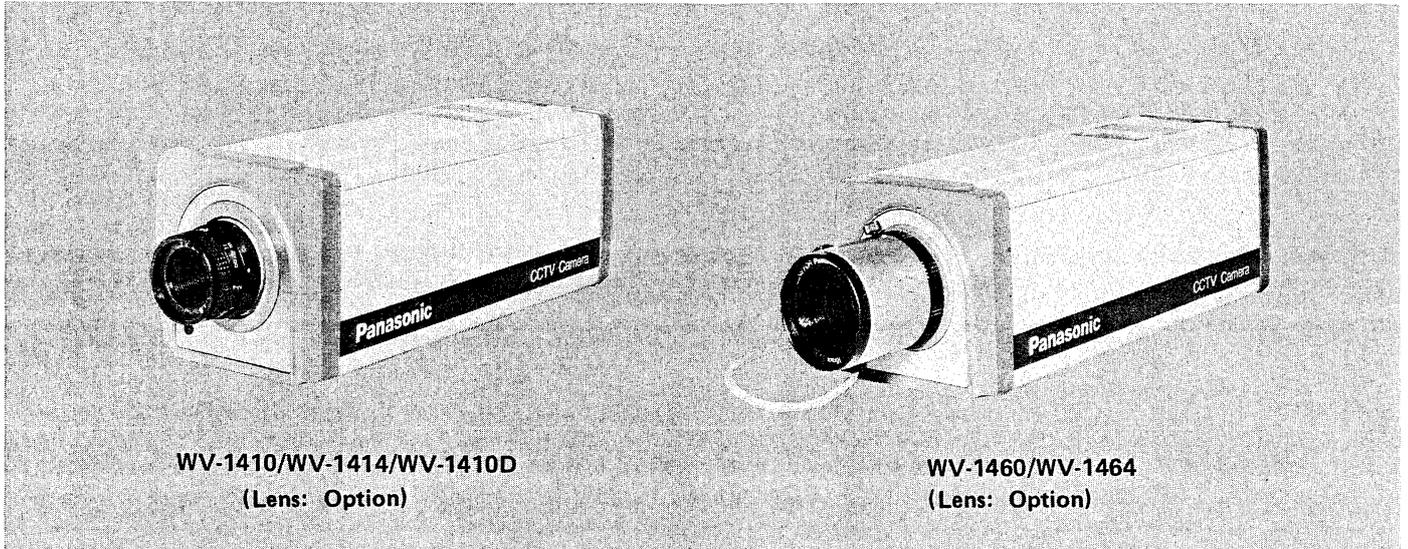


Service Manual

CCTV Camera
WV-1410 Series



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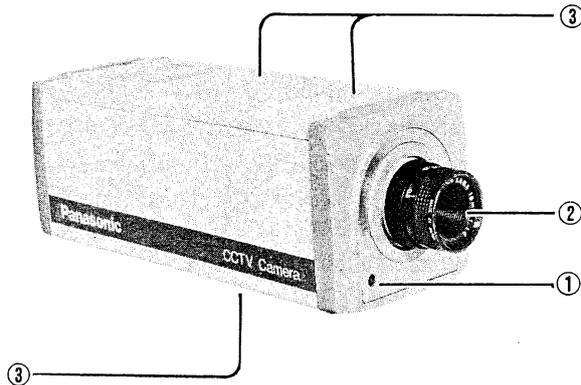
SPECIFICATIONS

Power Source:	WV-1410/C,G, WV-1410N/C:	220V AC 50Hz 8W
	WV-1410F:	220V AC 50Hz 8W
	WV-1460/C,G, WV-1460N/C:	220V AC 50Hz 9W
	WV-1460F:	220V AC 50Hz 9W
	WV-1410/B, WV-1410N/A:	240V AC 50Hz 8W
	WV-1460/B, WV-1460N/A:	240V AC 50Hz 9W
	WV-1410N:	115V AC 50Hz/60Hz 9W
	WV-1460N:	115V AC 50Hz/60Hz 10W
	WV-1414E, WV-1414F:	24V AC 50Hz 9W
	WV-1414NC:	24V AC 50Hz 9W
	WV-1464E, WV-1464F:	24V AC 50Hz 10W
	WV-1464NC:	24V AC 50Hz 10W
	WV-1414N:	24V AC 50Hz/60Hz 11W
	WV-1464N:	24V AC 50Hz/60Hz 12W
Pick-up Tube:	WV-1410/WV-1414:	Magnetic focus, magnetic deflection, separate mesh 2/3" vidicon, 20PE 13A
	WV-1460/WV-1464:	Magnetic focus, magnetic deflection, separate mesh 2/3" Newvicon, S4075
Scanning:	WV-1410F, WV-1414F:	} 625 lines/50 fields/25 frames (CCIR standard)
	WV-1460F, WV-1464F:	
	WV-1410, WV-1414E:	
	WV-1460, WV-1464E:	
	WV-1410N/C, WV-1414NC:	
	WV-1460N/C, WV-1464NC:	} 525 lines/60 fields/30 frames (US standard)
	WV-1410N, WV-1414N:	
	WV-1460N, WV-1464N:	
Synchronizing:	2:1 interlace or vertical line locked (swithable internally)	
Video Output:	1.0Vp-p composite/75 ohms (BNC connector)	
Horizontal Resolution (at center):	550 lines	
Signal-to-Noise Ratio:	More than 43dB (with 4.5MHz filter)	
White Suppress:	1.0 Vp-p	
Gamma Correccion:	WV-1410/WV-1414:	1.0 (fixed)
	WV-1460/WV-1464:	0.7 (fixed)
Automatic Light Compensation:	WV-1410/WV-1414:	20,000:1
	WV-1460/WV-1464:	40,000~66,000:1 (Depending on the model of the Automatic Iris Lens)
Minimum Required Illumination: (With f 1.4 lens used under incandescent light)	Usadle Picture:	WV-1410/WV-1414: 0.5 footcandle (5 lux) WV-1460/WV-1464: 0.05 footcandle (0.5 lux)
	Recommended Illumination:	WV-1410/WV-1414: 5.0 footcandles (50 lux) WV-1460/WV-1464: 0.05 footcandle (5 lux)
Extenal Controls:	Power ON/OFF, Mechanical Focus	
Ambient Operating Temperature:	14°F~122°F (-10° C~ +50° C)	
Ambient Operating Humidity:	Less than 90%	
Lens Mounting:	Standard C-mount	
Camera Mounting:	Top:	Two 1/4"-20 threaded holes
	Bottom:	One 1/4"-20 threaded hole
Dimensions:	91(W) x 84(H) x 212(D) mm [3-9/16" (W) x 3-5/16" (H) x 8-3/8" (D)]	
Weight:	WV-1410:	1.6kg (3.5 lbs)
	WV-1414:	1.4kg (3.1 lbs)
	WV-1460:	1.6kg (3.5 lbs)
	WV-1464:	1.4kg (3.1 lbs)
Standard Accessories:	WV-1460/WV-1464:	Lens cleaning paper. 1set

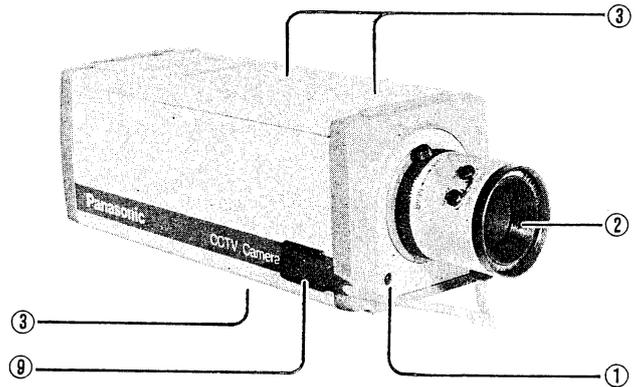
Specifications are subject to chang without notice.

MAJOR OPERATING CONTROLS AND THEIR FUNCTIONS

WV-1410/WV-1414

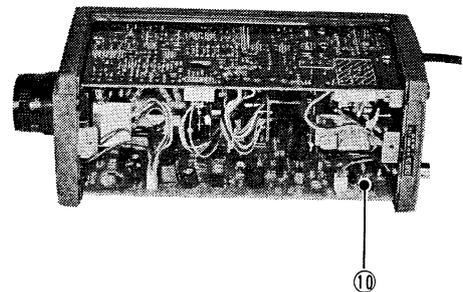
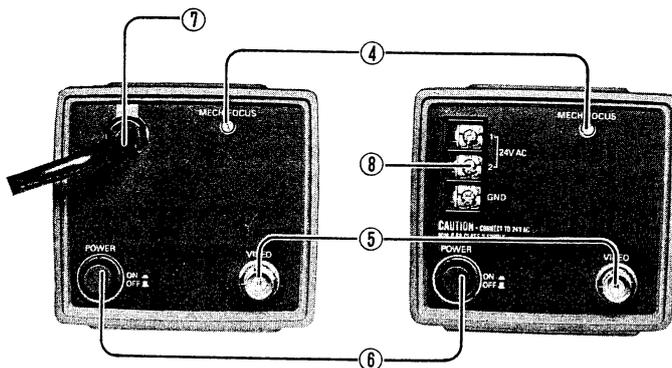


WV-1414/WV-1464



WV-1410/WV-1460

WV-1414 /WV1464



1 Power Indicator

2 Lens

WV-1410/WV-1414: Option

WV-1460/WV-1464: Automatic Iris Lens (option)

3 Camera Mounting Screw Holes

Standard photographic pan-head screw size (1/4" - 20).

4 Mechanical Focus [MECH FOCUS]

Adjust the distance from the pick-up tube to the lens by moving the pick-up tube carrier along its optical axis. If required, this allows the minimum working distance between the camera and object to be reduced. In the case of a zoom lens, focus tracking can be adjusted with this control.

5 Video Output Connector [VIDEO]

Use a coaxial cable with a BNC connector. Video output signal is fed to a video monitor or VTR.

6 Power ON/OFF Switch [POWER ON/OFF]

7 AC Power Cord – Models WV-1410/1460

Power cord for connecting to power outlet

8 24V AC Power Terminal Strip – Models WV-1414/ WV-1464

Accepts 24V AC power source. Be sure to connect grounding lead to the GND terminal.

9 Connector for Automatic Iris Lens

This supplies the power and the video signal to the Automatic Iris Lens. The video signal controls the iris with the servo control circuit in the Automatic Iris Lens.

10 Sync Selector Switch [LL-INT]

This switch selects the internal sync mode.

L.L.: Vertical line locked random interlace mode.

INT: 2:1 interlace mode.

This switch has been factory-preset to the L.L. position. If the 2:1 interlace is required, this switch should be set to the INT position.

