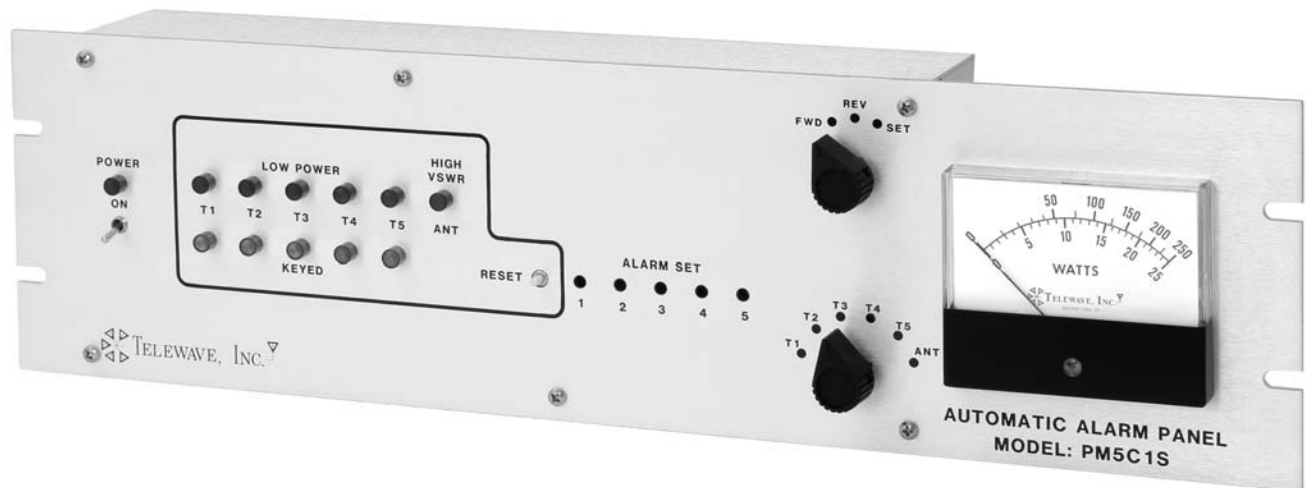




Technical Manual

Model PM5C1S AUTOMATIC ALARM PANEL





TECHNICAL MANUAL - PM5C1S

TABLE OF CONTENTS

	Page Number
SECTION 1 - GENERAL INFORMATION	4
1.1 - SPECIFICATIONS	4
1.2 - DESCRIPTION	5
1.3 - FRONT AND REAR PANEL CALLOUTS	6
SECTION 2 - INITIAL SETUP	7
2.1 METER	7
2.2 POWER MONITORS	7
2.3 TIME DELAY	7
2.4 LOW POWER	7
2.5 VSWR	8
SECTION 3 - OPERATION	8
3.1 OPERATION	8
SECTION 4 - SCHEMATICS AND PARTS LIST	9
FIGURE 4.1 - MAIN SCHEMATIC	10
FIGURE 4.2 - POWER SUPPLY / LOGIC	11
FIGURE 4.3 - COMPONENT OUTLINE	12
FIGURE 4.4 - PARTS LIST	13
CONTACT / TECHNICAL ASSISTANCE	14

SECTION 1

GENERAL INFORMATION

1.1 - SPECIFICATIONS

VSWR alarm	2.0:1 (+25% / -10%)
LOW POWER alarm range	5 watts to full scale
RELAY CONTACTS, closure	N/O and 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)	5.25 x 19 x 2.5 (13.3 x 48 x 6.4)
WEIGHT	
lb (kg).	4.5 (2)

**THE PM5C1S REQUIRES UP TO SIX OF THE
FOLLOWING POWER MONITORS:**

- PM-2A-50 - Power Monitor, Dual Direction 30-88 MHz
- PM-2A-90 - Power Monitor, Dual Direction 87.5-108 MHz
- PM-2A-150 - Power Monitor, Dual Direction 118-230 MHz
- PM-2A-300 - Power Monitor, Dual Direction 200-400 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

