

SONY®

HD ELECTRONIC VIEWFINDER

HDVF-15




HDVS

OPERATION AND MAINTENANCE MANUAL

1st Edition

Serial No. 10001 and Higher

SAFETY RELATED COMPONENT WARNING

Components identified by shading and  marked on the schematic diagrams and parts list are critical to safe operation. Replace these components with SONY parts whose part numbers appear as shown in this manual or in supplements published by SONY.

X-RAY RADIATION WARNING

Be sure that parts replacement in the high voltage block and adjustments made to the high voltage circuits are carried out precisely in accordance with the procedures given in this manual.

Warning—This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

Important—To insure that the complete system (including this peripheral) is capable of complying with the FCC requirements, it is recommended that the user make sure that the individual equipment of the complete system has a label with one of the following statements.

"This equipment has been tested with a Class A Computing Device and has been found to comply with Part 15 of FCC Rules."

—or—

"This equipment complies with the requirements in Part 15 of FCC Rules for a Class A Computing Device."

—or equivalent.

The shielded interface cable recommended in this manual must be used with this equipment in order to comply with the limits for a computing device pursuant to Subpart J of Part 15 of FCC Rules.

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SECTION 1 OPERATION

1-1. Overview

The HDVF-15 is a 1.5-inch monochrome electronic viewfinder designed to be mounted on the Sony High Definition Video System (HDVS) color video camera.

High-resolution picture

This viewfinder has a high-resolution picture tube. Horizontal resolution is more than 450 lines.

Continuously variable peaking compensation

The continuously variable peaking compensation circuit helps to provide sharp pictures and make it easier to focus the camera.

Tally lamps

This viewfinder is provided with two tally lamps which light up when red or green tally signal has been received.

Lens fog-proof heater

When the power of the camera is turned on, the built-in heater starts operating to prevent fog on the lens caused by temperature difference.

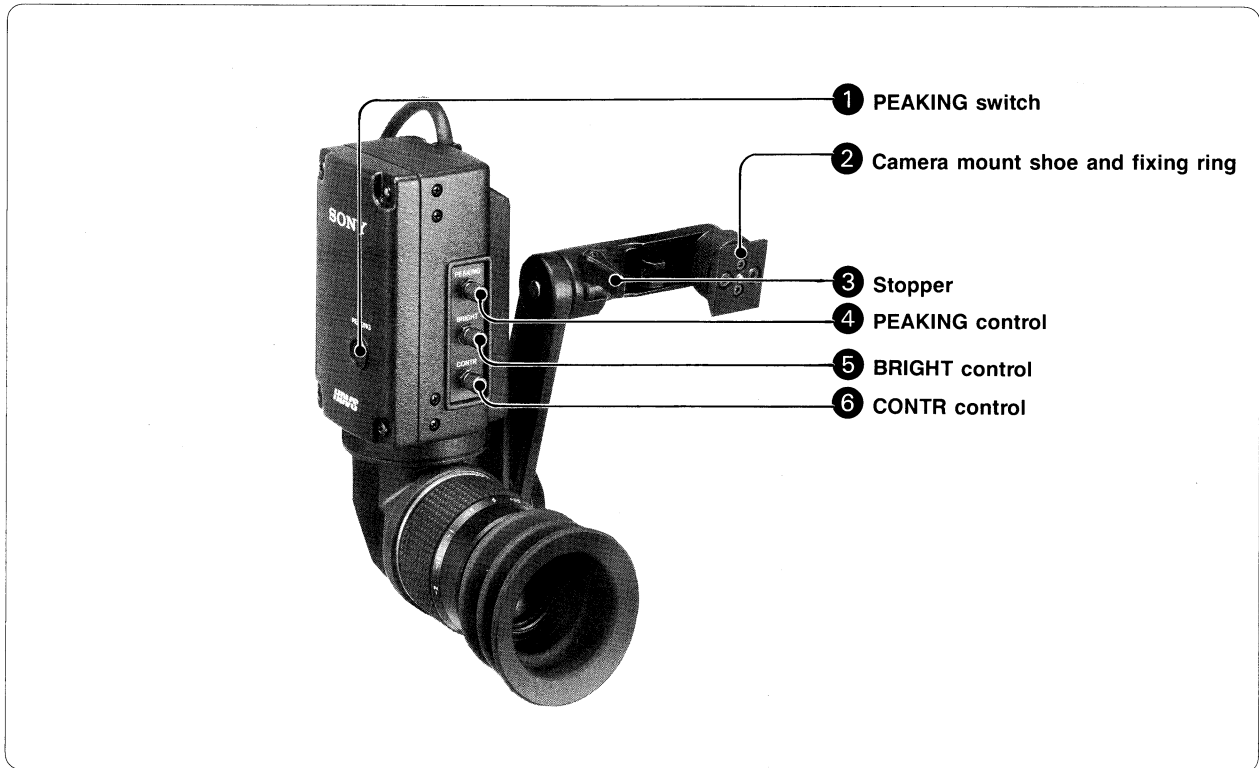
Fog-proof filter

A fog-proof filter is attached to the lens.

Water-resistant

The protective outer structure enables you to shoot outdoors.

1-2. Location and Function of Parts and Controls



1 PEAKING switch

When the power is supplied, the switch is set to ON, and the PEAKING control functions. Then pressing the switch deactivates the PEAKING control, and compensation is equivalent to 0 dB. Every time the switch is pressed, the control will be activated and deactivated alternately.

2 Camera mount shoe and fixing ring

Insert to the VF shoe on the camera, and turn the fixing ring to lock it.

3 Stopper

Locks the angle adjusting arm.

4 PEAKING control

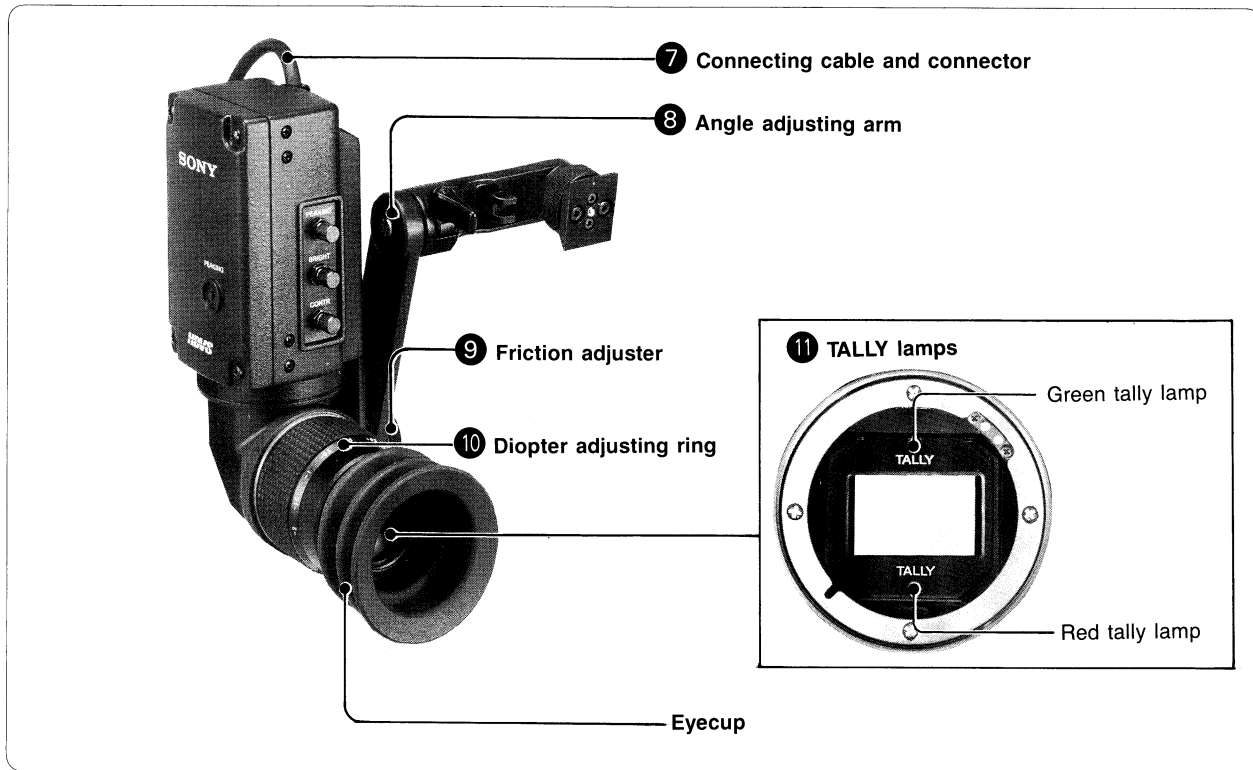
Used for contour compensation (peaking) of the picture when the PEAKING switch is pressed. Compensation increases as the control is turned clockwise. The compensation ranges from 0 to 12 dB.

5 BRIGHT control

Used to adjust the picture brightness.

