

# BOMBS AWAY MANUAL

**MEADOWS GAMES INC.**

181 COMMERCIAL • SUNNYVALE, CALIFORNIA 94086 • PHONE (408) 732-8110

BOMBS AWAY MANUAL

Table of Contents

1. Warranty Information	Page	i
2. New Machine Check Out		1
3. Game Sequence		1
4. Service Entry		2
5. Adjustments		2
6. Static Harness		3
7. Coin Acceptor		3
8. Trouble Shooting		5

Illustrations

1. Coin Acceptor	6
2. Wiring Diagram	7
3. Motorola Manual	8

## Warranty Information

Each game manufactured by Meadows Games, Inc. carries a full, one (1) year warranty on the P.C. logic board (and its components).

The Motorola T.V. Montitor carries a six (6) month warranty on parts and labor.

To honor the warranty, Meadows Games must have the cabinet S/N in reference to any repair work. This will negate any service charges that would otherwise apply.

All incoming equipment must travel freight prepaid.



## New Machine Check-Out Procedures

After uncrating, save all packing materials in the event the machine needs to be returned.

Each machine receives thorough 100%, inspection and adjustment at the factory. However, components may have been damaged or adjustments changed during shipment. Check out of machine should be done before placement on location.

Before plugging unit in, unlock front door. To gain entry into top of unit, loosen suitcase latches on sides of cabinet near front of cabinet. Inspect for any loose or damaged components.

Plug in machine and check game sequence, as follows:

### Bombs Away - Game Sequence

Bombs Away will display an attract mode when plugged in. The attract mode displays a plane carrying a bomb moving left to right, a bomb count, a score count, and three sets of moving ships. The ships move horizontally with different speeds and directions.

The game credit box will light up when a coin has been accepted. After a game credit has been registered, the score and bomb counts will reset by

pushing the "start game" button. The plane will now drop bombs when the "bomb release" button is pushed. If a ship is hit by a bomb, the picture will flash, the ship will sink, and an explosion sound will occur. The time length of the explosion is determined by the ship value hit. The bomb count will increase by one, and the score count will increase according to the ship value hit. Another bomb will appear below the plane automatically.

If the bomb misses the ship, a splash sound will occur. The bomb count will increase one, and the score count will not change. Another bomb will appear below the plane automatically.

The plane increases horizontal speed when the score exceeds twenty points, and again after passing thirty points. When fifteen bombs have been dropped the "bomb release" button is disabled.

A Game Credit is awarded if a player scores more than forty points, or if no points are made. Only one "game credit" is awarded for each coin. Therefore, a "game credit" cannot be given from a previously won game.

#### Service Entry

To enter Bombs Away cabinet, open front door. This will allow access to coin acceptor, volume adjustments, and P.C. Board replacements. For monitor adjustment or replacement, loosen suitcase latches that hold down the top of Bombs Away.

#### Adjustments

Monitor: See Motorola manual for location of adjustments.

Volume: Adjust trimmer pot on P.C. board for desired volume.

Brightness: Adjust the brightness of the sky until it fades at the tip of the screen.

Contrast: Adjust for clear images.

Vertical Hold: Adjust if the screen is rolling.

Horizontal Hold: Adjust if the picture is off center, the images are warped, or if the picture is broken into diagonal lines.

### Static Grounding Harness

To prevent static interference, the panel, speaker, coin acceptor, and monitor chassis have been grounded together on a separate harness. Removal of this harness may result in erratic game operation.

### Coin Acceptor Operation, Adjustment And Maintenance

Operation: The detection and rejection of undesired or counterfeit coins are determined by size (both thickness and diameter), weight, and metallic composition. The transfer cradle (#9 in figure 4) is used to test both the size and weight of the coin. The quarter must first pivot an "undersize" lever (10) to unlock the transfer cradle. Undersize "quarters" will fail to unlock the transfer cradle and can be returned by actuating the wiper operation lever (17). Oversize diameter coins will fail to pass between the transfer cradle and the wiper can be returned by operating the wiper lever. Coins that are oversize in thickness will fail to pass between the magnet gate (11) and the main channel (5) and will have to be dislodged by actuating the wiper operating lever. Underweight coins will fail to overcome the transfer cradle counterweight and can be returned by operating the wiper lever.

A magnet is used to test the metallic composition of the coin. Highly magnetic coins, such as steel or iron, will be retained by the magnet and can be returned by actuating the wiper operating lever. Coins having comparatively high magnetic properties will be slowed down by the magnet and will drop off the rail short of the "accept" entrance and will be returned. Coins having little or no magnetic properties, such as brass or zinc, will pass through the magnetic field so fast they will overshoot the accept entrance and will be returned.

Adjustment: All coin acceptors leave the factory adjusted for maximum performance. If, however, more critical adjustment is desired, or if the unit has been disassembled for cleaning, the following adjustment procedure is suggested.

Kicker and Separator:

- a. Set the acceptor on a level surface with the back of the unit facing you (the kicker and separator are on the back).
- b. Loosen the screws holding the kicker (1) and the separator (3) and move both the kicker (2) and the separator (4) as far to the right as they will go. Tighten the screws lightly.
- c. Insert several test coins (both old and new) and note that some are returned by striking the separator.
- d. Loosen the separator screw and move the separator a slight amount to the left. Retighten the screw.
- e. Insert the test coins again, and if some are still returned, repeat Step D until all the coins are accepted.
- f. Loosen the kicker screw and move the kicker a slight amount to the right. Retighten the screw.