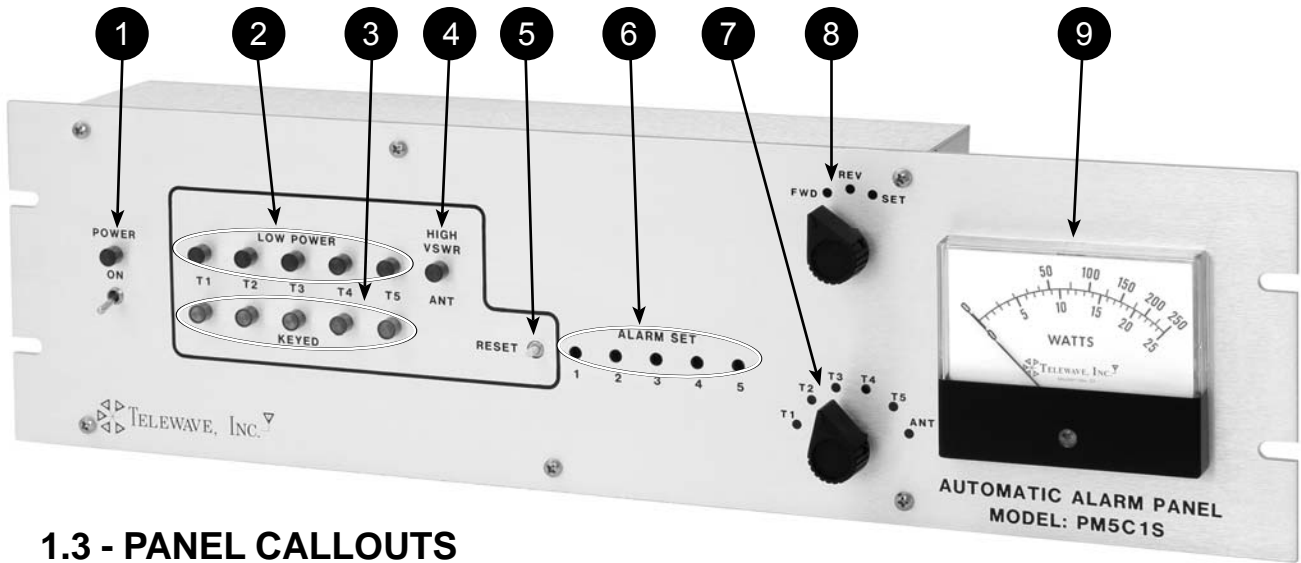
1.2 - DESCRIPTION AND OPERATION

The Telewave PM5C1S is a five-channel, automatic, low transmit power and high VSWR alarm panel, featuring “true VSWR” circuitry and a built-in wattmeter. The standard 5.25-inch by 19-inch panel will mount directly in a standard rack and can be powered from 120VAC, 230VAC or 12VDC.

Whenever a transmitter low power condition is sensed by the PM5C1S on one of the five TX channels, 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 for each channel. A high VSWR condition on the antenna path is indicated by a sixth latched relay and light. These contacts can be used to remotely activate lights, speakers, or other alarm systems. The relays and lights are reset by means of a front panel RESET button, by momentarily grounding the RESET contacts on the rear of the unit, or by removing power to the panel for 3 seconds.

The panel also operates as an inline wattmeter, measuring both forward and reverse RF power on all 5 channels plus the sixth “ANT” channel, with readings displayed on a 3½-inch meter.