6 CONTR (contrast) control

Used to adjust the picture contrast.



7 Connecting cable and connector

Connect to the VF connector on the camera.

8 Angle adjusting arm

Used to place the HDVF-15 to the position where the screen can easily be seen.

9 Friction adjuster

Used to adjust the frictional force when adjusting the angle adjusting arm.

10 Diopter adjusting ring

Used to adjust depending upon the diopter of the camera operator so that the picture on the viewfinder screen can be seen clearly. The adjustable range is from +0.5 to -2.0 diopters.

11 TALLY lamps

Light up when the camera receives a tally signal.

When the red tally signal is sent to the camera, the lower red tally lamp will light; when the green tally signal is sent, the upper green tally lamp will light.

PEAKING **4**, BRIGHT **5** and CONTR **6** controls do not have any effect on the video output signals of the camera.

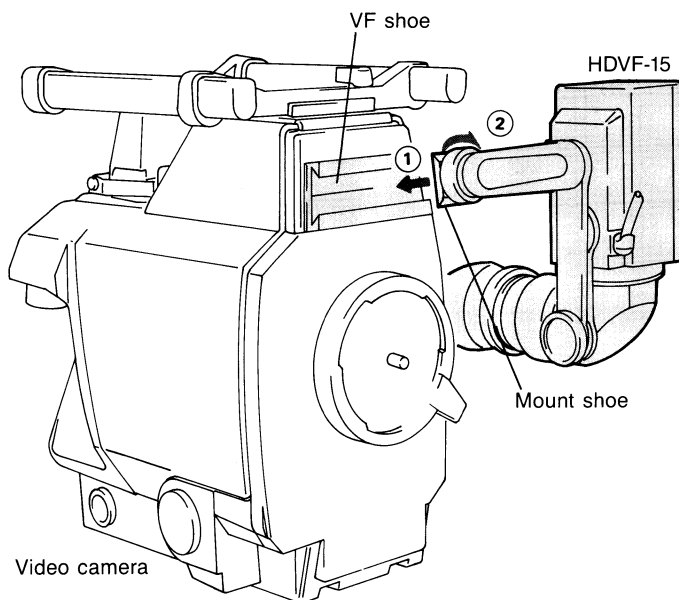
1-3. Installation

The video camera is furnished with two VF shoes, one is on the front (on the lens mount side), and the other is on the rear. Mount the HDVF-15 to either of them. It also has two VF connectors. Connect the cable to either of them to which the cable can easily be connected.

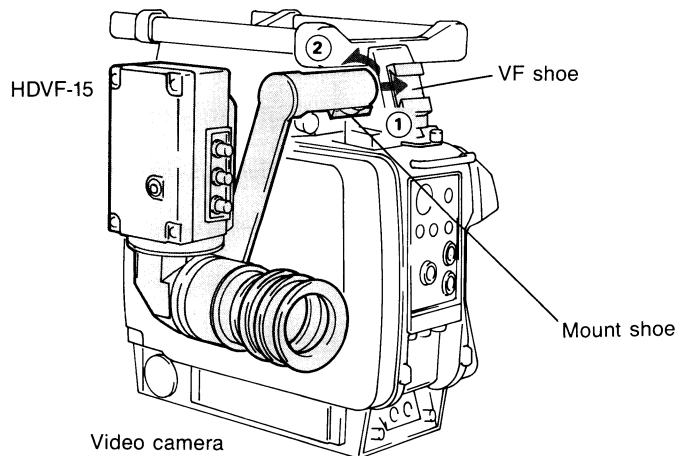
1-3-1. Attaching to the video camera

- 1 Insert the mount shoe of the HDVF-15 to the VF shoe on the camera, and turn the fixing ring to lock it.

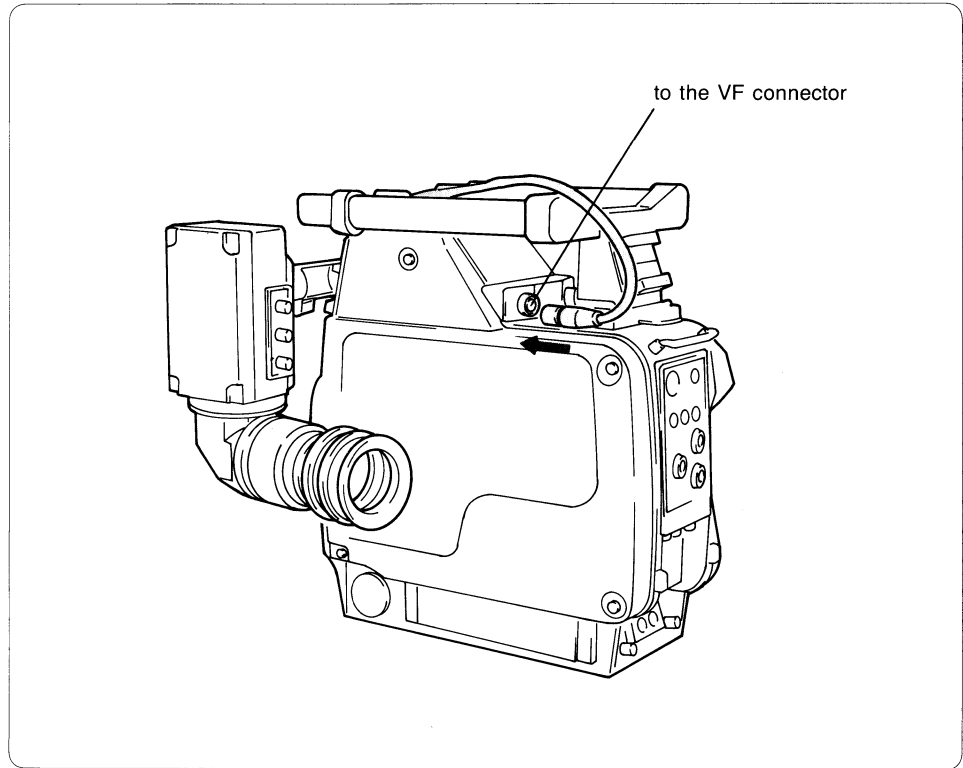
To attach to the front



To attach to the rear

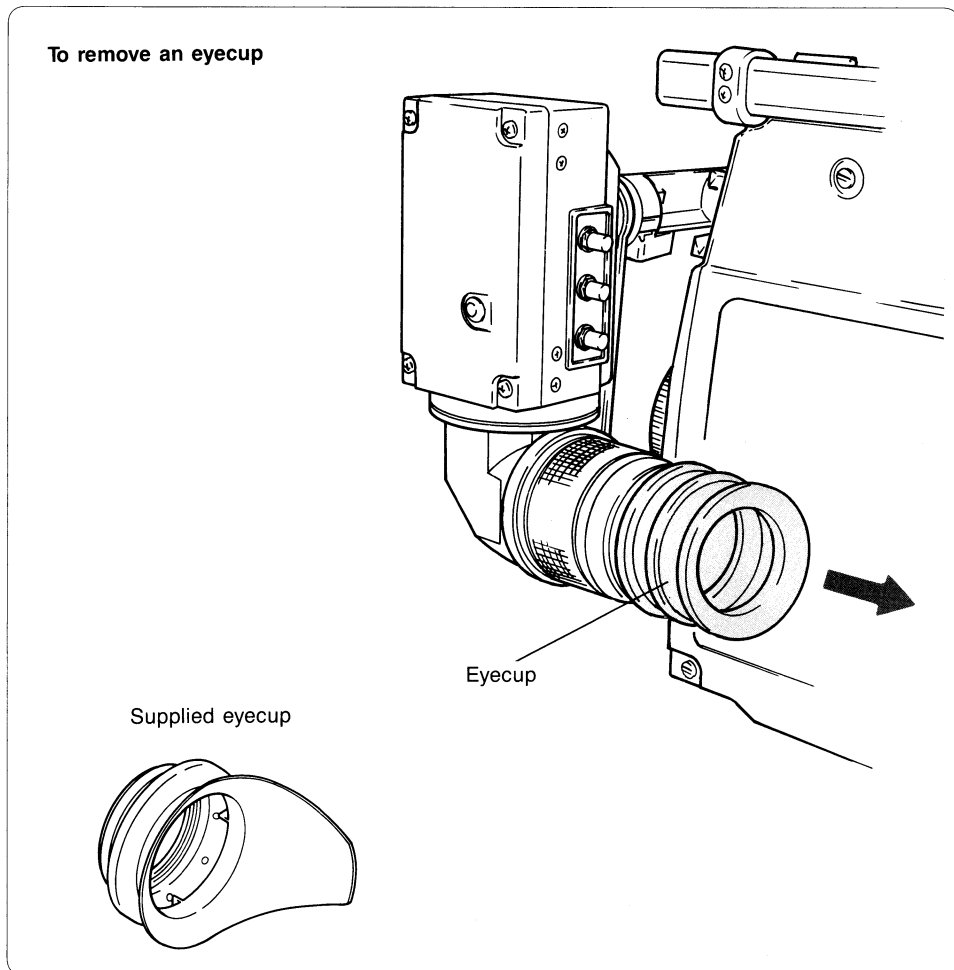


2 Connect the cable of the HDVF-15 to the VF connector on the camera.



1-3-2. Attaching the eyecup

Two eyecups are supplied; one is attached to the body, and the other is packed as one of the supplied accessories. The eyecup can easily be removed. Use the proper one according to the conditions under which the camera is used.