- g. Insert test coins again, and if some of them are returned, repeat Step F until all coins are accepted.
- h. Be sure that both screws are tight after adjustments have been made.

### Trouble Shooting

No Picture: Check monitor adjustments, power, and monitor fuses. Test continuity of harness, monitor connector pin #6 to logic board pin #3 (5 volt supply), and monitor pin #1 to logic pin #15 (video). If adjustments and harness are good the fault is in the logic board or monitor.

No Sound: The logic board generates all sounds. If harness wires and connector from the PC board to the speaker pass continuity test, then the trouble is most likely in the PC board itself. Check volume control adjustment on the PC board.

No Game Credit, Start, or Bomb Release: Test harness wires and connector to each function. Check switches. If switches and harness are good, replace the logic board.



REVISIONS

DESCRIPTION

DATE

APPROVED

LTR

- 1 KICKER SCREW
- 2 KICKER
- 3 SEPARATOR SCREW
- 4 SEPARATOR
- 5 MAINPLATE ASSEMBLY
- 6 GATE ASSEMBLY
- 7 COVERPLATE ASSEMBLY
- 8 RAIL
- 9 CRADLE ASSEMBLY
- 10 UNDERSIZE LEVER
- 11 MAGNET GATE ASSEMBLY
- 12 MAGNET GATE ADJUSTER SCREW
- 13 LOWER GATE PIVOT SPRING
- 14 UPPER GATE PIVOT SPRING
- 15 GATE PIVOT PIN
- 16 WIPER LEVER SPRING
- 17 WIPER LEVER
- 18 WIPER

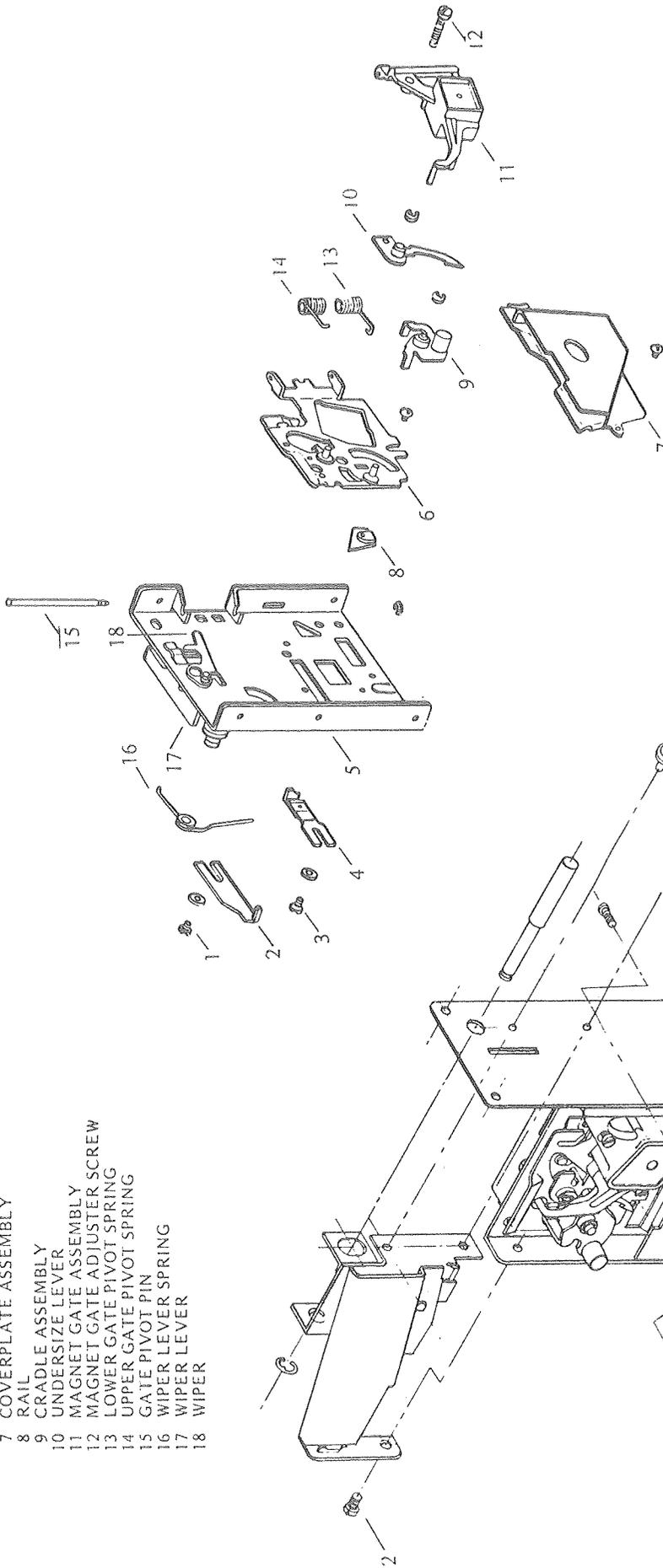


FIGURE 4 COIN ACCEPTOR - EXPLODED

TOLERANCES UNLESS OTHERWISE SPECIFIED		FRACTIONS DEC ANGLES	
±	±	±	±
APPROVALS	DATE		
DRAWN B.F.	1/2/76		
CHECKED			

Meadows Games, Inc.

