



Technical Manual

Model PM1C1S AUTOMATIC ALARM PANEL





TECHNICAL MANUAL - PM1C1S

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SECTION 1

GENERAL INFORMATION

1.1 - SPECIFICATIONS

| | |
|-----------------------------------|------------------------------|
| VSWR alarm range | 2.0:1 (+25% / -10%) |
| LOW POWER alarm range | 5 watts to full scale |
| RELAY CONTACTS, closure | N/O or N/C |
| RELAY CONTACTS, ratings | |
| @120VAC resistive | 3A |
| @ 30VDC | 3A |
| DELAY TIMING RANGE | 0.1 to 1 second |
| WATTMETER RANGE | |
| FWD | 0-250 or 0-400 watts |
| REV | 0-25 or 0-120 watts |
| POWER REQUIREMENTS | |
| 120 VAC | 4 watts (max) |
| +12 VDC | 2 watts (max) |
| TEMPERATURE RANGE | -20°C to +60°C |
| DIMENSIONS (HWD) | |
| in (cm) | 3.5 x 19 x 4.5 (9 x 48 x 11) |
| WEIGHT | |
| lb (kg). | 3.0 (1.4) |

THE PM1C1S INCLUDES ONE OF THE FOLLOWING POWER MONITORS:

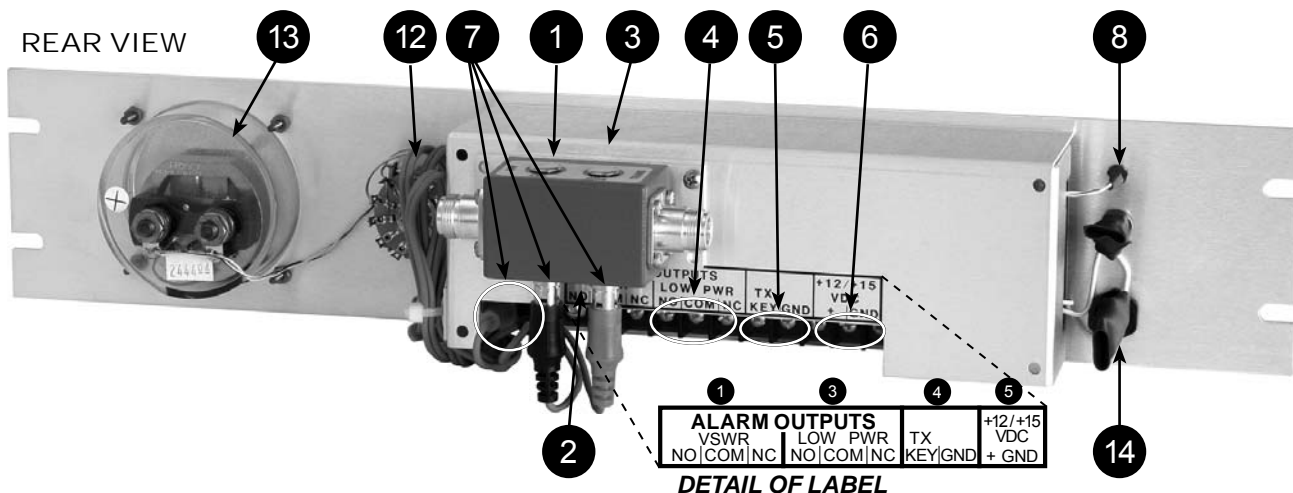
- PM-2A-50 - Power Monitor, Dual Direction 30-88 MHz
- PM-2A-150 - Power Monitor, Dual Direction 118-230 MHz
- PM-2A-300 - Power Monitor, Dual Direction 300-400 MHz
- PM-2A-450 - Power Monitor, Dual Direction 380-512 MHz
- PM-2A-760 - Power Monitor, Dual Direction 700-869 MHz
- PM-2A-900 - Power Monitor, Dual Direction 806-960 MHz

1.2 - DESCRIPTION

The Telewave PM1C1S is a one-channel, automatic, low transmit power and high VSWR alarm panel, featuring “true VSWR” circuitry and a built-in power monitor and wattmeter. The standard 3½-inch by 19-inch panel will mount directly in a standard rack and can be powered directly from 120VAC or 12VDC.

