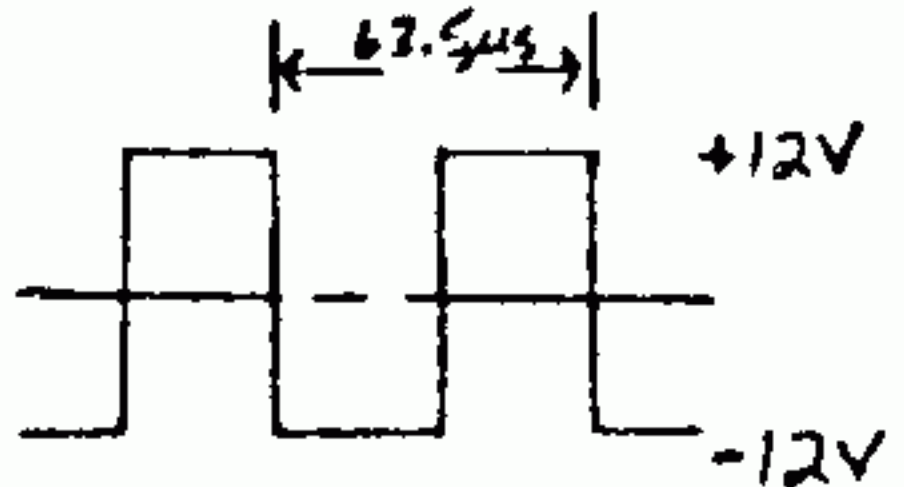
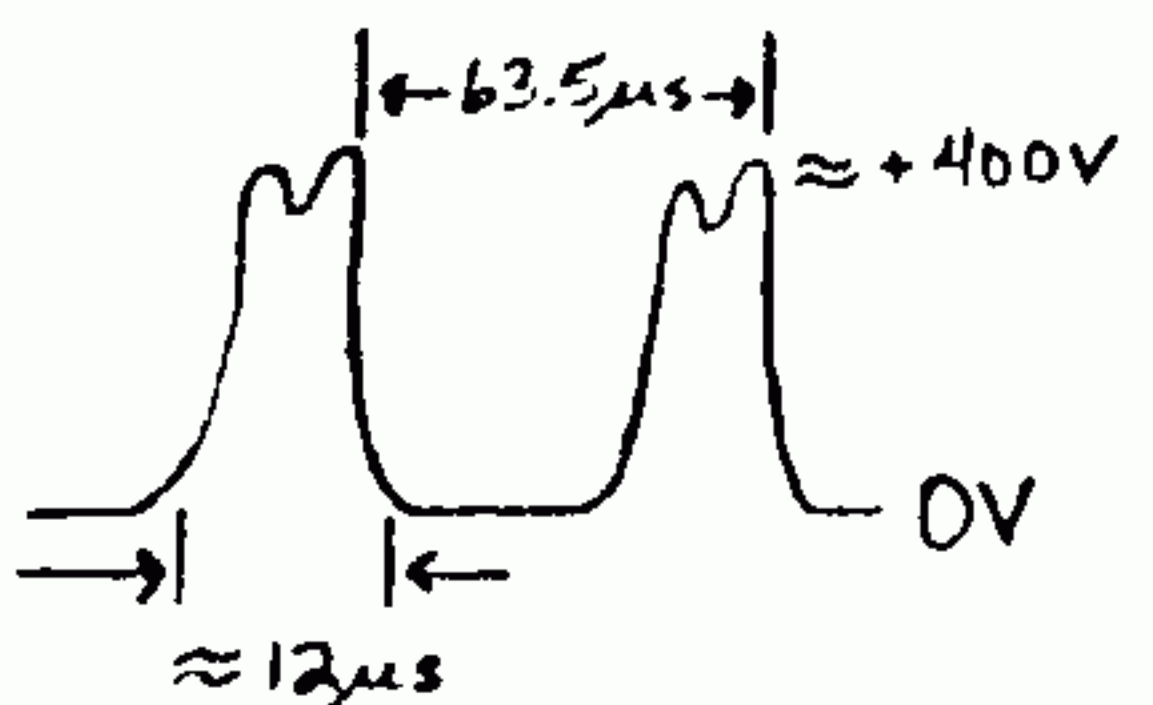


<u>TS No.</u>	<u>Symptom</u>	<u>Possible Cause</u>	<u>Remedy or Reference</u>	<u>Replacement Part</u>
1	Cooling water does not flow to diffusion pump.	a. Water pressure too low b. Cooling water lines for diffusion pump clogged.	a. Increase flow rate b. Unclog or replace water lines	
2	Instrument is not energized by depressing POWER switch.	a. Loss of power to instrument b. Fuse F1 blown c. Relay Y4 inoperative	a. Check circuit breaker for line supplying power to instrument. b. Replace F1 c. Replace Y4	F1 (15A) Y4 (MY4)
3	Rotary pump does not operate by depressing R.P. switch.	a. Fuse F2 blown b. Leak valve of rotary pump did not operate after shut down and pump oil flows back into foreline c. Relay Y1 or Y5 inoperative	a. Replace F2 b. Replace leak valve. If oil has flowed back, clean vacuum lines. c. Replace Y1 or Y5	F2 (15A) Leak Valve Y1 (MM2P) Y5 (MY4)
4	Evacuating sound of rotary pump does not cease.	a. Stage clamp knob set at CLAMP position on specimen chamber assembly b. Foreign matter (fibers etc.) adhering to o-ring between specimen chamber and door	a. Set stage clamp knob at UNCLAMP position b. Clean o-ring and o-ring surfaces.	

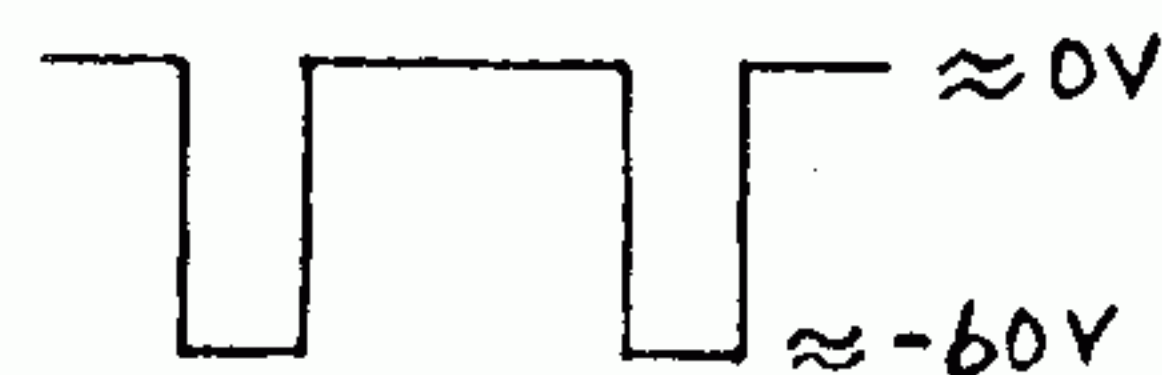
<u>TS No.</u>	<u>Symptom</u>	<u>Possible Cause</u>	<u>Remedy or Reference</u>	<u>Replacement Part</u>
		c. Electron gun housing mis-adjusted in electron gun chamber	c. After loosening 4 set screws, readjust housing. Tighten set screws.	
		d. Foreign matter (fibers etc.) adhering to o-ring between electron gun housing and electron gun chamber	d. Clean o-ring and o-ring surfaces.	
		e. Poor vacuum in column	e. Check if vacuum is poor in electron gun chamber, specimen chamber or other component by isolating these areas one at a time.	
		f. Rotary pump defective		Rotary Pump
		g. Valve defective		Valve assembly
5-a	Valve can not be turned by depressing VACUUM CONTROL OPERATION switch.	a. Valve defective		Valve assembly
		b. IC4 or IC8 defective on PC board N82DC01P	b. Replace IC4 and/or IC8	IC4 (7404) IC8 (7410)
		c. Relay Y1 defective in auto valve power supply (N82DB01)	c. Replace Y1	Y1 (MY2)
5-b	Valve cannot be stopped at 1(S) position by depressing VALVE CONTROL SHUT switch.	a. IC5, IC6, IC7 or IC8 defective on P.C. Board N82DC01P	a. Replace IC5, IC6, IC7 and/or IC8	IC5, IC6, IC7 (7400) IC8 (7410)
		b. IC defective or relay Y1 or Y2 defective on PC Board N82DB03P in auto valve power supply (N82DB01)	b. Replace IC and/or Y1, or Y2	IC (7404) Y1, Y2 (MY2)

<u>Ts No.</u>	<u>Symptom</u>	<u>Possible Cause</u>	<u>Remedy or Reference</u>	<u>Replacement Part</u>
5-c	Air is not admitted into column by depressing VACUUM CONTROL AIR switch	<ul style="list-style-type: none"> a. IC3, IC4 or IC6 on PC Board N82DC01P defective. b. Relay Y3 defective in auto valve power supply (N82DB01) c. Column leak valve defective 	<ul style="list-style-type: none"> a. Replace IC3, IC4 and/or IC6 b. Replace Y3 c. Replace leak valve 	<ul style="list-style-type: none"> IC3 IC4 (7404) IC6 (7400) Y3 (MY2) Valve
6	Diffusion pump heater does not operate	<ul style="list-style-type: none"> a. Fuse F3 Blown b. Diffusion pump cooling water stops c. Relay Y2 defective d. Diffusion pump heater open e. Thermostat open 	<ul style="list-style-type: none"> a. Replace F3 b. Supply cooling water c. Replace Y2 d. Replace diffusion pump heater. e. Depress thermostat reset button 	<ul style="list-style-type: none"> F3 (5A) Y2 (MY2) Heater
7	1. Trouble related to PIRANI gauge 1-1 Vacuum lamp (green) does not light even though gauge pointer deflects to green range with meter switch set at vac. position	<ul style="list-style-type: none"> a. Lamp filament open b. IC2 defective or relay Y1 defective on PC Board N82MA01P 	<ul style="list-style-type: none"> a. Replace lamp b. Replace IC2 and/or Y1 	<ul style="list-style-type: none"> Lamp IC2 (741) Y1 (MHU2P-0)

<u>TS No.</u>	<u>Symptom</u>	<u>Possible Cause</u>	<u>Remedy or Reference</u>	<u>Replacement Part</u>
	1-2 Gauge pointer does not deflect to green range with meter switch set at vac. even though vac level is high.	a. IC1 defective on PC Board N82MA01P b. Filament in Pirani detector in contact with housing c. Zero point of vacuum gauge circuit miscalibrated	a. Replace IC1 b. Replace Pirani tube c. After admitting air into the column, calibrate zero point by adjusting RV1 on PC board N82MA01P (with meter switch set at vac. position)	IC1 (741) Pirani tube
	1-3 Vacuum lamp stays on even though vacuum level is low	a. IC2 or TR1 defective on PC board N82MA01P b. IC1 defective on PC board N82MA01P c. Filament in Pirani detector open	a. Replace IC2 and/or TR1 b. Replace IC1 c. Replace Pirani detector	IC2 (741) TR1 (2SC484Y) IC1 (741) Pirani detector
	1-4 Vacuum gauge pointer does not deflect smooth	a. Vacuum leak b. Specimen outgassing	a. Check if dust or fiber is adhering to o-rings b. Pump for longer time before turning on operation switch	
8	Instrument is not energized by depressing OPERATION switch (EMISSION meter normally reads as follows)	a. Fuse F4 blown b. Vacuum level too low c. Relay Y3 defective	a. Replace F4 b. See TS No. 7 c. Replace Y3	F4 (5A) Y3 (MY3)

<u>TS No.</u>	<u>Symptom</u>	<u>Possible Cause</u>	<u>Remedy or Reference</u>	<u>Replacement Part</u>
	30kV - 60 μ A 15kV - 36 μ A 2kV - 4 μ A			
9	Loss of intensity on CRT °Check voltages on PC Board N82HD01P in high voltage power supply: CP4-GND: +15V CP5-GND: -15V CP3-GND: +75V °Check voltage in unit A of display console. On PC Board N82MA01P: CP2-GND: +15V CP3-GND: -15V	a. Fuse F1 blown in high voltage power supply Dwg. No. N83H03 b. No high voltage for CRT b-1 Voltage not supplied across CP2-GND on PC Board N82HD01P (Normally about +60V) b-2 No oscillator wave form across CP4-GND on PC Board N83HC01P Normal Wave Form:  b-3 No wave form across CP1-GND on PC Board N80HB01P-B 	a. Replace F1 b-1 Replace IC1 b-2 Replace IC4 b-3 Fuse F2-2 blown and TR7 defective in high voltage power supply drawing no. N83H03	F1 (5A) IC1 (741) IC4 (709) F2-2 (1A) TR7 (2SC643A) or (2SC1172)

<u>TS No.</u>	<u>Symptom</u>	<u>Possible Cause</u>	<u>Remedy or Reference</u>	<u>Replacement Part</u>
	b-4 Wire broken in connector of CRT high voltage cable JHB2-JN5	b-4 Wire broken in connector of CRT high voltage cable JHB2-JN5	b-4 Repair or replace cable NHB2-JN5	CRT High voltage cable JHB2-JN5
	c. About -500V is supplied to INTENSITY terminal of CRT. Check voltage across CP4-GND on PC Board N80HB01P-B (H.V. Power supply check point #6)	c. About -500V is supplied to INTENSITY terminal of CRT. Check voltage across CP4-GND on PC Board N80HB01P-B (H.V. Power supply check point #6)	c. Zener diode ZD2 and/or ZD3 defective.	ZD2 (IN4764B) ZD3 (IN3710B)
	d. +400V is not applied to second grid of CRT. Check voltage across CP5-GND on PC Board N80HB01P-B. (H.V. Power supply check point #8)	d. +400V is not applied to second grid of CRT. Check voltage across CP5-GND on PC Board N80HB01P-B. (H.V. Power supply check point #8)	d. Zener diode ZD4, ZD5 defective	ZD4, ZD5 (IN3710B)
	e. Scanning on CRT kept in blanking condition. About -60V is applied across CP5-GND on PC Board N82NK01P. Normal wave form:	e. Scanning on CRT kept in blanking condition. About -60V is applied across CP5-GND on PC Board N82NK01P. Normal wave form:	e. Replace IC7 on N82NC02P or IC5 TR4, TR5 on N82NK01P	IC7 (709) IC5 (709) TR4, TR5 (2SA510-0)



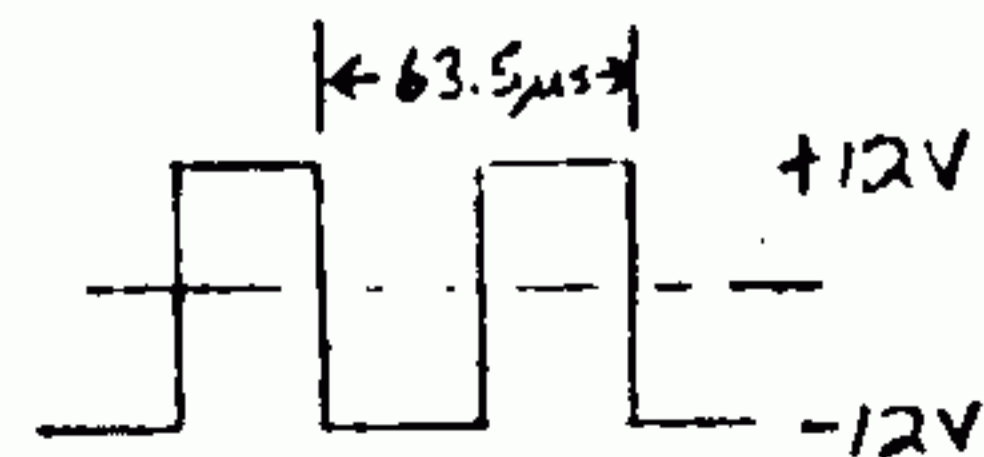
f. Image amplifier faulty

f. Trouble TS No. 9 should be checked in scanning mode other than TV, since causes f-1, f-2 and f-3 can not be detected in TV mode.

