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RC740 VIDEO DISPLAY

Tecnical Manual

RCSL Nr. 48-F 0089

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af 1979

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Abstract:

Technical manual for RC740 monochrome monitor

as used by the RC750

Printed by A/S Regnecentralen af 1979, Copenhagen

RCSL Nr. 46-F 0087

Table of contents Page

1. General description

The RC740 is a monochrome 12 inch monitor for use in connection with the RC750 series of computers.

It is manufactured to RC-specifications by NEC, Japan.

This manual mainly consists of a circuit description and diagram from NEC and a part of the monitor specifications.

2. Operator controls

2.1 Sound Volume

Front panel control (top) for adjusting the audio output level.

2.2 Brightness

Front panel control (middle) for adjusting the general brightness level of the picture.

2.3 Contrast

Front panel control (bottom) for adjusting the relative brightness of the three possible intensity levels.

The brightest intensity level is only affected by the Brightness control while the two darker gray levels can be adjusted with the contrast control.

Turning the contrast control clockwise increases the brightness of the grey levels such that when turned fully clockwise all three intensity levels are shown with the same (high) intensity.

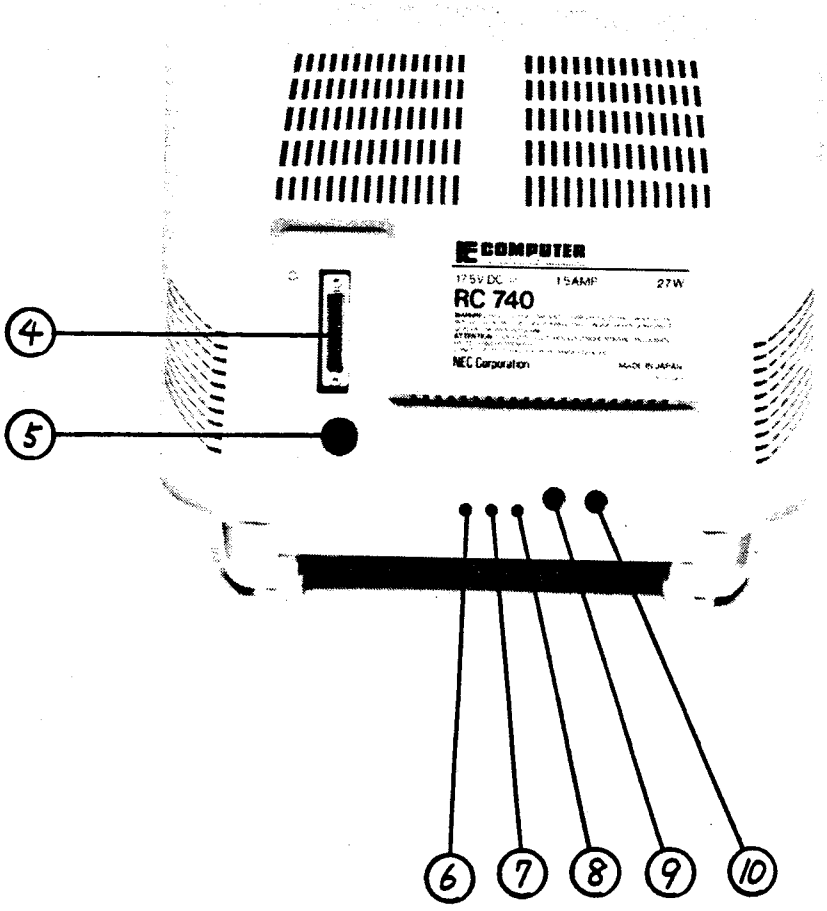
2.4 Horizontal Hold (H. HOLD)

Rear panel control. If the horizontal oscillator is unsynchronized stripes will appear on the screen. In this case adjust H.HOLD until a normal picture appears.

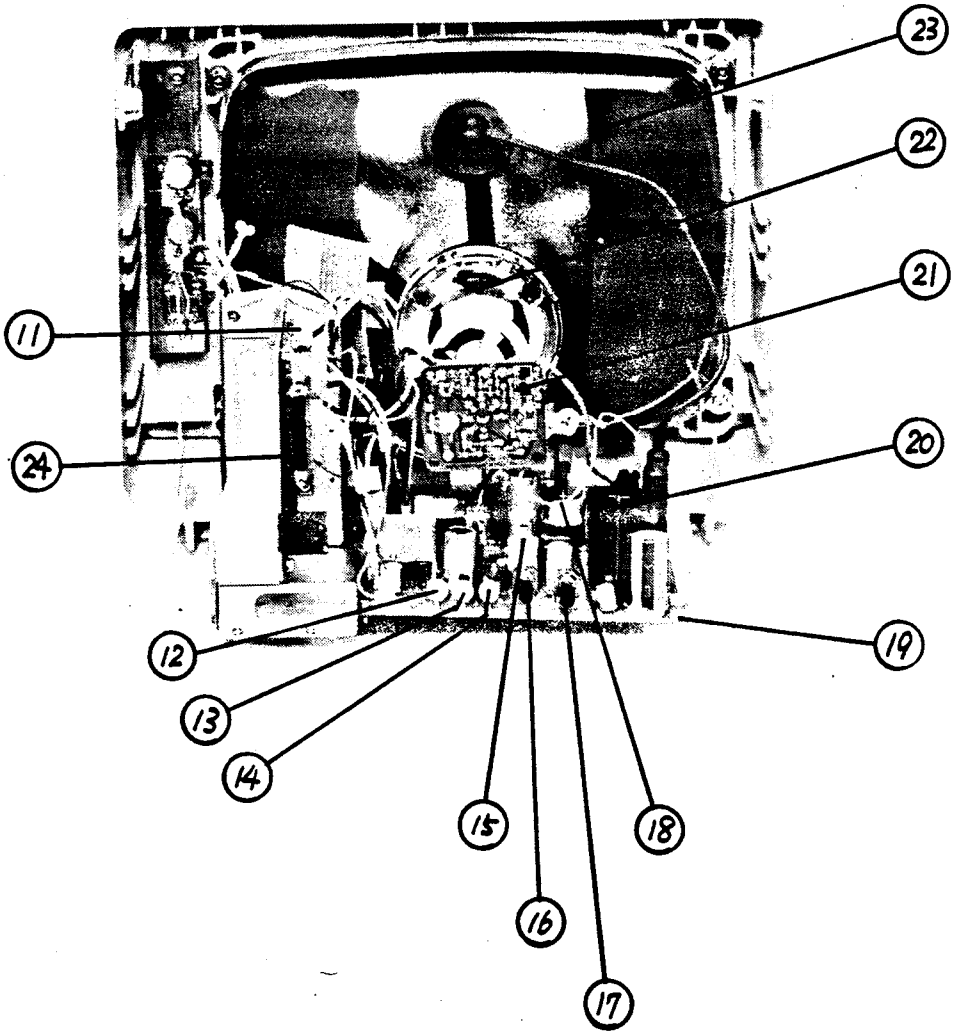
2.5 Vertical Hold (V. HOLD)

Rear panel control. If the picture moves up-or downward adjust V. HOLD until a stable picture is obtained.

3. Location of main parts



4	Signal input connector
5	Keyboard connector
6	Sub brightness control
7	Vertical linearity control
8	Vertical height control
9	Vertical hold control
10	Horizontal hold control



11	Sub contrast control
12	Sub brightness control
13	Vertical linearity control
14	Vertical height control
15	Sub horizontal hold control
16	Vertical hold control
17	Horizontal hold control
18	Horizontal width control
19	Main P.W.B.
20	F.B.T.
21	CRT P.W.B.
22	Deflection yoke
23	CRT
24	Signal P.W.B.

4. Adjustment of semi-fixed (internal) adjusters

4.1 +B Adjustment: VR 601 (+B ADJ)

Connect a DC voltmeter to TP91 on the printed circuit board and to the ground. Adjust VR 601 until the voltmeter reads 12 V.

4.2 Horizontal width adjustment: L 503 (H. WIDTH)

(1) Fill the screen with for example the character H.

(2) Turn the hexagonal core of L 503 until the correct horizontal width (220 mm + - 5 mm) is obtained.

4.3 Vertical height adjustment: VR 401 (V. HEIGHT)

Vertical linearity adjustment: VR 402 (V. LIN)

(1) Fill the screen with for example the character H.

(2) Adjust VR 401 and VR 402 until the correct height (148 mm + - 5 mm) and optimum linearity is obtained.

4.4 Focus adjustment: VR 901

Adjust VR 901 until the best focus is obtained.

4.5 Sub brightness adjustment: VR 201

Turn the intensity control on the front of the monitor fully clockwise (max. intensity). Adjust VR 201 until the background raster just becomes invisible even in a dark room.

