DCM-1458 SERVICE MANUAL

#1 Fault
L403 open - next to DY connector
- no PIX
a vertical line on screen
- remove L403 from PB & resolder wires to leads. - re-install

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DELTA ELECTRONIC IND. CO., LTD. ISSUE NOV 17, 1993 ENG. DEPT. MONITOR

CONFIDENTIAL

Hewitt Pand
Computer Monitor - 1994

Tamanawis
Fleetwood Park
etc.

- Made by Delta Electronics - in Taiwan

DATE: 08/27/'93

b. Unpack the monitor carefully **and do not scratch or strike the picture tube face.**

c. Please read the Section'of installation precaution before connecting the color -monitor to any AC power supply.

2.6 DISASSEMBLY INSTRUCTIONS

This paragraph contains the instructions for disassembly of the plastic enclosures and the subassembly kits.

2.6.1 SWIVEL BASE AND REAR COVER REWOVAL

Before removing the rear cover please read the paragraphs of "Safety Precautions".

1. Turn AC power switch off, then unplug power cord and disconnect signal cable from computer or system unit.

2. Laying the monitor on soft surface to avoid scrape the picture tube face.

3. Lifting the swivel tag up which is marked with " ". And push the swivel base assembly backward (Reverse direction of arrow symbol shown) to remove the swivel base assembly.

2.5.2 REAR COVER REMOVAL

1. Using one minus screw driver to pry hook plate of bottom rear cover to release bottom rear cover from front cabinet. (please refer to page 35)

2. Keeping the bottom rear cover release then pat the top rear cover and hold the rear cover toward release direction at the same time , the rear cover may now be removed from front cabinet.

3. Slide the rear cover backward. and carefully dress the signal cable through the rear cover.

2.6.3 CHASSIS SERVICING POSITION / REMOVAL

The chassis assembly contains main board, metal frame, signal cable, AC inlet, and video board with EMI shield can. For disassembly, -disconnect the following:

1. Two Tapping screws mounting to front bezel (cross-recessed head #2, S type threads, M4~16 Length).

2. PlOl connector (degaussing)--- on main board

3. P401 connector (yoke ass'y)--- on main board

4. D411 connector (LED)--- on main board

5. Using solder iron to take apart CRT ground wire from video board.

5. Anode lead from picture tube.

7. Cut out the wire tie which binds together yoke connector (P401), signal wires (P603), hand V Sync. (P602) and CRT ground wire.

8. Remove silicon rubber between CRT base and CRT socket then **remove** video board with shield can from CRT base.
~ This subassembly may now be removed from the instrument.

9. Using solder iron to take apart braid wire of signal cable and shield can from video board assembly. For video board removal, disconnect the following:

(1) P601 connector (SIGNAL)
(2) P6P602 connector (SYNC.)
(3) P603 connector (BLANK)
(4) P604 connector (POWER SUPPLY)
(5) G2 wire (SCREEH)
(6) Focus wire (FOCUS)
(7) Braid wire connected between video shield and main chassis metal bracket by loosening the screw on the latter. Video board may now be removed from the subassembly.

10. To reassemble, reverse the procedures.

2.6.4 PICTURE TUBE REMOVAL AND REPLACEMENT

Caution: Read the paragraphs of "Safety Precaution" and "Installation Precautions" before removing or replacing picture tube.

1. Laying CRT cabinet front down on a soft surface.

2. Remove 4 Tapping screws with lock washers, one in each corner of picture tube.

3. Lift picture tube up and out carefully.

4. Cut out 4pcs wire tie which binding together picture tube and degaussing coil ass'y to **remove degaussing coil.**

5. To reassemble reverse the procedures.

3. C IRCU IT DESCRIPTION

3.1 VIDEO AMPLIFIER

The video amplifier module is composed of three amplifiers_ for red, green, blue channel.

The video input signal is fed to the video amplifier IC601(Pin4 blue, pin6 red, pin9 green) through AC coupling capacitor.

Transistor Q610, Q612 and Q614 are the final stages of blue, red 2 green video amplifier respectively. Their outputs are fed to the CRT cathodes.

3.1.1 Clamping Pulse

IC601 needs a clamping pulse at pin14 for DC restoration. The positive H sync pulse coming from IC301 pin8 is fed to 0601. Q601 is a invertor amplifier. So the clamping pulse is the negative sync.

3.1.2 Contrast. Gain Control & Bias Control

Contrast is controlled by varying the bias voltage of pin12 of IC601 by using the variable contrast VR4620.

VR601 & VR602 are adjusted for hight light white balance.

VR603, VR604, VR605 are adjusted for low light white balance.

3.1.3 Auto Beam Limit CKT (A. B. L. CKT)

Refer Fig 3.2: Bean current passes through R440. Yhen beam current is over 350uA, Q620 base DC voltage will be low pulling IC601 pin14 DC bias down & reducing the gain of video amplifier.

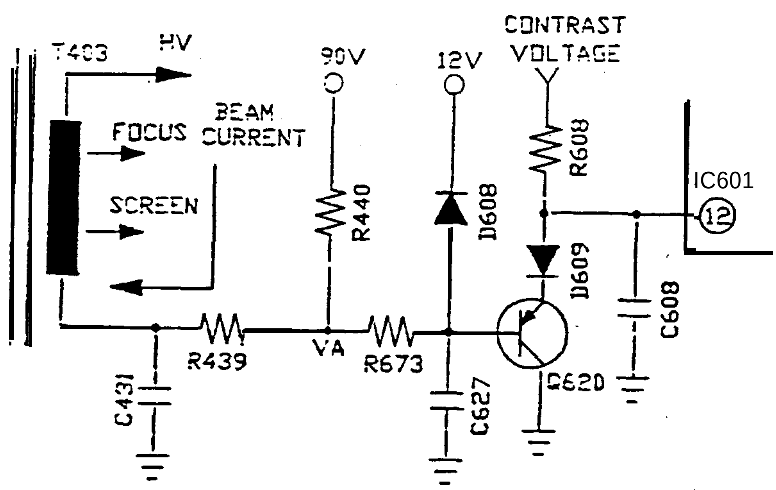


Fig 3. 1ABL CKT

3.1.4 Brightness Control

Erightness is control led by varying the DC voltage of Gl with the variable resistor VR4621.

3.1.5 Blanking CKT

Flrback pulse & vertical O/P pulse are fed to the base of Q414 and Q415. The blanking O/P is coupled to Gl by C637.

3.2 MODE DETECTOR

CM-1458 can be used on VGA, SVGA, 48K(1024x768). 48K(800x 600) & 8514/A. The parameters of these modes are shown as table 3.1.

		H freq (KHZ)	polarity	V freq (HZ)	polarity
VGA	350	31.5	+	70	-
	400		-	70	+
	480			60	-
SVGA	800x600	35.16	•	56	+
8514/A	1024x768	35.52	+	87	+
48K	1024x 768	48.19	+	60	+
48K	800x 600	48.09	+	72	+

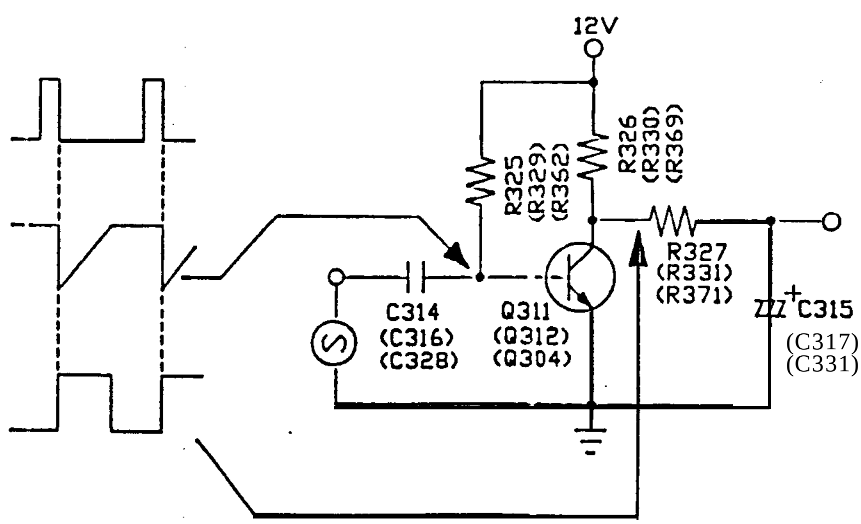
TABLE 3.1

3.2.1 Sync Processing

IC301 74LS86 is an exclusive or gate IC. Pin12 is H sync I/P. Pin1 is V sync I/P. Sync polarity can be detected by integrating the sync. signal through R304/C302 (for H sync.) & R302/C301 (for V sync.). Pin8 & pin6 are positive sync output of H & V sync. respectively.

3.2.2 F/V (Freq. to Voltage Convertor)

Q304/ Q311 & Q312 are H & V freq. to voltage convertors respectively. The waveform of f/V convertor is shown on Fig 3.3. (Q311 for fh=33K, Q304 for fh=43K)



FIG, 3.2 F/V CKT

VR 308 is adjusted to determine the switched H freq=33K.
VR 307 is adjusted to determine the switched H freq=43K.

3.2.3 Mode Decoder

IC304 is a dual tro-to-four decoder. H. Freq Detection **output** is fed to IC304 pinl, pinl5. Low H. Freq. Mode (VGA Mode) enables IC304 pinl5. Output pin9,10,11, and 12 decode the input pin13 and 14 which are outputs of H and V sync. pulses integrators (R30. C30. R302 C301). High H freq enables IC303 pinl. Output pin4, 5, 6 and 7 decode input pin2, 3 which are output of horizontal &vertical F/V respectively.

3.3 DEFLECTION CIRCUIT

3.3.1 HORIZONTAL PHASE SHIFTER:

This function is operated by a bipolar TTL IC302 (74LS 221) which contains two Wonostable Multivibrators. Horizontal sync signal is separated and polarity-normalized from IC301 (74LS86) then coupled to the first monostable multivibrator of IC302 via R311. The pulse output is triggered at positive going edge of sync input. Pulse idth is determined by C308 and ‘current source from Q301. The pulse width is adjusted by VR301 to control H-phase. R358, R338, R339, R382, R379 and R308 are internally preseted for U-phase of each specified mode.

The output of the first monostable multivibrator is fed into the input (pin1) of second monostable multivibrator, the output is also tr igsered at positive going edge of input. Pulse width is determined by C307 and R310, and pulse output is as a sync input of Horizontal synchronization stage.