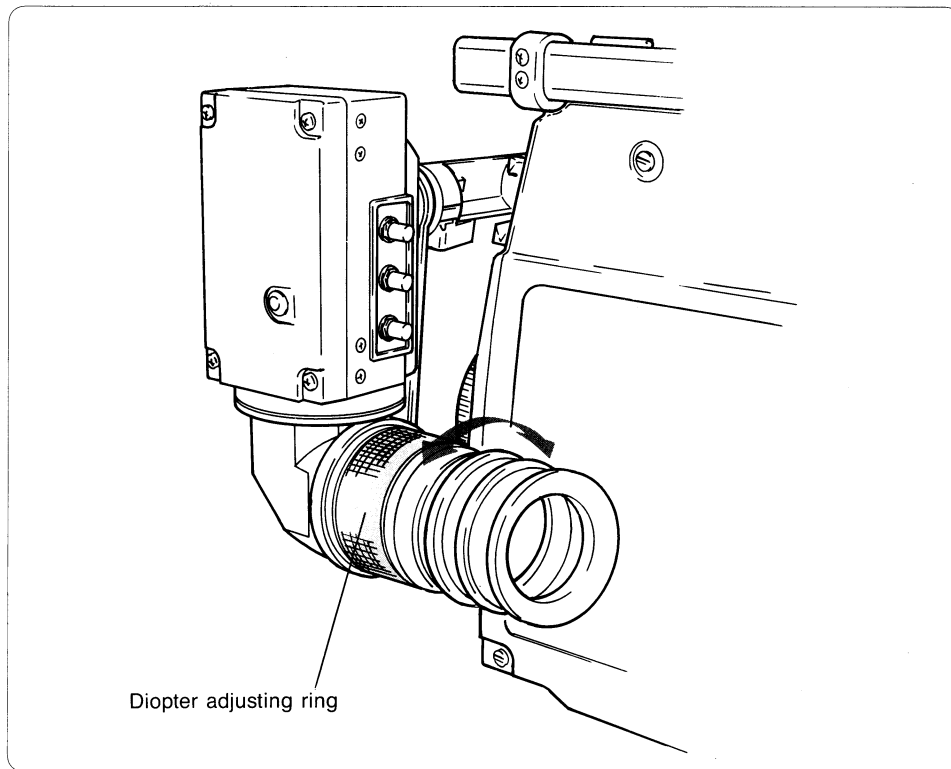


1-4. Operation

When the power of the video camera is turned on, the power is also supplied to the viewfinder, and a picture can be seen on the screen.

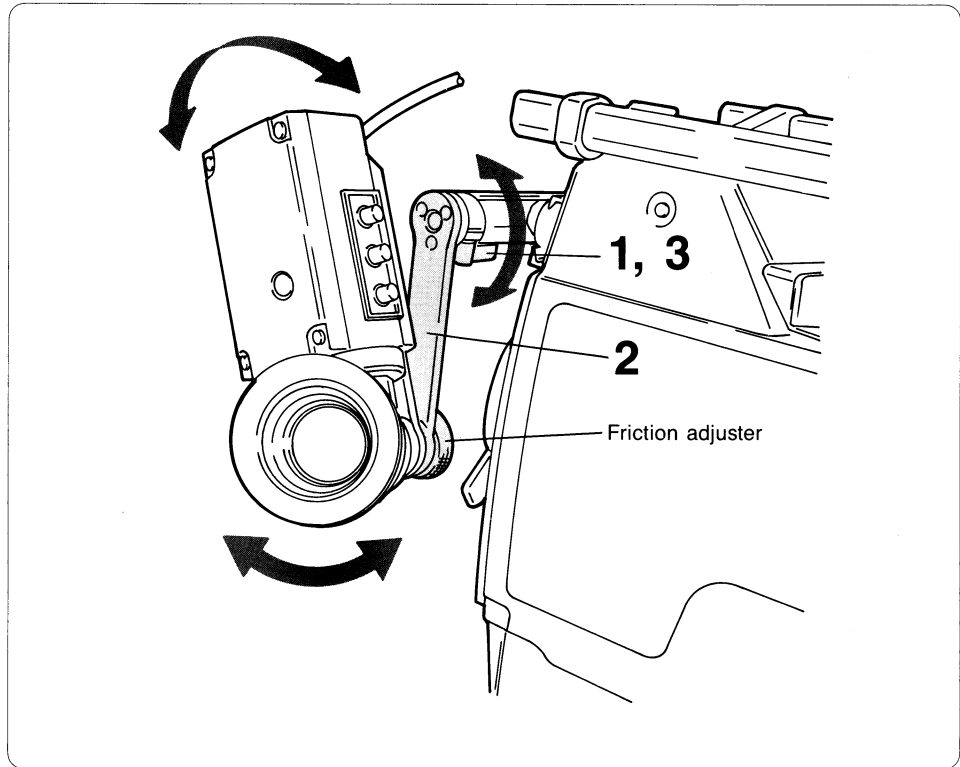
1-4-1. Adjusting the diopter

Adjust the diopter depending upon the camera operator. Turn the diopter adjusting ring so that the picture on the viewfinder screen can be seen clearly.



1-4-2. Adjusting the angle

The angle of the viewfinder can be adjusted so that the screen can easily be seen.



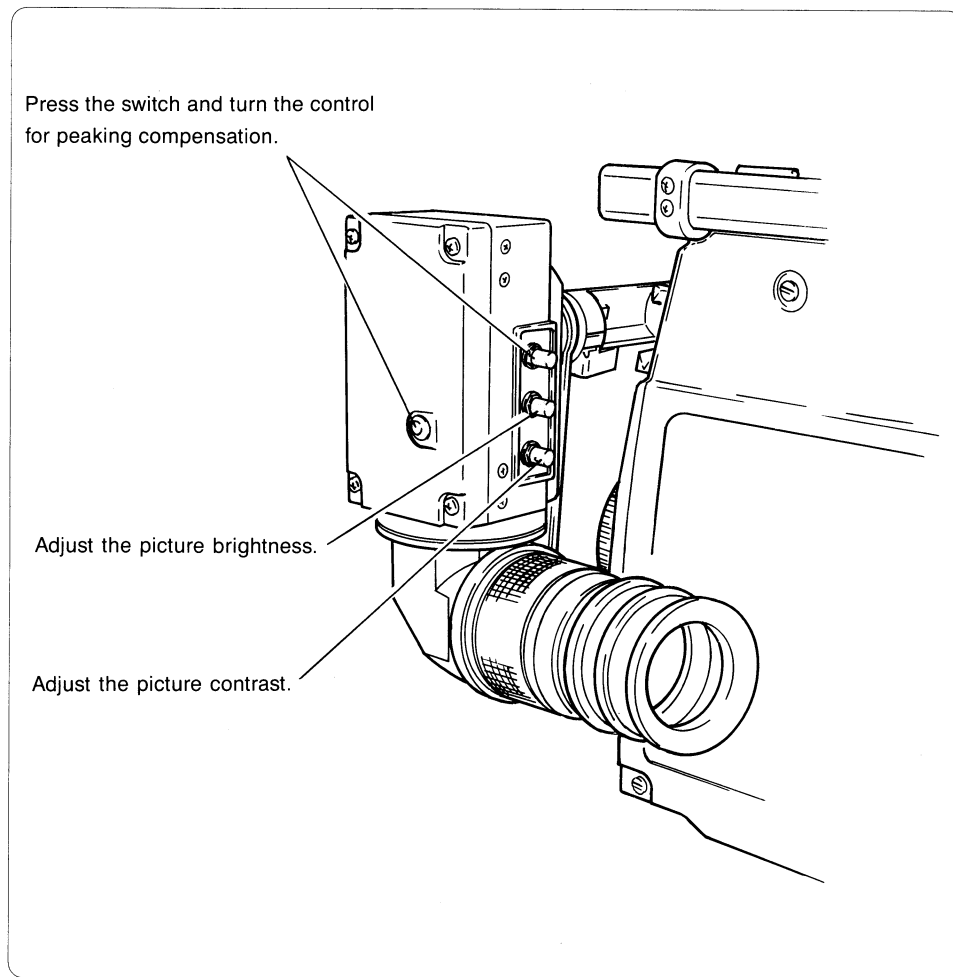
- 1** Loosen the stopper.
- 2** Move the angle adjusting arm to the position where the screen can easily be seen.
- 3** Fasten the stopper to lock the arm.

Adjusting the friction

The frictional force of the angle adjusting arm can be adjusted by the friction adjuster.