4.6 Sub contrast adjustment: VR 251, VR 252, VR 253

For this adjustment use a test picture with all four intensity levels (including the dark level) appearing as for example in the RC750 CRT-self test.

Sub brightness (VR 201) is slightly readjusted so that background raster is just visible (with front intensity control at max. intensity).

Then the (front) intensity control is turned fully counterclockwise (min. intensity) and VR 253 is adjusted so that the high intensity areas of the picture (I, R = 1,1) is just visible.

Readjust sub brightness (VR 201) as described in section 4.5.

Adjust low (VR 252) and medium (VR 251) intensity levels in the following way:

Turn the (front) intensity control clockwise to max. intensity without too much defocusing in the high intensity areas of the picture.

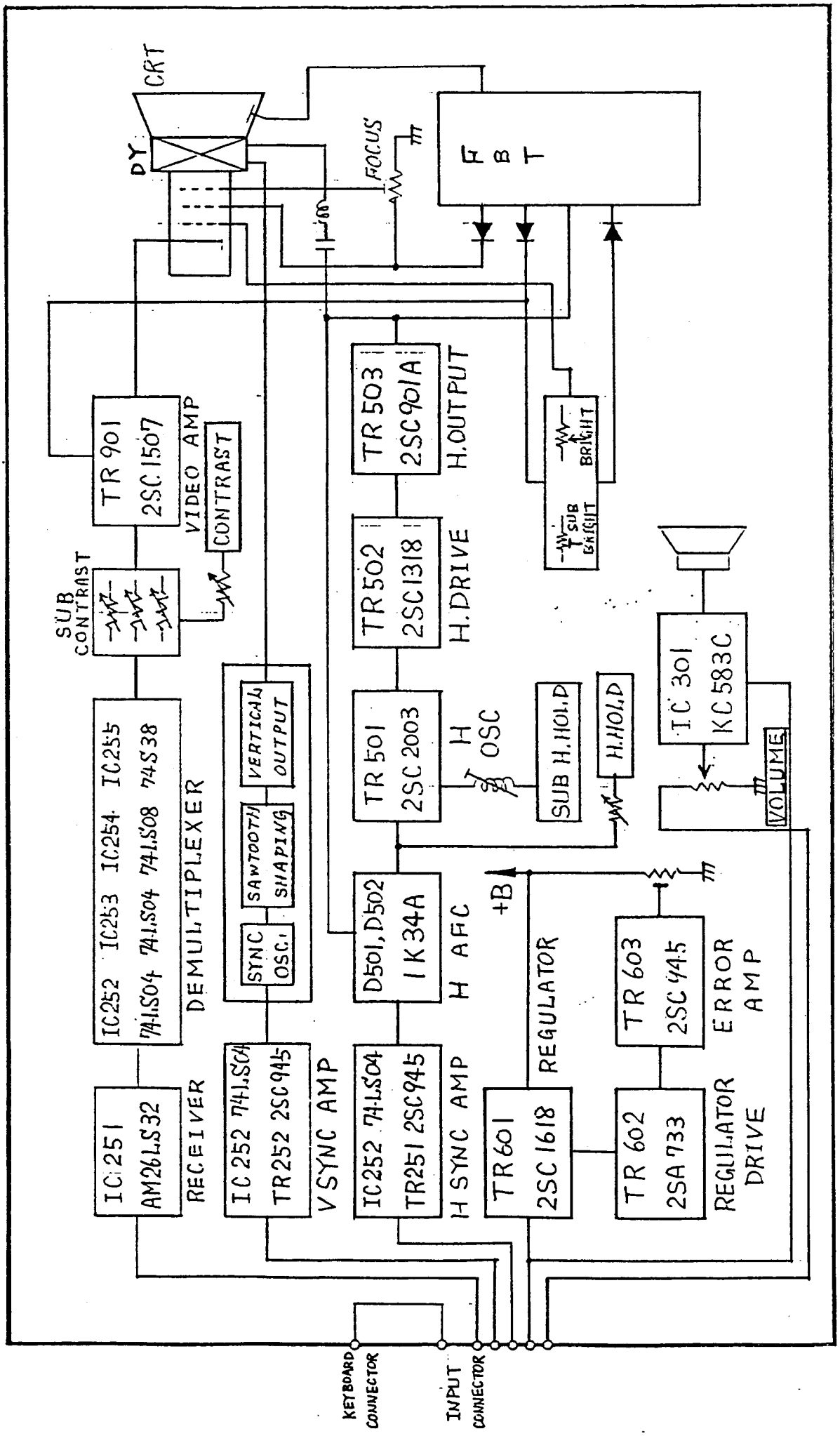
Turn the contrast control (front) fully counterclockwise.

Adjust VR 252 and VR 251 until the intensity differences from level to level appears to be the same. Check that this can also be obtained at a lower intensity setting just by turning the contrast (front) control in clockwise direction.

5. Circuit description

The following pages contain Block diagram, Description, Circuit diagram and Replacement parts list, as prepared by NEC.

BLOCK DIAGRAM



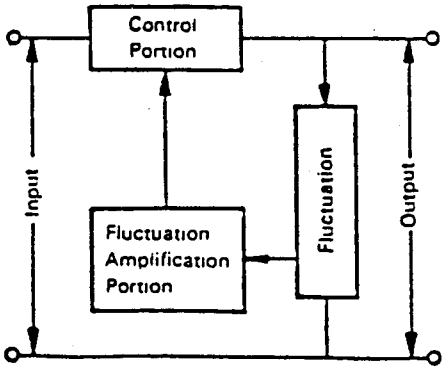
1. Power Regulator Circuit

The Power Regulator Circuit is used to stabilize the power source voltage in case the transistor circuit as load,has a composition in which the operating current changes considerably by the input signal.

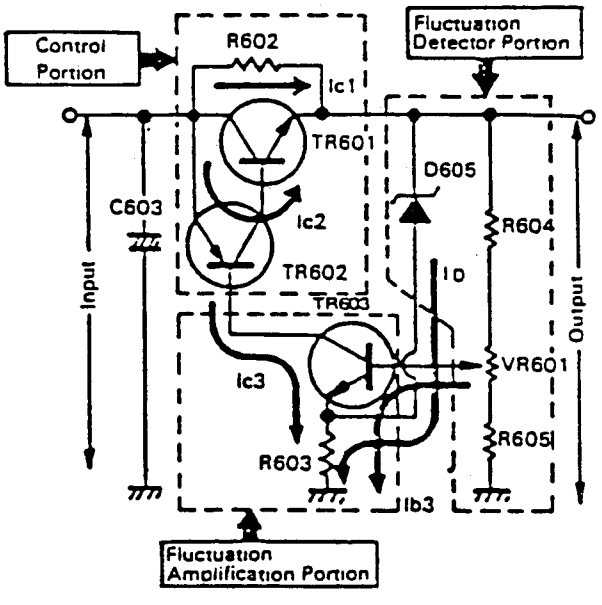
As shown in Fig.3,the Power Regulator Circuit is composed of three major blocks when roughly divided into its functions. The Fluctuation Detection Portion detects the fluctuation of output voltage and adds this to the Fluctuation Amplification Portion.The Fluctuation Amplification Portion will amplify the voltage fluctuation and add this to the Control Portion, By doing so,the Control Portion will control the current supplied to the Fluctuation Detector Portion.If we consider the case in which the output voltage begins to get high by the influence of something,the fluctuation amount will be added to the emitter of TR603 by the Zener diode D605, and the emitter voltage will be raised.On the other hand,at the base of TR603,the voltage fluctuations will be divide at R604,R605,and fluctuation voltage smaller than the emitter will be added. Therefore the voltage increase of the emitter will become greater than the base,and the voltage between the base of TR603 and the emitter will become small and the base current will decrease.

In case the base current of TR603 decreases,the base current of TR602,TR601 will decrease.

Consequently,the collector current of TR601 will decrease, and make the output voltage drop. Furthermore,in case the output voltage beings to drop,the potential of TR603 base and emitter will be reduced,but the degree of reduction will be greater for the emitter. Thus,the voltage difference between TR603 base and emitter will become greater,and Ib3 will increase. By this,Ic3,Ic2 and Ic1 will increase and make the output voltage rise.R602 will actuate so that the output voltage will generate immediately when the power source switch is turned ON.In other words,in case R602 does not exist,output voltage will not be impressed when the power source switch is turned ON,and TR603 will not actuate.As a result,no voltage will appear in the output, and it will remain as it is. For this reason,voltage is impressed to the output side at the start up time by R602, to actuate this constant voltage circuit.