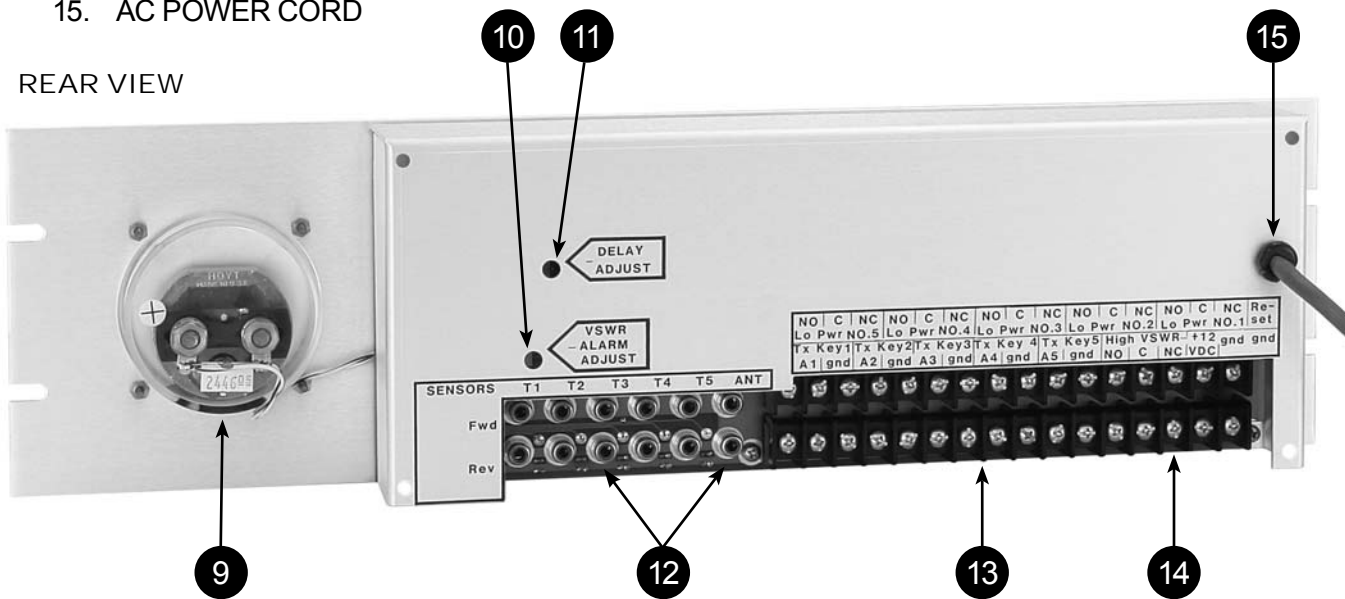
FRONT VIEW



1.3 - PANEL CALLOUTS

1. ON AND OFF SWITCH WITH LED INDICATOR
2. LOW POWER ALARM LATCHED INDICATORS - RED
3. TRANSMITTER POWER INDICATORS - GREEN (>5 W)
4. HIGH VSWR LATCHED INDICATOR - RED
5. RESET SWITCH
6. LOW POWER ALARM LEVEL SETTINGS - T1-T5
7. TRANSMITTER METER DISPLAY SWITCH - T1-T5, ANT
8. METER DISPLAY SWITCH FWD / REV, LOW POWER ALARM SET
9. METER
10. VSWR ALARM ADJUSTMENT (NORMALLY SET FOR 2:1 MISMATCH)
11. DELAY ADJUSTMENT (0.1-1.0 SEC.)
12. POWER MONITOR INPUTS FWD / REV / ANT
13. RELAY CONTACTS AND TX KEY CLOSURE INPUTS
14. +12 VDC INPUT
15. AC POWER CORD

REAR VIEW



SECTION 2 INITIAL SETUP

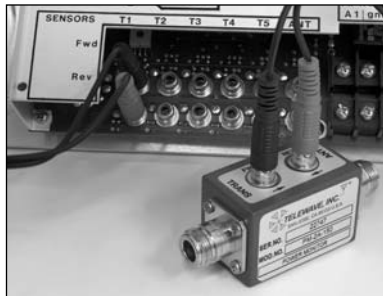
2.1 METER

The PM5C1S wattmeter displays up to 250 watts forward and 25 watts reflected, or 400 watts forward and 120 watts reflected, depending on the installed meter version. The relative accuracy of the display is controlled by the two trim pots on up to six associated power monitors, one for each channel, plus antenna VSWR. All power monitors are factory adjusted for the center of the applicable frequency band and should not require additional adjustment prior to use. If needed, an inline wattmeter of known accuracy may be inserted in series with a 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 must be reset after any power monitor adjustments.

2.2 POWER MONITORS

Power monitors are connected via shielded RCA cable to the REV and FWD connectors on the back panel as indicated, for each channel to be monitored. Typically red is used for REV, and black is used for FWD.



2.3 TIME DELAY

A built-in time delay between the moment the alarm panel senses RF or receives a transmitter key closure, and the initiation of alarm sensing, is provided to allow the transmitter output to stabilize. This delay reduces the possibility of false low power alarms. The default delay is 0.5 (1/2) second, and is adjustable from 0.1 second to 1.0 second by adjusting the DELAY ADJUST trimmer, located through the upper port on the back panel.

2.4 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 for T1-T5, as selected. The adjustment ports for varying these settings are labelled "ALARM SET" and are located to the right of the RESET button. Turn the adjustment and the meter will indicate the trip point for that channel. The default low power setting is 45 watts.

Note: The sixth channel "ANT" indicates antenna VSWR and the meter will peg if ANT is selected in SET mode. This condition should be avoided.

SECTION 2 (cont.)

2.5 VSWR

The VSWR alarm is triggered via the ANT monitor input, and is factory adjusted to trip at VSWR ratios of 2.0:1 or greater. The adjustment pot is located through the lower of the two ports on the back of the PM5C1S and can be set by introducing a deliberate 2.0:1 VSWR on the antenna side of the power monitor connected to the ANT inputs. Two 50 ohm dummy loads connected in parallel by means of a coaxial “tee” will provide a suitable 2.0:1 VSWR. When the transmitter is keyed, the alarm should pause slightly for the delay time, then trip.