Whenever a low transmitter power condition is sensed by the PM1C1S, a latched relay closure occurs and a red light on the front panel turns on. Both normally-open and normally-closed relay contacts are provided. A high VSWR condition is indicated by a second latched relay and light. These contacts can be used to remotely activate light, speakers, or other alarm systems. The relays and lights are reset by means of a front panel RESET button.

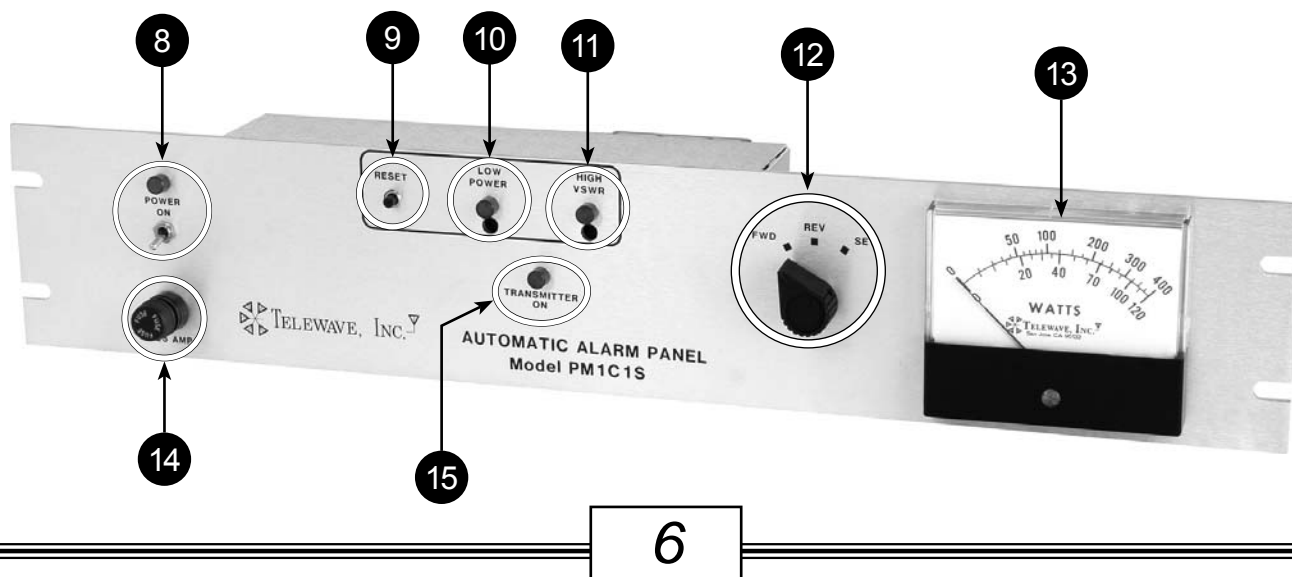
The panel also operates as an inline wattmeter, measuring both forward and reverse RF power, with readings displayed on a 3½-inch meter.