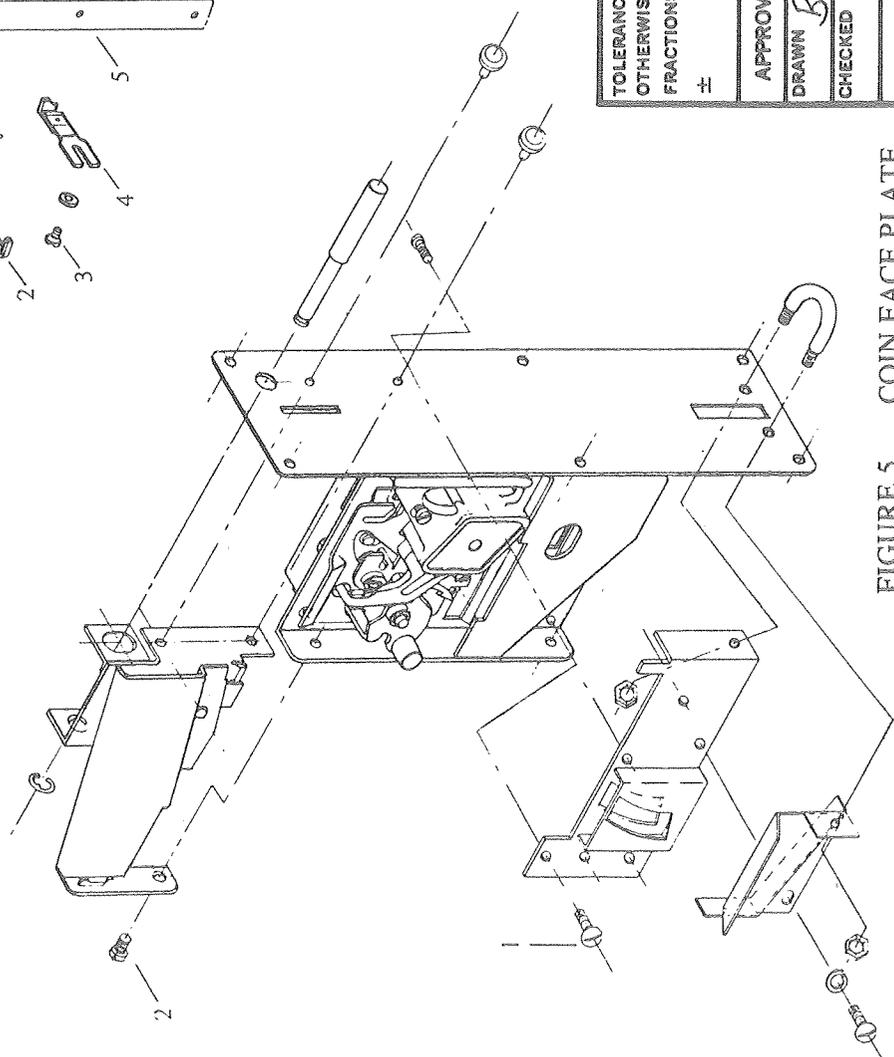
Coin Acceptor  
Exploded View

SCALE	SIZE	DRAWING NO.
	A	16-0009

DO NOT SCALE DRAWING

SHEET 1 OF 1

FIGURE 5 COIN FACE PLATE





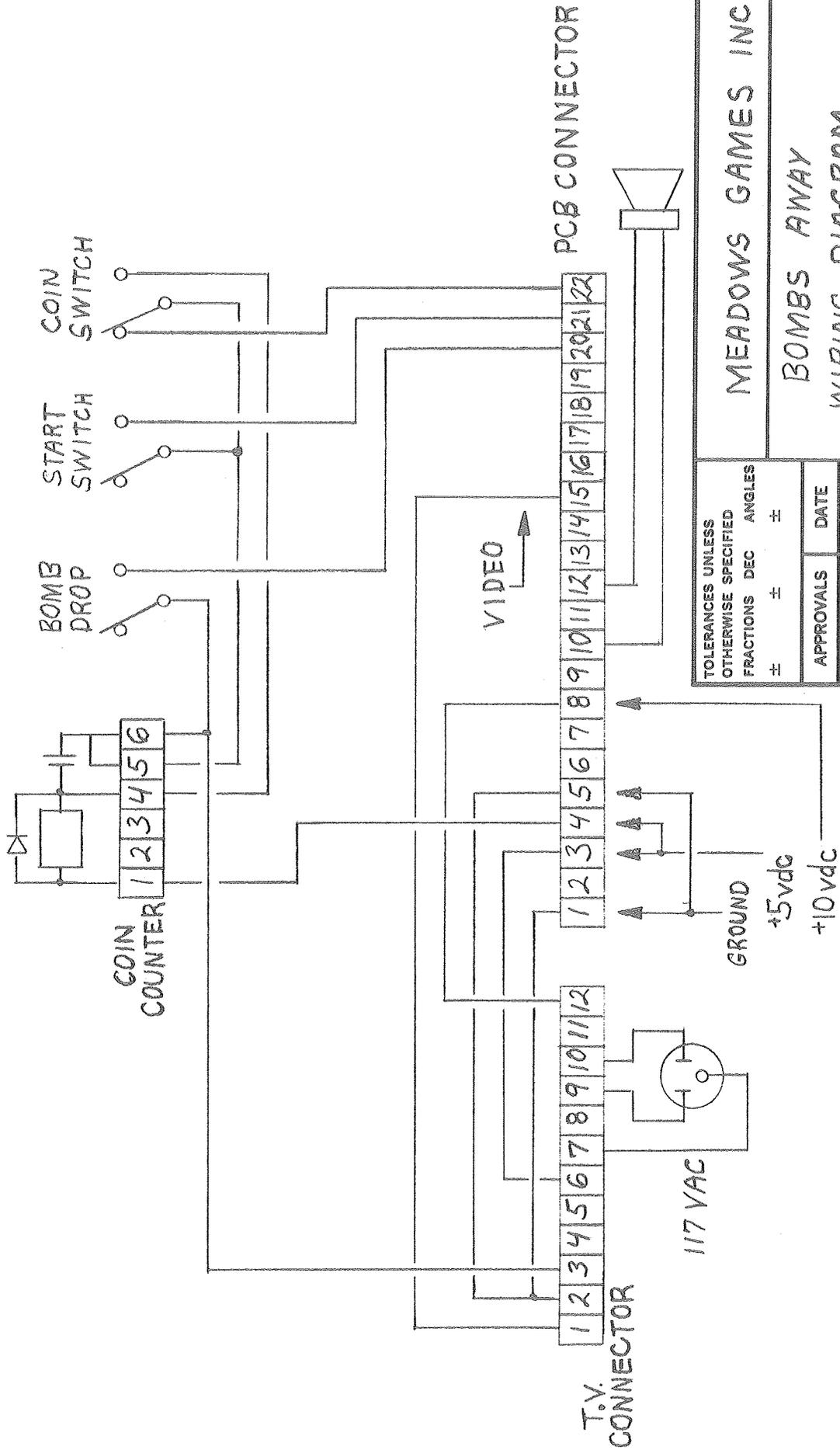
REVISIONS

DESCRIPTION

DATE

APPROVED

LTR



TOLERANCES UNLESS OTHERWISE SPECIFIED	
FRACTIONS	DEC ANGLES
±	±
APPROVALS	DATE
DRAWN <i>B.Z.</i>	1/19
CHECKED	

MEADOWS GAMES INC.

BOMBS AWAY  
WIRING DIAGRAM

SCALE

SIZE

DRAWING NO. 026-0007

DO NOT SCALE DRAWING

SHEET 1 OF 1

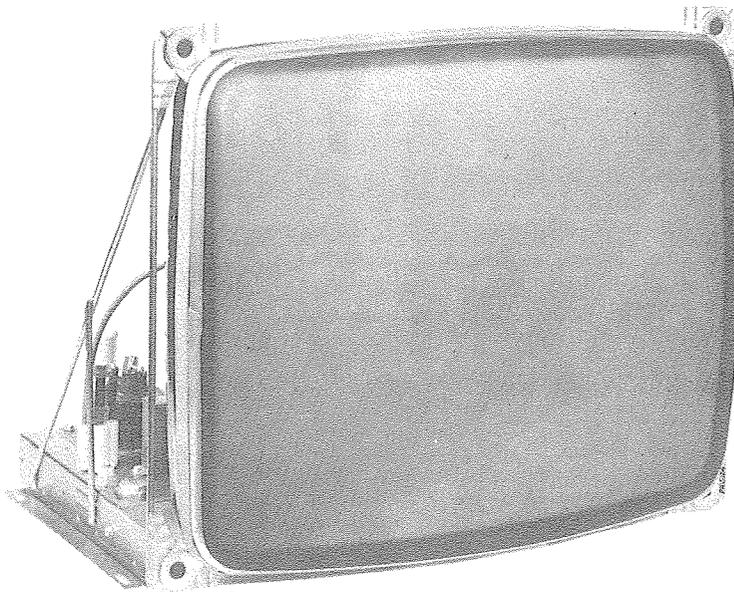




# MOTOROLA service manual

FILE VP12

DISPLAY PRODUCTS



CHASSIS

**19VP111**  
**23VP111**

MODELS

**XM501-10**  
**XM701-10**

MODEL XM501-10  
XM701-10

CHASSIS 19VP111  
23VP111

FILE VP12

MANUAL 68P65130A70-1

## GENERAL INFORMATION

These models are transistorized monitors designed for the video game market. They are identical except for the CRT size. See V1 in Replacement Parts List.

Circuitry includes four stages of video amplification, a two stage audio amplifier, sync and deflection circuits and a regulated power supply. An additional 5 volt 3 amp supply is included to power external logic systems. The picture tube is a 114 degree deflection CRT with implosion protection. Composite video is fed to the monitor through a connector mounted on the rear of the chassis.

Rear panel controls include Horizontal Hold, Vertical Hold, Contrast, Brightness, Volume and width controls. Additional service controls are mounted on the plated circuit panel, and are accessible from the rear of the chassis.