3.3.2 HORIZONTAL SYNCHRONIZATION PROCESSING

The horizontal synchronization uses a chip IC401(MC1391) to perform this function. KC1391 uses a single Phase-Lock-Loop (PLL) design with an oscillator ‘operating at 31.5KHZ dependent on the frequency of sync input. The frequency of oscillator is determined by the EC NETWORK circuit (VR401, R326, R404. C407, C320) connected between pin6 and 7 of the IC. C320 is grounded through Q324 transistor, C326 is grounded through Q303 transistor, Q303, Q324 turn-on at 31.5KHZ. a324 turn-on only at 35.2KHz, Q324, Q303 turn-off at 48KHZ.

The PLL circuit is used to control the oscillator frequency and maintains it in proper frequency and phase with the incoming sync signal. One input (pin3) is coupled from the pin13 of IC302 via C406 and R405 and a second input (pin4 of IC) is coupled from pin5 of T403(FBT) via a RC network. These RC components compose an integrator to generate a sawtooth waveform. A loop filter. with a properly- selected time constant is connected at pin5 (C408, C409, R407). The control voltage formed through loop filter is to control the oscillator frequency via R406 and then maintains proper relationship between video and yoke current.

The Horizontal drive pulses are sent out from pin1 of, IC and duty cycle is determined by R411 and R412.

3.3.3 HORIZONTAL DRIVER STAGE

The horizontal drive pulse is applied to the base of driver transistor Q402. B+ is provided by the regulated 95V voltage source via R416 and C416. The output of driver transistor 0402 is transformer (T401) coupled to the base of Horizontal Output Transistor Q403, C415 and R417 compose a damping network which is to eliminate the leakage flux of T401 during Q402 turns off.

3.3.4 HORIZONTAL SCANNING AND HIGH VOLTAGE POWER SUPPLY CIRCIUT

The horizontal scanning is accomplished in a diode modulator method. Except the basic horizontal scan output, the diode modulator adds one second resonant circuit during turning off which also performs the parabola modulation in yoke current to compensate the pincushion effect. iinearity coil L403 . corrects the asymmetrical linearity. C419 is s-correction capacitor The conducting period of horizontal output transis -tor Q403 and D401 completes the second half of scan. The conducting period of damper diode D401 complets the first half part of horizontal scan.

The retrace capacitor is C421, the charge and discharge act-ions of retrace capacitor via yoke after Q403 being turned off completes the retrace period of scan. C418 AND L401 is a second resonant circuit, which is designed for the same resonant fresu -ency with the main circuit.

In the high voltage drive circuit, the output Of Q403 is applied to the primary winding of flyback transformer T402 and drives the flrback transformer to supply CRT anode voltage of about 23RV by stepping up FBT during retrace period;

3.3.5 BOOST B+ AND RETRACE CAPACITOR SYITCHING

in order to maintain same scan switch and high voltage for different modes, different B+ is necessary to be switched individually. Herein we choose 95V for VGA mode, 107V for 8514/SVGA modes, and 154V for 48K (1024X 768) / 48K (800X 600) modes. The 95V voltage source is directly provided from the main power supply to C433 via D406. The 107V / 154V voltage source is built up at C433 by using boost-up method. The 95V source is coupled to pin8 of primary winding of T402 via D407 through a switch network composed of Q405, R421, Q407, Q418, R481, R479, R427 AND Q419 using self coupling of transformer, the 107V voltage is built UP AT C433 by selecting the proper position o.f pin8. The 154V voltage is built UP at C433 by selecting the proper position of pinl.

3.3.6 THE E-V PINCUSHION CORRECTION AND YIDTH CONTROL CIRCUIT

The voltage across C417 can be varied in accordance with a vertical parabolic wave by two stage driver Q408 / Q411. The yoke current is decreased in proportion to the voltage across C419. As the voltage across C417 is increased near the bottom and top of the picture, thus compensating for the pincushion effect. The parabolic wave is generated from vertical sawtooth through R464 and C428 integration. VR406 is external pincushion control.

The DC voltage across C417 can be varied by adjusting the VR403 external ridth control.

3.3.7 VERTICAL DEFLECTION

Vertical deflection function is operated all in the chip IC501 (TDA1675) which mainly contains the oscillator, ramp generator, pover output amplifier and flyback generator, Vertical oscillator is obtained by means of an integrator driven by a two-precise threshold circuit that switches R503 high or low so allowing the charge or the discharge of C503 under constant current conditions. Zener diode (ZD519) 3V is added on the charge period of C503 to increase the pull in range of sync frequency. The vertical sync signal is applied to the pin5 through C501 and R502. Once the sync signal synchronized a clock pulse is generated inside this chip. The clock pulse is just as a sync input of ramp generator. A liner voltage ramp is produced at pin9 by charging the series of C517 and C518 with constant current mirror at pin7. The current intensity of which can be externally adjusted.

The resistance between pin7 and ground defines the current and then the height of the scanning. The resistance is composed of R524, VR501 (EXTERNAL HEIGHT CONTROL), R524 and six variable resistors vhich are internal preseted for height of each mode respectively. A particular VR will be connected to ground dependent on the right mode selected at IC303.

Pin10 is the output of buffer stage of ramp generator. Feed back at C518 through R522, CR515 (vertical linearity control) does C shape correction. R523 is also a part of linearity correction network.

Pover amplifier is a voltage-to-current power converter, which is supplied by the main supply at pin2 during the trace period, and by the flyback generator during the retrace time. Pin10 is, internally coup led to the inverting input of the power amplifier. An external feed back network, R517 and R518 defines the DC level across C511 so allowing a correct centering of the output voltage. The series network R519 and C512 in conjuction with R517 and R518 applies at the feedback input pinl2. A small part of the parabola, and AC feedback is taken from the voltage across R520.

Pin1 is the output of the power amplifier and it drives the yoke by a negative slope current ramp R536, and the series network R515, C507 are used to stabilize the power amplifier. Pin15 is the output of the flyback generator which is driven during flyback time, when driving voltage jumps from low to high condition. An external capacitor C506 transfers the jump to pin2, voltage of which is boosted up two times of the main supply to perform the retrace action of scanning.

Vertical Centering Circuit is mainly composed of two transistor Q504 and Q506, vhich controls DC bias current for the vertical scanning current by adjusting VR511.

3.4 POWER SUPPLY

The rav DC B+ voltage is got from AC input voltage after EMI filter and rectifier. 'It supplies lover voltage Vcc to PWM controller, IClOl, through start-up circuit. R123 & Cl15 generate triangle vaveform to decide switching frequency. The pin6 output of IClOl drives pover switch Q102 on/off. A High-frequency & High-Voltage square vaveform is across the primary vinding and transfers energy to the secondary. The output DC voltage gets after rectifying and filtering.

In order to have a stable and regulated output voltage vithout influence by AC input voltage and output load change, the output voltage is fedback to PWM controller circuit to adjust duty cycle and maintain stable voltage.

fhe PWM controller IClOl is kicked UP from raw B+. The lower voltage, vcc, is provided by TlOl's AUX. Winding through D1O6, R106, C112. The short circuit protection and over power protection are controlled by a signal that is sensed from primary current; this signal is sent to IClOl pin3 to limit the duty cycle. The snubber circuit can suppress the spike voltage to protect the MOSFET during on/off.

3.5 X-RADIATION PROTECTION

Should a fault occur which would cause the high voltage to increase above a predetermined level, the positive pulse at pin7 of the FBT (T402) would go more positive. This action in turn would increase the voltage applied to Zener diode (ZD471) to exceed its breakdown voltage. This in turn would apply more voltage to the sate of the SCR401. activating the SCR401 and pull down the B+ of the IC401, shutting down the horizontal oscillation and drive pulse.

NOTE: The X-Radiation protection circuit used in this scnitor is a latching type circuit. Therefore, should a fault occur which would activate the X-ray protect circuit, the ronitor will shutdown and continue until turn-off the monitor with power switch. (CM1406 can't latch when shutdown occur.)

SERVICE ADJUSTWENT / TEST

44.1 TEST EQUIPMENT AND TOOLS ARE RECOHHENDED TO MAINTAIN THE HONITOR.

a. Volt-Ohm-Amp meter
b: High voltage probe
c. Oscilloscope
d. White balance adjuster (Minota color Analyzer)
e. Pattern Generator
f. Alignment Screwdriver
g Hexa Tunning Tool

4.2 POWER SUPPLY ALIGNWENT
SCREEN VR SET TO CCW
INPUT SIGNAL: VGA480 FLAT FIELD PATTERN
ADJ VR201 TO GET VDC OF TP201 EQUAL TO 90V+/-0.5%

4.3 MEASURE
TP202 = 83V+/-5%
TP203 = 23.6V+/-5%
TP204 = 12V+/-5%
TP205 = 6.3V+/-5%
TP401 = 5V+/-5%

4.4 F/V ALIGNMENT (FOR THE MODELS OF SVGA, 8514/A, 48K)
INPUT SIGNAL: (1)flat field VGA 480 timing but fh=34.00 KHZ adj VR308 to get vdc of IC303 pin2 just changing from high to low.
(2)flat field 48K timing but fh=43KHz, adj VR307 to get vdc of IC302 pin13 just changing from high to low.
(3)Input 48K timing but fv=65Hz, adj VR302 to get vdc of IC303 pin1 just changing from high to low.

4.5 DEFLECTION ADJUSTMENT the position of adjusting potentiometers are labelled on page 25, 26.

4.5.1 Horizontal Synchronization Adjustment
. Adjusting Potentiometer
H. HOLD : VR410
. Condition
Display Pattern: Cross-Hatch (VGA TIMING)
TP402 Be Shorted to ground
. Adjustment Procedure
adjust H. HOLD VR gradually so that pattern of cross-hatch is locked in raster.

4.5.2 Adjustment of Horizontal Screen Location
. Adjustment Potentiometers
H. CENTER : VR402
. Condition
Display Pattern: Full-Size Picture
Timing VGA, 8514/A, SVGA, 48K(l024x 7681, 48K(800x 600)
Brightness : Hax
. Adjustment Procedure
(1) Adjust VR402 so that Raster scan area moves to center, if raster is not located at center of screen.
(2) Adjust H. PHASE VR301 so that the center of the picture aligns with the center of the screen at all Hodes

4.5.3 Adjustment of Vertical Screen Location'
Adjusting Potentiometer
V. Center : VR511
Condition
Display Pattern: Full-Size Picture
Timing : 8514/A mode
Adjusting Procedure
Adjust V. CENTER VR511 so that the picture CENTER is aligned with the CRT screen center.

4.5.4 Adjustment of Vertical Scan Linearity
Adjusting Potentiometer
V. LINEARITY : VR515
. Condition:
Display Pattern: Cross-Hatch Pattern
Timing : VGA mode
Adjusting Procedure
Adjust VR515 so that the height of vertical square on the top area of the screen is same as that on the bottom area.