(1) Block Diagram

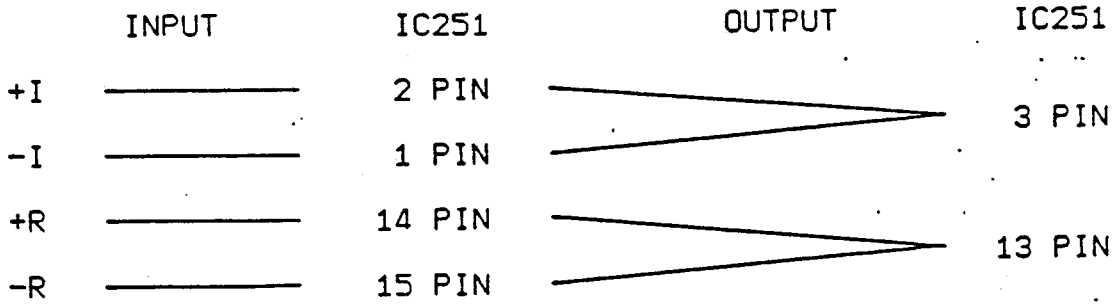


(2) Basic Circuit

Fig. 3 Power Regulator Circuit

2. VIDEO CIRCUIT

RC740 has 4 luminance modes from video signal(TTL level), I and R combination. 2 video signals I and R come from RC750 as each different signals. Different signals as +I,-I,+R -R are input and output as follows.



I,R combination is shown as follows,and also following shows Gate input of IC255 owing to the logic circuit made from IC252, IC253,IC254 and IC255.

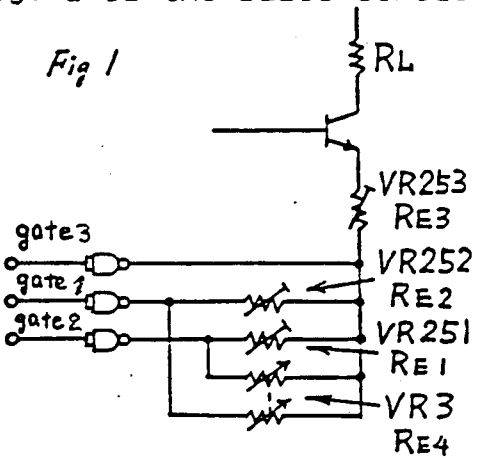
	I	R	gate 1	gate 2	gate 3	picture
case 1	0	0	L	L	L	dark
case 2	0	1	H	L	L	harf level 1 L1
case 3	1	0	L	H	L	harf level 2 L2
case 4	1	1	L	L	H	white level L3

note) L1 ,L2 ,L3 : Brightness
(when contrast VR is MIN, L1 < L2 < L3)

VIDEO AMP

When AMP gain become larger brightness also become larger.
Fig. 1 is the basic circuit.

Fig 1



AMP GAIN G is shown eq.1

$G = RL / \Sigma RE$ eq.1

note ΣRE : total resistance between Emitter and ground.

case 1

G = 0

because $\Sigma RE = \infty$

(gate1 gate 3 is open corrector TTL)

case 2, 3

$$G = \frac{RL}{RE3 + (RE2 \text{ or } RE1) // RE4}$$

case 4

G = RL / RE3

From the above mentioned equation,G is changed by RE4(VR3) only on the case 2 and 3.
When RE4 is 0, G is the same as the case 4.

3. Vertical Deflection Circuit

As shown in the block diagram,the base circuit of the vertical deflection circuit is composed of vertical oscillation circuit which generates saw tooth wave voltage,amplification waveform shaping,and output circuit. The vertical synchronous signal that has been synchronously separated and which has passed through the integration circuit is added to the vertical synchronous circuit by pin 5 of IC401.The saw tooth wave which has been generated by the vertical oscillation circuit is taken from pin 4,and after passing through R404,VR401 and C405,it is added to pin 7, then after the waveform shaping,it is amplified,and added to the vertical output. VR4 and C413 are time constants which determine the oscillation. The vertical output waveform is a waveform in which pulse is superposed with sawtooth wave as it is clear from TP82.
This is designed so that high voltage is added to retrace line period,and low voltage is added to scanning period in order to decrease the power consumption of vertical deflection circuit by retrace line pulse clamp circuit.
In the above mentioned way,the circuit power consumption is reduced and the operation is done efficiently.
VR401 is for adjustment of V Height and VR402 is for adjustment of V Lin,and they are connected to pin 4 and pin 7, repsectively. Furthermore,vertical synchronization is done by VR4 connected to pin 6.

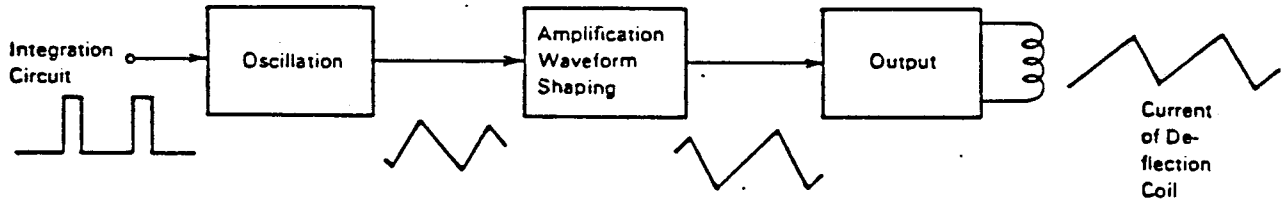


Fig. 4 Composition of Vertical Deflection Circuit

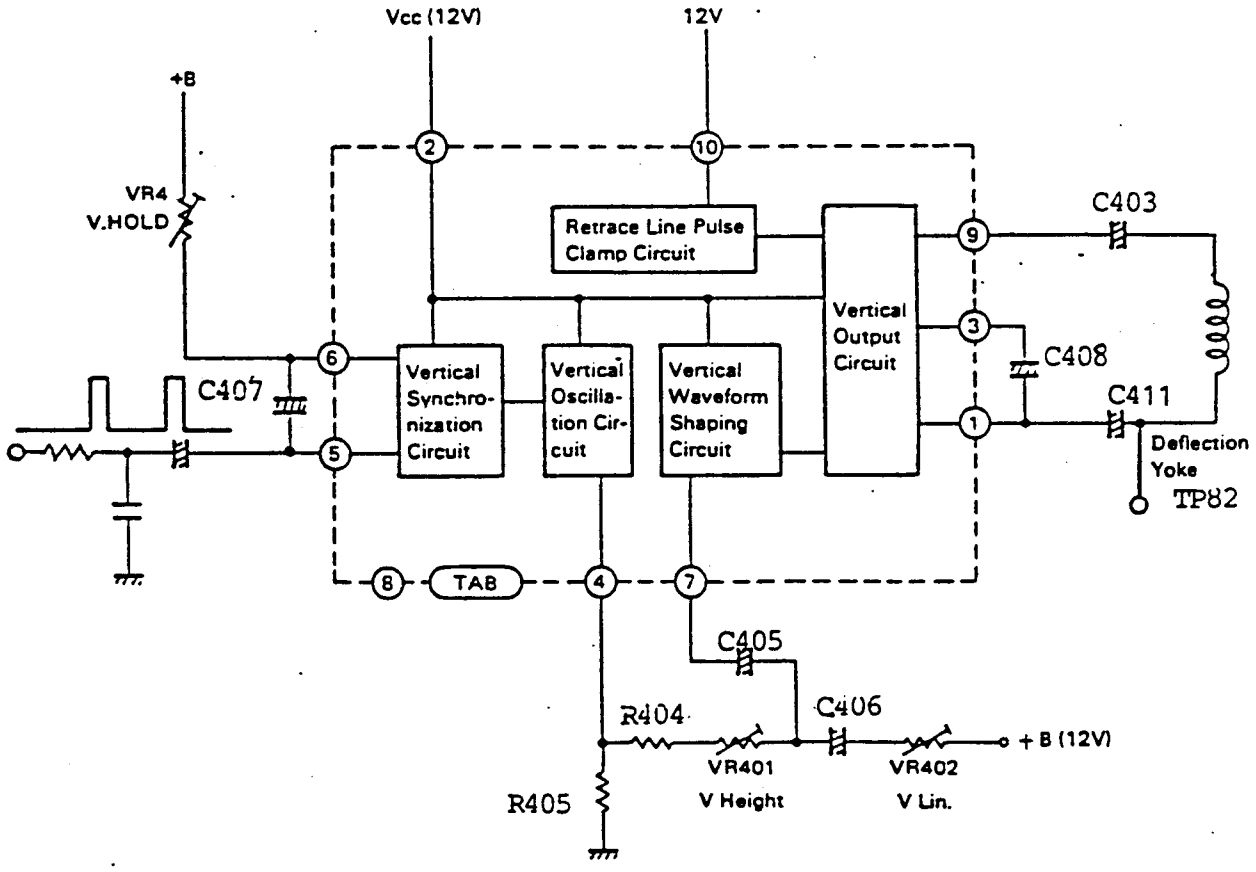


Fig. 5

4. Horizontal Deflection Circuit

As shown in Fig.6 the horizontal deflection circuit is composed of AFC Circuit,Oscillation Circuit,and Output Circuit,and its function is to pass sawtooth wave current synchronized with the horizontal synchronization signal to the deflection coil.