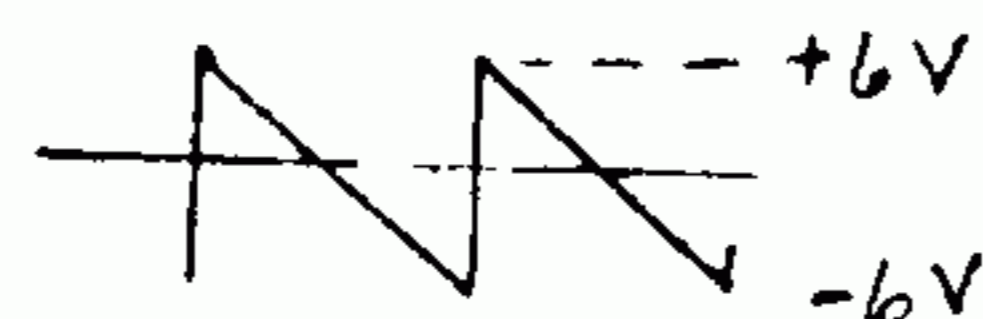
<u>TS No.</u>	<u>Symptom</u>	<u>Possible Cause</u>	<u>Remedy or Reference</u>	<u>Replacement Part</u>
		f-1 Check if PHOTO METER pointer deflects from 0 A to about 50 A by turning BRIGHTNESS control		
		f-2 About +12V is applied across CP5-GND on PC board N82NB02P. Normally voltage should change from +9V to 0V by turning BRIGHTNESS control		
		f-3 Disconnect connector JN3 from rear of display console. Check as instructed in f-1 for indication of different symptoms.	f-3 Replace IC8 on PC Board N82NB02P	IC8 (709)
		f-4 In step f-3 check indicates same symptom as in f-1.	f-4 Replace preamplifier or photomultiplier.	Preamplifier Photomultiplier
		g. CRT heater open	g. Check heater. If open, replace CRT	CRT (C816P7)
10	Brightness does not change by turning BRIGHTNESS control	a. See TS No. 9-f	a. See TS No. 9-f	See TS No. 9-f
11	Intensity abnormally bright on CRT	a. Voltage supplied to CRT INTENSITY terminal below -300V	a. Zener diode ZD2 and/or ZD3 defective	ZD2 (IN4764B) ZD3 (IN3710B)

<u>TS No.</u>	<u>Symptom</u>	<u>Possible Cause</u>	<u>Remedy or Reference</u>	<u>Replacement Part</u>
	<p>Check voltage in unit A in display console. Voltage on PC Board N82MA01P:</p> <p>CP2-GND: +15V CP3-GND: -15V</p> <p>When brightness changes on CRT, voltage mentioned in 11-a</p>	<p>Check voltage across CP4-GND on PC Board N80HB01P-B (high voltage check point #6)</p> <p>b. Image amplifier faulty</p> <p>b-1 PHOTO METER pointer reads a high value and cannot be deflected by turning BRIGHTNESS control. Normally, the pointer should deflect from 0μA to about 50μA.</p> <p>b-2 Voltage across CP5-GND on PC board N82NB02P is below +5V and is not changed by turning BRIGHTNESS control. Normally voltage should change within an approximate range of +9V ~ 0V.</p>	<p>b. In TV mode, causes b-1, b-2 or b-3 can not be detected. Select scanning mode other than TV mode for checks.</p>	

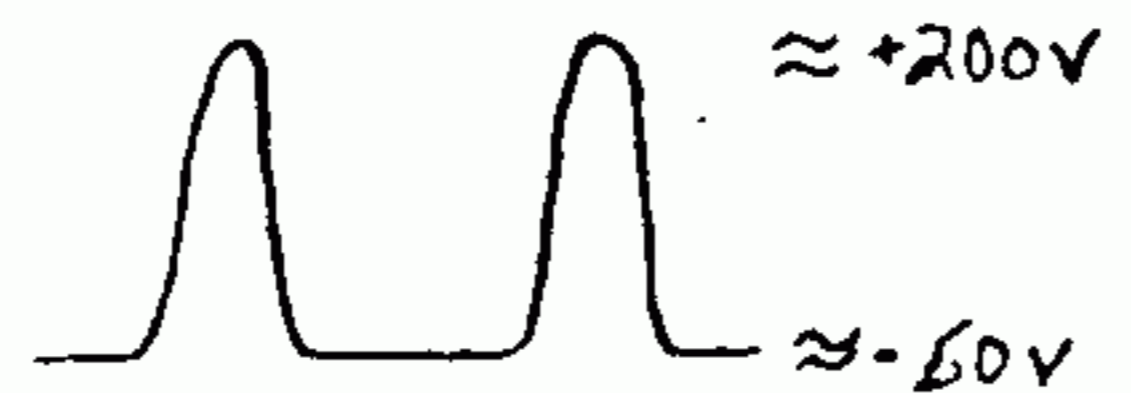
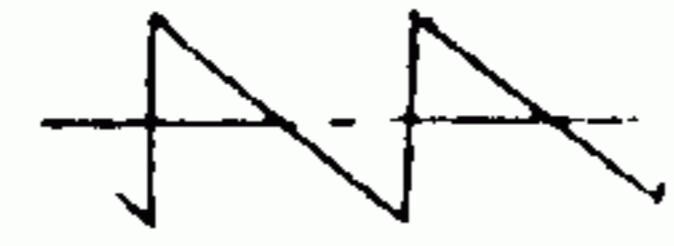
<u>TS No.</u>	<u>Symptom</u>	<u>Possible Cause</u>	<u>Remedy or Reference</u>	<u>Replacement Part</u>
		b-3 Disconnect preamplifier cable connector JN3 from rear of display console. Check as instructed in b-1 above. If the pointer does not deflect as described in b-1, IC8 defective.	b-3 Replace IC8 on PC Board N82NB02P	IC8 (709)
		b-4 If the pointer deflects normally, preamplifier or photomultiplier is defective.	b-4 Replace preamplifier. Replace photomultiplier.	Preamplifier Photomultiplier
12	Scan line can not be focused on CRT	a. CRT high voltage too low. Scan area too large in rapid scanning mode. Normal area: 60mm x 50 mm (approx.)		
		a-1 Voltage too low across CP2-GND on PC board N82HD01P. Normally: Approx. +60V	a-1 Replace IC1	IC1 (741)
		a-2 Frequency of wave form changing across CP4-GND on PC board N83HC01P. Normal frequency:	a-2 Replace IC4	IC4 (709)

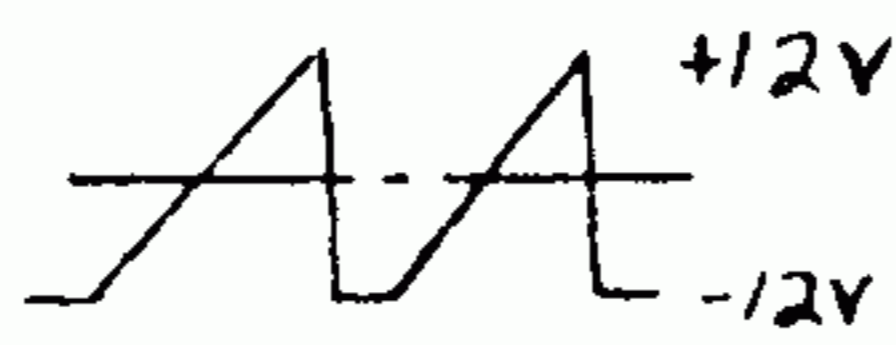
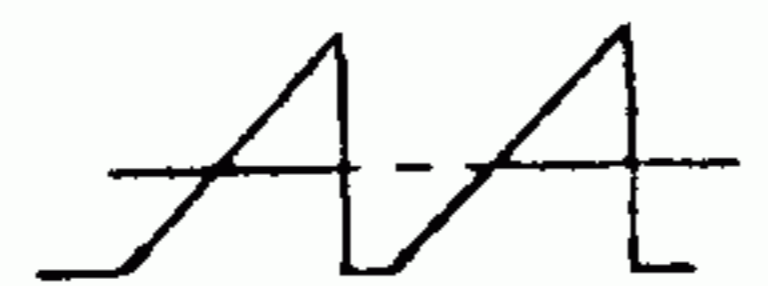
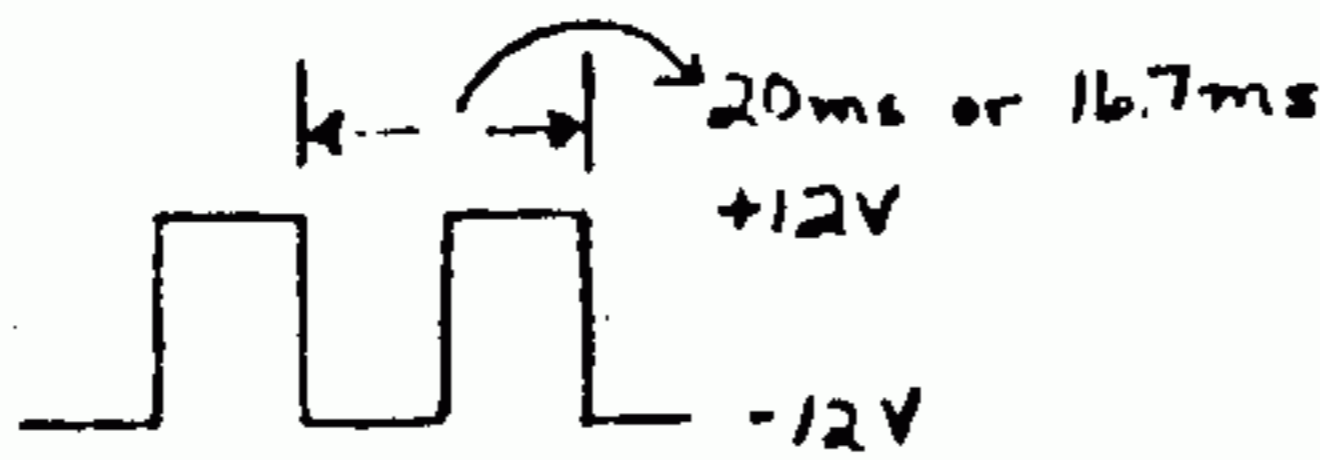


<u>TS No.</u>	<u>Symptom</u>	<u>Possible Cause</u>	<u>Remedy or Reference</u>	<u>Replacement Part</u>
		b. Voltage supplied to 4th grid of CRT too low (below +400V) Voltage too low across CP5-GND on PC Board N80HB01P-B in high voltage power supply. Normally approx. +400V (H.V. power supply check point #8)	b. Replace Zener diode ZD4, ZD5	ZD4, ZD5 (IN3710B)
13	CRT does not scan horizontally (in PHOTO, NORMAL, RAPID scanning mode) NOTE: In most cases, vertical scanning will occur at the left or right side of CRT just outside the frame. Increase brightness to observe. Check can also be made by selecting RAPID mode. ° Check voltage in unit A of display console.	a. Horizontal scan circuit not oscillating. No wave form across CP2-GND on PC board N82NB02P Normal Wave Form:	a. Replace IC3, although IC2 or IC5 may be defective on PC Board N82NB02P	IC3 (531) IC2, IC5 (709)



<u>TS No.</u>	<u>Symptom</u>	<u>Possible Cause</u>	<u>Remedy or Reference</u>	<u>Replacement Part</u>
	Voltage on PC board N82MA01P: CP2-GND: +15V CP3-GND: -15V	b. CRT scanning circuit defective. No wave form across CP3-GND on PC Board N80NA02P. Normal scanning wave form:	b. Replace IC5 on PC Board N80NA01P	IC5 (741)
	(In TV scanning mode)	c. CRT scanning circuit defective c-1 Voltage not supplied across CP3-GND on PC board N83NH01P. Normally approx. +6V +10V c-2 No wave form across CP2-GND on PC Board N83NH01P. Normal wave form:	c-1 Check and replace any one of TR2, TR3 on PC board N83NH01P and TR10 in display console. c-2 Replace TR9 in display console.	TR2,TR3 (2SC510-0) TR10 (2SD110-0) TR9 (2SC558)



<u>TS No.</u>	<u>Symptom</u>	<u>Possible Cause</u>	<u>Remedy or Reference</u>	<u>Replacement Part</u>
14	<p>CRT does not scan vertically.</p> <p>NOTE: In most cases, horizontal scanning will occur at top or bottom of CRT just outside the frame. Increase brightness to observe. Check</p>	<p>a. Vertical scanning circuit does not oscillate. No wave form across CP1-GND on PC Board N82NC02P.</p> <p>Normal scanning wave form:</p> 	<p>a. Replace IC3 although IC1 - IC5 may be defective on PC board N82NC02P.</p>	<p>IC3 (709) IC1 - IC5 (709)</p>
	<p>can also be made by selecting RAPID mode.</p>	<p>b. CRT scanning circuit defective. No wave form across CP4-GND on PC Board N80NA02P.</p> <p>Normal scanning wave form:</p> 	<p>b. Replace IC6 on PC Board N80NA02P</p>	<p>IC6 (741)</p>
15	<p>CRT scan lines not uniform. CRT horizontal scan not synchronized at line frequency in PHOTO, NORMAL and RAPID mode.</p>	<p>a. No line frequency across CP1-GND on PC Board N82NL01P</p> <p>Normal frequency:</p> 	<p>a. Replace IC1 on PC board N82NL01P</p>	<p>IC1 (709)</p>

