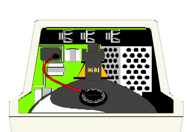
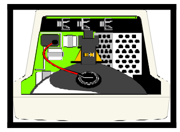
Kristel corporation

555 S. Kirk Road St.Charles, Il 60174
630-443-1290 630-443-1390FAX

SERVICE MANUAL

Color Monitors  **1428 - 30K Series**

Produced by M.M



COLOR DATA DISPLAY by KRISTEL, ISO-9001 CERTIFIED

1428 - 30K series

COLOR SPECIFICATIONS

CRT

- From 10” to 28” diagonal measure
- P22 phosphor
- Polished faceplate standard (dark - tint, light transmission: 57%, none glare, deflection angle 90 degree, dot pitch: 0.28 - 0.82. Optional finer pitches available.

INPUT SIGNALS

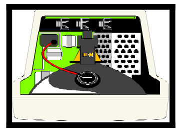
- Video: Red, Green, Blue separate input Impedance: 75 ohm, amplitude: 0.7Vp-p
- Horizontal scan: 31.5 KHz / 35.5 KHz, TTL positive or negative
- Vertical signal: 50-70Hz

VIDEO CHARACTERISTICS

- Video bandwidth: 45MHz
- Power supply: universal (90-250vAC)
- Resolution: VGA /sVGA
- Linear distortion: 10% max.
- Geometric distortion: 3,0mm max. top/bottom, 4.0mm max. left/right

ENVIRONMENTAL CONDITIONS

- Operating temp. 0-55 degree C. Complies with UL, CSA and TUVradiation performance standard.



MECHANICAL

- The 14” monitor is also available in universal mount brackets. The monitor can be mounted in the user’s cabinet horizontally or vertically.
- All the models are available also as a kit - without a frame. Custom frames can be furnished
  also available in the chassis form adaptable to individual customer requirements.

USER ADJ. CONTROLS AND ADJUSTMENTS

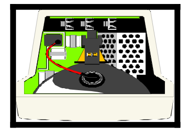
- HORIZONTAL size, VERTICAL size
- CONTRAST BRIGHTNESS
- VERTICAL center HORIZONTAL phase

- SUB-BRIGHTNESS RASTER center
- SUB-SIZE VERTICAL lin.
- SUB.HORIZ.size X-RAY prot.
- HORIZONTAL hold B+ adj.
- PINCUSHION GAIN
- R,G,B bias R,B Gain

PRODUCT SAFETY NOTICE

WARNING: FOR CONTINUED SAFETY REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER RECOMMENDED PARTS

AVERTISSEMENT: POUR MAINTENIR LE DEGRE DE SECURITE DE L’APPAREIL NE REMPLACER LES COMPOSANTS DONT LE FONCTIONNEMENT EST CRITIQUE POUR LA SECURITE QUE PAR DES PIECES RECOMMANDEES PAR LE FABRICANT.



SAFETY PRECAUTION

NOTICE: Comply with all cautions and safety related notes located on or inside the chassis or picture tube. The following precautions should be observed:

1.The design of this product contains special hardware, many circuits and components especially for safety purposes.

2. For continous protection, no changes should be made to the original design unless authorized in writing by manufacturer.

3.Any design alterations or additions will void the manufacturer's warranty and will further relieve the manufacturer of responsability for personal injury or property damage resulting there from.

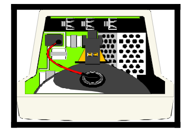
4. Many electrical and mechanical parts in display sets have special safety related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, current etc.

5. If severe arcing occurs, remove AC power immediately and determine the cause by visual inspection (incorect installation, cracked or melted HV harness, poor soldering, broken wires etc.)

6. No modification of any circuit should be attemted. Service work should only performed after you are throughly familiar with all of the safety check.

7.Do not place the monitor on unstable surface. If the product should fall, it may become seriously damaged and, more importantly, may cause injuries to the user.

8.Follow all wanings and instructions marked on the product.



IMPORTANT

Do not check high voltage by drawing an arc. Use a high voltage meter or a high voltage probe with a digital voltage meter.

When service is required, observe the original lead dress. Extra precaution should be given to assure correct lead dress in high voltage circuit area. Where a short circuit has occurred, those components that indicate evidence of overheating should be replaced. Always use original components.

NOTE: Make sure to turn power swich off before making the connection to the Anode Button.

WARNING

X-RADIATION. Operation of this color monitor under normal conditions will not exceed the 0.5 mR/h iso-exposer-rate. Be sure that the anode voltage and other tube voltages are adjusted to the recommended values.

SHOCK HAZARD. To remove any residual charge, short the anode contact button, located in the funnel of the tube, to the external conductive coating before handling the tube.

TUBE HANDLING. Tube assembly should never be handled by the tube neck, deflection yoke or other neck components. If suspending the tube assembly from the mounting lugs, ensure that a minimum of two are used.
Under no circumstances suspend the tube assembly from one lug.
To protect the screen when placing the tube face-down, ensure that the tube face rests on a cushion kept free from abrasive substances / or foreign parts.

TUBE REPLACEMENT. This monitor tube incorporates integral X-radiation and implosion protection and must be replaced with the same type number or recommended replacement to assure continued safety.