Function of AFC Circuit

The vertical synchronous signals which control the vertical oscillation current pass through 2 or 3 stages of integration circuit which is a kind of lowpass filter,so the horizontal synchronous signals and pulsing noises are leveled off and do not appear in the output.Therefore,the oscillation circuit can be directly controlled by the synchronous signals. However,horirzontal synchronous signals are taken out by passing them through a kind of high-pass filter,so pulsing noises will be mixed, and in the same way as the vertical circuit,if direct control is done,the synchronization will be disturbed,and a stable picture can not be obtained.

Consequently,for the control of horizontal oscillation frequency, AFC circuits are used.The AFC circuits will compare the phase of the oscillation circuit and the phase of the synchronous signal, then generate direct current output voltage proportionate to the phase difference. This voltage is added to the oscillation circuit,and the oscillation fequency and its phase will be coincided with the horizontal synchronous signal.

The horizontal oscillation signal fed back to the AFC circuit is normally done by changing the pulse generated in the horizontal output circuit into sawtooth wave(This is called comparative waveform signal).

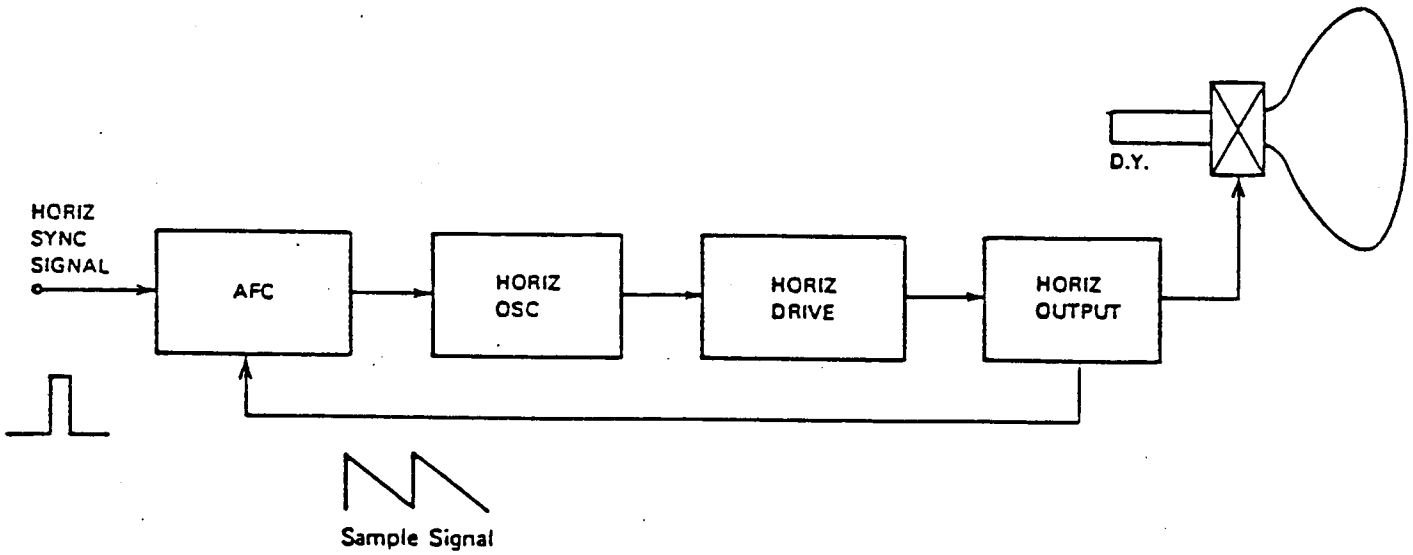


Fig. 6 Horizontal Deflection Circuit

5. Horizontal Oscillation Circuit

The horizontal oscillation circuit just like in case of the vertical oscillation circuit,blocking oscillation circuit which employs the oscillation transformer is often used.
The oscillation time constant becomes rather small time constant than the vertical oscillation circuit at R509,C507 and C508.
The Oscillation Transformer is designed so that positive feedback and oscillation will be made at T501.
In case the base voltage of the oscillation transistor becomes high,the oscillation frequency also becomes high, and in case the base voltage becomes low,the oscillation frequency becomes low.
Therefore,the frequency control will function as follows.
If the oscillation frequency begins to get low(The phase is delayed) the output of AFC increases.
Since this voltage is added to the base of the horizontal oscillation,it will function as raising the oscillation frequency (The phase is advanced.).
Contrary to this,if the oscillation frequency begins to get high (The phase advances),the output of AFC will become low,and this will be added to the oscillation circuit. Consequently,it will function as lowering the oscillation frequency(The phase is delayed).In the above mentioned way,the horizontal oscillation frequency and its phase will always coincide with the horizontal synchronous signal.

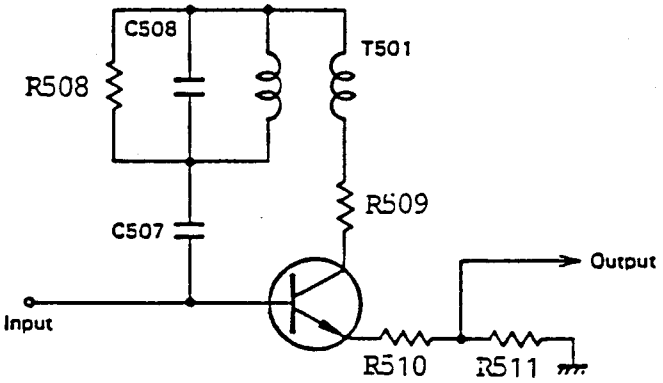


Fig. 7 Horizontal Oscillation Circuit

6. Horizontal Drive Circuit

The horizontal oscillation drive circuit is located between the oscillation circuit and the output circuit,and its function is to amplify the oscillation output and drive the output circuit. In Fig.8,its circuit is shown.

The waveform which is amplified is a waveform like rectangular waves. Since transformers are used,sharp pulses generate when the transistor become ON or OFF. C510 and R512 are inserted to absort such pulses.

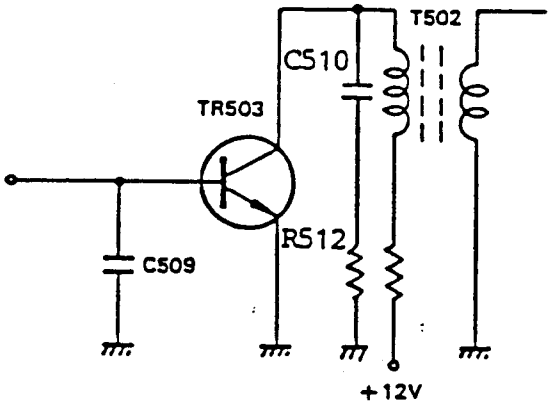


Fig. 8 Horizontal Drive Circuit

7. Horizontal Output Circuit

The horizontal output circuit has the function of sending sawtooth wave current to the horizontal deflection coil.However, unlike the vertical output circuit,this is done by the switch operation of the transistors,Fig.9 shows the horizontal output circuit.

