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SERVICE MANUAL

UHF CONTINUOUS DUTY RF POWER AMPLIFIERS

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L-PA6-CD-S/C1

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OPTIONS

TPL Communications' UHF Continuous Duty RF Power Amplifiers are available with several options: input, output, voltage, frequency ranges, and configurations, special logos, etc., when specified at the time of order. We work closely with you, our customer, to develop products that are in complete compliance with your needs and specifications.

PACKAGE OPTIONS:

- RXR:** Extruded aluminum heat sink. No fan needed.
19"W x 7"H x 3 ½"D
- RXRPS:** Same as "RXR," but with integral 25 Ampere power supply.
19"W x 7"H x 8"D
- RXRF:** Same as "RXR," but with a 13.8 VDC cooling fan.
19"W x 7"H x 5"D
- RXRF2:** Same as "RXR," but with two 13.8 VDC cooling fans.
19"W x 7"H x 5"D
- RXRFPS:** Same as "RXRPS", but with a 13.8 VDC cooling fan.
19"W x 7"H x 8"D
- RXRF2PS:** Same as "RXRPS", but with two 13.8 VDC cooling fans.
19"W x 7"H x 8"D
- RS:** Extruded aluminum heat sink. No fan needed.
19"W x 5¼"H x 27/8"D
- RSPS:** Same as "RS", but with integral 10 Ampere power supply.
19"W x 5¼"H x 9 ½"D
- RXHF3:** Extruded aluminum heat sink with two front and one rear fan.
19"W x 14"H x 7"D
- RXHF3PS:** Same as "RXHF3", but with model-dependant switching power supply.
19"W x 14"H x 9.5" (or 12") D

OPTIONS
(continued)

SOLID STATE COR OPTION - SSR

A solid state carrier operated relay is available on some models if specified.

*Other variations and options are available; contact TPL for further information.

NOTE: All TPL standard UHF series amplifiers are factory-tuned to the frequency specified at the time of order and will operate within minimum ± 10 MHz of that frequency unless otherwise specified. Many models are available with lower input drive level. Contact Manufacturer for details.

Radio Properties

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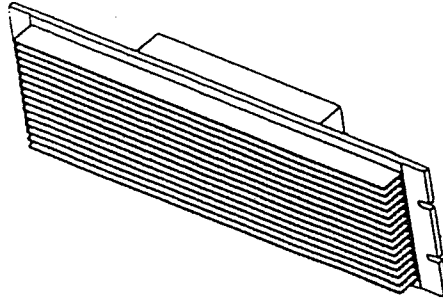
Elmira, CA. 95625

**Voice (707) 678-4187 - Fax (707) 693-8057
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OPTIONS
(continued)

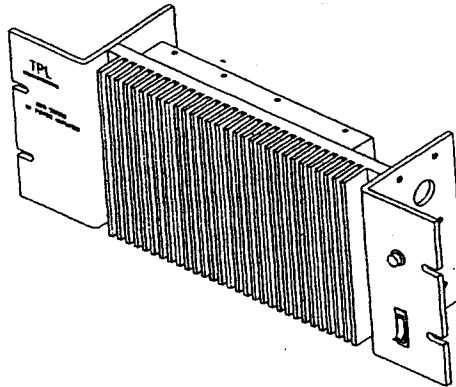
RS

Extruded aluminum heat sink. No fan needed.



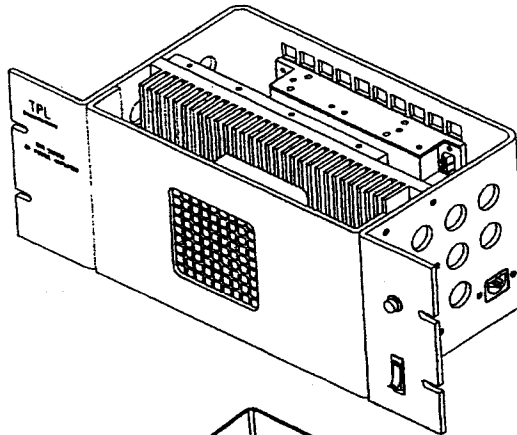
RXR

Extruded aluminum heat sink. No fan needed.



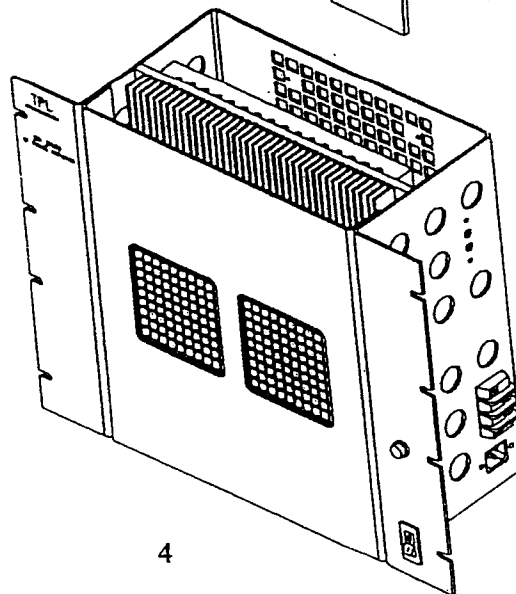
RXRFPS

Same as "RXRF," but with a 13.8 VDC power supply.



RXHF3

Extruded aluminum heat sink. With three cooling fans.



CAUTION!

Inspect the amplifier thoroughly upon receipt for visible damage. If any is noticed, please call **TPL Communications** at **800 HI POWER** to request an **RMA** (Return Material Authorization) number. If purchased through a dealer or distributor, ask them to also follow this procedure for best results.

EXPENSIVE COMPONENTS MAY BE DESTROYED IF THE AMPLIFIER IS TURNED ON IN A DAMAGED CONDITION.

GENERAL SPECIFICATIONS

CONTINUOUS DUTY UHF POWER AMPLIFIERS

FREQUENCY RANGE: 400 - 512 MHz

| MODEL | POWER INPUT | POWER OUTPUT | CURRENT | PRIMARY VOLTAGE |
|----------------|--------------------|---------------------|----------------|------------------------|
| PA6-1EE-RXRF | 75-150 mW | 70-100 W | 24 Amp. | 13.8 VDC |
| PA6-1AB-RS | 1-4 W | 10-25 W | 4 Amp. | 13.8 VDC |
| PA6-1AC-RS | 1-4 W | 25-50 W | 8 Amp. | 13.8 VDC |
| PA6-1AC3-RS | 4-8 W | 25-50 W | 8 Amp. | 13.8 VDC |
| PA6-1AE-RXRF | 1-4 W | 70-100 W | 20 Amp. | 13.8 VDC |
| PA6-1BC-RS | 8-15 W | 25-50 W | 7 Amp. | 13.8 VDC |
| PA6-1BE-RXRF | 8-15 W | 70-100 W | 16 Amp. | 13.8 VDC |
| PA6-1FE-RXRF | 25-40 W | 60-100 W | 15 Amp. | 13.8 VDC |
| PA6-1XF-RXHF3* | 1-60 W | 200 W | N/A | 13.8 VDC |
| PA6-2XF-RXHF3* | 5-45 W | 300 W | N/A | 28 VDC |

1. *Input level should be specified at the time of order.
2. Power Supplies are available for all models as PS option.

OPERATING MODE:

FM / CW

OPERATING VOLTAGE:

13.8 VDC or with 110 VAC / 220 VAC power supplies available if required.
(PS option).

EIA DUTY CYCLE:

100% / Continuous

HARMONIC & SPURIOUS ATTENUATION:

Meets or exceeds FCC Type Acceptance requirements.

IN/OUT IMPEDANCE:

50 Ohms.

IN/OUT RF CONNECTORS:

Type "N"

GENERAL SPECIFICATIONS
(continued)

RECEIVER PATH INSERTION LOSS:

1 dB maximum when the optional Carrier Operated Relay (COR) is specified.

CONFIGURATION:

Repeater configuration is standard and it is supplied without a COR. Base station configuration is optional and it is supplied with COR.

CIRCUIT PROTECTION:

Provided by a circuit breaker or a fuse with model-dependant current rating.

OPERATING TEMPERATURE RANGE:

-20° to +50° Celsius.

STORAGE TEMPERATURE:

-40° to +85° Celsius.

OPERATING HUMIDITY:

0% - 85% RH (non-condensing).

STORAGE HUMIDITY:

0% - 95% RH (non-condensing).

