

# STL-1

## STUDIO TRANSMITTER LINK

TECHNICAL & MAINTENANCE MANUAL



MANUFACTURED BY:

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**IMPORTANT WARNING !**

**VIBRATIONS WHICH OCCUR DURING SHIPMENT MAY CAUSE ELECTRICAL AND ELECTRONIC CONNECTIONS TO BECOME LOOSE!**

**IT IS IMPERATIVE THAT ALL SCREW TYPE CONNECTIONS BE CHECKED DURING THE INSTALLATION PROCESS TO ENSURE THEY HAVE REMAINED TIGHT!**

**CONNECTIONS ON ALL ELECTRICAL CONNECTIONS INCLUDING THOSE ON CIRCUIT BREAKERS AND CONTACTORS SHOULD BE CHECKED AT LEAST TWICE A YEAR DURING ROUTINE MAINTENANCE ON THE PRODUCT.**

**THANK YOU FOR PURCHASING ENERGY-ONIX EQUIPMENT.**

**THIS EQUIPMENT HAS BEEN TUNED TO YOUR FREQUENCY  
AND TESTED AT THE FACTORY.**

**IT IS READY TO BE INSTALLED AND OPERATED.**

**WE RECOMMEND INSTALLATION BE PERFORMED ONLY BY  
QUALIFIED TECHNICAL PERSONNEL.**

**OUR TECHNICAL STAFF IS READY TO ANSWER QUESTIONS YOU  
HAVE OR TO ASSIST WITH TROUBLESHOOTING TECHNICAL  
PROBLEMS SHOULD THEY OCCUR.**

**MONDAY THROUGH FRIDAY 9AM TO 5PM EASTERN TIME CALL  
518-758-1690**

**AFTER HOURS, WEEKENDS AND HOLIDAYS:**

**TRY THE ABOVE NUMBER FIRST. IF NO ANSWER THEN TRY OUR  
24 HOUR EMERGENCY TECHNICAL SUPPORT BEEPER FROM A  
TOUCH TONE PHONE 518-484-3965.**

**OUR ON CALL ENGINEER WILL RETURN YOUR CALL SHORTLY  
AFTER RECEIVING YOUR PAGE.**

## PRELIMINARY INSTRUCTIONS AND WARRANTY INFORMATION

PLEASE OBSERVE SAFETY PRECAUTIONS WHEN HANDLING THIS UNIT. THIS EQUIPMENT CONTAINS DANGEROUS CURRENTS AND HIGH VOLTAGES.

THIS MANUAL IS WRITTEN AS A GENERAL GUIDE FOR THOSE HAVING PREVIOUS KNOWLEDGE AND EXPERIENCE WITH THIS KIND OF EQUIPMENT. IT IS NOT INTENDED TO CONTAIN A COMPLETE STATEMENT OF ALL SAFETY WARNINGS WHICH SHOULD BE OBSERVED BY PERSONNEL IN USING THIS OR OTHER ELECTRONIC EQUIPMENT.

ENERGY-ONIX DOESN'T ASSUME RESPONSIBILITY FOR INJURY OR DAMAGE RESULTING FROM IMPROPER PROCEDURES BY UNTRAINED/UNQUALIFIED PERSONNEL IN THE HANDLING OF THIS UNIT.

PLEASE OBSERVE ALL LOCAL CODES AND FIRE PROTECTION STANDARDS IN THE OPERATIONS OF THIS UNIT.

**CAUTION:** ALWAYS DISCONNECT POWER BEFORE OPENING COVERS OR REMOVING ANY PART OF THIS UNIT. USE APPROPRIATE GROUNDING PROCEDURES TO SHORT OUT CAPACITORS AND HIGH VOLTAGE POINTS BEFORE SERVICING.

ANY DAMAGE TO THE GOODS MUST BE REPORTED TO THE CARRIER IN WRITING ON THE SHIPMENT RECEIPT.

ANY DISCREPANCY OR DAMAGE DISCOVERED SUBSEQUENT TO DELIVERY, SHALL BE REPORTED TO ENERGY-ONIX WITHIN FIVE 5 DAYS FROM ITS RECEIPT.

### WARRANTY

ENERGY-ONIX SHALL NOT BE LIABLE FOR ANY DAMAGE REGARDLESS OF THE NATURE, ARISING OUT OF OR IN CONNECTION WITH THE PRODUCT OR ITS USE THEREOF.

ENERGY-ONIX'S WARRANTY SHALL NOT INCLUDE:

- 1) RE-SHIPMENT OF THE UNIT TO ENERGY-ONIX FOR REPAIR PURPOSES
- 2) ANY UNAUTHORIZED REPAIR/MODIFICATION
- 3) INCIDENTAL/CONSEQUENTIAL DAMAGES AS A RESULT OF ANY DEFECT
- 4) NOMINAL NON-INCIDENTAL DEFECTS
- 5) RE-SHIPMENT COSTS OR INSURANCE OF THE UNIT OR REPLACEMENT UNITS/PARTS.

WARRANTY SHALL COME INTO FORCE FROM THE INVOICE DATE AND FOR THE PERIOD OF 12 MONTHS. A COPY OF THE ENERGY-ONIX WARRANTY IS INCLUDED ON THE FOLLOWING PAGE.



# Warranty

Seller guarantees at his option to either replace or repair any product or part found to be defective in material or workmanship under normal use within one (1) year from date of shipment, with the exception of tubes or moving parts (blowers) which will carry the original manufacturer's warranty only. Seller's obligation is limited to replacement and repair of such defective product or part, if delivered, transportation prepaid to seller's factory within thirty (30) days after return is authorized. Repaired or replacement parts will be sent freight collect.

This warranty is in lieu of all other warranties, expressed or implied, and there is specifically no warranty of merchantability of fitness for a particular use, purpose, or otherwise, unless expressly set forth to the contrary herein and no waiver, alteration or modification herein shall be valid unless in writing signed by the executive officer of seller. There is no warranty on merchandise or equipment which has been subjected to abuse, misuse, neglect, accident, improper installation, or application, negligence in use, storage, transportation or handling; nor is there any warranty as to merchandise which has been repaired or altered outside seller's factory.

**RETURN AUTHORIZATION**

IF IT IS DEEMED NECESSARY TO RETURN EQUIPMENT FOR REPAIR, YOU WILL BE GIVEN A RETURN AUTHORIZATION NUMBER (RA).

WHEN YOU RECEIVE THE AUTHORIZATION, YOU CAN RETURN THE UNIT. PACK IT CAREFULLY FOR THE SHIPMENT, PREFERABLY USING THE ORIGINAL PACKING, AND SEAL THE PACKAGE PERFECTLY. THE CUSTOMER ALWAYS ASSUMES THE RISKS OF LOSS (i.e., ENERGY-ONIX IS NEVER RESPONSIBLE FOR DAMAGE OR LOSS), UNTIL THE PACKAGE REACHES THE ENERGY-ONIX PREMISES. FOR THIS REASON, WE SUGGEST YOU INSURE THE GOODS FOR THE WHOLE VALUE. SHIPMENT MUST BE EFFECTED C.I.F. (PREPAID) TO THE ADDRESS SPECIFIED BY ENERGY-ONIX'S SERVICE MANAGER ON THE AUTHORIZATION.

DO NOT RETURN UNITS WITHOUT AUTHORIZATION AS THEY WILL BE REFUSED.

BE SURE TO ENCLOSE A WRITTEN TECHNICAL REPORT WHICH MENTIONS ALL THE PROBLEMS FOUND AND A COPY OF YOUR ORIGINAL INVOICE ESTABLISHING THE STARTING DATE OF THE WARRANTY.

REPLACEMENT AND WARRANTY PARTS MAY BE ORDERED BY CALLING OR FAXING THE FACTORY. BE SURE TO HAVE THE EQUIPMENT MODEL AND SERIAL NUMBER AS WELL AS PART DESCRIPTION AND PART NUMBER ON ALL PART ORDERS.

ENERGY-ONIX RESERVES THE RIGHT TO MODIFY THE DESIGN AND SPECIFICATIONS OF THE EQUIPMENT IN THIS MANUAL WITHOUT PREVIOUS NOTICE.

**TECHNICAL SUPPORT**

ENERGY-ONIX'S TECHNICAL STAFF IS AVAILABLE TO PROVIDE TECHNICAL CONSULTATION 24 HOURS A DAY TO TRAINED COMPETENT ENGINEERING PERSONNEL. MONDAY - FRIDAY, 8:00 AM TO 5:00 PM EST CALL THE FACTORY AT 518-758-1690. AFTER HOURS CALL OUR BEEPER AT 518-484-3965.

**WARNING!**

THE CURRENTS AND VOLTAGES IN THIS EQUIPMENT ARE DANGEROUS!  
PERSONNEL MUST AT ALL TIMES OBSERVE SAFETY REGULATION!

THIS MANUAL IS INTENDED AS A GENERAL GUIDE FOR TRAINED AND QUALIFIED PERSONNEL WHO ARE AWARE OF THE DANGERS INHERENT IN HANDLING POTENTIALLY HAZARDOUS ELECTRICAL AND ELECTRONIC CIRCUITS.

IT IS NOT INTENDED TO CONTAIN A COMPLETE STATEMENT OF ALL SAFETY PRECAUTIONS WHICH SHOULD BE OBSERVED BY PERSONNEL IN USING THIS OR OTHER ELECTRONIC EQUIPMENT.

THE INSTALLATION , OPERATION, MAINTENANCE AND SERVICE OF THIS EQUIPMENT INVOLVES RISKS BOTH TO PERSONNEL AND EQUIPMENT, AND MUST BE PERFORMED ONLY BY QUALIFIED PERSONNEL EXERCISING DUE CARE.

ENERGY-ONIX SHALL NOT BE RESPONSIBLE FOR INJURY OR DAMAGE RESULTING FROM IMPROPER PROCEDURES OR FROM THE USE OF IMPROPERLY TRAINED OR INEXPERIENCED PERSONNEL PERFORMING SUCH TASKS.

DURING INSTALLATION AND OPERATION OF THIS EQUIPMENT, LOCAL BUILDING CODES AND FIRE PROTECTION STANDARDS MUST BE OBSERVED.

**WARNING!**

ALWAYS DISCONNECT POWER BEFORE OPENING COVERS,  
DOORS, ENCLOSURES, GATES, PANELS OR SHIELDS.  
ALWAYS USE GROUNDING STICKS AND SHORT OUR HIGH  
VOLTAGE POINTS BEFORE SERVICING. NEVER MAKE  
INTERNAL ADJUSTMENTS, PERFORM MAINTENANCE OR  
SERVICE WHEN ALONE OR WHEN FATIGUED.

DO NOT REMOVE, SHORT-CIRCUIT OR TAMPER WITH INTERLOCK SWITCHES ON ACCESS COVERS, DOORS, ENCLOSURES, GATES, PANELS OR SHIELDS.

KEEP AWAY FROM LIVE CIRCUITS, KNOW YOUR EQUIPMENT AND DON'T TAKE CHANCES.

**WARNING!**

IN CASE OF EMERGENCY ENSURE THAT POWER HAS BEEN DISCONNECTED.

- (1) IN THE EVENT OF MEDICAL EMERGENCY, SUCH AS ELECTROCUTION, CALL EMERGENCY MEDICAL PERSONNEL.
- (2) TO OBTAIN INFORMATION AND TRAINING ON FIRST AID AND CPR, CONTACT YOUR LOCAL RED CROSS CHAPTER.



## CHAPTER 1

### GENERAL DESCRIPTION

#### 1.1 MECHANICAL DESCRIPTION

THE ENERGY-ONIX STL-1 TRANSMITTER IS HOUSED IN A 2U, 19" RACK-MOUNTING CHASSIS COMPRISING A NUMBER OF INTERCONNECTED MODULES MOUNTED INTERNALLY ON THE BASE OF THE UNIT. THIS ALLOWS EASY REMOVAL AND REPLACEMENT OF EACH MODULE. THE POWER OUTPUT CONTROL, AUDIO LEVEL CONTROL AND METERS FOR VARIOUS OPERATING PARAMETERS ARE SITUATED ON THE FRONT PANEL. MAINS POWER AND R.F. OUTPUT CONNECTORS ARE MOUNTED ON THE REAR PANEL.

#### 1.2 ELECTRICAL DESCRIPTION

THE STL-1 IS A HIGH QUALITY, BROADBAND, FM TRANSMITTER WITH A STANDARD OUTPUT POWER OF 2W.

SPECIAL NARROW BAND VERSIONS ARE AVAILABLE WITH OUTPUTS OF 5W AND 10W. THE TRANSMITTER IS MICROPROCESSOR-CONTROLLED AND SYNTHESIZED WITH STEPS OF 10 KHZ IN THE 200-1100 MHz BAND.

THE OPERATING FREQUENCY IS GOVERNED BY A THERMALLY COMPENSATED REFERENCE OSCILLATOR WORKING WITHIN A PHASE LOCKED LOOP (PLL).

THE TRANSMITTER WILL ATTAIN FREQUENCY LOCK WITHIN A MAXIMUM OF 30 SECONDS. THE OPERATING BAND IS 15-25 MHz DEPENDING UPON THE APPLICATION. THE FINAL STAGE IS FULLY PROTECTED AGAINST ANY LEVEL OF VSWR. FURTHERMORE, A 15 KHZ LOW-PASS FILTER IS PROVIDED WHICH MAY BE INSERTED IN THE MONO OR MPX INPUT.

#### 1.3 METERS AND INDICATORS

THE TRANSMITTER'S OPERATING PARAMETERS CAN BE MEASURED WITH THE ANALOG MULTIMETERS (# 15 FIG. 1) AND THE LED BAR-GRAPH DISPLAY (# 19 FIG. 1) SITUATED ON THE FRONT PANEL. THE MEASUREMENT BEING MADE BY THE ANALOG MULTIMETER IS INDICATED BY A LED INDICATOR (# 11 FIG. 1) AND SELECTABLE VIA THE CORRESPONDING CONTROL (#10 FIG. 1).

PEAK DEVIATION CAN BE MEASURED WITH THE BAR-GRAPH DISPLAY WITH A RESOLUTION OF 5%.

THE FIVE-FIGURE DISPLAY (# 20 FIG. 1), MOUNTED CENTRALLY, INDICATES THE OPERATING FREQUENCY SELECTED BY THE UP (# 9 FIG. 1) AND "DOWN" (# 7 FIG. 1) CONTROLS AND SAVABLE WITH THE "ENTER" (# 8 FIG. 1) CONTROL. THREE ALARM CONDITION LEDS PROVIDE INDICATION OF VCO UNLOCKED (# 14 FIG. 1), EXCESS STANDING WAVES ON THE OUTPUT (#12 FIG. 1) AND INTERVENTION BY A REMOTE COMPUTER (# 13 FIG. 1).

#### 1.4 REMOTE CONTROL (OPTIONAL)

IN THIS EQUIPMENT, AN OPTIONAL SERIAL PORT (# 9 PIN D-TYPE) IS AVAILABLE ALLOWING REMOTE CONTROL OF OPERATING FREQUENCY AND OUTPUT POWER.

#### 1.5 SPECIFICATIONS

PLEASE REFER TO TABLE A FOR THE ELECTRICAL SPECIFICATIONS AND TABLE B FOR THE MECHANICAL SPECIFICATIONS.

TABLE A  
ELECTRICAL SPECIFICATIONS

A.C. POWER	117 OR 230V ( 10% 50-60 Hz, SINGLE PHASE 47W
COOLING	FORCED VENTILATION
OPERATING FREQUENCY	FROM 200 TO 1100 MHz IN 15-25 MHz BANDS (BY REQUEST)
OUTPUT POWER	FROM 0.2W TO 2W (UP TO 5W OR 10W BY REQUEST)
OUTPUT IMPEDANCE	50(
R.F. OUTPUT CONNECTOR	N-TYPE
HARMONIC SUPPRESSION	BETTER THAN 55dB COMPLYING WITH FCC AND CCIR REGS
PRE-EMPHASIS	75 MICROSECONDS FOR FCC 50 MICROSECONDS FOR CCIR
AUDIO INPUT IMPEDANCE, MONO	600( UNBALANCED
AUDIO INPUT LEVEL	-10 dB NOMINAL FOR ( 75 KHz AT 400Hz, ADJUSTABLE
AUDIO FREQUENCY RESPONSE	( 0.5 dB FORM 30 Hz TO 15 KHz
FM S/N RATIO, MONO	BETTER THAN -70 dB, ( 75 KHz DEVIATION AT 400 Hz MEASURED IN THE 30 Hz TO 20 KHz BAND BY RMS DETECTOR
TOTAL HARMONIC DISTORTION, MONO	< 0.5%
MPX INPUT IMPEDANCE	10 KOHM, 1 UNBALANCED BNC
TOTAL HARMONIC DISTORTION, MPX	< 0.2%
S/N RATIO, FM STEREO	BETTER THAN -70 dB, ( 75KHz DEVIATION AT 400 Hz, RIGHT AND LEFT CHANNELS DECODED AND DE- EMPHASIZED
MPX AMPLITUDE RESPONSE	( 0.5 dB FROM 30 Hz TO 100 KHz
STEREO SEPARATION	GREATER THAN 45 dB

STL-1 STUDIO TRANSMITTER LINK

OPTIONAL INPUTS FOR 0 dBm AUDIO LEVEL:

SCA INPUT IMPEDANCE	10 KOHM, 3 UNBALANCED BNCs
SCA INPUT LEVEL	0 dBm NOMINAL FOR ( 7.5 KHz
SCA AMPLITUDE RESPONSE	( 0.5 dB FROM 40 KHz TO 100 KHz

TABLE B

MECHANICAL SPECIFICATIONS

CHASSIS DIMENSIONS	82 mm (3.22") H 326 mm (12.83") D 445 mm (17.51") W
PANEL DIMENSIONS	483 mm (19") W 88 mm (3.47") H
AMBIENT OPERATING TEMP.	FROM -10(C TO +50(C
HUMIDITY	90% MAXIMUM, NON-CONDENSING
WEIGHT	22 LBS (10KG)

## CHAPTER 2

### ELECTRICAL DESCRIPTION

#### **2.1 INTRODUCTION**

THIS SECTION DESCRIBES, IN DETAIL, THE OPERATING THEORY OF THE STL-1 TRANSMITTER. TO AID UNDERSTANDING, THE UNIT HAS BEEN SUBDIVIDED INTO BLOCKS, EACH OF WHICH IS FULLY DESCRIBED BELOW. A BLOCK DIAGRAM IS SHOWN IN FIG. 3.

#### **2.2 POWER SUPPLY**

THIS SUB-ASSEMBLY COMPRISES 2 BOARDS MOUNTED ON HEAT-SINKS, IN TURN MOUNTED AT RIGHT-ANGLES TO EACH OTHER ON THE CHASSIS BASE (# 5 PHOTO 1). THE POWER SUPPLY GENERATES THE STABILIZED VOLTAGES REQUIRED BY THE VARIOUS MODULES COMPRISING THE STL-1. AFTER HAVING UNDERGONE FILTERING FOR MAINS-BORNE INTERFERENCE, THE SUPPLY IS TRANSFORMED TO LOWER VOLTAGES, RECTIFIED, SMOOTHED AND STABILIZED FOR THE FOLLOWING OUTPUTS: +5V, +12V, +15V, -15V, AND 2-18V VARIABLE. THE +5V OUTPUT SUPPLIES THE CPU CARD, THE (15V OUTPUTS SUPPLY THE MAIN CARD, THE CPU CARD, THE MODMETER CARD AND THE ANAMETER CARDS 1 AND 2; THE +12V OUTPUT SUPPLIES THE R.F. DRIVER MODULE AND THE VARIABLE 2-18V OUTPUT SUPPLIES THE FINAL POWER STAGE OF THE TRANSMITTER. THE VOLTAGE APPLIED TO THE FINAL STAGE IS VARIED BY THE PWR ADJ CONTROL. AN AUTOMATIC OUTPUT POWER LIMITING SYSTEM INTERVENES IN THE CASE OF EXCESS S.W.R. ON THE R.F. OUTPUT. ALL SUPPLY VOLTAGES AND THE CURRENT DRAWN BY THE FINAL STAGE MAY BE MONITORED BY THE ANALOG MULTIMETER.

#### **2.3 MAIN CARD**

THE MAIN CARD IS SITUATED ON THE LOWER LEFT SIDE OF THE UNIT (# 7 PHOTO 1).

THIS CARD CONTAINS A VOLTAGE-CONTROLLED OSCILLATOR (VCO), HOUSED IN A METAL BOX, WHICH GENERATES THE OPERATING FREQUENCY OF THE TRANSMITTER WHICH HAS BEEN PROGRAMMED. THE AUDIO SIGNAL, COMING FROM THE TWO "MONO" AND "STEREO" CONNECTORS ON THE FRONT PANEL, IS AMPLIFIED AND INJECTED INTO THE VCO TO PRODUCE A CLASS F3E MODULATION. ON THE PLL CIRCUIT THE VCO OPERATING FREQUENCY IS DIVIDED DOWN AND COMPARED TO A REFERENCE FREQUENCY, GENERATED BY A 4 MHz QUARTZ CRYSTAL WHICH IS THERMALLY-COMPENSATED BY A PTC. THE ERROR VOLTAGE IS FILTERED AND FED-BACK TO GUARANTEE THE STABILITY OF THE VCO FREQUENCY. AN INDICATOR ON THE FRONT PANEL LIGHTS WHEN THE CIRCUIT IS NOT LOCKED.

#### **2.4 R.F. POWER AMPLIFIER**

THE POWER STAGE IS MOUNTED ON A HEAT SINK TO DISSIPATE GENERATED HEAT, AND TOTALLY ENCLOSED IN A METAL SCREENING BOX (# 6 PHOTO 1). THIS SUB-ASSEMBLY IS MOUNTED TO THE BASE OF THE CHASSIS IN A CENTRAL POSITION. THE R.F. SIGNAL COMING FROM THE VCO, AT A POWER LEVEL OF ABOUT 10mW, PASSES THROUGH THE DRIVER STAGE (BFR96) AND IS AMPLIFIED BY THE FINAL STAGE (BFQ34 AND BFQ68) UP TO A LEVEL OF 2 W (VERSIONS ARE AVAILABLE WITH 5 W AND 10 W POWER OUTPUTS). THE SIGNAL THEN PASSES THROUGH A LOW-PASS FILTER TO REMOVE ANY HARMONIC COMPONENTS. A DIRECTIONAL COUPLER ALLOWS BOTH DIRECT AND REFLECTED POWER TO BE MEASURED AND FED-BACK TO THE POWER SUPPLY. THE DIRECT POWER READING IS ALSO CONNECTED TO THE MULTIMETER.

## 2.5 CPU

THE CPU IS HOUSED IN A METAL BOX MOUNTED CENTRALLY ON THE REAR OF THE FRONT PANEL (# 2 PHOTO 1). THIS CIRCUIT CONVERTS THE NUMBER CORRESPONDING TO THE SELECTED OPERATING FREQUENCY INTO BINARY CODE WHICH IS WRITTEN TO THE PROGRAMMABLE DIVIDERS OF THE PLL. THIS ALLOWS THE VCO TO LOCK TO THE DESIRED OPERATING FREQUENCY. SEVERAL OF THE TRANSMITTER'S PARAMETERS MAY BE REMOTELY CONTROLLED VIA AN OPTIONAL 9 PIN D-TYPE SERIAL PORT. IN THE ABSENCE OF MAINS POWER, A NON-VOLATILE MEMORY MAINTAINS INDEFINITELY, THE LAST FREQUENCY THAT WAS PROGRAMMED.

## 2.6 MODMETER

THIS CARD IS MOUNTED ON THE LEFT SIDE OF THE FRONT PANEL (# 1 PHOTO 1). THIS CIRCUIT ALLOWS THE DEVIATION OF THE VCO FREQUENCY TO BE DISPLAYED BY RECTIFYING THE SIGNAL SUPPLIED TO THE MAIN CARD. THE CARD HAS TWO CONNECTORS; ONE FOR THE MONO SIGNAL AND THE OTHER FOR THE STEREO SIGNAL. A SWITCH ALLOWS THE GAIN OF THE MEASURING CIRCUIT TO BE SET TO 10% OR 100% FOR A MORE PRECISE READING OF LOW-LEVEL DEVIATION (IE. SCA, RDS, MPX PILOT TONE). ANOTHER SWITCH SETS THE DISPLAY MODE TO BAR-GRAPH OR PEAK MODE. THE DISPLAY COMPRISES 14 GREEN LEDS AND 6 RED LEDS. IN THE 100% DISPLAY MODE, EACH LED REPRESENTS 5 KHz OF DEVIATION WITH THE FIRST RED LED REPRESENTING 75 KHz AND FSD AT 100 KHz. IN THE 10% MODE, EACH LED REPRESENTS 0.5 KHz OF DEVIATION.

## 2.7 ANAMETER

THIS CIRCUIT COMPRISES TWO CARDS AND A METER MOUNTED ON THE RIGHT HAND SIDE OF THE FRONT PANEL (# 3 PHOTO 1). THIS SUB-ASSEMBLY DISPLAYS THE VALUES OF VARIOUS OPERATING PARAMETERS OF THE EXCITER: INTERNAL VOLTAGES AND CURRENTS, DIRECT POWER AND EXTERNAL 24V. THE PARAMETERS ARE SELECTED BY A LEVER SWITCH (#10 FIG. 1) AND THE SELECTION IS INDICATED BY THE LEGEND OF THE GREEN LED (#11 FIG. 1). THE READINGS ARE TAKEN USING THE CORRESPONDING SCALE:

<u>MEASUREMENT</u>	<u>SCALE</u>	<u>FSD</u>
INTERNAL VOLTAGES	V	30 V
INTERNAL CURRENTS	A	6 A
DIRECT POWER	W	10 W (5/10W VERSION)
REFLECTED POWER	W	2.5 W (2W VERSION)

THIS CIRCUIT ALSO FEATURES A RED "UNLOCK" LED (# 14 FIG. 1) AND A RED "REMOTE" LED (#13 FIG. 1), CONTROLLED BY THE MAIN CARD AND A RED SWR LED (# 12 FIG. 1), CONTROLLED BY THE POWER SUPPLY. IN ADDITION, THERE ARE: A RED POWER LED (# 16 FIG. 1), A POWER OUTPUT PWR TRMMER (# 21 FIG. 1) AND THE MAINS SUPPLY SWITCH (# 17 FIG. 1).

FRONT PANEL DESCRIPTION (FIG. 1)

5	10% - 100%	EXPANSION OF MODULATION METER SCALE POS. 10% - FULL SCALE SHOWS 10% POS. 100% - FULL SCALE SHOWS 100%
6	ON/OFF LPF/15KHz	ON/OFF LOW PASS FILTER SELECTOR
7	DOWN	CONTROL FREQUENCY DISPLAY. A MOMENTARY PUSH CAUSES THE DIGIT TO GO DOWN 10 KHz A TIME
8	ENTER	ENTERS THE FREQUENCY ON THE DISPLAY INTO MICROPROCESSOR AND MEMORY. ONCE ENTERED, THE FREQUENCY IS STORED UNTIL A NEW FREQUENCY IS ENTERED ON THE FRONT PANEL EVEN IF THE POWER IS TURNED OFF FOR SEVERAL DAYS
9	UP	CONTROLS THE DISPLAY FREQUENCY IN THE SAME WAY AS THE "DOWN" BUTTON, EXCEPT THAT THE FREQUENCY GOES UP IN 10 KHz STEPS
10	METER SWITCH	PUSHING THE SWITCH EACH TIME WILL LIGHT ON LED AT A TIME IN UPWARD DIRECTION
11	LEDS	LIGHT INDICATOR INDICATED WHICH PARAMETER OF THE EXCITER IS BEING DISPLAYED ON THE ANALOG METER
12	SWR ALARM	IF THIS INDICATOR LIGHTS, IT MEANS THAT THE EXCITER SHUT DOWN TO A HIGH VSWR CONDITION ON THE OUTPUT
13	REMOTE	THIS INDICATOR SHOWS IF THE TRANSMITTER IS CONTROLLED BY A REMOTE COMPUTER
14	UNLOCK	THIS INDICATOR WILL LIGHT WHEN THE VCO IS NOT LOCKED TO THE REFERENCE FREQUENCY. POWER OUTPUT WILL ALSO DECREASE TO ZERO IN THIS CONDITION
15	METER	ANALOG METER USED TO MONITOR THE PARAMETERS OF THE EXCITER SUCH AS: + 15V + 12V + 5V FORWARD POWER EXT 24V

FRONT PANEL DESCRIPTION (FIG. 1) (CONTINUED)

		VPA IPA AFC
16	ON	A.C. POWER "ON" INDICATOR
17	POWER	ON/OFF POWER SWITCH
18	BAR/DOT	SELECTOR OF OPERATION MODE (BAR/DOT) FOR DEVIATION METER
19	MODULATION	MODULATION METER BY "LED DIODE BAR"
20	FREQUENCY DISPLAY	FREQUENCY INDICATOR
21	PWR ADJ	A TEN TURN CONTROL WHICH CONTROLS THE POWER OUTPUT OF THE EXCITER. ONCE SET THE POWER REMAINS AT THAT LEVEL DUE TO AGC ACTION



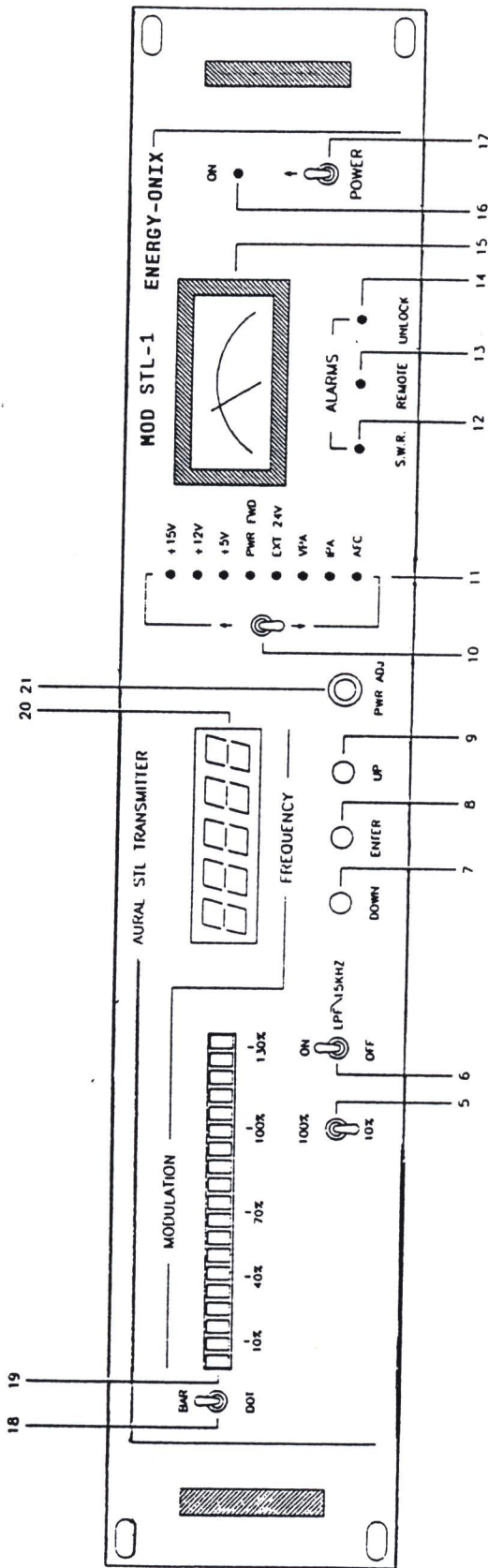


FIG. 1



REAR PANEL VIEW (FIG. 2)

1	PLUG	A.C. POWER PLUG
2	FUSE	FUSE BLOCK & VOLTAGE SETTING. USE A SMALL SCREWDRIVER TO CHANGE FUSE OR VOLTAGE SETTING. TURN BLOCK AND PLACE DESIRED OPERATING VOLTAGE NEXT TO ARROW.
3	REMOTE CONTROL (OPTIONAL)	<p>dB9 COMMUNICATION LINE TO CONTROL OR RECEIVE STATUS OF THE TRANSMITTER. BAUD RATE IS 1200 BAUD. ON REQUEST, IT MAY BE CHANGED TO 300, 600 OR 2400 BAUD. A PROGRAM IS AVAILABLE ON 5 1/4" OR 3 1/2" DISK FOR IBM ( OR COMPATIBLE. PLUG IS A STANDARD dB9 FEMALE.</p> <p>PIN 1 NOT CONNECTED PIN 2 TXD PIN 3 RXD PIN 4 DSR * PIN 5 GND PIN 6 DTR * PIN 7 CTS \$ PIN 8 RTS \$ PIN 9 NOT CONNECTED</p> <p>* DSR AND DTR ARE CONNECTED TOGETHER \$ CTS AND RTS ARE CONNECTED TOGETHER</p>
4	EXT 24V (+)	POSITIVE TERMINAL FOR EXT 24V (OPTIONAL)
5	EXT 24V (-)	NEGATIVE TERMINAL FOR EXT 24V (OPTIONAL)
6	FAN	COOLING FAN
7	R.F. TEST -30dB	R.F. TEST POINT CONNECTOR -30dB
8	U.S.A. AUDIO INPUT	U.S.A AUDIO INPUTS AND TELEMETRY (OPTIONAL)
9	EXT. REF. IN	EXTERNAL REFERENCE INPUT (NOT USED)
10	INTERLOCK	BNC CONNECTOR WHICH PERMITS THE EXCITER TO BE PUT IN STAND-BY
11	R.F. OUTPUT	50 (, "N" CONNECTOR

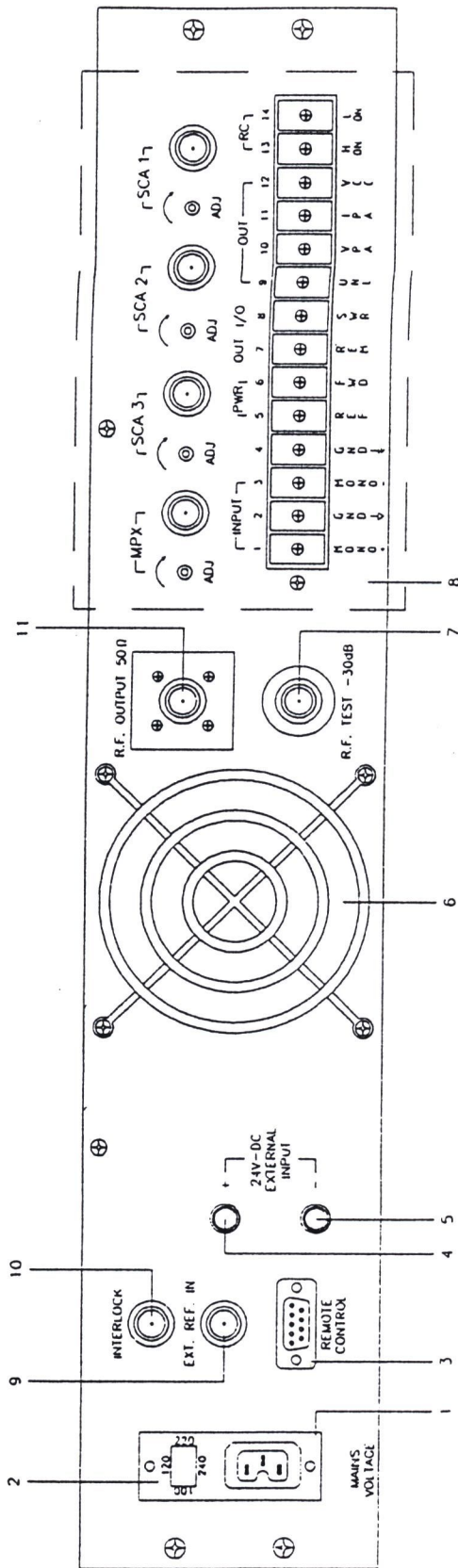


FIG. 2

TOP VIEW DESCRIPTION (PHOTO 1)

- |   |       |                      |
|---|-------|----------------------|
| 1 | ..... | MODMETER CARD        |
| 2 | ..... | C.P.U.               |
| 3 | ..... | ANAMETER CARD        |
| 4 | ..... | TRANSFORMER          |
| 5 | ..... | POWER SUPPLY         |
| 6 | ..... | R.F. POWER AMPLIFIER |
| 7 | ..... | MAIN CARD            |
| 8 | ..... | V.C.O.               |

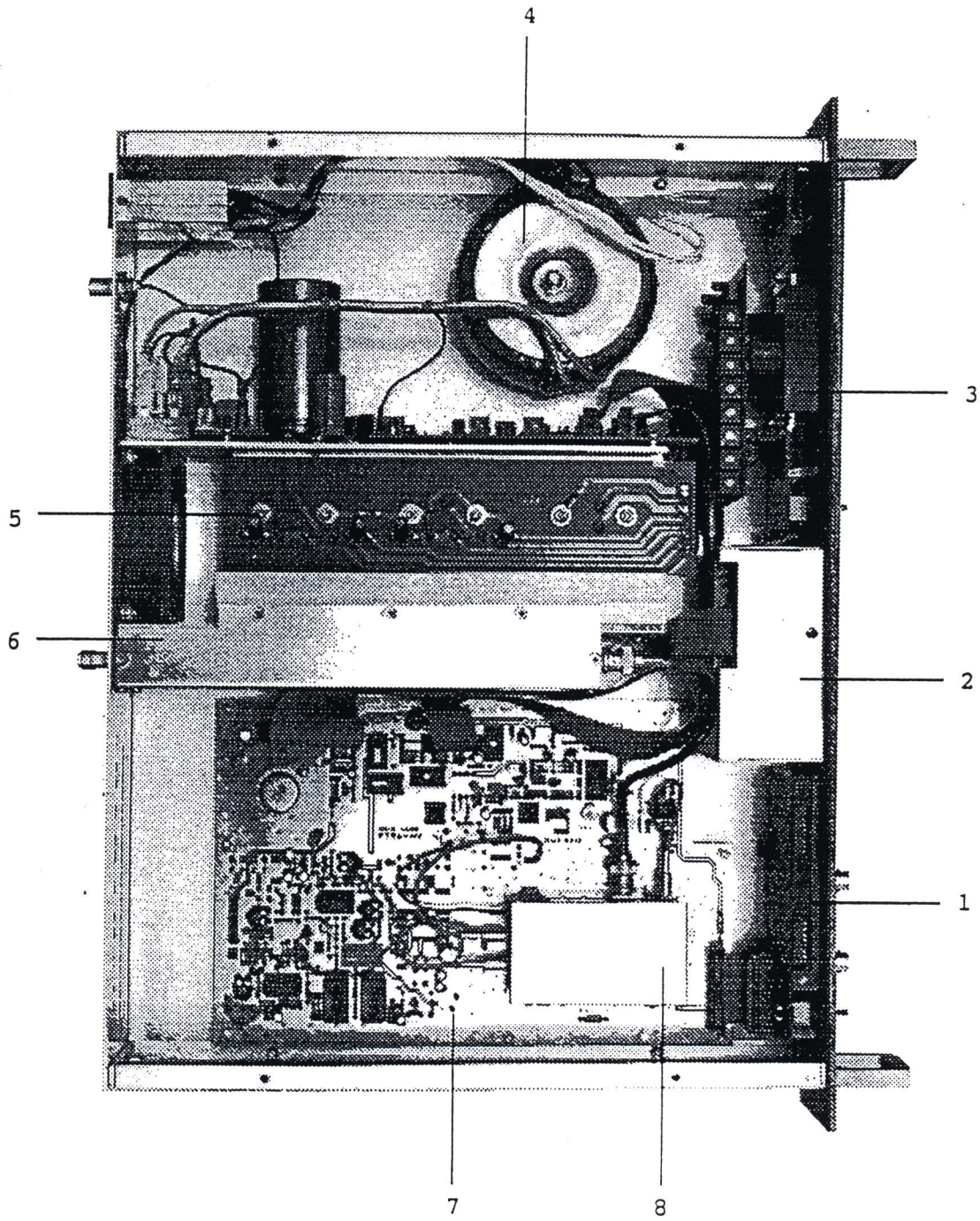


PHOTO 1

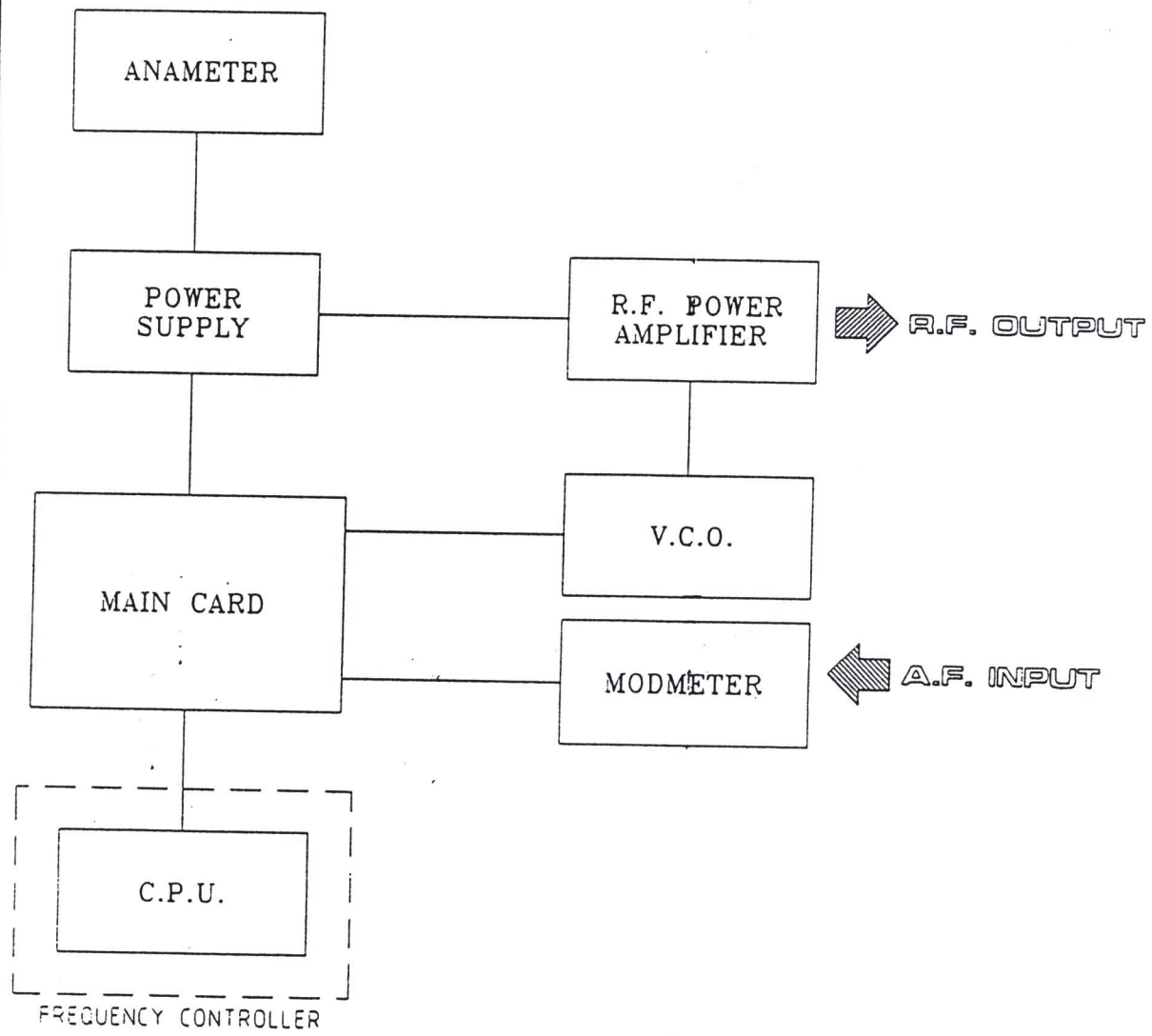


FIG. 3

CHAPTER 3

INSTALLATION

**3.1 INTRODUCTION**

THIS CHAPTER CONTAINS THE INFORMATION REQUIRED TO INSTALL THE STL-1 AND CARRY OUT PRELIMINARY CHECKS.