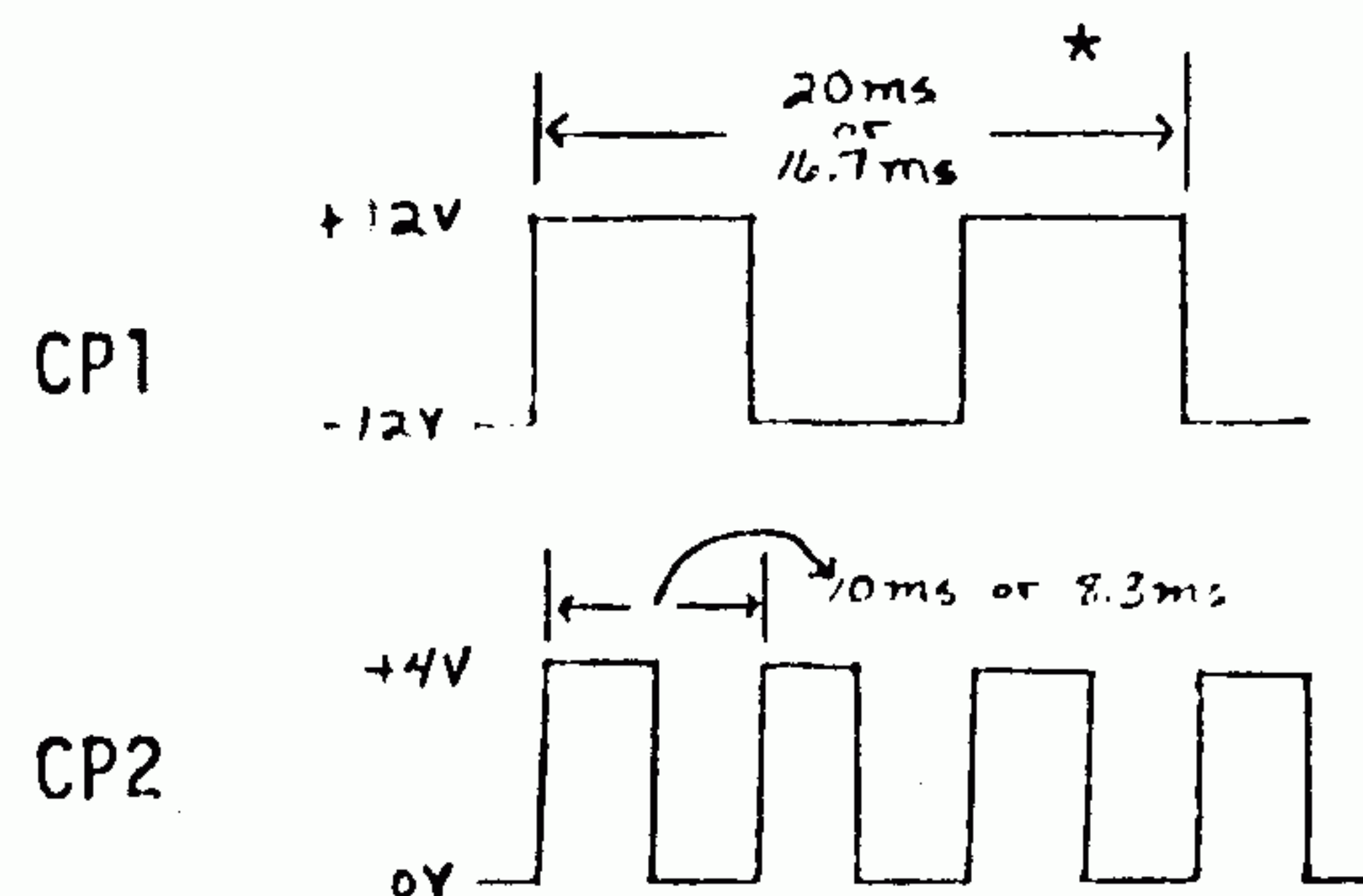
<u>S No.</u>	<u>Symptom</u>	<u>Possible Cause</u>	<u>Remedy or Reference</u>	<u>Replacement Part</u>
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b. Abnormal wave form at CP2 on PC board N82NL01P.

b. Readjust RV1 (50K Ω). Replace IC2

IC2 (709)

Normal wave form:



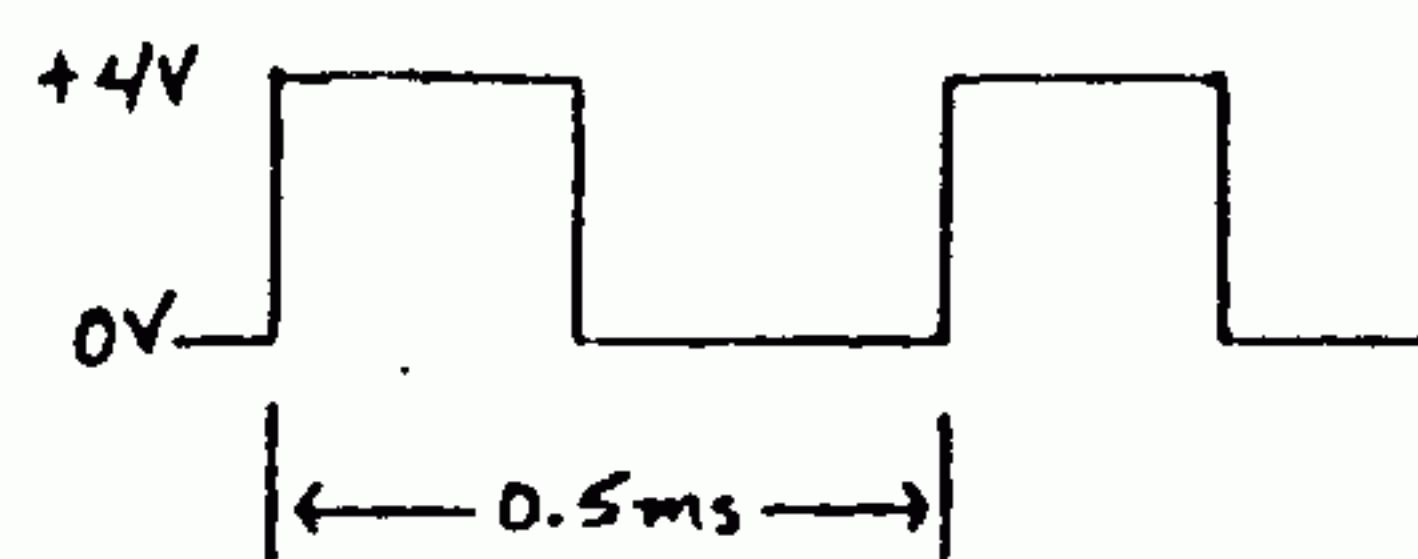
*50-60 cycle operation.

c. Abnormal wave form at CP3 on PC board N82NL01P.

c. Readjust RV2 (50k Ω)
Replace IC3

IC3 (709)

Normal wave form:



d. Abnormal wave-form at CP4 on PC board N82NL01P

d. Replace IC12 ~ IC19

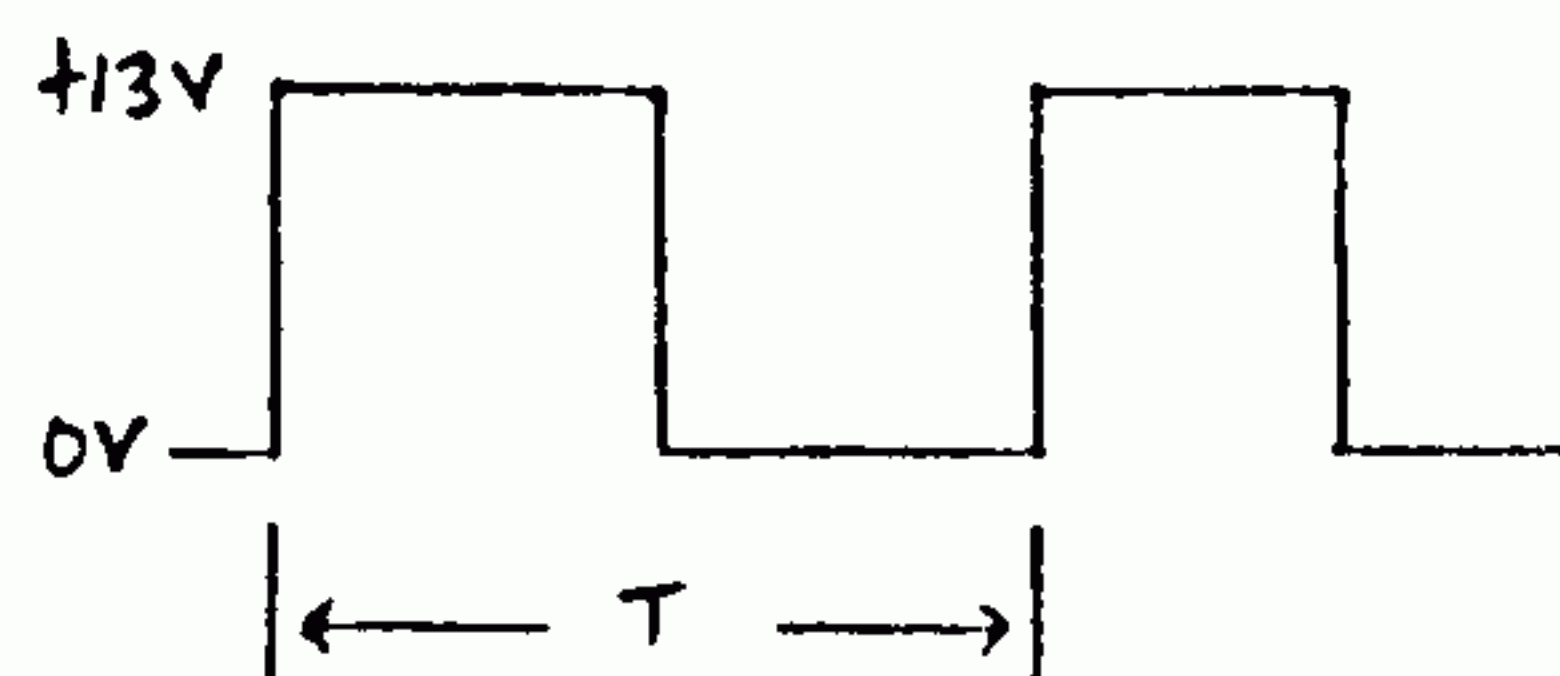
IC12,14,17,18 (7400)

IC13 (7404)

IC15, IC16 (7473)

IC19 (7420)

Normal wave form:



<u>TS No.</u>	<u>Symptom</u>	<u>Possible Cause</u>	<u>Remedy or Reference</u>	<u>Replacement Part</u>
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	T	
	DUAL OFF	DUAL ON
PHOTO	80ms or 66.8ms	40ms or 33.3ms
NORMAL	20ms or 16.7ms	10ms or 8.33ms
RAPID (full)	2ms	1ms
RAPID (red.)	1ms	1ms

e. Horizontal scanning not synchronized and frequency miscalibrated.

e. Readjust RV1 on N82NB02P at PHOTO mode. Readjust RV2 on N82NB02P at NORMAL mode. Readjust RV3 on N82NB02P at RAPID (reduced) mode, and adjust RV22 on N82N11 at RAPID (full) mode. In PHOTO mode, readjust with RV1 (100K Ω) so that scan line intervals are uniform.

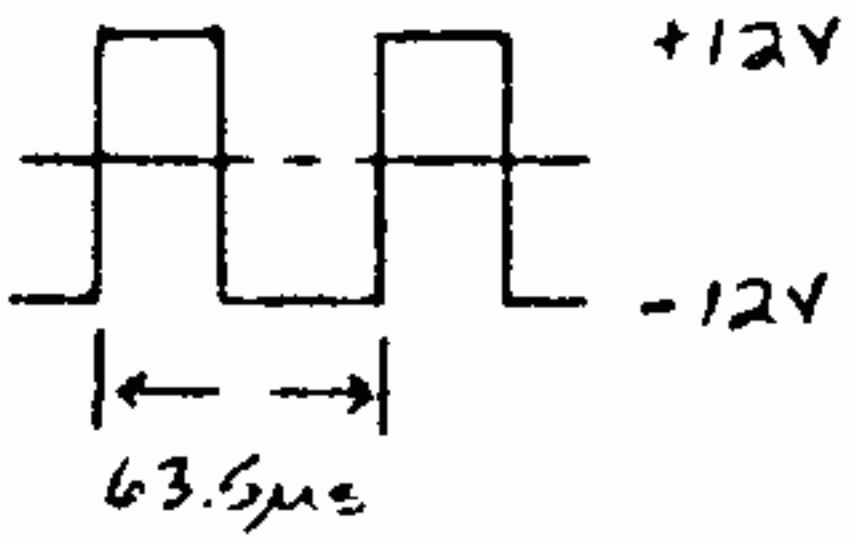
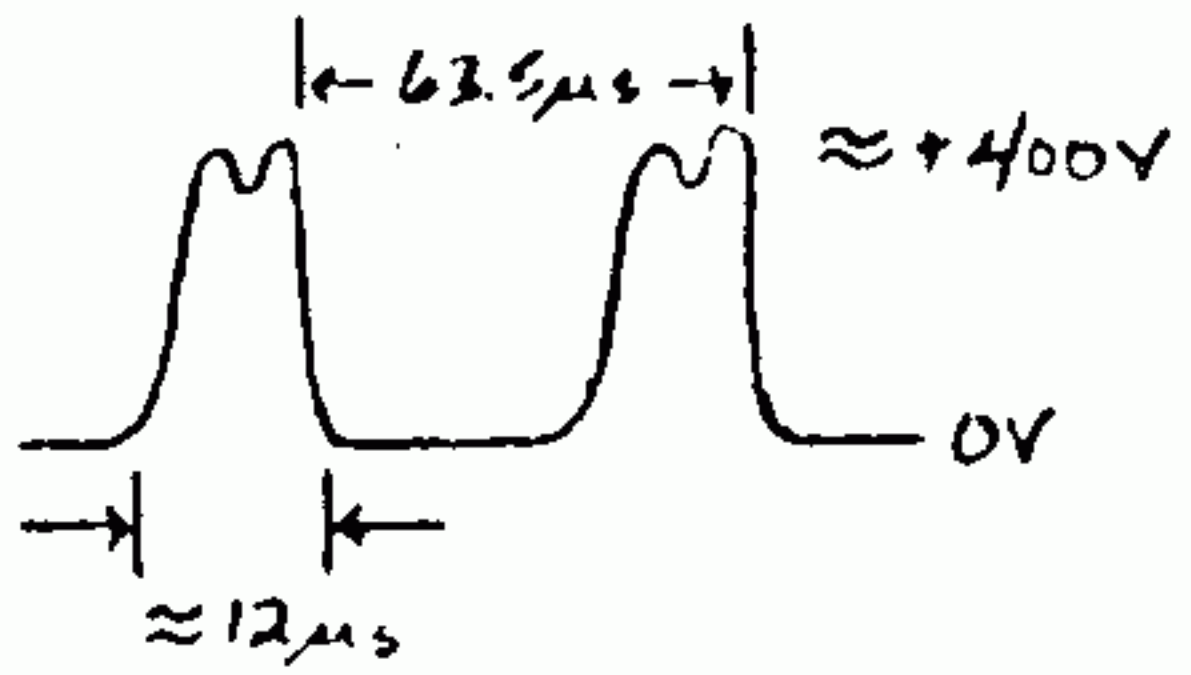
16 In TV scan mode, white lines on upper part on CRT

a. See 15-a above.