OPERATING PRECAUTIONS

- CAUTION:** This amplifier produces RF voltages that can cause painful and dangerous RF burns. Use caution! Connect and disconnect all RF connections with the DC power and drive power off.
- DRIVE POWER:** RF power transistors, although quite rugged in most respects, are easily damaged by overdrive. Be careful not to overdrive this amplifier, even for an instant. Higher-than-rated drive power may destroy the transistors and **VOID ANY WARRANTY**.
- TERMINATIONS:** The efficiency of this amplifier will degrade if it is operated into anything but a **50Ω** load. Lowered efficiency may mean any or all of the following: lower power output, increased a current drain, higher operating temperature, and reduced life time.

INSTALLATION INSTRUCTIONS FOR CONTINUOUS DUTY AMP

This unit is designed for mounting in a standard 19" rack. When picking a location in the rack, consideration must be given to RF power output cable lengths, as well as cooling considerations.

Mount the unit where dust and other debris are not likely to clog the cooling fans. Avoid mounting the amplifier directly above hot pieces of equipment that could artificially raise the amplifiers temperature.

Connect the radio transmitter to the "**RF INPUT**" connector with a **50 Ω** cable and a type "**N**" plug. Connect the antenna to the "**RF OUTPUT**" connector on the amplifier with **50 Ω** coaxial cable and a type "**N**" plug.

Plug the AC line cord into the system AC power receptacle. If powered by a user-supplied **13.8 VDC** source, connection must be made with **#10 AWG** (or heavier) wiring.

For safety, ensure that the rack and all equipment connected to the amplifier have proper AC grounds. Do not rely on coaxial cable shielding. Assure the installation has proper lightning protection (e.g. in line coaxial protectors manufactured by PolyPhaser Corporation or equivalent).

CIRCUIT DESCRIPTION

The UHF Continuous Duty Power Amplifiers are comprised of a group 50 Ohm. modular building blocks as shown in Table 1. A brief description of each follows (See Appendix 1 for corresponding schematic diagram).

Pre-driver stage Part No. T-100327-P-D-SA **(Power output 15W Maximum at 13.8 VDC)**

This stage provides approximately 6dB of gain utilizing a common emitter bipolar RF transistor Q1. Input impedance matching of Q1 is accomplished by the combination of capacitors C1, C2, C3, C4 and microstrip line Z1. Output impedance matching is accomplished in a similar manner by capacitors C8, C9, C10 and microstrip line Z2. DC bypass and isolation are achieved by capacitors C6, C7, C11, C12, Inductors L2, L3 and resistors R1, and R3. A bias voltage from the bias circuit on the Relay board is supplied through L1, C5, and R1. If bias is not used the end of the L1 opposite to the Base of Q1 should be connected to ground. Input and output impedances are 50 Ohms.

Pre-driver stage Part No. T-101649-6-SA **(Used for PA6-1EE only)**

This pre-driver is used for low input drives (75-250 mW). It replaces pre-driver part number 100327-P-D-SA in PA6-1EE or other special amplifiers. This stage provides approximately 21 dB gain and consists of RF Power Hybrid Amplifier U1, which has a maximum power out of 30 watts, power control circuit C1, R1, R2, R3, U2, and DC bypass capacitors C2, C3, C4, C5, C6. Power output of this stage is preset by the pot. R3, to avoid an overdrive of the next stage. Input and output impedance are 50 Ohms.

Driver, Final stage Part No. T-1000327-D-SA, T-100327-F-SA **(Power Output - 60W, maximum)**

This stage provides approximately 5 dB of gain employing a common emitter bipolar RF Power transistor - Q1. Input impedance matching realized by capacitors: C1, C2, C3, C4 and microstrip line Z1. Output impedance matching is accomplished by capacitors C7, C8, C9, C10 and microstrip line Z2. DC bypass and isolation are accomplished through C5, C6, C11, C12, L2, L3, and R4. Inductor L1 provides a DC ground for the base of Q1 for class C operation. Input and output impedance are 50 Ohms.

Input Splitter / Output Combiner Part No. 100237-1

Power splitter / combiner is a classical two way coaxial Wilkinson combiner. It consists of two ¼ wave length 75 Ohms impedance coaxial cables T1, T2, and 100 Ohms balancing resistor R1. All inputs and output impedances are 50 Ohms.

Low Pass Filter (L.P.F.) Part No. 100134-LPF-SA

LPF is a seven pole Chebychev filter providing 45-55 dB of attenuation of the 2nd and higher harmonics.

CIRCUIT DESCRIPTION
(continued)

Antenna Switch Relay

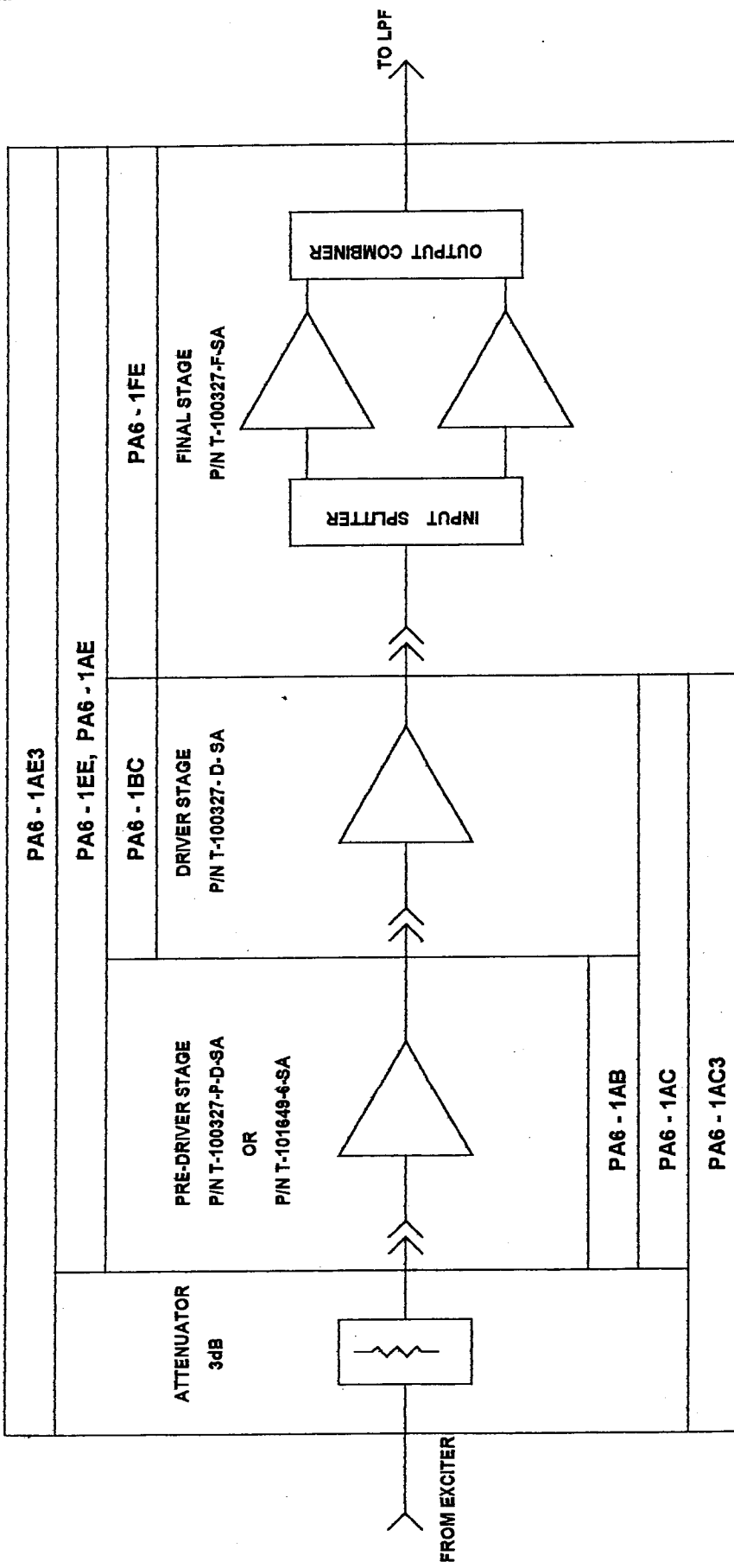
Mechanical: Part No. T-00816-R-SA, T-100816-R-1-SA