Before the VSWR circuitry will operate, at least 5 watts of RF power must be flowing through any of the 5 power monitors, which will activate the associated green KEYED lights. The time delay also applies to the VSWR circuitry to prevent false alarms.

SECTION 3 OPERATION

3.1 OPERATION

The power output of each monitored transmitter can be displayed by selecting T1-T5 or ANT on the meter display switch. The FWD / REV / SET switch is set for the desired direction to be displayed. Alarm monitoring is initiated in one of two ways: transmitter activation sensing or transmitter output sensing. 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 KEYED light immediately indicates the presence of RF power. The delay timer is started if monitored RF power fails to reach or drops below the preset level for that channel.

Transmitter activation sensing requires the transmitter circuit to provide a relay closure or grounded output which can be applied across the rear 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 green KEYED light is not activated unless RF is also detected by the power monitor.

The delay timer is reset whenever the transmitter is deactivated. The alarm outputs have both normally open and normally closed contacts. The contacts are rated at 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, the RESET terminal on the rear panel is momentarily grounded, or until power to the panel is removed for at least three seconds.

The PM5C1S operates from 120 VAC or +12-15 VDC. A 12V battery connected to the panel will provide backup power in the event that AC power is interrupted. No battery charging is provided.

SECTION 4

SCHEMATICS AND PARTS LIST

NOTES:
 UNLESS OTHERWISE SPECIFIED:
 RESISTANCE IS IN OHMS
 CAPACITANCE IS IN MICROFARADS
 RESISTORS ARE 1/4 WATT 5%, CARBON FILM
 CERAMIC CAPACITORS ARE 25 VOLTS, 20%
 TANTALUM CAPACITORS ARE 35 VOLTS, 20%
 DIODES ARE 1N4148