1.3 - PANEL CALLOUTS

1. POWER MONITOR AND ADJUSTMENT POTS
2. HIGH VSWR DETECT INPUTS
3. DELAY ADJUSTMENT POT (ADJUSTS MEASUREMENT DELAY FROM 0.1-1.0 SEC.) (FOUND BEHIND POWER MONITOR.)
4. LOW PWR. OUTPUTS (FORM "C" CONTACT CLOSURES)
5. TX KEY DETECT INPUTS (TRANSMIT KEY DETECT LINES TO GROUND FOR KEY DETECT)
6. +12 VDC EXT. INPUT
7. POWER MONITOR RCA JACKS
8. ON AND OFF SWITCH WITH LED INDICATOR
9. RESET SWITCH
10. LOW PWR. INDICATOR & ADJUSTMENT POT (TO 1.0 SEC.)
11. HIGH VSWR INDICATOR & VSWR ADJUSTMENT POT (NORMALLY SET FOR 2 TO 1 MISMATCH)
12. FWD / REV SET SWITCH
13. METER
14. FUSE HOLDER
15. TRANSMITTER ON INDICATOR

FRONT VIEW



SECTION 2

INITIAL ADJUSTMENT

2.1 TIME DELAY

A built-in time delay between the moment the alarm panel receives a transmitter “ON” signal and the initiation of alarm sensing is provided to allow the transmitter to reach full power and stabilize. This delay prevents the possibility of false alarms. The delay is internally adjustable from 0.1 second to 1.0 second. An oscilloscope can be used to measure the clock pulses at pin 14 of U7 while R25 is adjusted to trim the pulse cycle time to $\frac{1}{8}$ the desired delay period; for example, a 1 second delay = 0.125 second clock cycle.

2.2 METER

The wattmeter displays either 250 watts or 400 watts full scale in the forward direction, depending on the meter version specified with the order. Likewise, the reverse direction displays either 25 watts or 120 watts full scale. The accuracy of the display is controlled by the two trim pots on the power monitor. An inline wattmeter of known accuracy may be inserted in series with the power monitor, and the forward and reflected readings can be adjusted accordingly.

Note: Power monitor adjustments affect the settings of the low power and high VSWR alarm levels. The alarm levels will need resetting after any power monitor adjustments.

2.3 LOW POWER

When the front panel selector knob is in the SET position, the wattmeter will display the forward power level below which the alarm will trip. The adjustment port for varying the setting is directly below the low power alarm light. Turn the adjustment and the meter will indicate the desired trip point.

2.4 VSWR

The VSWR alarm is normally adjusted to trip at VSWR ratios of 2:1 or greater. The adjustment port is directly below the high VSWR alarm light, and can be set by introducing a deliberate 2:1 VSWR on the antenna side of the power monitor. Two 50-ohm dummy loads connected in parallel by means of a coaxial “tee” will provide a suitable 2:1 VSWR. The alarm should *just* trip when the transmitter is activated.

SECTION 3 OPERATION

3.1 OPERATION

Alarm monitoring is initiated in one of two ways: transmitter activation sensing or transmitter output sensing. Transmitter activation sensing requires the transmitter circuit to provide a relay closure which can be applied across the PM1C1S alarm panel TX KEY and GND terminals. The relay closure starts the alarm panel's delay timer and alarm monitoring begins at the end of the delay. The delay timer is reset whenever the transmitter is deactivated. Transmitter output sensing is the default method of operation. Whenever 5 watts or more of RF power is sensed by the alarm panel circuitry, the green TRANSMITTER ON light indicates that the delay timer has been started. The delay timer is reset whenever the RF power drops below 5 watts.

The alarm outputs have both normally open and normally closed contacts. The contacts are rated 3 amps at 30 VDC or 120 VAC resistive. Once an alarm condition has occurred, the contacts are latched and the relays remain energized until the front panel RESET button is pressed, or until power to the panel is interrupted for three or more seconds.

The PM1C1S operates from 120 VAC or +12 to +15 VDC. A 12V battery connected to the panel will provide backup power in the event that AC power is interrupted. No charging of an attached battery is provided.