1-4-3. Adjusting the viewfinder screen

Adjust the picture brightness, contrast and contour compensation with the BRIGHT, CONTR and PEAKING controls respectively in order to obtain a good picture.



1-5. Specifications

CRT	1.5-inch monochrome 36-degree deflection
Picture size	28 × 15.8 mm (16:9) (1 ¹ / ₈ × ⁵ / ₈ inches)
Brightness	350 foot-lamberts max.
Resolution	Horizontal: 450 lines
EHT voltage	6.5 ± 0.3 kV (standard)
Power sources	9.5 V DC DC 17V (heater)
Video input	2.0 Vp-p, 3 level sync
Frequency response	100 Hz to 20 MHz ± 3 dB
Aperture correction	0 dB to 8 dB (8 MHz)
Power consumption	7.5W max.
Dimensions	130 × 186 × 192 mm (w/h/d) (5 ¹ / ₈ × 7 ³ / ₈ × 7 ⁵ / ₈ inches) excluding the eyecup
Weight	1.2 kg (2 lb 11 oz) excluding the eyecup
Accessories supplied	Eyecup (1) Operation and maintenance manual (1 set)

Design and specifications subject to change without notice.

SECTION B

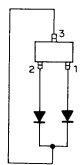
SEMICONDUCTOR PIN ASSIGNMENTS

The circuit diagram of IC is obtained from the IC data book published by the manufacturer.

TYPE	PAGE
1S2837	B-2
1SS123	B-2
1SZ ??	B-2
2SA1385	B-2
2SA1461	B-2
2SC3074	B-2
2SC3600	B-2
2SC3734	B-2
2SC4412	B-2
2SK430L	B-2
2SK94	B-2
ES1F	B-2
HA11423MP	B-3
RD ?? MB	B-2
TC4S69F	B-3
TC4S71F	B-3
TC74HC4538F	B-3
TC74HC74F	B-3
TLG124A	B-2
TLR124	B-2
uPC4062G	B-3
V09G	B-2

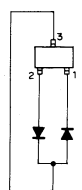
DIODE, TRANSISTOR

TOP VIEW

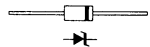


1S2837

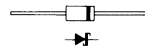
TOP VIEW



1SS123



1SZ ??

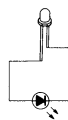


ES1F

TOP VIEW



RD ?? MB ??

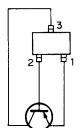


TLG124A ; GREEN
TLR124 ; RED

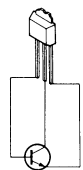


V09G

TOP VIEW

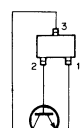


2SA1461

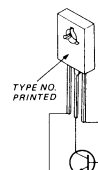


2SC3074

TOP VIEW

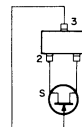


2SC3734
2SC4412

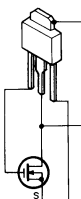


2SC3600

TOP VIEW

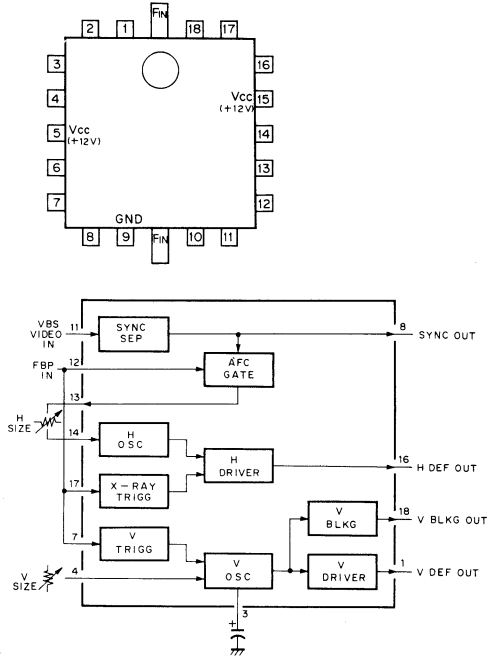


2SK94

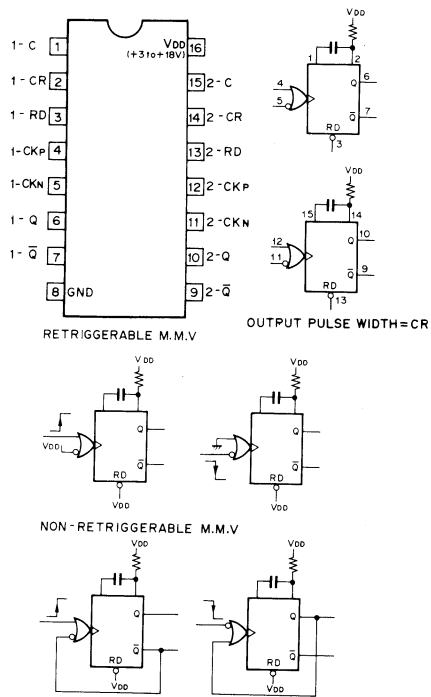


2SK430L

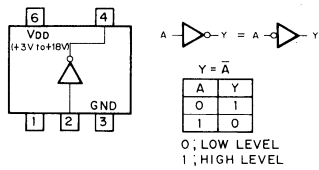
HA11423MP (HITACHI) FLAT PACKAGE
TV H/V SYNC SIGNAL PROCESSOR
- TOP VIEW -



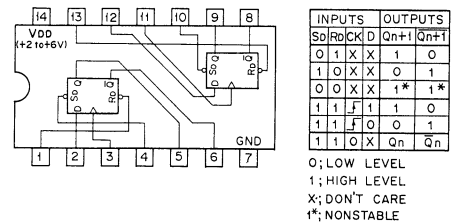
TC74HC4538F (TOSHIBA) FLAT PACKAGE
C-MOS DUAL RETRIGGERABLE/NON-RETRIGGERABLE
MONOSTABLE MULTIVIBRATOR
- TOP VIEW -



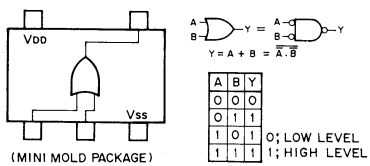
TC4S69F (TOSHIBA) FLAT PACKAGE
C-MOS INVERTER BUFFER
- TOP VIEW -



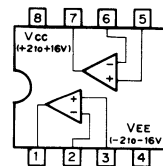
TC74HC74F (TOSHIBA) FLAT PACKAGE
C-MOS D-TYPE FLIP FLOP WITH DIRECT SET/RESET
- TOP VIEW -

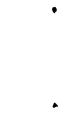


TC4S71F (TOSHIBA) FLAT PACKAGE
C-MOS 2-INPUT OR GATE
- TOP VIEW -

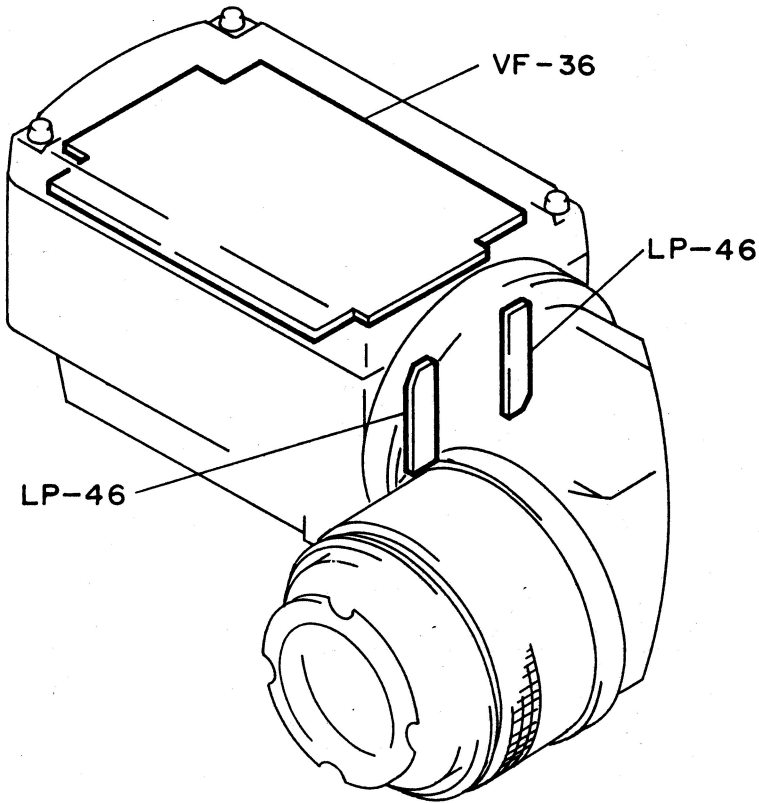


uPC4062G (NEC) FLAT PACKAGE
TTL-DUAL OPERATIONAL AMPLIFIER WITH
LOW POWER CONSUMPTION
- TOP VIEW -





SECTION C
SCHEMATIC DIAGRAMS AND BOARD ILLUSTRATION



SECTION D SPARE PARTS

D-1. PARTS INFORMATION

1. Safety Related Component Warning

Components identified by shading marked with Δ on the schematic diagrams, exploded views and electrical spare parts list are critical to safe operation. Replace these components with Sony parts whose parts numbers appear as shown in this manual or in service manual supplements published by Sony.