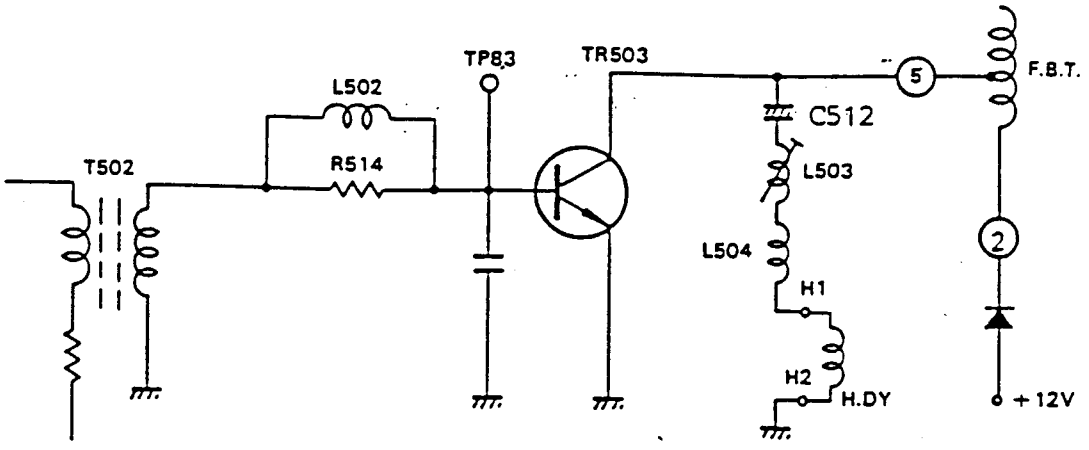
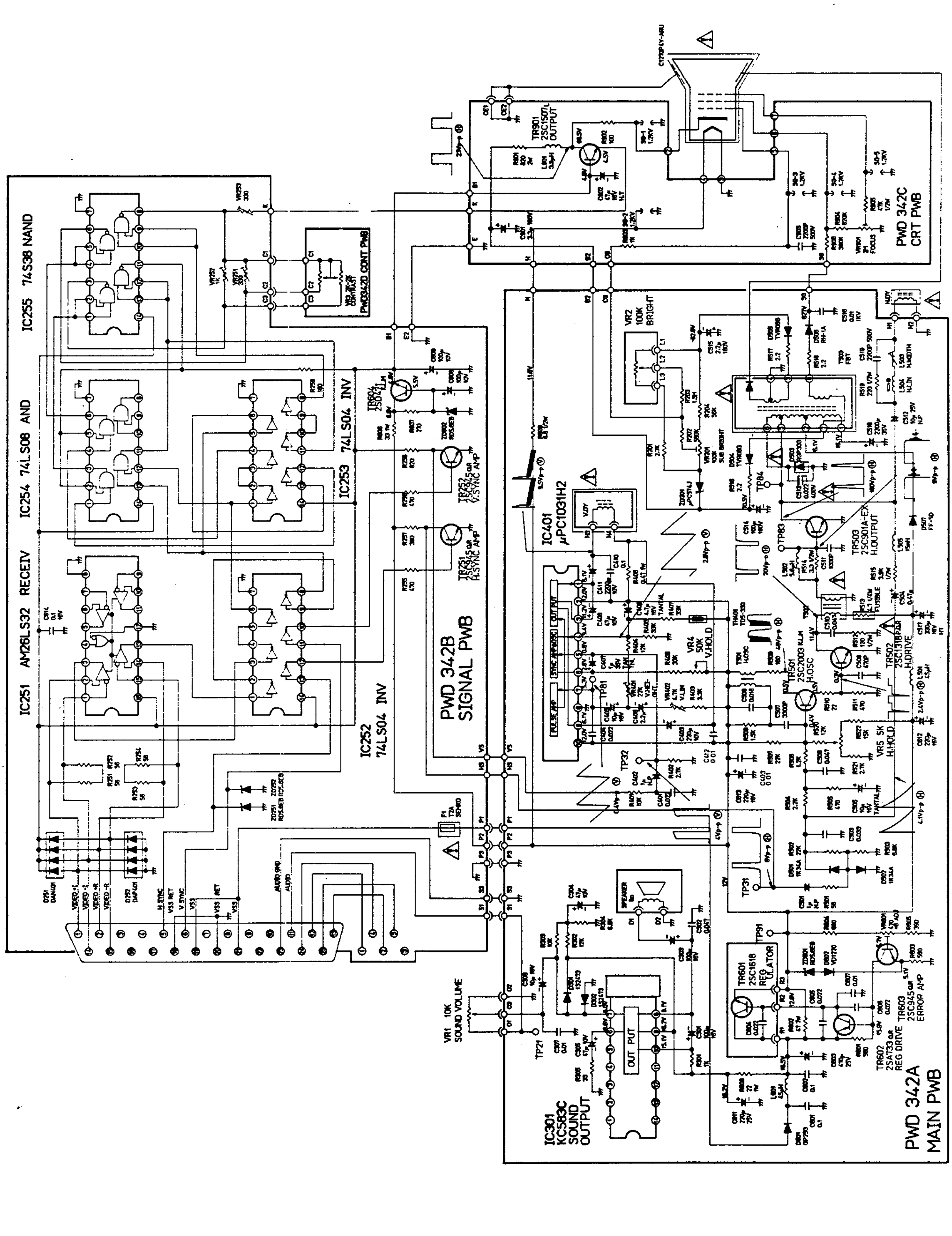
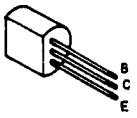
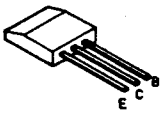


Fig. 9 Horizontal Output Circuit

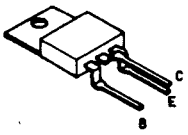

IC255 74S38 NAND
IC254 74LS08 AND
IC251 AM26LS32 RECEIV
IC253 74LS04 INV
IC252 74LS04 INV
PWD 342B SIGNAL PWB
PWD 342C CRT PWB
IC401 μPC1031H2
VR2 100K BRIGHT
VR4 50K V.HOLD
VR5 5K H.HOLD
VR1 10K SOUND VOLUME
IC301 KC583C SOUND OUTPUT
PWD 342A MAIN PWB



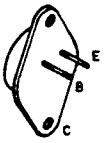
2SA733
2SC945
2SC1318
2SC2003



2SD471



2SC1507



2SC1618
2SC901A-EX

E.EMITTER
B.BASE
C.COLLECTOR

NOTE

1. ALL RESISTORS ARE SHOWN IN OHMS
   K = 10^3 M = 10^6
2. ALL RESISTORS ARE 1/4 WATT UNLESS OTHERWISE NOTED.
3. CAPACITANCE VALUES ARE μFD UNLESS OTHERWISE NOTED.
   P = 10^{-6}
4. ALL CAPACITORS ARE 50WV UNLESS OTHERWISE NOTED.
   REPLACEMENT PARTS WHICH HAVE SPECIAL SAFETY CHARACTERISTICS ARE IDENTIFIED BY ⚠ SHADING ON THE SCHEMATICS.
   REPLACE THESE CRITICAL COMPONENTS WITH RECOMMENDED REPLACEMENT PARTS DON'T DEGRADE THE SAFETY OF THE SET THROUGH IMPROPER SERVICING.

MODEL :RC740 MONOCHROME DISPLAY MONITOR

SYMBOL	PARTS NO	DESCRIPTION	QTY UNI /1 SET (
** CRT **			
	5534165E	PIX,TUBE C1270P4Y(N) ARU	1
** ICS **			
IC301	37001012	IC KC583C	1
IC401	37006008	IC MPC1031H2 (VERT)	1
IC252 IC253	37051075	IC SN74LS04N (INVERT)	2
IC254	37051076	IC SN74LS08N (AND)	1
IC251	37051267	IC AM26LS32PC (RECEIV)	1
IC255	37052053	SN74S38N	1
** TRANSISTORS **			
TR502	35050217	TR,2SC1318,Q	1
TR901	35050517	TR,2SC1507 L	1
TR501	35054113	TR 2SC2003 M	1
TR601	35054200	TR 2SC1618	1
TR604	35063512	TR 2SD471 (1) L	1
TR503	35081200	TRANSISTOR 2SC901A EX	1
TR251 TR252 TR603	350D7217	TR,2SC945Q	3
TR602	350K3517	TR 2SA733/2SA733A Q	1
D503	79431023	RECTIFIER,SI RGP30G	1
** DIODES **			
ZD201	36003049	DIODE,ZENER MPC-574J	1
D301 D302	360K1009	DIODE,SI.1S2473	2
D501 D502	360K2023	DIODE 1K34A	2
ZD251 ZD252 ZD601 ZD602	360K3068	DIODE RD5.6EB	4
D601	36107059	RECTIFIER,SI GP25G	1
D506	36107165	RECTIFIER,SI RH-1A	1
D507	36107290	RECTIFIER,SI FE5D	1
D251	36108030	DIODE DAN401	1
D252	36108031	DIODE DAP401	1
D504 D505	361K7160	RECTIFIER,SI.TVR-06G	2
D602	38005011	VARISTER,VD1220	1
TH401	38102018	THERMISTOR,TD5-330	1

