ENERGY-ONIX
BROADCAST EQUIPMENT CO., INC.

PULSAR

250 – 500 – 1KW

TECHNICAL AND MAINTENANCE MANUAL

MANUFACTURED BY:

ENERGY-ONIX BROADCAST EQUIPMENT CO., INC.
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AUGUST 25, 2003

Energy-Onix
BROADCAST EQUIPMENT CO., INC.
VALATIE, NEW YORK 12184

MAILING ADDRESS
P.O. BOX 801

SHIPPING ADDRESS
1306 RIVER STREET

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

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

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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.

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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 OF UNITS/PARTS.

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

Energy-Onix 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 or 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.

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.

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 RISK 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 TO INSURE THE GOODS FOR THE WHOLE VALUE. SHIPMENT MUST BE EFFECTED C.I.F. (PREPAID) TO THE ADDRESS SPECIFIED BY ENERGY-ONIX 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 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 518-822-2644.

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PULSAR 250

SPECIFICATIONS:

Configuration	One independent AM Power Module with integral cooling fan.
Power Output	250 watts (rated), 300 watts (capable): Four power levels continuously adjustable between 30 and 300 watts selectable via local or remote control. Automatic power Controller maintains power output at all four preset levels.
Frequency Range	530 kHz to 1700 kHz
RF Terminating Impedance	50 ohms unbalanced-Type "N"
Modulator Type	Pulse duration Modulator (PDM)
Audio Frequency Response	+\-0.5 db, 30-10,000 Hz
Audio Harmonic Distortion	Better than 1% (THD) at 95% modulation with 400 Hz
Modulation Capability	125% positive peak modulation capability to 300 watts..
Carrier Shift	Not exceeding 1%
RF Harmonics	73 db or more below 250 watts
Spurious Outputs	73 db or more below 250 watts
Noise and Hum	60 db more below 100% modulation capability to 300 watts
Frequency Stability	+\-5 Hz or +\-5 PPM, whichever is greater over temperature range.
Audio Input	600 ohms active balanced + 4 dBm nominal
Power Input	Single phase 198-250 V, 50/60 Hz (Other voltages on special order)
Permissible Power Supply Variation	+10%, -5% voltage, +/-5% frequency
Power Consumption	360 W maximum at 250 W, 0% modulation; 530 W maximum at 250 W, 100% continuous sine wave modulation.
Power Factor	0.82 or better
Overall Efficiency	Better than 70%
Metering	Forward/Reflected power, DC current, DC and AC voltage
Remote Control	Transmitter ON/OFF; Power level selection 1,2,3,4; Overload reset
Ambient temperature	-10°C to 50°C
Humidity Range	0-95%
Altitude	0-4000m (0-13,000 ft.)
Size (Cabinet)	50" H x 23 1/4" W x 36" D
Weight (Cabinet)	400 lbs. (approximately)

PULSAR 500

SPECIFICATIONS:

Configuration	Two independent AM Power Modules with integral cooling fans.
Power Output	500 watts (rated), 750 watts (capable): Four power levels continuously adjustable between 50 and 750 watts selectable via local or remote control. Automatic power Controller maintains power output at all four preset levels.
Frequency Range	530 kHz to 1700 kHz
RF Terminating Impedance	50 ohms unbalanced-Type "N"
Modulator Type	Pulse duration Modulator (PDM)
Audio Frequency Response	+\-0.5 dB, 30-10,000 Hz
Audio Harmonic Distortion	Better than 1% (THD) at 95% modulation with 400 Hz
Modulation Capability	125% positive peak modulation capability to 550 watts..
Carrier Shift	Not exceeding 1%
RF Harmonics	73 db or more below 500 watts
Spurious Outputs	73 db or more below 500 watts
Noise and Hum	60 db more below 100% modulation capability to 750 watts
Frequency Stability	+\-5 Hz or +\-5 PPM, whichever is greater over temperature range.
Audio Input	600 ohms active balanced + 4 dBm nominal
Power Input	Single phase 198-250 V, 50/60 Hz (Other voltages on special order)
Permissible Power Supply Variation	+10%, -5% voltage, +/-5% frequency
Power Consumption	720 W maximum at 500 W, 0% modulation; 1.07 kw maximum at 500 W, 100% continuous sine wave modulation.
Power Factor	0.82 or better
Overall Efficiency	Better than 70%
Metering	Forward/Reflected power, DC current, DC and AC voltage
Remote Control	Transmitter ON/OFF; Power level selection 1,2,3,4; Overload reset
Ambient temperature	-10°C to 50°C
Humidity Range	0-95%
Altitude	0-4000m (0-13,000 ft.)
Size (Cabinet)	50" H x 23 1/4" W x 36" D
Weight (Cabinet)	500 lbs. (approximately)

SPECIFICATIONS

Configuration	Three Independent AM power modules with integral cooling fans.
Power Output	1000 watts (rated) 1200 watts (capable). Four power levels continuously adjustable between 100 and 1200 watts selectable via local or remote control. Automatic power Controller maintains power output at all four preset levels.
Frequency Range	530 kHz to 1700 kHz.
RF Terminating Impedance	50 ohms unbalanced, type "N".
Modulator Type	Pulse Duration Modulator (PDM).
Audio Frequency Response	+/-0.5 dB, 30-10,000Hz.
Audio Harmonic Distortion	Better than 1% (THD) at 95% modulation with 400Hz.
Modulation Capacity	125% positive peak modulation capability to 1,100 watts.
Carrier Shift	Not exceeding 1%.
RF Harmonics	73 dB or more below 1kW.
Spurious Outputs	73 dB or more below 1 kW.
Noise and Hum	60 dB or more below 100% modulation capability to 1,100 watts
Frequency Stability	+/-5 Hz or +/-5ppm whichever is greater over temperature range.
Audio Input	600 ohms balanced +4 dBm nominal.
Power Input	Single phase 198-250 V, 50/60 Hz (other voltages on special order).
Permissible Power Supply Variation	+10%, -5% voltage, +/-5% frequency.
Power Consumption	1.43 kW maximum at 1 kW, 0% modulation, 2.14 kW maximum at 1 kW, 100% continuous sine wave modulation.
Power Factor	0.82 or better.
Overall Efficiency	Better than 70%.
Metering	Forward/Reflected Power, DC Current, DC and AC voltage.
Remote Control	Transmitter ON/OFF, Power Level Selection 1,2,3,4; Overload reset
Ambient Temperature	-10°C to 50°C.
Humidity Range	0-95%.
Altitude	0-4,000m (0-13,000 ft).
Size	50"H x 23 1/4"W x 36"D
Weight	600lbs. (approximately).

ADDENDUM PULSAR 1000

The transmitter as supplied, has been modified so that the output of each module is wired in series. The original Pulsar 1000 utilized (3) modules operating in parallel.

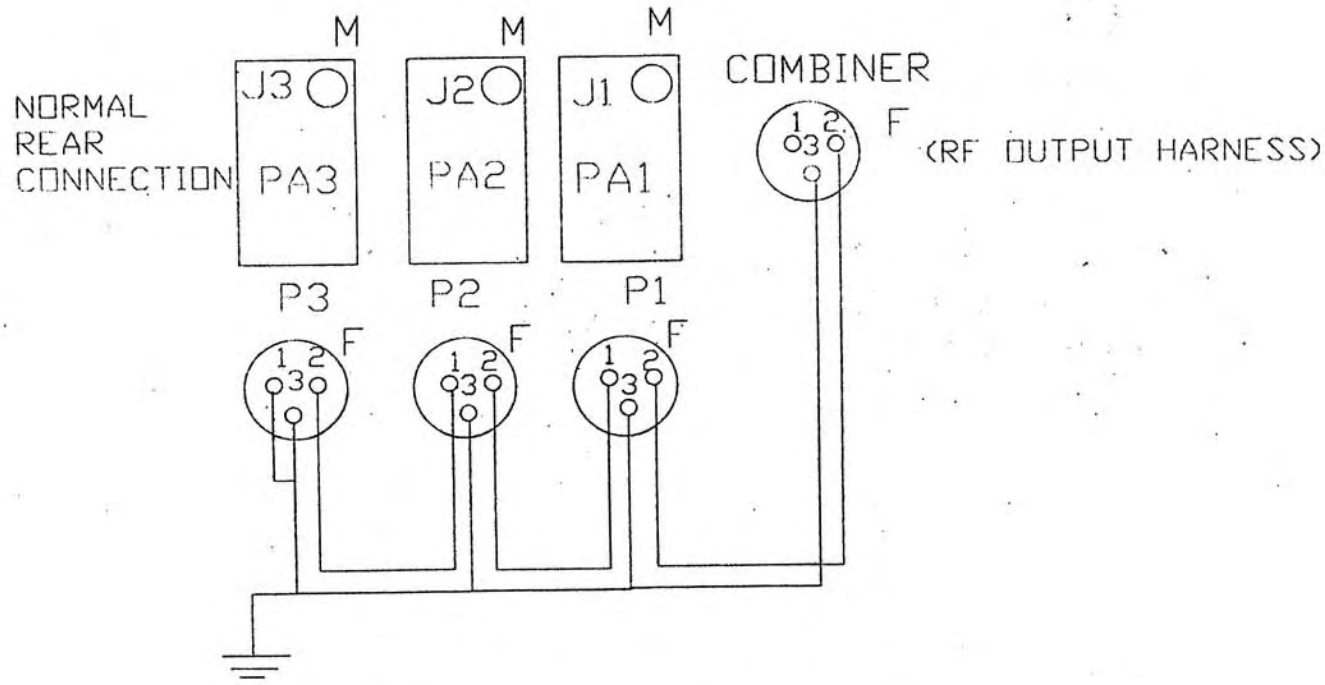
This series arrangement results in a reduction of potentially damaging lightning voltages by a factor of three.

Attached is a drawing which describes the interconnection of all (3) power amplifier outputs. Normally, the interconnecting harness has its (3) plugs (P1, P2 and P3) installed on the PA modules (J1, J2 and J3). Its output plug, P4 is installed on the rear of the combiner chassis.

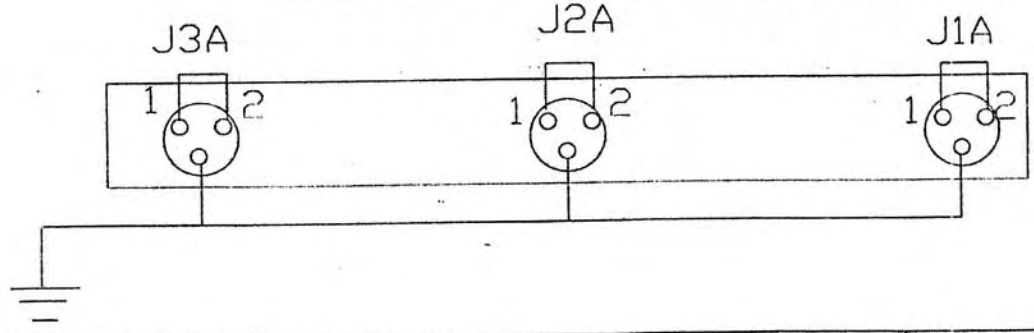
In the event of a fault, turn off the transmitter. The front panel circuit breaker relating to this module should also be turned off. Remove the plug (P1, P2 or P3) that corresponds to the defective module. Insert the plug in the emergency panel socket mounted just below the modules. Thus, P1 should be installed in J1a, etc.

Remove the remaining plugs on the rear of the defective module and remove the defective module for repair.

Select position #5 and operate the "start" switch. The transmitter output power should be adjusted to achieve 500 watts output with (2) operating modules and 200 watts with (1) operating module.



EMERGENCY CONNECTOR PANNEL



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BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

REVISIONS:

TITLE: PULSAR 1000 PA OUTPUT SERIES CIRCITRY

DESIGNED BY: BW	DATE: 7/24/03	DWG. BY: JW	DWG. No. S-P1000-1
CHK'ED:	CAD No.		

PULSAR 250, 500, 1000
Description

General:

The low power Pulsar medium wave, AM broadcast transmitters are available in 250 watts, 500 watts and 1KW versions. The 1KW "Pulsar 1000" utilizes (3) PA/modulator modules, the "Pulsar 500" contains (2) modules, and the "Pulsar 250" contains one module. Each version has the appropriate power supply corresponding to the number of modules. The Pulsar transmitter is a high efficiency, solid state transmitter with excellent modulation performance specifications.

Up to four pre-set power output levels can be selected, as well as a fifth continuously variable front panel power control. This configuration allows convenient and seamless power changes to be accomplished at the transmitter or by remote control. "Daytime", "nighttime", "pre-sunrise", and "post sunset" power changes are quick and require no further adjustment.

Mechanical:

The Pulsar is self contained in a medium sized cabinet 50" H 23 1/4" W x 36" D.

The transmitter contains a "combiner-matcher" drawer; a controller/low level RF/audio driver drawer; independent 400 watt RF amplifier/modulator modules; and a hinged circuit breaker panel. All of the drawers and modules are capable of being withdrawn from the cabinet.

The power supply components are mounted on the base and sides of the cabinet.

Cooling is achieved by having air enter the cabinet through the rear cover. This air then enters the individual chassis and is exhausted through the front door. The air entering the cabinet passes through a removable air filter which should be periodically cleaned.

Electrical Description

Power Supplies:

The Pulsar transmitters utilize a high quality ferroresonant power supply to produce the voltage required to operate the RF AMP/MODULATOR modules and INTERMEDIATE POWER AMPLIFIER (IPA).

In addition, the transmitter utilizes two switching power supplies to produce +15V and –15V. (One is dedicated exclusively to the PDM/Audio Board).

Details on these supplies are included in the "Theory of Operation" section of this book.

RF Section:

The transmitter utilizes a crystal which is at four times the carrier frequency.

The output of the crystal oscillator, after division, is used to drive an IPA. This IPA has a capacity of driving as many as 10 RF modules.

The RF Modules contain (4) Push Pull circuits – the combination is capable of producing 400 watts CW.

The output of each of the RF modules are combined with simple LC circuits. This combined output then passes through a "Tee" network to eliminate harmonics and is followed by a directional coupler and then followed by a "matching Tee" whose tuning and loading controls are available on the front panel for adjustment. Details are available in the "Theory" section of this book.

Audio Section:

The audio section accepts the normal balanced audio input, amplifies it and drives a PDM generator. The width or "pulse duration" of this generator is changed at the audio rate. The basic PDM frequency is from about 70 to 94KHz. The modulator is driven with the PDM signal. The output of the modulator is series connected through a low pass filter to the sources of the RF amplifiers. The low pass filter eliminates the PDM basic switching frequency and produces audio sine waves. Details are available in the "Theory" section.

Installation Instructions

Step #1 Carefully inspect the cabinet for any obvious physical damage.

Step #2 Remove the Rear cover and secure all the retaining hardware on all terminal boards, "D Subminiature" sockets as well as coaxial interconnecting plugs.

Step #3 Turn off the wall breaker dedicated to the transmitter. Then pass the (3) AC power lines through the rear cabinet access hole located on the rear edge of the cabinet. Two of these lines should measure 230 volts (+ 10%, - 15%) between each other while the 3rd wire should be ground. Pass these wires up through the base and connect them to the (3) terminal board located on the base. The ground wire should be secured to the left hand terminal when viewing the cabinet from the rear. It is recommended that #10AWG wire or larger be used to to serve as the power lines. A 25 to 30 amp wall breaker should be used.

Step #4 If Pulsar is to be operated by remote control, CN5 (connector to CONTR-J3) should be wired according to instructions on page 11.

Step #5 Pass the audio input line through the rear entrance hole of the cabinet. Attach this 600 OHM line to the audio input terminals located on the rear of the control drawer [2nd chassis down]. These terminals are located on the left hand side of the drawer when facing from the rear.

Step #6 Connect a substantial ground strap between the base of the cabinet side rail and a known station ground. See "Lightning Protection Instructions", front page of this manual.

Step #7 Connect a coax jumper between the "RF monitor" BNC jack on the rear of the combiner chassis, and the station modulation monitor.

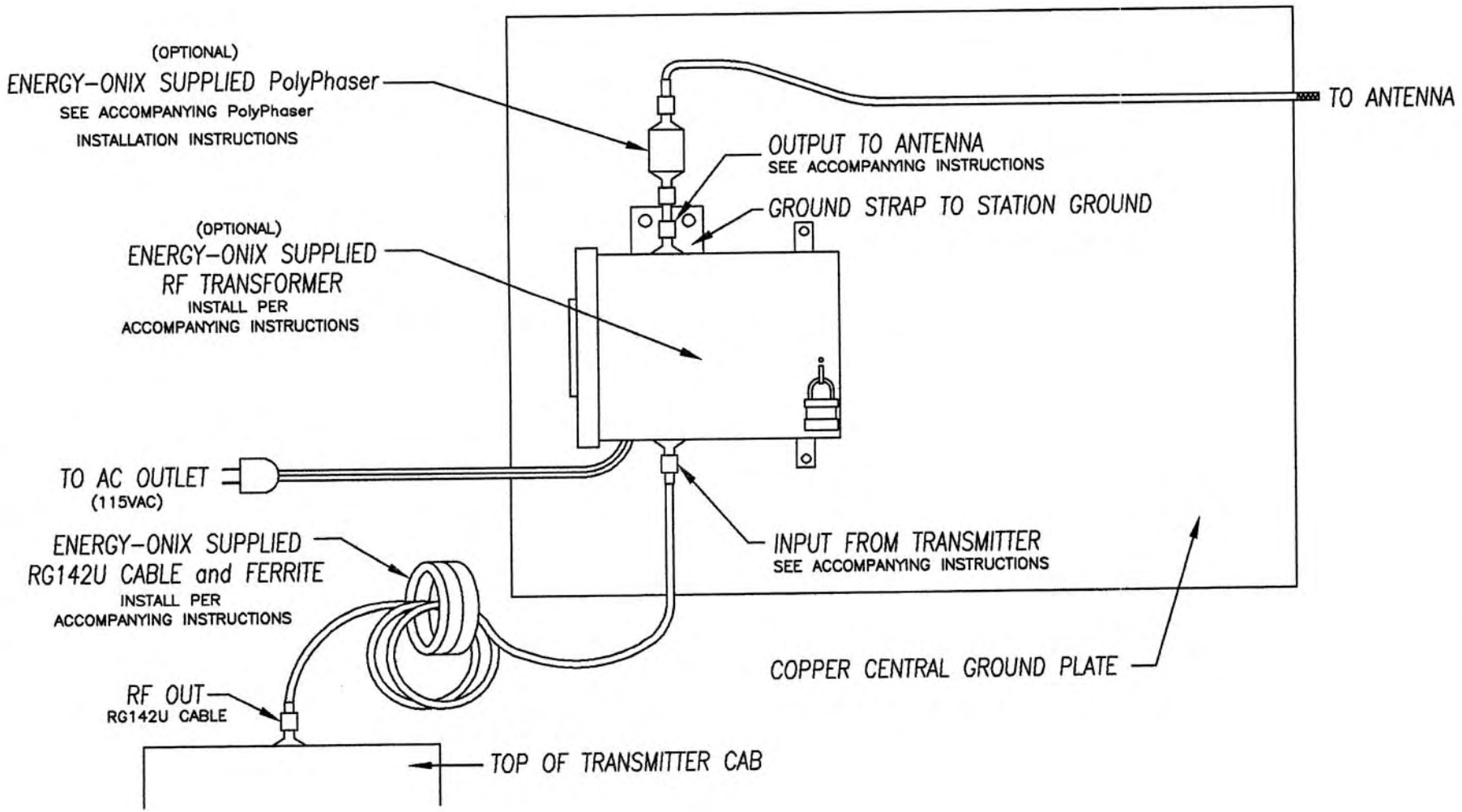
Step #8 Restore the back cover to the cabinet.

BE SURE TO READ AND FOLLOW THE "LIGHTNING PROTECTION INSTRUCTIONS", FRONT PAGE OF THIS MANUAL

Step #9A **If the optional Pulsar Lightning Protection Kit is NOT used, connect the transmission line coax from antenna to the PULSAR cabinet RF output (roof - mounted bulkhead "N" jack).**

Step #9B **If the optional Pulsar Lightning Protection Kit is IS used, refer to the diagrams on the following pages. Connect the transmission line coax from antenna to the PolyPhaser "N" jack (labeled "surge"). Connect the supplied COAX/FERRITE JUMPER FROM the (insulated) "N" jack on the LIGHTNING PROTECTION KIT ASSEMBLY (labeled "Transmitter") TO the PULSAR cabinet RF output (roof-mounted bulkhead "N" jack). The LIGHTNING PROTECTION KIT contains a small cooling fan, and this must be connected to 110 VAC.**

THE INSTALLATION OF THE TRANSMITTER HAS BEEN COMPLETED.



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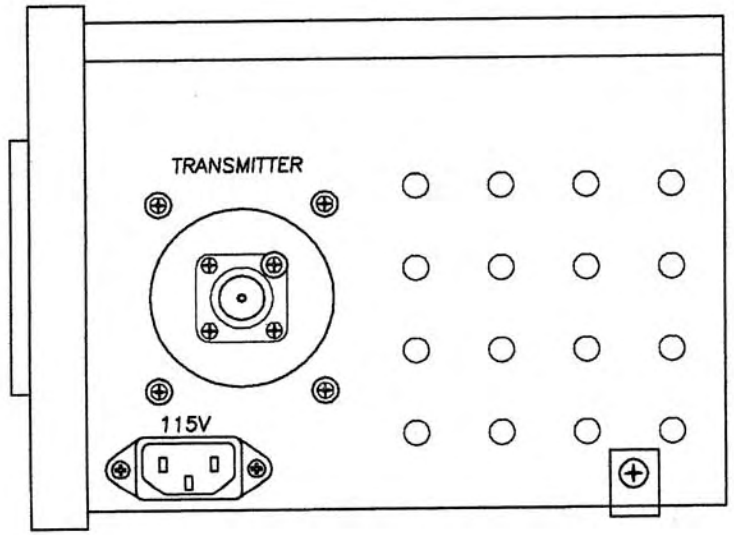
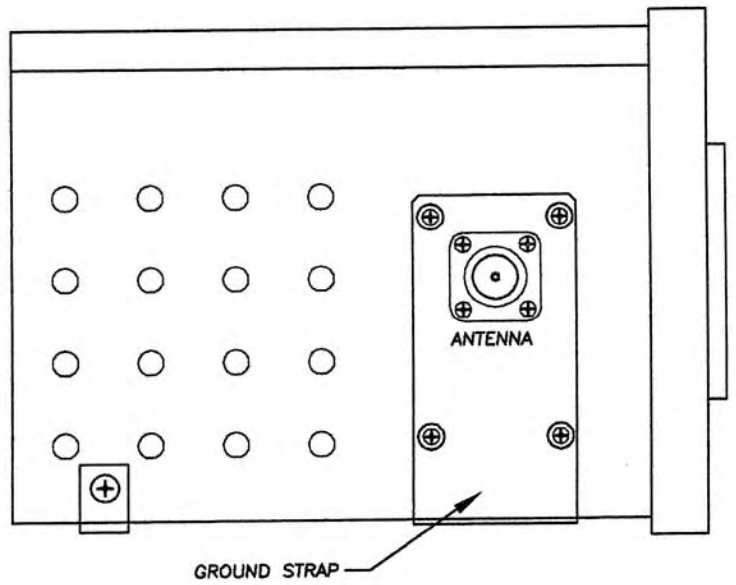
1308 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

N.T.S.

TITLE: LIGHTNING PROTECTION KIT

DESIGNED BY:	DATE: 3/13/07	DWG. BY: John McCool	DWG. No. —
CHK'ED:	CAD: _		





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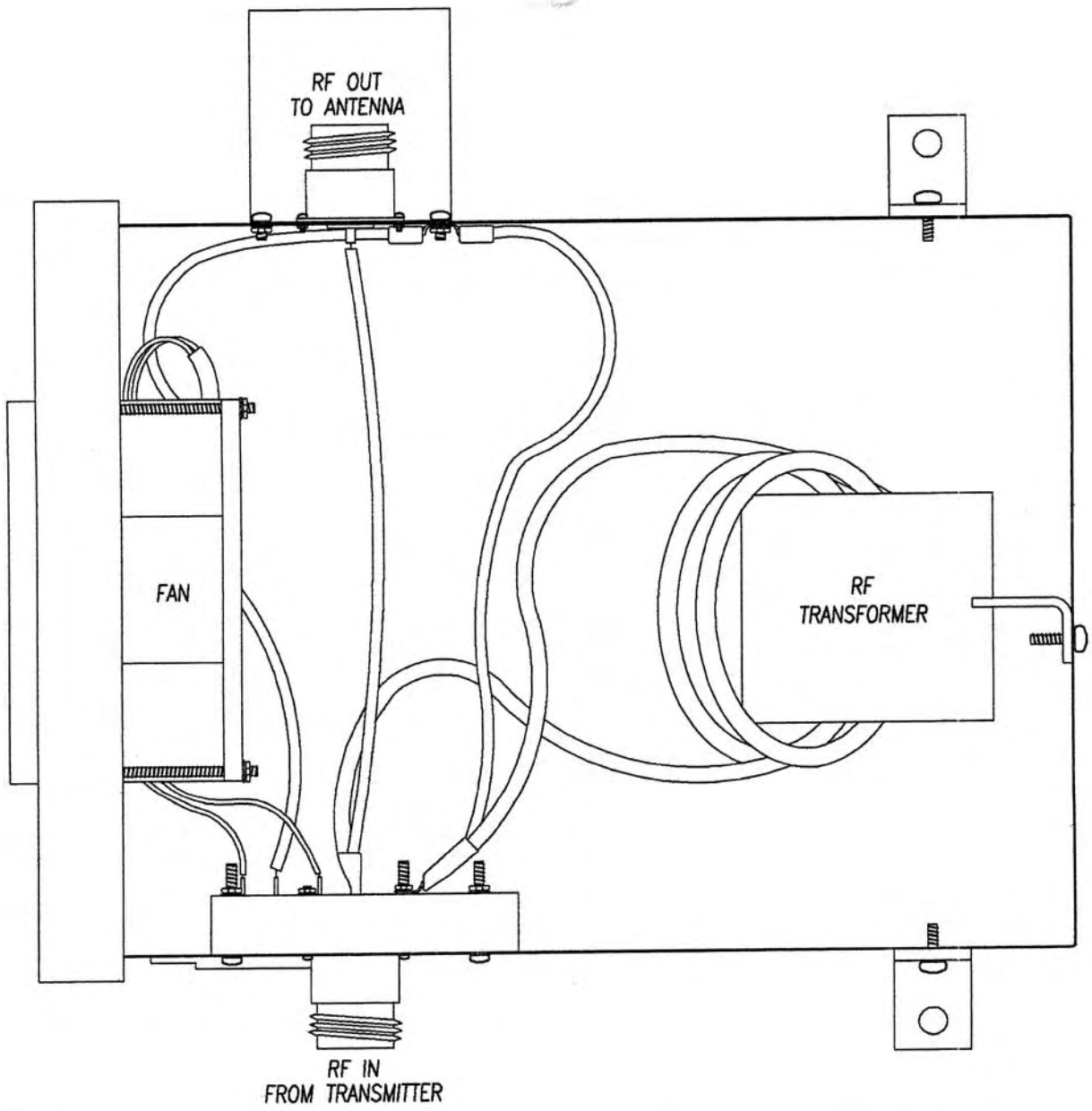
N.T.S.

TITLE: LIGHTNING PROTECTION KIT SIDE VIEWS

DESIGNED BY:	DATE: 3/13/07	DWG. BY: John McCool	DWG. No. —
CHK'ED:	CAD: _		



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1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

N.T.S.

TITLE: LIGHTNING PROTECTION KIT
TOP VIEW

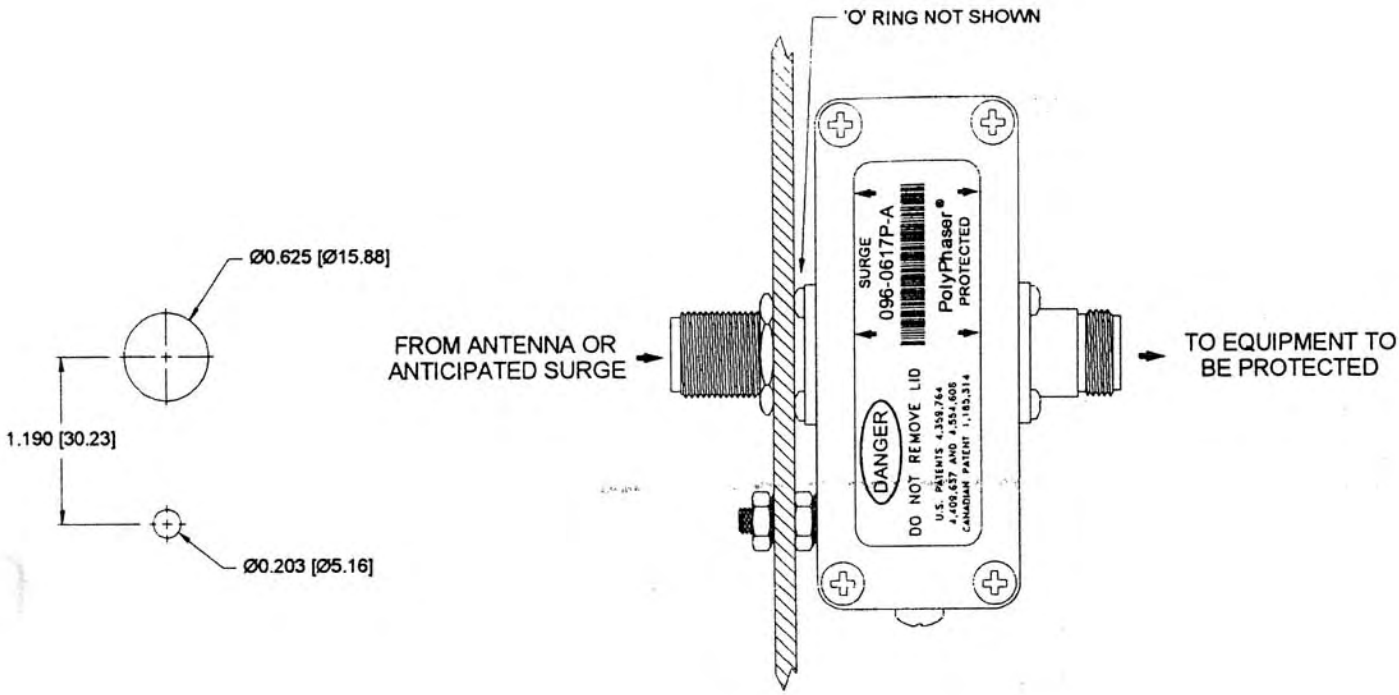
DESIGNED BY:	DATE: 3/14/07	DWG. BY: John McCool	DWG. No. —
CHK'ED:	CAD: _		

IMPULSE SUPPRESSOR INSTALLATION

PLEASE READ **DANGER** SHEET BEFORE INSTALLING

096-0617P-A

The 096-0617P-A is for multichannel HF transmitter (crossband) combiner output. The VSWR is ≤1.1:1 with an insertion loss of ≤0.1dB for the bandwidth from 500KHz to over 100MHz. The dc turn-on is 1800V.



IT IS VERY IMPORTANT THIS UNIT BE GROUNDED TO A LOW IMPEDANCE (LOW R AND LOW L) GROUND SYSTEM IN ORDER TO WORK PROPERLY. When mounting (grounding) stud to panel, use maximum of 20 inch pounds of torque for 10-32 hardware. We strongly recommend this ground be interconnected to the tower ground and power ground to form one system. To minimize the "in-air" interconnect inductance to the ground system since skin effect is present, use as straight and as large a surface area strap as possible. Keep bends to 8" radius or larger.

The transmission line is only one means of having damaging impulse energy enter your equipment. We strongly recommend that power line protectors and telephone line protectors be used on the equipment.

For further information on grounds, ground systems, power line and telephone interconnect protection, order PolyPhaser's book, "The 'Grounds' for Lightning & EMP Protection", 2nd edition, at a cost of $22.95 or our VHS video, "Grounding – An Overview", at a cost of $53.95. Please note prices are subject to change. For more information about PolyPhaser Corporation, please refer to our Home Page on the Internet at www.polyphaser.com.

DANGER

PLEASE REVIEW THIS SHEET PRIOR TO ANY INSTALLATIONS.

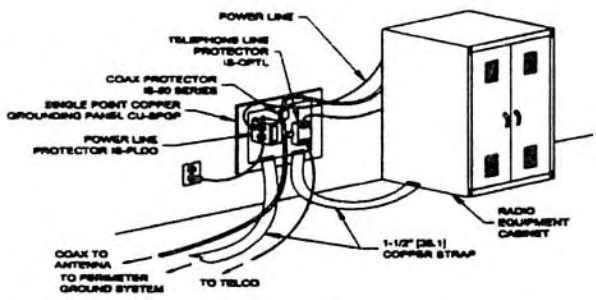
GOOD GROUND SYSTEM IS REQUIRED FOR PROPER INSTALLATION AND OPERATION. THE IMPULSE SUPPRESSOR IS ONLY AS GOOD AT SUPPRESSING IMPULSES AS THE ELECTRICAL GROUND SYSTEM THAT IS CONNECTED TO THE UNIT.

DO NOT CONNECT WHEN A STORM IS NEAR. DO NOT CONNECT WHEN TRANSMISSIONS ARE OCCURRING.

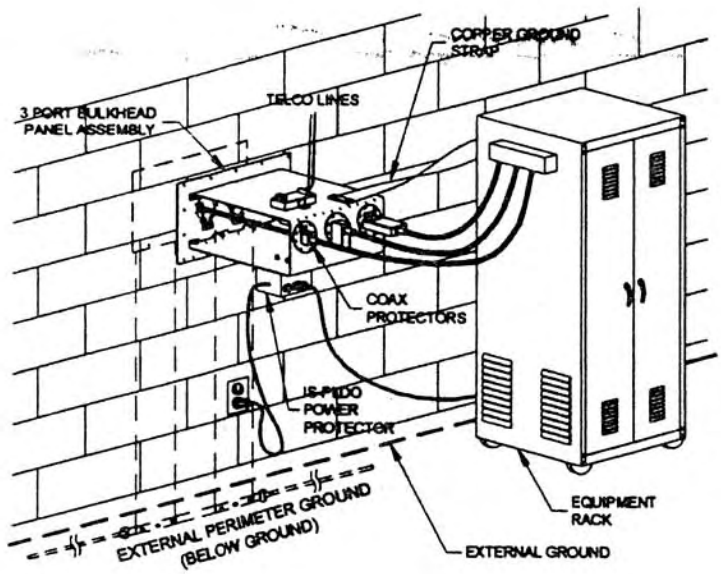
50% of the time a lightning strike occurs in groups of two or three strokes with the first stroke having 20,000 amps and then less for the following strokes. Each stroke may have a rise time of 2.1μs to the peak current and a decay between 10 to 40μs.

Most antenna installations are mounted on a continuously conductive mast or tower which when properly grounded, should conduct the larger share of the strike current, thus leaving only a fraction (50% or less) for the RF transmission line to handle. Therefore, the current capability of the Impulse Suppressor should be sufficient for all but the rare percentage of super strike occurrences when properly installed to a good low impedance ground system.

DO NOT STAY AROUND OPERATING EQUIPMENT IN AN ELECTRICAL STORM. THE IMPULSE SUPPRESSOR MAY SAVE YOUR EQUIPMENT FROM DANGER BUT CANNOT KEEP PERSONNEL IN THE AREA SAFE.



SINGLE POINT GROUNDING PANEL
FOR PROPER GROUNDING/PROTECTION



We recommend the coax, power, and telephone protectors, if used, all be mounted/grounded together on a bulkhead plate or wall and the equipment chassis also be grounded only to this plate. The plate is then grounded to your ground system. Only by using this single point ground system can your equipment really survive a direct lightning strike.

LIMITED TEN YEAR WARRANTY

ENG-F-016 Rev. (-) 12/97

PolyPhaser Corporation warrants this product to meet or exceed the published specifications of the time of manufacturing and to be free of manufacturing defects for a ten year period after proven date of purchase. PolyPhaser Corporation makes no claims, nor extends any warranty to include an "IMPLIED WARRANTY OF MERCHANTABILITY OR IMPLIED WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE" PolyPhaser Corporation assumes no responsibility for personal injury, property damage, and any other losses. This warranty is limited to the repair, replacement or refund of purchased price of this product only and it will be PolyPhaser Corporation's decision as to whether this unit is defective and as to which of the above mentioned actions will be taken PolyPhaser Corporation extends no obligation to update or modify any of its existing products, as newly developed products are marketed.

When Lightning Strikes...
U.S. Patent #'s 4,359,764, 4,409,637, 4,554,608

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Minden, NV 89423 U.S.A.

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Fax: (775) 782-4476

Preliminary Tuning

Step #1 Be sure that all (6) circuit breakers on bottom front panel are "off" (Down Position), and the "local-remote" switch on the controller panel is in "local".

Step #2 Turn on the wall breaker and observe the voltage on the front panel circuit breaker panel. This voltage should be between 200 and 250 volts.

Step #3 Turn on the "control circuit breaker". (First breaker from the left on CB panel when viewing from the front.) The following lights will register:

+15 Volts (green)
-15 Volts (red)
"Stop Switch" Light (red)
Variable Power Output Switch (green)

NOTE: The +95% and –95% lights are inoperative when transmitter is not producing power. They may be on or off, in any combination at this time.

If the stop switch does not indicate, depress this switch. Do the same for the variable output switch. The result should be that the lights in the center of the "stop" and variable Power Output switches should indicate.

Step #4 Turn on the "start" switch. All of the fans within the cabinet should be on and, provided all of the interlocks are closed, the (7) green control lights on the control panel will register.

Step #5 Operate the "stop switch" to turn off the controller. Operate the manual gain control to maximum counter clockwise position. (Minimum Power Output)

Step #6 Turn on the +72 volt circuit breaker and operate the "start" switch. The front panel meter on the combiner should register approximately 95 volts (78 volts for Pulsar 500 and Pulsar 250) in its second position from the left.

Step #7 Operate the stop switch and wait until the volt meter falls to zero. Turn "on" the remaining circuit breaker(s) located to the right of the 72 volt breaker.

NOTE: The tuning and loading controls are factory adjusted for a 50 OHM, non-reactive load. FIELD ADJUSTMENTS SHOULD NOT BE ATTEMPTED UNLESS NECESSARY, AND ONLY BY TECHNICALLY QUALIFIED INDIVIDUALS. If controls are mis-adjusted, it may be necessary to remove top cover from combiner drawer and return controls to the factory settings, as indicated by black coloring indicator on rotary inductors.

Step #8 **The "voltage" position on the output meter should still be selected. Operate the start switch, verify that the plate voltage is correct, and select the "current" position. Slowly rotate the manual gain control to obtain an indication of 3 amps of current. Quickly select the forward power and observe an indication of about 10 to 20% of rated power output. Select the "reflected" position, and observe a negligible reading. Only if the "reflected" reading is significant, should the tuning and loading controls be adjusted.**

Tuning and loading controls should be "rocked" back and forth in small increments as the transmitter is adjusted for minimum reflected power on meter.

Step #9 **Select "forward" power position and rotate control until about 50% of rated power is indicated. Select "reflected" power and if not negligible, follow procedure in Step #8. REPEAT FOR APPROXIMATELY 75% OF RATED POWER, AND, FINALLY, 100% OF RATED POWER.**

Step #10 **Select each of the power preset positions and enter the meter readings on the data sheet (next page of this manual).**

*** **IMPORTANT** ***

Do not rapidly switch from one level to another, as it is possible to "latch" more than one level at the same time. Allow at least a 5-second interval between selections.

Step #11 **Compare the resultant readings with the test data sheet. If there are any significant deviations, contact the factory.**

Step #12 **Provide low level programming – type audio input and slowly increase level until the –95% light is "on" more than half the time. (if using external modulation monitor adjust audio so positive peaks are greater than 95% and less than 125%.)**

PULSAR DATA SHEET

POWER LEVEL_____ FREQ_____ S/N_____

DATE _____ CUSTOMER_____

AC VOLTS_____

MODULATION @ 0.0%	PRE-SETS				
	#1	#2	#3	#4	VAR
POWER OUTPUT					
POWER REFLECTED					
CURRENT					
VOLTAGE					

REMOTE READINGS:

INCIDENT (# 7 TO GND) TB12-7					
REFLECTED (# 6 TO GND) TB12-6					
CURRENT (# 5 TO GND) TB12-5					
VOLTAGE (# 4 TO GND) TB12-4					

*START TB12-11_____ *STOP TB12-10_____ *RESET TB12-12_____

*LEVEL 1 TB13-2_____ *LEVEL 2 TB13-3_____ *LEVEL 3 TB13-4_____

*LEVEL 4 TB13-5_____ *VARIABLE TB13-6_____

NOTE: (*) Momentary closure to ground

Step #13 Keep the transmitter in this condition for 30 minutes. All readings should be stable. If higher positive modulation levels are required, simply increase the audio levels. It is recommended that program peaks do not exceed +125%.

THE PRELIMINARY TUNING HAS NOW BEEN COMPLETED.

DO NOT ATTEMPT TO ADJUST TRANSMITTER FOR HIGHER THAN RATED POWER. ALTHOUGH ENERGY-ONIX TRANSMITTERS ARE WELL PROTECTED AGAINST OVERLOAD CONDITIONS, THE PROTECTIVE CIRCUITS ARE FACTORY ADJUSTED FOR OPTIMUM PROTECTION AT RATED POWER LEVELS AND EXCEEDING THESE LEVELS MAY RESULT IN TRANSMITTER "RE-CYCLING" AS OVERLOADS ARE DETECTED.

IN ADDITION, THE PULSAR IS PROTECTED AGAINST DAMAGE FROM OVERMODULATION. TWO "CLIPPER" CIRCUITS ARE USED TO EFFECTIVELY PROTECT THE MODULATORS AND AMPS FROM DRAWING EXCESSIVE CURRENT. NONETHELESS, GROSSLY EXCESSIVE AUDIO LEVELS OR PROCESSING MUST NEVER OCCUR.

Normal Operation

Local Operation

Keep all circuit breakers "up" [on position].

To Turn On

Select appropriate power pre-set switch.
Operate the "start" switch.

To Turn Off

Operate the "stop" switch.

To Reset Overload

Operate the front panel reset switch.

To Switch Power Output Level

Operate the appropriate front panel power output preset switch.

*** **IMPORTANT** ***

Do not rapidly switch from one level to another, as it is possible to "latch" more than one level at the same time. Allow at least a 5-second interval between selections.

If it becomes necessary to change a preset power level, adjust the recessed trimpot under the appropriate preset switch to desired power output as observed on meter.

Remote Control

The Pulsar transmitters contain a 25 Pin "D" Subminiature socket on the rear of the controller chassis.

PC-333B, Page 12, describes the wiring to this socket.

Remote Control Functions

Terminal #13 is ground

To Turn On

Provide momentary connection from terminal #11 to ground.

To Turn Off

Momentary connection from terminal #10 to ground.

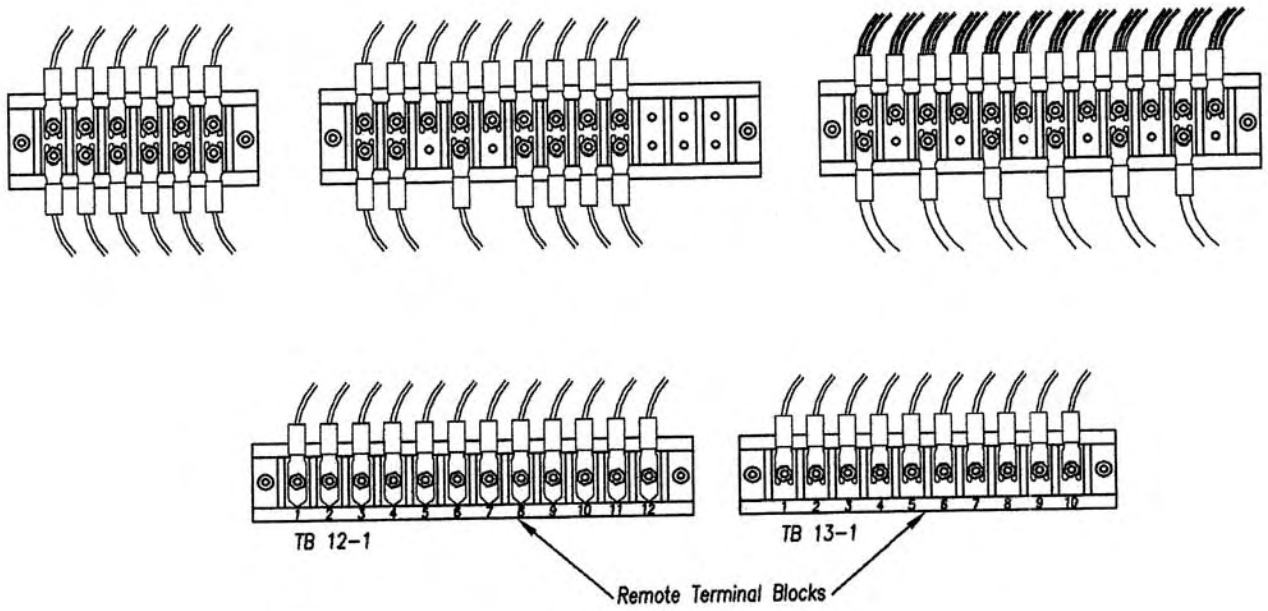
To Reset

Momentary connection from terminal #12 to ground

To Select Output Setting #5 – Connect momentary ground to terminal #18
To Select Output Setting #4 – Connect momentary ground to terminal #17
To Select Output Setting #3 – Connect momentary ground to terminal #16
To Select Output Setting #2 – Connect momentary ground to terminal #15
To Select Output Setting #1 – Connect momentary ground to terminal #14

Remote Control Metering

Parameter	Terminal # to Ground
RF MODULE VOLTAGE	#4
TOTAL POWER SUPPLY CURRENT	#5
REFLECTED POWER	#6
INCIDENT POWER	#7



N.T.S.

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BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

PULSAR

TITLE: Center Shelf Remote Terminal Blocks Rear View

DESIGNED BY: PI	DATE: 3/12/07	DWG. BY: John McCool	DWG. No. AM-10001
CHK'ED:	CAD: AM-10001		

PULSAR REMOTE

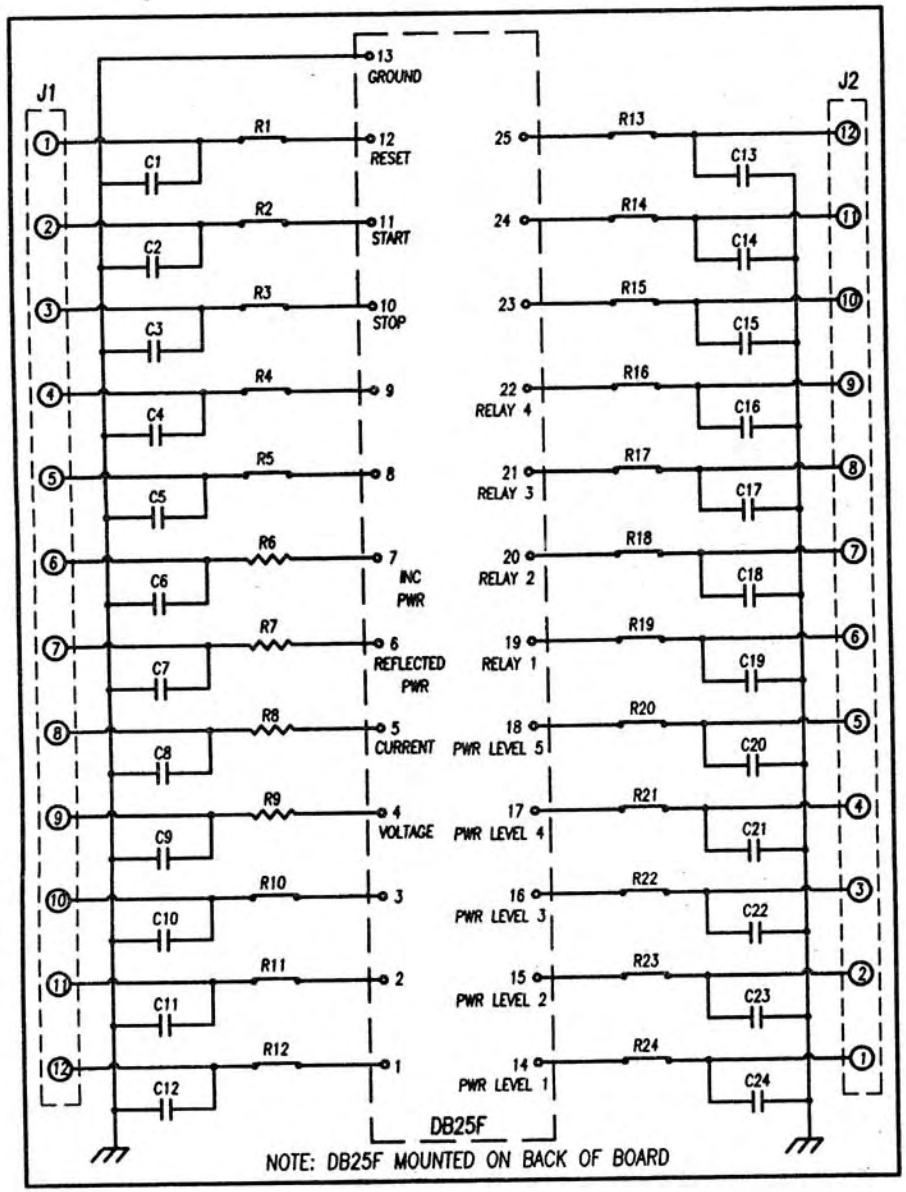
D-SUB POS	COLOR	FUNCTION	TERMINAL BLOCK
1	N/C		
2	ORN/WHT	VOTAGE #2 (2500 ONLY)	TB 12-1
3	YEL/WHT	CURRENT #2 (2500 ONLY)	TB 12-2
4	PURPLE	VOLTAGE	TB 12-4
5	BLACK	CURRENT	TB 12-5
6	GREY	REFL. POWER	TB 12-6
7	BLUE	INC. POWER	TB 12-7
8	N/C	EXT. INTERLOCK	TB 12-8
9	N/C	EXT.INTERLOCK	TB 12-9
10	ORANGE	STOP	TB 12-10
11	PUR/WHT	START	TB 12-11
12	BLUE/WHT	RESET	TB 12-12
13	GREEN	GROUND (MOMENTARY TO GROUND)	TB 12-3, TB 13-1
14	BROWN	PWR LEVEL SELECTION ONE	TB 13-2
15	GREY/WHT	PWR LEVEL SELECTION TWO	TB 13-3

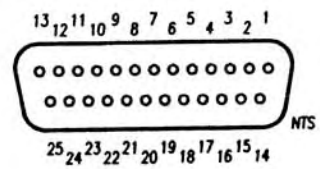
HB

PULSAR REMOTE

D-SUB POS	COLOR	FUNCTION	TERMINAL BLOCK
16	RED/WHT	PWR LEVEL SELECTION THREE	TB 13-4
17	RED	PWR LEVEL SELECTION FOUR	TB 13-5
18	BLK/WHT	PWR LEVEL SELECTION FIVE	TB 13-6
19	BLUE/WHT	RELAY ONE (STATUS TO GND) O= SELECTED	TB 13-7
20	WHITE	RELAY TWO 15V=NC	TB 13-8
21	BRN/WHT	RELAY THREE	TB 13-9
22	YELLOW	RELAY FOUR	TB 13-10
23	N/C		
24	N/C		
25	N/C		

PIC





DB25F

(VIEWED FROM BACK OF CONTROLLER DRAWER)

PARTS LIST

C1 – C24 = 0.01mfd/100V, STACK METAL FILM, P4713
R1 – R5 = JUMPER
R6 – R9 = 1000 ohm, 1/4W
R10 – R24 = JUMPER
J1 & J2 = 12 PIN MOLEX
DB25F = D-SUBMIN 25 PIN FEMALE

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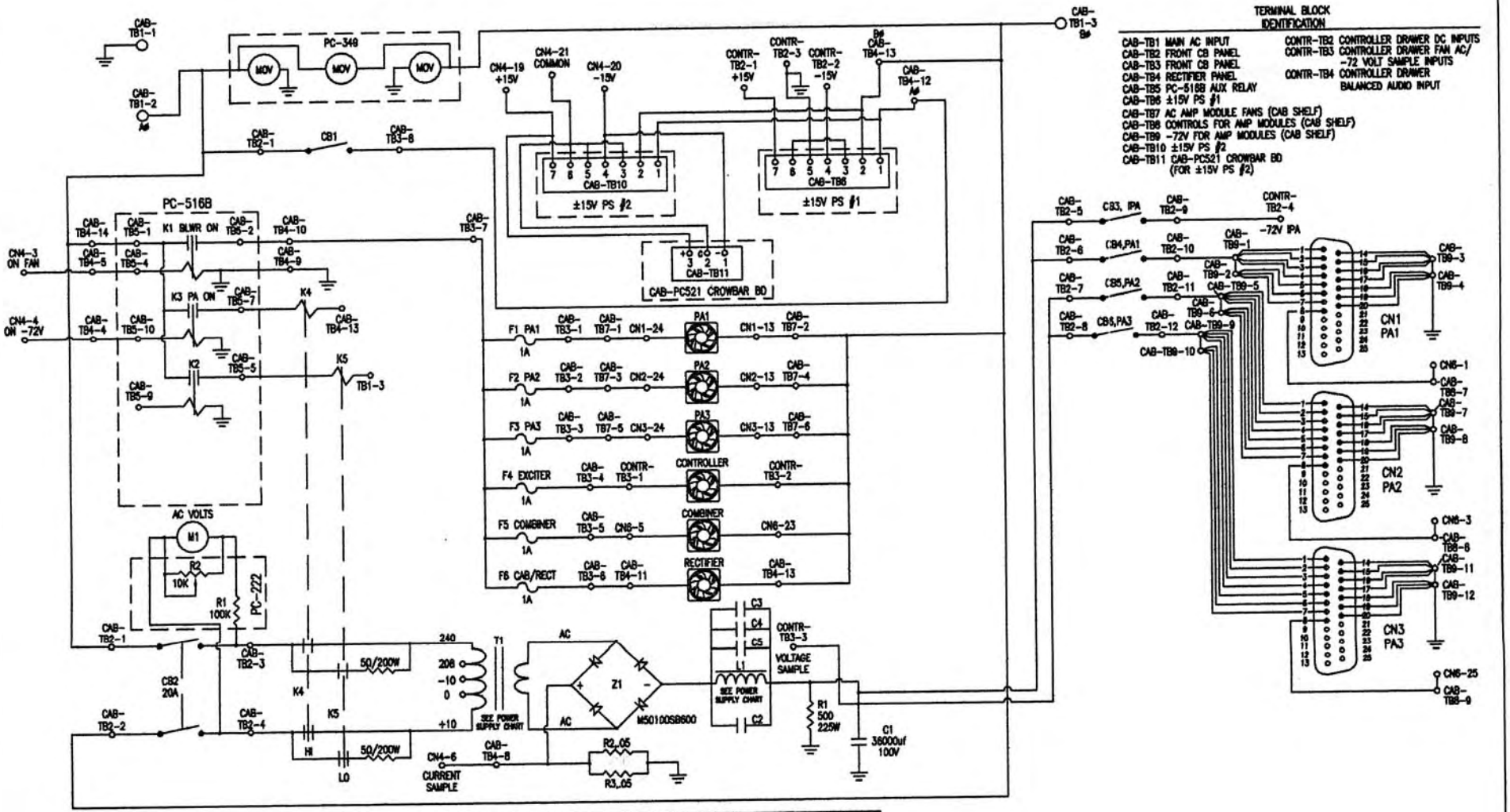
REVISION DESCRIPTION:	REVISION:
ROTATE DB25F & CHANGE NOTE OF DB25F, 07/20/99	A

TITLE: PULSAR AM REMOTE INTERFACE BD., PC–333B SCHEMATIC DIAGRAM

DESIGNED BY: NDT	DATE: 6/18/99	DWG. BY: CKB	DWG. No. AM–2501S
CHK'ED:	CAD No. AM–2501S		



POWER SUPPLY CHART		250W	500W	1000W	2500W
	T1	376-129	376-127	376-125	376-031
	L1	376-139	376-138	376-137	(2) x 376-137

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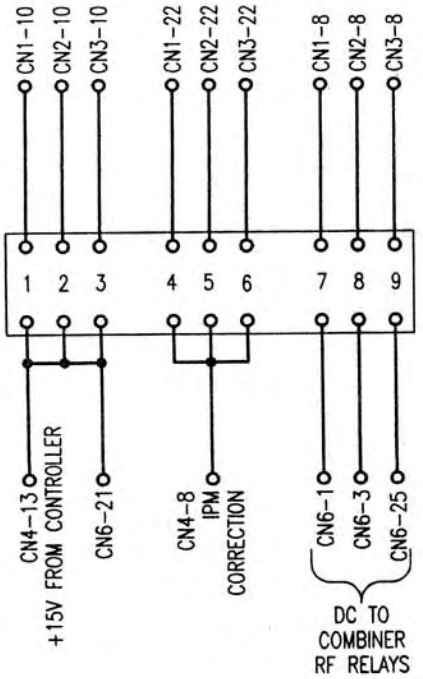
NOTES:
N.T.S.
ADDED PREFIX TO TB #'S, REDRAW PS AND RELATED CIRCUITS, 12/22/99

TITLE: PULSAR 1000 AC CONTROL LADDER /CABINET SCHEMATIC (2008-PRESENT)

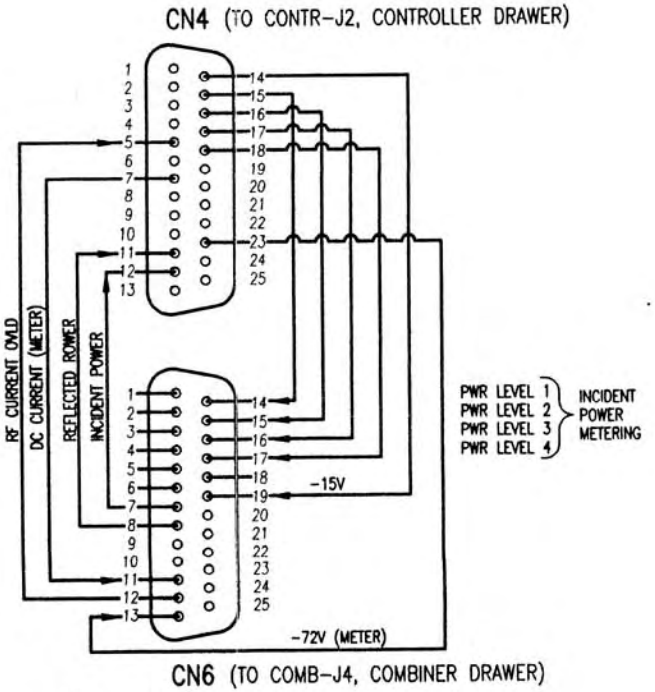
DWG. BY: CKB		MODIFIED: 1/10/08 by John McCool	DWG. No. AM-1004s
DATE: 6/23/99	REV: A		