MAIN PCB, 1428-30K

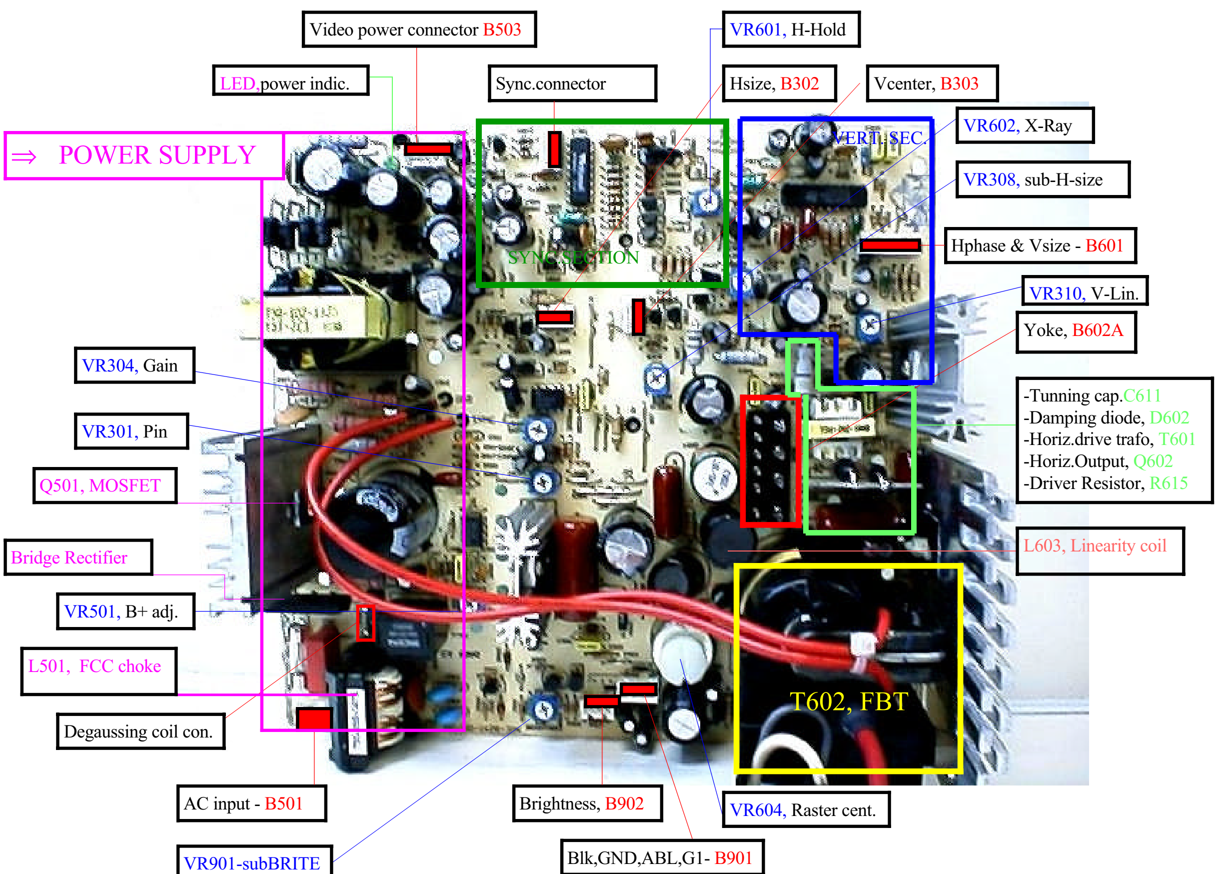
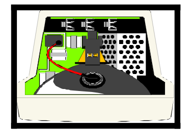


FIG. 1A

* VR CONTROL INFORMATION
* CONNECTORS INFORMATION
* PRINCIPAL SECTIONS AREA

KRISTEL 100-100-1428-30K PCB rev.A with blanking circuit incorporated.



