mount	
R51	4K7	1/4W	SMD Thick Film Resistor	
R52	10K	1/4W	Multi Turn Cermet Trimmer Resistor	
R53	10K	1/4W	SMD Thick Film Resistor	
R54	1K	1/4W	SMD Thick Film Resistor	
R55	10K	1/4W	SMD Thick Film Resistor	
R56	10K	1/4W	SMD Thick Film Resistor	
R57	10K	1/4W	SMD Thick Film Resistor	
R58	10K	1/4W	SMD Thick Film Resistor	
R59	NC			
R60	NC			
R61	NC			
R62	10K	1/4W	SMD Thick Film Resistor	
R63	1K5	1/4W	SMD Thick Film Resistor	
R64	10K	1/4W	SMD Cermet Skeleton Trimmer Resistor	
R65	1K2	1/4W	SMD Thick Film Resistor	
R66	6k8	1/4W	SMD Thick Film Resistor	
R67	6k8	1/4W	SMD Thick Film Resistor	
R68	6k8	1/4W	SMD Thick Film Resistor	
R69	6k8	1/4W	SMD Thick Film Resistor	
R70	6k8	1/4W	SMD Thick Film Resistor	
R71	6k8	1/4W	SMD Thick Film Resistor	
R72	6k8	1/4W	SMD Thick Film Resistor	
R73	1K2	1/4W	SMD Thick Film Resistor	
R74	390	1/4W	SMD Thick Film Resistor	
R75	33	1/4W	SMD Thick Film Resistor	

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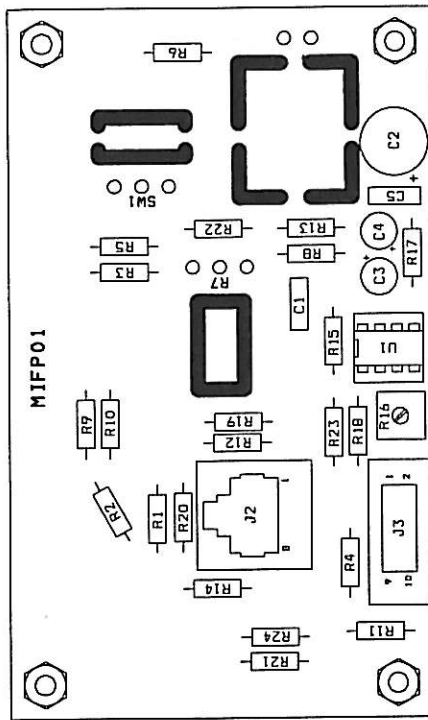
Rif.	Value	Remarks	Description	Code
R76	33	1/4W	SMD Thick Film Resistor	
R77	390	1/4W	SMD Thick Film Resistor	
R78	33	1/4W	SMD Thick Film Resistor	
R79	33	1/4W	SMD Thick Film Resistor	
R80	1K2	1/4W	SMD Thick Film Resistor	
R81	47K	1/4W	SMD Thick Film Resistor	
R82	47K	1/4W	SMD Thick Film Resistor	
R83	100K	1/4W	SMD Thick Film Resistor	
R84	47K	1/4W	SMD Thick Film Resistor	
R85	47K	1/4W	SMD Thick Film Resistor	
R86	47K	1/4W	SMD Thick Film Resistor	
R87	2K2	1/4W	SMD Thick Film Resistor	
R88	150	1/4W	SMD Thick Film Resistor	
R89	150	1/4W	SMD Thick Film Resistor	
R90	33	1/4W	SMD Thick Film Resistor	
R91	10	1/4W	SMD Thick Film Resistor	
R92	4K7	1/4W	SMD Thick Film Resistor	
R93	47K	1/4W	SMD Thick Film Resistor	
R94	47K	1/4W	SMD Thick Film Resistor	
R95	47K	1/4W	SMD Thick Film Resistor	
R96	12K	1/4W	SMD Thick Film Resistor	
R97	47K	1/4W	SMD Thick Film Resistor	
R98	560	1/4W	SMD Thick Film Resistor	
R99	100	1/4W	SMD Thick Film Resistor	
R100	27K	1/4W	SMD Thick Film Resistor	
R101	3K3	1/4W	SMD Thick Film Resistor	
R102	100K	1/4W	SMD Thick Film Resistor	
R103	5K	1/4W	SMD Cermet Skeleton Trimmer Resistor	
R104	12K	1/4W	SMD Thick Film Resistor	
R105	10K	1/4W	SMD Thick Film Resistor	
R106	1K2	1/4W	SMD Thick Film Resistor	
R107	50K	1/4W	SMD Thick Film Resistor	
R108	100	1/4W	SMD Thick Film Resistor	
R109	10K	1/4W	SMD Thick Film Resistor	
R110	12K	1/4W	SMD Thick Film Resistor	
R111	10K	1/4W	SMD Thick Film Resistor	
R112	12K	1/4W	SMD Thick Film Resistor	
R113	10K	1/4W	SMD Thick Film Resistor	
R114	8K2	1/4W	SMD Thick Film Resistor	
R115	50K	1/4W	SMD Thick Film Resistor	
R116	100	1/4W	SMD Thick Film Resistor	
R117	27K	1/4W	SMD Thick Film Resistor	
R118	10K	1/4W	SMD Thick Film Resistor	
R119	10K	1/4W	SMD Thick Film Resistor	
R120	22	1/4W	SMD Thick Film Resistor	
R121	47	1/4W	SMD Thick Film Resistor	
R122	22	1/4W	SMD Thick Film Resistor	
R123	47	1/4W	SMD Thick Film Resistor	
R124	82	1/4W	SMD Thick Film Resistor	
R125	82	1/4W	SMD Thick Film Resistor	
R126	680	1/4W	SMD Thick Film Resistor	
R127	680	1/4W	SMD Thick Film Resistor	
R128	330	1/4W	SMD Thick Film Resistor	