3.2 PARTS LIST MODEL PM1C1S

ALARM PANEL PCB

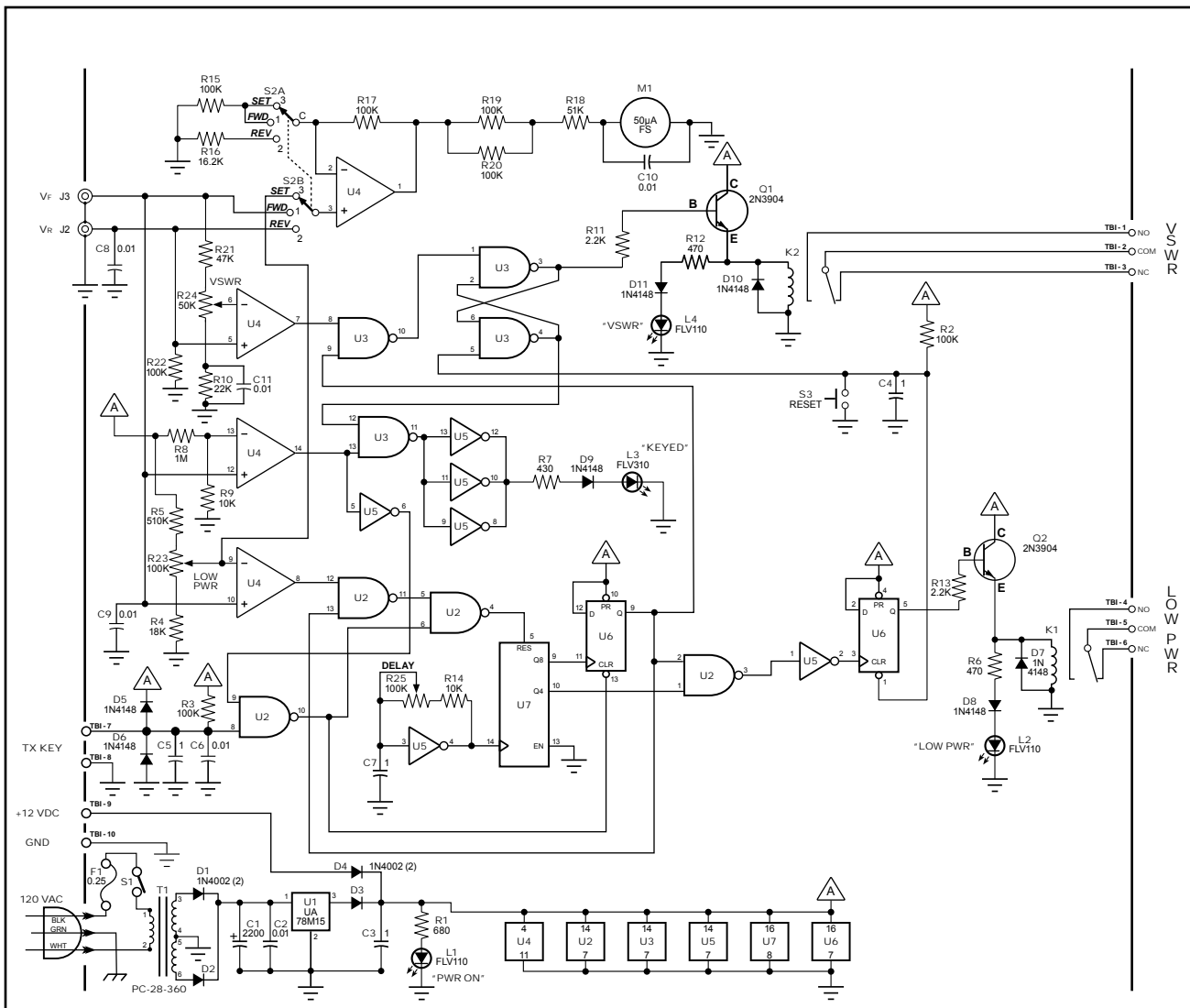
| REF. DSG | TELEWAVE PART NO. | DESCRIPTION | QTY. EA. |
|---------------------------------|----------------------|-------------------------------------|-------------|
| | 7111 | Schematic Diagram | |
| | 7715 | Component Outline | |
| R1 | RE239 | Resistor, CF, 680 ¼ W 5% | 1 |
| R2, R3, R15, R17, R19, R20, R22 | RE043 | Resistor, CF, 100K ¼ W, 5% | 7 |
| R4 | RE021 | Resistor, CF, 18K ¼ W 5% | 1 |
| R5 | RE023 | Resistor, CF, 510K ¼ W 5% | 1 |
| R6, R12 | RE240 | Resistor, CF, 470 ¼ W 5% | 2 |
| R7 | RE241 | Resistor, CF, 430 ¼ W 5% | 1 |
| R8 | RE247 | Resistor, CF, 1M ¼ W 5% | 1 |
| R9, R14 | RE242 | Resistor, CF, 10K ¼ W 5% | 2 |
| R10 | RE025 | Resistor, CF, 22K ¼ W 5% | 1 |
| R11, R13 | RE016 | Resistor, CF, 2.2K ¼ W 5% | 2 |
| R16 | RE244 | Resistor, CF, 16.2K ¼ W 5% | 1 |
| R18 | RE022 | Resistor, CF, 51K ¼ W 5% | 1 |
| R21 | RE245 | Resistor, CF, 47K ¼ W 5% | 1 |
| R23, R25 | RE246 | Potentiometer, Spectrol 63S-100K | 2 |
| R24 | RE157 | Potentiometer, Spectrol 63S-50K | 1 |
| C1 | CA011 | Capacitor, Electrolytic, 2200mF | 1 |
| C2, C6, C8-C10 | CA021 | Capacitor, Ceramic, .01mF 50V | 5 |