MAIN PCB, 1428-30K

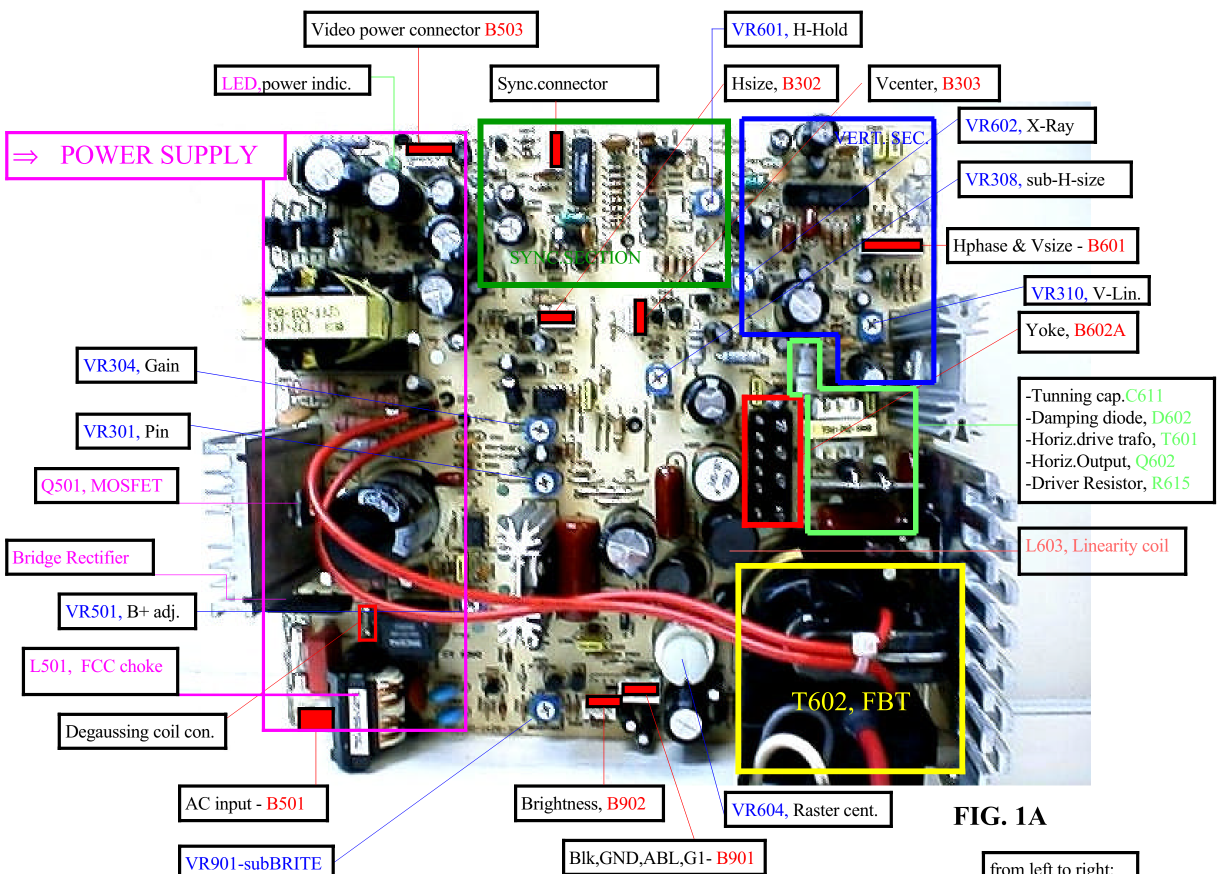


FIG. 1A

KRISTEL 100-100-1428-30K PCB rev.A

***NOTE:** for AutoBias optional configuration,*
***B902** is NOT used, and **B901** is like in fig.2A*

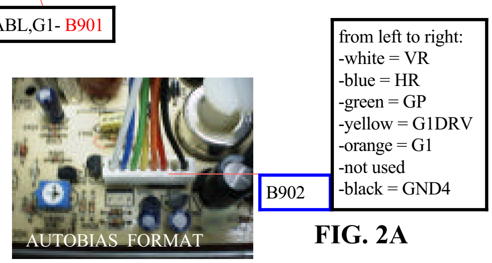
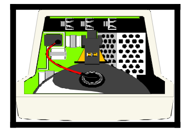
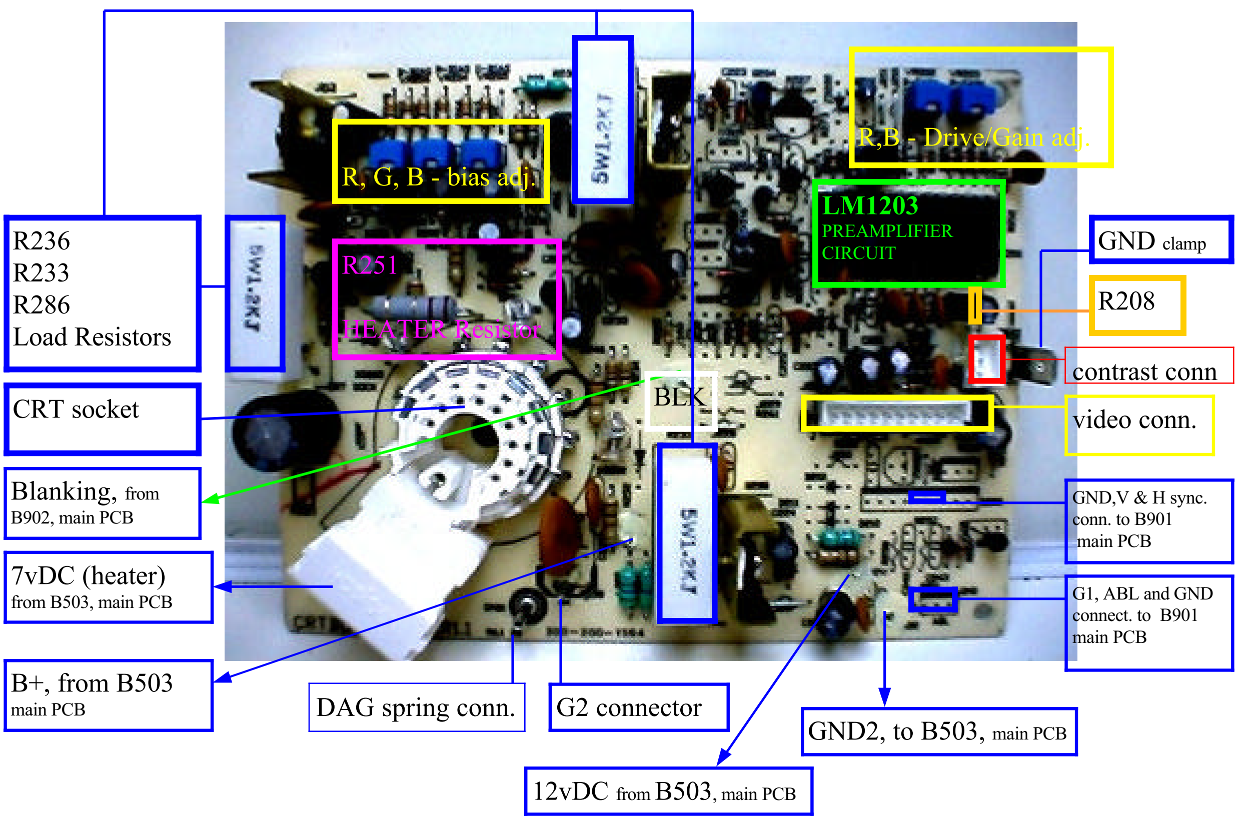