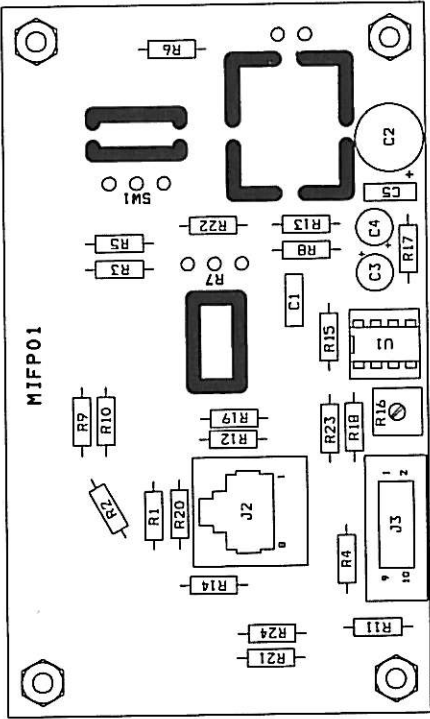
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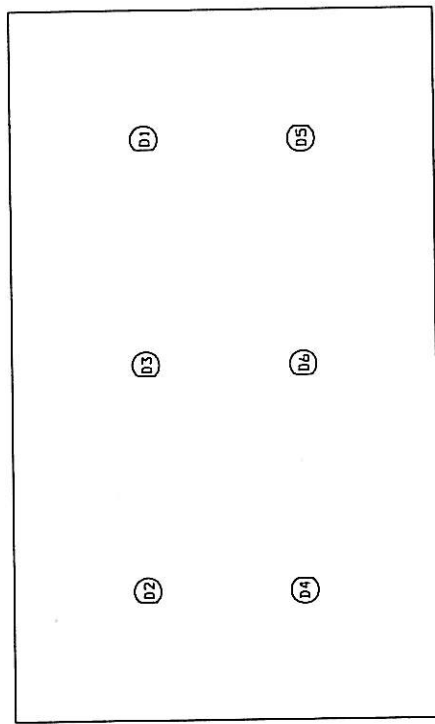
Rif.	Value	Remarks	Description	Code
R129	10	1/4W	SMD Thick Film Resistor	
R130	470	1/4W	SMD Thick Film Resistor	
R131	6K8	1/4W	SMD Thick Film Resistor	
R132	47K	1/4W	SMD Thick Film Resistor	
R133	470K	1/4W	SMD Thick Film Resistor	
R134	180	1/4W	SMD Thick Film Resistor	
R135	56K	1/4W	SMD Thick Film Resistor	
R136	10K	1/4W	SMD Thick Film Resistor	
R137	100	1/4W	SMD Thick Film Resistor	
R138	18K	1/4W	SMD Thick Film Resistor	
R139	330	1/4W	SMD Thick Film Resistor	
R140	4K7	1/4W	SMD Thick Film Resistor	
R141	10K	1/4W	SMD Thick Film Resistor	
R142	100	1/4W	SMD Thick Film Resistor	
R143	560	1/4W	SMD Thick Film Resistor	
R144	1K	1/4W	SMD Thick Film Resistor	
R145	120K	1/4W	SMD Thick Film Resistor	
R146	3K9	1/4W	SMD Thick Film Resistor	
R147	3K9	1/4W	SMD Thick Film Resistor	
R148	2K2	1/4W	SMD Thick Film Resistor	
R149	100	1/4W	SMD Thick Film Resistor	
R150	47K	1/4W	SMD Thick Film Resistor	
R151	47K	1/4W	SMD Thick Film Resistor	
R152	47K	1/4W	SMD Thick Film Resistor	
R153	47K	1/4W	SMD Thick Film Resistor	
R154	47K	1/4W	SMD Thick Film Resistor	
R155	470	1/4W	SMD Thick Film Resistor	
R156	47K	1/4W	SMD Thick Film Resistor	
R157	470	1/4W	SMD Thick Film Resistor	
R158	100K	1/4W	SMD Thick Film Resistor	
R159	560	1/4W	SMD Thick Film Resistor	
R160	220K	1/4W	SMD Thick Film Resistor	
R161	1K	1/4W	SMD Thick Film Resistor	
R162	22K	1/4W	SMD Thick Film Resistor	
R163	10	1/4W	SMD Thick Film Resistor	
R164	10	1/4W	SMD Thick Film Resistor	
R165	10K	1/4W	SMD Cermet Skeleton Trimmer Resistor	
R166	18K	1/4W	SMD Thick Film Resistor	
R167	470	1/4W	SMD Thick Film Resistor	
R168	390	1/4W	SMD Thick Film Resistor	
R169	12	1/4W	SMD Thick Film Resistor	
R170	330	1/4W	SMD Thick Film Resistor	
R171	330	1/4W	SMD Thick Film Resistor	
R172	10	1/4W	SMD Thick Film Resistor	
R173	39	1/4W	SMD Thick Film Resistor	
R174	10	1/4W	SMD Thick Film Resistor	
R175	470	1/4W	SMD Thick Film Resistor	
R176	12	1/4W	SMD Thick Film Resistor	
R177	12K	1/4W	SMD Thick Film Resistor	
R178	56	1/4W	SMD Thick Film Resistor	
R179	20K	1/4W	SMD Cermet Skeleton Trimmer Resistor	
R180	5K	1/4W	Multi Turn Cermet Trimmer Resistor	
R181	2K2	1/4W	SMD Thick Film Resistor	

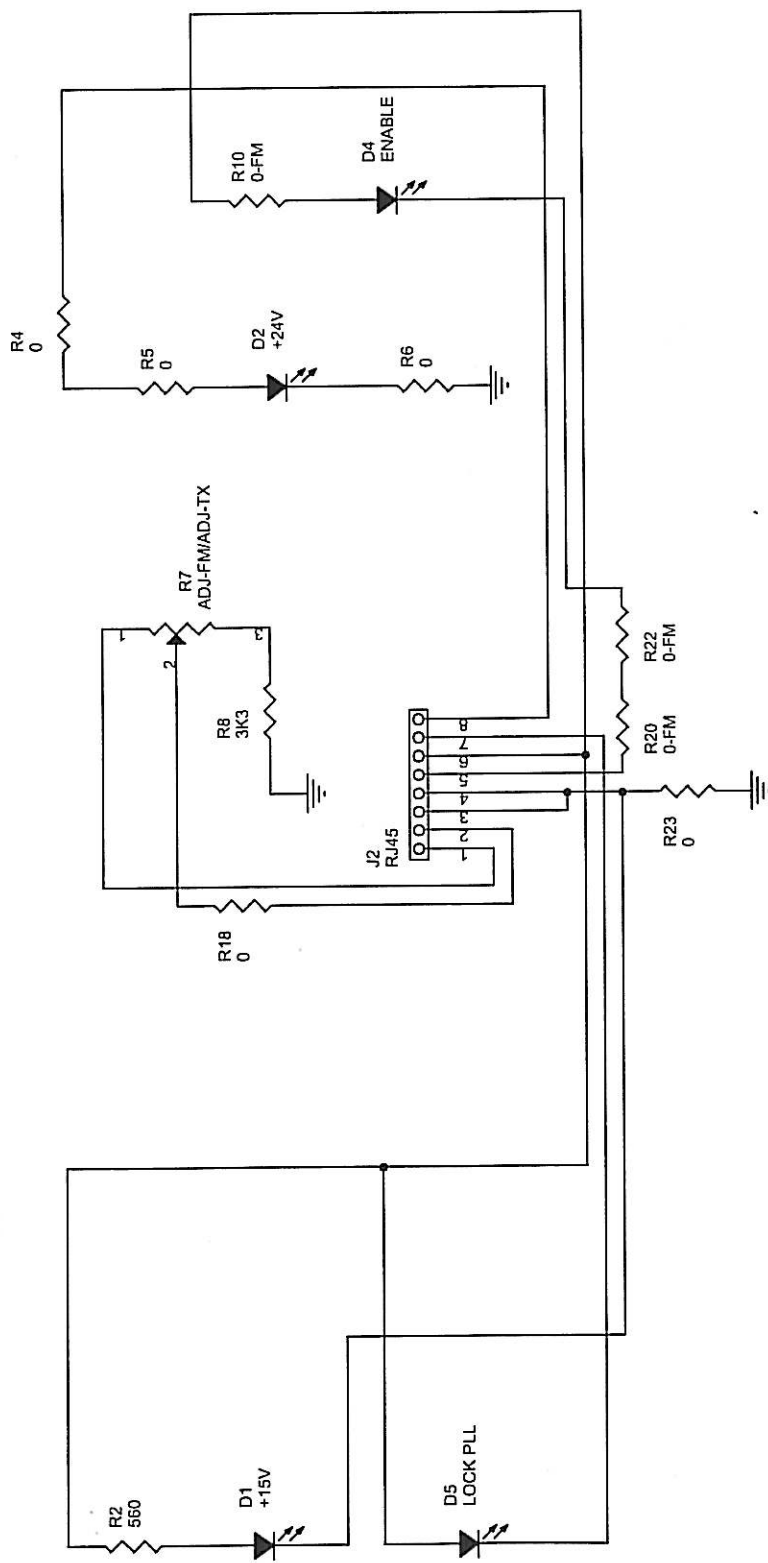
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Rif.	Value	Remarks	Description	Code
R182	470K	1/4W	SMD Thick Film Resistor	
R183	4K7	1/4W	SMD Thick Film Resistor	
R184	4K7	1/4W	SMD Thick Film Resistor	
D1	LL4148		SMD Low Power Signal Diode	
D2	LL4148		SMD Low Power Signal Diode	
D3	BAT43		Diode Schottky	
D4	BAT43		Diode Schottky	
D5	LL4148		SMD Low Power Signal Diode	
D6	3V3		SMD Diode Zener	
D7	LL4148		SMD Low Power Signal Diode	
D8	LL4148		SMD Low Power Signal Diode	
D9	LL4148		SMD Low Power Signal Diode	
D10	LED	YELLOW	SMD Light Emitting Diode	
D11	LED	YELLOW	SMD Light Emitting Diode	
D12	MBS340		SMD Diode Schottky	
D13	MBS340		SMD Diode Schottky	
D14	LED	YELLOW	SMD Light Emitting Diode	
D15	LED	YELLOW	SMD Light Emitting Diode	
D16	15V		SMD Diode Zener	
D17	LL4148		SMD Low Power Signal Diode	
D18	LL4148		SMD Low Power Signal Diode	
D19	15V		SMD Diode Zener	
D20	MV209		Tuning Diode	
D21	MV209		Tuning Diode	
D22	MV209		Tuning Diode	
D23	MV209		Tuning Diode	
D24	MV209		Tuning Diode	
D25	MV209		Tuning Diode	
D26	MV209		Tuning Diode	
D27	MV209		Tuning Diode	
D28	LL4148		SMD Low Power Signal Diode	
D29	LED	GREEN	SMD Light Emitting Diode	
D30	LL4148		SMD Low Power Signal Diode	
D31	5V1		SMD Diode Zener	
D32	LL4148		SMD Low Power Signal Diode	
D33	LL4148		SMD Low Power Signal Diode	
D34	LL4148		SMD Low Power Signal Diode	
Q1	BC327		Low Power Bipolar Transistor	
Q2	BC327		Low Power Bipolar Transistor	
Q3	BC337		Low Power Bipolar Transistor	
Q4	BC327		Low Power Bipolar Transistor	
Q5	BC337		Low Power Bipolar Transistor	
Q6	BDX53		Medium Power Bipolar Transistor	
Q7	BC337		Low Power Bipolar Transistor	
Q8	J310		JFET	
Q9	J310		JFET	
Q10	BC327		Low Power Bipolar Transistor	
Q11	BC327		Low Power Bipolar Transistor	
Q12	PD55003		LDMOS	
Q13	BFR96		RF Bipolar Transistor	