**3.2 UNPACKING**

REMOVE THE UNIT FROM ITS PACKING AND, BEFORE ANYTHING ELSE, ENSURE THAT THE UNIT HAS NOT SUFFERED ANY DAMAGE DURING TRANSIT AND THAT ALL FRONT REAR PANEL CONTROLS ARE OPERATIONAL.

**3.3 INSTALLATION**

- 1) ENSURE THAT THE CORRECT AC SUPPLY VOLTAGE HAS BEEN SELECTED ON THE REAR PANEL SELECTOR. IF THE VOLTAGE SELECTED IS NOT CORRECT, SELECT THE CORRECT SUPPLY VOLTAGE USING THE SELECTOR SITUATED ON THE REAR PANEL; USE A SCREWDRIVER TO RAISE THE COVER (# 2 FIG. 2) ON WHICH ARE WRITTEN THE VARIOUS VOLTAGES, ROTATE IT UNTIL THE ARROW POINTS TO THE CORRECT VOLTAGE AND RE-INSERT IT. CHECK THAT A FUSE IS FITTED TO THE COVER AND THAT ITS VALUE CORRESPONDS TO THE FOLLOWING:

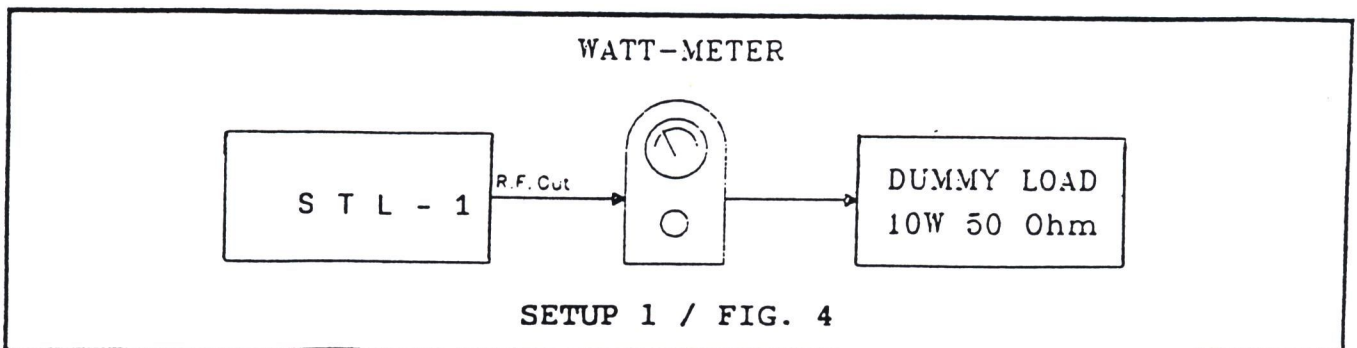
220 - 240 V    2A  
100 - 120 V    3.1A

- 2) NOW ENSURE THAT THE PWR ADJ CONTROL (# 21 FIG. 1) IS ROTATED FULLY COUNTER-CLOCKWISE FOR MINIMUM POWER USING A SMALL SCREWDRIVER. SINCE THE CONTROL IS A TEN-TURN POTENTIOMETER, IT MAY BE NECESSARY TO DOUBLE-CHECK THE ADJUSTMENT.

UNITS ARE NORMALLY SUPPLIED WITH THIS CONTROL SET TO MAXIMUM.

- 3) CONNECT A DUMMY LOAD WITH A CONTINUOUS POWER RATING OF AT LEAST 10W AT THE UNIT'S REQUIRED OPERATING FREQUENCY, TO THE R.F. OUTPUT CONNECTOR SITUATED ON THE REAR PANEL.

A BYPASS WATTMETER SHOULD BE CONNECTED IN SERIES WITH THIS LOAD IN ORDER TO VERIFY THE READING OF THE UNIT'S OWN INTERNAL WATTMETER (SHOW SETUP 1/FIG. 4).



## STL-1 STUDIO TRANSMITTER LINK

- 4) CONNECT A SWITCH, VIA A CABLE, TO THE "REMOTE" CONNECTOR (# 10 FIG. 2) ON THE REAR PANEL SO THAT THE SWITCH IS ABLE TO SHORT THE CENTRAL CONDUCTOR TO ITS SCREEN AND LEAVE THE SWITCH IN THE SHORT-CIRCUIT POSITION.
- 5) SWITCH THE POWER SWITCH (# 17 FIG. 1) TO THE "OFF" POSITION.
- 6) CONNECT POWER TO THE UNIT VIA THE VDE SOCKET (# 1 FIG. 2).

N.B. IT IS ESSENTIAL THAT THE UNIT BE PROPERLY GROUNDED TO ENSURE 7) SWITCH THE POWER SWITCH TO THE "ON" POSITION AND CHECK THAT THE GREEN "POWER ON" LED (# 16 FIG. 1), THE RED "UNLOCK" LED (# 14 FIG. 1) AND THE LED CORRESPONDING TO THE PARAMETER SELECTION PWR FWD (# 11 FIG. 1), ARE ALL LIT. AFTER A FEW SECONDS THE CENTRAL DISPLAY (# 20 FIG. 1) WILL COME ON AND DISPLAY A NUMBER (IE. 760.00) CORRESPONDING TO THE LAST OPERATING FREQUENCY TO HAVE BEEN PROGRAMMED.

THE RED "UNLOCK" LED SHOULD SWITCH OFF WITHIN 30 SECONDS INDICATING THAT THE OSCILLATOR HAS LOCKED TO THE OPERATING FREQUENCY DISPLAYED. THE DISPLAY HAS FIVE DIGITS, 3 BEFORE THE DECIMAL POINT REPRESENTING (FROM LEFT TO RIGHT) HUNDREDS OF MHz, TENS OF MHz AND MHz; AND 2 AFTER THE DECIMAL POINT REPRESENTING HUNDREDS AND TENS OF KHz. TO CHANGE THIS NUMBER, USE THE "UP" (# 9 FIG. 1) AND "DOWN" (# 7 FIG. 1) BUTTONS TO RESPECTIVELY INCREASE IT AND DECREASE IT.

ONCE THE DESIRED FREQUENCY HAS BEEN FOUND, PRESS "ENTER" (# 8 FIG. 1) TO CONFIRM AND SAME IT.

AS SOON AS THE "ENTER" BUTTON HAS BEEN PRESSED, THE UNLOCK LED WILL COME ON (PROVIDING THAT THE NEW FREQUENCY IS DIFFERENT FROM THE OLD), INDICATING THAT THE VCO IS RE-TUNING TO THE NEW FREQUENCY.

IF THE "ENTER" IS NOT PUSHED, THE DISPLAY WILL FLASH THE NEW VALUE FOUR TIMES AND THEN RESET TO THE PREVIOUS VALUE.

NOTE: THE TRANSMITTER WILL CONTINUE TO FUNCTION NORMALLY AT THE SAME FREQUENCY, THROUGHOUT THE PROCEDURE DESCRIBED ABOVE, UNTIL THE "ENTER" BUTTON IS PRESSED.

NOTE THAT A MOMENTARY PRESS OF THE "UP" AND "DOWN" BUTTONS WILL INCREMENT OR DECREMENT THE RIGHT MOST DIGIT BY 1 (CORRESPONDING TO A FREQUENCY CHANGE OF 10 KHz).

A LONGER PRESS OF EITHER BUTTON WILL CAUSE THE DISPLAY TO INCREMENT OR DECREMENT CONTINUOUSLY UNTIL THE BUTTON IS RELEASED.

FURTHERMORE, WHEN THE LIMIT OF THE OPERATING FREQUENCY BAND IS REACHED, THE DISPLAYED FREQUENCY WILL JUMP TO THE OTHER LIMIT AND CARRY ON CHANGING IN THE DIRECTION CORRESPONDING TO THE BUTTON BEING PUSHED.

NOTE: THE FREQUENCY BAND IS PRE-DEFINED BY THE USER AND RARELY EXCEEDS 25 MHz.



## STL-1 STUDIO TRANSMITTER LINK

EXAMPLE: BAND 840-860 MHz:

"UP" BUTTON PRESSED: 859.99 860.00 840.00 840.01

"DOWN" BUTTON PRESSED: 840.01 840.00 860.00 859.99

AFTER THE PLL HAS BEEN LOCKED FOR ABOUT 90 SECONDS, THE DISPLAY TURNS OFF AUTOMATICALLY.

TO SWITCH IT ON, PRESS THE "ENTER" BUTTON.

- 8) HAVING VERIFIED THAT THE TRANSMITTER HAS LOCKED ONTO THE DESIRED OPERATING FREQUENCY BY CHECKING THAT THE "UNLOCK" LED IS OFF, SET THE SWITCH SO AS TO REMOVE THE SHORT-CIRCUIT FROM BETWEEN THE TWO CONDUCTORS OF THE "REMOTE" CABLE.

THE R.F. POWER OUTPUT IS NOW ENABLED.

ADJUST THE POWER CONTROL PWR ADJ UNTIL MAXIMUM POWER IS REACHED. THIS WILL BE ABOUT 2W (5 OR 10W FOR SPECIAL VERSIONS).

TO MAKE THIS MEASUREMENT, ENSURE THAT THE PWR FWD LED IS ON BY SETTING THE METER SWITCH (# 10 FIG. 1) TO THE CORRESPONDING POSITION AND THEN TAKE THE READING FROM THE 10W FSD SCALE ON THE METER.

- 9) USING A SMALL SCREWDRIVER OR TRIMMER TOOL, ROTATE THE PWR ADJ CONTROL COUNTER-CLOCKWISE, CHECKING THAT THE OUTPUT POWER FALLS GRADUALLY TO A MINIMUM OF ABOUT 0,2W (1W FOR 5W VERSION AND 2W FOR THE 10W VERSION.) CHECK THE POWER READING AGAINST THAT OF THE BYPASS WATTMETER ((10%).
- 10) RE-ADJUST THE OUTPUT POWER TO 2W (OR MAXIMUM POWER IN THE CASE OF THE 5 OR 10W VERSIONS) AND SELECT A NEW OPERATING FREQUENCY AT LEAST 5MHz AWAY FROM THE CURRENT VALUE.

ON PRESSING "ENTER", THE "UNLOCK" LED SHOULD LIGHT AND THE OUTPUT POWER FALL TO ZERO.

THE POWER LEVEL SHOULD RETURN TO ITS PREVIOUS VALUE ONLY WHEN THE "UNLOCK " LED GOES OUT (OSCILLATOR LOCKED TO NEW FREQUENCY).

- 11) SWR PROTECTION CHECK.

DISCONNECT THE LOAD FROM THE R.F. OUTPUT AND CHECK THAT THE SWR LED COMES ON. THE DIRECT POWER READING ON THE UNIT'S MULTIMETER SHOULD BE ABOUT 50% OF MAXIMUM (-3dB).

CHECK THAT THE SWR LED DOES OUT AND THE POWER LEVEL RETURNS TO ITS PREVIOUS VALUE WHEN THE LOAD IS RECONNECTED.

- 12) NOW SHORT-CIRCUIT THE "REMOTE" INPUT AND THE POWER LEVEL SHOULD IMMEDIATELY FALL TO ZERO. REMOVING THE SHORT SHOULD RESULT IN THE POWER OUTPUT RETURNING GRADUALLY TO ITS PREVIOUS LEVEL.

- 13) DEVIATION METER CHECK.

SET THE MODULATION BAR-GRAPH DISPLAY GAIN (# 5 FIG. 1) TO 100%.

## STL-1 STUDIO TRANSMITTER LINK

CONNECT A LOW-DISTORTION AUDIO FREQUENCY GENERATOR TO THE "MONO" INPUT (# 2 FIG. 1) OR "STEREO" INPUT (# 4 FIG. 1).

INJECT A 400Hz TONE AT A LEVEL OF -10 dBm FOR THE EUROPEAN VERSION OR 0 dBm (775mV RMS = 2.2V PEAK TO PEAK) FOR THE AMERICAN VERSION.

CHECK THAT THE BAR-GRAPH DISPLAY (# 19 FIG. 1) LIGHTS UP TO THE FIRST RED LED, INDICATING 100% DEVIATION.

WITH THE DOT/BAR SWITCH (# 18 FIG. 1) IN THE "BAR" POSITION, ALL THE GREEN LEDS AND THE FIRST RED LED SHOULD BE ON; IN THE DOT POSITION ONLY THE FIRST RED LED WILL BE ON.

NOW DISCONNECT THE AUDIO GENERATOR AND ENSURE THAT ALL THE BAR-GRAPH LEDS GO OUT (# 19 FIG. 1).

SET THE CONTROL (# 5 FIG. 1) T 10% AND INJECT A 400 Hz TONE OF -30dBm (-20 dBm FOR THE AMERICAN VERSION) AND REPEAT THE PRECEDING OPERATION. THE PROCEDURE SHOULD BE FOLLOWED FIRST FOR THE "MONO" INPUT AND THEN FOR THE "STEREO" INPUT.

TABLE C  
RECOMMENDED TEST EQUIPMENT

INSTRUMENT	MODEL	SPECIFICATION
NON-INDUCTIVE DUMMY LOAD	BIRD	50 ( P > 10W
SPECTRUM ANALYZER	ADVANTEST	10 KHz - 3.5 GHz MOD. R4131D
F.M. MODULATION METER	R/S MOD. F.A.M.	
DIGITAL MULTIMETER	MOD. METRIX	
BYPASS WATTMETER	BIRD MOD. 43	50(
STEREO DECODER	A.E.V. MOD. SMD	STEREO SEPARATION > 60 dB 30Hz TO 15KHz
LOW DISTORTION A.F. GENERATOR	KROHN-HITE	THD < 0.001%
OSCILLOSCOPE	TEKTRONIX	DC-20MHz
R.F. GENERATOR	R/S MOD. SMG	100KHz 1GHz
AUDIO ANALYZER	PANASONIC MOD. 2247A	
30dB ATTENUATOR	H.P. MOD. 8498A	MAX AVG PWR 30W
VARIABLE ATTENUATOR	H.P. MOD. 8496B	ATTENUATOR 110dB MAX RF PWR 1W CW
VARIABLE ATTENUATOR	H.P. MOD. 8494B	ATTENUATOR 11dB MAX RF PWR 1W CW

CHAPTER 4

MAINTENANCE

**4.1 SAFETY REQUIREMENTS**

WARNING WARNING WARNING WARNING WARNING WARNING WARNING WARNING WARNING

WHEN THE TRANSMITTER IS OPERATIONAL, REMOVING THE TOP PANEL WILL EXPOSE LETHAL VOLTAGES ON THE LINE VOLTAGE SELECTOR.

ENSURE THAT THE UNIT IS DISCONNECTED FROM ALL SOURCES OF POWER BEFORE CARRYING OUT ANY INSPECTION OR MAINTENANCE WORK.

**MAINTENANCE LEVEL 1**

**4.2 ROUTINE MAINTENANCE**

THE ONLY ROUTINE MAINTENANCE REQUIRED BY THE TRANSMITTER IS THE PERIODIC REMOVAL OF ACCUMULATED DUST.

THE PERIOD BETWEEN SUCH ACTION WILL DEPEND ON AMBIENT OPERATING CONDITIONS SUCH AS TEMPERATURE, AIR-BORNE DUST LEVELS AND HUMIDITY.

IT IS ADVISABLE TO CHECK THE UNIT EVERY 6 MONTHS AND TO REPLACE NOISY OR WORN FANS.

**MAINTENANCE LEVEL 2**

**CARD REPLACEMENT**

NOTE: TO FIT A CARD, FOLLOW THE REMOVAL PROCEDURE IN REVERSE.

**4.3 MAIN CARD REPLACEMENT**

- 1) OPEN THE TOP COVER OF THE UNIT.
- 2) DISCONNECT CONNECTORS CN1, CN2, CN3, CN4, CN5, CN6, AND CN7.
- 3) UNDO THE NUTS HOLDING THE CARD IN PLACE.
- 4) REMOVE THE MAIN CARD WITH GREAT CARE.

**4.4 MODMETER CARD REPLACEMENT**

- 1) OPEN THE TOP COVER OF THE UNIT.
- 2) DISCONNECT THE CONNECTOR CN1 THAT CONNECTS THE MODMETER CARD TO THE MAIN CARD.
- 3) UNDO THE TWO FRONT PANEL FIXING SCREWS.

## **STL-1 STUDIO TRANSMITTER LINK**

- 4) UNDO THE MODMETER SWITCH NUTS, SITUATED ON THE FRONT PANEL.
- 5) UNDO THE "MONO" AND "STEREO" CONNECTOR FIXING NUTS ON THE FRONT PANEL.
- 6) SLIDE THE CARD OUT WITH GREAT CARE.

### **4.5 CPU REPLACEMENT**

- 1) OPEN THE TOP COVER OF THE UNIT.
- 2) UNDO THE FRONT PANEL FIXING SCREWS.
- 3) UNDO THE NUTS FIXING THE SWITCHES TO THE FRONT PANEL.
- 4) DISCONNECT CONNECTORS CN1 AND CN2 THAT CONNECT THE CPU TO THE MAIN CARD AND TO THE REAR PANEL RS232 CONNECTOR, RESPECTIVELY.
- 5) UNDO THE SCREWS FIXING THE METAL CONTAINER PROTECTING THE CPU, AND REMOVE IT.
- 6) REMOVE THE CARD WITH GREAT CARE.

### **4.6 ANAMETER CARD REPLACEMENT**

- 1) OPEN THE TOP COVER OF THE UNIT.
- 2) UNDO THE FRONT PANEL FIXING SCREWS AND THE "SWITCH SELECTOR" FIXING NUT.
- 3) DISCONNECT CONNECTOR CN1 CONNECTING THE ANAMETER CARD TO THE POWER SUPPLY AND CONNECTOR CN1 CONNECTING THE MODMETER CARD TO THE MAIN CARD.
- 4) DISCONNECT THE FASTON CONNECTORS CONNECTING THE POWER CABLES AND THE JUMPERS THAT CONNECT THE CARD TO THE POWER ADJUST CONNECTOR.
- 5) UNSCREW THE NUTS HOLDING THE CARD TO THE METER.
- 6) REMOVE THE CARD WITH GREAT CARE.

### **4.7 R.F. POWER AMPLIFIER REPLACEMENT**

- 1) OPEN THE TOP COVER OF THE UNIT.
- 2) DISCONNECT CN1 CONNECTOR OF THE R.F. POWER AMPLIFIER AND CN1 CONNECTOR OF THE CON-PA CARD.
- 3) UNSCREW THE SCREWS FIXING THE R.F. POWER AMPLIFIER TO THE BASE OF THE UNIT.
- 4) REMOVE THE R.F. POWER AMPLIFIER IN AN UPWARDS DIRECTION.

#### **4.8 POWER SUPPLY REPLACEMENT**

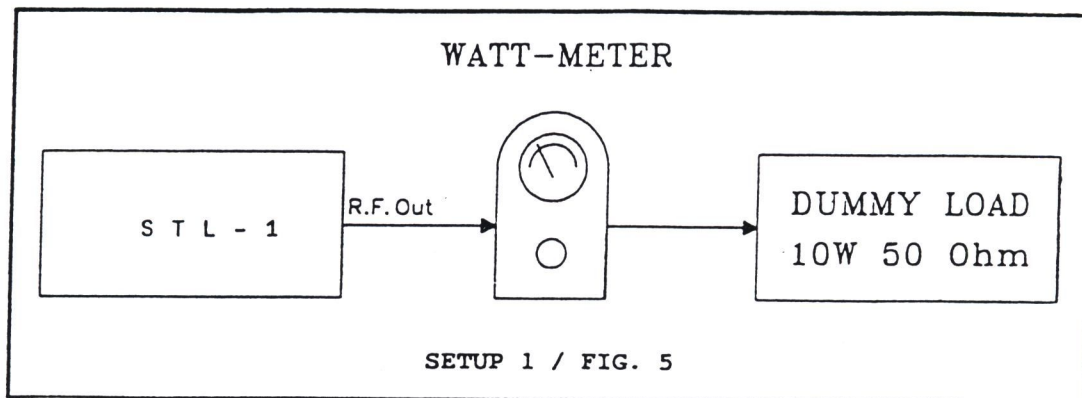
- 1) OPEN THE TOP COVER OF THE UNIT.
- 2) DISCONNECT CONNECTORS CN3 AND CN4.
- 3) UNSCREW THE SCREWS FIXING THE POWER SUPPLY TO THE BASE OF THE UNIT.
- 4) TAKE CAREFUL NOTE OF THE POSITION OF EACH CABLE WITH REFERENCE TO ITS COLOR.
- 5) DISCONNECT THE CONNECTOR CN2 ON THE MAIN CARD, THE CN7 CONNECTOR AND THE FASTON CONNECTORS CONNECTING THE TRANSFORMER TO THE BRIDGE RECTIFIER.
- 6) REMOVE THE POWER SUPPLY WITH GREAT CARE.

CHAPTER 5

CALIBRATION OF MODULES

**5.1 CALIBRATION OF THE R.F. POWER AMPLIFIER**

AFTER REPLACEMENT OF THE AMPLIFIER, THE FOLLOWING PROCEDURE SHOULD BE FOLLOWED "SETUP" 1 (FIG. 5):



- 1) CONNECT A BYPASS WATTMETER BETWEEN THE R.F. OUTPUT AND 50( DUMMY LOAD.
- 2) SWITCH ON THE TRANSMITTER AND WAIT FOR THE PLL TO LOCK AND THE POWER OUTPUT TO BE ENABLED.
- 3) TURN THE PWR ADJ TRIMMER (# 21 FIG. 1) CLOCKWISE UNTIL MAXIMUM OUTPUT POWER IS OBTAINED.
- 4) USE THE EXTERNAL WATTMETER TO ADJUST THE TRIMMER FOR A POWER OUTPUT OF 2W ( 5 OR 10W FOR OTHER VERSIONS).
- 5) SET THE METER SELECTOR (# 10 FIG. 1) TO FWD AND ADJUST R21 ON THE ANAMETER CARD FOR A READING OF 2W ON THE TRANSMITTER'S OWN METER (# 15 FIG. 1).
- 6) DISCONNECT THE DUMMY LOAD FROM THE EXCITER OUTPUT AND CHECK THAT THE POWER REDUCES AND THAT THE SWR LED (# 12 FIG. 1) SWITCHES ON.  
  
ADJUST R8 ON THE POWER SUPPLY CARD FOR A READING OF 50% OF MAXIMUM DIRECT POWER ON THE INTERNAL POWER METER.
- 7) RE-CONNECT THE DUMMY LOAD AND VERIFY THAT THE OUTPUT POWER RETURNS TO 2W.

**5.2 CALIBRATION OF THE POWER SUPPLY**

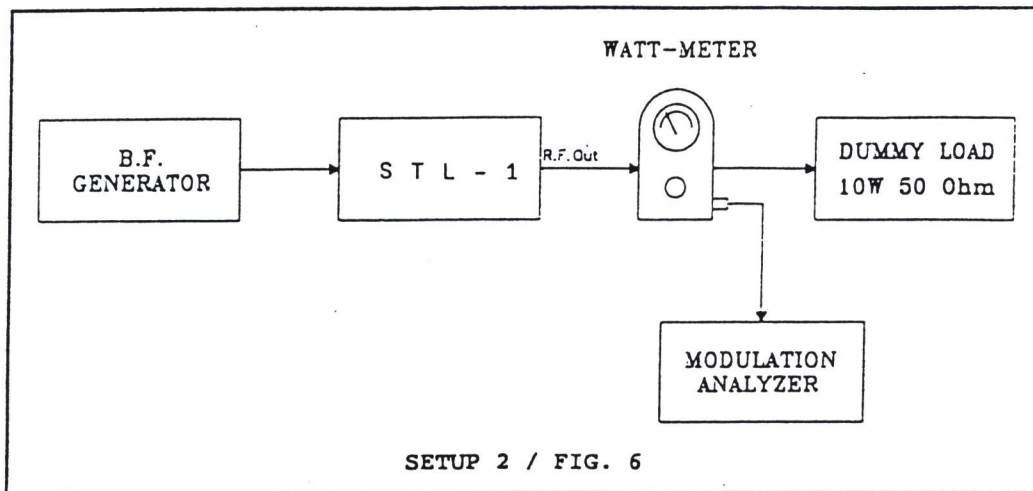
THE ONLY ADJUSTMENTS REQUIRED AFTER REPLACEMENT OF THE POWER SUPPLY ARE THOSE DETAILED IN 5.1 (CALIBRATION OF THE R.F. POWER AMPLIFIER).

## STL-1 STUDIO TRANSMITTER LINK

IT IS SUFFICIENT TO FOLLOW STEPS 1 TO 7 OF THIS PROCEDURE AFTER THE POWER SUPPLY HAS BEEN REPLACED.

### 5.3 CALIBRATION OF THE MODMETER CARD

FOR THIS PROCEDURE PLEASE REFER TO SETUP 2 (FIG. 6):



- 1) CONNECT A 50( DUMMY LOAD TO THE R.F. OUTPUT OF THE EXCITER.
- 2) CONNECT AN AUDIO FREQUENCY GENERATOR TO THE "MONO" OR "STEREO" INPUTS SET AT A FREQUENCY OF 400 Hz AND AN AMPLITUDE (AT THE CONNECTOR) OF -10 dBm (0 dBm FOR THE AMERICAN VERSION).
- 3) CONNECT THE R.F. INPUT OF THE FM MODULATION METER TO THE OUTPUT OF THE WATTMETER CONNECTED TO THE OUTPUT OF THE STL-1.
- 4) SET THE SWITCH (# 5 FIG. 1) TO 100% AND ADJUST THE AF ADJ CONTROL (# 1 FIG. 1) IN A CLOCKWISE DIRECTION FOR MAXIMUM POWER.
- 5) ADJUST TRIMMER R30 ON THE MODMETER CARD UNTIL THE 1ST RED LED COMES ON (CORRESPONDING TO THE 100% LEVEL).
- 6) SET THE SWITCH (# 5 FIG. 1) TO 10%.
- 7) INJECT A 400 Hz SIGNAL INTO THE INPUT CONNECTOR AT A LEVEL OF -30 dBm FOR EUROPEAN VERSIONS OR -20 dBm FOR AMERICAN VERSIONS.
- 8) ADJUST TRIMMER R4 ON THE MODMETER CARD UNTIL THE 1ST RED LED COMES ON (CORRESPONDING TO A LEVEL OF 10%).

### 5.4 CALIBRATION OF THE MAIN CARD

HAVING FITTED THE MAIN CARD AND MADE ALL NECESSARY CONNECTIONS, CARRY OUT THE FOLLOWING PROCEDURE (SEE SETUP 2/FIG. 6):



## STL-1 STUDIO TRANSMITTER LINK

- 1) CONNECT AN AUDIO FREQUENCY GENERATOR TO THE "MONO" OR "STEREO" INPUTS.
- 2) CONNECT A 50( DUMMY LOAD WITH A POWER RATING OF AT LEAST 10W TO THE R.F. OUTPUT.
- 3) CONNECT THE R.F. INPUT OF THE FM MODULATION METER TO THE OUTPUT OF THE WATTMETER CONNECTED TO THE OUTPUT OF THE STL-1.
- 4) REMOVE JUMPER J4 FROM THE MAIN CARD.
- 5) INJECT A 400 Hz SIGNAL AT A LEVEL OF -10 dBM (0 dBM, 775MV RMS, 2.2V PEAK TO PEAK FOR AMERICAN VERSIONS) INTO THE "MONO" INPUT (TRIMMER R42 AT MAXIMUM).
- 6) SET THE LPF\15KHz SELECTOR (# 6 FIG. 1) TO "ON".
- 7) FOR AMERICAN VERSION, INJECT THE MONO SIGNAL AT 0 dBM INTO THE MONO "+" AND MONO "-" OF THE U.S.A. AUDIO INPUT CARD. SET THE LPF\15KHz SWITCH TO "ON" AND ADJUST R8 TO ANNUL THE SIGNAL ON PIN 14 OF U2 (CMRR COMMON MODE REJECTION RATIO).

NOW, INJECT THE MONO SIGNAL AT 0 dBM INTO THE MONO "+" ONLY (MONO "-" IS CONNECTED TO GROUND).

- 8) CONNECT AN OSCILLOSCOPE TO PIN 14 OF U1 (WITH R8 IN A CENTRAL POSITION) AND ADJUST R40 FOR A READING OF 8VPP.

SET THE LPF\15KHz SWITCH (# 6 FIG. 1) T "OFF" AND MAKE THE SAME ADJUSTMENT USING R37.

- 9) CONFIGURE THE FM MODULATION METER TO MEASURE DEVIATION WITH 30Hz/200KHz FM/P+ FILTERS AND CHECK THAT THE DEVIATION IS 75KHz.

IF THIS IS NOT THE CASE, ADJUST TRIMMER R8 ON THE VCO FOR THE RIGHT VALUE

- 10) INJECT A 400 Hz SIGNAL AT A LEVEL OF -10 dBM (0 dBM, 775MV RMS, 2.2V PEAK TO PEAK FOR AMERICAN VERSIONS) INTO THE MPX INPUT (TRIMMER R41 AT MAXIMUM).
- 11) SET THE LPF/15KHz SWITCH (# 6 FIG. 1) TO "OFF" AND FIT JUMPER J3 TO THE MAIN CARD.
- 12) CONNECT AN OSCILLOSCOPE TO PIN 14 OF U1 (WITH R8 IN A CENTRAL POSITION) AND ADJUST R28 FOR A READING OF 8VPP.
- 13) NOW REMOVE JUMPER JP3 AND FIT IT TO JP4. ADJUST R35 FOR 8VPP.

NOTE: THE AUDIO GENERATOR USED FOR THIS TEST MUST HAVE A DISTORTION LEVEL OF BETTER THAN 0.001%.

CARRY OUT THIS PROCEDURE AT THE NORMAL OPERATING FREQUENCY OF THE TRANSMITTER.

### **5.5 CALIBRATION OF THE ANAMETER CARD**

AFTER REPLACEMENT OF THE CARDS IT IS NECESSARY TO CALIBRATE ALL THE FUNCTIONS THAT THEY PERFORM:

- 1) CONNECT A BYPASS WATTMETER BETWEEN THE R.F. OUTPUT AND A 50( DUMMY LOAD (SHOW SETUP 1/FIG. 5/PG.32):

## STL-1 STUDIO TRANSMITTER LINK

- 2) ADJUST THE OUTPUT POWER FOR 2W (5 OR 10W).
- 3) FOR EACH OF THE SELECTOR (# 10 FIG. 1) POSITIONS ADJUST THE CORRESPONDING TRIMMER FOR THE VALUES LISTED BELOW:

READING	VALUE	FSD	TRIMMER	NOTE
+15V	15V	30V	R18	
+12	12V	30V	R17	
+5V	5V	30V	R22	
PWR FWD	2W	2.5W	R21	0
EXT 24V (OPT)	24V	30V	R16	1
VPA	VARIABLE	30V	R15	2
IPA	VARIABLE	6A	R19	3
AFC	VARIABLE	30V	R20	4

### NOTE:

- 0) FULL SCALE DEFLECTION (FSD) IS 10W FOR THE 5 AND 10W VERSIONS.
- 1) THE READING IS 0V IF NOT FITTED.
- 2) USE A MULTIMETER TO MEASURE THE VOLTAGE BETWEEN VP OF Q1 (MJ3001 OF THE POWER SUPPLY CARD) AND GROUND AND CHECK FOR THE SAME READING IN THE INTERNAL METER.
- 3) FOR THE IPA READING, USE A 10( 5W RESISTOR BETWEEN VP OF Q1 (MJ3001 ON THE POWER SUPPLY CARD) AND GROUND IN SERIES WITH AN AMMETER AND CHECK FOR THE SAME READING ON THE INTERNAL METER.  
  
REMOVE THE AMMETER AND CALIBRATE THE INTERNAL METER FOR THE SAME READING.
- 4) USA A MULTIMETER TO READ THE AFC VOLTAGE (3-11V) ON PIN 2 OF U7 ON THE MAIN CARD.

## 5.6 CALIBRATION OF THE CPU

AFTER REPLACEMENT, CHECK THAT THE DISPLAYS FUNCTION AND THAT OPERATING FREQUENCIES CAN BE PROGRAMMED USING THE "UP" (# 9 FIG. 1), "DOWN" (# 7 FIG. 1) AND "ENTER" (# 8 FIG. 1) BUTTONS.

CHECK CORRECT OPERATION OF THE dB9 SERIAL PORT (IF FITTED).

NO OTHER CHECKS ARE REQUIRED.

## 5.7 CALIBRATION OF THE VCO

TO CALIBRATE THE VCO, CARRYOUT THE FOLLOWING PROCEDURE:

- 1) CONNECT THE POSITIVE PROBE OF A VOLTMETER TO THE GLASS CAPACITOR (CONNECTED TO THE VARICAP) AND THE NEGATIVE PROBE TO GROUND.

**STL-1 STUDIO TRANSMITTER LINK**

- 2) CHECK THAT AT BOTH LIMITS OF THE OPERATING FREQUENCY BAND, THE VOLTAGE READING LIES BETWEEN 3.5 AND 10.3V.

THE HIGHER FREQUENCY SHOULD CORRESPOND TO THE HIGHER VOLTAGE AND VICE VERSA.

- 3) IF THE VOLTAGES IN STEP 2 CANNOT BE VERIFIED (I.E. THE PLL IS NOT LOCKED) THE SOLDERED JOINT, CONNECTING THE SL STRIP-LINE TO GROUND, SHOULD BE MOVED (THE OTHER END OF THE STRIP-LINE IS CONNECTED TO THE CATHODE OF THE VARICAP VIA CAPACITOR CX).
- 4) SHOULD THE CHOSEN OPERATING FREQUENCY BE LESS THAN 500 MHz, THE STRIP-LINE WILL HAVE BEEN REPLACED BY A PIECE OF 50( TEFLON CABLE (RG316). IN THIS CASE THE VARICAP VOLTAGE MAY BE ADJUSTED BY VARYING THE LENGTH OF THE CABLE ACCORDINGLY. THE CENTRAL CONDUCTOR IS SHORTED TO THE SCREEN AT ONE END OF THIS CABLE.
- 5) IF THE CALIBRATION PROCEDURE IS BEING CARRIED OUT AFTER A CHANGE OF FREQUENCY, CAPACITOR CX, SITUATED ON THE VCO CARD, WILL ALSO HAVE TO BE CHANGED. VALUES ARE LISTED BELOW:

**TABLE D**

FREQUENCY RANGE CX VALUE

220 - 300 MHz	1 pF
300 - 380 MHz	56 - 82 pF
380 - 400 MHz	33 pF
400 - 700 MHz	3.3 - 5.6 pF
700 - 980 MHz	3.3 - 5.6 pF

CHAPTER 6

ALIGNMENT OF THE RADIO LINK

6.1 INTRODUCTION

THIS CHAPTER DETAILS THE ALIGNMENT PROCEDURE FOR THE STL-1 TRANSMITTER AND THE STL-R RECEIVER.