Solid State: Part No. T-100371-UHF-SA

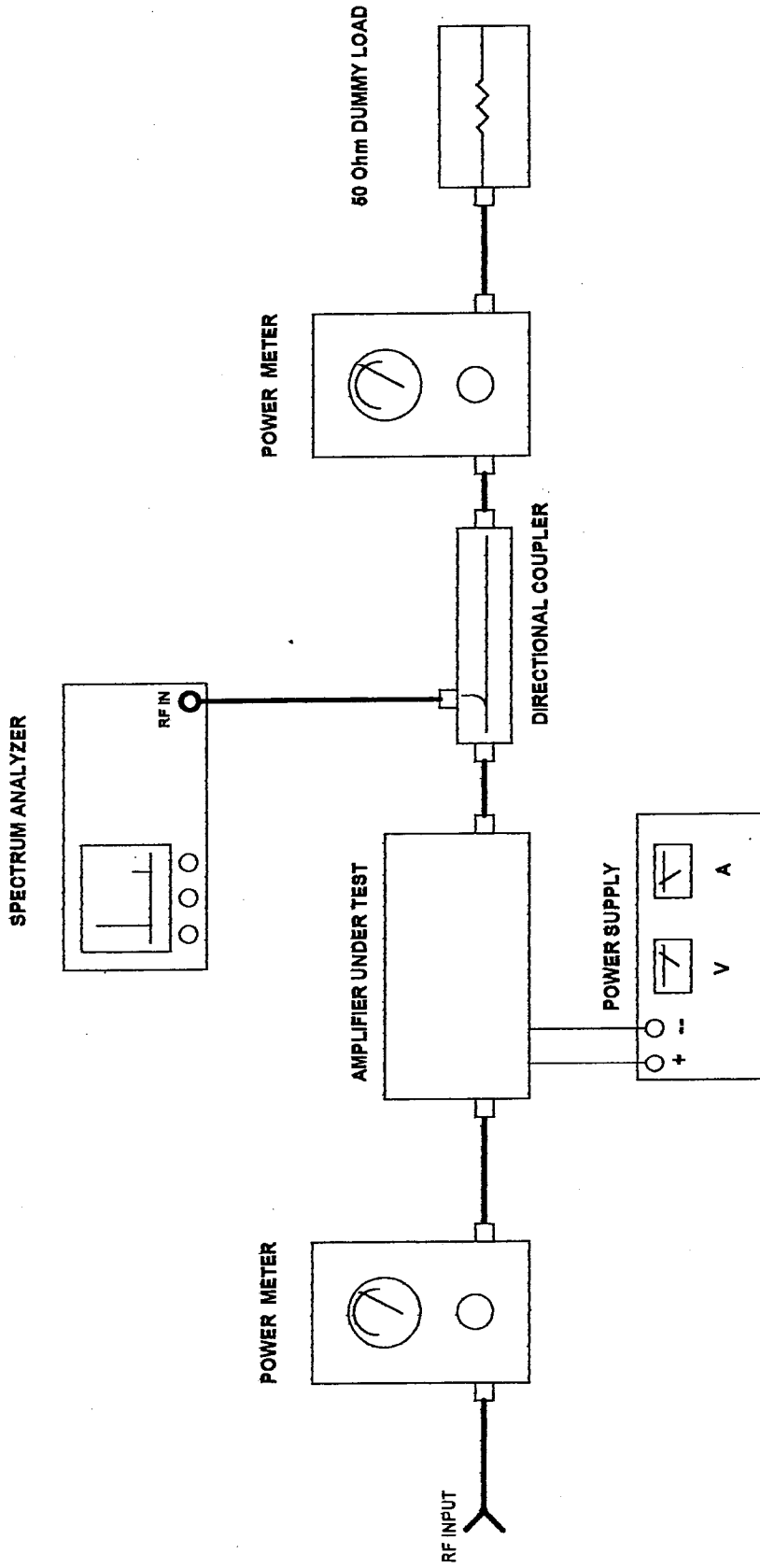
This circuit is activated by RF signal from the input of the amplifier through the combination of C1, C2, D1, D2 for Mechanical COR and C3, D3, R3, R4, Q1 for Solid State Relay. This antenna switch relay switches RF signal through the amplifier during transmit and bypass it during receive cycle. In mechanical antenna switch relay it is accomplished by relay K1 and K2 and in Solid State Relay - by PIN diodes D1, D2, D4, and D5. When specified the relay may be configured to bypass the amplifier in case of input AC or DC power failure.

UHF RF POWER AMPLIFIERS STAGE LINE - UP.

TABLE 1.



AMPLIFIER TEST AND ADJUSTMENT SET UP DIAGRAM



TUNE-UP INSTRUCTIONS

All TPL UHF Continuous Duty Power Amplifiers are comprised of 50 Ohm building blocks and combined in various ways to make up the various models (see Table 1). This approach makes a tune-up very simple.

Since layout of the PCB for pre-driver, driver and final stages are practically the same. The tuning procedures for all these stages consist of 3 basic steps.

| STEP | ADJUST | FUNCTION | INSTRUCTIONS |
|------|--------|---|--|
| 1 | C2 | Input impedance matching. | Tune for minimum VSWR. |
| 2 | C9 | Output impedance matching. | Tune for maximum output power. |
| 3 | C2, C9 | Optimization Frequency spectrum observation. | Repeat steps 1 and 2 for minimum VSWR, maximum Power and maximum efficiency. Observe a signal on a spectrum analyzer at all times for any signs of oscillation, harmonics or spurious emission. |

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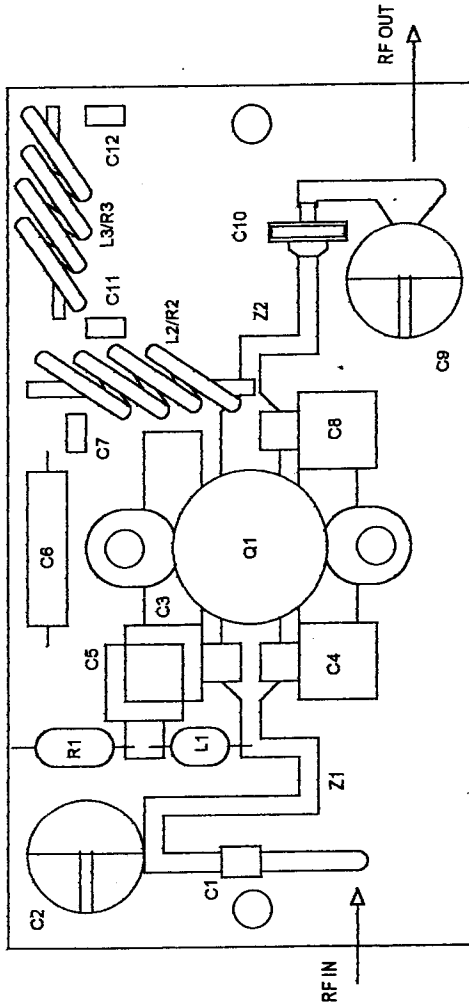
Skipp May P.O. Box 192