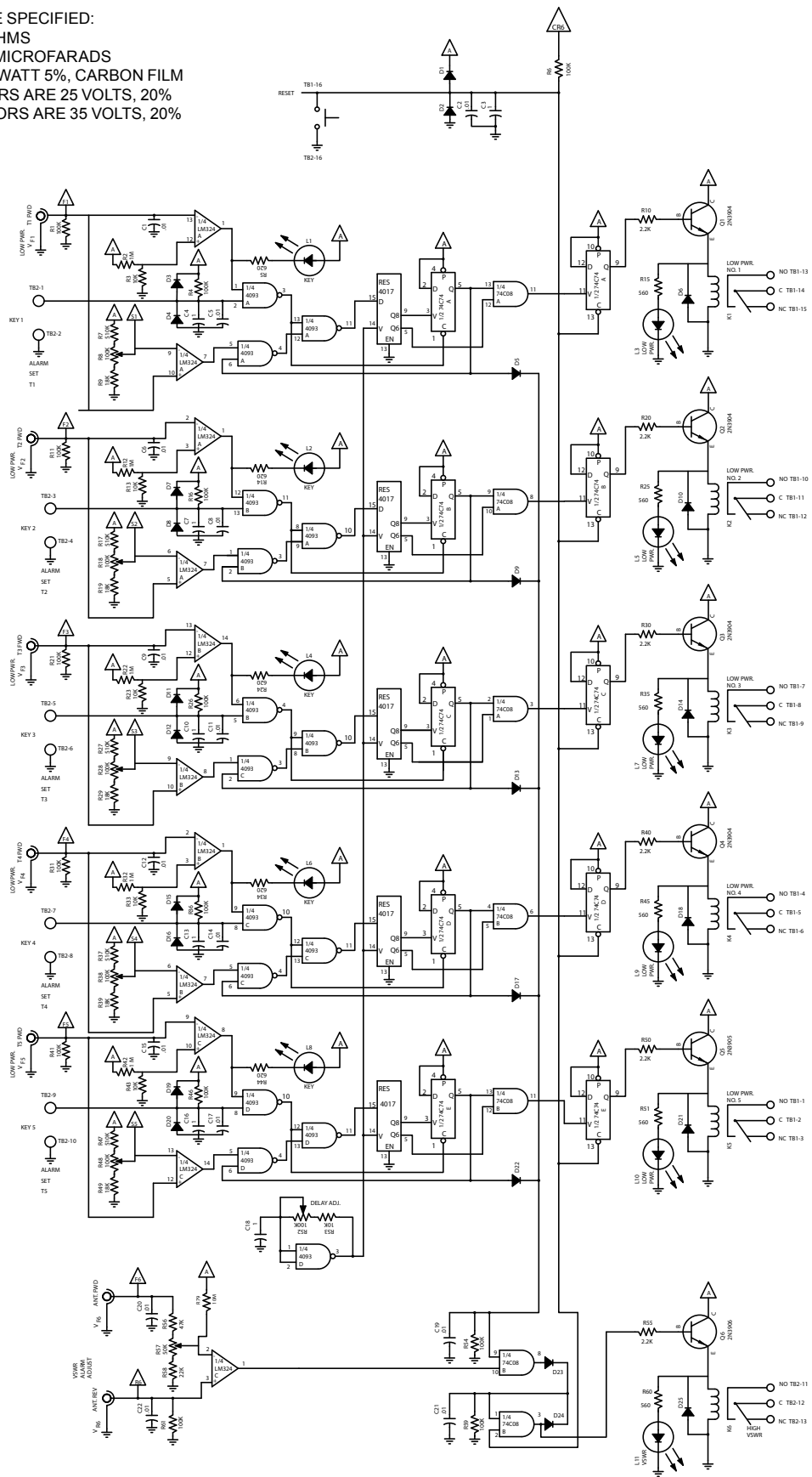
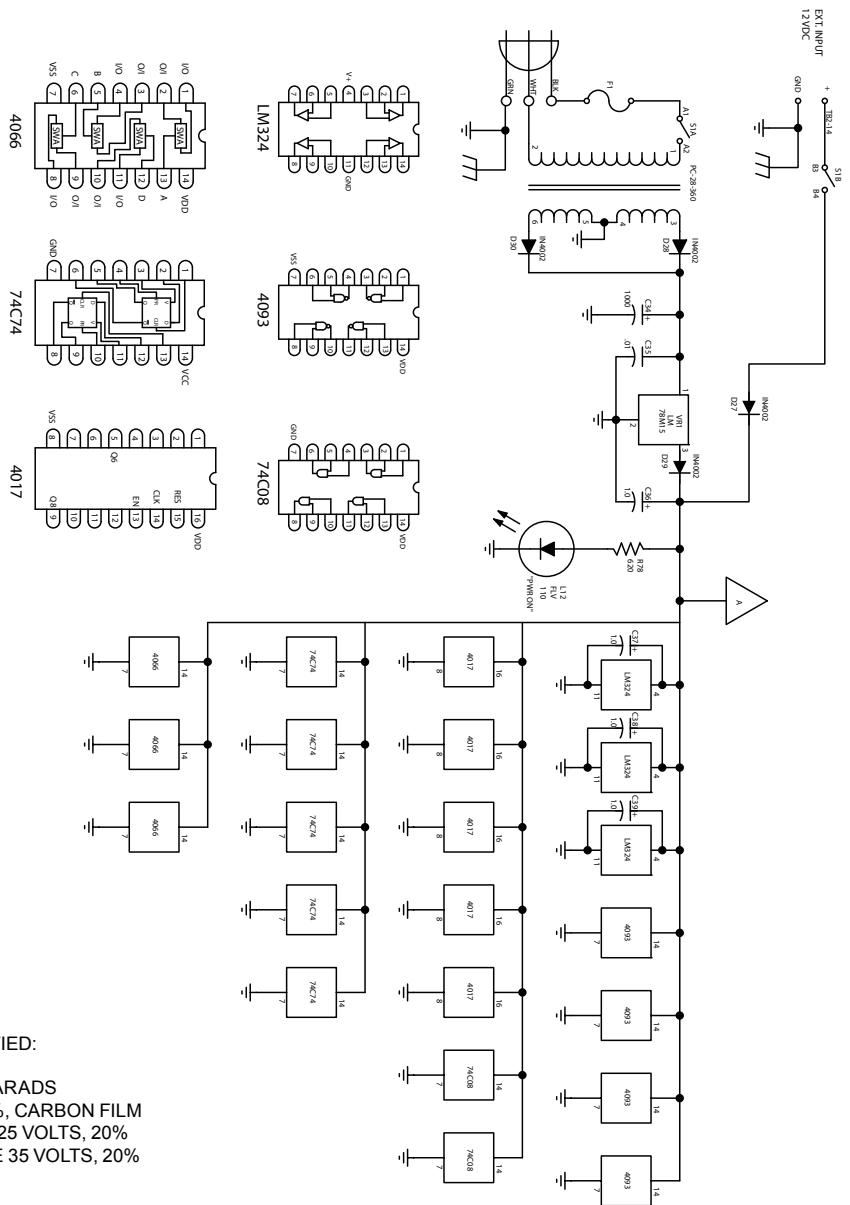