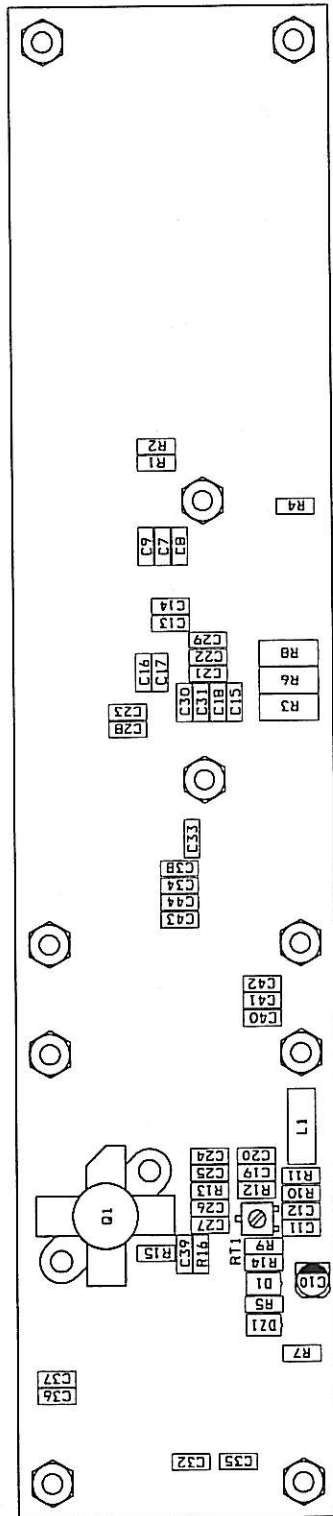


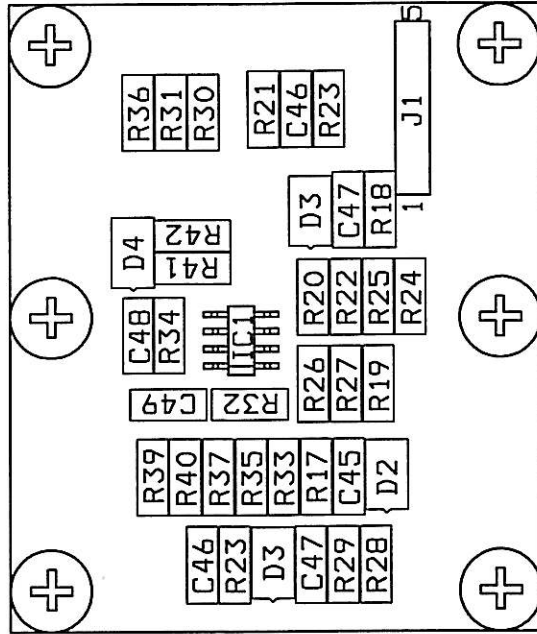


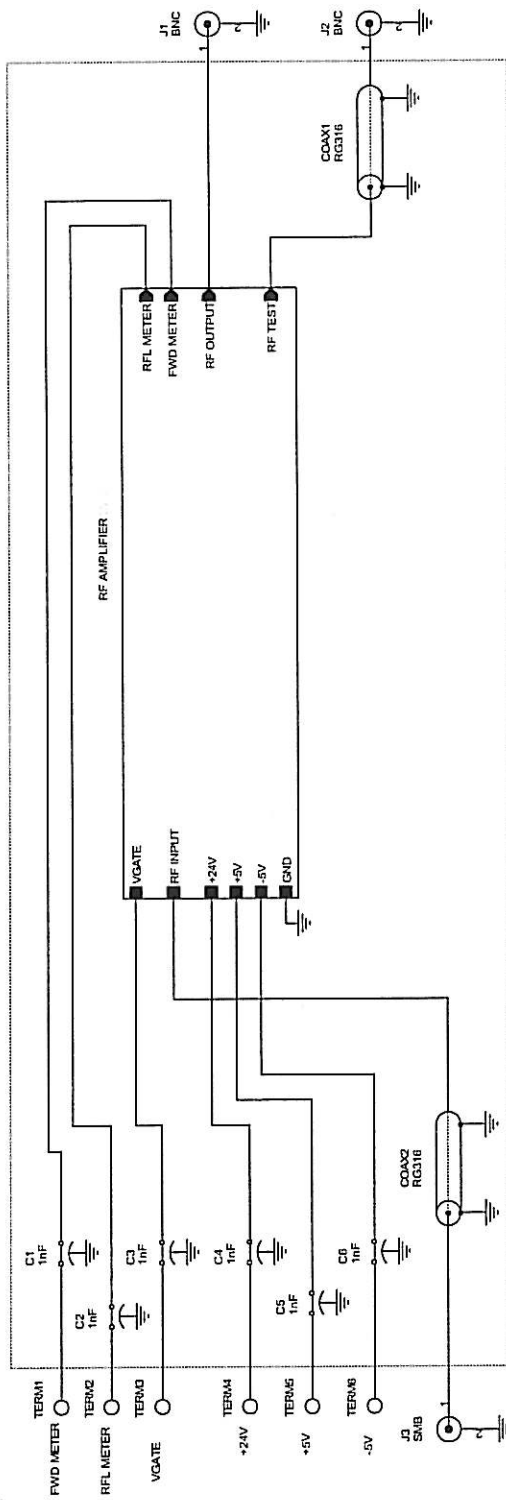




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Size	Document Number	Rev	1.0
A	Mod. MIFP01		
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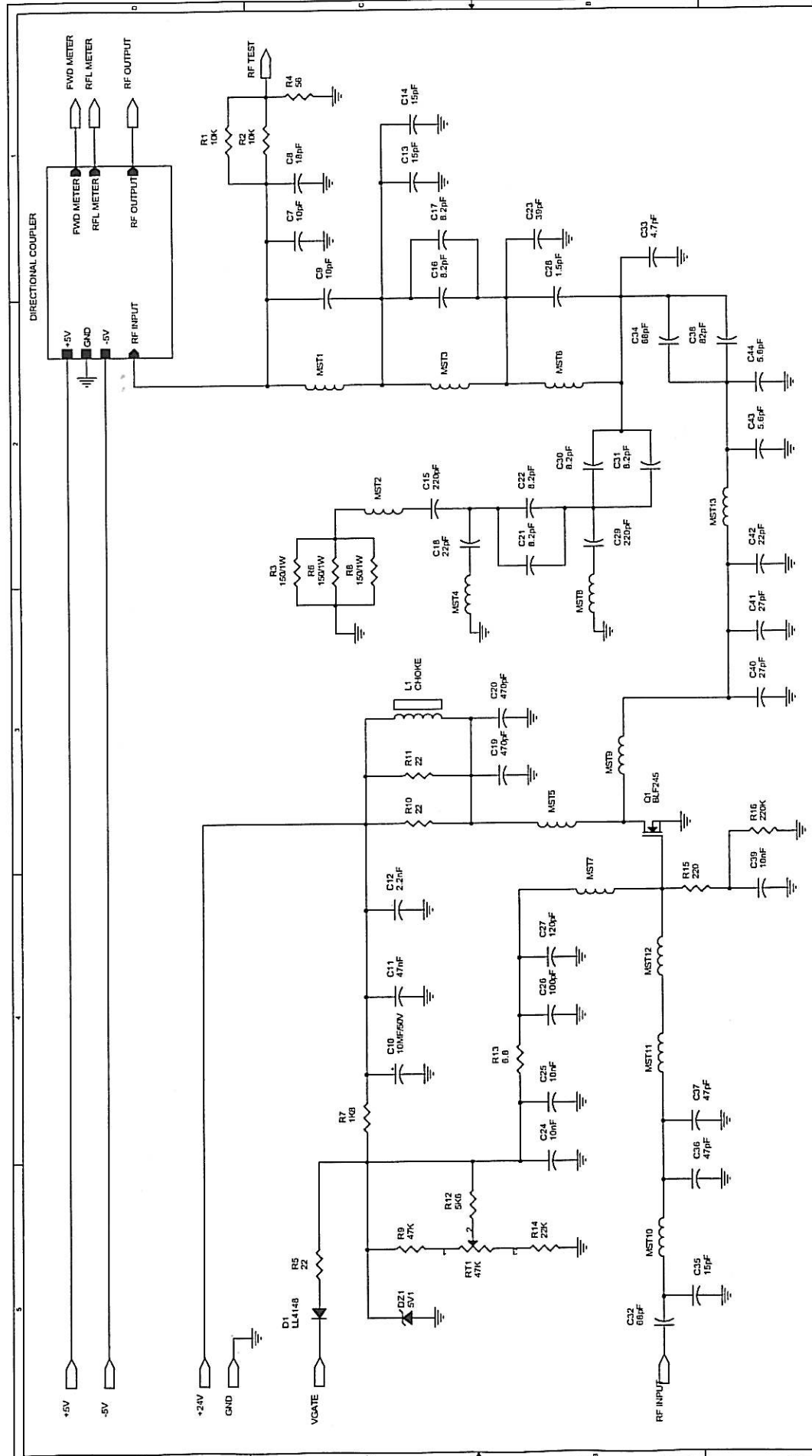