Elmira, CA. 95625

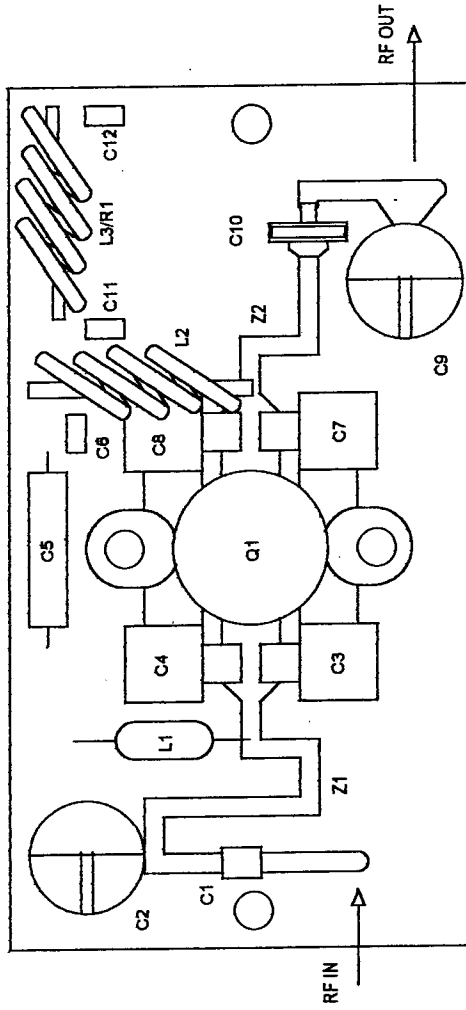
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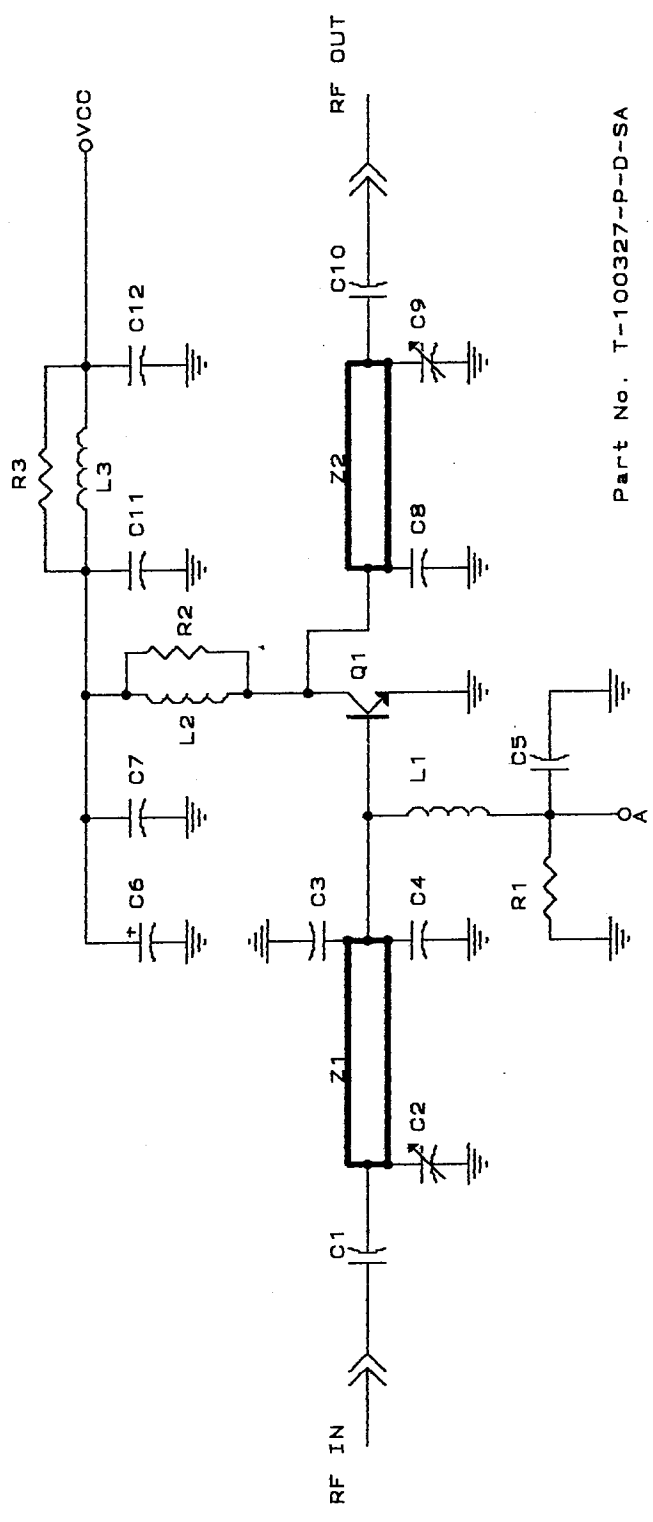
COMPONENT LAYOUT

PRE-DRIVER STAGE P/N T-100327-P-D-SA



DRIVER, FINAL STAGE P/N T-100327-F-SA





Part No. T-100327-P-D-SA

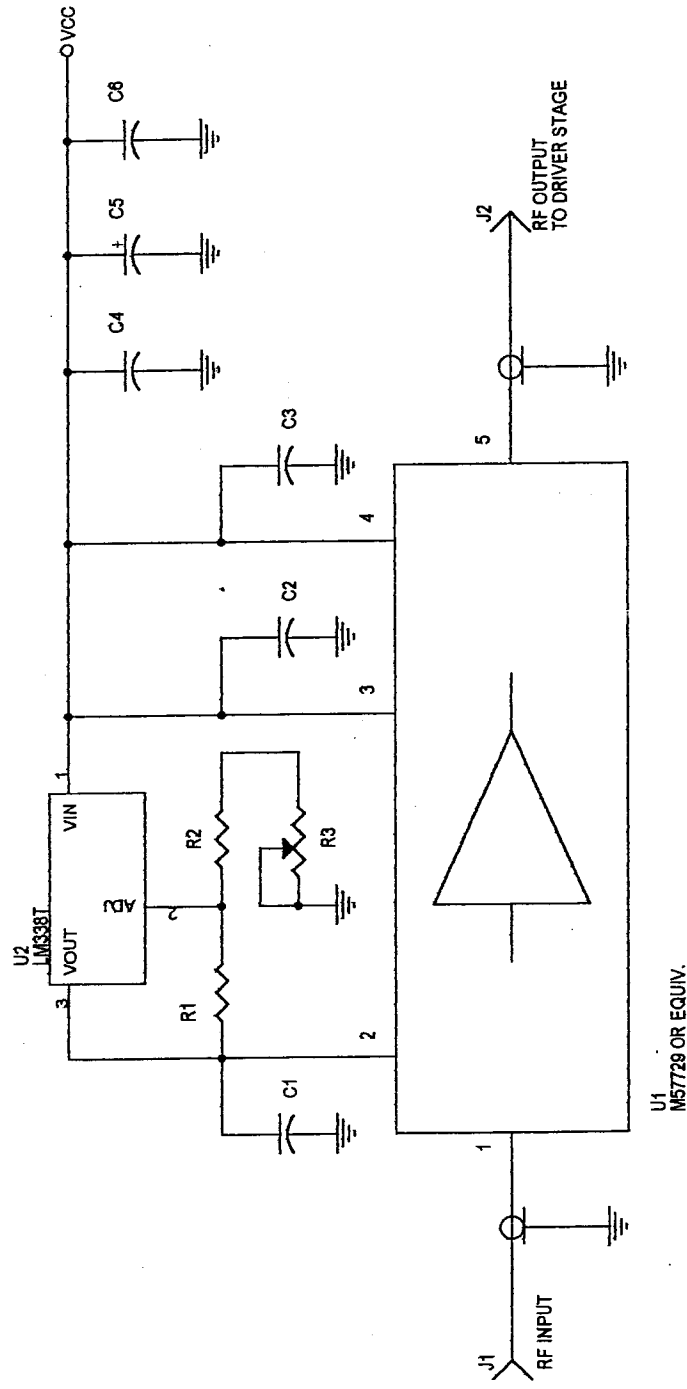
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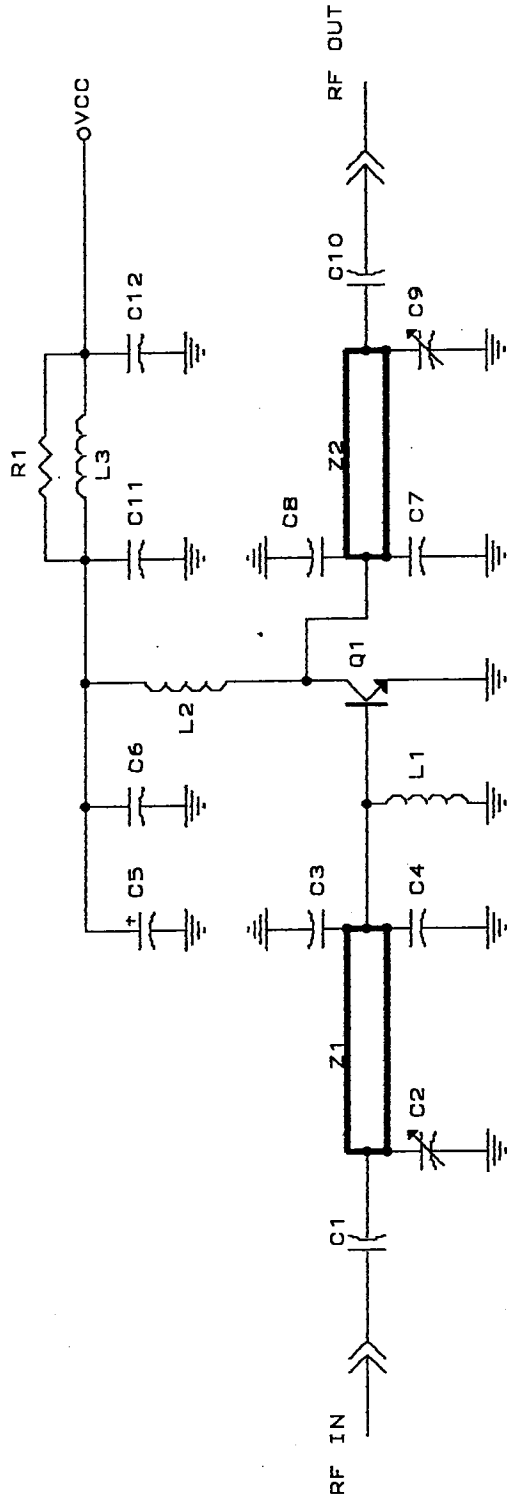
1. POINT A IS A BIAS INPUT FROM FROM A BIAS NETWORK ON RELAY BOARD
2. ON PA6-1AC POINT A IS CONNECTED TO GROUND
3. R1 AND C5 USED ONLY ON PA6-1AE

| | | |
|-----------------|----------------|----------------------|
| Title | | T P L COMMUNICATIONS |
| Size | | A |
| Document Number | | REV |
| Date: | March 21, 2001 | Sheet of |