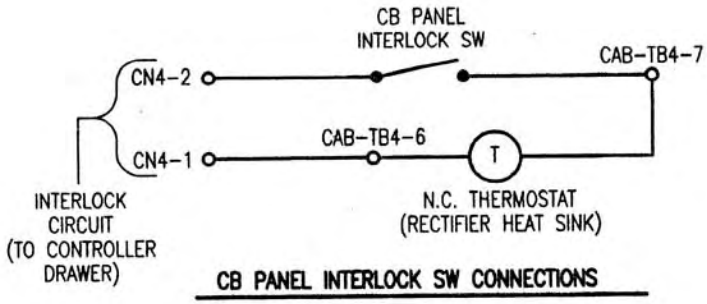
CAB-TB8 CONNECTIONS

D-SUB CONNECTOR IDENTIFICATION

CONNECTOR	TO JACK	LOCATION
CN1	AMP1-J1	AMPLIFIER MODULE #1
CN2	AMP2-J1	AMPLIFIER MODULE #2
CN3	AMP3-J1	AMPLIFIER #3
CN4	CONTR-J2	CONTROLLER DRAWER
CN5	CONTR-J3	CONTROLLER (REMOTE CONNECTIONS)
CN6	COMB-J4	COMBINER DRAWER



CN4 to CN6 DIRECT CONNECTIONS



CB PANEL INTERLOCK SW CONNECTIONS

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1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

REVISION DESCRIPTION:	REVISION:

PULSAR

TITLE: PULSAR 1000 CABINET AND CONNECTOR DETAILS

DESIGNED BY: PI	DATE: 12/22/99	DWG. BY:	DWG. No.
CHK'ED:	CAD: AM-1003S	ERB	AM-1003S

PULSAR 1000

CABINET INTERCONNECTS

PA1: AMP1 - J4 (RED) RF OUT TO COMBINER: COMB – J1 (RED) RF INPUT #1

PA2: AMP 2 - J4 (BLUE) RF OUT TO COMBINER: COMB – J2 (BLUE) RF INPUT #2

PA3: AMP 3 - J4 (YELLOW) RF OUT TO COMBINER: COMB – J3 (YELLOW) RF INPUT #3

PA1: AMP1 – J2 (RED) RF IN TO CONTROLLER: CONTR – J1A (RED) RF OUTPUT #1

PA2: AMP 2 – J2 (RED) RF IN TO CONTROLLER: CONTR – J1B (RED) RF OUTPUT #2

PA3: AMP 3 – J2 (RED) RF IN TO CONTROLLER: CONTR – J1C (RED) RF OUTPUT #3

PA1: AMP1 – J3 (BLUE) MOD IN TO CONTROLLER: CONTR – J7A (BLUE) MOD OUTPUT #1

PA2: AMP 2 – J3 (BLUE) MOD IN TO CONTROLLER: CONTR – J7B (BLUE) MOD OUTPUT #2

PA3: AMP 3 – J3 (BLUE) MOD IN TO CONTROLLER: CONTR – J7C (BLUE) MOD OUTPUT #3

PA1: AMP1 – J1 CONTROL TO CN1 (RED) DB-25F CONNECTOR

PA2: AMP 2 – J1 CONTROL TO CN2 (BLUE) DB-25F CONNECTOR

PA3: AMP 3 – J1 CONTROL TO CN3 (YELLOW) DB-25F CONNECTOR

COMBINER: COMB-J7 RF OUTPUT TO CABINET: CAB-J1 (BULKHEAD CONNECTOR, THROUGH TOP OF CABINET) THIS IS A SHORT COAX/FERRITE JUMPER

COMBINER: COMB-J5 (YELLOW) MOD ENVELOPE TO CONTROLLER: CONTR-J5 (YELLOW) MOD ENVELOPE

COMBINER: COMB-J4 CONTROL TO CN6 DB-25F CONNECTOR

CONTROLLER: CONTR-J2 CONTROL TO CN4 DB-25F CONNECTOR

USER INTERFACE CONNECTIONS

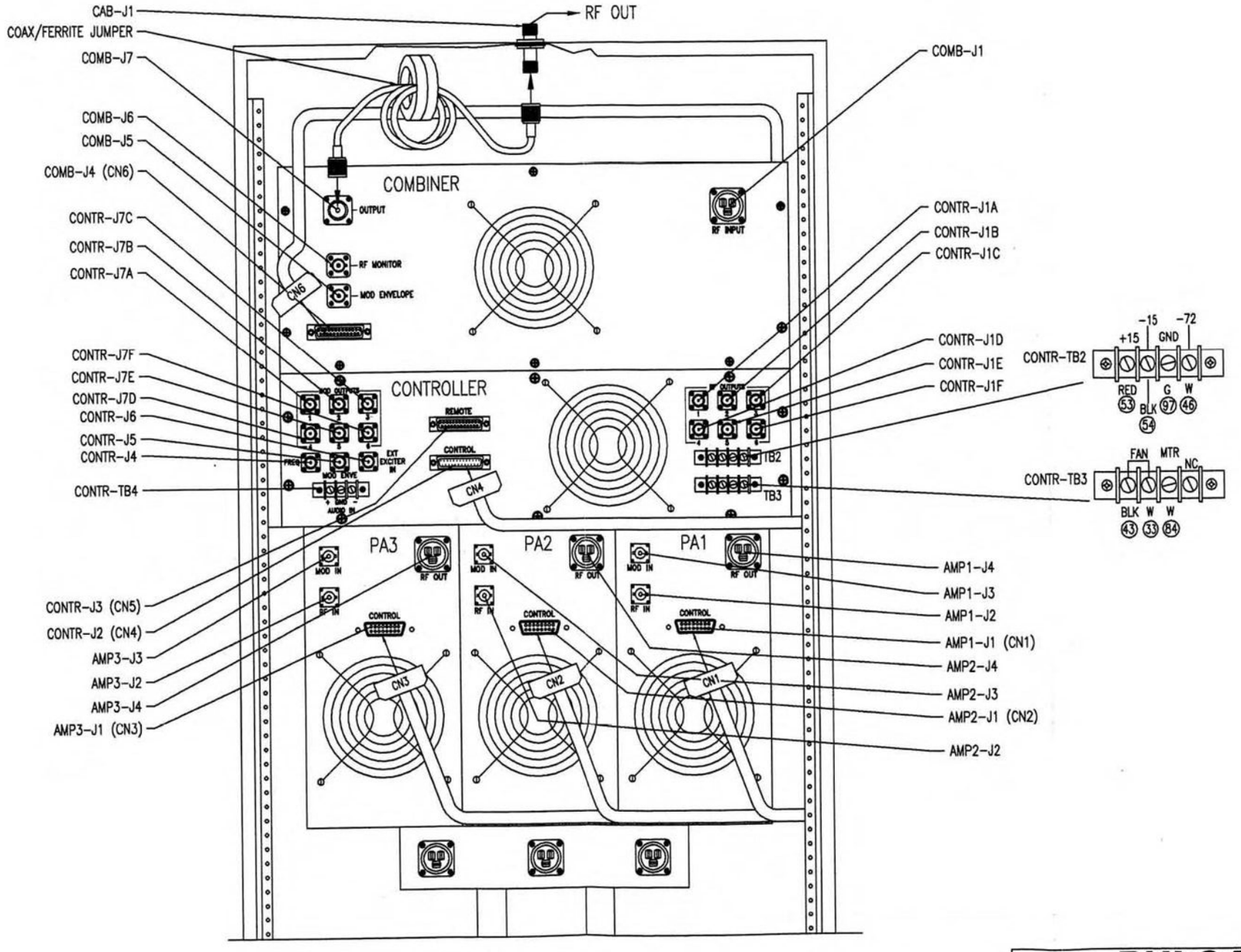
COMBINER: COMB-J6 RF MONITOR (TO STATION MODULATION MONITOR)

CONTROLLER: CONTR-J3 REMOTE TO CN5 DB25-M (REMOTE CONTROL/TELEMETRY)

CONTROLLER: CONTR-J4 FREQUENCY (TO FREQUENCY COUNTER)

CONTROLLER: CONTR-J6 EXT EXCITER (OPTIONAL USER SUPPLIED STEREO EXCITER INPUT)

CONTROLLER: CONTR-TB4 AUDIO INPUT



REAR VIEW OF TRANSMITTER

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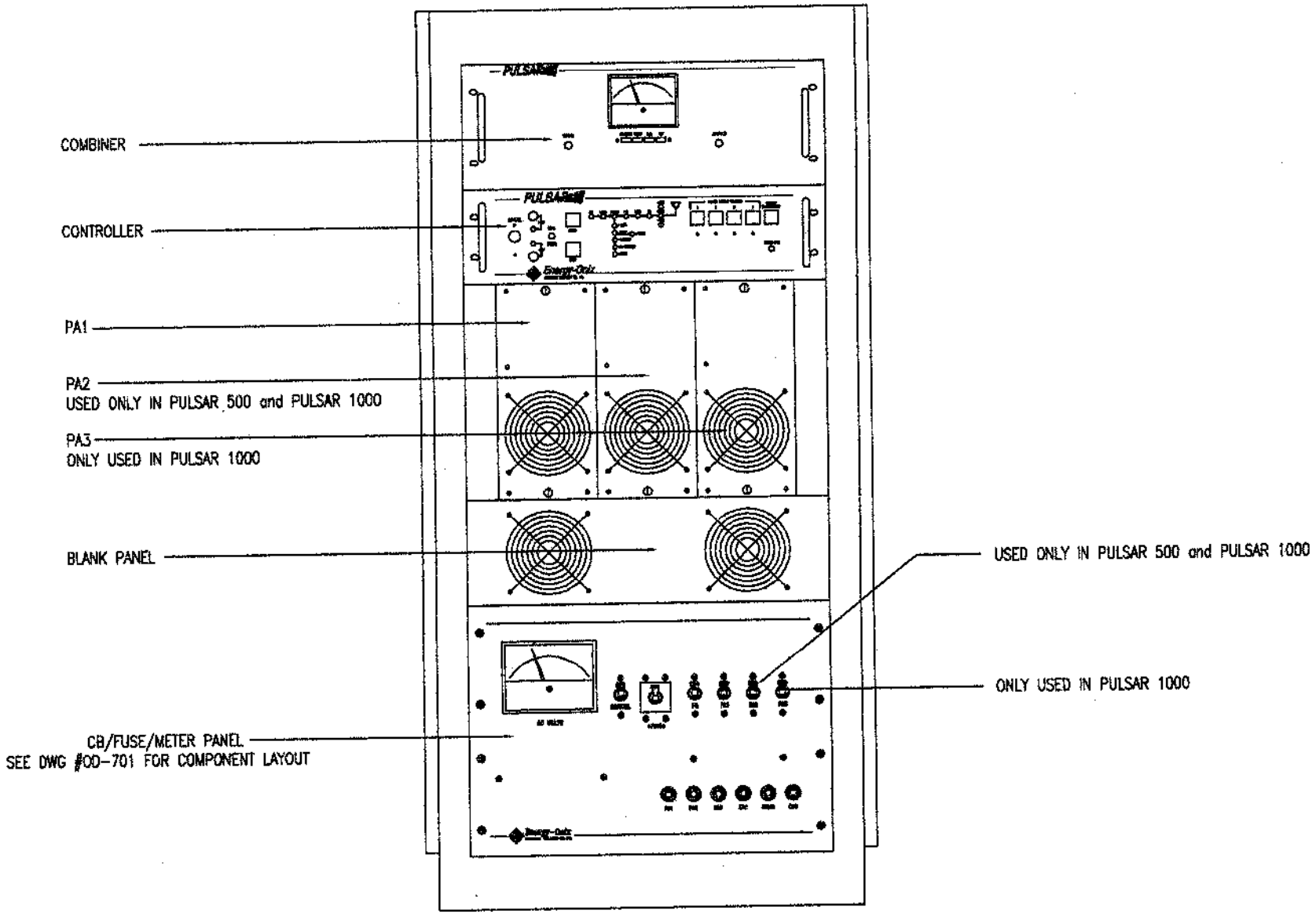
BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

REVISION DESCRIPTION:	REVISION:

PULSAR

TITLE: PULSAR 1000 CABINET INTERCONNECTIONS

SCALE: NTS	DESIGNED BY: NDT / II	DATE: 04/28/00	DWG. BY: ESB	DWG. No. AM-0002A
CAD: AM-0002A		MODIFIED: 2/26/07 by John McCool		



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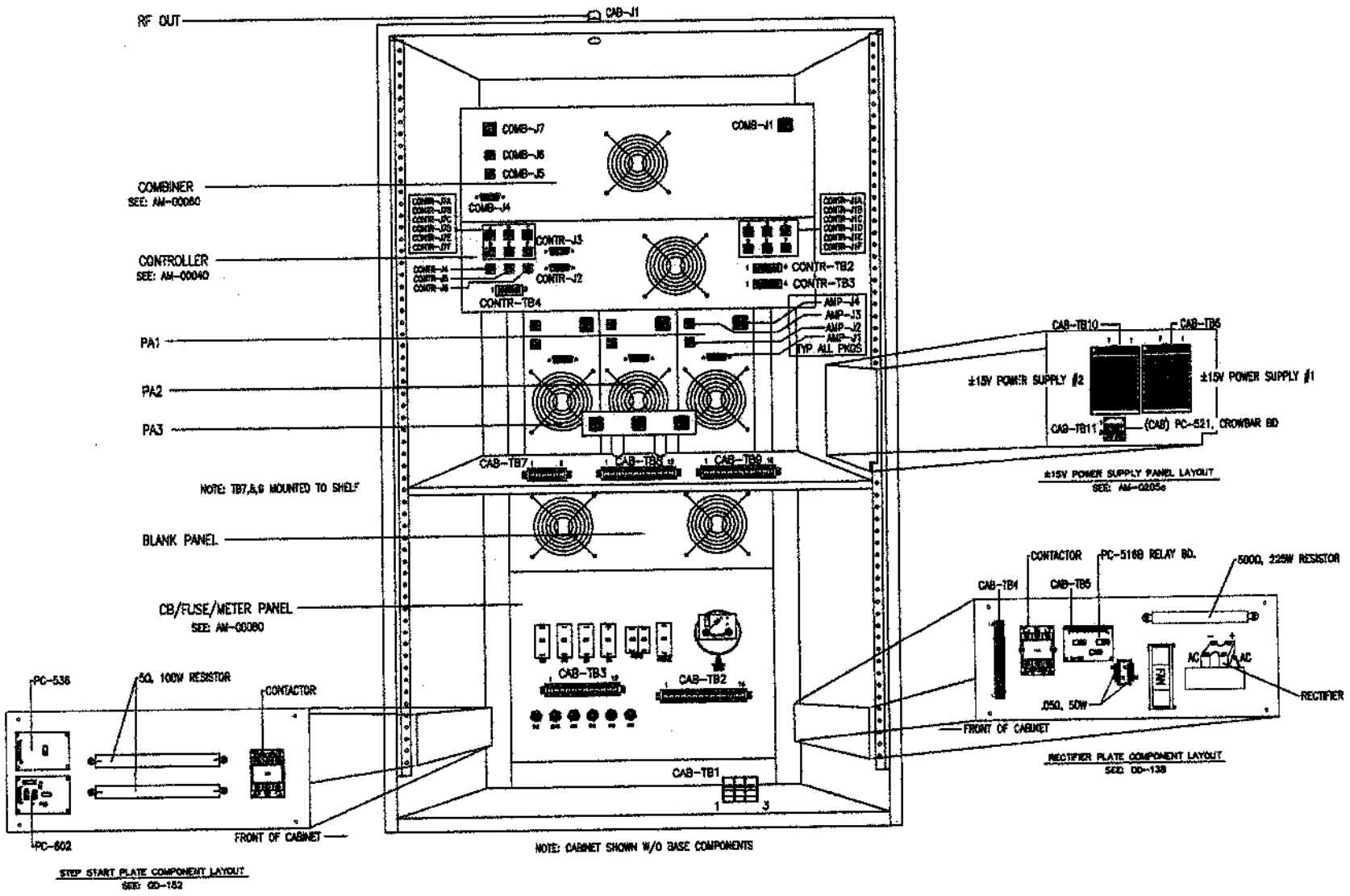
PULSAR

TITLE: PULSAR 1000 CABINET VIEW (FRONT)					
SCALE: NTS	DESIGNED BY: NDT / Π	DATE: 07/19/99	DWG. BY: CRB	DWG. No. AM-00010	
CAD: AM--00010		MODIFIED: 2/28/07 by John McCool			



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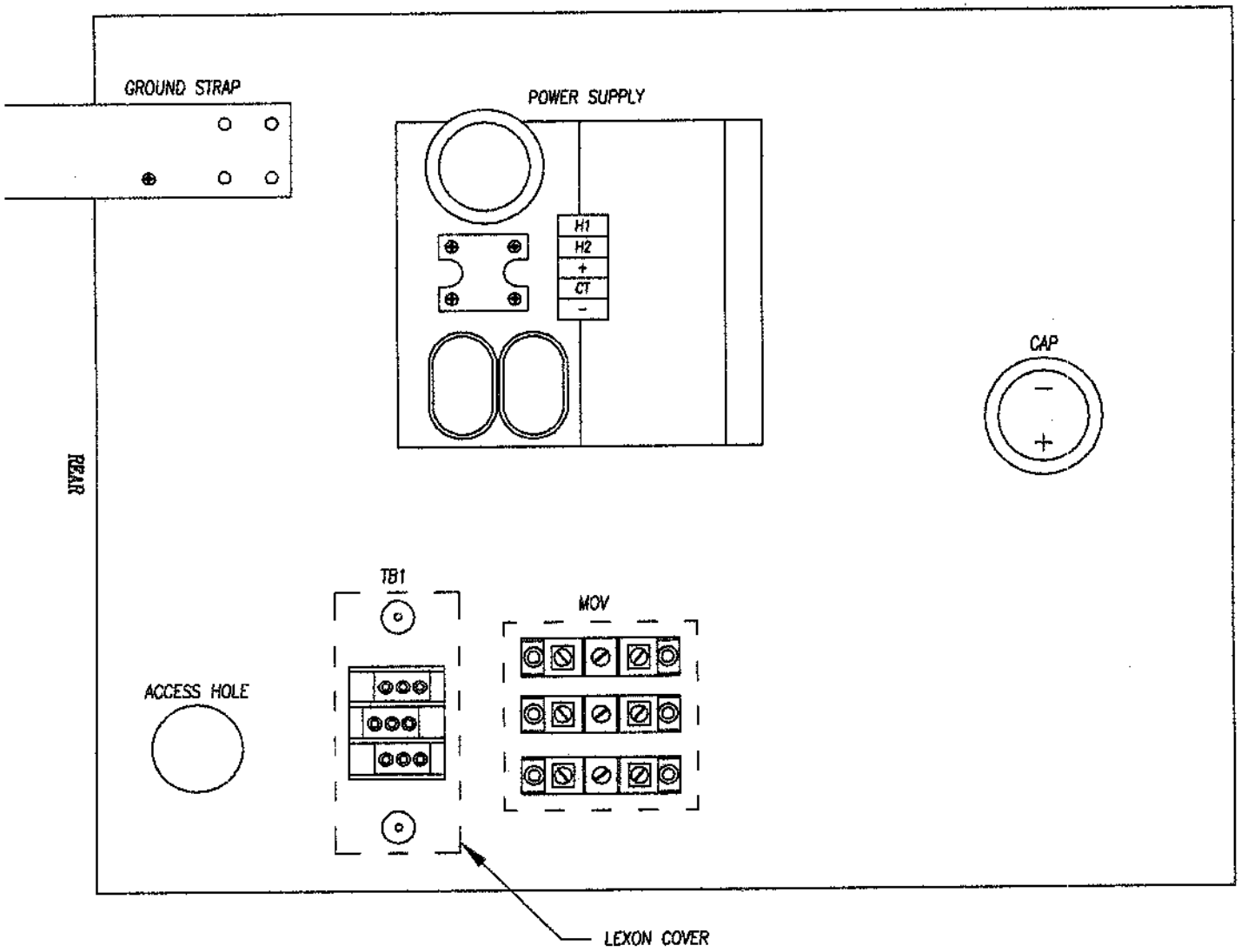
BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 501, VALATIE, NY. 12184

NOTES:
N.T.S.
UPDATED TERMINAL BLOCK AND MOLEX CALLOUTS,
IDENTIFIED COMB, CONTROL REAR PANELS, 11/5/99

TITLE: PULSAR 1000 CABINET REAR VIEW (2008 – PRESENT)

DWG. BY: CKB		MODIFIED: 1/10/08 by John McCool	DWG. No. AM-0033o
DATE: 7/6/99	REV: A		



N.T.S.

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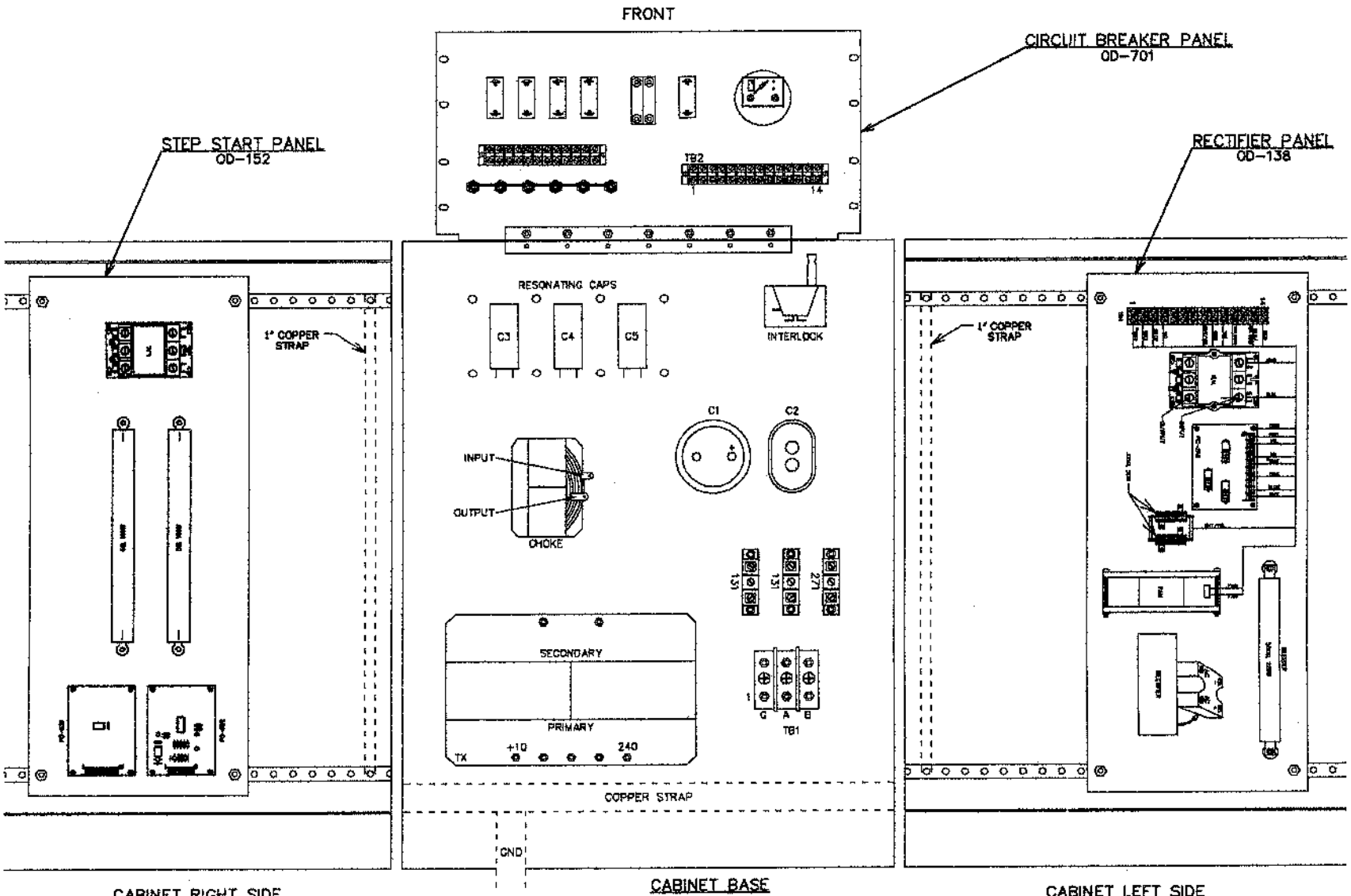
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

PULSAR

REVISION:	TITLE: PULSAR 1000 CABINET BASE VIEW			
	DESIGNED BY: PI	DATE: 3/9/07	DWG. BY: John McCool	DWG. No. AM--00110
	CHK'ED:	CAD: AM-00110		



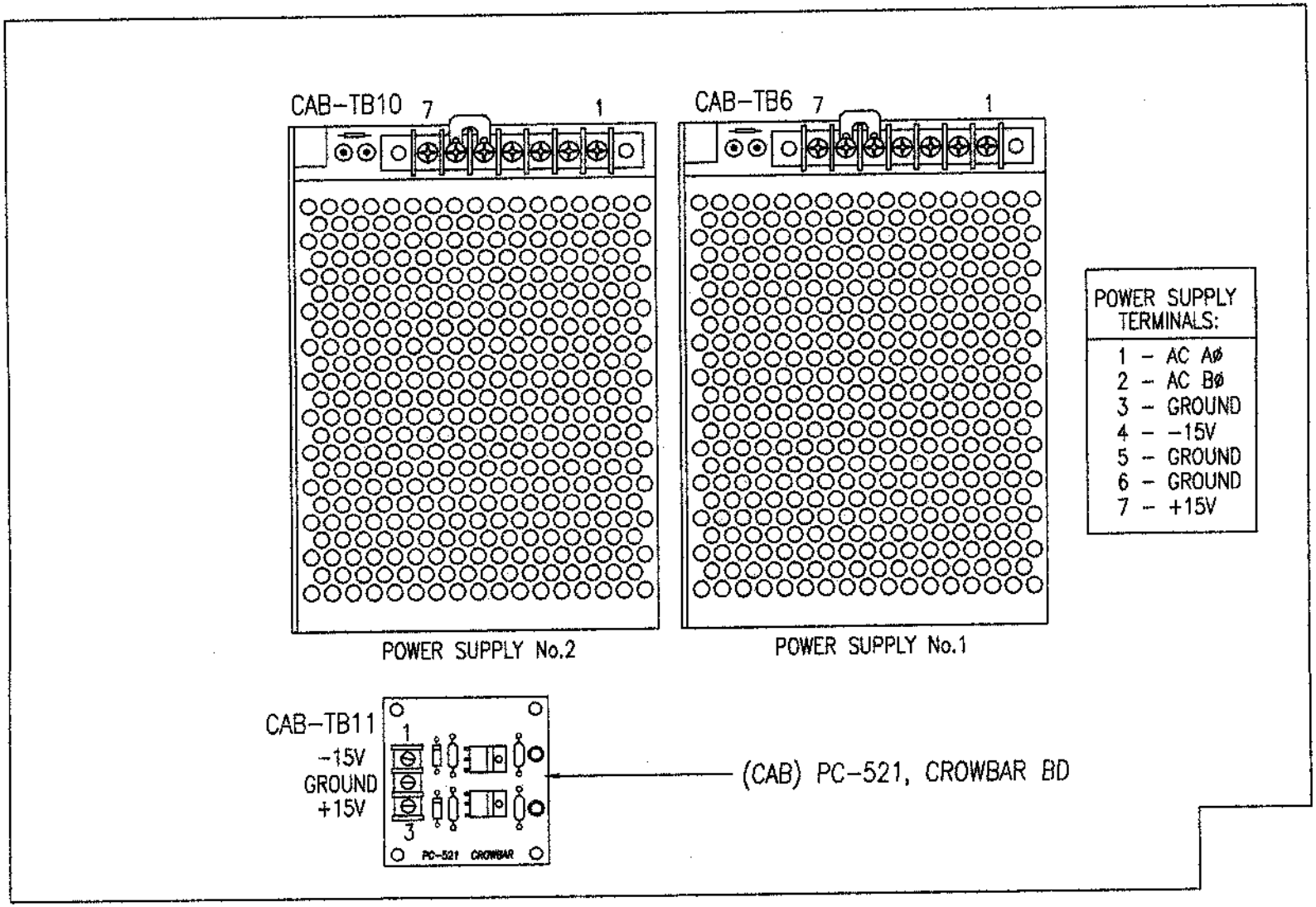
Energy-Onix

BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 601, VALATIE, N.Y. 12184

NOTES:
N.T.S.

TITLE:
PULSAR 1000 CABINET BASE LAYOUT

DWG. BY: John McCool		MODIFIED:	DWG. No.
DATE: 10/8/07	REV: -	1/9/08	OD-136

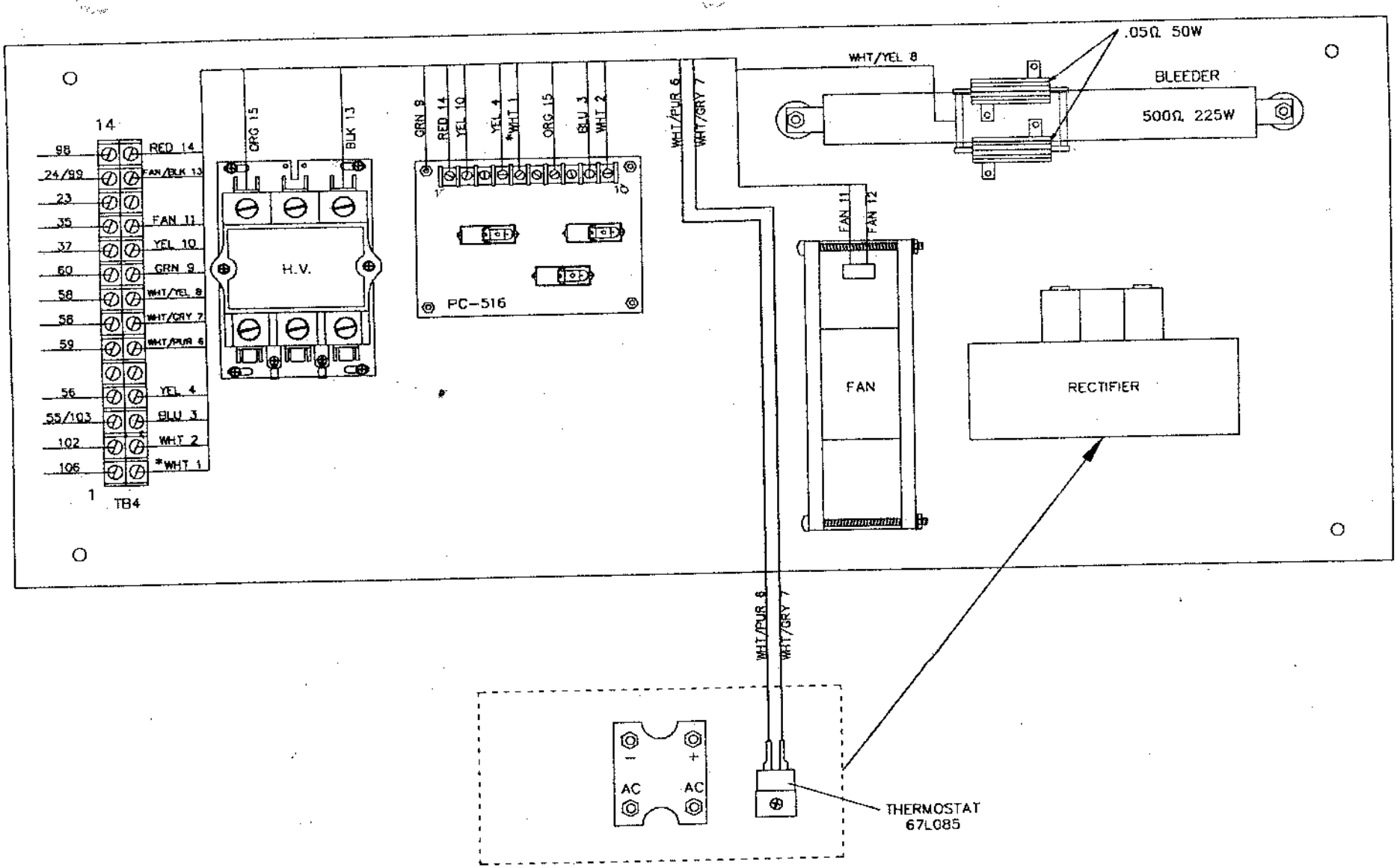


Energy–Onix
BROADCAST EQUIPMENT CO., INC.
1308 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

REVISIONS:
ID POWER SUPPLY, CROWBAR BD's TB's, DWG# CHANGED.
FORMER#: CL–503A, 7/20/99
RELABELED TB'S, 11/12/99
CHANGED CAB–TB14 TO CAB–TB15, CAB–TB11 TO CAB–TB19, 4/12/07

TITLE: PULSAR 1000 ±15V POWER SUPPLY PANEL LAYOUT

DWG. BY: CKB		MODIFIED: 1/9/08 by John McCool	DWG. No. AM–0205c
DATE: 7/16/99	REV: B		



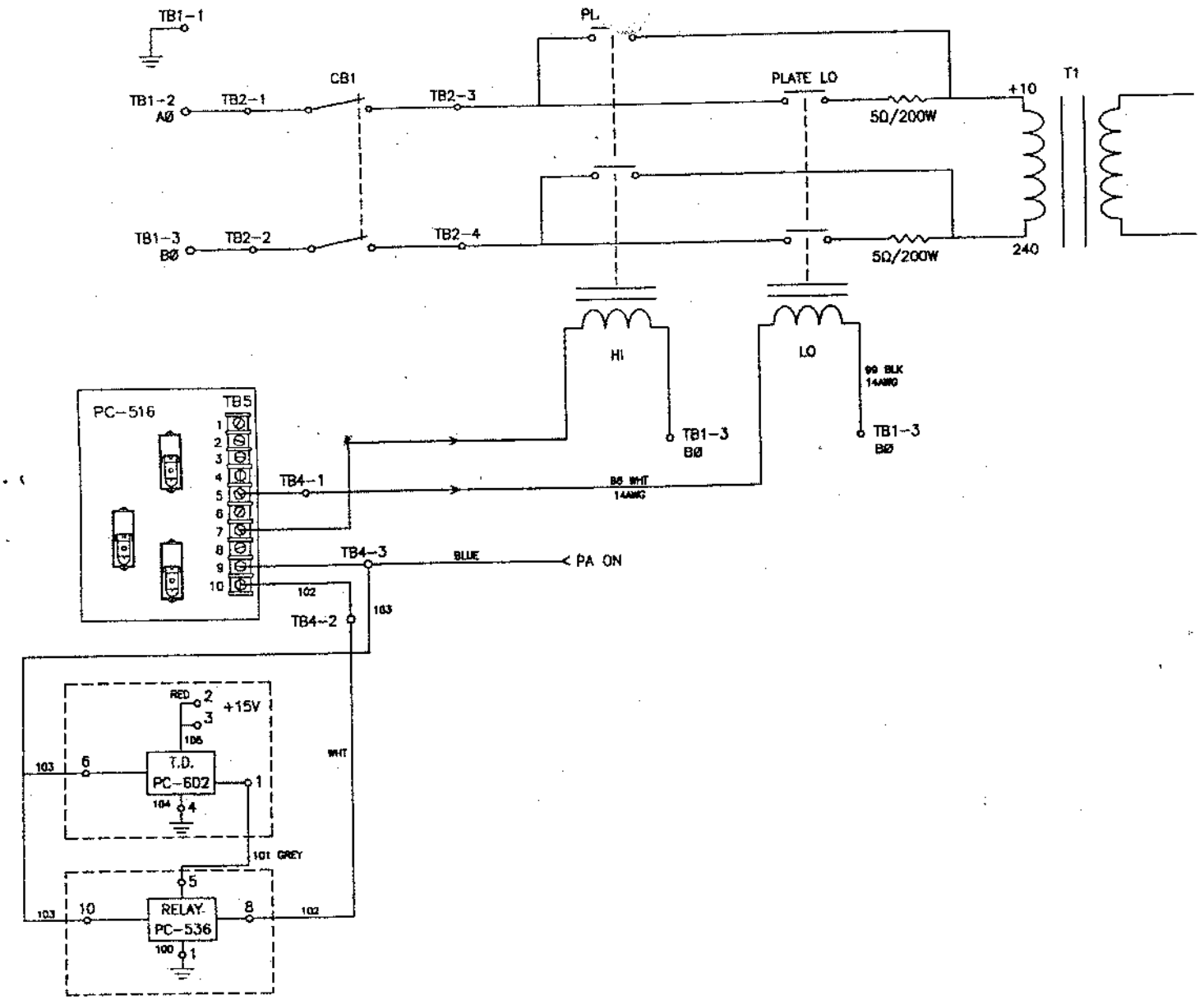
Energy-Onix
BROADCAST EQUIPMENT CO., INC.
1308 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

NOTES:
N.T.S.

TITLE: PULSAR 1000 RECTIFIER PANEL

DWG. BY: John McCool		MODIFIED:	DWG. No.
DATE: 10/12/07	REV: –	11/19/08	OD-138

14D



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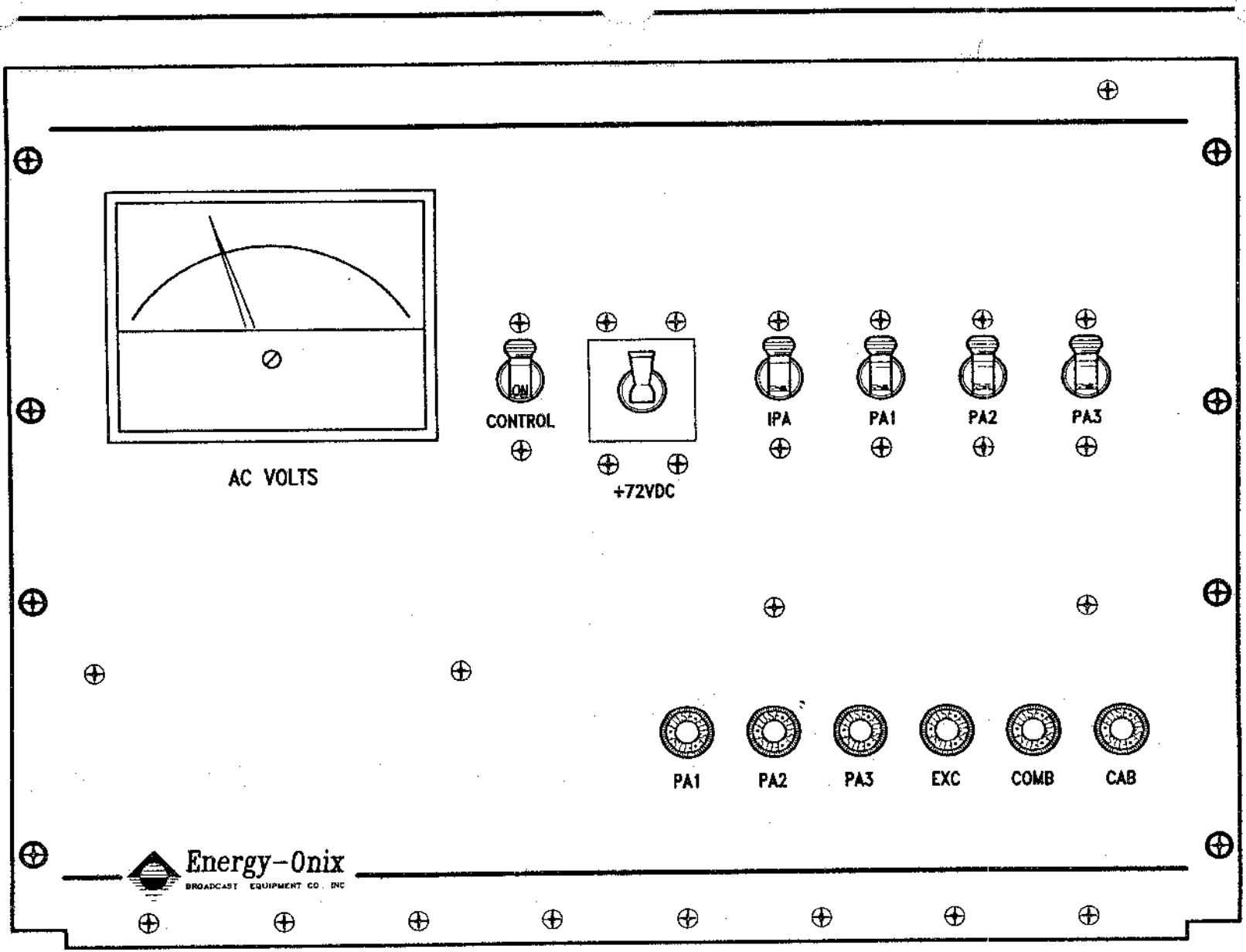
BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

NOTES:
N.T.S.

TITLE:
PULSAR 1000 STEP START SCHEMATIC

DWG. BY: John McCool		MODIFIED:	DWG. No.
DATE: 1/9/08	REV: -	-	S-330

14E



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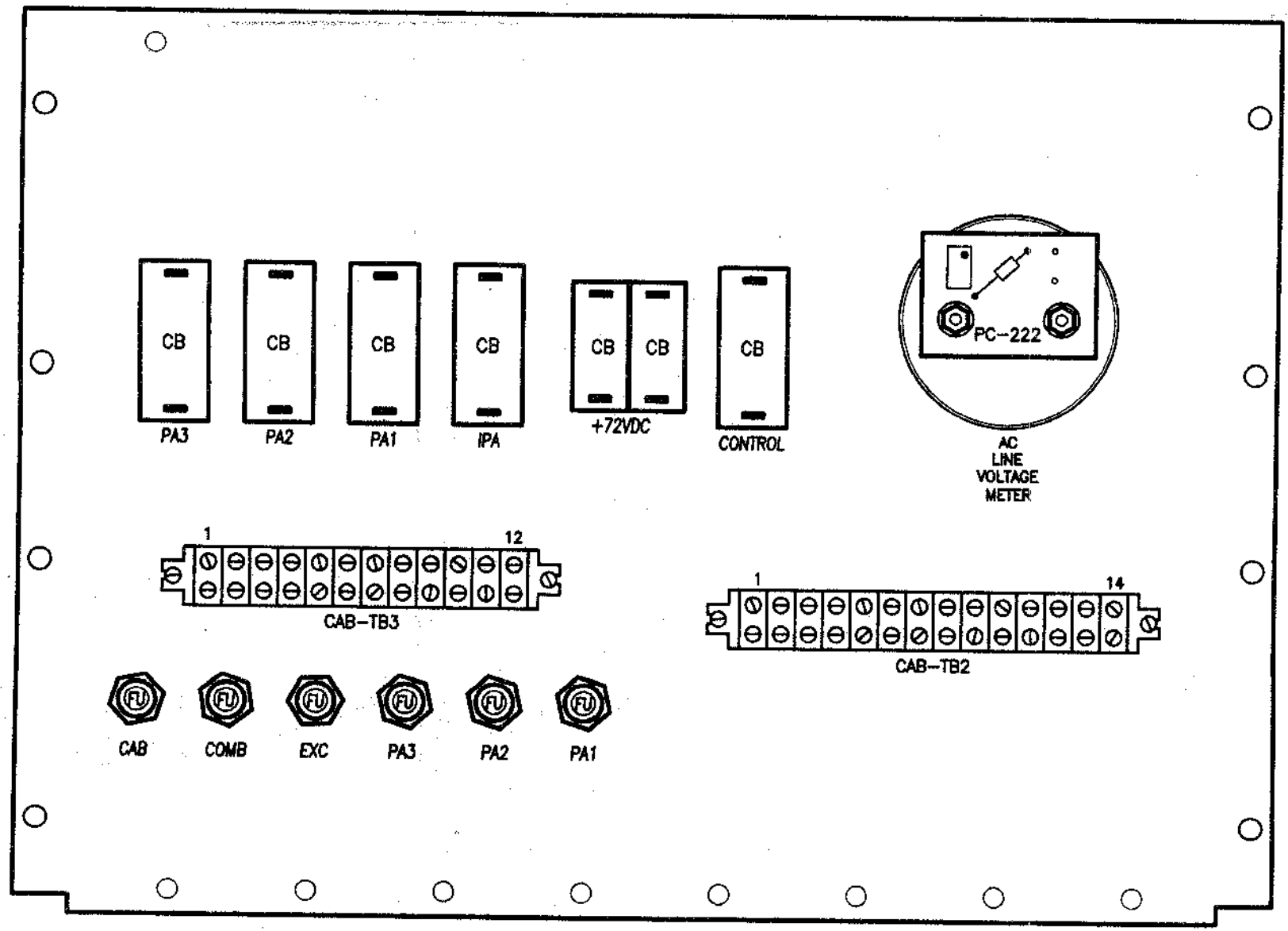
BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

REVISIONS:

TITLE: PULSAR CB/FUSE/METER PANEL COMPONENT VIEW (FRONT)

DESIGNED BY: JW	DATE: 03/26/99	DWG. BY: CKB	DWG. No. OD–700
CHK'ED:	CAD No. OD–700		



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BROADCAST EQUIPMENT CO., INC.

1306 RIVER ST., P.O. BOX 801, VALATIE, NY, 12184

REVISION DESCRIPTION:	REVISION:
RENUMBERED, OD-701 to AM-00080, 07/21/99 RELABELED TB'S, 11/12/99	B

TITLE: PULSAR CB/FUSE/METER PANEL COMPONENT VIEW (REAR)

DESIGNED BY: JW	DATE: 07/21/99	DWG. BY: CKB	DWG. No. AM-00080
CHK'ED:	CAD No. AM-00080		

PULSAR-1000
THEORY OF OPERATION

POWER SUPPLIES

THE PULSAR CABINET CONTAINS THREE POWER SUPPLIES: A -72V BRUTE FORCE SUPPLY SIZED TO THE TPO REQUIREMENT (NUMBER OF AMP MODULES) AND TWO INDEPENDENT OEM REGULATED ±15V SUPPLIES. THE 220V AC POWER IS ALSO USED TO POWER THE COOLING FANS AND COIL OF –72V POWER SUPPLY CONTACTOR.

±15V PS #1 IS USED TO SUPPLY PC-520, METER AMP/RELAY BOARD, (COMBINER DRAWER) AND THE +15V SUPPLIES ALL OTHER LOW VOLTAGE REQUIREMENTS, EXCEPT FOR PC-506 (CONTROLLER DRAWER). ±15V PS #2 IS DEDICATED TO PC-506, AUDIO/PDM BOARD.

THE –72V PS POWERS THE AMP/MODULATOR MODULES AND THE INTERMEDIATE POWER AMPLIFIER (IPA MODULE, CONTROLLER DRAWER).

"STOP" MODE AND DETECTOR/ENABLE

±15V PS #1 & PS #2 ARE POWERED AT ALL TIMES (IF AC IS PRESENT AND "CONTROL" CB IS ON). THUS, WHEN PULSAR IS IN "STOP" MODE, CONTROLLER PC BOARDS RECEIVE ±15V. THE RF DETECTOR/ENABLE BOARD, PC-509, RECEIVES A GROUND (NO VOLTAGE) FROM EXCITER, PC-501 WHEN RF DRIVE IS PRESENT (+V DISABLES). PC-509 THEN OUTPUTS FIVE "ENABLES". THREE OF THESE GO THROUGH PC-507, CONTROL PANEL BOARD AND WILL BE DESCRIBED LATER. THE FOURTH ENABLE (PC-509, K1) LIFTS A GROUND FROM GATE OF Q1 ON PC-506, AUDIO/PDM BOARD. (THIS IS NOT SUFFICIENT TO DE-MUTE AUDIO, AS PC-507, K5 ((N. C.)) IS IN PARALLEL.) THE FIFTH ENABLE REMOVES VOLTAGE FROM MOD DRIVE INHIBIT CIRCUIT (Q2, PC-506), ENABLING PDM GENERATOR. THIS MOD DRIVE INHIBIT CIRCUIT IS ALSO ACTIVATED BY PC-506 PDM FAULT DETECTOR CIRCUIT, WHICH SENSES FAULT AT OUTPUT OF PC-506 PDM DIVIDER CIRCUIT.

CONTROL

A LOCAL OR REMOTE "START" LATCHES PC-507, K1 (CONTROL PANEL BOARD) LIGHTING "START" AND "ON" LED'S AND ENERGIZING 507-K2. K2 ENERGIZES A RELAY ON CABINET AUX RELAY BOARD WHICH POWERS THE COOLING FANS. IF INTERLOCKS ARE CLOSED (AN N.C. THERMOSTAT MOUNTED ON –72V PS RECTIFIER HEATSINK IS IN SERIES WITH INTERLOCKS), THE "INTLK" LED LIGHTS AND IF NO OVERLOAD ALARMS ARE PRESENT, THE "ALARMS" LED IS LIT AND 507-K3 IS ENERGIZED. K-3 LIGHTS THE "EXC" LED AND ENERGIZES A RELAY ON CABINET AUX RELAY BOARD WHICH ENERGIZED THE –72V POWER SUPPLY CONTACTOR. IF 509-K1 (DRIVE DET.) IS ENABLED, THE "DRIVE" LED IS LIT AND

507-K4 IS ENERGIZED. 507-K4 LIGHTS THE "PA" LED, ENERGIZES 507-K5 AND, PROVIDED 509 "MOD DRIVE" IS ENABLED, SENDS A VOLTAGE TO 506-K1 CLOSING THE PDM OUTPUT CONNECTION FROM PC-506. 507-K5 LIGHTS THE "AUDIO" LED AND LIFTS A GROUND FROM GATE OF Q1 ON PC-506, DE-MUTING THE AUDIO. THE PULSAR IS NOW OPERATIONAL AND WILL POWER UP TO A LEVEL DETERMINED BY WHICH OF THE FIVE POWER OUTPUT LEVELS (FOUR PRESETS, ONE MANUAL) IS SELECTED.

POWER OUTPUT CONTROL/POWER OUTPUT REGULATION

CARRIER OUTPUT POWER CONTROL IS DETERMINED BY THE GAIN OF AUDIO/PDM DRIVER, PC-506-U10 CIRCUITRY. U10 AMP GAIN IS LINEAR AND PROPORTIONAL TO THE GAIN CONTROL VOLTAGE. THIS GAIN CONTROL VOLTAGE IS DETERMINED BY CONTROL PANEL BOARD (PC-507) POWER CONTROL CIRCUITRY. THIS CONSISTS OF SWITCHABLE VOLTAGE REFERENCES ADJUSTED BY RECESSED TRIM POTS CORRESPONDING TO POWER OUTPUTS 1 THROUGH 4, AND THE VARIABLE POWER OUTPUT MANUAL GAIN CONTROL. LOCAL SWITCHING IS BY 507-S5 THROUGH 507-S9 (FRONT PANEL PUSH BUTTONS) AND REMOTE SWITCHING IS BY OPTO ISOLATED SWITCHES 507-U2 AND 507-U3. TRIM POT R45, LOCATED ON THE BACK OF PC-507, IS FACTORY SET TO PREVENT EXCESSIVE POWER OUTPUT, IRRESPECTIVE OF FRONT PANEL SETTINGS.

506-U10/U8 CIRCUITRY ALSO MAINTAINS CONSTANT POWER OUTPUT WITHIN AC POWER VARIATIONS OF $\pm$10%. THIS IS ACCOMPLISHED BY USING A –72V POWER SUPPLY REFERENCE SAMPLE WHICH INVERSELY CHANGES U10 GAIN, PROPORTIONAL TO SAMPLE VOLTAGE CHANGE.

METERING/INDICATORS/OVERLOAD-RESET

AN AC VOLTMETER (LOCATED ON BOTTOM FRONT PANEL) IS ALWAYS CONNECTED ACROSS AC POWER INPUT. –72V POWER SUPPLY VOLTAGE SAMPLE IS DERIVED FROM CONTR-R1/CONTR-R2 DIVIDER LOCATED INSIDE CONTROLLER BACK PANEL, AND –72V POWER SUPPLY CURRENT SAMPLE IS DERIVED ACROSS SERIES RESISTOR IN GROUND RETURN OF CABINET SUPPLY.

FORWARD AND REFLECTED RF POWER SAMPLES ARE DERIVED FROM PC-514, DIRECTIONAL COUPLER; PC-518, VOLTAGE PROBE; AND PC-520, METER AMP/RELAY BOARD. THESE ARE LOCATED IN THE COMBINER DRAWER. 518-C10, 518-L1 AND 518-R1 ADJUST AMPLITUDE AND PHASE OF RF SAMPLE USED TO NULL REFLECTOMETER CIRCUIT IN PC-514. THE DC FORWARD AND REFLECTED SAMPLES DRIVE OP AMP U1 IN PC-520: REFLECTED DIRECTLY AND FORWARD THROUGH K1-K4 AND R1-R5. THIS PERMITS FORWARD POWER READINGS TO BE CALIBRATED TO EACH OF THE FIVE POWER LEVEL CONTROL SETTINGS(4 PRESETS, 1 MANUAL).

THE DC VOLTAGE, DC CURRENT, REFLECTED POWER AND FORWARD POWER SAMPLES ARE USED FOR BOTH THE MULTIMETER (COMBINER FRONT PANEL) AND TELEMETRY SAMPLES (THROUGH PC-333B, REMOTE INTERFACE). PC-515, R1-R4, MULTIMETER BOARD (BACK OF COMBINER FRONT PANEL) ADJUST MULTIMETER CALIBRATION. IN ADDITION, THE DC VOLTAGE, DC CURRENT AND REFLECTED POWER (VSWR) SAMPLES ARE ALSO USED AS INPUTS TO PC-508, OVERLOAD BOARD (CONTROLLER DRAWER).

PC-519, RF CURRENT SAMPLE BOARD IS LOCATED IN COMBINER DRAWER, IMMEDIATELY AFTER AMPS ARE COMBINED. IT OUTPUTS TWO SAMPLES: AN RF "MOD ENVELOPE" WHICH WILL BE DESCRIBED LATER AND A DC SAMPLE PROPORTIONAL TO THE TOTAL RF CURRENT IN THIS 25Z SECTION OF THE MATCHING NETWORK. THE "RF CURRENT" SAMPLE IS USED AS THE FOURTH INPUT TO PC-508.

THE FIFTH INPUT TO THE OVERLOAD BOARD IS AN (RF) "DRIVE" ALARM FROM PC-501, PREVIOUSLY DESCRIBED IN THE "DETECTOR/ENABLE" SECTION. A VOLTAGE ON THIS INPUT CONSTITUTES AN ALARM CONDITION. PC-508 R4, R10, R16, R22 AND R28 ADJUST THE OVERLOAD THRESHOLDS ("TRIP POINTS"). UPON DETECTION OF AN OVERLOAD CONDITION, THE APPROPRIATE LATCHING RELAY (K1-K5) WILL "SET". AN "N. C" WILL OPEN THE CONTROL LADDER AT THE "OVERLOAD ALARMS" POINT (PC-507, DESCRIBED IN "CONTROL" SECTION), SHUTTING DOWN THE TRANSMITTER. AT THE SAME TIME, AN "N. O.". WILL CLOSE, ILLUMINATING THE APPROPRIATE CONTROLLER FRONT PANEL LED ("VSWR", "VOLT", "CURRENT", "RF CURRENT", OR "DRIVE"). THIS SAME N. O. ALSO ENABLES AN INPUT TO PC-517, 4X RECYCLE BOARD. THIS WILL START TWO TIMERS. AFTER THE SHORT TIMER DELAY (517-U3A), A "RESET" PULSE WILL RESET 508-K1 THROUGH K5, RE-STARTING THE TRANSMITTER. THE SECOND TIMER (517-U3B) IS CONFIGURED FOR A 30 SECOND PERIOD. IF A SECOND OVERLOAD INPUT IS RECEIVED WITHIN THIS INTERVAL, CYCLE #2 IS INITIATED, RESULTING IN A SECOND TRANSMITTER RESET. A THIRD OVERLOAD (WITHIN THE TIMING WINDOW) INITIATES CYCLE #3, RESULTING IN A THIRD TRANSMITTER RESET. A FOURTH OVERLOAD (WITHIN THE TIMING WINDOW) INITIATES CYCLE #4, RESULTING IN 517-K1 LATCHING, OPENING THE TRANSMITTER RESET CIRCUIT. AT THIS POINT, A MANUAL RESET IS NECESSARY TO RESTART THE TRANSMITTER. THIS CAN BE ACCOMPLISHED THROUGH "LOCAL" CONTROL (CONTROLLER FRONT PANEL "RESET" SWITCH), OR BY "REMOTE" CONTROL ("RESET" ON CONTR-J3).

THE "MOD ENVELOPE" OUTPUT FROM PC-519 IS USED IN PC-507 IN THE +95% AND –95% MODULATION INDICATOR CIRCUIT. THE RF WAVEFORM IS RECTIFIED AND A FILTERED OFFSET IS PRODUCED. RESISTIVE DIVIDER NETWORK R17-R23 DETERMINE THE INPUTS TO COMPARATORS U1C AND U1D WHICH DRIVE THE CONTROLLER FRONT PANEL +95% AND –95% LED'S. (THESE ARE INTENDED TO BE A CONVENIENT "AT A GLANCE" INDICATOR, NOT AS A SUBSTITUTE FOR A STATION MODULATION MONITOR).

A SECOND USE OF THE "MOD ENVELOPE" SAMPLE IS TO DRIVE A MODULATION LEVEL "CLIPPER" CIRCUIT IN PC-506, AUDIO/PDM DRIVER. THE "MOD ENVELOPE" SAMPLE IS RECTIFIED AND USED WITH REFERENCE VOLTAGES IN A COMPARATOR CIRCUIT WHICH CONTROLS THE DISCHARGE CURVE OF 506-C8. THRESHOLD CONTROL, R6, ADJUSTS THE CIRCUIT SUCH THAT OVERMODULATION WILL CAUSE C8 TO DISCHARGE, CAUSING U4B TO OUTPUT A NEGATIVE VOLTAGE WHICH WILL FORWARD BIAS Q1, CLAMPING AUDIO TO GROUND (FOR THE REMAINDER OF THE POSITIVE HALF CYCLE.) THIS EFFECTIVELY PROTECTS THE POWER AMPS FROM DRAWING EXCESS CURRENT. (THIS SHOULD BE USED AS A "LAST DEFENSE". INPUT AUDIO LEVEL SHOULD BE SUCH THAT THE "CLIPPER" RARELY IS REQUIRED).

EXCITER

PC-501, RF EXCITER, HAS TWO BASIC FUNCTIONS: PROVIDE RF DRIVE AT THE CARRIER OPERATING FREQUENCY AND PROVIDE AN OUTPUT TO PC-506, AUDIO/PDM DRIVER, WHICH WILL BE USED TO PRODUCE THE PDM FREQUENCY. BOTH OF THESE OUTPUTS ARE SQUARE WAVE.

REFER TO PC-501 DRAWINGS FOR THE FOLLOWING: CRYSTAL, Y1, IS FOUR TIMES CARRIER FREQUENCY OF BELOW 1000KHZ (JUMPER F TO D AND J TO H) AND TWO TIMES CARRIER FREQUENCY OF 1000KHZ AND ABOVE (JUMPER F TO E AND J TO G). FOR MONO AUDIO (NORMAL CONFIGURATION), JUMPER C TO B. A C TO A JUMPER PROVIDES INPUT FOR AN EXTERNAL STEREO EXCITER AT CONTR-J6 (CONTROLLER REAR PANEL).
DIP SWITCH S1 DETERMINES THE DIVIDER WHICH WILL DETERMINE THE SQUARE WAVE FREQUENCY OUTPUT TO PC-506. SETTINGS ARE CARRIER FREQUENCY DEPENDENT ACCORDING TO THE FOLLOWING TABLE:

	S1 SETTINGS			
OPERATING FREQUENCY	1(A)	2(B)	3(C)	4(D)
531-559-KHZ	OPEN	CLOSED	CLOSED	OPEN
560-749KHZ,1280-1439KHZ	CLOSED	OPEN	OPEN	OPEN
750-909KHZ,1440-1710KHZ	CLOSED	OPEN	CLOSED	OPEN
910-1099KHZ	CLOSED	CLOSED	OPEN	OPEN
1100-1279KHZ	CLOSED	CLOSED	CLOSED	OPEN

TRIMMER CAPACITOR C14 IS USED TO ADJUST TRANSMITTER TO EXACT FREQUENCY. TRIM POT R18 USES A (SUMMED) SAMPLE OF POWER AMPLIFIER VOLTAGES TO ADJUST FOR MINIMUM INCIDENTAL PHASE MODULATION. TRIM POT R4, SLICER BIAS, IS USED TO ADJUST WAVEFORM TO A SYMMETRICAL SQUARE WAVE.