MODULE RF AMPLIFIER

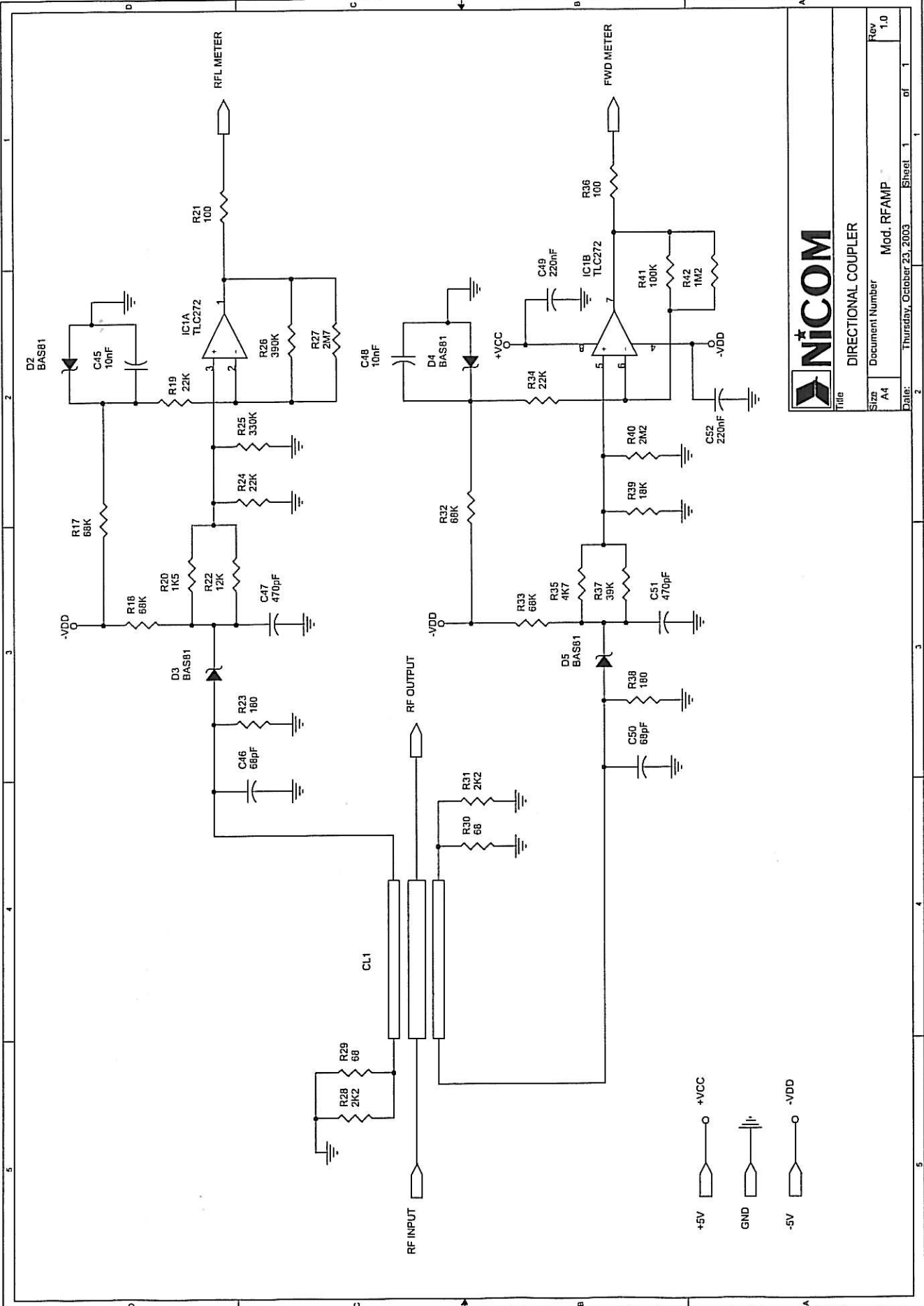
Document Number Module RFAMP

REV 1.0

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RF AMPLIFIER
 Document Number Mcd_RFAMP
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 Rev 1.0