UHF DVR

**PRE-DRIVER STAGE P/N T-101649-6-SA
SCHEMATIC DIAGRAM**

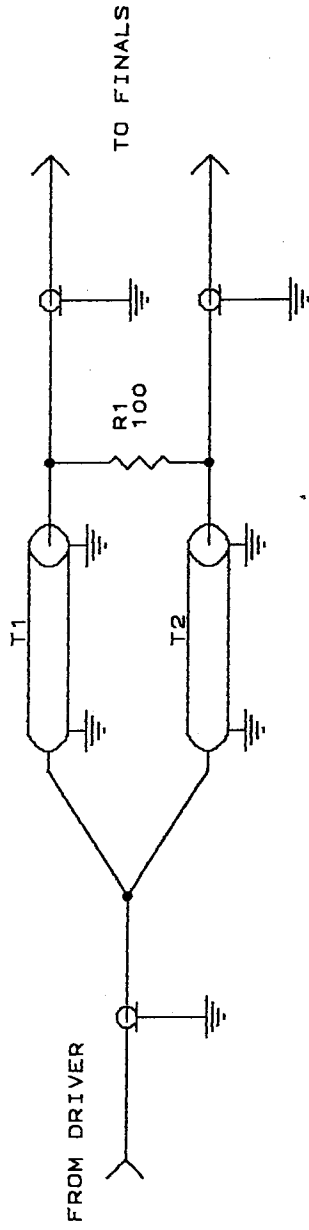




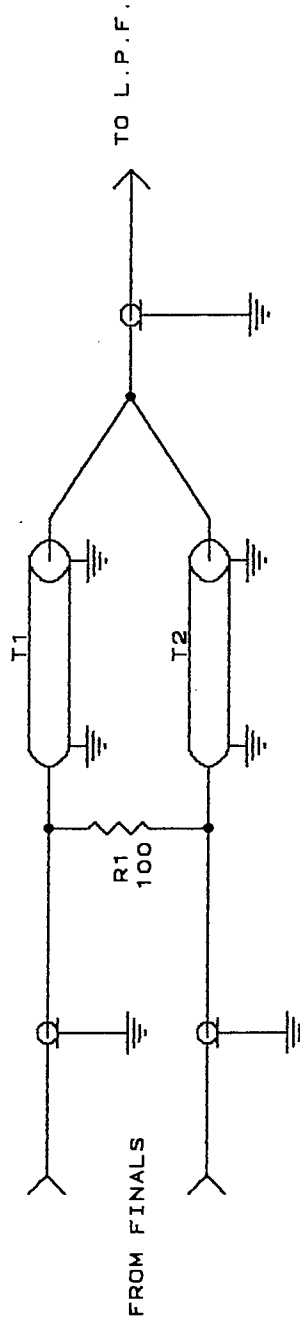
Part No. T-100327-D-1-SA, T-100327-F-SA

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| Date: | | March 21, 2001 |
| Sheet | | 17 of |

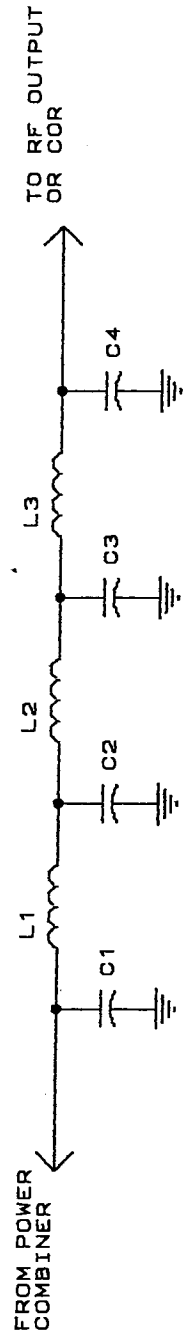
2 WAY POWER SPLITTER



2 WAY POWER COMBINER



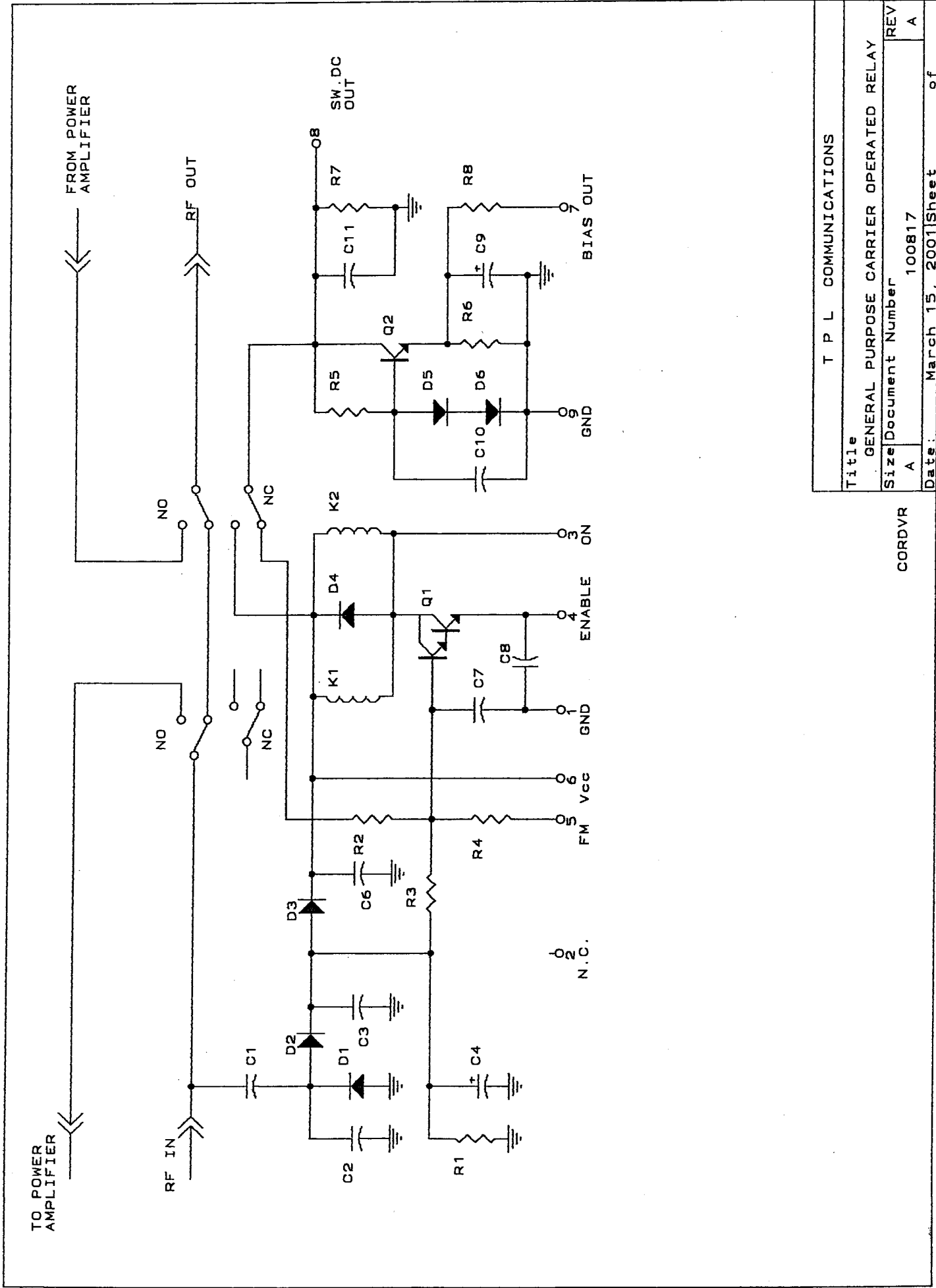
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| Document Number | | PA6COMB.SCH |
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| Date: | March 21, 2001 | Sheet of |



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| T P L COMMUNICATIONS | |
| Title | UHF LOW PASS FILTER SCHEMATIC DIA. |
| Size | Document Number 101383 |
| REV | A |
| Date | March 13, 2001 |