AUDIO/PDM DRIVER

THE FUNCTION OF PC-506, AUDIO/PDM BOARD, IS TO PRODUCE A VARIABLE, RECTANGULAR PDM OUTPUT DEPENDENT UPON AUDIO INPUT AND PRECURSOR PDM INPUT FROM PC-501.

JUMPERS AT U5 ("A" AND "B") ARE SET TO DIVIDE PRECURSOR PDM FREQUENCY BY TWO FOR CARRIER FREQUENCIES BELOW 1280KHZ AND DIVIDE BY FOUR FOR CARRIER FREQUENCIES OF 1280KHZ AND HIGHER. THIS WILL RESULT IN A PDM OUTPUT FREQUENCY BETWEEN 70.0KHZ AND 93.63KHZ.

AUDIO INPUT IS 600 OHMS, BALANCED AND TRIM POT R17 ADJUSTS COMMON MODE BALANCE TO NULL OUT-OF-PHASE AUDIO. R86/R84/CR14 AND R87/R85/CR15 COMPRISE A "SOFT" AUDIO CLIPPER CIRCUIT. THE THRESHOLD OF CLIPPING OCCURS AT AN AUDIO INPUT OF +8DBM. THE MODULATION LEVEL "CLIPPER" HAS BEEN PREVIOUSLY DESCRIBED AT END OF "METERING" SECTION. TRIM POT R34 ADJUSTS AUDIO GAIN WHICH SETS MODULATION PERCENTAGE. S1 ADJUSTS AUDIO LOW PASS FILTER HIGH FREQUENCY ROLLOFF (SEE TABLE ON PC-506 SCHEMATIC DIAGRAM).

THE LOWPASS FILTERED AUDIO IS SUMMED WITH A DC OFFSET VOLTAGE AT THE INPUT OF U7B AND IS THE CARRIER REFERENCE LEVEL FOR THE U10 CIRCUIT, PREVIOUSLY DESCRIBED IN THE "POWER OUTPUT CONTROL" SECTION. CARRIER LEVEL TRIM POT, R37, IS INCLUDED AS A FINE VOLTAGE ADJUSTMENT.

THE (NOW DIVIDED) PDM SQUARE WAVE IS USED AS THE INPUT OF U6A, PDM RAMP INTEGRATOR TO PRODUCE A TRIANGULAR WAVEFORM (AT THE PDM FREQUENCY). THE VARIABLE PULSE DURATION GENERATOR (Q3 CIRCUIT) PRODUCES A RECTANGULAR WAVEFORM (AT THE PDM FREQUENCY) BY COMPARING THE CARRIER REFERENCE VOLTAGE TO THE INSTANTANEOUS PDM RAMP VOLTAGE. THE ON/OFF RATIO IS PROPORTIONAL TO THE CARRIER LEVEL AND INSTANTANEOUS AUDIO MODULATION LEVEL, RANGING FROM 45/55, CARRIER ONLY, TO 90/10 WITH 100% MODULATION (HIGHER WITH OVER 100% POSITIVE MODULATION). THIS PDM OUTPUT IS USED TO DRIVE THE POWER AMPLIFIER MODULES.

THE PDM FAULT DETECTOR/MOD DRIVE INHIBIT CIRCUITS HAVE BEEN PREVIOUSLY DESCRIBED IN THE "STOP" MODE SECTION.

IPA

THE INTERMEDIATE POWER AMPLIFIER (IPA MODULE) CONSISTS OF PC-502, TB1, AND TB2 MOUNTED ON THE IPA HEATSINK ASSEMBLY IN THE CONTROLLER DRAWER.

PC-502 INPUTS RF AT CARRIER FREQUENCY FROM PC-501. SECONDARIES OF 502-T1 ALTERNATELY DRIVE Q1/Q2 SWITCHING AMP WHICH OUTPUTS THROUGH CONTR-L1 ASSEMBLY (IPA TUNING ASSEMBLY) TO PC-503, IPA TUNING BOARD, CONSISTING OF C1 (FREQUENCY DEPENDENT) AND T1. THIS (NOW SINE WAVE) DRIVE IS USED AS THE RF DRIVE FOR AMPLIFIER MODULES. A SAMPLE (THROUGH 503-R1) IS MADE AVAILABLE AT CONTR-J4 AS A FREQUENCY MONITOR INPUT.

POWER AMP MODULE

THE PDM OUTPUT FROM CONTROLLER DRAWER IS THE MOD DRIVE INPUT TO PA AT AMP-J2. IT ENTERS PC-511 AT TP5 AND IS USED IN THE Q4/Q5/U1 LOGIC LEVEL CONVERTER CIRCUIT TO PRODUCE LOGIC 0 OF B-V(NOM.-72V) AND LOGIC 1 OF NOM. –59V.

THE FINAL MODULATOR, PC-512, USES PARALLEL MOSFETS Q1 AND Q2 AS A HIGH SPEED SWITCH WHICH APPLIES THE B-V TO LOW PASS FILTER INPUT (PC-513) WHEN LOGIC 1 IS PRESENT AT GATES.

LOW PASS FILTER, PC-513, REMOVES PDM FREQUENCY AND OUTPUTS A NEGATIVE VOLTAGE PROPORTIONAL TO INSTANTANEOUS MODULATING AUDIO AND WITH A DC COMPONENT THAT REPRESENTS THE RF CARRIER LEVEL. (OUTPUT WILL BE AT CONSTANT LEVEL WITH NO MODULATION).

RF DRIVE FROM CONTROLLER DRAWER ENTERS AT AMP-J2, PASSES THROUGH AMP-R2, IS SHUNTED BY AMP-L1 (PA INPUT TUNING ASSEMBLY) AND IS CONNECTED TO THE (OUT-OF-PHASE) PRIMARIES OF 511-T1, WHICH DRIVE THE PRIMARIES OF 510-T1 AND 510-T2. THE SECONDARIES OF 510-T1 AND 510-T2 DRIVE POWER AMPLIFIER PC-510, CONSISTING OF Q1-Q8 CONFIGURED AS TWO (PARALLEL) PUSH-PULL CIRCUITS. THE B- SUPPLY IS THE OUTPUT OF MODULATION LOW PASS FILTER (PC-513). THE LOW IMPEDANCE RF OUTPUT IS TRANSFORMED TO A NOMINAL 25 OHMS BY AMP-T1 AND IS CONNECTED TO THE OUTPUT "N" JACK, AMP-J4.

PC-511 CONTAINS TWO FAULT DETECTORS. A PA MOSFET FAILURE WILL RESULT IN CURRENT FLOW IN THE SECONDARY OF T1. THE SECOND FAULT IS HEATSINK OVER TEMPERATURE, WHICH WILL DECREASE RESISTANCE OF RT1, FORWARD BIASING Q1. EITHER OF THESE CONDITIONS WILL APPLY VOLTAGE TO THE GATE OF THE MOD DRIVE CROWBAR, Q3, TURNING IT ON. THIS WILL HAVE THREE RESULTS: PC-511 MOD DRIVE INPUT WILL BE CLAMPED; FRONT PANEL "FAIL" LED WILL BE ILLUMINATED; AND 510-Q9 (SCR LOCATED ON HEATSINK) WILL TURN ON, GROUNDING MODULATOR LOW PASS FILTER OUTPUT.

COMBINER-MATCHER

INDIVIDUAL RF OUTPUTS FROM EACH AMP MODULE ENTER COMBINER DRAWER AT COMB-J1, COMB-J2, AND COMB-J3. THEY ARE COMBINED AND MATCHED TO 25

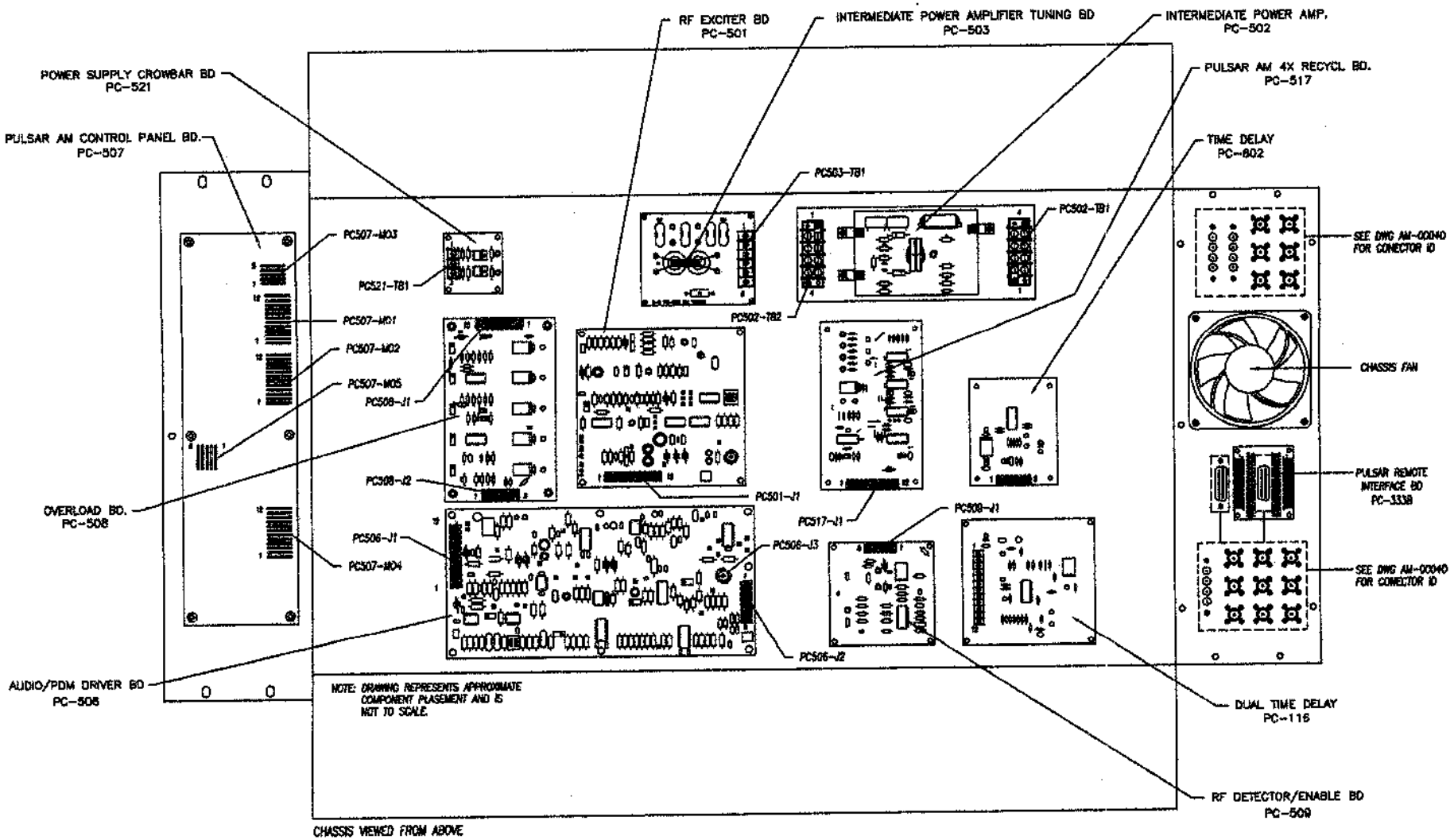
OHM OUTPUT IMPEDANCE IN THE COMB L1-L2-L3/COMB C1 NETWORK. COIL TAPS AND CONNECTIONS TO THE INPUT "N" JACKS ARE USED IN THE RF RELAY BOARD, PC-516A, TO PROVIDE FOR GOOD MATCHING IN A SITUATION WHEN ONE OF THE AMP MODULES IS "OFF". INDIVIDUAL B-SUPPLY VOLTAGE FROM EACH AMP MODULE ENERGIZES THE RESPECTIVE 516A RELAY. IN NORMAL OPERATION (ALL AMP MODULES "ON") THE INDIVIDUAL "N" JACK IS CONNECTED TO THE COIL TAP. IF AN AMP MODULE IS "OFF", ITS RELAY IS NOT ENERGIZED, THE COIL TAP IS DISCONNECTED, AND THE "N" JACK IS GROUNDED (GROUNDING THE END OF ITS COIL). IN THIS SITUATION, THE REMAINING (FUNCTIONAL) AMP MODULES STILL SEE THE PROPER (25 OHM) IMPEDANCE.

THE OUTPUT OF THE COMBINER NETWORK PASSES THROUGH THE TORROID OF PC-519 AS THE PRIMARY OF THE RF CURRENT SAMPLE TRANSFORMER. IT IS THEN CONNECTED TO THE COMB-L4/COMB-C2/COMB-L5 TEE NETWORK. THIS BAND PASS/MATCHING NETWORK INPUTS A 25 OHM IMPEDANCE AND OUTPUTS A 50 OHM IMPEDANCE. THE OUTPUT PASSES THROUGH THE TORROID OF PC-514 AS THE PRIMARY OF THE DIRECTIONAL COUPLER TRANSFORMER TO THE OUTPUT TEE NETWORK.

THE COMB-L6/ COMB-C2/ COMB-L7 OUTPUT TEE IS ADJUSTABLE WITH THE COMBINER FRONT PANEL " TUNING" AND " LOADING" CONTROLS. THIS ALLOWS CONSIDERABLE LATITUDE IN MATCHING TO A LESS THAN IDEAL (REACTIVE) ANTENNA SYSTEM.

FROM THE OUTPUT TEE, THE RF IS COUPLED THROUGH BLOCKING CAPACITOR COMB-C5 AND SHUNTED BY RF CHOKE COMB-L8. THESE COMPONENTS AFFORD SOME MEASURE OF PROTECTION AGAINST LIGHTNING INDUCED TRANSIENTS.

RF OUTPUT IS AT COMBINER REAR PANEL "N" JACK, COMB–J7. COMB-C4 PROVIDES AN RF SAMPLE (FOR MODULATION MONITOR, ETC.) AT REAR PANEL BNC JACK, COMB–J6.



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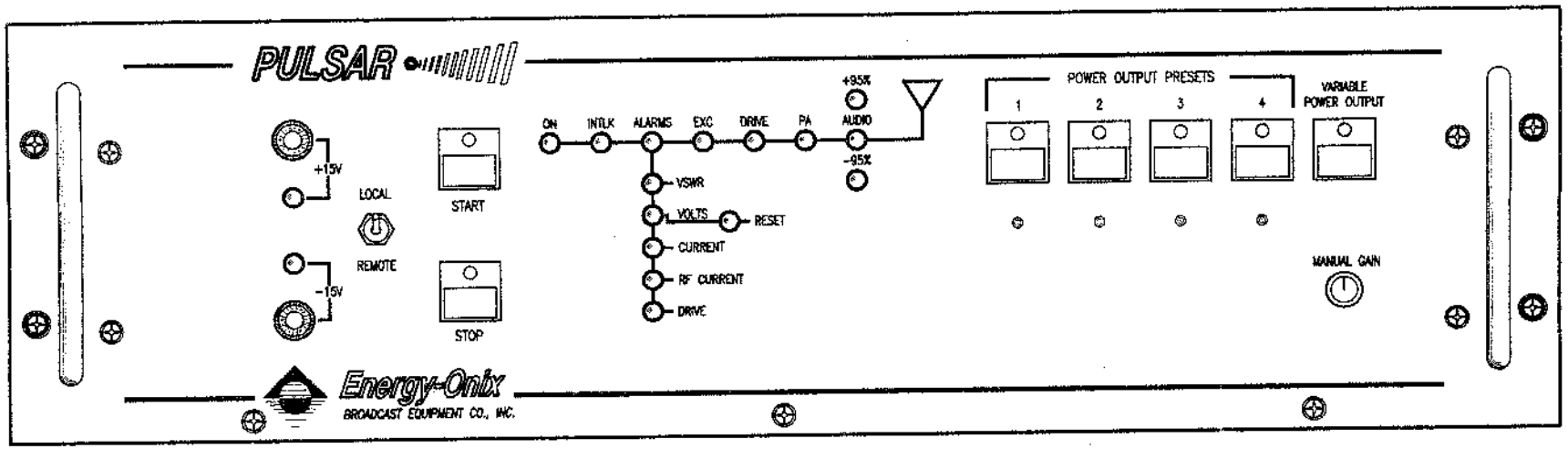
BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

PULSAR

REVISION:	TITLE: PULSAR AM EXCITER/CONTROLLER DRAWER COMPONENT LAYOUT			
	DESIGNED BY: BW	DATE: 3/28/99	DWG. BY: CRB	DWG. No. AM-0001C
	MODIFIED: 2/27/07 by John McCool	CAD: AM-0001C		



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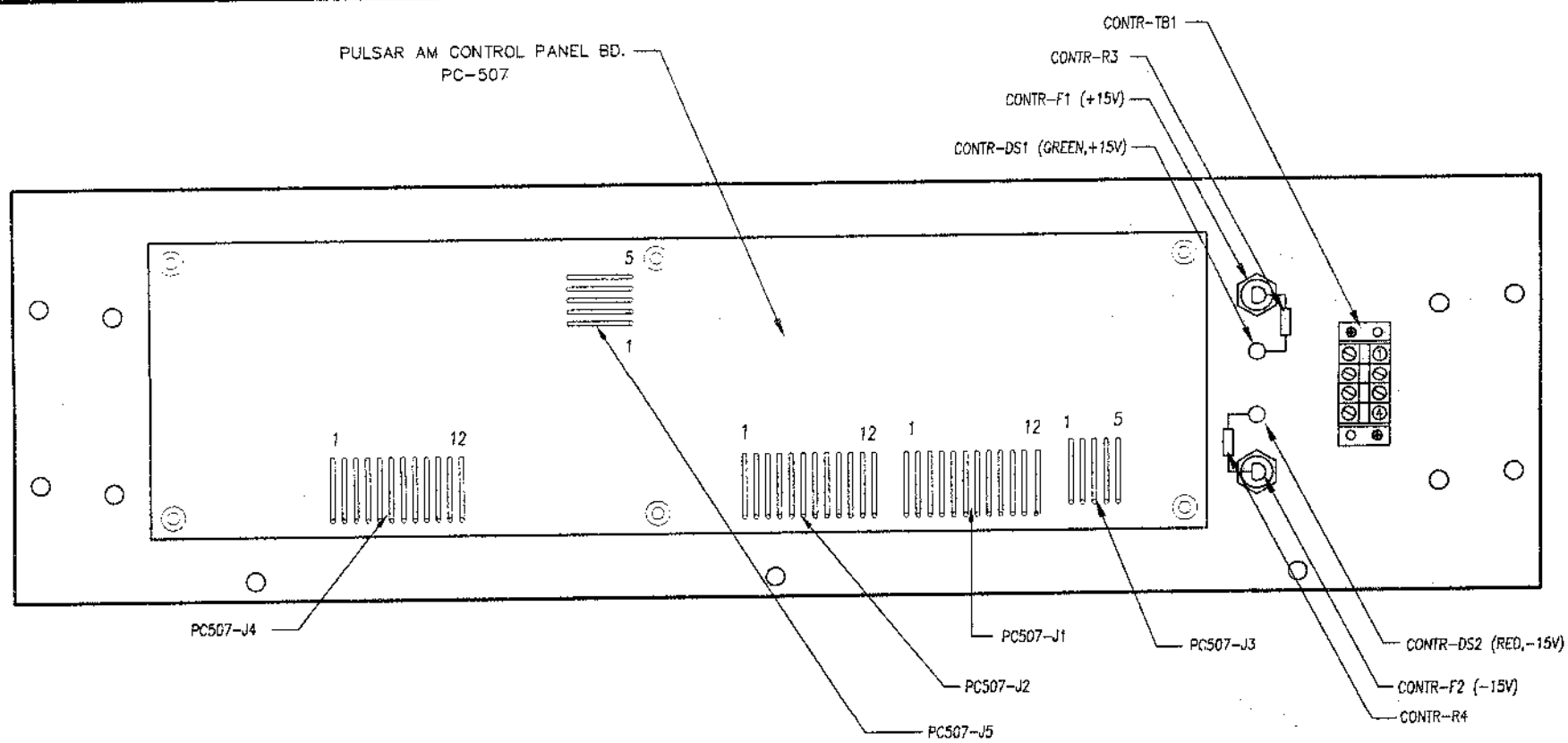
BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

REVISION:

PULSAR

TITLE: PULSAR 1000 CONTROL PANEL FRONT PANEL VIEW

SCALE: NA	DESIGNED BY: NDT	DATE: 07/21/98	DWG. BY:	DWG. NO. AM–00030
CAD: AM–00030		CK BY:		



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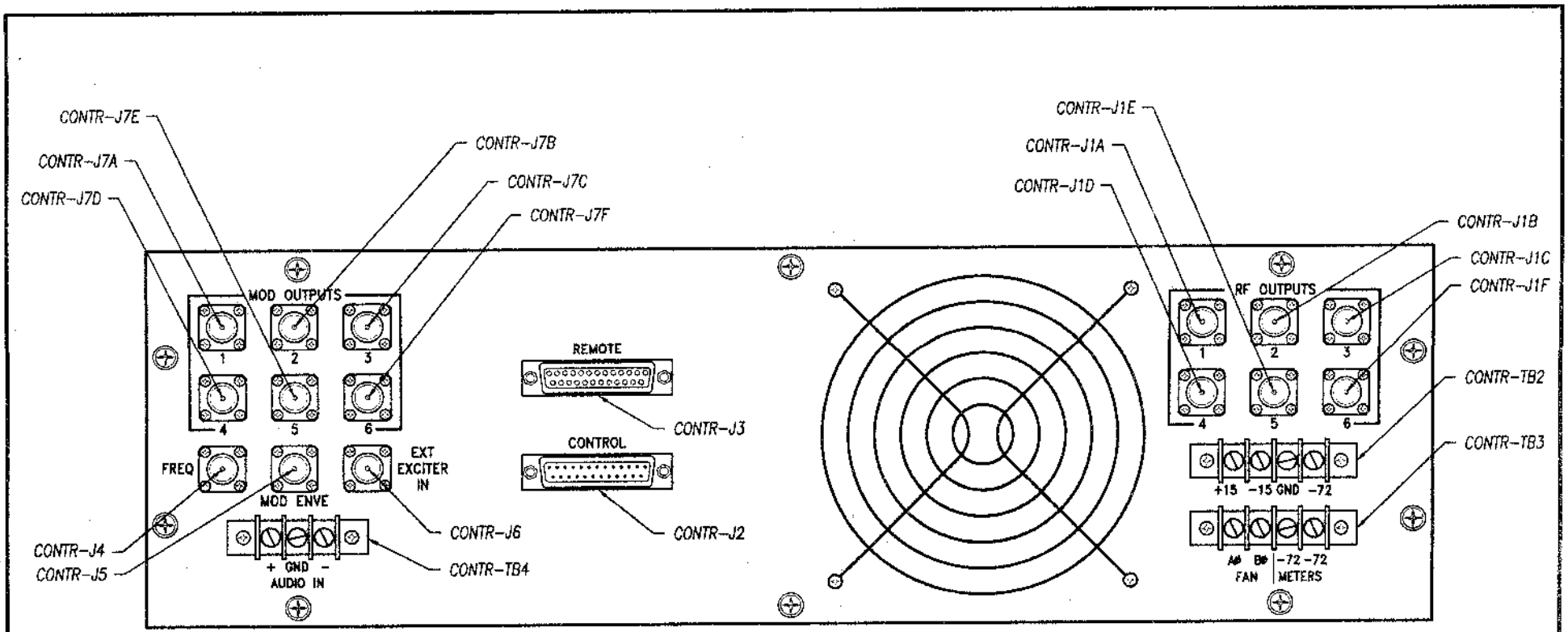
BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 801, VALATIE, NY 12184

REVISION:

PULSAR

TITLE: PULSAR 1000 CONTROL DRAWER
FRONT PANEL VIEW (INSIDE)

SCALE: NA	DESIGNED BY:	DATE: 11/29/99	DWG. BY:	DWG. No
CAD: AM-PD100		CK BY:	E.S.B.	AM-00100



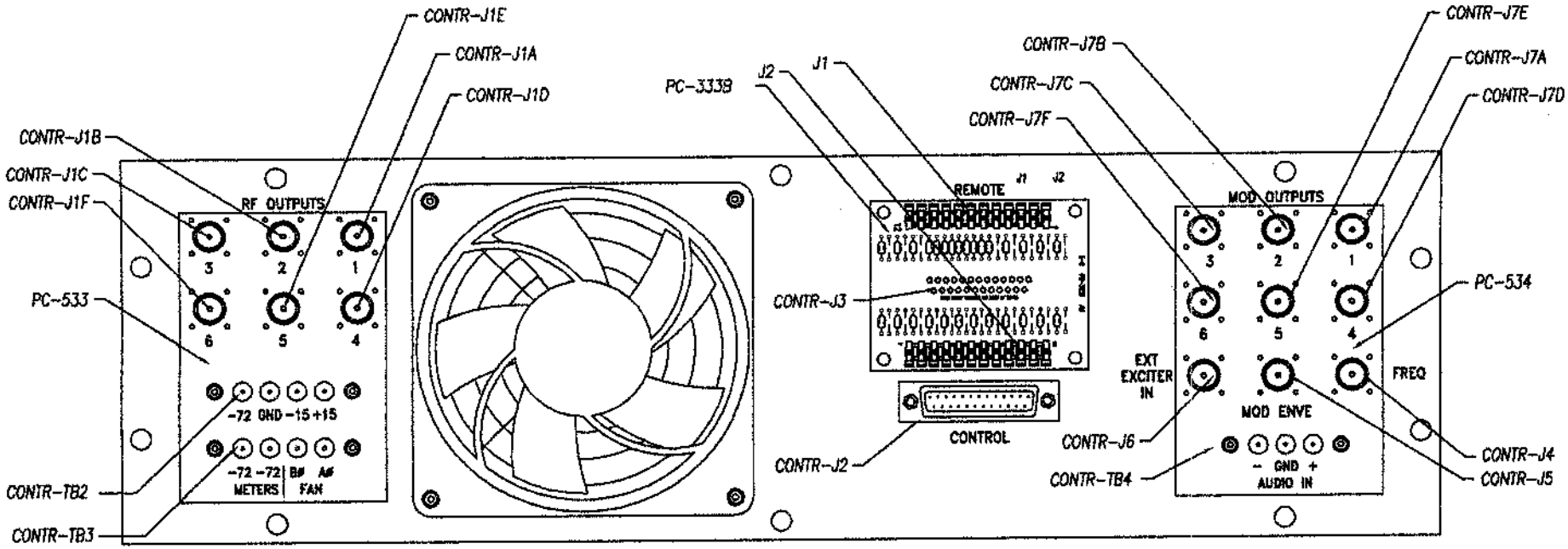
PULSAR

Energy–Onix
BROADCAST EQUIPMENT CO., INC.
1508 RIVER ST., P.O. BOX 801, VALATIE, NY 12184

REVISION DESCRIPTION:	REVISION:
IDENTIFY CONNECTIONS, 11/12/99	A

TITLE: PULSAR CONTROL DRAWER PANEL VIEW (REAR)

SCALE: NTS	DESIGNED BY:	DATE: 07/26/99	DWG. BY:	DWG No.
CAD: AM–00040	DDE	CK. BY:	ESB	AM–00040



PULSAR

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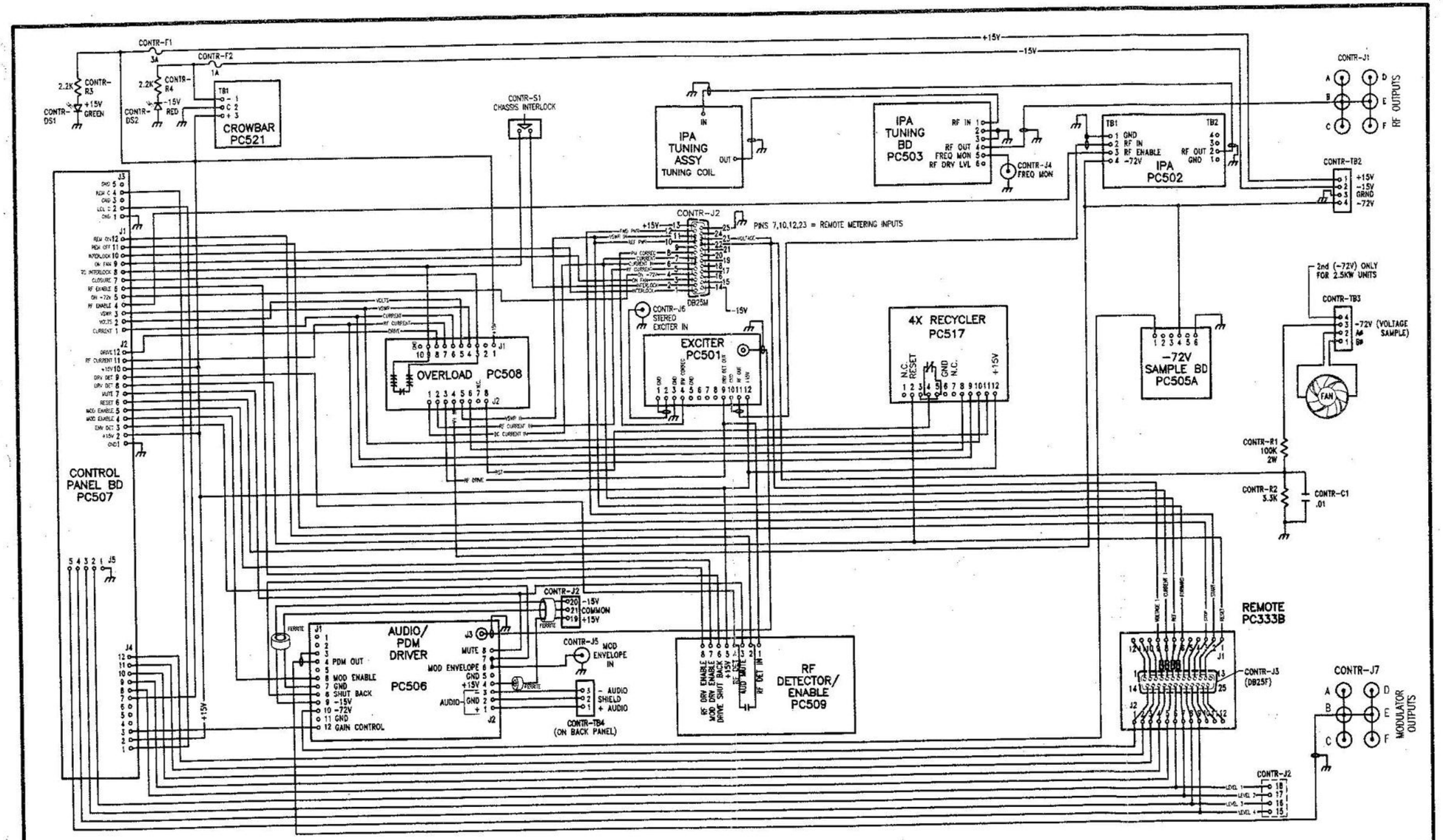
BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

REVISION DESCRIPTION:	REVISION:

TITLE: PULSAR CONTROL DRAWER
REAR PANEL VIEW (INSIDE)

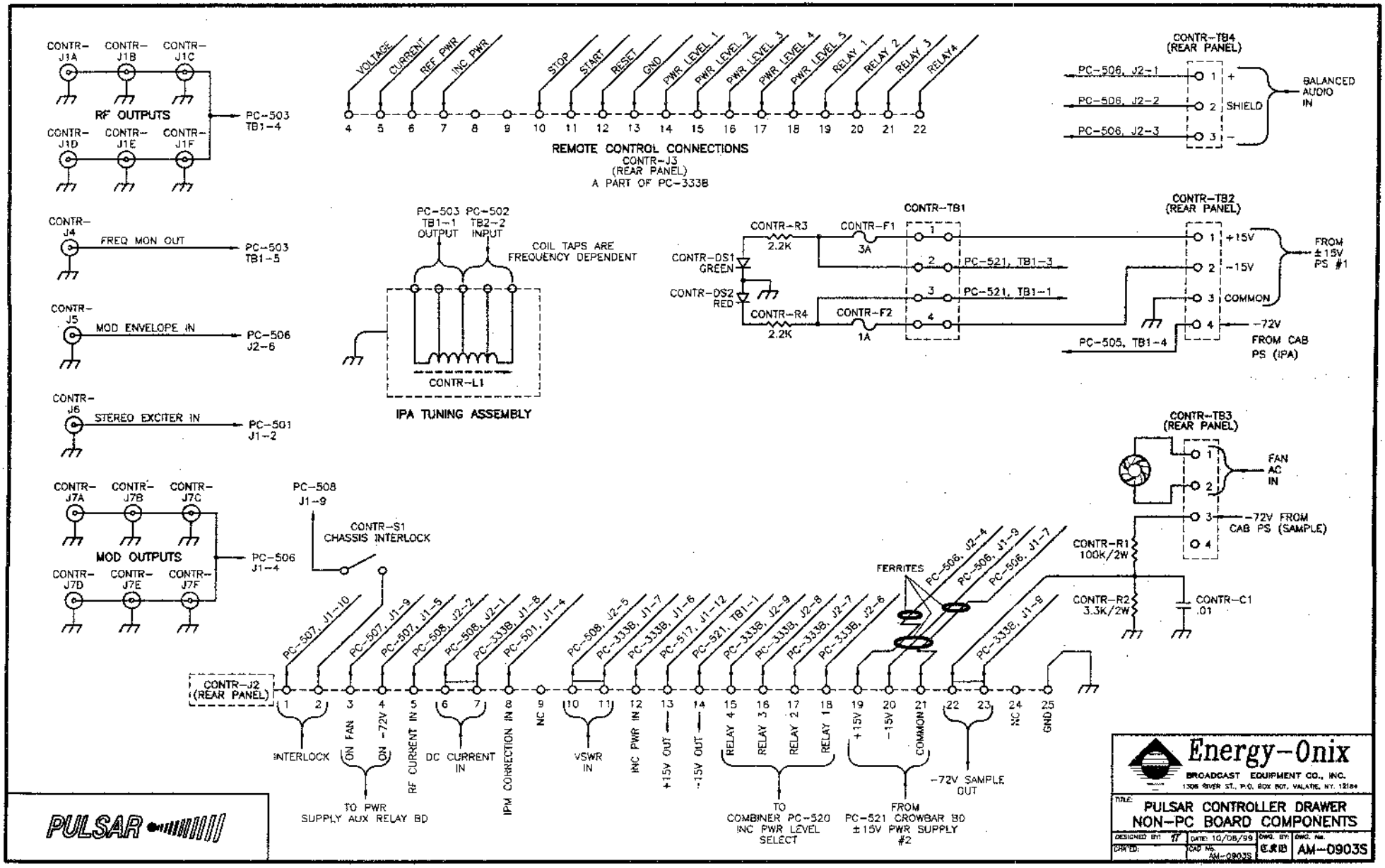
SCALE: NTS	DESIGNED BY:	DATE: 11/29/99	DWG. BY:	DWG. No.
CAD: AM-00090	TT	MODIFIED: 2/28/07 by John McCool	E.S.B.	AM-00090



Energy–Onix
BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

PULSAR

TITLE: CONTROLLER DRAWER INTERCONNECT DIAGRAM					
SCALE: NA	DESIGNED BY:	DATE: 01/05/00	DWG. BY:	DWG. No.	
CAD: AM-0001S		CK BY:		AM-0001S	


CONTR-J1A
CONTR-J1B
CONTR-J1C
RF OUTPUTS
CONTR-J1D
CONTR-J1E
CONTR-J1F
PC-503 TB1-4
CONTR-J4
FREQ MON OUT
PC-503 TB1-5
CONTR-J5
MOD ENVELOPE IN
PC-506 J2-6
CONTR-J6
STEREO EXCITER IN
PC-501 J1-2
CONTR-J7A
CONTR-J7B
CONTR-J7C
MOD OUTPUTS
CONTR-J7D
CONTR-J7E
CONTR-J7F
PC-506 J1-4
VOLTAGE
CURRENT
REF PWR
INC PWR
STOP
START
RESET
GND
PWR LEVEL 1
PWR LEVEL 2
PWR LEVEL 3
PWR LEVEL 4
PWR LEVEL 5
RELAY 1
RELAY 2
RELAY 3
RELAY4
4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22
REMOTE CONTROL CONNECTIONS
CONTR-J3
(REAR PANEL)
A PART OF PC-333B
CONTR-TB4
(REAR PANEL)
PC-506, J2-1
PC-506, J2-2
PC-506, J2-3
SHIELD
BALANCED AUDIO IN
PC-503 TB1-1 OUTPUT
PC-502 TB2-2 INPUT
COIL TAPS ARE FREQUENCY DEPENDENT
CONTR-L1
IPA TUNING ASSEMBLY
CONTR-TB1
CONTR-R3
2.2K
CONTR-F1
3A
CONTR-DS1 GREEN
CONTR-DS2 RED
CONTR-R4
2.2K
CONTR-F2
1A
PC-521, TB1-3
PC-521, TB1-1
PC-505, TB1-4
CONTR-TB2
(REAR PANEL)
+15V
-15V
COMMON
-72V
FROM ±15V PS #1
FROM CAB PS (IPA)
CONTR-TB3
(REAR PANEL)
FAN AC IN
-72V FROM CAB PS (SAMPLE)
CONTR-R1
100K/2W
CONTR-R2
3.3K/2W
CONTR-C1
.01
FERRITES
PC-506, J2-4
PC-506, J1-9
PC-506, J1-7
PC-508 J1-9
CONTR-S1
CHASSIS INTERLOCK
PC-507, J1-10
PC-507, J1-9
PC-507, J1-5
PC-508, J2-2
PC-508, J2-1
PC-333B, J1-8
PC-501, J1-4
PC-508, J2-5
PC-333B, J1-7
PC-333B, J1-6
PC-517, J1-12
PC-521, TB1-1
PC-333B, J2-9
PC-333B, J2-8
PC-333B, J2-7
PC-333B, J2-6
PC-333B, J1-9
CONTR-J2
(REAR PANEL)
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
INTERLOCK
ON FAN
ON -72V
RF CURRENT IN
DC CURRENT IN
IPM CORRECTION IN
NC
VSWR IN
INC PWR IN
+15V OUT
-15V OUT
RELAY 4
RELAY 3
RELAY 2
RELAY 1
+15V
-15V
COMMON
-72V SAMPLE OUT
NC
GND
TO PWR SUPPLY AUX RELAY BD
TO COMBINER PC-520 INC PWR LEVEL SELECT
FROM PC-521 CROWBAR BD ±15V PWR SUPPLY #2
PULSAR
Energy-Onix
BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 807, VALATIE, NY. 12184
TITLE:
PULSAR CONTROLLER DRAWER
NON-PC BOARD COMPONENTS
DESIGNED BY:
DRAWN:
DATE: 10/08/99
CAD No. AM-0903S
DWG. BY:
DWG. No. AM-0903S

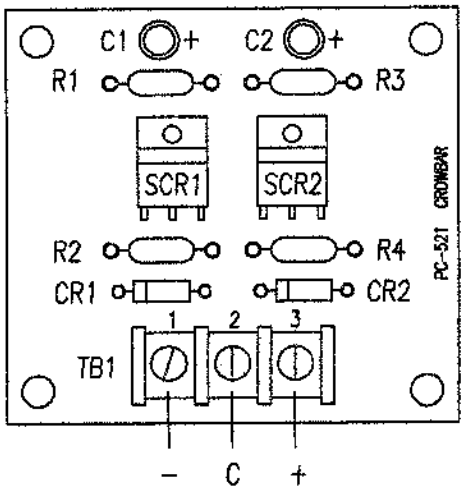
PULSAR CONTROLLER DRAWER

NON - PC BOARD COMPONENTS

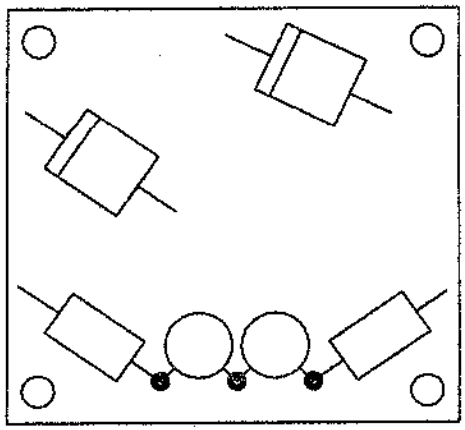
PARTS LIST

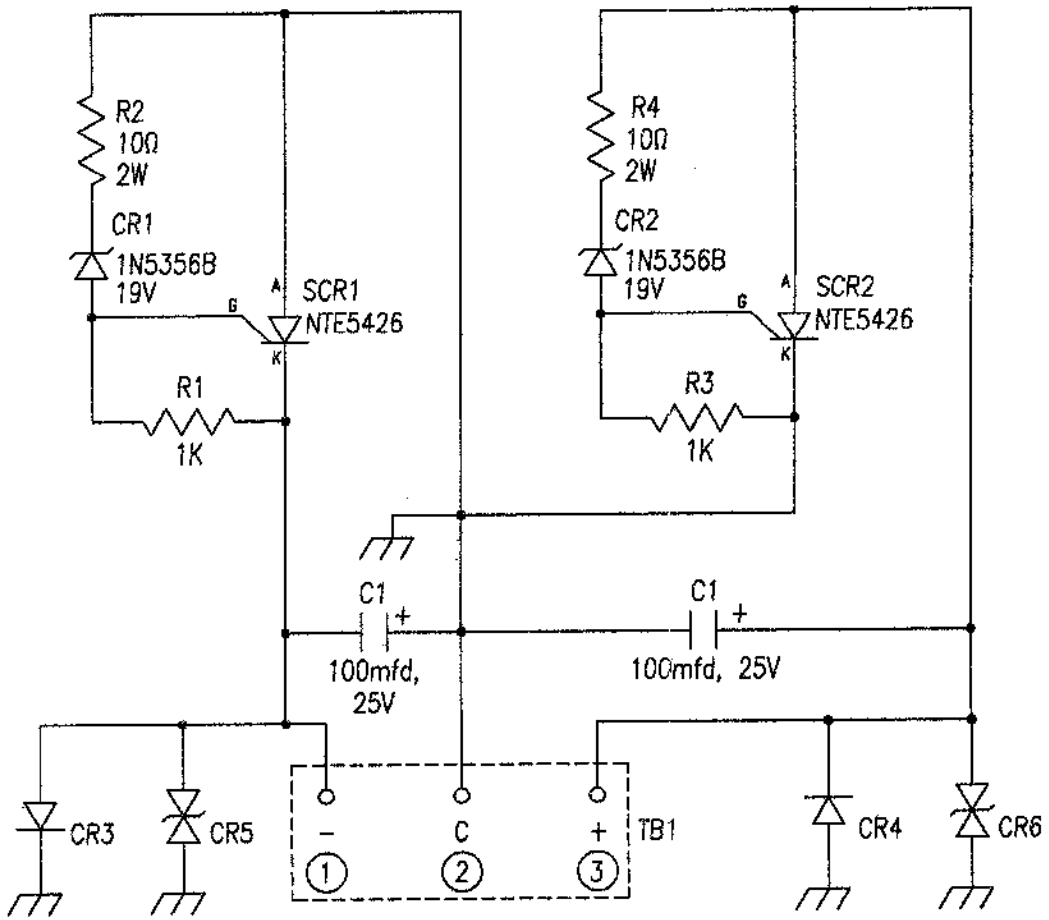
CONTR C1	.01μF/1KV DISC CERAMIC	
CONTR DS1	LED, GREEN	
CONTR DS2	LED, RED	
CONTR F1	FUSE, 3A	
CONTR F2	FUSE, 1A	
CONTR J1A-J1F,)		
CONTR J4-J6,)	BNC FEMALE	
CONTR J7A-J7F)		
CONTR J2	DB 25, MALE	
CONTR J3	DB 25, FEMALE	
CONTR L1	IPA TUNING ASSEMBLY	
CONTR R1	100K, 2W	
CONTR R2	3.3K, 2W	
CONTR R3, R4	2.2K, 1/4W	
CONTR S1	INTERLOCK SWITCH	MICRO SWITCH DM401
CONTR TB1	4 POSITION BARRIER, 15A	
CONTR TB2,TB3	4 POSITION CHASSIS MOUNT, 20A	
CONTR TB4	3 POSITION CHASSIS MOUNT, 20A	

TOP



BOTTOM



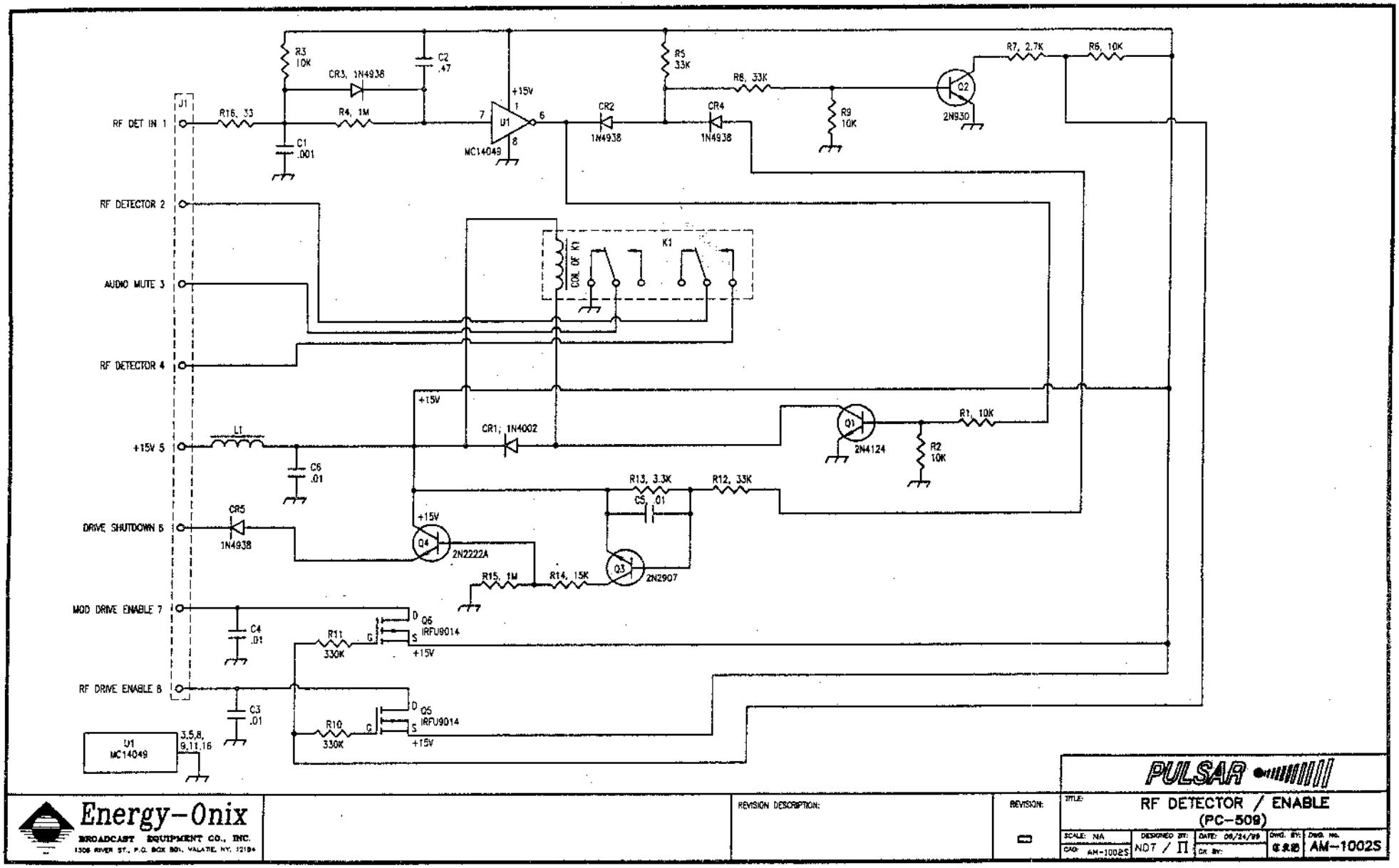


Energy–Onix BROADCAST EQUIPMENT CO., INC. 1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184	REVISION DESCRIPTION:	REVISION:	TITLE: POWER SUPPLY CROWBAR BD PC–521 COMPONENT LAYOUT
			DESIGNED BY: NDT DATE: 5/19/99 DWG. BY: CKB DWG. No. AM–0202C MODIFIED: 3/5/07 by John McCool CAD No. AM–0202C

PC- 521 ± 15V PS CROWBAR BOARD

PARTS LIST

C1, C2	100μF, 25V ELECTROLYTIC
CR1, CR2	1N5356B 19V ZENER
R1, R3	1K, 1/4W
R2, R4	10ohm, 2W
SCR1, SCR2	50802DH
TB1	3 POSITION, PC MOUNT



Energy–Onix
BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

REVISION DESCRIPTION:

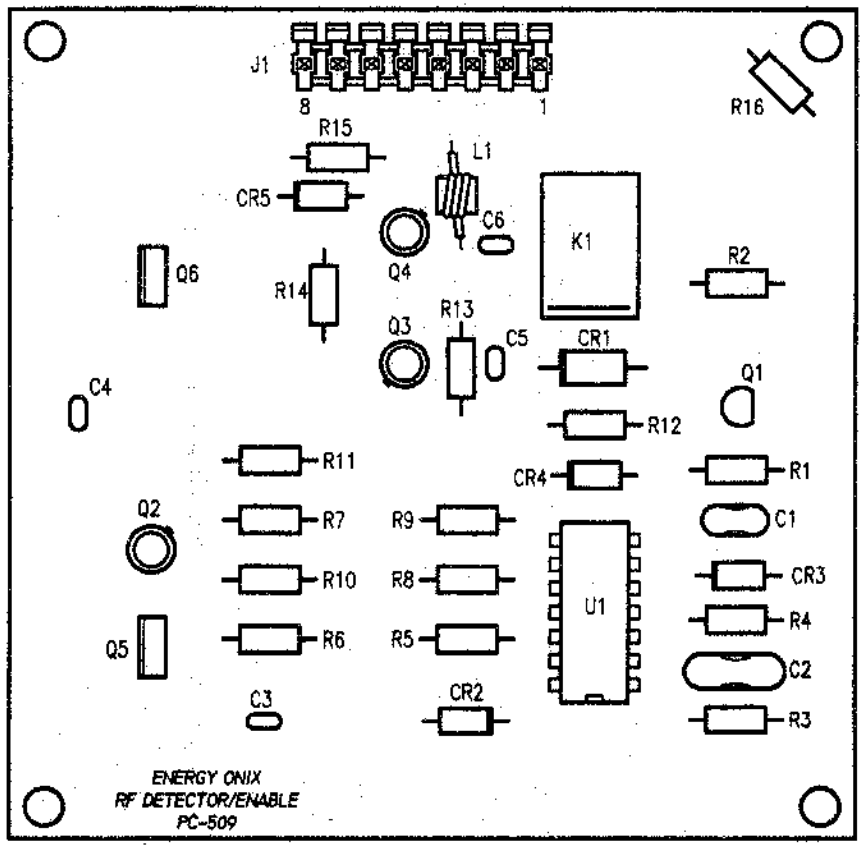
REVISION:

PULSAR

TITLE: RF DETECTOR / ENABLE (PC–509)

SCALE: NA | DESIGNED BY: NDT / Π | DATE: 06/24/99 | DWG. BY: | DWG. No. AM–1002S

CAD: AM–1002S | CK BY:



PULSAR

Energy-Onix
BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

REVISION DESCRIPTION:	REVISION:

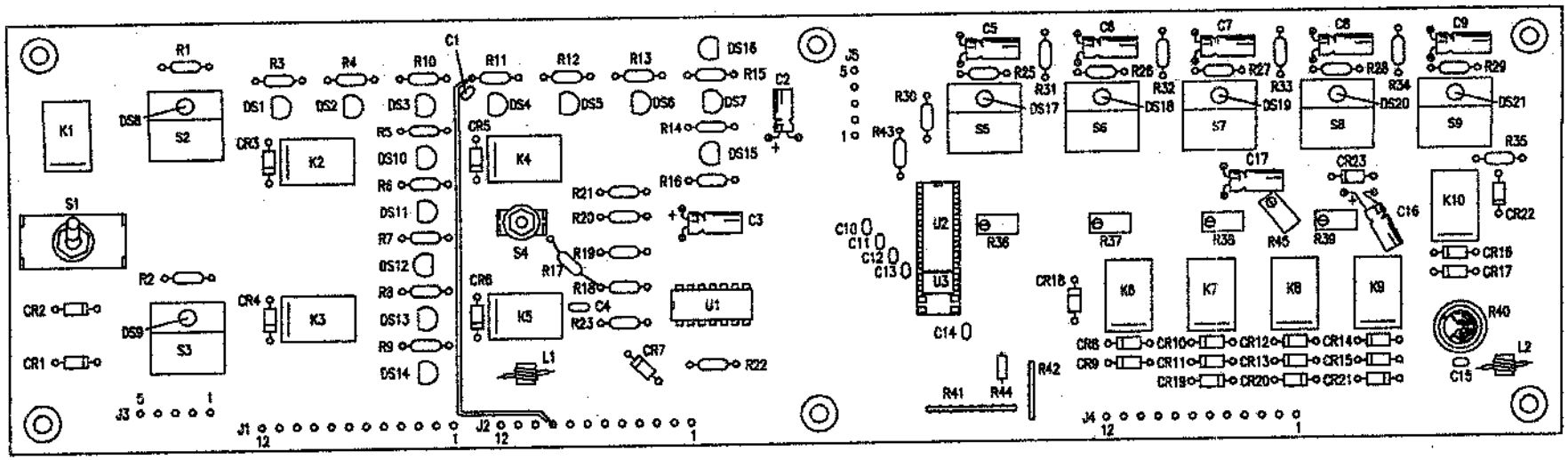
TITLE: RF DETECTOR/ENABLE PCB COMPONENT LAYOUT (PC-509)

DESIGNED BY: NDT	DATE: 5/12/99	DWG. BY:	DWG. No
CHK'ED:	CAD: AM-1002C	CRB	AM-1002C

PC - 509 DETECTOR/ENABLE

PARTS LIST

C1	.001μF/1KV DISC CERAMIC	
C2	.47 μF/100V METAL POLY	EF1474
C3-C6	.01 μF/100V MONO. CERAMIC	P4904
CR1	1N4002	
CR2-CR5	1N4938	
J1	8-PIN MOLEX HEADER	
K1	AROMAT, NON-LATCHING	
L1	FERRITE BEAD	21-129B
Q1	2N4124	
Q2	2N930	
Q3	2N2907	
Q4	2N2222A	
Q5,Q6	IRFU9014	
R1,R2,R3,R6,R9	10K, 1/4W	
R4,R15	1M,1/4W	
R5,R8,R12	33K, 1/4W	
R7	2.7K, 1/4W	
R10,R11	330K, 1/4	
R13	3.3K, 1/4W	
R14	15K, 1/4W	
R16	33 OHMS, 1/4W	
U1	MC14049	
XU1	16-PIN IC SOCKET	

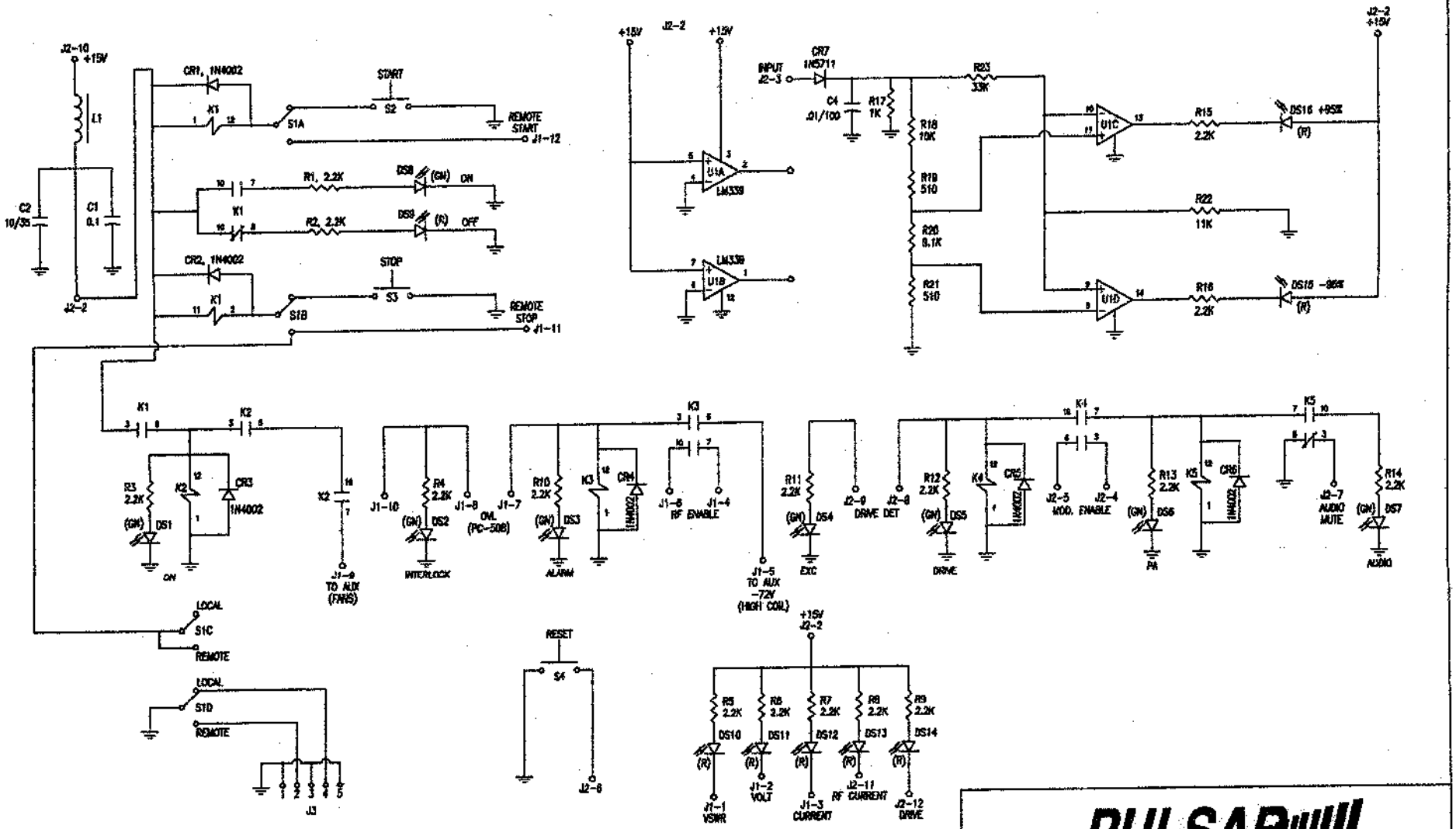


NOTE: J1-J5, R45 ON BACK OF BOARD

Energy-Onix
BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

PULSAR

TITLE: PULSAR AM CONTROL PANEL BD. PC-507 COMPONENT LAYOUT					
SCALE: NA	DESIGNED BY: NDT	DATE: 08/08/89	DWG. BY:	DWG. No.	
CAD: AM-0901C		MODIFIED: 3/2/07 by John McCool		AM-0901C	