2. Replace Parts that are supplied from Sony Parts Center can sometimes have different shape and external appearance than what are actually used in equipment. This is due to "accommodating the improved parts and/or engineering changes" or "standardization of genuine parts."

.This manual's exploded view and electrical spare parts lists are indicating the parts numbers of "the standardized genuine parts at present."

.Regarding engineering parts and diagrams changes in our engineering department, refer to Sony service bulletins and service manual supplements.

3. The parts marked with "S" in the SP column of the exploded views and electrical spare parts list are normally required for routine service work. Orders for parts marked with "0" will be processed, but allow for additional delivery time.
4. Item with no parts number and/or no description are not stocked because they are seldom required for routine service.

5. Abbreviation

REF.No.	DESCRIPTION	REF.No.	DESCRIPTION	REF.No.	DESCRIPTION
BT	BATTERY	FB	FERRITE BEAD	RB	RESISTOR BLOCK
BZ	BUZZER	FL	FILTER	RV	VARIABLE RESISTOR
C	CAPACITOR	IC	IC	S	SWITCH
CN	CONNECTOR	L	INDUCTOR	T	TRANSFORMER
CP	COMBINATION PARTS	LY	RYLAY	TH	THERMISTOR
CV	VARIABLE CAPACITOR	LV	VARIABLE INDUCTOR	TM	TIMER
D	DIODE	Q	TRANSISTOR	VDR	VARISTOR
DL	DELAY LINE	R	RESISTOR	X	OSCILLATOR

All capacitors are in micro farads unless otherwise specified.
 All inductors are in micro henries unless otherwise specified.
 All resistors are in ohms.

D-2. EXPLODED VIEW

No.	Parts No.	SP Description	No.	Parts No.	SP Description
1	A-7513-775-A	0 COMPLETE PCB, VF-36	51	3-697-397-01	0 SPACER, LENS
2	X-3697-018-1	0 PLATE ASSY, CLUTCH	52	3-697-398-01	0 RING, STOPPER RUBBER
3	X-3697-019-1	0 COVER ASSY, VF	53	3-697-399-01	0 COVER, HEATER
4	1-226-735-00	S RES, VAR, CARBON 2K	54	3-733-201-01	0 RING
5	1-230-350-11	S RES, VAR, CARBON 20K	55	3-733-205-01	0 CYLINDER, GUIDE
6	▲ 1-451-330-11	S DEFLECTION YOKE, VF (HD)	56	3-733-206-01	0 RING, ADJUSTMENT
7	▲ 1-464-168-22	S MULTIPLIER	57	3-733-208-01	0 BRACKET (A), PC BOARD
8	▲ 1-546-077-11	S PICTURE TUBE	58	3-733-209-01	0 BRACKET (B), PC BOARD
9	1-547-320-11	0 LENS ASSY	59	3-733-210-01	0 BRACKET, CRT
10	1-547-321-11	0 FILTER, FP	60	3-733-211-01	0 FLANGE (A)
11	1-547-322-11	0 G3	61	3-733-212-01	0 RING, ATTACHMENT
12	1-547-323-11	0 G4	62	3-733-213-01	0 SHEET, INDICATOR
13	1-547-324-11	0 G1/2	63	3-733-214-01	0 LABEL, VOL
14	1-550-442-11	0 HEATER ASSY	64	3-733-215-01	0 BEZEL
15	1-568-143-11	0 CONNECTOR, VF MOUNT (PIN) 2P	65	3-733-216-01	0 TUBE, MIRROR
16	1-568-263-11	0 CONNECTOR, (V) MOUNT (BASE) 2P	66	3-733-218-01	0 BODY, VF
17	▲ 1-934-936-21	S HARNESS (CRT)	67		S CABLE, VF
18	2-234-904-00	0 BUSH, CORD			
19	3-641-622-00	S SPRING, COMPRESSION			
20	3-657-627-00	S KNOB (2)			
21	3-672-201-00	0 MIRROR			
22	3-672-241-00	0 RING (B), SLEEVE			
23	3-672-247-00	0 RING (A), SLEEVE			
24	3-672-286-00	0 SUPPORT (B), CRT			
25	3-672-287-00	0 HOLDER, MIRROR			
26	3-676-244-11	S COVER, SW			
27	3-680-595-01	0 SUPPORT, ROTARY			
28	3-682-718-02	0 SHOE, VF SLIDE			
29	3-682-759-01	0 RING, LOCK			
30	3-682-760-01	0 SCREW (M7-0.75), ADJUSTMENT			
31	3-685-129-01	0 SPRING (N), LEAF, VF			
32	3-693-751-01	S LEVER, FASTENING			
33	3-697-373-01	0 PLATE, VF			
34	3-697-374-01	0 SHOE (DIA.30), CLUTCH			
35	3-697-377-01	0 SCREW, CLUTCH			
36	3-697-378-01	0 SHEET, CLUTCH			
37	3-697-380-01	0 SPACER (1), VF			
38	3-697-381-01	0 SPACER (2), VF			
39	3-697-382-01	0 SCREW, VF ROTARY			
40	3-697-383-01	0 SHEET (DIA.26), VF ROTARY			
41	3-697-384-01	0 SHOE (DIA.16), CLUTCH			
42	3-697-385-01	0 STOPPER, ROTARY			
43	3-697-386-01	0 SCREW, TORQUE ADJUSTMENT			
44	3-697-389-01	0 BRACKET, VF			
45	3-697-391-01	0 FLANGE (B)			
46	3-697-392-01	0 ROLLER			
47	3-697-393-01	0 PIN, GUIDE			
48	3-697-394-01	0 HOLDER, MOVABLE LENS			
49	3-697-395-01	0 RING (A), LENS RETAINER			
50	3-697-396-01	0 RING (B), LENS RETAINER			

D-2. EXPLODED VIEW

No.	Parts No.	SP Description	No.	Parts No.	SP Description
1	A-7513-775-A	O COMPLETE PCB, VF-36	51	3-697-397-01	O SPACER, LENS
2	X-3697-018-1	O PLATE ASSY, CLUTCH	52	3-697-398-01	O RING, STOPPER RUBBER
3	X-3697-019-1	O COVER ASSY, VF	53	3-697-399-01	O COVER, HEATER
4	1-226-735-00	S RES, VAR, CARBON 2K	54	3-733-201-01	O RING
5	1-230-350-11	S RES, VAR, CARBON 20K	55	3-733-205-01	O CYLINDER, GUIDE
6	△ 1-451-330-11	S DEFLECTION YOKE, VF (HD)	56	3-733-206-01	O RING, ADJUSTMENT
7	△ 1-464-168-22	S MULTIPLIER	57	3-733-208-01	O BRACKET (A), PC BOARD
8	△ 1-546-077-11	S PICTURE TUBE	58	3-733-209-01	O BRACKET (B), PC BOARD
9	1-547-320-11	O LENS ASSY	59	3-733-210-01	O BRACKET, CRT
10	1-547-321-11	O FILTER, FP	60	3-733-211-01	O FLANGE (A)
11	1-547-322-11	O G3	61	3-733-212-01	O RING, ATTACHMENT
12	1-547-323-11	O G4	62	3-733-213-01	O SHEET, INDICATOR
13	1-547-324-11	O G1/2	63	3-733-214-01	O LABEL, VOL
14	1-550-442-11	O HEATER ASSY	64	3-733-215-01	O BEZEL
15	1-568-143-11	O CONNECTOR, VF MOUNT (PIN) 2P	65	3-733-216-01	O TUBE, MIRROR
16	1-568-263-11	O CONNECTOR, (V) MOUNT (BASE) 2P	66	3-733-218-01	O BODY, VF
17	△ 1-934-936-21	S HARNESS (CRT)	67		S CABLE, VF
18	2-234-904-00	O BUSH, CORD			
19	3-641-622-00	S SPRING, COMPRESSION			
20	3-657-627-00	S KNOB (2)			
21	3-672-201-00	O MIRROR			
22	3-672-241-00	O RING (B), SLEEVE			
23	3-672-247-00	O RING (A), SLEEVE			
24	3-672-286-00	O SUPPORT (B), CRT			
25	3-672-287-00	O HOLDER, MIRROR			
26	3-676-244-11	S COVER, SW			
27	3-680-595-01	O SUPPORT, ROTARY			
28	3-682-718-02	O SHOE, VF SLIDE			
29	3-682-759-01	O RING, LOCK			
30	3-682-760-01	O SCREW (M7-0.75), ADJUSTMENT			
31	3-685-129-01	O SPRING (N), LEAF, VF			
32	3-693-751-01	S LEVER, FASTENING			
33	3-697-373-01	O PLATE, VF			
34	3-697-374-01	O SHOE (DIA.30), CLUTCH			
35	3-697-377-01	O SCREW, CLUTCH			
36	3-697-378-01	O SHEET, CLUTCH			
37	3-697-380-01	O SPACER (1), VF			
38	3-697-381-01	O SPACER (2), VF			
39	3-697-382-01	O SCREW, VF ROTARY			
40	3-697-383-01	O SHEET (DIA.26), VF ROTARY			
41	3-697-384-01	O SHOE (DIA.16), CLUTCH			
42	3-697-385-01	O STOPPER, ROTARY			
43	3-697-386-01	O SCREW, TORQUE ADJUSTMENT			
44	3-697-389-01	O BRACKET, VF			
45	3-697-391-01	O FLANGE (B)			
46	3-697-392-01	O ROLLER			
47	3-697-393-01	O PIN, GUIDE			
48	3-697-394-01	O HOLDER, MOVABLE LENS			
49	3-697-395-01	O RING (A), LENS RETAINER			
50	3-697-396-01	O RING (B), LENS RETAINER			