CONNECTIONS

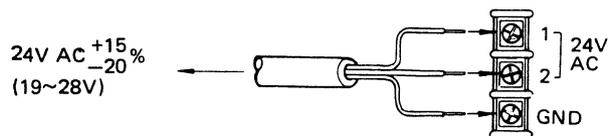
Power Cable

A. WV-1410/WV-1464

1. Keep the camera Power Switched OFF during installation.
2. Connect the AC Power Cord ⑦ to a grounded electrical outlet.

B. WV-1414/WV-1464

1. Keep the camera POWER switched OFF during the installation.
2. A power supply of 24V AC is required.
3. Connect the power cable to the 24V AC Power Terminal Strip ⑧ on the rear panel of the camera.



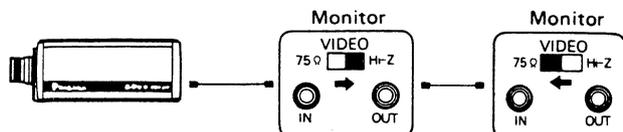
Be careful not to obstruct the operation of Power ON/OFF Switch ⑥

Recommended wire gauge sizes for 24V AC 1line

Copper wire size (AWG)		# 24 (0.22mm ²)	# 22 (0.33mm ²)	# 20 (0.52mm ²)	# 18 (0.83mm ²)
Length of Cable (Approx)	WV-1414E,F 1414N/C	75m	105m	165m	270m
	WV-1464E,F 1464N/C	65m	95m	150m	245m
	WV-1414N	60m	85m	135m	225m
	WV-1464N	55m	80m	125m	205m

Video Cable

1. Use a video monitor whose resolution is at least equal to the camera's.
2. Terminate the camera output in a 75Ω resistor at the furthest end of its cable run.
 - A. Use 75Ω coaxial cable. (RG-59, RG-59B/U, RG-59/U, RG-6/U or RG-11/U)
 - B. Always set the last monitor's termination switch to 75Ω, and set the termination switches of intermediate monitors to HIGH (Hi-Z).



3. Wiring Precautions:

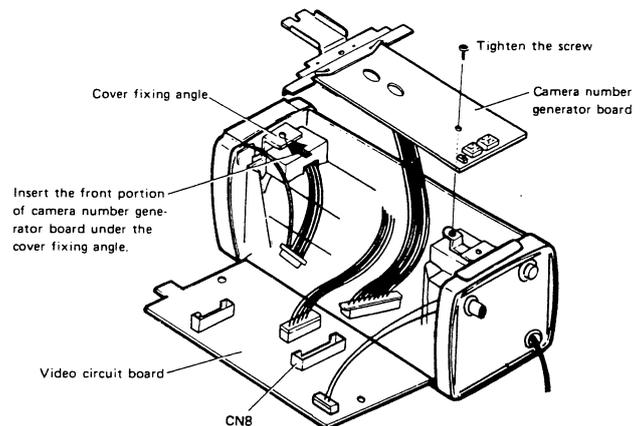
- Do not bend coaxial cable into a curve whose radius is smaller than 10 times its diameter.
- Never staple the cable — not even with circular staples. Mismatching will occur.
- Never crush or pinch the cable.

All these will change the impedance of the cable and cause poor picture quality.

INSTALLATION AND SETTING UP/ADJUSTMENT OF CAMERA NUMBER GENERATOR BOARD WV-Q90

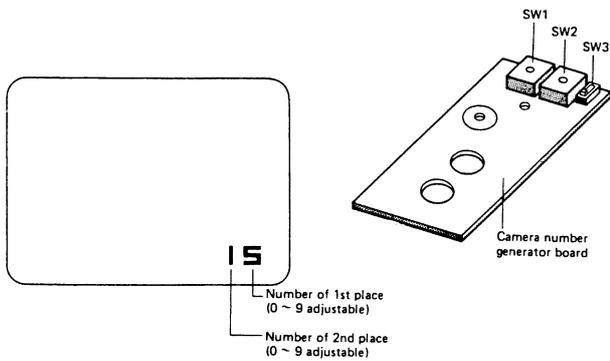
Installation

1. Remove two screws fixing the cover of WV-1410, WV-1414, WV-1460 and WV-1464 cameras and remove the cover.
2. Remove two screws fixing the video circuit board and open the circuit board.
3. Connect the 10 pin connector from the camera number generator board to the connector CN8 on the video circuit board and fix the video circuit board with two screws.
4. Install the camera number generator board onto the camera with one screw (attached to the camera number generator board).
5. Mount the cover after completing the setting up/adjustment.



Setting Up/Adjustment

1. Connect the camera and the video monitor with a coaxial cable, and turn ON the power switches.
2. While observing the video monitor, rotate two camera number setting switches (SW1, SW2) on the camera number generator for desired number. If the number of 2nd place is unnecessary, set the 2nd place ON/OFF switch (SW3) to the OFF position.
3. After setting the camera number, mount the cover.



FIELD ADJUSTMENT

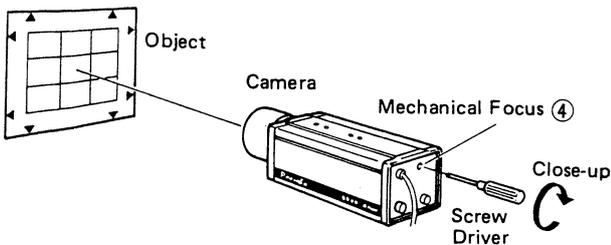
1. Mechanical Focus [MECH, FOCUS] ④

The camera will focus from about 20.5 inches (52cm) to infinity with the f1.6 16mm lens (WV-1410/WV-1414/WV-1460/WV-1464: not supplied) and with the pick-up tube in its factory set position.

For a fixed focal lens, extreme closeups can be made, and non-standard lenses can be used easily by changing the pick-up tube position with a screw adjustment at the back of the camera.

For a zoom lens, this mechanical focus control is adjusted as:

- (1) Set zoom lens at Tele position
- (2) Adjust the focus ring on the lens for best focus.
- (3) Set zoom lens at Wide position.
- (4) Adjust the mechanical focus control on the rear of the camera for best focus.
- (5) Zoom in again and adjust the focus ring on the lens for best focus.
- (6) Zoom out again and adjust the mechanical focus control on the rear of the camera for best focus.
- (7) Repeat the process (1) – (6) until the focus tracks the zoom range of the lens.



2. Focus Control

Turn the Control slowly until picture on monitr is shapest.

ADJUSTMENT

1. TEST EQUIPMENT

The following test equipment is required for adjustment of WV-1410 series TV cameras.

- Oscilloscope
- Digital voltmeter (DVM)
- Underscanned video monitor
- Lens

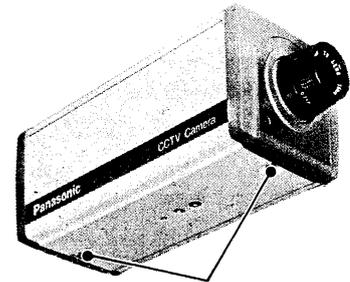
For WV-1410/WV-1414: f1.6, 16mm C-mount lens

For WV-1460/WV-1464: Panasonic WV-LA16A (f1.4 16mm, automatic iris, C-mount) or equivalent

- Resolution chart (YWV1400RB99)

2. DISASSEMBLING FOR ADJUSTMENT

- Remove two screws fixing the cover and remove the cover. (Fig. 1).



Remove two screws.

Fig. 1

3. PICK-UP TUBE REPLACEMENT

- Disassemble the camera referring to "2. DISASSEMBLING FOR ADJUSTMENT" on page 4.
- Remove the lens.
- Loosen the pick-up tube holding screw. (Fig. 2)

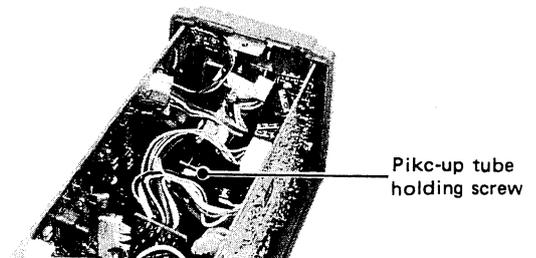


Fig. 2

- Push the pick-up tube out (in the direction of the lens).
- Insert the new pick-up tube (WV-1410/WV-1414: Vidicon 20PE13A WV-1460/WV-1464: Newwicon S4075) into the deflection coil and push it completely until it stops.

Steps denoted by shaded outlines do not have to be performed if only pick-up tube is replaced.

- Note:**
1. When inserting the vidicon in place, be careful not to expose the target directly to bright light.
 2. Before inserting the Newwicon, note the value of target voltage E_{sj} stamped on the Newwicon neck (Fig. 3). The value of E_{sj} will be used for the target voltage adjustment.

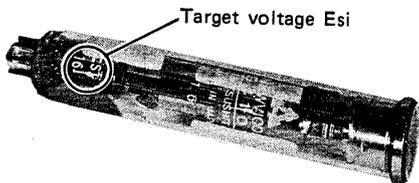


Fig. 3

3. Make sure that the blank-pin portion of pick-up tube positions on the right (viewed from the rear). (Fig. 4)

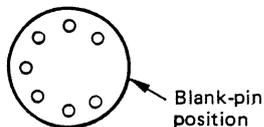


Fig. 4

- Tighten the pick-up tube holding screw (Fig. 2) to secure the pick-up tube in place.
- Clean the faceplate of pick-up tube with the lens cleaning tissue or cloth.
- Mount the lens.

4. SETTING UP FOR ADJUSTMENT

■ **Connection**

- Connect the coaxial cable between the camera and the video monitor.
- Terminate the video input of monitor with 75 ohms.
- Position the resolution chart (YWV1400RB99) in front of the camera as shown in Fig. 5.

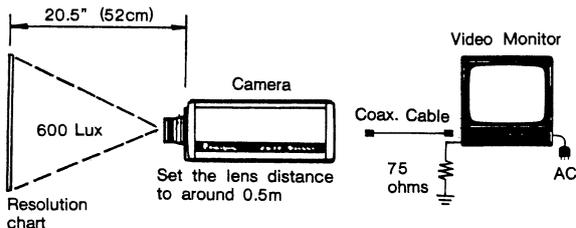


Fig. 5

■ **Position of switches on the camera**

- Set the switches on the camera as follows; (Refer to page 7 for the switches.)
Sync Selector Switch (SW401) INT position

5. ADJUSTMENT PROCEDURE

- Refer to page 7 for the position of test points and adjusting controls.

