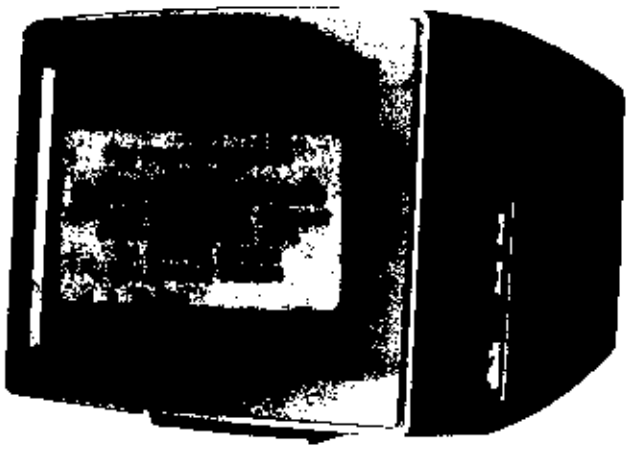
CPD-1402E

SERVICE MANUAL

AEP Model
UK Model
Chassis No. SCC-A83A-A

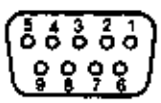


MULTISCAN

SPECIFICATIONS

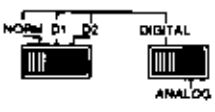
Picture tube	Super Fine Pitch Trinitron color tube 14-inch picture tube measured diagonally 90 degree deflection Anti-glaring dark screen Useful screen 274mm × 207mm Phosphor P22 Phosphor pitch 0.26mm
Resolution	900 dots × 560 lines
Scanning frequency	Vertical sync signal frequency: 50 - 100 Hz Horizontal sync signal frequency: 15.0 - 34.0 kHz
Input	RGB input (D-sub 9 pin) (Analog and TTL available)
Power requirements	220–240V AC, 50/60 Hz
Power consumption	96 W (maximum)
Dimensions	360 × 360 × 425 mm (w/h/d) (14 1/4 × 11 7/8 × 16 3/4 inches) including projecting parts
Weight	14.5 kg (32 lb)
Supplied accessory	AC power cord (1)

Pin Assignment



			1	2	3	4	5	6	7	8	9
ANALOG**			GND	GND	R	G*	B	GND	—	H/HV	V
DIGITAL	NORMAL		GND	GND	R	G	B	GND	—	H/HV	V
	D1		GND	GND	R	G	B	I	—	H/HV	V
	D2	CGA	GND	GND	R	G	B	I	—	H/HV	V
		MDA	GND	GND	—	—	—	I	G	H/HV	V
		EGA	GND	r	R	G	B	g	b	H/HV	V

(Input Selection)



GND: Ground R: Red Signal G: Green Signal
B: Blue Signal —: No connection
H: Horizontal Sync V: Vertical Sync
HV: Composite sync I: Intensity Signal
r: Secondary Red for EGA 64 colors
g: Secondary Green for EGA 64 colors
b: Secondary Blue for EGA 64 colors

ANALOG
* Sync on Green automatic if horizontal or composite sync is not assigned at Pin #6
** IBM PGA should be connected with PGA Video cable (SMF-513)

DIGITAL (TTL LEVEL)
"Normal" is for 8 colors (R, G, & B)
"D1" is for 16 colors (R, G, B & I)
"D2" is for IBM Digital Color Graphic Boards (CGA, MDA, EGA) and there is no need to readjust anything among these cards.

SYNC
Composite sync is acceptable at Pin #6.
Every polarity is acceptable at Pin #8 & 9.

VERTICAL Size
Vertical size depends on vertical frequency and can be manually adjusted.

Optional accessories

Monitor cable (9-pin ↔ 9-pin)	SMF-512 SMF-513 SMF-514
Tilt/Swivel	SU-535 Display Stand

Design and specifications subject to change without notice.

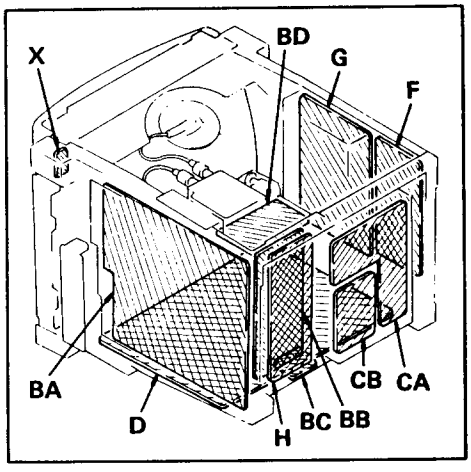
TRINITRON® CHARACTER DISPLAY

SONY®

MICROFILM

MON

5-2. CIRCUIT BOARDS LOCATION



Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

Note:

- All capacitors are in μF unless otherwise noted. p : μμF 50WV or less are not indicated except for electrolytics.
- All resistors are in ohms, 1/6W unless otherwise noted. k : 1000Ω, M : 1000kΩ.
- ▭ : nonflammable resitor.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- ▭ : fusible resitor.
- △ : internal component.
- ▭ : panel designation.
- ✱ : selected to yield optimum performance.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken with a 10 MΩ digital multimeter.
- Voltage variations my be noted due to normal production tolerances.
- Readings are taken with a color-bar-signal input. (SONY SMC-70)
- ▭ : adjustment to repair.
- no mark: with 15.73kHz color-bar signal received.
  ( ) : with 21.8kHz color-bar signal received.
  (( )) : with 30.12kHz color-bar signal received.
- ➡ : signal path.

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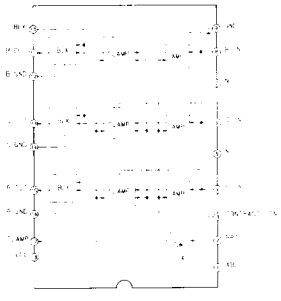
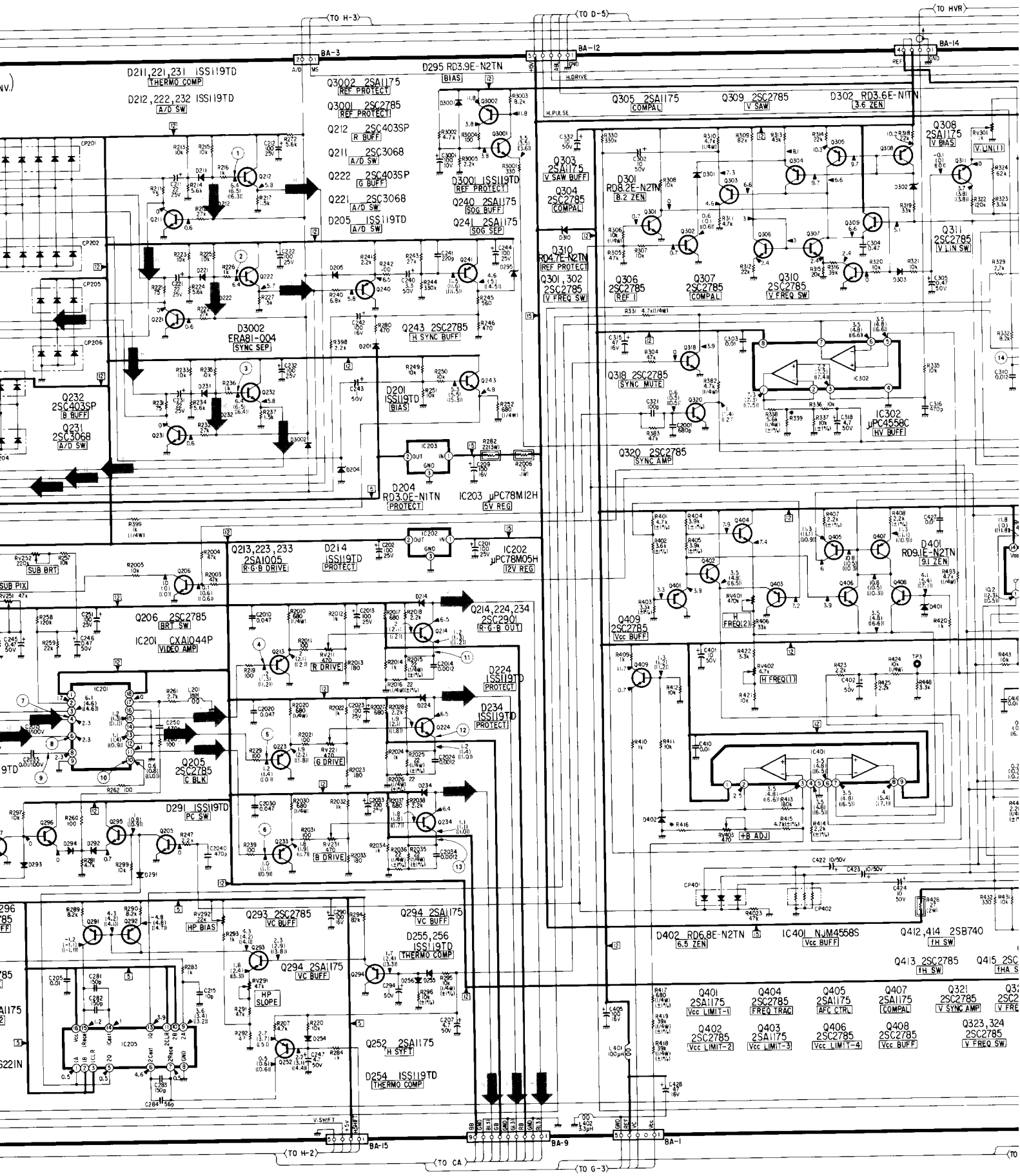
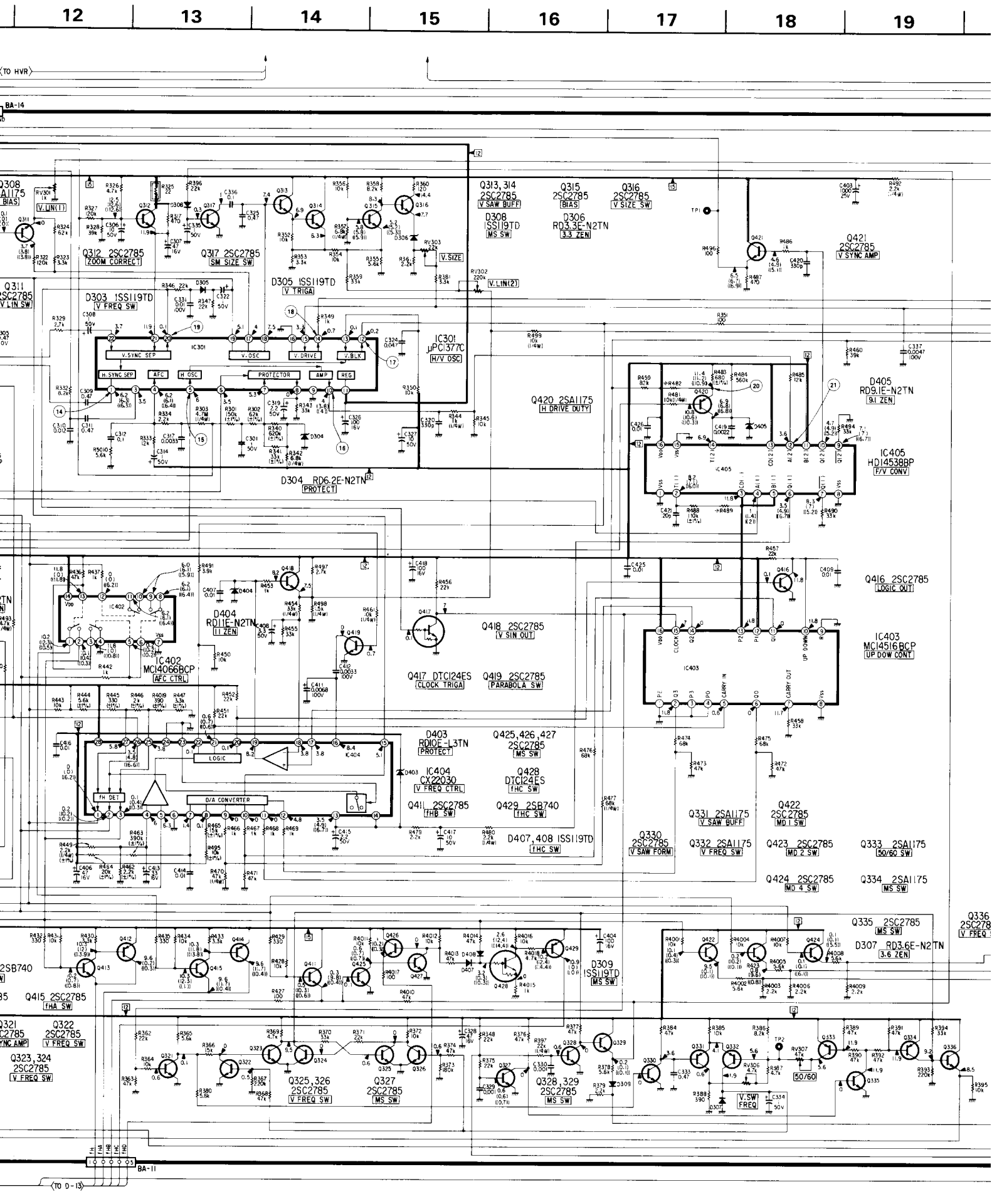
8 Cherry Tree Road, Chinnor
Oxfordshire, OX9 4QY.
Tel (01844) 351694
Fax (01844) 352554