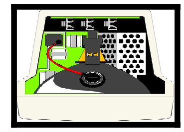
FIG. 2A



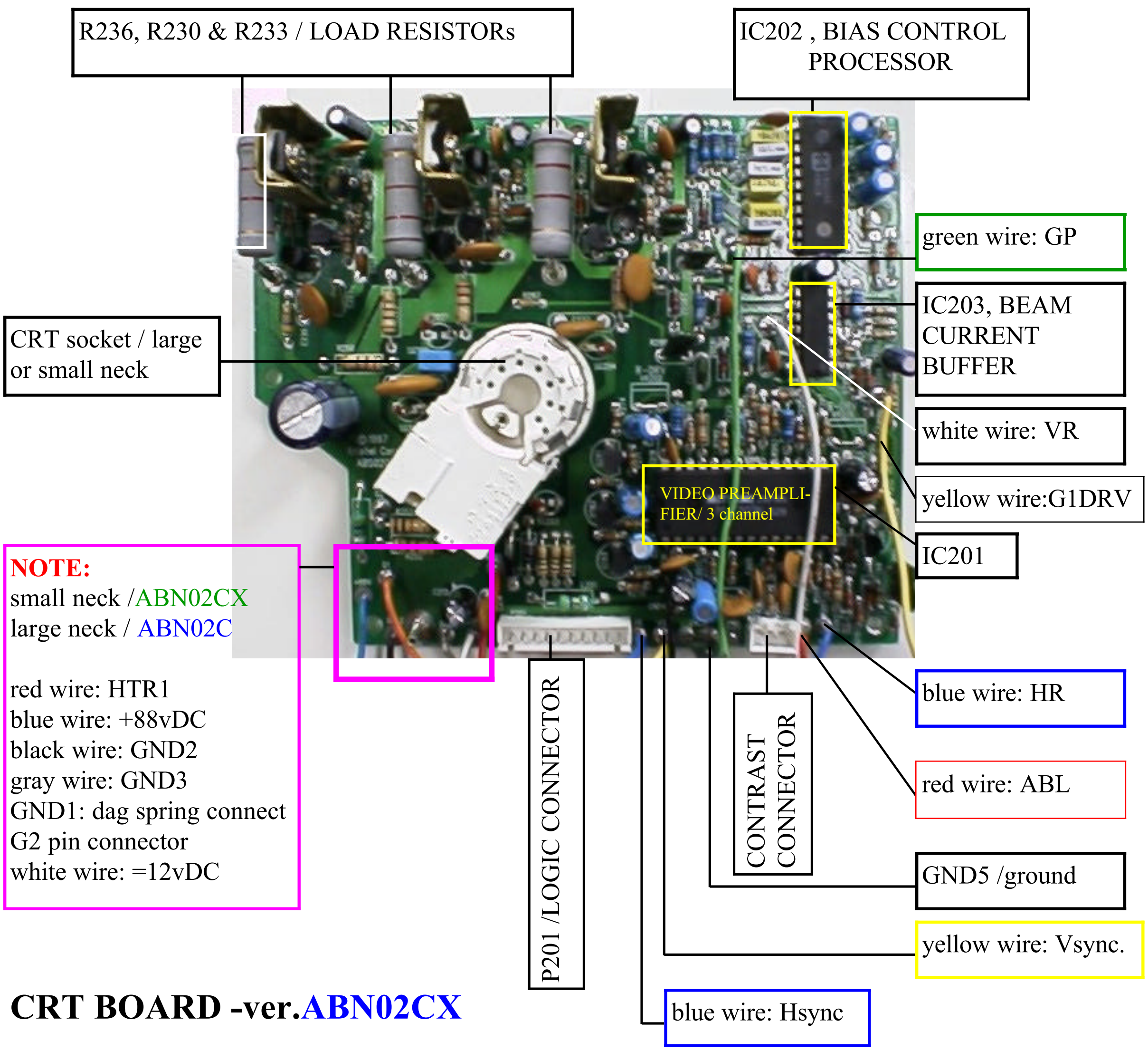
VIDEO PCB CONNECTION INFORMATION & PRINCIPAL SECTIONS AREA



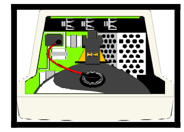
CRT BOARD - ver.1.1 200-200-1564



VIDEO PCB - ABNO2CX /autobias/ INFORMATION & PRINCIPAL SECTIONS AREA



CRT BOARD -ver.ABN02CX



AUTOMATIC BIASING VIDEO SYSTEM

PURPOSE

The purpose of the system is to establish and maintain a constant and correct black level (cutoff level) on the CRT screen, without the need for manually adjusting the biasing of the individual video amplifiers. This has the advantage of greatly simplifying the initial setup, plus maintaining the biasing conditions throughout the life of the CRT as it ages. It also eliminates the need for individual red, green, and blue bias potentiometers, and even a brightness control. The Automatic Biasing System is integrated into the video amplifier system.

OVERVIEW OF OPERATION

The system works by sending a DC correction to each of the video amplifiers, in response to cathode current changes resulting from a fixed step in G1 voltage. During a setup and sampling period after vertical retrace, a fixed step is applied to the G1 grid, while the three cathodes are held steady. When bias conditions are correct, this voltage step results in a small step in cathode current for each gun. This step produces a faint horizontal line at the top of the screen, visible if the vertical size is set low enough.

OPERATION DESCRIPTION

Video System: The basic video system consists of a three-channel video processor IC201, and three video output stages (Q205, Q202, Q206, and Q207 comprise the Red Video Output stage). The Automatic Biasing System adds a Bias Control Processor, IC202, plus Beam Current Buffers IC203B-D, a G1 control circuit IC203A, and clamping circuits. IC201 contains three video preamplifiers with DC-controlled gain and DC clamping. IC202 contains timing circuits, sample-and-hold circuits, and buffers.

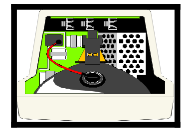
The three video channels are identical, so only the Red channel will be described in detail. The Red video input signal is terminated by R201, and is delivered to the input of IC201 at pin 4 through R274 and AC coupling capacitor C201. Pin 11 supplies a DC bias level for the video input signal through R204.