6.2 FREQUENCY ALIGNMENT

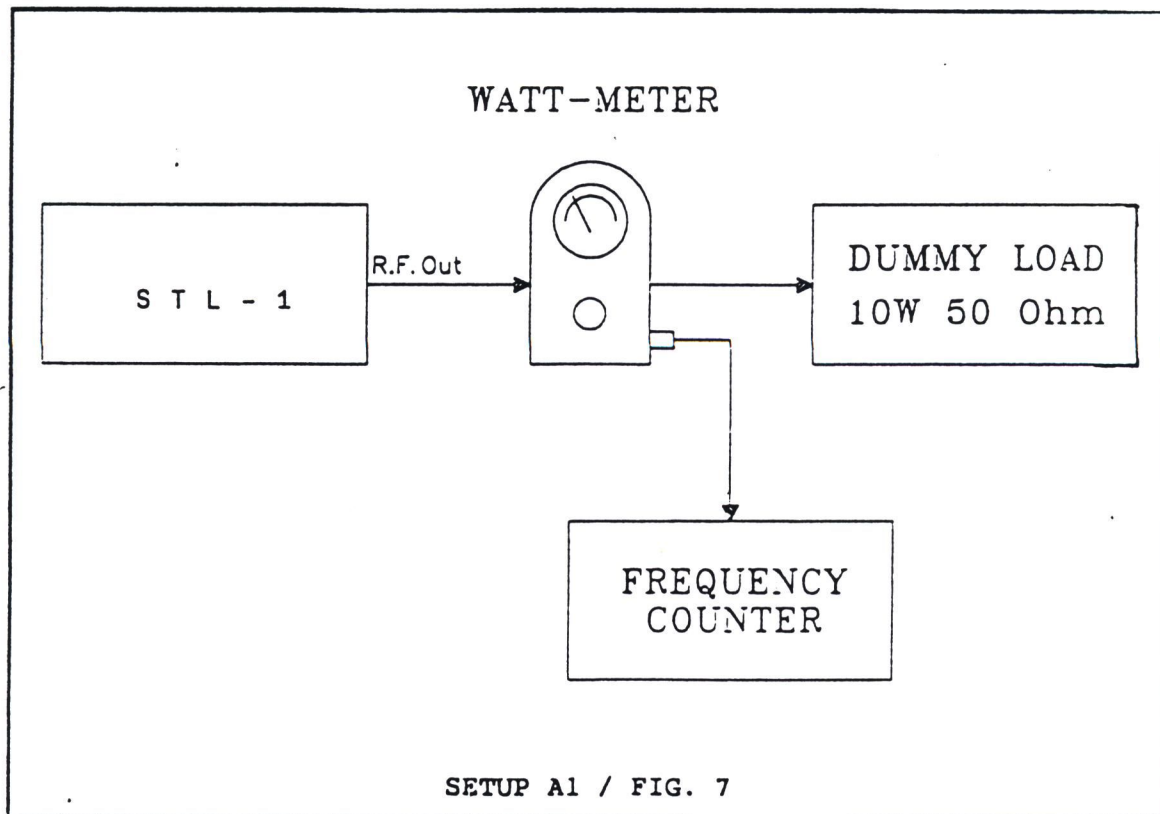
THE OPERATING FREQUENCY OF THE COMPLETE RADIO LINK (TX + RX) IS SET USING A FREQUENCY METER TO MEASURE THE FREQUENCY OUTPUT BY THE TRANSMITTER AND THE FREQUENCY AFTER THE SECOND CONVERSION OF THE RECEIVER.

IT IS RECOMMENDED TO ALIGN BOTH UNITS (TX AND RX) AT THE SAME TIME AND WITH THE SAME FREQUENCY METER, PREFERABLY ONE OF HIGH PRECISION (I.E. ( 0.2 ppm).

A DIFFERENCE GREATER THAN 2 KHz BETWEEN THE TRANSMITTER'S CENTER FREQUENCY AND THAT OF THE RECEIVER (MEASURED AT THE INTERMEDIATE FREQUENCY OF 10.7 MHz) WILL RESULT IN DEGRADATION OF AUDIO QUALITY AND STEREO SEPARATION.

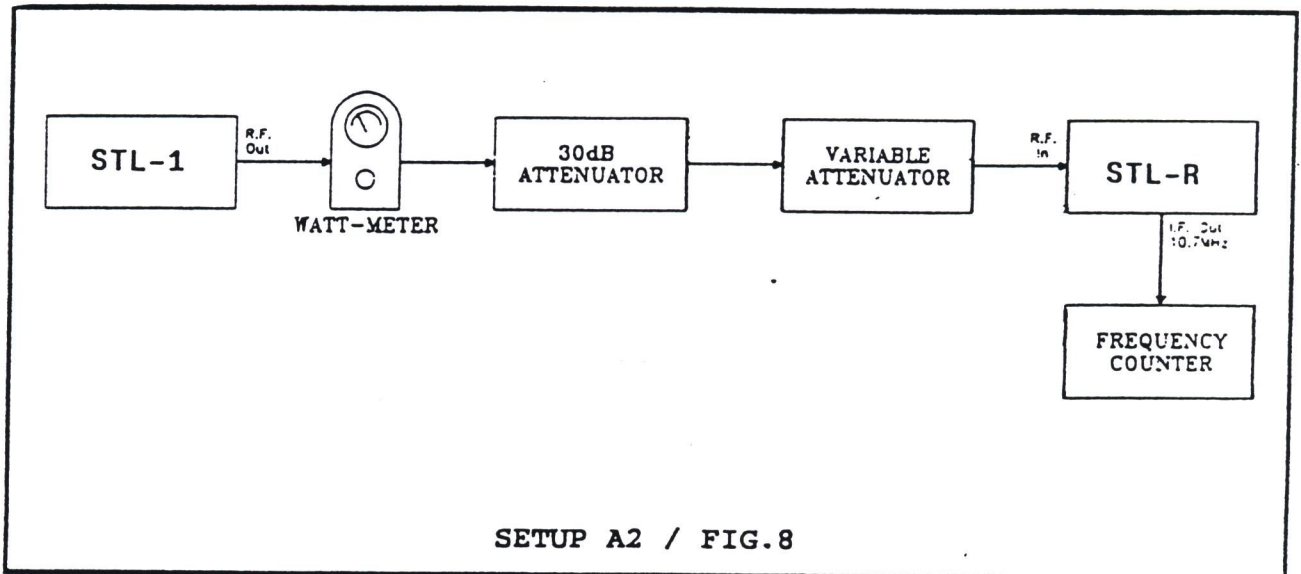
TO PERFORM THIS ALIGNMENT, CARRY OUT THE FOLLOWING PROCEDURE (SETUP A1 AND A2):

- 1) CONNECT THE TRANSMITTER AS SHOWN IN SETUP A1 (FIG. 7).



STL-1 STUDIO TRANSMITTER LINK

- 2) SWITCH ON THE TRANSMITTER AND WAIT UNTIL IT HAS LOCKED TO ITS OPERATING FREQUENCY AND THE "UNLOCK" LIGHT GOES OUT.
- 3) CONNECT THROUGH A WATTMETER WITH SAMPLE A FREQUENCY METER AND A DUMMY LOAD, RATED AT 15W CONTINUOUS, TO THE R.F. OUTPUT SITUATED ON THE REAR PANEL OF THE TRANSMITTER.
- 4) USE THE METER SELECTOR TO SELECT DIRECT POWER MEASUREMENT, FWD. CHECK THAT MAXIMUM OUTPUT POWER (2W, 5W, OR 10W DEPENDING ON THE VERSION) CAN BE ATTAINED BY TURNING THE PWR ADJ CONTROL TO ITS LIMIT.
- 5) USING THE FREQUENCY METER, CHECK THE OUTPUT FREQUENCY OF THE TRANSMITTER AND ADJUST AS NECESSARY WITH CAPACITORS C68 AND C69 SITUATED ON THE MAIN CARD.
- 6) CONNECT THE TO UNITS (TX AND RX) AS SHOWN IN SETUP A2 (FIG. 8).



- 7) ADJUST THE VARIABLE ATTENUATOR FOR A VALUE DEPENDENT FROM THE TRANSMITTER'S OUTPUT POWER (TABLE E).

TABLE E

TRANSMITTER PWR	ATTENUATION	30dB ATTENUATOR	VALUE OF VARIABLE ATTENUATOR
2W	86 dB	30 dB	56 dB
5W	90 dB	30 dB	60 dB
10W	93 dB	30 dB	63 dB

NOTE: THE ATTENUATION VALUES, ABOVE MENTIONED, ARE USED TO OBTAIN A -53 dBM SIGNAL ON THE RECEIVER'S R.F. INPUT.

- 8) CONNECT THE COUNTER TO THE IF 10.7 MHz OUTPUT AND CHECK THAT THE FREQUENCY CORRESPONDS TO THIS VALUE, ADJUSTING AS NECESSARY WITH CAPACITOR C27 AND C28 SITUATED ON THE SYNTHESIZER CARD FOR A FREQUENCY OF 10.700 MHz (2 KHz).

## STL-1 STUDIO TRANSMITTER LINK

IN THIS WAY, "IF" THE 10.7 MHz CONVERSION IS CORRECTED, IT MEANS THAT THE OUTPUT FREQUENCY OF THE FRONT-END MIXER BEFORE THE 70 MHz CONVERSION HAS THE SAME VALUE OF THE OUTPUT FREQUENCY OF THE TRANSMITTER.

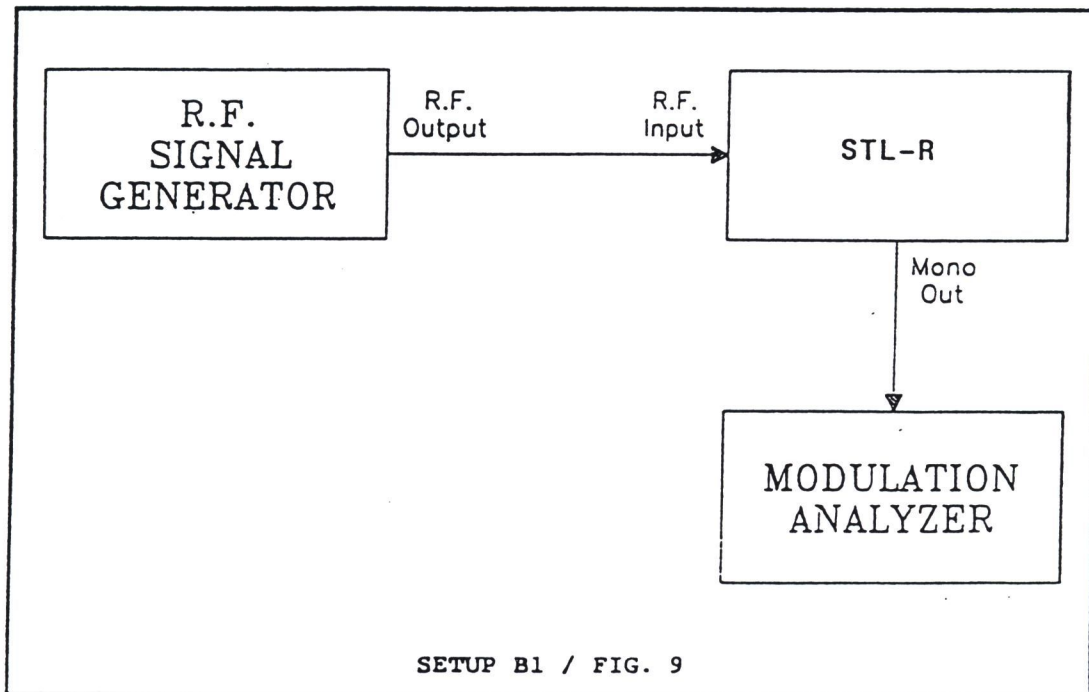
### 6.3 MEASUREMENT OF RECEIVER S/N RATIO

THE MONO S/N (SIGNAL TO NOISE) RATIO IS MEASURED AT THE OUTPUT OF THE RECEIVER BY FEEDING IT WITH A 400 Hz MODULATING SIGNAL ((76 KHz DEVIATION) AND COMPARING THE OUTPUT WITH THE SAME OUTPUT, UNDER THE SAME CONDITIONS, IN THE ABSENCE OF THE MODULATING SIGNAL, ACROSS THE 30Hz/20KHz BAND.

IN THE CASE OF STEREO MODULATION, THE S/N RATIO WILL BE MEASURED ON SINGLE CHANNELS (LEFT AND RIGHT) DECODED AND DE-EMPHASIZED.

BOTH MONO AND STEREO MEASUREMENTS SHOULD BE TAKEN HAVING CONFIGURED THE UNIT ACCORDING TO SETUP B1 AND B2 AND CARRYING OUT THE FOLLOWING PROCEDURE:

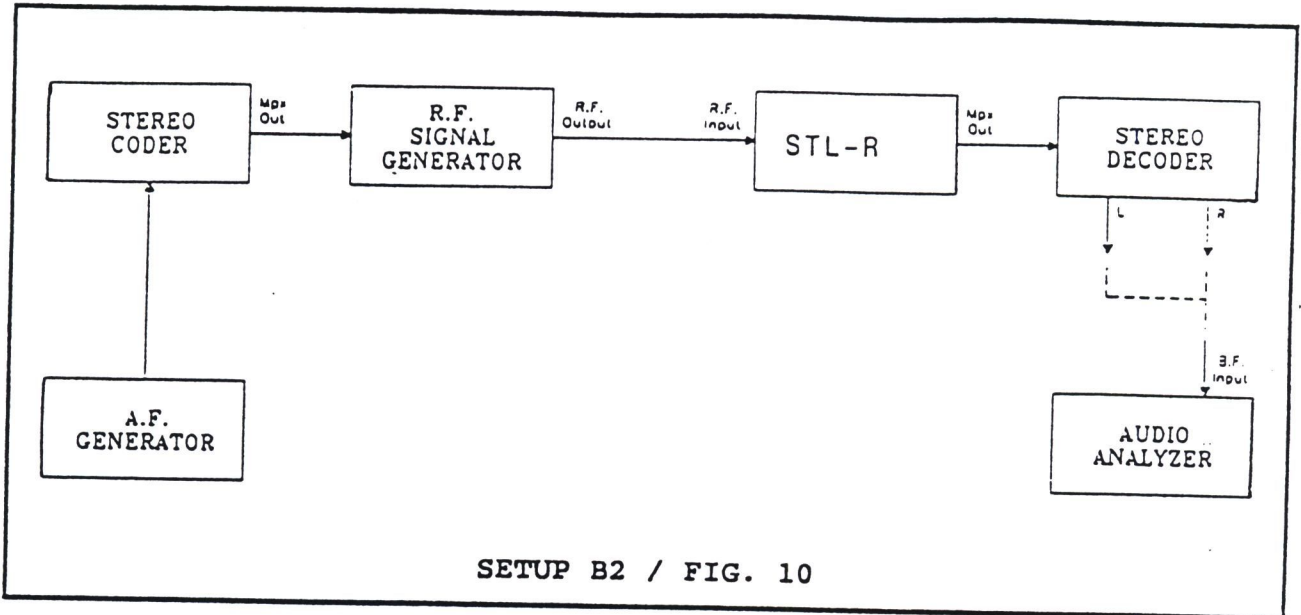
- 1) CONNECT THE INSTRUMENTS AS SHOWN IN SETUP B1 (FIG. 9) TO MAKE THE "MONO" MEASUREMENT.



- 2) GENERATE AN R.F. CARRIER AT OPERATING FREQUENCY AND -67 dBm; MODULATE THE CARRIER WITH A 400 Hz TONE WITH A (75 KHz DEVIATION). INJECT THE RESULTANT R.F. SIGNAL INTO THE RECEIVER INPUT.
- 3) USING THE "FAM" MODULATION ANALYZER, CHECK THAT THE S/N RATIO OF THE STL-R RECEIVER IS BETTER THAN 65 dB, REFERRED TO A DEVIATION OF (75 KHz).
- 4) CONNECT THE INSTRUMENTS AS SHOWN IN SETUP B2 (FIG. 10/PG.40) TO MAKE THE "STEREO" MEASUREMENT.

## STL-1 STUDIO TRANSMITTER LINK

- ADJUST THE SIGNAL GENERATOR OUTPUT FOR A LEVEL OF 1mV (THE CARRIER AND DEVIATION WILL REMAIN CONSTANT).
- USE THE MODULATION ANALYZER TO MAKE THE S/N MEASUREMENT AND CHECK THAT THE FIGURE IS BETTER THAN 60 dB FOR THE STL-R.

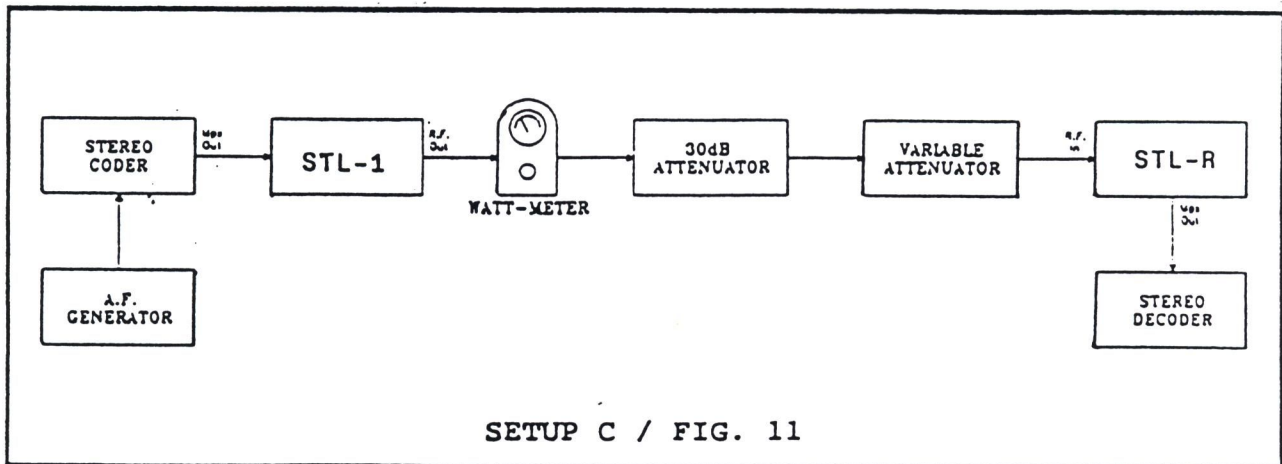


### 6.4 STEREO SEPARATION

STEREO SEPARATION IS MEASURED USING A STEREO CODER, A STEREO DEMODULATOR.

THE FIGURE IS OBTAINED FROM THE RATIO OF THE LEFT AND RIGHT CHANNEL OUTPUTS WITH ONLY THE LEFT CHANNEL MODULATED, FOR FREQUENCIES BETWEEN 30 Hz AND 15 KHz.

TO MAKE THIS MEASUREMENT, CONFIGURE THE UNIT ACCORDING TO SETUP C (FIG. 15) AND CARRY OUT THE FOLLOWING PROCEDURE:



- ADJUST THE VARIABLE ATTENUATOR FOR A VALUE DEPENDENT FROM THE TRANSMITTER'S OUTPUT POWER (TABLE E).

**TABLE E**

TRANSMITTER PWR	ATTENUATION	30dB ATTENUATOR	VALUE OF VARIABLE ATTENUATOR
2W	86 dB	30 dB	56 dB
5W	90 dB	30 dB	60 dB
10W	93 dB	30 dB	63 dB

NOTE: THE ATTENUATION VALUES, ABOVE MENTIONED, ARE USED TO OBTAIN A -53 dBm SIGNAL ON THE RECEIVER'S R.F. INPUT.

- 2) ADJUST THE SIGNAL GENERATOR FOR AN OUTPUT LEVEL OF -10 dBm AT THE RIGHT INPUT (AND SUBSEQUENTLY THE LEFT) OF THE STEREO CODER.
- 3) CHECK THAT THE READING FROM THE OUTPUT OF THE STEREO DECODER IS BETTER OR EQUAL TO 47 dB (BOTH AT 400 Hz AND 10 KHz).
- 4) REPEAT THE OPERATION FOR BOTH CHANNELS WITH A MODULATING TONE OF 400 Hz AND 10 KHz.

THE MAXIMUM DIFFERENCE SHOULD BE (3 dB).

## **6.5 CHANGING FREQUENCY**

THERE ARE THREE DIFFERENT PROCEDURES FOR CHANGING FREQUENCY, DEPENDING ON THE NEW FREQUENCY TO BE SELECTED:

### **CASE A**

SHOULD THE NEW FREQUENCY FALL WITHIN THE RANGE SELECTABLE BY THE CPU (AND WITHOUT THE REQUIREMENT OF A CHANGE OF EPROM), THE FOLLOWING PROCEDURE SHOULD BE CARRIED OUT:

#### **TRANSMITTER**

- 1) SELECT THE NEW FREQUENCY WITH THE "UP" (# 9 FIG. 1) AND "DOWN" (# 7 FIG. 1) BUTTONS AND CONFIRM IT WITH THE "ENTER" (# 8 FIG. 1) KEY.

#### **RECEIVER**

- 1) SELECT THE NEW FREQUENCY WITH THE "UP" AND "DOWN" BUTTONS AND CONFIRM IT WITH THE "ENTER" KEY.
- 2) SELECT THE "SIGNAL" MEASUREMENT USING THE SELECTOR AND CONFIRMED BY THE CORRESPONDING GREEN LED.
- 3) CALIBRATE THE 6 COMPENSATORS, SITUATED ON THE TWO FILTERS FIL1 AND FIL2 OF THE FRONT-END MIXER, FOR THE MAXIMUM R.F. SIGNAL, CHECKING AGAINST THE CORRESPONDING READING ON THE RECEIVER'S METER (MAXIMUM R.F. SIGNAL DISPLAYABLE = -47 dBm).

### **CASE B**

THIS PROCEDURE SHOULD ONLY BE CARRIED OUT BY QUALIFIED PERSONNEL USING THE CORRECT TEST EQUIPMENT.



## STL-1 STUDIO TRANSMITTER LINK

ERRORS CAN CAUSE SERIOUS DAMAGE TO EQUIPMENT AND WILL AUTOMATICALLY NULLIFY THE WARRANTY.

SHOULD THE NEW OPERATING FREQUENCY FALL WITHIN ONE OF THE TWO ADJACENT BANDS (HIGHER OR LOWER), THE FOLLOWING PROCEDURE SHOULD BE CARRIED OUT:

### **TRANSMITTER**

- 1) CHANGE THE EPROM FOR ONE CONTAINING THE DESIRED FREQUENCY.
- 2) AFTER THE REPLACEMENT OF THE EPROM, SET THE CPU ON THE FREQUENCY RANGE RELATIVE TO THE EPROM FREQUENCY. WHEN THE TRANSMITTER SWITCHES ON, APPEARS ON THE DISPLAY THE LIGHTENING NOTICE SET 0; NOW, PUSH "ENTER" AND VERIFY THAT THE MINIMUM FREQUENCY OF THE EPROM APPEARS ON THE DISPLAY.

IN CASE IN WHICH APPEARS THE LIGHTENING NOTICE SET 1 TOO, PUSH THE "ENTER" COMMAND AGAIN.

- 3) SELECT THE NEW FREQUENCY USING THE "UP" (# 9 FIG. 1) AND "DOWN" (# 7 FIG. 1) BUTTONS AND CONFIRM IT WITH THE "ENTER" (# 8 FIG. 1) KEY.
- 4) FOLLOW THE CALIBRATION PROCEDURE FOR THE VCO, AS DETAILED IN PARAGRAPH "CALIBRATION OF THE VCO" OF THE STL-1 MANUAL.
- 5) FOLLOW THE CALIBRATION PROCEDURE FOR THE FINAL POWER STAGE, AS DETAILED IN PARAGRAPH "CALIBRATION OF THE R.F. POWER AMPLIFIER" OF THE STL-1 MANUAL TO OPTIMIZE THE OUTPUT POWER.

### **RECEIVER**

- 1) CHANGE THE EPROM FOR ONE CONTAINING THE DESIRED FREQUENCY.
- 2) AFTER THE REPLACEMENT OF THE EPROM, SET THE CPU ON THE FREQUENCY RANGE RELATIVE TO THE EPROM FREQUENCY. WHEN THE RECEIVER SWITCHES ON, APPEARS ON THE DISPLAY THE LIGHTENING NOTICE SET 0; NOW, PUSH "ENTER" AND VERIFY THAT THE MINIMUM FREQUENCY OF THE EPROM APPEARS ON THE DISPLAY.

IN CASE APPEARS THE LIGHTENING NOTICE SET 1 TOO, PUSH AGAIN "ENTER" COMMAND.

- 3) SELECT THE NEW FREQUENCY USING THE AND CONFIRM IT WITH THE "ENTER" KEY.
- 4) CALIBRATE THE VCO AS DETAILED IN PARAGRAPH "CALIBRATION OF THE VCO" OF THE STL-R MANUAL.
- 5) SELECT THE "SIGNAL" MEASUREMENT USING THE SELECTOR AND CONFIRMED BY THE CORRESPONDING GREEN LED.
- 6) CALIBRATE THE 6 COMPENSATORS, SITUATED ON THE TWO FILTERS FIL1 AND FIL2 OF THE FRONT-END MIXER, FOR THE MAXIMUM R.F. SIGNAL, CHECKING AGAINST THE CORRESPONDING RATING ON THE RECEIVER'S METER (MAXIMUM R.F. SIGNAL DISPLAYABLE = -47 dBm).

## STL-1 STUDIO TRANSMITTER LINK

### CASE C

THIS PROCEDURE SHOULD ONLY BE CARRIED OUT BY QUALIFIED PERSONNEL USING THE CORRECT TEST EQUIPMENT.

ERRORS CAN CAUSE SERIOUS DAMAGE TO EQUIPMENT AND WILL AUTOMATICALLY NULLIFY THE WARRANTY.

SHOULD THE NEW OPERATING FREQUENCY FALL WITHIN A NON-ADJACENT BAND, THE FOLLOWING PROCEDURE SHOULD BE CARRIED OUT:  
TRANSMITTER

- 1) CHANGE THE EPROM FOR ONE CONTAINING THE DESIRED FREQUENCY.
- 2) AFTER THE REPLACEMENT OF THE EPROM, SET THE CPU ON THE ON THE FREQUENCY RANGE RELATIVE TO THE EPROM FREQUENCY. WHEN THE TRANSMITTER SWITCHES ON, APPEARS ON THE DISPLAY THE LIGHTENING NOTICE SET 0; NOW, PUSH "ENTER" AND VERIFY THAT THE MINIMUM FREQUENCY OF THE EPROM APPEARS ON THE DISPLAY. IN CASE APPEARS THE LIGHTENING NOTICE SET 1 TOO, PUSH AGAIN "ENTER" COMMAND.
- 3) SELECT THE NEW FREQUENCY USING THE "UP" (# 9 FIG. 1) AND "DOWN" (# 7 FIG. 1) BUTTON AND CONFIRM IT WITH THE "ENTER" (# 8 FIG. 1) KEY.
- 4) FOLLOW THE PROCEDURE FOR CALIBRATING OR REPLACING THE VCO AS DETAILED IN PARAGRAPH "CALIBRATION OF THE VCO" AND PARAGRAPH "MAIN CARD REPLACEMENT" OF THIS MANUAL.
- 5) FOLLOW THE PROCEDURE FOR CALIBRATING OR REPLACING THE FINAL POWER STAGE AS DETAILED IN PARAGRAPHS "CALIBRATION OF THE R.F. POWER AMPLIFIER" AND PARAGRAPH "R.F. POWER AMPLIFIER REPLACEMENT" OF THIS MANUAL.

### RECEIVER

- 1) CHANGE THE EPROM FOR ONE CONTAINING THE DESIRED FREQUENCY.
- 2) REPLACE THE FRONT-END MIXER (IF THE NEW FREQUENCY REQUIRES IT) AS DETAILED IN PARAGRAPH "REPLACEMENT OF THE FRONT-END MIXER" OF THE STL-R MANUAL.
- 3) REPLACE THE VCO (IF THE NEW FREQUENCY REQUIRES IT) AS DETAILED IN PARAGRAPH "REPLACEMENT OF THE P.L.L." OF THE STL-R MANUAL.
- 4) AFTER THE REPLACEMENT OF THE EPROM, SET THE CPU ON THE FREQUENCY RANGE RELATIVE TO THE EPROM FREQUENCY. WHEN THE RECEIVER SWITCHES ON, APPEARS ON THE DISPLAY THE LIGHTENING NOTICE SET 0; NOW, PUSH "ENTER" AND VERIFY THAT THE MINIMUM FREQUENCY OF THE EPROM APPEARS ON THE DISPLAY.

IN CASE APPEARS THE LIGHTENING NOTICE SET 1 TOO, PUSH AGAIN "ENTER" COMMAND.

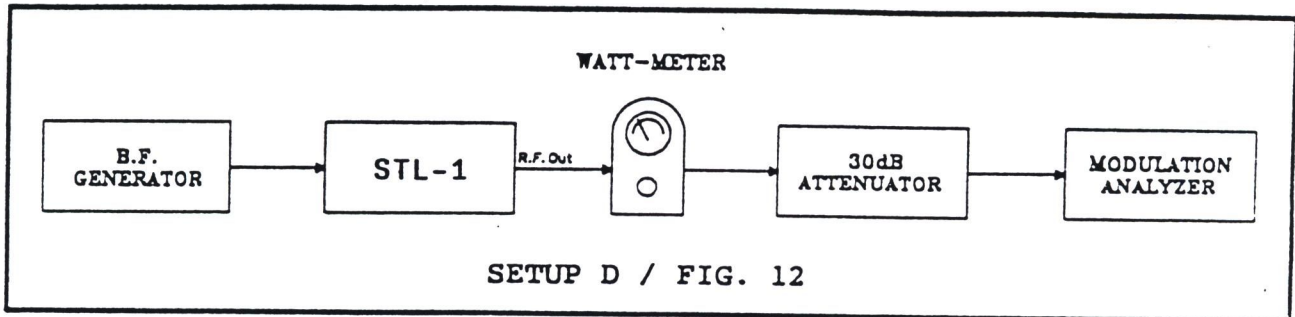
- 5) SELECT THE "SIGNAL" MEASUREMENT USING THE SELECTOR CONFIRMED BY THE CORRESPONDING GREEN LED.
- 6) SELECT THE NEW FREQUENCY USING THE "UP" AND "DOWN" BUTTONS AND CONFIRM IT WITH THE "ENTER" KEY.

## STL-1 STUDIO TRANSMITTER LINK

- 7) CALIBRATE THE VCO AS DETAILED IN PARAGRAPH "CALIBRATION OF THE VCO" OF THE STL-R MANUAL.
- 8) CALIBRATE THE 6 COMPENSATORS, SITUATED ON THE TWO FILTERS FIL1 AND FIL2 OF THE FRONT-END MIXER, FOR THE MAXIMUM R.F. SIGNAL, CHECKING AGAINST THE CORRESPONDING READING ON THE RECEIVER'S METER (MAXIMUM R.F. SIGNAL DISPLAYABLE = -47 dBM).

### 6.6 TRANSMITTER AUDIO DEVIATION AND DISTORTION FIGURES

TO MAKE THIS MEASUREMENT, CONFIGURE THE UNIT ACCORDING TO SETUP D (FIG. 12) AND CARRY OUT THE FOLLOWING PROCEDURE:



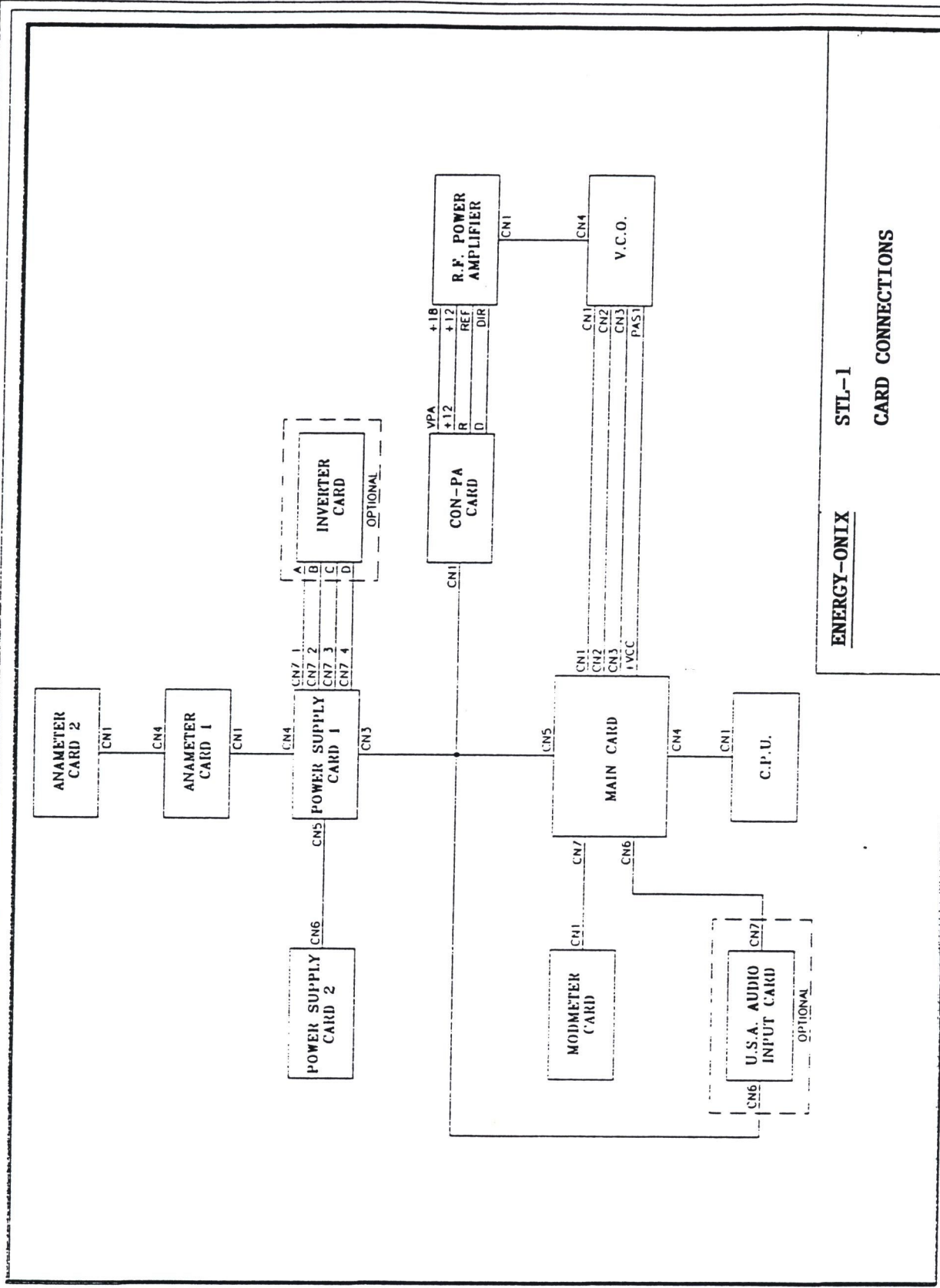
- 1) ADJUST THE SIGNAL GENERATOR FOR A SIGNAL LEVEL OF -10 dBM (0 dBM FOR AMERICAN VERSIONS) AT THE "MONO" AND "STEREO" INPUTS.
- 2) CONFIGURE THE MODULATION ANALYZER TO READ DEVIATION (P+).
- 3) CHECK THAT THE DEVIATION READING FOR THE STL-1 IS 75 KHz AND IF NOT, ADJUST TRIMMER R8 (INSIDE THE VCO) TO OBTAIN IT.
- 4) CONFIGURE THE AUDIO ANALYZER TO READ DISTORTION (WITH 50 US DE-EMPHASIS FOR EUROPEAN VERSIONS AND 75 US FOR AMERICAN VERSIONS).
- 5) CHECK THAT THE DISTORTION FIGURE IS BETTER THAN 0.5% WITH LOW-PASS AND HIGH-PASS FILTERS OF 20 KHz AND 30 Hz RESPECTIVELY, FOR BOTH "MONO" AND "STEREO" INPUTS.

APPENDIX A

CIRCUIT DIAGRAMS, LAYOUTS AND BILLS OF MATERIAL

THIS SECTION CONTAINS CIRCUIT DIAGRAMS, LAYOUTS AND BILLS OF MATERIAL FOR THIS EQUIPMENT.

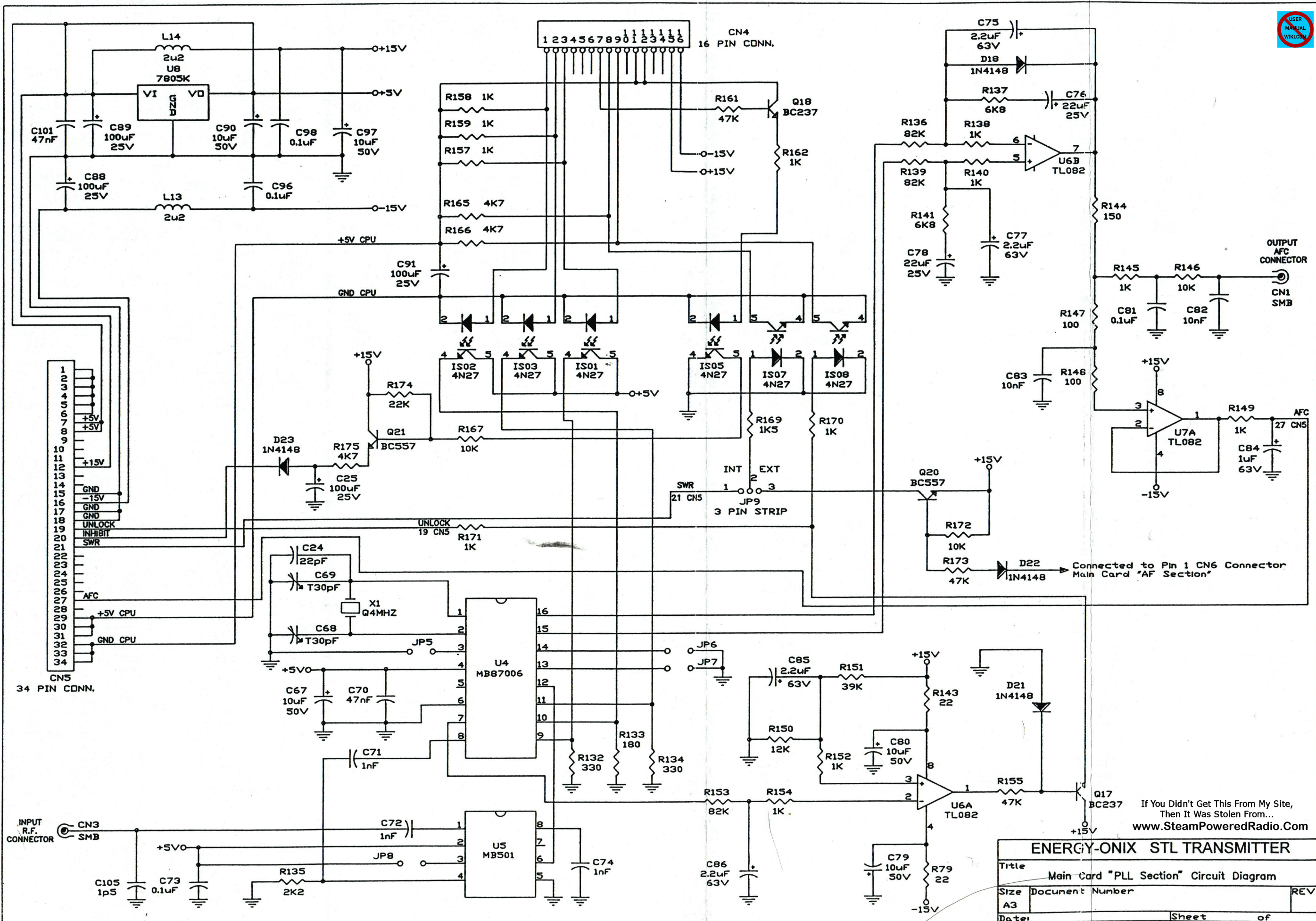
FOR MORE INFORMATION ABOUT EACH MODULE SEE SECTION 2.