BA Board IC201 BLOCK DIAGRAM
CXA1044P
(VIDEO AMP)




(TO H-3)
(TO D-5)
(TO HVR)
BA-3
BA-12
BA-14
D211,221,231 ISS119TD
THERMO COMP
D212,222,232 ISS119TD
A/D SW
D295 RD3.9E-N2TN
BIAS
Q3002 2SA1175
REF PROTECT
Q3001 2SC2785
REF PROTECT
Q212 2SC403SP
R BUFF
Q211 2SC3068
A/D SW
Q222 2SC403SP
G BUFF
Q221 2SC3068
A/D SW
D205 ISS119TD
A/D SW
D3001 ISS119TD
REF PROTECT
Q240 2SA1175
SOG BUFF
Q241 2SA1175
SOG SEP
Q305 2SA1175
COMPAL
Q309 2SC2785
V SAW
D302 RD3.6E-N1TN
3.6 ZEN
Q303 2SA1175
V SAW BUFF
Q304 2SC2785
COMPAL
D301 RD8.2E-N2TN
8.2 ZEN
Q308 2SA1175
V BIAS
Q311 2SC2785
V LIN SW
Q306 2SC2785
REF I
Q307 2SC2785
COMPAL
Q310 2SC2785
V FREQ SW
Q310 RD4.7E-N2TN
REF PROTECT
Q301,302 2SC2785
V FREQ SW
D3002 ERA81-004
SYNC SEP
Q243 2SC2785
H SYNC BUFF
Q232 2SC403SP
B BUFF
Q231 2SC3068
A/D SW
D201 ISS119TD
BIAS
D204 RD3.0E-N1TN
PROTECT
IC203 μPC78M12H
5V REG
Q318 2SC2785
SYNC MUTE
IC302 μPC4558C
HV BUFF
Q320 2SC2785
SYNC AMP
Q213,223,233 2SA1005
R·G·B DRIVE
D214 ISS119TD
PROTECT
IC202 μPC78M05H
12V REG
SUB BRT
SUB PIX
Q206 2SC2785
BRT SW
IC201 CXA1044P
VIDEO AMP
Q214,224,234 2SC2901
R·G·B OUT
D224 ISS119TD
PROTECT
D234 ISS119TD
PROTECT
R DRIVE
G DRIVE
B DRIVE
Q205 2SC2785
C BLK
D291 ISS119TD
PC SW
D401 RD9.1E-N2TN
9.1 ZEN
Q409 2SC2785
Vcc BUFF
H FREQ(2)
H FREQ(1)
+B ADJ
D402 RD6.8E-N2TN
6.5 ZEN
IC401 NJM4558S
Vcc BUFF
Q412,414 2SB740
fH SW
Q413 2SC2785
fH SW
Q293 2SC2785
VC BUFF
Q294 2SA1175
VC BUFF
D255,256 ISS119TD
THERMO COMP
HP BIAS
HP SLOPE
Q252 2SA1175
H SYFT
D254 ISS119TD
THERMO COMP
Q401 2SA1175
Vcc LIMIT-1
Q402 2SC2785
Vcc LIMIT-2
Q404 2SC2785
FREQ TRAC
Q403 2SA1175
Vcc LIMIT-3
Q405 2SA1175
AFC CTRL
Q406 2SC2785
Vcc LIMIT-4
Q407 2SA1175
COMPAL
Q408 2SC2785
Vcc BUFF
Q321 2SC2785
V SYNC AMP
Q323,324 2SC2785
V FREQ SW
V-SHIFT
BA-15
BA-9
BA-1
(TO H-2)
(TO CA)
(TO G-3)


12
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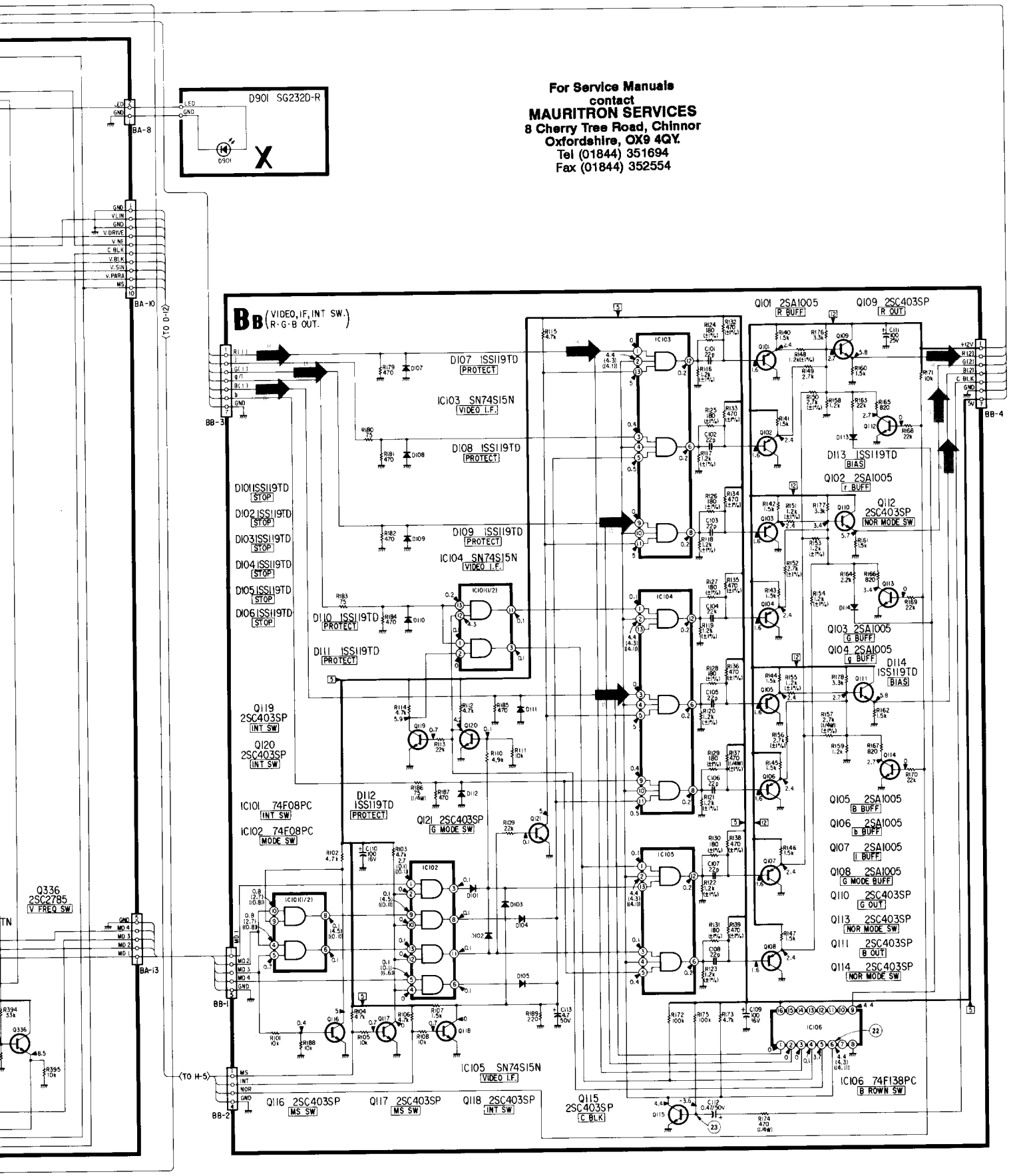
(TO HVR)
BA-14
Q313, 314 2SC2785 V SAW BUFF
Q315 2SC2785 BIAS
Q316 2SC2785 V SIZE SW
D308 ISS119TD MS SW
D306 RD3.3E-N2TN 3.3 ZEN
Q421 2SC2785 V SYNC AMP
Q312 2SC2785 ZOOM CORRECT
Q317 2SC2785 SM SIZE SW
D305 ISS119TD V TRIGA
V.SIZE
V.LIN(2)
V.LIN(1)
D303 ISS119TD V FREQ SW
IC301 μPC1377C H/V OSC
V.SYNC SEP
H.SYNC SEP
AFC
H OSC
V.OSC
PROTECTOR
V.DRIVE
AMP
V.BLK
REG
Q420 2SA1175 H DRIVE DUTY
D405 RD9.1E-N2TN 9.1 ZEN
IC405 HD14538BP F/V CONV
D304 RD6.2E-N2TN PROTECT
Q416 2SC2785 LOGIC OUT
IC403 MC14516BCP UP DOW CONT
D404 RD11E-N2TN 11 ZEN
Q418 2SC2785 V SIN OUT
IC402 MC14066BCP AFC CTRL
Q417 DTC124ES CLOCK TRIGA
Q419 2SC2785 PARABOLA SW
D403 RD10E-L3TN PROTECT
Q425,426,427 2SC2785 MS SW
IC404 CX22030 V FREQ CTRL
Q428 DTC124ES fHC SW
Q411 2SC2785 fHB SW
Q429 2SB740 fHC SW
D407,408 ISS119TD fHC SW
Q331 2SA1175 V SAW BUFF
Q422 2SC2785 MD1 SW
Q330 2SC2785 V SAW FORM
Q332 2SA1175 V FREQ SW
Q423 2SC2785 MD2 SW
Q333 2SA1175 50/60 SW
Q424 2SC2785 MD4 SW
Q334 2SA1175 MS SW
Q335 2SC2785 MS SW
D307 RD3.6E-N2TN 3.6 ZEN
D309 ISS119TD MS SW
Q415 2SC2785 fHA SW
Q322 2SC2785 V FREQ SW
Q323,324 2SC2785 V FREQ SW
Q325,326 2SC2785 V FREQ SW
Q327 2SC2785 MS SW
Q328,329 2SC2785 MS SW
50/60
V.SW FREQ
BA-11
(TO D-13)