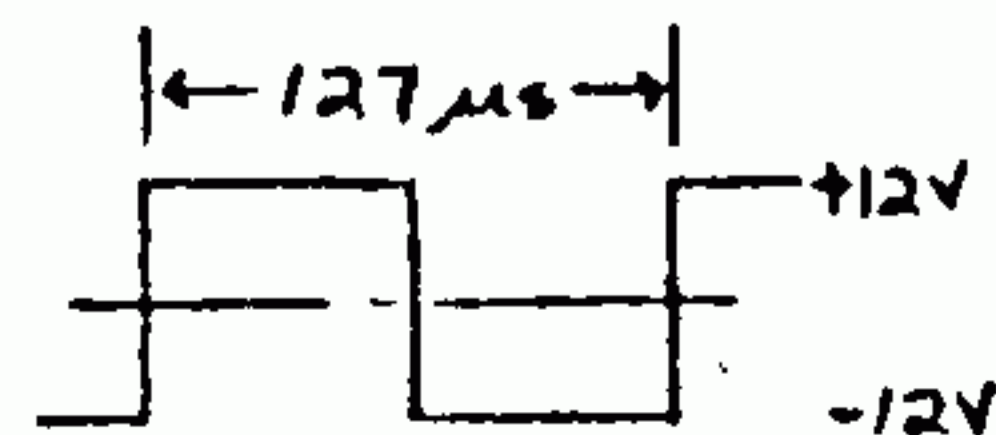
a. See 15-a above.

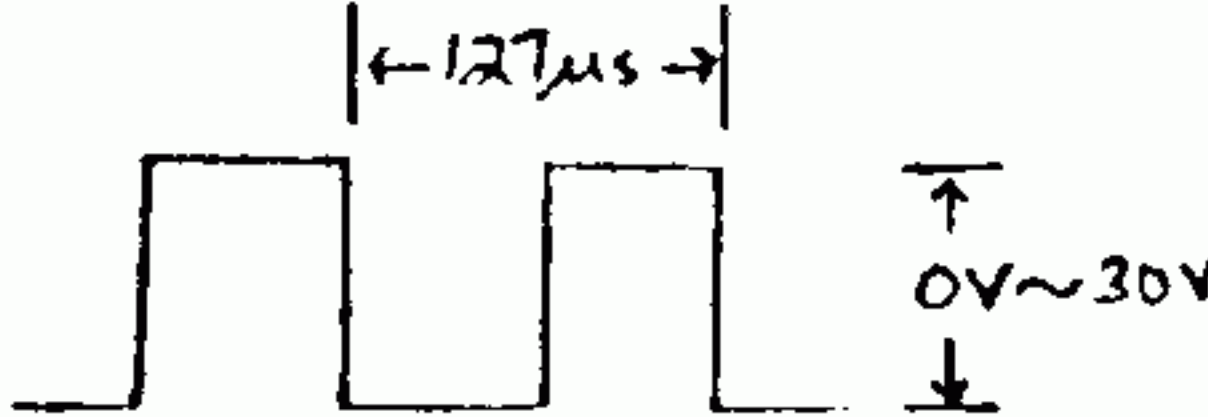
IC (709)

<u>TS No.</u>	<u>Symptom</u>	<u>Possible Cause</u>	<u>Remedy or Reference</u>	<u>Replacement Part</u>
		b. Vertical scan not synchronized and frequency miscalibrated.	b. Adjust by turning RV3 (2 M Ω) on PC Board N82NC01P to eliminate white lines on upper part of CRT	
17	When EMISSION control is turned fully CCW (no emission current), EMISSION meter reading unstable at the following levels.	a. Electron gun cartridge contaminated causing electrical discharge. b. Anode contamination c. Bad contamination or dust (especially fibers) accumulated in anode chamber. d. Poor vacuum in anode chamber	a. Clean electron gun cartridge. b. Clean anode c. Clean anode chamber d. Disconnect electron gun cable. Replace with blank plate and check vacuum after pumping for reasonable length of time. Compare with vacuum level when electron gun cable is in position. With meter switch at vac. position, check how long it takes meter to deflect from the green range.	Electron Gun Cartridge Anode Electron gun cable.
	25kV - 54 μ A 15kV - 36 μ A 10kV - 18 μ A 5kV - 10 μ A 2kV - 4 μ A			
		e. Insulation oil contaminated in H.V. tank. f. Voltage across CP3-GND on PC board N83HC01P exceeds +25V	e. Remove H.V. Supply, check oil for contamination. f. IC2, TR2, TR3 on PC board or TR3 in H.V. power supply defective.	Insulation oil (Shell Diala) IC2 (741) TR2, TR3 (2SC484Y) TR3 (2SD110)

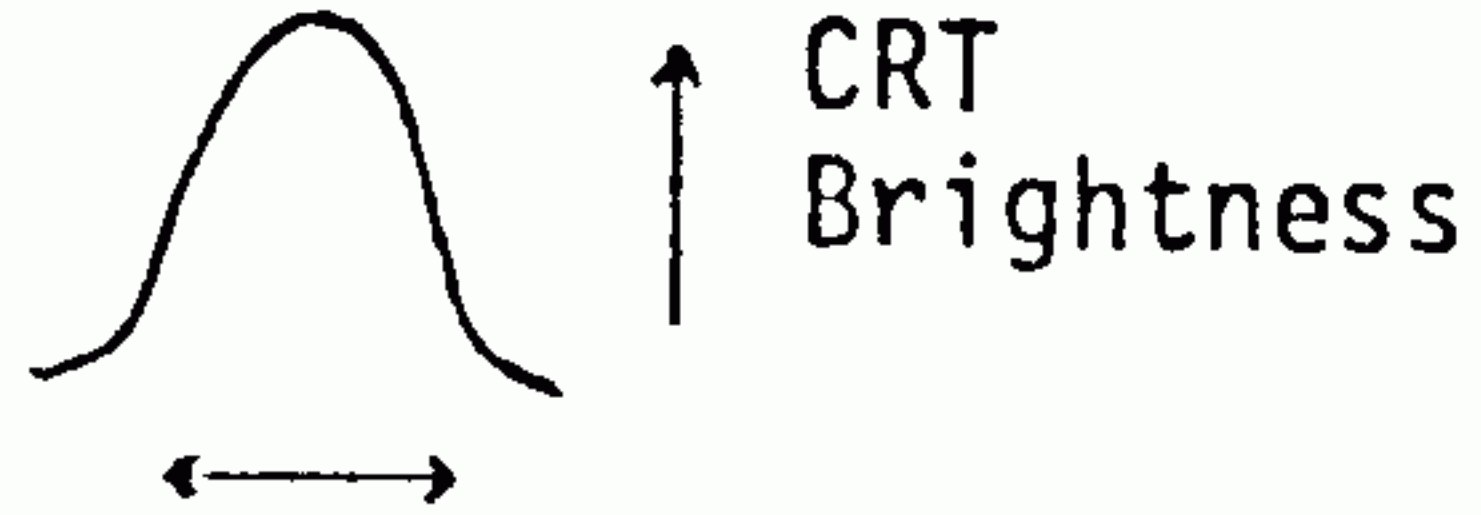
<u>TS No.</u>	<u>Symptom</u>	<u>Possible Cause</u>	<u>Remedy or Reference</u>	<u>Replacement Part</u>
18	When EMISSION control is turned fully CCW (No emission current), EMISSION meter pointer does not deflect or meter reading is far lower than the following value (normal electron gun H.V. is not supplied)	<p>a. No voltage across CP6-GND on PC board N83HC01P. Normally +60V ~ +65V (at electron gun high voltage of 25kV)</p> <p>b. No oscillator wave form across CP4-GND on PC board N83HC01P. Normal wave form:</p>  <p>c. Following wave form unavailable at check point #2 in H.V. power supply (N83H03) (at electron gun high voltage of 25kV):</p>  <p>d. Insulation deteriorated for H.V. Capacitors C1 ~ C9 in electron gun high voltage supply (oil immersed type) N83HA08</p>	<p>a. IC5, TR5, TR6 on PC board N83HC01P or TR5 in H.V. Power supply (N83H03) defective.</p> <p>b. Replace IC4</p> <p>c. Fuse F2-1 blown and TR4 defective in H.V. power supply</p> <p>d. Check insulation resistance in capacitor using a megger.</p>	<p>IC5 (741) TR2 (2SC484Y) TR3 (2SD110)</p> <p>IC4 (709)</p> <p>F2-1 (2 A) TR4 (2SC643A)</p> <p>C1 ~ C5 1000PF, 15kV C6 ~ C9 4700PF, 15kV</p>
	<p>25kV - 54μA 15kV - 36μA 10kV - 18μA 5kV - 10μA 2kV - 4μA</p>			

<u>S No.</u>	<u>Symptom</u>	<u>Possible Cause</u>	<u>Remedy or Reference</u>	<u>Replacement Part</u>
9	When EMISSION control is turned CW, EMISSION meter reading does not exceed value listed in TS No. 18 above.	<p>a. Filament open</p> <p>b. Poor contact between electron gun cartridge pin and socket in electron gun cable.</p> <p>c. Electron gun bias resistor open (electron gun cut off)</p> <p>d. Filament power supply defective</p> <p>d-1 Voltage not supplied across CP3-GND on PC board N83HC01P (when EMISSION control is turned clockwise). Normally, the voltage changes from 0V to about +30V by turning EMISSION control.</p> <p>d-2 No wave form across CP1-GND on PC board N83HC01P</p> <p>Normal wave form:</p>	<p>a. Replace electron gun cartridge (filament)</p> <p>b. Tighten sockets in electron gun cable.</p> <p>c. Replace one of R11 ~ R35 (100KΩ) in electron gun H.V. supply (N83HA08)</p> <p>d-1 IC2, TR2, TR3 and TR3 in H.V. power supply (N83H03) may be defective.</p> <p>d-2 Replace IC1 on PC board N83HC01P</p>	<p>Electron gun cartridge</p> <p>R11 ~ R35 (100KΩ)</p> <p>IC2 (741) TR2, TR3 (2SC484Y) TR3, (2SD110)</p> <p>IC1 (709)</p>



<u>TS No.</u>	<u>Symptom</u>	<u>Possible Cause</u>	<u>Remedy or Reference</u>	<u>Replacement Part</u>
		d-3 No wave form on collector of power transistors TR1, TR2 (2SC643A) in H.V. power supply (N83H03). When EMISSION control is turned clockwise, wave form should normally be as follows:	d-3 Replace TR1, TR2 in H.V. Power Supply (N83H03).	TR1, TR2 (2SC643A)
				
20	When EMISSION control is turned CW, EMISSION meter reads above 250µA or pointer deflects abnormally.	<p>a. Electron gun cartridge contaminated.</p> <p>a-1 Bad contamination around grid cap bore causing leakage</p> <p>a-2 Filament base badly contaminated.</p> <p>b. Anode not seated properly</p> <p>c. Leakage between electron gun cable filament sockets and H.V. contact</p>	<p>a-1 Clean grid cap</p> <p>a-2 Replace filament</p> <p>b. Seat anode properly</p> <p>c. Resistance must be 2.6 MΩ ~ 5ΩM as measured with a megger (DC 500V) (depending on position of bias resistor). If resistance is low, replace electron gun cable.</p>	<p>Electron gun cartridge</p> <p>Electron Filament</p> <p>Electron gun cable</p>

<u>TS No.</u>	<u>Symptom</u>	<u>Possible Cause</u>	<u>Remedy or Reference</u>	<u>Replacement Part</u>
21	Signal on CRT can not be maximized with beam alignment	<p>a. Filament tip miscentered in the cap opening of electron gun cartridge.</p> <p>b. Electron gun cartridge clamp ring not tightened securely.</p> <p>c. ALIGNMENT X or Y circuit defective</p> <p>c-1 Voltage across CP4-GND on PC board N82MA01P does not change but deviates only on positive or negative side when ALIGNMENT X control is turned.</p> <p>c-2 Voltage across CP5-GND on PC board N82MA01P does not change but deviates only on positive or negative side when ALIGNMENT Y Control is turned.</p> <p>d. Voltage not applied to photomultiplier.</p> <p>d-1 No voltage across CP2-GND on PC board N80HB01P-B (H.V. power supply check point #4) When CONTRAST control is turned CW, the voltage should normally be: Approx. -300V ~ -700V</p>	<p>a. Recenter filament</p> <p>b. Securely tighten electron gun cartridge clamp ring.</p> <p>c-1 Replace IC5</p> <p>c-2 Replace IC6</p> <p>d-1 Replace IC1</p>	<p>IC5 (741)</p> <p>IC6 (741)</p> <p>IC1 (741)</p>

<u>TS No.</u>	<u>Symptom</u>	<u>Possible Cause</u>	<u>Remedy or Reference</u>	<u>Replacement Part</u>
		d-2 Dividing resistors R15 ~ R26 (for photomultiplier) open in preamplifier (N82BA03)	d-2 Replace open dividing resistor of R15 ~ R26	R15 ~ R25 200 k Ω R26 150 k Ω
		e. Image amplifier defective. See 9-f	e. See 9-f	See 9-f
22	Signal on CRT can not be maximized by beam alignment.	a. Filament not saturated. b. Filament tip miscentered in cap of electron gun cartridge	a. See Section 6 of instruction manual b. Recenter filament	
	 <p>Alignment</p>			
23	Signal on CRT can not be maximized by turning ALIGNMENT X and Y controls.	a. Mechanical alignment insufficient (also check TS No. 22) b. ALIGNMENT X or Y circuit defective. See TS No. 21-c	b. See TS No. 21-c	See TS No. 21-c
24	Image contrast can not be changed by turning CONTRAST control. However, CRT brightness can be changed by turning BRIGHTNESS control.	a. Photomultiplier voltage can not be changed by turning CONTRAST control. a-1 Voltage across CP2-GND on PC board N80HB01P-B in H.V. power supply can not be changed by turning CONTRAST control	a-1 Replace IC1	IC1 (741)