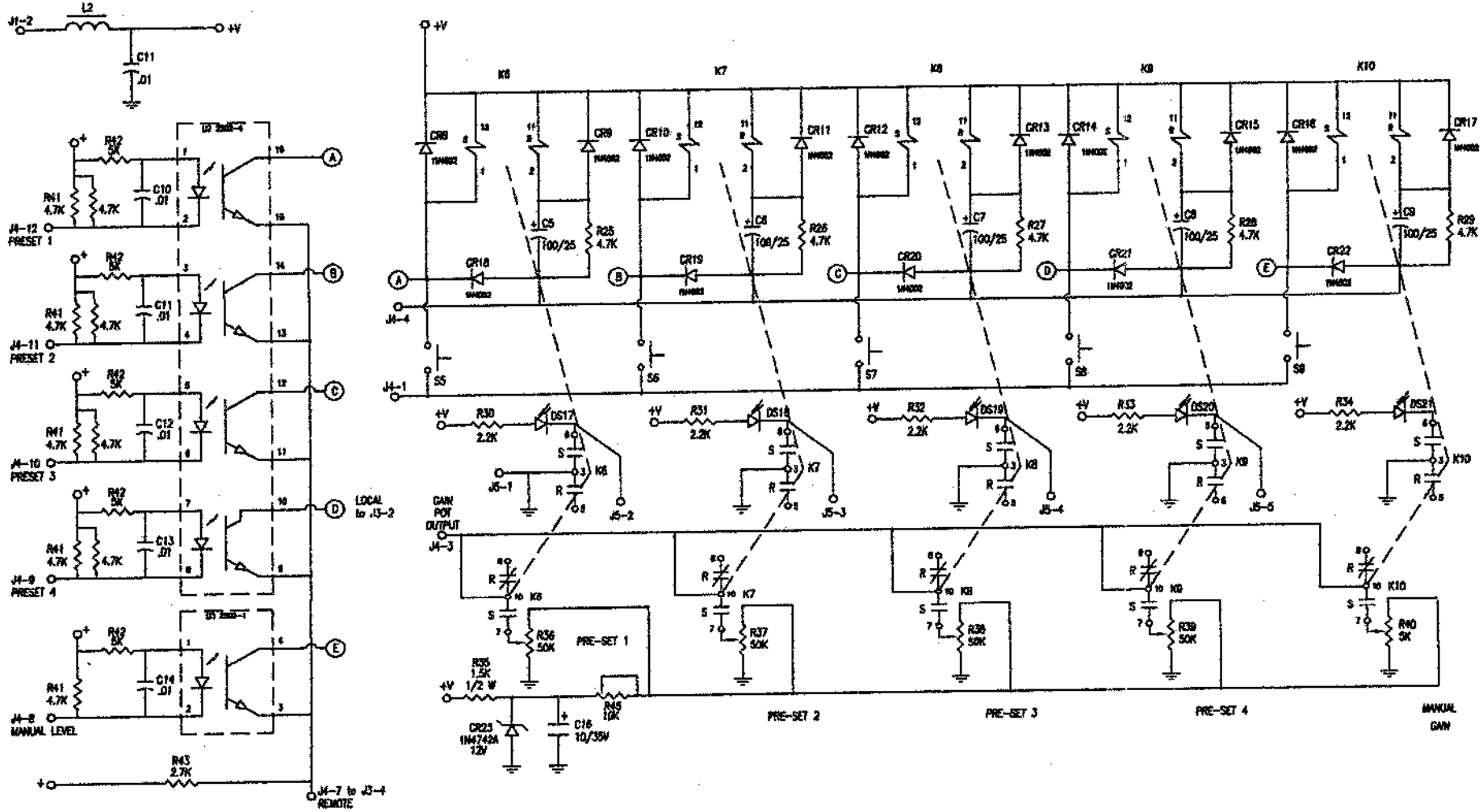
PULSAR

Energy-Onix
BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

REVISION DESCRIPTION:	REVISION:
RELABLE U1D, 1/11/99 COMPONENT ID REASIGNMENTS, 8/31/99	B

TITLE: CONTROL PANEL BOARD
PC-507 SCHEMATIC DIAGRAM

SCALE: NA	DESIGNED BY:	DATE: 11/09/98	DWG. BY:	DWG. No.
CAD: AM-0901S	NDT	MODIFIED: 3/2/07 by John McCool	CRB	AM-0901S SHEET: 1/2

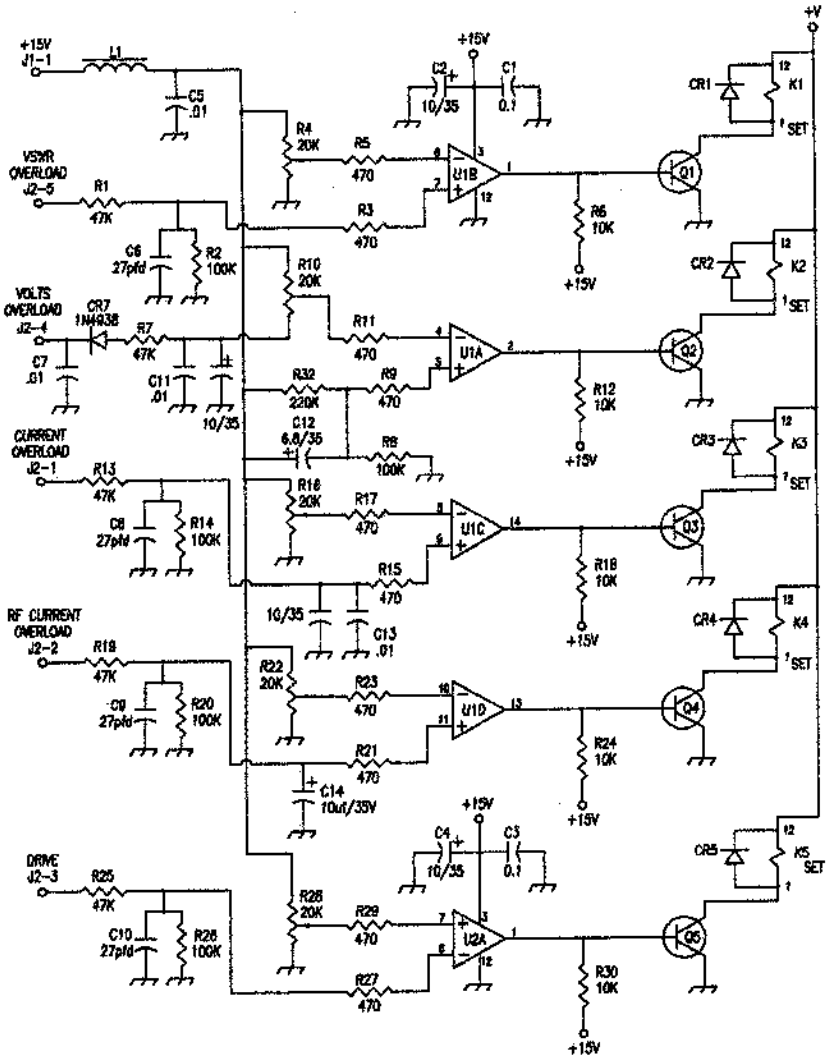


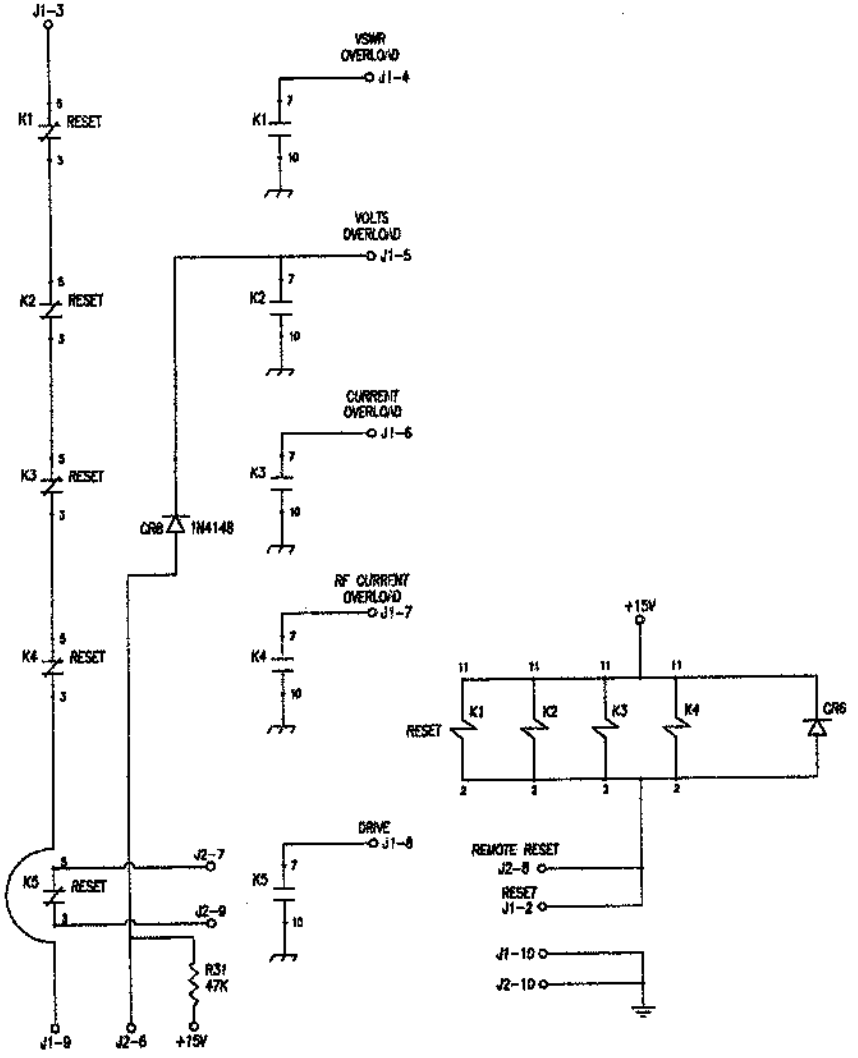
Energy–Onix BROADCAST EQUIPMENT CO., INC. 1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184	REVISION DESCRIPTION: CHG S1-15 TO OPEN POSITION, ADDED F,G,H,I 01-11-99 C. GEN. REV., 07-30-01, DH	REVISION: C	TITLE: CONTROL PANEL BOARD PC-507 SCHEMATIC DIAGRAM		
			SCALE: NA CAD: AM-0902S	DESIGNED BY: NDT	DATE: 11/10/98 MODIFIED: 3/2/07 by John McCool DWG. BY: CAB DWG. No. AM-0902S SHEET: 2/2

PC - 507 CONTROL PANEL BOARD

PARTS LIST

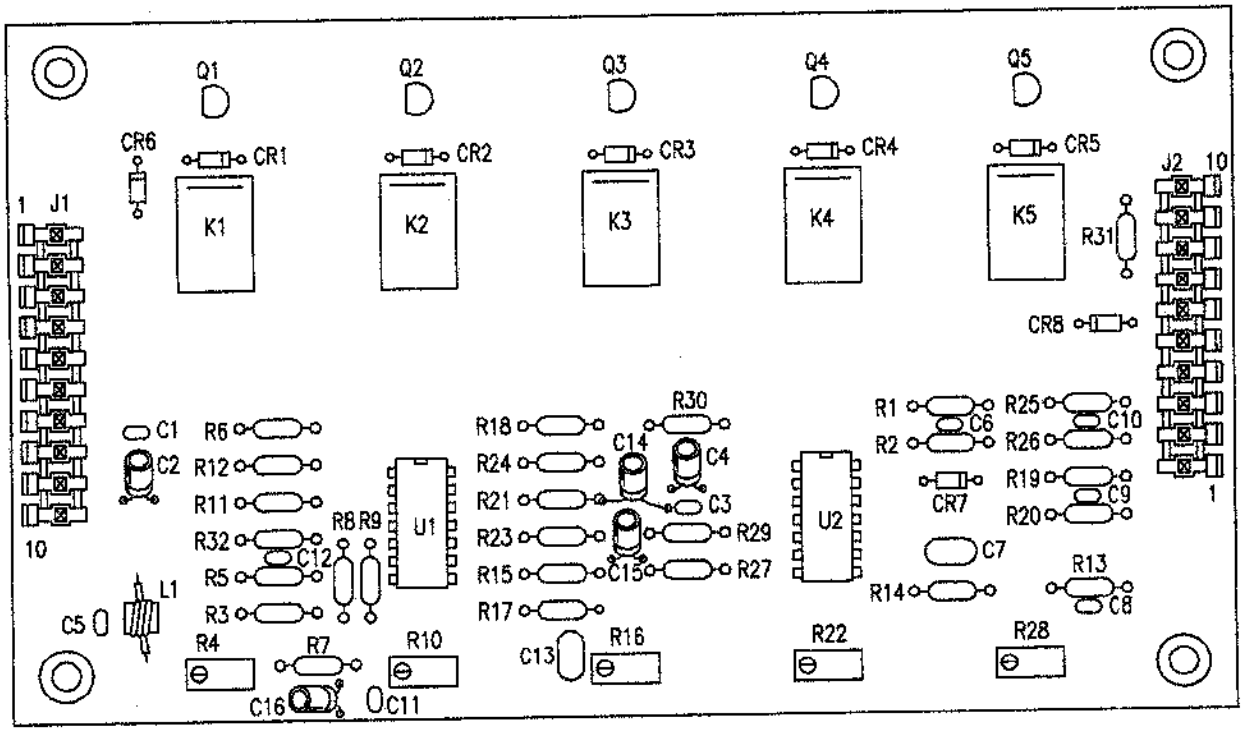
C1,C10-C15	.01μF/100V MONO. CERAMIC	P4904
C2,C16, C17	10μF/35V ELECTROLYTIC	
C3,C5-C9	100μF/25V ELECTROLYTIC	
C4	.01μF/100V STACK METAL FILM	
CR1-CR6,CR8-CR22	1N4002	
CR7	1N5711	
CR23	1N4742A, 12V ZENER	
DS1-DS7	LED, GREEN	
DS8,DS17-DS21	LED, GREEN, PART OF S2,S5-S9	
DS9	LED, RED, PART OF S3	
DS10-DS16	LED, RED	
J1,J2,J4	12 - PIN MOLEX HEADER, ANGLE	
J3	5 - PIN MOLEX HEADER, ANGLE	
J5	5 - PIN MOLEX HEADER, STRAIGHT	
K1,K6-K10	AROMAT, LATCHING	
K2-K5	AROMAT, NON-LATCHING	
L1,L2	FERRITE BEAD	21-129B
R1-R16,R30-R34	2.2K, 1/4W	
R17	1K, 1/4W	
R18,R44	10K, 1/4W	
R19,R21	510 OHMS, 1/4W	
R20	9.1K, 1/4W	
R22	11K, 1/4W	
R23	33K, 1/4W	
R24	VALUE SELECTED IN TEST	
R25-R29	4.7K, 1/4W	
R35,R43	2.7K, 1/4W	
R36-R39	50K VARIABLE, MULTI-TURN	
R40	5K VARIABLE, SINGLE TURN	CM46434
R41	10K, 9-ELEMENT	71-CSL10A01-10K
R42	15K, 5-ELEMENT	569-L61-15K
R45	10K VARIABLE, MULTI-TURN	
S1	4PDT TOGGLE	EATON 65F1699
S2,S3,S5-S9	PUSH BUTTON, MOMENTARY W/LED	C & K MP01
S4	PUSH BUTTON, MOMENTARY	C & K 8125
U1	339 OP AMP	
U2	2502-4 OPTO COUPLER	
U3	2502-1 OPTO COUPLER	
XU1	14-PIN IC SOCKET	
XU2	16-PIN IC SOCKET	
XU3	8-PIN IC SOCKET	





Energy-Onix BROADCAST EQUIPMENT CO., INC. 1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184	REVISION DESCRIPTION: REMOVED J2-7 FROM GND.,ADDED CR8,CR9,R31, 07/13/99 ADDED J2-7 TO GND., 07/20/99 CHG R31 CALLOUT TO R32, CHGD C5,C11 VALUE, DWG # CHG, 08/13/99	REVISION: C	PULSAR

TITLE: OVERLOAD BOARD SCHEMATIC (PC-508)					
SCALE: NA	DESIGNED BY: NDT / Π	DATE: 08/24/99 MODIFIED: 3/2/07 by John McCool	DWG. BY:	DWG. No. AM-1001S	
CAD: AM-1001S					

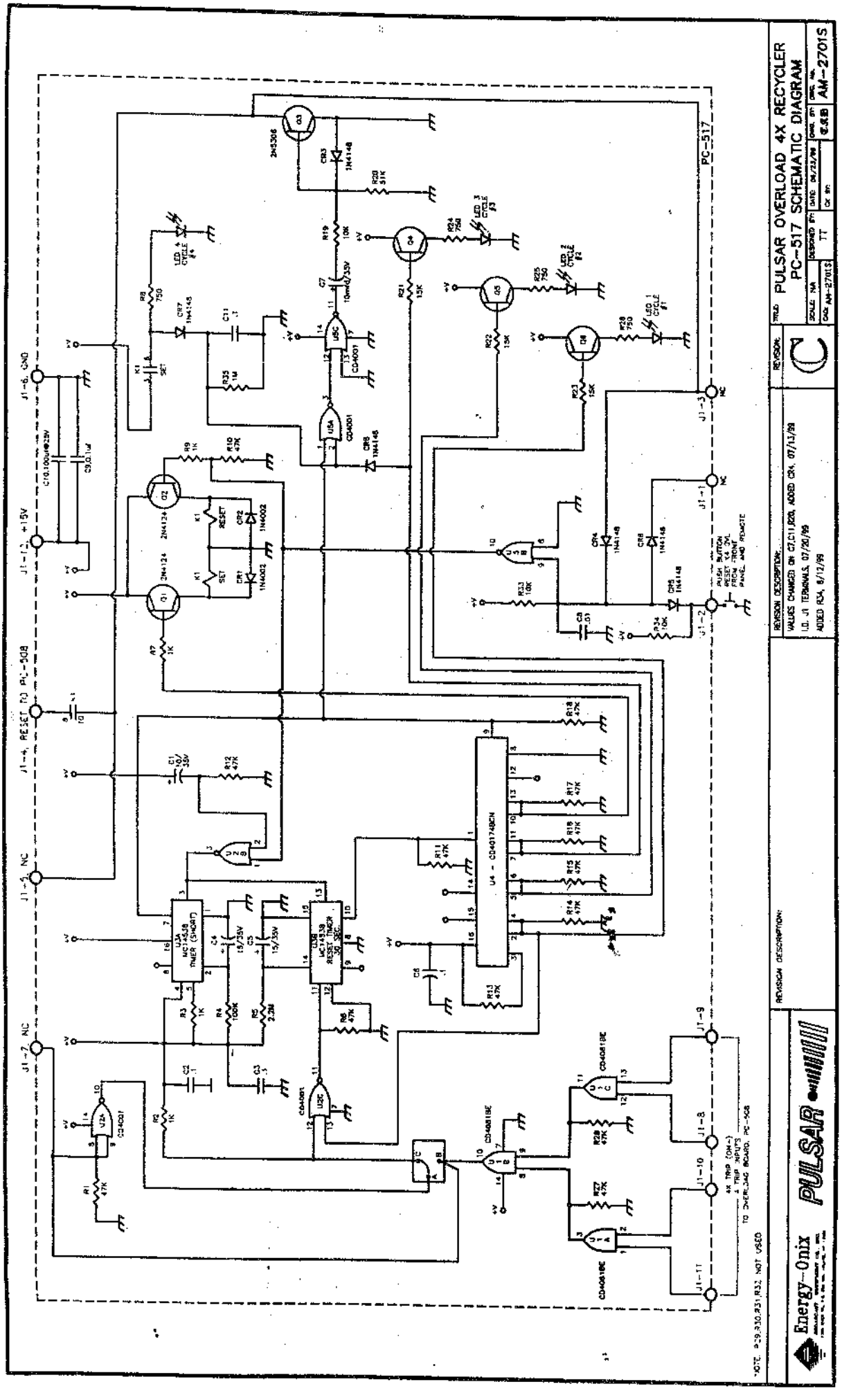


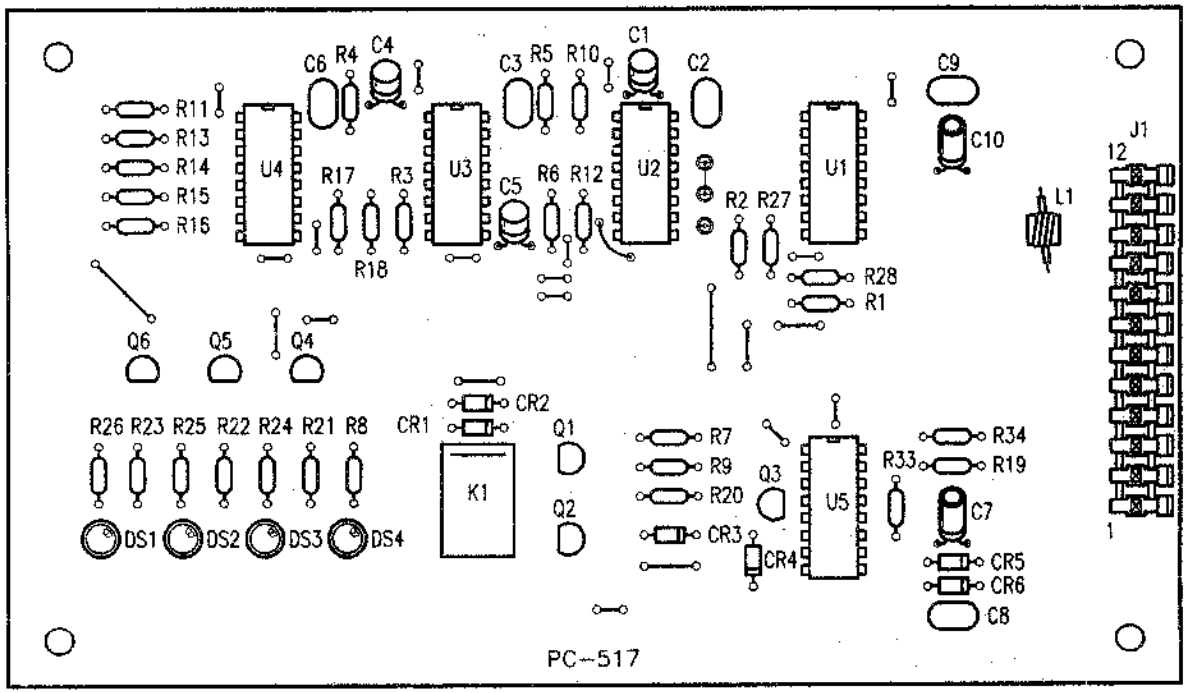
Energy–Onix BROADCAST EQUIPMENT CO., INC. 1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184	REVISION DESCRIPTION:	REVISION:	PULSAR TITLE: PULSAR AM OVERLOAD BD. PC–508 COMPONENT LAYOUT DESIGNED BY: NDT · DATE: 06/09/99 · DWG. BY: CRB · DWG. No. AM–1001C MODIFIED: 3/2/07 by John McCool · CAD: AM–1001C

PC- 508 OVERLOAD BOARD

PARTS LIST

C1,C3	0.1 μF/100V MONO. CERAMIC	P4910
C2,C4,C14	10 μF/35V ELECTROLYTIC	
C5,C11	.01 μF/100V MONO. CERAMIC	
C6,C8,C9,C10	27μμF DISC CERAMIC	1331-PH-ND
C7	.01 μF DISC CERAMIC	
C12	6.8 μF/35V TANT.	
C13	.01/100V STACK METAL FILM	
CR1 - CR6	1N4002	
CR7	1N4938	
CR8,CR9	1N4148	
J1	10 PIN MOLEX HEADER	
J2	8 PIN MOLEX HEADER	
K1 - K5	AROMAT RELAY, LATCHING	
L1	5.8MM FERRITE BEAD	21-129B
Q1 - Q5	2N4124	
R1,R7,R13,R19,R25,R31	47K, 1/4W	
R2,R8,R14,R20,R26	100K, 1/4W	
R3,R5,R9,R11,R15,R17, R21,R23,R27,R29	470 OHMS, 1/4W	
R4,R10,R16,R22,R28	20K VARIABLE, MULTI-TURN	
R6,R12,R18,R24,R30	10K, 1/4W	
R32	220K, 1/4W	
U1,U2	339 OP AMP	
XU1,XU2	14-PIN IC SOCKET	


PULSAR OVERLOAD 4X RECYCLER
PC-517 SCHEMATIC DIAGRAM
AM-2701S
Energy-Onix
PULSAR
PC-517
REVISION DESCRIPTION:
VALUES CHANGED ON C7,C11,R20, ADDED CR4, 07/13/99
I.D. J1 TERMINALS, 07/20/99
ADDED REV. C, 8/12/99
J1-6, GND
J1-12, +15V
J1-4, RESET TO PC-508
J1-5, NC
J1-7, NC
J1-3, NC
J1-1, NC
J1-2
J1-9
J1-8
J1-10
J1-11
4X TRIP (OM+)
1 TRIP INPUTS
TO OVERLOAD BOARD, PC-508
*NOTE: R29,R30,R31,R32, NOT USED
PUSH BUTTON RESET 14 CKT FRONT PANEL AND REMOTE



C11,CR7,CR8,R35 ON BACK OF BOARD

Energy-Onix
BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

REVISION DESCRIPTION:	REVISION:

PULSAR

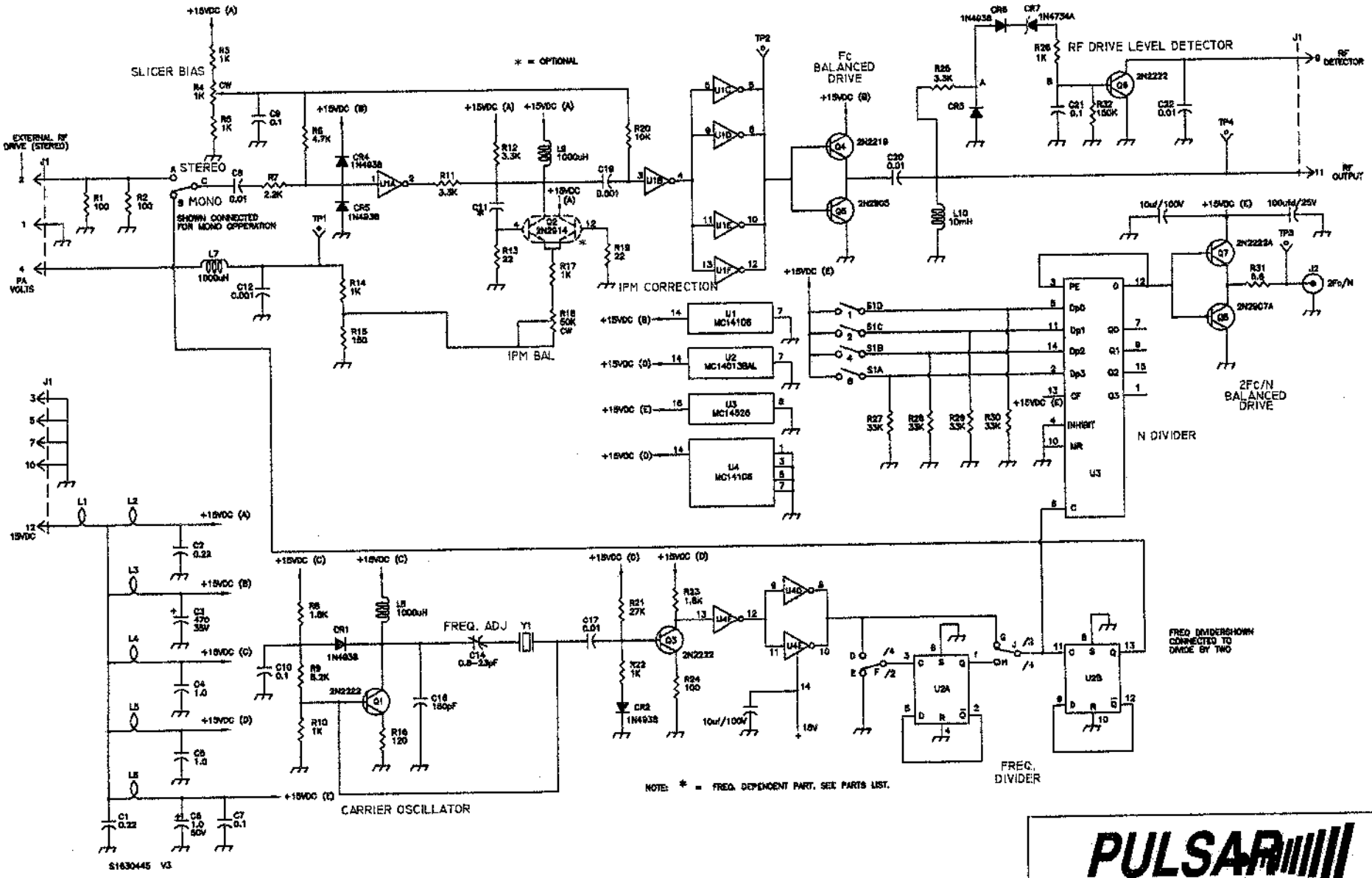
TITLE: PULSAR AM 4X RECYCL BD.
PC-517 COMPONENT LAYOUT

DESIGNED BY: NDT	DATE: 06/08/99	DWG. BY:	DWG. No.
CHK'ED:	CAD: AM-2701C	CRB	AM-2701C

PC-517 4 X RECYCLE BOARD

PARTS LIST

C1,C7	CAPACITOR, ELECTROLYTIC	10mFD/35V
C2,C3,C6,C9,C11	CAPACITOR, STACK METAL FILM	0.1mFD/I00V
C4,C5	CAPACITOR, ELECTROLYTIC	15mFD/35V
C8	STACK METAL FILM	.01/100V
C10	CAPACITOR, ELECTROLYTIC	100mFD/25V
CR1,CR2	DIODE,GENERAL PURPOSE	1N4002
CR3-CR8	DIODE,SILICON,FAST SWITCHING 100PRV	1N4148
K1	RELAY,AROMAT 12V, LATCHING	
J1	12 POSITION MOLEX HEADER,STRAIGHT	
L1	FERRITE BEAD, 5.8mm 21-129B	
LED1-LED4	LIGHT EMITTING DIODE, RED	
Q1,Q2,Q4,Q5,Q6	TRANSISTOR, NPN	2N4124
Q3	TRANSISTOR, NPN DARLINGTON	2N5306
R1	RESISTOR, METAL FILM	47K,1/4W
R2,R3	RESISTOR, METAL FILM	1K,1/4W
R4	RESISTOR, METAL FILM	100K,1/4W
R5	RESISTOR, METAL FILM	2.2M,1/4W
R6	RESISTOR, METAL FILM	47K,1/4W
R7	RESISTOR, METAL FILM	1K,1/4W
R8	RESISTOR, METAL FILM	750,1/4W
R9	RESISTOR, METAL FILM	1K,1/4W
R10-R18	RESISTOR, METAL FILM	47K,1/4W
R19	RESISTOR, METAL FILM	10K,1/4W
R20	RESISTOR, METAL FILM	51K,1/4W
R21-R23	RESISTOR, METAL FILM	15K,1/4W
R24-26	RESISTOR, METAL FILM	750,1/4W
R27,R28	RESISTOR, METAL FILM	47K,1/4W
R29,R30,R31,R32	NOT USED	
R33,R34	RESISTOR, METAL FILM	10K,1/4W
R35	RESISTOR, METAL FILM	1M,1/4W
U1	IC,C-MOS,QUAD 2-INPUT AND GATE	CD4081BE
U2,U5	IC,C-MOS,QUAD 2-INPUT NOR GATE	CD4001BE
U3	IC,C-MOS,DUAL PRECISION RETRIGGER-ABLE RESETTABLE MONOSTABLE MULTI VIBRATOR	MC14538BE
U4	IC,C-MOS HEX 'D' FLIP FLOP	CD40174BCN
X1,X2,X5	SOCKET, IC 14 PIN	
X3,X4	SOCKET, 16 PIN	



PULSAR

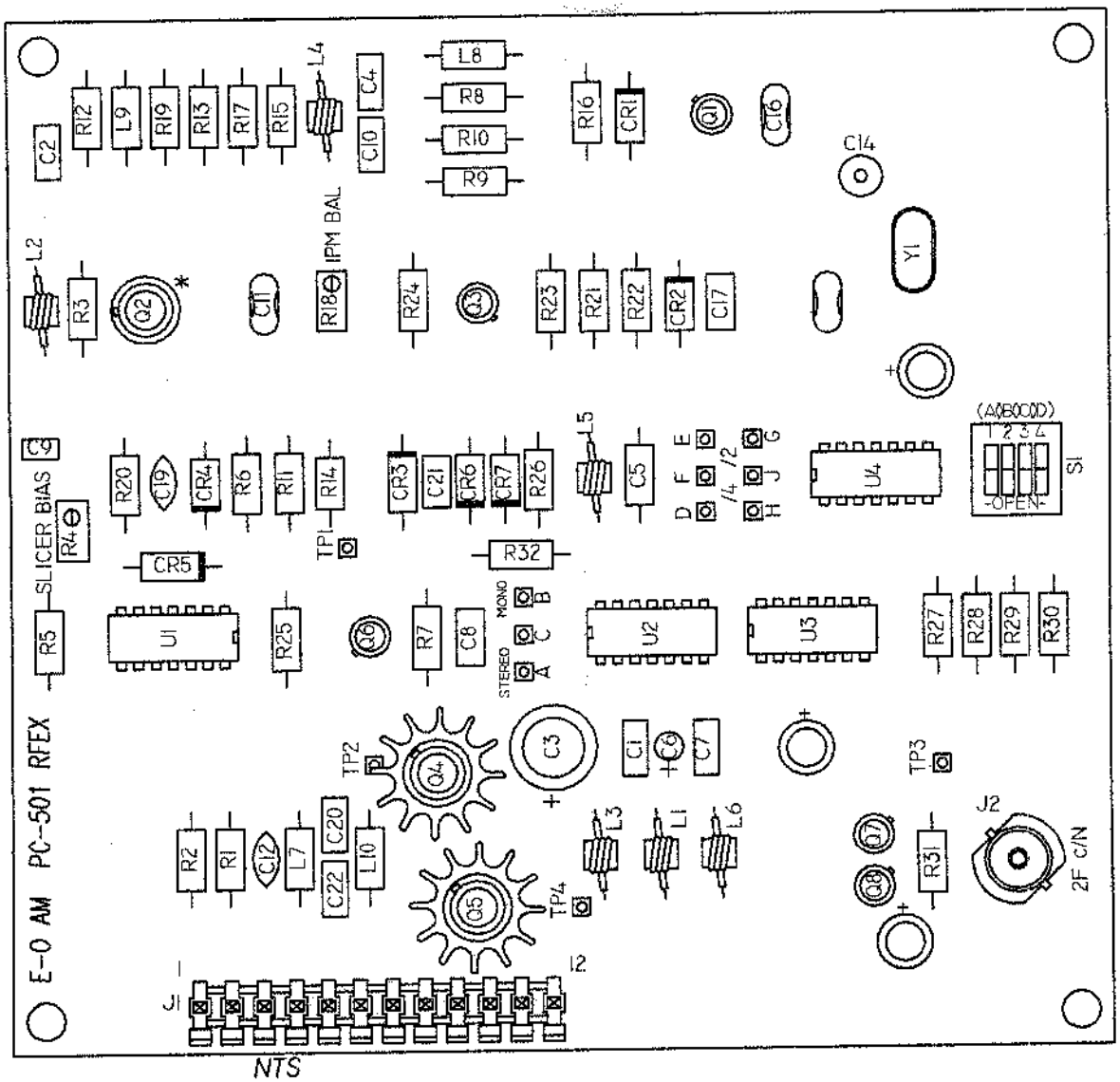
Energy–Onix
BROADCAST EQUIPMENT CO., INC.
1308 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

REVISION DESCRIPTION:
ADDED R32, 07/12/99
U1,U4 PT# CHG, U40,U2A,U2B CONNECTIONS CHG, 8/16/99

REVISIONS: B
CAD: AM-0101S

TITLE: RF EXCITER
RF DRIVE SCHEMATIC (PC-501)

DESIGNED BY:	DATE:	DWG. BY:	DWG. No.
N.D.T.	10/29/98 MODIFIED: 3/1/07 by John McCool	GRB	AM-0101S



* = OPTIONAL

PULSAR

Energy–Onix
BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

REVISION DESCRIPTION:	REVISION:
COMPONENT ADDITIONS, REMOVAL, 5/12/99 COMPONENT ADDITIONS, REMOVAL, ID, 8/13/99 ADD Y1, 8/20/99	C

TITLE: RF EXCITER PCB COMPONENT LAYOUT (PC–501)

DESIGNED BY: NDT	DATE: 10/30/98	DWG. BY:	DWG. No.
MODIFIED: 3/1/07 by John McCool	CAD: AM–0101C	CRB	AM–0101C

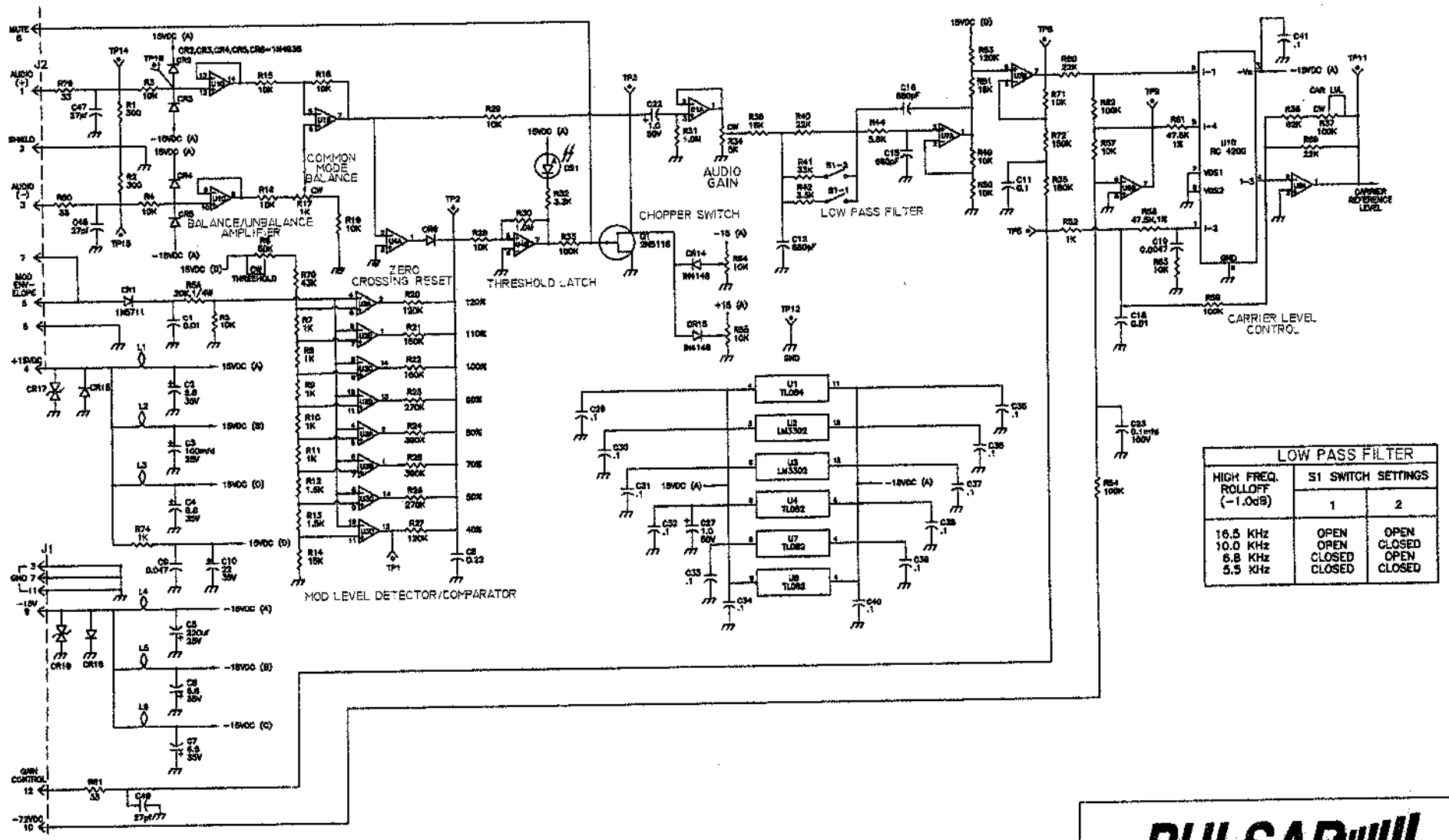
PC - 501 RF EXCITER

PARTS LIST

C1,C2	.22 μF/50V MONO.CERAMIC	P4958
C3	470 μF/35V ELECTROLYTIC	140-XRL35V470
C4,C5	1.0 μF/50V MONO CERAMIC	P4962
C6	1.0 μF/50V TANT.	P2073
C7,C9,C10, C20, C21	.1 μF/100V MONO. CERAMIC	P4910
C8,C17, C22	.01 μF/100V MONO. CERAMIC	P4904
C11(FREQ.DEPENDENT)	535 -589 KHZ 47 μμF DIP MICA	
	590-879 KHZ 33 μμF	
	880-1324 KHZ 22 μμF	
	1325-1710 KHZ 15 μμF	
C12,C19	1000 μμF/1KV DISC CERAMIC	
C13	6800 μμF/100V DISC CERAMIC	
C14	3-36 μμF VARIABLE	SG3005
C15	DELETED	
C16	180 μμF DIP MICA	
C18	DELETED	
CR1-CR6	1N4938	
CR7	1N4734A	
J1	12 PIN MOLEX HEADER	
J2	BNC JACK	
L1-L6	5.8 MM FERRITE BEAD	21-129B
L7-L9	1000 μH	DN41105
L10	10,000 μH	M9263
Q1,Q3,Q6,Q7	2N2222A	
Q2	2N2914	
Q4	2N2219	
Q5	2N2905	
Q8	2N2907A	
R1,R2,R24	100 OHM - 1/2W	
R3,R5,R10,R14,R17,R22, R26	1K - 1/2 W	
R4	1K VARIABLE, MULTI-TURN	
R6	4.7K - 1/2 W	
R7	2.2K - 1/2 W	
R8,R23	1.8K - 1/2 W	
R9	8.2K - 1/2 W	
R11,R12,R25	3.3K - 1/2 W	
R13,R19	22 OHM - 1/2 W	
R15	150 OHM - 1/2 W	

PARTS LIST

R16	120 OHM - 1/2 W	
R18	50K VARIABLE, MULTI-TURN	
R20	10K - 1/2 W	
R21	27K - 1/2 W	
R27-30	33K – 1/2W	
R31	5.6 OHM - 1/4 W	
R32	150K - 1/2 W	
S1	4PST DIP	571-4356402
U1,U4	HEX SCHMITT	MC14106BCP
U2	DUAL FLIP-FLOP	MC14013BCP
U3	BINARY COUNTER	MC14526BCP
UX1,UX2,UX4	14-PIN IC SOCKET	
UX3	16 PIN IC SOCKET	
Y1	CRYSTAL, FREQUENCY DEPENDENT	



LOW PASS FILTER		
HIGH FREQ. ROLLOFF (-1.0dB)	S1 SWITCH SETTINGS	
	1	2
16.5 KHz	OPEN	OPEN
10.0 KHz	OPEN	CLOSED
6.8 KHz	CLOSED	OPEN
5.5 KHz	CLOSED	CLOSED

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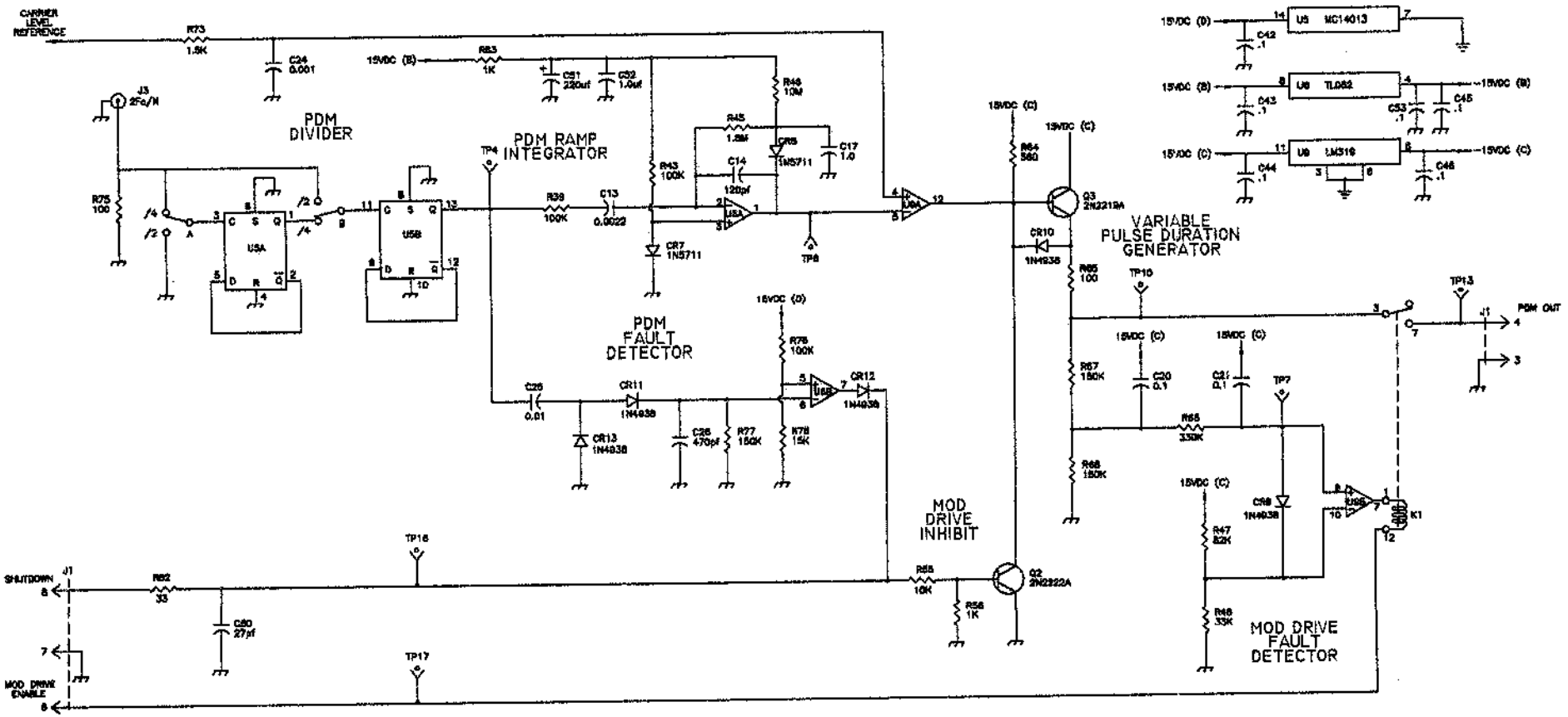
BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

REVISION DESCRIPTION:
REASSIGN NEW J#'s, ADD CAPS C29 thru C49, 07/12/99
CHAANGE VALUE OF C23, 7/20/99

REVISION: B

TITLE: AUDIO/PDM DRIVER SCHEMATIC (PC-506)

DESIGNED BY:	DATE: 11/4/98	DWG. BY:	DWG. No.	SHEET: 1/2
CAD: AM-0801S	MODIFIED: 3/2/07 by John McCool	CSB	AM-0801S	



PULSAR

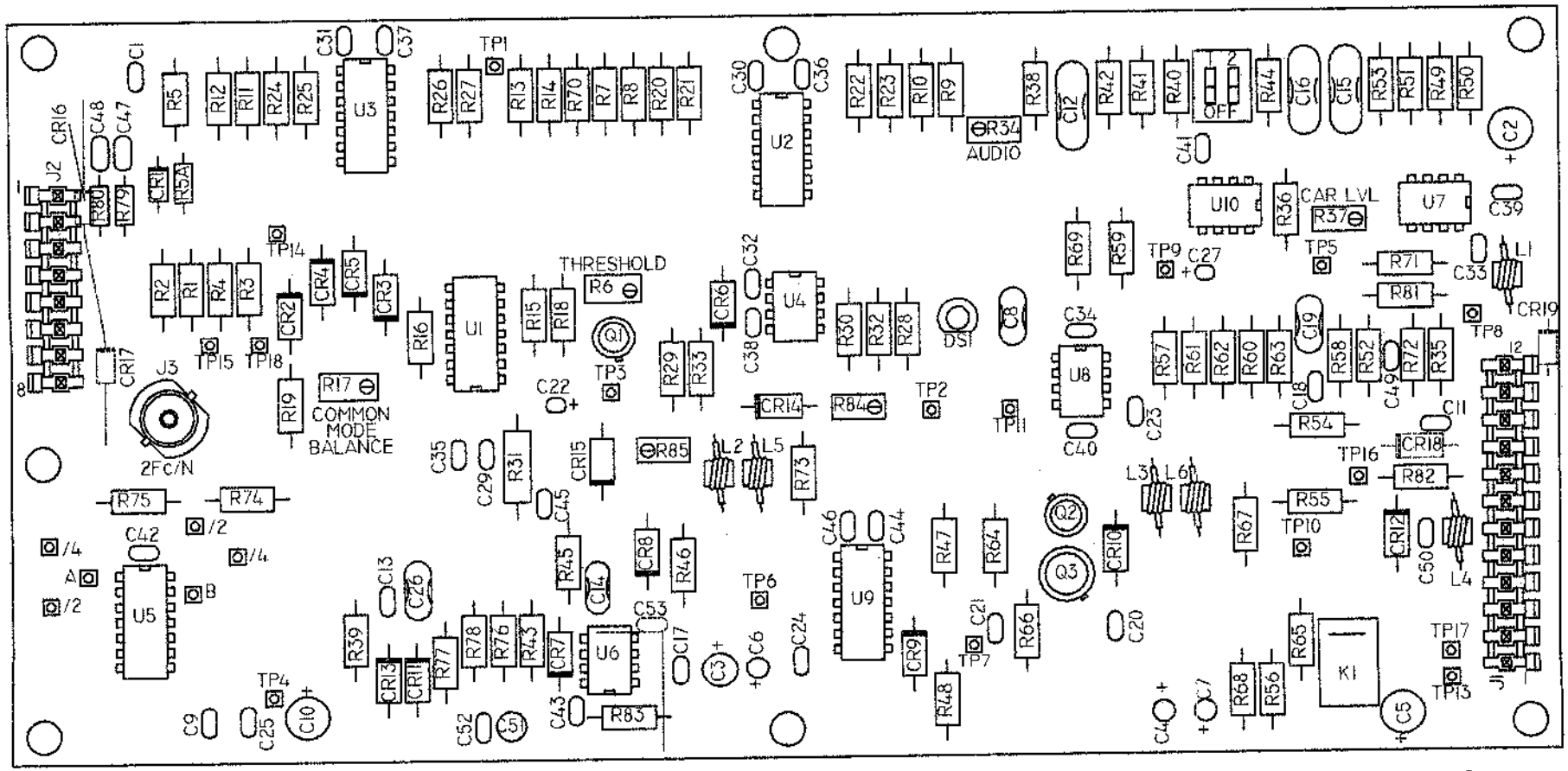
Energy–Onix
BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 501, VALATIE, NY. 12184

REVISION DESCRIPTION:
ADD C42,C43,C44,C45,C46,C50,C51,C52,C53,R82,R83, 7/12/99
CHGD VARIABLE DURATION GEN TO VARIABLE PULSE GEN, 7/20/99

REVISION: B

TITLE: AUDIO/PDM DRIVER SCHEMATIC (PC–506)

DESIGNED BY: NDT/MT	DATE: 11/4/98	DWG. BY:	DWG. No.	SHEET: 2/2
CAD: AM–0802S	MODIFIED: 3/2/07 by John McCool	E.R.B.	AM–0802S	



ENERGY ONIX
AUDIO/PDM DRIVER
PC-506

NOTE: C53, CR16 – CR19 ON BACK OF BOARD

PULSAR

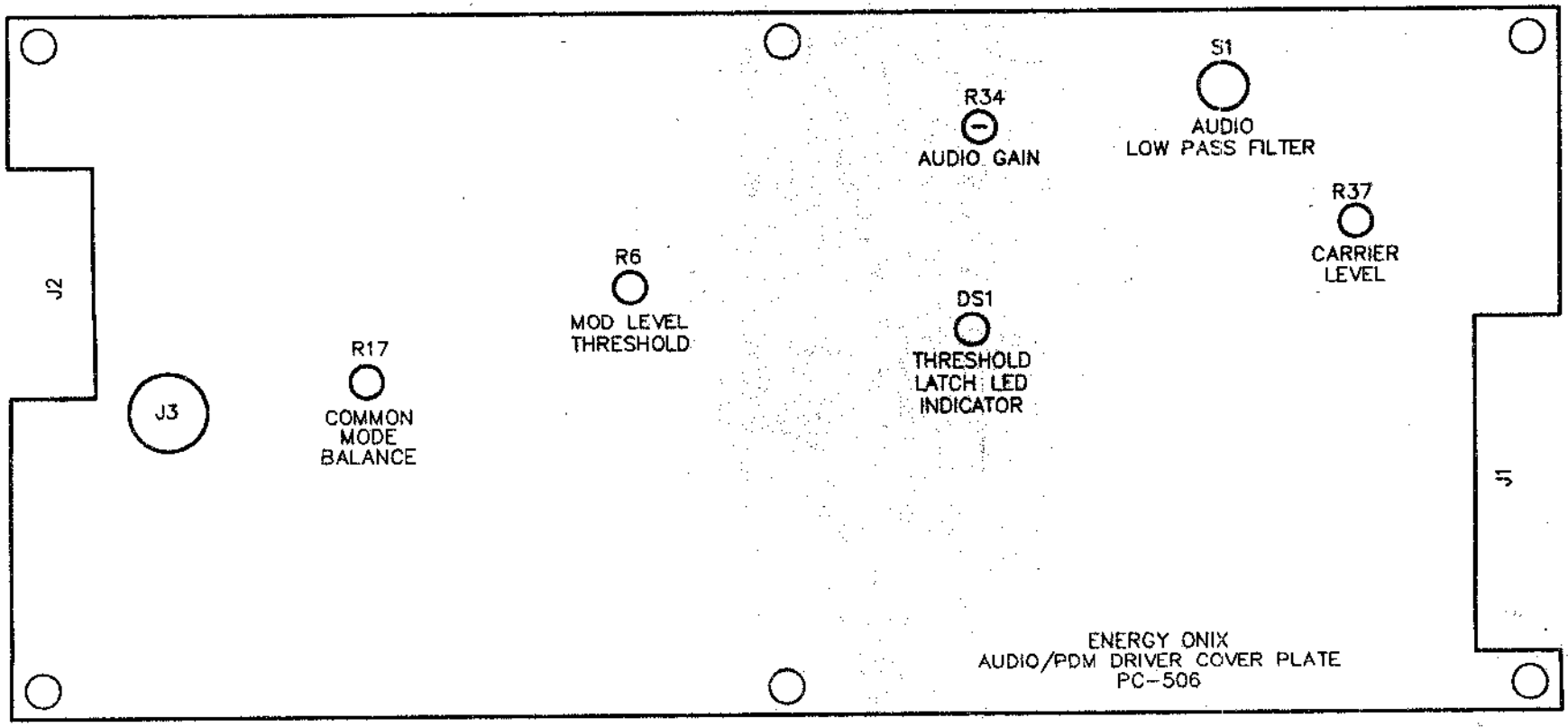
Energy–Onix
BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

REVISION DESCRIPTION:
ADDED C30,C31,C32,C33,C34,C35,C36,C37,C38,C39,C40,C41,C42,C43, C44,C45,C46,C47,C48,C49,C50,C51,C52,R79,R80,R81,R82, 07/14/99
ADD C41, REMOVE C34, 07/21/99
DRAWING # CHANGE, AM–1201C TO AM–0801C, 9/6/99

REVISION: C

TITLE: AUDIO/PDM DRIVER PCB COMPONENT LAYOUT (PC–506)

DESIGNED BY: NDT	DATE: 11/4/98	DWG. BY:	DWG. No.
MODIFIED: 3/2/07 by John McCool	CAD: AM–0801C	CRB	AM–0801C



PULSAR

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BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

REVISION DESCRIPTION:	REVISION:

TITLE: AUDIO/PDM DRIVER COVER PLATE LAYOUT (PC-524)