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- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
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- △ : internal component.
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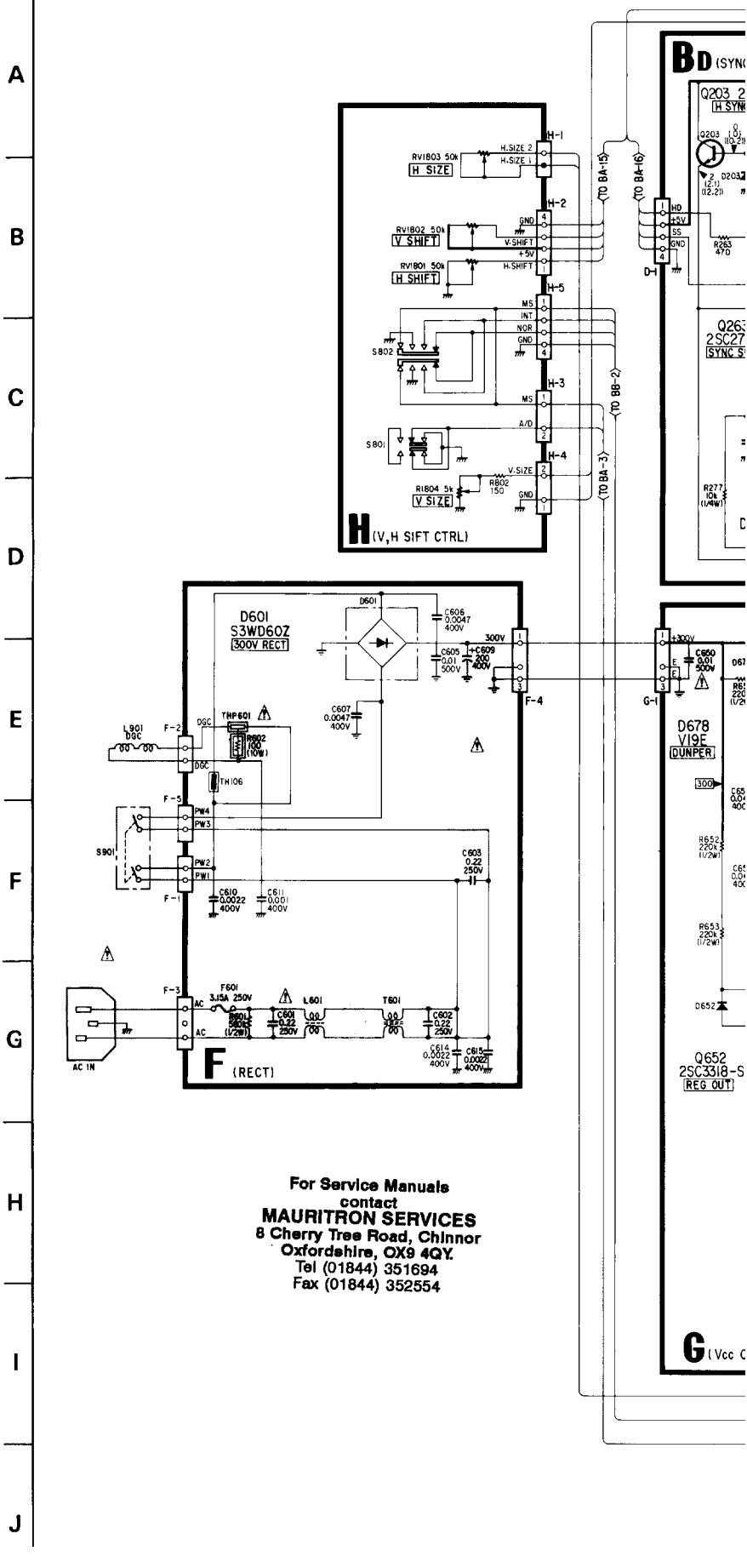

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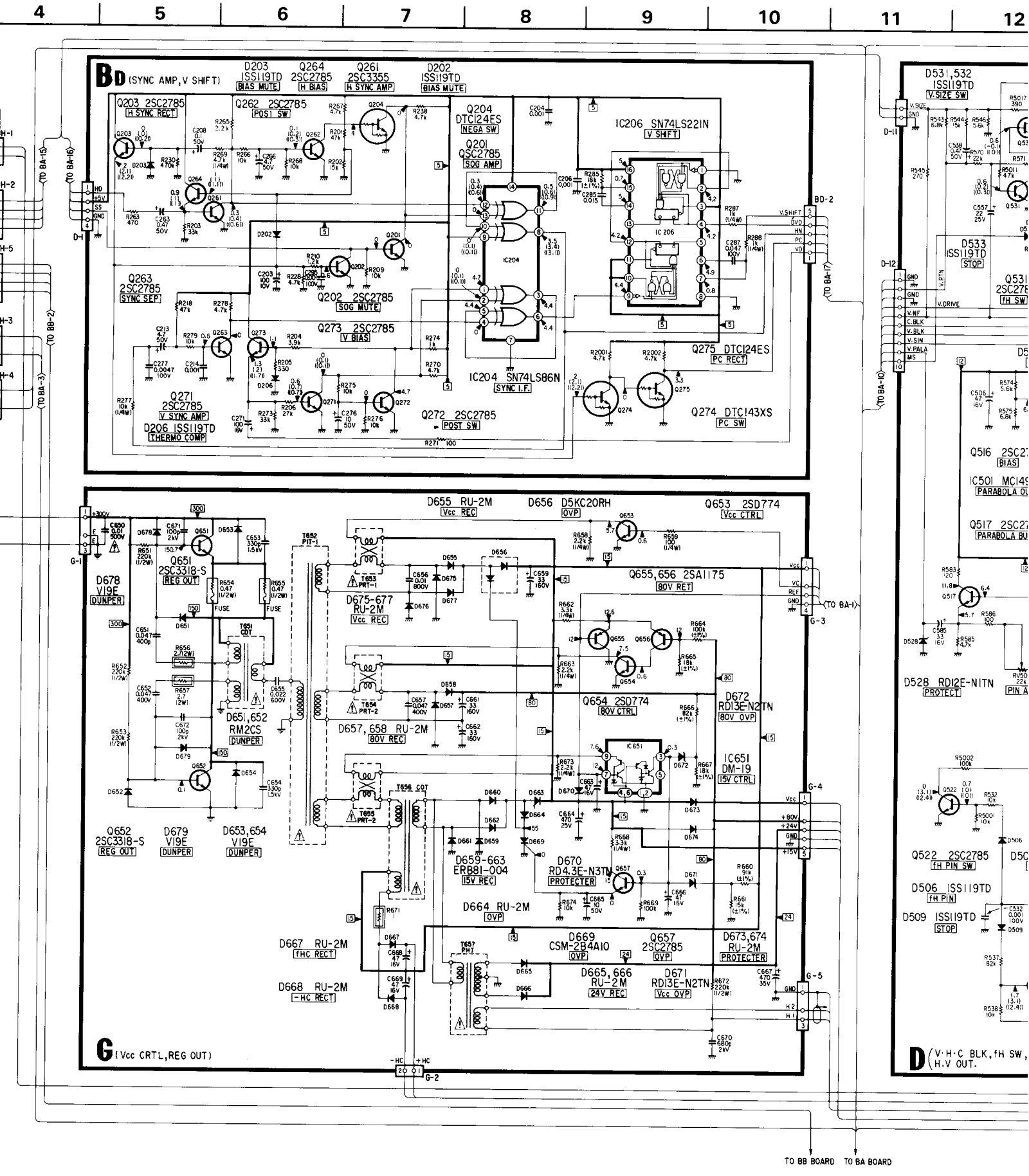
4
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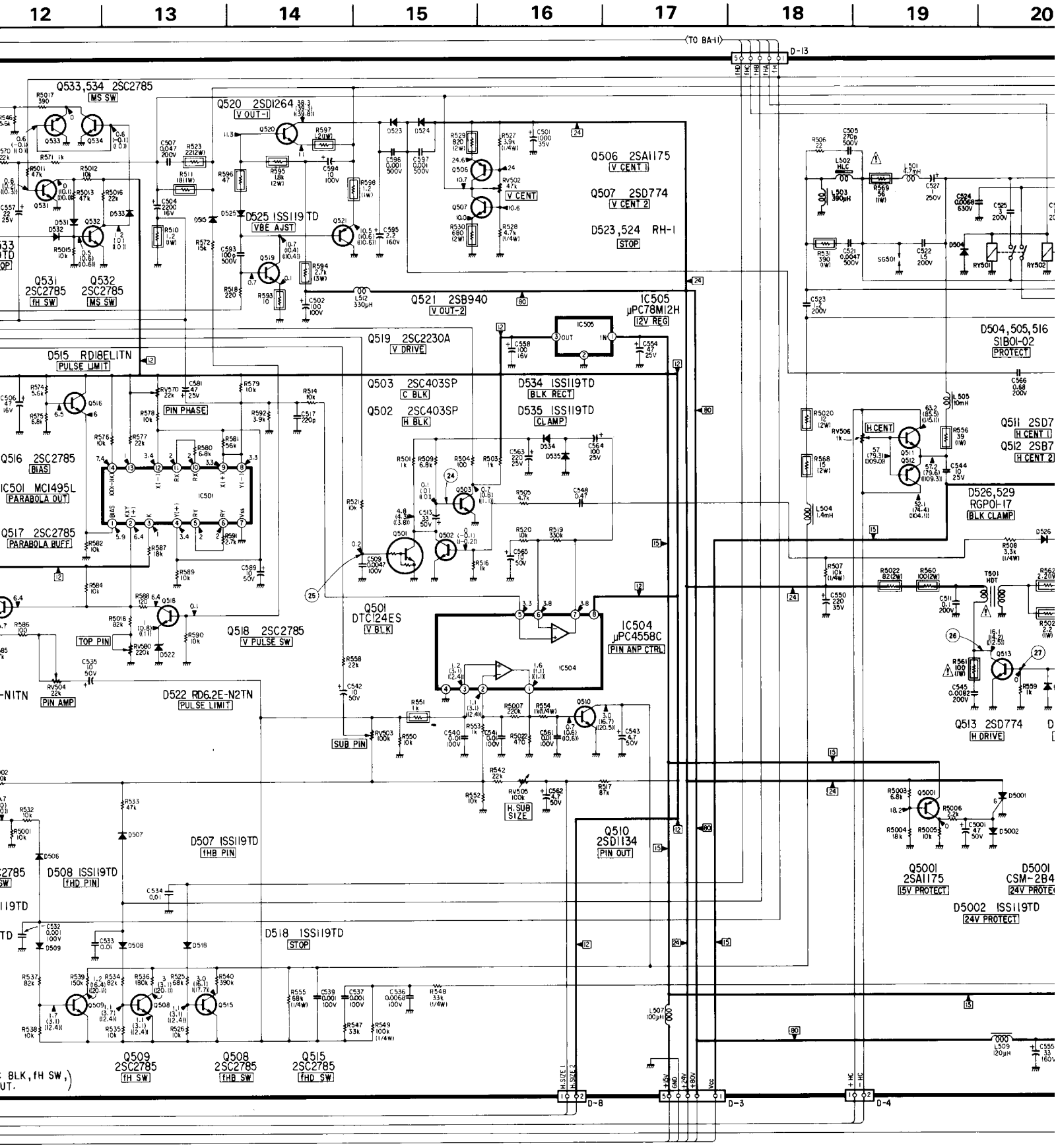
11
12
BD (SYNC AMP, V SHIFT)
D203 ISS119TD BIAS MUTE
Q264 2SC2785 H BIAS
Q261 2SC3355 H SYNC AMP
D202 ISS119TD BIAS MUTE
Q203 2SC2785 H SYNC RECT
Q262 2SC2785 POS1 SW
Q204 DTC124ES NEGA SW
Q201 QSC2785 SOG AMP
IC206 SN74LS22IN V SHIFT
Q263 2SC2785 SYNC SEP
Q202 2SC2785 SOG MUTE
Q273 2SC2785 V BIAS
Q275 DTC124ES PC RECT
IC204 SN74LS86N SYNC I.F.
Q271 2SC2785 V SYNC AMP
D206 ISS119TD THERMO COMP
Q272 2SC2785 POS2 SW
Q274 DTC143XS PC SW
G (Vcc CRTL, REG OUT)
D655 RU-2M Vcc REC
D656 D5KC20RH OVP
Q653 2SD774 Vcc CTRL
Q655,656 2SA1175 80V REG
D675-677 RU-2M Vcc REC
Q654 2SD774 80V CTRL
D672 RD13E-N2TN 80V OVP
D657,658 RU-2M 80V REC
IC651 DM-19 15V CTRL
D659-663 ERB81-004 15V REC
D670 RD4.3E-N3TN PROTECTER
D664 RU-2M OVP
D669 CSM-2B4A10 OVP
Q657 2SC2785 OVP
D673,674 RU-2M PROTECTER
D667 RU-2M fHC RECT
D668 RU-2M -HC RECT
D665,666 RU-2M 24V REC
D671 RD13E-N2TN Vcc OVP
D651,652 RM2CS DUNPER
Q652 2SC3318-S REG OUT
D679 V19E DUNPER
D653,654 V19E DUNPER
D678 V19E DUNPER
Q651 2SC3318-S REG OUT
D531,532 ISS119TD V.SIZE SW
D533 ISS119TD STOP
Q531 2SC2785 fH SW
Q516 2SC2785 BIAS
IC501 MC149 PARABOLA OUT
Q517 2SC2785 PARABOLA BUF
D528 RD12E-N1TN PROTECT
Q522 2SC2785 fH PIN SW
D506 ISS119TD fH PIN
D509 ISS119TD STOP
D (V·H·C BLK, fH SW, H·V OUT.
TO BB BOARD
TO BA BOARD