| C3-C5, C7 | CA133 | Capacitor, Dip Tant, 1mF 35V | 4 |
| D1-D4 | D1004 | Rect Diode 1N4002,1A 100 PRV | 4 |
| D5-D11 | D1003 | Signal Diode 1N4148, 5NS 100 PRV | 7 |
| S3 | SW010 | Switch, Momentary, N/O | 1 |
| U1 | VR003 | IC UA78M15, 15V Regulator, TO-220 | 1 |
| U2, U3 | IC003 | IC 4093, Digital, Quad Nand, CMOS | 2 |
| U4 | IC011 | IC LM324N Linear Quad OP Amp | 1 |
| U5 | IC010 | IC 74C14, Digital, Hex Schmitt Trig | 1 |
| U6 | IC005 | IC 74C74, Digital, Dual D Flip Flop | 1 |
| U7 | IC012 | IC 4017, Digital Decoded Decade Ctr | 1 |
| IC-SOC | 0036 | Socket, Dual in Line, 14 Pin | 5 |
| IC-SOC | 0037 | Socket, Dual in Line, 15 Pin | 1 |
| T1 | TF001 | Transformer, 28 VCT 360 MA | 1 |
| Q1, Q2 | TR003 | Transistor 2N3904, NPN, 60V | 2 |
| L1, L2, L4 | LE001 | Red LED FLV110 Long Leads | 3 |
| L3 | LE005 | Green LED | 1 |
| K1, K2 | RL002 | Relay, SPDT, PC Mount, 3A 120 VAC | 2 |
| TB1 | 0044 | Terminal Block, Feed Thru, 10 Pin | 1 |
| J2, J3 | 3501FP | RCA Jack | 2 |
| | SCR110 | 8-32 x 5/8" Slot Pan | 1 |
| | SCR113 | 8-32 x 3/4" Slot Pan | 1 |
| | SCR058 | 6-32 x 3/8" Slot Pan | 1 |
| | WAS851 | Internal Lockwasher | 4 |
| | NUT526 | 6-32 Hex Pltd | 1 |
| | NUT551 | 8-32 Hex Nut | 1 |
| | MS016 | Clamp Cable Black ¼" Plastic | 1 |