4.5.5 Adjustment of Picture Size
Adjusting Potentiometer
Yidth : L403
Height: VR501,
Condition
Display Pattern: Full-Size Picture
Timing : VGA, 8514/A, SVGA, 48K(1024x 768). 48K(800x 600)
Light Output: 20FLS
(Adjusting Procedure
(1) Adjusting L403 so that the horizontal picture ridth is 248mm without border at VGA Mode.
(2) Preset VR511 at central position, then adjust VR501 so that the picture height is 186mm without border at VGA (720x350) mode.

4.5.6 Adjustment of Side-Pincushion-Correction (SPC)
Adjusting Potentiometer
Pin-correction : VR406
Condition
Pattern: Cross-Hatch Pattern
Timing : SVGA
Adjusting Procedure
Adjusting VR406 so that the horizontal picture width at central line equals that at the lowest line of picture.

4 6 VIDEO PRESETS
4.6.1 Screen to Minimum.
4.6.2 Biases to Minimum.
4.6.3 Drives to Midrange.
4.6.4 Brightness to Midrange.
4.6.5 Contrast to Hidrange.
4.6.6 Allow 20 Minutes Warm-Up Before Alignment.

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4.7 WHITE BALANCE ALIGNWENT.

4.7.1 Apply Signal & Pattern: Flat Yhite Field

4.7.2 Advance the Screen Control to-Threshold of Raster Extinction.

7.3 Turn the Contrast **Down to** 2FL of Luminance.

4.7.4 Adjust Biases VR603 & VR604 & VR605 to Obtain Proper Chromaticity-
(X=0.281+-0.003, Y=O.311+-0.003).

4.7.5 Set the Contrast to 25FL of Luminance.

4.7.6 Adjust Drive VR601 & VR602 to Obtain Proper Chroeaticity
(X=0.281+-0.003, Y=O.311+-0.003).

4.7.7 Repeat 4.7.2 Through 4.7.6 Until No Further
Adjustment Are needed to Meet Chroaaticity
(X=0.281+-0.001, Y=O.311+-0.001) from 2FL to 25FL.

4.8 VIDEO TEST

4.8.1 Yhite Balance Chromaticity & Color Tracking
1. Apply signal & pattern: flat white field
2. Adjust brightness to threshold of raster extinction.
3. Color temperature coordinates must be
X=0.281+-0.03; Y=O.311+-0.03 rhen contrast is adjusted to any luminance level between 2 and 25FL.

4.8.2 Contrast & Input Level Range
1. Apply signal & pattern: 2-X 2” patch
2. Set brightness control to threshold of raster extinction.
3. Yith contrast at maximum, a luminance level equal to or greater than 50FL must be present.
4. With contrast at minimum, a luminance level of less that 3FL must be achievable.
5. Xith input level change to IV, luminance must be greater than 80FL with contrast at maximum and less than 5FL with contrast at minimum. No evidence of smearing picture can be observed with light O/P belov 25FL.
6. Xith input level changed to 0.5V luminance must be greater than 30FL with contrast at maximum, and less than 2FL with contrast at minimum.

4.8.3 Brightness Range
1. Apply signal a flat white field.
2. Adjust brightness to threshold of raster extinction contrast for 25FL of luminance.
3. Yith the brightness control at minimum, a luminance level less than 20FL must be present.
4. Set contrast to minimum.
5. With brightness at maximum a visible raster of at least 2FL luminance must be produced.

4.8.4 Luminance Linearity
1. Apply signal & Pattern: stairstep.
2. Set brightness to threshold of raster extinction.-
3. All stairsteps must be discernible from each other for any contrast setting where the brightest bar is varied betveen 5 and 20FL by adjusting contrast control.

4.8.5 Temperature Stability
1. Apply signal & pattern: flat vhite field.
2. Set brightness to threshold of raster extinction and contrast to produce 25FL at 25 DEG. C.
3. Luminance must not change more than 5FL over a temperature range of 10 DEG. C to 40 DEG. C.

4.8.6 Bandvidth/Resolution

1. Apply signal & pattern: "E" pattern
2. Observe that vertical lines and horizontal lines are approximately the same brightness with any setting of brightness & contrast control.

4.8.7 Miscellaneous Picture Quality

1. No waving or motion may be visible at any best frequency betveen AC power and vertical refresh.
2. Color Quality
   - 2.1 Set brightness to threshold of raster extinction and contrast to equivalent of 25FL with flat white field pattern.
   - 2.2 Apply signal & pattern: Color bars
   - 2.3 Observe that all colors are of proper hue and saturation , qnd no streaking or smearing is present.

4.9 PURITY ADJUSTMENT

The rear pair of magnets (closest to the beam bender clamp) on the Beam Bender assembly are two-pole aagnets designed to move all three beams uniformly in both direction and amplitude.

Spreading the tabs causes the three beams to be offset prior to entering the yoke field such that their trajectory is altered and results in their passing through the slots in the shadow mask at a different angle and striking the phosphor in a different horizontal location thus providing purity adjustment (control).

Face the screen of the monitor to the east to make purity adjustments. This assures that any effect of the earths magnetic field upon beam landing will be negligible when the monitor is finally placed in any viewing position.

The monitor should be at room temperature (60 degrees F or over six hours) and be operating at high beam current full brightness and contrast for at least ten (10) minutes.

Purity adjustment must be made to observe the green color field only as any min-convergence on the red and blue fields will show up as additional purity errors.

4.9.1 Static (Center) Purity

1. Lossen deflection yoke neck clamp and slide deflection yoke all the way forward. Tighten yoke neck clasp screw to hold, but not to full torque.

2. Place all of the beam benders tabs together in the 12 o'clock position.

3. Purity magnets are the rear pair of magnets' (closest to the beam bender clamp). Starting with the tabs together pointing straight UP (12 o'clock) or straight down (6 o'clock), spread the tabs an equal distance'apart from the vertical center line until the green vertical raster is centered horizontally on the screen.

~Do not rotate the pair of magnets (together) CW or CCY away from vertical center. Rotating together will only decrease the effect of the two pole magnets on the desired horizontal movement of the green beam and will introduce vertical effect (centering) to the raster.

4.9.2 Dynamic (Edge) Purity

1. Slowly move the deflection Yoke to the rear to obtain best overall green raster. Loosen the neck clamp only enough to permit movement of the yoke. Do not allow the front of the yoke to slump dorn appreciably while performing this operation or undesired axial Yoke movement may result when later tightening yoke neck clamp.

2. Rotate yoke to level raster while carefully maintaining axial location of Yoke.

3. Tighten yoke neck clamp securely (6 in-lb) while supporting Yoke in front such that the neck clamp draws down flat on the neck and is not twisted on the anchor tape underneath.

4. Check purity on blue and red rasters to ensure that good purity has been obtained on each respective field.

   Impurities iii these two raster may indicate that convergence errors are also present and should be checked (corrected1 before attempting readjustment of purity.

5. Perform color temperature adjustment and check for uniform vhite screen. If uniformity has not been obtained, reconverge center of screen and repeat purity adjustment.

4.10 COHVERGENCE ADJUSTMENTS

4.10.1 Center Convergence

NOTE: The magnetic tape bear bender on the picture tube is adjustable concentric beam bender only. Center convergence is accomplished by two (2) pairs of concentric magnets (4 and 6 poles). The center green color is the stationary reference color line. The adjustable magnets move the red and blue 1 ines in order to converge them with the green line.

NOTE: Hake sure that the focus is set correctly on this monitor before making convergence adjustments.

The front pair of magnets (closest to the YOKE) are four (4) pole magnets designed to move red and blue in both a vertical (up and down) and lateral [horizontal) movement.

Spreading the tabs apart causes blue and red to move in opposite direction away from green. Conversely, moving the tabs together blue and red. to eove closer to **green. Rotating** the pair of tabs together moves blue and red UP and down (vertical) vith respect to green.

The center pair of tabs are six (6) pole magnets which move red and blue as a pair in both a vertical (UP and down) and lateral (Horizontal) movement vith respect to green. Spreading the tabs apart causes red and blue to move to the right and up avay from green.

Conversely moving the tabs together will cause red and blue to move to the left and dovn away from green.

Do not rotate the center pair of tabs together either clockwise (CW) or counterclockwise (CCW) avay from vertical center. Rotating the pair of tabs together will only have minimal effect on the green beam.

1. Connect a pattern Generator to monitor. While observing a crosshatch pattern, adjust the black level and picture controls to produce a distinct pattern.

2. Spread or rotate the front pair (4 pole) and /or the center pair (6 pole) magnets to converge the lines.

3. Repeat step 2 to achieve optimum blue and red to green convergence.

4.10.2 Dynamic Edge Convergence

Edge convergence is achieved by tiliting the front of the deflection yoke up-dovn ("Y" axis) and left-right ("X" axis).

Good center convergence is desired before attempting edge convergence

1. Temporarily remove 3 (or 4) wedges from under front of yoke.

2. Using wedge at 1:00 position move yoke vertically (rocking motion) for balance-of red and blue vertical lines at 12:00 (top) and 6:00 (bottom) so they are separated equally (if any) and do not cross over each other (opposite sides at top and bottom).

3 Stick down 1:00 wedge.

4 Hove yoke horizontally (rocking motion) to balance red and blue raster height at top and bottom such that the red and blue horizontal lines at 12:00 (top) and 6:00 (bottom) are separated equally (if any) both red lines high or low, but not either one high at top and lov at bottom.

5. Replace remaining vedge at 5:00 and 9:00 and stick down while maintaining the Position of the yoke.

6. Check for overall convergence and purity and repeat steps 1 through 5 as needed.

7. Place anchor tap over three (or four) wedges.
   NOTE: Because of the interaction of purity and convergence adjustments. repetition of adjustments may be necessary to obtain best results.