12
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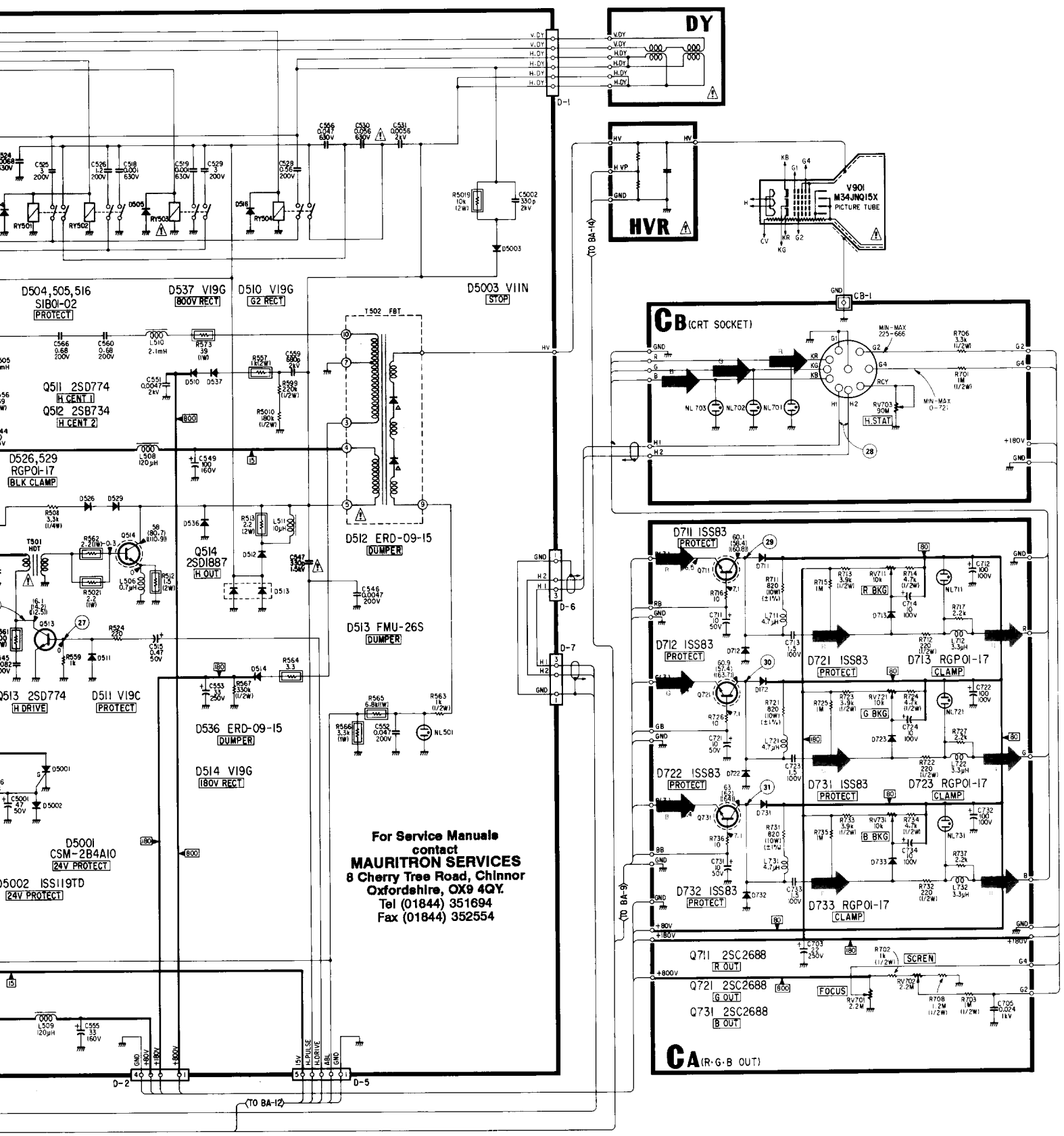
20
(TO BA-H)
D-13
Q533,534 2SC2785
MS SW
Q520 2SDI264
V OUT-I
Q506 2SAII75
V CENT I
Q507 2SD774
V CENT 2
D523,524 RH-I
STOP
D525 ISSII9TD
VBE AJST
Q531 2SC2785
fH SW
Q532 2SC2785
MS SW
Q521 2SB940
V OUT-2
IC505
μPC78MI2H
I2V REG
D504,505,516
SIBOI-02
PROTECT
Q519 2SC2230A
V DRIVE
D515 RDI8ELITN
PULSE LIMIT
Q503 2SC403SP
C BLK
D534 ISSII9TD
BLK RECT
Q502 2SC403SP
H BLK
D535 ISSII9TD
CLAMP
Q516 2SC2785
BIAS
IC501 MCI495L
PARABOLA OUT
Q517 2SC2785
PARABOLA BUFF
PIN PHASE
Q511 2SD7
H CENT I
Q512 2SB7
H CENT 2
H CENT
D526,529
RGP0I-I7
BLK CLAMP
Q501
DTCI24ES
V BLK
IC504
μPC4558C
PIN ANP CTRL
TOP PIN
Q518 2SC2785
V PULSE SW
PIN AMP
D522 RD6.2E-N2TN
PULSE LIMIT
SUB PIN
H SUB SIZE
Q513 2SD774
H DRIVE
Q510
2SDII34
PIN OUT
D507 ISSII9TD
fHB PIN
D508 ISSII9TD
fHD PIN
D518 ISSII9TD
STOP
Q5001
2SAII75
I5V PROTECT
D5001
CSM-2B4
24V PROTE
D5002 ISSII9TD
24V PROTECT
Q509
2SC2785
fH SW
Q508
2SC2785
fHB SW
Q515
2SC2785
fHD SW
D-8
D-3
D-4


20
21
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23
24
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26
27
DY
HVR
V901
M34JNQ15X
PICTURE TUBE
CB (CRT SOCKET)
CA (R·G·B OUT)
D504,505,516
SIB01-02
PROTECT
D537 V19G
800V RECT
D510 V19G
G2 RECT
D5003 V11N
STOP
T502 FBT
Q511 2SD774
H CENT 1
Q512 2SB734
H CENT 2
D526,529
RGP01-17
BLK CLAMP
T501 HDT
Q514
2SD1887
H OUT
D512 ERD-09-15
DUMPER
D513 FMU-26S
DUMPER
Q513 2SD774
H DRIVE
D511 V19C
PROTECT
D536 ERD-09-15
DUMPER
D514 V19G
180V RECT
D5001
CSM-2B4A10
24V PROTECT
D5002 ISS119TD
24V PROTECT
D711 ISS83
PROTECT
D712 ISS83
PROTECT
D721 ISS83
PROTECT
D713 RGP01-17
CLAMP
D722 ISS83
PROTECT
D731 ISS83
PROTECT
D723 RGP01-17
CLAMP
D732 ISS83
PROTECT
D733 RGP01-17
CLAMP
R BKG
G BKG
B BKG
Q711 2SC2688
R OUT
Q721 2SC2688
G OUT
Q731 2SC2688
B OUT
SCREN
FOCUS
H.STAT
TO BA-14
TO BA-9
TO BA-12
D-1
D-2
D-5
D-6
D-7
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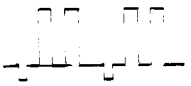
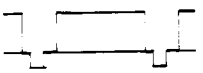
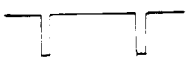
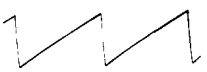
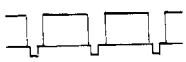
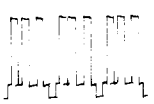
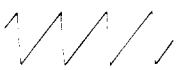
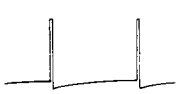
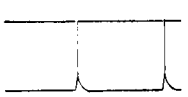
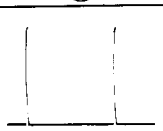
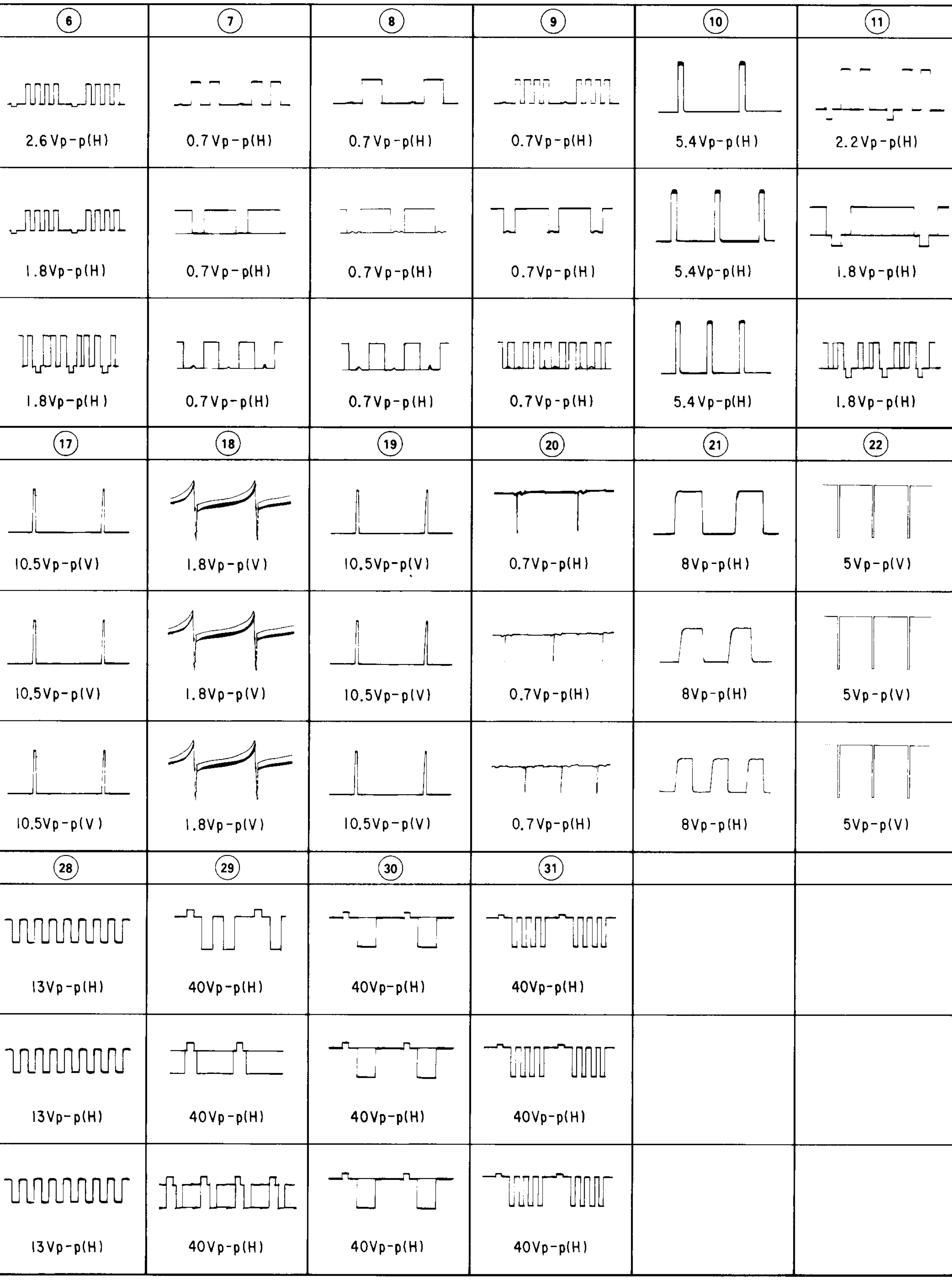
5-5. WAVE FORM