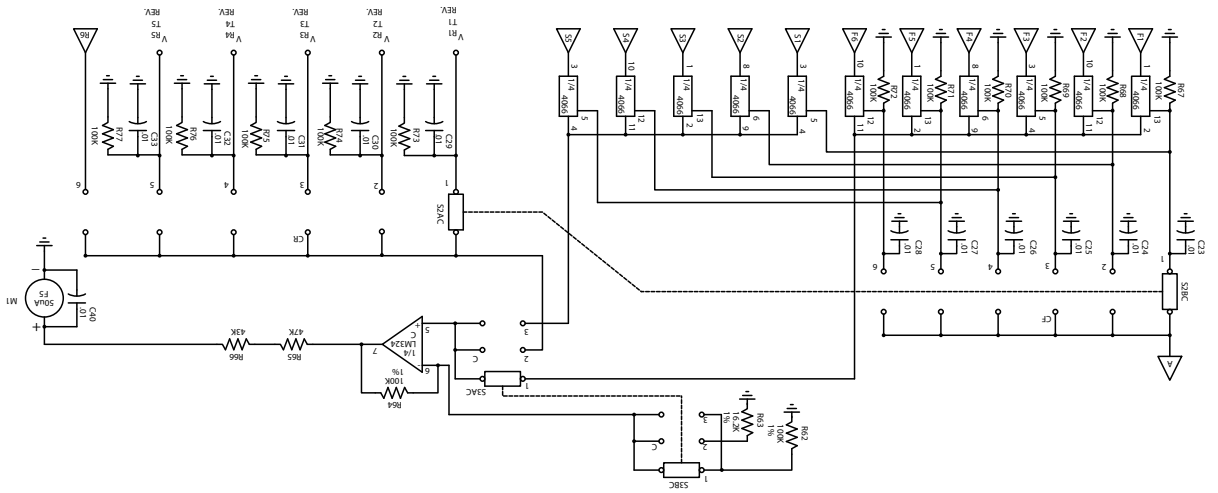