D-3. SCREW

+B Bzn-N		+B Cr-N		+B Bzn-N		+B Cr-N		+RK Bzn-N		+RK Bzn-N		+PSW Czn-N		PRECISION +K Cr-N		PRECISION +P Bzn-N		TOTSU P Bzn-N NON SLIT		HEXAGON SET SCREW (WP) SNCM6-PD		BOLT, HEXAGON SOCKET SNCM6 Bzn-N4	
7-621-000-00		7-621-000-00		7-682-000-00		7-682-000-00		7-621-000-00		7-682-000-00		7-621-000-00		7-627-000-00		7-627-000-00		7-685-000-00		7-621-000-00 7-701-000-00		7-683-000-00	
SIZE	Parts No.	SIZE	Parts No.	SIZE	Parts No.	SIZE	Parts No.	SIZE	Parts No.	SIZE	Parts No.	SIZE	Parts No.	SIZE	Parts No.	SIZE	Parts No.	SIZE	Parts No.	SIZE	Parts No.	SIZE	Parts No.
2 x 3	772-00	2 x 3	772-08	3 x 3	544-09	3 x 3	544-04	2 x 3	-	3 x 4	345-09	2.6 x 5	759-35	1.7 x 1.8	-	1.7 x 1.6	552-18	2 x 4	102-19	2.6 x 3	734-09	3 x 4	401-04
x 4	772-10	x 4	772-18	x 4	545-09	x 4	545-04	x 4	-	x 5	346-09	x 6	759-45	x 2	-	x 1.8	-	2 x 5	103-19	2.6 x 4	735-09	3 x 5	402-04
x 5	772-20	x 5	771-06	x 5	546-09	x 5	546-04	x 5	-	x 6	347-09	x 8	759-65	x 2.2	-	x 2	552-28	2 x 6	104-19	2.6 x 5	736-09	3 x 6	403-04
x 6	772-30	x 6	772-38	x 6	547-09	x 6	547-04	x 6	-	x 8	348-09	x 10	759-75	x 2.5	-	x 2.2	-	2 x 8	105-19	2.6 x 6	737-09	3 x 8	404-04
x 8	772-40	x 8	772-48	x 8	548-09	x 8	548-04	x 8	-	x 10	349-09	x 12	759-85	x 2.8	-	x 2.5	552-08	2 x 10	106-19	2.6 x 8	738-09	3 x 10	405-04
x 10	772-50	x 10	772-58	x 10	549-09	x 10	549-04	x 10	-	x 12	350-09	x 14	759-95	x 3	-	x 2.8	-	2 x 12	107-19	2.6 x 8	739-09	3 x 12	406-04
x 12	772-60	x 12	772-68	x 12	550-09	x 12	550-04	x 12	661-30	x 12	351-09	x 16	760-05	x 3.5	-	x 3	552-38	2.6 x 4	131-19	3 x 3	505-01	3 x 14	407-04
x 14	772-70	x 14	772-78	x 14	551-09	x 14	551-04	x 14	661-40	x 14	352-09	x 16	760-15	x 4	-	x 3.5	552-78	3 x 4	506-01	3 x 4	506-01	3 x 16	408-04
x 16	772-80	x 16	772-88	x 16	552-09	x 16	552-04	x 16	-	x 16	353-09	x 20	760-15	x 4.5	-	x 4	552-48	3 x 6	507-01	3 x 6	508-01	3 x 20	410-04
x 20	-	x 20	-	x 20	553-09	x 20	553-04	x 20	-	x 20	353-09	x 30	760-15	x 5	-	x 5	552-58	3 x 8	509-01	3 x 8	509-01	4 x 5	417-04
2.6 x 3	775-00	2.6 x 3	775-08	4 x 4	558-09	4 x 4	558-04	2.6 x 4	-	4 x 6	360-09	x 5	662-10	2 x 2	452-07	2 x 1.8	554-38	3 x 5	144-19	3 x 3	510-01	4 x 6	418-04
x 4	775-10	x 4	773-86	x 5	559-09	x 5	559-04	x 5	662-20	x 8	361-09	x 6	662-20	x 2.2	452-87	x 2	553-18	4 x 5	145-19	4 x 4	511-01	4 x 8	419-04
x 5	775-20	x 5	770-87	x 6	560-09	x 6	560-04	x 8	662-30	x 10	362-09	x 8	662-30	x 2.8	-	x 2.2	-	4 x 10	146-19	4 x 5	511-01	4 x 10	420-04
x 6	773-95	x 6	770-67	x 8	561-09	x 8	561-04	x 10	-	x 12	363-09	x 10	-	x 3	452-17	x 2.5	553-28	4 x 12	147-19	4 x 6	512-01	4 x 12	421-04
x 8	775-40	x 8	770-99	x 10	562-09	x 10	562-04	x 12	-	x 14	364-09	x 12	-	x 3.5	-	x 2.8	554-58	4 x 14	148-19	4 x 8	513-01	4 x 14	422-04
x 10	775-50	x 10	773-87	x 12	563-09	x 12	563-04	x 14	-	x 16	365-09	x 14	-	x 4	452-27	x 3	553-38	4 x 16	149-19	4 x 16	513-01	4 x 16	423-04
x 12	775-60	x 12	775-68	x 14	564-09	x 14	564-04	x 16	-	x 20	366-09	x 16	-	x 4.5	-	x 3.5	554-18	3 x 10	147-19	4 x 20	513-01	4 x 20	425-04
x 14	775-70	x 14	775-78	x 16	565-09	x 16	565-04	x 20	-	5 x 8	574-04	x 18	-	x 5	-	x 4	553-48	3 x 12	148-19	5 x 8	434-04	5 x 8	434-04
x 16	775-80	x 16	775-88	x 20	566-09	x 20	566-04	x 20	-	x 10	575-04	x 5.5	-	x 5.5	-	x 4.5	553-58	3 x 14	149-19	5 x 10	435-04	5 x 10	435-04
x 20	775-90	x 20	773-91	5 x 8	574-04	x 10	575-04	5 x 8	-	x 12	576-04	x 6	-	x 6	452-67	x 5	554-28	3 x 16	150-19	5 x 12	436-04	5 x 12	436-04
				x 10	575-09	x 12	576-04			x 14	577-04	x 7	-	x 7	-	x 5.5	554-58	3 x 18	151-19	5 x 14	437-04	5 x 14	437-04
				x 12	576-09	x 14	577-04			x 16	578-04	x 8	-	x 8	-	x 6	553-68	3 x 20	152-19	5 x 16	438-04	5 x 16	438-04
				x 14	577-09	x 16	578-04					x 8	-			x 7	553-88	3 x 25	153-19	5 x 20	440-04	5 x 20	440-04
				x 16	578-09							x 16	-			x 8	553-98	3 x 30	154-19	5 x 25	442-04	5 x 25	442-04
				x 20	579-09							x 20	-			x 10	553-78	3 x 35	155-19	5 x 30	444-04	5 x 30	444-04
																		3 x 40	155-19	5 x 50	447-04	5 x 50	447-04
																		3 x 58	155-19				
																		4 x 6	158-19	6 x 10	452-04	6 x 10	452-04
																		4 x 8	159-19	6 x 12	453-04	6 x 12	453-04
																		4 x 10	160-19	6 x 14	454-04	6 x 14	454-04
																		4 x 12	161-19	6 x 16	455-04	6 x 16	455-04
																		4 x 14	162-19	6 x 20	457-04	6 x 20	457-04
																		4 x 16	163-19	6 x 25	459-04	6 x 25	459-04
																		4 x 18	164-19	6 x 30	461-04	6 x 30	461-04
																		4 x 20	165-19	6 x 35	463-04	6 x 35	463-04
																		4 x 22	166-19	6 x 40	465-04	6 x 40	465-04
																		4 x 24	167-19	6 x 45	466-04	6 x 45	466-04
																		4 x 26	168-19	6 x 50	468-04	6 x 50	468-04
																		4 x 28	169-19	8 x 12	470-04	8 x 12	470-04
																		4 x 30	170-19	8 x 14	471-04	8 x 14	471-04
																		4 x 32	171-19	8 x 16	472-04	8 x 16	472-04
																		4 x 34	172-19	8 x 20	473-04	8 x 20	473-04
																		4 x 36	173-19	8 x 25	474-04	8 x 25	474-04
																		4 x 38	174-19	8 x 30	475-04	8 x 30	475-04
																		4 x 40	175-19	8 x 35	476-04	8 x 35	476-04
																		4 x 42	176-19	8 x 40	477-04	8 x 40	477-04
																		4 x 44	177-19	8 x 45	478-04	8 x 45	478-04
																		4 x 46	178-19	8 x 50	479-04	8 x 50	479-04
																		4 x 48	179-19				
																		4 x 50	180-19				