(a) **H. frequency adjustment**

Test point:	TP4	Video Board
Adjust:	L401 (H. FREQ.)	Video Board

- Connect the DVM probe to TP4.
- Adjust H. FREQUENCY L401 for $2.5V \pm 0.1V$

(b) **Target voltage adjustment for Newwicon – Models WV-1460/WV-1464**

Test point:	TP3	Power Board
Adjust:	VR202 (TARGET)	Power Board

- Connect the DVM probe to TP3.
- Adjust TARGET VR202 so that the voltage at TP3 is equal to the E_{sj} value stamped on the Newwicon neck. (Fig. 6)

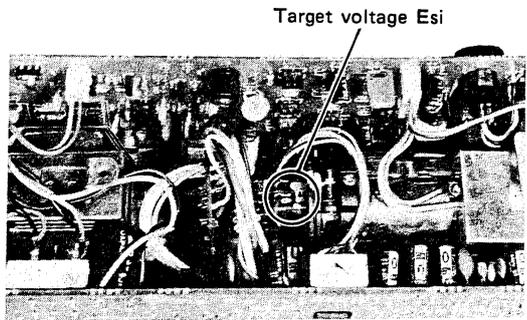


Fig. 6

(c) **Beam and focus coarse adjustment**

Adjusts:	VR201 (BEAM)	Power Board
	VR101 (FOCUS)	Power Board

- Turn BEAM-VR201 fully counterclockwise.
- Then turn it back slowly and stop it at a point where the picture just appears.
- Adjust FOCUS VR101 for best resolution.

(d) **Beam alignment adjustment**

Adjusts:	VR101 (FOCUS)	Power Board
	Alignment magnets	Coil Assembly

- While turning FOCUS VR101 clockwise and counterclockwise, rotate the alignment magnets (Fig. 7) so that the picture appears rotating around the center. In other words, as the picture goes in and out of focus, the center of picture will not move.
- After completing the above adjustment, adjust FOCUS VR101 for best resolution.

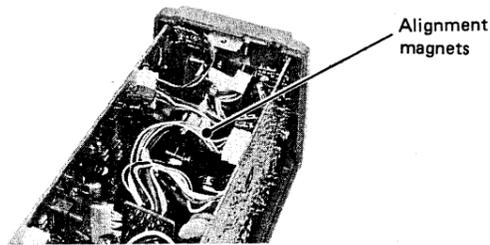


Fig. 7

(e) Mechanical focus adjustment

Adjust: Mechanical focus control Rear Panel control

- Aim the camera at a object further than 10m (33ft).
Note: Lower the light level for the Newvicon model WV-1460/WV-1464 so that the lens iris opens fully in order to have minimum depth of focus.
- Set the lens focus ring to the infinity (∞) position.
- Adjust MECHANICAL FOCUS control on the rear of camera for the best focus.

(f) Picture tilt adjustment

Adjust: Coil assembly

- Make sure that the camera is level with the chart.
- Loosen one deflection coil holding screws. (Fig. 8)
- Turn the deflection coil so that the image is straight.
- Tighten the deflection coil holding screw. (Fig. 8)

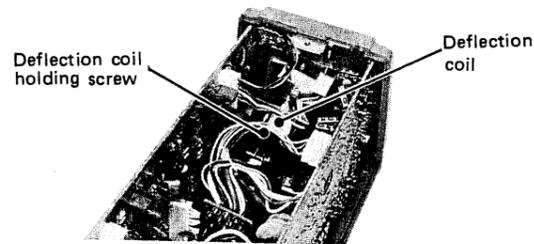


Fig. 8

(g) H. size and V. size adjustment

Adjusts: VR301 (H. SIZE) Power Board
VR302 (V. SIZE) Power Board

Steps denoted by shaded outlines do not have to be performed if only pick-up tube is replaced.

- Set the distance between the camera and chart to 20.5 inch (52cm) as shown in Fig. 5.
- Adjust H. SIZE VR301 and V. SIZE VR302 so that the reference arrow heads in the resolution chart line up with the edge of the raster on the underscanned monitor. (Fig. 9)

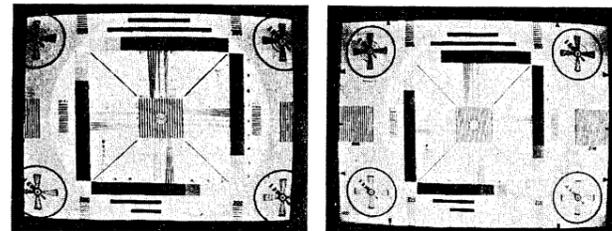


Fig. 9

(h) Target voltage adjustment for Vidicon – Models WV-1410/WV-1414

Test point: TP2 Video Board
Adjust: VR202 (TARGET) Power Board

- Connect the oscilloscope to TP2.
- Adjust TARGET VR202 so that the video signal level is $0.7 \pm 0.02_{-0.05}$ Vp-p. (Fig. 10)

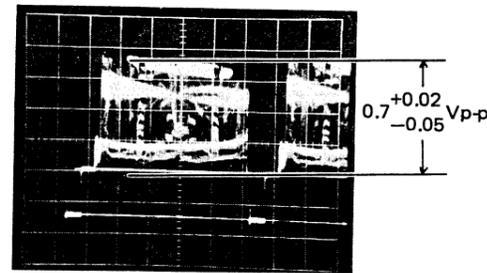


Fig. 10

(i) Beam adjustment

Test point: TP2 Video Board
Adjust: VR201 (BEAM) Power Board

- Connect the oscilloscope to TP2.
- Aim the camera at the scene which contains small lamps of fluorescent lamp.
- Turn BEAM VR201 so that the signal level is 1 ± 0.05 Vp-p. (Fig 11)

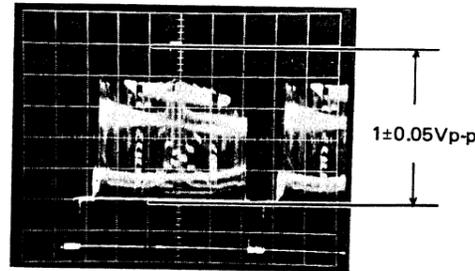


Fig. 11

(j) Focus adjustment

Adjust: VR101 (FOCUS) Power Board

- Adjust FOCUS VR101 for best resolution.

(k) Line-lock vertical phase adjustment

Test points: TP2 Video Board
Power line
Adjust: VR401 (V. PHASE) Video Board

Steps denoted by shaded outlines do not have to be performed if only pick-up tube is replaced.

- Set the sync selector switch SW401 to the LL (line) position.
- Connect the oscilloscope to the power line and TP2.
- Set the trigger of oscilloscope to the LINE position.
- Adjust V. PHASE VR401 so that the leading edge of sync signal and zero-cross point of power line wave-form are coincident. (Fig. 12)

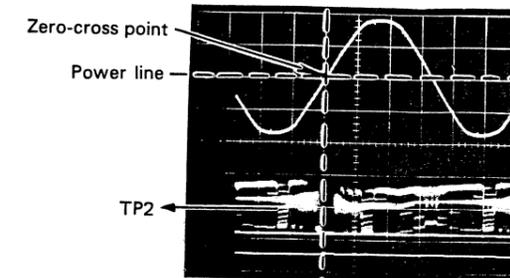
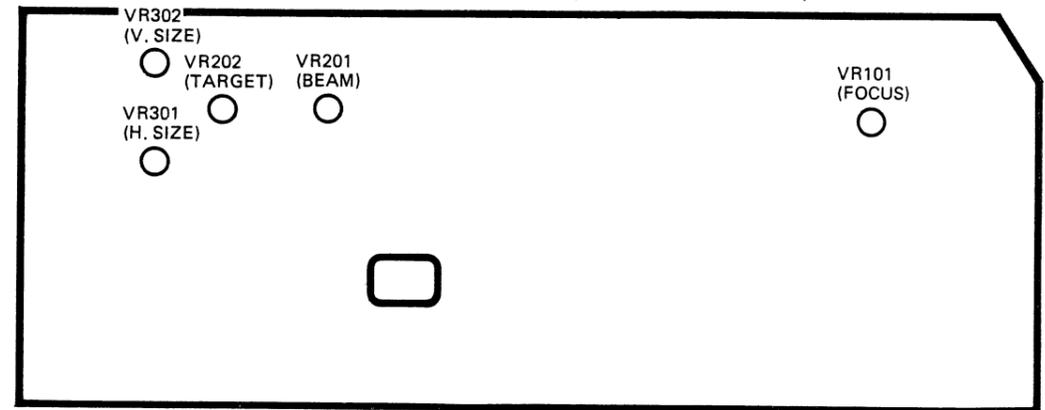


Fig. 12

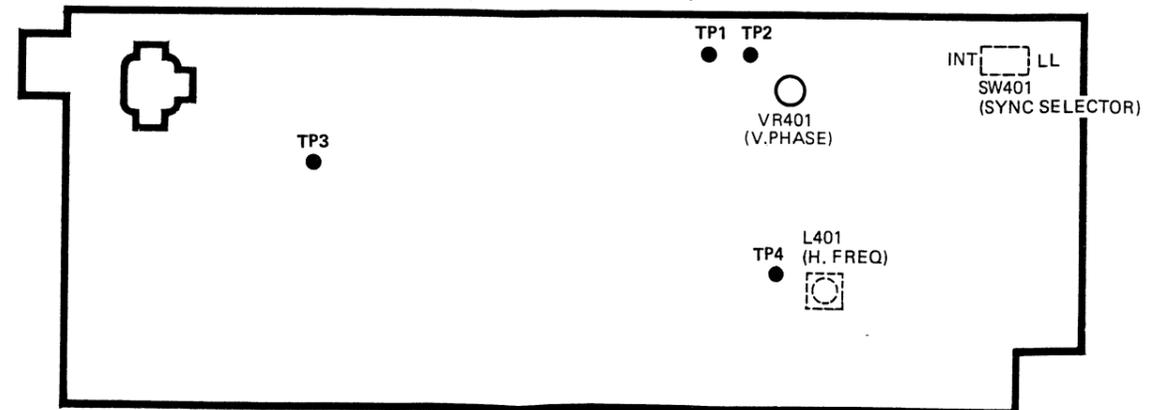
LOCATION OF TEST POINTS AND ADJUSTING CONTROLS

– View from conductor side –

POWER SUPPLY/DEFLECTION BOARD (POWER BOARD)

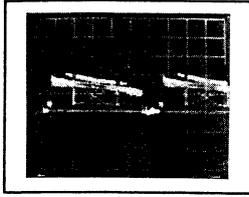


VIDEO AMPLIFIER BOARD (VIDEO BOARD)