THE FOLLOWING ITEMS PLUS THE ALARM PCB MAKEUP THE 1 CHANNEL ALARM PANEL

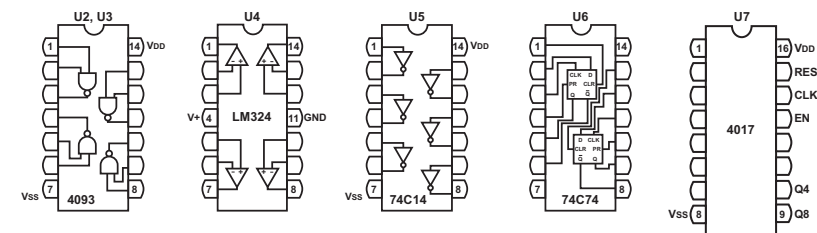
| | | | |
|----|--------|-----------------------------------|-------|
| 1 | PM2A | Power Monitor | 1 |
| 2 | WAS826 | #6 Split Lockwasher | 6 |
| 3 | SCR058 | 6-32 x 3/8" Slot Pan | 6 |
| 4 | 7286 | Mounting Plate | 1 |
| 5 | SCR306 | #2 x 1/4" Phil. Pan | 4 |
| 6 | 7115 | PCB Back Cover | 1 |
| 7 | 0022 | Line Cord | 1 |
| 8 | 7715 | Component Outline | 1 |
| 9 | | PEM BSOA-632-22 | 4 |
| 10 | STB006 | Shrink Tube Fuse | 2 |
| 11 | 7112 | Front Panel (Pnl #009) | 1 |
| 12 | 0026 | Red LED Lens Cover | 3 |
| 13 | 0029 | Green LED Lens Cover | 1 |
| 14 | 0007 | Knob | 1 |
| S1 | SW004 | Switch, Min. Toggle, SPDT | 1 |
| S2 | SW | 2 Pole, 5 Positions Rotary Switch | 1 |
| F1 | FH002 | Fuse Holder | 1 |
| M1 | ME002 | Meter 250 / 25 watts | 1 |
| M1 | ME003 | Meter 400 / 120 watts | 1 |
| | FU005 | Fuse (AGC 1/4 Amp) | 1 |
| | WI006 | Hook Up Wire 22 Awg Red | 1 ft. |
| | WI013 | Hook Up Wire 22 Awg Blue | 6 in. |
| | WI005 | Hook Up Wire 22 Awg Black | 1 ft. |
| | WI015 | Hook Up Wire 22 Awg White | 6 in. |