D-4. ELECTRICAL PARTS

Ref.No.	Parts No.	SP Description
LP-46 BOARD		
	1-628-787-11	o PRINTED CIRCUIT BOARD "LP-46"
CN1	1-562-149-11	o PLUG HOUSING, 4P
D1	8-719-812-41	s TLR124
D2	8-719-812-43	s TLG124A

VF-36 BOARD

Ref.No.	Parts No.	SP Description
	A-7513-775-A	o MOUNTED CIRCUIT BOARD "VF-36"
C1	1-163-038-00	s CERAMIC CHIP 0.1MF 25V
C2	1-131-375-00	s TANTALUM 4.7MF 10% 10V
C3	1-131-347-00	s TANTALUM 1MF 10% 35V
C4	1-131-375-00	s TANTALUM 4.7MF 10% 10V
C5	1-131-347-00	s TANTALUM 1MF 10% 35V
C6	1-163-141-00	s CERAMIC CHIP 0.001MF 5% 50V
C8	1-163-038-00	s CERAMIC CHIP 0.1MF 25V
C9	1-131-374-00	s TANTALUM 33MF 10% 10V
C10	1-131-347-00	s TANTALUM 1MF 10% 35V
C12	1-131-347-00	s TANTALUM 1MF 10% 35V
C14	1-163-038-00	s CERAMIC CHIP 0.1MF 25V
C15	1-163-021-00	s CERAMIC CHIP 0.01MF 10% 50V
C16	1-163-021-00	s CERAMIC CHIP 0.01MF 10% 50V
C17	1-163-021-00	s CERAMIC CHIP 0.01MF 10% 50V
C18	Δ1-106-355-12	s MYLAR 0.0033MF 5% 100V
C19	Δ1-106-351-00	s MYLAR 0.0022MF 5% 100V
C20	1-124-925-11	s ELECT 2.2uF 20% 100V
C21	1-131-374-00	s TANTALUM 33MF 10% 10V
C22	1-136-187-11	s FILM 0.047MF 5% 250V
C23	1-136-187-11	s FILM 0.047MF 5% 250V

Ref.No.	Parts No.	SP Description
C24	1-136-203-11	s FILM 0.01MF 5% 630V
C25	1-136-195-11	s FILM 0.022MF 5% 400V
C26	1-136-203-11	s FILM 0.01MF 5% 630V
C27	1-163-145-00	s CERAMIC CHIP 0.0015MF 10% 50V
C28	1-131-365-00	s TANTALUM 10MF 10% 16V
C29	1-131-365-00	s TANTALUM 10MF 10% 16V
C30	1-163-117-00	s CERAMIC CHIP 100PF 5% 50V
C31	1-163-117-00	s CERAMIC CHIP 100PF 5% 50V
C32	1-163-021-00	s CERAMIC CHIP 0.01MF 10% 50V
C33	1-131-347-00	s TANTALUM 1MF 10% 35V
C34	1-163-038-00	s CERAMIC CHIP 0.1MF 25V
C35	1-136-684-11	s FILM 0.0022MF 5% 100V
C36	1-130-483-00	s MYLAR 0.01MF 5% 50V
C37	1-163-019-00	s CERAMIC CHIP 0.0068MF 10% 50V
C38	1-131-347-00	s TANTALUM 1MF 10% 35V
C39	1-131-587-11	s TANTALUM 0.68MF 10% 35V
C40	1-131-347-00	s TANTALUM 1MF 10% 35V
C41	1-131-365-00	s TANTALUM 10MF 10% 16V
C42	1-136-287-11	s FILM 0.0047uF 5% 100V
C43	1-163-129-00	s CERAMIC CHIP 330PF 5% 50V
C44	1-131-365-00	s TANTALUM 10MF 10% 16V
C45	1-131-341-00	s TANTALUM 0.1MF 10% 35V
C46	1-131-368-00	s TANTALUM 3.3MF 10% 16V
C47	1-126-176-11	s ELECT 220MF 20% 10V
C48	1-131-365-00	s TANTALUM 10MF 10% 16V
C50	1-131-368-00	s TANTALUM 3.3MF 10% 16V
C51	1-131-367-00	s TANTALUM 22MF 10% 16V
C52	1-163-038-00	s CERAMIC CHIP 0.1MF 25V
C53	1-126-101-11	s ELECT 100MF 20% 10V
C54	1-163-021-00	s CERAMIC CHIP 0.01MF 10% 50V
C55	1-163-021-00	s CERAMIC CHIP 0.01MF 10% 50V
C56	1-163-038-00	s CERAMIC CHIP 0.1MF 25V
C60	1-163-117-00	s CERAMIC CHIP 100PF 5% 50V
CN1	1-566-391-11	o RECEPTACLE, 12P, MALE
CN2	1-506-468-11	o RECEPTACLE, 3P, MALE
CN3	1-506-468-11	o RECEPTACLE, 3P, MALE
CN4	1-506-468-11	o RECEPTACLE, 3P, MALE
CN5	1-566-392-11	o RECEPTACLE, 4P, MALE
CN6	1-566-395-11	o RECEPTACLE, 10P, MALE
CN7	1-506-467-11	o RECEPTACLE, 2P, MALE
CN8	1-506-470-41	o RECEPTACLE, 5P, MALE

Ref.No.	Parts No.	SP Description
D1	Δ8-719-102-51	s 1S251
D2	8-719-100-05	s 1S2837
D3	8-719-100-05	s 1S2837
D4	8-719-100-05	s 1S2837
D5	8-719-300-65	s ES1F
D6	8-719-900-95	s V09G
D7	8-719-300-65	s ES1F
D8	8-719-300-65	s ES1F
D9	8-719-300-65	s ES1F
D10	8-719-105-28	s RD2.4M-B
D11	8-719-101-23	s 1SS123
D12	8-719-101-23	s 1SS123
D20	8-719-106-31	s RD8.2M-B1
DL1	1-415-434-11	s 50nS
IC1	8-759-142-20	s UPG4062G
IC2	8-759-205-06	s TC74HC74F
IC3	8-759-209-90	s TC4S71F
IC4	8-759-209-57	s TC4S69F
IC5	8-759-206-55	s TC74HC4538F
IC6	Δ8-759-300-28	s HA11423MP
IC7	8-759-142-20	s UPG4062G
IC8	8-759-142-20	s UPG4062G
L1	1-408-421-00	s 100UH
L2		s LINEARITY
Q1	8-729-206-12	s 2SA1244-Y
Q2	8-729-140-36	s 2SC3734-B23
Q3	8-729-140-31	s 2SA1461-Y23
Q4	8-729-140-36	s 2SC3734-B23
Q5	8-729-140-31	s 2SA1461-Y23