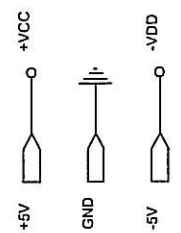


Title
DIRECTIONAL COUPLER

Document Number
Mod. RFAMP

Date: Thursday, October 23, 2003 Sheet 1 of 1

Rev
1.0



NICOM

Part List Schematic : RFAMP30W

Rif.	Value	Remarks	Description	Code
C1	1nF		SMD Multilayer Ceramic Capacitor	
C2	1nF		SMD Multilayer Ceramic Capacitor	
C3	1nF		SMD Multilayer Ceramic Capacitor	
C4	1nF		SMD Multilayer Ceramic Capacitor	
C5	1nF		SMD Multilayer Ceramic Capacitor	
C6	1nF		SMD Multilayer Ceramic Capacitor	
C7	10pF		SMD Multilayer Ceramic Capacitor	
C8	18pF		SMD Multilayer Ceramic Capacitor	
C9	10pF		SMD Multilayer Ceramic Capacitor	
C10	10MF	50V	SMD Aluminium Electrolytic Capacitor	
C11	47nF		SMD Multilayer Ceramic Capacitor	
C12	2.2nF		SMD Multilayer Ceramic Capacitor	
C13	15pF		SMD Multilayer Ceramic Capacitor	
C14	15pF		SMD Multilayer Ceramic Capacitor	
C15	220pF		SMD Multilayer Ceramic Capacitor	
C16	8.2pF		SMD Multilayer Ceramic Capacitor	
C17	8.2pF		SMD Multilayer Ceramic Capacitor	
C18	22pF		SMD Multilayer Ceramic Capacitor	
C19	470pF		SMD Multilayer Ceramic Capacitor	
C20	470pF		SMD Multilayer Ceramic Capacitor	
C21	8.2pF		SMD Multilayer Ceramic Capacitor	
C22	8.2pF		SMD Multilayer Ceramic Capacitor	
C23	39pF		SMD Multilayer Ceramic Capacitor	
C24	10nF		SMD Multilayer Ceramic Capacitor	
C25	10nF		SMD Multilayer Ceramic Capacitor	
C26	100pF		SMD Multilayer Ceramic Capacitor	
C27	120pF		SMD Multilayer Ceramic Capacitor	
C28	1.5pF		SMD Multilayer Ceramic Capacitor	
C29	220pF		SMD Multilayer Ceramic Capacitor	
C30	8.2pF		SMD Multilayer Ceramic Capacitor	
C31	8.2pF		SMD Multilayer Ceramic Capacitor	
C32	68pF		SMD Multilayer Ceramic Capacitor	
C33	4.7pF		SMD Multilayer Ceramic Capacitor	
C34	68pF		SMD Multilayer Ceramic Capacitor	
C35	15pF		SMD Multilayer Ceramic Capacitor	
C36	47pF		SMD Multilayer Ceramic Capacitor	
C37	47pF		SMD Multilayer Ceramic Capacitor	
C38	82pF		SMD Multilayer Ceramic Capacitor	
C39	10nF		SMD Multilayer Ceramic Capacitor	
C40	27pF		SMD Multilayer Ceramic Capacitor	
C41	27pF		SMD Multilayer Ceramic Capacitor	
C42	22pF		SMD Multilayer Ceramic Capacitor	
C43	5.6pF		SMD Multilayer Ceramic Capacitor	
C44	5.6pF		SMD Multilayer Ceramic Capacitor	
C45	10nF		SMD Multilayer Ceramic Capacitor	
C46	68pF		SMD Multilayer Ceramic Capacitor	
C47	470pF		SMD Multilayer Ceramic Capacitor	
C48	10nF		SMD Multilayer Ceramic Capacitor	
C49	220nF		SMD Multilayer Ceramic Capacitor	

NICOM

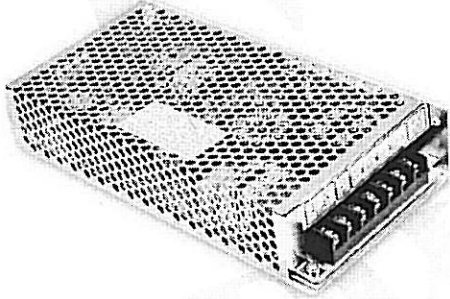
Rif.	Value	Remarks	Description	Code
C50	68pF		SMD Multilayer Ceramic Capacitor	
C51	470pF		SMD Multilayer Ceramic Capacitor	
C52	220nF		SMD Multilayer Ceramic Capacitor	
L1	CHOKE		Beads Ferroxcube Core	
MST1	INDUCTOR		Microstrip Inductor	
MST2	INDUCTOR		Microstrip Transmission Line	
MST3	INDUCTOR		Microstrip Inductor	
MST4	INDUCTOR		Microstrip Inductor	
MST5	INDUCTOR		Microstrip Transmission Line	
MST6	INDUCTOR		Microstrip Inductor	
MST7	INDUCTOR		Microstrip Transmission Line	
MST8	INDUCTOR		Microstrip Inductor	
MST9	INDUCTOR		Microstrip Transmission Line	
MST10	INDUCTOR		Microstrip Transmission Line	
MST11	INDUCTOR		Microstrip Transmission Line	
MST12	INDUCTOR		Microstrip Transmission Line	
MST13	INDUCTOR		Microstrip Transmission Line	
R1	10K	1/4W	SMD Thick Film Resistor	
R2	10K	1/4W	SMD Thick Film Resistor	
R3	150	1W	SMD Thick Film Resistor	
R4	56	1/4W	SMD Thick Film Resistor	
R5	22	1/4W	SMD Thick Film Resistor	
R6	150	1W	SMD Thick Film Resistor	
R7	1K8	1/4W	SMD Thick Film Resistor	
R8	150	1W	SMD Thick Film Resistor	
R9	47K	1/4W	SMD Thick Film Resistor	
R10	22	1/4W	SMD Thick Film Resistor	
R11	22	1/4W	SMD Thick Film Resistor	
R12	5K6	1/4W	SMD Thick Film Resistor	
R13	6.08	1/4W	SMD Thick Film Resistor	
R14	22K	1/4W	SMD Thick Film Resistor	
R15	220	1/4W	SMD Thick Film Resistor	
R16	220K	1/4W	SMD Thick Film Resistor	
R17	68K	1/4W	SMD Thick Film Resistor	
R18	68K	1/4W	SMD Thick Film Resistor	
R19	22K	1/4W	SMD Thick Film Resistor	
R20	1K5	1/4W	SMD Thick Film Resistor	
R21	100	1/4W	SMD Thick Film Resistor	
R22	12K	1/4W	SMD Thick Film Resistor	
R23	180	1/4W	SMD Thick Film Resistor	
R24	22K	1/4W	SMD Thick Film Resistor	
R25	330K	1/4W	SMD Thick Film Resistor	
R26	390K	1/4W	SMD Thick Film Resistor	
R27	2M7	1/4W	SMD Thick Film Resistor	
R28	2K2	1/4W	SMD Thick Film Resistor	
R29	68	1/4W	SMD Thick Film Resistor	
R30	68	1/4W	SMD Thick Film Resistor	
R31	2K2	1/4W	SMD Thick Film Resistor	
R32	68K	1/4W	SMD Thick Film Resistor	