**ENERGY-ONIX** **STL-1**  
**CARD CONNECTIONS**

MAIN CARD

- 1) "PLL SECTION" CIRCUIT DIAGRAM PG. 48
- 2) "PLL SECTION" BILL OF MATERIALS PG. 49
- 3) "AF SECTION" CIRCUIT DIAGRAM PG. 51
- 4) "AF SECTION" BILL OF MATERIALS PG. 52
- 5) MAIN CARD COMPONENT LAYOUT PG. 54



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<b>ENERGY-ONIX STL TRANSMITTER</b>			
Title	Main Card "PLL Section" Circuit Diagram		
Size	Document	Number	REV
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STL-1 STUDIO TRANSMITTER LINK

## MAIN CARD "P.L.L. SECTION" BILL OF MATERIALS

Page 1 of 2

ITEM	QUANTITY	REFERENCE	PART	DESCRIPTION	PART ORDER CODE
1	2	R79,R143	22	RESISTOR 1/4W 5%	RSC1/4JH0022
2	2	R147,R148	100	RESISTOR 1/4W 5%	RSC1/4JH0100
3	1	R144	150	RESISTOR 1/4W 5%	RSC1/4JH0150
4	1	R133	180	RESISTOR 1/4W 5%	RSC1/4JH0180
5	2	R132, R134	330	RESISTOR 1/4W 5%	RSC1/4JH0330
6	12	R138,R140, R145,R149, R152,R154, R157,R158, R159,R162, R170,R171	1K	RESISTOR 1/4W 5%	RSC1/4JK0001
7	1	R169	1K5	RESISTOR 1/4W 5%	RSC1/4JK01,5
8	1	R135	2K2	RESISTOR 1/4W 5%	RSC1/4JK02,2
9	3	R165,R166, R175	4K7	RESISTOR 1/4W 5%	RSC1/4JK04,7
10	2	R137,R141	6K8	RESISTOR 1/4W 5%	RSC1/4JK06,8
11	3	R146,R167, R172	10K	RESISTOR 1/4W 5%	RSC1/4JK0010
12	1	R150	12K	RESISTOR 1/4W 5%	RSC1/4JK0012
13	1	R174	22K	RESISTOR 1/4W 5%	RSC1/4JK0022
14	1	R151	39K	RESISTOR 1/4W 5%	RSC1/4JK0039
15	3	R155,R161, R173	47K	RESISTOR 1/4W 5%	RSC1/4JK0047
16	3	R136,R139, R153	82K	RESISTOR 1/4W 5%	RSC1/4JK0082
17	1	C105	1p5	CERAMIC CAPACITOR NPO	CKM1,5BJ600C
18	1	C24	22pF	CERAMIC CAPACITOR NPO	CKM220BJ600C
19	2	C68,C69	T30pF	TRIMMER CAPACITOR	CVC300BK600
20	3	C71,C72,C74	1nF	CERAMIC CAPACITOR	CKM102BK600P
21	2	C82,C83	10nF	CERAMIC CAPACITOR	CKM103BK600P

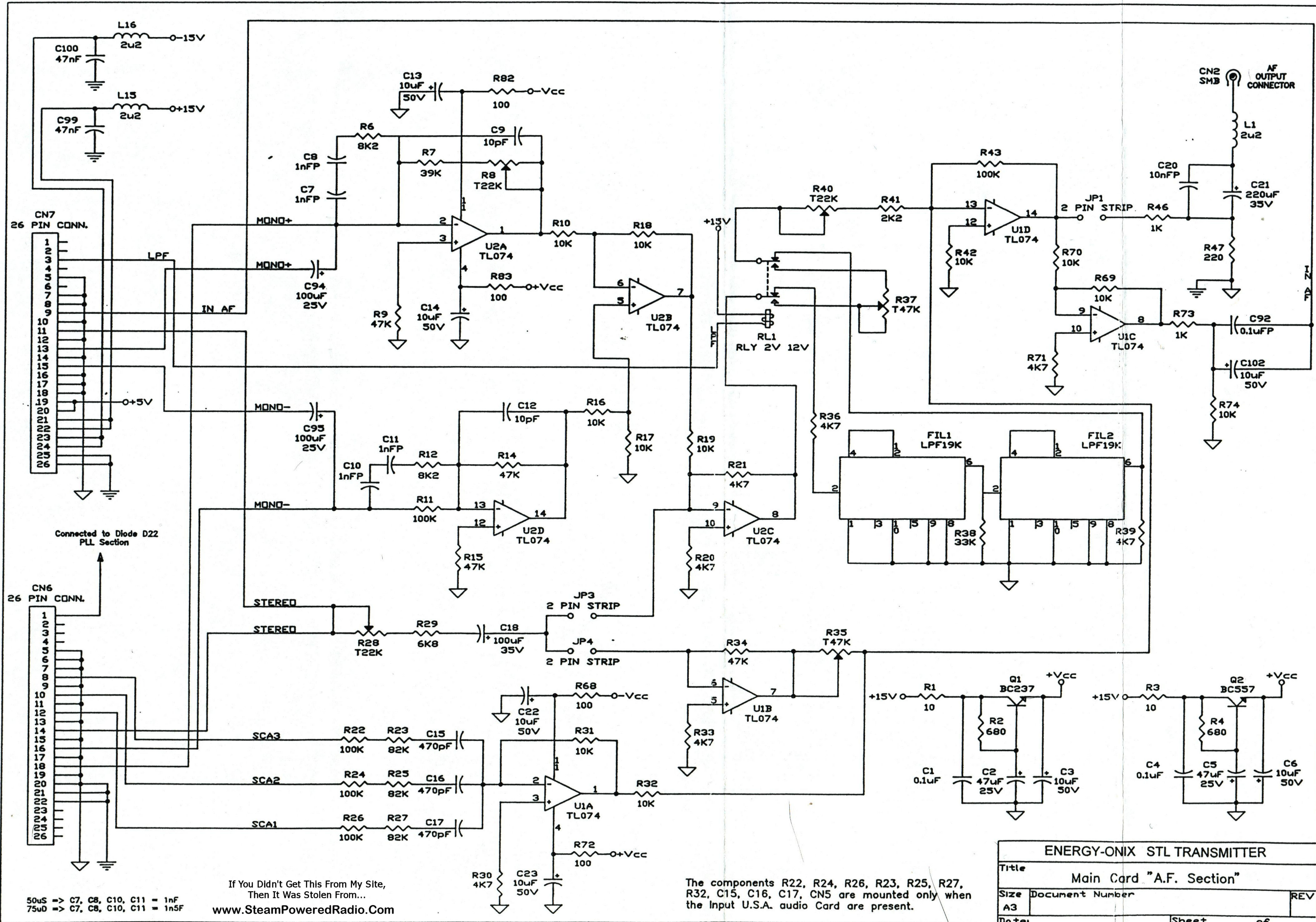


STL-1 STUDIO TRANSMITTER LINK

## MAIN CARD "P.L.L. SECTION" BILL OF MATERIALS

Page 2 of 2

ITEM	QUANTITY	REFERENCE	PART	DESCRIPTION	PART ORDER CODE
22	2	C70,C101	47nF	CERAMIC CAPACITOR	CKM473BK600P
23	4	C73,C81, C96,C98	0.1(F	CERAMIC CAPACITOR	CKM104BK600P
24	1	C84	1(F	ELECTROLYTIC CAPACITOR	CEA105AM630
25	4	C75,C77, C85,C86	2.2(F	ELECTROLYTIC CAPACITOR	CEA225AM630
26	5	C67,C79, C80,C90,C97	10(F	ELECTROLYTIC CAPACITOR	CEA106AM350
27	2	C76,C78	22(F	ELECTROLYTIC CAPACITOR	CEA226BM350
28	4	C25,C88, C89,C91	100(F	ELECTROLYTIC CAPACITOR	CEA107BM350
29	2	L13,L14	2(2	RF CHOKE	IMP02U2A
30	4	JP5,JP6, JP7,JP8	2 PIN STRIP	STRIP M P 2.54 2 PIN	CNTSTRIPMCS
31	1	JP9	3 PIN STRIP	STRIP M P 2.54 3 PIN	CNTSTRIPMCS
32	1	CN4	16P CONN.	CONN. M 2*8 P 2.54	CNTMCSFC16P
33	1	CN5	34P CONN.	CONN. M 2*17 P 2.54	CNTMCSFC34P
34	2	CN1,CN3	SMB	CONN. SMB A CRIM. RG188	CNTSMBFCVD
35	1	X1	Q4MHz	CRYSTAL	QRZ4HC18
36	4	D18,D21, D22,D23	1N4148	SILICON DIODE	DIS1N4148
37	6	IS01,IS02, IS03, IS05, IS07, IS08	4N27	PHOTOCOUPLER	LED4N27
38	1	U8	7805K	POS. STABILIZER 1.5A	CIL7805K
39	2	Q17,Q18	BC237	NPN TRANSISTOR	TRNBC237
40	2	Q20,Q21	BC557	PNP TRANSISTOR	TRNBC557
41	2	U6,U7	TL082	DOUBLE OP. AMP.	CILTL082
42	1	U5	MB501	DUAL MOD. PRESCALER	CIDMB501
43	1	U4	MB87006	INTERGRATED DIVIDER PLL	CIDMB87006



50uS => C7, C8, C10, C11 = 1nF  
 75u0 => C7, C8, C10, C11 = 1n5F

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The components R22, R24, R26, R23, R25, R27,  
 R32, C15, C16, C17, CN5 are mounted only when  
 the Input U.S.A. audio Card are present.

ENERGY-ONIX STL TRANSMITTER		
Title		
Main Card "A.F. Section"		
Size	Document Number	REV
A3		
Date:	Sheet	of

## MAIN CARD "A.F. SECTION" BILL OF MATERIALS

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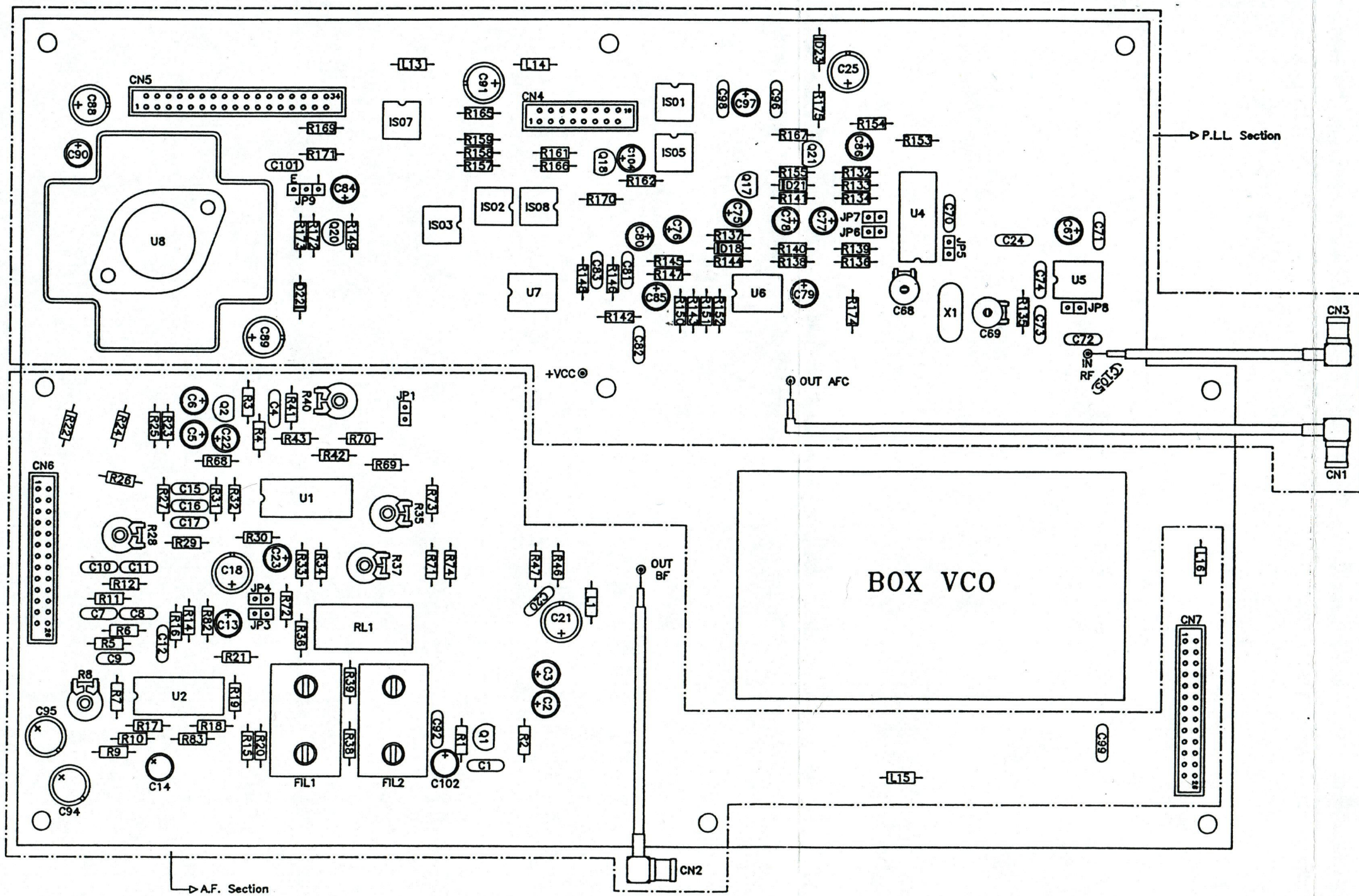
ITEM	QUANTITY	REFERENCE	PART	DESCRIPTION	PART ORDER CODE
1	2	R1,R3	10	RESISTOR 1/4W 5%	RSC1/4JH0010
2	4	R68, R72, R82,R83	100	RESISTOR 1/4W 5%	RSC14JH0100
3	1	R47	220	RESISTOR 1/4W 5%	RSC1/4JH0220
4	2	R2,R4	680	RESISTOR 1/4W 5%	RSC1/4JH0680
5	2	R46,R73	1K	RESISTOR 1/4W 5%	RSC1/4JK0001
6	1	R41	2K2	RESISTOR 1/4W 5%	RSC1/4JK02,2
7	7	R20,R21, R30,R33, R36,R39, R71	4K7	RESISTOR 1/4W 5%	RSC1/4JK04,7
8	1	R29	6K8	RESISTOR 1/4W 5%	RSC1/4JK06,8
9	2	R6,R12	8K2	RESISTOR 1/4W 5%	RSC1/4JK08,2
10	11	R10,R16, R17,R18, R19,R31, R32,R42, R69,R70, R74	10K	RESISTOR 1/4W 5%	RSC1/4JK0010
11	1	R38	33K	RESISTOR 1/4W 5%	RSC1/4JK0033
12	1	R7	39K	RESISTOR 1/4W 5%	RSC1/4JK0039
13	4	R9,R14, R15,R34	47K	RESISTOR 1/4W 5%	RSC1/4JK0047
14	3	R23,R25,R27	82K	RESISTOR 1/4W 5%	RSC1/4JK0082
15	5	R11,R22, R24,R26, R43	100K	RESISTOR 1/4W 5%	RSC1/4JK0100
16	3	R8,R28,R40	T22K	TRIMMER REG. VERT. 10mm	RVTD10VK0022
17	2	R35,R37	T47K	TRIMMER REG. VERT. 10mm	RVTD10VK0047
18	2	C9,C12	10pF	CERAMIC CAPACITOR NPO	CKM100BJ600C
19	3	C15,C16,C17	470pF	CERAMIC CAPACITOR	CKM471BK600P
20	4	C7,C8,C10,C11	1nFP	POLIESTER CAPACITOR	CPE102BK161

STL-1 STUDIO TRANSMITTER LINK

## MAIN CARD "A.F. SECTION" BILL OF MATERIALS

Page 2 of 2

ITEM	QUANTITY	REFERENCE	PART	DESCRIPTION	PART ORDER CODE
21	1	C20	10nFP	POLYESTER CAPACITOR	CPE103BJ101
22	2	C99,C100	47nF	CERAMIC CAPACITORCKM473BK600P	
23	2	C1,C4	0.1(F	CERAMIC CAPACITORCKM104BK600P	
24	1	C92	0.1(FP	POLYESTER CAPACITOR	CPE104DK101
25	7	C3,C6,C13, C14,C22, C23,C102	10(F	ELECTROLYTIC CAPACITOR	CEA106AM350
26	2	C2,C5	47(F	ELECTROLYTIC CAPACITOR	CEA476BM630
27	3	C18,C94, C95	100(F	ELECTROLYTIC CAPACITOR	CEA107BM350
28	1	C21	220(F	ELECTROLYTIC CAPACITOR	CEA227BM350
29	3	L1,L15,L16	2(2	RF CHOKE	IMP02U2A
30	2	FIL1,FIL2	LPF19K	19KHz LOW PASS FILTER	FLP19KHz
31	3	JP1,JP3, JP4	2 PIN STRIP	STRIP M P 2.54 2 PIN	CNTSTRIPMCS
32	2	CN6, CN7	26P CONN.	CONN. M 2*13 P 2.54	CNTMCSFC26P
33	1	CN2	SMB	CON. SMB A CRIMP. RG188	CNTSMBFCVD
34	1	RL1	RLY 2V 12V	RELAY 2 VIE 12V	RLDLFHA00212
35	1	Q1	BC237	NPN TRANSISTOR	TRNBC237
36	1	Q2	BC557	PNP TRANSISTOR	TRNBC557
37	2	U1,U2	TL074	QUAD OP. AMP.	CILTL074



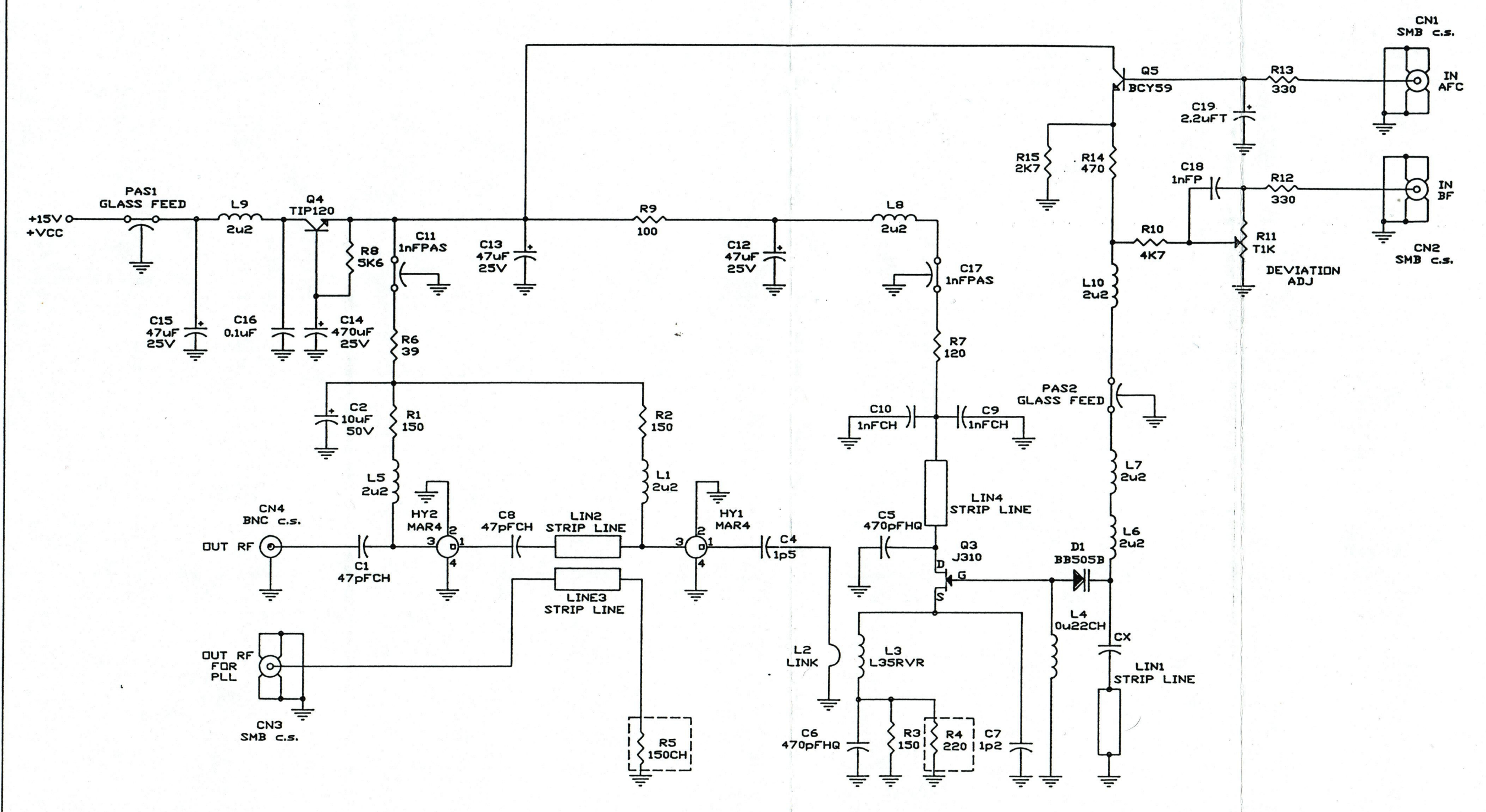
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STL-1 STUDIO TRANSMITTER LINK

V.C.O. CARD

- 1) CIRCUIT DIAGRAM PG. 50
- 2) BILL OF MATERIALS PG. 51 - 52
- 3) COMPONENT LAYOUT PG. 53



The resistor R4 and R5 could be not present

ENERGY-ONIX STL TRANSMITTER		
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STL-1 STUDIO TRANSMITTER LINK

## V.C.O. CARD

## BILL OF MATERIALS

Page 1 of 2

ITEM	QUANTITY	REFERENCE	PART	DESCRIPTION	PART ORDER CODE
1	1	R6	39	RESISTOR 1/4W 5%	RSC1/4JH0039
2	1	R9	100	RESISTOR 1/4W 5%	RSC1/4JH0100
3	1	R7	120	RESISTOR 1/4W 5%	RSC1/4JH0120
4	1	R5	150CH	CHIP RESISTOR	RCC1/4JH0150F
5	3	R1,R2,R3	150	RESISTOR 1/4W 5%	RSC1/4JH0150
6	1	R4	220	RESISTOR 1/4W 5%	RSC1/4JH0220
7	2	R12,R13	330	RESISTOR 1/4W 5%	RSC1/4JH0330
8	1	R14	470	RESISTOR 1/4W 5%	RSC1/4JH0470
9	1	R15	2K7	RESISTOR 1/4W 5%	RSC1/4JK02,7
10	1	R10	4K7	RESISTOR 1/4W 5%	RSC1/4JK04,7
11	1	R8	5K6	RESISTOR 1/4W 5%	RSC1/4JK05,6
12	1	R11	T1K	TRIMMER REG. VERT. 10mm	RVTD10VK0001
13	2	PAS1,PAS2		GLASS FEED PASSANTE IN VETRO	PASSVETRO
14	1	C7	1P2	CERAMIC CAPACITOR NPO	CKM1,2BJ600C
15	1	C4	1P5	CERAMIC CAPACITOR NPO	CKM1,5BJ600C
16	2	C1,C8	47pFCH	CERAMIC CHIP CAPACITOR	CCC470AJ500
17	2	C5,C6	470pFHQ	HEIGHT Q CAPACITOR	CHQ471AJ500
18	2	C9,C10	1nFCH	CERAMIC CHIP CAPACITOR	CCC102AJ500
19	2	C11,C17	1nFPAS	CERAMIC THROUGH CAPAC.	CDP102XK500
20	1	C18	1nFP	POLIELSTER CAPACITOR	CPE102BK161
21	1	C16	0.1(F	CERAMIC CAPACITOR	CKM104BK600P
22	1	C19	2.2(FT	TANTALIUM CAPACITOR	CET225AM350
23	1	C2	10(F	ELECTROLYTIC CAPACITOR	CEA106AM350
24	3	C12,C13,C15	47(F	ELECTROLYTIC CAPACITOR	CEA476BM630
25	1	C14	470(F	ELECTROLYTIC CAPACITOR	CEA477BM350



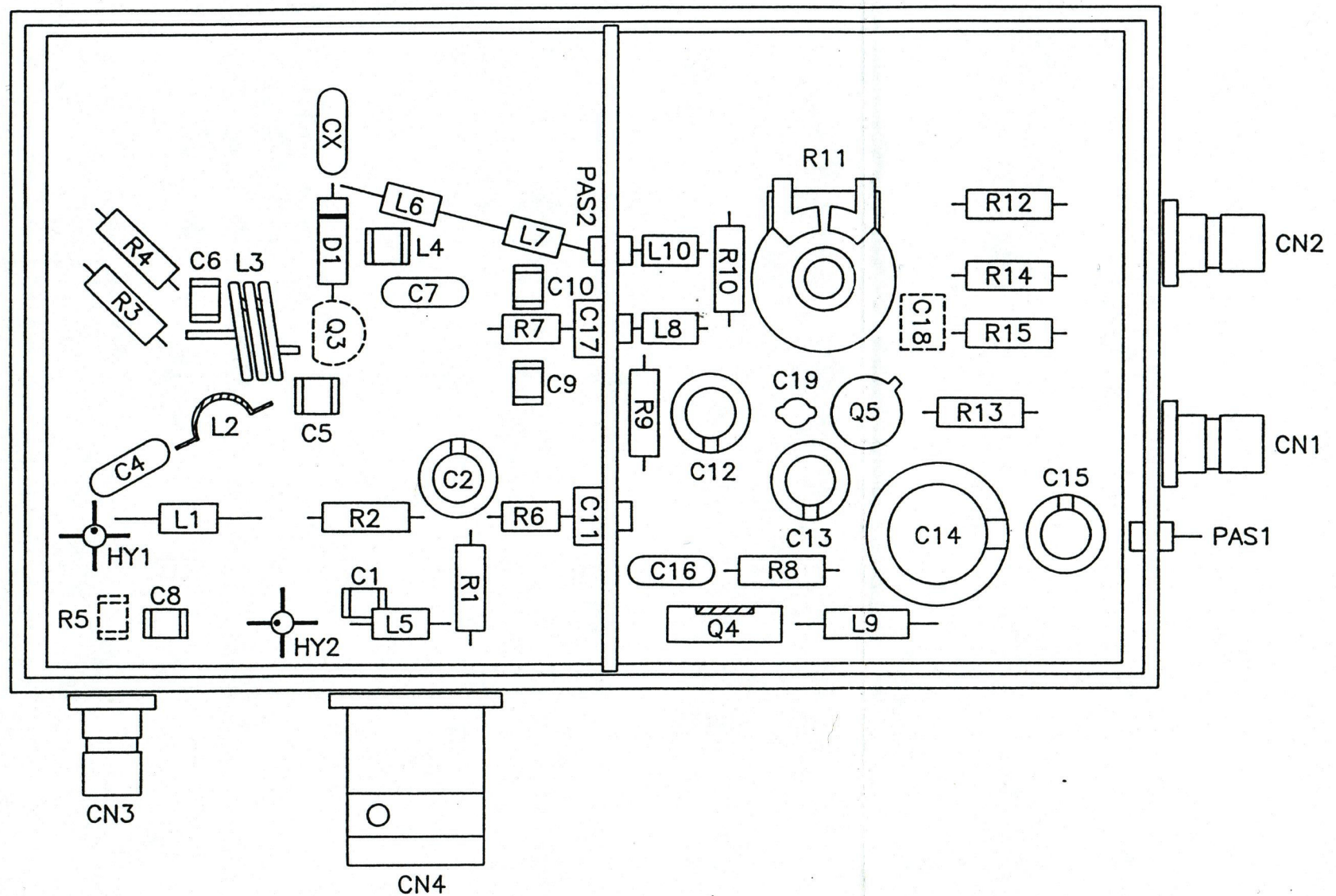
STL-1 STUDIO TRANSMITTER LINK

V.C.O. CARD

BILL OF MATERIALS

Page 2 of 2

ITEM	QUANTITY	REFERENCE	PART	DESCRIPTION	PART ORDER CODE
26	1	L4	0(22CH	CHIP RF CHOKE	
27	7	L1,L5,L6, L7,L8,L9, L10	2(2	RF CHOKE	IMP02U2A
28	1	L3	L35RVR	3 SP DIA 5	
29	1	L2	LINK	LINK FILO ARG. 1mm	CAVARG1000
30	1	CN4	BNC C.S. CONN.	BNC A STAMPATO	CNTBNCFCS
31	3	CN1,CN2,CN3	SMB C.S. CONN.	SMB A STAMPATO	CNTSMBMCS
32	1	D1	BB505B	VARICAP DIODE	DIVBB505
33	1	Q5	BCY59	NPN TRANSISTOR	TRNBCY59
34	1	Q4	TIP120	NPN DARLINGTON	TRNTIP120
35	1	Q3	J310	FET TRANSISTOR	TRNJ310
36	2	HY1,HY2	MAR4	HYBRID AMP MAR4	MIBMAR4
37	4	LIN1,LIN2, LIN3,LIN4	STRIP LINE	STRIP LINE	
38	1	CX	SEE REFERENCE TABLE D FOR THE VALUE OF THE CAPACITOR CX (PG. 40).		



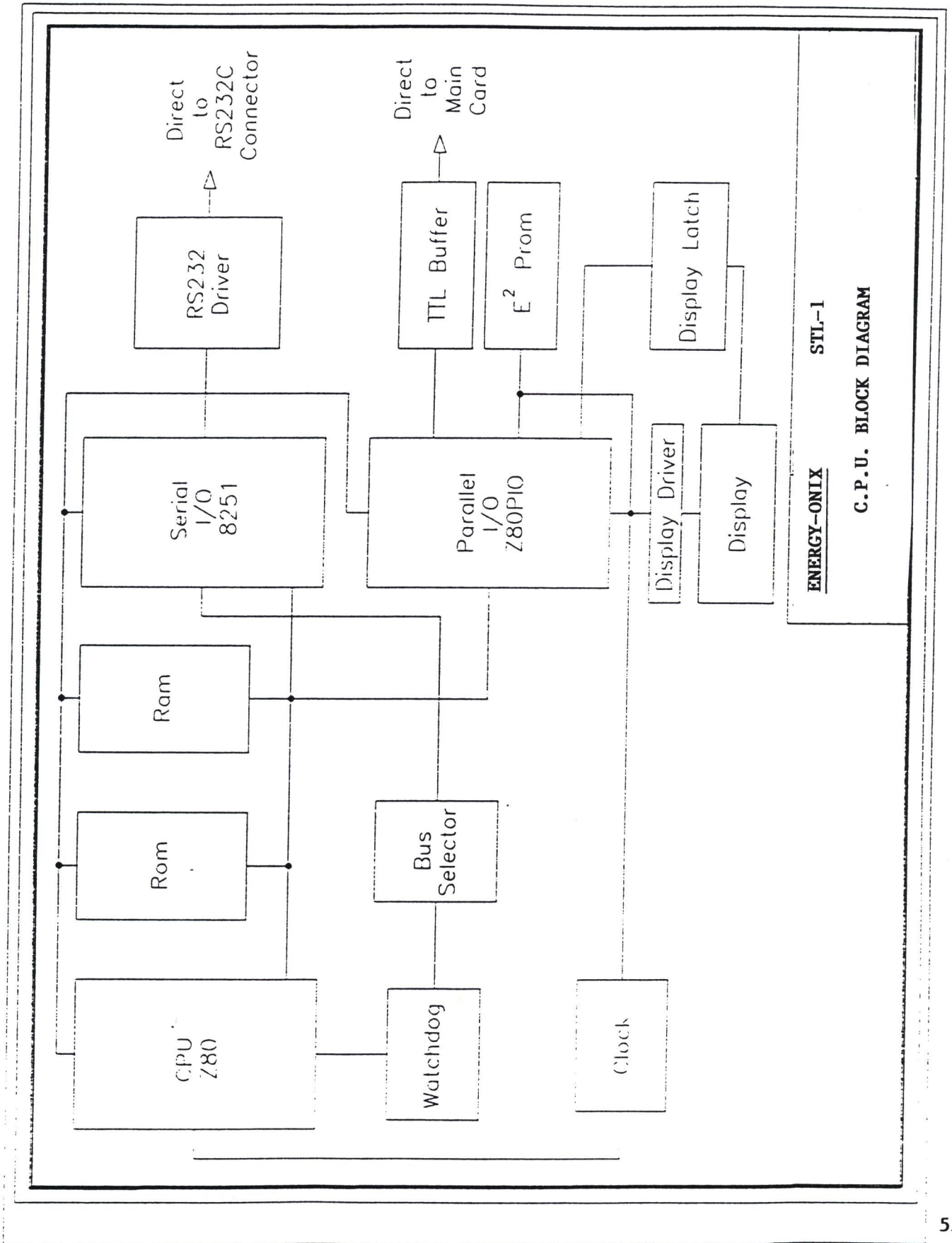
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Size	Document Number

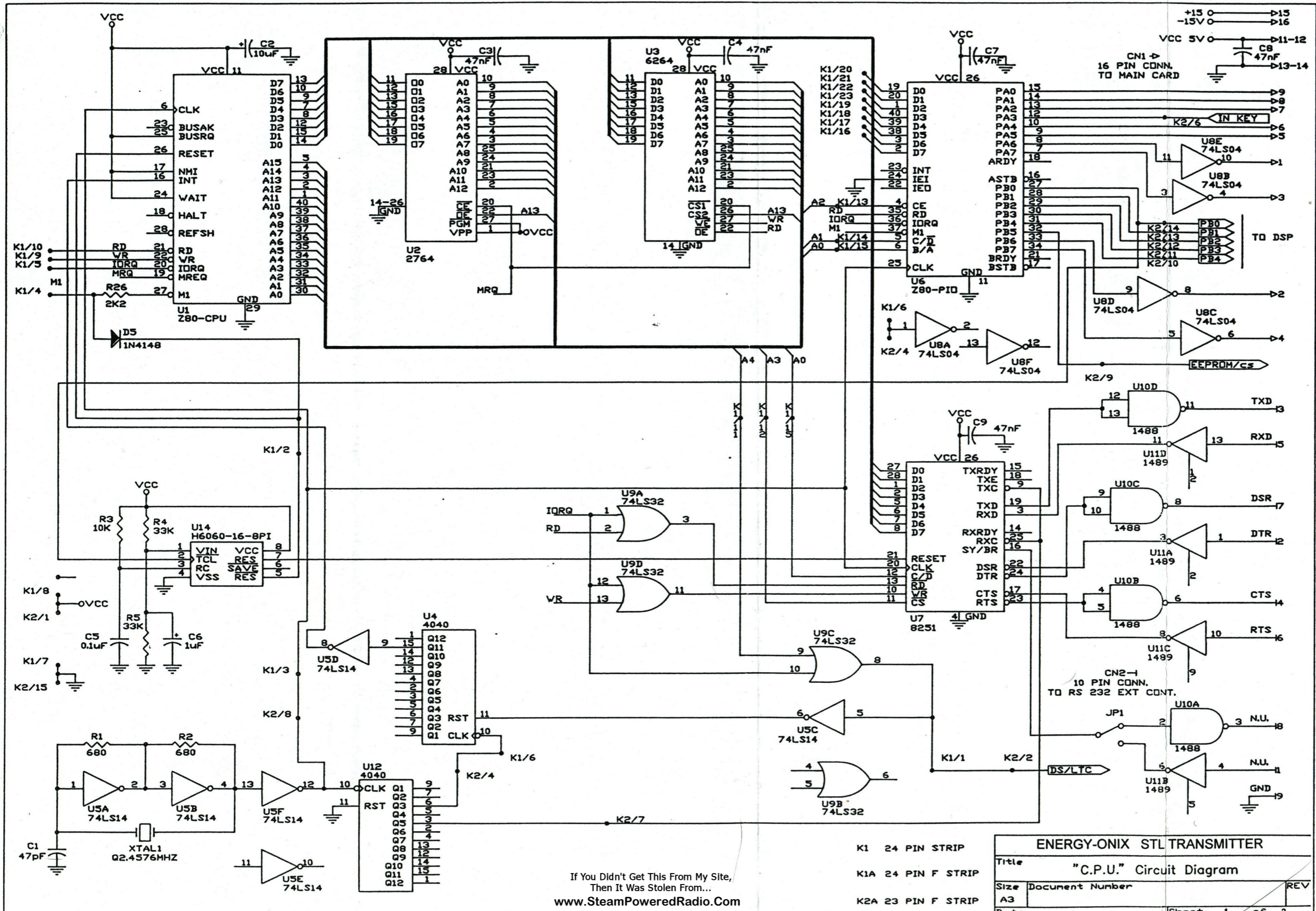
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C.P.U.

- 1) BLOCK DIAGRAM PG. 55
- 2) CIRCUIT DIAGRAM PG. 56 - 57
- 3) BILL OF MATERIALS PG. 58 - 60
- 4) COMPONENT LAYOUT PG. 61 - 63



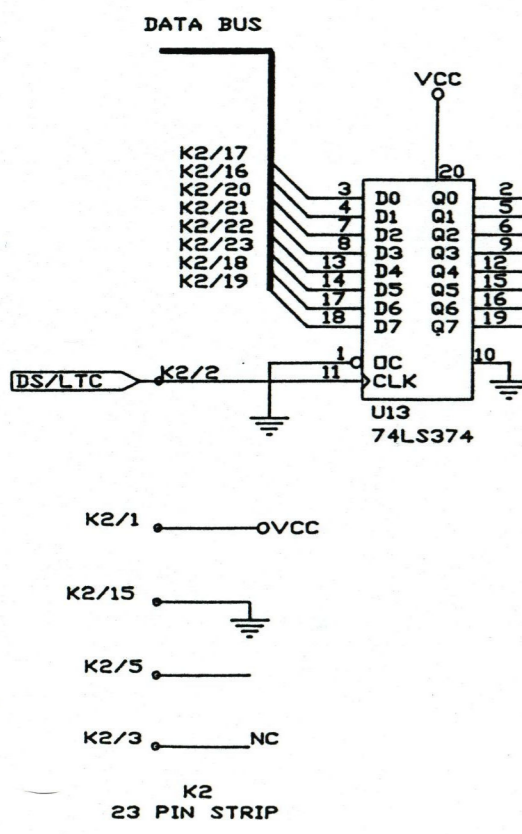
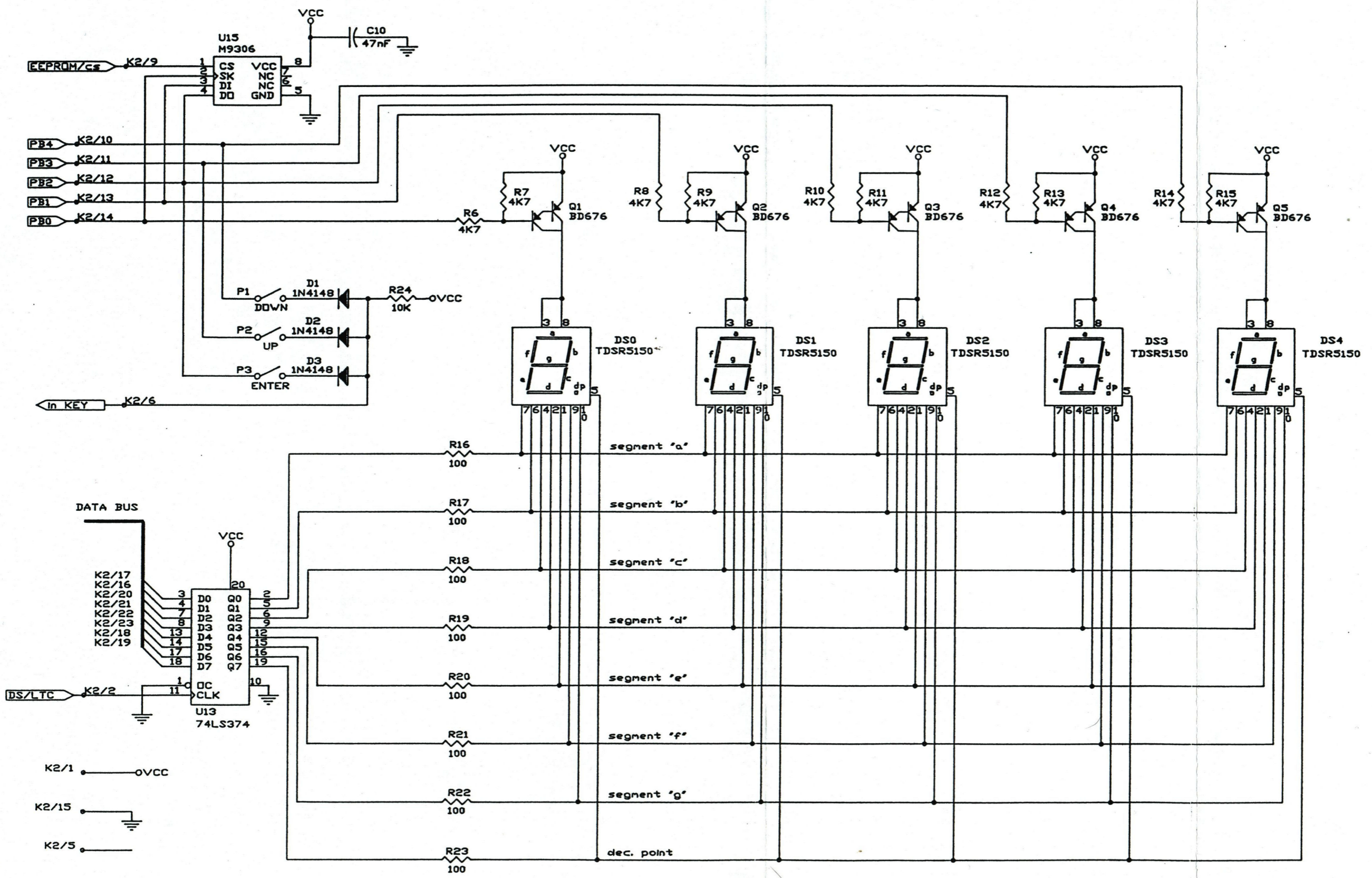
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**C.P.U. BLOCK DIAGRAM**



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- K1 24 PIN STRIP
- K1A 24 PIN F STRIP
- K2A 23 PIN F STRIP

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Title "C.P.U." Circuit Diagram		
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**STL-1 STUDIO TRANSMITTER LINK**

"C. P.U."