4.11 X-RADIATION PROTECTION CIRCUIT TEST

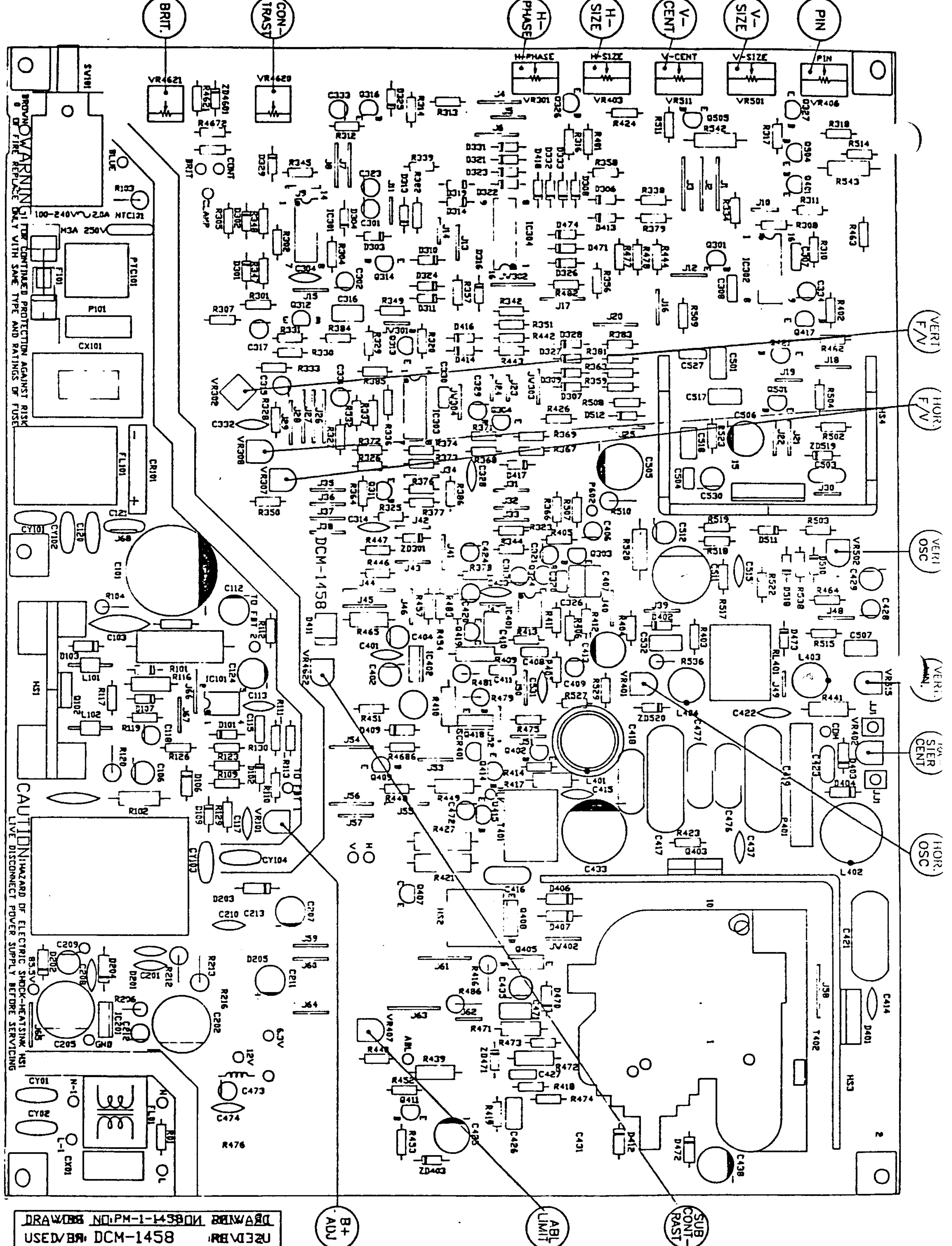
Yhen any service is performed on the horizontal deflection, high voltage, or B+ regulator system, the X-Radiation circuit must be tested for proper operation as follows:

1. Apply 120 volt AC using a variac transforner for accurate input voltage.

2. Allow for monitor warm-up and adjust all customer controls f.or normal viewing.

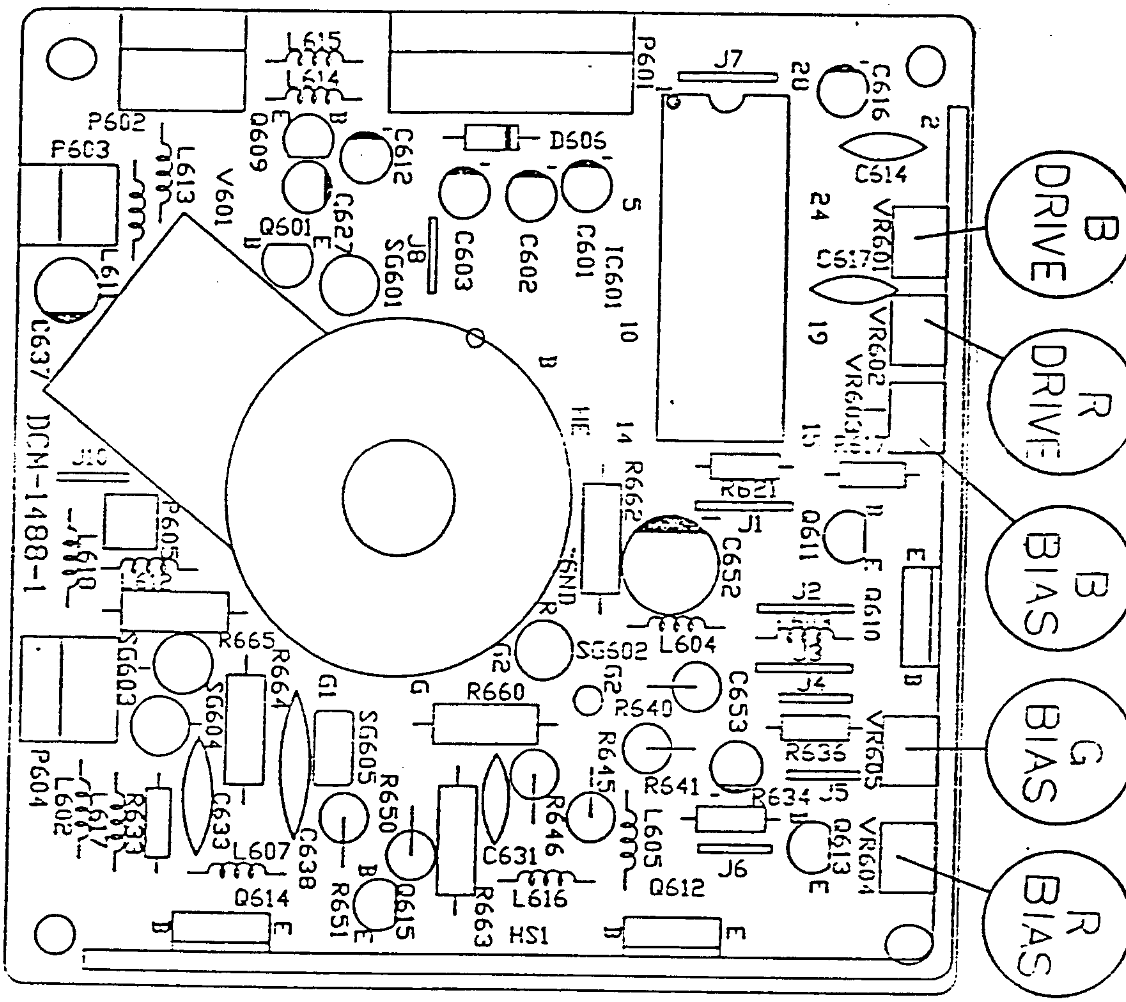
3. Short point XPl to XP2 with short clip lead momentarily. The monitor should shut down immediately.

   NOTE: If the monitor does not shut down during. this test, service is required in the X-Ray protect circuit.



DRAWING NO: PM-1-1458	
USED BY: DCM-1458	
MADE BY: RITA TANG	DATE: 08/18/98
CHKD BY:	DATE:

COMPONENT SIDE SIZE 1=1



DRAWING NO: PM-1-1488-1 REV: 0

USED ON: DCM-1488-1 REV: 0

MADE BY: J.W.YU DATE: 09/10/92'

CHKD BY: DATE:

COMPONFNT SIDF SI7F: 1=1

5. Trouble Shooting Procedure

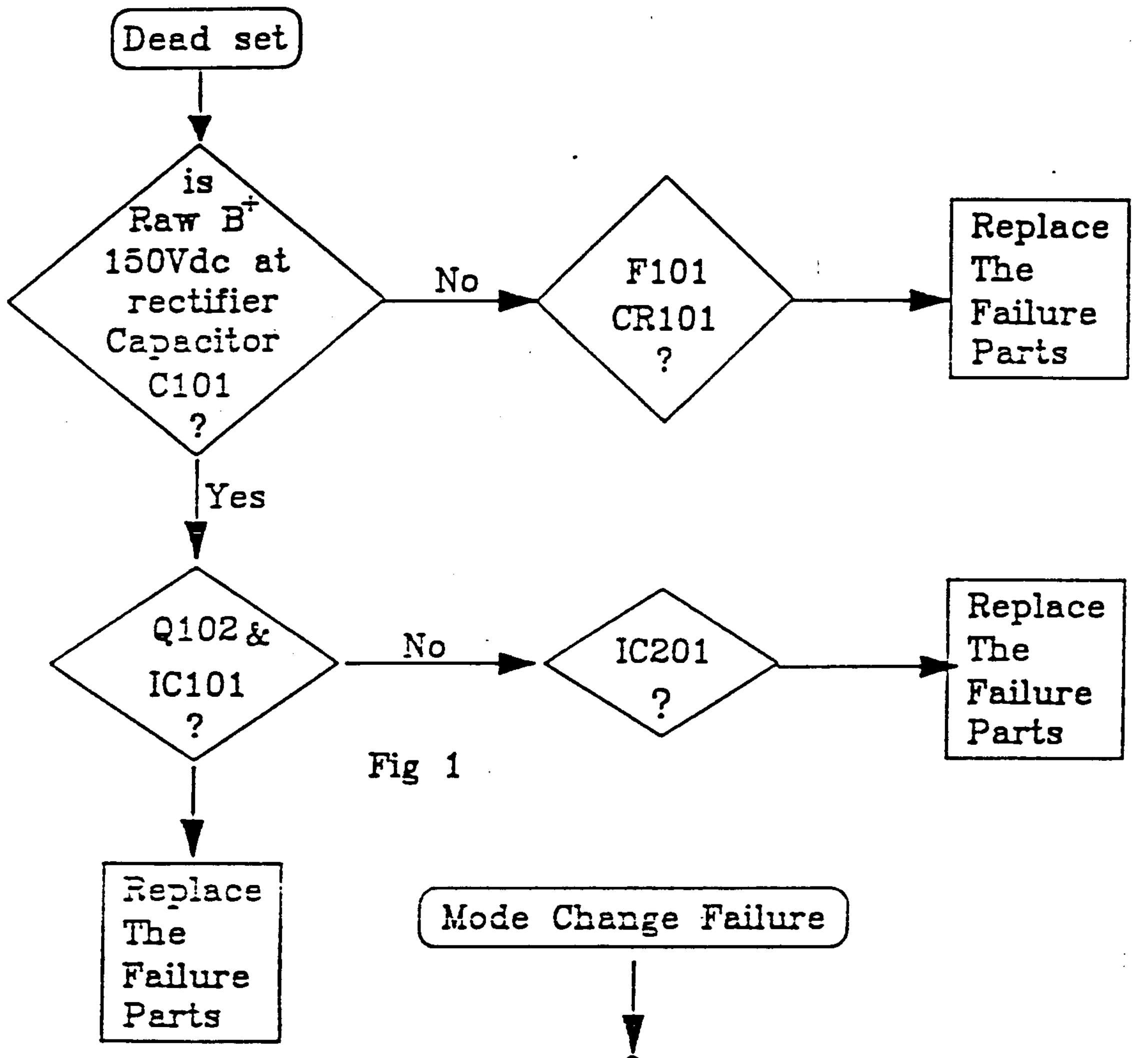


Fig 1

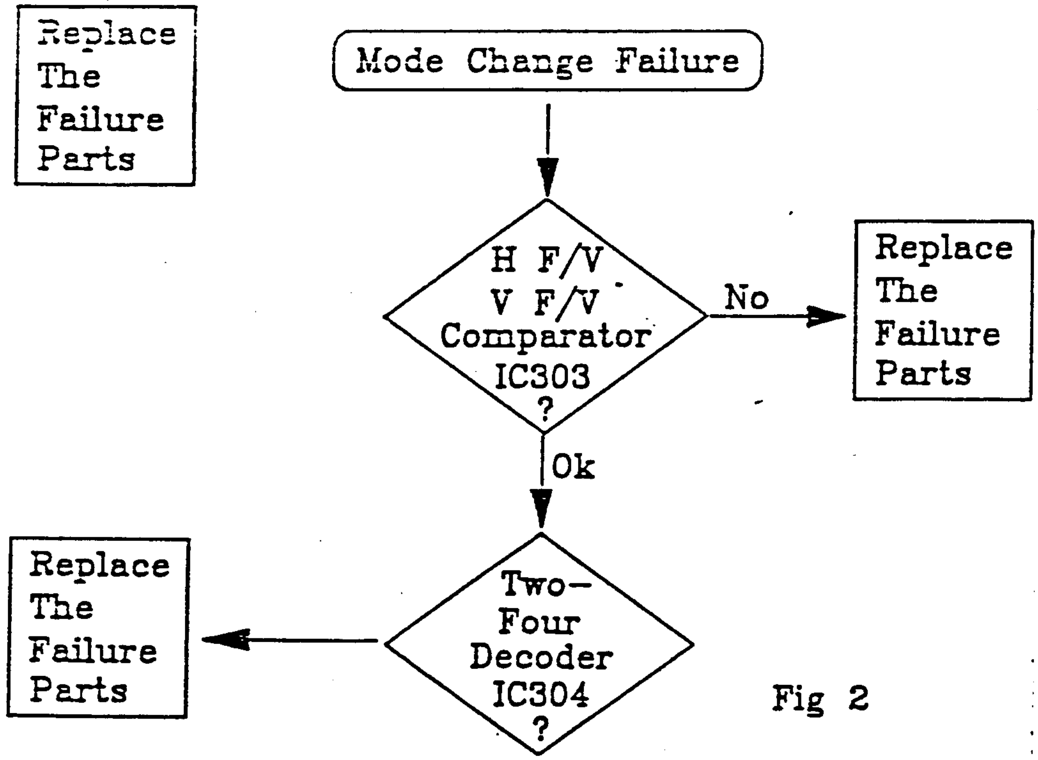


Fig 2

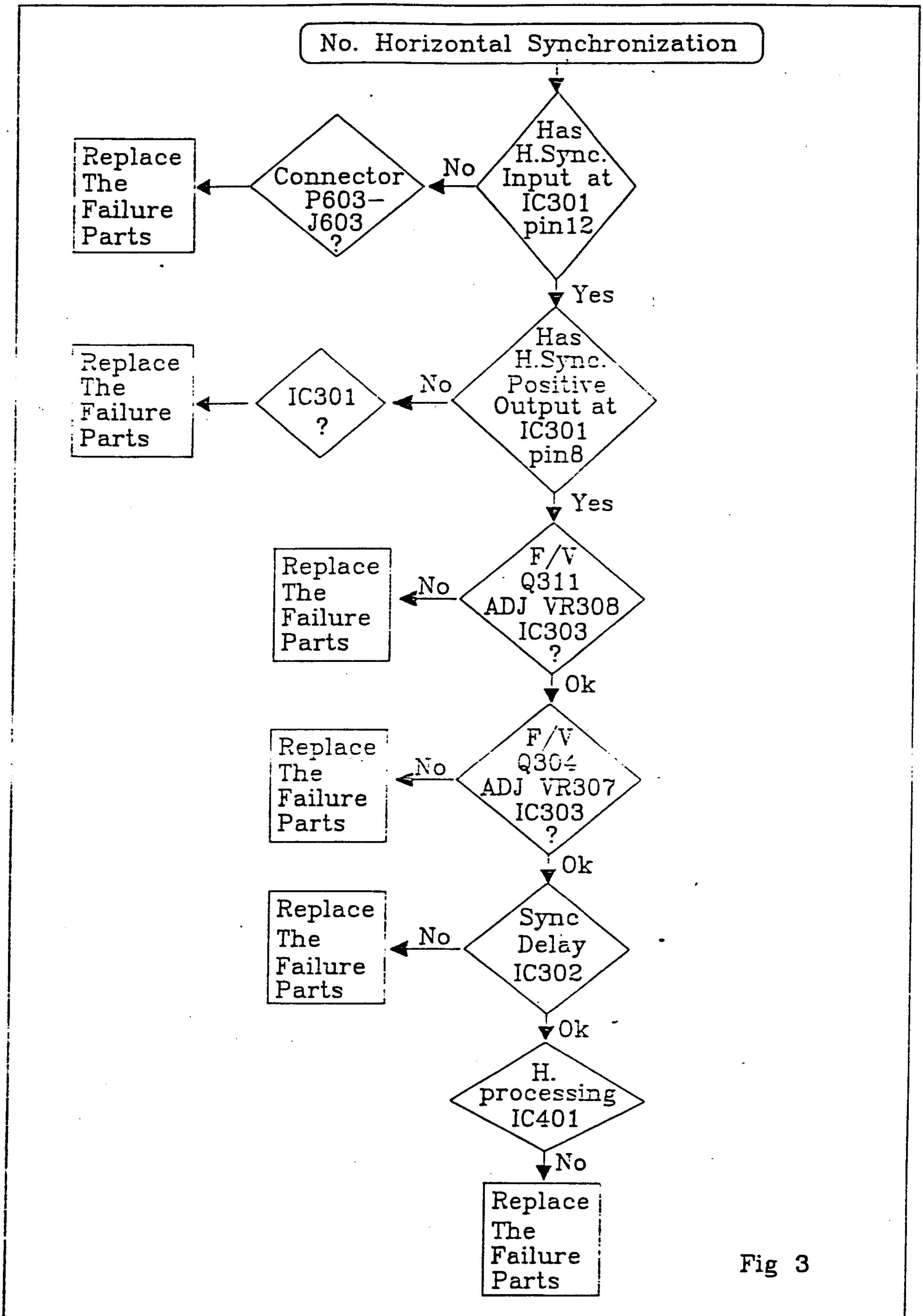

No. Horizontal Synchronization
Has H.Sync. Input at IC301 pin12
No
Connector P603-J603 ?
Replace The Failure Parts
Yes
Has H.Sync. Positive Output at IC301 pin8
No
IC301 ?
Replace The Failure Parts
Yes
F/V Q311 ADJ VR308 IC303 ?
No
Replace The Failure Parts
Ok
F/V Q304 ADJ VR307 IC303 ?
No
Replace The Failure Parts
Ok
Sync Delay IC302
No
Replace The Failure Parts
Ok
H. processing IC401
No
Replace The Failure Parts