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150W Single Output Switching Power Supply

RS-150 series



■ Features :

- Protections: Short circuit/Over load/Over voltage
- Cooling by free air convection
- LED indicator for power on
- 100% full load burn-in test
- All using 105°C long life electrolytic capacitors
- Withstand 300VAC surge input for 5 second
- High operating temperature up to 70°C
- Withstand 5G vibration test
- High efficiency, long life and high reliability
- 3 years warranty



SPECIFICATION

MODEL		RS-150-3.3	RS-150-5	RS-150-12	RS-150-15	RS-150-24	RS-150-48
OUTPUT	DC VOLTAGE	3.3V	5V	12V	15V	24V	48V
	RATED CURRENT	30A	26A	12.5A	10A	6.5A	3.3A
	CURRENT RANGE	0 ~ 30A	0 ~ 26A	0 ~ 12.5A	0 ~ 10A	0 ~ 6.5A	0 ~ 3.3A
	RATED POWER	99W	130W	150W	150W	156W	158.4W
	RIPPLE & NOISE (max.) Note.2	80mVp-p	80mVp-p	120mVp-p	120mVp-p	120mVp-p	200mVp-p
	VOLTAGE ADJ. RANGE	3.2V ~ 3.5V	4.75 ~ 5.5V	11.4 ~ 13.2V	14.25 ~ 16.5V	22.8 ~ 26.4V	45.6 ~ 52.8V
	VOLTAGE TOLERANCE Note.3	±3.0%	±2.0%	±1.0%	±1.0%	±1.0%	±1.0%
	LINE REGULATION Note.4	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%
	LOAD REGULATION Note.5	±2.0%	±1.0%	±0.5%	±0.5%	±0.5%	±0.5%
SETUP, RISE, HOLD TIME	800ms, 20ms, 20ms/230VAC 1200ms, 30ms, 10ms/115VAC at full load						
INPUT	VOLTAGE RANGE	88 ~ 132VAC / 176 ~ 264VAC selected by switch 248 ~ 373VDC (Withstand 300VAC surge for 5sec. Without damage)					
	FREQUENCY RANGE	47 ~ 63Hz					
	EFFICIENCY (Typ.)	74%	78%	83%	84%	86%	87%
	AC CURRENT	3A/115VAC 2A/230VAC					
	INRUSH CURRENT(max.)	COLD START 50A/230VAC					
LEAKAGE CURRENT	<2mA / 240VAC						
PROTECTION	OVER LOAD	110 ~ 150% rated output power Protection type : Hiccup mode, recovers automatically after fault condition is removed					
	OVER VOLTAGE	3.8 ~ 4.45V	5.75 ~ 6.75V	13.8 ~ 16.2V	17.25 ~ 20.25V	27.6 ~ 32.4V	55.2 ~ 64.8V
ENVIRONMENT	WORKING TEMP.	-25 ~ +70°C (Refer to output load derating curve)					
	WORKING HUMIDITY	20 ~ 90% RH non-condensing					
	STORAGE TEMP., HUMIDITY	-40 ~ +85°C, 10 ~ 95% RH					
	TEMP. COEFFICIENT	±0.03%/°C (0 ~ 50°C)					
	VIBRATION	10 ~ 500Hz, 5G 10min./1cycle, period for 60min. each along X, Y, Z axes					
SAFETY & EMC (Note 6)	SAFETY STANDARDS	UL60950-1, TUV EN60950-1 Approved					
	WITHSTAND VOLTAGE	I/P-O/P:3KVAC I/P-FG:1.5KVAC O/P-FG:0.5KVAC					
	ISOLATION RESISTANCE	I/P-O/P, I/P-FG, O/P-FG:100M Ohms/500VDC					
	EMI CONDUCTION & RADIATION	Compliance to EN55022 (CISPR22) Class B					
OTHERS	HARMONIC CURRENT	Compliance to EN61000-3-2,-3					
	EMS IMMUNITY	Compliance to EN61000-4-2,3,4,5,6,8,11; ENV50204, EN61000-6-2 (EN50082-2) heavy industry level, criteria A					
NOTE	MTBF	244Khrs min. MIL-HDBK-217F (25°C)					
	DIMENSION	199*98*38mm (L*W*H)					
	PACKING	0.7Kg; 20pcs/15Kg/0.72CUFT					
NOTE		1. All parameters NOT specially mentioned are measured at 230VAC input, rated load and 25°C of ambient temperature. 2. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1uf & 47uf parallel capacitor. 3. Tolerance : includes set up tolerance, line regulation and load regulation. 4. Line regulation is measured from low line to high line at rated load. 5. Load regulation is measured from 0% to 100% rated load. 6. The power supply is considered a component which will be installed into a final equipment. The final equipment must be re-confirmed that it still meets EMC directives. 7. Length of set up time is measured at cold first start. Turning ON/OFF the power supply very quickly may lead to increase of the set up time.					



150W Single Output Switching Power Supply

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RS-150 series

MODEL : RS-150-5

OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	RIPPLE & NOISE	V1: 80 mVp-p (Max)	I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	V1: 25 mVp-p (Max)	P
2	OUTPUT VOLTAGE ADJUST RANGE	CH1: 4.75 V- 5.5 V	I/P: 230 VAC I/P: 115 VAC O/P: MIN LOAD Ta: 25°C	4.64V~5.57 V/ 230VAC 4.64V~5.57 V/ 115VAC	P
3	OUTPUT VOLTAGE TOLERANCE	V1: -2 % - 2 % (Max)	I/P: 176 VAC / 264 VAC O/P: FULL / 0 % LOAD Ta: 25°C	V1: 0.3%~ -0.3%	P
4	LINE REGULATION	V1: 0.5 % - 0.5 % (Max)	I/P: 176 VAC ~ 264 VAC O/P: FULL LOAD Ta: 25°C	V1: 0 % - 0 %	P
5	LOAD REGULATION	V1: -1 % - 1 % (Max)	I/P: 230 VAC O/P: FULL - MIN LOAD Ta: 25°C	V1: 0.2 % - -0.2 %	P
6	SET UP TIME	230 VAC/800 ms (Max) 115 VAC/1200 ms (Max)	I/P: 230 VAC I/P: 115 VAC O/P: FULL LOAD Ta: 25°C	230VAC/ 493 ms 115VAC/ 484 ms	P
7	RISE TIME	230 VAC/20 ms (Max) 115 VAC/30 ms (Max)	I/P: 230 VAC I/P: 115 VAC O/P: FULL LOAD Ta: 25°C	230 VAC/ 1.8 ms 115 VAC/ 1.8 ms	P
8	HOLD UP TIME	230 VAC/ 20 ms (Min) 115 VAC/ 10 ms (Min)	I/P: 230 VAC I/P: 115 VAC O/P: FULL LOAD Ta: 25°C	230VAC/ 22 ms 115VAC/ 27 ms	P
9	OVER/UNDERSHOOT TEST	< ±5%	I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	TEST: < 5 %	P
10	DYNAMIC LOAD	V1: 1000 mVp-p	I/P: 230 VAC O/P: FULL / Min LOAD 90% DUTY / 1KHZ Ta: 25°C	241 mVp-p	P



INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	176VAC-264 VAC	I/P:TESTING O/P:FULL LOAD Ta:25°C	119V- 264 V	P
			I/P: LOW-LINE-3V= 173 V HIGH-LINE+15%= 300 V O/P:FULL/MIN LOAD ON: 30 Sec , OFF: 30 Sec 10MIN (AC POWER ON/OFF NO DAMAGE)	TEST: OK	
2	INPUT FREQUENCY RANGE	47 HZ ~ 63 HZ NO DAMAGE OSC	I/P: 176 VAC ~ 264 VAC O/P:FULL-MIN LOAD Ta:25°C	TEST: OK	P
3	EFFICIENCY	78 % (TYP)	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	78.37 %	P
4	INPUT CURRENT	230 V/ 2 A(Max) 115 V/ 3 A(Max)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	I = 1.5 A/ 230 VAC I = 2.5 A/ 115 VAC	P
5	INRUSH CURRENT	230 V/ 50 A(Max) COLD START	I/P:230 VAC O/P:FULL LOAD Ta:25°C	I = 35 A/ 230 VAC	P
6	LEAKAGE CURRENT	< 2 mA / 240 VAC	I/P:254 VAC O/P:Min LOAD Ta:25°C	L-FG: 0.32 mA N-FG: 0.4 mA	P

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PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	110 %- 150 %	I/P: 230 VAC I/P: 115 VAC O/P: TESTING Ta: 25°C	116 %/ 230 VAC 116 %/ 115 VAC Hiccup Mode	P
2	OVER VOLTAGE PROTECTION	CH1: 5.75 V- 6.75 V	I/P: 230 VAC I/P: 115 VAC O/P: MIN LOAD Ta: 25°C	5.96 V/ 230 VAC 5.96 V/ 115 VAC Hiccup Model	P
3	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 264 VAC O/P: Full LOAD Ta: 25°C	NO DAMAGE Hiccup Mode	P

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ENVIRONMENT TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT																																																																																
1	TEMPERATURE RISE TEST	MODEL : RS-150-5 1. ROOM AMBIENT BURN-IN : 1 HRS I/P: 230 VAC O/P: FULL LOAD Ta= 24.7 °C 2. HIGH AMBIENT BURN-IN : 3 HRS I/P: 230 VAC O/P: FULL LOAD Ta= 50.9 °C			P																																																																																
		<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>P/N</th> <th>ROOM AMBIENT Ta=24.7 °C</th> <th>HIGH AMBIENT Ta= 50.9 °C</th> </tr> </thead> <tbody> <tr><td>1</td><td>LF1</td><td>TF-096B LS</td><td>47.0°C</td><td>72.1°C</td></tr> <tr><td>2</td><td>BD1</td><td>KBJ608G 6A/800V LT</td><td>70.5°C</td><td>94.5°C</td></tr> <tr><td>3</td><td>C5</td><td>330U/200V RUB 105°C</td><td>65.9°C</td><td>86.9°C</td></tr> <tr><td>4</td><td>R2</td><td>150K/2W R/MO</td><td>105.6°C</td><td>123.0°C</td></tr> <tr><td>5</td><td>T1 CORE</td><td>TF-1055 LS</td><td>77.1°C</td><td>99.3°C</td></tr> <tr><td>6</td><td>T1 COIL</td><td>TF-1055 LS</td><td>89.1°C</td><td>110.1°C</td></tr> <tr><td>7</td><td>D61</td><td>D83004 30A/40V FUJI</td><td>94.4°C</td><td>116.8°C</td></tr> <tr><td>8</td><td>ZD2</td><td>15V/1W</td><td>81.0°C</td><td>96.4°C</td></tr> <tr><td>9</td><td>ZD1</td><td>P6KE300A PAN</td><td>87.2°C</td><td>99.3°C</td></tr> <tr><td>10</td><td>D4</td><td>HER208 2A/1KV REC</td><td>77.9°C</td><td>98.6°C</td></tr> <tr><td>11</td><td>Q1</td><td>2SK2082 9A/800V FUJI</td><td>69.3°C</td><td>94.2°C</td></tr> <tr><td>12</td><td>D60</td><td>D83004 30A/40V FUJI</td><td>95.3°C</td><td>118.1°C</td></tr> <tr><td>13</td><td>C10</td><td>100U/35V RUB 105°C YXF</td><td>72.3°C</td><td>94.7°C</td></tr> <tr><td>14</td><td>C64</td><td>2200U/16V RUB 105°C</td><td>80.9°C</td><td>101.2°C</td></tr> <tr><td>15</td><td>L60</td><td>TR-408</td><td>96.8°C</td><td>119.4°C</td></tr> </tbody> </table>	NO	Position		P/N	ROOM AMBIENT Ta=24.7 °C	HIGH AMBIENT Ta= 50.9 °C	1	LF1	TF-096B LS	47.0°C	72.1°C	2	BD1	KBJ608G 6A/800V LT	70.5°C	94.5°C	3	C5	330U/200V RUB 105°C	65.9°C	86.9°C	4	R2	150K/2W R/MO	105.6°C	123.0°C	5	T1 CORE	TF-1055 LS	77.1°C	99.3°C	6	T1 COIL	TF-1055 LS	89.1°C	110.1°C	7	D61	D83004 30A/40V FUJI	94.4°C	116.8°C	8	ZD2	15V/1W	81.0°C	96.4°C	9	ZD1	P6KE300A PAN	87.2°C	99.3°C	10	D4	HER208 2A/1KV REC	77.9°C	98.6°C	11	Q1	2SK2082 9A/800V FUJI	69.3°C	94.2°C	12	D60	D83004 30A/40V FUJI	95.3°C	118.1°C	13	C10	100U/35V RUB 105°C YXF	72.3°C	94.7°C	14	C64	2200U/16V RUB 105°C	80.9°C	101.2°C	15	L60	TR-408	96.8°C	119.4°C		
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2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P: 230 VAC O/P: 117%LOAD Ta:25°C	TEST : OK	P																																																																																
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P: 230 VAC O/P: 100% LOAD Ta= -25 °C	TEST : OK	P																																																																																
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 40°C NO DAMAGE	I/P: 272 VAC O/P:FULL LOAD Ta= 40°C HUMIDITY= 95 %R.H	TEST : OK	P																																																																																
5	TEMPERATURE COEFFICIENT	± 0.03 % (0-50°C)	I/P: 230 VAC O/P:FULL LOAD	± 0.01 % (0-50°C)	P																																																																																
6	VIBRATION TEST	1 Carton & 1 Set Operating at I/P: VAC NO LOAD (1) Waveform: Sine Wave (2) Frequency:10-500Hz (3) Sweep Time:10min/sweep cycle (4) Acceleration:2G (5) Test Time:1 hour in each axis (X.Y.Z) (6) Ta 25°C		TEST :	N/A																																																																																