SECTION 4

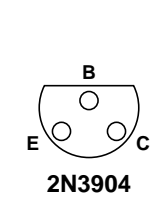
DRAWINGS AND FIGURES



TOP VIEW



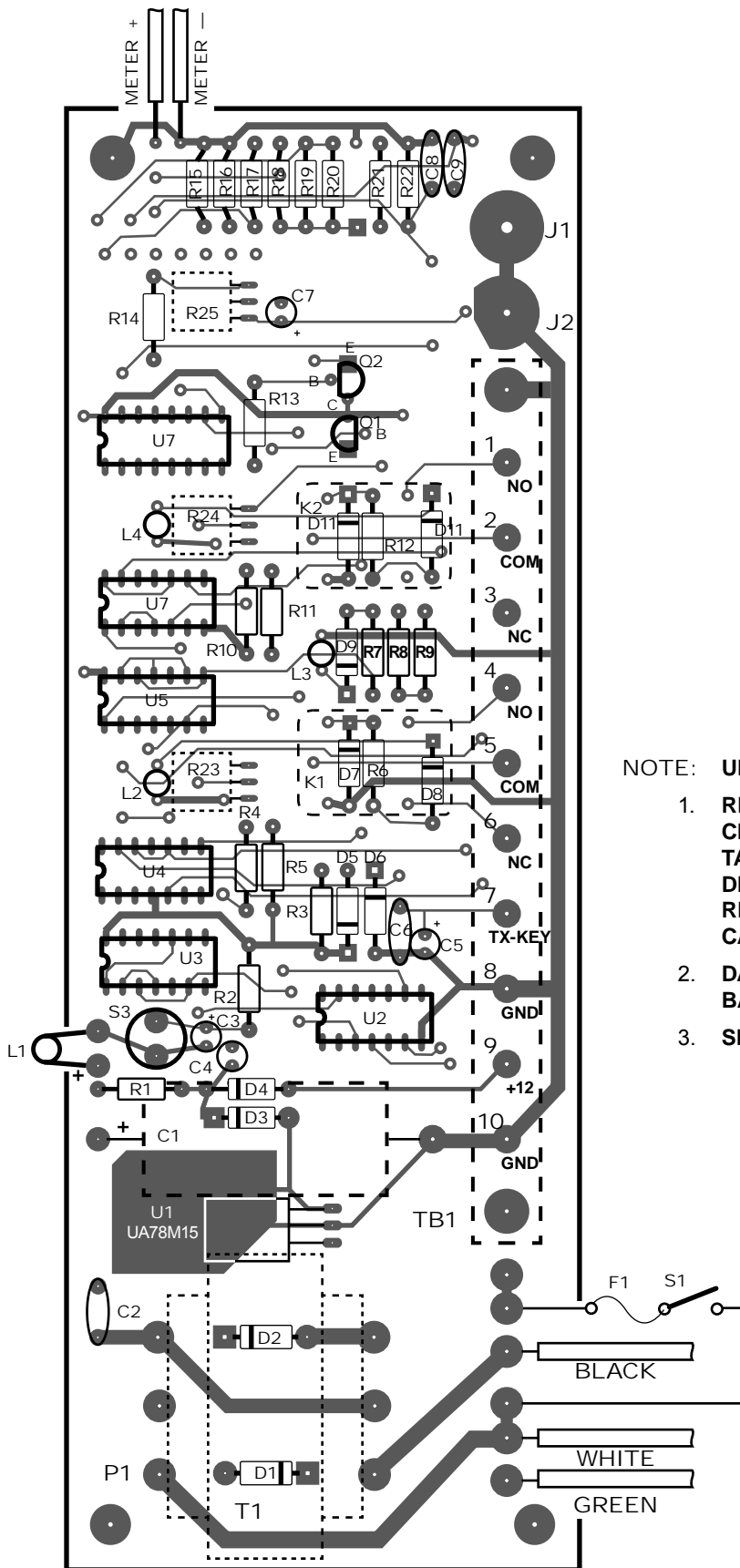
BOTTOM VIEW



- NOTE: UNLESS OTHERWISE SPECIFIED:
1. CAPACITORS ARE 20%, 25 VDC CAPACITANCE IN MICROFARADS
 2. RESISTORS ARE 1/4 WATT, 5% RESISTANCE IN OHMS
 3. SEE DWG. #7715 FOR COMPONENT OUTLINE

**PM1C1S
AUTOMATIC
ALARM PANEL
DRAWING # 7111**

FIGURE 4.1 - SCHEMATIC



NOTE: UNLESS OTHERWISE SPECIFIED:

1. RESISTORS ARE 1/4 WATT 5%, CARBON FILM
CERAMIC CAPACITORS ARE 25 VOLTS, 20%
TANTALUM CAPACITORS ARE 35 VOLTS, 20%
DIODES D5-D11 ARE 1N4148
RESISTANCE IS IN OHMS
CAPACITANCE IS IN MICROFARADS
2. DASHED OUTLINES SHOW COMPONENTS ON
BACK SIDE OF BOARD.
3. SEE #7111 FOR SCHEMATIC DIAGRAM.

PM1C1S
**AUTOMATIC
 ALARM PANEL**
 DRAWING # 7715

FIGURE 4.2 - COMPONENT OUTLINE

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