The chassis utilizes plug-in etched panel construction with components mounted on the top side and plated wiring on the bottom. Component reference numbers and circuit legend are printed on the board to aid in servicing. Horizontal, vertical output and regulator transistors are mounted on the chassis base which also serves as a heat sink and CRT support.

## CAUTION

NO WORK SHOULD BE ATTEMPTED ON ANY EXPOSED MONITOR CHASSIS BY ANYONE NOT FAMILIAR WITH SERVICING PROCEDURES AND PRECAUTIONS.

## ELECTRICAL SPECIFICATIONS

Power Rating: 110 watts nominal.  
50 watts without 5 volt supply.

Source: 120/240V AC at 50/60Hz  
Switch selected.

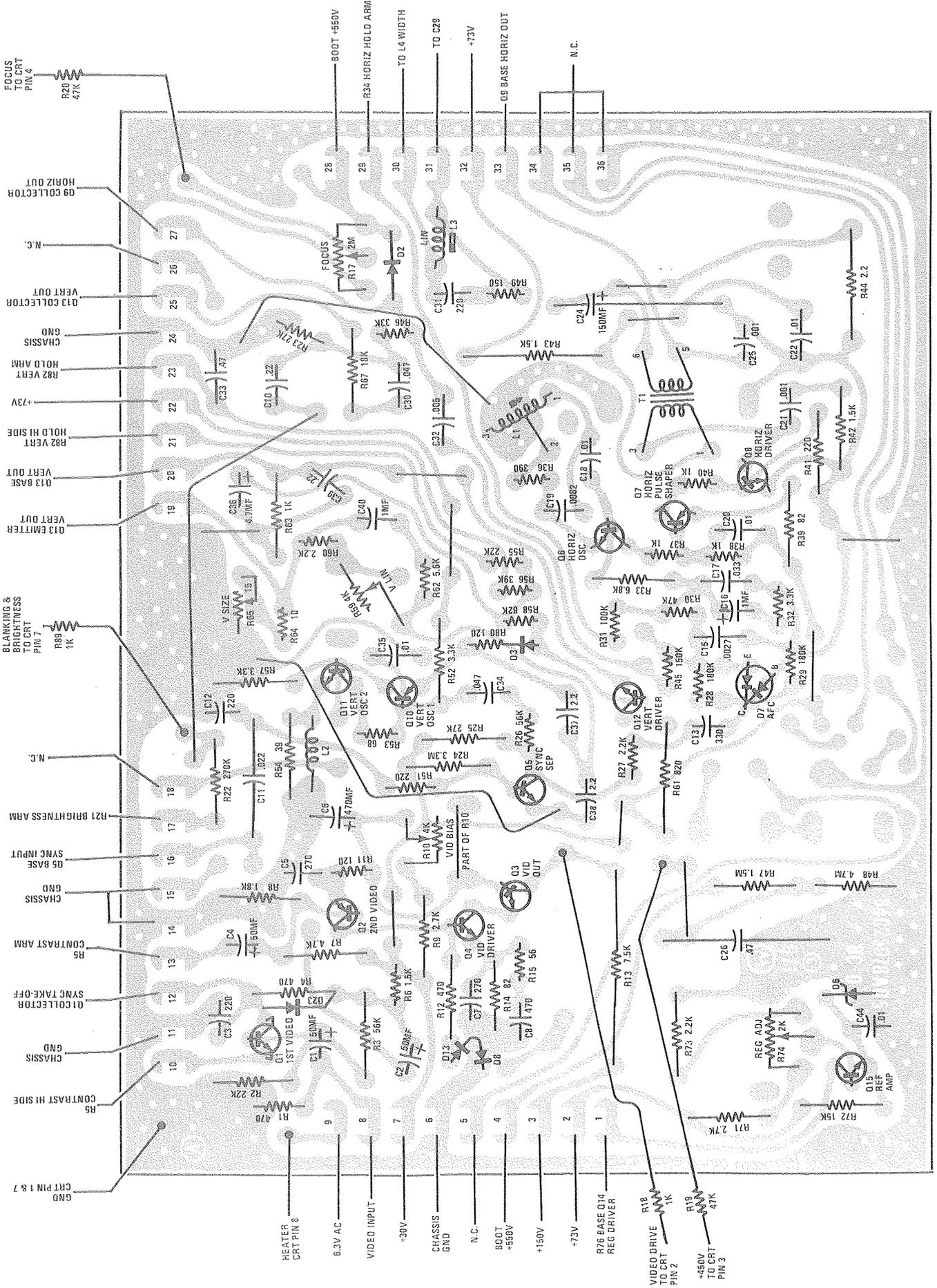
Video Input: 0.5 to 2.5 volts composite  
PP (sync negative).