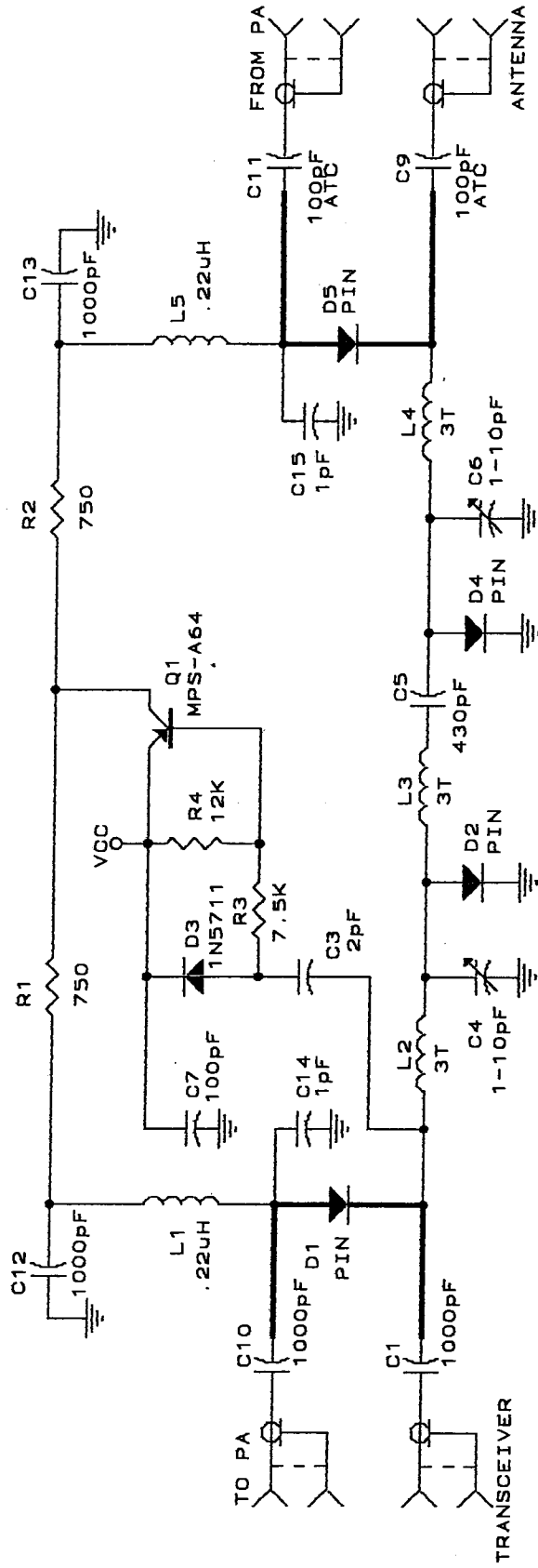
PA6LPF.SCH

Sheet 13 of 19



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| Title | | T P L COMMUNICATIONS | |
| Size | | GENERAL PURPOSE CARRIER OPERATED RELAY | |
| REV | Document Number | 100817 | REV |
| A | | | A |
| Date: | | March 15, 2001 | |
| | | Sheet | |
| | | of | |

CORDVR



NOTES:

1. — MICROSTRIP Z = 50 Ohm

SSRCORU.SCH

TPL COMMUNICATIONS
LOS ANGELES CA

Title

SOLID STATE CARRIER OPERATED RELAY, UHF

Size Document Number

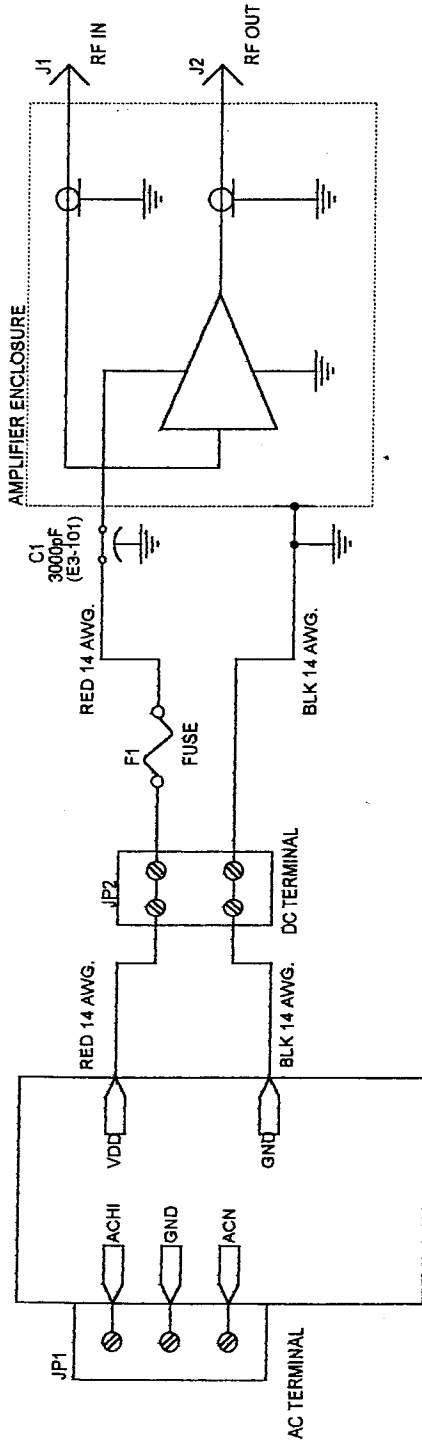
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REV

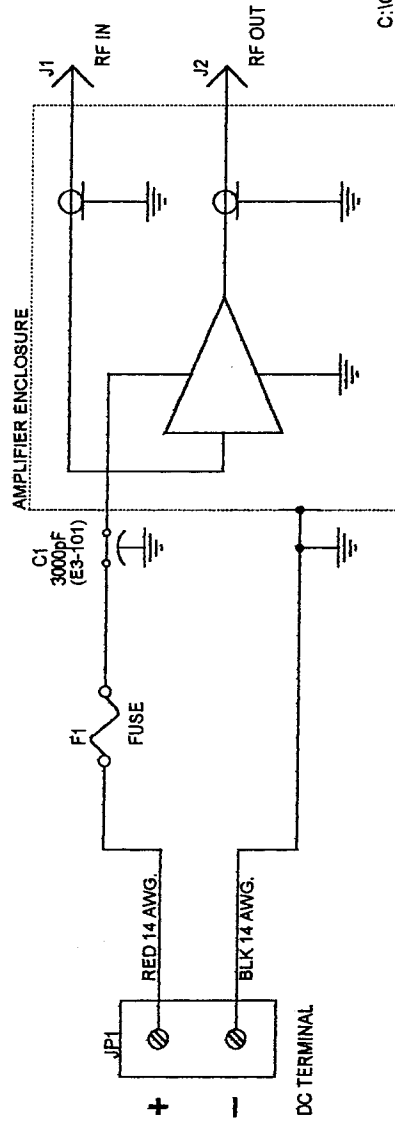
B

Date: March 15, 2001 Sheet of

RSPS CONFIGURATION



RS CONFIGURATION



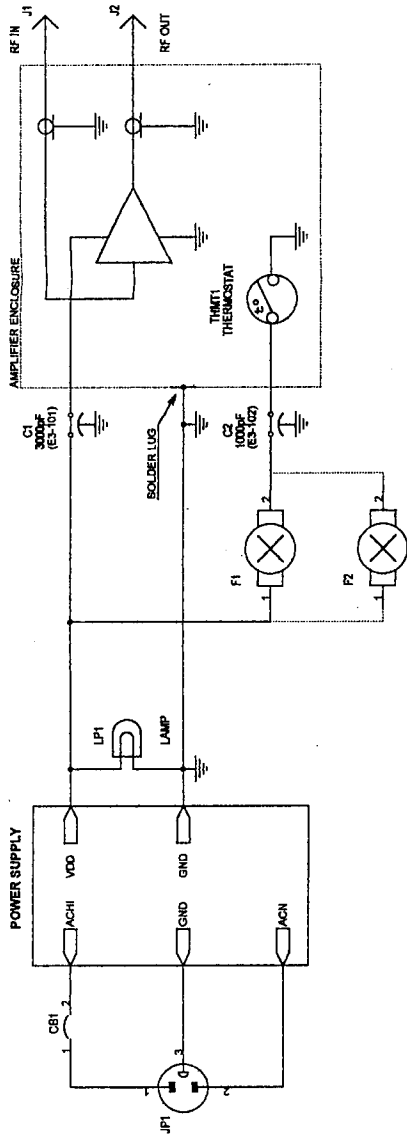
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T P L COMMUNICATIONS
LOS ANGELES, CA 90065