FIGURE 4.1 - MAIN SCHEMATIC



NOTES:
 UNLESS OTHERWISE SPECIFIED:
 RESISTANCE IS IN OHMS
 CAPACITANCE IS IN MICROFARADS
 RESISTORS ARE 1/4 WATT 5%, CARBON FILM
 CERAMIC CAPACITORS ARE 25 VOLTS, 20%
 TANTALUM CAPACITORS ARE 35 VOLTS, 20%
 DIODES ARE 1N4002

FIGURE 4.2 - POWER SUPPLY AND LOGIC

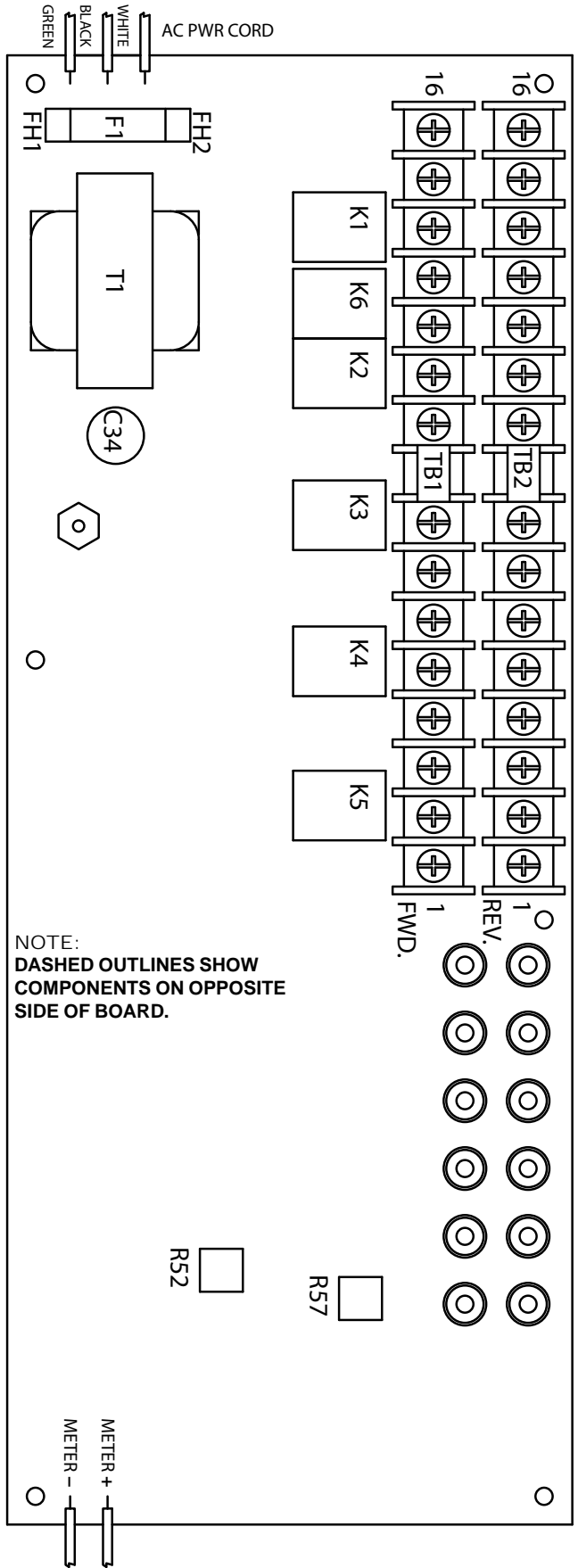
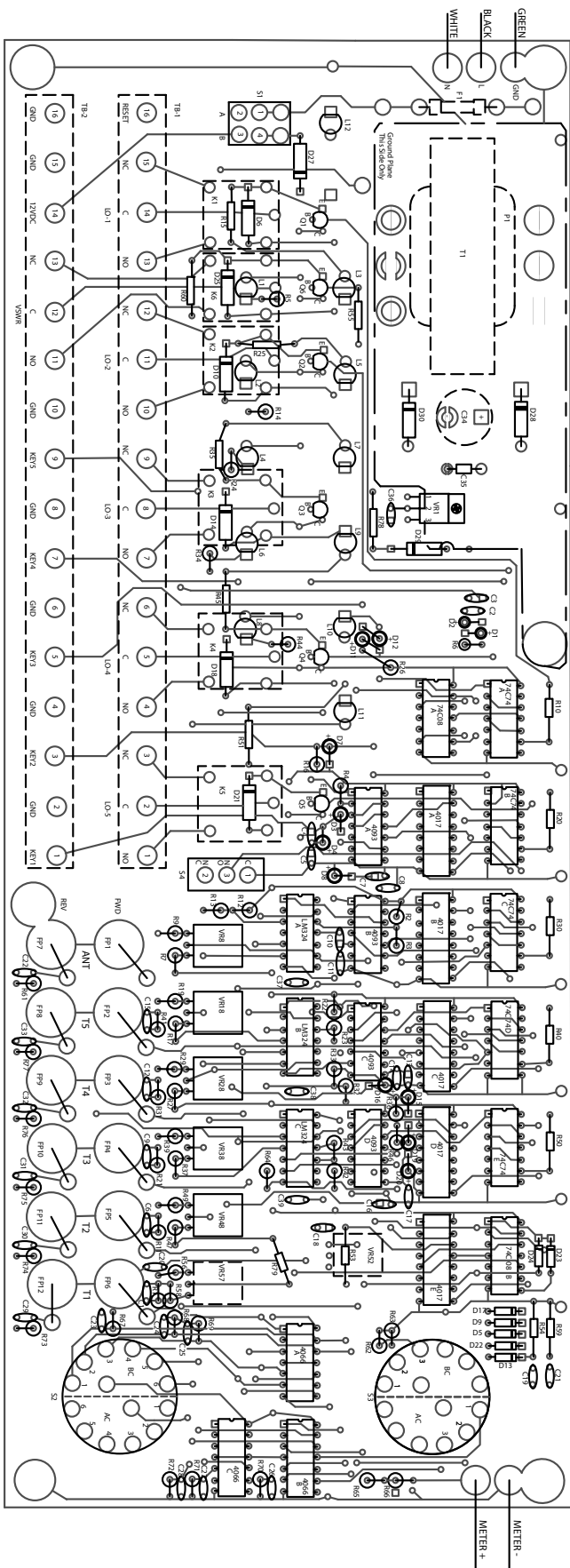