DESIGNED BY: PI	DATE: 11/12/99	DWG. BY:	DWG. No.
CHK'ED:	CAD: AM-0802C	ERB	AM-0802C

PC - 506 AUDIO/PDM DRIVER

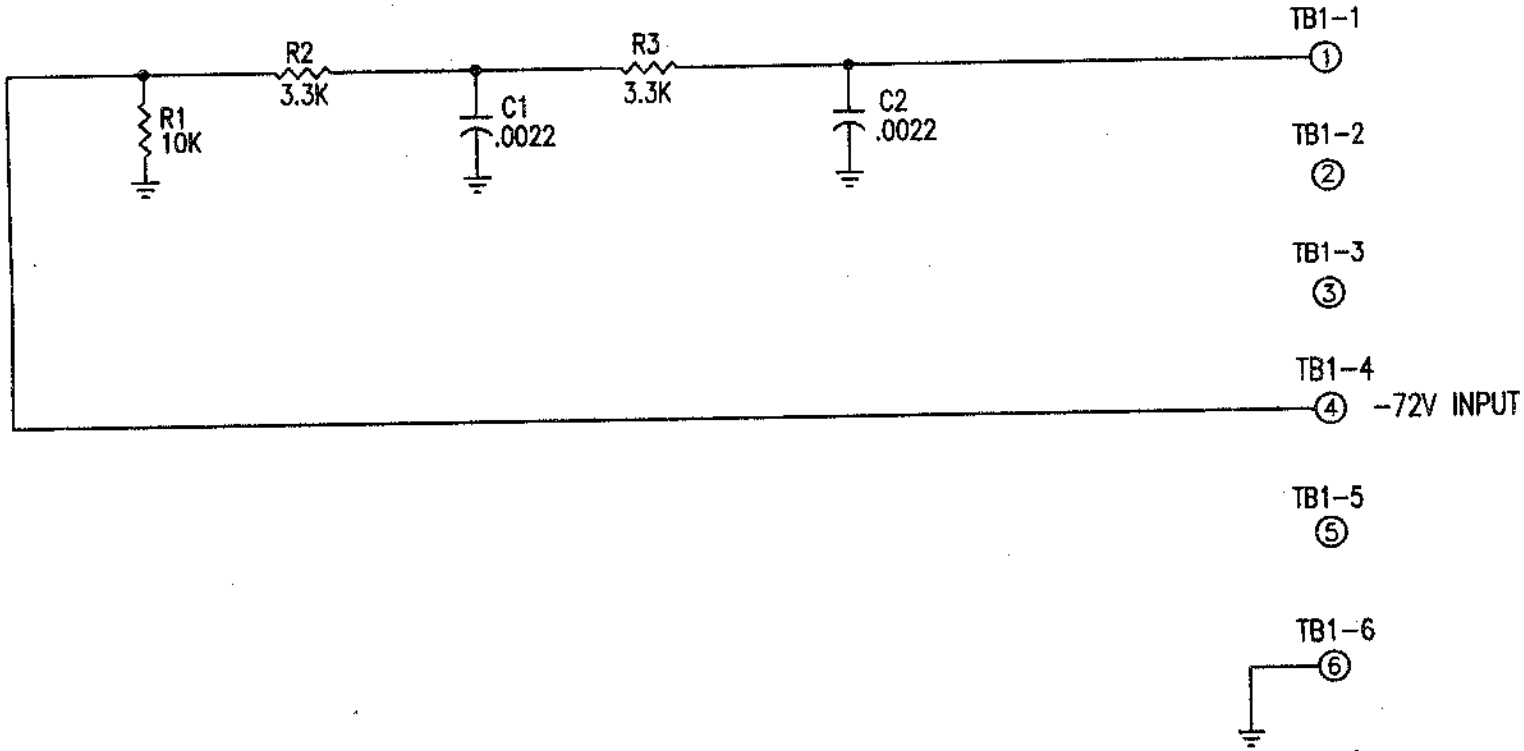
PARTS LIST

C1,C18,C25	.01mF/100V MONO.CERAMIC	P4904
C2,C4,C6,C7	6.8mF/35V TANTALUM	P2064
C3	100mF/25V ELECTROLYTIC	
C5,C51	220mF/25V ELECTROLYTIC	
C8	.22mF/50V MONO.CERAMIC	P4958
C9	.047mF/100V MONO.CERAMIC	P4908
C10	22mF/35V TANTALUM	P2101
C11,C20,C21,C23,C29-C46,C53	0.1mF/100V MONO.CERAMIC	P4910
C12,C15,C16	680pF/300V DIPPED MICA	5982-15300V680
C13	.0022mF/100V DISC CERAMIC	1387PH
C14	120pF/500V DIPPED MICA	5982-15 500V-120
C17,C52	1.0mF/50V MONO CERAMIC	P4968
C19	.0047mF/100V DISC CERAMIC	1391PH
C22,C27	1.0mF/50V TANT.	P2073
C24	.001mF/1KV DISC CERAMIC	1383PH
C26	470pF/500V DIPPED MICA	5982-15-500V 470
C47-C50	27pF DISC CERAMIC	1331PH
C28	NOT USED	
CR1,CR7,CR8	1N5711	
CR2–CR6, CR9–CR15	1N4938	
DS1	LED, AMBER	
J1	12 PIN MOLEX HEADER	
J2	8 PIN MOLEX HEADER	
J3	BNC FEMALE	
K1	AROMAT RELAY, NON-LATCHING	
L1-L6	5.8mm FERRITE BEAD	21-129B
Q1	P CHAN. FET.2N5116	
Q2	NPN TRANSISTOR 2N2222A	
Q3	NPN TRANSISTOR 2N2219A	
R1,R2	300 OHM, 1/2W	
R3,R4,R15,R16,R18,R19, R28,R29,R49,R50,R55, R57,R63,R71	10K, 1/2W	
R5,R7,R8,R9,R10,R11, R52,R56,R74	1K. 1/2W	
R5A	20K, 1/4W	
R6	50K, VARIABLE, MULTI-TURN	
R12,R13,R73	1.5K, 1/2W	
R14,R78	15K,1/2W	
R17	1K,VARIABLE,MULTI-TURN	

PC 506 AUDIO/PDM DRIVER

PARTS LIST

R20,R27,R53	120K, 1/2W	
R21,R67,R68,R72,R77	150K, 1/2W	
R22,R35	180K, 1/2W	
R23,R26	270K, 1/2W	
R24,R25	390K, 1/2W	
R30,R31	1M,1/2W	
R32,R42	3.3K, 1/2W	
R33,R39,R43,R54,R59, R62,R76	100K, 1/2W	
R34	5K, VARIABLE, MULTI-TURN	
R36,R47	82K, 1/2W	
R37	100K, VARIABLE, MULTI-TURN	
R38,R51	18K, 1/2W	
R41,R48	33K, 1/2W	
R44	5.6K, 1/2W	
R45	1.8M, 1/2W	
R46	10M, 1/2W	
R58,R61	47.5K, 1%, 1/2W	
R60,R69	22K, 1/2W	
R64	560 OHMS, 1/2W	
R65	10 OHMS, 1/2W	
R66	330K, 1/2W	
R70	43K, 1/2W	
R75	100 OHMS, 1/2W	
R79-R82	33 OHMS 1/4W	
R83	1K, 1/4W	
R84,R85	1K, 1/4W	
R86,R87	6.8K, 1/4W	
S1	DIP SWITCH, DPST	571-24356409
U1	QUAD OP AMD TL084IN	
U2,U3	QUAD COMPARATOR LM3302N	
U4,U6,U7,U8	DUAL OP AMP TL082MJG	
U5	DUAL CMOS TYPE D FLIP-FLOP	MC14013BCP
U9	DUAL HIGH SPEED COMPARATOR	LM319N
U10	ANALOG MULTIPLIER	RC4200AN
XU1,XU2,XU3,XU5,XU9	14 PIN IC SOCKET	
XU4,XU6,XU7,XU8,XU10	8 PIN IC SOCKET	



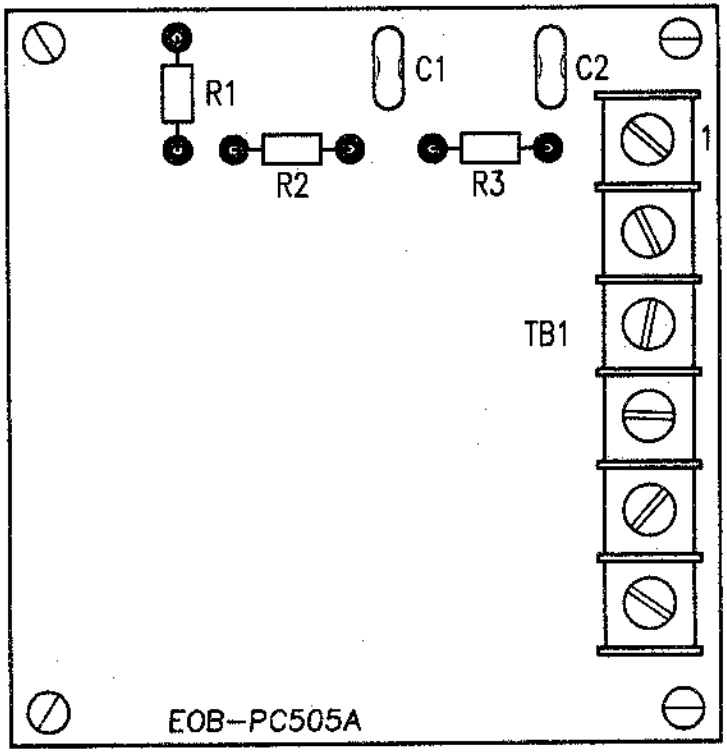
PULSAR

Energy-Onix
BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

REVISION DESCRIPTION:	REVISION:
-	

TITLE: -72V SAMPLE BD SCHEMATIC DIAGRAM (PC-505A)

DESIGNED BY:	DATE: 11/17/99	DWG. BY:	DWG. No.
CHK'ED:	CAD No. AM-0702S	CRB	AM-0702S



NTS

PULSAR

Energy–Onix
BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

REVISION DESCRIPTION:	REVISION:
-	

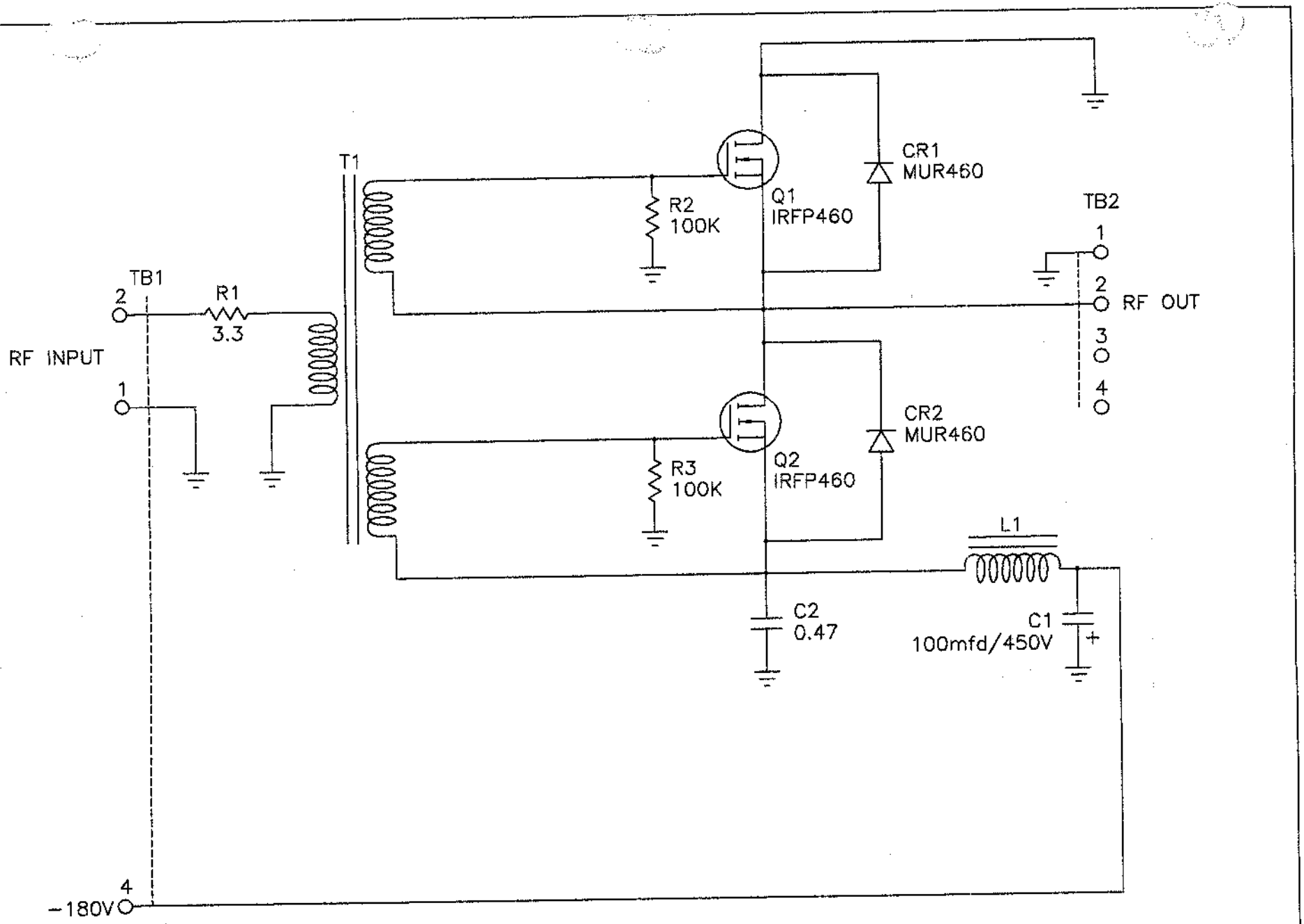
TITLE: –72V SAMPLE BD COMPONENT LAYOUT (PC–505A)

DESIGNED BY: NDT	DATE: 11/17/99	DWG. BY:	DWG. No.
CHK'ED:	CAD: AM–0702C	CRB	AM–0702C

PC- 505A -72V SAMPLE BOARD

PARTS LIST

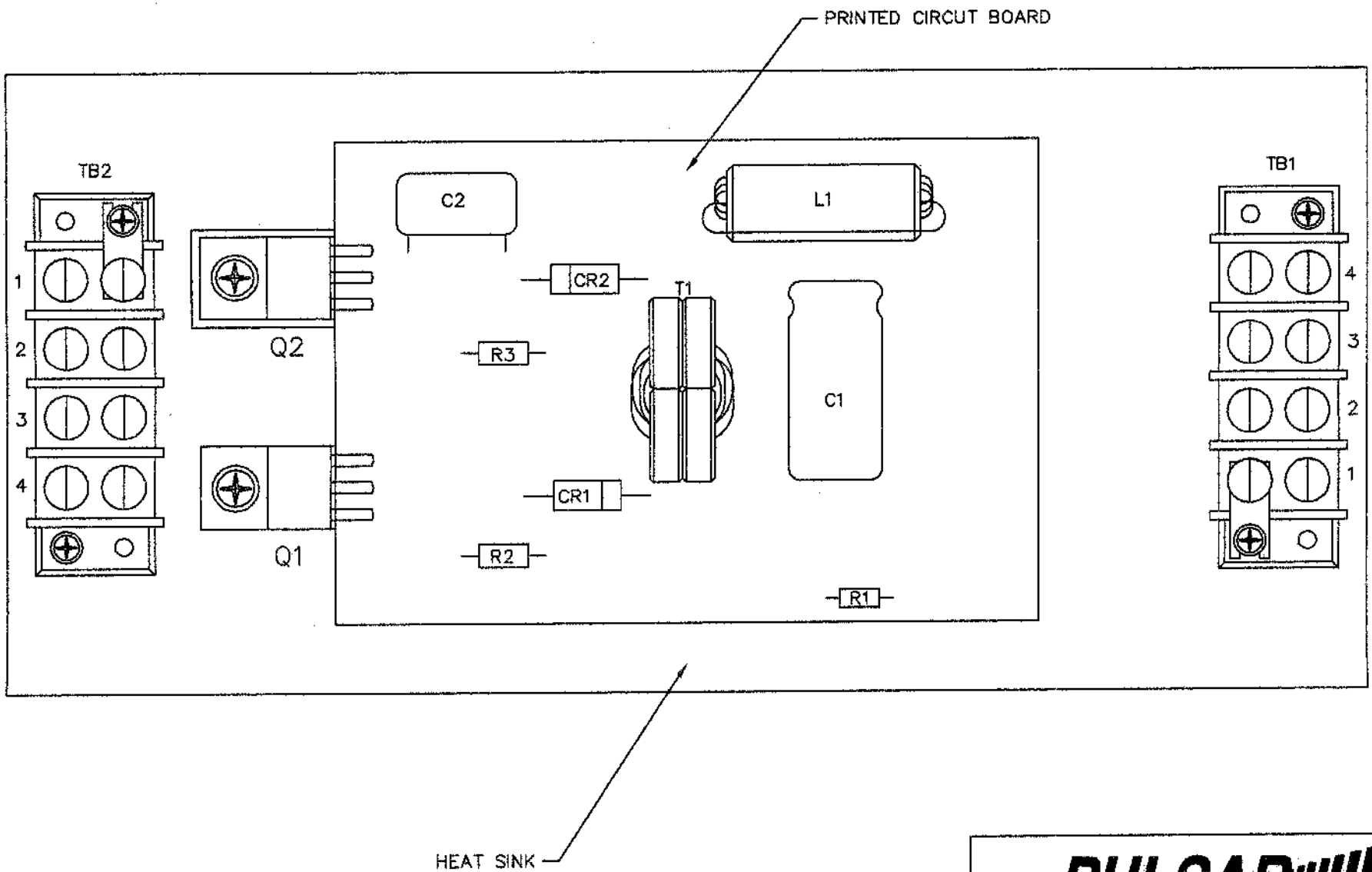
C1, C2	.0022uf, 100V DISC CERAMIC	1387PH
R1	10K, 1/2W	
R2, R3	3.3K, 1/2W	



Energy-Onix
BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

PULSAR

TITLE: INTERMEDIATE POWER AMP. SCHEMATIC DIAGRAM (PC-502)				
DESIGNED BY: N.D.T.	DATE: 5/23/97	DWG. BY:	DWG. No.	
MODIFIED: 3/14/07 by John McCool	CAD No. AM-0301S	ESB	AM-0301S	



NOTE: Q2 MOUNTED W/ MICA INSULATOR, Q2 DIRECT MOUNT TO HEATSINK

PULSAR

Energy–Onix
BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

REVISION DESCRIPTION:	REVISION:
COMPLETE BOARD REDESIGN, 5/12/99	A

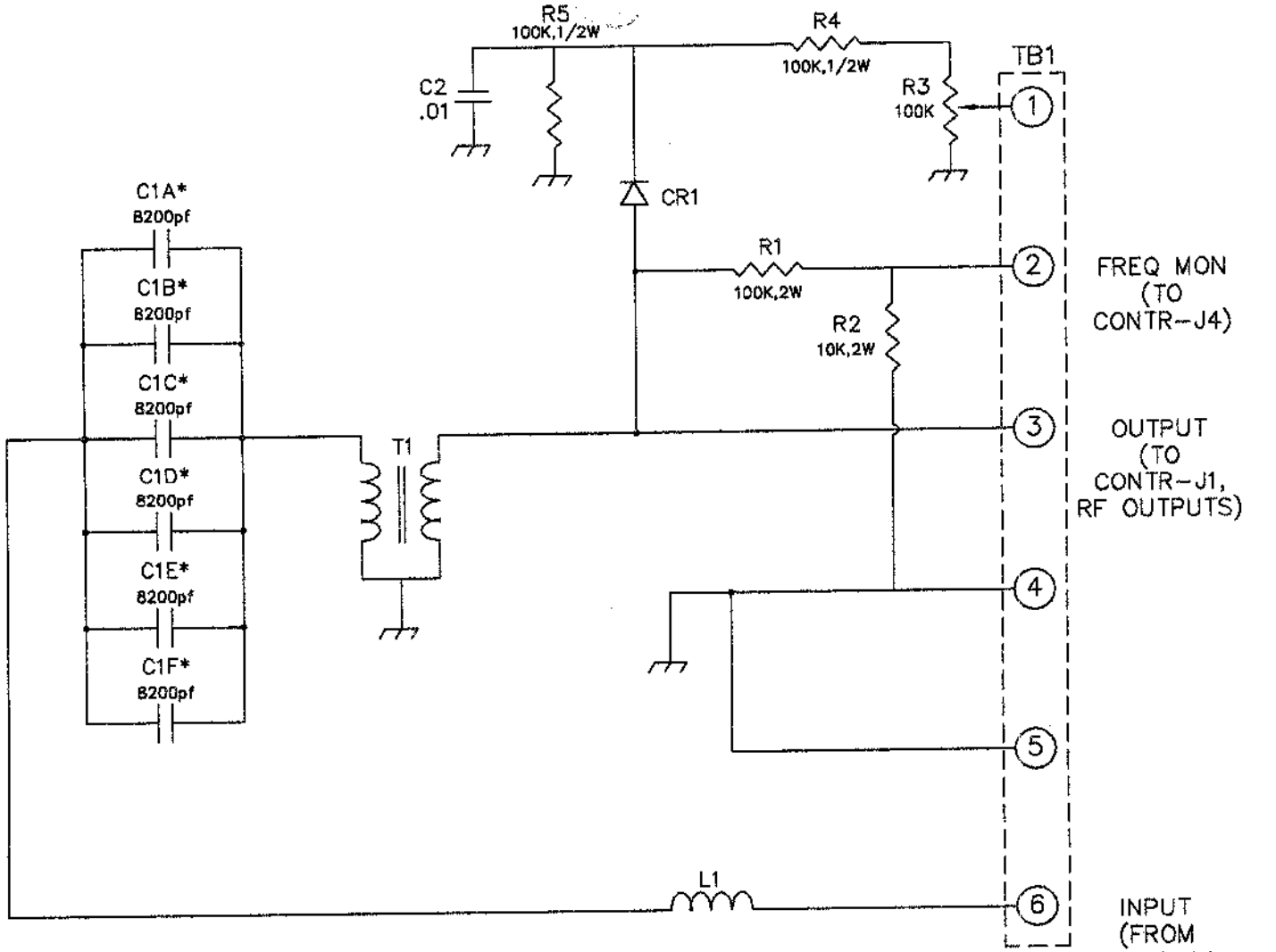
TITLE: INTERMEDIATE POWER AMP. COMPONENT LAYOUT (PC–502)

DESIGNED BY: PI	DATE: 9/3/99	DWG. BY:	DWG. No.
MODIFIED: 3/14/07 by John McCool	CAD No. AM–0301C	CKB	AM–0301C

PC- 502 INTERMEDIATE POWER AMPLIFIER

PARTS LIST

C1-C5	.01μF/100V MONO. CERAMIC	P4904-ND
C6,C7	.47μF/250V POLYPROP.	EF2474-ND
CR1,CR2	BYW 98 - 200	
CR3,CR4	1N5711	
L1	FERRITE TORROID	2643540002
Q1-Q3	IRF 540	
Q4	2N6433	
R1	3.3OHMS, 1/2W	
R2,R10	10K, 1/2W	
R3,R6	6.8K, 1/2W	
R4	330K, 1/2W	
R5	56K, 1/2W	
R7	3.3K, 1/2W	
R8,R9	100K, 1/2W	
R11	33K, 1/2W	
T1	IPA INPUT TRANSFORMER ASSEMBLY	11-250B
TB1,TB2	4-POSITION BARRIER STRIP,15A	CINCH 4-141



* NUMBER OF CAPACITORS USED
IS FREQUENCY DEPENDENT

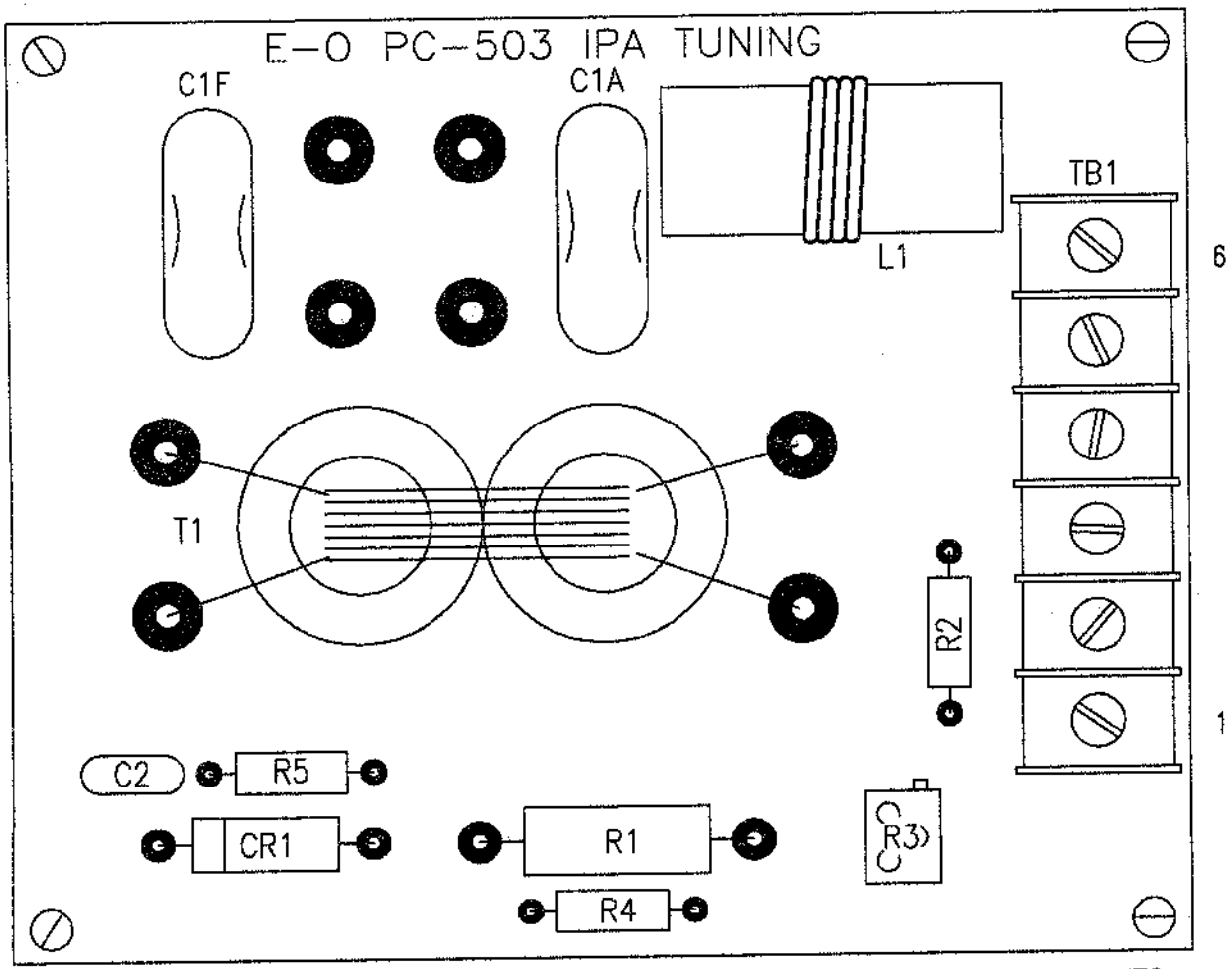
PULSAR

Energy-Onix
BROADCAST EQUIPMENT CO., INC.
1305 RIVER ST., P.O. BOX 601, VALATIE, NY. 12184

REVISION DESCRIPTION

TITLE: IPA TUNING BOARD
SCHEMATIC DIA. (PC-503)

DESIGNED BY: PI	DATE: 10/26/99	DWG. BY: CKB	DWG. No. AM-0501S
MODIFIED: 3/2/07 by John McCool	CAD No. AM-0501S		



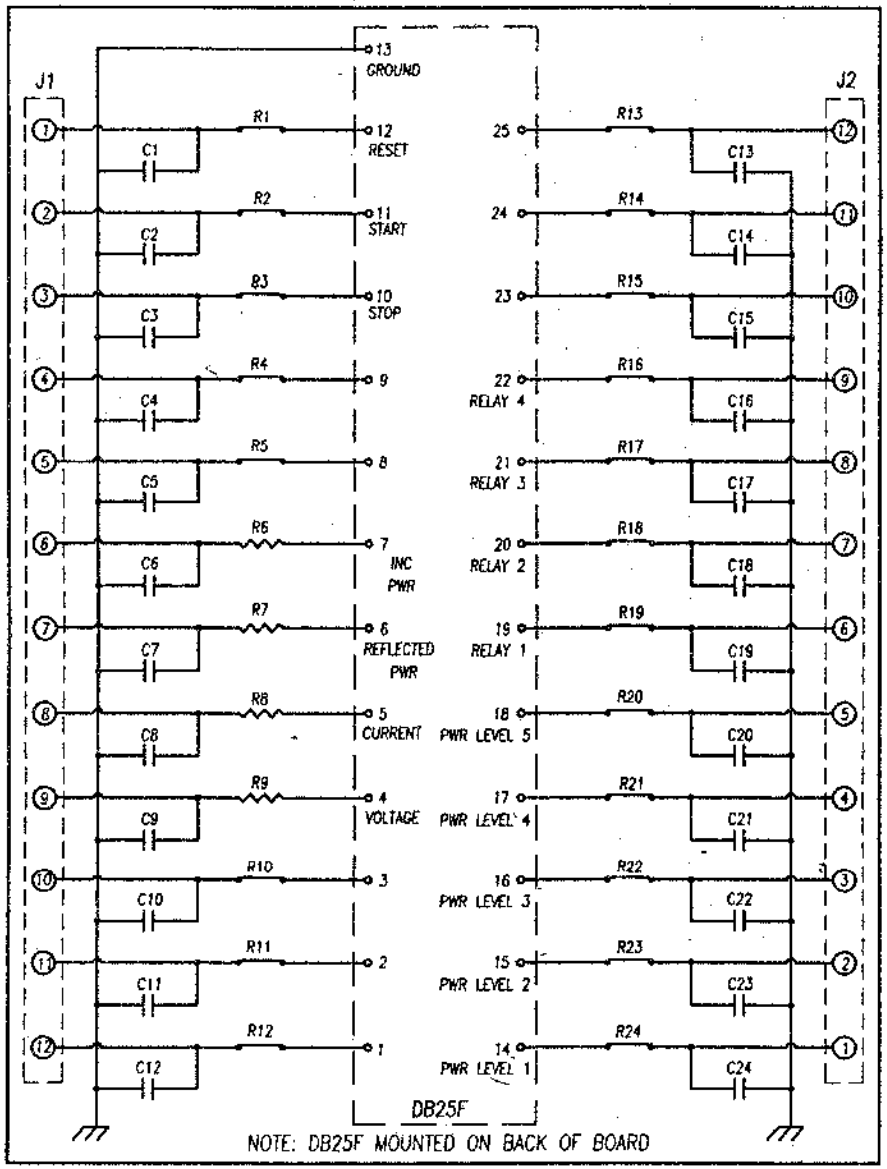
NTS

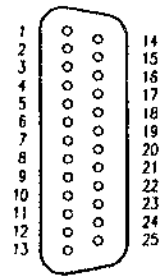
Energy-Onix BROADCAST EQUIPMENT CO., INC. 1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184	REVISION DESCRIPTION: ADDED C2,CR1,R2,R3,R4,R5, 10/13/00	REVISION: A	PULSAR TITLE: INTERMEDIATE POWER AMPLIFIER TUNING PCB COMPONENT LAYOUT (PC-503) DESIGNED BY: NDT · DATE: 11/04/98 · DWG. BY: CSB · DWG. No. AM-0501C MODIFIED: 3/6/07 by John McCool · CAD: AM-0501C

PC- 503 IPA TUNING BOARD

PARTS LIST

C1A - C1F	8200μμF/500V DIP MICA	
R1	1.2K/2W	
T1	IPA TRANSFORMER ASSEMBLY	11-280B
TB1	6 POSITION, PC MOUNT	





DB25F (VIEWED FROM BACK OF BOARD)

PARTS LIST

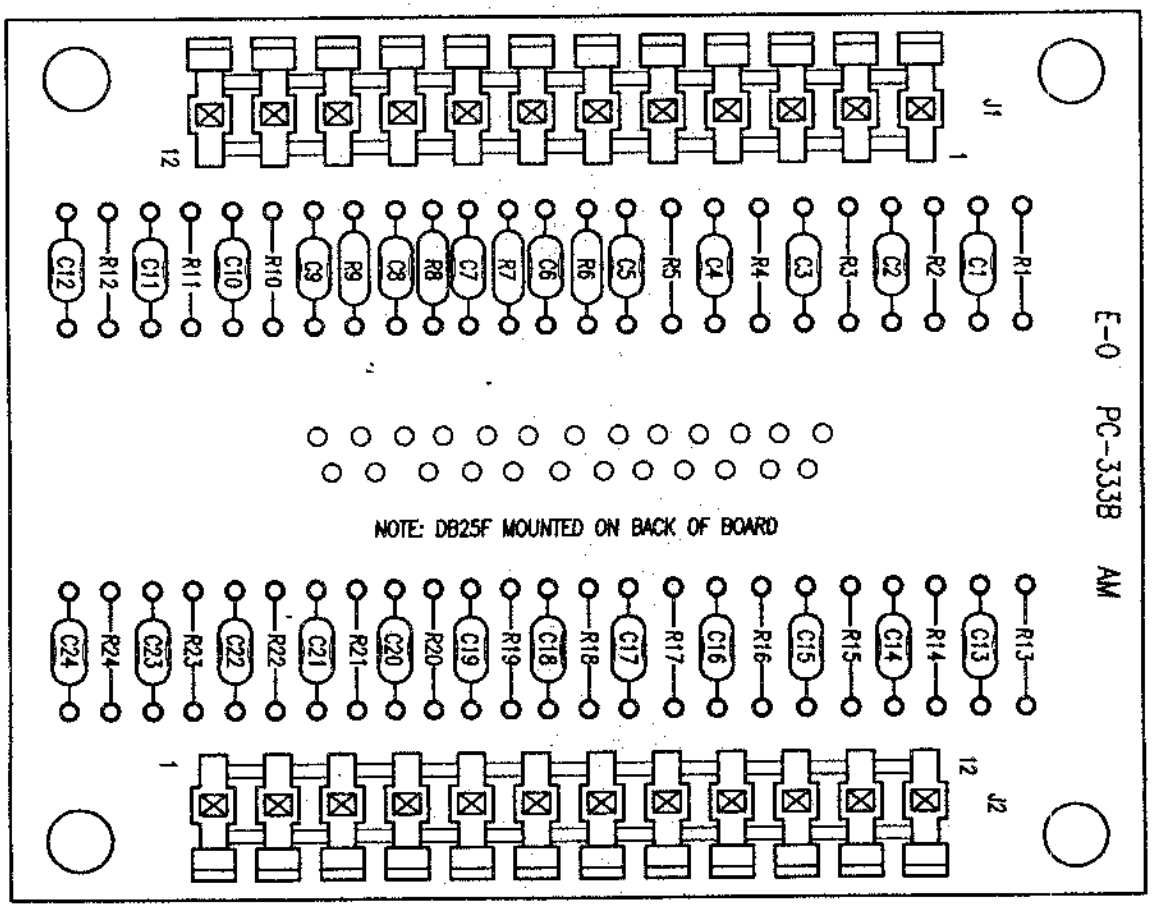
C1 – C24 = 0.01mfd/100V, STACK METAL FILM, P4713
R1 – R5 = JUMPER
R6 – R9 = 1000 ohm, 1/4W
R10 – R24 = JUMPER
J1 & J2 = 12 PIN MOLEX
DB25F = D-SUBMIN 25 PIN FEMALE

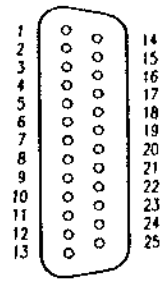
Energy–Onix
BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

REVISION DESCRIPTION:	REVISION:
	▭

TITLE: PULSAR AM REMOTE INTERFACE BD., PC–333B SCHEMATIC DIAGRAM

DESIGNED BY: NDT	DATE: 6/18/99	DWG. BY: CKB	DWG. No. AM–2501S
CHK'ED: 7-19-99	CAD No. AM-2501S		





DB25F
(VIEWED FROM BACK OF BOARD)

Energy–Onix
BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

REVISION DESCRIPTION:	REVISION:
	D

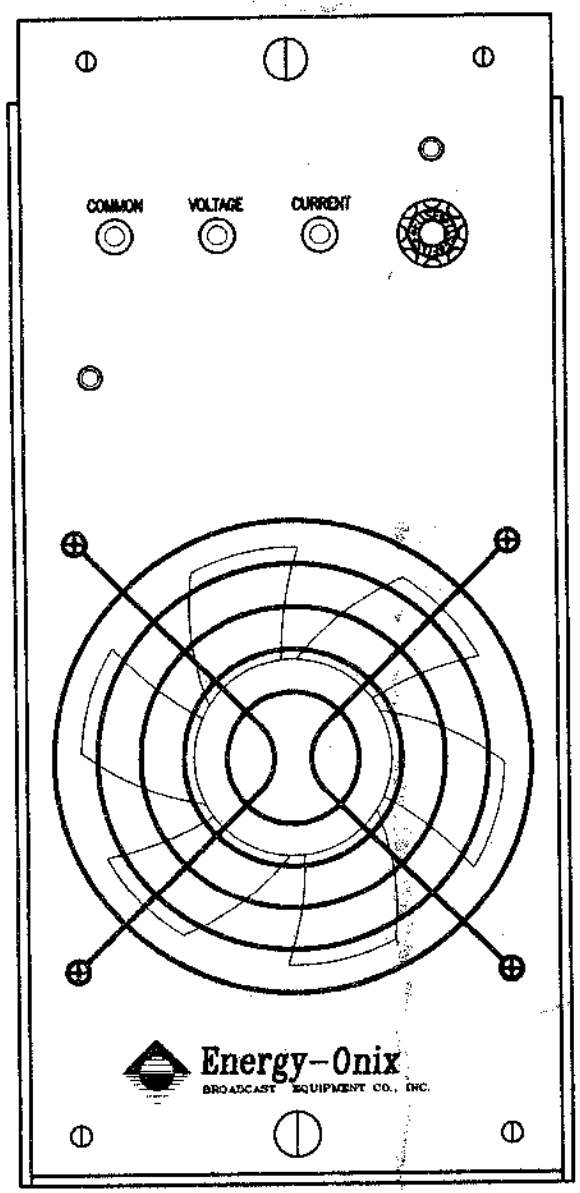
TITLE: PULSAR REMOTE INTERFACE BD., PC-333B COMPONENT LAYOUT

DESIGNED BY: NDT	DATE: 5/18/99	DWG. BY: CKB	DWG. No. AM-2501C
CHK'ED: 7-19-99 TT	CAD No. AM-2501C		

PC- 333B REMOTE INTERFACE BOARD

PARTS LIST

C1-C24	.01 μF/100V STACK METAL FILM	P4713
R1-R5	JUMPER	
R6-R9	1K, 1/4W	
R10-R24	JUMPER	
J1, J2	12 – PIN MOLEX HEADER	
DB25F	D-SUBMIN, 25 PIN FEMALE	



N.T.S.

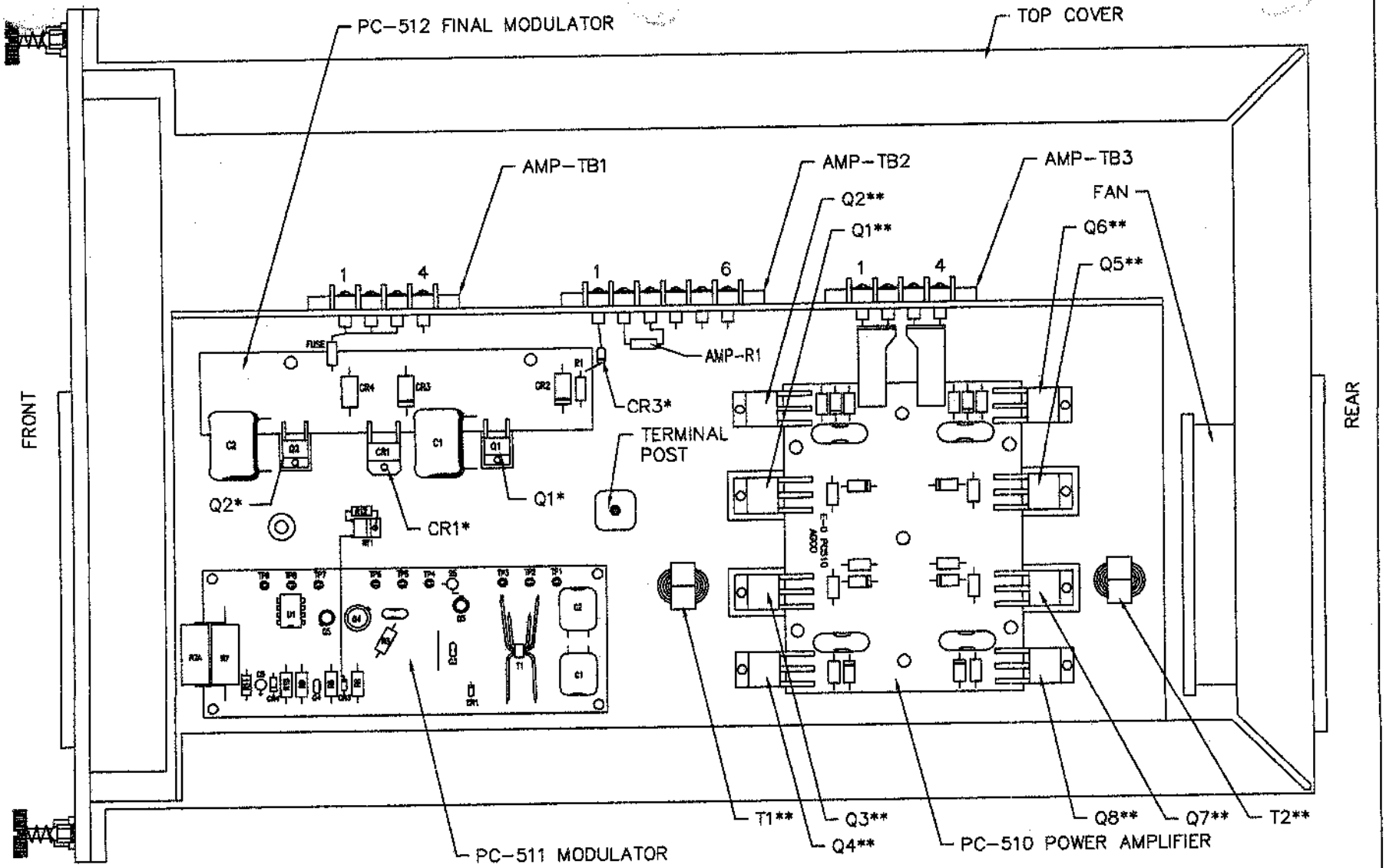
PULSAR

Energy–Onix
BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

REVISION DESCRIPTION:	REVISION:
ADDED (3) TEST POINTS, FUSE & INDICATOR LIGHT, 07/20/00	A

TITLE: PULSAR AMP MODULE FRONT PANEL (EXTERNAL VIEW)

DESIGNED BY: PI	DATE: 11/29/99	DWG. BY:	DWG No.
CHK'ED:	CAD: AM–1107C	CRB	AM–1107C



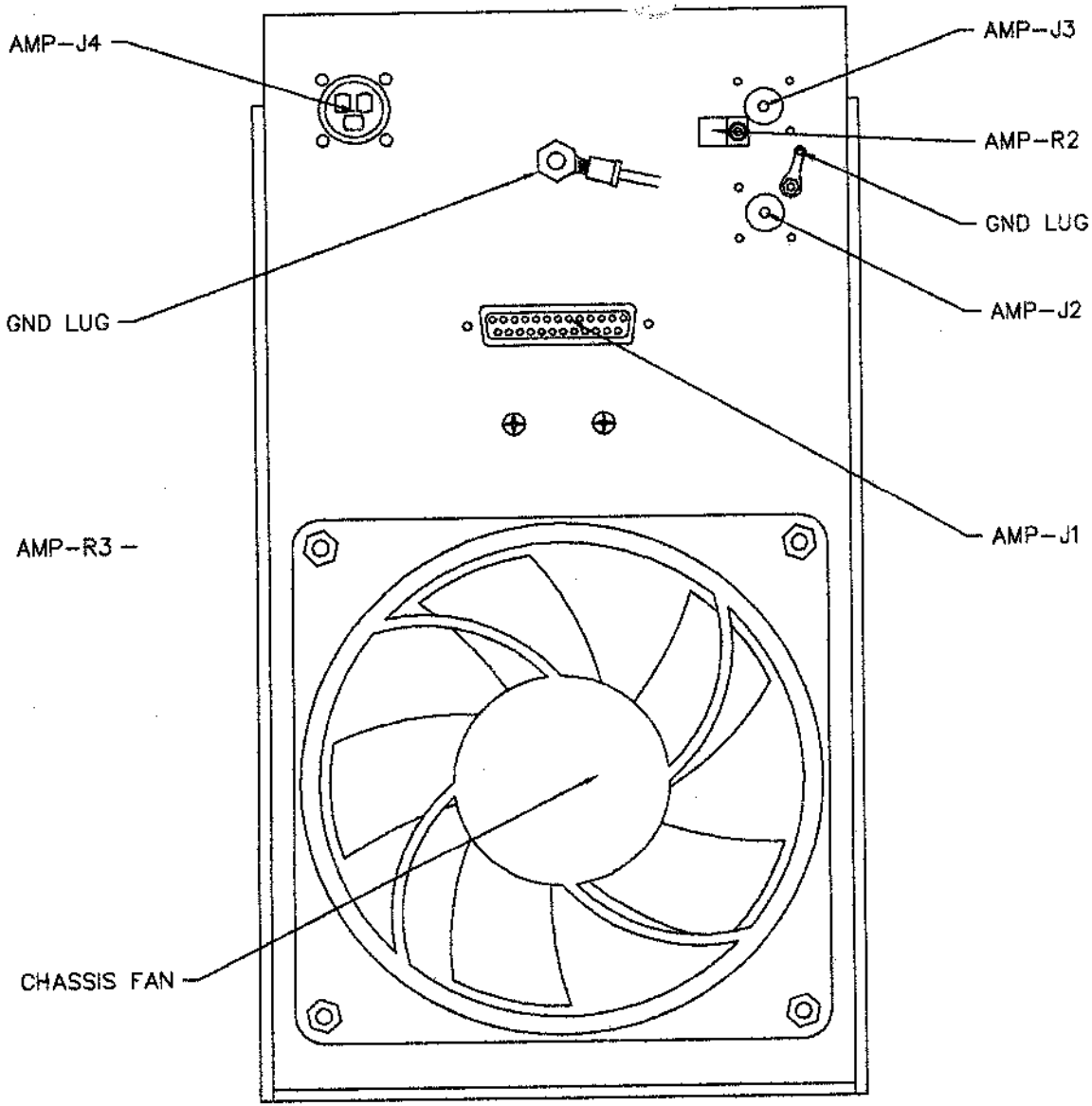
NOTE:
* = A PART OF PC-512 & ASSOCIATED SCHEMATIC
** = A PART OF PC-510 & ASSOCIATED SCHEMATIC

N.T.S.

Energy-Onix
BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

PULSAR

REVISION:	TITLE: PULSAR AMP MODULE COMP LAYOUT, HEATSINK VIEW			
-	DESIGNED BY: PI	DATE: 10/20/99	DWG. BY: CRB	DWG. No. AM-1102C
	MODIFIED: 3/8/07 by John McCool	CAD: AM-1102C		

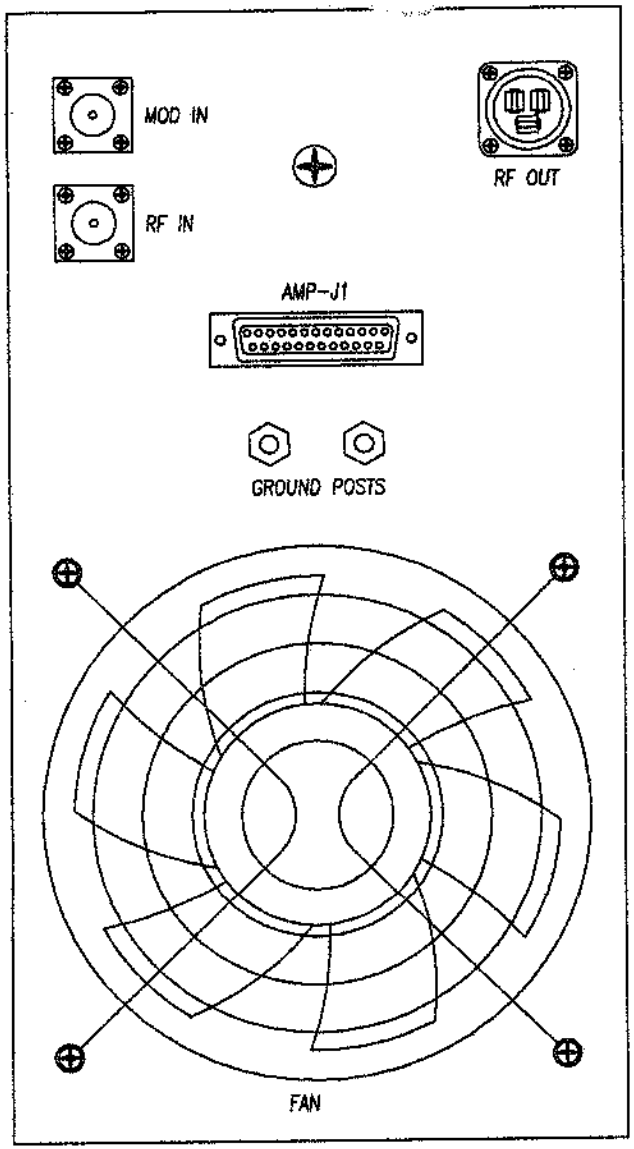


N.T.S.

Energy–Onix
BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

PULSAR

REVISION:	TITLE: PULSAR AMPLIFIER MODULE REAR PANEL (VIEWED FROM INSIDE)			
	DESIGNED BY: PI	DATE: 10/26/99	DWG. BY: CRB	DWG. No. AM–1106C
	MODIFIED: 3/8/07 by John McCool	CAD: AM–1106C		



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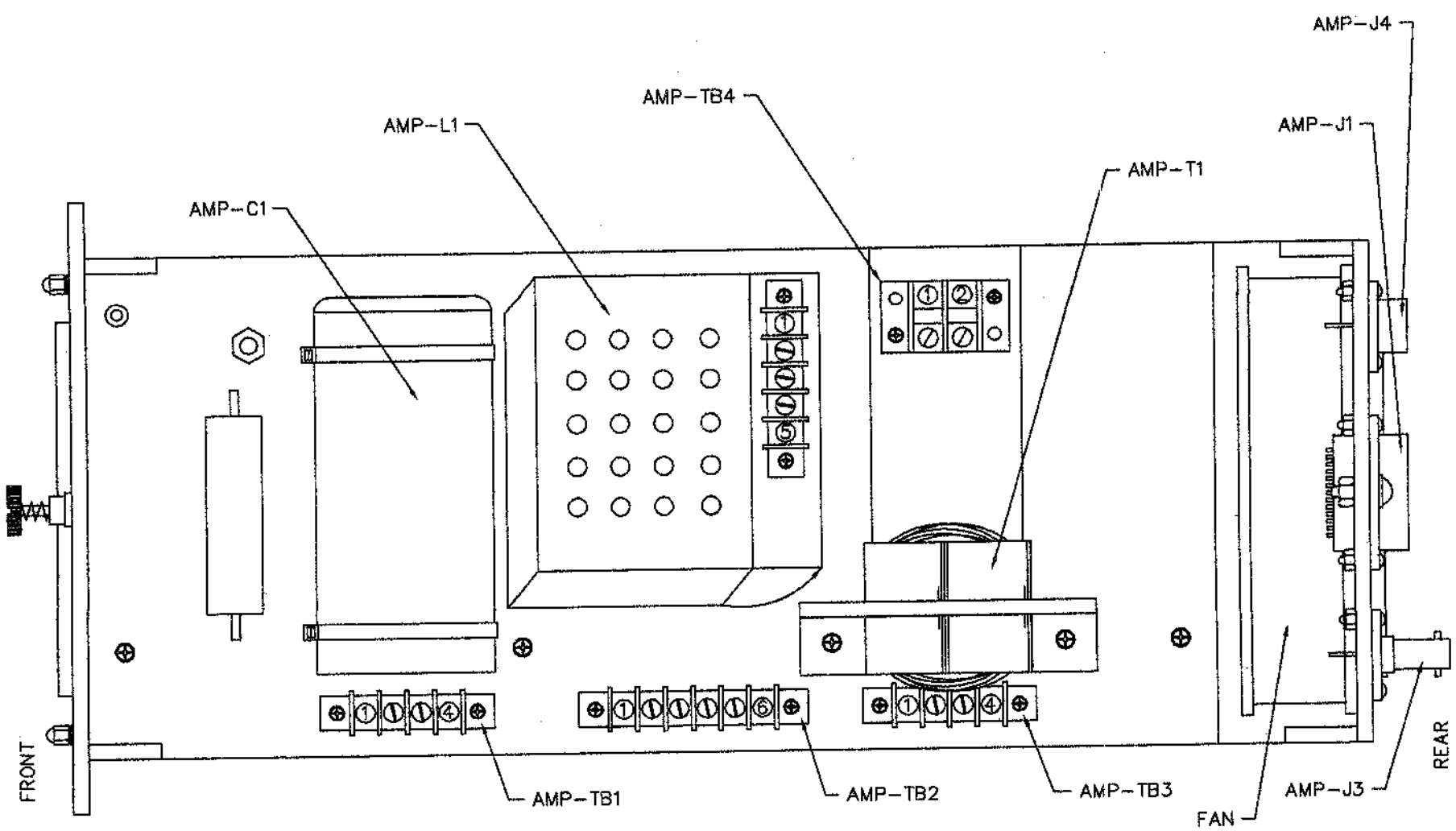
BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

PULSAR

REVISION:	TITLE: PULSAR AMPLIFIER MODULE REAR PANEL (EXTERNAL VIEW)			
	DESIGNED BY: PJ	DATE: 3/9/07	DWG. BY: John McCool	DWG. No. AM--1110C
	CHK'ED:	CAD: AM-1110C		



N.T.S.

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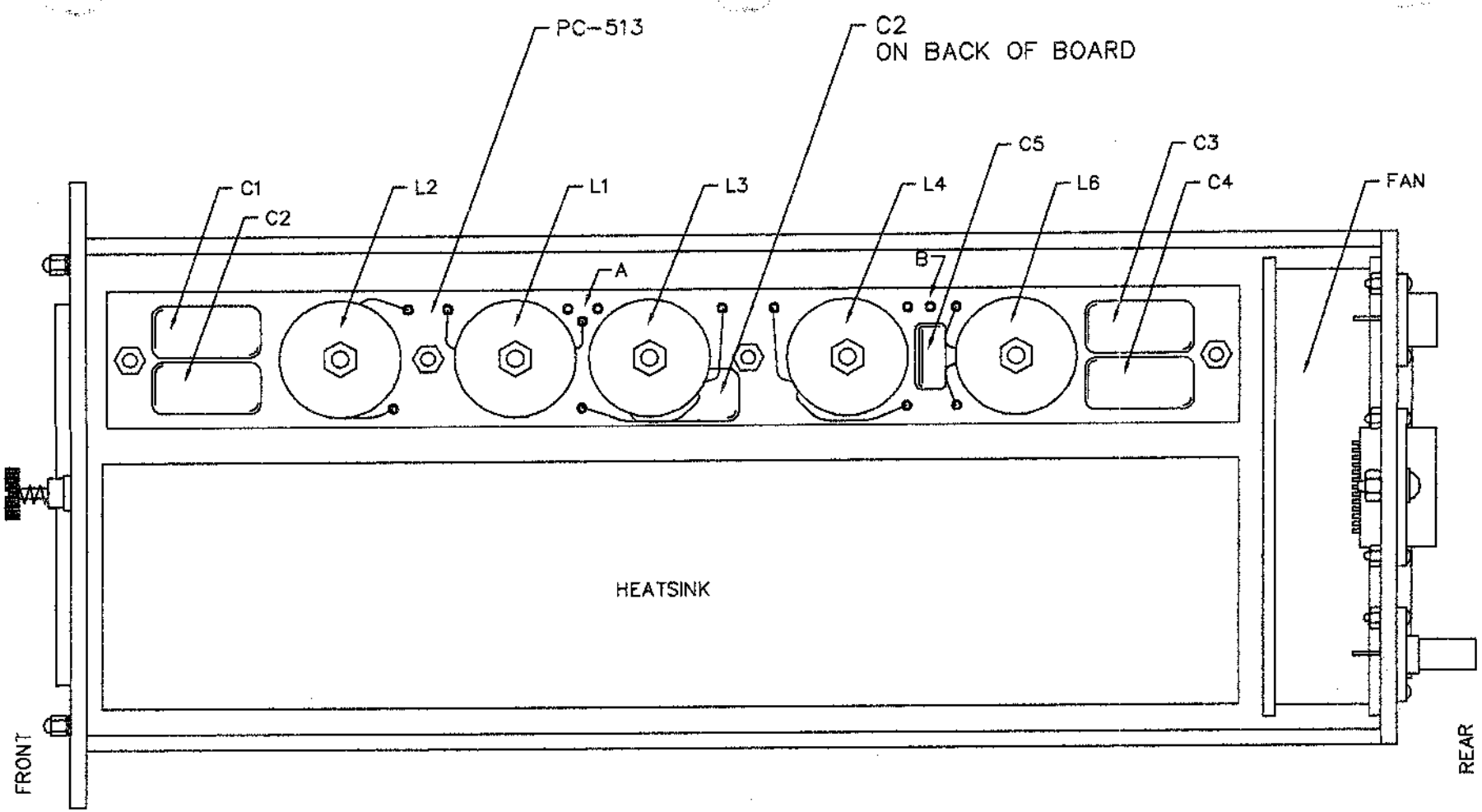
BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

PULSAR

REVISION:	TITLE: PULSAR AMP MODULE COMP LAYOUT, TOP VIEW			
	DESIGNED BY: PI	DATE: 10/20/99	DWG. BY: CRB	DWG. No. AM-1103C
	MODIFIED: 3/8/07 by John McCool	CAD: AM-1102C		



N.T.S.

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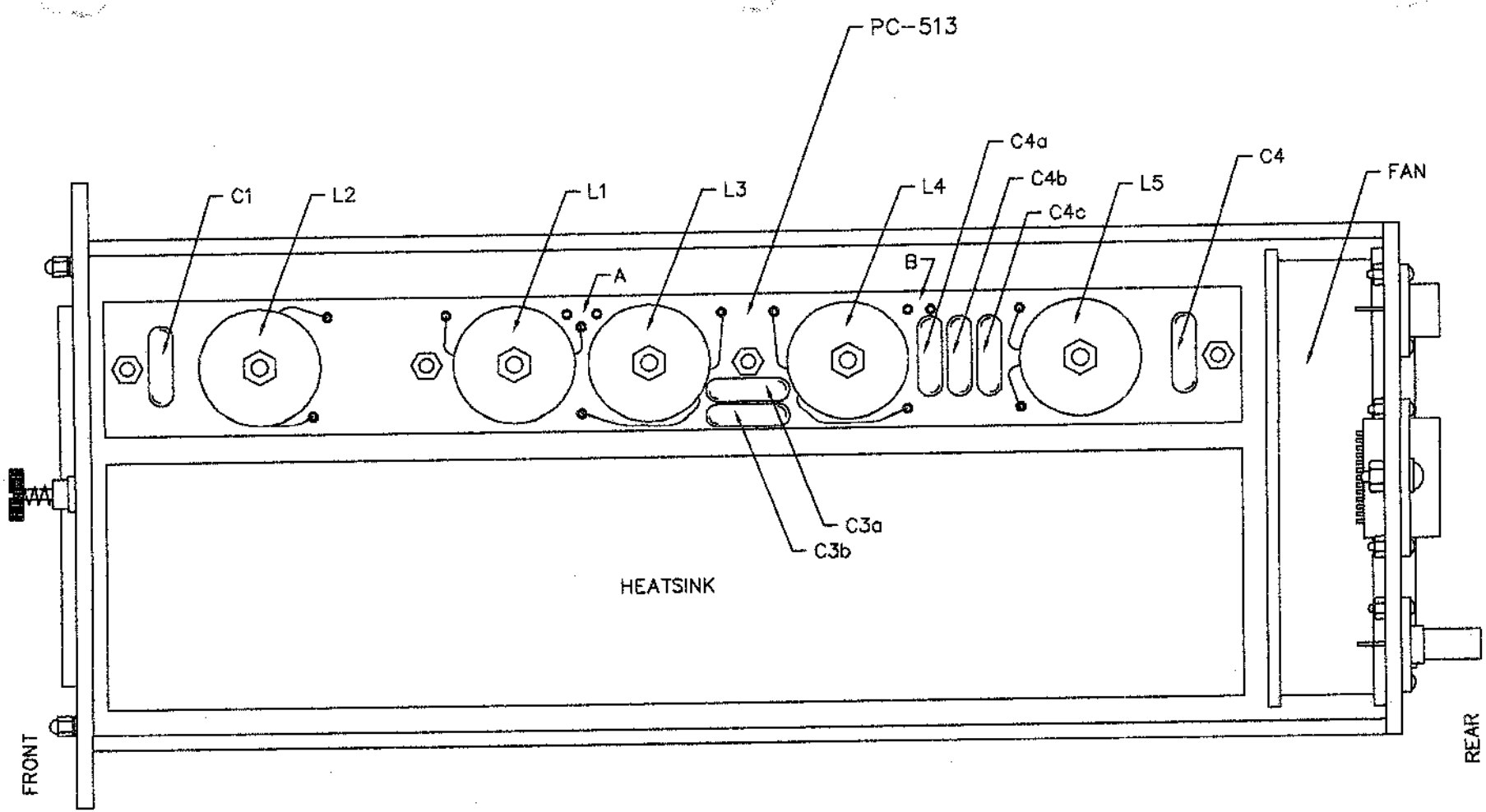
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

PULSAR

REVISION:	TITLE: PULSAR AMP MODULE – 95V COMP LAYOUT, INSIDE BASE VIEW			
	DESIGNED BY: PI	DATE: 10/22/99	DWG. BY: ESB	DWG. No. AM-1104C
	MODIFIED: 3/8/07 by John McCool	CAD: AM-1104C		



N.T.S.