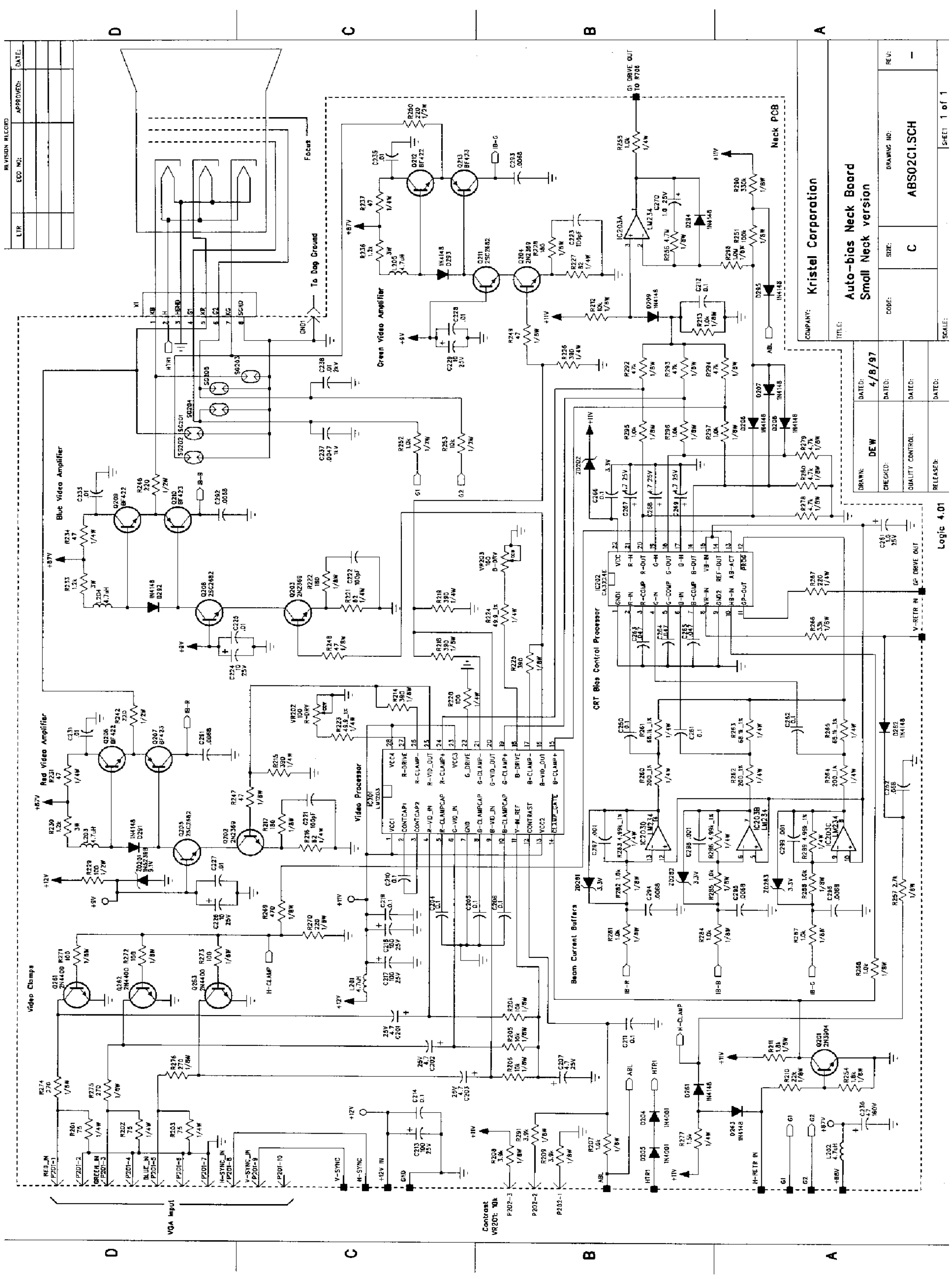
IC201 increases the 0.7V p-p nominal video input level to about 2.7V p-p at pin 25, which then drives the base of Q202. The exact amount of gain is determined by the DC level on pin 12, the Contrast control input. This DC level controls the gain of all three video channels simultaneously.

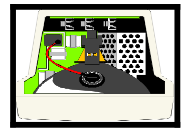
Q202 and Q205 operate as a cascode video output amplifier, with a gain of about 15. The video swing at Q205's collector is about 40V p-p. Q206 and Q207 operate as a buffer, driving the red CRT cathode through R242.

Q201 is driven by a horizontal retrace signal, and supplies a negative-going clamping pulse to IC201 pin 14. This provides DC restoration for the video signal by forcing the output of the video processor, IC201 pin 25, to the same DC voltage as on pin 24, during horizontal retrace time.