Fig 3

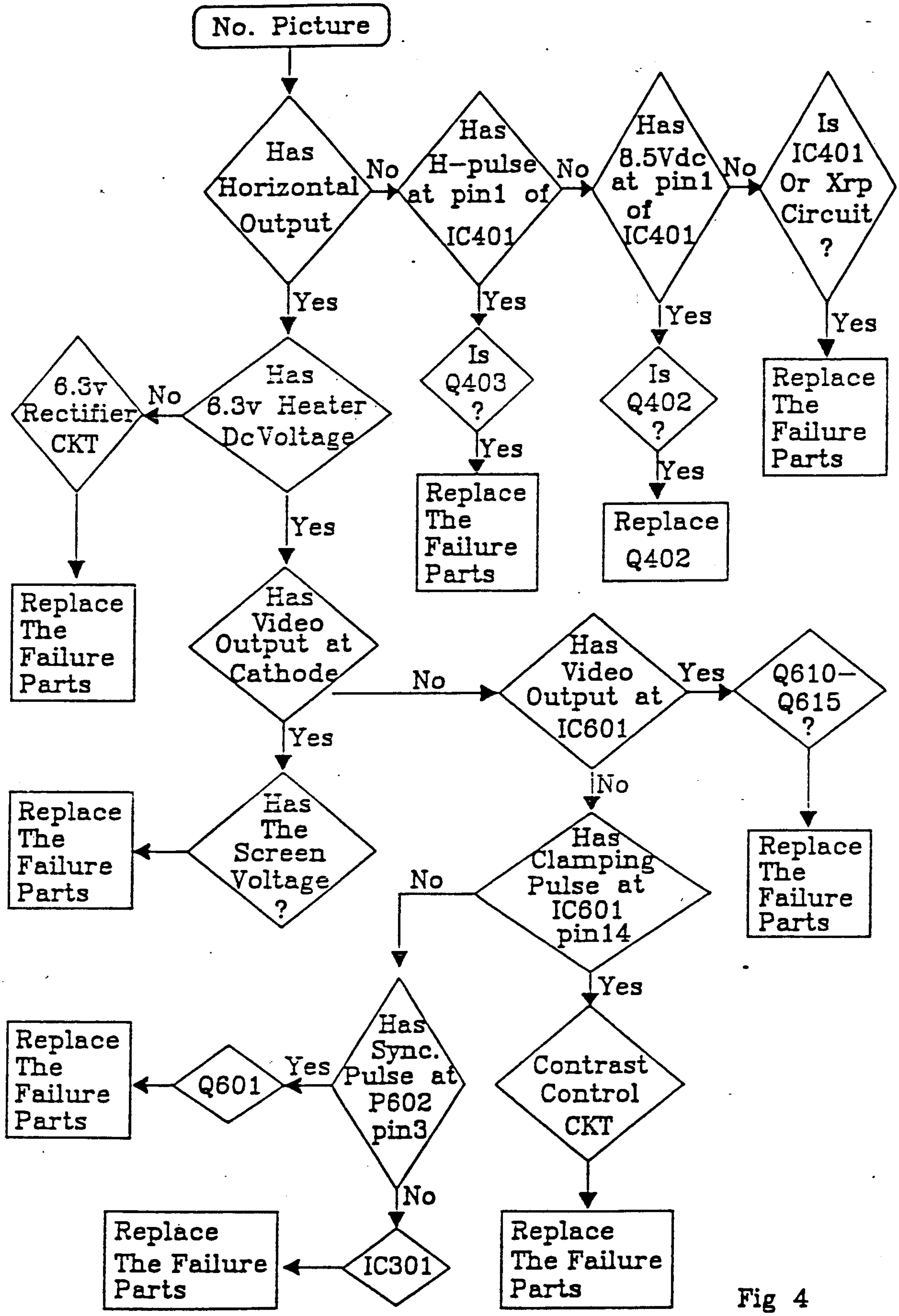

No. Picture
Has Horizontal Output
No
Has H-pulse at pin1 of IC401
No
Has 8.5Vdc at pin1 of IC401
No
Is IC401 Or Xrp Circuit ?
Yes
Yes
Yes
Yes
Has 6.3v Heater Dc Voltage
No
6.3v Rectifier CKT
Is Q403 ?
Yes
Is Q402 ?
Yes
Replace The Failure Parts
Replace The Failure Parts
Replace Q402
Yes
Replace The Failure Parts
Has Video Output at Cathode
No
Has Video Output at IC601
Yes
Q610-Q615 ?
Yes
No
Replace The Failure Parts
Has The Screen Voltage ?
Replace The Failure Parts
Has Clamping Pulse at IC601 pin14
No
Yes
Replace The Failure Parts
Has Sync. Pulse at P602 pin3
Yes
Q601
Replace The Failure Parts
Contrast Control CKT
No
IC301
Replace The Failure Parts
Replace The Failure Parts

Fig 4

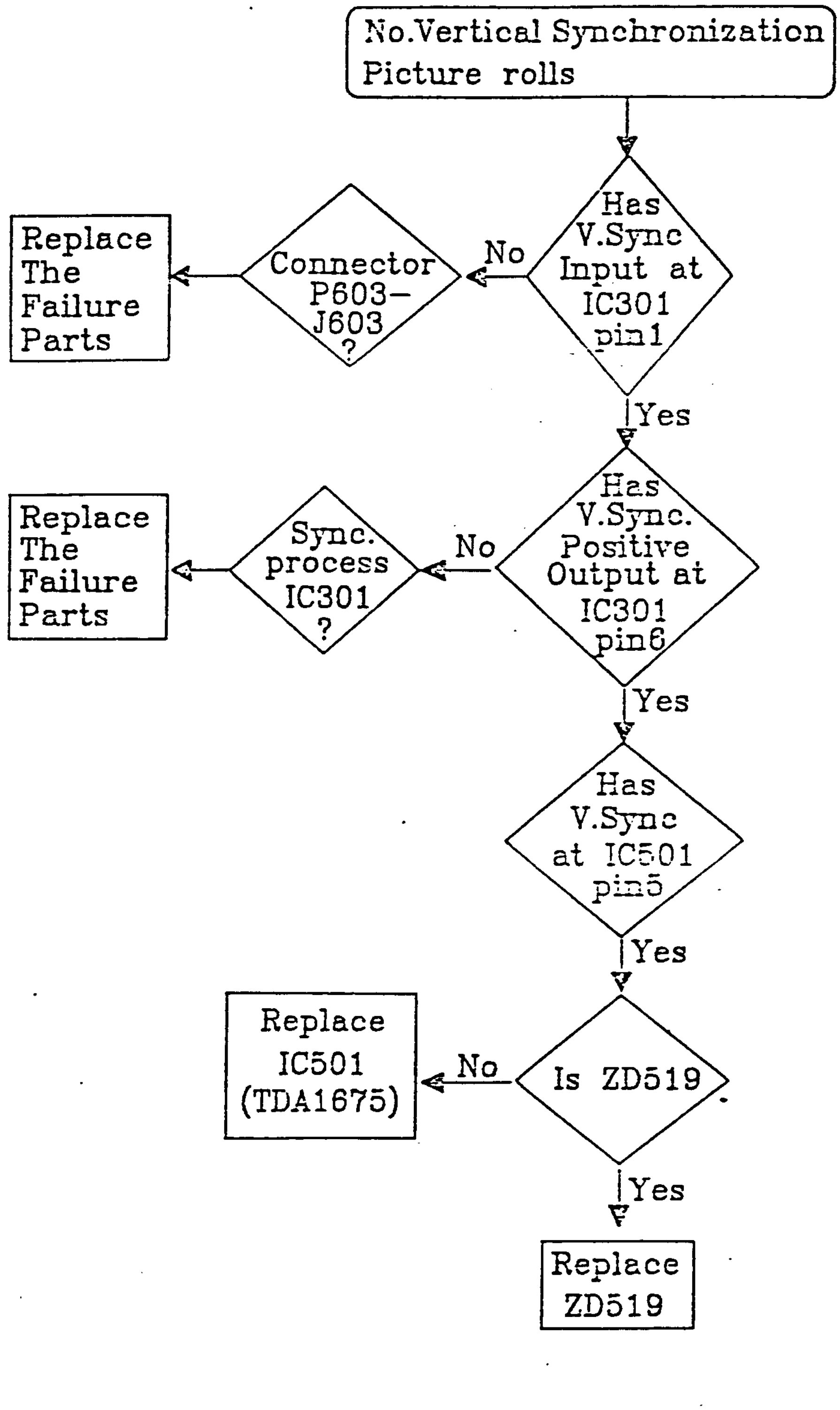

No.Vertical Synchronization
Picture rolls
Has V.Sync Input at IC301 pin1
No
Connector P603–J603 ?
Replace The Failure Parts
Yes
Has V.Sync. Positive Output at IC301 pin6
No
Sync. process IC301 ?
Replace The Failure Parts
Yes
Has V.Sync at IC501 pin5
Yes
Is ZD519
No
Replace IC501 (TDA1675)
Yes
Replace ZD519

Fig 5

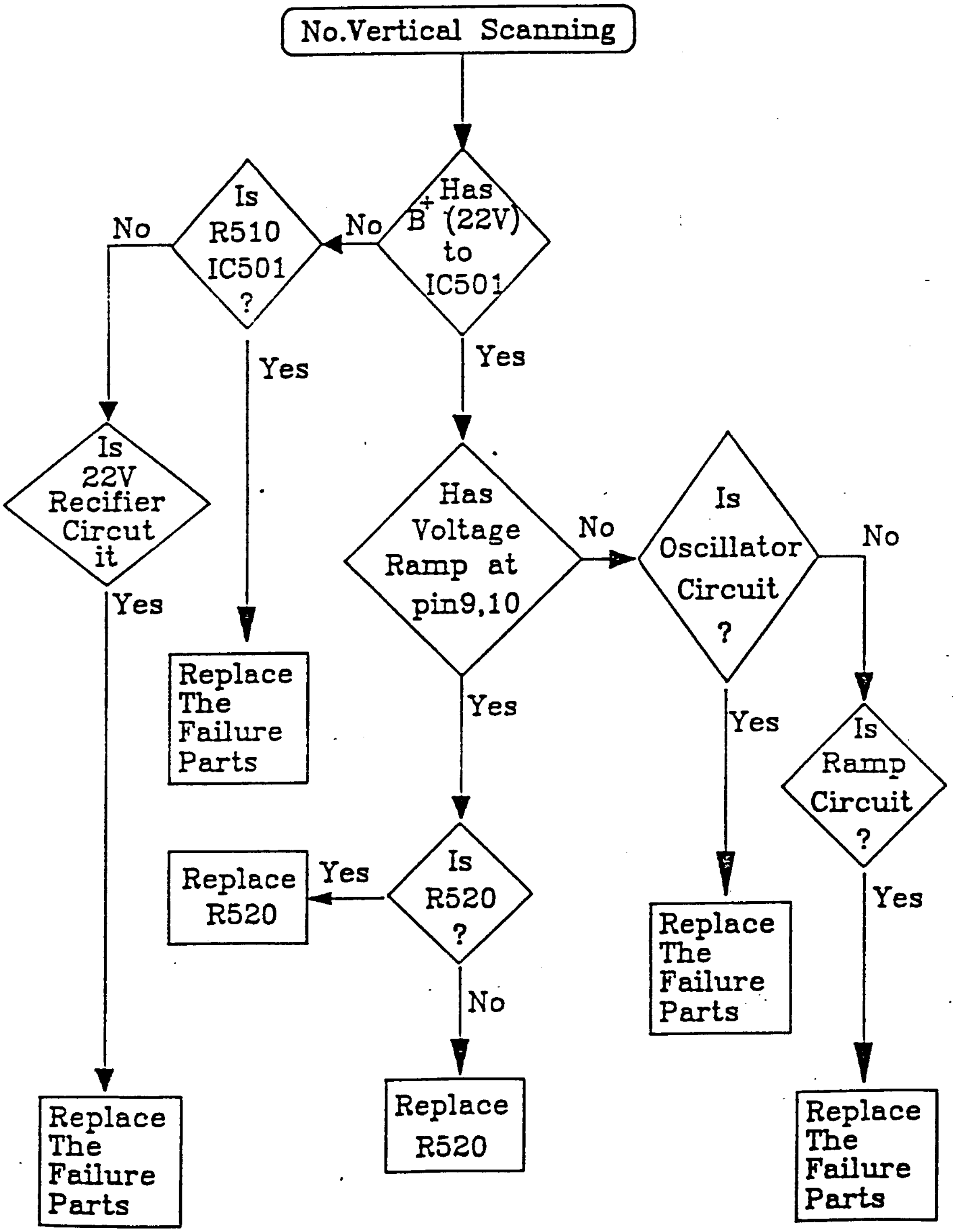
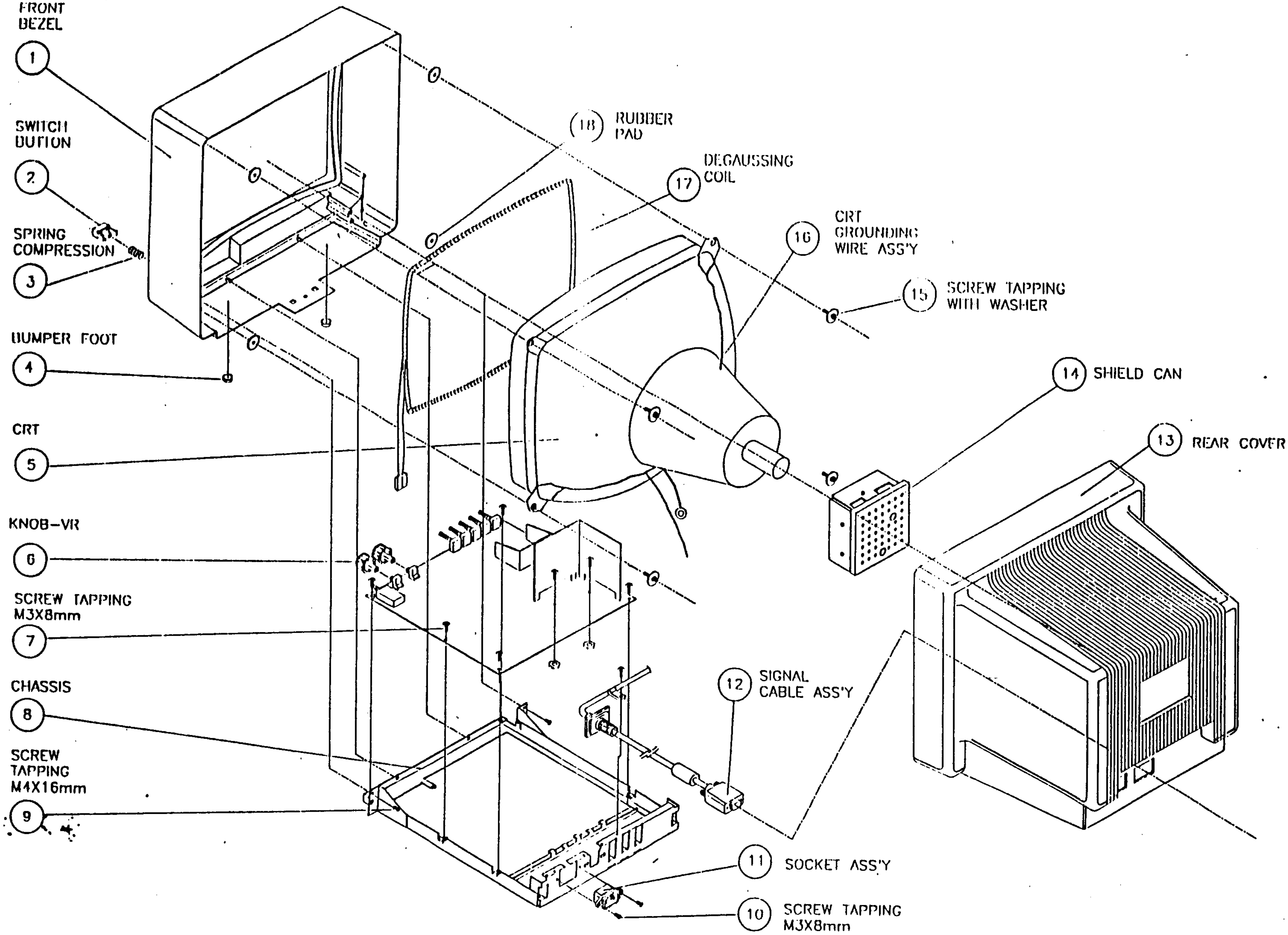