**BILL OF MATERIALS**

Page 1 of 3

ITEM	QUANTITY	REFERENCE	PART	DESCRIPTION	PART ORDER CODE
1	2	R1,R2	680	RESISTOR 1/4W 5%	RSC1/4JH0680
2	1	R3	10K	RESISTOR 1/4W 5%	RSC1/4JK0010
3	2	R4,R5	33K	RESISTOR 1/4W 5%	RSC1/4JK0033
4	1	C1	47pF	CERAMIC CAPACITOR NPO	CKM470BJ600C
5	5	C3,C4,C7, C8,C9	47nF	CERAMIC CAPACITOR	CKM473BK600P
6	1	C5	0.1(F	CERAMIC CAPACITOR	CKM104BK600P
7	1	C6	1(F	ELECTROLYTIC CAPACITOR	CEA105AM630
8	1	C2	10(F	ELECTROLYTIC CAPACITOR	CEA106AM350
9	1	K1	24P STRIP	STRIP M P 2.54 24 PIN	CNTSTRIPFCS
10	1	K2A	23P F STRIP	STRIP F P 2.54 23 PIN	CNTSTRIPFCS
11	1	K1A	24P F STRIP	STRIP F P 2.54 24 PIN	CNTSTRIPFCS
12	1	CN2	10P CONN.	CONN. M 2*5 P 2.54	CNTMCSFC10P
13	1	CN1	16P CONN.	CONN. M 2*8 P 2.54	CNTMCSFC16P
14	1	XTAL1	Q2.4576MHz	CRYSTAL	QRZ2,45HC18
15	1	U10	1488	TTL LEV. SHIFT RS232 CID1488	
16	1	U11	1489	TTL LEV. SHIFT RS232 CID1489	
17	2	U4,U12	4040	CMOS DIVIDER	CID4040
18	1	U8	74LS04	TTL HEX INVERTER	CID74LS04
19	1	U5	74LS14	TTL HEX INVERT. TRIGGER	CID74LS14
20	1	U9	74LS32	TTL QUAD OR	CID74LS32
21	1	U1	Z80-CPU	CPU	CIDZ80CPU
22	1	U6	Z80-PIO	PARALLEL I/O PORT	CIDZ80PIO
23	1	U7	8251	SERIAL I/O PORT	CID8251
24	1	U3	6264	RAM MEMORY 8KBYTE	CID6264
25	1	U2	2764	EPROM MEMORY 8KBYTE	CID2764

STL-1 STUDIO TRANSMITTER LINK

"C.P.U."

## BILL OF MATERIALS

Page 2 of 3

ITEM	QUANTITY	REFERENCE	PART	DESCRIPTION	PART ORDER CODE
26	1	U14	H606016-8PI	STANDALONE WATCHDOG	CIDH606016
27	1	ZC1	ZOC8	ZOCCOLO INTEGRATO 8 PIN	ZIN08
28	5	ZC2,ZC3, ZC4, ZC5, ZC6	ZOC14	ZOCCOLO INTEGRATO 14P	ZIN14
29	2	ZC7,ZC8	ZOC16	ZOCCOLO INTEGRATO 16 P	ZIN16
30	3	ZC9,ZC10, ZC11	ZOC28	ZOCCOLO INTEGRATO 28 P	ZIN28
31	2	ZC12,ZC13	ZOC40	ZOCCOLO INTEGRATO 40 P	ZIN40
32	1	CS2	CPU2	CS I/O CPU 2-1 (2-2)	PCBCPU2
33	1	SW1	WIRE JUMPER	PONTICELLO A FILO	WIREJUMPER
34	2	JP1,R25	N.C.	NOT CONNECTED	
35	8	R16,R17, R18,R19, R20,R21, R22,R23	100	RESISTOR 1/4W 5%	RSC1/4JHO100
36	10	R6,R7,R8, R9,R10,R11 R12,R13,R14, R15	4K7	RESISTOR 1/4W 5%	RSC1/4JK04,7
37	1	R24	10K	RESISTOR 1/4W 5%	RSC1/4JK0010
38	1	C10	47nF	CERAMIC CAPACITOR	CKM473BK600P
39	1	K2	23 P STRIP	STRIP M P 2.54 23 PIN	CNTSTRIPMCS
40	3	P1,P2,P3	P1V 2P	PULSANTE 1 VIA 2 POS	PLS1V11MO3CS
41	3	D1,D2,D3	1N4148	SILICON DIODE	DIS1N4148
42	5	DS1,DS2, DS3,DS4,DS0	TDSR5150	7 SEGM. DISPLAY	DSPAC14RO
43	5	Q1,Q2,Q3, Q4,Q5	BD676	PNP DARLINGTON	TRNBD676
44	1	U13	74LS374	TTL LATCH	CID74LS374
45	1	U15	M9306	EEPROM 256BIT	CIDM9306
46	1	ZC14	ZOC8	ZOCCOLO INTEGRATO 8 P	ZIN08

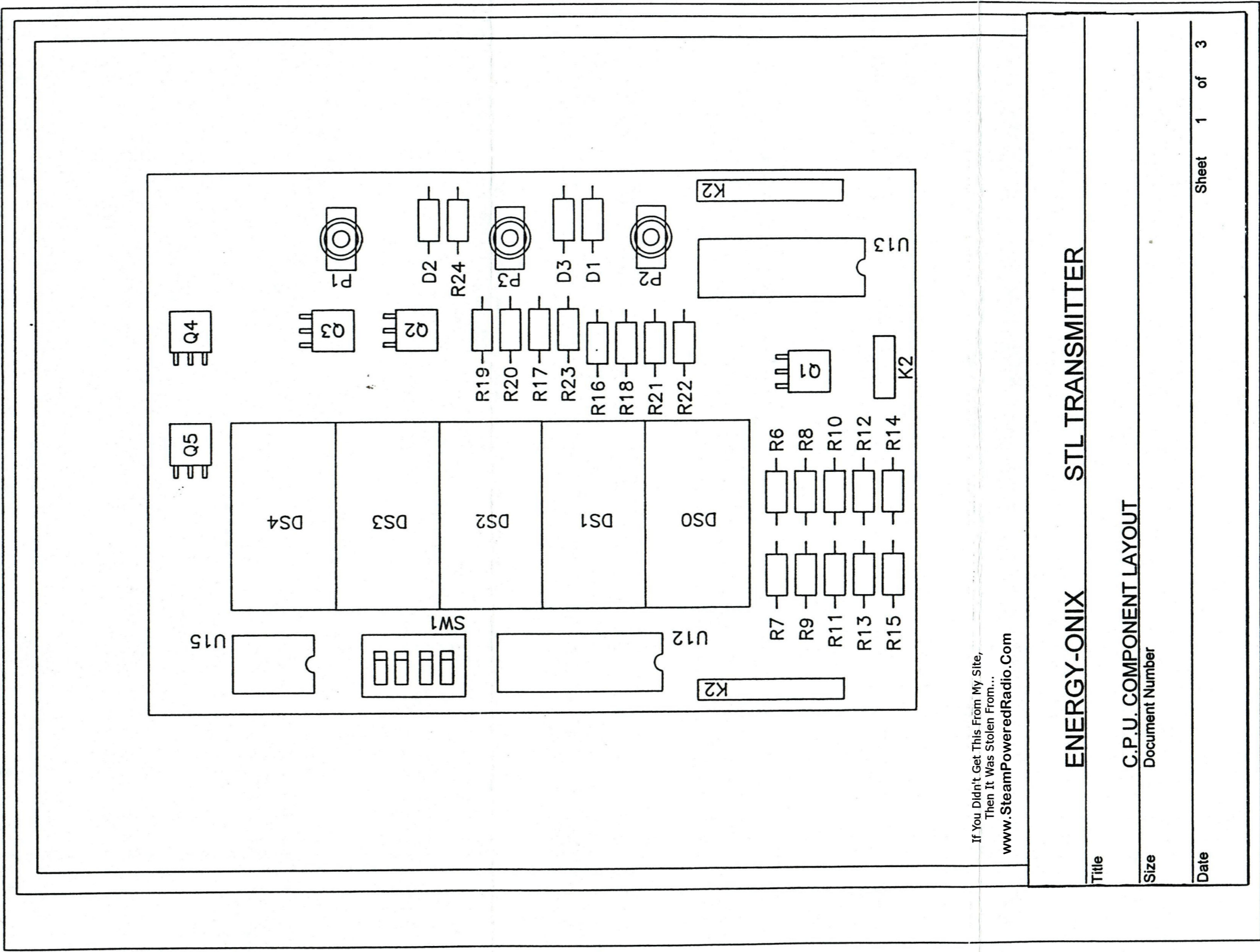


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**BILL OF MATERIALS**

**Page 3 of 3**

ITEM	QUANTITY	REFERENCE	PART	DESCRIPTION	PART ORDER CODE
47	1	ZC15	ZOC20	ZOCCOLO INTEGRATO 20 P	ZIN20
48	2	ZC16, ZC17	ZOC24	ZOCCOLO INTEGRATO 24 P	ZIN24
49	2	ZC18, ZC19	ZOC28	ZOCCOLO INTEGRATO 28 P	ZIN28
50	1	CS3	CPU3	CS DISPL PULS CPU 3-1	PCBCPU3



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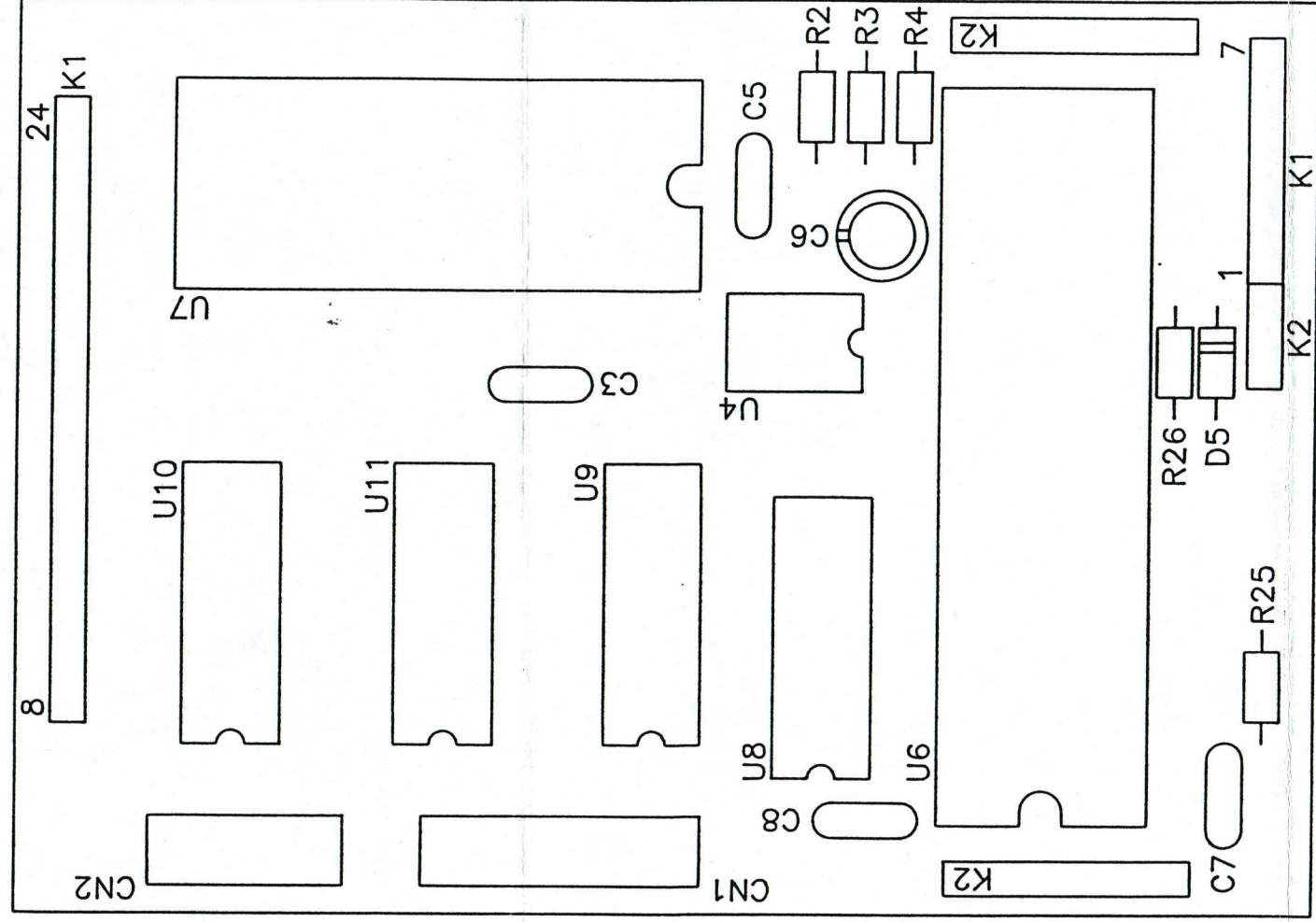
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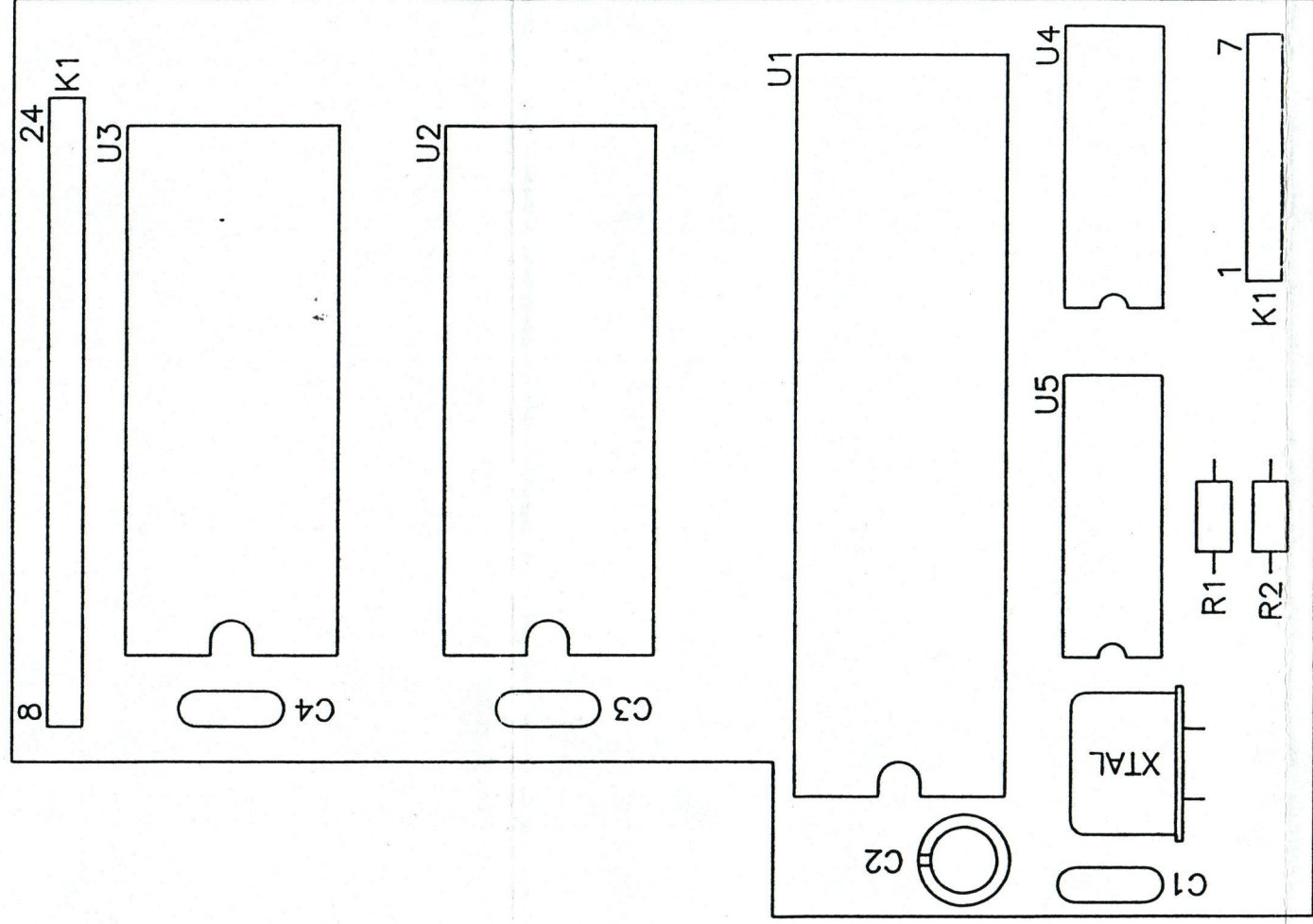
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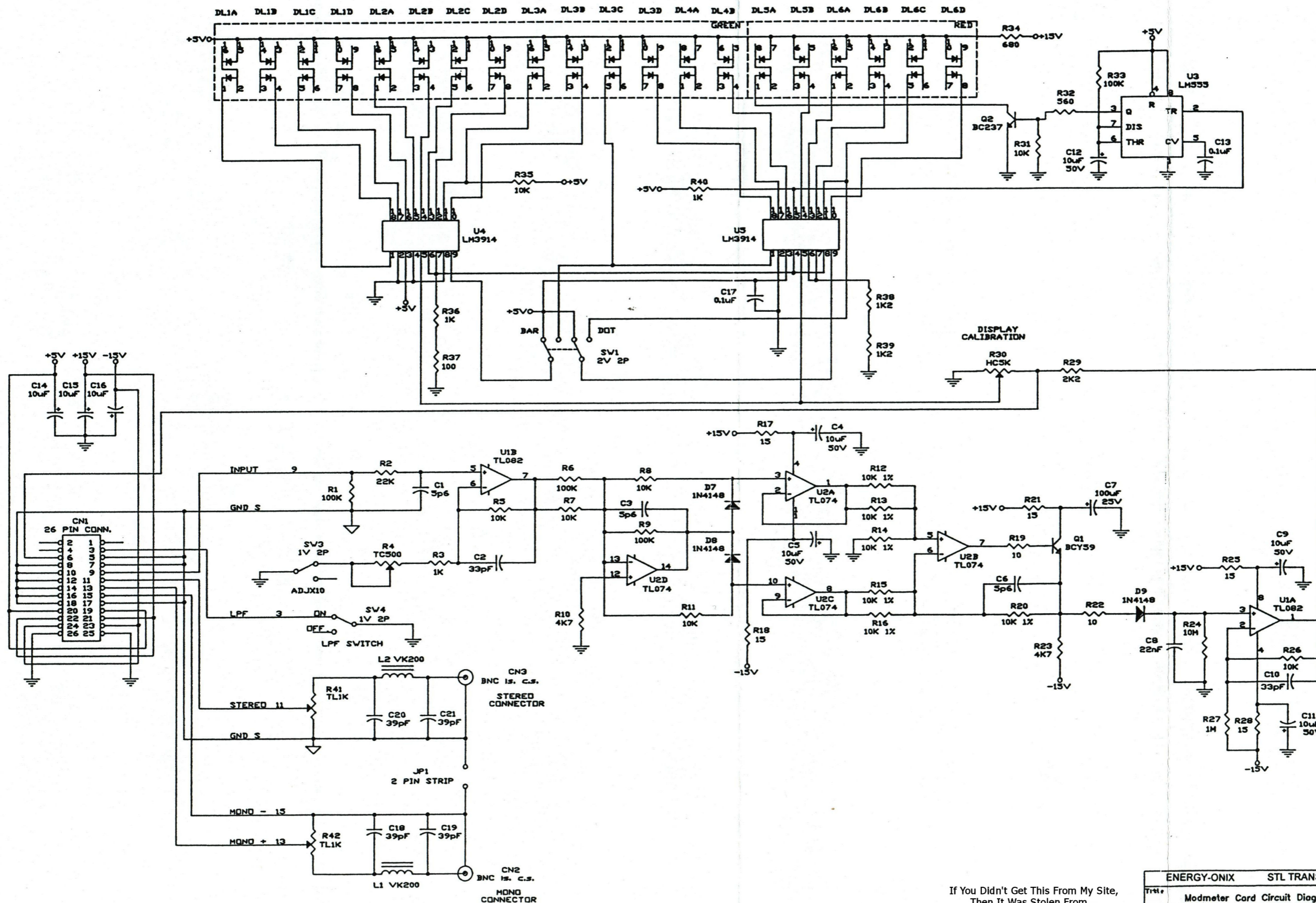


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MODMETER CARD

- 1) CIRCUIT DIAGRAM PG. 65
- 2) BILL OF MATERIALS PG. 66 - 67
- 3) COMPONENT LAYOUT PG. 68



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**MODMETER CARD**

**BILL OF MATERIALS**

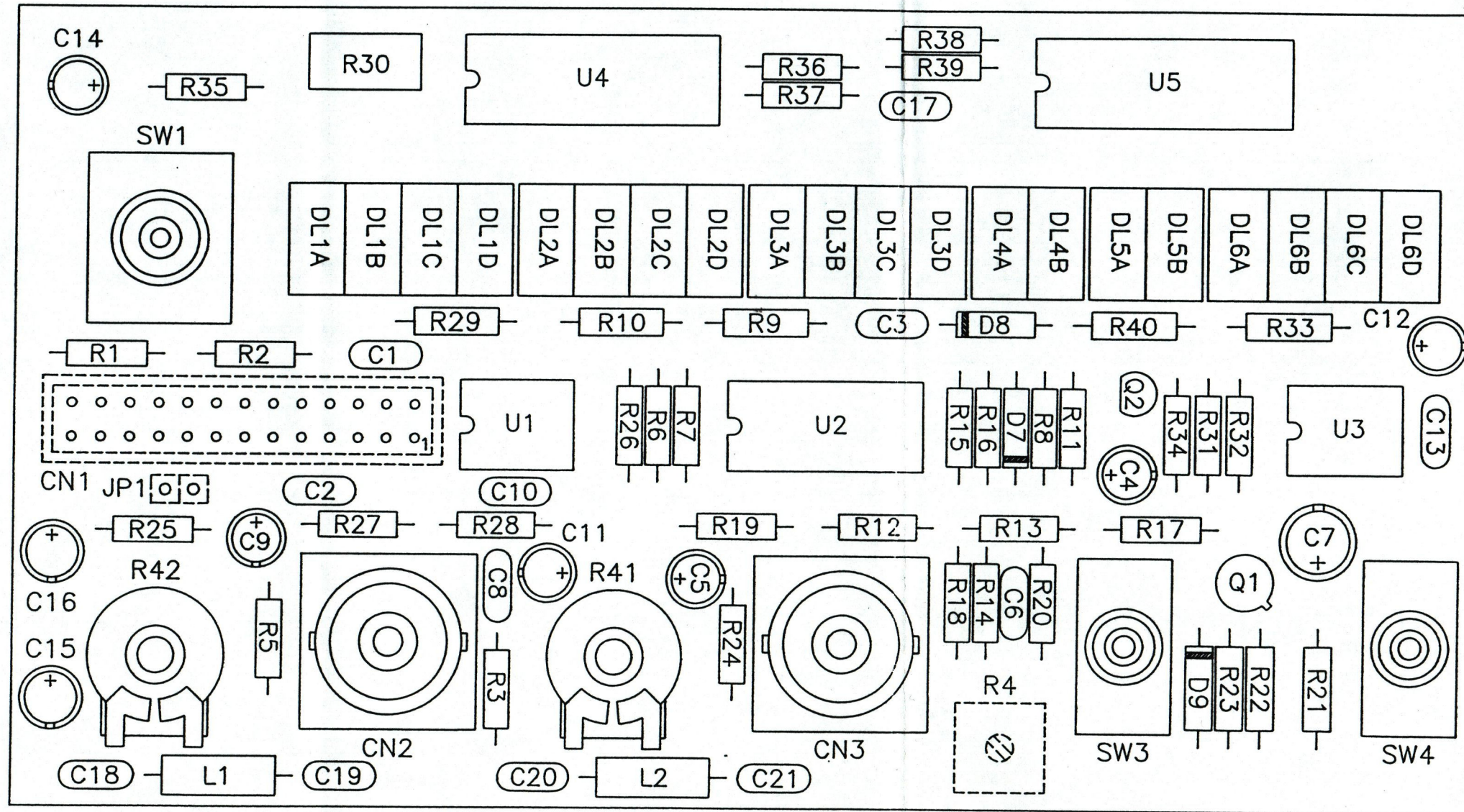
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1	2	R19,R22	10	RESISTOR 1/4W 5%	RSC1/4JH0010
2	5	R17,R18, R21,R25, R28	15	RESISTOR 1/4W 5%	RSC1/4JH0015
3	1	R37	100	RESISTOR 1/4W 5%	RSC1/4JH0100
4	1	R32	560	RESISTOR 1/4W 5%	RSC1/4JH0560
5	1	R34	680	RESITROR 1/4W 5%	RSC1/4JH0680
6	3	R3,R36,R40	1K	RESISTOR 1/4W 5%	RSC1/4JK0001
7	2	R38,R39	1K2	RESISTOR 1/4W 5%	RSC1/4JK01,2
8	1	R29	2K2	RESISTOR 1/4W 5%	RSC1/4JK02,2
9	2	R10,R23	4K7	RESISTOR 1/4W 5%	RSC1/4JK04,7
10	6	R12,R13, R14,R15, R16,R20	10K 1%	RESISTOR 1/4W 5%	RSM1/4FK0010
11	7	R5,R7,R8, R11,R26, R31,R35	10K	RESISTOR 1/4W 5%	RSC1/4JK0010
12	1	R2	22K	RESISTOR 1/4W 5%	RSC1/4JK0022
13	4	R1,R6,R9, R33	100K	RESISTOR 1/4W 5%	RSC1/4JK0100
14	1	R27	1M	RESISTOR 1/4W 5%	RSC1/4JM0001
15	1	R24	10M	RESISTOR 1/4W 5%	RSC1/4JM0010
16	1	R4	TC500	TRIM. REG. VERT. CERMET	RVTCERVH0500
17	2	R41,R42	TL1K	TRIM. REG. VERT. 15mm	RVTD15VK0001
18	1	R30	HC5K	TRIM. REG. ORIZ. CERMET	RVTCEROK0005
19	2	ALB1,ALB2	ALB	ALBERINO TRIMMER 15mm	ALBERINOXRVT
20	3	C1,C3,C6	5p6	CERAMIC CAPACITOR NPO	CKM5,6BJ600C
21	2	C2,C10	33pF	CERAMIC CAPACITOR NPO	CKM330BJ600C
22	4	C18,C19 C20,C21	39pF	CERAMIC CAPACITOR NPO	CKM390BJ600C

**MODMETER CARD**

**BILL OF MATERIALS**

ITEM	QUANTITY	REFERENCE	PART	DESCRIPTION	PART ORDER CODE
23	1	C8	22NF	CERAMIC CAPACITOR	CKM223BK600P
24	2	C13,C17	0.1(F	CERAMIC CAPACITOR	CKM104BK600P
25	1	C7	100(F	ELECTROLYTIC CAPACITOR	CEA107BM350
26	8	C4,C5,C9 C11,C12, C14,C15, C16	10(F	ELECTROLYTIC CAPACITOR	CEA106AM350
27	2	L1,L2	VK200	RF CHOKE	IMPVK200
28	1	JP1	2 PIN STRIP	STRIP M P 2.54 2 PIN	CNTSTRIPMCS
29	1	CN1	26P CONN.	CONN. M 2*13 P 2.54	CNTMCSFC26P
30	2	CN2,CN3	BNC IS. CS	CONN. BNC A STAMP. IS.	CNTBNCFCISIS
31	2	SW3,SW4	1V 2P	DEVIATORE 1 VIA 2 POS	DEV1V1103CS
32	1	SW1	2V 2P	DEVIATORE 2 VIE 2 POS	DEV2V1103CS
33	3	D7,D8,D9	1N4148	SILICON DIODE	DIS1N4148
34	1	DL5	HLMP2600	2 RED LED DIODE	LEDHLMP2600
35	1	DL6	HLMP2620	4 RED LED DIODE	LEDHLMP2620
36	1	DL4	HLMP2800	2 GREEN LED DIODE	LEDHLMP2800
37	3	DL1,DL2, DL3	HLMP2820	4 GREEN LED DIODE	LEDHLMP2820
38	1	Q2	BC237	NPN TRANSISTOR	TRNBC237
39	1	Q1	BCY59	NPN TRANSISTOR	TRNBCY59
40	1	U1	TL082	DOUBLE OP. AMP.	CILTL082
41	1	U2	TL074	QUAD OP. AMP.	CILTL074
42	1	U3	LM555	TIMER	CIL555
43	2	U4,U5	LM3914	BAR DOT LED DRIVER	CILLM3914

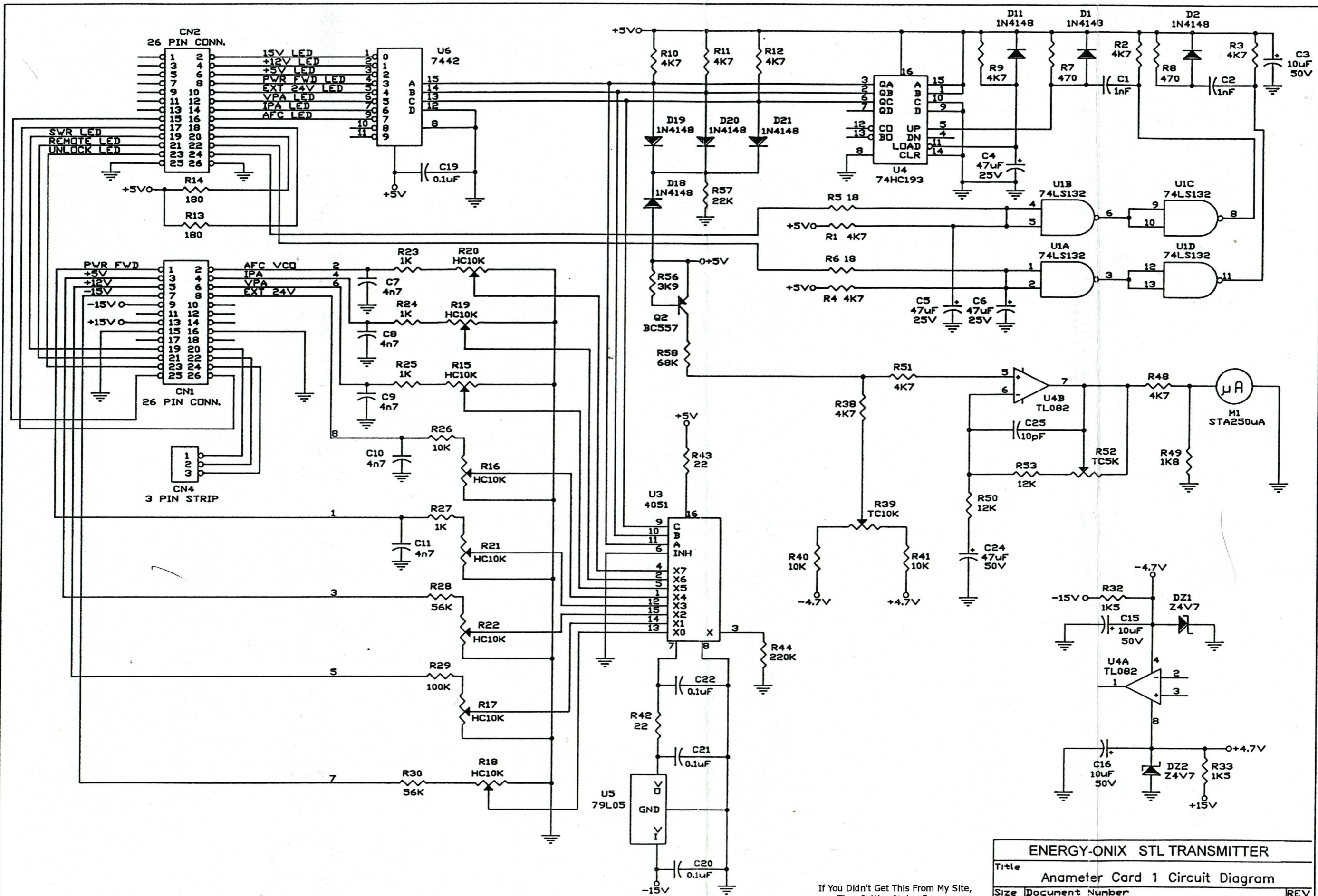




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<b>MODMETER CARD COMPONENT LAYOUT</b>	
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ANAMETER CARD

- 1) ANAMETER CARD 1 CIRCUIT DIAGRAM PG. 70
- 2) ANAMETER CARD 1 BILL OF MATERIALS PG. 71 - 72
- 3) ANAMETER CARD 1 COMPONENT LAYOUT PG. 73
- 4) ANAMETER CARD 2 CIRCUIT DIAGRAM PG. 74
- 5) ANAMETER CARD 2 BILL OF MATERIALS PG. 75
- 6) ANAMETER CARD 2 COMPONENT LAYOUT PG. 76



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ANAMETER CARD 1

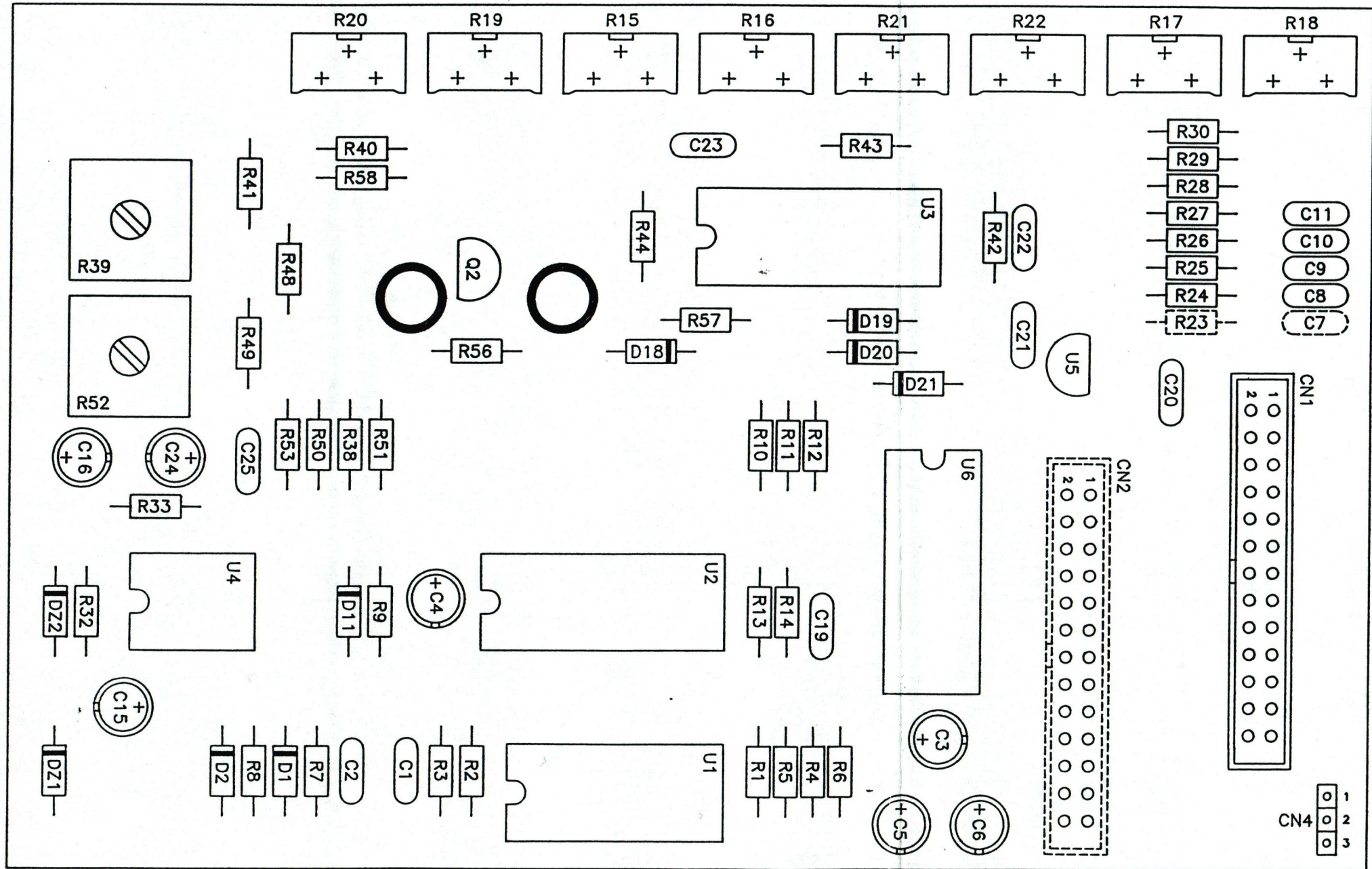
BILL OF MATERIALS

ITEM	QUANTITY	REFERENCE	PART	DESCRIPTION	PART ORDER CODE
1	2	R5,R6	18	RESISTOR 1/4W 5%	RSC1/4JH0018
2	2	R42,R43	22	RESISTOR 1/4W 5%	RSC1/4JH0022
3	2	R13,R14	180	RESISTOR 1/4W 5%	RSC1/4JH0180
4	2	R7, R8	470	RESISTOR 1/4W 5%	RSC1/4JH0470
5	4	R23,R24, R25,R27	1K	RESISTOR 1/4W 5%	RSC1/4JK0001
6	2	R32,R33	1K5	RESISTOR 1/4W 5%	RSC1/4JK01,5
7	1	R49	1K8	RESISTOR 1/4W 5%	RSC1/4JK01,8
8	1	R56	3K9	RESISTOR 1/4W 5%	RSC1/4JK03,9
9	11	R1,R2,R3, R4,R9,R10, R11,R12, R38,R48, R51	4K7	RESISTOR 1/4W 5%	RSC1/4JK04,7
10	3	R26,R40, R41	10K	RESISTOR 1/4W 5%	RSC1/4JK0010
11	2	R50,R53	12K	RESISTOR 1/4W 5%	RSC1/4JK0012
12	1	R57	22K	RESISTOR 1/4W 5%	RSC1/4JK0022
13	2	R28,R30	56K	RESISTOR 1/4W 5%	RSC1/4JK0056
14	1	R58	68K	RESISTOR 1/4W 5%	RSC1/4JK0068
15	1	R29	100K	RESISTOR 1/4W 5%	RSC1/4JK0100
16	1	R44	220K	RESISTOR 1/4W 5%	RSC1/4JK0220
17	1	R52	TC5K	TRIM. REG. VERT. CERMET	RVTCERVK0005
18	1	R39	TC10K	TRIM. REG. VERT. CERMET	RVTCERVK0010
19	8	R15,R16, R17,R18, R19,R20, R21,R22	HC10K	TRIM. REG. ORIZ. CERMET	RVTCEROK0010
20	1	C25	10pF	CERAMIC CAPACITOR NPO	CKM100BJ600C
21	2	C1,C2	1NF	CERAMIC CAPACITOR	CKM102BK600P