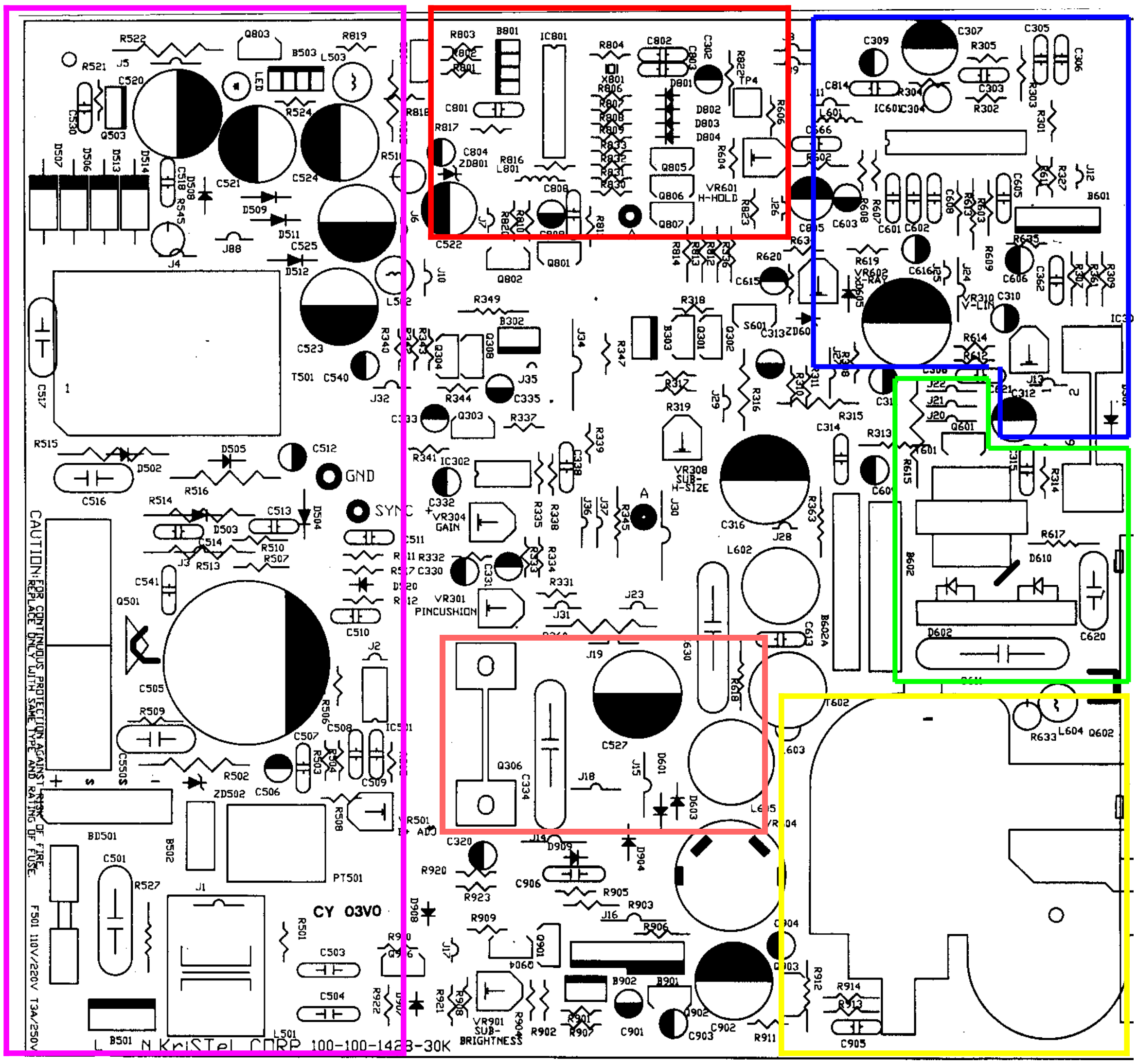
1428-30k series, AUTO BIAS



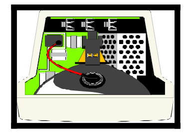




PURPLE: Power Supply Section
RED: Sync.Processing Section
BLUE: Vertical Section
GREEN: Horizontal Output Section
YELLOW: HV Section (FBT)
CORAL: Electronic Width Control



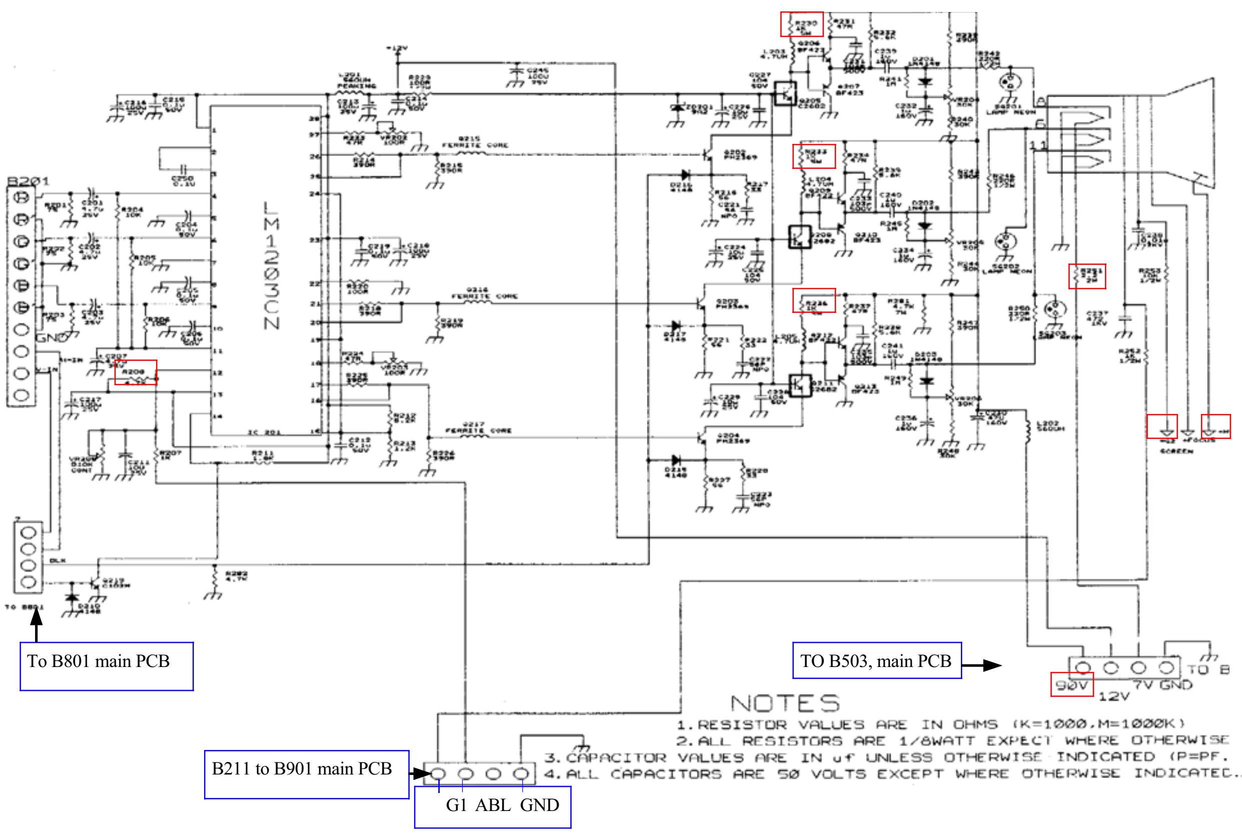
TOP OVERLAY KRISTEL / 100-100-1428-30K PCB