Audio Output: 5 watts peak

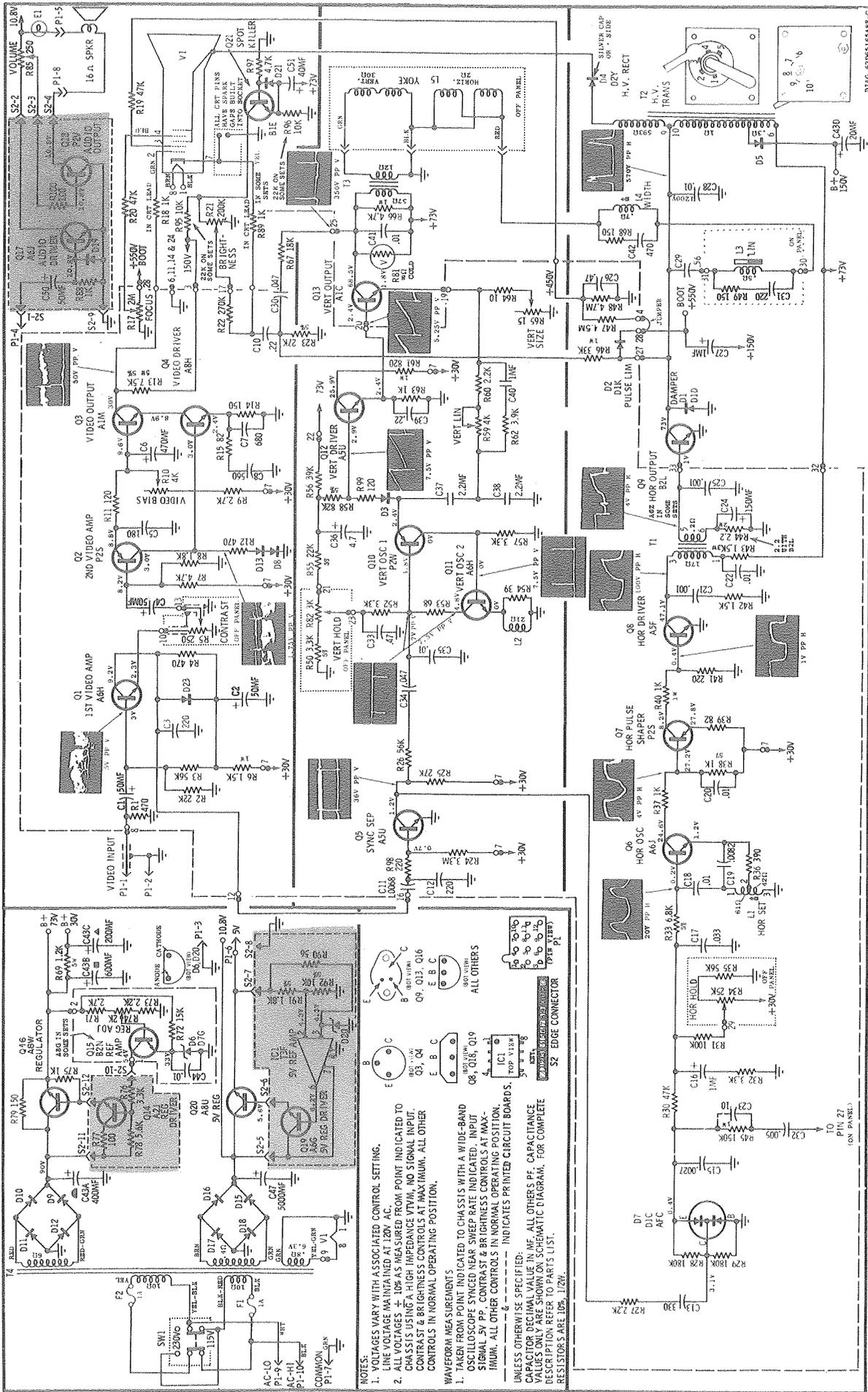
## TABLE OF CONTENTS

CHASSIS PARTS	
LOCATION . . . . .	8-11
CHASSIS SCHEMATIC	
DIAGRAM . . . . .	12
REPLACEMENT PARTS	
LIST . . . . .	13, 14
SAFETY WARNING . . . . .	2
SERVICE NOTES . . . . .	7
THEORY OF	
OPERATION . . . . .	3





Monitor Panel - Circuit Side



Schematic Diagram

**NOTES:**

1. VOLTAGES VARY WITH ASSOCIATED CONTROL SETTING.
2. LINE VOLTAGE MAINTAINED AT 120V AC.
3. ALL VOLTAGES  $\pm$  10% AS MEASURED FROM POINT INDICATED TO CHASSIS USING A HIGH IMPEDANCE VTVM, NO SIGNAL INPUT. CONTRAST & BRIGHTNESS CONTROLS AT MAXIMUM. ALL OTHER CONTROLS IN NORMAL OPERATING POSITION.

**WAVEFORM MEASUREMENTS**

1. TAKEN FROM POINT INDICATED TO CHASSIS WITH A WIDE-BAND OSCILLOSCOPE SYNCED NEAR SWEEP RATE INDICATED. INPUT SIGNAL 5V PP. CONTRAST & BRIGHTNESS CONTROLS AT MAXIMUM. ALL OTHER CONTROLS IN NORMAL OPERATING POSITION.
2. --- INDICATES PRINTED CIRCUIT BOARDS.

UNLESS OTHERWISE SPECIFIED:  
CAPACITOR DECIMAL VALUE IN MF. ALL OTHERS P.F. CAPACITANCE VALUES ONLY ARE SHOWN ON SCHEMATIC DIAGRAM. FOR COMPLETE DESCRIPTION REFER TO PARTS LIST.  
RESISTORS ARE 10% 1/2W.