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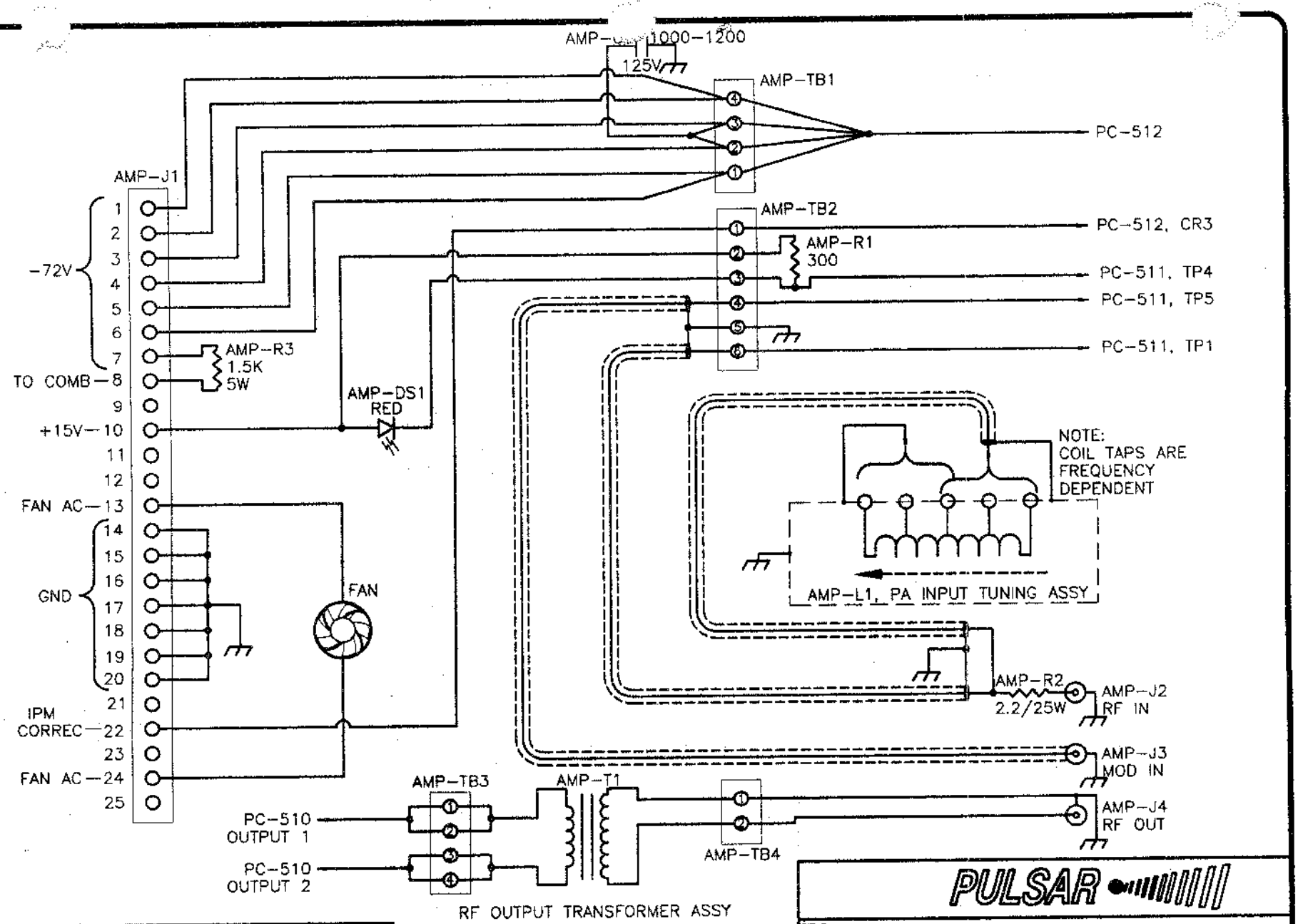
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

PULSAR

REVISION:	TITLE: PULSAR AMP MODULE – 180V COMP LAYOUT, INSIDE BASE VIEW			
	DESIGNED BY: PI	DATE: 10/22/99	DWG. BY:	DWG. No.
	MODIFIED: 3/8/07 by John McCool	CAD: AM-1109C	CRB	AM-1109C



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1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

REVISION DESCRIPTION:	REVISION:
	▭

PULSAR

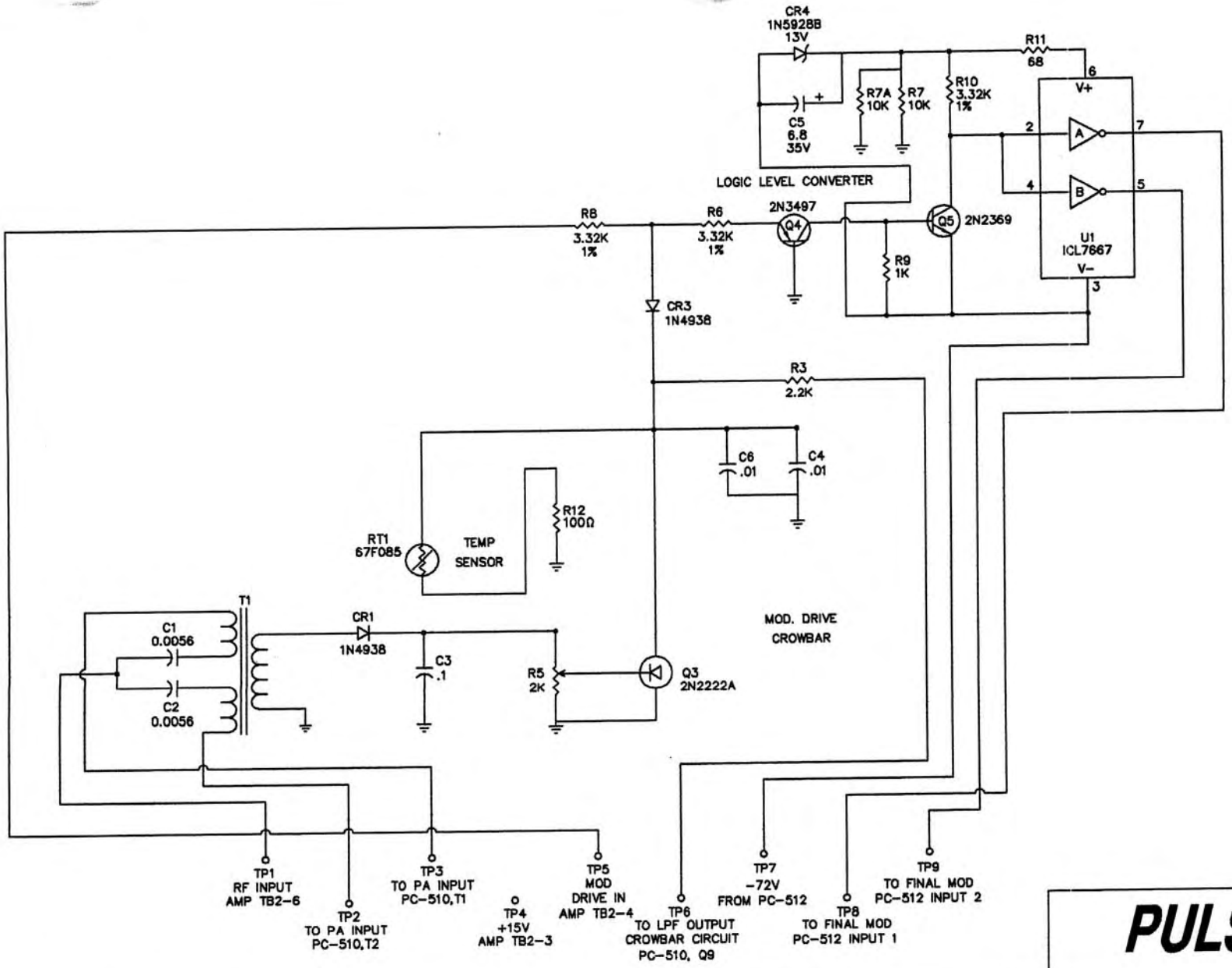
TITLE: PULSAR AMPLIFIER MODULE
SCHEMATIC DIAGRAM (COMP NOT HEATSINK MTD)

DESIGNED BY: PI	DATE: 10/27/99	DWG. BY:	DWG. No.
CHK'ED:	CAD: AM-1102S	ESB	AM-1102S

PULSAR AMPLIFIER MODULE - COMPONENTS NOT HEATSINK MOUNTED

PARTS LIST

AMP C1	1000-1200μF/125 VAC MOTOR START	MALLORY PSUI00015A
AMP DS1	LED, RED	
AMP J1	D-SUBMIN 25 PIN MALE	
AMP J2, AMP J3	BNC FEMALE	
AMP J4	N FEMALE	
AMP L1	PA INPUT TUNING ASSEMBLY	
AMP R1	300 OHM, 1/2W	
AMP R2	2.2 OHM, 25W, CADDOCK	
AMP R3	1.5K, 5W	YAGEO 751
AMP T1	RF OUTPUT TRANSFORMER ASSEMBLY	
AMP TB1,		
AMP TB3	4 POSITION, CHASSIS MOUNT 20A	
AMP TB2	6 POSITION, CHASSIS MOUNT 20A	
AMP TB4	2 POSITION, BARRIER 20A	



PULSAR

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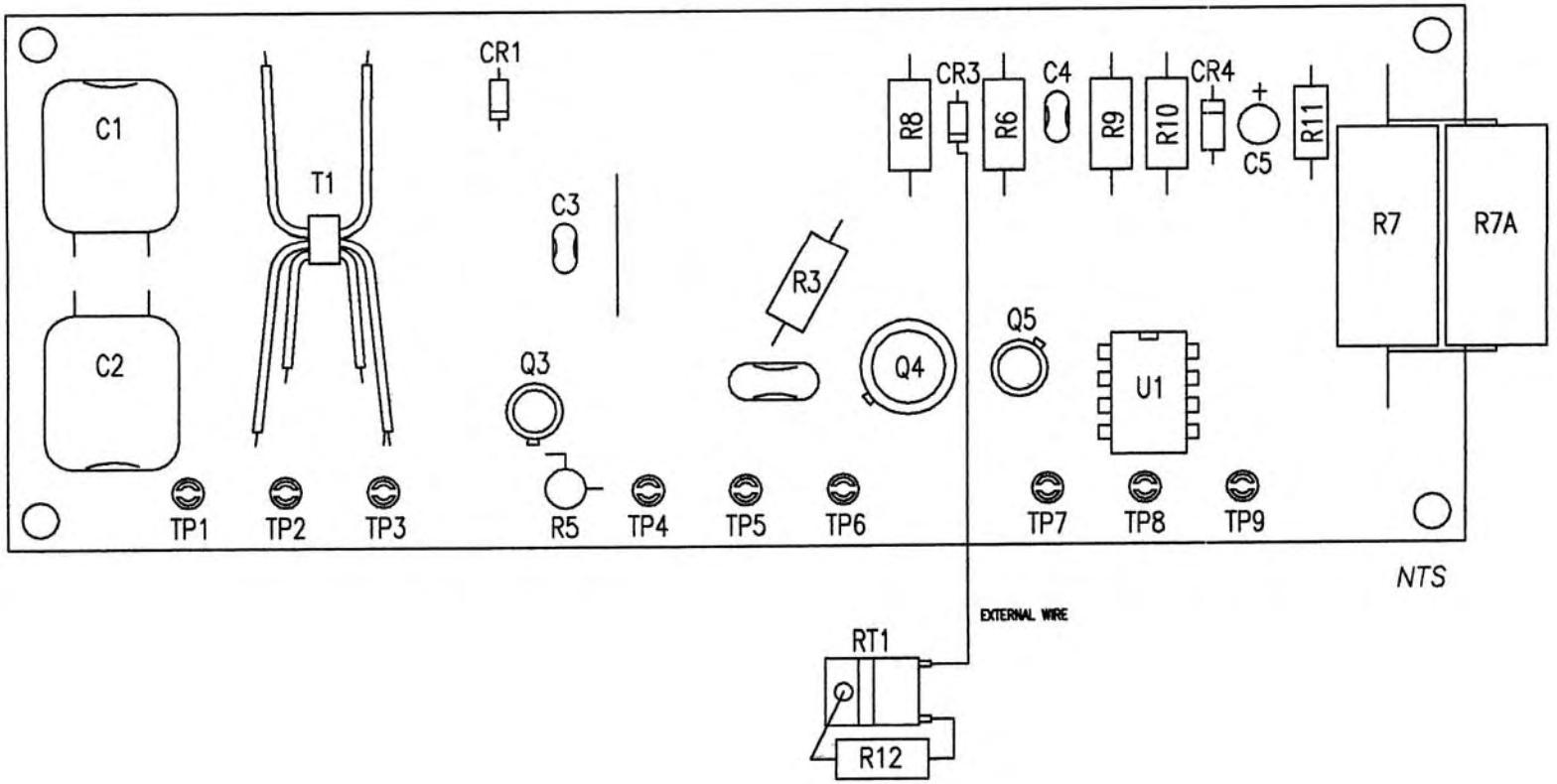
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

REVISION DESCRIPTION:	REVISION
ADD C4, REMOVE PCB OUTLINE, FORM TP STRIP, 9/6/99 MODIFY TP TEXT, 10/01/99	B

TITLE: MODULATOR
SCHEMATIC DIAGRAM (PC-511)

DESIGNED BY: N.D.T.	DATE: 11/30/98	DWG. BY:	DWG. No.
MODIFIED: 3/8/07 by John McCool	CAD No. AM-1201S	E.S.B.	AM-1201S



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1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

PULSAR

REVISION: –

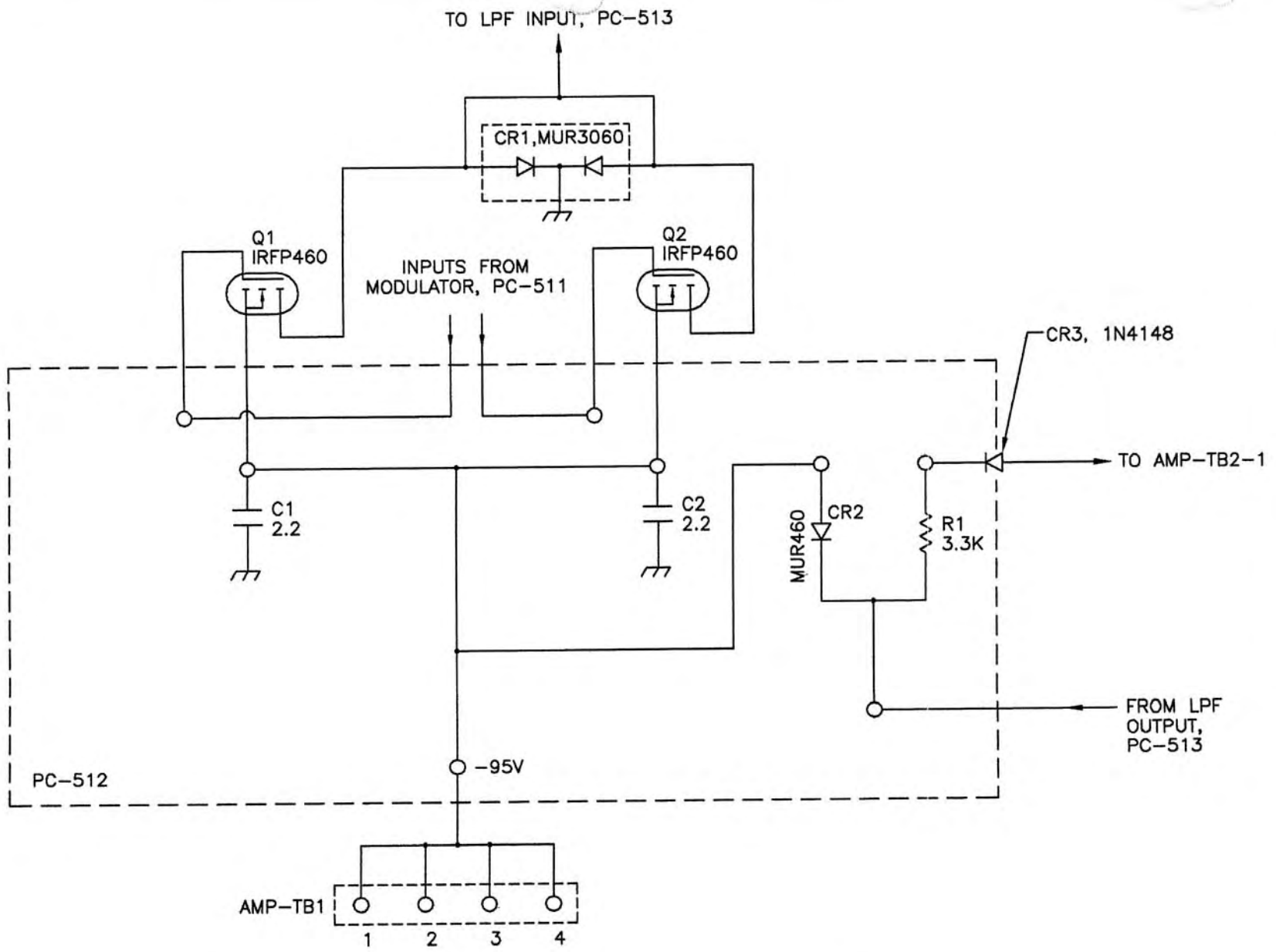
TITLE: MODULATOR PCB COMPONENT LAYOUT (PC–511)

DESIGNED BY: NDT	DATE: 9/8/99	DWG. BY:	DWG. No.
MODIFIED: 3/8/07 by John McCool	CAD: AM–1201C	CRB	AM–1201C

PC – 511 MODULATOR

PARTS LIST

C1,C2	.0056μF/400V POLYPROP.	P3506-ND
C3	.1μF/100V MONO. CERAMIC	P4910-ND
C4	.01μF/100V MONO. CERAMIC	P4904-ND
C5	6.8μF/35V TANTALUM	P2064-ND
C6	10μF/100V ELECTROLYTIC	
CR1,CR3	1N4938	
CR2	1N4737A 7.5V ZENER	
CR4	1N5928B 13V ZENER	
Q1	2N2907	
Q2	2N5415	
Q3	2N2323 THYRISTOR	
Q4	2N3497	
Q5	2N2369	
R1	22.1K/ 1/2W 1%	22.1KH-ND
R2	6.8 OHMS/1/2W	
R3	510/1/2W	
R4,R6,R8,R10	3.32K/1/2W 1%	3320H-ND
R5,R9,R12	1K/1/2W	
R7	2K/5W	YAGEO 719
R11	68 OHMS/1/4W	
R13	43K/1/2 W	
RT1	200K THERMISTOR	KC010N-ND
T1	UNBALANCE TRANSFORMER ASSEMBLY	11-122B
TP1-TP9	PC MOUNT TERMINAL POST	KEYST 1592-2
U1	ICL7667CPA	
XU1	8-PIN IC SOCKET	



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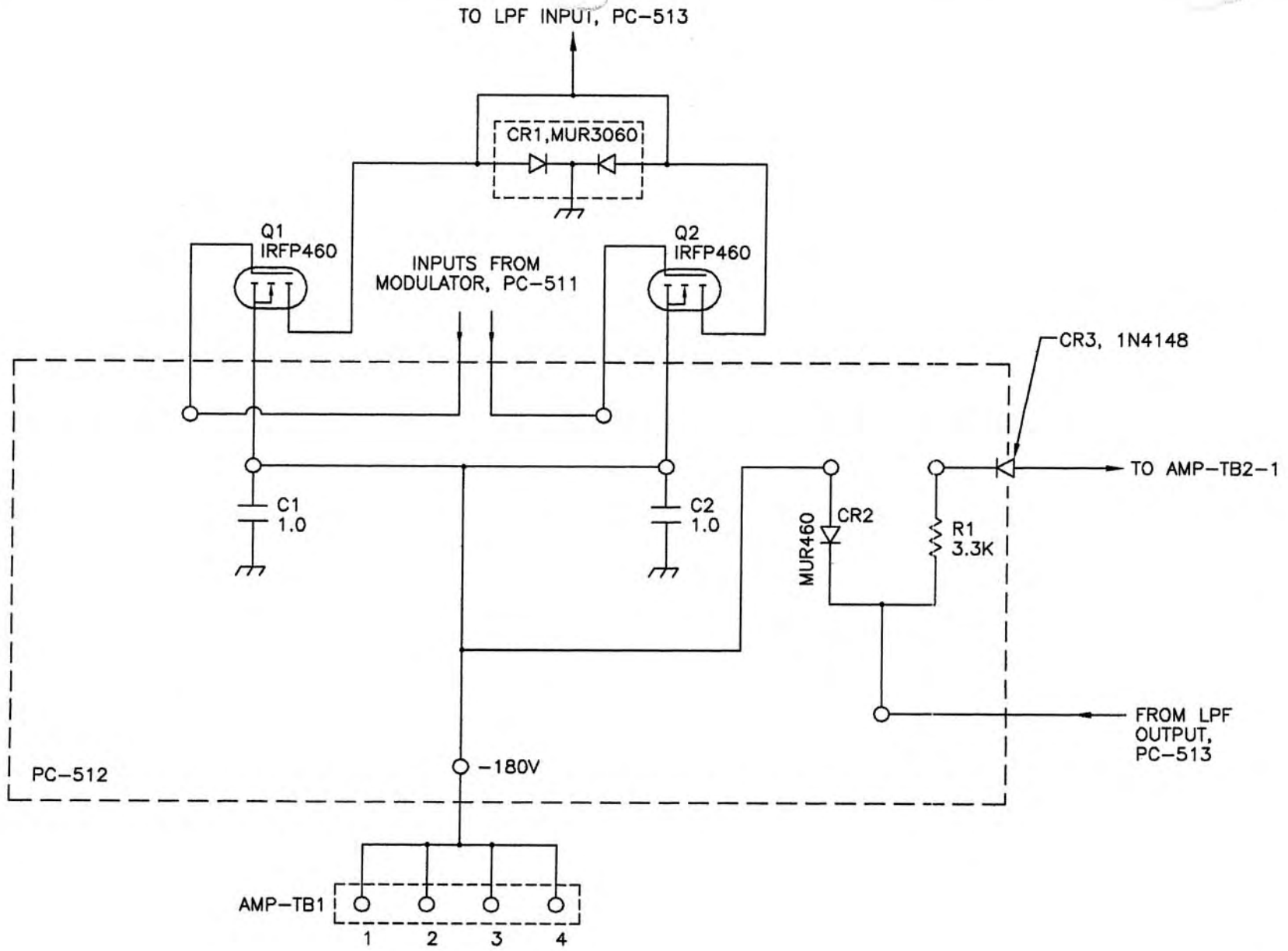
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

PULSAR

TITLE:
FINAL MODULATON ASSY, PC-512 (95V)
AND ASSOCIATED COMPONENTS

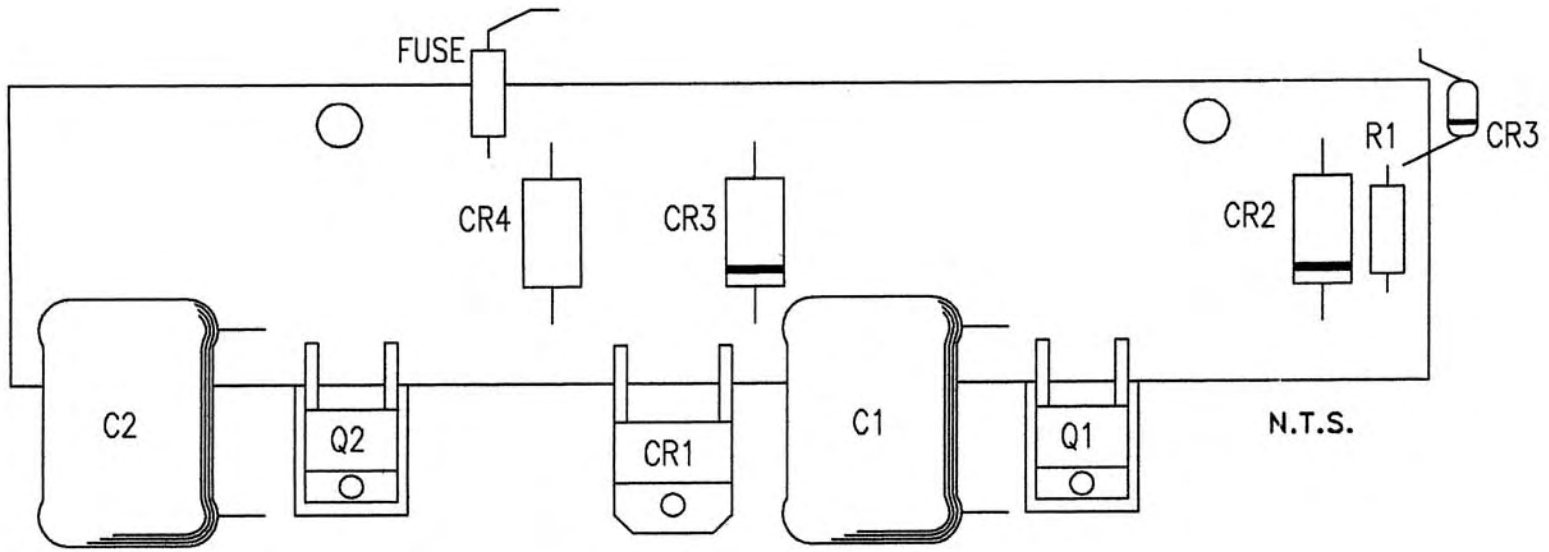
DESIGNED BY:	DATE: 11/01/99	DWG. BY:	DWG. No.
MODIFIED: 3/8/07 by John McCool	CAD No. AM-1301S	CKB	AM-1301S



Energy-Onix
BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

PULSAR

TITLE: FINAL MODULATON ASSY, PC-512 (180V) AND ASSOCIATED COMPONENTS			
DESIGNED BY:	DATE: 3/8/07	DWG. BY: John McCool	DWG. No. AM-1302S
CHK'ED:	CAD No. AM-1302S		



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BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

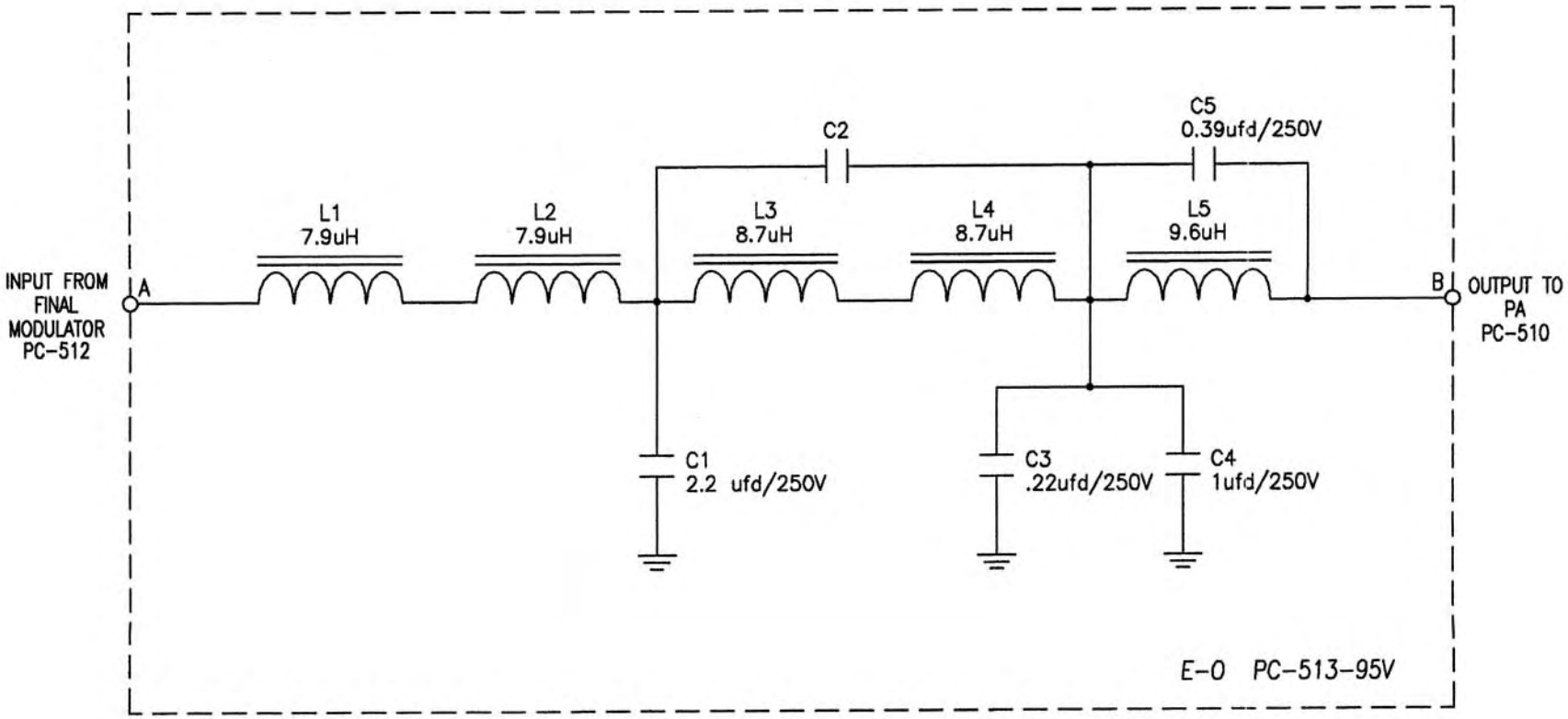
PULSAR

REVISION:	TITLE: FINAL MODULATOR COMPONENT LAYOUT (PC–512)			
▬	DESIGNED BY: NDT	DATE: 6/21/99	DWG. BY: CRB	DWG. No. AM–1301C
	MODIFIED: 3/8/07 by John McCool	CAD: AM–1301C		

PC-512 FINAL MODULATOR ASSEMBLY & ASSOCIATED COMPONENTS

PARTS LIST

C1,C2	2.2μF/250V METALIZED POLYPROP	PF2225-ND
CR1	MUR 3020	
CR2	BYW 98 - 200	
CR3	1N4148	
Q1,Q2	IRF 540	
R1	3.3K, 1/2W	
AMP TB1	4-POSITION, CHASSIS MOUNT 20A	



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BROADCAST EQUIPMENT CO., INC.

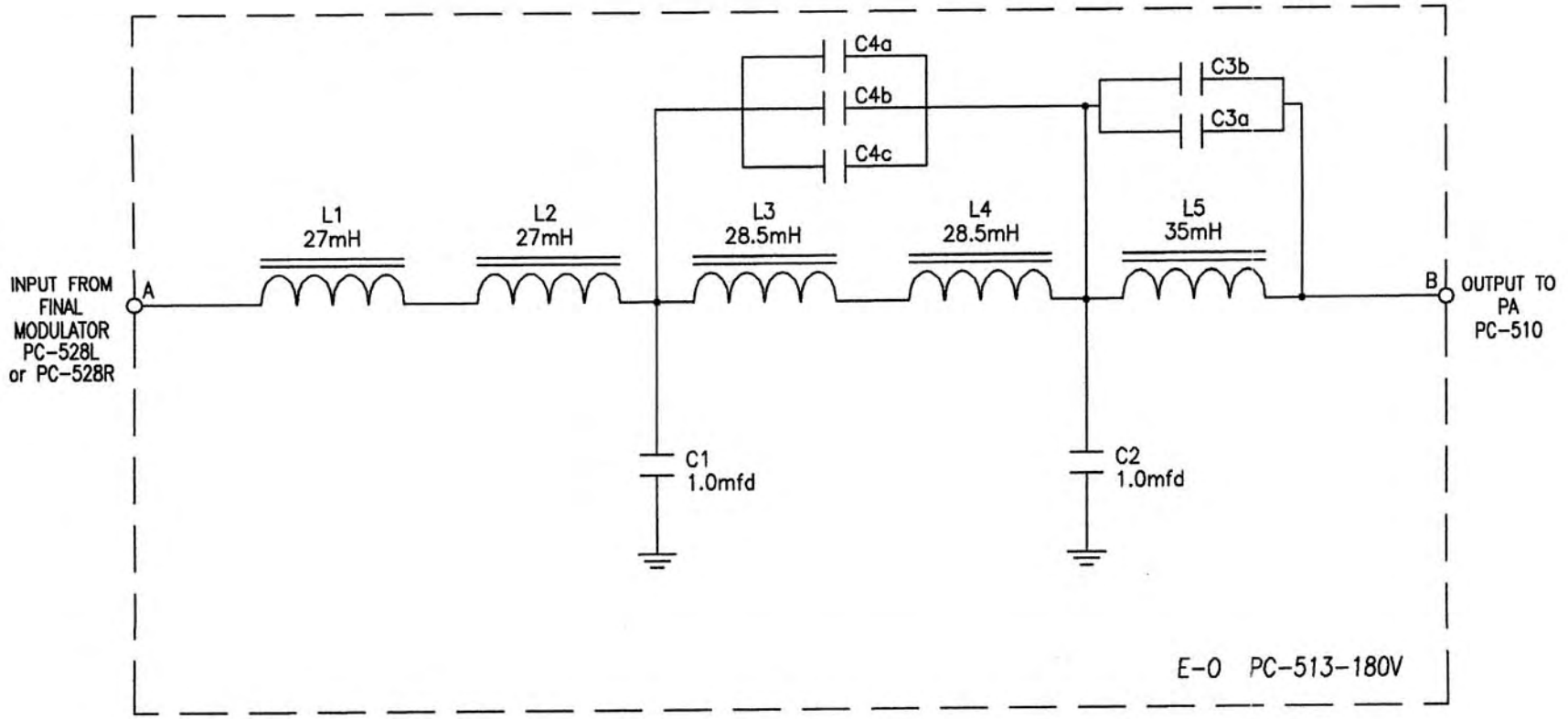
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

REVISIONS:

A. DELETED C2, ADDED DESCRIPTIONS, 06/28/01

TITLE: LOW PASS FILTER - SCHEMATIC DIAGRAM PC-513 (95V)

DESIGNED BY: BW	DATE: 12/01/98	DWG. BY: CKB	DWG. No. AM-1601S
MODIFIED: 3/5/07 by John McCool	CAD No. AM-1601S		



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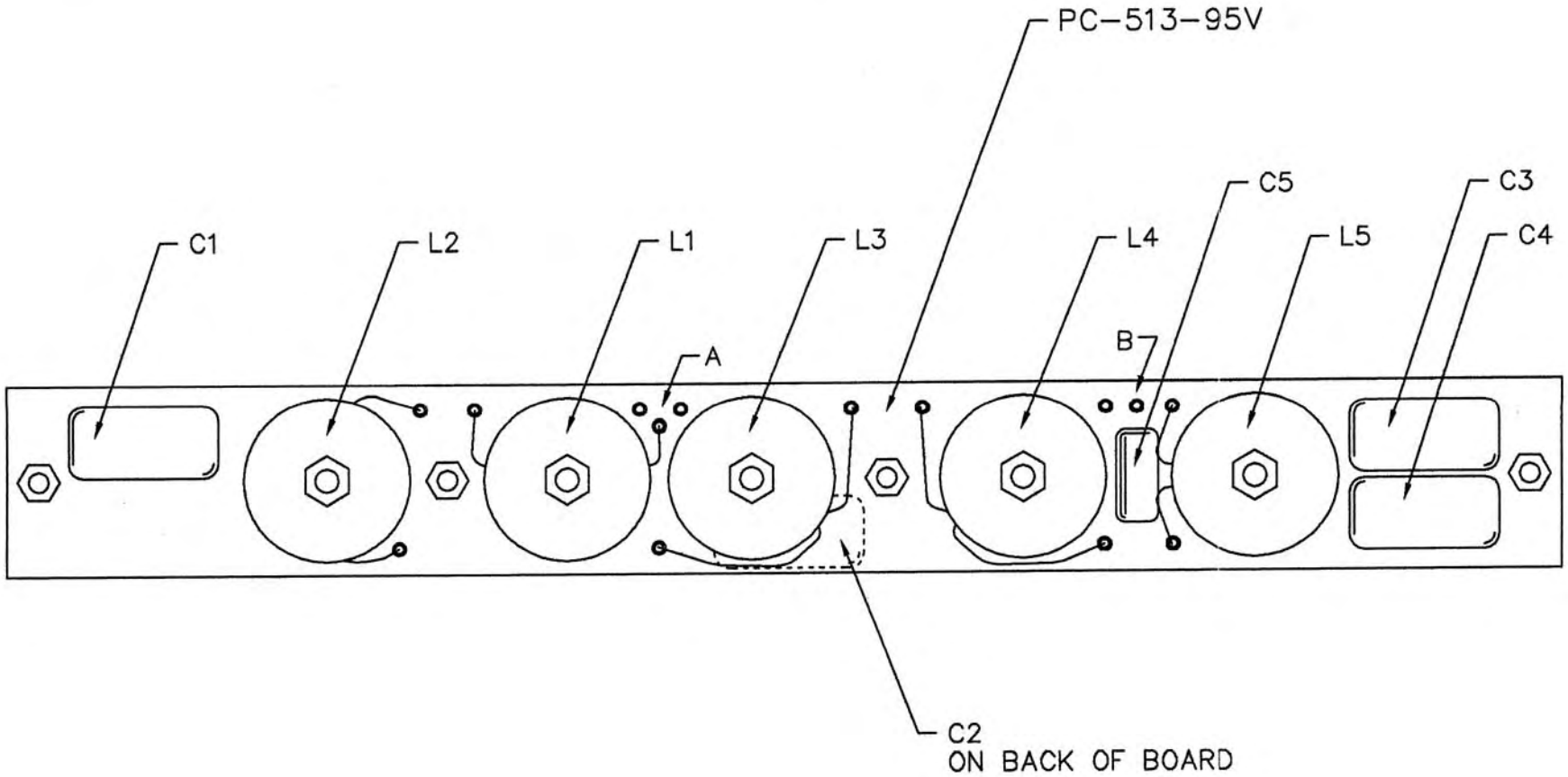
BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

REVISIONS:

TITLE: LOW PASS FILTER – SCHEMATIC DIAGRAM PC-513 (180V)

DESIGNED BY: BW	DATE: 12/01/98	DWG. BY: CKB	DWG. No. AM-1602S
MODIFIED: 3/5/07 by John McCool	CAD No. AM-1602S		



N.T.S.

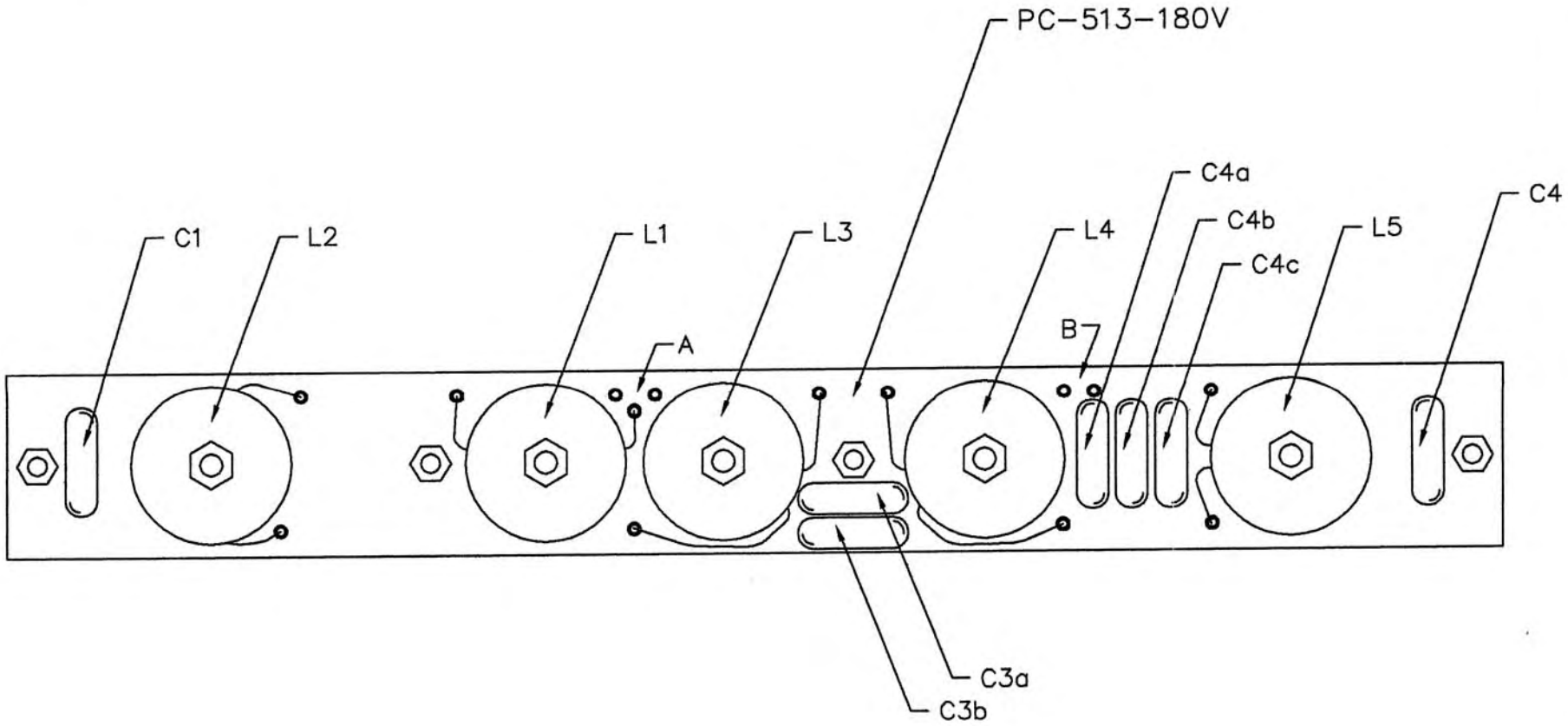
PULSAR

Energy-Onix
BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

REVISION DESCRIPTION:	REVISION:
A. L6 CALLOUT CHG. TO L5, 03/10/00 B. DELETED C2, 06/28/01	B

TITLE: LOW PASS FILTER COMP LAYOUT, PC-513 (95V)

DESIGNED BY: PI	DATE: 10/22/99	DWG. BY:	DWG. No.
MODIFIED: 3/5/07 by John McCool	CAD: AM-1105C	CRB	AM-1105C



N.T.S.

PULSAR

Energy-Onix
BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

REVISION DESCRIPTION:	REVISION:
A. L6 CALLOUT CHG. TO L5, 03/10/00 B. DELETED C2, 06/28/01	B

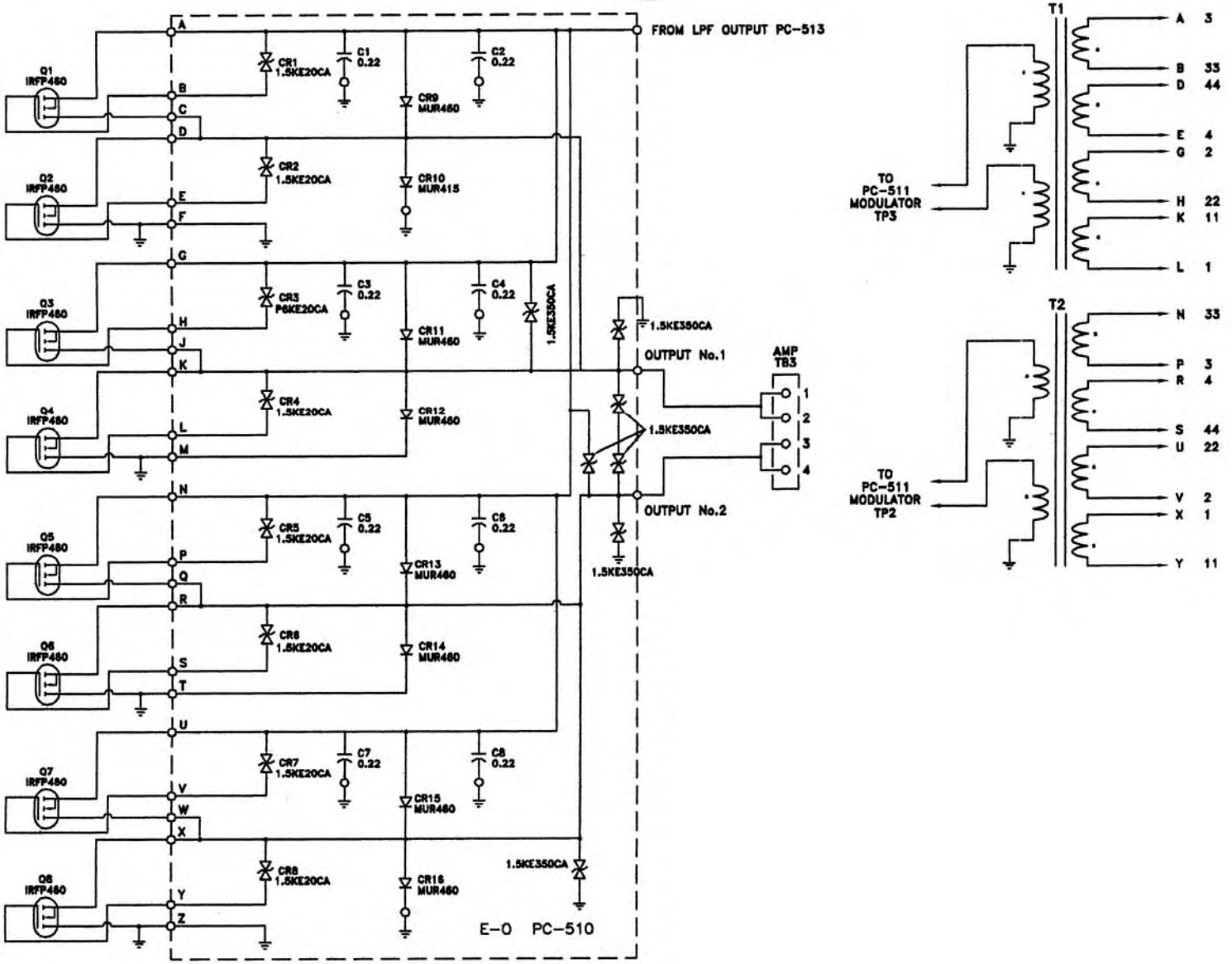
TITLE: LOW PASS FILTER
COMP LAYOUT, PC-513 (180V)

DESIGNED BY: PI	DATE: 10/22/99	DWG. BY:	DWG. No.
MODIFIED: 3/5/07 by John McCool	CAD: AM-1108C	CRB	AM-1108C

PC – 513 LOW PASS FILTER

PARTS LIST

C1	3.3μF/250V METALLIZED POLYPROP	PF2335-ND
C2,C3,C4	2.7μF/250V METALLIZED POLYPROP	PF2275-ND
C5	.39μF/250V METALLIZED POLYPROP	PF2394-ND
L1,L2	7.9μH POT CORE ASSEMBLY	5678-362221
L3,L4	8.7μH POT CORE ASSEMBLY	5678-362221
L5	9.6μH POT CORE ASSEMBLY	5678-362221



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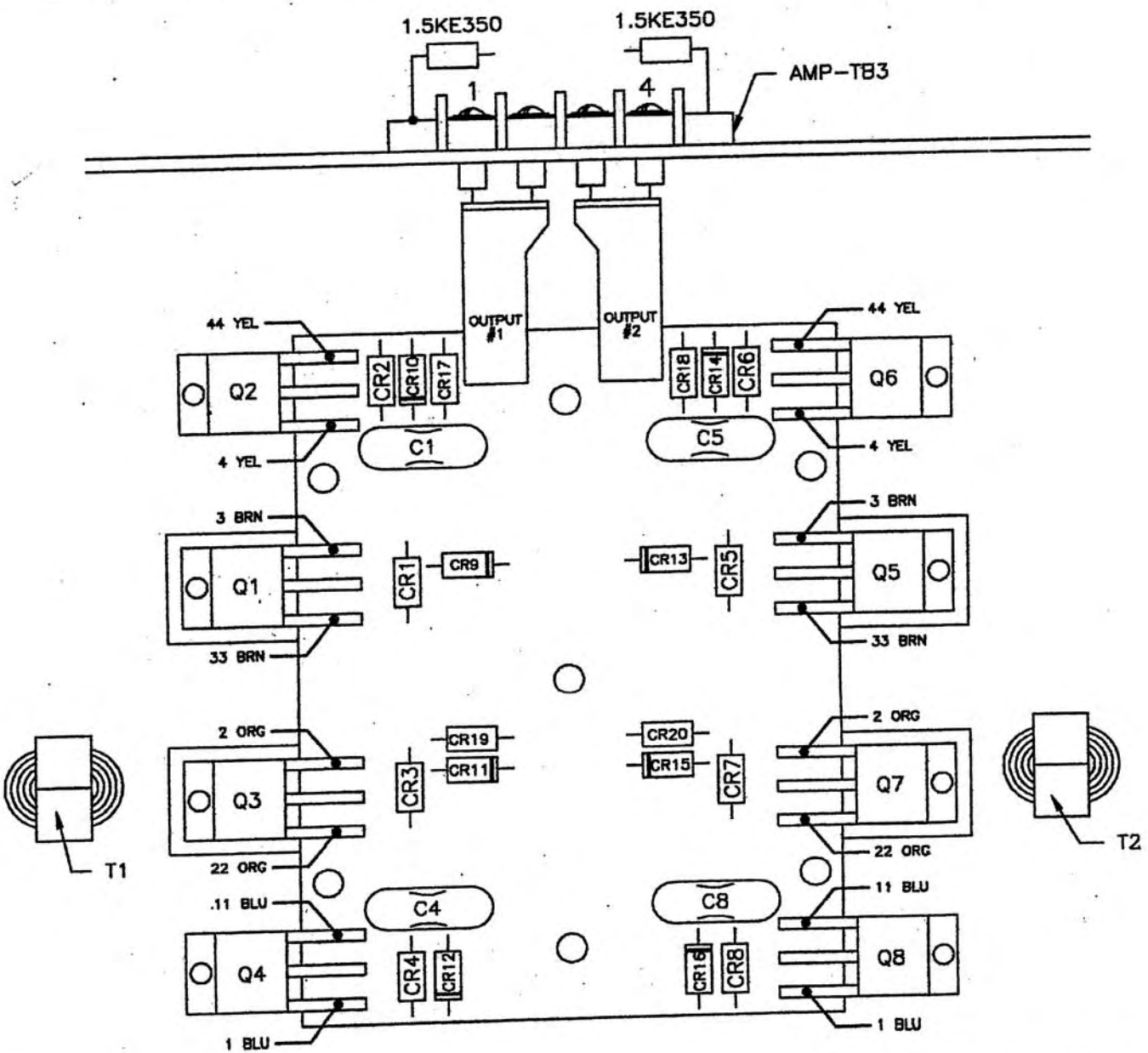
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

PULSAR

TITLE: PC-510 POWER AMPLIFIER AND ASSOCIATED COMPONENTS

DESIGNED BY:	DATE: 11/25/98	DWG. BY:	DWG. No.
MODIFIED: 3/5/07 by John McCool	CAD No. AM-1101S	E.S.B.	AM-1101S



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1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

NOTES:
N.T.S.