SCHEMATIC DIAGRAM CRT BOARD

model: 200-200—1564

USED IN CONJUNCTION WITH 1428-30k pcb

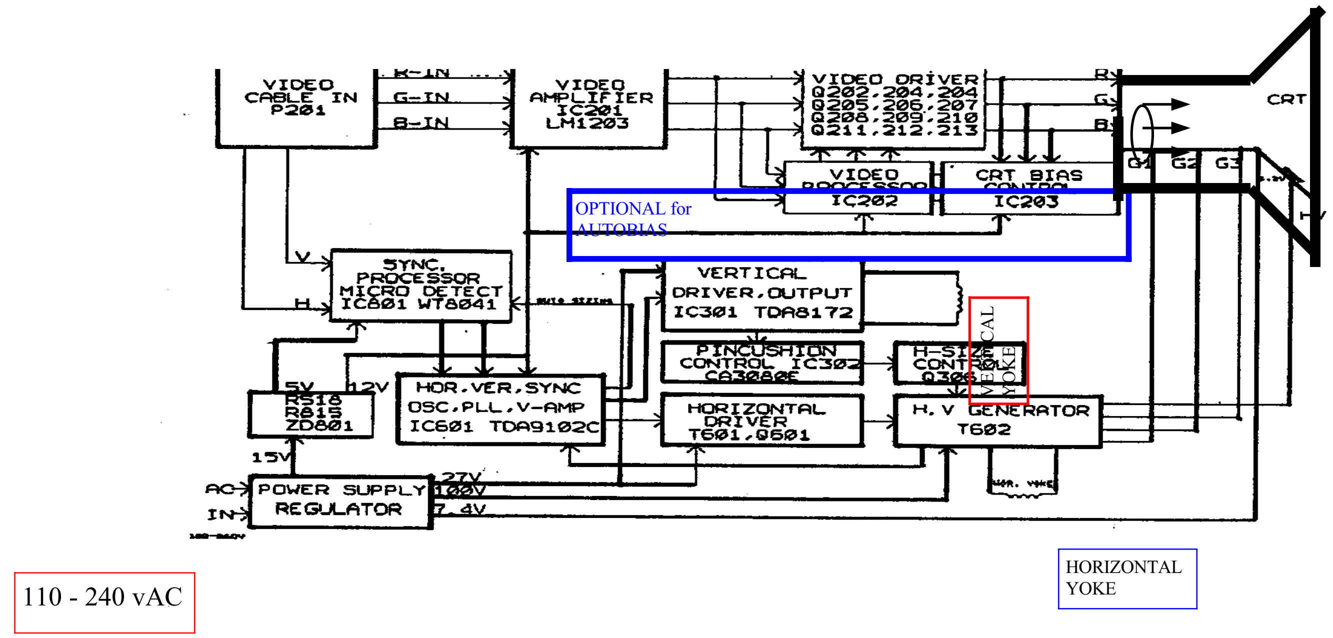


NOTE

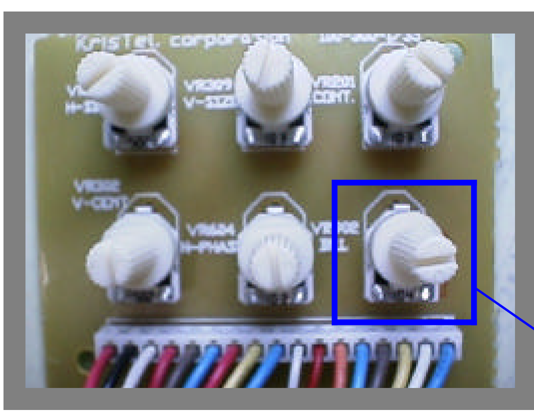
All marked area with red square is subject to be changed accordingly with the model of the CRT and the characteristics of the deflection yoke existing on the CRT.

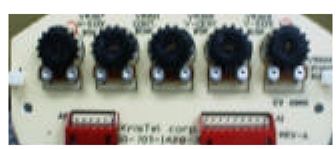
Actual schematics is not refered as autobias video board.

BLOCK DIAGRAM 100-100-1428-30K



CHARACTERISTICS of potentiometers:





REMOTE CONTROL BLOCK / SIX CONTROLS or FIVE CONTROLS (AB)

Hsize=VR307=5Kohm; Vsize=VR309=10Kohm; Contrast=VR201=10Kohm
Vcent=VR302=5Kohm; Hphase=VR604; Brightness=VR901=100kohm

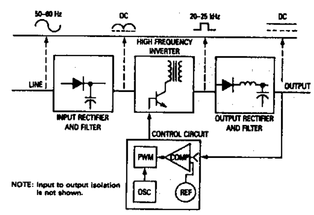
POWER SUPPLY - CIRCUIT DESCRIPTION / guide for switching power supply and components.

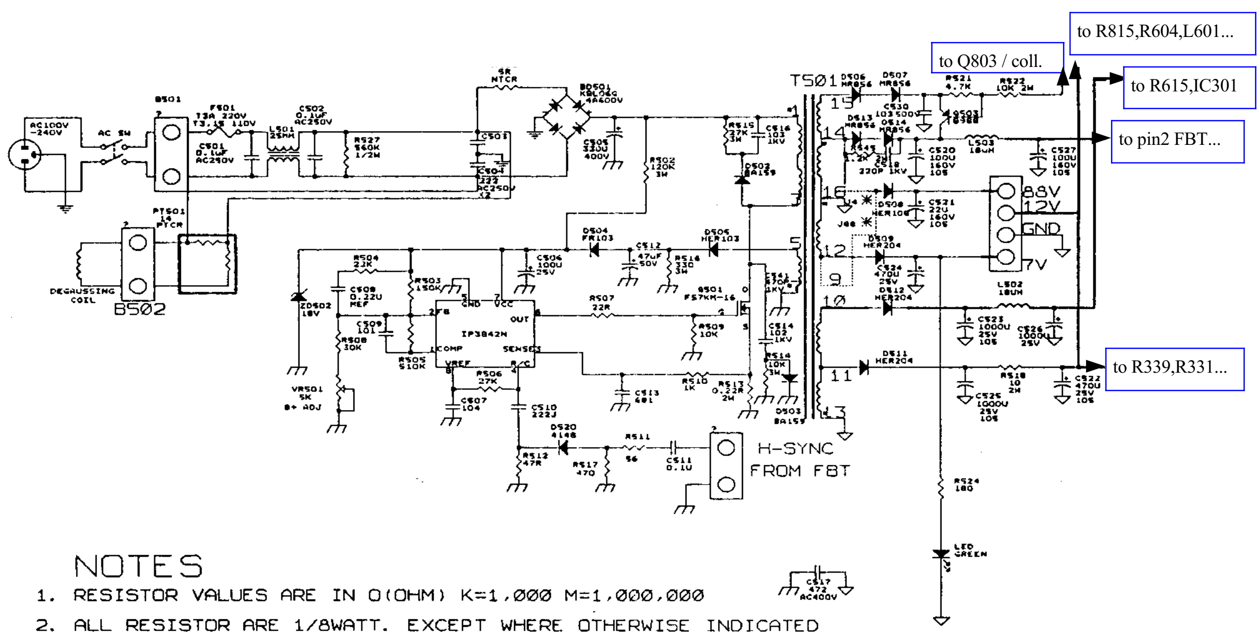
1.POWER CIRCUIT

The power circuit includes the lines filter, input rectifier circuit, start up, current-mode control and OVP. Please refer to the circuit diagram.

FUNCTIONAL BLOCK DIAGRAM

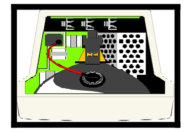
Switching Power Supply





NOTES

1. RESISTOR VALUES ARE IN O(OHM) K=1,000 M=1,000,000
2. ALL RESISTOR ARE 1/8WATT. EXCEPT WHERE OTHERWISE INDICATED
3. CAPACITOR VALUES ARE IN uf UNLESS OTHERWISE INDICATED P=pf
4. ALL CAPACITOR ARE 50 VOLTS EXCEPT WHERE OTHERWISE INDICATED
5. J88:15" USE J4:14" USE.