## REPLACEMENT PARTS LIST

REF. NO.	PART NUMBER	DESCRIPTION	REF. NO.	PART NUMBER	DESCRIPTION
<b>ELECTRICAL PARTS</b>			<b>COILS &amp; CHOKES</b>		
	1Y25017A01	MONITOR PANEL: complete; KT364LM	L-1	24D68822A08	HORIZ SET
	1Y25017A02	POWER, Audio Panel: complete; KT365LM	L-2	24D68801A67	COMPENSATING: 2000 uh
<b>CAPACITORS</b>			L-3	24D69163A18	HORIZ LINEARITY
C-1	23C65282A41	50 mf 50V Lytic	L-4	24V25000A74	HORIZ WIDTH: incl's C42 & R68
C-2	23C65282A41	50 mf 50V Lytic	L-5	24D68523A15	DEFLECTION YOKE
C-3	21S180D10	220 pf 20% 100V X5F (Use 21R132503)	<b>TRANSISTORS</b>		
C-4	23C65282A41	50 mf 50V Lytic	Q-1	48S137171	1st VIDEO: A6H
C-5	21S180B98	180 pf 10% 500V X5F	Q-2	48S137127	2nd VIDEO: P2S
C-6	23S10255A78	470 mf 16V Lytic	Q-3	48S134919	VIDEO OUTPUT: A1M
C-7	21S180C01	680 pf 10% 500V X5F	Q-4	48S137317	VIDEO DRIVER: A8H
C-8	21S180B85	560 pf 10% 500V X5F	Q-5	48S137115	SYNC SEPARATOR: A5U
C-10	8S10191B67	.22 mf 10% 250V Polyester	Q-6	48S137172	HORIZ OSCILLATOR: A6J
C-11	8S10191A54	.0068 mf 10% 160V Polyester	Q-7	48S137127	HORIZ PULSE SHAPER: P2S
C-12	21S180D10	220 pf 20% 100V X5F (Use 21R132503)	Q-8	48S137093	HORIZ DRIVER: A5F
C-13	21S131625	330 pf 10% X5F	Q-9	48S137570	HORIZ OUTPUT: B2L
C-15	21S180C41	.0027 mf 10% 500V Z5F (Use 21K121699)	Q-10	48S137173	VERT OSCILLATOR (1): P2W
C-16	23S10229A07	1.0 mf +40-20% 15V Lytic (Use 23C43280A17)	Q-11	48S137171	VERT OSCILLATOR (2): A6H
C-17	8S10191B90	.033 mf 10% 160V Polyester	Q-12	48S137115	VERT DRIVER: A5U
C-18	8S10299A73	.01 mf 10% 100V Poly carb	Q-13	48S134900	VERT OUTPUT: A1C
C-19	8S10299A74	.0082 mf 10% 160V Poly carb	Q-14	48S134952	REGULATOR DRIVER: A2J
C-20	8S10191B98	.01 mf 10% 250V Polyester	Q-15	48S137574	REFERENCE AMP: B2N
C-21	21S180B51	.001 mf 10% 500V X5F	Q-16	48S137368	REGULATOR: A8W
C-22	8S10191B98	.01 mf 10% 160V Polyester	Q-17	48S137172	AUDIO DRIVER: A6J
C-23	21S180C02	10 pf 10% N150	Q-18	48S137168	AUDIO OUTPUT: P2V
C-24	23D65282A40	150 mf 10V Lytic	Q-19	48S137169	5V REGULATOR, Driver: A6G
C-25	21S180B51	.001 mf 10% 500V X5F	Q-20	48S137344	5V REGULATOR: A8U
C-26	8S10212B53	.47 mf 10% 630V Mtlz Poly	Q-21	48S137476	SPOT KILLER: B1E
C-27	8S10212A11	1.0 mf 10% 630V Mtlz Poly	<b>CONTROLS</b>		
C-28	8S10571A06	.01 mf 5% 1200V Poly Prop Foil	R-5	18D68222A34	CONTRAST: 250 Ohm
C-29	8S10571A23	.56 mf 10% 250V Prop Foil	R-10	18D66401A44	VIDEO BIAS: 4K
C-30	8S10191A32	.047 mf 10% 250V Polyester	R-17	18D67858A12	FOCUS: 2 meg
C-31	21S180B87	220 pf 10% 500V X5F	R-21	18D68222A35	BRIGHTNESS: 200K
C-32	21S180D34	.005 mf 20% 1KV Z5F (Use 21S180D31)	R-34	18D68222A37	HORIZ HOLD: 25K
C-33	8S10212A69	.47 mf 10% 100V Mtlz Poly	R-59	18D66401A44	VERT LINEARITY: 4K
C-34	8S10191A32	.047 10% 250V Polyester	R-65	18D67671A18	VERT SIZE: 15 Ohm
C-35	8S10191B98	.01 mf 10% 250V Polyester	R-74	17D65820A37	REGULATOR ADJUST: 2K
C-36	23S10255A69	4.7 mf 100V Lytic	R-82	18D68222A36	VERT HOLD: 3K
C-37	8S10212A20	2.2 mf 10% 100V Mtlz Poly	R-85	18D68222A34	VOLUME: 250 Ohm
C-38	8S10212A20	2.2 mf 10% 100V Mtlz Poly	<b>RESISTORS</b>		