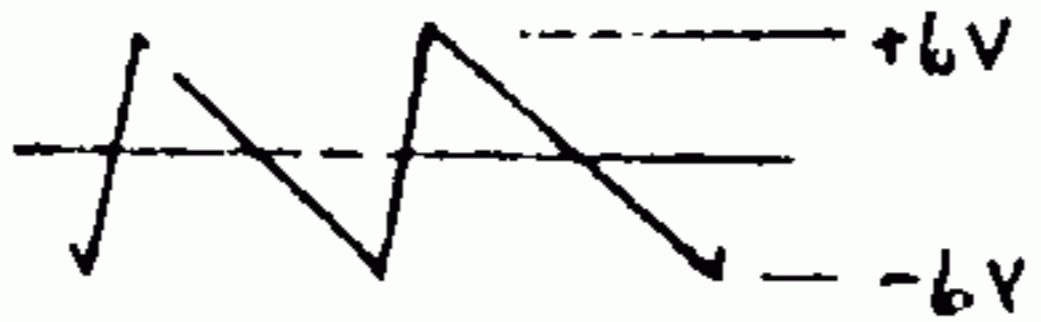
<u>TS No.</u>	<u>Symptom</u>	<u>Possible Cause</u>	<u>Remedy or Reference</u>	<u>Replacement Part</u>
		H.V. Power source check point #4. Normally, the voltage should change from approx. -300V to -700V.		
		a-2 Dividing resistors R15 ~ R26 (for photomultiplier) open in preamplifier (N82BA03)	a-2 Replace open dividing resistor R15 ~ R26	R15 ~ R25 200 k Ω R26 150 k Ω
25	Signal level can not be changed on CRT by turning SPOT SIZE control. and/or	a. First condenser lens power supply defective. Voltage across CP3-GND on PC board N80MB01P can not be changed by turning SPOT SIZE control. The voltage should normally change from approx. +1V to +3.3V (at 25 kV)	a. IC3, TR13, TR14 on PC board N80MB01P or TR1 in unit A of display console may be defective.	IC3 (741) TR13 (2SC484) TR14 (2SD234) TR1 (2SD110)
26	CRT intensity abnormally bright when electron beam is aligned.	b-1 Defective IC3 or IC7 on N82MK01P. Defective IC15, IC14 or IC19 on N82NL01P. Check CP2. CP2-GND: Approx +7V (SE, SE/BSE on) b-2 If CP2-GND is +7V, IC1 or IC2 is defective on N82NK01P	b-1 Replace IC3 or IC7 on N82NK01P Replace IC15, IC14 or IC19 on N82NL01P b-2 Replace IC1 and/or IC 2	IC3 (709) IC7 (7400) IC15 (7473) IC14(7400) IC19 (7420) IC1 (CD4066) IC2 (709)

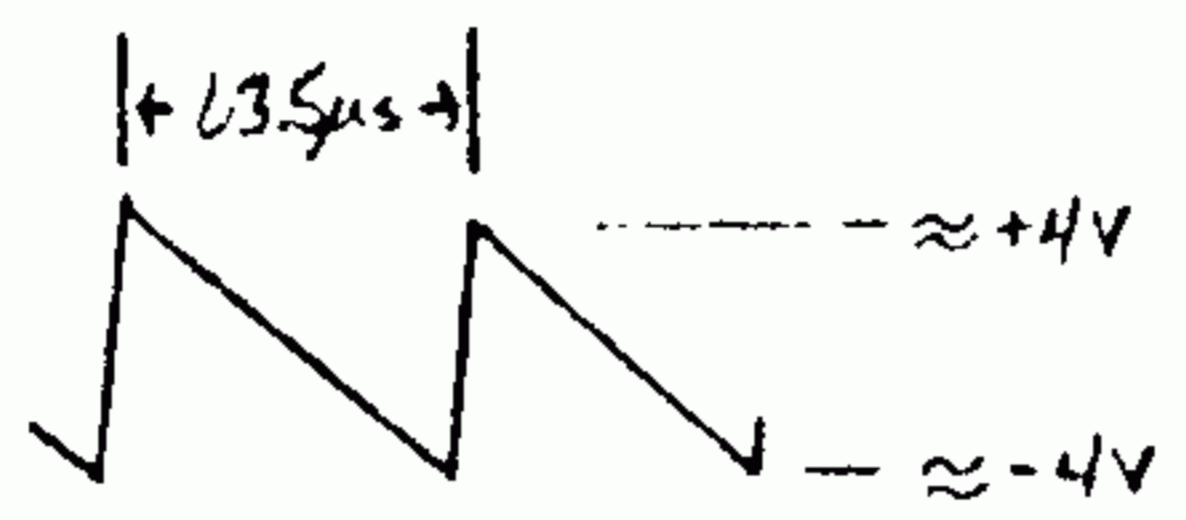

<u>TS No.</u>	<u>Symptom</u>	<u>Possible Cause</u>	<u>Remedy or Reference</u>	<u>Replacement Part</u>
		b-3 Defective <u>+7V</u> power supply on N30NP01P (CP1, CP2)	b-3 If no +7V (CP1) replace TR1 and/or ZD1. If no -7V, (CP2) replace TR3 and/or ZD2	TR1 (2SC510) TR2 (2SD234) ZD1 (RD4A) TR3, (2SA510) TR4 (2SB434) ZD2 (RD4A)
26	1. Intensity on CRT abnormally bright even when SPOT SIZE control is turned fully CW	1-a No second condenser lens current. No voltage across CP4-GND on PC board N80MB01P. The voltage should normally be approx. +3.0V (at 25kV)	1-a IC4, TR15, TR16 on PC board N80MB01P or TR2 in unit A of display console may be defective.	IC4 (741) TR15 (2SC484) TR16 (2SD234) TR2 (2SD110)
		1-b No First condenser lens current. No voltage across CP3-GND on PC board N80MB01P. The voltage should normally be approx. +1V ~ +3.3V (at 25kV)	1-b IC3, TR13, TR14, on PC board N80MB01P or TR1 in unit A of display console may be defective.	IC3 (741) TR13 (2SC484) TR14 (2SD234) TR1 (2SD110)
	2. Intensity on CRT too bright although it is somewhat reduced by turning SPOT SIZE control fully CW.	2-a Intensity cannot be reduced by turning CONTRAST control CCW. Voltage approx. -700V across CP2-GND on PC board N80HB01P-B can not be changed by turning CONTRAST control (H.V. power supply check point #4). The voltage should normally be approx. -300V ~ -700V.	2-a Replace IC1	IC1 (741)

<u>TS No.</u>	<u>Symptom</u>	<u>Possible Cause</u>	<u>Remedy or Reference</u>	<u>Replacement Part</u>
27	Image cannot be focused by turning FOCUS controls.	<p>a. Specimen height incorrect</p> <p>b. Gross astigmatism</p> <p>c. Objective lens power supply defective. Voltage across CP5-GND on PC board N80MB01P cannot be changed by turning FOCUS (COARSE) control. The voltage should normally be approx. +2.9V ~ +3.7V (at electron gun high voltage of 25kV and working distance of 8mm).</p> <p>d. Electron gun high voltage changed from normal value. See TS No. 18</p>	<p>a. See Section 4 of Instruction manual.</p> <p>b. See Section 8 of Instruction manual.</p> <p>c. IC5, TR17, TR18 on PC board N80MB01P or TR3 in display unit A may be defective.</p> <p>d. See TS No. 18</p>	<p>200 micron aperture.</p> <p>IC5 (741)</p> <p>TR17 (2SC484)</p> <p>TR18 (2SD234)</p> <p>TR3 (2SD110)</p> <p>See TS No. 18</p>
28	Image focus unstable (In PHOTO or NORMAL scanning mode.) Line frequency may also be a cause in items b and c.	<p>a. Emission current too high or unstable. See TS No. 20.</p> <p>b. Electron gun high voltage unstable. See TS No. 17.</p> <p>c. Objective lens power supply defective. Voltage unstable across CP5-GND on PC Board N80MB01P.</p>	<p>a. See TS No. 20</p> <p>b. See TS No.17</p> <p>c. IC5, TR17, TR18 on PC board N80MB01P or TR3 on display console A may be defective.</p>	<p>See TS No. 20</p> <p>See TS No. 17</p> <p>IC5 (741)</p> <p>TR17 (2SC484)</p> <p>TR18 (2SD234)</p> <p>TR3 (2SD110)</p>

<u>TS No.</u>	<u>Symptom</u>	<u>Possible Cause</u>	<u>Remedy or Reference</u>	<u>Replacement Part</u>
29	Signal level unstable. Focus changing. Image moves horizontally as when vibration exists, in PHOTO or NORMAL mode. Line frequency may also be a cause in item a	<p>a. First or second condenser lens power supply defective.</p> <p>a-1 Voltage unstable across CP3-GND on PC board N80MB01P.</p> <p>a-2 Voltage unstable across CP4-GND on PC board N80MB01P</p> <p>b. Specimen, lens aperture, sleeves, slits are badly contaminated.</p>	<p>a-1 IC3, TR13, TR14 on PC board N80MB01 or TR1 in display unit A may be defective</p> <p>a-2 IC4, TR15, TR15 on PC board N80MB01P or TR2 in display unit A may be defective.</p> <p>b. See Section 21 of instruction manual.</p>	<p>IC3 (741)</p> <p>TR13 (2SC484)</p> <p>TR14 (2SD234)</p> <p>TR1 (2SD110)</p> <p>IC4 (741)</p> <p>TR15 (2SC484)</p> <p>TR15 (2SD234)</p> <p>TR2 (2SD110)</p>
30	Bright horizontal line visible on CRT occurring at random.	<p>a. Discharge from electron gun.</p> <p>a-1 See TS No. 17.</p> <p>a-2 See TS No. 20</p> <p>b. Discharge around detector.</p> <p>b-1 Foreign matter (especially fibers) around detector.</p> <p>b-2 Vacuum leak at detector base.</p>	<p>a-1 See TS No. 17</p> <p>a-2 See TS No. 20</p> <p>b-1 Blow Freon gas around detector to remove foreign matter.</p> <p>b-2 Replace detector.</p>	<p>Detector.</p>
1	Astigmatism cannot be corrected with STIGMATOR X & Y control.	<p>a. Objective aperture contaminated</p> <p>b. Sleeves, sleeve joints, slits, aperture stops, aperture holders contaminated.</p>	<p>a. Clean aperture. See Section 21 of instruction manual.</p> <p>b. Clean. See Section 21 of instruction manual.</p>	<p>Lens aperture (200 micron)</p> <p>Sleeves</p>

<u>TS No.</u>	<u>Symptom</u>	<u>Possible Cause</u>	<u>Remedy or Reference</u>	<u>Replacement Part</u>
		c. Stigmator circuit defective. Voltage across CP1-GND on PC Board N80MB01P can not be changed by turning STIGMATOR X control. Voltage across CP2-GND can not be changed by turning STIGMATOR Y control. Normally, X and Y controls change the voltage from approx. -2V to +2V.	c. Replace IC1 and/or IC2	IC (741)
32	Image cannot be shifted with IMAGE SHIFT X & Y controls.	a. When image cannot be shifted horizontally: Voltage on L of plug connector J1 on PC board N80NA02P cannot be changed by turning IMAGE SHIFT X control. Normally the voltage should change from approx. -6V to +6V. b. When image cannot be shifted vertically: Voltage on 11 of plug connector J1 on PC board N80NA02P cannot be changed by turning IMAGE SHIFT Y control. Normally, the voltage should change from approx. -6V to +6V.	a. IC2 or TR33 may be defective. b. IC3 or TR3 may be defective.	IC2 (741) TR33 (2SD234) IC3(741) TR3(2SD234)

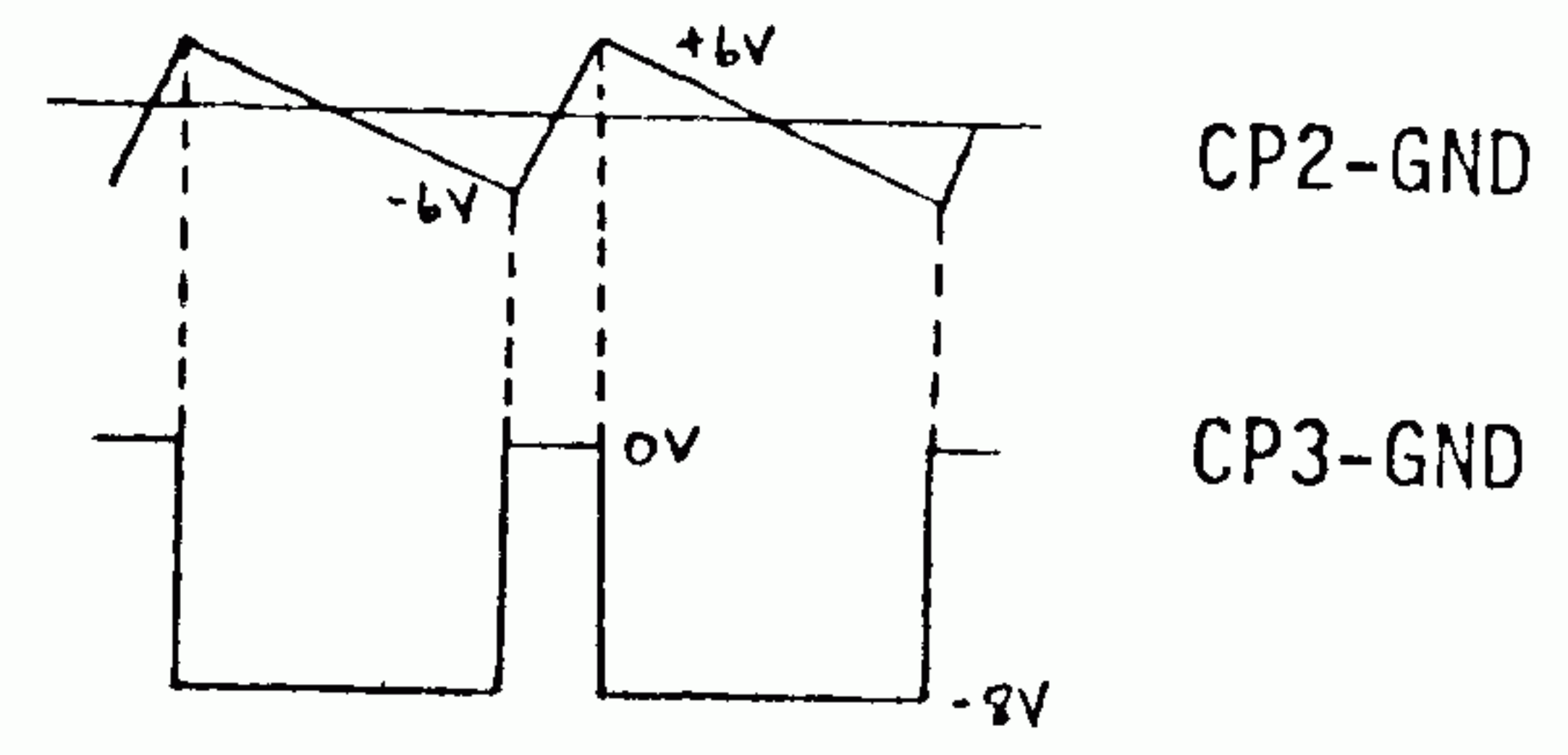
<u>TS No.</u>	<u>Symptom</u>	<u>Possible Cause</u>	<u>Remedy or Reference</u>	<u>Replacement Part</u>
33	Image elongated horizontally (in PHOTO, RAPID or NORMAL scanning mode)	<p>a. Horizontal scan inoperative.</p> <p>a-1 Horizontal scan defective. No wave form across CP2-GND on PC board N82MB02P Normal Wave Form:</p> 	a-1 IC2 through IC5 may be defective	IC (709) IC (531)
		<p>a-2 No wave form across CP1-GND on PC board N80NA02P.</p>	a-2 IC1, TR1 through TR8 or TR1, TR2 in display unit B may be defective	IC1 (741) TR1, TR3 (2SA495) TR2, TR4 (2SD372) TR5, TR1 (2SA510) TR6, TR7 (2SC510) TR1 (2SD110) TR2 (2SA663)
		a-3 Resistor in magnification selector switch may be open in display unit B	a-3 R101, 2Ω (2W) may be open.	R101 (2Ω, 2W)
34	Image elongated horizontally (in TV scanning mode)	<p>a. Horizontal probe scan inoperative.</p> <p>a-1 Horizontal scan circuit defective. See TS No. 33-a-1.</p>	a-1 See TS No. 33-a-1	