FIGURE 4.3 - COMPONENT OUTLINE

REFERENCE NUMBER	TELEWAVE P/N	DESCRIPTION	QTY.
C1,C2,C5,C6,C8,C9,C11,C12,C14,C15, C17,C19-C33,C35,C37,C39	CA021	CAPACITOR, .01 μ f, 25V (P3400)	30
C3,C4,C7,C10,C13,C16,C18,C38	CA133	CAPACITOR, 1.0 μ f, 35V (D-K P2059)	8
C34	CA134	CAPACITOR, 1000 μ f, 35V, RADIAL	1
D1-D25	D1003	DIODE, 1N4148	25
D27-D30	D1004	DIODE, 1N4002	4
F1	FU005	FUSE, AGC 1/4A 120VAC	1
FH1,FH2	FH003	LITTLE FUSE 102069 CLIP	2
IC4017 A-E	IC012	4017, DECADE COUNTER	5
IC4066 A-C	IC017	4066, QUAD ANALOG SWITCH	3
IC4093 A-D	IC015	4093, QUAD NAND SCHMITT GATE	4
IC74C08 A,B	IC016	74C08, QUAD AND GATE	2
IC74C74 A-E	IC013	MM74C74N, DUAL-D FLIP FLOP	5
ICLM324 A-C	IC011	LM324N, OP AMP	3
IC SOC	0036	IC SOCKET, 14 PIN, DUAL IN-LINE	17
IC SOC	0037	IC SOCKET, 16 PIN, DUAL IN-LINE	5
K1-K6	RL002	RELAY, NTE R46-5D12-12 12A / 125VDC	6
KNOBS (S2,S3)	0007	KNOBS, FRONT PANEL	2
L1,L2,L4,L6,L8	LE005	LED, GREEN, FLV310	5
L3,L5,L7,L9,L10,L12	LE001	LED, RED, FLV110	7
LENS COVER	0026	RED LED LENS COVER	7
LENS COVER	0029	GREEN LED LENS COVER	5
M1	ME002	METER MOVEMENT 0-250W DC 50MA FS	1
M1	ME003	METER MOVEMENT 0-400W DC 50MA FS	1
POWER CABLE	0022	BELDEN 17237S 3 COND, 6FT	1
Q1-Q6	TR003	TRANSISTOR, 2N3904, NPN, 60V	6
R1,R4,R6,R11,R16,R21,R26,R31,R36, R41,R46,R54,R59,R61,R67-R77	RE043	RESISTOR, CF, 100K 1/4W, 5%	25
R2,R12,R22,R32,R42	RE247	RESISTOR, CF 1M, 1/4W, 5%	5
R3,R13,R23,R33,R43,R53	RE242	RESISTOR, CF 10K, 1/4W, 5%	6
R5,R14,R24,R34,R44,R78	RE250	RESISTOR, CF 620, 1/4W, 5%	6
R7,R17,R27,R37,R47	RE023	RESISTOR, CF 510K, 1/4W, 5%	5
R8,R18,R28,R38,R48,R52	RE246	POTENTIOMETER, SPECTROL 63S-100K	6
R58	RE256	RESISTOR, CF 22K, 1/4W, 5%	1
R9,R19,R29,R39,R49	RE021	RESISTOR, CF 18K, 1/4W, 5%	5
R10,R20,R30,R40,R50,R55	RE016	RESISTOR, CF 2.2K, 1/4W, 5%	6
R15,R25,R35,R45,R51,R60	RE249	RESISTOR, CF 560, 1/4W, 5%	6
R56,R65	RE245	RESISTOR, CF 47K, 1/4W, 5%	2
R57	RE157	POTENTIOMETER, SPECTROL 63S-50K	1
R62,R64	RE248	RESISTOR, MF 100K, 1/4W, 1%	2
R63	RE244	RESISTOR,MF 16.2K, 1/4W, 1%	1
R66	RE251	RESISTOR,CF 43K, 1/4W, 5%	1
R79	RE260	RESISTOR, CF 10M, 1/4W, 5%	1
S1	SW011	SWITCH, C&K 7201SYCBE DPDT	1
S2,S3	SW013	SWITCH, LORLIN CK-1454	2
S4	SW012	SWITCH, C&K 8125ZE SPDT MOM	1
T1	TF001	TRANSFORMER, 110VAC 28VCT SIGNAL PC-28-360	1
TB1,TB2	0043	TERMINAL BLOCK, FEED THRU, 16 PIN	2
VF1-VF6,VR1-VR6, FP1-12	3501FP	RCA JACKS	12
VR1	VR003	VOLTAGE REGULATOR, LM78M15, TO-220	1

FIGURE 4.4 - PARTS LIST PM5C1S

Technical Assistance

USA

1-800-331-3396

International

+408-929-4400

+408-929-4080 fax

**Telewave, Inc
660 Giguere Court
San Jose, CA 95133
USA**

**www.telewave.com
sales@telewave.com**