No.Vertical Scanning
Has B+ (22V) to IC501
No
Is R510 IC501 ?
No
Is 22V Recifier Circut it
Yes
Replace The Failure Parts
Yes
Replace The Failure Parts
Yes
Has Voltage Ramp at pin9,10
No
Is Oscillator Circuit ?
No
Is Ramp Circuit ?
Yes
Replace The Failure Parts
Yes
Replace The Failure Parts
Yes
Is R520 ?
Yes
Replace R520
No
Replace R520

Fig 6

EXPLODED VIEWS



APPENDIX III REPLACEMENT PARTS

1. Components marked with "@" are safety related parts. Please read product SAFETY NOTICE before servicing.

2. Symbols of the parts:

R: RESISTOR	F: FUSE	CX: X CAPACITOR OF POWER LINE
C: CAPACITOR	FL: FILTER	CY: Y CAPACITOR OF POWER LINE
Q: TRANSISTOR	FB: FERRITE BEAD	SCR: SILICON CONTROLLED RECTIFIER
L: INDUCTOR	D(CR): DIODE	VR: VARIABLE RESISTOR
T: TRANSFORMER	ZD: ZENER	IC: INTEGRATED CIRCUIT
Z: VARISTOR	PTC: POSITIVE TEMPERATURE COEFFICIENT THERMISTORS	
	NTC: NEGATIVE TEMPERATURE COEFFICIENT THERMISTORS	