Ref.No.	Parts No.	SP Description
Q6	8-729-140-31	s 2SA1461-Y23
Q7	8-729-140-31	s 2SA1461-Y23
Q8	8-729-109-41	s 2SK94-X1
Q9	8-729-140-31	s 2SA1461-Y23
Q10	8-729-140-31	s 2SA1461-Y23
Q11	8-729-140-36	s 2SC3734-B23
Q12	8-729-804-59	s 2SC3600-F
Q13	8-729-140-36	s 2SC3734-B23
Q14	8-729-804-59	s 2SC3600-F
Q15	8-729-320-14	s 2SK430L
Q16	8-729-320-14	s 2SK430L
Q17	8-729-320-14	s 2SK430L
Q18	8-729-140-31	s 2SA1461-Y23
Q19	8-729-140-36	s 2SC3734-B23
Q20	8-729-140-36	s 2SC3734-B23
Q21	8-729-140-36	s 2SC3734-B23
Q22	8-729-140-31	s 2SA1461-Y23
Q23	8-729-205-88	s 2SC3074-Y
Q24	8-729-809-34	s 2SC4412-4
Q25	8-729-809-34	s 2SC4412-4
R1	1-216-009-00	s METAL CHIP 22 5% 1/10W
R2	1-216-051-00	s METAL CHIP 1.2K 5% 1/10W
R3	1-216-057-00	s METAL CHIP 2.2K 5% 1/10W
R4	Δ1-216-679-11	s METAL CHIP 15K 0.5% 1/10W
R5	Δ1-216-687-11	s METAL CHIP 33K 0.5% 1/10W
R6	1-216-642-11	s METAL CHIP 430 0.5% 1/10W
R7	1-216-049-00	s METAL CHIP 1K 5% 1/10W
R8	1-216-093-00	s METAL CHIP 68K 5% 1/10W
R9	1-216-097-00	s METAL CHIP 100K 5% 1/10W
R10	1-216-059-00	s METAL CHIP 2.7K 5% 1/10W
R11	1-216-083-00	s METAL CHIP 27K 5% 1/10W
R12	1-216-085-00	s METAL CHIP 33K 5% 1/10W
R13	1-216-109-00	s METAL CHIP 330K 5% 1/10W
R14	1-216-073-00	s METAL CHIP 10K 5% 1/10W
R15	1-216-053-00	s METAL CHIP 1.5K 5% 1/10W
R16	1-216-033-00	s METAL CHIP 220 5% 1/10W
R17	1-216-035-00	s METAL CHIP 270 5% 1/10W
R18	1-216-027-00	s METAL CHIP 120 5% 1/10W
R19	1-216-059-00	s METAL CHIP 2.7K 5% 1/10W
R20	1-216-089-00	s METAL CHIP 47K 5% 1/10W
R21	1-216-037-00	s METAL CHIP 330 5% 1/10W
R22	1-216-057-00	s METAL CHIP 2.2K 5% 1/10W
R23	1-216-051-00	s METAL CHIP 1.2K 5% 1/10W
R24	1-216-045-00	s METAL CHIP 680 5% 1/10W
R25	1-216-091-00	s METAL CHIP 56K 5% 1/10W
R26	1-216-668-11	s METAL CHIP 5.1K 0.5% 1/10W
R27	1-216-081-00	s METAL CHIP 22K 5% 1/10W
R28	1-216-678-11	s METAL CHIP 13K 0.5% 1/10W
R29	1-216-033-00	s METAL CHIP 220 5% 1/10W

Ref.No.	Parts No.	SP	Description	Ref.No.	Parts No.	SP	Description
R30	1-216-073-00	s	METAL CHIP 10K 5% 1/10W	R71	1-216-073-00	s	METAL CHIP 10K 5% 1/10W
R31	1-216-025-00	s	METAL CHIP 100 5% 1/10W	R72	Δ1-216-057-00	s	METAL CHIP 2.2K 5% 1/10W
R32	1-216-033-00	s	METAL CHIP 220 5% 1/10W	R73	1-216-067-00	s	METAL CHIP 5.6K 5% 1/10W
R33	1-216-069-00	s	METAL CHIP 6.8K 5% 1/10W	R74	1-216-061-00	s	METAL CHIP 3.3K 5% 1/10W
R34	1-216-049-00	s	METAL CHIP 1K 5% 1/10W	R75	1-216-057-00	s	METAL CHIP 2.2K 5% 1/10W
R35	1-216-071-00	s	METAL CHIP 8.2K 5% 1/10W	R76	1-216-748-11	s	METAL CHIP 39K 5% 1/10W
R36	1-216-025-00	s	METAL CHIP 100 5% 1/10W	R77	1-216-073-00	s	METAL CHIP 10K 5% 1/10W
R37	1-216-009-00	s	METAL CHIP 22 5% 1/10W	R78	1-216-069-00	s	METAL CHIP 6.8K 5% 1/10W
R38	1-216-073-00	s	METAL CHIP 10K 5% 1/10W	R79	1-216-105-00	s	METAL CHIP 220K 5% 1/10W
R39	1-216-748-11	s	METAL CHIP 39K 5% 1/10W	R80	1-216-073-00	s	METAL CHIP 10K 5% 1/10W
R40	1-216-109-00	s	METAL CHIP 330K 5% 1/10W	R81	1-216-073-00	s	METAL CHIP 10K 5% 1/10W
R41	1-216-083-00	s	METAL CHIP 27K 5% 1/10W	R82	1-216-093-00	s	METAL CHIP 68K 5% 1/10W
R42	1-216-113-00	s	METAL CHIP 470K 5% 1/10W	R83	1-216-081-00	s	METAL CHIP 22K 5% 1/10W
R43	1-216-109-00	s	METAL CHIP 330K 5% 1/10W	R84	1-216-005-00	s	METAL CHIP 15 5% 1/10W
R44	1-216-089-00	s	METAL CHIP 47K 5% 1/10W	R85	1-216-061-00	s	METAL CHIP 3.3K 5% 1/10W
R45	1-216-097-00	s	METAL CHIP 100K 5% 1/10W	R86	1-216-065-00	s	METAL CHIP 4.7K 5% 1/10W
R46	1-216-009-00	s	METAL CHIP 22 5% 1/10W	R87	1-216-308-00	s	METAL CHIP 4.7 5% 1/10W
R47	1-216-009-00	s	METAL CHIP 22 5% 1/10W	R88	1-216-085-00	s	METAL CHIP 33K 5% 1/10W
R48	1-216-009-00	s	METAL CHIP 22 5% 1/10W	R89	1-216-089-00	s	METAL CHIP 47K 5% 1/10W
R49	1-216-097-00	s	METAL CHIP 100K 5% 1/10W	R90	1-216-097-00	s	METAL CHIP 100K 5% 1/10W
R50	Δ1-216-025-00	s	METAL CHIP 100 5% 1/10W	R91	1-216-033-00	s	METAL CHIP 220 5% 1/10W
R51	1-216-049-00	s	METAL CHIP 1K 5% 1/10W	R92	1-216-005-00	s	METAL CHIP 15 5% 1/10W
R52	1-216-049-00	s	METAL CHIP 1K 5% 1/10W	R93	1-216-043-00	s	METAL CHIP 560 5% 1/10W
R54	1-216-121-00	s	METAL CHIP 1M 5% 1/10W	R94	1-216-049-00	s	METAL CHIP 1K 5% 1/10W
R55	1-216-121-00	s	METAL CHIP 1M 5% 1/10W	R95	1-216-071-00	s	METAL CHIP 8.2K 5% 1/10W
R56	1-216-121-00	s	METAL CHIP 1M 5% 1/10W	R96	1-216-025-00	s	METAL CHIP 100 5% 1/10W
R57	1-216-128-11	s	METAL CHIP 2M 5% 1/10W	R99	1-216-073-00	s	METAL CHIP 10K 5% 1/10W
R58	1-216-128-11	s	METAL CHIP 2M 5% 1/10W	R100	1-216-057-00	s	METAL CHIP 2.2K 5% 1/10W
R59	1-216-091-00	s	METAL CHIP 56K 5% 1/10W	R101	1-216-071-00	s	METAL CHIP 8.2K 5% 1/10W
R60	1-216-109-00	s	METAL CHIP 330K 5% 1/10W	R102	1-216-067-00	s	METAL CHIP 5.6K 5% 1/10W
R61	1-216-065-00	s	METAL CHIP 4.7K 5% 1/10W	R103	1-216-037-00	s	METAL CHIP 330 5% 1/10W
R62	1-216-073-00	s	METAL CHIP 10K 5% 1/10W	R110	1-216-033-00	s	METAL CHIP 220 5% 1/10W
R63	1-216-073-00	s	METAL CHIP 10K 5% 1/10W	R111	1-216-073-00	s	METAL CHIP 10K 5% 1/10W
R64	1-216-001-00	s	METAL CHIP 10 5% 1/10W	R112	1-216-025-00	s	METAL CHIP 100 5% 1/10W
R65	1-216-081-00	s	METAL CHIP 22K 5% 1/10W	R113	1-216-085-00	s	METAL CHIP 33K 5% 1/10W
R66	1-216-025-00	s	METAL CHIP 100 5% 1/10W	R114	1-216-067-00	s	METAL CHIP 5.6K 5% 1/10W
R67	1-216-073-00	s	METAL CHIP 10K 5% 1/10W	R115	1-216-049-00	s	METAL CHIP 1K 5% 1/10W
R68	1-216-071-00	s	METAL CHIP 8.2K 5% 1/10W	R116	1-216-049-00	s	METAL CHIP 1K 5% 1/10W
R69	1-216-093-00	s	METAL CHIP 68K 5% 1/10W	R117	1-216-077-00	s	METAL CHIP 15K 5% 1/10W
R70	Δ1-216-085-00	s	METAL CHIP 33K 5% 1/10W	R118	1-216-085-00	s	METAL CHIP 33K 5% 1/10W
				R119	1-216-085-00	s	METAL CHIP 33K 5% 1/10W
				R120	1-216-081-00	s	METAL CHIP 22K 5% 1/10W
				R121	1-216-089-00	s	METAL CHIP 47K 5% 1/10W
				R122	1-216-081-00	s	METAL CHIP 22K 5% 1/10W
				R124	1-216-065-00	s	METAL CHIP 4.7K 5% 1/10W

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