	①	②	③	④	⑤	⑥
15.73kHz (60Hz)	 0.7Vp-p(H)	 0.7Vp-p(H)	 0.7Vp-p(H)	 2.8Vp-p(H)	 2.8Vp-p(H)	 2.6Vp-p(H)
21.8kHz (60Hz)	 0.7Vp-p(H)	 0.7Vp-p(H)	 0.7Vp-p(H)	 2.2Vp-p(H)	 2.1Vp-p(H)	 1.8Vp-p(H)
30.12kHz (60Hz)	 0.7Vp-p(H)	 0.7Vp-p(H)	 0.7Vp-p(H)	 2.2Vp-p(H)	 2.1Vp-p(H)	 1.8Vp-p(H)
	⑫	⑬	⑭	⑮	⑯	⑰
15.73kHz (60Hz)	 2.2Vp-p(H)	 2Vp-p(H)	 0.48Vp-p(H)	 4Vp-p(H)	 8.8Vp-p(H)	 10.5Vp-p(V)
21.8kHz (60Hz)	 1.6Vp-p(H)	 1.5Vp-p(H)	 0.4Vp-p(H)	 4Vp-p(H)	 8.8Vp-p(H)	 10.5Vp-p(V)
30.12kHz (60Hz)	 1.6Vp-p(H)	 1.5Vp-p(H)	 0.3Vp-p(H)	 4Vp-p(H)	 8.8Vp-p(H)	 10.5Vp-p(V)
	㉓	㉔	㉕	㉖	㉗	㉘
15.73kHz (60Hz)	 5.6Vp-p(V)	 5.6Vp-p(V)	 7.4Vp-p(V)	 32Vp-p(H)	1.6Vp-p(H)	13Vp-p(H)
21.8kHz (60Hz)	5.6Vp-p(V)	4.8Vp-p(V)	7.4Vp-p(V)	30Vp-p(H)	1.6Vp-p(H)	13Vp-p(H)
30.12kHz (60Hz)	5.6Vp-p(V)	4.2Vp-p(V)	7.4Vp-p(V)	28Vp-p(H)	1.6Vp-p(H)	13Vp-p(H)



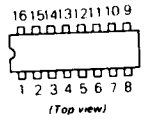
6	7	8	9	10	11
2.6Vp-p(H)	0.7Vp-p(H)	0.7Vp-p(H)	0.7Vp-p(H)	5.4Vp-p(H)	2.2Vp-p(H)
1.8Vp-p(H)	0.7Vp-p(H)	0.7Vp-p(H)	0.7Vp-p(H)	5.4Vp-p(H)	1.8Vp-p(H)
1.8Vp-p(H)	0.7Vp-p(H)	0.7Vp-p(H)	0.7Vp-p(H)	5.4Vp-p(H)	1.8Vp-p(H)

17	18	19	20	21	22
10.5Vp-p(V)	1.8Vp-p(V)	10.5Vp-p(V)	0.7Vp-p(H)	8Vp-p(H)	5Vp-p(V)
10.5Vp-p(V)	1.8Vp-p(V)	10.5Vp-p(V)	0.7Vp-p(H)	8Vp-p(H)	5Vp-p(V)
10.5Vp-p(V)	1.8Vp-p(V)	10.5Vp-p(V)	0.7Vp-p(H)	8Vp-p(H)	5Vp-p(V)

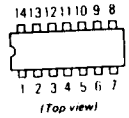
28	29	30	31		
13Vp-p(H)	40Vp-p(H)	40Vp-p(H)	40Vp-p(H)		
13Vp-p(H)	40Vp-p(H)	40Vp-p(H)	40Vp-p(H)		
13Vp-p(H)	40Vp-p(H)	40Vp-p(H)	40Vp-p(H)		

5-6. SEMICONDUCTORS

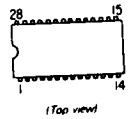
74F08PC
MC1495L
MC14066BCP
SN74LS86N
SN74S15N
TC4066BP
μPD4066BC



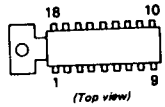
74F138PC
HD74LS221P
HD14538BP
MC14516BCP
SN74LS221N
TC4516BC
μPD4516BC



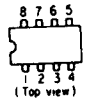
CX22030



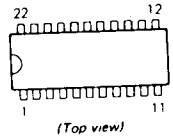
CXA1044P



DM-19
NJM4558S
μPD4558C



μPC78M05
μPC78M05H
μPC78M12
μPC78M12H
μPC1377C



2SA564
2SA933S
2SA1005
2SC1740
2SC3068

2SA1175
2SC2785

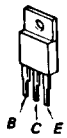
2SA1048
2SA1115
2SC403SP
2SC2458
2SC2603
DTC114ES
DTC124ES

2SA1206
2SC2901

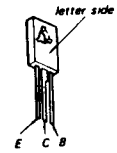
2SB734
2SD774

2SB740
2SC2230A
2SD789

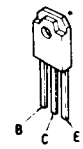
2SB940
2SB940P
2SD1134
2SD1264
2SD1264P



2SC2688



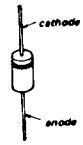
2SC3318-S



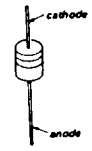
2SC3355

2SD1887

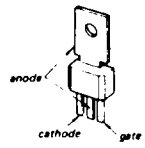
1SS83
1DE2
11E2
ERB12-02
ERB12-02V1
ERD09-15
ESIF
RD3.0E-N1
RD3.0F-NIT
RD3.0E-N2
RD3.1E-N1
RD3.1E-N2
RD3.3E-N2
RD3.6E-N1
RD3.6E-N2
RD4.3E-N2
RD4.3E-N3
RD4.3E-N3T
RD4.7E-N2
RD6.2E-N2
RD6.8E-N2
RD8.2E-N2
RD9.1E-N2
RD10E-L2
RD10E-LZ
RD10-E-L3T
RD11E-N2
RD12E-N1
RD12E-NIT
RD12E-N2
RD13E-N2
RD18E-L1
RD18E-L1T
RGP01-17
RGP01-17PKG23



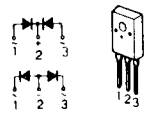
ISS119
ISS133
ISS148



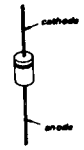
CSM2A4A10
CSM2B4A10



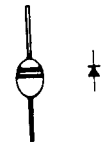
D5KC20RH



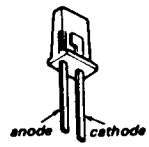
FRB81-004
EMU-26S
RH-1
RM2SC
RU-2M
SIB01-02
SIB01-02V1



U05E
V11N
V19C
V19E
V19G

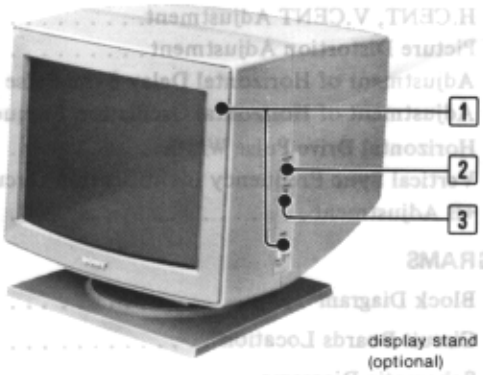


SG232D

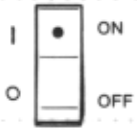


1-1. LOCATION AND FUNCTION OF CONTROLS

On the front panel



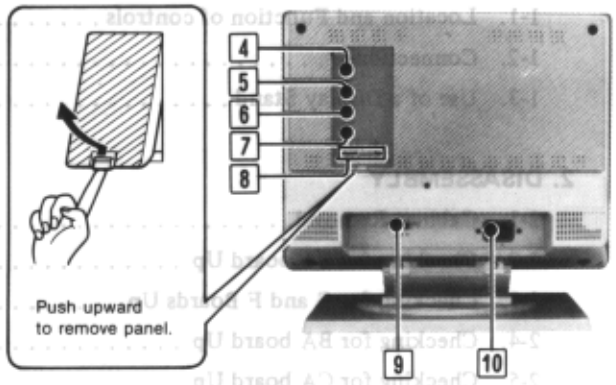
1 POWER switch and indicator (green)
To turn on the power of the unit, press this switch to ON. The indicator will light up. To turn off the unit, press towards OFF.



2 PICTURE control
Adjusts the picture contrast. Turn downwards to increase contrast, or upwards for less contrast.

3 BRIGHTNESS control
Normally keep this control at the center detent position. For a brighter display, turn this knob downwards, or for a darker display, turn it upwards.

On the rear panel



4 H SHIFT (horizontal shift) control
Turn this control to center the displays of microcomputers, character generators, etc. that are shifted toward the left or right side of the screen.