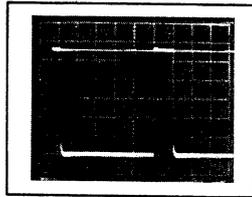


SIGNAL WAVEFORMS

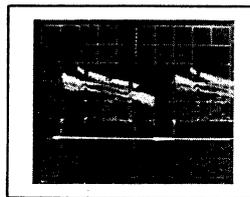
1 0.05V/DIV, 10 μ S/DIV



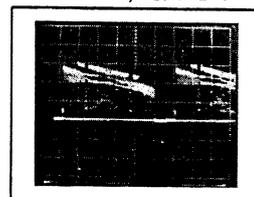
2 0.5V/DIV, 10 μ S/DIV



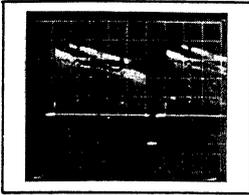
3 0.5V/DIV, 10 μ S/DIV



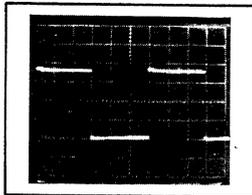
4 0.5V/DIV, 10 μ S/DIV



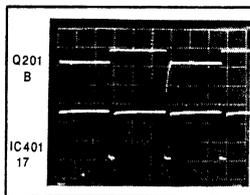
5 0.2V/DIV, 10 μ S/DIV



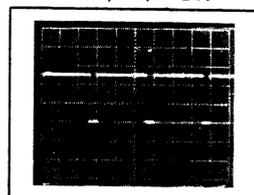
6 1V/DIV, 20 μ S/DIV



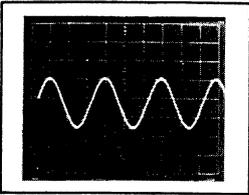
7 2V/DIV, 20 μ S/DIV



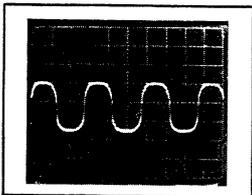
8 2V/DIV, 20 μ S/DIV



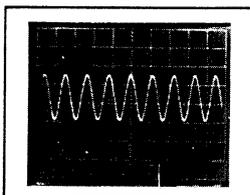
9 0.5V/DIV, 10 μ S/DIV



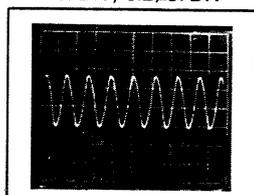
10 2V/DIV, 10 μ S/DIV



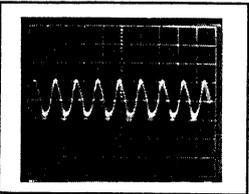
11 0.5V/DIV, 0.2 μ S/DIV



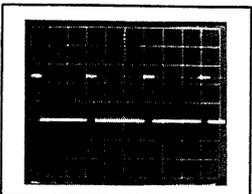
12 1V/DIV, 0.2 μ S/DIV



13 0.01V/DIV, 0.2 μ S/DIV



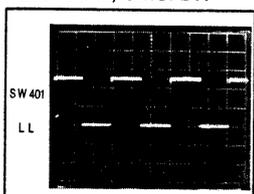
14 2V/DIV, 20 μ S/DIV



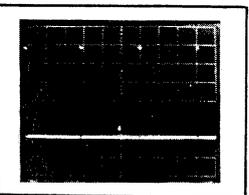
15 2V/DIV, 20 μ S/DIV



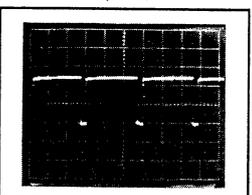
16 2V/DIV, 5ms/DIV



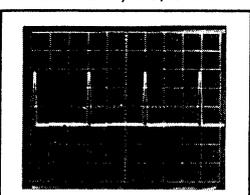
17 1V/DIV, 5ms/DIV



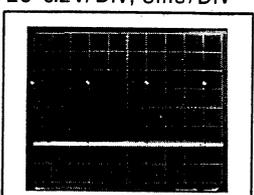
18 2V/DIV, 20 μ S/DIV



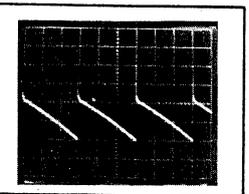
19 50V/DIV, 20 μ S/DIV



20 0.2V/DIV, 5ms/DIV



21 2V/DIV, 5ms/DIV



POWER SUPPLY/DEFLECTION

VIDEO AMPLIFIER

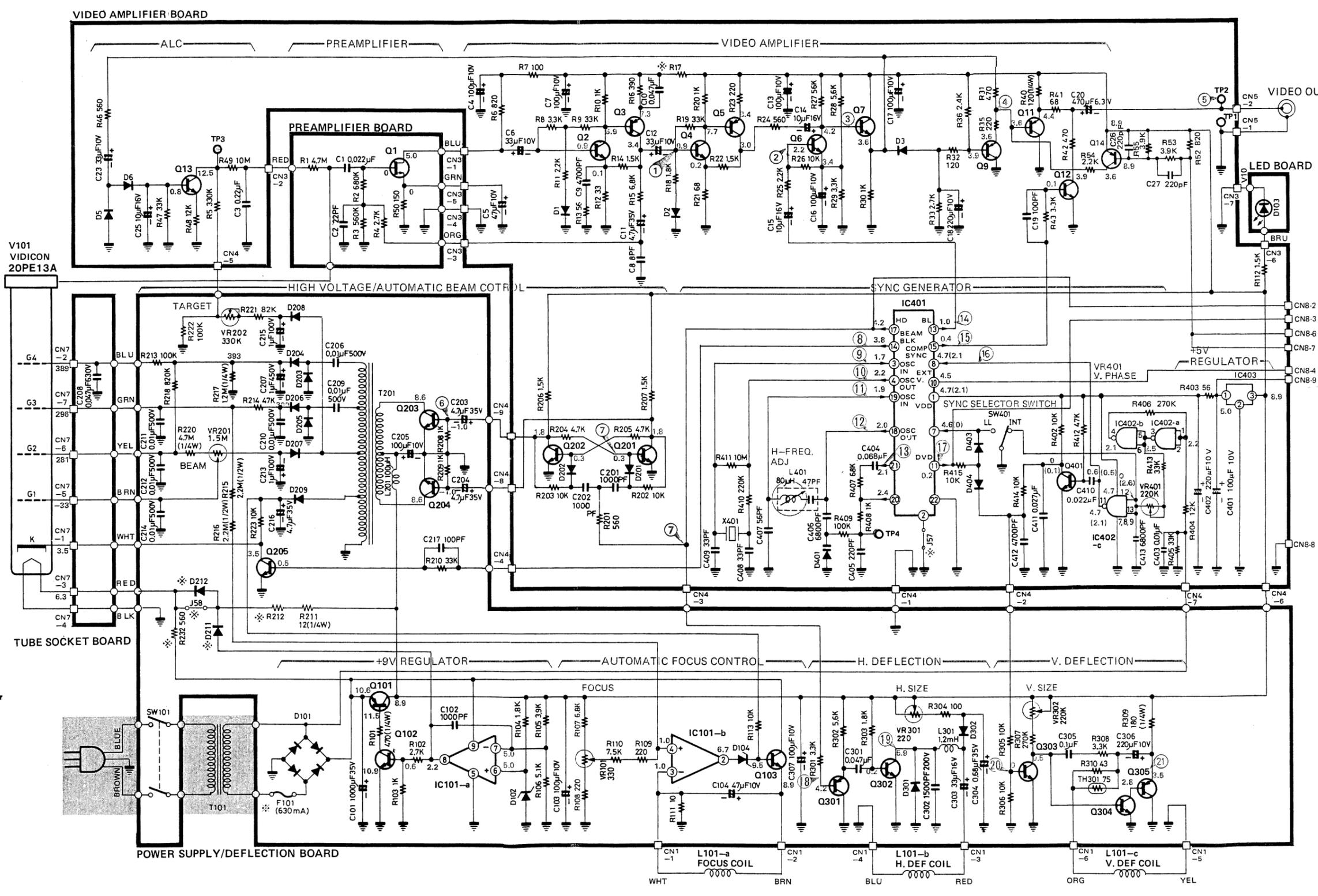
	* F101	* D211	* D212	* R212	* R232	* J58	* R17	* J57
WV-1410N WV-1414N	NOT USED	NOT USED	NOT USED	15	NOT USED	USED	56	NOT USED
WV-1410, F WV-1414E, F	USED	USED	USED	10	USED	NOT USED	100	USED

PRODUCT SAFETY NOTE

The shaded area on this schematic diagram incorporates special features important for protection from X-Radiation, fire and electrical shock hazards. When servicing it is essential that only manufacturer's specified parts be used for the critical components in the shaded areas of the schematic.

SCHEMATIC DIAGRAM OF WV-1410/WV-1414

- | | | | |
|---|---------|-------------|----|
| D | IC101-a | AN-6551 | A3 |
| | IC101-b | AN-6551 | A4 |
| | IC401 | YW5C6433 | B4 |
| | IC402 | HD14011BP | B5 |
| | IC403 | YWNJM78L05A | B6 |
| | Q1 | 2SK218-QR | C3 |
| | Q2 | 2SC2377-CD | C3 |
| | Q3 | 2SA838-CD | C3 |
| | Q4 | 2SC2377-CD | C4 |
| | Q5 | 2SA838-CD | C4 |
| | Q6 | 2SC2377-CD | C4 |
| | Q7 | 2SD636-RS | C4 |
| | Q9 | 2SB641-RS | C5 |
| | Q11 | 2SB641-RS | C5 |
| | Q12 | 2SC2377-CD | C5 |
| | Q13 | 2SD958-RST | C2 |
| | Q14 | 2SB641-RS | C5 |
| | Q101 | 2SA963-OR | A3 |
| | Q102 | 2SD636-RS | A3 |
| | Q103 | 2SC1568-RST | A4 |
| | Q201 | 2SD636-RS | B4 |
| | Q202 | 2SD636-RS | B3 |
| | Q203 | 2SD638-RS | B3 |
| | C204 | 2SD638-RS | B3 |
| | Q205 | 2SD637-RS | B2 |
| | Q301 | 2SB641-RS | A4 |
| | Q302 | 2SC2590-OR | A5 |
| | Q303 | 2SD636-RS | A5 |
| | Q304 | 2SD661-TU | A5 |
| | Q305 | 2SB641-RS | A5 |
| | Q401 | 2SD636-RS | B6 |
-
- | | | | |
|---|------|-------------|----|
| B | D1 | MA150 | C3 |
| | D2 | MA150 | C4 |
| | D3 | MA150 | C4 |
| | D5 | OA91 | C2 |
| | D6 | OA91 | C2 |
| | D101 | RB152 | A2 |
| | D102 | RD5.1J | A3 |
| | D103 | LN21RPH | C6 |
| | D104 | YUDYZ-040B | A4 |
| | D201 | MA150 | B3 |
| | D202 | MA150 | B3 |
| | D203 | ES01F | B2 |
| | D204 | ES01F | B2 |
| | D205 | ES01F | B2 |
| | D206 | ES01F | B2 |
| | D207 | ES01F | B2 |
| | D208 | ES01F | B2 |
| | D209 | YUDERB12-01 | B2 |
| | D301 | EU01ZV0 | A4 |
| | D302 | EU01ZV0 | A5 |
| | D401 | YF15V53B | B4 |
| | D403 | MA150 | B5 |
| | D404 | MA150 | B5 |