<u>TS No.</u>	<u>Symptom</u>	<u>Possible Cause</u>	<u>Remedy or Reference</u>	<u>Replacement Part</u>
		a-2 Wave form distorted across CP2-GND on PC board N83ND02P Normal wave form: 	a-2 IC1, TR4 through TR8 or TR11, TR12, TR13, TR14 in display unit B may be defective.	IC (531) TR4, TR7, TR8 (2SC51) TR5, TR6 (2SA510) TR11, TR12 (2SA663) TR13, TR14 (2SC558)
		a-3 Resistor in magnification selector switch open in display unit B. (N82N11)	a-3 See TS No. 33-a-3	
35	Image elongated vertically.	a. Vertical probe scan in-operative. a-1 Vertical scan circuit defective. Wave form distorted across CP1-GND on PC board N82NC02P. Normal wave form: 	a-1 IC1 through IC5 may be defective	IC (741) IC (709)
		a-2 Wave form distorted across CP2-GND on PC board N80NA02P.	a-2 IC4, TR9 ~ TR16 or TR3, TR4 in display unit B may be defective.	IC (741) TR9, TR11 (2SC372) TR10, TR12 (2SA495) TR13, TR16 (2SC484)
		a-3 Resistor in magnification selector switch may be open in display unit B.	a-3 R124, 2Ω (2W) may be open	R124 (2Ω, 2W)

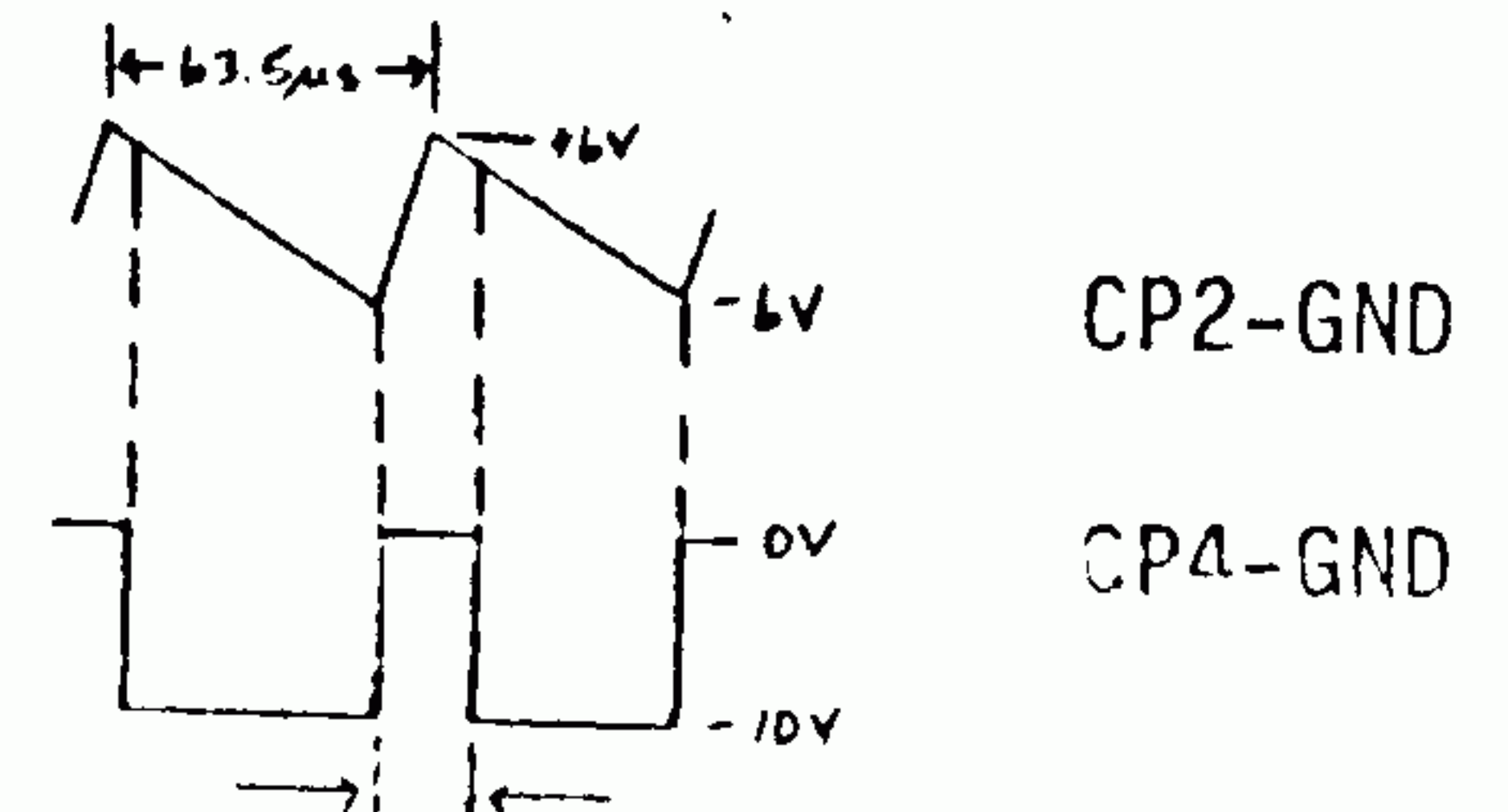
<u>TS No.</u>	<u>Symptom</u>	<u>Possible Cause</u>	<u>Remedy or Reference</u>	<u>Replacement Part</u>
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36	High magnification cannot be changed with mag. selector	a. Simultaneous occurrence of symptoms in TS Nos.33, (34), 35.	a. See TS No. 33, (34) 35.	
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37	Image shadowed on left side (doubled image) especially on the right side of CRT.	a. No horizontal blanking. a-1 In PHOTO or NORMAL scan mode; Improper correlation between wave form across CP2-GND and wave form across CP3-GND on PC board N82NB02P. Normal correlation (in phase)	a-1 Replace IC6 on PC board N82NB02P	IC (709)
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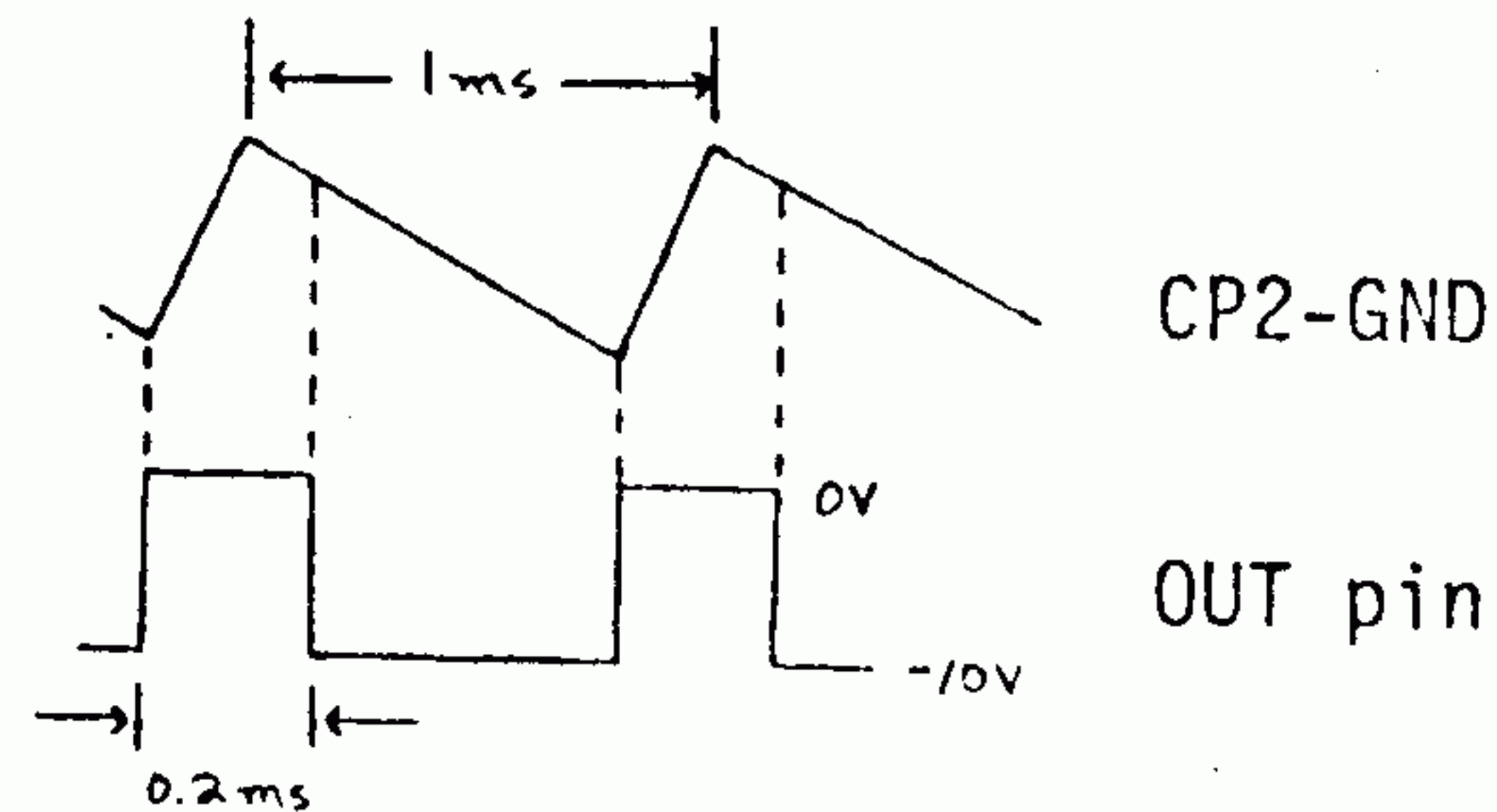


		a-2 In TV scan mode: correlation incorrect between wave form across CP2-GND ON PC board N82NB02P and wave form across CP4-GND. Normal correlation:	a-2 Replace IC7 on PC board N82NB02P If doubled image still remains, adjust RV7 (100 kΩ) to obtain normal image.	IC (709)
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<u>TS No.</u>	<u>Symptom</u>	<u>Possible Cause</u>	<u>Remedy or Reference</u>	<u>Replacement Part</u>
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a-3 In RAPID scan mode: Phase incorrect between wave form across CP2-GND on PC board N82NB02P and wave form at OUT pin on PC board N82NJ01P
Normal in Phase:

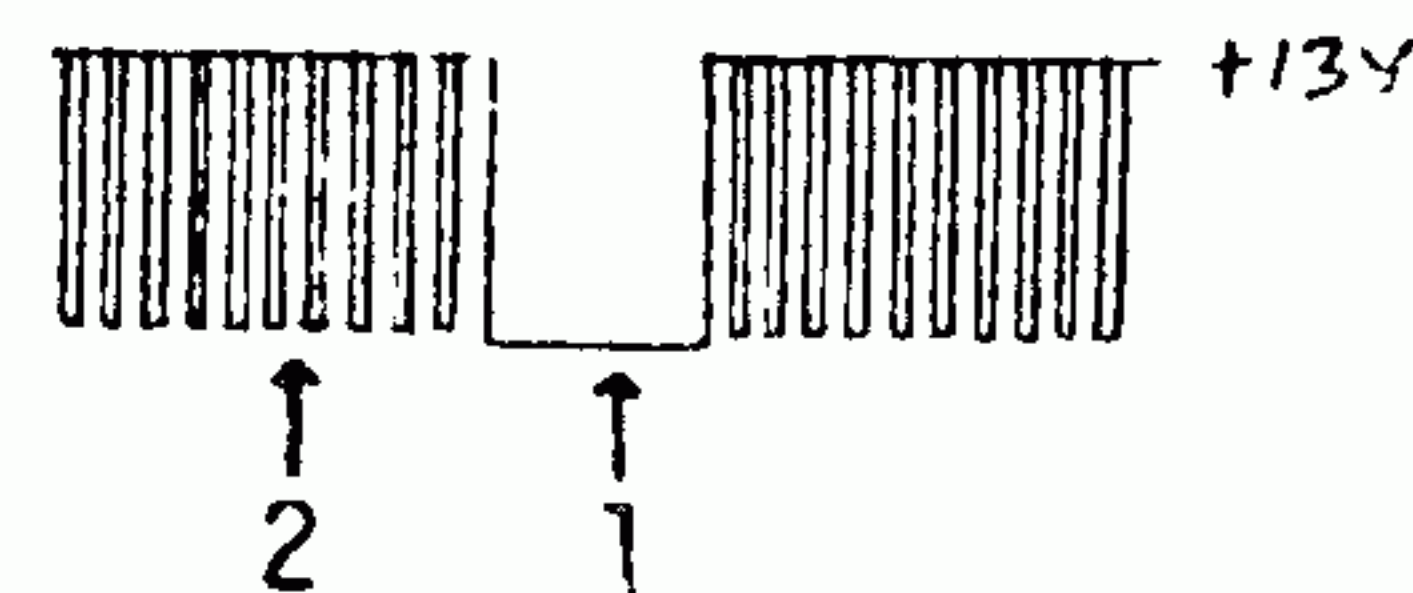


a-3 Replace IC1 on PC board N82NJ01P. Adjust blanking width by adjusting RV1 (100 k Ω)

IC1 (709)

38 Oblique bright lines visible on CRT at beginning and end of vertical scan.

a. Wave form for vertical scan incorrect across CP3-GND on PC board N82NC02P.
Normal wave form:

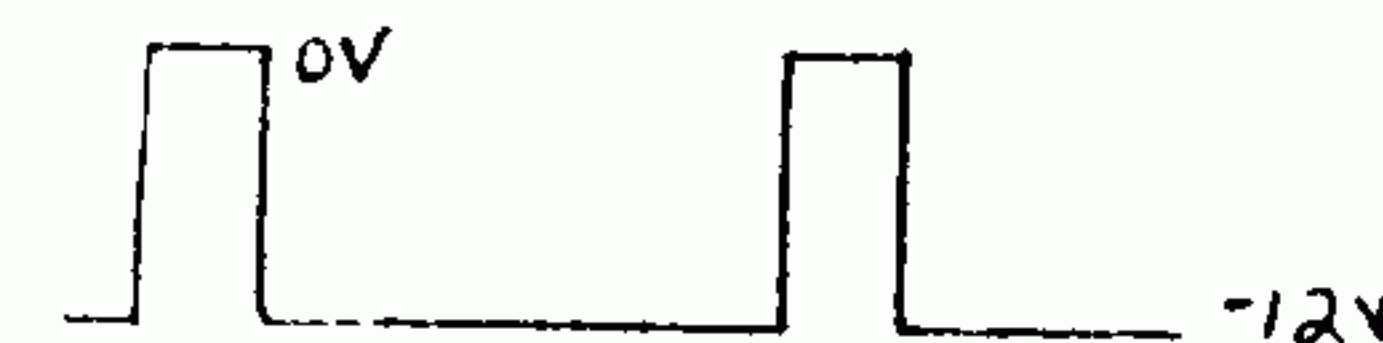


1. Blanking for vertical scan
2. Blanking for horizontal scan

a. IC7 defective on PC board N82NC01P


IC7 (709)

When only blanking wave form for vertical scan is not available, the following blanking wave form is not available from collector of TR2 (2SA495G-0) on PC board N82NC02P:

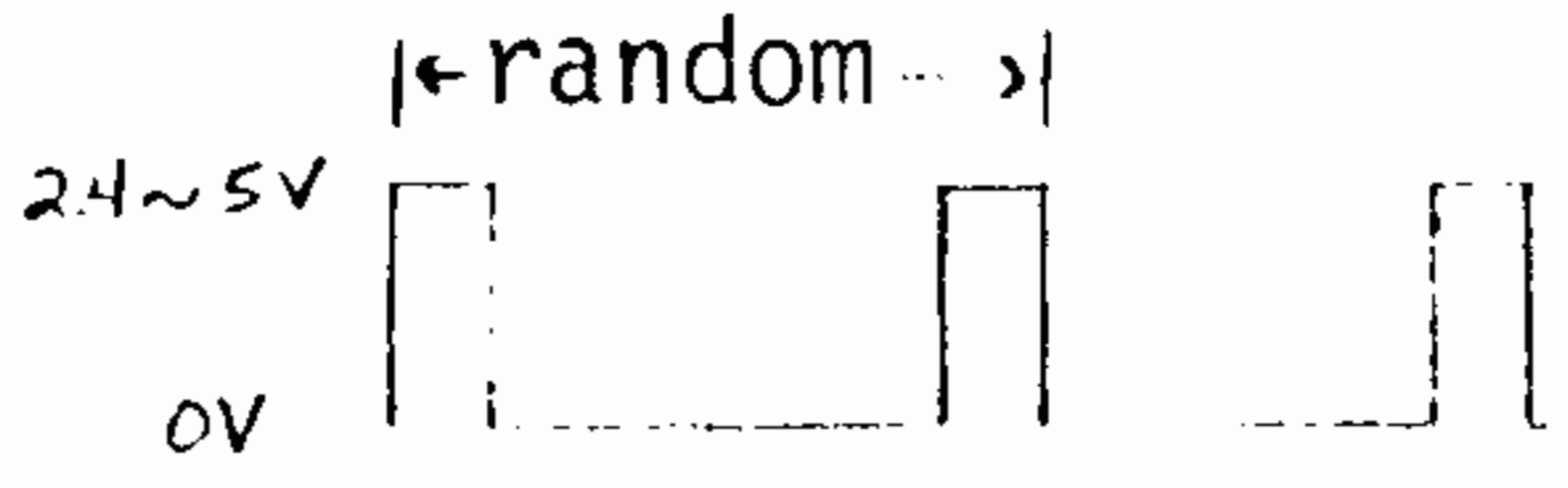


TR2, TR1 may be defective

TR1, TR2 (2SA495G-0)

<u>TS No.</u>	<u>Symptom</u>	<u>Possible Cause</u>	<u>Remedy or Reference</u>	<u>Replacement Part</u>
38		b. Improper blanking at CP5-GND on PC Board N82NK01P. Normal wave form at CP5. 	b. Replace IC9, IC10, IC5, and/or TR4, TR5.	IC9 (7404) IC10 (7400) IC5 (709) TR4, TR5 (2SA510)
39	Specimen image smearing or jumps at some specific area (bright horizontal strips may be visible)	a. Charging up on specimen surface	a. Coat specimen surface with carbon, gold, etc. See section 4 of instruction manual.	
40	Ragged edge on image due to vibration.	a. Specimen stub not fixed securely to specimen holder. b. Shaft set screw for specimen holder loose.	a. See section 4 of instruction manual b. See section 4 of instruction manual	
41	Backlash in stage X and Y controls.	a. Screw loose on X control shaft b. Screw loose for Y control shaft.	a. Tighten screw. b. Tighten screw.	

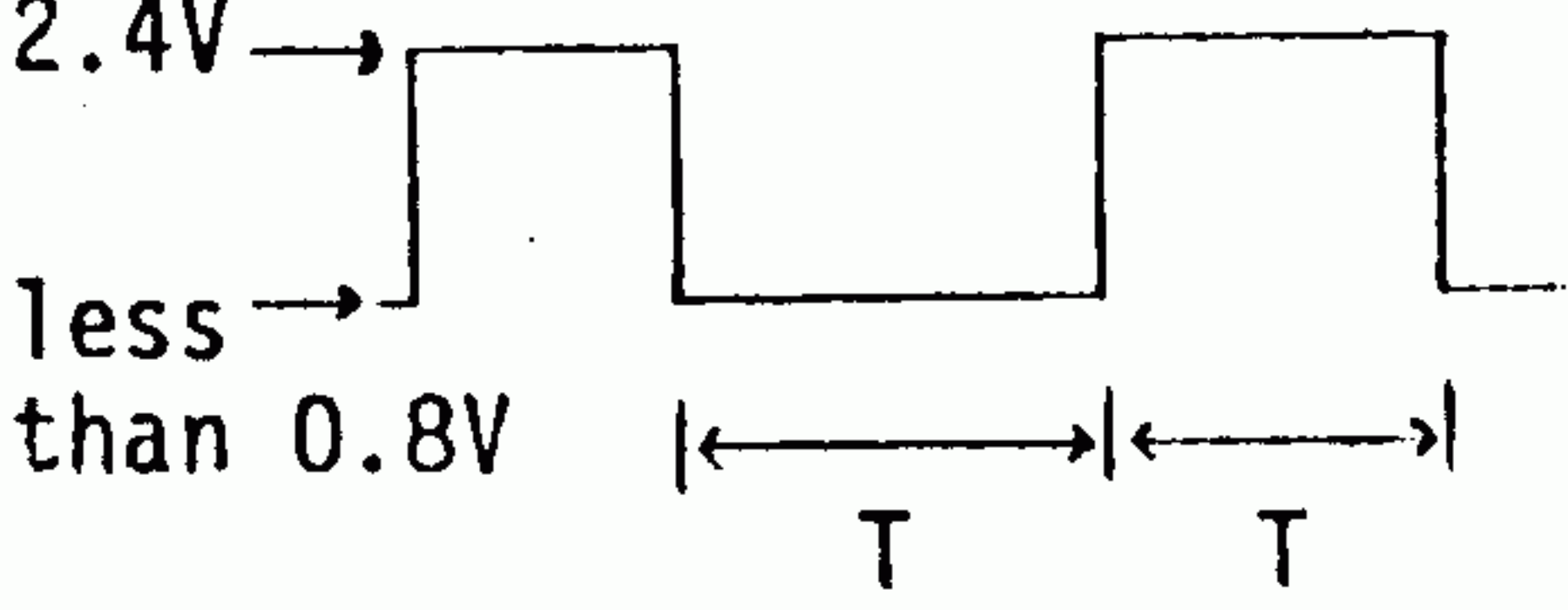
<u>TS No.</u>	<u>Symptom</u>	<u>Possible Cause</u>	<u>Remedy or Reference</u>	<u>Replacement Part</u>
42	Video signal degrading with time, proper signal level cannot be obtained without turning SPOT SIZE control CCW or CONTRAST control clockwise.	a. Scintillator deteriorated. b. Poor vacuum in column	a. Replace scintillator. See Section 20 of instruction manual. b. See TS No. 4	Scintillator
43	Backscattered electron image formed on CRT even though IMAGE MODE selector switch is set at SE (secondary electron position)	a. No high voltage to scintillator a-1 Resistor (51 M) open in detector a-2 Wire breakage in pin of H.V. connector of detector.	a-1 Replace detector assembly a-2 Solder wire to pin of connector (HN-P-8U (1)).	Detector Assembly
44	Secondary electron image formed on CRT with IMAGE MODE selector switch in BSE position.	a. Scintillator H.V. relay (Y1) inoperative in H.V. power supply (N80HB01)	a. Repair movable contact of relay (the contact may override the opposite contact)	
45	When IMAGE MODE selector switch is set at X-ray pos. 1. No X-ray image.	1.A Defective TR1, TR2, TR3, IC8, IC9, IC10 on N82NK01P. No signal at CP4. Normal waveform:	1.A Replace IC8, IC9, IC10, TR1, TR2, TR3	TR1, TR2, TR3 (2SC372) IC8 (7400) IC9 (7404) IC10 (7400)

<u>TS No.</u>	<u>Symptom</u>	<u>Possible Cause</u>	<u>Remedy or Reference</u>	<u>Replacement Part</u>
		 <p>The diagram shows a square wave pulse. The vertical axis is labeled '24~5V' and the horizontal axis is labeled '←random→'. The pulse is a single rectangular wave with a sharp rise and fall.</p>		
		1.B If A is normal, IC11, TR6 may be defective.	1.B Replace IC11, TR6	IC11 (7420) TR6 (2SC372)
	2. X-ray image reversed.	2.A Polarity selector switch S1 on N82NK01P improperly set	2.A Set selector switch to opposite position.	
46	When IMAGE MODE selector switch is set at SPOT, LINE position.			
	1. CRT intensity abnormally bright.	1.A See TS No. 11-a B. Zener diode ZD3 on PC board N82NB02P defective.	1.A See TS No. 11-a. B Replace ZD3	ZD3 (RD5A)
	2. No CRT intensity	2.A See TS No. 9a,b,c,d,e, and g. B Zener diode ZD3 defective on PC board N82NB02P	a.A See TS No. 9a,b,c,d,e, and g. B Replace ZD3	ZD3 (RD5A)
47	PHOTO METER pointer does not deflect when BRIGHTNESS and CONTRAST controls are changed.	a. See TS No. 9-f and 11-b b. Voltage across CP5-GND on PC board N82NB02P is changed by turning BRIGHTNESS and CONTRAST controls. IC9 defective in photometer circuit.	a. See TS No. 9-f and 11-b b. Replace IC9	IC9 (741)

<u>TS No.</u>	<u>Symptom</u>	<u>Possible Cause</u>	<u>Remedy or Reference</u>	<u>Replacement Part</u>
48	Scan does not appear on CRT after depressing PHOTO START button.	a. See TS No. 14	a. See TS No. 14	
49	Images different between viewing and photo CRT	a. Misadjustment after replacing PC boards N80NA02P, N82NB02P, N82NC02P, N78NC01P. After depressing SCAN MODE SPOT button, shift CRTspot to upper, lower left and right sides and match with photo CRT.	a. Adjust RV1, RV4 on PC board N78NC01P to match horizontal direction (left and right sides) Adjust RV2, RV3, to match vertical direction (upper and lower ends.)	
50	No scan on photo CRT (horizontal scanning not effected in RAPID and TV scan modes)	a. Horizontal: IC1 defective on PC board N78NC01P b. Vertical: IC2 defective on PC board N78NC01P	a. Replace IC1 b. Replace IC2	IC (741) IC2 (741)
51	When GAMMA CONTROL is on, no image and CRT is too bright or too dark.	Measure voltage at each check point on PC board N83NF03P a. Voltage across CP1-GND should be 0 V with no signal (emission off) b. Voltage across CP2-GND same as a.	a. IC1 may be defective Replace IC2	IC1 (709) IC2 (709)

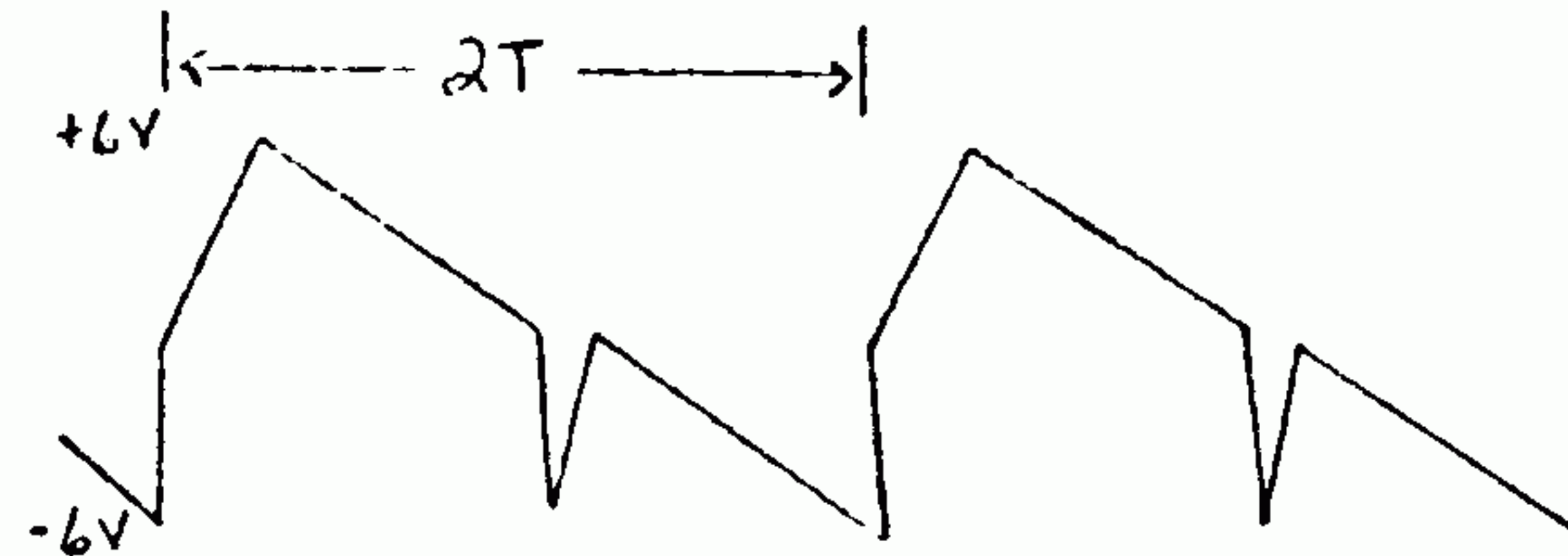
<u>TS No.</u>	<u>Symptom</u>	<u>Possible Cause</u>	<u>Remedy or Reference</u>	<u>Replacement Part</u>
		c. Voltage across CP3-GND same as a.	c. Replace IC3	IC3 (709)
		d. Voltage across CP4-GND same as a.	d. IC4 and/or IC5 defective	IC4 (741) IC5 (531)

TS NUMBERS 52 THROUGH 59 ARE WITH DUAL MAGNIFICATION ON

52	No intensity on CRT or vertical scan only with dual mag ON (x1, x3, x5 x10)	a. Switching circuit of Dual Mag. defective. Normal wave form not available at CP5 on N82NL01P. Normal wave form: more than 2.4V → less than 0.8V →  T: Horizontal Sweep time T (Dual Mag ON) PHOTO 40ms or 33.3ms NORMAL 10ms or 8.33ms RAPID (full) 1ms RAPID (reduced) 1ms	a. Replace IC19, IC14, IC15, and/or IC13 on N82NL01P	IC13 (7404) IC14 (7400) IC15 (7473) IC19 (7420)
		b. When item a is normal IC17 does not switch on N82NK01P-2/2	b. Replace IC4, IC5 on N82NL01P IC17, IC13 and IC15 on N82NK01P	IC4, IC5 (709) IC17 (CD4066) IC13 (741) IC15 (741)

<u>TS No.</u>	<u>Symptom</u>	<u>Possible Cause</u>	<u>Remedy or Reference</u>
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Normal wave form: (CP8)



T: Horizontal sweep time.