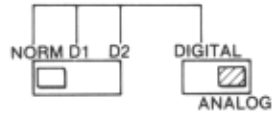
5 V SHIFT (vertical shift) control
Turn this control to eliminate any shifting in the vertical direction.

6 H SIZE (horizontal size) control
Turn this control to adjust the horizontal size.

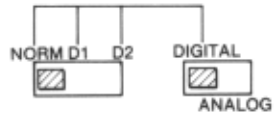
7 V SIZE (vertical size) control
Turn this control to adjust the vertical size.

8 RGB input selectors
Depending on the RGB output of the equipment you have connected, set these switches to one of the following four positions.

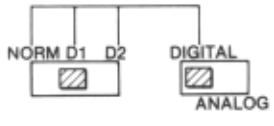
ANALOG: For microcomputers having analog RGB output, such as those using the PGA card. The position of the left switch has no effect when the right switch is set to ANALOG.



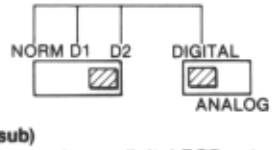
NORM-DIGITAL: For microcomputers having TTL RGB output, such as the IBM 3270.



D1-DIGITAL: For microcomputers having TTL RGB and I signal output, such as the IBM PC, AT and XT using the standard color graphics card.



D2-DIGITAL: For TTL graphics cards on the IBM PC, AT and XT. (automatic adjustment between EGA, CGA and MDA)



9 RGB IN (input) connector (9-pin D-sub)
Allows a microcomputer having either analog or digital RGB output to be connected.

10 AC IN connector
Connect to the AC outlet with the supplied AC power cord.

SETUP ADJUSTMENTS

3-1. LANDING ADJUSTMENT

Preparations:

1. Face the set CRT surface toward the east or west in order to lessen the effect of geomagnetism.
2. Turn the set power switch on and degauss.

Adjustment:

1. Input a white signal.
2. Perform rough adjustment of white balance, screen (G2), horizontal convergence and focus. The purity adjustment knob should be at the center position at this time. (Fig-1)
3. Set CA board R BKG VR (RV711) to maximum and G BKG VR (RV721) and B BKG VR (RV731) to minimum.
4. Move the deflection yoke back and adjust the purity magnet so that the entire picture is as shown in Fig-2.
5. Adjust so that the entire picture becomes red while moving the deflection yoke forward.
6. Use the G BKG VR (RV721) and B BKG VR (RV731) to check and adjust each color following steps 3 - 5.
7. When landing at the corners is not correct, perform magnet correction (Fig-3).
8. When the position of the deflection yoke is finalized, secure with the bracket.

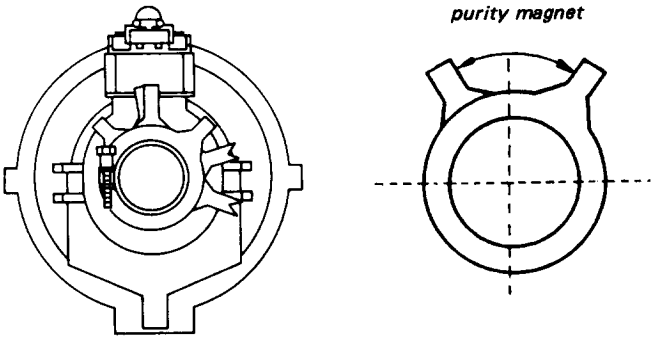


Fig. 1

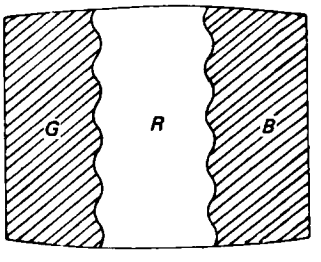
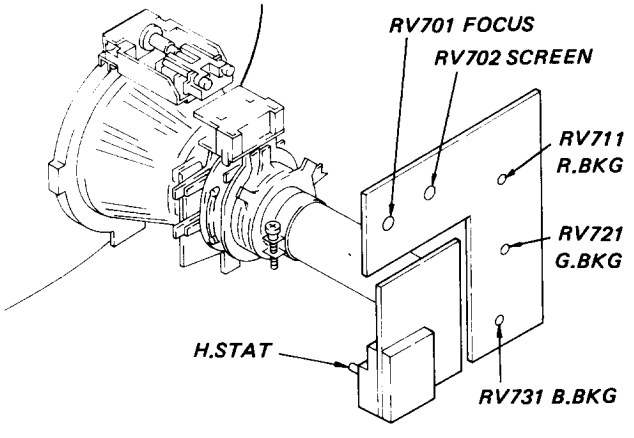
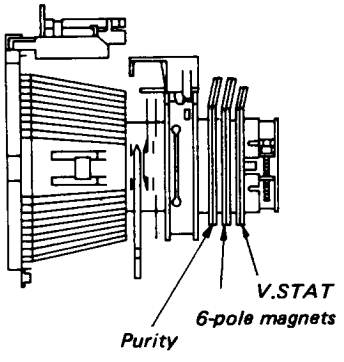


Fig. 2





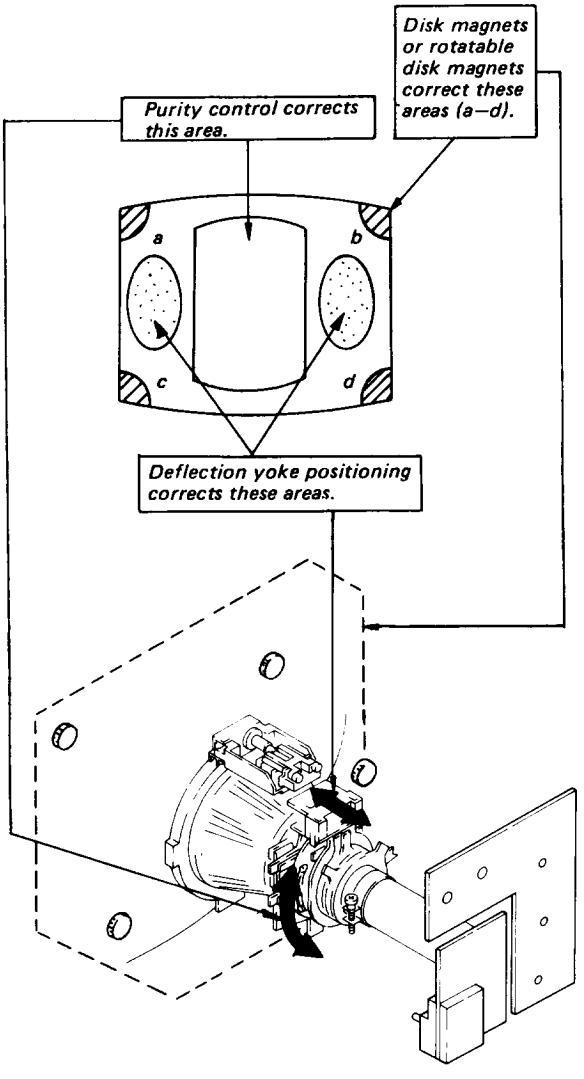


Fig. 3

3-2. DEFLECTION YOKE NECK ADJUSTMENT

Perform this adjustment when there is misconvergence and pincushion distortion at the top and bottom of the picture.

1. Tilt the deflection yoke up and down to adjust when the pincushion distortion is not the same at the top and bottom of the picture. (Fig-4)

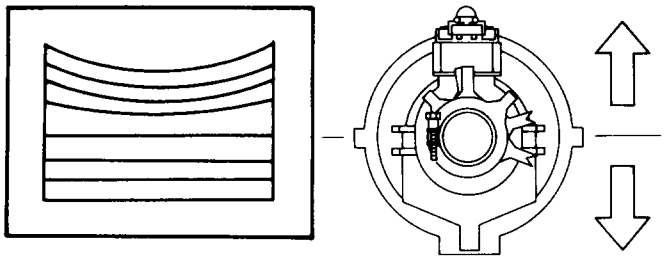


Fig. 4

2. When there is misconvergence at the top and bottom of the picture as shown in Fig-5 , tilt the deflection yoke to the left and right to adjust.

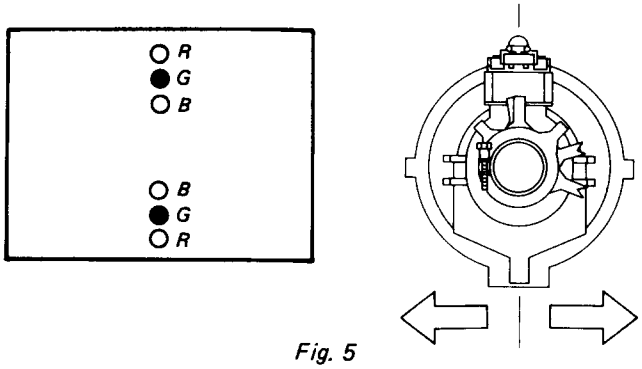


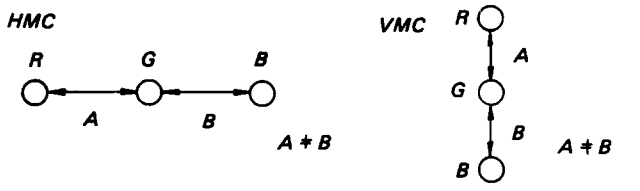
Fig. 5

1) Convergence Adjustment for Picture Center (H. STAT, V. STAT)

1. Input a dot signal, and with BRT at minimum, adjust for optimum picture with PICTURE.
2. Line up picture center and horizontal direction RGB dots with H. STAT VR (RV703).
3. Line up picture center and vertical direction RGB dots with V. STAT magnet.

2) Picture center horizontal direction asymmetrical misconvergence (HMC)
Picture center vertical direction asymmetrical misconvergence (VMC)

4. For HMC, move the six-pole magnet to adjust so that the R and B dots are symmetrical to the right and left of the G dot.
5. For VMC, move the six-pole magnet to adjust so that the R and B dots are symmetrical above and below the G dot.