C-39	8S10191B67	.22 mf 10% 250V Polyester	R-1	6S127633	470 10% 1/2W
C-40	8S10212A10	1.0 mf 10% 100V Mtlz Poly (Use 8S10191A46)	R-2	6S125568	22K 10% 1/2W
C-41	8S10064A06	.01 mf 10% 600V Mylar	R-3	6S127541	56K 10% 1/2W
C-42	21S180A71	470 pf 10% 500V X5F	R-4	6S127633	470 10% 1/2W
C-43	23C65807A47	400 mf/125V; 600 mf/50V; 20 mf/200V Lytic	R-6	6S128955	1500 10% 1W
C-44	21S180E60	.01 mf +80-20% 50V Z5V	R-7	6S121847	4700 10% 1/2W
C-47	*23C65807A52	5000 mf 20V Lytic	R-8	6S122445	1800 10% 1/2W
C-50	23D65282A41	50 mf 50V Lytic	R-9	6S119926	2700 10% 1/2W
C-51	23S10255B43	40 mf 100V Lytic	R-11	6S128226	120 10% 1/2W
<b>DIODES &amp; RECTIFIERS</b>			R-12	6S127633	470 10% 1/2W
D-1	48S134921	DIODE, Silicon: D1D; Damper	R-13	17S10731A02	7500 5% 5W WW
D-2	48S134978	DIODE, Silicon: D1K; Pulse Limiter	R-14	6S124797	150 10% 1/2W
D-3	48D67120A11	DIODE, Low Power	R-15	6S127516	82 10% 1/2W
D-4	48S137114	RECTIFIER, H. V.: Silicon; D2Y	R-18	-----	Part of CRT socket assembly
D-5	48S191A05	RECTIFIER, Silicon: 91A05 (Use 48S191A07)	R-19	-----	Part of CRT socket assembly
D-6	48S137469	DIODE, Silicon: zener; D7G	R-20	-----	Part of CRT socket assembly
D-7	48S134917	DIODE, Dual: D1C; Detector	R-22	6S129296	270K 10% 1/2W
D-8	48S67120A11	DIODE, Low Power	R-23	6S10053C67	27K 5% 1/2W
D-9	*48S191A07	RECTIFIER, Silicon: 91A07	R-24	6S127538	3.3 meg 10% 1/2W
D-10	48S191A07	RECTIFIER, Silicon: 91A07	R-25	6S121300	27K 10% 1/2W
D-11	48S191A07	RECTIFIER, Silicon: 91A07	R-26	6S127541	56K 10% 1/2W
D-12	48S191A07	RECTIFIER, Silicon: 91A07	R-27	6S129875	2200 10% 1/2W
D-13	48D67120A11	DIODE, Low Power	R-28	6S125531	180K 10% 1/2W
D-15	48S191A10	RECTIFIER, Silicon: 91A10	R-29	6S125531	180K 10% 1/2W
D-16	48S191A10	RECTIFIER, Silicon: 91A10	R-30	6S125892	47K 10% 1/2W
D-17	48S191A10	RECTIFIER, Silicon: 91A10	R-31	6S125534	100K 10% 1/2W
D-18	48S191A10	RECTIFIER, Silicon: 91A10	R-32	6S124506	3300 10% 1/2W
D-19	48D67120A11	DIODE, Low Power	R-33	6S10053C53	6800 5% 1/2W
D-20	*48S10641D43	DIODE, Silicon, D4,3	R-35	6S127541	56K 10% 1/2W
D-21	48D67120A11	DIODE, Low Power	R-36	6S125545	390 10% 1/2W
D-23	48S191A05	RECTIFIER, Silicon: (Use 48S191A07)	R-37	6S121301	1000 10% 1/2W
<b>FUSES</b>			R-38	6S10053C33	1000 5% 1/2W
F-1	65S139424	FUSE: 1A-250V	R-39	6S127516	82 10% 1/2W
F-2	65S139424	FUSE: 1A-250V	R-40	6S127547	1000 10% 1W
<b>INTEGRATED CIRCUITS</b>			R-41	6S127099	220 10% 1/2W
IC-1	*51S10732A01	INTEGRATED CIRCUIT: T3F	R-42	6S127513	1500 10% 1/2W
			R-43	17S10130B07	1500 10% 3W fxd mtl film
			R-44	17S744356	2.2 10% 2W WW
			R-45	6S120141	150K 10% 1W
			R-46	6S127634	33K 10% 1W
			R-47	6S129417	1.5 MEG 10% 1/2W
			R-48	6S10053D21	4.7 meg 10% 1/2W
			R-49	6S124797	150 10% 1/2W
			R-50	6S10053C45	3300 5% 1/2W
			R-52	6S124506	3300 10% 1/2W
			R-53	6S129874	68 10% 1/2W
			R-54	6S131972	39 10% 1/2W
			R-55	6S10053C65	22K 5% 1/2W
			R-56	6S125535	39K 10% 1/2W
			R-57	6S124506	3300 10% 1/2W
			R-58	6S129793	82K 5% 1/2W
			R-60	6S129875	2200 10% 1/2W
			R-61	6S10053F29	820 10% 1W
			R-62	6S127515	3900 10% 1/2W