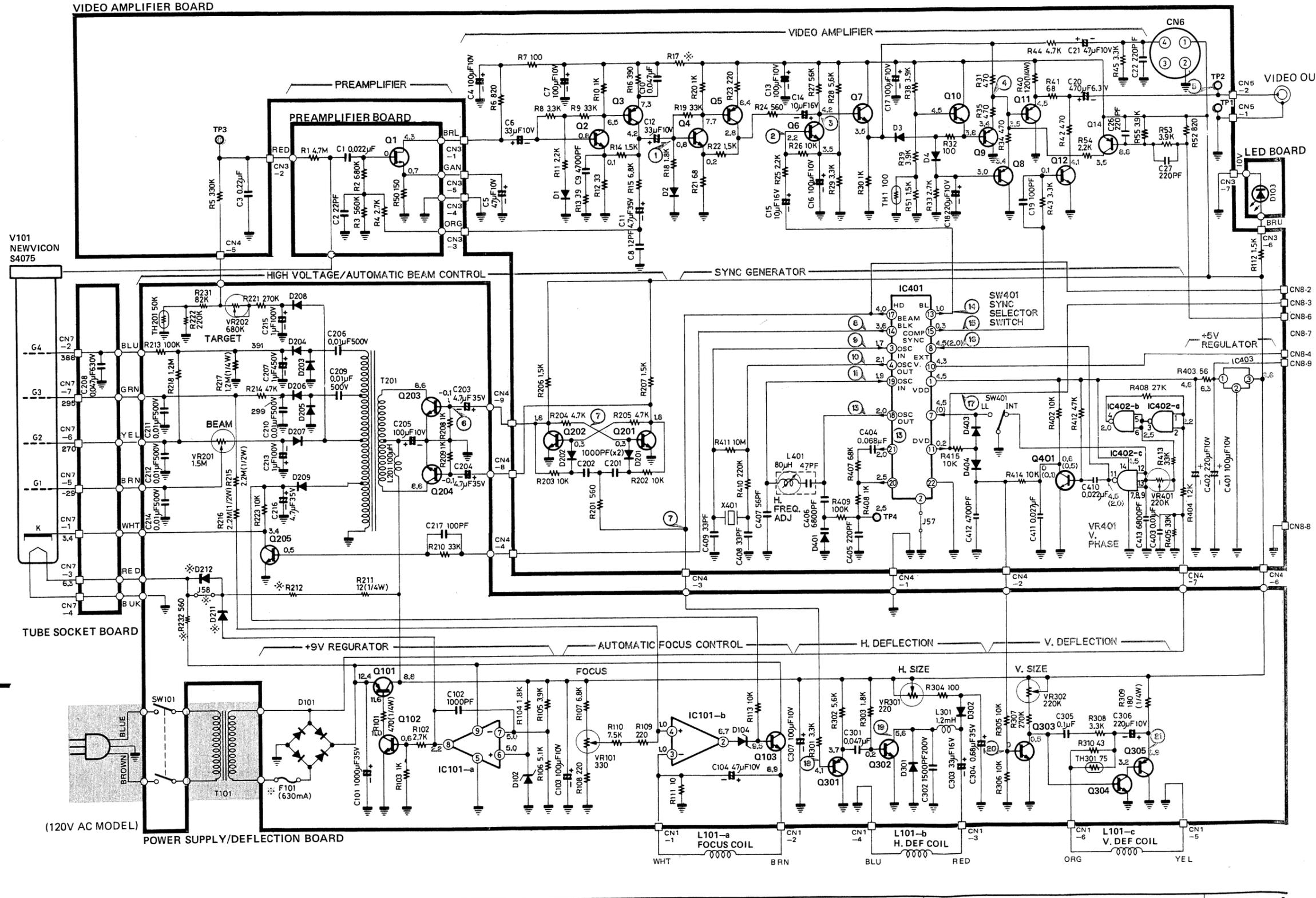


NOTE: () VOLTAGES ARE MEASURED AT LL MODE (SW401).

SCHEMATIC DIAGRAM OF WV-1460/WV-1464

D
C
B
A

IC101-a	AN-6551	A3
IC101-b	AN6551	A4
IC401	YWSC6433	B4
IC402	HD14011BP	B5
IC403	YWNJM78L05A	B6
Q1	2SA218-OR	C3
Q2	2SC2377-CD	C3
Q3	2SA838-CD	C3
Q4	2SC2377-CD	C4
Q5	2SA383-CD	C4
Q6	2SC2377-CD	C4
Q7	2SD636-RS	C4
Q8	2SB641-RS	C5
Q9	2SB641-RS	C5
Q10	2SD636-RS	C5
Q11	2SB641-RS	C5
Q12	2SC2377-CD	C5
Q14	2SB641-RS	C5
Q101	2SA963-OR	A3
Q102	2SD636-RS	A3
Q103	2SC1568-RST	A4
Q201	2SD636-RS	B4
Q202	2SD636-RS	B3
Q203	2SD638-RS	B3
Q204	2SD638-RS	B3
Q205	2SD637-RS	B2
Q301	2SB641-RS	A4
Q302	2SC2590-OR	A4
Q303	2SB641-RS	A5
Q304	2SD661-TU	A5
Q305	2SB641-RS	A5
Q401	2SD636-RS	B5
D1	MA150	C3
D2	MA150	C4
D3	MA150	C4
D4	MA150	C5
D101	RB152	A2
D102	RD5.1J	A3
D103	LN21RPH	C6
D104	YUDYZ-040B	A4
D201	MA150	B3
D202	MA150	B3
D203	ES01F	B2
D204	ES01F	B2
D205	ES01F	B2
D206	ES01F	B2
D207	ES01F	B2
D208	ES02F	C2
D209	YUDERB12-01	B2
D301	EU01ZV0	A4
D302	EU01ZV0	A5
D401	YF1SV53B	B4
D403	MA150	B5
D404	MA150	B5



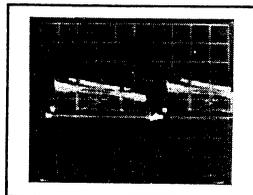
PRODUCT SAFETY NOTE

The shaded area on this schematic diagram incorporates special features important for protection from X-Radiation, fire and electrical shock hazards. When servicing it is essential that only manufacturer's specified parts be used for the critical components in the shaded areas of the schematic.

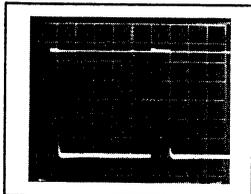
NOTE: () VOLTAGES ARE MEASURED AT LL MODE (SW401).