Dot Movement due to 6-pole Magnet movement

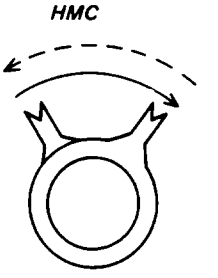


Fig. 6

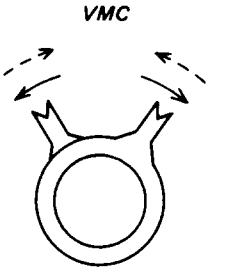
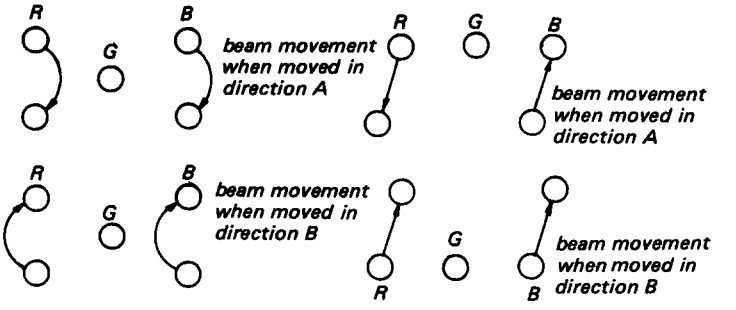
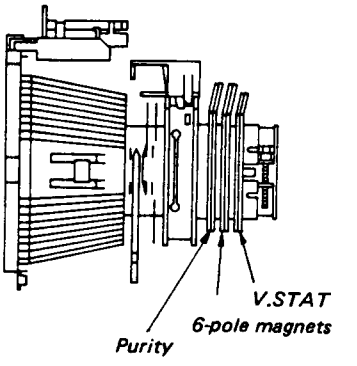


Fig. 7





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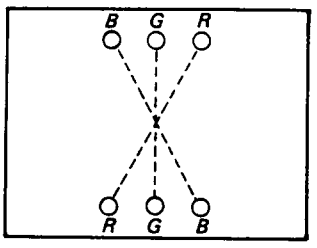
Fax (01844) 352554

3) Picture Periphery Convergence Adjustment

1. For Y crosstalk, adjust with the Y crosstalk correction magnet.



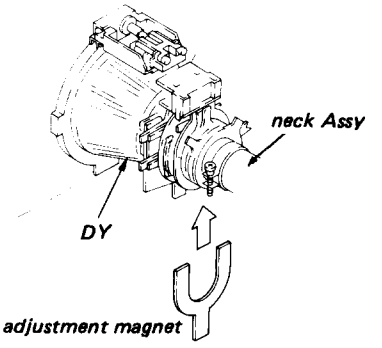
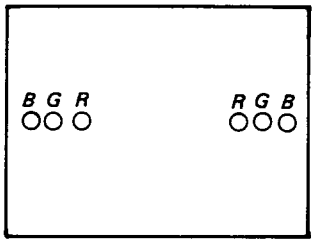


Fig. 8

2. Adjust with the X crosstalk adjustment magnet when there is H TILT.



When red dots are off to the inside at the right and left.

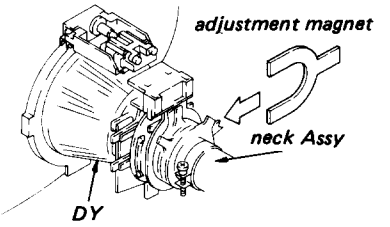
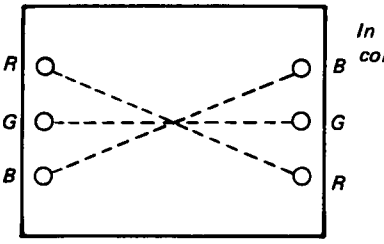
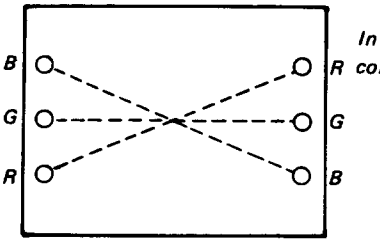


Fig. 9

3. Adjust with the deflection yoke reactor correction coil when there is X crosstalk. (Fig-10)



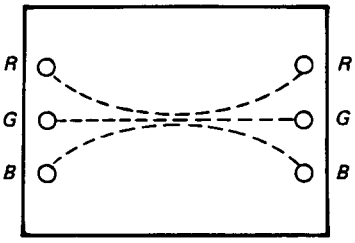
In this case adjust with coil A in Fig-11.



In this case adjust with coil B in Fig.-11.

Fig. 10

4. Adjust with the deflection yoke reactor correction coil when there is X bow.



In this case adjust with coil C in Fig-11 . At this time, put D core in so that the marked side is on side A. (Fig-11)
Note: Paint D core after adjustment.

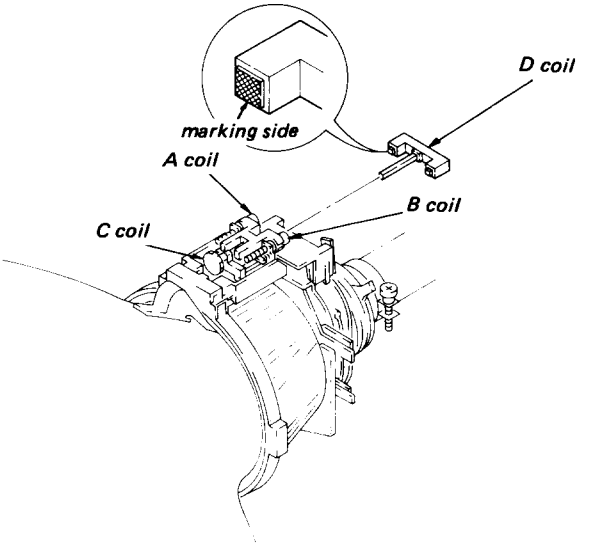


Fig. 11

3-3. G_2 ADJUSTMENT

1. Cut off color check
   (1) Receive a 21.8 kHz TTL H. V. separate SYNC signal.
   (2) Set PICTURE, BRIGHTNESS (user controls), BA board SUB PICTURE VR (RV251) and SUB BRT VR (RV252) to minimum. Set R.G.B. BKG VR's (RV711, 721, 731,) to minimum.
   (3) Brighten the entire picture with the screen VR, then gradually darken the picture and note which color remains glowing at the top of the picture.
2. G_2 Adjustment (RV702)
   (1) Apply 140V DC to the cathode (CB board) of the color which remained glowing for cut off color check.
   (2) Adjust the screen VR for optimum background over the entire picture.
   (3) Set R.G.B DRIVE VR's (RV211, 221, 231) to maximum.

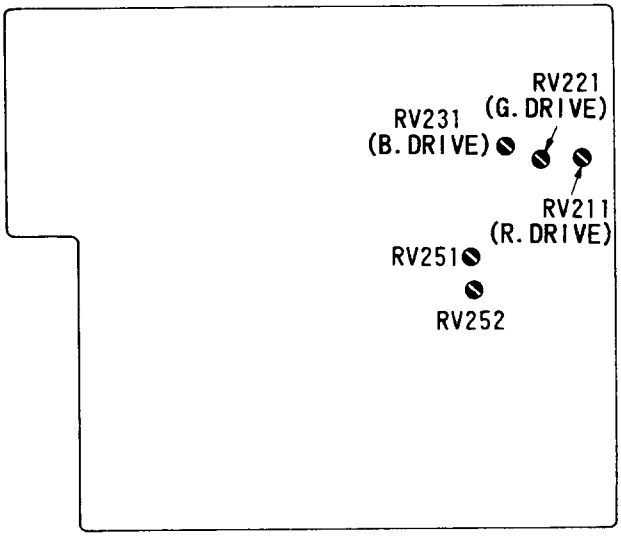
3-4. CUT OFF ADJUSTMENT

1. SUB BRT Setting
   (1) Input a white signal. (TTL H.V separate signal)
   (2) Set PICTURE to maximum, and adjust BA board SUB PIX VR (RV251) so that the luminance meter set at the top of the picture is about 10 NIT.
   (3) Perform white balance rough adjustment with the BKG VR's of the two colors which are not glowing as much.
   (4) Set BRIGHTNESS to maximum, and adjust BA board SUB BRT VR (RV252) so that the brightness is 40 NIT brighter than the NIT value at this time.
2. 3 NIT Adjustment
   (1) Set BRIGHTNESS at center click and PICTURE to minimum.
   (2) Adjust an all white signal at 3 NIT to get white balance with the R.G.B. BKG VR's.

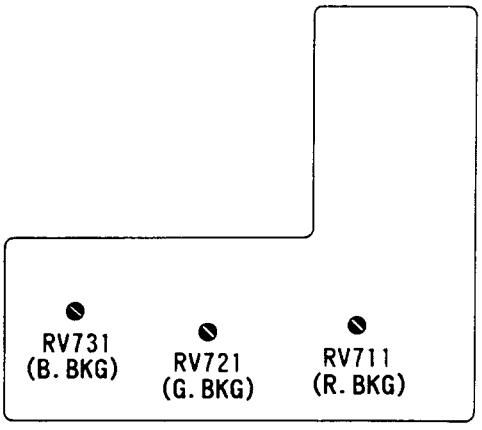
3-5. WHITE BALANCE ADJUSTMENT

1. Highlight Adjustment (during white peak)
   (1) Input an all white signal. (TTL H.V separate signal)
   (2) Set BRIGHTNESS and PICTURE to maximum.
   (3) Adjust picture liminance to about 100 NIT with the BA board SUB PIX VR (RV251), then adjust highlight white balance with R.G.B. DRIVE VR's.
2. 3 NIT Adjustment
   (1) Set BRIGHTNESS to center click and PICTURE to minimum.
   (2) Adjust white balance with R.G.B. BKG VR's.
3. Tracking
   (1) Repeat 2-3 times for white balance during highlight and 3 NIT.
4. MAX Luminance Adjustment
   (1) Set BRIGHTNESS and PICTURE to maximum, and adjust BA board SUB BRT VR (RV252) for about 80 NIT.

BA BOARD



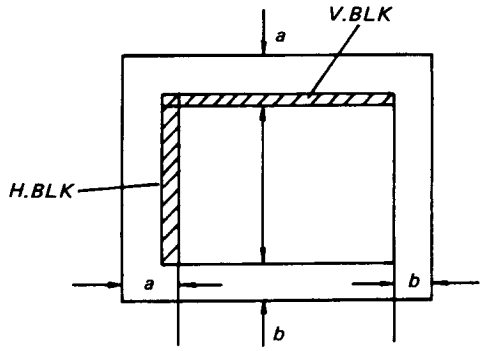
CA BOARD



CIRCUIT ADJUSTMENTS

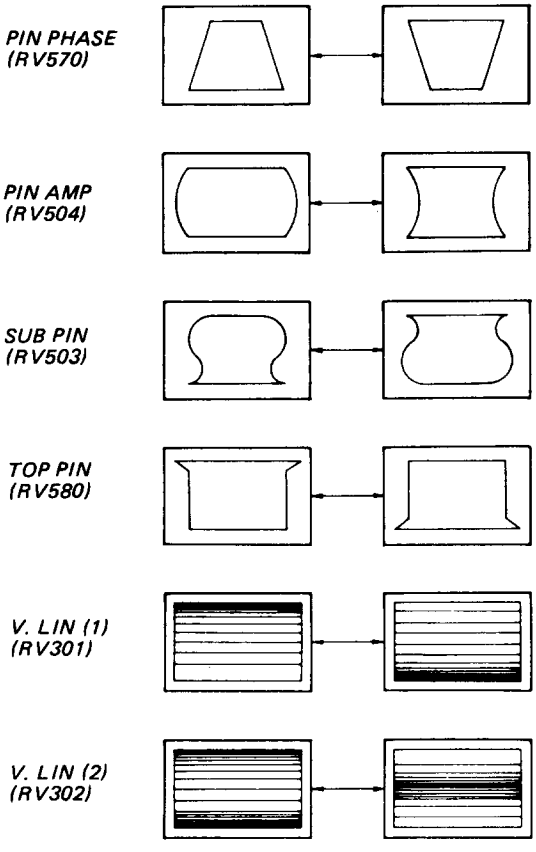
4-1. H.CENT, V.CENT ADJUSTMENT

1. Preparations
   (1) LIN rough adjustment
   Adjust top and bottom balance with V.LIN (1) for a 21.8 kHz signal. Balance center and top and bottom with V. LIN (2).
2. Brighten the background with the screen VR and adjust H. CENT (RV506) and V.CENT (RV502) so that the background shown in the figure is at the center of the effective picture.
   Note: Ignore raster blanking portion at this time.