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SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	WITHSTAND VOLTAGE	I/P-O/P: 3 KVAC/min I/P-FG: 1.5 KVAC/min O/P-FG: 0.5 KVAC/min	I/P-O/P: 3.6 KVAC/min I/P-FG: 1.8 KVAC/min O/P-FG: 0.6 KVAC/min Ta:25°C	I/P-O/P: 4.21mA I/P-FG: 3.35 mA O/P-FG: 2.65 mA NO DAMAGE	P
2	ISOLATION RESISTANCE	I/P-O/P:500VDC>100MΩ I/P-FG: 500VDC>100MΩ O/P-FG:500VDC>100MΩ	I/P-O/P: 500 VDC I/P-FG: 500 VDC O/P-FG: 500 VDC Ta:25°C	I/P-O/P: 11G Ω I/P-FG: 6G Ω O/P-FG: 9G Ω NO DAMAGE	P
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	30 A / 2min Ta:25°C	11 mΩ	P
4	APPROVAL	TUV: Certificate NO : R50046942 UL: File NO :			P

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	HARMONIC	EN61000-3-2 CLASS A	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25°C	PASS	P
2	CONDUCTION	EN55022 CLASS B	I/P: 230 VAC (50HZ) O/P:FULL/50% LOAD Ta:25°C	PASS Test by certified Lab	P
3	RADIATION	EN55022 CLASS B	I/P: 230 VAC (50HZ) O/P:FULL LOAD Ta:25°C	PASS Test by certified Lab	P
4	E.S.D	EN61000-4-2 INDUSTRY AIR:8KV / Contact:4KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA A	P
5	E.F.T	EN61000-4-4 INDUSTRY INPUT: 2KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA A	P
6	SURGE	IEC61000-4-5 INDUSTRY L-N :2KV L,N-PE:4KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA A	P
7	Test by certified Lab & Test Report Prepare				

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M.T.B.F & LIFE CYCLE CALCULATION

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	CAPACITOR LIFE CYCLE	SUPPOSE C64 IS THE MOST CRITICAL COMPONENT I/P: 230 VAC O/P: FULL LOAD Ta= 25 °C LIFE TIME= 38043 HRS I/P: 230 VAC O/P: FULL LOAD Ta= 40 °C LIFE TIME= 20226 HRS			P
2	MTBF	MIL-HDBK-217F NOTICES2 PARTS COUNT TOTAL FAILURE RATE: 244K HRS			P

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	Power Transistor (D to S) or (C to E) Peak Voltage	Q1 Rated 2SK2082 : 800V / 9 A	I/P: High-Line +3V = 267 V O/P: (1) Full Load Turn on (2) Full Load (3) Output Short Ta: 25°C	(1) 536 V (2) 678 V (3) 680 V	P
2	Diode Peak Voltage	D50 Rated D83-004 : 40 V / 30 A	I/P: High-Line +3V = 267 V O/P: (1) Full Load Turn on (2) Full Load (3) Output Short Ta: 25°C	(1) 24.7 V (2) 24.5 V (3) 24.7 V	P
3	Clamp Diode Peak Voltage	D1 Rated HER208 : 1K V / 2 A	I/P: High-Line +3V = 267 V O/P: (1) Full Load (2) Dynamic Load 90% Duty / 1KHz Ta: 25°C	(1) 666 V (2) 664 V	P
4	Input Capacitor Voltage	C5 Rated : 330u / 200 V	I/P: High-Line +3V = 267 V O/P: (1) Full Load Turn on / Off (2) Min load Turn on / Off (3) Full Load / Min load Change Ta: 25°C	(1) 187 V (2) 184 V (3) 184 V	P
5	Control IC Voltage Test	U1 Rated 1203 : 16 V	I/P: High-Line +3V = 267 V O/P: (1) Full Load Turn on / Off (2) Min load Turn on / Off (3) Full Load / Min load Change Ta: 25°C	(1) 14.9 V (4) 14.9 V (5) 14.9 V	P

DATE	SAMPLE	TEST RESULT	TESTER	APPROVAL
2004/3/19	RD SAMPLE	PASS	VINCENT TSENG	MAX LIN
2004/7/8	PRODUCT SAMPLE A404B34	PASS	VINCENT TSENG	MAX LIN

2003/12/12 A50-F023

勝特力材料 886-3-5753170
 勝特力电子(上海) 86-21-54151736
 勝特力电子(深圳) 86-755-83298787
 Http://www.100y.com.tw

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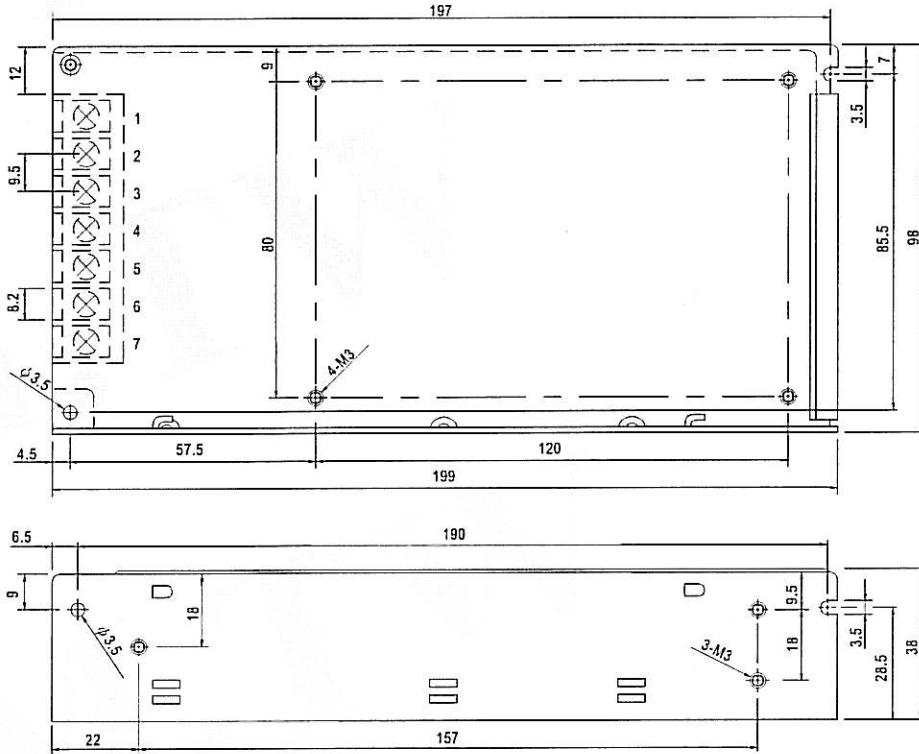


150W Single Output Switching Power Supply

RS-150 series

■ Mechanical Specification

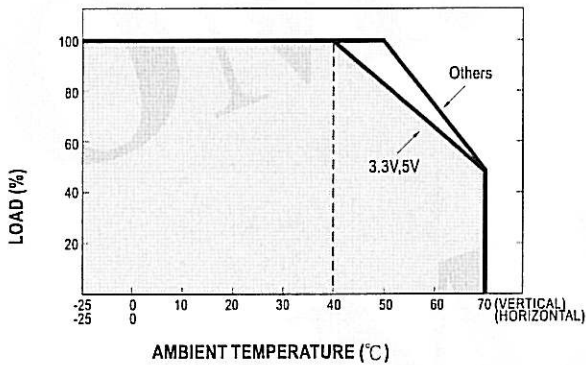
Case No. 902 Unit:mm



Terminal Pin. No Assignment

Pin No.	Assignment	Pin No.	Assignment
1	AC/L	4,5	DC OUTPUT -V
2	AC/N	6,7	DC OUTPUT +V
3	FG \perp		

■ Output Derating



■ Static Characteristics