SIGNAL WAVEFORMS

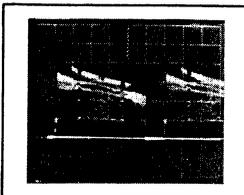
1 0.05V/DIV, 10 μ s/DIV



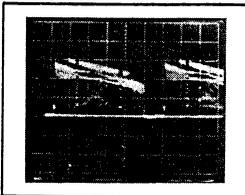
2 0.5V/DIV, 10 μ s/DIV



3 0.5V/DIV, 10 μ s/DIV



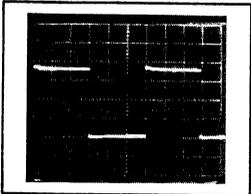
4 0.5V/DIV, 10 μ s/DIV



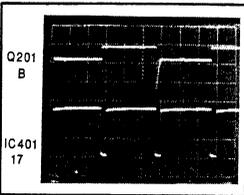
5 0.2V/DIV, 10 μ s/DIV



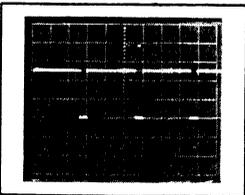
6 1V/DIV, 20 μ s/DIV



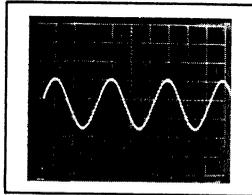
7 2V/DIV, 20 μ s/DIV



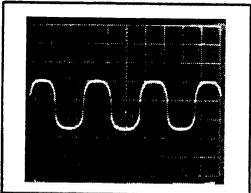
8 2V/DIV, 20 μ s/DIV



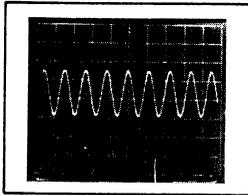
9 0.5V/DIV, 10 μ s/DIV



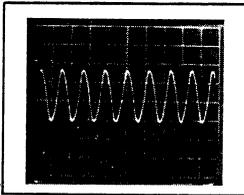
10 2V/DIV, 10 μ s/DIV



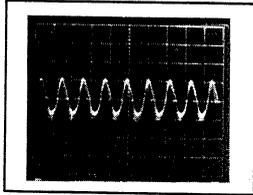
11 0.5V/DIV, 0.2 μ s/DIV



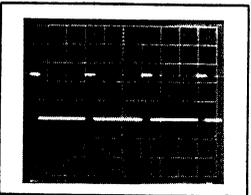
12 1V/DIV, 0.2 μ s/DIV



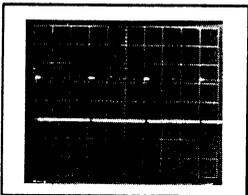
13 0.01V/DIV, 0.2 μ s/DIV



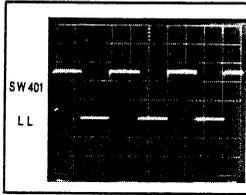
14 2V/DIV, 20 μ s/DIV



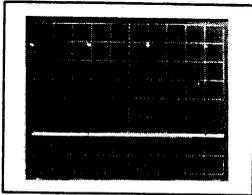
15 2V/DIV, 20 μ s/DIV



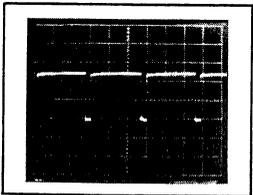
16 2V/DIV, 5ms/DIV



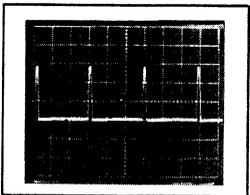
17 1V/DIV, 5ms/DIV



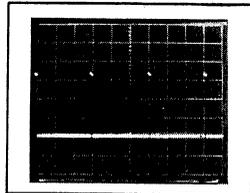
18 2V/DIV, 20 μ s/DIV



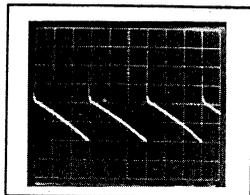
19 50V/DIV, 20 μ s/DIV



20 0.2V/DIV, 5ms/DIV



21 2V/DIV, 5ms/DIV

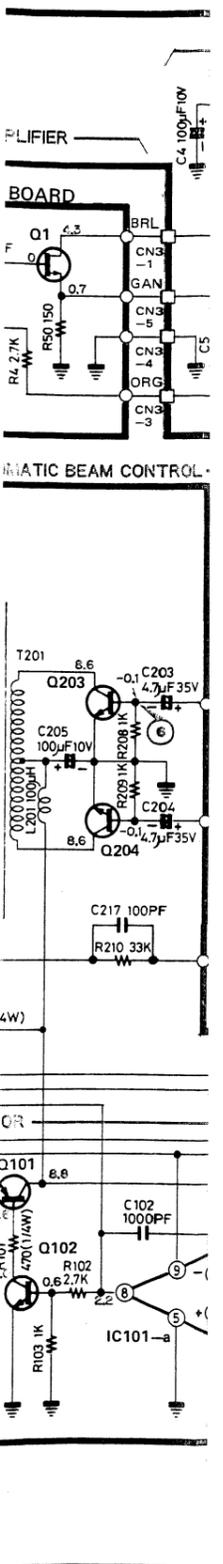


POWER SUPPLY/DEFLECTION

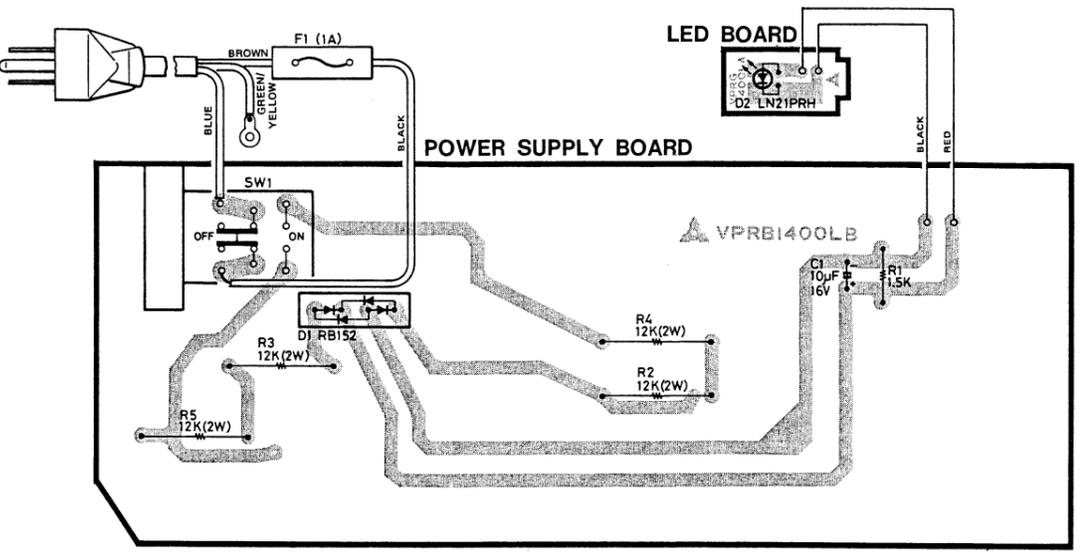
VIDEO AMPLIFIER

	* F101	* D211	* D212	* R212	* R232	* J58	* R17	* J57
WV-1460N WV-1464N	NOT USED	NOT USED	NOT USED	15	NOT USED	USED	56	NOT USED
WV-1460,F WV-1464E,F	USED	USED	USED	10	USED	NOT USED	100	USED