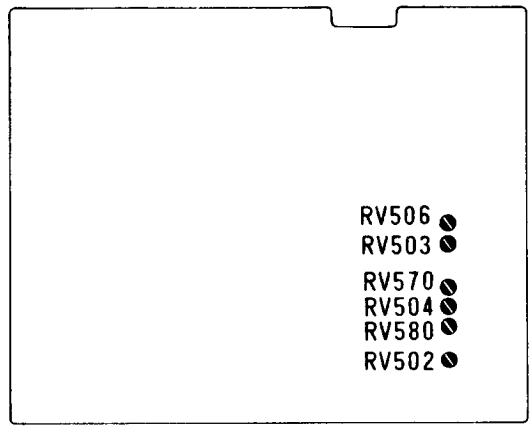
4-2. PICTURE DISTORTION ADJUSTMENT

1. Picture distortion adjustment
   Input a signal equivalent to a crosshatch signal. (TTL H.V. separate SYNC signal)

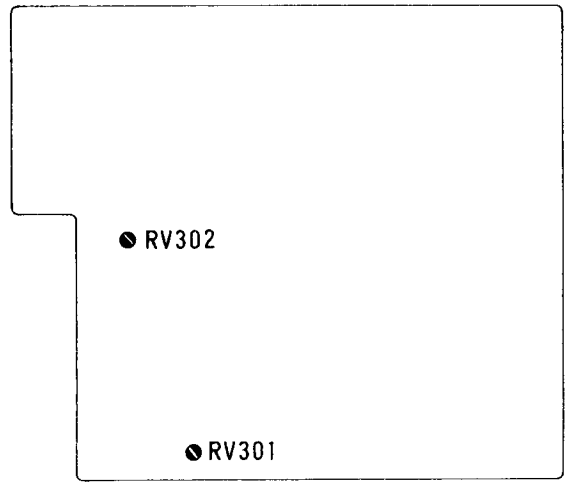


2. Picture Size
   Input a TTL H.V. separate SYNC signal.
   1. SIZE Adjustment
   (1) Adjust picture to about 182mm with V. SIZE on the set rear panel.
   (2) Set H. SIZE to maximum and adjust to about 244mm with D board H. SUB SIZE VR (RV505).
   (3) Adjust to about 240mm with H. SIZE.

D BOARD

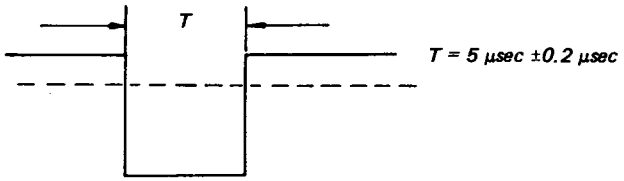


BA BOARD



4-3 ADJUSTMENT OF HORIZONTAL DELAY SYNC PULSE

1. Signal
   H: 15.734 kHz
   V: 60 Hz
2. Measure the BA board IC205 pin 13 pulse waveform and adjust pulse width value as shown below.
   (1) Turn HP BIAS VR (RV292) fully clockwise.
   (2) Adjust pulse width to 6 μsec ± 0.2 μsec with HP SLOPE VR (RV291).
   (3) Adjust pulse width to 4 μsec ± 0.2 μsec while turning HP BIAS VR (RV292) counterclockwise.
   (4) Adjust pulse width to 5μsec ± 0.2 μsec with HP SLOPE VR (RV291).

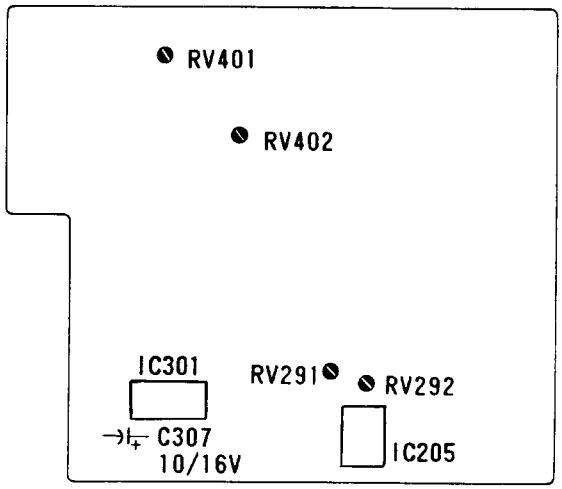


3. Signal
   H: 30.12 kHz
   V: 60Hz
4. Confirm that BA board IC205 pin 13 pulse width is 3μsec ± 0.2 μsec at this time.

4-4 ADJUSTMENT OF HORIZONTAL OSCILLATION FREQUENCY

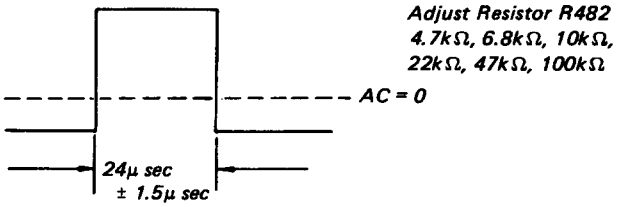
1. Signal
   H: 15.734 kHz
   V: 60 Hz
   H: 21.8 kHz
   V: 60 Hz
   H: 30.12 kHz
   V: 60 Hz
2. Mount a 10μ/16V chemical capacitor between BA board IC301 pin 1 and C307 negative side pin (GND).
3. Connect a frequency counter to IC405 pin 10.
4. Set H. FREQ (2) VR (RV401) to mechanical center.
5. Adjust H.FREQ (1) VR (RV402) so that the frequency counter reading is 30.12 kHz ±300 Hz for the input signal (30.12 kHz).
6. Adjust H. FREQ (2) VR (RV401) so that the frequency counter reading is 21.8 kHz ±300 Hz for the input signal (21.8 kHz).
7. Adjust H. FREQ (2) VR (RV401) so that the frequency counter reading is 15.734 kHz ±b100 Hz for the input signal (15.734 kHz).
8. With 30.12 kHz input signal again, adjust H. FREQ (1) VR (RV402) so that the frequency counter reading is 30.12 kHz ±300 Hz.
9. Repeat the above adjustments so that the frequency counter readings are as specified above. Then remove the chemical capacitor mounted in step 2.

BA BOARD

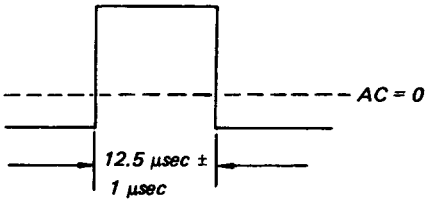


4-5. HORIZONTAL DRIVE PULSE WIDTH

1. Input signal H: 15.734 kHz
   V: 60 Hz
2. Connect an oscilloscope to BA board IC405 pin 10.
3. Adjust with adjustment resistor R482 so that pulse widths is 24 μsec ±1.5 μsec.



4. Check that the pulse width is 12.5 μsec ±1 μsec when input signal 30.12 kHz is input.



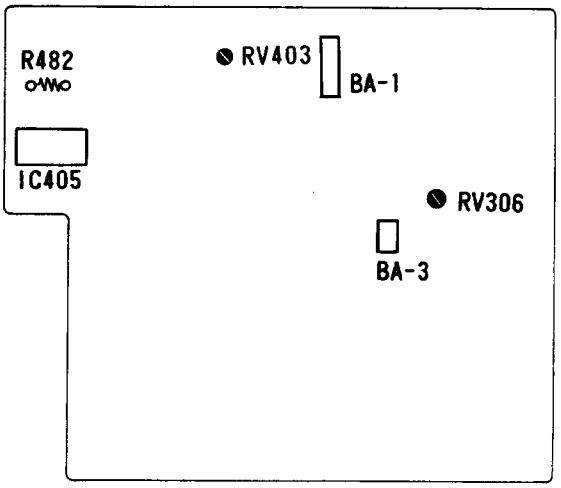
4-6. VERTICAL SYNC FREQUENCY IDENTIFICATION CIRCUIT

1. Input signal H: 15.734 kHz
   V: 60 Hz
2. Connect a digital voltmeter to BA board Q332 base and adjust RV306 so that the voltage value is 5.6 V ±0.05 V.
3. Short between BA-3 pin 1 (MS pin) and ground.
4. Adjust RV307 so that BA board Q332 base voltage value is 6.6V ±0.05V DC.

4-7. +B ADJUSTMENT

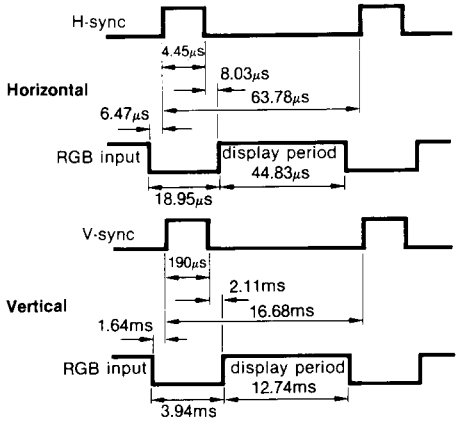
1. Input signal H: 21.8 kHz
   V: 60Hz
2. Connect a digital voltmeter to BA-1 connector pin 1 and adjust +B ADJ VR (RV403) so that the voltage value is 79.5 ±1V DC.

BA BOARD



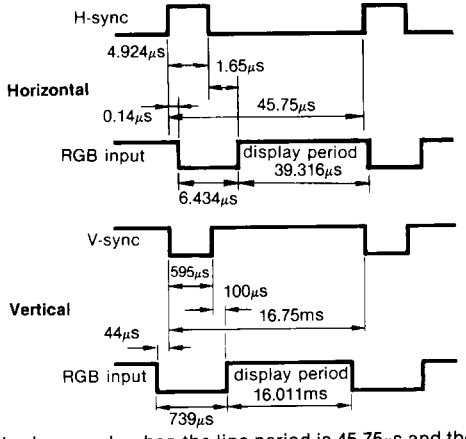
Timing Charts (for approximate reference)

[1] **D2-1** (IBM CGA compatible)



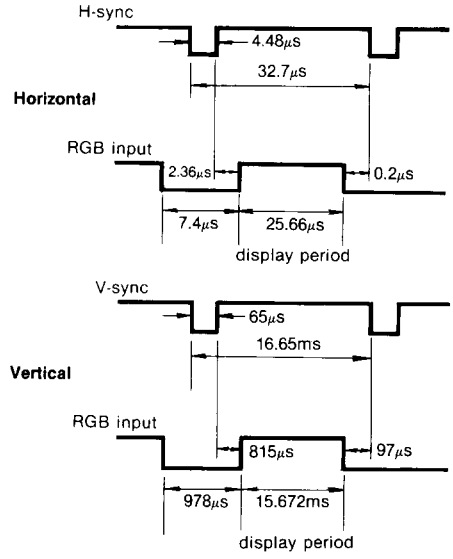
The indicated values apply when the line period is 63.78μs and the field period is 16.68ms.

[2] **D2-2** (IBM EGA compatible)



The indicated values apply when the line period is 45.75μs and the field period is 16.75ms.

[3] **D2-3** (IBM PGA compatible)



The indicated values apply when the line period is 32.7μs and the field period is 16.65ms.

Note

The picture may be biased or the picture size may be changed depending on the timing of the connected equipment.

WARNING !!

AN ISOLATION TRANSFORMER SHOULD BE USED DURING ANY SERVICE TO AVOID POSSIBLE SHOCK HAZARD, BECAUSE OF LIVE CHASSIS.
THE CHASSIS OF THIS RECEIVER IS DIRECTLY CONNECTED TO THE AC POWER LINE.

SAFETY-RELATED COMPONENT WARNING !!

COMPONENTS IDENTIFIED BY SHADING AND MARK ⚠ ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.