**ANAMETER CARD**

**BILL OF MATERIALS**

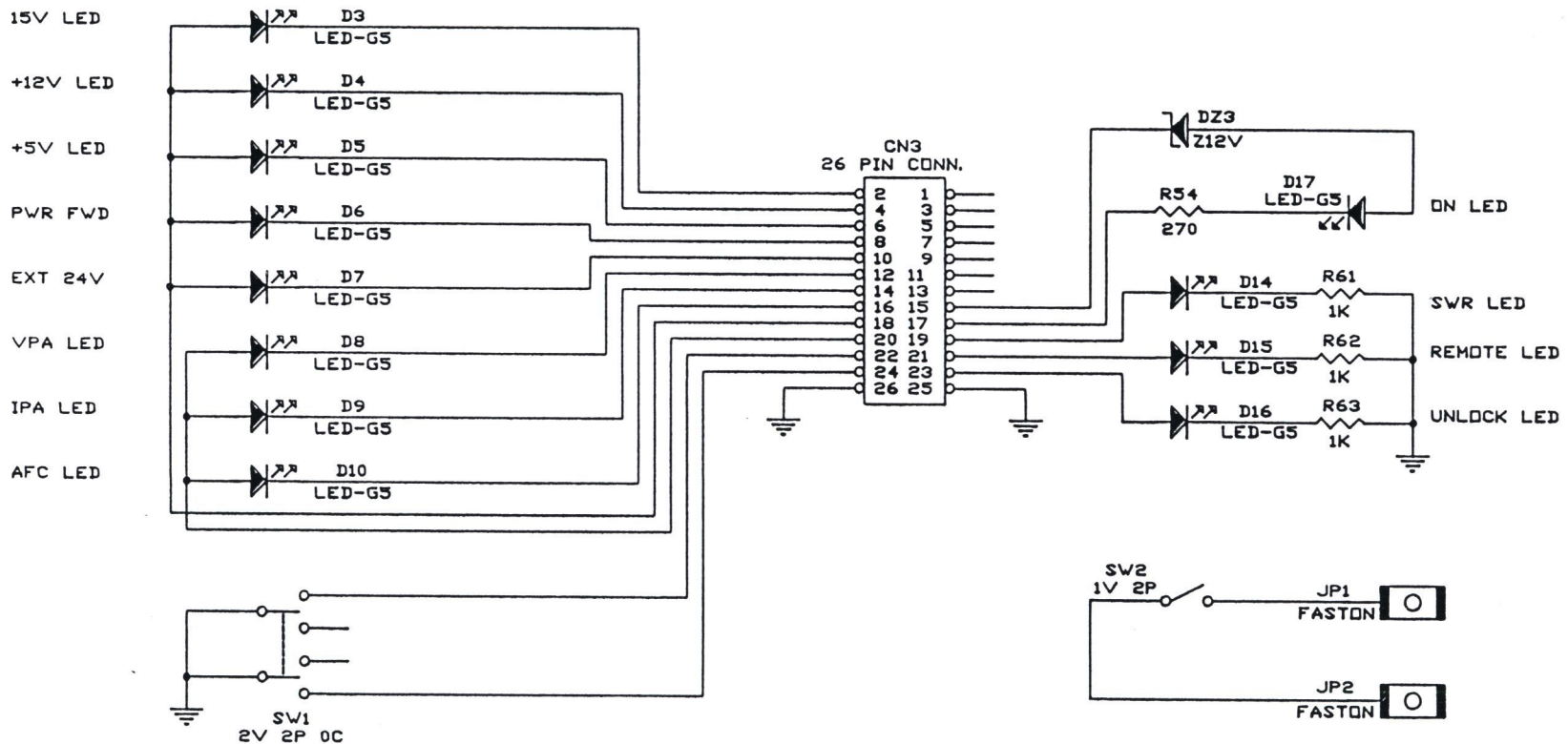
ITEM	QUANTITY	REFERENCE	PART	DESCRIPTION	PART ORDER CODE
22	5	C7,C8,C9, C10,C11	4N7	CERAMIC CAPACITOR	CKM472BK600P
23	4	C19,20, C21,C22	0.1(F	CERAMIC CAPACITOR	CKM104BK600P
24	3	C3,C15,C16	10(F	ELECTROLYTIC CAPACITOR	CEA106AM350
25	4	C4,C5,C6 C24	47(F	ELECTROLYTIC CAPACITOR	CEA476BM630
26	1	M1	STA250UA	STRUMENTO 250(A	SMABM55RQ251
27	1	CN4	3 PIN STRIP	STRIP M P 2.54 3 PIN	CNTSTRIPMCS
28	2	CN1,CN2	26P CONN.	CONN. M 2*13 P 2.54	CNTMCSFC26P
29	7	D1,D2,D11, D18,D19, D20,D21	1N4148	SILICON DIODE	DIS1N4148
30	2	DZ1,DZ2	Z4V7	ZENER DIODE 4.7V 0.4W	DIZ4V7OW4
31	1	U5	79L05	NEGATIVE STABILIZER 100mA	CIL79L05
32	1	Q2	BC557	PNP TRANSISTOR	TRNBC557
33	1	U4	TL082	DOUBLE OP. AMP.	CILTL082
34	1	U3	4051	ANALOG MULTIMETER	CID4051
35	1	U6	7442	TTL BCD DECODER	CID7442
36	1	U1	74LS132	TTL QUAD NAND TRIGGER	CID74LS132
37	1	U4	74HC193	CMOS BIN COUNTER	CID74HC193



**ENERGY-ONIX STL TRANSMITTER**

Title	<b>ANAMETER CARD 1 COMPONENT LAYOUT</b>	
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Title			
Anameter Card 2 Circuit Diagram			
Size	Document Number		REV
A4			
Date:	Sheet		of

STL-1 STUDIO TRANSMITTER LINK

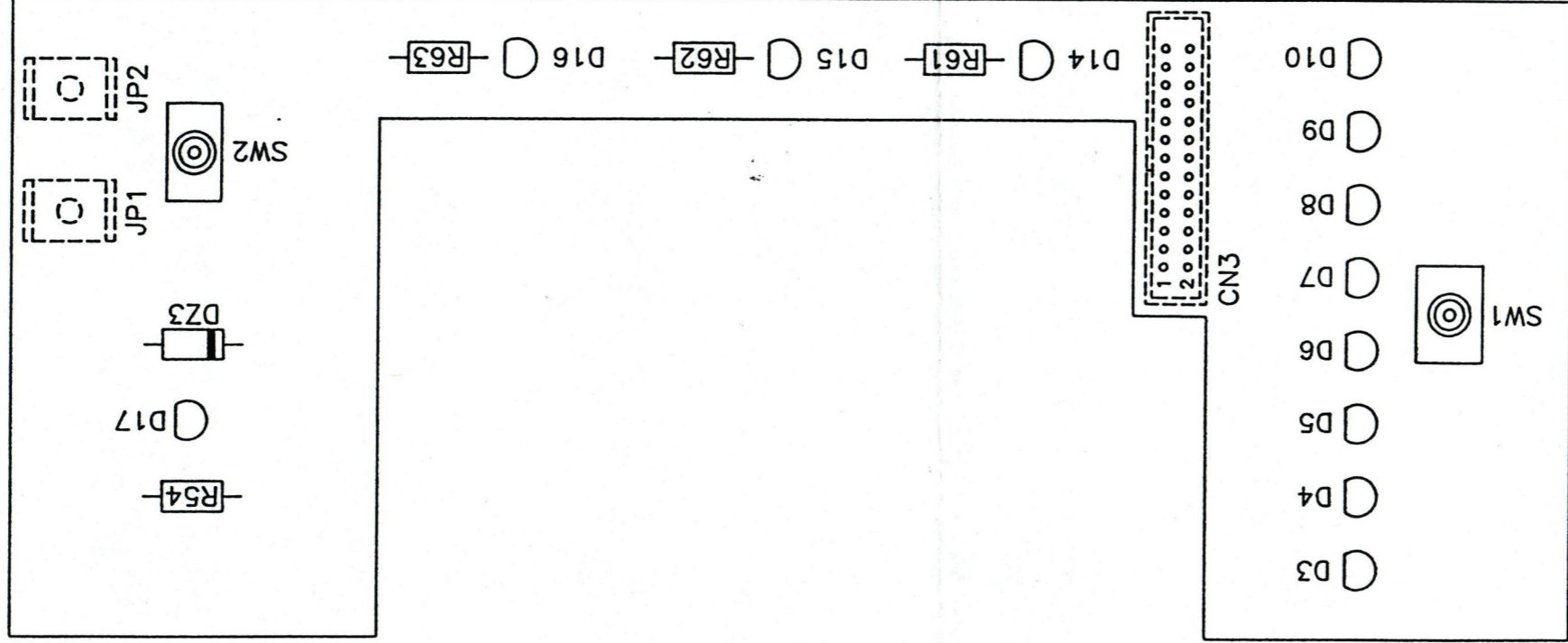
ANAMETER CARD 2

BILL OF MATERIALS

Page 1 of 1

ITEM	QUANTITY	REFERENCE	PART	DESCRIPTION	PART ORDER CODE
1	1	R54	270	RESISTOR 1/4W 5%	RSC1/4JH0270
2	3	R61,R62, R63	1K	RESISTOR 1/4W 5%	RSC1/4JK0001
3	2	JP1,JP2	FASTON	CON. FASTON M CIRC.ST.	CNTFSTMCSGR
4	1	CN3	26P CONN.	CONN. M 2*13 P 2.54	CNTMCSFC26P
5	1	SW2	1V 2P	DEVIATORE 1 VIA 2 POS	DEV1V1103CS
6	1	SW1	2V 2P 0C	DEV. 2 VIE 2 POS 0 CENT	DEV2V1M01M03
7	12	D3,D4,D5, D6,D7,D8, D9,D10, D14,D15, D16,D17	LED-G5	GREEN LED DIODE	LEDVE05
8	1	DZ3	Z12V	ZENER DIODE 12V 0.4W	DIZ12V0W4



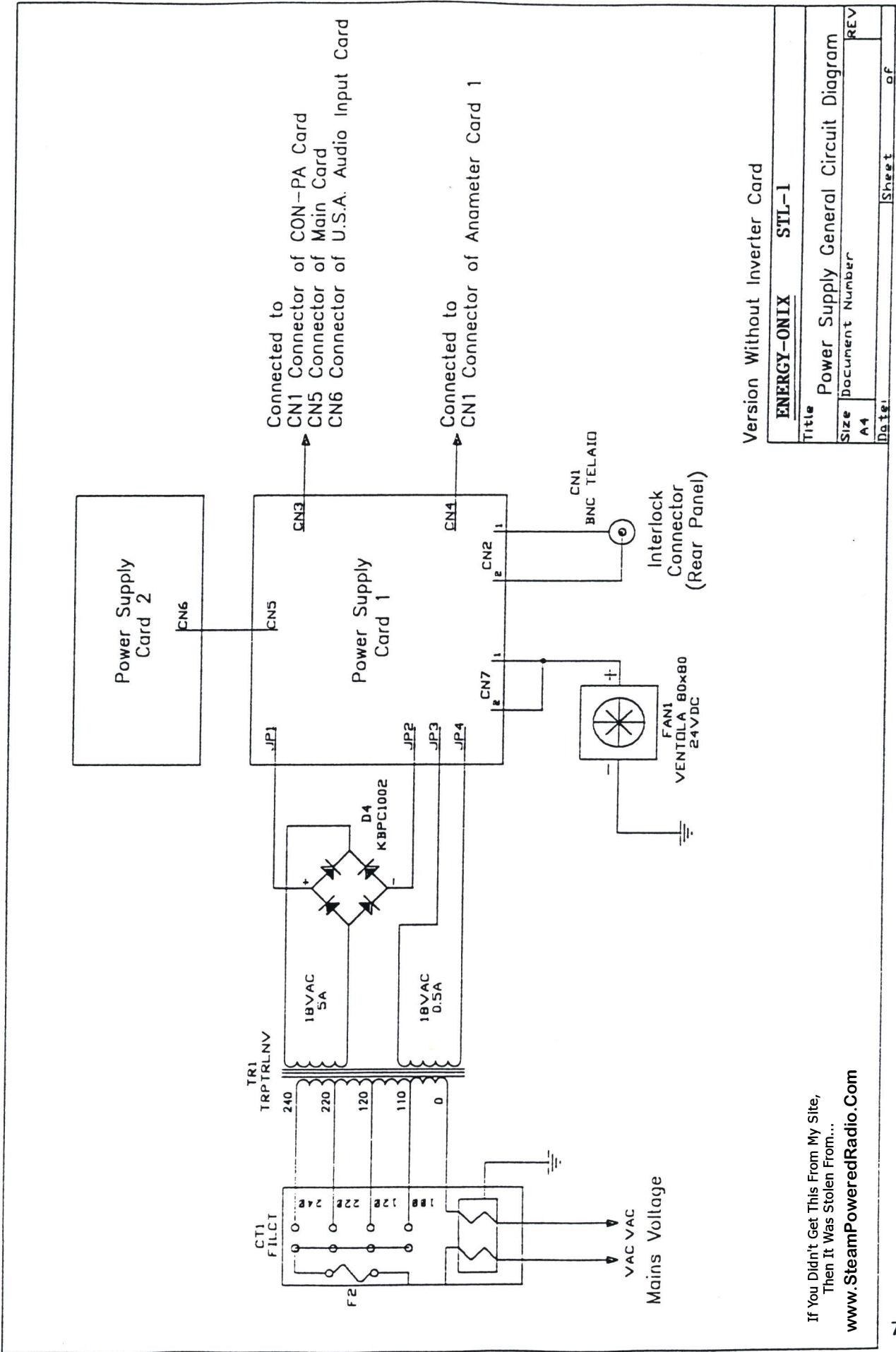


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Title	ENERGY-ONIX	STL TRANSMITTER
Size	ANAMETER CARD 2 COMPONENT LAYOUT	
	Document Number	
Date		Sheet 1 of 1

POWER SUPPLY

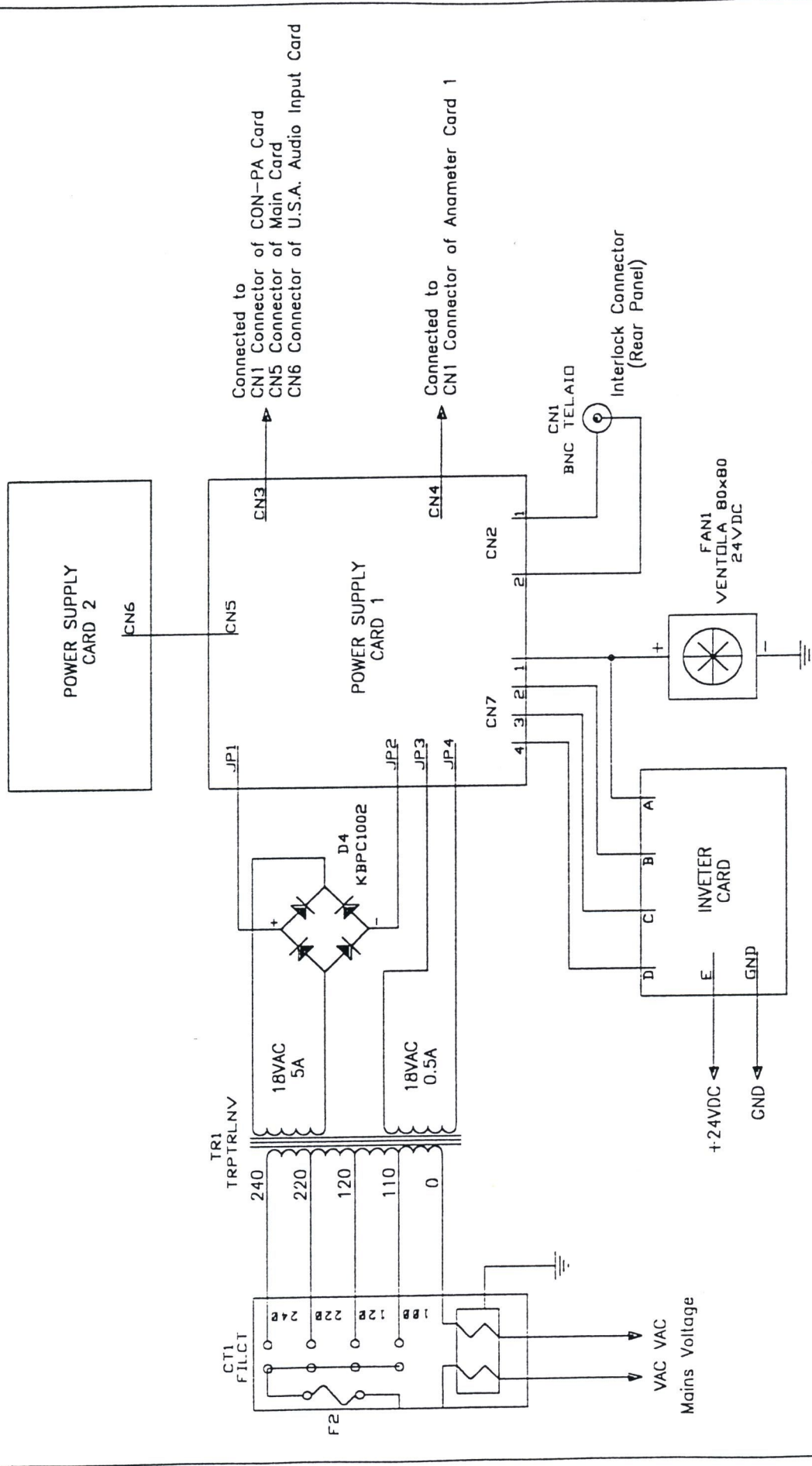
1)	POWER SUPPLY GENERAL CIRCUIT DIAGRAM (WITHOUT INVERTER CARD)	PG. 78
2)	POWER SUPPLY GENERAL CIRCUIT DIAGRAM (WITH INVERTER CARD)	PG. 79
3)	POWER SUPPLY CARD 1 CIRCUIT DIAGRAM	PG. 80
4)	POWER SUPPLY CARD 1 BILL OF MATERIALS	PG. 81 - 83
5)	POWER SUPPLY CARD 1 COMPONENT LAYOUT	PG. 84
6)	POWER SUPPLY CARD 2 CIRCUIT DIAGRAM	PG. 85
7)	POWER SUPPLY CARD 2 BILL OF MATERIALS	PG. 86
8)	POWER SUPPLY CARD 2 COMPONENT LAYOUT	PG. 87



Version Without Inverter Card

<b>ENERGY-ONIX</b>		<b>STL-1</b>	
Title Power Supply General Circuit Diagram			
Size	Document Number		REV
A4			
Date:		Sheet	of

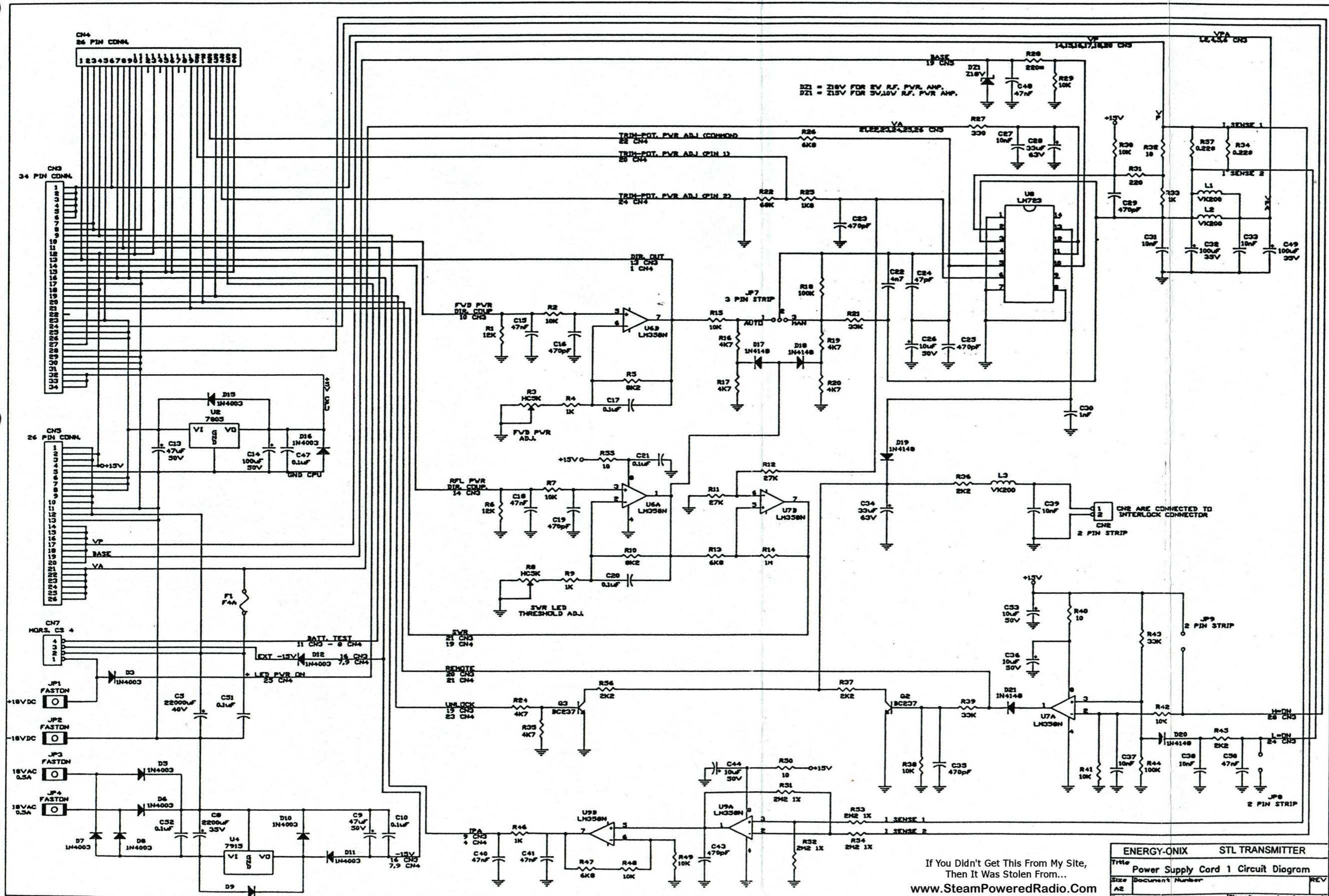
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Version With Inverter Card

<b>ENERGY-ONIX</b>		<b>S'TL-1</b>	
Title Power Supply General Circuit Diagram			
Size A4	Document Number	REV	
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ENERGY-ONIX		STL TRANSMITTER	
Title	Power Supply Card 1 Circuit Diagram		
Size	Document Number	REV	
A2			
Date	Sheet 1 of 1		

STL-1 STUDIO TRANSMITTER LINK

POWER SUPPLY CARD 1

BILL OF MATERIALS

ITEM	QUANTITY	REFERENCE	PART	DESCRIPTION	PART ORDER CODE
1	1	R34	0.22*	RESISTOR 1/2W 5%	RSC1/2JH0, 22
2	1	R57	0.22\$	RESISTOR 5W	RAF005JH0,22
3	4	R32,R40 R50,R55	10	RESISTOR 1/4W 5%	RSC1/4JH0010
4	1	R31	220	RESISTOR 1/4W 5%	RSC1/4JH0220
5	1	R28	220*	RESISTOR 1/2W 5%	RSC1/2JH0220
6	1	R27	330	RESISTOR 1/4W 5%	RSC1/4JH0330
7	4	R4,R9,R33, R46	1K	RESISTOR 1/4W 5%	RSC1/4JK0001
8	1	R25	1K8	RESISTOR 1/4W 5%	RSC1/4JK01,8
9	4	R36,R37, R45,R56	2K2	RESISTOR 1/4W 5%	RSC1/4JK02,2
10	6	R16,17, R19,R20, R24,R35	4K7	RESISTOR 1/4W 5%	RSC1/4JK04,7
11	3	R13,R26,R47	6K8	RESISTOR 1/4W 5%	RSC1/4JK06,8
12	2	R5,R10	8K2	RESISTOR 1/4W 5%	RSC1/4JK08,2
13	10	R2,R7,R15, R29,R30, R38,R41, R42,R48, R49	10K	RESISTOR 1/4W 5%	RSC1/4JK0010
14	2	R1,R6	12K	RESISTOR 1/4W 5%	RSC1/4JK0012
15	2	R11,R12	27K	RESISTOR 1/4W 5%	RSC1/4JK0027
16	3	R21,R39,R43	33K	RESISTOR 1/4W 5%	RSC1/4JK0033
17	1	R22	68K	RESISTOR 1/4W 5%	RSC1/4JK0068
18	2	R18,R44	100K	RESISTOR 1/4W 5%	RSC1/4JK0100
19	1	R14	1M	RESISTOR 1/4W 5%	RSC1/4JM0001
20	4	R51,R52, R53,R54	2M2 1%	RESISTOR 1/4W 1%	RSM1/4FM02,2
21	2	R3,R8	HC5K	TRIM. REG. ORIZ. CERMET.	RVTCEROK0005

ITEM	QUANTITY	REFERENCE	PART	DESCRIPTION	PART ORDER CODE
22	1	C24	47pF	CERAMIC CAPACITOR NPO	CKM470BJ600P
23	1	C30	1nF	CERAMIC CAPACITOR	CKM102BK600P
24	1	C22	4N7	CERAMIC CAPACITOR	CKM472BK600P
25	8	C16,C19, C23,C25, C29,C35, C43,C46	470pF	CERAMIC CAPACITOR	CKM471BK600P
26	6	C27,C31, C33,C37, C38,C39	10NF	CERAMIC CAPACITOR	CKM103BK600P
27	6	C15,C18 C40,C41, C48,C50	47NF	CERAMIC CAPACITOR	CKM473BK600P
28	8	C10,C17, C20,C21, C45,C47, C51,C52	0.1(F	CERAMIC CAPACITOR	CKM104BK600P
29	4	C26,C36, C44,C53	10(F	ELECTORLYTIC CAPACITOR	CEA106AM350
30	2	C28,C34	33(F	ELECTROLYTIC CAPACITOR	CEA336BM350
31	2	C9,C13	47(F	ELECTROLYTIC CAPACITOR	CEA476BM630
32	3	C14,C32,C49	100(F	ELECTORLYTIC CAPACITOR	CEA107BM350
33	1	C8	2200(F	ELECTROLYTIC CAPACITOR	CEA228CM350
34	1	C5	22000(F	ELECTROLYTIC CAPACITOR	CEA229PM630
35	3	L1,L2,L3	VK200	RF CHOKE	IMPVK200
36	1	F1	F4A	FAST FUSIBLE	FUS5X20RP4
37	3	CN2,JP8,JP9	2 PIN STRIP	STRIP M P 2.54 2 PIN	CNTSTRIPMCS
38	1	JP7	3 PIN STRIP	STRIP M P 2.54 3 PIN	CNTSTRIPMCS
39	4	JP1,JP2, JP3,JP4	FASTON	CON.. FASTON M CIRC. ST.	CNTFSTMCSGR
40	1	CN7	MORS. CS 4	MORS. C.S. 4 CONT.	MORSKB04PPO
41	2	CN4,CN5	26P CONN.	CONN. M 2*13 P 2.54	CNTMCSFC26P

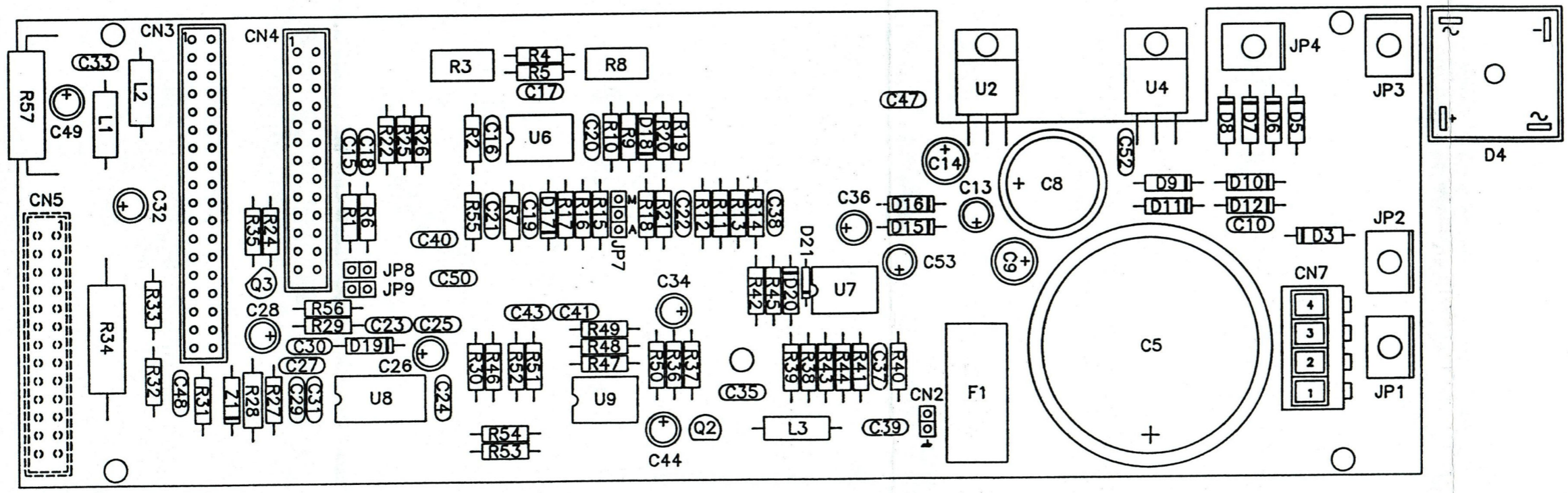
## POWER SUPPLY CARD 1

## BILL OF MATERIALS

Page 3 of 3

ITEM	QUANTITY	REFERENCE	PART	DESCRIPTION	PART ORDER CODE
42	1	CN3	34P CONN.	CONN. M 2*17 P 2.54	CNTMCSFC34P
43	5	D17,D18, D19,D20, D21	IN4148	SILICON DIODE	DIS1N4148
44	11	D3,D5,D6, D2,D8,D9, D10,D11, D12,D15, D16	IN4003	SILICON DIODE 200V	DIS1N4003
45	1	DZ1	Z18V	ZENER DIODE 18V 0.4W	DIZ18VOW4
46	1	U2	7805	POS. STABILIZER 1A	CIL7805P
47	1	U4	7915	NEG. STABILIZER 1A	CIL7915P
48	1	U8	LM723	VAR. STABILIZER 100mA	CILLM723
49	2	Q2,Q3	BC237	NPN TRANSISTOR	TRNBC237
50	3	U6,U7,U9	LM358N	DOUBLE OP. AMP.	CILLM358N
51	1	D4	KBPC1002	DIODE BRIDGE 10A	PNRKBPC1002

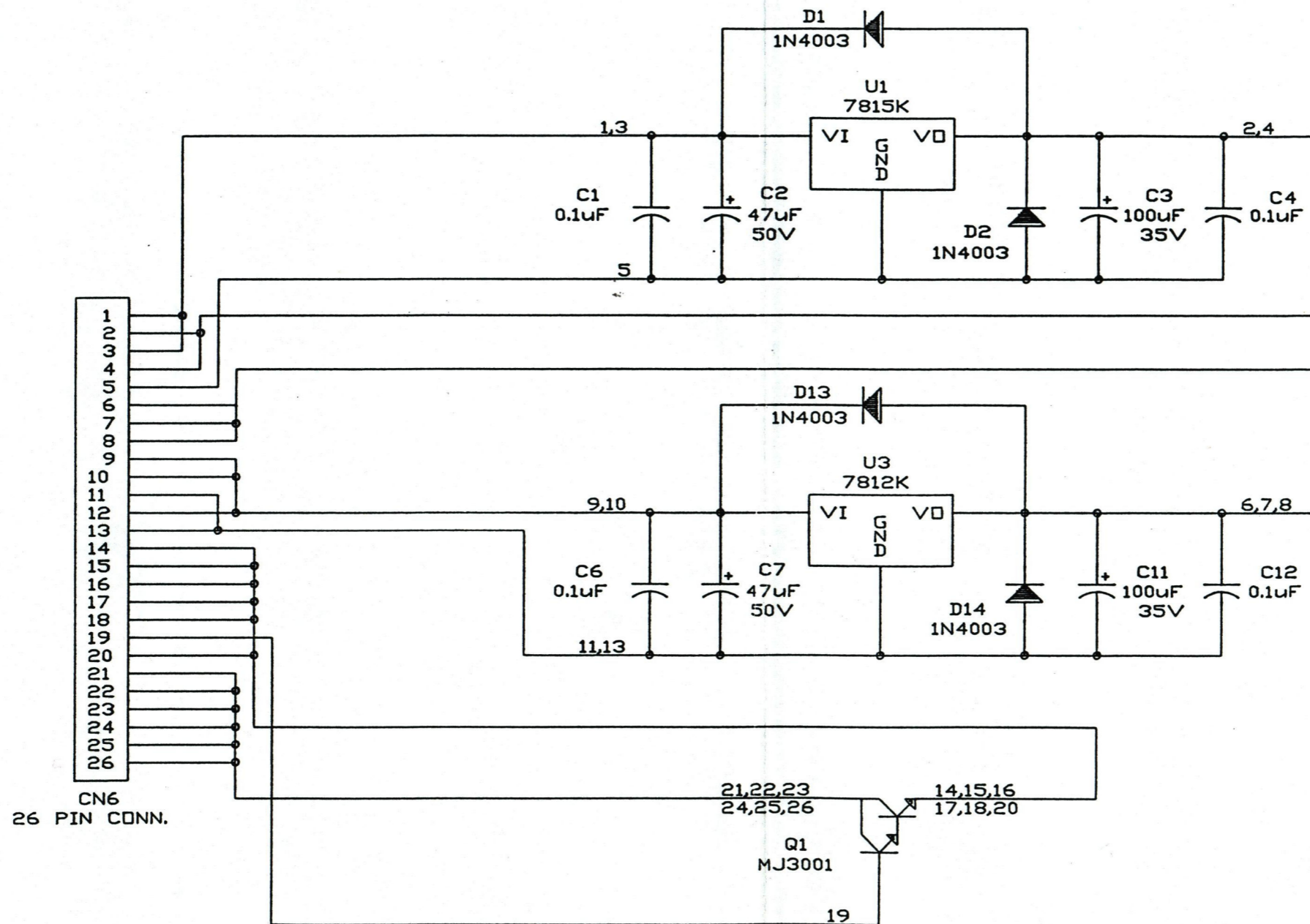




**ENERGY-ONIX STL TRANSMITTER**

Title	POWER SUPPLY CARD 1 COMPONENT LAYOUT
Size	Document Number
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CN6  
26 PIN CONN.

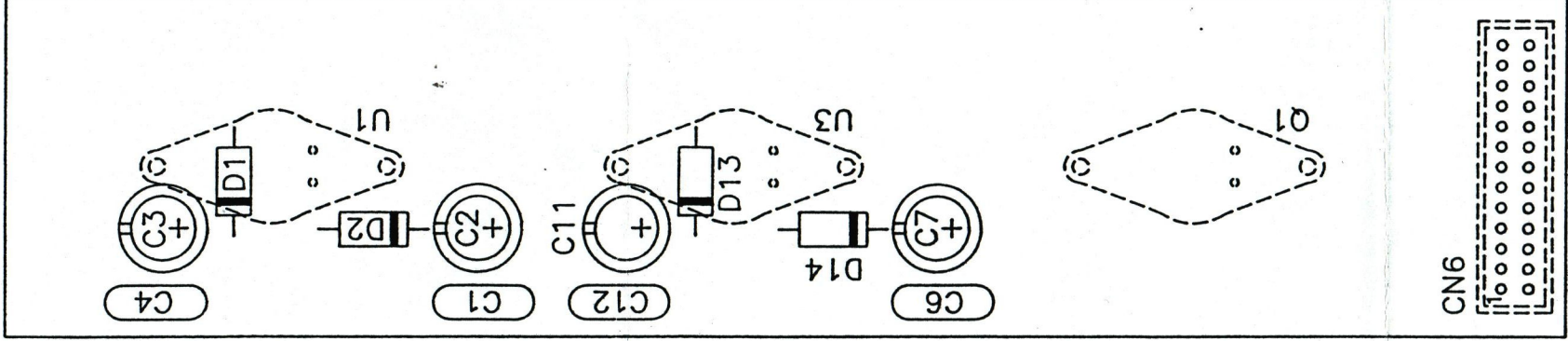
ENERGY-ONIX STL TRANSMITTER		
Title Power Supply Card 2 Circuit Diagram		
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**POWER SUPPLY CARD 2**

**BILL OF MATERIALS**

ITEM	QUANTITY	REFERENCE	PART	DESCRIPTION	PART ORDER CODE
1	4	C1,C4,C6, C12	0.1(F	CERAMIC CAPACITOR	CKM104BK600P
2	2	C2,C7	47(F	ELECTROLYTIC CAPACITOR	CEA476BM630
3	2	C3,C11	100(F	ELECTROLYTIC CAPACITOR	CEA107BM350
4	1	CN6	26P CONN.	CONN. M 2*13 P 2.54	CNTMCSFC26P
5	4	D1,D2,D13, D14	1N4003	SILICON DIODE 200V	DIS1N4003
6	2	U1,U3	7815K	POS. STABILIZER 1.5A CIL7815K	
7	1	Q1	MJ3001	POWER TRANSISTOR	TRNMJ3001



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**ENERGY-ONIX      STL TRANSMITTER**

Title

**POWER SUPPLY CARD 2 COMPONENT LAYOUT**  
Document Number

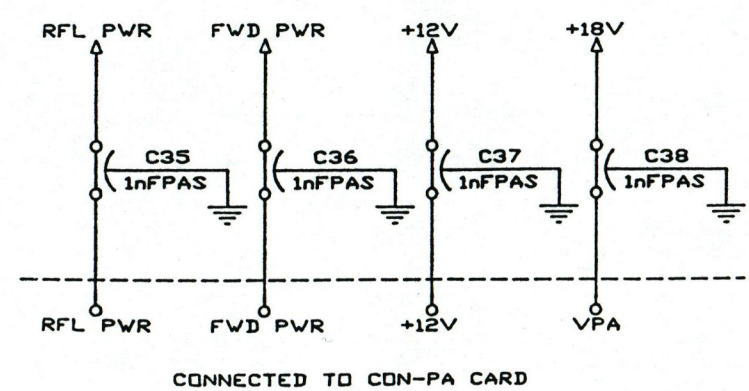
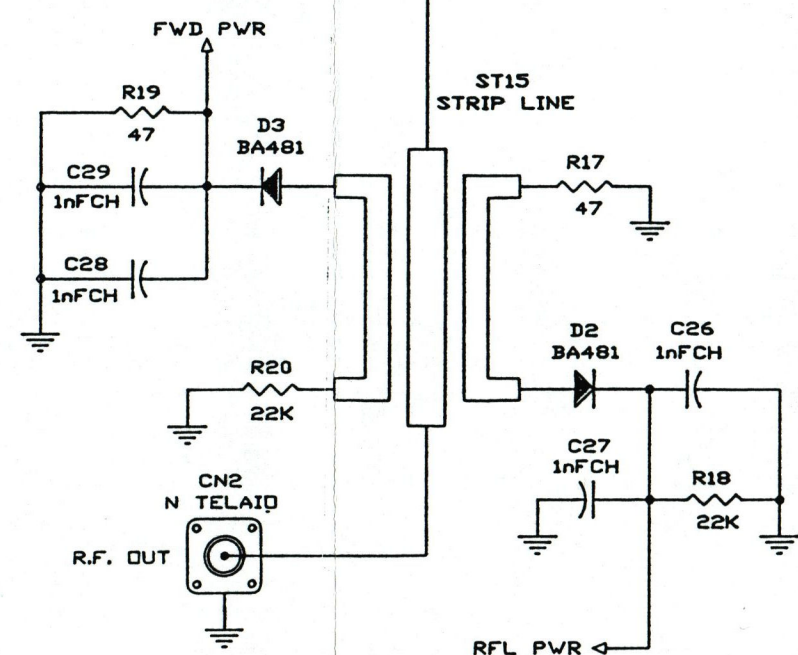
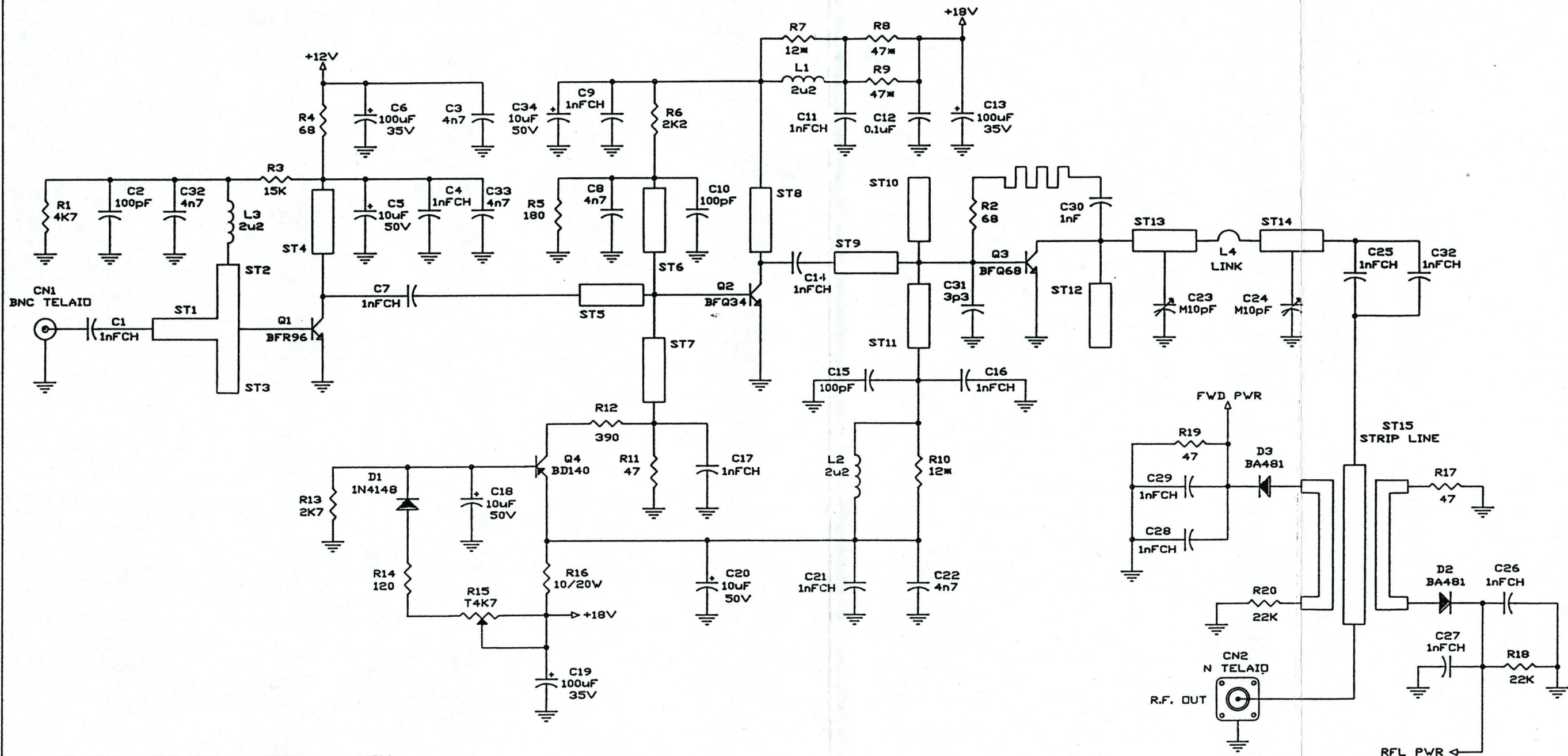
Size