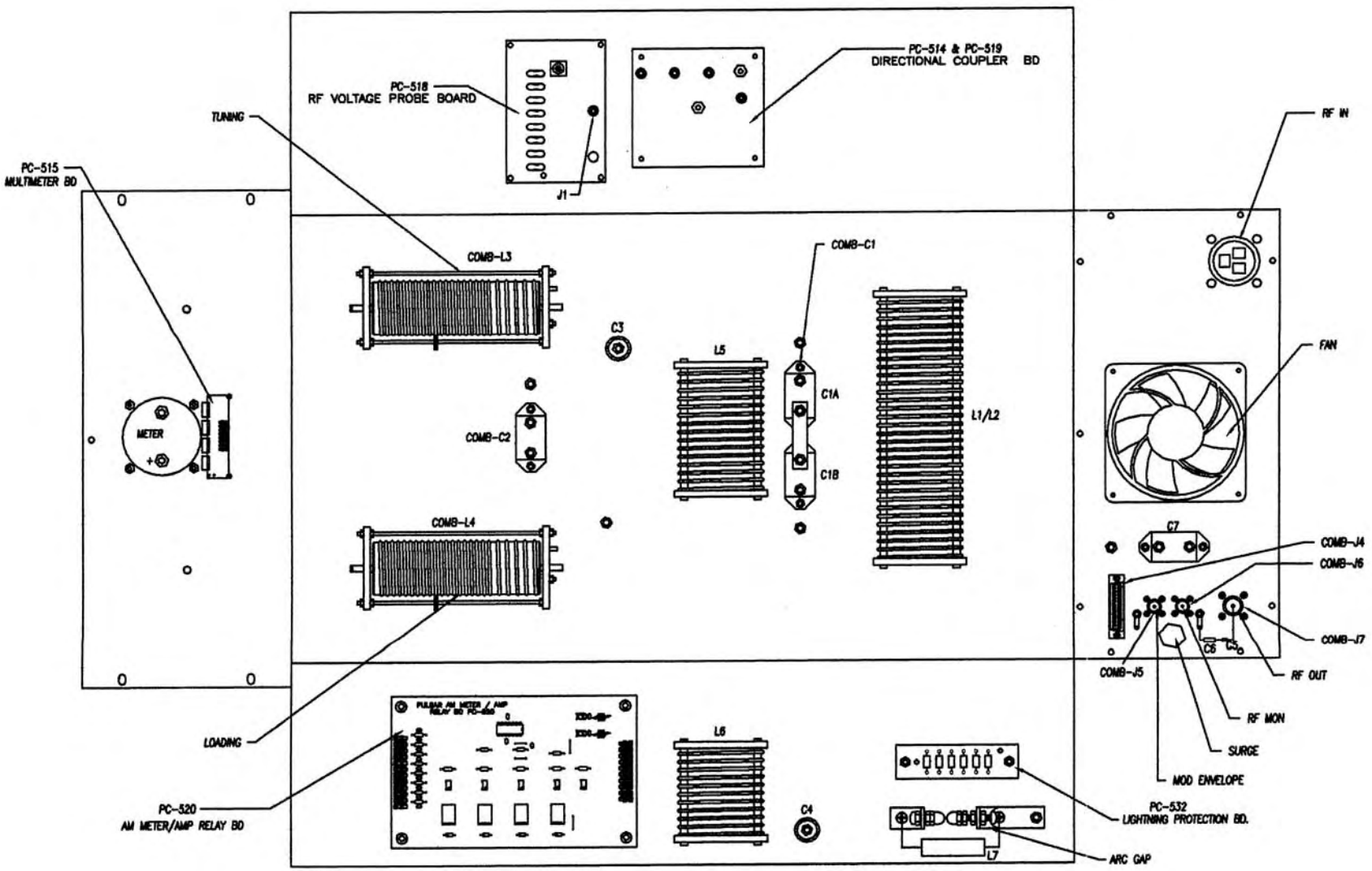
TITLE: PC–510 (POWER AMPLIFIER) COMPONENT LAYOUT

DWG. BY: CKB
DATE: 6/18/97
REV: –
MODIFIED: 4/28/98 by John McCool
DWG. No. AM–1101C

PC - 510 POWER AMPLIFIER AND ASSOCIATED COMPONENTS

PARTS LIST

C1-C8	.22μF/250V METALIZED POLYPROP.	PF2224-ND
C9	6.8μF/6V TANTALUM	
CR1-CR8	P6KE20CA ZENER TRANSIENT SUPPRESSOR	
CR9-CR16	BYW 98 - 200	
Q1-Q8	IRF540	
Q9	MCR264-8 SCR	
T1,T2	INPUT TRANSFORMER ASSEMBLY	11-250B
AMP TB3	4-POSITION, CHASSIS MOUNT 20A	



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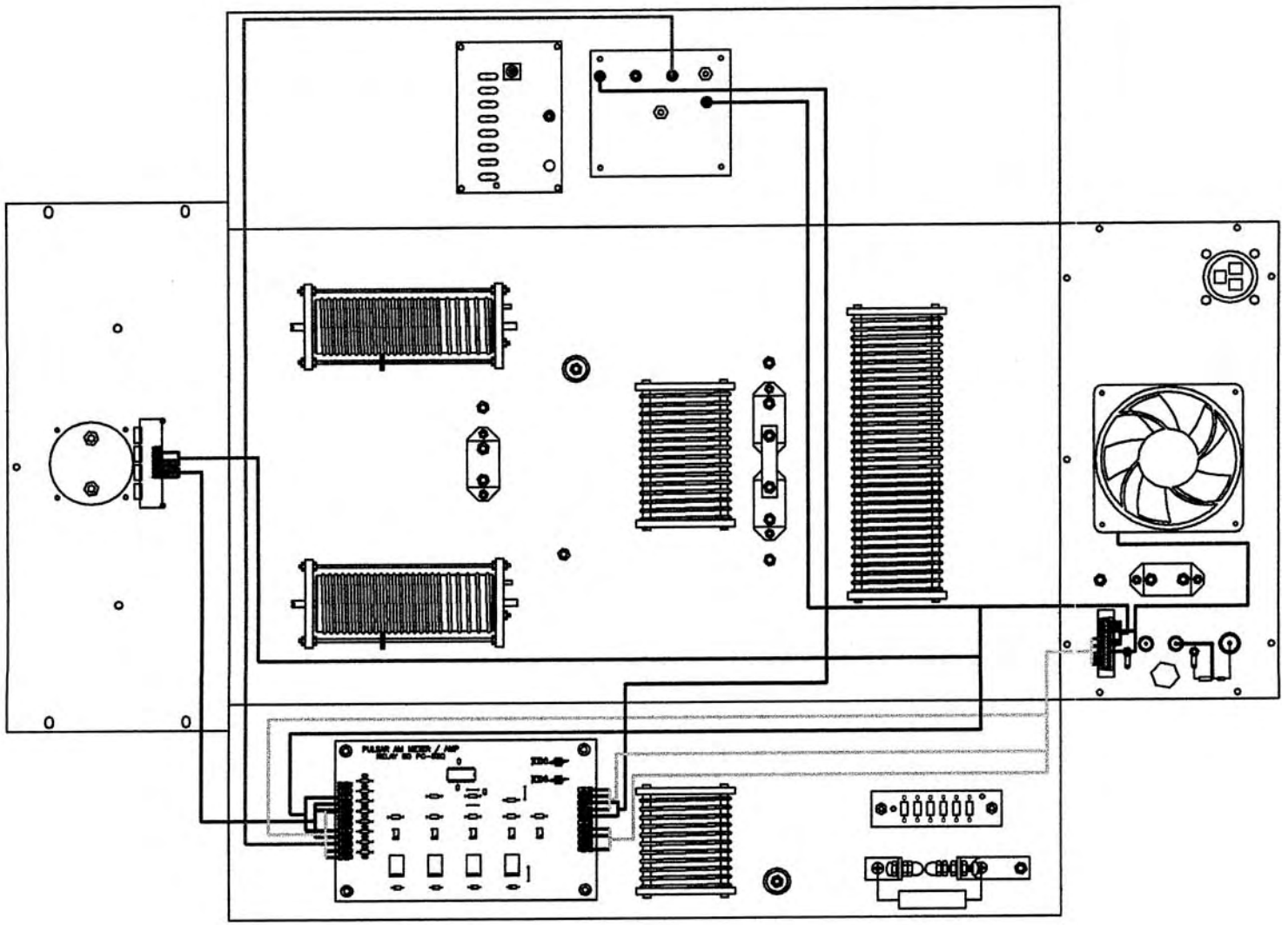
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

PULSAR

REVISION:	TITLE: PULSAR AM COMBINER DRAWER COMPONENT LAYOUT				
A	SCALE: NTS	DESIGNED BY: BW	DATE: 7/28/99	DWG. BY: ESB	DWG. No. AM-0002C
	CAD: AM-0002C		MODIFIED: 2/26/07 by John McCool		



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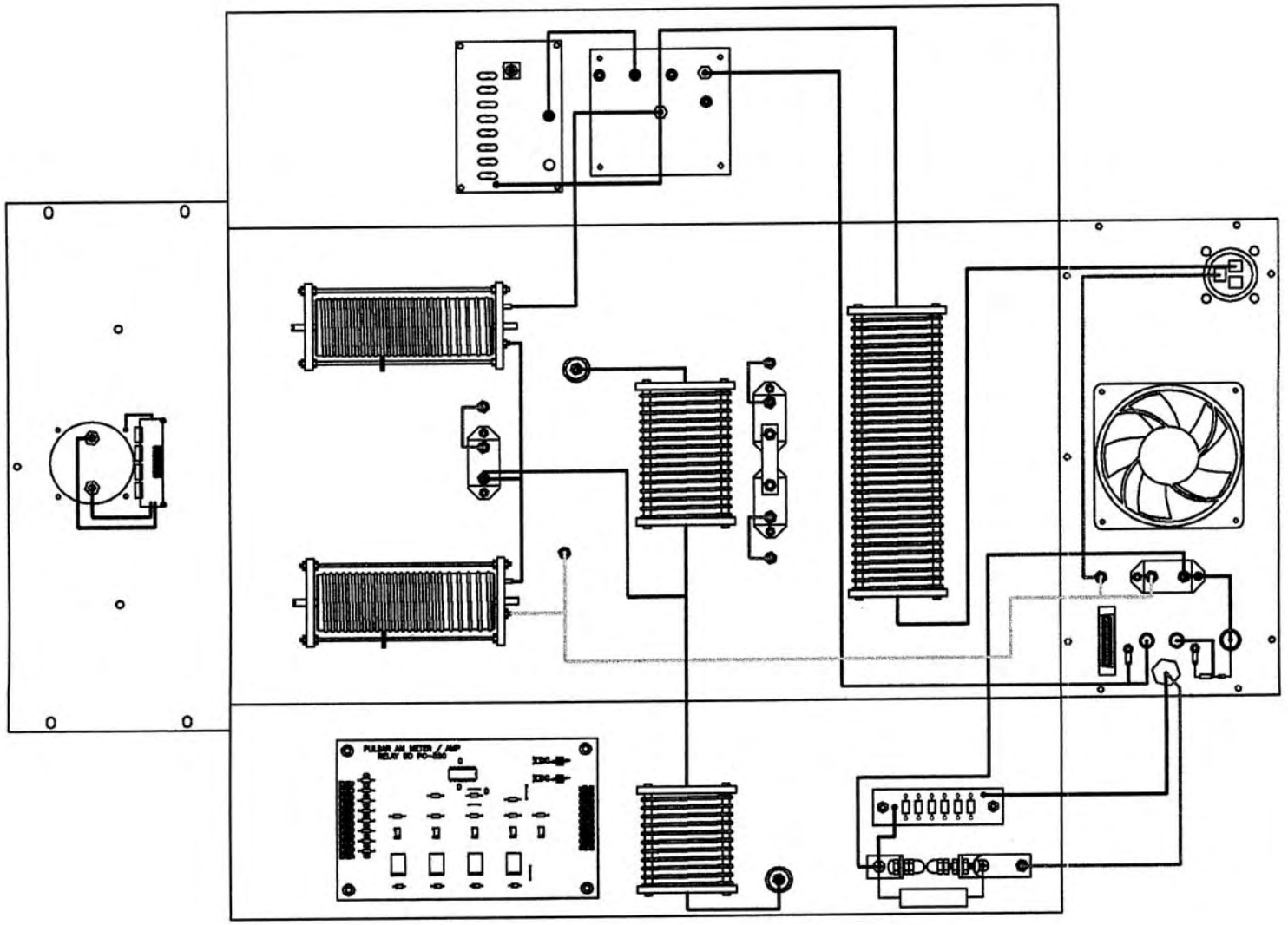
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

PULSAR

REVISION:	TITLE:				
A	PULSAR AM COMBINER D–SUB WIRING LAYOUT				
SCALE: NTS	DESIGNED BY:	DATE: 2/27/07	DWG. BY: John McCool	DWG. No.	
CAD: AM–0003C	BW	CK BY:		AM–0003C	



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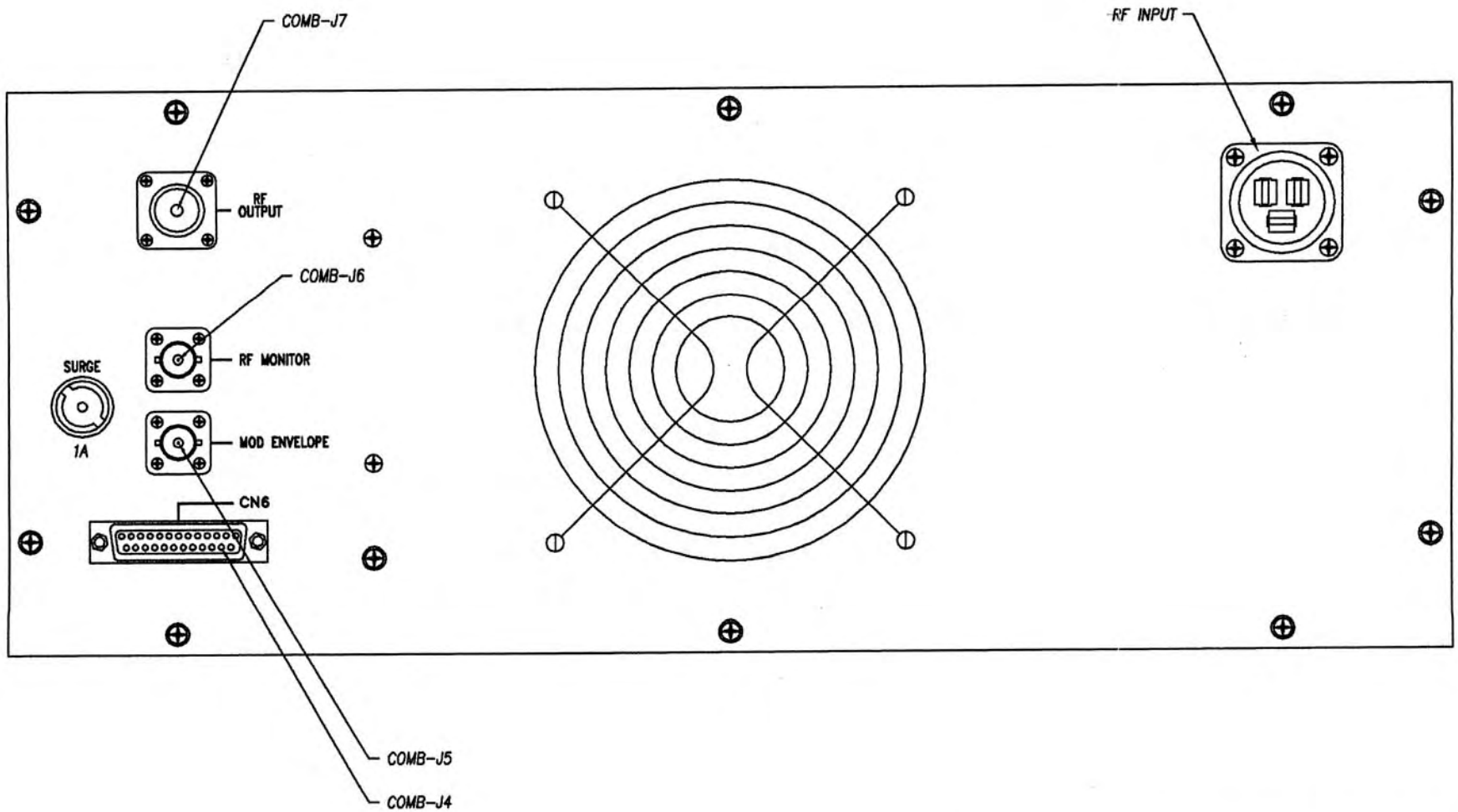
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

PULSAR

REVISION:	TITLE:				
A	PULSAR AM COMBINER COIL WIRING LAYOUT				
SCALE: NTS	DESIGNED BY:	DATE: 2/27/07	DWG. BY:	DWG. No.	
CAD: AM-0004C	BW	CK BY:	John McCool	AM–0004C	



PULSAR

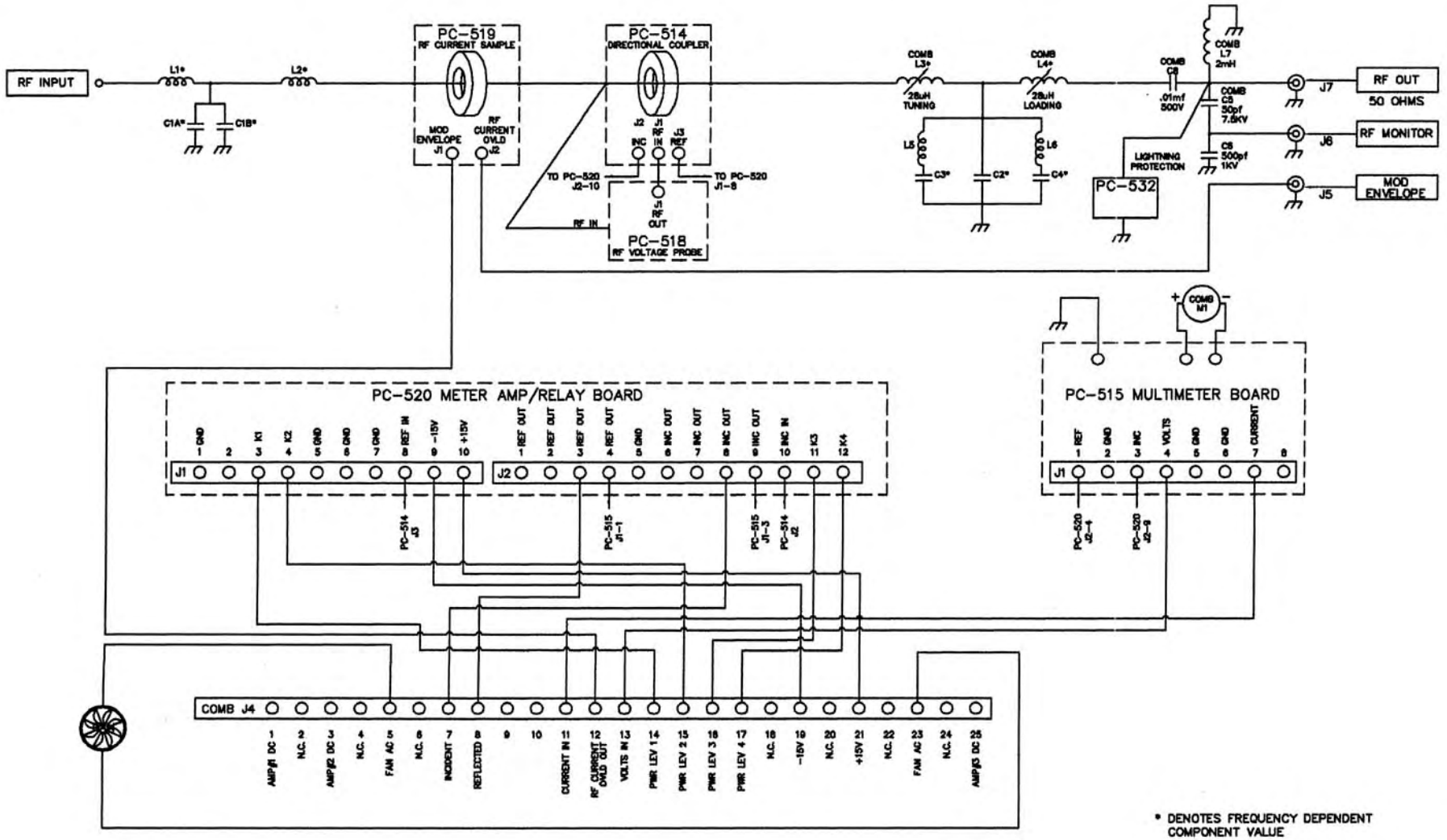
Energy-Onix
BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

REVISION DESCRIPTION:
IDENTIFY CONNECTIONS, 11/12/99
CHG CN#, 12/22/99

REVISION: B

TITLE: PULSAR COMBINER REAR PANEL

SCALE: NA	DESIGNED BY:	DATE: 7/26/99	DWG. BY:	DWG. No.
CAD: AM-00060	NDT/	MODIFIED: 2/26/07 by John McCool	ESB	AM-00060



* DENOTES FREQUENCY DEPENDENT COMPONENT VALUE

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BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

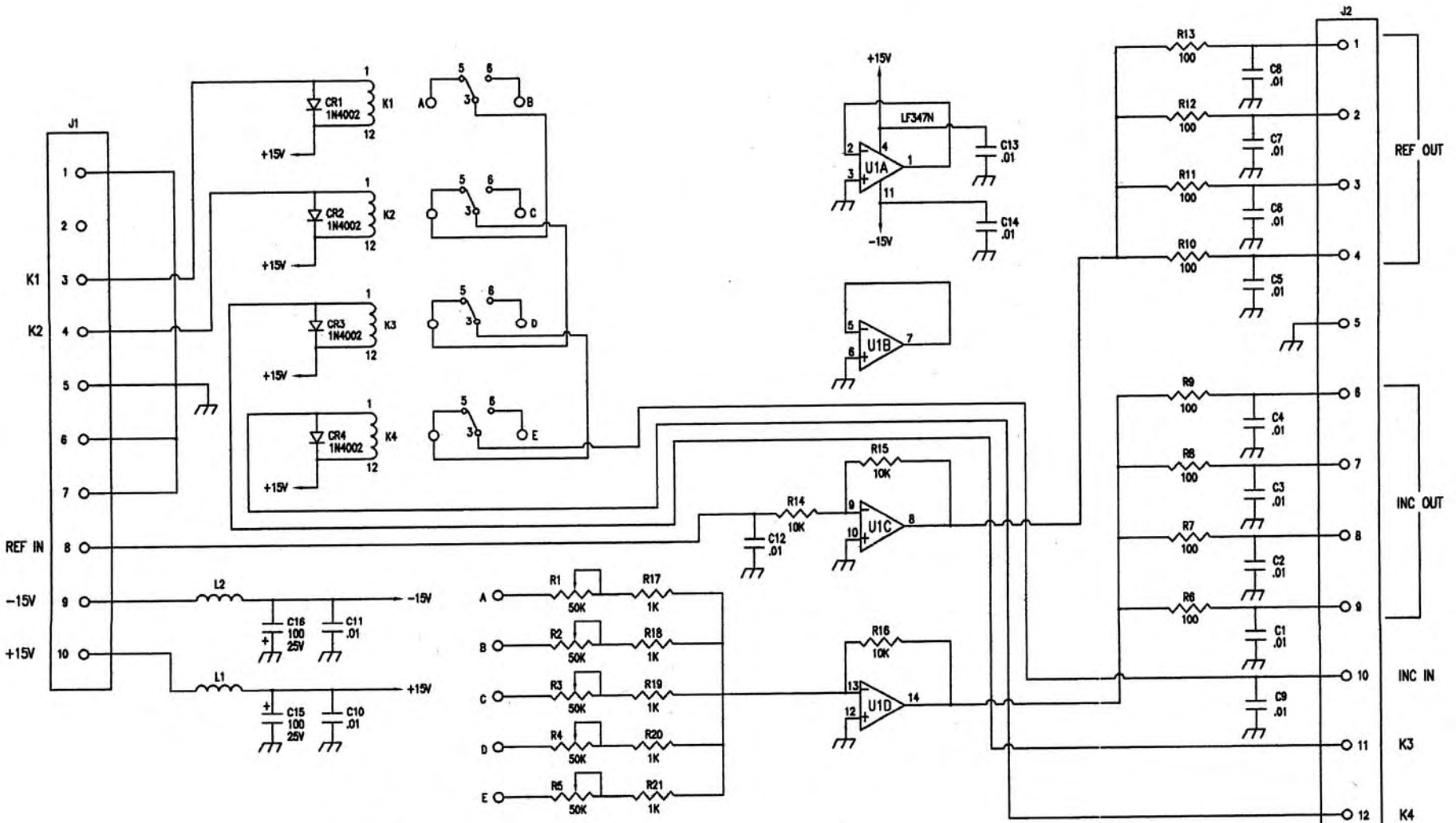
PULSAR

REVISION:	TITLE: PULSAR 1000 COMBINER DRAWER SCH DIA				
■	SCALE: NA	DESIGNED BY: NDT	DATE: 07/30/01	DWG. BY: DD	DWG. No. AM-3013s
	CAD: AM-3013s		MODIFIED: 2/27/07 by John McCool		

COMBINER DRAWER - PULSAR 1000

PARTS LIST

COMB C1	F2 TYPE TRANSMITTING CAPACITOR, FREQUENCY DETERMINED	
COMB C2	F2 TYPE TRANSMITTING CAPACITOR, FREQUENCY DETERMINED	
COMB C3	F2 TYPE TRANSMITTING CAPACITOR, FREQUENCY DETERMINED	
COMB C4	10μμF/7.5KV DOORKNOB	
COMB C5	.1μF / 500V	F2 TYPE
COMB J1-J3,COMB J7	N-FEMALE	
COMB J4	DB25-MALE	
COMB J5,COMB J6	BNC FEMALE	
COMB L1-COMB L5	35μH	B & W 2006T
COMB L6,COMB L7	28μH VARIABLE	CRC 229—203
COMB L8	2mH CHOKE	C – B 6400 - 8
COMB M1	100μA	TRANSCAT/EIL



NOTE: RELAYS SHOWN ENERGIZED (POWER LEVELS, MANUAL SELECTED).

Energy-Onix
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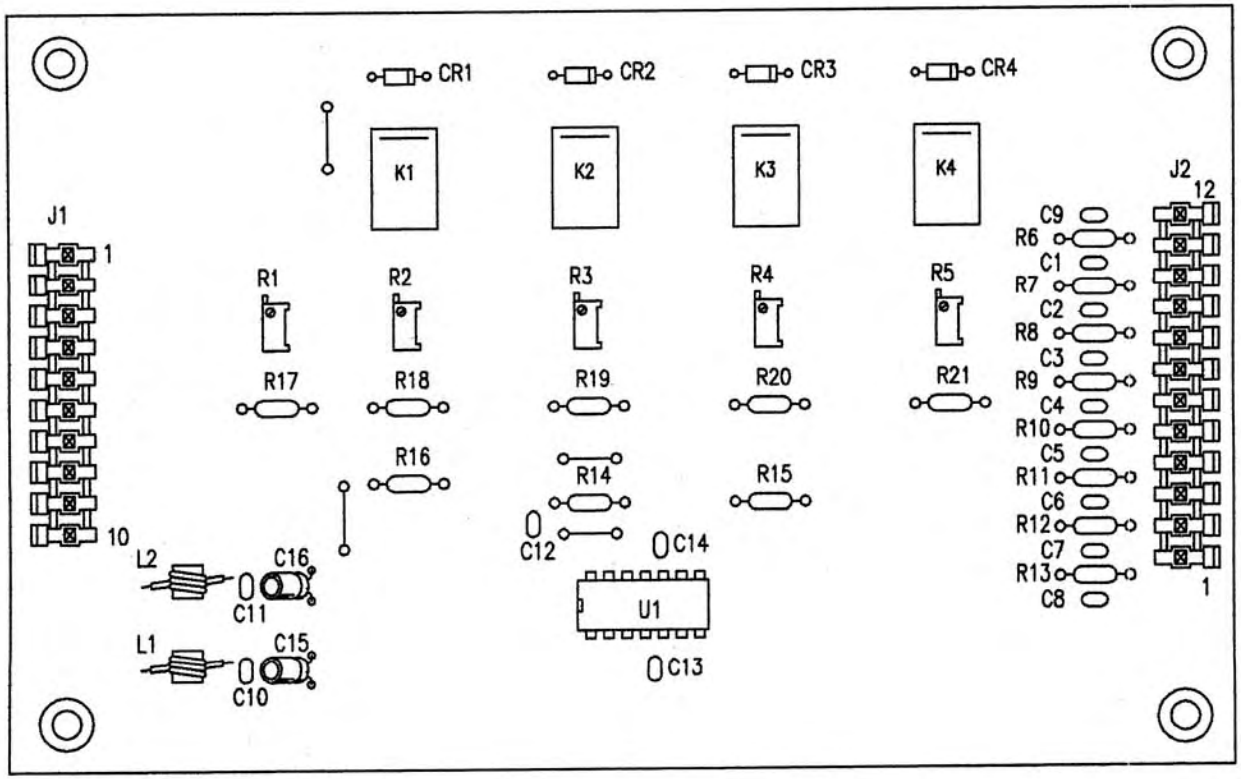
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

PULSAR

TITLE: METER AMP/RELAY BOARD PC-520 SCHEMATIC DIAGRAM					
SCALE: NA	DESIGNED BY: PI	DATE: 9/1/99	DWG. BY: CSB	DWG. No. AM-2002S	
CAD: AM-2002S		MODIFIED: 3/5/07 by John McCool			



Energy-Onix
BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

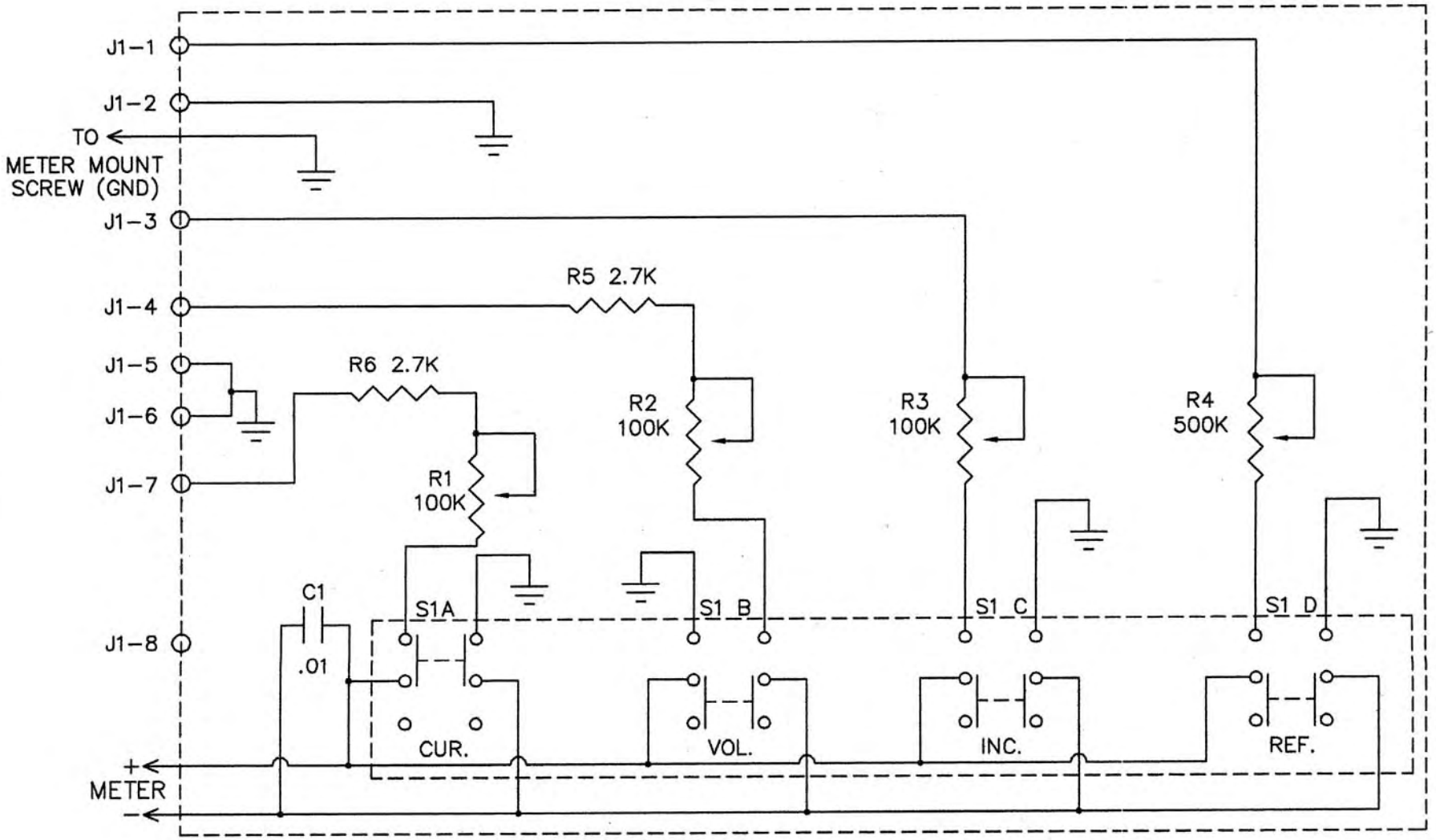
PULSAR

REVISION:	TITLE: PULSAR AM METER AMP/ RELAY BD PC-520			
-	DESIGNED BY: NDT	DATE: 07/27/99	DWG. BY: CRB	DWG. No. AM-2002C
	MODIFIED: 3/5/07 by John McCool	CAD: AM-2002C		

PC – 520 METER AMP/RELAY BOARD

PARTS LIST

C1-C14	.01μF/100V STACK METAL FILM	P4713-ND
C15,C16	100μF/25V ELECTROLYTIC	
CR1-CR4	1N4002	
J1	10 PIN MOLEX HEADER	
J2	12 PIN MOLEX HEADER	
K1-K4	AROMAT, NON-LATCHING	DF2E-DC12
L1,L2	FERRITE BEAD	21-129B
R1-R5	50K VARIABLE, MULTI-TURN	
R6-R13	100 OHM, 1/4W	
R14-R16	10K, 1/4W	
R17-R21	1K, 1/4W	
U1	LF347N	
XU1	14-PIN IC SOCKET	



PULSAR

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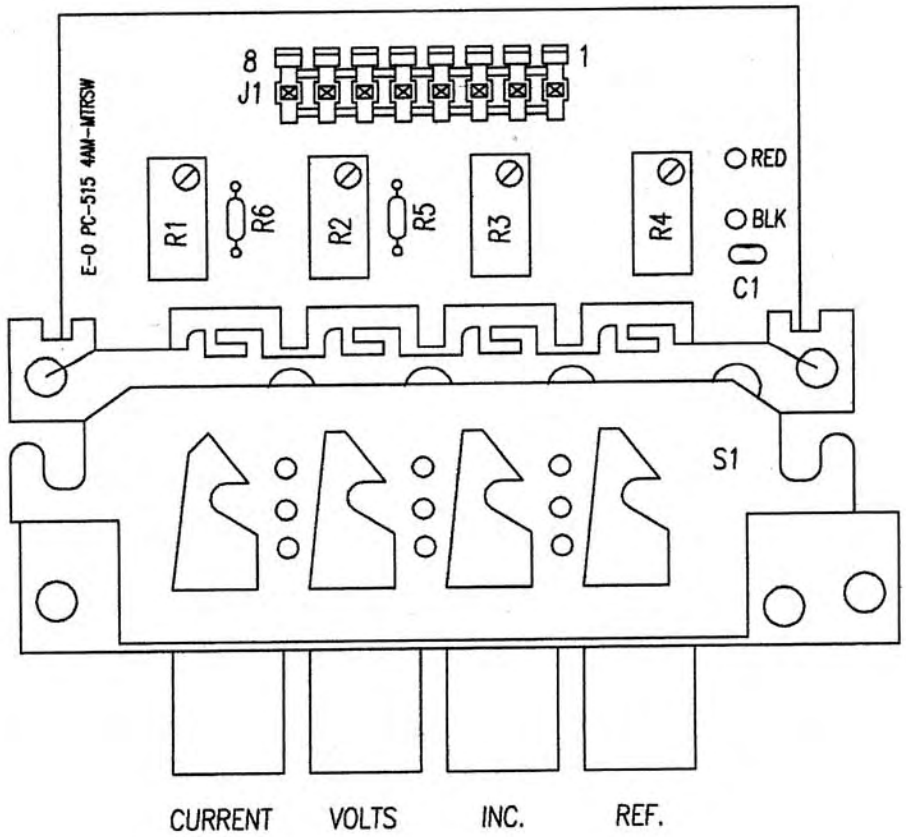
BROADCAST EQUIPMENT CO., INC.

1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

REVISION DESCRIPTION:	REVISION:
RE ID J#'s, TITLE CHANGED, 9/22/99	A

TITLE: MULTIMETER BOARD SCHEMATIC DIA. (PC-515)

DESIGNED BY: NDT	DATE: 11/04/98	DWG. BY: CKB	DWG. No. AM-2001S
MODIFIED: 3/5/07 by John McCool	CAD No. AM-2001S		



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1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

REVISIONS:

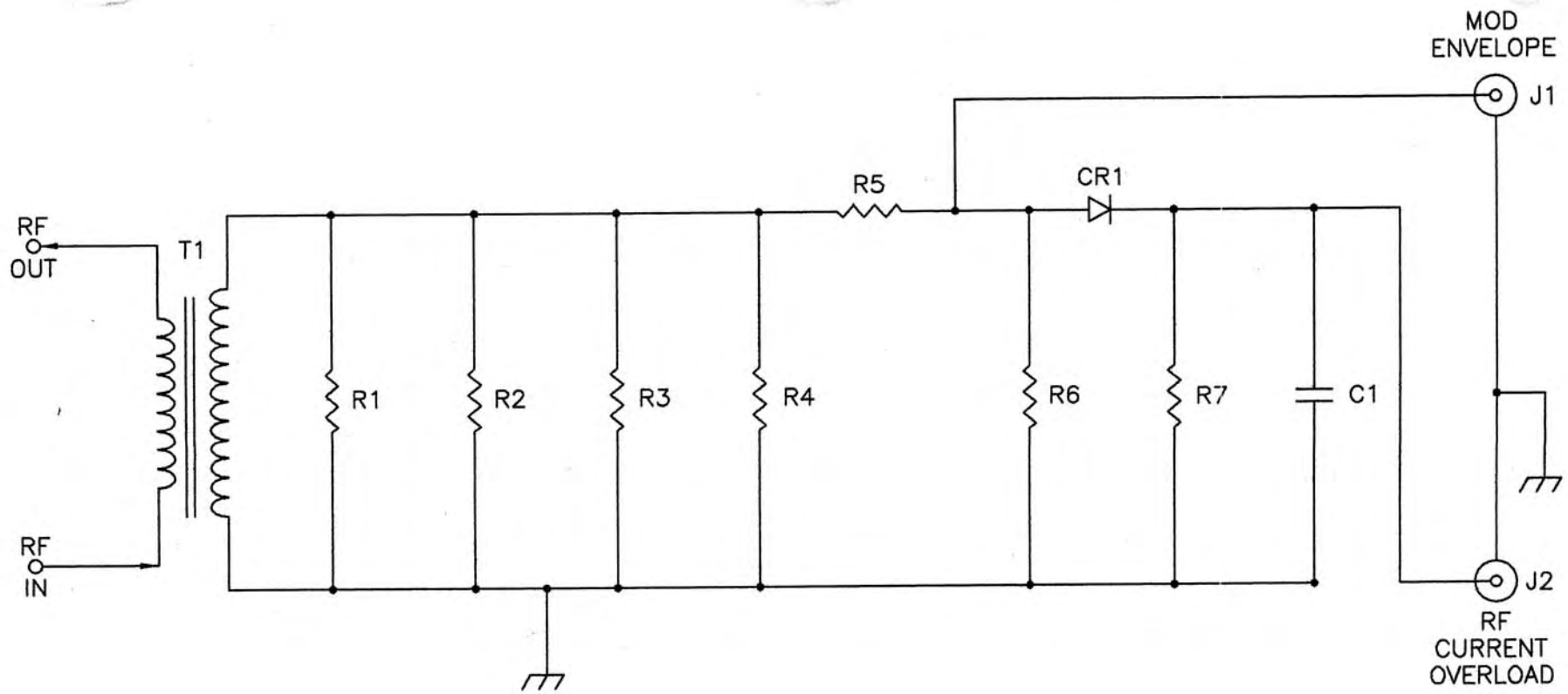
TITLE: MULTIMETER BD, PC-515 COMPONENT LAYOUT

DESIGNED BY: NDT	DATE: 9/22/99	DWG. BY: CKB	DWG. No. AM-2001C
MODIFIED: 3/5/07 by John McCool	CAD No. AM-2001C		

PC- 515 MULTIMETER BOARD

PARTS LIST

C1	.01/1KV DISC CERAMIC	
J1	8-PIN MOLEX HEADER	
R1-R3	100K VARIABLE, MULTI-TURN	
R4	500K VARIABLE, MULTI-TURN	
R5,R6	2.7K, 1/4W	
S1	SWITCHCRAFT 4-POSITION	65041K-206



PARTS LIST

C1	.27uf/100V STACK METAL FILM
CR1	1N4938
J1	BNC JACK, LOCATED ON PC-523 (COVER BOARD)
J2	RCA JACK, LOCATED ON PC-523 (COVER BOARD)
R1-R5	47ohm, 2W
R6	100K, 1/2W
T1	10 TURNS WOUND ON 5943003801 FERRITE TORROID
R7	10K 1/2W

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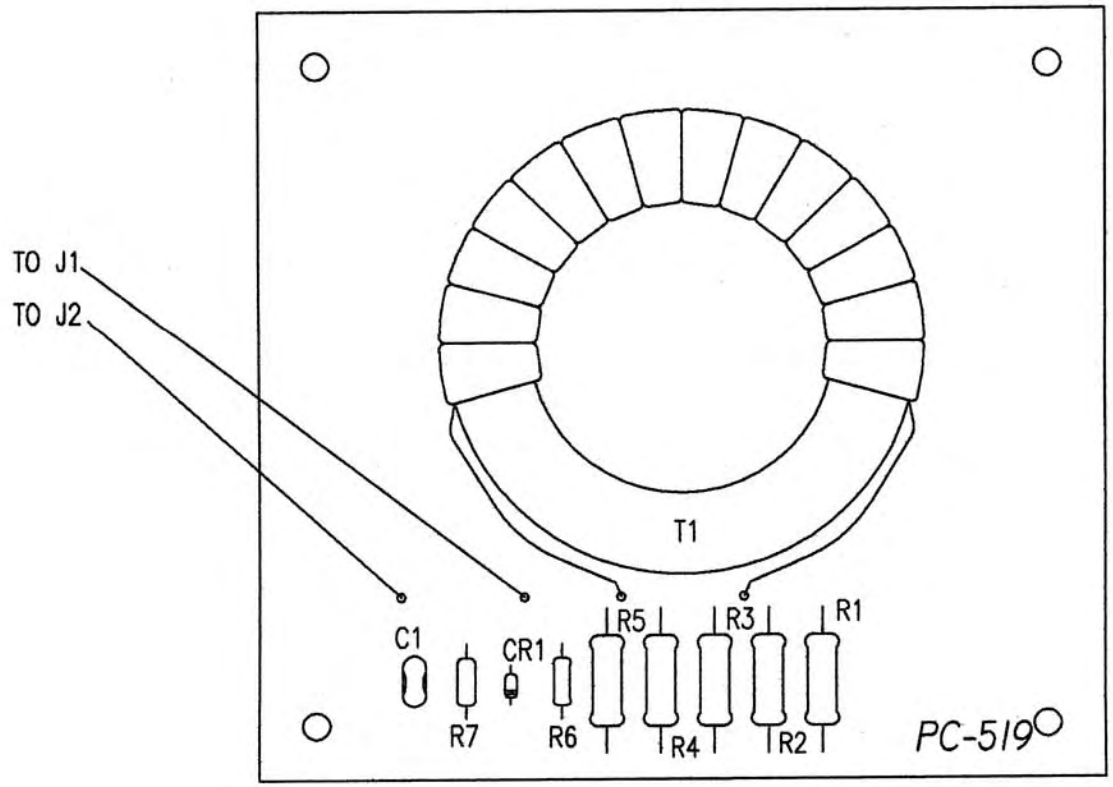
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

REVISIONS:

TITLE: RF CURRENT SAMPLE BD (PC-519)

DESIGNED BY: NDT/	DATE: 07/15/99	DWG. BY: CKB	DWG. No. AM-1901S
CHK'ED:	CAD No. AM-1901S		



PULSAR

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BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

REVISIONS:

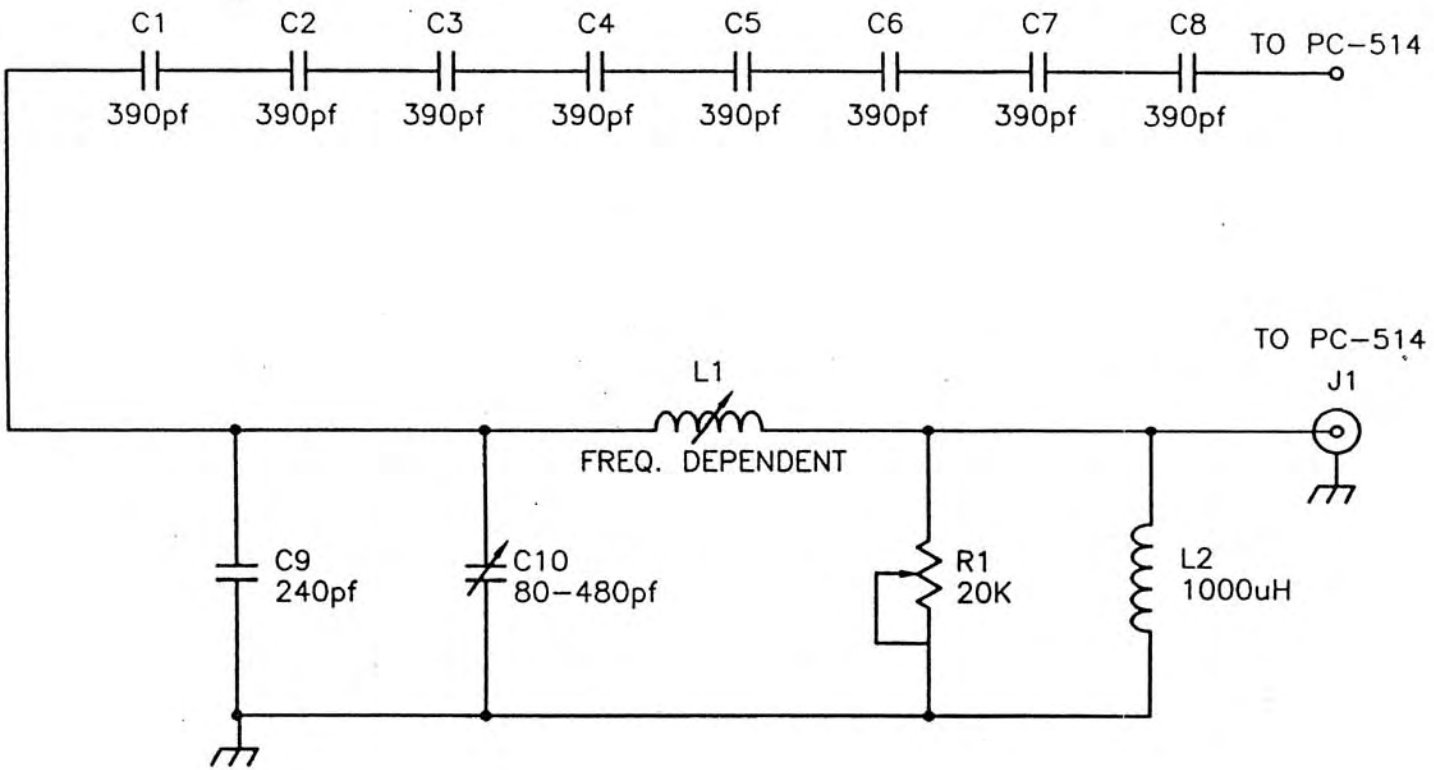
TITLE: RF CURRENT SAMPLE BD COMPONENT LAYOUT (PC–519)

DESIGNED BY:	DATE: 7/9/99	DWG. BY:	DWG. No.
CHK'ED:	CAD: AM–1901C	ERB	AM–1901C

PC- 519 RF CURRENT SAMPLE

PARTS LIST

C1	.01uf/100V STACK METAL FILM	
CR1	1N4938	
J1	BNC JACK, LOCATED ON PC-523 (COVER BOARD)	
J2	RCA JACK, LOCATED ON PC-523 (COVER BOARD)	
R1-R5	47ohm, 2W	
R6, R7	100K, 1/2W	
T1	10 TURNS WOUND ON FERRITE TORROID	5943003801



PARTS LIST

C1–C8	390pf DIP MICA
C9	240pf, DIP MICA
C10	80–480pf TRIMMER, EL–MENCO 466
J1	RCA JACK
L1	530–627kHz, 28–30uH, MILLER 9054 628–887kHz, 14–28uH, MILLER 9053 888–1255kHz, 7–14uH, MILLER 9052 1256–1710kHz, 3–7uH, MILLER 9051
L2	1000uH, DN41105ND
R1	20K VARIABLE, SINGLE TURN

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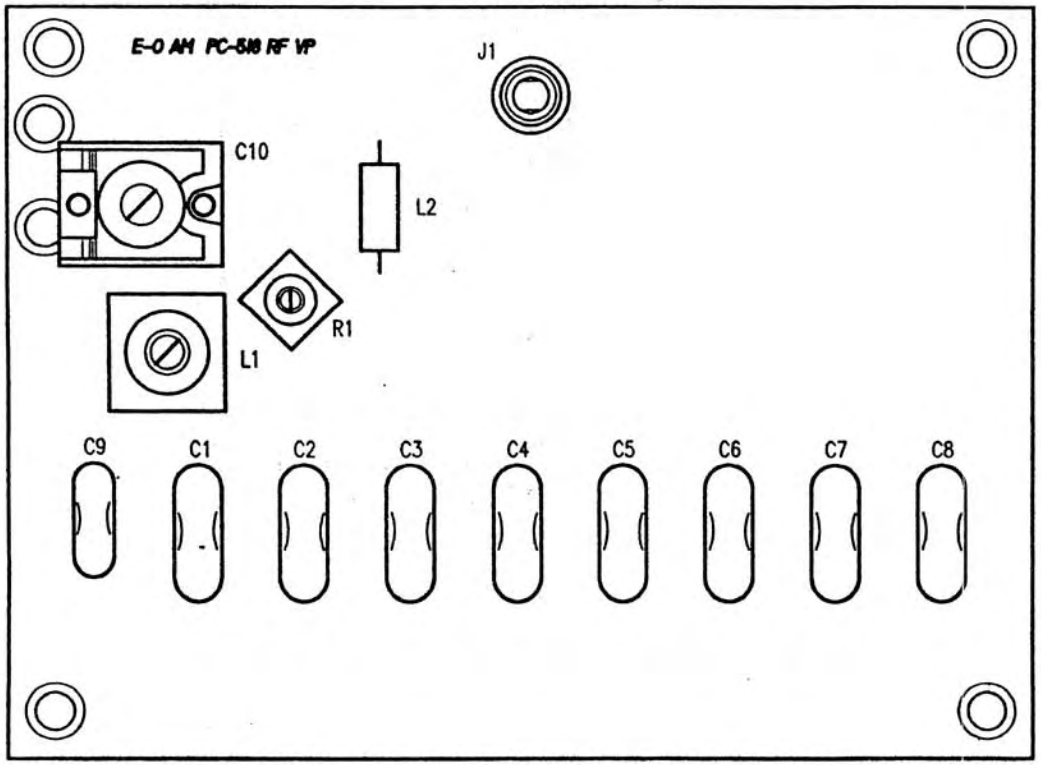
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

REVISION DESCRIPTION:	REVISION:
ADDED R1, REMOVED C11, 8/12/99	A

TITLE: RF VOLTAGE PROBE (PC–518)

DESIGNED BY: NDT/	DATE: 07/15/99	DWG. BY:	DWG. No.
CHK'ED:	CAD No. AM–1903S	CKB	AM–1903S



N.T.S.

PULSAR

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1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

REVISIONS:

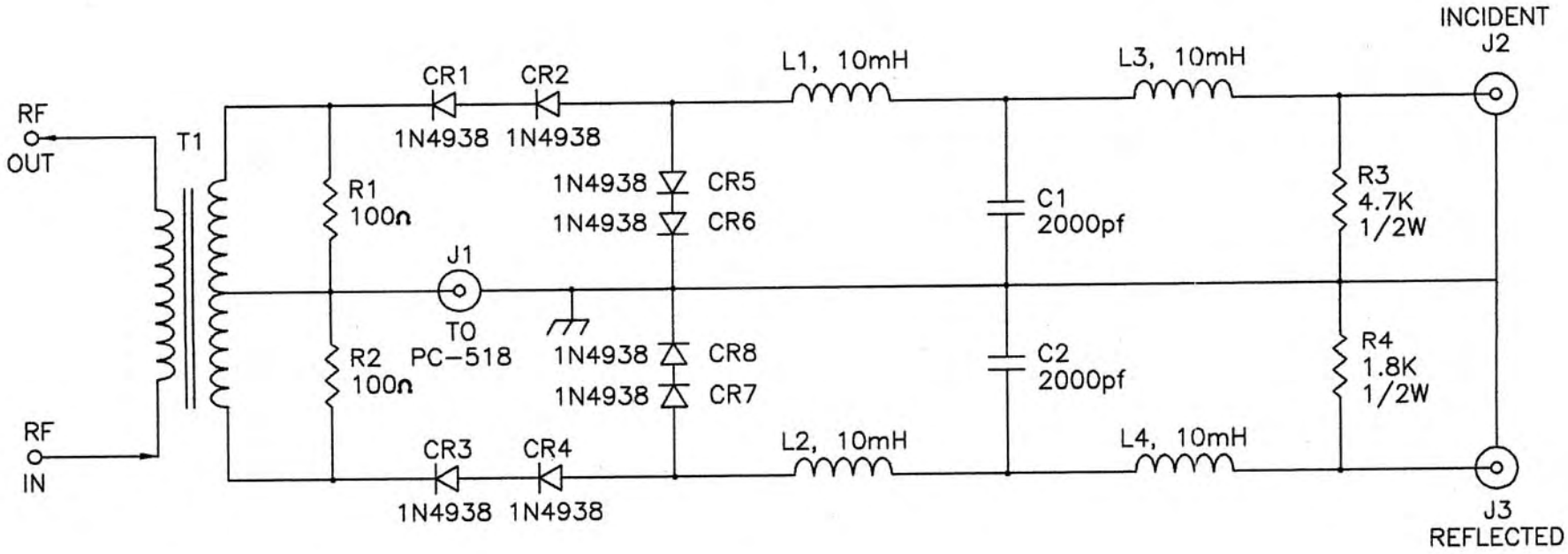
TITLE: RF VOLTAGE PROBE BOARD COMPONENT LAYOUT (PC–518)

DESIGNED BY: NDT	DATE: 10/30/98	DWG. BY:	DWG. No.
CHK'ED:	CAD: AM–1903C	ERB	AM–1903C

PC- 518 RF VOLTAGE PROBE

PARTS LIST

C1-C8	390pf DIP MICA	
C9	240pf DIP MICA	
C10	80-480pf TRIMMER	EL-MENCO 466
J1	RCA JACK	
L1	530-627kHz, 28-30uH	MILLER 9054
	628-887kHz, 14-28uH	MILLER 9053
	888-1255kHz, 7-14uH	MILLER 9052
	1256-1710kHz, 3-7uH	MILLER 9051
L2	1000uH, DN41105ND	
R1	20K VARIABLE, SINGLE TURN	



PARTS LIST

C1,C2	2000pf/500V DIP MICA
CR1–CR8	1N4938
J1–J3	RCA JACK, LOCATED ON PC–523 (COVER BOARD)
L1–L4	10mH RF CHOKE, M9263–ND
R1,R2	80ohm, CADDOCK
R3	4.7K, 1/2W
R4	1.8K, 1/2W
T1	20 TURNS, CENTER TAPPED, WOUND ON 5943003801 FERRITE TORROID

PULSAR

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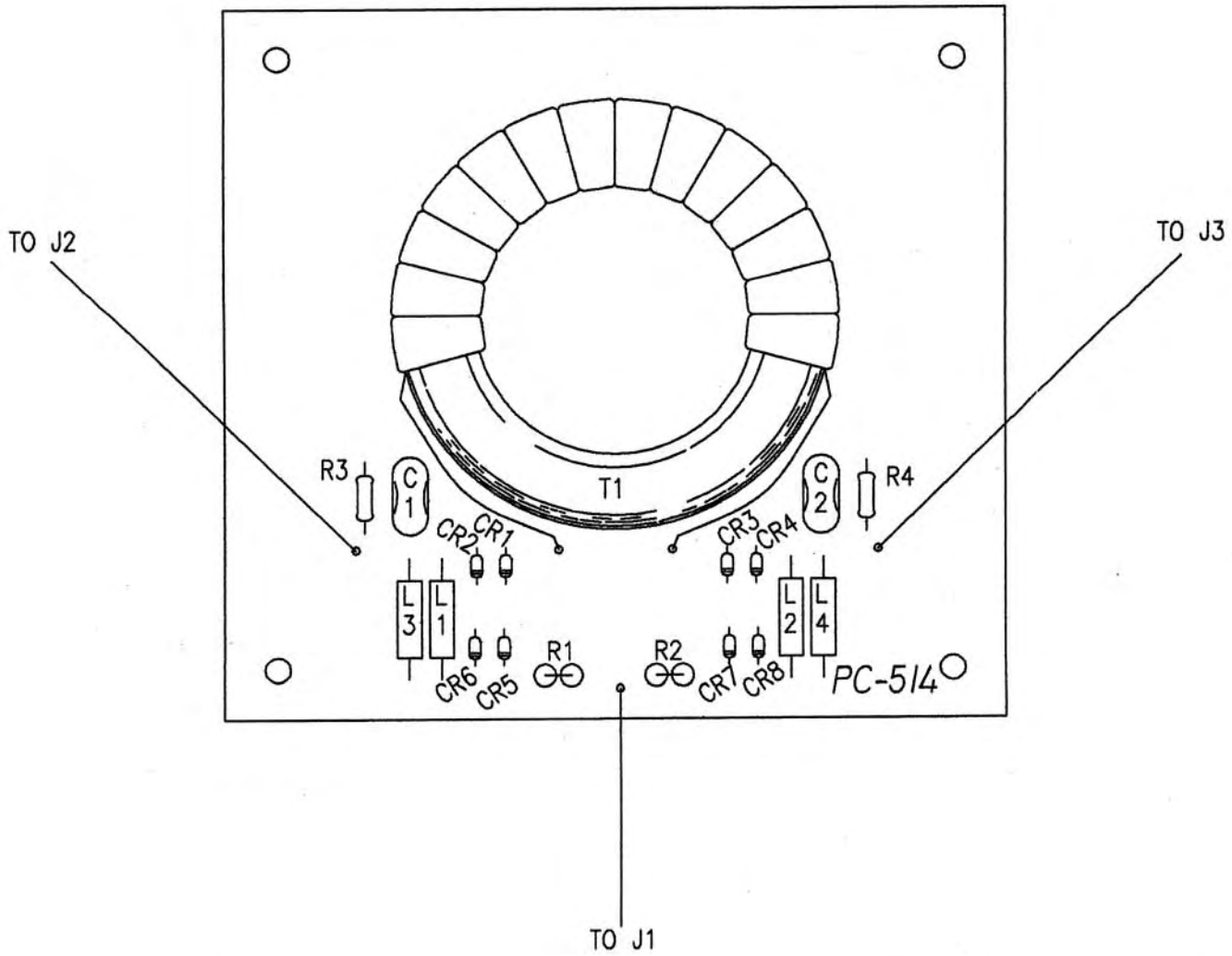
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

REVISION DESCRIPTION:	REVISION:
CORRECTED J CALLOUT, 8/9/99	A

TITLE: DIRECTIONAL COUPLER PCB (PC–514)

DESIGNED BY: NDT/TT	DATE: 07/14/99	DWG. BY: CKB	DWG. No. AM–1902S
MODIFIED: 3/5/07 by John McCool	CAD No. AM–1903S		



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PULSAR

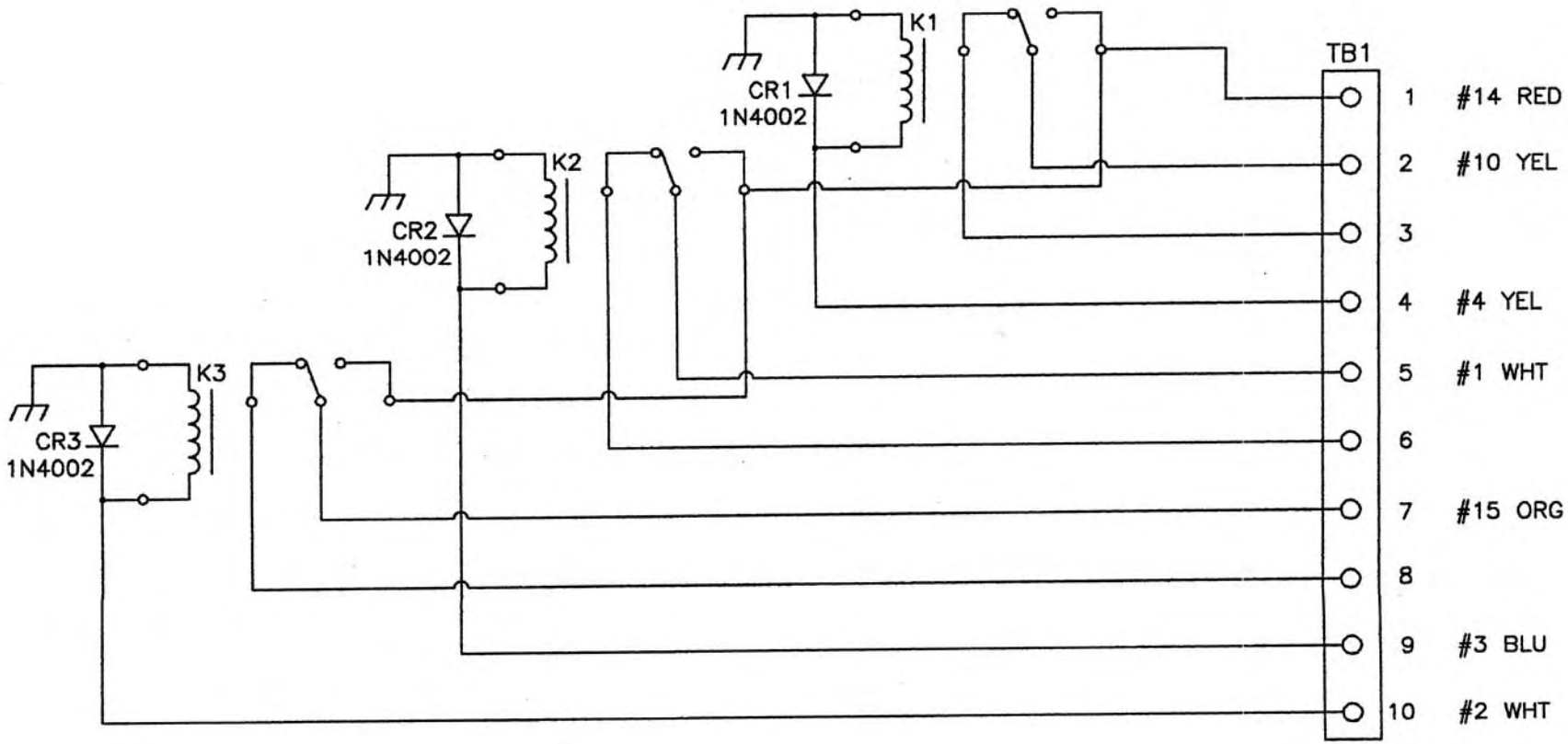
TITLE: DIRECTIONAL COUPLER BD COMPONENT LAYOUT (PC–514)

DESIGNED BY: NDT	DATE: 6/21/99	DWG. BY:	DWG. No.
MODIFIED: 3/5/07 by John McCool	CAD: AM–1902C	CRB	AM–1902C

PC- 514 DIRECTIONAL COUPLER

PARTS LIST

C1, C2	2000PF/500V DIP MICA	
CR1-CR8	1N4938	
J1-J3	RCA JACK, LOCATED ON PC-523 (COVER BOARD)	
L1-L4	10mH rf CHOKE, M9263-ND	
R1, R2	80ohm, CADDOCK	
R3	4.7K, 1/2W	
R4	1.8K, 1/2W	
T1	20 TURNS, CENTER TAPPED, WOUND ON FERRITE TORROID	5943003801



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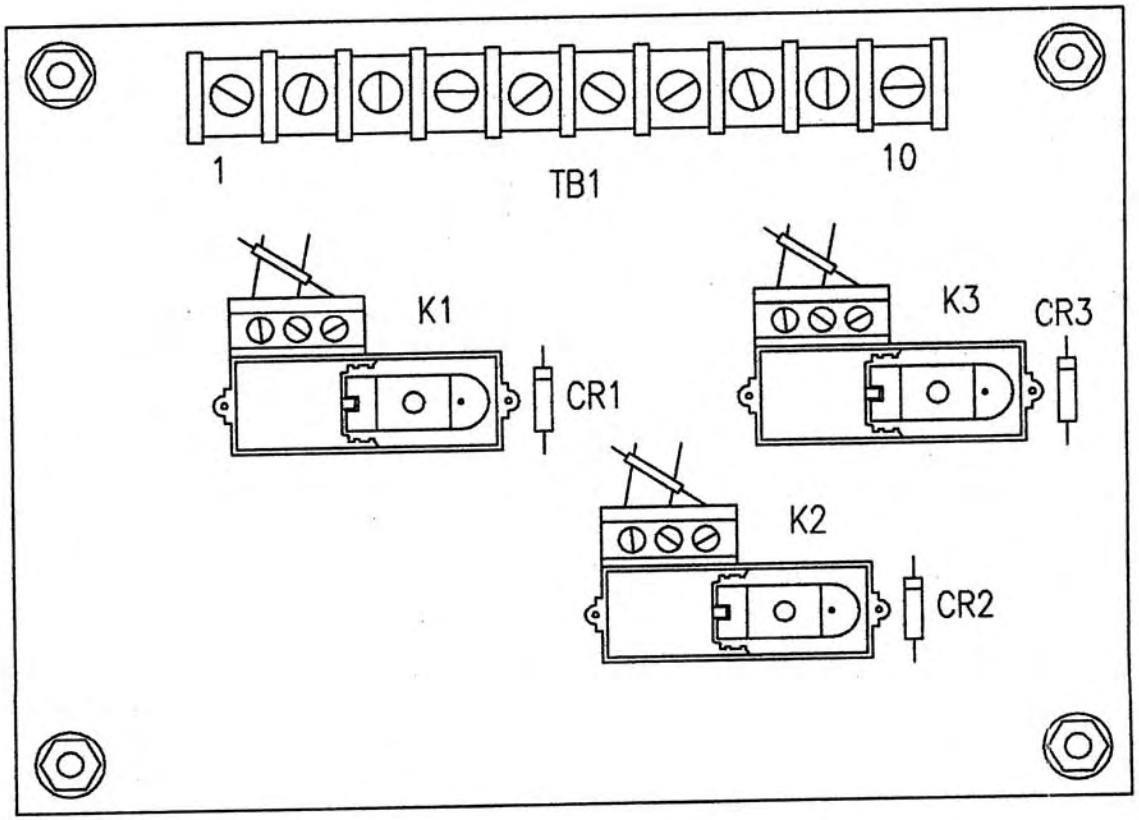
1306 RIVER ST., P.O. BOX 601, VALATIE, NY. 12184

NOTES:
N.T.S.