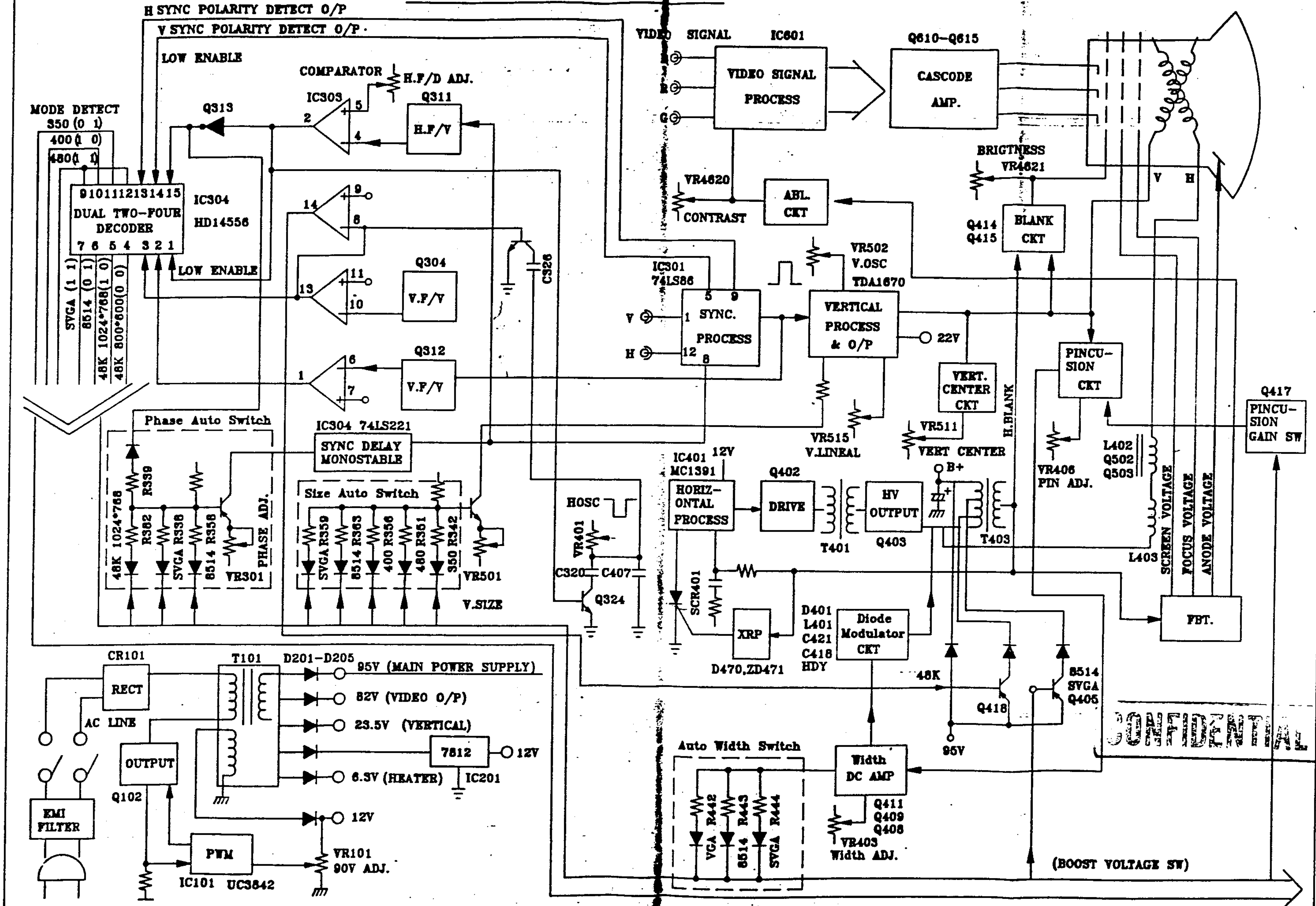
TOLERANCE

F: +-1%	J: +-5%	M: +-20%
G: +-2%	K: +-10%	T: +-30%

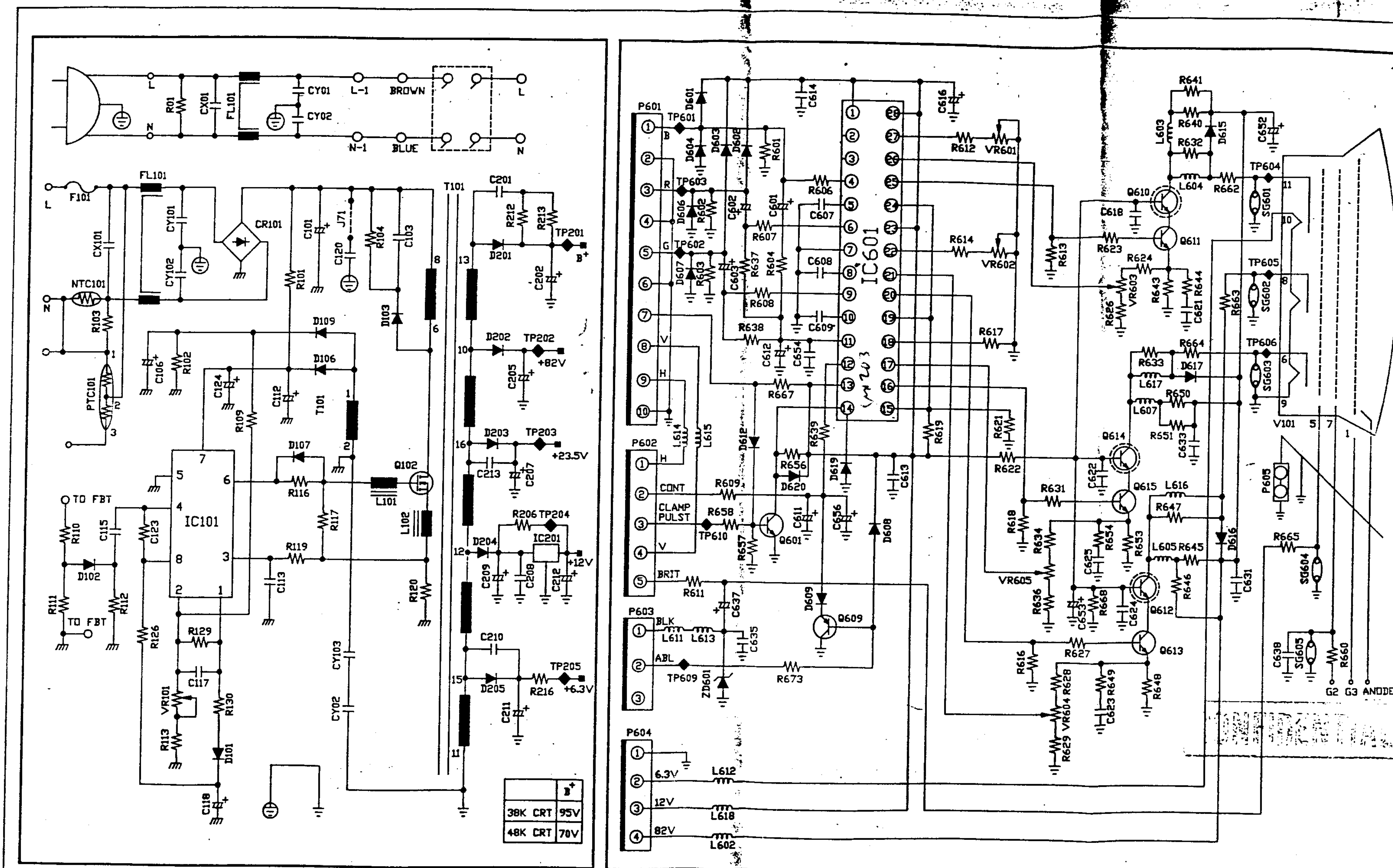
ITEM	PART	DESCRIPTION
	3421030100	CABLE TIE
	3421030303	CABLE TIE
R662	0023101000	PC RES CF 1/2W 100J
C612	1412015014	PC CAP AL 50V 1U M T&R
C618	1512454101	PC CAP MC 50V .01U K X7R
ZD601	2030020801	PCDIO ZEN .4W 18CV MELF
D601	2040010201	PC DIO SW 0.2A 100V MELF (IN4148)
Q609	2100005001	PC TR 35V .5A T92 (2SA673)
Q601	2100026001	PC TR 30V 0.1A T92 160-320 (2SC458C)
R329	0111103000	PC RES MF 1/4W 392K F
R502	0013472000	PC RES CF 1/4W 4.7K J
R410	0023103000	PC RES CF 1/2W 10K J
R472	0121297000	PC RES CF1/2W 21.5K F
R441	0023391000	PC RES CF 1/2W 390 J
R520	0123128000	PC RES MF 1W 1.2 J
R116	0123330000	PC RES MF 1/2W 33 J
C317	1412015505	PC CAP AL 50V 2.2U M T&R
C407	1869437206	PC CAP PP 50V 3.3KP J
D412	2010101001	PC DIO FRD 1A 100V D41 (RGP10B)
D470	2010101201	PC DIO FRD 1A 200V D41 (RGP10D)
D103	2010101601	PC DIO FRD 1A 600V D41 (RGP10J)
D404	2010101605	PC DIO FRD 1A 600V
D203	2010271401	PC DIO FRD 1A 400V D41 (UF4004)
D201	2010391601	PC DIO FRD 1A 800V D41 (BYM26C)
ZD520	2030120301	PC DIO ZEN .5W HZ18-2 D35 (18V)
ZD4601	2030121401	PC DIO ZEN .5W HZ 3C2 D35
ZD519	2030123201	PC DIO ZEN .5W 3B2V D35 (3V)
ZD471	2030820101	PC DIO ZEN 250MW 20V 2% D204 (2N4707)
D101	2040010001	PC DIO SW 0.5A 100V (IN4148)
Q415	2100006001	PC TR 35V .5A T92 (2SC1213C)
Q402	2100016001	PC TR 120V .1A T92 (2SC2240)
Q407	2100020007	PC TR 200V .5A T92 (MPSA43)
Q504	2100041009	PC TR 120V 1A T92 (2SD667C)

ITEM	PART	DESCRIPTION
Q311	2100027001	PC TR 14V 50mA TO-92 (2SC752)
Q405	2130007001	PC TR -80V -1A T92 (2SB857)
Q505	2110005001	PC TR -80V -1A T92 (2SB6467-H)
SCR401	2200010001	PC SCR 200V .8A .1W T92 (2N5064)
R641	0143302200	PC RES MF 2W 3K 5%
IC601	2530009004	PC IC RGB VIDEO AMP. 28PIN (LM1203)
R543	0133101000	PC RES MF 1W 100 J
C505	1410612205	PC CAP AL 35V 1000U M
D401	2010632114	PC DIO FRD 5A 1500V FMS-3FU
Q403	2120045001	PC TR 1500V 5A T3P (2SC3883)
Q408	2130007001	PC TR-50V-4A T220 (2SB857)
IC402	2500005010	PC IC REGU 1A 5V T220 (7805)
IC303	2520003021	PC IC COMPARATOR 8 PIN 393 (SM339)
IC401	2530003001	PC IC TV HORI PROCESSOR 8P (MC1391)
IC501	2530004001	PC IC VERT DEFLECTION 2A 15P (TDA1675)
IC301	2600019000	PC IC XOR GATE 30mV 14P (74LS86)
IC302	2600035000	PC IC DUAL MONOSTABLE 16P (74LS221)
IC304	2610029001	PC IC DUAL 1-4 DECODER 16P (HD14556)
R104	0133473000	PC RES MF 1W 47K J
R120	0513479000	PC RES WW 2W 0.47 OHM J
F101	0813020500	PC FUSE N/L 3A 250V UL (3A 250V)
C205	1430821207	PC CAP AL 100V 220U M
C202	1410624107	PC CAP AL 160V 100U M
CR101	2000141603	PC DIO BRD 4A 600V RBV (RBV-406)
D205	2010121001	PC DIO FRD 2A 100V D201 (RGP20B)
Q102	2430032001	PC FET 600V 6A T220 (2SK1117)
IC201	2500007001	PC IC REGU 1.5A 12V T220 (7812)
IC101	2510004002	PC IC PWM 1W 8PIN (UC3842)
R117	0013103000	PC RES CF 1/4W 10K J
D106	2010271201	PC DIO FRD 1A 200V D41
	3670022200	PC LED ASSY 2 PIN

DCM-1456 VGA MONITOR BLOCK DIAGRAM



Hewitt Rand

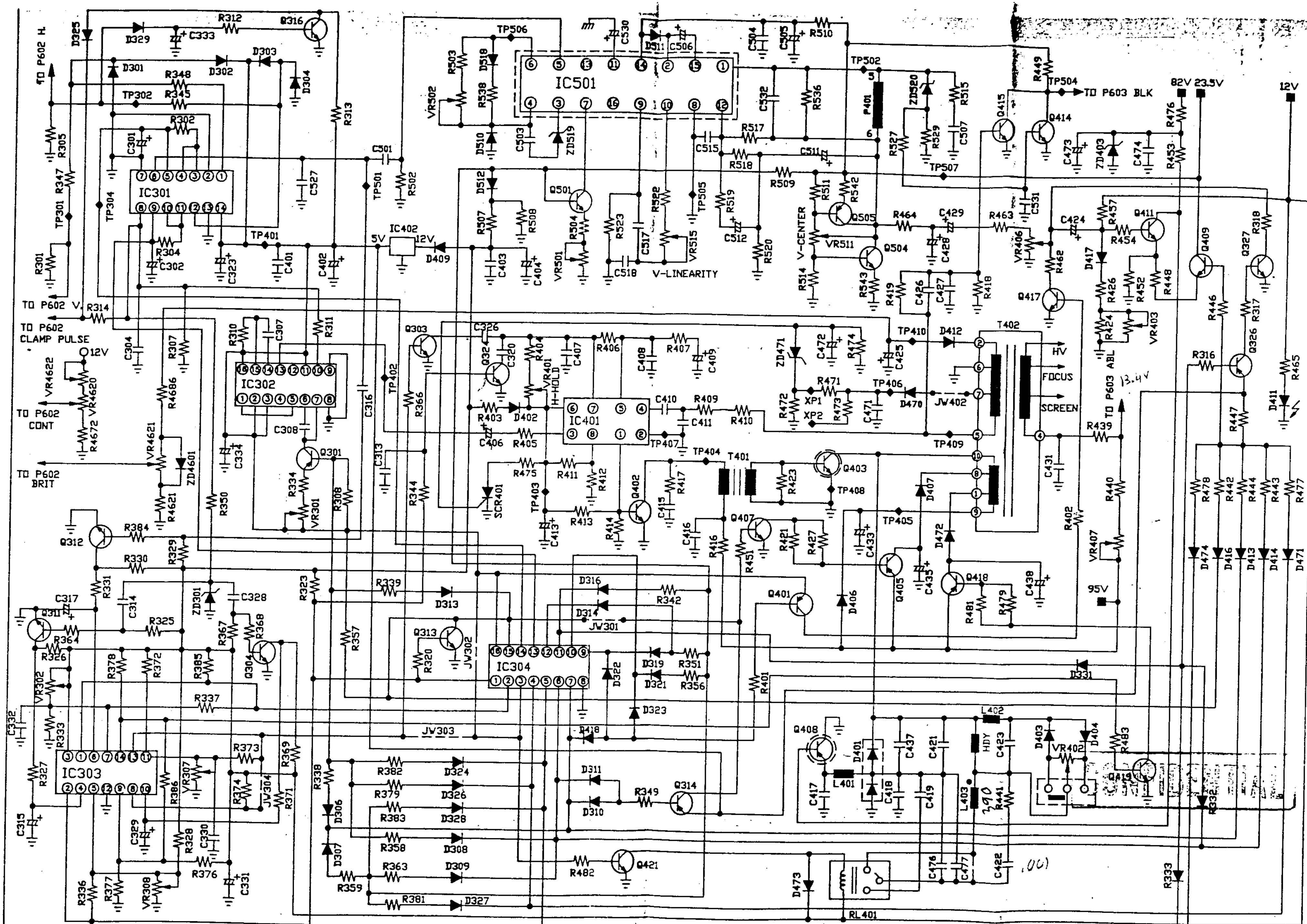


DELTA

DELTA ELECTRONICS,INC

SCALE		UNIT		DATE	07/28/93	WRTN		CHKD	APPVD	PART NAME : SCHEMATIC OF MONITOR	PART NO.	REV	SH

UNLESS OTHERWISE SPECIFIED DIMENSION TOLERANCE



DELTA ELECTRONICS, INC.

DELTA

SCALE	UNIT	DATE 07/28/93	FILE NAME	WRTN	CHKD	APPVD	PART NAME :	PART NO.	REV:	SHEET
UNLESS OTHERWISE SPECIFIED DIMENSION TOLERANCE DECIMALS .X± .XX± ANGLES±				J.W.YU			SCHEMATIC OF MONITOR DCM-1458	PK-1458	0	1 OF 2