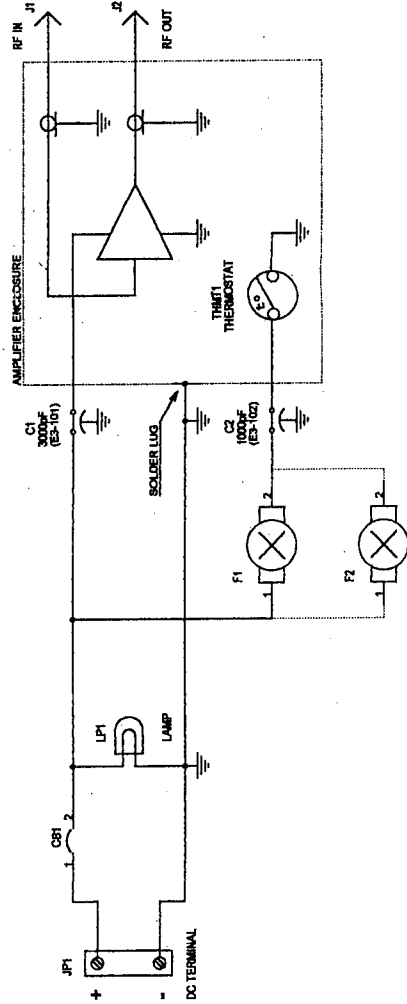
RS SERIES WIRING DIAGRAM

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|-------|---|-----------------|-----------------------------|
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| Rev | | Date | Thursday, February 22, 2001 |
| Sheet | 1 | of | 1 |

RXRFPFS & RXRF2PS CONFIGURATION



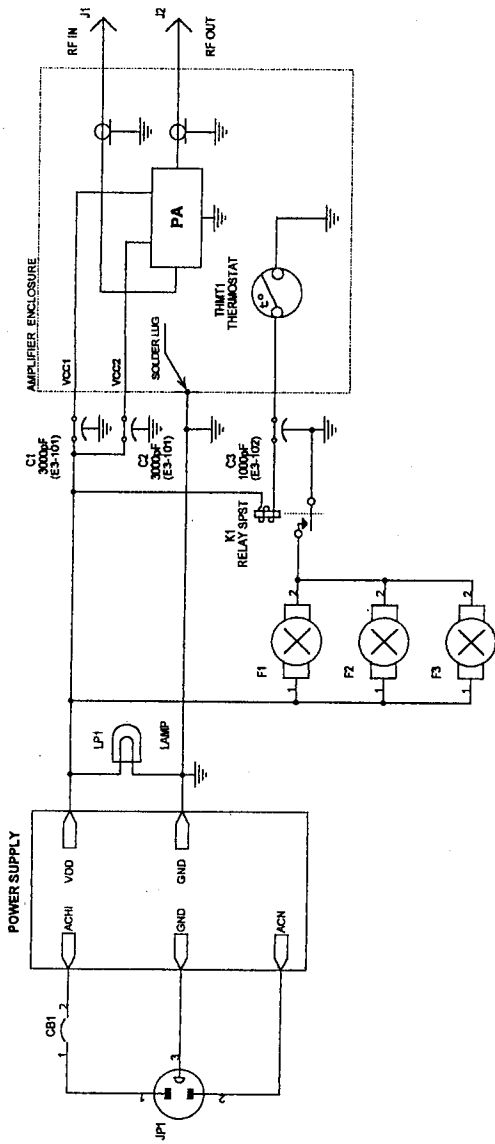
RXRF & RXRF2 CONFIGURATION



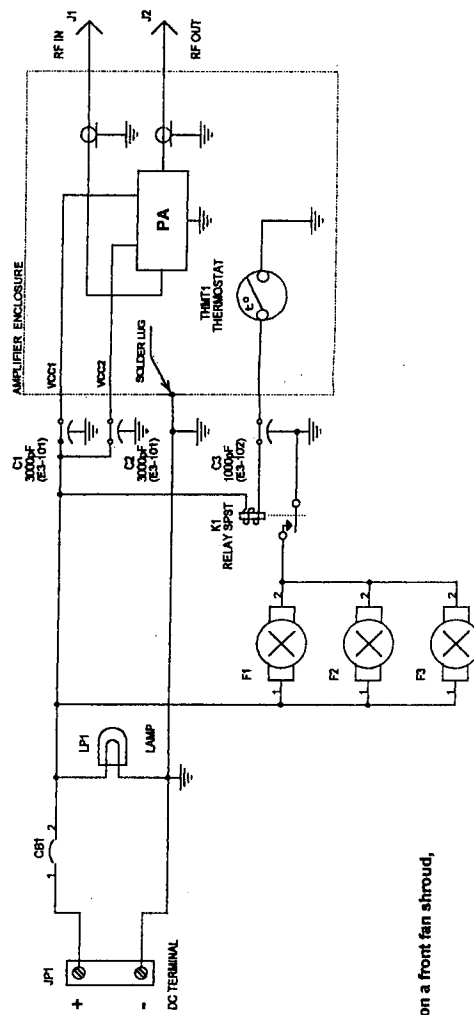
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| LOS ANGELES, CALIFORNIA 90066 | |
| RXR SERIES WIRING DIAGRAM | |
| Title | |
| Size | B |
| Document Number | 102408 |
| Date | Monday, February 18, 2001 |
| Sheet | 1 of 1 |

RXHF3PS CONFIGURATION



RXHF3 CONFIGURATION



NOTES:

1. Cooling fans F1 and F2 are located on a front fan shroud, F3 is located on a RF deck cover.

TPL COMMUNICATIONS
LOS ANGELES, CALIFORNIA 90065

RXH SERIES WIRING DIAGRAM

| | |
|------------|---------------------------|
| Rev | 1 |
| Doc Number | 102410 |
| Date | Friday, February 23, 2001 |

PARTS LIST

Pre-driver stage Part No. T-101649-6-SA

| REFERENCE NUMBER | PART DESCRIPTION | TPL PART NUMBER |
|------------------|---------------------------------------|-----------------|
| | PCB | T-101649 |
| C1,C2,C3 | 0.1uF Chip Cap. | A2-190 |
| C4 | 1000pF Chip Cap. | A2-172 |
| C5 | 10uF x 35V Tantalum Electrolytic Cap. | A4-127 |
| C6 | .1uF Dip Mica Cap. Hi Temp | A5-268A |
| U2 | LM338 T Voltage Regulator | B7-189 |
| U1 | M57729H (or Equiv.) RF Module | B5-128 |
| R1 | 620 Ohm 1/4W Res. | C1-167 |
| R2 | 2.2kOhm 1/4W Res. | C1-180 |
| R3 | 5k Pot. | C3-102A |

PARTS LIST
(continued)

Pre-driver stage Part No. T-100327-P-D-SA

| REFERENCE NUMBER | PART DESCRIPTION | TPL PART NUMBER |
|------------------|-------------------------|--------------------|
| | PCB | T-100327 |
| C1 | 100pF Cer. Disc Cap. | A1-148 |
| C2,C9 | 1-10pF Air Var. Cap. | A5-600 |
| C3,C4 | 25pF SEMCO Cap. | A1-104 |
| C5 | 700pF SEMCO Cap. | A1-113 |
| C6 | 33uF Axial Electr. Cap. | A4-113 |
| C7,C12 | .047uF Chip Cap. | A2-188 |
| C8 | 50pF SEMCO Cap. | A1-106 |
| C10 | 300pF SEMCO Cap. | A1-111 |
| C11 | 1000pF Chip Cap. | A2-172 |
| R1 | 33 Ohm ½ Res. | C1-336 |
| R2 | 100 Ohm 2W Res. | C1-748 |
| R3 | 100 Ohm 1W Res. | C1-548 |
| Q1 | MRF641 or SD1429-03 | B2-127 (B2-115) |
| L1 | 1.0uH Choke ¼W. | E1-113 |
| L2 | 5T; .25" DIA, #18 AWG. | E6-106 |
| L3 | 10T; 3/16" DIA #18 AWG. | E6-126 |

PARTS LIST
(continued)