MODEL : RC740 MONOCHROME DISPLAY MONITOR

SYMBOL	PARTS NO	DESCRIPTION	QTY UNI /1 SET (
** COILS & FILTERS **			
L503	60908026	COIL	1
L504	60917037	COIL-H.LINEARITY	1
T501	60953008	COIL,H.OSC	1
L901	61051712	FILTER COIL	1
L501 L601	61055009	COIL FILTER S450K (2A)	2
L505	61064061	COIL,FILTER S153J	1
L502	610F6014	COIL,FILTER 5.6UH	1
** PACKING MATERIALS **			
	24806961	BAG,POLYETHYLENE	1
	24807631	BAG,POLYETHYLENE	1
	24815801	FILLER-L,CARTON	1
	24815811	FILLER-R,CARTON	1
	25806231	CARTON BOX	1
	78160951	LABEL,SCHEMATIC DIAGRAM	1
** RESISTORS **			
R514	40003007	R,SOLID 3.3H 10% 1/2W	1
R515	40003044	R,SOLID 3.9K 10% 1/2W	1
R512	400K3526	R,SOLID 120H 10% 1/2W	1
R519	400K3529	R,SOLID 220H 10% 1/2W	1
R905	400K3557	R,SOLID 47K 10% 1/2W	1
R516 R517 R518	40177109	R,CARBON 2.2H 5% 1/4W	3
R510	401C6633	R,CARBON 22H 5% 1/4W	1
R305	401C6637	R,CARBON 33H 5% 1/4W	1
R251 R252 R253 R254 R501	401C6643	R,CARBON 56H 5% 1/4W	5
R902	401C6649	R,CARBON 100H 5% 1/4W	1
R259 R509	401C6655	R,CARTON 180H 5% 1/4W	2
R607	401C6659	R,CARBON 270H 5% 1/4W	1
R257 R605	401C6663	R,CARBON 390H 5% 1/4W	2
R255 R256 R505 R511	401C6665	R,CARBON 470H 5% 1/4W	4
R601 R603	401C6667	R,CARBON 560H 5% 1/4W	2
R604	401C6669	R,CARBON 680H 5% 1/4W	1
R258	401C6671	R,CARBON 820H 5% 1/4W	1
R301 R903	401C6673	R,CARBON 1.0K 5% 1/4W	2

MODEL : RC740 MONOCHROME DISPLAY MONITOR

SYMBOL	PARTS NO	DESCRIPTION	QTY UNI /1 SET (
** RESISTORS **			
R506	401C6675	R,CARBON 1.2K 5% 1/4W	1
R508	401C6677	R,CARBON 1.5K 5% 1/4W	1
R504	401C6681	R,CARBON 2.2K 5% 1/4W	1
R201 R402 R521	401C6683	R,CARBON 2.7K 5% 1/4W	3
R403	401C6685	R,CARBON 3.3K 5% 1/4W	1
R304 R503	401C6693	R,CARBON 6.8K 5% 1/4W	2
R303 R401	401C6697	R,CARBON 10K 5% 1/4W	2
R302 R404 R405 R520	401C6699	R,CARBON 12K 5% 1/4W	4
R522	401C6701	R,CARBON 15K 5% 1/4W	1
R502 R507	401C6705	R,CARBON 22K 5% 1/4W	2
R407 R408	401C6709	R,CARBON 33K 5% 1/4W	2
R204	401C6715	R,CARBON 56K 5% 1/4W	1
R906	401C6735	R,CARBON 390K 5% 1/4W	1
R202	401C6739	R,CARBON 560K 5% 1/4W	1
R904	401C6743	R,CARBON 820K 5% 1/4W	1
R203	401C6749	R.CARBON 1.5M 5% 1/4W	1
R602	40216037	R,WIRE 47H 5% 7W	1
R608	40351133	R,METAL 22H 5% 1W	1
R606	40351137	R,METAL 33H 5% 1W	1
R901	40352171	R,METAL 820H 5% 2W	1
R609	40354121	R,METAL 6.8H 5% 1/2W	1
R406	40404809	R,METAL 0.47H 10% 1W	1
R513	40811617	R,FUSE 4.7H 5% 1/4W	1
	74900281	INSULATOR D	1
	74900512	METAL PLATE TR M.P	1
** CAPACITORS **			
C516	42019625	C,CERAMIC 1KV 0.01UF	1
C511	4202J513	C,CERAMIC 50V 1000P	1
C607	420B9525	C,CERAMIC 50V 0.01UF	1
C519 C903	420C9567	C,CERAMIC 500V 2200PF	2
C604	42110929	C,CERAMIC 50V 0.022UF	1
C605 C606	421A0429	C,CERAMIC 50V 0.022UF	2
C509	421C0209	C,CERAMIC 50V 470PF	1
C412 C413	421C0225	C,CERAMIC 50V 0.01UF	2
C601 C602	421J9001	C,CERAMIC 50V 0.1UF	2
C614	421J9006	C,CERAMIC 2.5V 0.1UF	1
C513	42703867	C,FILM 400V 0.022UF	1

MODEL : RC740 MONOCHROME DISPLAY MONITOR

SYMBOL	PARTS NO	DESCRIPTION	QTY UNI /1 SET (
** TRANSFORMERS **			
T502	45802001	TRANS,H.DRIVE	1
T503	47304610	F.B.T	1
** VARIABLE RESISTORS **			
VR4	41021413	R,VARIABLE B50K-H	1
VR5	41021441	R,VARIABLE 10K B5K-H	1
VR1	41053008	R,VARIABLE 10K 0.2W	1
VR2	41053017	R,VARIABLE B100K	1
VR3	41055551	R,VARIABLE C2K-C2K	1
VR901	41056108	R,VARIABLE B2.OM	1
VR601	41061007	R,Variable B47OH	1
VR251 VR25	41061604	R,VARIABLE B300H	2
VR252	41061607	R,VARIABLE 1K 0.1W	1
VR402	41061611	R,VARIABLE B4.7K	1
VR201	41061614	R,VARIABLE B100K	1
VR401	41061615	R,VARIABLE B22K	1
** PWB ASSY **			
	94T63102	MAIN PWB ASSY	1
** MISCELLANEOUS PARTS **			
	48201070	DEFLECTION YOKE	1
	63001527	SPEAKER 77MM 8H 0.8W	1
F1	66671005	FUSE2AT 250V SEMKO 20MM	2
SG1 SG2 SG3 SG4 SG5	66705001	SPARK GAP 1.2KV	5
	70031033	CRT SOCKET	1
	70101001	SOCKET,TR	1
** APPEARANCE PARTS **			
	25303272	CABINET FRONT	1
	25303282	CABINET BACK	1
	25450572	KNOB,CONTROL	3

MODEL : RC740 MONOCHROME DISPLAY MONITOR

SYMBOL	PARTS NO	DESCRIPTION	QTY UNI /1 SET (
** CAPACITORS **			
C507	427F4057	C,FILM 50V 3300PF	1
C307	427F4063	C,FILM 50V 0.01UF	1
C508	427F4066	C,FILM 50V 0.018UF	1
C401 C404	427F4067	C,FILM 50V 0.022UF	2
C503	427F4069	C,FILM 50V 0.033UF	1
C302 C506 C510	427F4071	C,FILM 50V 0.047UF	3
C410	427F4075	C,FILM 50V 0.1UF	1
C514	4300E127	C,ELEC 160V 100UF	1
C411	43019021	C,ELEC 10V 2200UF	1
C518	43019059	C.ELEC 35V 2200UF	1
C304 C305 C408	4301J015	C,ELEC 10V 47UF	3
C612 C613	4301J030	C.ELEC 16V 220UF	2
C603	4301J045	C,ELEC 25V 470UF	1
C902	4302C049	C.ELEC 16V 47UF	1
C504	430A3071	C,ELEC 50V 0.47UF	1
C608 C609	430A9016	C.ELEC 10V 100UF	2
C403	430A9017	C,ELEC 10V 220UF	1
C306 C405	430A9025	C.ELEC 16V 10UF	2
C301 C303	430A9029	C,ELEC 16V 100UF	2
C611	430A9043	C,ELEC 25V 220UF	1
C406	430A9062	C.ELEC 50V 2.2UF	1
C515	430K5117	C,ELEC 160V 2.2UF	1
C901	430K5118	C,ELEC 160V 3.3UF	1
C517	43201011	C,ELEC 16V 330UF	1
C402 C501	43313055	C.ELEC 50V 1UF	2
C512	43399001	C,ELEC 25V 10UF	1
C409	435A5053	C,TANTALUM 16V 4.7UF	1
C505	435A5055	C,TANTALUM 16V 10UF	1
C407	435A5071	C,TANTALUM 35V 1UF	1

6. Specifications

The following 8 pages contain the main specifications of the monitor.

3.MECHANICAL DESCRIPTION

3-1. Cabinet
: Molded plastic cabinet(same as of RC 752)

3-2. Dimensions
: 360(W) X 296(H) X 330(D) mm

3-3. Weight
: Approx 6.5 (Kg) (Net Weight)

3-4. Input Terminal
: 25 PIN Female D-shell connector

4.Picture Tube

4-1. Type Name	:	C1270P4Y ARU
4-2. Phosphor	:	Yellow(P4Y)
4-3. Face Finish	:	Amber color coated face(ARU)
4-4. Dimension		
Size	:	12 inch diagonal
Deflection Angle	:	90 degree
Face Curvature	:	635 mm radius
Tube length	:	280 mm max.