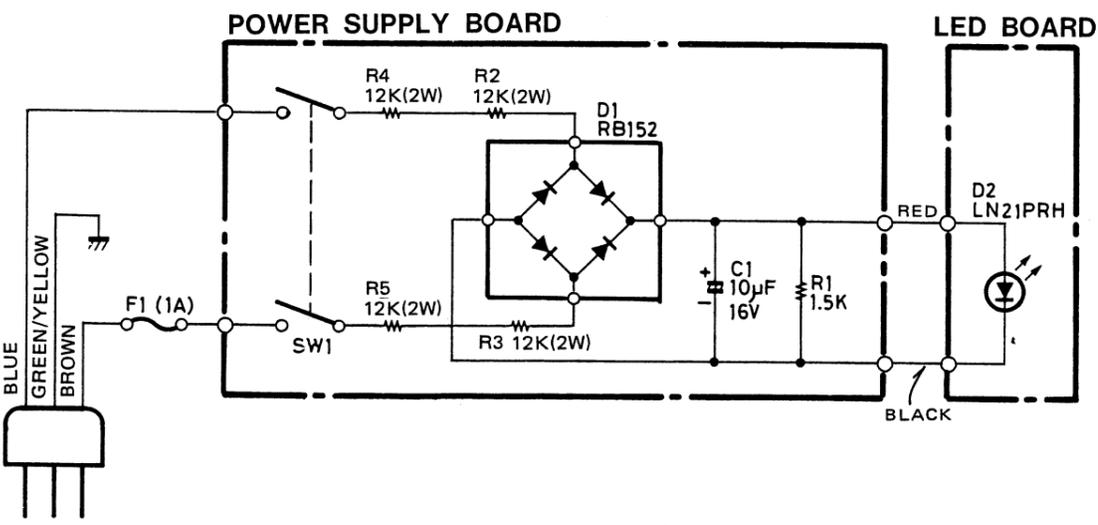
TIC DIAGRAM



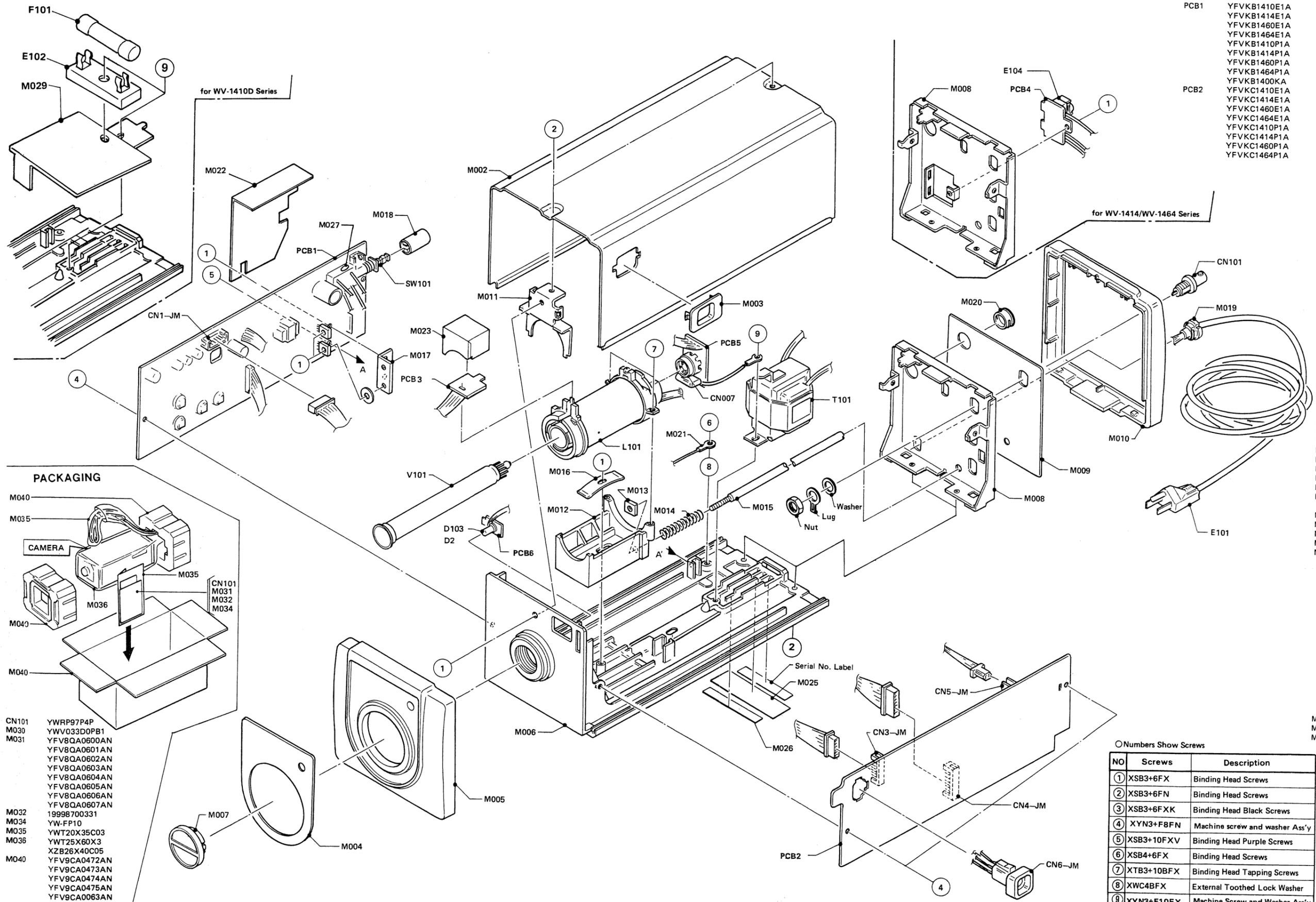
CONDUCTOR VIEW OF WV-1410D



SCHEMATIC DIAGRAM OF WV-1410D



EXPLODED VIEW OF CAMERA



- | | | | |
|-------|---|------|---|
| PCB1 | YFVKB1410E1A
YFVKB1414E1A
YFVKB1460E1A
YFVKB1464E1A
YFVKB1410P1A
YFVKB1414P1A
YFVKB1460P1A
YFVKB1464P1A
YFVKB1400KA
YFVKB1410E1A
YFVKB1414E1A
YFVKB1460E1A
YFVKB1464E1A
YFVKB1410P1A
YFVKB1414P1A
YFVKB1460P1A
YFVKB1464P1A | PCB3 | YFVKD1410E1A
YFVKD1414E1A
YFVKD1460E1A
YFVKD1464E1A
YFVKD1410P1A
YFVKD1414P1A
YFVKD1460P1A
YFVKD1464P1A
YFVKE1414E1A
YFVKE1464E1A
YFVKE1414P1A
YFVKE1464P1A
YFVKF1410P1A
YFVKG1410P1A
20PE13AJL
S-4075 |
| PCB2 | YFVKB1410E1A
YFVKB1414E1A
YFVKB1460E1A
YFVKB1464E1A
YFVKB1410P1A
YFVKB1414P1A
YFVKB1460P1A
YFVKB1464P1A | PCB4 | YFVKE1414E1A
YFVKE1414P1A
YFVKE1464P1A
YFVKE1464P1A
YFVKE1464P1A
YFVKE1464P1A
YFVKE1464P1A
YFVKE1464P1A |
| PCB5 | YFVKB1410E1A
YFVKB1414E1A
YFVKB1460E1A
YFVKB1464E1A
YFVKB1410P1A
YFVKB1414P1A
YFVKB1460P1A
YFVKB1464P1A | PCB6 | YFVKB1410E1A
YFVKB1414E1A
YFVKB1460E1A
YFVKB1464E1A
YFVKB1410P1A
YFVKB1414P1A
YFVKB1460P1A
YFVKB1464P1A |
| V101 | 20PE13AJL
S-4075 | D103 | LN21RPH |
| D2 | LN21RPH | L101 | ELY18A018B |
| T101 | YFPT48E002A
YFPT48X002B
XBA2C063E0A
XBA2C10E0A
YFHBS308A | F101 | YFCE009908FA
YFVM009908A
YFKPGTSA25
YWX-N1153-07
YWBNC-R |
| E101 | YFV5EA0179A2
YFV5EB0179A2
YFV5EC0179A2
YFV5ED0179A2
YFV5EA0179A2
YFV5EB0179A2
YFV5EC0179A2
YFV5ED0179A2 | E102 | YFV5EA0179A2
YFV5EB0179A2
YFV5EC0179A2
YFV5ED0179A2 |
| CN101 | YFV5EA0179A2
YFV5EB0179A2
YFV5EC0179A2
YFV5ED0179A2 | M002 | YFV5EA0179A2
YFV5EB0179A2
YFV5EC0179A2
YFV5ED0179A2 |
| M003 | YFV5EA0179A2
YFV5EB0179A2
YFV5EC0179A2
YFV5ED0179A2 | M004 | YFV5EA0179A2
YFV5EB0179A2
YFV5EC0179A2
YFV5ED0179A2 |
| M005 | YFV5EA0179A2
YFV5EB0179A2
YFV5EC0179A2
YFV5ED0179A2 | M006 | YFV5EA0179A2
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YFV5ED0179A2 |
| M007 | YFV5EA0179A2
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| M009 | YFV5EA0179A2
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YFV5EC0179A2
YFV5ED0179A2 | M010 | YFV5EA0179A2
YFV5EB0179A2
YFV5EC0179A2
YFV5ED0179A2 |
| M011 | YFV5EA0179A2
YFV5EB0179A2
YFV5EC0179A2
YFV5ED0179A2 | M012 | YFV5EA0179A2
YFV5EB0179A2
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| M013 | YFV5EA0179A2
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YFV5ED0179A2 |
| M015 | YFV5EA0179A2
YFV5EB0179A2
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YFV5ED0179A2 | M016 | YFV5EA0179A2
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YFV5ED0179A2 |
| M017 | YFV5EA0179A2
YFV5EB0179A2
YFV5EC0179A2
YFV5ED0179A2 | M018 | YFV5EA0179A2
YFV5EB0179A2
YFV5EC0179A2
YFV5ED0179A2 |
| M019 | YFV5EA0179A2
YFV5EB0179A2
YFV5EC0179A2
YFV5ED0179A2 | M020 | YFV5EA0179A2
YFV5EB0179A2
YFV5EC0179A2
YFV5ED0179A2 |
| M021 | YFV5EA0179A2
YFV5EB0179A2
YFV5EC0179A2
YFV5ED0179A2 | M022 | YFV5EA0179A2
YFV5EB0179A2
YFV5EC0179A2
YFV5ED0179A2 |
| M023 | YFV5EA0179A2
YFV5EB0179A2
YFV5EC0179A2
YFV5ED0179A2 | M025 | YFV5EA0179A2
YFV5EB0179A2
YFV5EC0179A2
YFV5ED0179A2 |
| M026 | YFV5EA0179A2
YFV5EB0179A2
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YFV5ED0179A2 | M027 | YFV5EA0179A2
YFV5EB0179A2
YFV5EC0179A2
YFV5ED0179A2 |
| M029 | YFV5EA0179A2
YFV5EB0179A2
YFV5EC0179A2
YFV5ED0179A2 | M029 | YFV5EA0179A2
YFV5EB0179A2
YFV5EC0179A2
YFV5ED0179A2 |

- PACKAGING**
- M040
- M035
- CAMERA
- M036
- M035
- CN101
- M031
- M032
- M034
- M040
- M040
- M040
- CN101
- M030
- M031
- M032
- M034
- M032
- M034
- M035
- M036
- M040
- YWRP97P4P
- YVW033D0PB1
- YFV8QA0600AN
- YFV8QA0601AN
- YFV8QA0602AN
- YFV8QA0603AN
- YFV8QA0604AN
- YFV8QA0605AN
- YFV8QA0606AN
- YFV8QA0607AN
- 19998700331
- YV-FP10
- YWT20X35C03
- YWT25X60X3
- XZB26X40C05
- YFV9CA0472AN
- YFV9CA0473AN
- YFV9CA0474AN
- YFV9CA0475AN
- YFV9CA0063AN

○ Numbers Show Screws

NO	Screws	Description
①	XSB3+6FX	Binding Head Screws
②	XSB3+6FN	Binding Head Screws
③	XSB3+6FXK	Binding Head Black Screws
④	XYN3+F8FN	Machine screw and washer Ass'y
⑤	XSB3+10FXV	Binding Head Purple Screws
⑥	XSB4+6FX	Binding Head Screws
⑦	XTB3+10BFX	Binding Head Tapping Screws
⑧	XWC4BFX	External Toothed Lock Washer
⑨	XYN3+F10FX	Machine Screw and Washer Ass'y

SYM-BOL NO.	PART NO.	DESCRIPTION	SYM-BOL NO.	PART NO.	DESCRIPTION
C217	ECCR1H101J	Ceramic 100pF 50V	Q14	2SB641-RS	Transistor
C301	ECQM1H473K	Polyestor 0.047μF 50V	Q201,202	2SD636-RS	Transistor
C302	ECQM2152KZW	Polyestor 0.0015μF 200V	Q401	2SD636-RS	Transistor
C303	ECSF1CE336	Tantalum 33μF 16V	D1~3	MA150	Diode
C304	ECSF1VE684	Tantalum 0.68μF 35V	D4	MA150	Diode for WV-1460/WV-1464 Series
C305	ECQV05104JZ	Metal 0.1μF 50V	D5,6	0A91A	Diode for WV-1410/WV-1414 Series
C306	ECEA1ASS221	Electrolytic 220μF 10V	D201,202	MA150	Diode
C307	ELEA1ASS101	Electrolytic 100μF 10V	D401	1SV53B	Diode
L201	YFELEH101KA	Inductor 100μH	D403,404	MA150	Diode
L301	YWL8122J	Inductor 1.2mH	X401	YWBWVHS3125K	Crystal Oscillator
T201	YFHVT2H3022	Converter Transformer			
SW1	△ YW1P31AC202A	Power Push Switch for WV-1410D Series	TH1	PTH60BM101M	Thermistor for WV-1460/WV-1464
SW101	△ YW1P31AC202A	Power Push Switch	R5	ERD10TJ334	Carbon 330KΩ 1/8W
E1	YWSN5053	Fuse Holder	R6	ERD10TJ821	Carbon 820Ω 1/8W
CN1-JM	EMCS0652M	6 pin Jack Male	R7	ERD10TJ101	Carbon 100Ω 1/8W
M017	YFV7DA0001A4	Heat Sink	R8	ERD10TJ332	Carbon 3.3KΩ 1/8W
M018	YWK470-HR02	Knob	R9	ERD10TJ333	Carbon 33KΩ 1/8W
M022	*YFV2PA0043A4	Insulator Paper	R10	ERD10TJ102	Carbon 1KΩ 1/8W
YFVKC1410E1A for WV-1410/BCG, WV-1410F, WV-1410N/AC YFVKC1414E1A for WV-1414E, WV-1414F, WV-1414NC YFVKC1460E1A for WV-1460/BCG, WV-1460F, WV-1460N/AC YFVKC1464E1A for WV-1464E, WV-1464F, WV-1464NC YFVKC1410P1A for WV-1410N YFVKC1414P1A for WV-1414N YFVKC1460P1A for WV-1460N YFVKC1464P1A for WV-1464N VIDEO AMPLIFIER BOARD			R14	ERD10TJ152	Carbon 1.5KΩ 1/8W
			R15	ERD10TJ682	Carbon 6.8KΩ 1/8W
			R16	ERD10TJ391	Carbon 390Ω 1/8W
			R17	ERD10TJ101	Carbon 100Ω 1/8W
			PCB2	*YFVKC1410E1A	Printed Circuit Board Ass'y
	*YFVKC1414E1A	Printed Circuit Board Ass'y	R19	ERD10TJ333	Carbon 33KΩ 1/8W
	*YFVKC1460E1A	Printed Circuit Board Ass'y	R20	ERD10TJ102	Carbon 1KΩ 1/8W
	*YFVKC1464E1A	Printed Circuit Board Ass'y	R21	ERD10TJ680	Carbon 68Ω 1/8W
	YFVKC1410P1A	Printed Circuit Board Ass'y	R22	ERD10TJ152	Carbon 1.5KΩ 1/8W
	YFVKC1414P1A	Printed Circuit Board Ass'y	R23	ERD10TJ221	Carbon 220Ω 1/8W
	YFVKC1460P1A	Printed Circuit Board Ass'y	R24	ERD10TJ561	Carbon 560Ω 1/8W
	YFVKC1464P1A	Printed Circuit Board Ass'y	R25	ERD10TJ222	Carbon 2.2KΩ 1/8W
IC401	YWSC6433	Integrated Circuit	R26	ERD10TJ103	Carbon 10KΩ 1/8W
IC402	YWHD14011BP	Integrated Circuit	R27	ERD10TJ563	Carbon 56KΩ 1/8W
IC403	YWNJM78L05A	Integrated Circuit	R28	ERO25CKF5601	Metal 5.6KΩ 1/8W
Q2	2SC2377-CD	Transistor	R29	ERO25CKF3301	Metal 3.3KΩ 1/8W
Q3	2SA838-CD	Transistor	R30	ERD10TJ102	Carbon 1KΩ 1/8W
Q4	2SC2377-CD	Transistor	R31	ERD10TJ471	Carbon 470Ω 1/8W
Q5	2SA838-CD	Transistor	R32	ERD10TJ121	Carbon 120Ω 1/8W
Q6	2SC2377-CD	Transistor		ERD10TJ101	Carbon 100Ω 1/8W
Q7	2SD636-RS	Transistor	R33	ERO25CKF2701	Metal 2.7KΩ 1/4W
Q8	2SB641-RS	Transistor for WV-1460/WV-1464 Series	R34	*ERD10TJ471	Carbon 470Ω 1/8W
Q9	2SB641-RS	Transistor		ERD10TJ221	Carbon 220Ω 1/8W
Q10	2SD636-RS	Transistor for WV-1460/WV-1464 Series	R35	ERD10TJ471	Carbon 470Ω 1/8W
Q11	2SB641-RS	Transistor		ERO25CKF2401	Metal 2.4KΩ 1/4W
Q12	2SC2377-CD	Transistor	R36		
Q13	2SD958-RST	Transistor for WV-1410/WV-1414 Series			