Date

Sheet 1 of 1

2W R.F. POWER AMPLIFIER

- 1) CIRCUIT DIAGRAM PG. 89
- 2) BILL OF MATERIALS PG. 90 - 91
- 3) COMPONENT LAYOUT PG. 92



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Title	2W R.F. Power Amplifier Circuit Diagram		
Size	Document Number	REV	
A3			
Date:	Sheet	of	

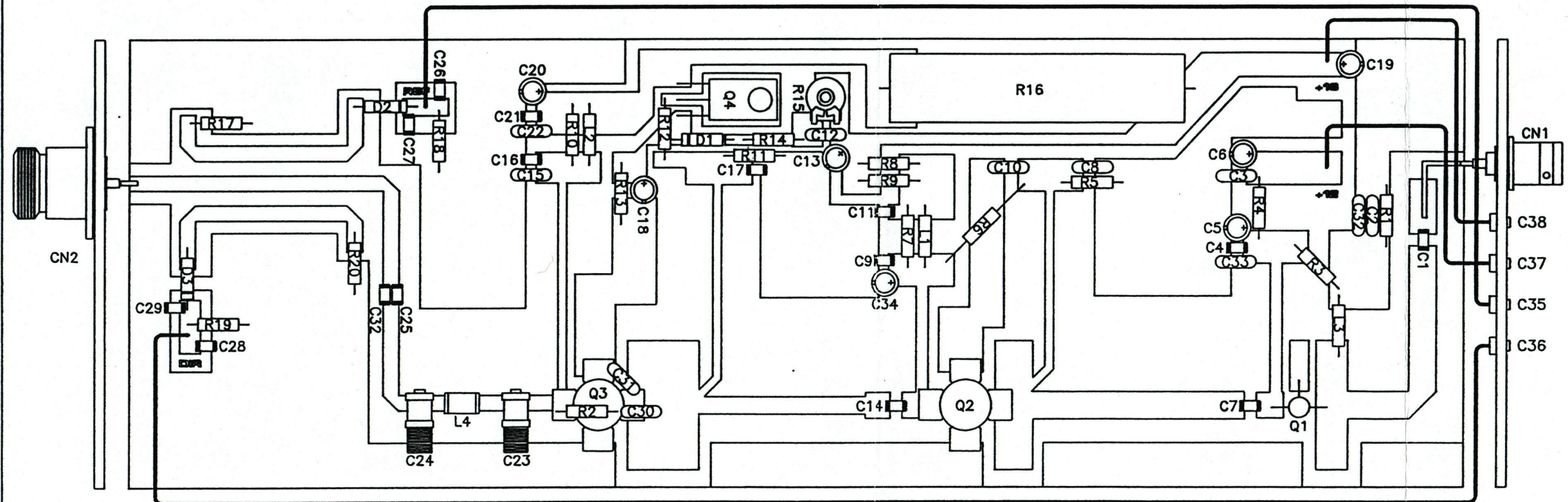
**2W R.F. POWER AMPLIFIER BILL OF MATERIALS**

ITEM	QUANTITY	REFERENCE	PART	DESCRIPTION	PART ORDER CODE
1	1	R16	10/20W	RESISTOR 20W	RAF020KH0010
2	2	R7,R10	12*	RESISTOR 1/2W 5%	RSC1/2JH0012
3	3	R11,R17,R19	47	RESISTOR 1/4W 5%	RSC1/4JH0047
4	2	R8,R9	47*	RESISTOR 1/2W 5%	RSC1/2JH0047
5	2	R2,R4	68	RESISTOR 1/4W 5%	RSC1/4JH0068
6	1	R14,	120	RESISTOR 1/4W 5%	RSC1/4JH0120
7	1	R5	180	RESISTOR 1/4W 5%	RSC1/4JH0180
8	1	R12	390	RESISTOR 1/4W 5%	RSC1/4JH0390
9	1	R6	2K2	RESISTOR 1/4W 5%	RSC1/4JK02,2
10	1	R13	2K7	RESISTOR 1/4W 5%	RSC1/4JK02,7
11	1	R1	4K7	RESISTOR 1/4W 5%	RSC1/4JK04,7
12	1	R3	15K	RESISTOR 1/4W 5%	RSC1/4JK0015
13	2	R18,R20	22K	RESISTOR 1/4W 5%	RSC1/4JK0022
14	1	R15	T4K7	TRIM. REG. VERT. 10mm	RVTD10VK04,7
15	1	C31	3p3	CERAMIC CAPACITOR NPO	CKM3,3BJ600C
16	2	C23,C24	M10pF	PRECISION TRIMMER CAP.	CVA100BK101
17	3	C2,C10,C15	100pF	CERAMIC CAPACITOR NPO	CKM101BJ600C
18	1	C30	1nF	CERAMIC CAPACITOR	CKM102BK600P
19	15	C1,C4,C7, C9,C11,C14 C16,C17, C21,C25, C26,C27 C28,C29, C32	1nFCH	CERAMIC CAPACITOR	CCC102AJ500
20	4	C35,C36, C37,C38	1nFPAS	CERAMIC THROUGH CAP.	CDP102XK500
21	5	C3,C8,C22, C32,C33	4n7	CERAMIC CAPACITOR	CKM472BK600P
22	1	C12	0.1(F	CERAMIC CAPACITOR	CKM104BK600P

**2W R.F. POWER AMPLIFIER BILL OF MATERIALS**

ITEM	QUANTITY	REFERENCE	PART	DESCRIPTION	PART ORDER CODE
23	4	C5,C18,C20, C34	10(F	ELECTORLYTIC CAPACITOR	CEA106AM350
24	3	C6,C13,C19	100(F	ELECTROLYTIC CAPACITOR	CEA107BM350
25	3	L1,L2,L3	2(2	RF CHOKE	IMP02U2A
26	1	L4	LINK	LINK FILO ARG. 1mm	CAVARG1000
27	1	CN1	BNC TELAIO	CONN. BNC A TELAIO	CNTBNCFPV
28	1	CN2	N TELAIO	CONN. N A TELAIO	CNTNFPFL
29	1	D1	1N4148	SILICON DIODE	DIS1N4148
30	2	D2,D3	BA481	HOT CARRIER DIODE	DHCBA481
31	1	Q4	BD140	PNP TRANSISTOR	TRNBD140
32	1	Q2	BFQ34	NPN RF TRANSISTOR	TRNBFQ34
33	1	Q3	BFQ68	NPN RF TRANSITOR	TRNBFQ68
34	1	Q1	BFR96	NPN RF TRANSISTOR	TRNBFR96
35	15	ST1,ST2, ST3,ST4 ST5,ST6, ST7,ST8, ST9,ST10, ST11,ST12 ST13,ST14, ST15	STRIP LINE	STRIP LINE	





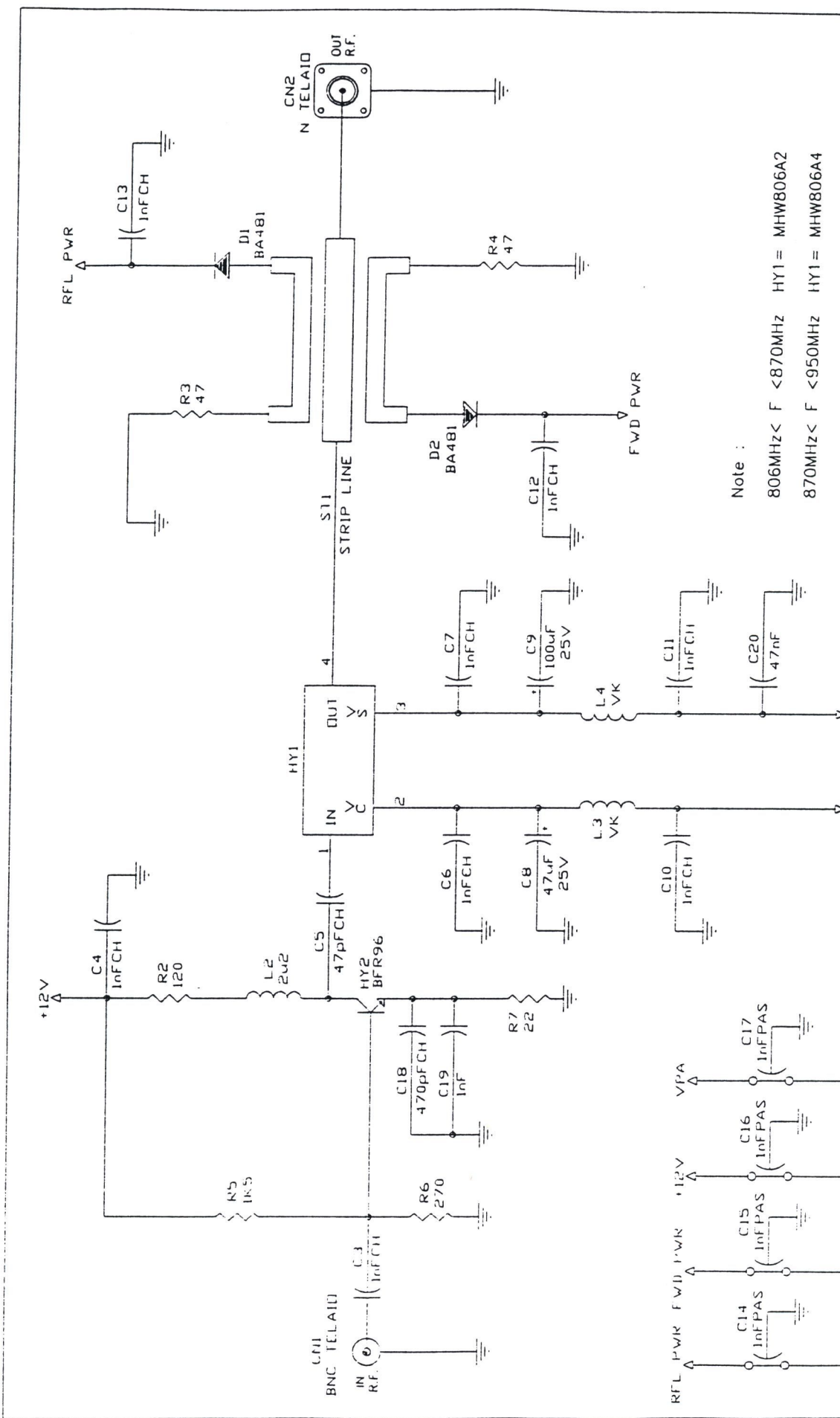
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Title	2W R.F. POWER AMPLIFIER COMPONENT LAYOUT
Size	Document Number
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STL-1 STUDIO TRANSMITTER LINK

5W R.F. POWER AMPLIFIER (VERS. 1)  
FREQUENCY RANGE 806MHz - 870MHz & 870MHz - 950MHz

- |    |                   |        |
|----|-------------------|--------|
| 1) | CIRCUIT DIAGRAM   | PG. 94 |
| 2) | BILL OF MATERIALS | PG. 95 |
| 3) | COMPONENT LAYOUT  | PG. 96 |



Note :  
 806MHz < F < 870MHz HY1 = MHW806A2  
 870MHz < F < 950MHz HY1 = MHW806A4

<b>ENERGY-ONIX</b>		<b>STL-1</b>	
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Size	Document Number	REV	
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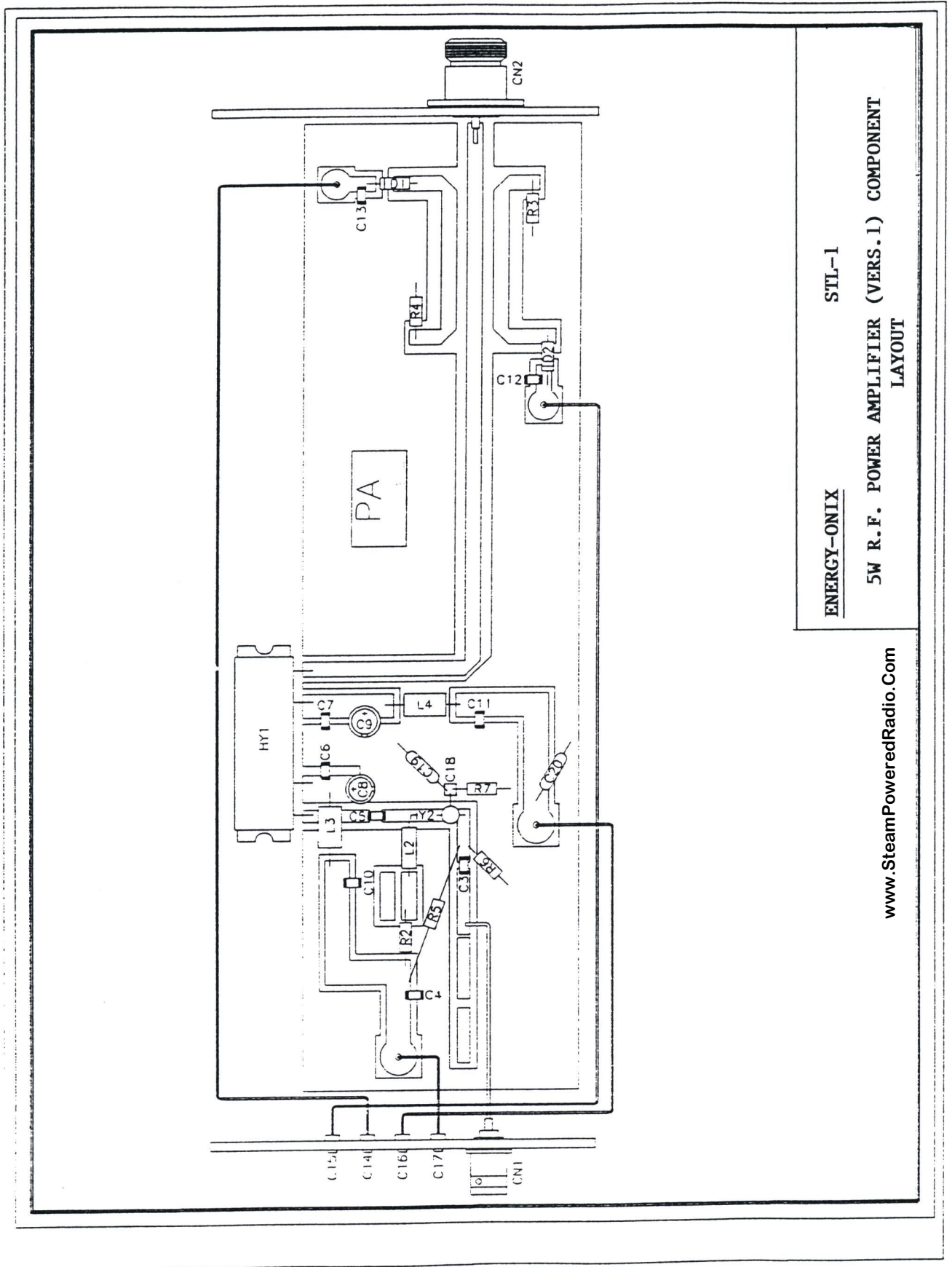
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**5W R.F. POWER AMPLIFIER V1**

**BILL OF MATERIALS**

ITEM	QUANTITY	REFERENCE	PART	DESCRIPTION	PART ORDER CODE
1	1	R7	22	RESISTOR 1/4W 5%	RSC1/4JJH0022
2	2	R3,R4	47	RESISTOR 1/4W 5%	RSC1/4JH0047
3	1	R2	120	RESISTOR 1/4W 5%	RSC1/4JH0120
4	1	R5	1K5	RESISTOR 1/4W 5%	RSC1/4JK01,5
5	1	R6	270	RESISTOR 1/4W 5%	RSC1/4JH0270
6	1	C5	47pFCH	CERAMIC CHIP CAPACITOR	CCC470AJ500
7	1	C18	470pFCH	CERAMIC CHIP CAPACITOR	CCC471AJ500
8	1	C19	1nF	CERAMIC CAPACITOR	CKM102BK600P
9	8	C3,C4,C6, C7,C10,C11	1nFCH	CERAMIC CHIP CAPACITOR	CCC102AJ500
10	4	C14,C15, C16,C17	1nFPAS	CERAMIC THROUGH CAP.	CDP102XK500
11	1	C20	47nF	CERAMIC CAPACITOR	CKM473BK600P
12	1	C8	47(F	ELECTROLYTIC CAPACITOR	CEA476BM630
13	1	C9	100(F	ELECTROLYTIC CAPACITOR	CEA107BM350
14	1	L2	2(2	RF CHOKE	IMP02U2A
15	2	L3,L4	VK	RF CHOKE	IMPVK00A
16	1	CN1	BNC TELAIO	CONN. BNC A TELAIO	CNTBNCFPV
17	1	CN2	N TELAIO	CONN. N A TELAIO	CNTNFPFL
18	2	D1,D2	BA481	HOT CARRIER DIODE	DHCBA481
19	1	HY2	BFR96	NPN RF TRANSISTOR	TRNBFR96
20	1	ST1	STRIP LINE	STRIP LINE	
21A	1	HY1	MHW806A2	HYBRID POW AMP MHW806A2 806MHz<F<870MHz	MIBMHW806A2
21B	1	HY1	MHW806A4	HYBRID POW AMP MHW806A2 870MHz<F<950MHz	MIBMHW806A4



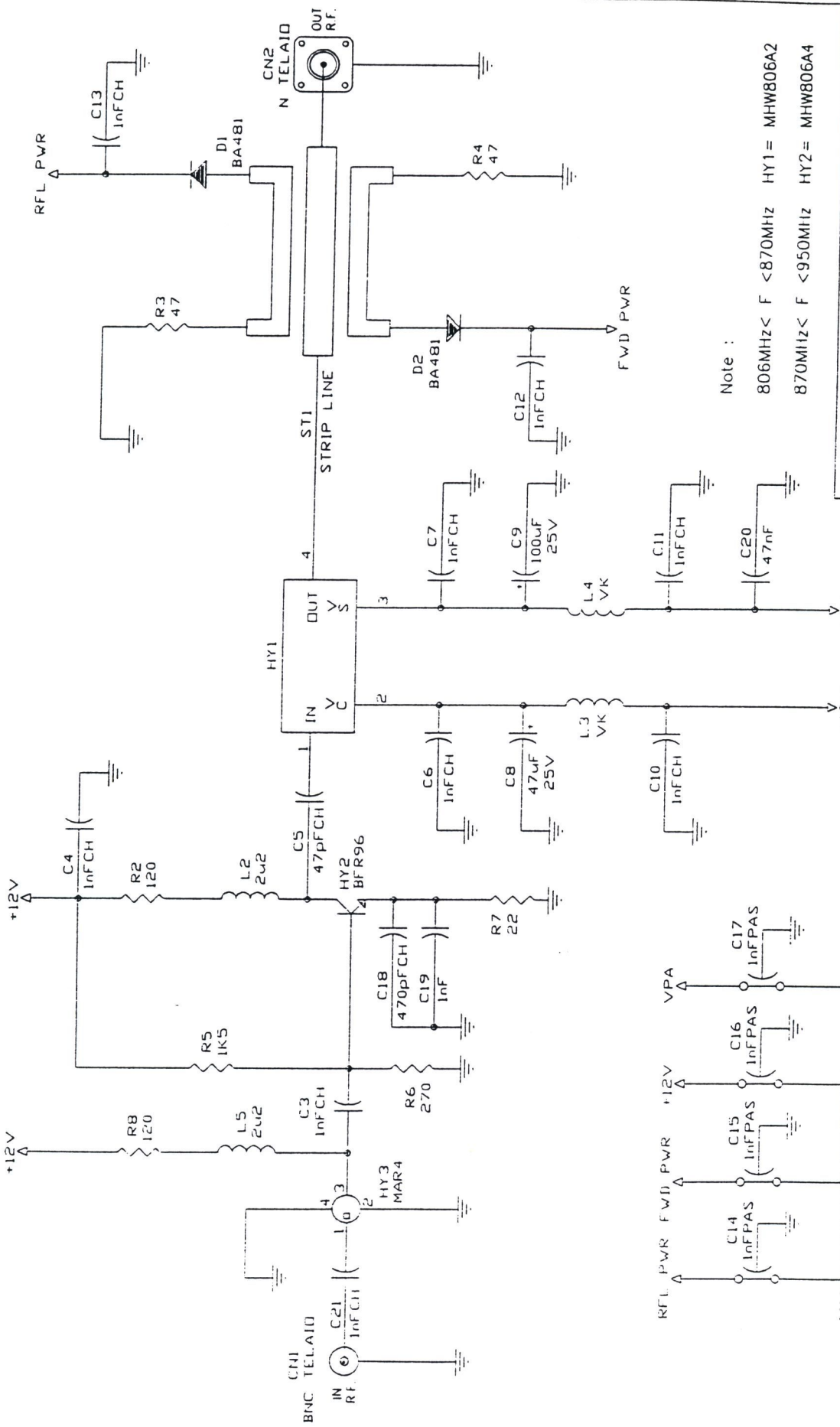
ENERGY-ONIX S'TL-1  
 5W R.F. POWER AMPLIFIER (VERS.1) COMPONENT  
 LAYOUT

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STL-1 STUDIO TRANSMITTER LINK

5W R.F. POWER AMPLIFIER (VERS. 2)  
FREQUENCY RANGE 806MHz - 870MHz & 870MHz - 950MHz

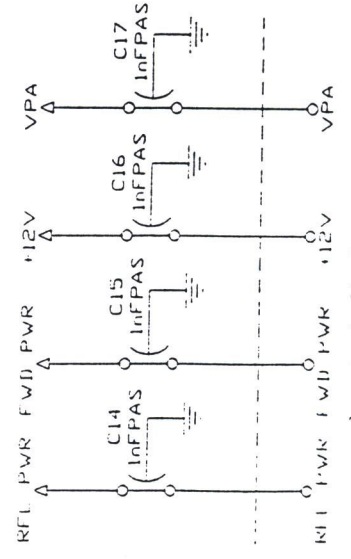
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|----|-------------------|---------|
| 1) | CIRCUIT DIAGRAM   | PG. 98  |
| 2) | BILL OF MATERIALS | PG. 99  |
| 3) | COMPONENT LAYOUT  | PG. 100 |



Note :  
 806MHz < F < 870MHz HY1 = MHWB06A2  
 870MHz < F < 950MHz HY2 = MHWB06A4

<b>ENERGY-ONIX</b>		<b>STL-1</b>	
Title	5W R.F. Power Amplifier (Vers. 2) Circuit Diagram		
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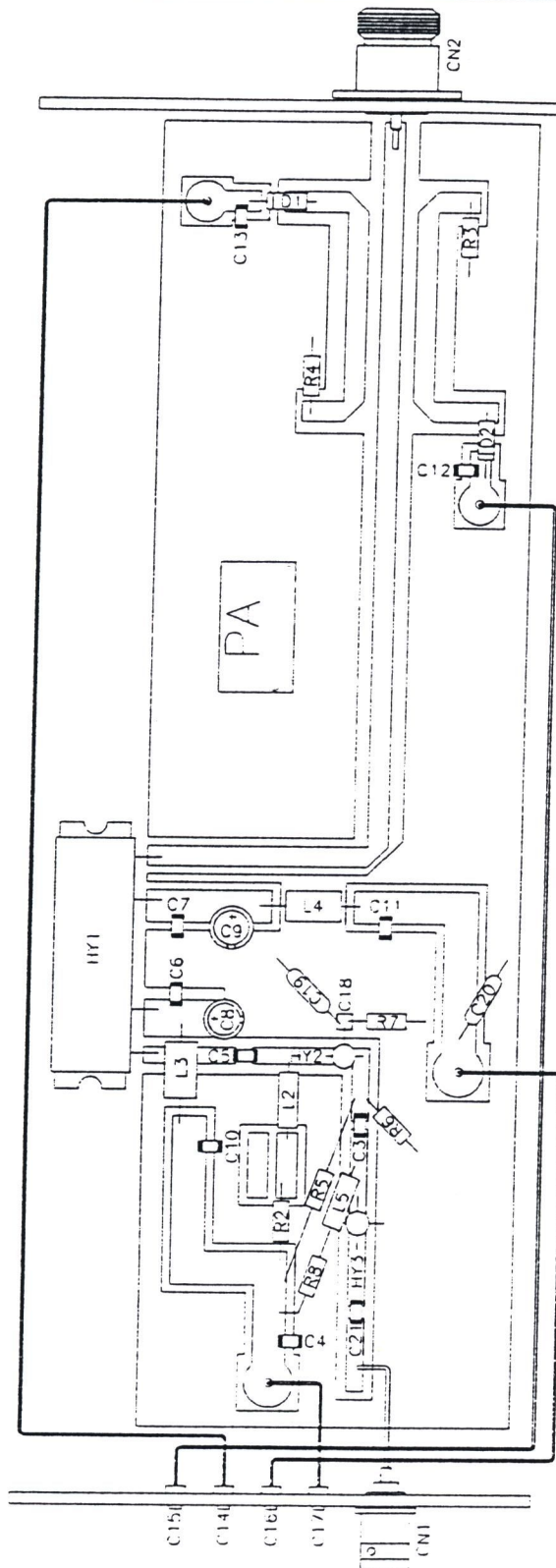


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**5W R.F.POWER AMPLIFIER V2 BILL OF MATERIALS**

ITEM	QUANTITY	REFERENCE	PART	DESCRIPTION	PART ORDER CODE
1	1	R7	22	RESISTOR 1/4W 5%	RSC1/4JJH0022
2	2	R3,R4	47	RESISTOR 1/4W 5%	RSC1/4JH0047
3	2	R2,R8	120	RESISTOR 1/4W 5%	RSC1/4JH0120
4	1	R5	1K5	RESISTOR 1/4W 5%	RSC1/4JK01,5
5	1	R6	270	RESISTOR 1/4W 5%	RSC1/4JH0270
6	1	C5	47pFCH	CERAMIC CHIP CAPACITOR	CCC470AJ500
7	1	C18	470pFCH	CERAMIC CHIP CAPACITOR	CCC471AJ500
8	1	C19	1nF	CERAMIC CAPACITOR	CKM102BK600P
9	9	C3,C4,C6, C7,C10,C11 C12,C13, C21	1nFCH	CERAMIC CHIP CAPACITOR	CCC102AJ500
10	4	C14,C15, C16,C17	1nFPAS	CERAMIC THROUGH CAP.	CDP102XK500
11	1	C20	47nF	CERAMIC CAPACITOR	CKM473BK600P
12	1	C8	47(F	ELECTROLYTIC CAPACITOR	CEA476BM630
13	1	C9	100(F	ELECTROLYTIC CAPACITOR	CEA107BM350
14	2	L2,L5	2(2	RF CHOKE	IMP02U2A
15	2	L3,L4	VK	RF CHOKE	IMPVK00A
16	1	CN1	BNC TELAIO	CONN. BNC A TELAIO	CNTBNCFPV
17	1	CN2	N TELAIO	CONN. N A TELAIO	CNTNFPFL
18	2	D1,D2	BA481	HOT CARRIER DIODE	DHCBA481
19	1	HY2	BFR96	NPN RF TRANSISTOR	TRNBFR96
20	1	HY3	MAR4	HYBRID AMP MAR4	MIBMAR4
21	1	ST1	STRIP LINE	STRIP LINE	
22A	1	HY1	MHW806A2	HYBRID POW AMP MHW806A2 806MHz < F < 870MHz	MIBMHW806A2
22B	1	HY1	MHW806A4	HYBRID POW AMP MHW806A2 870MHz < F < 950MHz	MIBMHW806A4



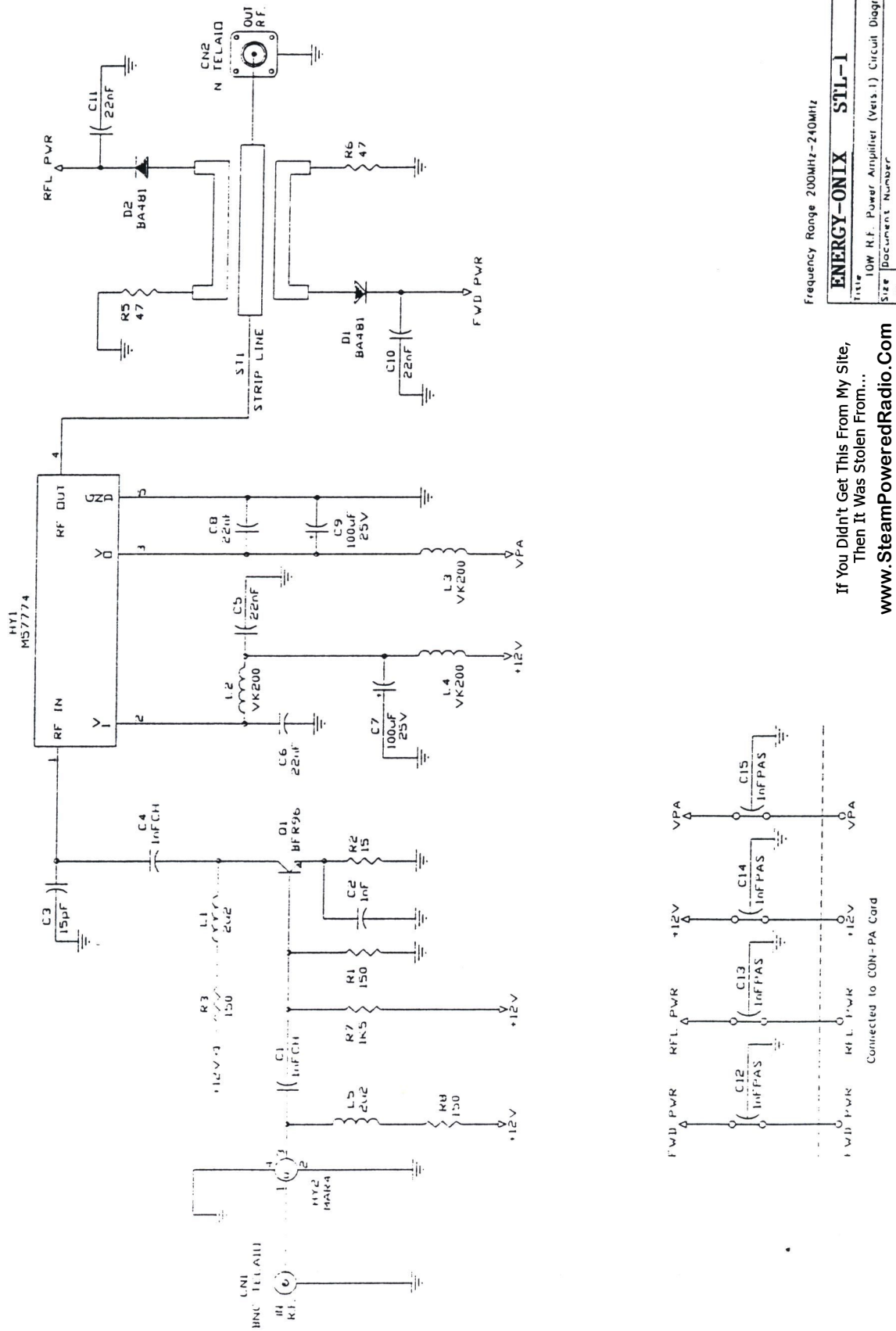


ENERGY-ONIX  
 STL-1  
 5W R.F. POWER AMPLIFIER (VERS.2) COMPONENT  
 LAYOUT

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10W R.F. POWER AMPLIFIER (VERS.1)  
FREQUENCY RANGE 200MHz - 240MHz

- |    |                   |         |
|----|-------------------|---------|
| 1) | CIRCUIT DIAGRAM   | PG. 102 |
| 2) | BILL OF MATERIALS | PG. 103 |
| 3) | COMPONENT LAYOUT  | PG. 104 |



Frequency Range 200MHz-240MHz

**ENERGY-ONIX STL-1**

10W R.F. Power Amplifier (Vols.1) Circuit Diagram  
 Size Document Number REV  
 A3

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Connected to CON-PA Card

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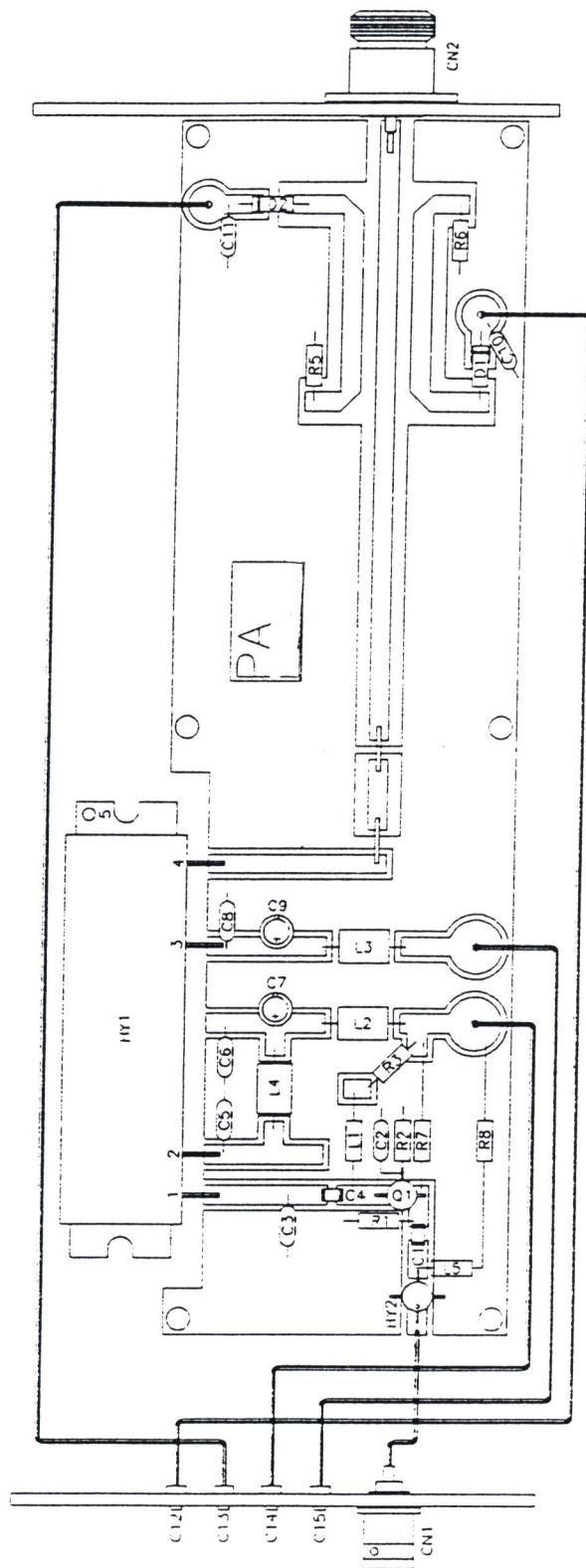
STL-1 STUDIO TRANSMITTER LINK

10W R.F.POWER AMP. V1

## BILL OF MATERIALS

Page 1 of 1

ITEM	QUANTITY	REFERENCE	PART	DESCRIPTION	PART ORDER CODE
1	1	R2	15	RESISTOR 1/4W 5%	RSC1/4JH0015
2	2	R5,R6	47	RESISTOR 1/4W 5%	RSC1/4JH0047
3	3	R1,R3,R8	150	RESISTOR 1/4W 5%	RSC1/4JH0150
4	1	R7	1KS	RESISTOR 1/4W 5%	RSC1/4JK01,5
5	1	C3	15pF	CERAMIC CAPACITOR NPO	CKM150BJ600C
6	1	C2	1nF	CERAMIC CAPACITOR	CKM102BK600P
7	2	C1,C4	1nFCH	CERAMIC CHIP CAPACITOR	CCC102AJ500
8	4	C12,C13, C14,C15	1nFPAS	CERAMIC THROUGH CAP.	CDP102XK500
9	5	C5,C6,C8, C10,C11	22nF	CERAMIC CAPACITOR	CKM223BK600P
10	2	C7,C9	100(F	ELECTROLYTIC CAPACITOR	CEA107BM350
11	2	L1,L5	2(2	RF CHOKE	IMP02U2A
12	3	L2,L3,L4	VK200	RF CHOKE	IMPVK200
13	1	CN1	BNC TELAIO	CONN. BNC A TELAIO	CNTBNCFPV
14	1	CN2	N TELAIO	CONN. N A TELAIO	CNTNFPFL
15	2	D1,D2	BA481	HOT CARRIER DIODE	DHCBA481
16	1	Q1	BFR96	NPN RF TRANSISTOR	TRNBFR96
17	1	HY2	MAR4	HYBRID AMP MAR4	MIBMAR4
18	1	HY1	M57774	HYBRID POW AMP M57774	MIBM57774
19	1	ST1	STRIP LINE	STRIP LINE	