(Reference: Normal wave form at CP2 on N82NB02P Dual Mag. ON)



c. No +7V power supply on N30NP01P (CP1 and CP2)

c. Refer to TS No. 24-b-3

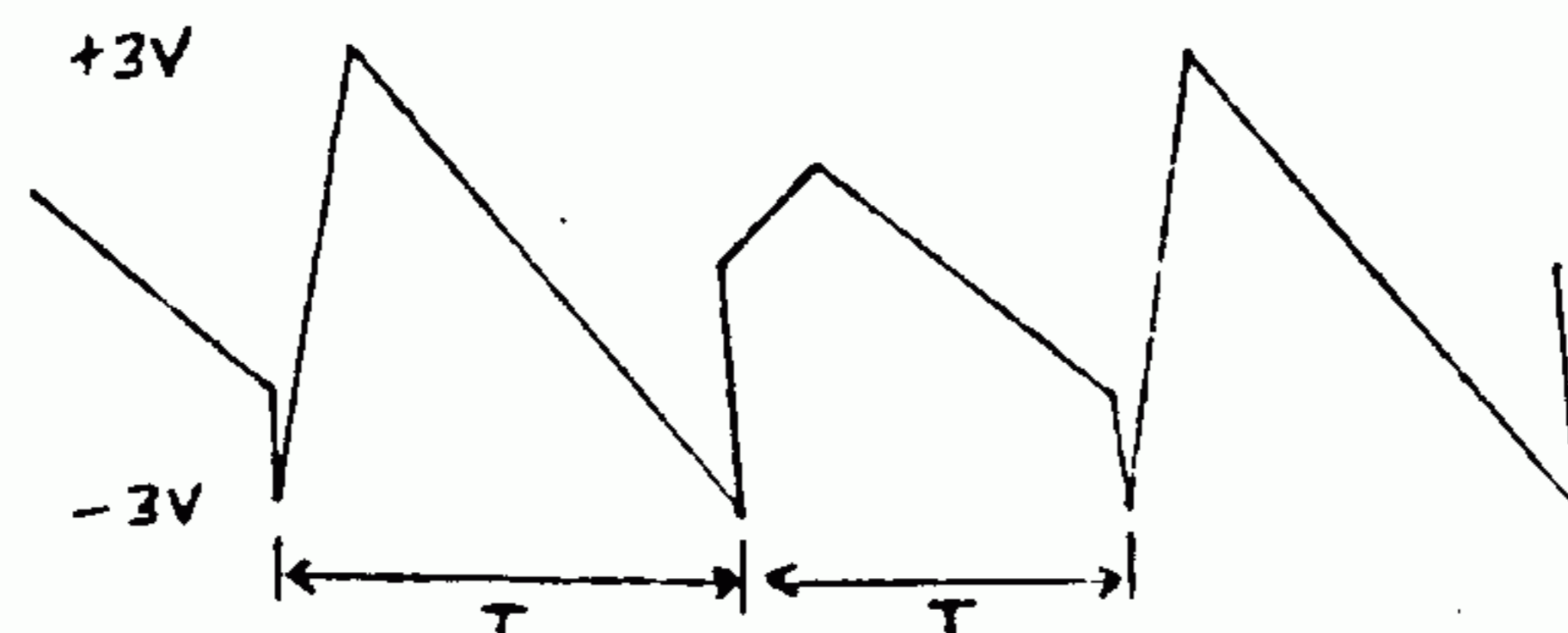
a. Improper adjustment of RV5 on N82NK01P-2/2

a. Readjust RV5 so that width becomes approx. 1mm in PHOTO MODE.

53

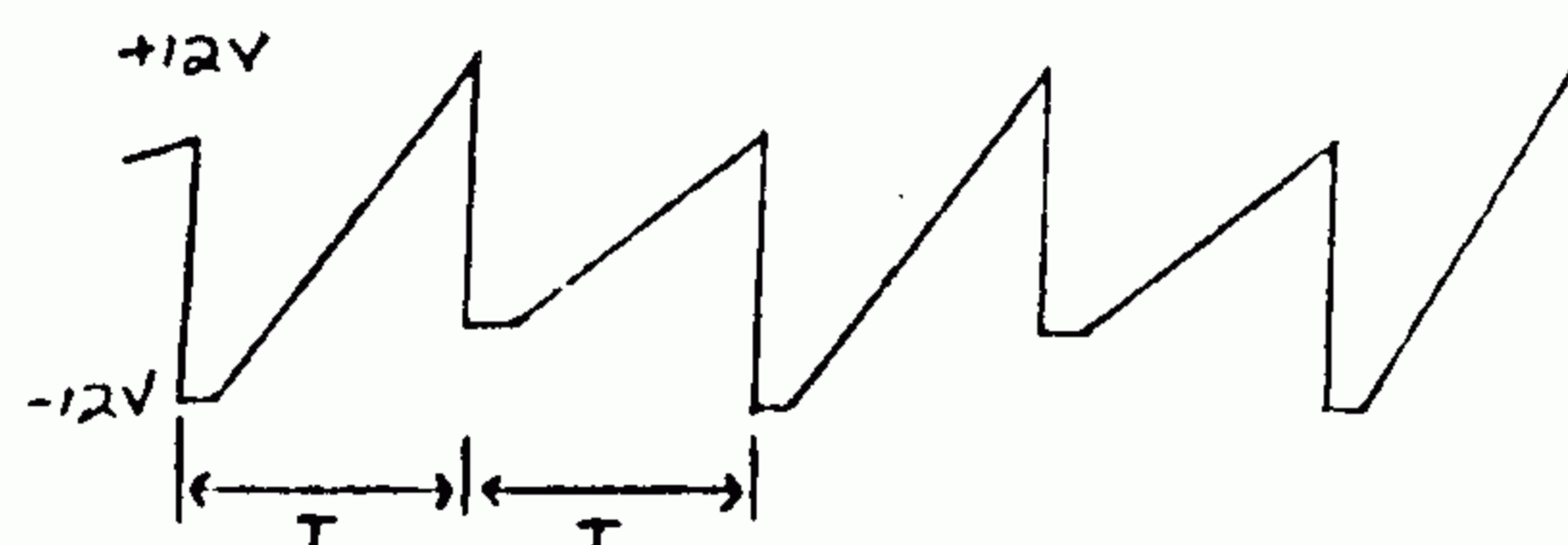
Improper blanking band width at CRT center.

<u>TS NO.</u>	<u>Symptom</u>	<u>Possible Cause</u>	<u>Remedy or Reference</u>	<u>Replacement Part</u>
54	Dual ON or OFF image mode selector switch does not operate properly. (TS No. 24 and 38 is normal)	a. Image switching circuit does not operate, defective IC1 ~ 4, IC7 and IC8 on N82NK01P-1/2	a. Replace IC1 IC2, IC3, IC4 and/or IC7, IC8	IC1 (CD4066) IC2, IC3, IC4 (709) IC7, IC8 (7400)
55	a) Both low mag. and high mag images are horizon. elongated b) Either low mag. or high mag. image is horizontally elongated.	a) No horizontal probe sweep.	a)-1 Replace IC12, and/or IC14 on N82NK01P-2/2 a)-2 Replace relay Y14 in N82N11.	IC12 (741) IC14 (741) Y14 (MH6PG 12V AC)
		b) No horizontal probe sweep on one side only (Reference: Normal wave form at CP7 on N82NK01P-2/2 Dual x2. Dual position knobs at center.	b) Replace IC17 and/or IC16	IC17 (CD4066) IC16 (741)



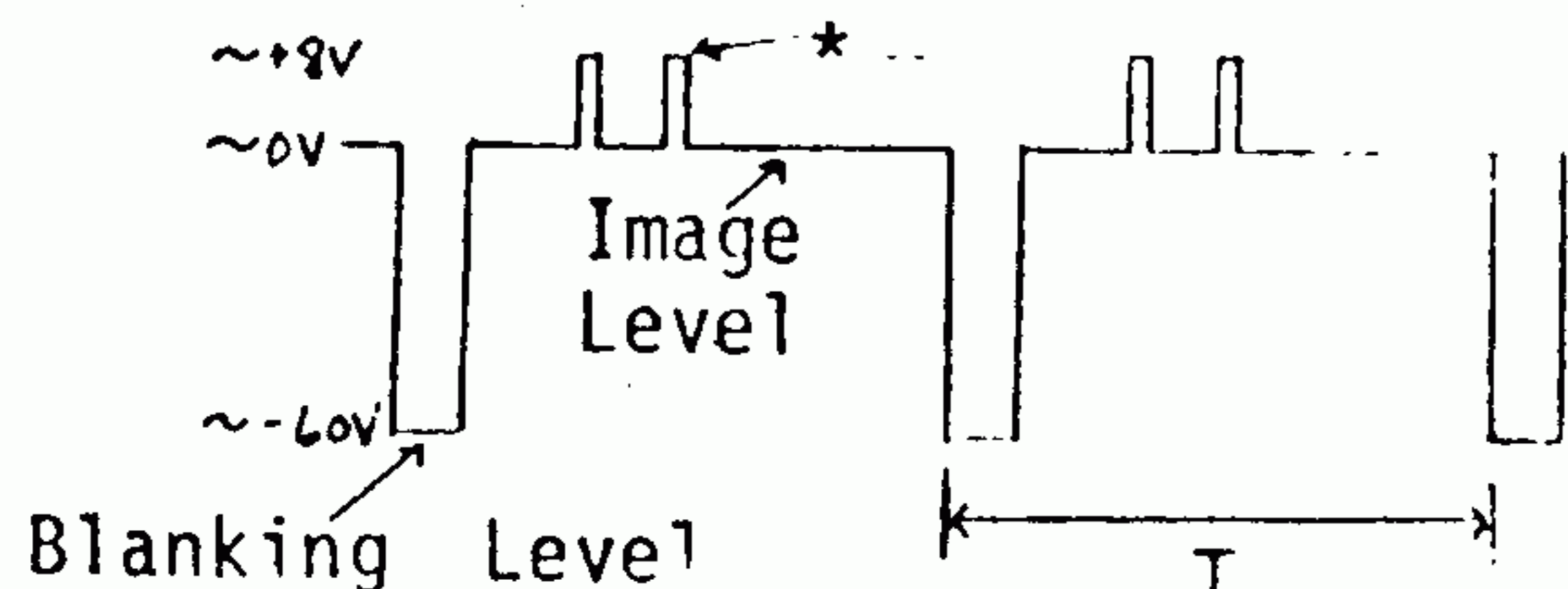
T: Horizontal sweep time

<u>TS No.</u>	<u>Symptom</u>	<u>Possible Cause</u>	<u>Remedy or Reference</u>	<u>Replacement Part</u>
56	a) Both low mag. and high mag. images are vertically elongated.	a) No vertical probe sweep	a)-1 Replace IC1, IC3 on N82NM01P a)-2 Replace relay Y14 in N82N11	IC1, IC3 (741) Y14 (MH6PG 12V DC)
	b) Either low mag. or high mag. image is vertically elongated.	b) No vertical probe sweep on one side only. (Reference: Normal wave form at CP1 on N82NM01P) (Dual x2, dual position knobs at center)	b) Replace IC14 IC2 on N82NM01P	IC14 (CD4066) IC2 (741)



T: Vertical sweep time.

57	Dual window marker and μ marker do not appear on CRT. (regardless of whether dual mag. is on or off)	a. Defective IC11, IC9 and/or IC10 on N82NK01P-1/2 Normal wave form not available at connector pin No. 21 of N82NK01P-1/2. Normal wave form at connector pin No. 21.	a. When connector pin No. 8 of N82NK01P- 1/2 is grounded, check if image becomes brighter. a-1 If image becomes brighter, refer to TS No. 58 and 59. a-2 If image does not become brighter, replace IC11, IC9 and/or IC10 on N82NK01P-1/2	IC11 (7420) IC9 (7404) IC10 (7400) IC11 (7420) IC9 (7404) IC10 (7400)
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T: Horizontal sweep time

<u>TS No.</u>	<u>Symptom</u>	<u>Possible Cause</u>	<u>Remedy or Reference</u>	<u>Replacement Part</u>
58	a) No vertical dual window marker or incorrect vertical dual marker width	a. Improper adjustment of RV3, RV4 on N82NM01P. When IC9 or IC10 is replaced. Adjustment of RV3 may be necessary. When IC12 or IC13 is replaced. Adjustment of RV4 may be necessary.	a. Readjust RV3 and RV4 on N82NM01P	
	b) Improper dual window marker size or dual window marker position	b. Improper adjustment of RV1, RV2 RV5 on N82NM01P	b. Readjust RV1, RV2 and RV5 on N82NM01P	
59	a) μ Marker does not appear on CRT	a. Vertical logic circuit does not operate properly. (N83ND02P-2/2)	a. Replace IC8, IC9 and/or IC10	IC8, IC9 (741) IC10 (7400)
		b. Horizontal logic circuit does not operate properly.	b. Replace IC2 ~ IC7	IC2 ~ IC7 (741)