5.Input

5-1. Power supply input

Power supply voltage	:	17.5V +-10 %
ripple	:	less than 100 mV

5-2. Signal input

Signal timing : see page 10

5-2-1.Video signal

Polarity	:	Positive going
Dot rate	:	20.000MHz
Character matrix	:	7 dots X 9 lines
Character block	:	9 dots X 14 lines
Character format	:	80 characters X 25 rows
Display format	:	720 dots X 350 lines
Display time	:	36.000us(80 characters) 15.964ms(350 H)

5-2-2.Horizontal Synchronaization

Pulse polarity	:	TTL level, Positive going
Frequency	:	21.930KHz
Pulse width	:	4.800uS
Front porch	:	3.200uS
Back porch	:	1.600uS

5-2-3.Vertical Synchronaization

Pulse polarity	: TTL level, Positive going
Frequency	: 58.169Hz
Pulse width	: 0.227mS(5 H)
Front porch	: 0.136mS(3 H)
Back porch	: 0.864mS(19 H)

5-2-4.Audio signal

Input Level	: 0.1 Vp-p
Input Impedance	: 5 K-Ohm minimum

6.Controls

Front (User controls)	: VOLUME, BRIGHTNESS, CONTRAST
REAR (User controls)	: HORIZONTAL HOLD, VERTICAL HOLD
INSIDE (Serviceman controls)	: VERTICAL HEIGHT, SUB BRIGHTNESS VERTICAL LINEARITY, +B ADJUSTMENT SUB CONTRAST, HORIZONTAL WIDTH FOCUS, CENTERING MAGNET

7. ELECTRICAL REQUIREMENTS

7-1. Video responce

Rise time	: 15 nsec.typ.
Fall time	: 25 nsec.typ.
Pulse responce	: Overshoot and/or riging shall not be noticeablly visible.

(condition)
Signal : all white pattern (I,R)=(1,1) MODE

7-2. Active video time

Horizontal	: 36.000 us.
Vertical	: 15.964 ms.

7-3. Scanning Frequency

Horizontal	: 21.930 KHz
Vertical	: 58.169 Hz

7-4. Pull in range

Horizontal	: +- 180 Hz
Vertical	: + 0,- 8 Hz

7-5. Retrace time

Horizontal	: 9 us. max.
Vertical	: 800 us. max.

7-6. Display size

Horizontal size : 220 (mm) +- 5 (mm) (36.000 us.)
Vertical size : 148 (mm) +- 5 (mm) (15.964 mS.)

(condition)
1)Signal : all white pattern (I,R)=(0,1) MODE
Non Return to Zero Signal
2)BRIGHTNESS VR : maximum CONTRAST VR : minimum
3)Monitor should be facing EAST direction

7-7. Geometric distortion

(condition)
All specifications of this item should be made under following condition.
1)Signal : all white pattern (I,R)=(0,1) MODE
Non Return to Zero Signal
2)BRIGHTNESS VR : maximum CONTRAST VR : minimum
3)Monitor should be facing EAST direction

7-7-1. Centering

Horizontal $|E - E'| =< 5$ mm

Vertical $|F - F'| =< 5$ mm

7-7-2. Pincusion and Barrel distortion (Fig 1)

a)Top and Bottom Barrel distortion

$$a >= 2 \text{ mm}, \left[\frac{4 \times a \times 100}{AB + CD} =< 2.7\ \% \right]$$

$$b >= 2 \text{ mm}, \left[\frac{4 \times b \times 100}{AB + CD} =< 2.7\ \% \right]$$

b)Top and Bottom Pincusion distortion

$$a' >= 2 \text{ mm}, \left[\frac{4 \times a' \times 100}{AB + CD} =< 2.7\ \% \right]$$

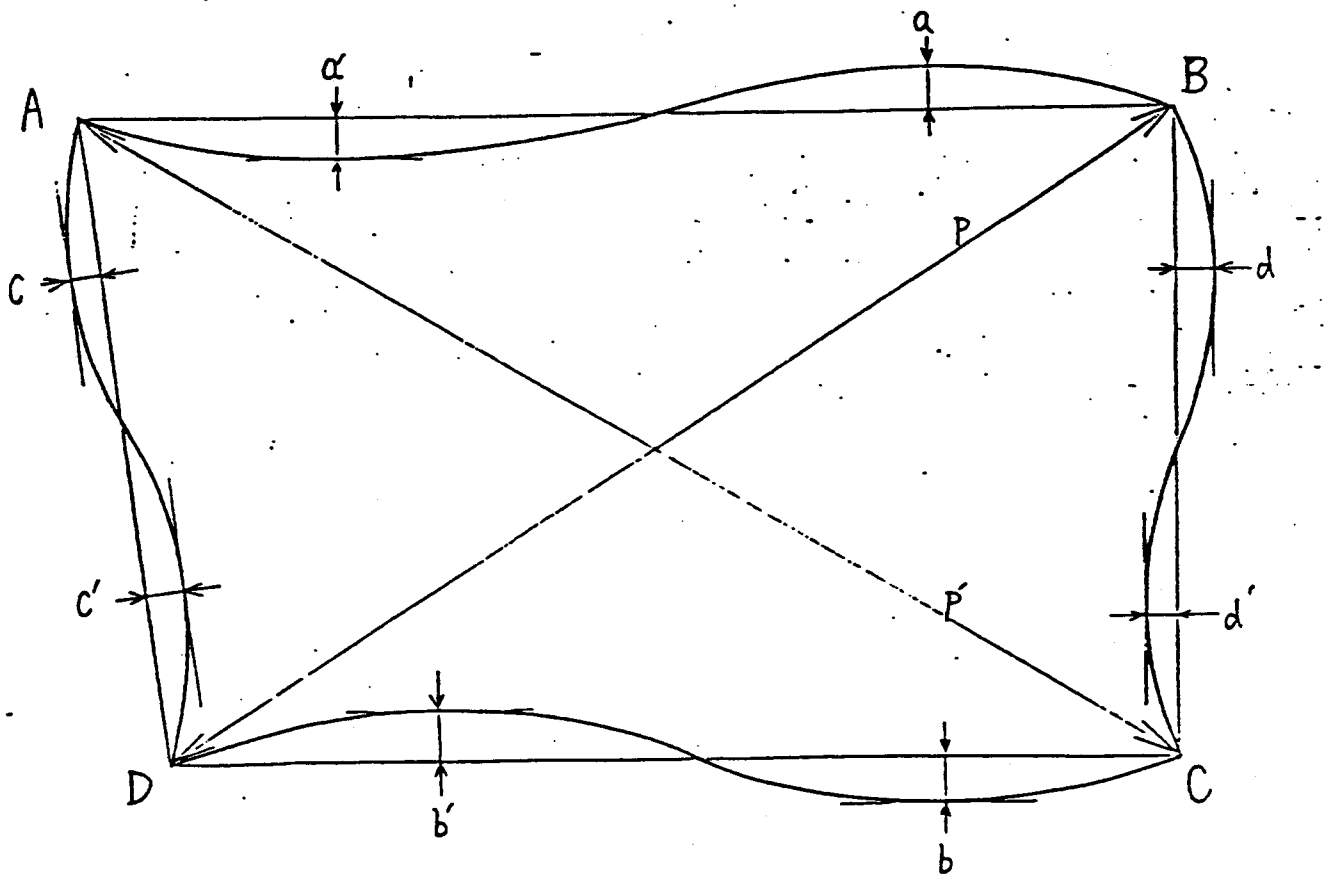
$$b' >= 2 \text{ mm}, \left[\frac{4 \times b' \times 100}{AB + CD} =< 2.7\ \% \right]$$

c)Side Barrel distortion

$$c >= 1.5\text{mm}, \left[\frac{4 \times c \times 100}{BC + DA} =< 1.4\ \% \right]$$

$$d >= 1.5\text{mm}, \left[\frac{4 \times d \times 100}{BC + DA} =< 1.4\ \% \right]$$

Fig 1



d)Side Pincusion distortion

$$c' >= 1.5\text{mm} \ , \ \left[\frac{4 \times c' \times 100}{BC + DA} =< 1.4\ \% \right]$$

$$d' >= 1.5\text{mm} \ , \ \left[\frac{4 \times d' \times 100}{BC + DA} =< 1.4\ \% \right]$$

7-7-3. Trapezoidal distortion (Fig 1)

a)Horizontal trapezoidal distortion

$$|AB-CD| =< 2.0\text{mm} \ , \ \left[\left| \frac{AB - CD}{AB + CD} \right| =< 0.7\ \% \right]$$

b)Vertical trapezoidal distortion

$$|AD-BC| =< 2.0\text{mm} \ , \ \left[\left| \frac{AD - BC}{AD + BC} \right| =< 0.5\ \% \right]$$

7-7-4. Parallelogram distortion

$$|p - p'| =< 3\ \text{mm}$$

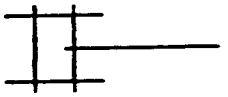
7-7-5. Linearity

Horizontal $\left[\left| \frac{ai - an/16}{an/16} \right| \times 100 =< 10\ \% \right]$

Vertical $\left[\left| \frac{bi - bn/12}{bn/12} \right| \times 100 =< 10\ \% \right]$

7-8. Focus

When character '#' with dark back ground is diplayed 1 dot blank of character '#' shall be distinguished.