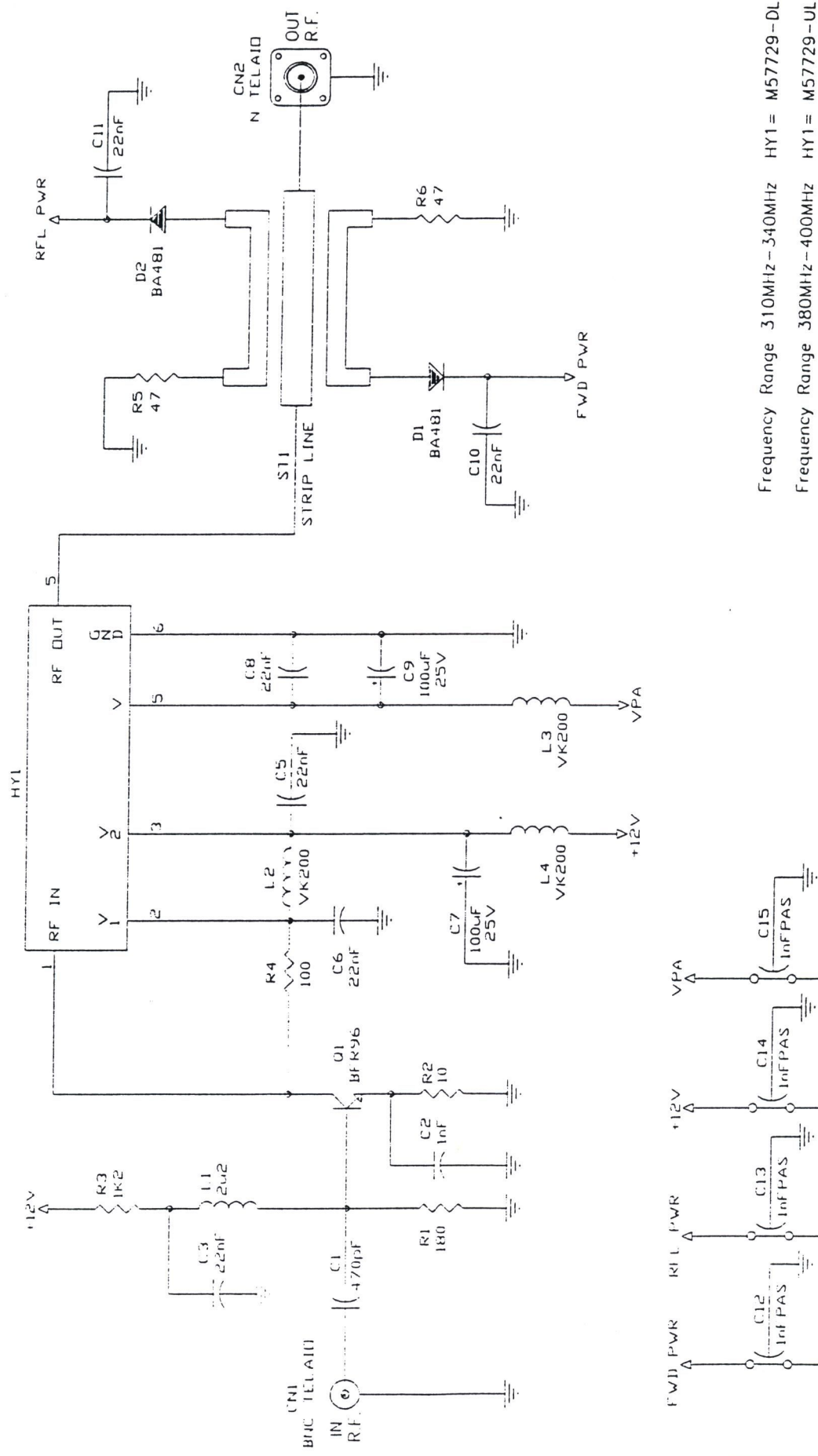
ENERGY-ONIX STL-1

10W R.F. POWER AMPLIFIER (VERS. 1)  
COMPONENT LAYOUT

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**10W R.F. POWER AMPLIFIER (VERS. 2)**  
**FREQUENCY RANGE 310MHz - 340MHz & 380MHz - 400MHz**

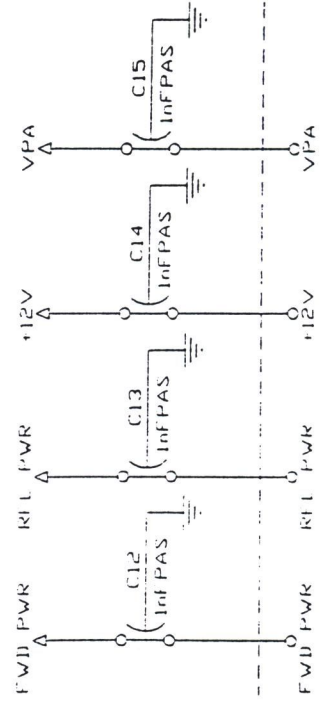
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|----|-------------------|---------|
| 1) | CIRCUIT DIAGRAM   | PG. 106 |
| 2) | BILL OF MATERIALS | PG. 107 |
| 3) | COMPONENT LAYOUT  | PG. 108 |



<b>ENERGY-ONIX</b>		<b>STL-1</b>	
Title 10W R.F. Power Amplifier (Vers.2) Circuit Diagram			
Size A4	Document Number REV	Date:	Sheet   of

Frequency Range 310MHz-340MHz HY1 = M57729-DL  
 Frequency Range 380MHz-400MHz HY1 = M57729-UL

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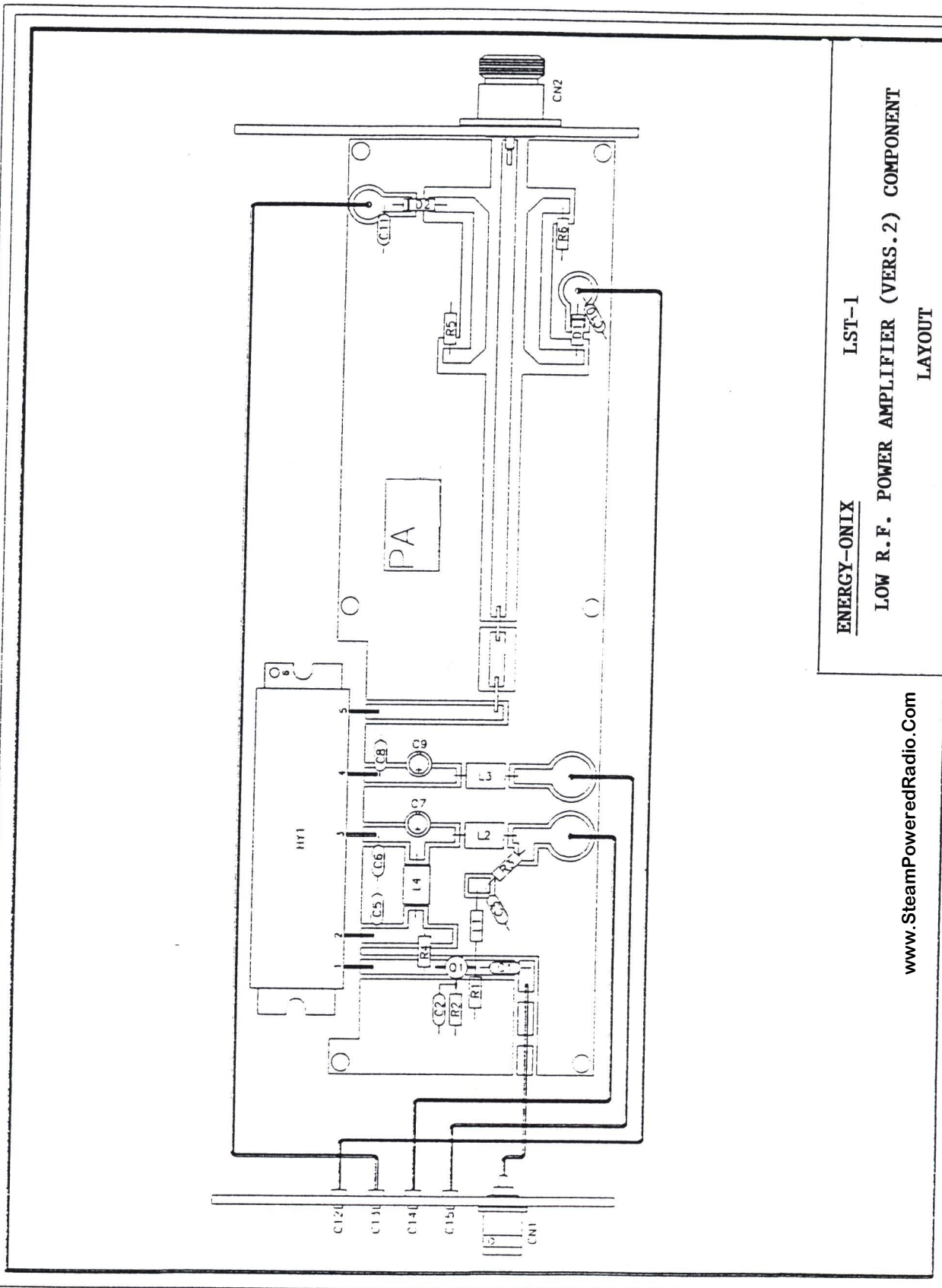
10W R.F. POWER AMP. V2

BILL OF MATERIALS

Page 1 of 1

ITEM	QUANTITY	REFERENCE	PART	DESCRIPTION	PART ORDER CODE
1	1	R2	10	RESISTOR 1/4W 5%	RSC1/4JH0010
2	2	R5,R6	47	RESISTOR 1/4W 5%	RSC1/4JH0047
3	1	R4	100	RESISTOR 1/4W 5%	RSC1/4JH0100
4	1	R1	180	RESISTOR 1/4W 5%	RSC1/4JH0180
5	1	R3	1K2	RESISTOR 1/4W 5%	RSC1/4JK01,2
6	1	C1	470pF	CERAMIC CAPACITOR CKM471BK600P	
7	1	C2	1nF	CERAMIC CAPACITOR CKM102BK600P	
8	4	C12,C13, C14,C15	1nFPAS	CERAMIC THROUGH CAP.	CDP102XK500
9	6	C3,C5,C6, C8,C10,C11	22nF	CERAMIC CAPACITOR CKM223BK600P	
10	2	C7,C9	100(F	ELECTROLYTIC CAPACITOR	CEA107BM350
11	1	L1	2(2	RF CHOKE	IMP02U2A
12	3	L2,L3,L4	VK200	RF CHOKE	IMPVK200
13	1	CN1	BNC TELAIO	CONN. BNC A TELAIO	CNTBNCFPV
14	1	CN2	N TELAIO	CONN. N A TELAIO	CNTNFPFL
15	2	D1,D2	BA481	NOT CARRIER DIODE	DHCBA481
16	1	Q1	BFR96	NPN RF TRANSISTOR	TRNBFR96
17	1	ST1	STRIP LINE	STRIP LINE	
18	1	HY1	M57729-DL	HYB. POW AMP M57729-DL F. RANGE 310MHz-340MHz	MIBM57729-DL
			M57729-UL	HYB. POW AMP M57729-UL F. RANGE 380MHz-400MHz	MIBM57729-UL





ENERGY-ONIX

LST-1

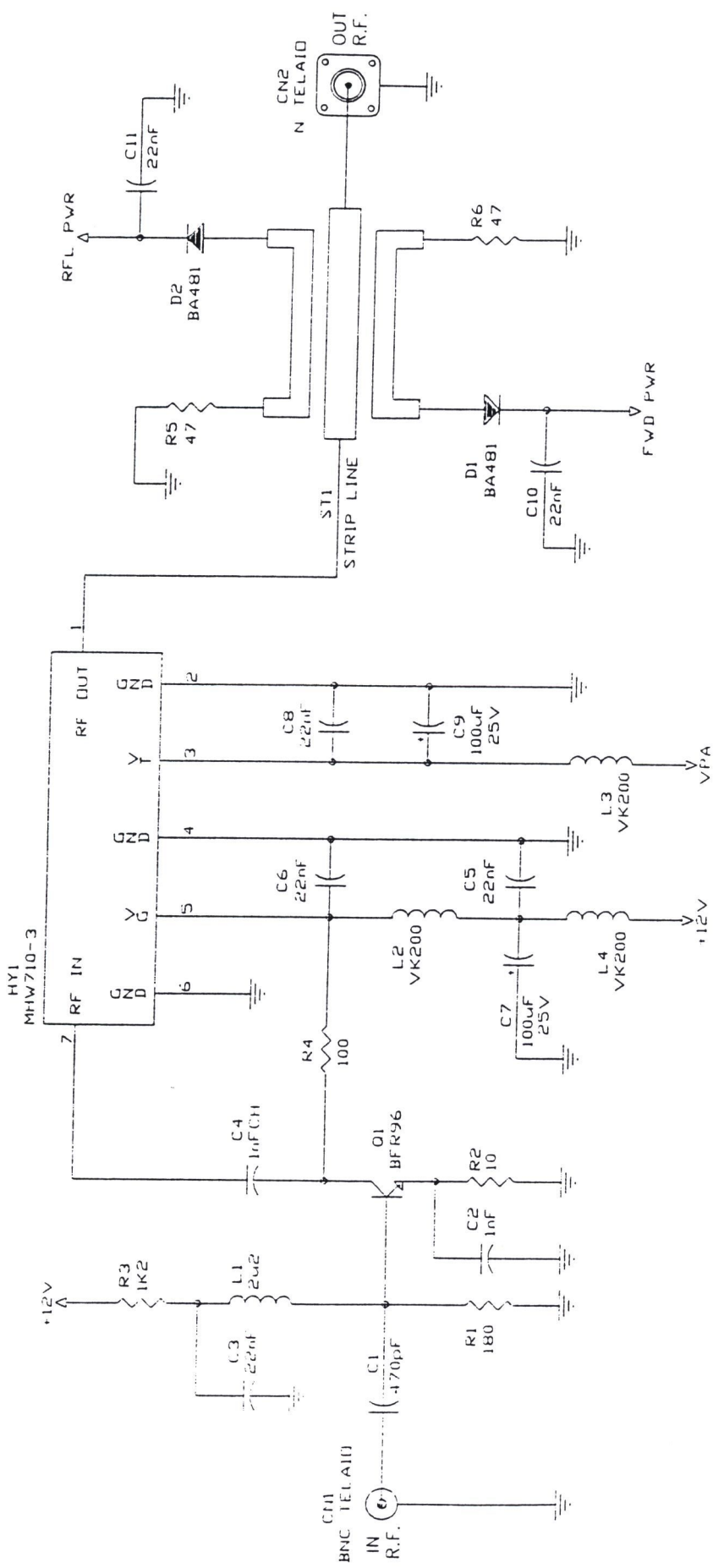
**LOW R.F. POWER AMPLIFIER (VERS. 2) COMPONENT LAYOUT**

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STL-1 STUDIO TRANSMITTER LINK

10W R.F. POWER AMPLIFIER (VERS. 3)  
FREQUENCY RANGE 470MHz - 512MHz

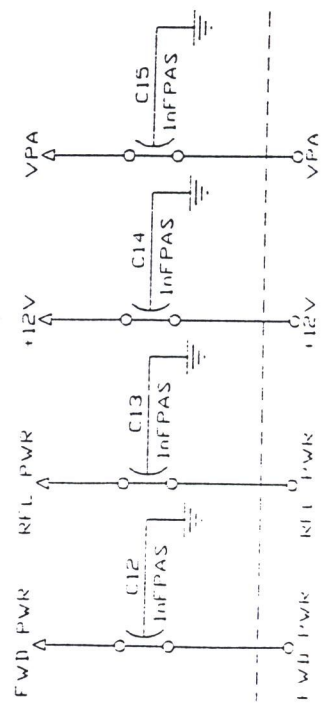
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| 1) | CIRCUIT DIAGRAM   | PG. 110 |
| 2) | BILL OF MATERIALS | PG. 111 |
| 3) | COMPONENT LAYOUT  | PG. 112 |



Frequency Range 470MHz - 512MHz

<b>ENERGY-ONIX</b>		<b>STL-1</b>
Title		
10W R.F. Power Amplifier (Vers.3) Circuit Diagram		
Size		
Document Number		
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Date:	Sheet	1 of 1

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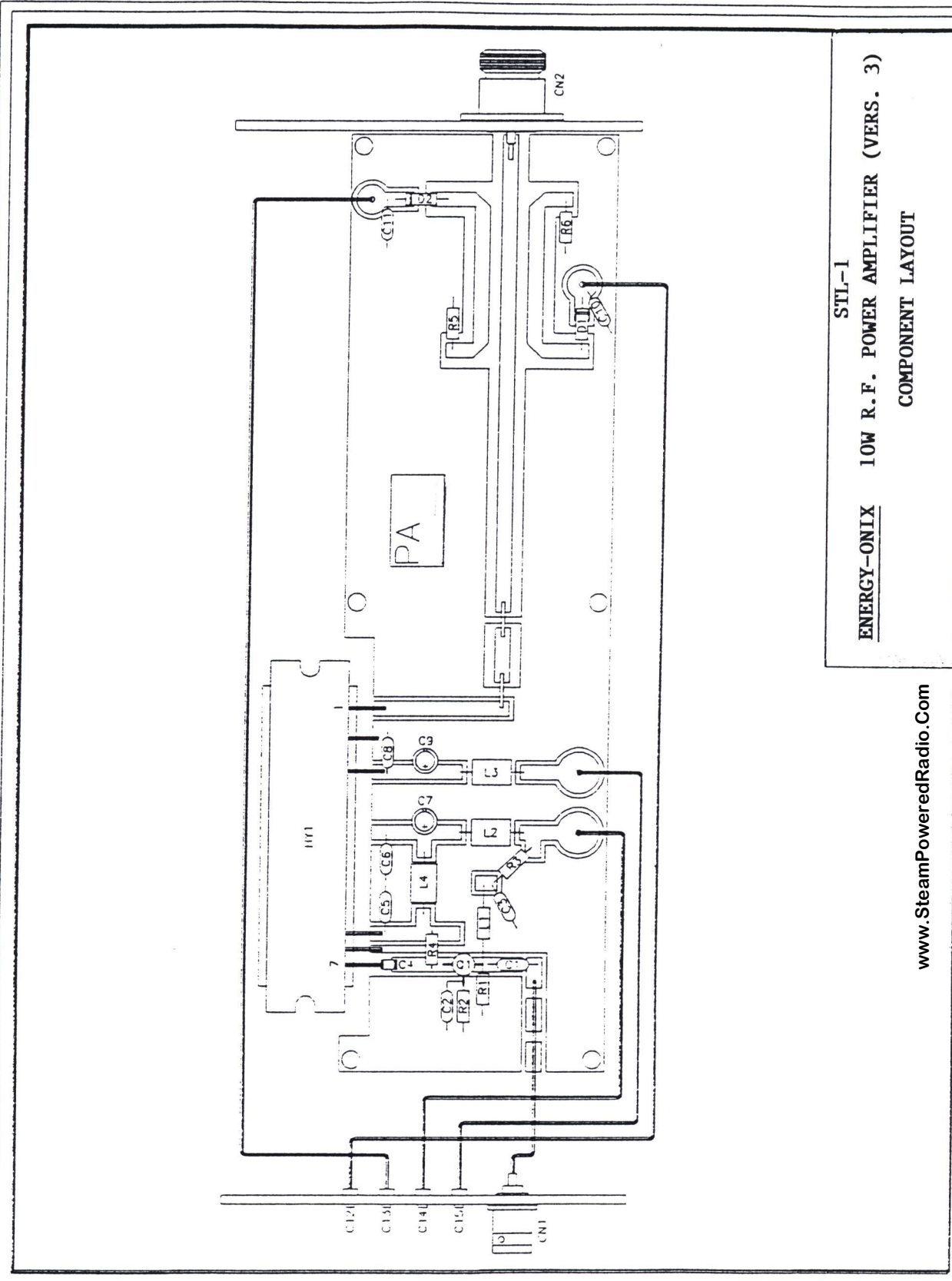
STL-1 STUDIO TRANSMITTER LINK

10W R.F. POWER AMP V3

## BILL OF MATERIALS

Page 1 of 1

ITEM	QUANTITY	REFERENCE	PART	DESCRIPTION	PART ORDER CODE
1	1	R2	10	RESISTOR 1/4W 5%	RSC1/4JH0010
2	2	R5,R6	47	RESISTOR 1/4W 5%	RSC1/4JH0047
3	1	R4	100	RESISTOR 1/4W 5%	RSC1/4JH0100
4	1	R1	180	RESISTOR 1/4W 5%	RSC1/4JH0180
5	1	R3	1K2	RESISTOR 1/4W 5%	RSC1/4JK01,2
6	1	C1	470pF	CERAMIC CAPACITOR CKM471BK600P	
7	1	C2	1nF	CERAMIC CAPACITOR CKM102BK600P	
8	1	C4	1nFCH	CERAMIC CHIP CAPACITOR	CCC102AJ500
9	4	C12,C13, C14,C15	1nFPAS	CERAMIC THROUGH CAP.	CDP102XK500
10	6	C3,C5,C6 C8,C10,C11	22nF	CERAMIC CAPACITOR CK223BK600P	
11	2	C7,C9	100(F	ELECTROLYTIC CAPACITOR	CEA107BM350
12	1	L1	2(2	RF CHOKE	IMP02U2A
13	3	L2,L3,L4	VK200	RF CHOKE	IMPVK200
14	1	CN1	BNC TELAIO	CONN. BNC A TELAIO	CNTBNCFPV
15	1	CN2	N TELAIO	CONN. N A TELAIO	CNTNFPFL
16	2	D1,D2	BA481	HOT CARRIER DIODE	DHCBA481
17	1	Q1	BFR96	NPN RF TRANSISTOR	TRNBFR96
18	1	HY1	MHW710-3	HYBRID POW AMP MHW710-3	MIBMHW710-3
19	1	ST1	STRIP LINE	STRIP LINE	

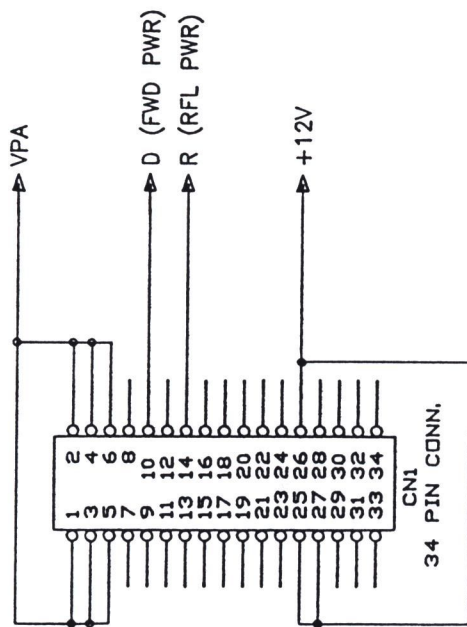


STL-1  
 ENERGY-ONIX 10W R.F. POWER AMPLIFIER (VERS. 3)  
 COMPONENT LAYOUT

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CON-PA CARD

- |    |                   |         |
|----|-------------------|---------|
| 1) | CIRCUIT DIAGRAM   | PG. 114 |
| 2) | BILL OF MATERIALS | PG. 115 |
| 3) | COMPONENT LAYOUT  | PG. 116 |



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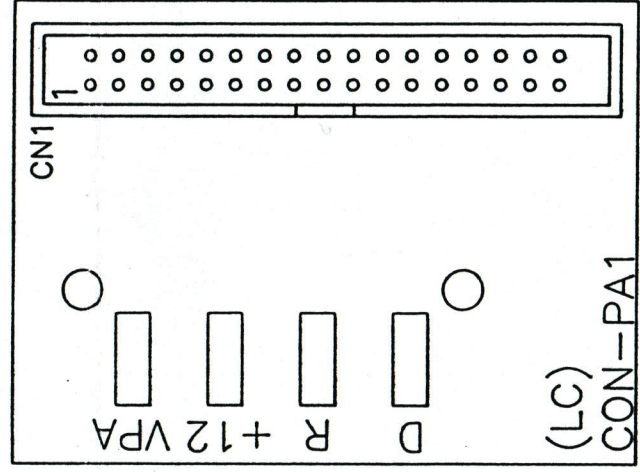
CON-PA CARD

BILL OF MATERIALS

Page 1 of 1

ITEM	QUANTITY	REFERENCE	PART	DESCRIPTION	PART ORDER CODE
1	1	CN1	34P CONN.	CONN. M 2*17 P 2.54	CNTMCSFC34P





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**ENERGY-ONIX STL TRANSMITTER**

Title

**CON-PA CARD COMPONENT LAYOUT**

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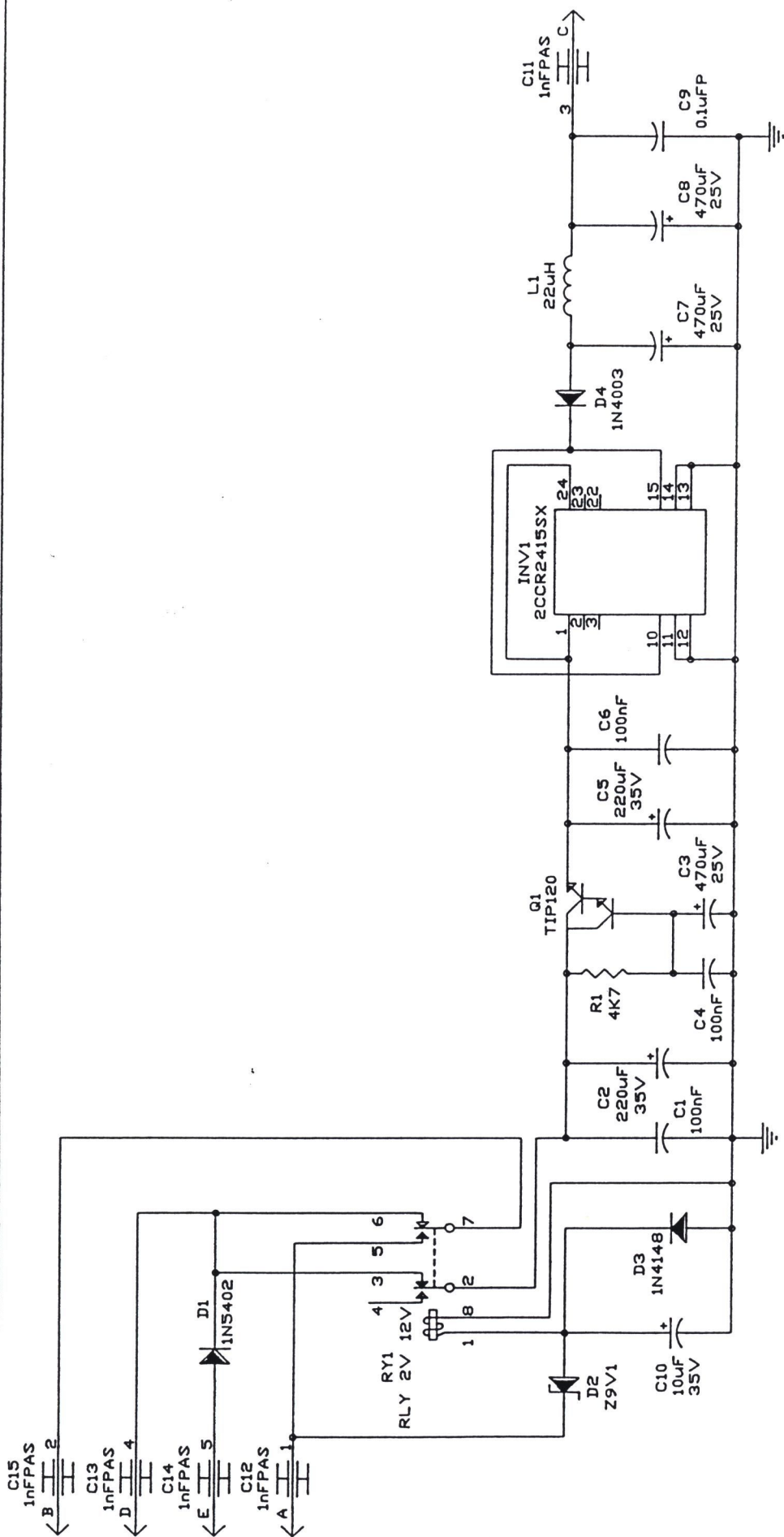
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INVERTER CARD

- |    |                   |         |
|----|-------------------|---------|
| 1) | CIRCUIT DIAGRAM   | PG. 118 |
| 2) | BILL OF MATERIALS | PG. 119 |
| 3) | COMPONENT LAYOUT  | PG. 120 |



Pin Name	Pin Reference
A	+24V
B	+24V
C	-15V
D	+24V
E	+24V

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Inverter Card Circuit Diagram

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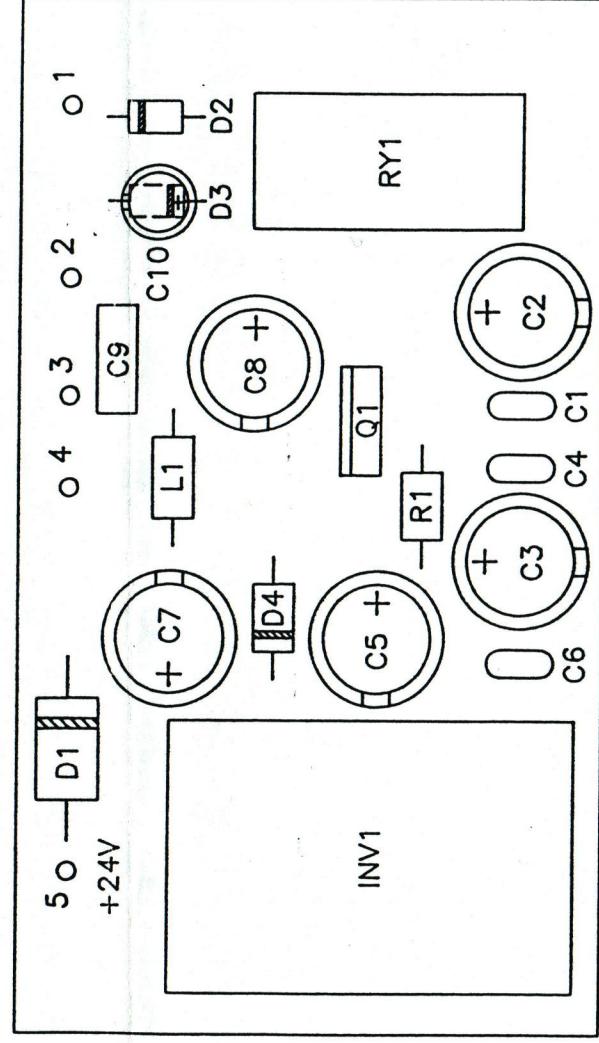
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## INVERTER CARD

## BILL OF MATERIALS

Page 1 of 1

ITEM	QUANTITY	REFERENCE	PART	DESCRIPTION	PART ORDER CODE
1	1	R1	4K7	RESISTOR 1/4W 5%	RSC1/4JK04,7
2	5	C11,C12, C13,C14,C15	1nFPAS	CERAMIC THROUGH CAP.	CDP102XK500
3	3	C1,C4,C6	100nF	CERAMIC CAPACITOR	CKM104BK600P
4	1	C9	0.1(FP	POLIESTER CAPACITOR	CPE104DK101
5	1	C10	10(F	ELECTROLYTIC CAPACITOR	CEA106AM350
6	2	C2,C5	220(F	ELECTROLYTIC CAPACITOR	CEA227BM350
7	3	C3,C7,C8	470(F	ELECTROLYTIC CAPACITOR	CEA477BM350
8	1	L1	22(H	RF CHOKE	IMP22U0A
9	1	RY1	RLY 2V 12V	RELAY 2 VIE 12V	RLDLFHA00212
10	1	D3	1N4148	SILICON DIODE	DIS1N4148
11	1	D4	1N4003	SILICON DIODE 200V	DIS1N4003
12	1	D1	1N5402	SILICON DIODE 200V 3A	DIS1N5402
13	1	D2	Z9V1	ZENER DIODE 9.1V 0.4W	DIZ9V10W4
14	1	INV1	2CCR2415SX	DC/CD CONV. 24VI 15VO	2CCR2415SX
15	1	Q1	TIP120	NPN DARLINGTON	TRNTIP120



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INVERTER 24VDC/-15VDC COMPONENT LAYOUT  
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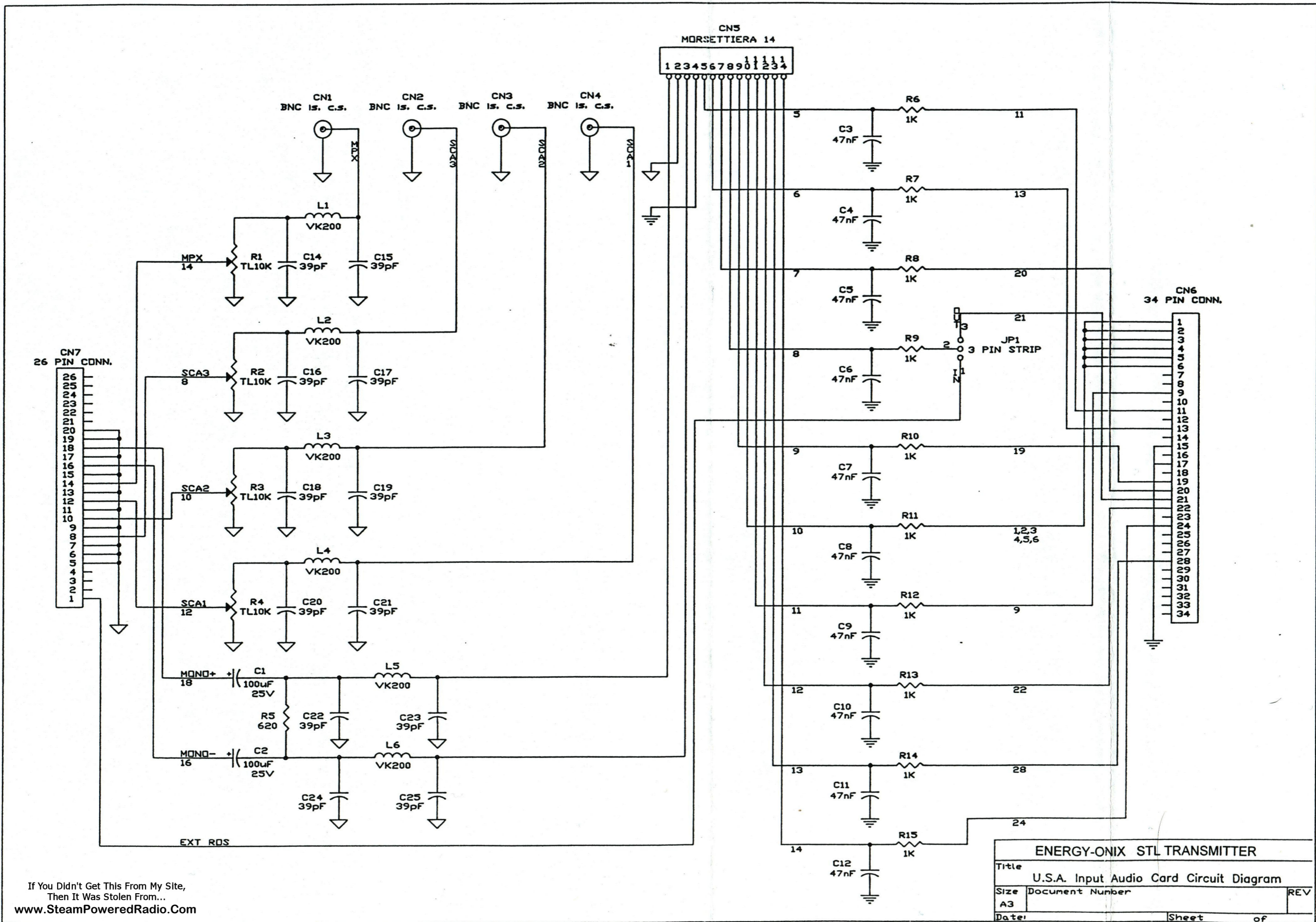
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U.S.A. INPUT AUDIO CARD

- |    |                   |         |
|----|-------------------|---------|
| 1) | CIRCUIT DIAGRAM   | PG. 122 |
| 2) | BILL OF MATERIALS | PG. 123 |
| 3) | COMPONENT LAYOUT  | PG. 124 |



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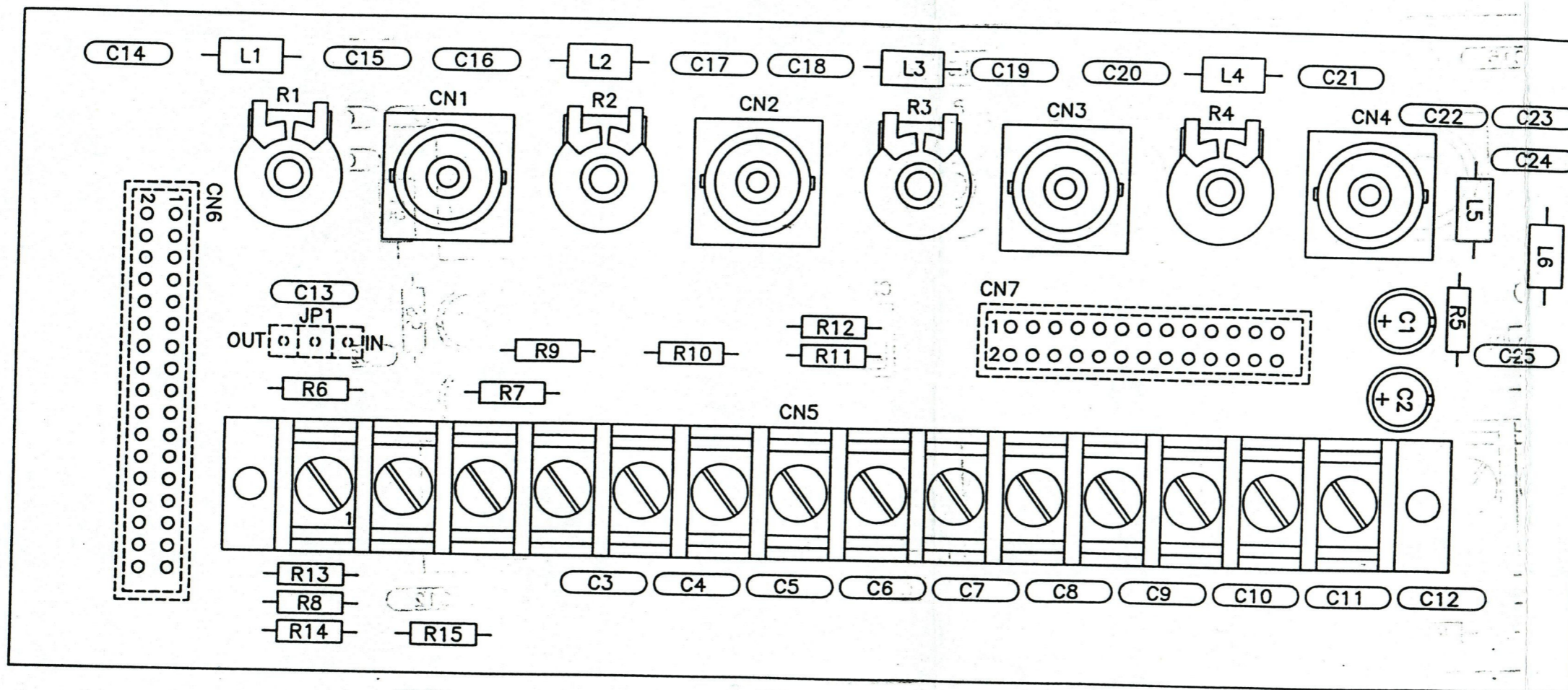
STL-1 STUDIO TRANSMITTER LINK

U.S.A. INPUT AUDIO CARD BILL OF MATERIALS

Page 1 of 1

ITEM	QUANTITY	REFERENCE	PART	DESCRIPTION	PART ORDER CODE
1	1	R5	620	RESISTOR 1/4W 1%	RSM1/4FH0620
2	10	R6,R7,R8, R9,R10,R11 R12,R13, R14,R15	1K	RESISTOR 1/4W 5%	RSC1/4JK0001
3	4	R1,R2,R3,R4	TL10K	TRIM. REG. VERT. 15mm	RVTD15VK0010
4	12	C14,C15, C16,C17, C18,C19, C20,C21, C22,C23, C24,C25	39pF	CERAMIC CAPACITOR NPO	CKM390BJ600C
5	10	C3,C4,C5 C6,C7,C8, C9,C10,C11, C12	47nF	CERAMIC CAPACITOR	CKM473BK600P
6	2	C1,C2	100(F	ELECTROLYTIC CAPACITOR	CEA107BM350
7	6	L1,L2,L3, L4,L5,L6	VK200	RF CHOKE	IMPVK200
8	1	JP1	3 PIN STRIP	STRIP M P 2.54 3 PIN	CNTSTRIPMCS
9	1	CN5	MORS. 14	MORS. TELAIO 14 CONT.	MORSP14P
10	1	CN7	26P CONN.	CONN. M 2*13 P 2.54	CNTMCSFC26P
11	1	CN6	34P CONN.	CONN. M 2*17 P 2.54	CNTMCSFC34P
12	4	CN1,CN2, CN3,CN4	BNC IS.	CS CONN. BNC A STAMP. IS.	CNTBNCFCISIS





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