MODEL WV-1410 Series

SYM-BOL NO.	PART NO.	DESCRIPTION	SYM-BOL NO.	PART NO.	DESCRIPTION
R38,39	ERO25CKF3901	Metal 3.9KΩ 1/4W for WV-1460/WV-1464 Series	C13	ECEA1ASS101	Electrolytic 100μF 10V
R40	ERD25FJ121	Carbon 120Ω 1/4W	C14,15	ECEA1CSS100	Electrolytic 10μF 16V
R41	ERD10TJ680	Carbon 68Ω 1/8W	C16,17	ECEA1ASS101	Electrolytic 100μF 10V
R42	ERD10TJ471	Carbon 470Ω 1/8W	C18	ECEA1ASS221	Electrolytic 220μF 10V
R43	ERD10TJ332	Carbon 3.3KΩ 1/8W	C19	ECCR1H101J	Ceramic 100pF 50V
R44	ERD10TJ472	Carbon 4.7KΩ 1/8W for WV-1460/WV-1464 Series	C20	ECEA0JSS471E	Electrolytic 470μF 6.3V
R45	ERD10TJ332	Carbon 3.3KΩ 1/8W for WV-1460/WV-1464 Series	C21	ECEA1ASS470E	Electrolytic 47μF 10V for WV-1460/WV-1464 Series
R46	ERD10TJ561	Carbon 560Ω 1/8W for WV-1410/WV-1414 Series	C22	ECKF1H221K	Ceramic 220pF 50V for WV-1460/WV-1464 Series
R47	ERD10TJ333	Carbon 33KΩ 1/8W for WV-1410/WV-1414 Series	C23	ECEA1ASS330	Electrolytic 33μF 10V for WV-1410/WV-1414 Series
R48	ERD10TJ123	Carbon 12KΩ 1/8W for WV-1410/WV-1414 Series	C25	ECEA1CSS100	Electrolytic 10μF 16V for WV-1410/WV-1414 Series
R49	ERC14GK106	Solid 10MΩ 1/4W for WV-1410/WV-1414 Series	C26,27	ECKF1H221K	Ceramic 220pF 50V
R51	ERD10TJ152	Carbon 1.5KΩ 1/8W for WV-1460/WV-1464 Series	C201,202	ECQM1H102KZ	Polyester 0.001μF 50V
R52	ERD10TJ821	Carbon 820Ω 1/8W	C401	ECEA1ASS101	Electrolytic 100μF 10V
R53	ERD10TJ392	Carbon 3.9KΩ 1/8W	C402	ECEA1ASS221	Electrolytic 220μF 10V
R54	ERD10TJ222	Carbon 2.2KΩ 1/8W	C403	ECQM1H103KZ	Polyester 0.01μF 50V
R55	ERD10TJ392	Carbon 3.9KΩ 1/8W	C404	ECQV05683JZ	Metallized Plastic 0.068μF 50V
R112	ERD10TJ152	Carbon 1.5KΩ 1/8W	C405	ECKF1H221K	Ceramic 220pF 50V
R201	ERD10TJ561	Carbon 560Ω 1/8W	C406	ECQM1H682KZ	Polyester 0.0068μF 50V
R202,203	ERD10TJ103	Carbon 10KΩ 1/8W	C407	ECCR1H560J	Ceramic 56pF 50V
R204,205	ERD10TJ472	Carbon 4.7KΩ 1/8W	C408,409	ECCR1H330JC	Ceramic 33pF 50V
R206,207	ERD10TJ152	Carbon 1.5KΩ 1/8W	C410	ECQV05223JZ	Metallized Plastic 0.022μF 50V
R402	ERD10TJ103	Carbon 10KΩ 1/8W	C411	ECQV05273JZ	Metallized Plastic 0.027μF 50V
R403	ERD10TJ560	Carbon 56Ω 1/8W	C412	ECQM1H472KZ	Polyester 0.0047μF 50V
R404	ERD10TJ123	Carbon 12KΩ 1/8W	C413	ECQM1H682KZ	Polyester 0.0068μF 50V
R405	ERD10TJ333	Carbon 33KΩ 1/8W	L401	YF7P7553C	Inductor
R406	ERD10TJ274	Carbon 270KΩ 1/8W	SW401	YWSSS21200	Sync Detector Switch
R407	ERD10TJ683	Carbon 68KΩ 1/8W	CN3-JM	EMCS0852M	8 pin Jack Male
R408	ERD10TJ102	Carbon 1KΩ 1/8W	CN4-JM	EMCS0952M	9 pin Jack Male
R409	ERD10TJ104	Carbon 100KΩ 1/8W	CN5-JM	EMCS0252M	2 pin Jack Male
R410	ERD10TJ224	Carbon 220KΩ 1/8W	CN6-JM	YWRP97R4S	ALC Connector for WV-1460/ WV-1464 Series
R411	ERC14GK106	Solid 10MΩ 1/4W	CN8-JM	EMCS1052M	10 pin Jack Male
R412	ERD10TJ473	Carbon 47KΩ 1/8W	E1 ~ 4	YW32BH7R5	Terminal
R413	ERD10TJ333	Carbon 33KΩ 1/8W	YFVKD1410E1A for WV-1410/BCG, WV-1410F, WV-1410N/AC YFVKD1414E1A for WV-1414E, WV-1414F, WV-1414NC YFVKD1460E1A for WV1460/BCG, WV1460F, WV-1460N/AC YFVKD1464E1A for WV-1464E, WV-1464F, WV-1464NC YFVKD1410P1A for WV-1410N YFVKD1414P1A for WV-1414N YFVKD1460P1A for WV-1460N YFVKD1464P1A for WV-1464N PREAMPLIFIER BOARD		
R414	ERD25FJ103	Carbon 10KΩ 1/4W			
R415	ERD10TJ103	Carbon 10KΩ 1/8W			
VR401	YWSR19R220KB	Variable Resistor 220KΩ			
C3	ECQV05224JZ	Metallized Plastic 0.22μF 50V			
C4	ECEA1ASS101E	Electrolytic 100μF 10V	PCB3	*YFVKD1410E1A	Printed Circuit Board Ass'y
C5	ECEA1ASS470	Electrolytic 47μF 10V		*YFVKD1414E1A	Printed Circuit Board Ass'y
C6	ECEA1ASS330	Electrolytic 33μF 10V		*YFVKD1460E1A	Printed Circuit Board Ass'y
C7	ECEA1ASS101E	Electrolytic 100μF 10V		*YFVKD1464E1A	Printed Circuit Board Ass'y
C8	ECCR1H080D	Ceramic 8pF 50V for WV-1410/WV-1414 Series		YFVKD1410P1A	Printed Circuit Board Ass'y
	ECCR1H120J	Ceramic 12pF 50V for WV-1460/WV-1464 Series		YFVKD1414P1A	Printed Circuit Board Ass'y
C9	ECQM1H472KZ	Polyester 0.0047μF 50V		YFVKD1460P1A	Printed Circuit Board Ass'y
C10	ECQM1H473KZ	Polyester 0.047μF 50V		YFVKD1464P1A	Printed Circuit Board Ass'y
C11	ECEA1VSS4R7	Electrolytic 4.7μF 35V			
C12	ECEA1ASS330	Electrolytic 33μF 10V			

SYM-BOL NO.	PART NO.	DESCRIPTION	SYM-BOL NO.	PART NO.	DESCRIPTION
Q1	2SK218-QR	Transistor			
R1	ERD25FJ475	Carbon		*YFV8QA0604AN	Operating Instruction for WV1410N/AC, WV-1414NC
R2	ERD10TJ684	Carbon			
R3	ERD10TJ564	Carbon		*YFV8QA0605AN	Operating Instruction for WV-1460N/AC, WV-1464NC
R4	ERD10TJ272	Carbon			
R50	ERD10TJ151	Carbon		*YFV8QA0606AN	Operating Instruction for WV-1410N, WV-1414N
C1	ECCF1H220JC	Metal		*YFV8QA0607AN	Operating Instruction for WV-1460N WV-1464N
C2	ECCF1H180JC	Ceramic			
M023	YFV2HA0002A4	Shield Case			
YFVKE1414E1A for WV-1414E, WV-1414F, WV-1414NC YFVKE1464E1A for WV-1464E, WV-1464F, WV-1464NC YFVKE1414P1A for WV-1414N YFVKE1464P1A for WV-1464N 24V TERMINAL BOARD			M032	19998700331	Warranty Card for WV-1410/BCG, WV-1460/BCG
			M034	YW-FP10	Lens Paper for WV-1460 Series WV-1464 Series
			M035	YWT20X35C03	Polythylene Bag
			M036	YWT25X60X3	Polythylene Bag for WV-1410 Series' WV-1460 Series
				XZB26X40C05	Polythylene Bag for WV-1414 Series, WV-1464 Series
			M040	YFV9CA0472AN	Packaging for WV-1410/BCG, WV-1414E, WV-1460/BCG, WV-1464/BCG, WV01410D/BCG
PCB4	*YFVKE1414E1A *YFVKE1464E1A YFVKE1414P1A YFVKE1464P1A	Printed Circuit Board Ass'y Printed Circuit Board Ass'y Printed Circuit Board Ass'y Printed Circuit Board Ass'y		YFV9CA0473AN YFV9CA0474AN	Packaging for WV-1410F, Packaging for WV-1414F, WV-1460F, WV-1464F, WV-1410DF
E104	YFS02A3P	Terminal Block 3P		YFV9CA0475AN YFV9CA0063AN	Packaging for WV1410N Packaging for WV-1414N, WV-1460N, WV-1464N, WV-1410N/AC, WV-1414NC, WV-1460N/AC, WV-1464NC
YFVKF 1410P1B TUBE SOCKET BOARD					
PCB5 C208 CN007	YFVKF1410P1B ECQE6473KZ YFS7504B05	Printed Circuit Board Ass'y Metal Tube Socket			
YFVKG1410P1B LED BOARD					
PCB6 D103 D2	YFVKG1410P1B LN21RPH LN21RPH	Printed Circuit Board Ass'y Light Emitting Diode (Red) Light Emitting Diode for WV-1410D Series			
ACCESSORY PARTS/PACKAGING PARTS					
CN101 M030	YWRP97P4P YWV033D0PB1	Lens Counector Dummy Lens for WV-1410D/BCG, WV-1410DF			
M031	*YFV8QA0600AN	Operating Instruction for WV-1410 /BCG, WV-1414E			
	*YFV8QA0601AN	Operating Instruction for WV-1460 /BCG, WV-1464E			
	*YFV8QA0602AN	Operating Instruction for WV-1410F, WV-1414F			
	*YFV8QA0603AN	Operating Instructing for WV-1460F, WV-1464F			