7-9. Raster (Back Ground Raster)

Outer display area of raster area shall not be brightened.

(check condition)

1)Ambient illumination —— approx. 500 Lux
2)Vieuing distance —— approx. 500 mm
3)Check signal —— Grid pattern

7-10. Display pattern regulation

Horizontal —— 5 %
Vertical —— 5 %

$$\left[\frac{B - A}{A} \times 100\ (\ \%\ ) =< 5\right]$$

A : Light character pattern on dark background
B : Dark character pattern on dark background
(condition)
Signal : all white pattern

7-11. Brightness

Brightness at the center position of the all white pattern.

30 FL.(Minimum)

(condition)
1)Signal : all white pattern
2)BRIGHTNESS and CONTRAST VR pots: maximum
3)Monitor should be facing EAST direction
4)Instrument : J16 + J6503 (Tektronics)
5)Note : Before mesurement, the monitor should be taken more than 5 minutes with above condition 1) to 3) until the moniter is stabilized.

This model is adjusted by use 'Non Return to Zero' Signal pattern mode. Because,NEC's pattern signal generator can not produce the 'Return to Zero Signal' pattern mode. Picture quality it is as final sample.

7-12. Contrast

Contrast control can be adjusted only the gray levels relative to the white level.

7-13. Synchronization stability

Synchronization shall be stabilized after power supply and signals are fed to the monitor.

7-14. Power consumption

Load current <= 1.558 A.

7-15. X-Ray Radiation

Less than 0.5mR/hr.

8. Environmetal

8-1 Temperature

Operating	temperature	:	5 (°C) to 40 (°C)
Non-operating	temperature	:	-20 (°C) to 60 (°C)

8-2 Humidity

Operating	humidity	:	10 (%)RH to 85 (%)RH
Non-operating	humidity	:	10 (%)RH to 90 (%)RH (Non codensing)

8-3. Drop test

When the following test is applied the monitor should not be damaged to make fatal operating condition.

Drop height with carton box : 80 (cm)

8-4. Vibration test

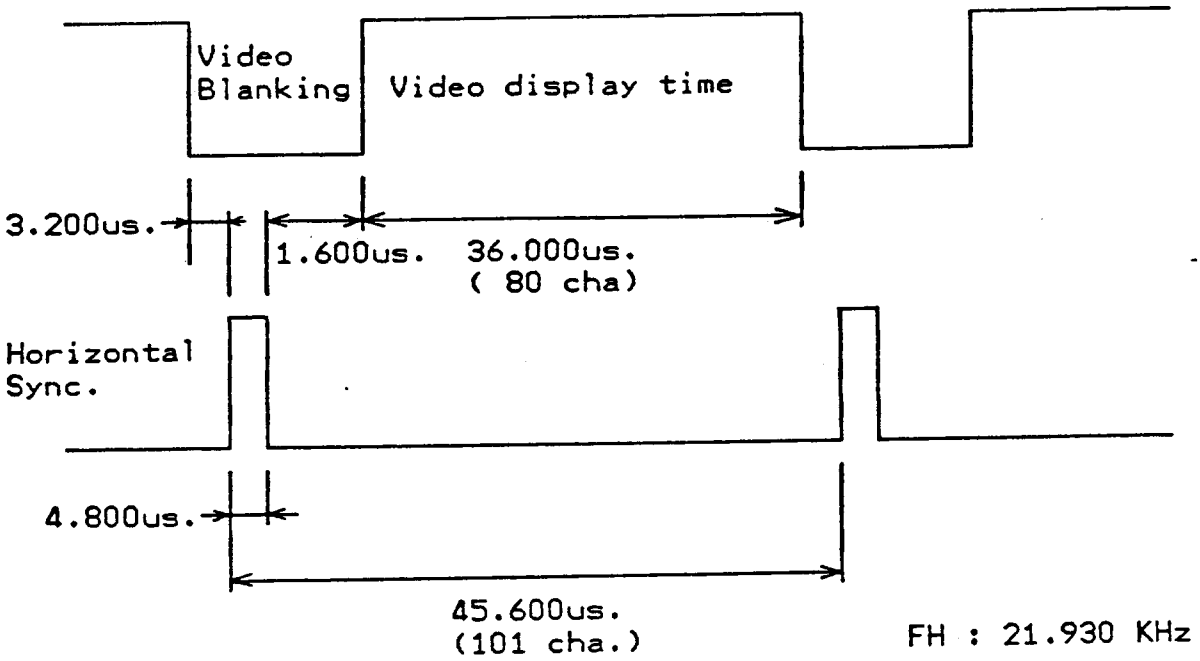
When the following test is applied the monitor should not be damaged to make fatal operating condition.

Frequency	:	5 to 10 (Hz)
Acceleration	:	1 (G)
Test Time	:	30 (min)

Signal Timing

Horizontal rate

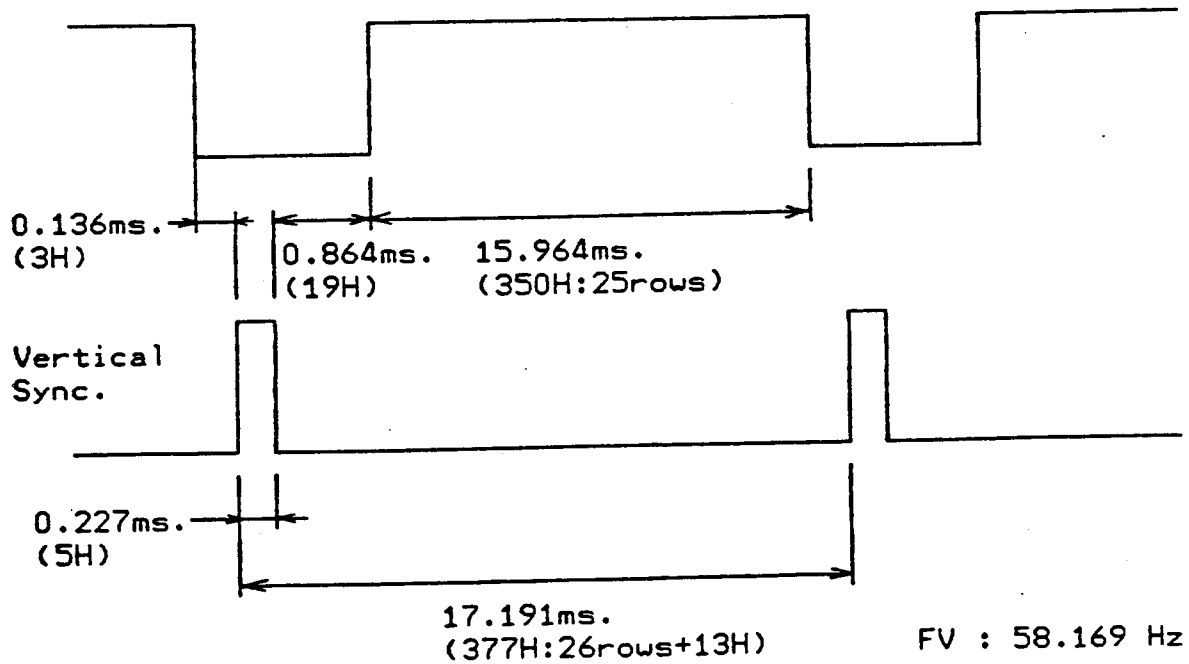
Video signal



FH : 21.930 KHz

Vertical rate

Video signal



FV : 58.169 Hz

Note: Dot Frequency —— 20.000MHz
Character cell width —— 9 dots
Character cell height —— 14 lines(H)

RETURN LETTER

Title: RC740 Video Display Technical Manual

RCSL No.: 991 9825

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Please comment on this manual's completeness, accuracy, organization, usability, and readability:

Do you find errors in this manual? If so, specify by page.

How can this manual be improved?

Other comments?

Name: _____ Title: _____

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