Driver stage Part No. T-100327-D-SA

| REFERENCE NUMBER | PART DESCRIPTION | TPL PART NUMBER |
|------------------|--------------------------|--------------------|
| | PCB | T-100327 |
| C1 | 100pF Cer. Disc Cap. | A5-148 |
| C2,C9 | 1-10pF Air Var Cap | A5-600 |
| C3,C4 | 25pF SEMCO Cap. | A1-104 |
| C5 | 33uF x 35V Electr. Cap. | A4-113 |
| C6,C12 | .047uF Chip Cap. | A2-188 |
| C7,C8 | 35pF SEMCO Cap. | A1-105 |
| C10 | 300 pF SEMCO Cap. | A1-111 |
| C11 | 1000pF Chip Cap. | A2-172 |
| Q1 | MRF644 or SD1422 | B2-120 (B2-116) |
| L1 | 1.0uH ¼W Choke | E1-113 |
| L2 | 5T; .25" DIA; #18 AWG. | E6-106 |
| L3 | 10T; 3/16" DIA; #18 AWG. | E6-126 |
| R1 | 100 Ohm, 1W Res. | C1-548 |

PARTS LIST
(continued)

Driver stage Part No. T-100327-D-1-SA

| REFERENCE NUMBER | PART DESCRIPTION | TPL PART NUMBER |
|------------------|--------------------------|-----------------|
| | PCB | T-100327 |
| C1 | 100pF Cer. Disc Cap. | A5-148 |
| C2,C9 | 1-10pF Air Var Cap. | A5-600 |
| C3,C4 | 25pF SEMCO Cap. | A1-104 |
| C5 | 33uF x 35V Electr. Cap. | A4-113 |
| C6,C12 | .047uF Chip Cap. | A2-188 |
| C7,C8 | 35pF SEMCO Cap. | A1-105 |
| C10 | 300pF SEMCO Cap. | A1-111 |
| C11 | 1000pF Chip Cap. | A2-172 |
| Q1 | MRF646 | B2-142 |
| L1 | 1.0uH ¼W Choke | E1-113 |
| L2 | 5T; .25" DIA; #18 AWG. | E6-106 |
| L3 | 10T; 3/16" DIA; #18 AWG. | E6-126 |
| R1 | 100 Ohm, 1W Res. | C1-548 |

PARTS LIST
(continued)

Final stage Part No. T-100327-F-SA

| REFERENCE NUMBER | PART DESCRIPTION | TPL PART NUMBER |
|------------------|--------------------------|-----------------|
| | PCB | T-100327 |
| C1 | 100pF Cer. Disc Cap. | A5-148 |
| C2,C9 | 1-10pF Air Var Cap. | A5-600 |
| C3 | 25pF SEMCO Cap. | A1-104 |
| C4 | 30pF SEMCO Cap. | A1-104B |
| C5 | 33uF x 35 V Electr. Cap. | A4-113 |
| C6,C12 | .047uF Chip Cap. | A2-188 |
| C7,C8 | 35pF SEMCO Cap. | A1-105 |
| C10 | 300pF SEMCO Cap. | A1-111 |
| C11 | 1000pF Chip Cap. | A2-172 |
| Q1 | MRF648 | B2-141 |
| L1 | 1.0uH 1/4W Choke | E1-113 |
| L2 | 5T; .25" DIA; #18 AWG. | E6-106 |
| L3 | 10T; 3/16" DIA; #18 AWG. | E6-126 |
| R1 | 100 Ohm; 1W Res. | C1-548 |

PARTS LIST
(continued)

Two-Way Power Splitter/Combiner Part No. T-100237-1

| REFERENCE NUMBER | PART DESCRIPTION | TPL PART NUMBER |
|------------------|------------------|-----------------|
| R1 | 100 Ohm 2W Res. | C1-758 |
| T1,T2 | 75 Coax Cable | Z-RG179 |

Low Pass Filter Part No. T-100134-LPF-SA

| REFERENCE NUMBER | PART DESCRIPTION | TPL PART NUMBER |
|------------------|----------------------------|-----------------|
| | PCB | T-101383 |
| C1,C4 | 10pF SEMCO Cap. | A1-101 |
| C2,C3 | 20pF SEMCO Cap | A1-103 |
| L1,L2,L3 | Coil 1T, #16 AWG; .3" DIA. | E6-158 |

PARTS LIST
(continued)

UHF Carrier Operated Relay Part No. T-100816-R-SA*

| REFERENCE NUMBER | PART DESCRIPTION | TPL PART NUMBER |
|------------------|-----------------------------------|-----------------|
| | PCB | T-100816 |
| R1 | 270 Ohm ¼W Resistor | C1-229 |
| R2,R4 | 100kOhm ¼W Resistor | C1-220 |
| R3 | 47kOhm ¼W Resistor | C1-212 |
| C1,C2 | 1pF Dip. Mica Cap. | A8-100 |
| C3 | .01uF Cer. Disc Cap. | A5-244 |
| C4 | 1.0uF 50V Electrolytic Cap. | A4-106 |
| C6,C7,C8 | .001uF Cer. Disc Cap. | A5-172 |
| D1,D2 | 1N5711 Diode | B3-118 |
| D3,D4 | 1N4148 Diode | B3-110 |
| Q1 | MPS-A14 NPN Darlington Transistor | B2-139 |
| K1,K2 | Relay, UHF | J1-101 |
| R5 | 1.5kOhm ½W Resistor | C1-376 |
| R6 | 47 Ohm ¼W Resistor | C1-140 |
| R7 | 1.0kOhm ¼W Resistor | C1-172 |
| R8 | 10 Ohm ¼W Resistor | C1-124 |
| C9,C10,C11 | .001uF Cer. Disc Capacitor | A5-172 |
| D5,D6 | 1N4148 Diode | B3-110 |
| Q2 | TIP 31 NPN Transistor | B2-150 |

NOTE: *Only used on models with biasing

PARTS LIST
(continued)

UHF Carrier Operated Relay Part No. T-100816-R-1-SA

| REFERENCE NUMBER | PART DESCRIPTION | TPL PART NUMBER |
|------------------|-----------------------------------|-----------------|
| | PCB | T-100816 |
| R1 | 270 Ohm ¼W Resistor | C1-229 |
| R2,R4 | 100kOhm ¼W Resistor | C1-220 |
| R3 | 47kOhm ¼W Resistor | C1-212 |
| C1,C2 | 1pF Dip Mica Cap. | A8-100 |
| C3 | .01uF Cer. Disc Cap. | A5-244 |
| C4 | 1.0uF 50V Electrolytic Cap. | A4-106 |
| C6,C7,C8 | .001uF Cer. Disc Cap. | A5-172 |
| D1,D2 | 1N5711 Diode | B3-118 |
| D3,D4 | 1N4148 Diode | B3-110 |
| Q1 | MPS-A14 NPN Darlington Transistor | B2-139 |
| K1,K2 | Relay, UHF | J1-101 |

PARTS LIST
(continued)

UHF Solid State Carrier Operated Relay Part No. T-100816-R-1-SA

| REFERENCE NUMBER | PART DESCRIPTION | TPL PART NUMBER |
|------------------|--------------------------|-----------------|
| | PCB | T-101369 |
| C1,C10,C12,C13 | 1000pF Chip Cap. | A2-172 |
| C7 | 100pF Chip Cap | A2-148 |
| C3 | 2pF Cer. Disc Cap. | A5-107 |
| C4,C6 | 1-10pF EP10 Trimmer Cap. | A5-708 |
| C5 | 430pF Dipped Mica Cap. | A8-163 |
| C2,C8 | 1pF Chip Cap. | A2-100A |
| C9,C11 | 100pF ATC Chip Cap. | A2-191 |
| D1,D2,D4,D5 | MA47266 Diode | B3-115A |
| D3 | 1N5711 Diode | B3-118 |
| L5,L1 | 0.22uH Choke | E1-111 |
| L2,L3,L4 | Coil 3 Turns #22 AWG. | E1-123 |
| Q1 | MPS-A64 Transistor PNP | B2-106 |
| R1,R2 | 750 Ohm Resistor ½W | C1-369 |
| R3 | 7.5kOhm Resistor ¼W | C1-193 |
| R4 | 12kOhm Resistor ¼W | C1-198 |

WARRANTY

TPL Communications has tested and found this unit to function properly and to operate within the parameters of its stated specifications.

TPL Communications warrants that this product is free from defects in material and workmanship. If found to be defective within two (2) years from the date of purchase, the factory will, at its discretion, either repair or replace the unit at no cost, provided the unit is delivered by the owner to the factory intact. The warranty does not apply to any product which has been subjected to misuse, neglect, accident, improper installation, or used in violation of instructions furnished by us, nor does it extend to units which have been repaired or altered outside our service department, nor where the serial number has been removed, defaced or changed.

SERVICE

For service on this amplifier, contact:

TPL Communications
Customer Service Department
(323) 256-3000
800 HI POWER
FAX (323) 254-3210
E-Mail: tplcom@usa.net