TITLE: PC–516C (PULSAR AUX RELAY BD.) SCHEMATIC

DWG. BY: John McCool		MODIFIED:	DWG. No.
DATE: 1/20/09	REV: –	–	S–165



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1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

NOTES:
N.T.S.

TITLE: PC–516C (PULSAR AUX RELAY BD.) COMPONENT LAYOUT

DWG. BY: John McCool		MODIFIED:	DWG. No.
DATE: 1/20/09	REV: –	–	CL–252

PC- 516A RF RELAY BOARD

PARTS LIST

CR1-CR3	1N4002	
K1- K3	HENGSTLER	H00-550-1569
TB1	10 POSITION, 20A, PC MOUNT	

PULSAR 1000

PARTS LIST: ACTIVE DEVICES AND FUSES

TRANSISTORS

PART DESC.	NUMBER PER TRANSMITTER	PC BOARD/DESIGNATION
2N2222A	(6)	501 - Q1,Q3,Q6,Q7 506 - Q2 509 - Q4
2N2914	(1)	501 - Q2
2N2219A	(2)	501 - Q4 506 - Q3
2N2905	(1)	501 - Q5
2N2907A	(5)	501 - Q8 509 - Q3 511 - Q1 (1 X 3 MODULES)
IRF540	(32)	502 - Q1,Q2 510 - Q1-Q8 (8 X 3 MODULES) 512 - Q1,Q2 (2 X 3 MODULES)
2N3497	(3)	511 - Q4 (1 X 3 MODULES)
2N5116	(1)	506 - Q1
2N4124	(11)	508 - Q1,Q2,Q3,Q4,Q5 509 - Q1 517 - Q1,Q2,Q4,Q5,Q6
2N930	(1)	509 - Q2
IRFU9014	(2)	509 - Q5,Q6 TRANSISTORS
MCR264-8	(3)	510 - Q9 (SCR) (1 X 3 MODULES)
2N5415	(3)	511 - Q2 (1 X 3 MODULES)
2N2323	(3)	511 - Q3 (THYRISTOR) (1 X 3 MODULES)
2N2369	(3)	511 - Q5 (1 X 3 MODULES)
2N5306	(1)	517 - Q3
S0802DH	(4)	521 - SCR1,SCR2

INTEGRATED CIRCUITS

PARTS LIST

PART DESC.	NUMBER PER TRANSMITTER	PC BOARD/DESIGNATION
MC14106BCP	(2)	501 - U1,U4
MC14013BCP	(2)	501 - U2 506 - U5
MC14526BCP	(1)	501 - U3
ICL7667CPA	(3)	511 - U1 (1 X 3 MODULES)
TL084IN	(1)	506 - U1
LM3302N	(2)	506 - U2,U3
TL082MJG	(4)	506 - U4,U6,U7,U8
LM319N	(1)	506 - U9
RC4200AN	(1)	506 - U10
339 OP AMP	(3)	507 - U1 508 - U1,U2
2502-4	(1)	507 - U2
2502-1	(1)	507 - U3
MC14049	(1)	509 - U1
CD4081BE	(1)	517 - U1
CD4001BE	(2)	517 - U2,U5
MC14538BE	(1)	517 - U3
CD40174BCN	(1)	517 - U4
LF347N	(1)	520 - U1

FUSES

PARTS LIST

PART DESC.	NUMBER PER TRANSMITTER	PC BOARD/DESIGNATION
3 AMP	(1)	CONTROLLER +15V
1 AMP	(7)	CONTROLLER -15V POWER SUPPLY (FANS): PA1, PA2, PA3, EXC, COMB, CAB

TROUBLESHOOTING POWER AMPLIFIER

Power amplifier modules with defective mosfets usually have a fault (red LED lit up on front panel of the module). With the transmitter power OFF, pull out the defective module by:

1. Disconnect the RF output cable, RF input cable, Mod input cable, and the DB-25 connector from the back panel of the module to be pulled out.

2. Loosen the top and bottom screws at the front of the module.

3. Slide the module out to the front, and put it on the bench.

4. Take out the right hand side cover by taking out the 6-32 flat head screws.

5. Physically examine first the components inside. Focus particularly on the eight RF and two modulator mosfets, and look for obvious damage.

6. Make resistance measurements in the following table.

TROUBLESHOOTING TABLE

POSITIVE LEAD	NEGATIVE LEAD	NORMAL	ABNORMAL
6a. Ground	TB 3-1& TB 3-2 or TB 3-3 & TB 3-4	Open	Short
6b. TB 3-1& TB 3-2 or TB 3-3 & TB 3-4	Ground	Greater than 3K ohms	Less than 3K ohms
6c. Ground	Terminal Post	50K ohms or higher	Low Resistance/Short
6d. Terminal Post	Ground	50K ohms or higher	Low Resistance/Short

7. If the reading in line 6a./6b. is a short or lower than 1000 ohms respectively, disconnect the output transformer from TB3 and make the following test to isolate which side of the board has the defective mosfets (left side or the right side).

POSITIVE LEAD	NEGATIVE LEAD	NORMAL	ABNORMAL
7a. Ground	TB 3-1 & TB 3-2 (output 1)	Open	Shorted
7b. TB 3-1 & TB 3-2 (output 1)	Ground	3.0K or above	Shorted
7c. Ground	TB 3-3 & TB 3-4 (output 2)	Open	Shorted
7d. TB 3-3 & TB 3-4 (output 2)	Ground	3.0K or above	Shorted

8. In condition 7a./7b., if it is shorted (left of the PC Board), it is either or both, Q2 and Q4 that is defective (shorted Drain to source).

9. For abnormal condition in 7a./7b. (right side of the PC Board), it is either or both, Q6 and Q8 that is defective (shorted Drain to source).

10. From condition 8, take out the mounting screw from Q2, and lift the mosfet a little bit such that the Drain (body of mosfet) is not touching the heatsink, or just simply insert an insulator underneath the mosfet.

11. Make the same measurement as in 7a./7b. If the short still exists, Q4 is defective. If there is no more short, Q 2 is defective.

12. Measure resistance between TB3-1/2 and Q2 Drain (mosfet body). If the reading is a short then, Q2 is defective.

13. Repeat procedures 8 to 10 for abnormal condition in 7c./7d. (right side of PC Board) to test Q4 and Q6.

13a. With the output transformer disconnected as in step 7 and 8, measure the resistance between TB 3-1 and TB 3-2 and terminal post. Normally it should be open. If there is a short, or very low resistance, either Q1 or Q3 or both are defective.

13b. Measure the resistance between TB 3-3 and TB 3-4 and terminal post. Normally it is open. If there is a short or very low resistance, Q5 or Q7 or both are defective.

NOTE: If readings on procedures 7 to 13 are normal, it doesn't guarantee yet that the mosfets are good. All mosfets input side should be tested.

14. Unsolder the input transformer wires that go into each gate of the eight RF mosfets, Q1 - Q8.

15. Measure the gate to source resistance of each of the eight mosfets. Normally, resistance reading is open or infinite. If there is a low resistance reading or short, that particular mosfet is defective and should be replaced.

16. Replace the defective RF mosfets, and also replace the transorbs (P6KE10CA) that is mounted across the defective mosfet removed in step 14.

17. From the abnormal readings made on 6c./6d. (a short or a low resistance to ground), proceed as follows:

17a.) Disconnect the two output wires from the modulator, to isolate the trouble.

17b.) Measure resistance again between the terminal post to ground (as in table 6c./6d.). If the short still exists, the crowbar Q9 (MCR25D or MCR264-8)) is shorted. Verify, and replace Q9. If there are no more short between the terminal post and ground when the modulator wires are disconnected, it is the modulator mosfet, or mosfets, that is causing the short.

17c.) Measure the resistance between the modulator output (Q1 & Q2 Drain) and ground with positive lead to ground and negative lead on the drain This should be open. (Initially, the reading might be around 20K and goes higher as capacitor discharges down.)

17d.) If there is a short as shown on the ohmmeter, there might be a punctured insulating pad.

17e.) Jumper or short out with jumper wire across the gate and source of each of the modulator mosfets (momentarily) to discharge any voltage across the gate and source (the presence of a voltage or charge turns on the mosfet or shorts the source and drain).

17f.) Measure the resistance between the gate and the source of Q1 and Q2. Normally it is open in both directions. Abnormal - it is shorted. If it is shorted, replace mosfet. If it is open, continue.

17g.) Measure resistance between source and drain of Q1 and Q2. Normally - it should be open in both directions.

18. Replace the defective modulator mosfet.

NOTE: Even if only one modulator mosfet is defective, replace both Q1 and Q2. Occasionally, when Q1 and Q2 go, U1 of PC511 (ICL7667) also goes, and sometimes Q9 (MCR25D or MCR264-8) goes. Replace U1 and Q9. In very rare occasions when modulator mosfets go, Q4 and Q5 also go (see component layout PC511).

19. In replacing modulator mosfets, refer to page 115.

20. After the defective mosfets or other defective parts have been replaced, clean up in between the mosfet leads, because there might be small amount of solder of metal across the leads of the mosfets.

21. Make sure that the output transformer, input wires to the RF, and everything else has been restored. Perform a quick check as outlined from 6.

22. Re-install the hardwares to the box and install it to the transmitter.

23. .When testing the repaired amplifier, you should set to variable output and it should be at minimum. Slowly raise the power as you continue on.

REPLACING RF MOSFETS ON PC 512

1. In taking out the defective mosfets in the RF PC 512, unsolder first the transformer input wires at the gate and source of the mosfets to be replaced. Take out the transorbs (P6KE10CA), then take out the defective mosfets.

2. Clean up the mounting pads on the PC Board with solder wick, and also clean up the part of the heatsink where the defective mosfet has been previously mounted.

3. Make sure that there is adequate thermal grease between the device body and the heatsink for RF Q2, Q4, Q6 or Q8.

Align properly the insulating pad hole and the heatsink mounting hole.

4. For Q2, Q4, Q6 or Q8, they are mounted directly to heatsink without insulating pad, but for Q1, Q3, Q5 or Q7, it has an insulating pad .

NOTE: If a mosfet is replaced, replace also the transorb (P6KE10CA) associated with that mosfet.

REPLACING MODULATOR MOSFET

1. Remove the defective modulator mosfets by removing the mounting screws on Q1, Q2. Unsolder the Q1 and Q2.

2. Clean up old solder on the board surface, remove the old insulating pad, then wipe clean the heatsink.

3. Install the new mosfets with new insulating pads. Align it with the PC Board.

4. Solder the leads in place.

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BY:JW	USEON:PULSAR 1000
DATE:09-24-02	SHEET 1 OF 3

BASE (POWER SUPPLY) WIRE RUN SHEET

RE #	AWG	COLOR	FROM	REMARKS	TO
1	10	GREEN	TB1-1		MOV'S
2	10	GREEN	TB1-1		RAIL GROUND
3	10	GREEN	BLEEDER RESISTOR		RAIL GROUND
4	10	GREEN	JUNCTION OF 2-.05Ω RES.		RAIL GROUND
5	10		N/U		N/U
6	10	RED	TB1-2	A PHASE	TB2-1
7	10	RED	TB1-2	A PHASE	TB4-14
8	10	RED	TB1-2	A PHASE	MOV
9	10	BLACK	TB1-3	B PHASE	TB2-2
10	10	BLACK	TB1-3	B PHASE	TB4-13
11	10	BLACK	TB1-3	B PHASE	MOV
12	10	RED	TB2-3		K4 CONTACTOR LINE SIDE IN
13	10	BLACK	TB2-4		K4 CONTACTOR LINE SIDE IN
14	10	RED	K4 CONTACTOR LOAD SIDE OUT		POWER SUPPLY #1
15	10	BLACK	K4 CONTACTOR LOAD SIDE OUT		POWER SUPPLY #2
	10				
	10	WHITE	NEG.OUTPUT OF POWER SUPPL		C1-NEGATIVE
18	10		N/U		
19	10	RED	POS. OUTPUT OF POWER SU PP		JUNCTION OF 2-.05Ω RES.
20-21			N/U		
22	10	WHITE	NEG. OUTPUT OF CAPACITOR		TB2-5&6
23	10	BLUE	NEG.OUTPUT OF CAPACITOR		TB2-7&8
24-28			N/U		
29	10	WHITE	NEG. OUTPUT OF CAPACITOR		BLEEDER RESISTOR

Energy-Onix

BY:JW	USEON:PULSAR 1000
DATE:09-24-02	SHEET 2 OF 3

CABINET AC & DC WIRE RUN SHEET

RE #	AWG	COLOR	FROM	REMARKS	TO
30	16	BROWN	TB3-1	PA1 FAN	TB7-1
31	16	RED	TB3-2	PA2 FAN	TB7-3
32	16	ORANGE	TB3-3	PA3 FAN	TB7-5
33	16	WHITE	TB3-4	EXC/CONTRL	TB12-1
34	16	GRAY	TB3-5	COMBINER	TB13-1
35	16	BLUE	TB3-6	RECTIFIER	TB4-11
36	16	BLUE	TB3-6	BACK DOOR	MOLEX BACK DOOR
37	16	YELLOW	TB3-7	FAN ON	TB4-10
38	16	ORANGE	TB3-8	CONTRL ON	TB4-12
39	16	BLACK	TB1-3	B PHASE	TB7-2
40	16	BLACK	TB1-3	B PHASE	TB7-4,6
41	16	BLACK	TB7-4	B PHASE	MOLEX BACK DOOR
42	16	BLACK	TB7-2	COMBINER	TB13-3
43	16	BLACK	TB7-2	CONTL FAN	TB12-3
	16	RED	TB8-1 (JUMPER 1,2,3)	+15 VOLTS	D-SUB CONTROLLER PIN 13
	20	PURPLE	TB8-4	PA VOLTS	CONTROL D-SUB PIN 8
46	10	WHITE	TB2-9	IPA VOLT	TB11-4
47	10	WHITE	TB2-10	PA1 VOLT	TB9-1,2
48	10	GREEN	TB9-3,4		GROUND RAIL
49	10	RED	TB2-11	PA2 VOLTS	TB9-5,6
50	10	GREEN	TB9-7,8		GROUND RAIL
51	10	BLUE	TB2-12	PA3 VOLTS	TB9-9,10
52	10	GREEN	TB9-11,12		GROUND RAIL
53	16	RED	TB4-2	+15V IN	TB11-1
54	16	BLUE	TB4-3	-15V IN	TB11-2
55	20	BLUE	TB4-4	PLATE ON	D-SUB CONTROLLER PIN 4
56	20	YELLOW	TB4-5	FAN ON	D-SUB CONTROLLER PIN 3
57	20	WHT/PUR	TB4-6	THERMO	D-SUB CONTROLLER PIN 1
58	20	WHT/GRY	TB4-7		C.B.PANEL INTERLOCK
59	20	WHT/YEL	TB4-8	CURRENT	D-SUB CONTROLLER PIN 6
60	14	GREEN	TB4-9		GROUND RAIL
	20	GRAY	C.B.PANEL INTERLOCK		REAR DOOR INTERLOCK
	20	WHT/ORN	REAR DOOR INTERLOCK		D-SUB CONTROLLER PIN 2

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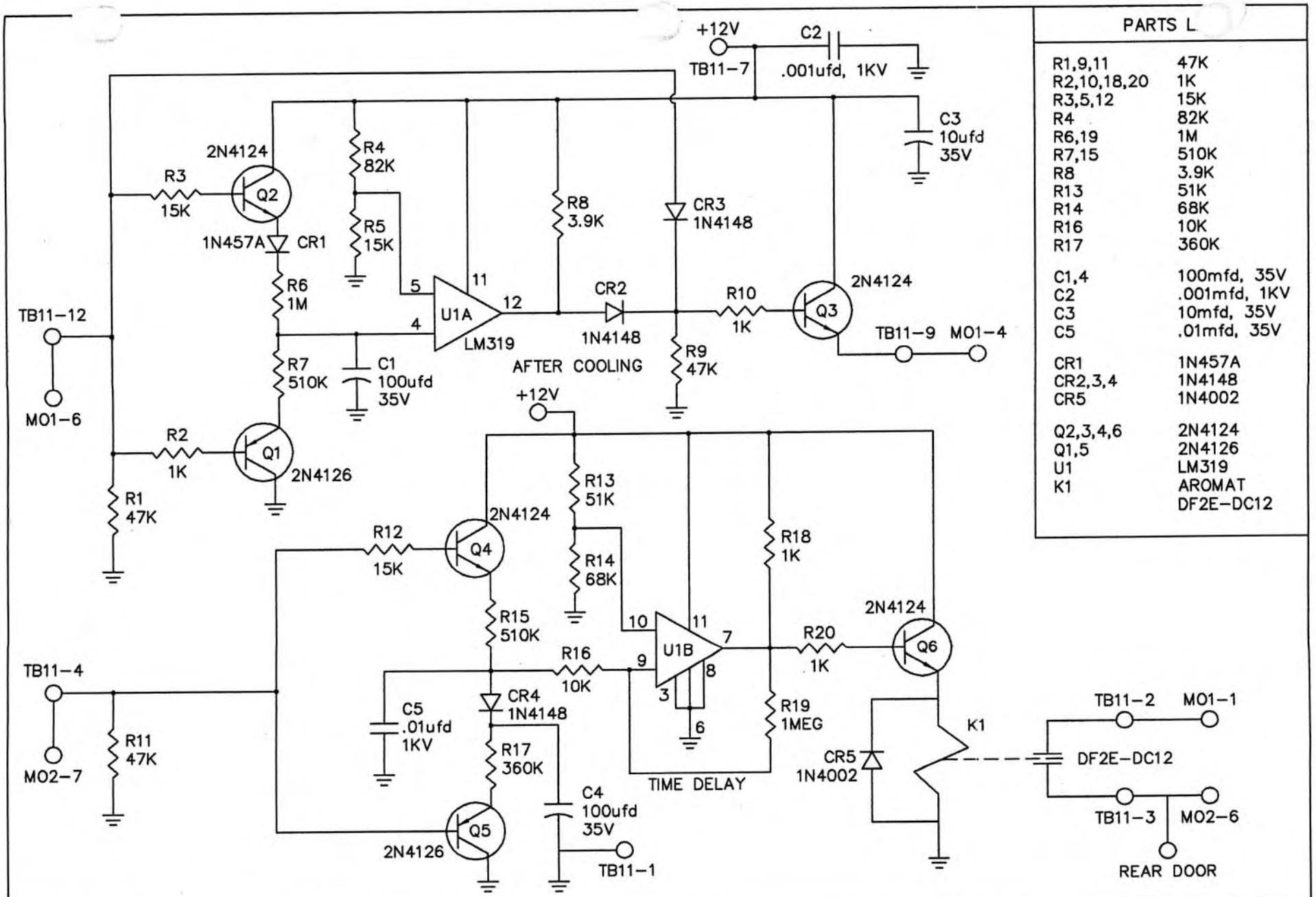
BY:JW	USEON:PULSAR 1000
DATE:09-24-02	SHEET 3 OF 3

CABINET AC & DC WIRE RUN SHEET

IE #	AWG	COLOR	FROM	REMARKS	TO
63	20	BROWN	COMBINER	RF CURRENT	D-SUB CONTROLLER #5
64					
65	20	RED	CONTROLLER DB-25 #23	VOLTAGE	COMBINER DB 25 #13
66	20	YELLOW	CONTROLLER DB 25 #7	CURRENT	COMBINER DB 25 #11
67	20	RED	CONTROLLER DB 25 #12	INC	COMBINER DB 25 #7
68	20	YELLOW	CONTROLLER DB 25 #11	REFLECTED	COMBINER DB25 #8
69	20	GREEN	CONTROLLER DB 25 #14	GROUND	TO CABINET RAIL
70	20	GREEN	CONTROLLER DB 25 #15	GROUND	TO CABINET RAIL
71	20	WHITE	COMBINER DB 25-1	K1 BYPASS	SHELF TB8-7
72	20	RED	COMBINER DB 25-3	K2 BY PASS	SHELF TB8-8
73	20	BLUE	COMBINER DB25- 25	K3 BY PASS	SHELF TB8-9
74	20	WHT/ORG	COMBINER DB 25- 14	LEVEL 1	CONTROLLER DB 15
75	20	WHT/VIO	COMBINER DB 25-15	LEVEL 2	CONTROLLER DB 16
76	20	WHT/BLK	COMBINER DB 25-16	LEVEL 3	CONTROLLER DB 17
77	20	WHT/YEL	COMBINER DB 25-17	LEVEL 4	CONTROLLER DB 18
	20	BLACK	COMBINER DB 25-19	-15 VOLTS	CONTROLLER DB 14
	20	RED	COMBINER DB 25-21	+15 VOLTS	SHELF TB 8 #2
80-83			N/U		
84	16	WHITE	-72 VOLTS C1 NEG	METER -72	TB 12-3
85	20	RED	PS ±15 V #2 V1	+15V -#2	CONTROL D SUB # 19
86	20	BLACK	PS ±15V # 2 G2	-15V #2	CONTROL D SUB #20
87	20	GREEN	PS ±15 # 2 GI	GROUND	CONTROLLER D SUB #21
88	20	GREEN	PS ± 15V #2 VZ	GROUND	PS ±15V GROUND
89	20	BLUE	PS ±15 #2 N	BØ	PS ± 15V #1 N
90	20	ORANGE	PS±15V #2 L	AØ	PS ±15V #1 L
91	16	GREEN	PS± 15V #1 V2	GROUND	RAIL
92	20	GREEN	PS±15V #1 G1	GROUND	PS ± 15V#1 GROUND
93	20	RED	CROWBAR #2 TB1	+15V	PS ±15 V #2 V1
94	20	GREEN	CROWBAR #2 TB 2	GROUND	PS ±15V#2 G1/V2
95	20	BLACK	CROWBAR #2 TB 3	-15V	PA ±15V #2 G2
96			N/U		N/U
97	14	GREEN	TB11-3		RAIL GROUND



PARTS L	
R1,9,11	47K
R2,10,18,20	1K
R3,5,12	15K
R4	82K
R6,19	1M
R7,15	510K
R8	3.9K
R13	51K
R14	68K
R16	10K
R17	360K
C1,4	100mfd, 35V
C2	.001mfd, 1KV
C3	10mfd, 35V
C5	.01mfd, 35V
CR1	1N457A
CR2,3,4	1N4148
CR5	1N4002
Q2,3,4,6	2N4124
Q1,5	2N4126
U1	LM319
K1	AROMAT DF2E-DC12

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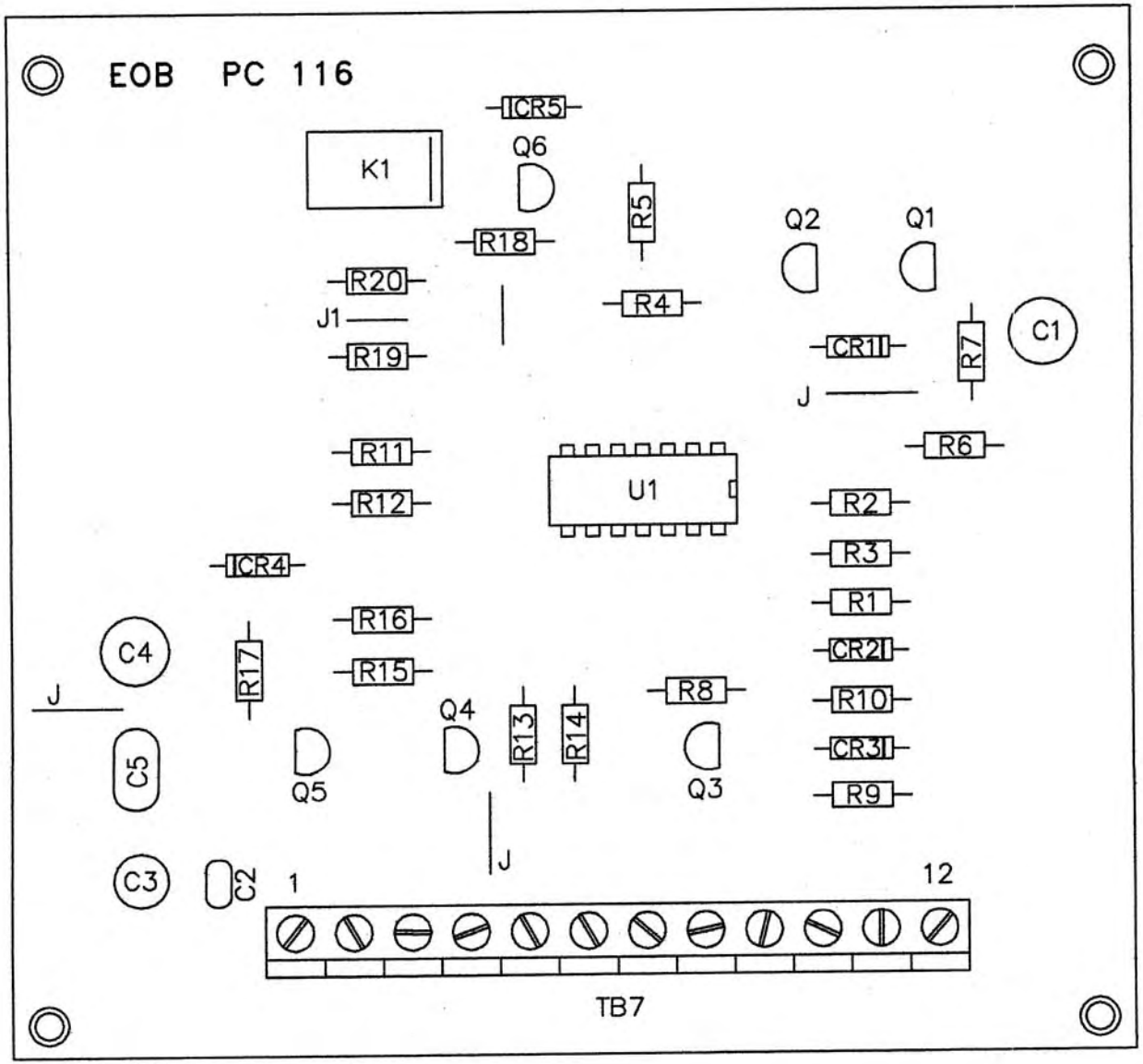
BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

REVISIONS: 9/26/97
THIS DRAWING REPLACES S-303A AS OF 12-2-01

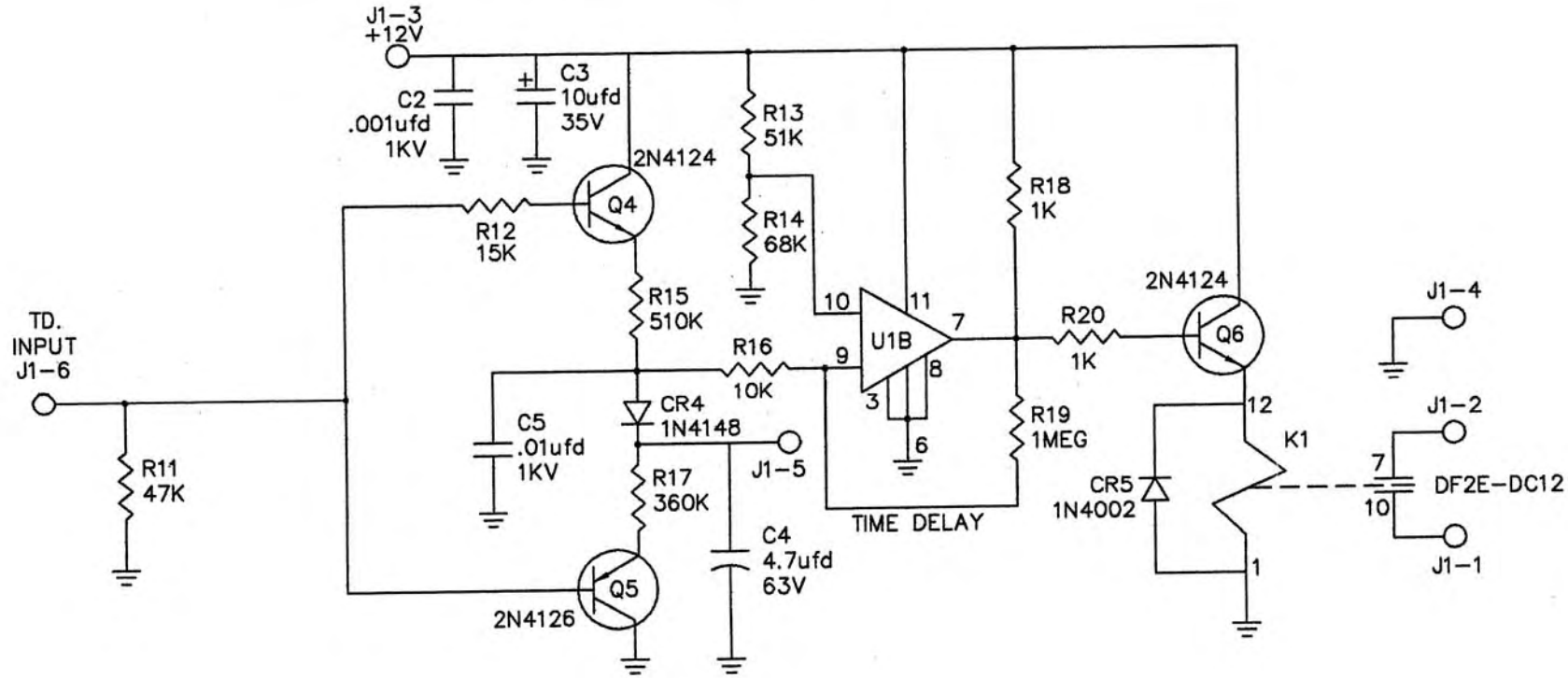
TITLE: DUAL TIME DELAY BD SCHEMATIC (PC-116)

DESIGNED BY: JW	DATE: 12-2-01	DWG. BY: DH	DWG. No. S-303B
CHK'ED:	CAD No. S-303B		



NTS

Energy–Onix BROADCAST EQUIPMENT CO., INC. 1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184	REVISION DESCRIPTION: ADD J1, R5, CHG R15 TO R18, 08/23/00	REVISION: A	TITLE: 'ECO' DUAL TIME DELAY BD. COMPONENT LAYOUT (PC–116) DESIGNED BY: CRB · DATE: 9/14/97 · DWG. BY: CRB · DWG. No. CL–65 CHK'ED: · CAD: CL–65



PARTS LIST

R11.....47K	R18.....1K	CR4.....IN4148	
R12.....15K	R19.....1M	CR5.....IN4002	
R13.....51K	R20.....1K	Q4.....2N4124	
R14.....68K	C2.....0.001MFD, 1KV	Q5.....2N4126	
R15.....510K	C3.....10MFD, 35V	U1.....LM319	
R16.....10K	C4.....4.7UFD, 63V	K1.....AROMAT DF2E-DC12	
R17.....360K	C5.....0.01MFD, 35V		

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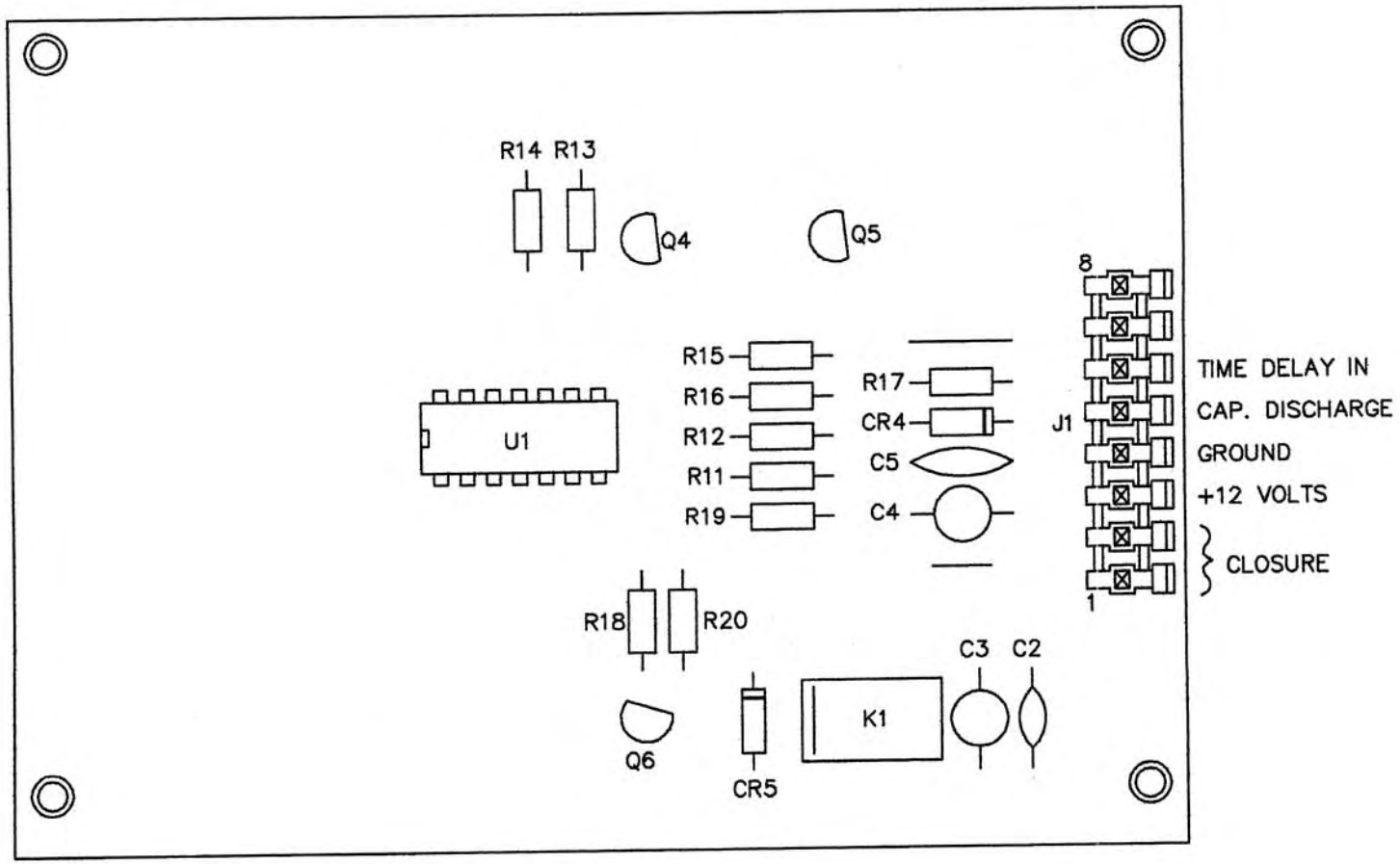
BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

REVISIONS:

TITLE: TIME DELAY BD SCHEMATIC (PC-602)

DESIGNED BY: JW	DATE: 12/12/97	DWG. BY: CKB	DWG. No. S-817
MODIFIED: 3/5/07 by John McCool	CAD No. S-817		



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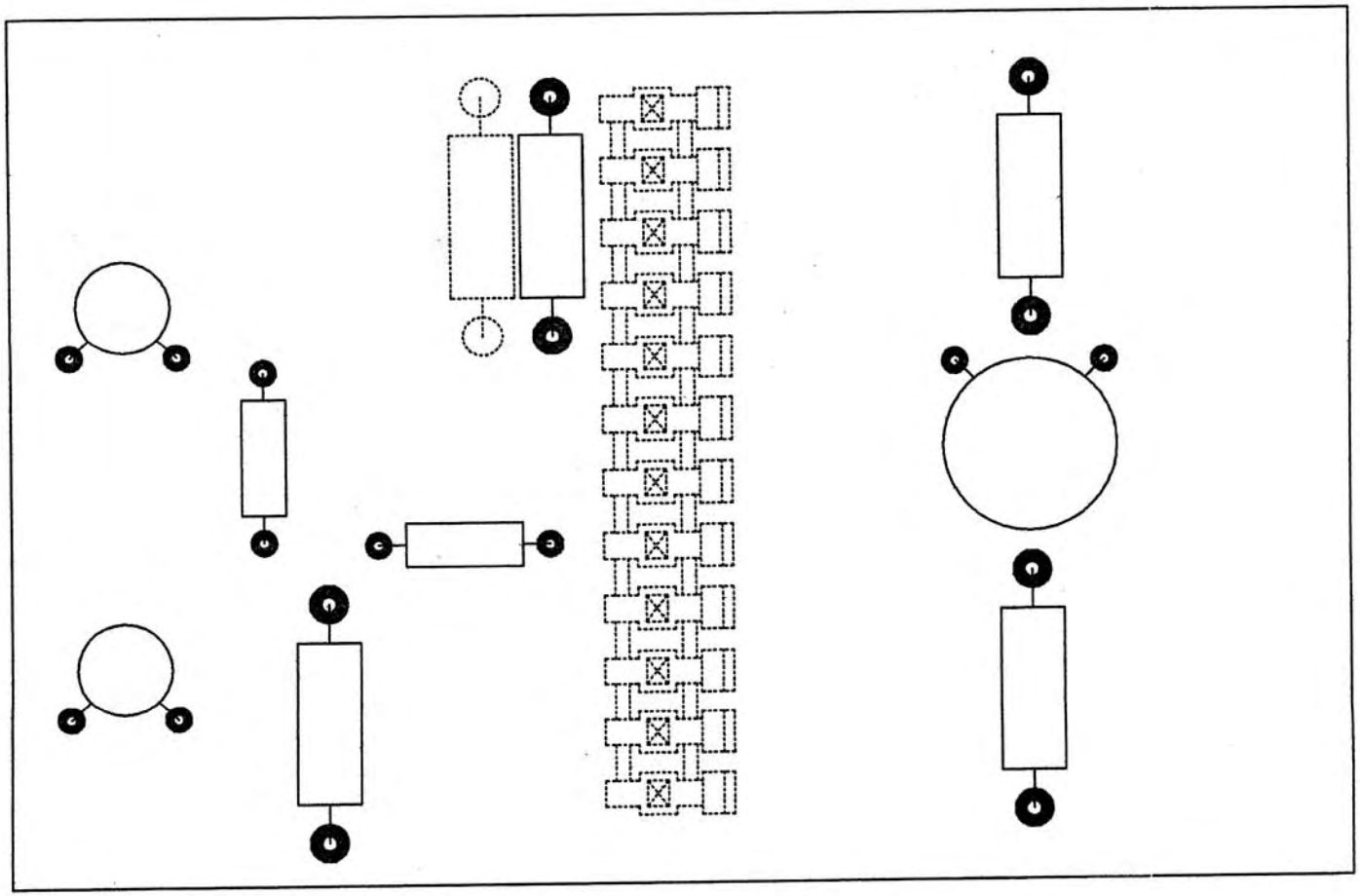
BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

REVISION DESCRIPTION:	REVISION:

TITLE: TIME DELAY BD. COMPONENT LAYOUT (PC–602)

DESIGNED BY: NT	DATE: 11–21–02	DWG. BY:	DWG. No.
MODIFIED: 3/5/07 by John McCool	CAD: CL–759	DH	CL–759



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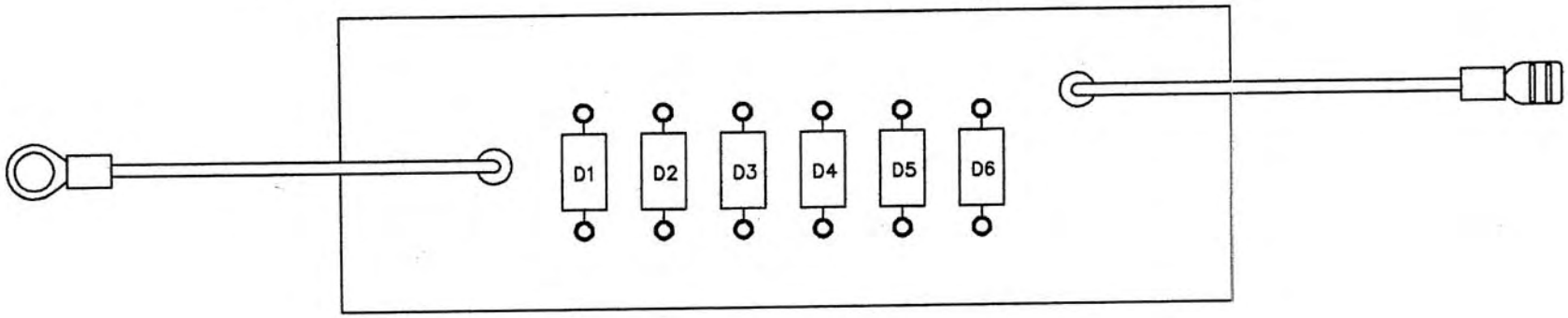
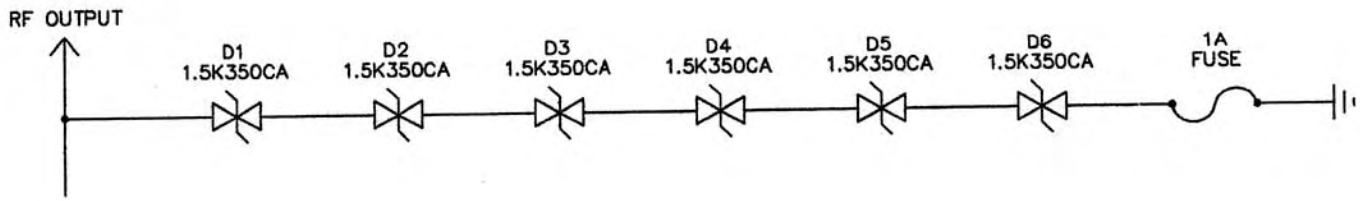
BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

TITLE: COMPONENT LAYOUT
PC–533

DESIGNED BY:	DATE: 3/7/07	DWG. BY: John McCool	DWG. No. PC–533
CHK'ED:	CAD No. PC–533		





N.T.S.

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BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

PULSAR

TITLE: Component Layout PC–532A			
DESIGNED BY: PI	DATE: 3/12/07	DWG. BY: John McCool	DWG. No. PC–532A
CHK'ED:	CAD: PC–532A		

121

PULSAR 1000 CABINET WIRE LIST

HIGH VOLTAGE

WIRE #	AWG	COLOR	FROM		TO
1	6	GREEN TAPE	TB1-1		GROUND RAIL
2	10	RED	TB1-2	A PHASE	TB2-1
3	10	BLACK	TB1-3	B PHASE	TB2-2
4	10	RED	TB2-3		H.V. CONTACTOR INPUT
5	10	BLACK	TB2-4		H.V. CONTACTOR INPUT
6	10	RED	H.V. CONTACTOR OUTPUT		PLATE TX. +10
7	10	BLACK	H.V. CONTACTOR OUTPUT		PLATE TX. 240
8	10	RED	TB1-2		MOV 131
9	10	BLACK	TB1-3		MOV 131
10	10	GREEN	131 MOVS		GROUND RAIL
11	10	BLUE	TX. SECONDARY		AC INPUT OF RECTIFIER
12	10	BLUE	TX. SECONDARY		AC INPUT OF RECTIFIER
13	10	WHITE	NEGITIVE OF RECTIFIER		CHOKE INPUT
14	10	RED	POSITIVE OF RECTIFIER		JUNCTION OF .05 OHM RES.
15	10	GREEN	JUNCTION OF .05 OHM RES.		RAIL GROUND
16	10	BLACK	OUTPUT OF CHOKE		500 OHM BLEEDER RES.
17	10	GREEN	500 OHM BLEEDER RES.		RAIL GROUND
18	10	BLACK	OUTPUT OF CHOKE		NEGITIVE OF CAPACITOR C1
19	10	GREEN	POSITIVE OF CAPACITOR C1		RAIL GROUND
20	10	BLACK	OUTPUT OF CHOKE		TB2-5
21	10	BLACK	OUTPUT OF CHOKE		TB2-7
22	10	BLACK	OUTPUT OF CHOKE		C2 RESONATING CAP
23	10	WHITE	INPUT OF CHOKE		C2 RESONATING CAP

PULSAR 1000 CABINET WIRE LIST

HIGH VOLTAGE

WIRE #	AWG	COLOR	FROM	TO
24	10	RED	H.V. CONTACTOR INPUT	L.V. CONTACTOR INPUT
25	10	BLACK	H.V. CONTACTOR INPUT	L.V. CONTACTOR INPUT
26	10	RED	H.V. CONTACTOR OUTPUT	5 OHM,100W RESISTOR
27	10	BLACK	H.V. CONTACTOR OUTPUT	5 OHM,100W RESISTOR
28	10	RED	5 OHM,100W RESISTOR	L.V. CONTACTOR OUTPUT
29	10	BLACK	5 OHM,100W RESISTOR	L.V. CONTACTOR OUTPUT

PULSAR 1000 CABINET WIRE LIST

LOW VOLTAGE

WIRE	AWG	COLOR	FROM	REMARKS	TO
30	16	BROWN	TB3-1	PA1 FAN	TB7-1
31	16	RED	TB3-2	PA2 FAN	TB7-3
32	16	ORANGE	TB3-3	PA3 FAN	TB7-5
33	16	WHITE	TB3-4	EXC/CONT	CONTR-TB3-1
34	16	GRAY	TB3-5	COMBINER	COMBINER D-SUB PIN 5
35	16	BLUE	TB3-6	RECT. FAN	TB4-11
36	16	BLUE	TB3-6	DOOR FAN	REAR DOOR MOLEX
37	16	YELLOW	TB3-7	ON FANS	TB4-10
38	16	ORANGE	TB3-8	CONTROLLER	TB4-12
39	16	BLACK	TB1-3	B PH	TB7-2
40	16	BLACK	TB1-3	B PH	TB7-4,6
41	16	BLACK	TB7-4	B PH	REAR DOOR MOLEX
42	16	BLACK	TB7-2	B PH	COMBINER D-SUB PIN23
43	16	BLACK	TB7-2	B PH	CONTR-TB3-2
44	16	RED	CONTROL D-SUB PIN 13		TB8-1,2,3
45	20	PURPLE	CONTROL D-SUB PIN 8	PA VOLTS	TB8-4,5,6
46	10	WHITE	TB2-9	IPA VOLT	CONTR-TB2-4
47	10	WHITE	TB2-10	PA1 VOLT	TB9-1,2
48	10	GREEN	TB9-3,4		RAIL GROUND
49	10	RED	TB2-11	PA2 VOLT	TB9-5,6
50	10	GREEN	TB9-7,8		RAIL GROUND
51	10	BLUE	TB2-12	PA3 VOLT	TB9-9,10
52	10	GREEN	TB9-11,12		RAIL GROUND

8-Jan-08

PULSAR 1000 CABINET WIRE LIST

LOW VOLTAGE

WIRE #	AWG	COLOR	FROM	REMARKS	TO
53	16	RED	TB6-7	POS. 15V	CONTR-TB2-1
54	16	BLUE	TB6-4	NEG. 15V	CONTR-TB2-2
55	20	BLUE	CONTROL D-SUB PIN 4	PLATE ON	TB4-3
56	20	YELLOW	CONTROL D-SUB PIN 3	FAN ON	TB4-4
57	20	WHT/PUR	CONTROL D-SUB PIN 1		TB4-6
58	20	WHT/GRY	TB4-8		C.B. INTERLOCK
59	20	WHT/YEL	CONTROL D-SUB PIN 6	CURRENT	TB4-8
60	14	GREEN	TB4-9		RAIL GROUND
61	20	GRAY	C.B INTERLOCK	INTERLOCK	REAR DOOR
62	20	WHT/ORN	REAR DOOR INTERLOCK		CONTROL D-SUB PIN 2
63	20	BROWN	COMBINER D-SUB PIN	RF CURRENT	CONTROL D-SUB PIN 5
64					
65	20	RED	CONTROL D-SUB PIN 23	VOLTAGE	COMBINER D-SUB PIN 13
66	20	YELLOW	CONTROL D-SUB PIN 7	CURRENT	COMBINER D-SUB PIN 11
67	20	RED	CONTROL D-SUB PIN 12	INC	COMBINER D-SUB PIN 7
68	20	YELLOW	CONTROL D-SUB PIN 11	REFL	COMBINER D-SUB PIN 8
69	20	GREEN	CONTROL D-SUB PIN 14	GROUND	RAIL GROUND
70	20	GREEN	CONTROL D-SUB PIN 15	GROUND	RAIL GROUND
71	20	WHITE	COMBINER D-SUB PIN 1	K1 BY-PASS	TB8-7
72	20	RED	COMBINER D-SUB PIN 3	K2 BY-PASS	TB8-8
73	20	BLUE	COMBINER D-SUB PIN 25	K3 BY-PASS	TB8-9
74	20	WHT/ORG	COMBINER D-SUB PIN 14	LEVEL 1	CONTROL D-SUB PIN 15
75	20	WHT/PUR	COMBINER D-SUB PIN 15	LEVEL 2	CONTROL D-SUB PIN 16

PULSAR 1000 CABINET WIRE LIST

LOW VOLTAGE

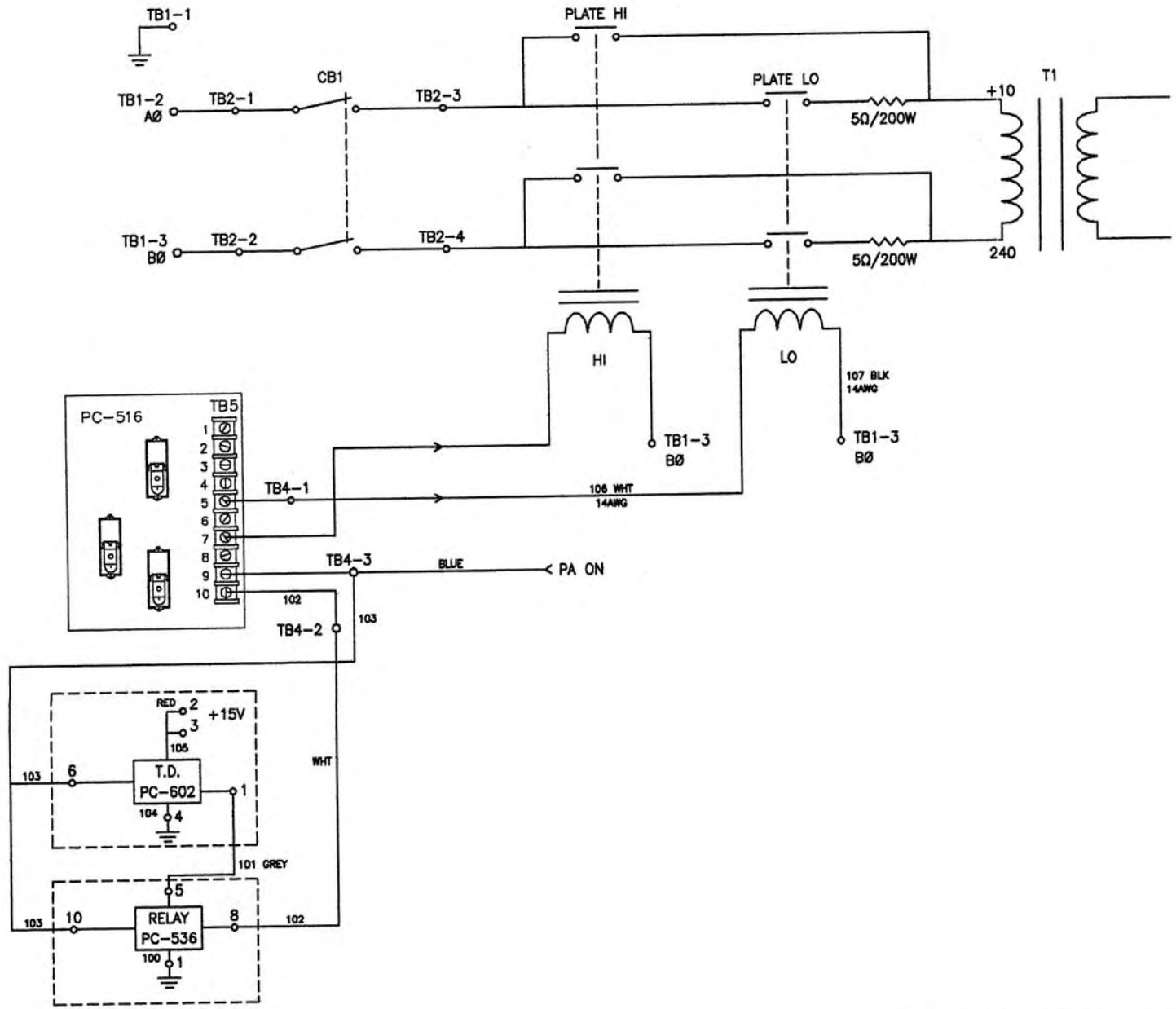
WIRE #	AWG	COLOR	FROM	REMARKS	TO
76	20	WHT/BLK	COMBINER D-SUB PIN 16	LEVEL 3	CONTROL D-SUB PIN 17
77	20	WHT/YEL	COMBINER D-SUB PIN 17	LEVEL 4	CONTROL D-SUB PIN 18
78	20	BLACK	COMBINER D-SUB PIN 19	NEG. 15V	CONTROL D-SUB PIN 14
79	20	RED	COMBINER D-SUB PIN 21	POS.15V	TB8-2
80-83		**N/U**		**N/U**	
84	16	WHITE	NEG. OF C1	180V METER	TB12-3
85	22	RED	P.S.#2 TB10-7	POS. 15V	CONTROL D-SUB PIN 19
86	22	BLACK	P.S.#2 TB10-4	NEG. 15V	CONTROL D-SUB PIN 20
87	22	GREEN	P.S.#2 TB10-6	GROUND	CONTROL D-SUB PIN 21
88	20	GREEN	P.S.#2 TB10-5		RAIL GROUND
89	20	BLUE	P.S.#1 TB6-2	AC	P.S.#2 TB10-2
90	20	ORANGE	P.S.#1 TB6-1	AC	P.S.#2 TB10-1
91	16	GREEN	P.S.#1 TB6-3		RAIL GROUND
92	20	GREEN	P.S.#1 TB6-3		P.S.#1 TB6-5,6
93	20	RED	P.S.#2 TB10-7	CROWBAR	PC-521TB11-1
94	20	GREEN	P.S.#2TB10-6	CROWBAR	PC-521TB11-2
94	20	BLACK	P.S.#2 TB10-4	CROWBAR	PC-521TB11-3
96		**N/U**			**N/U**
97	14	GREEN	CONTR-TB2-3		RAIL GROUND
98	12	RED	TB1-2	A PHASE	TB4-14
99	14	BLACK	TB1-3	B PHASE	TB4-13
100	20	GREEN	PC-536-MO1-1	RELAY BD.	RAIL GROUND
101	20	GRAY	PC-536-MO1-5	TIME DELAY	PC-602-MO1-1

8-Jan-08

PULSAR 1000 CABINET WIRE LIST

LOW VOLTAGE

WIRE	AWG	COLOR	FROM	REMARKS	TO
102	20	WHITE	PC-536-MO1-8		TB4-2
103	20	BLUE	TB4-3		PC-602-MO1-6
103	20	BLUE	PC-602-MO1-6		PC-536-MO1-10
104	20	GREEN	PC-602-MO1-4		RAIL GROUND
105	20	RED	CONTR-TB2-1	POS. 15V	PC-602-MO1-2,3
106	14	WHITE	TB4-1		L.V. CONTACTOR COIL
107	14	BLACK	TB1-3	B PH	L.V. CONTACTOR COIL



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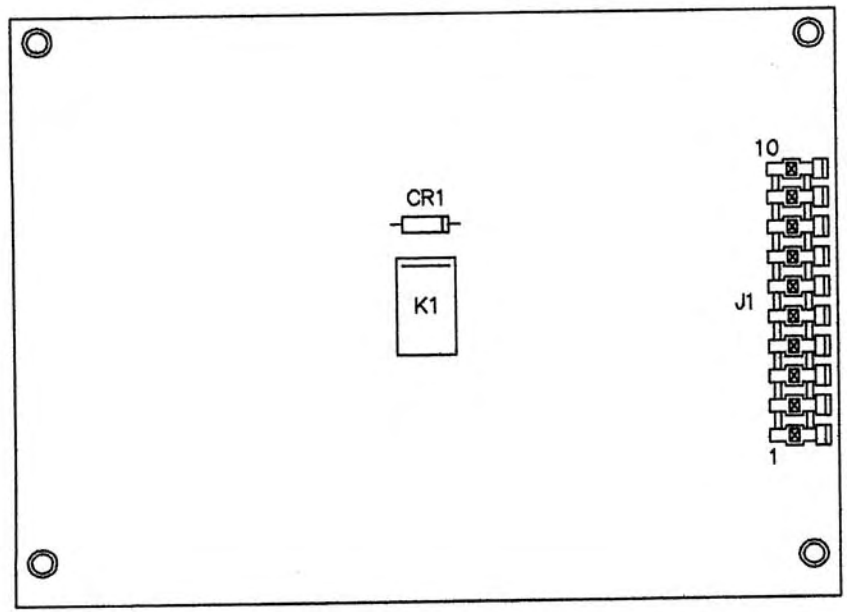
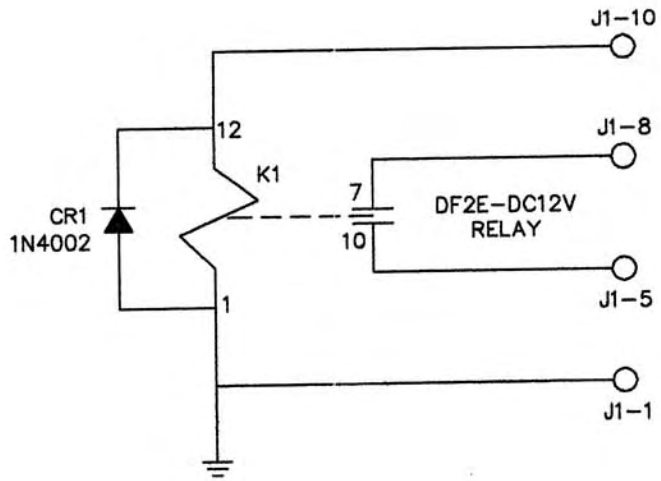
BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

NOTES:
N.T.S.

TITLE:
PULSAR 1000 STEP START SCHEMATIC

DWG. BY: John McCool		MODIFIED:	DWG. No.
DATE: 1/9/08	REV: -	-	S-330





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BROADCAST EQUIPMENT CO., INC.
1306 RIVER ST., P.O. BOX 801, VALATIE, NY. 12184

NOTES:
N.T.S.

TITLE: PC–536
COMPONENT LAYOUT & SCHEMATIC

DWG. BY: John McCool		MODIFIED:	DWG. No.
DATE: 12/20/07	REV: –	1/7/08	CL–732