1.1 LINE FILTER CIRCUIT

The line filter circuit is comprised of C501, C502 and L501. This line filter tends to reduce the noise of conducted EMI from monitor into the power line.

1.2 INPUT RECTIFIER CIRCUIT

The input rectifier circuit is comprised of BD501 and C505. BD501 and C505 is a full - wave mode rectifier. L501 is used to reduce the surge current while the power supply is turned on.

1.3 START UP CIRCUIT

The resistor R502 provides the start-up current of IC501. The turn-on and turn-off thresholds of under voltage lockout circuit in IC501 are set up internally at 16vDC respectively. To start up, C506 must be charged to 16vDC with a current of 0.3mA - 0.5mA which depends on the IC501 start-up current characteristics and R502 resistor value.

1.4 CURRENT MODE CONTROL OPERATION

When Vcc of IC501 pin 7 is charged to more than 16V, there is a square wave on the output pin 6 which can be adjusted to peak +/- Amp. for driving the gate of Q501. The current-mode sensing resistor R513 senses the primary current wave in order to control the current-mode PWM and limit the total output power. Pin 2 and pin 1 is an error AMP section. IC501 detects the output voltage while the line voltage and load current change.

1.5 OVP CIRCUIT

ZD502 is the OVP circuit (over voltage protection). If an over voltage condition exists the ZD502 will shut down IC501.

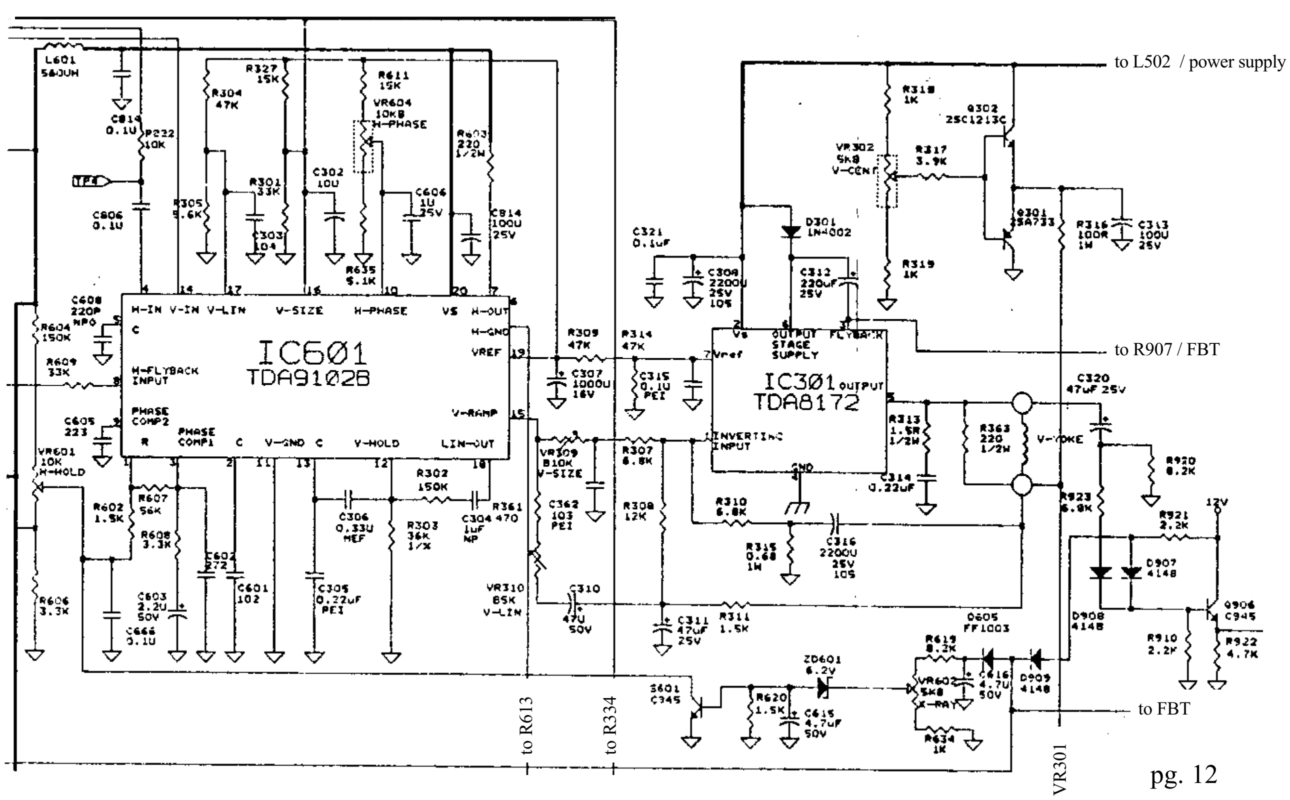
Per above related considerations a switching power supply is a relatively complex circuit (see functional block diagram). It is apparent here that the heart of the supply is really the high frequency inverter. It is here that the work of chopping the rectified line at the high frequency (20-200kHz) is done. Also the line voltage is transformed down to the correct output level. The 60 Hz input line is rectified and filtered by one block and after the inverter steps this voltage down, the output is again rectified and filtered by another.The task of regulating the output voltage is left to the control circuit which closes the loop from the output to the inverter.

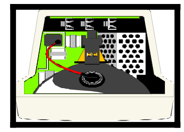
2. SYNCHRONOUS PROCESSING CIRCUIT

IC 801 circuit (WT8041), a sychronous signal processor of multi-sync, is capapble of many functions such as the horizontal and vertical frequency discrimination, display mode selection and synchronous pulse polarity detection. Pin 15 and pin 16 work as a clock generating circuit. Output pin 4 is active high while pin 5 is active low, fixed polarity and have the same pulse width as the original horizontal and vertical sync. signal. Pin 7 works as a frequency discrimination which is active low. Pin 9 and 14 work as mode selector which controls output. These output pins are to control Vsize, Hphase and Hosc of every display mode.

3 HORIZONTAL / VERTICAL PROCESSOR

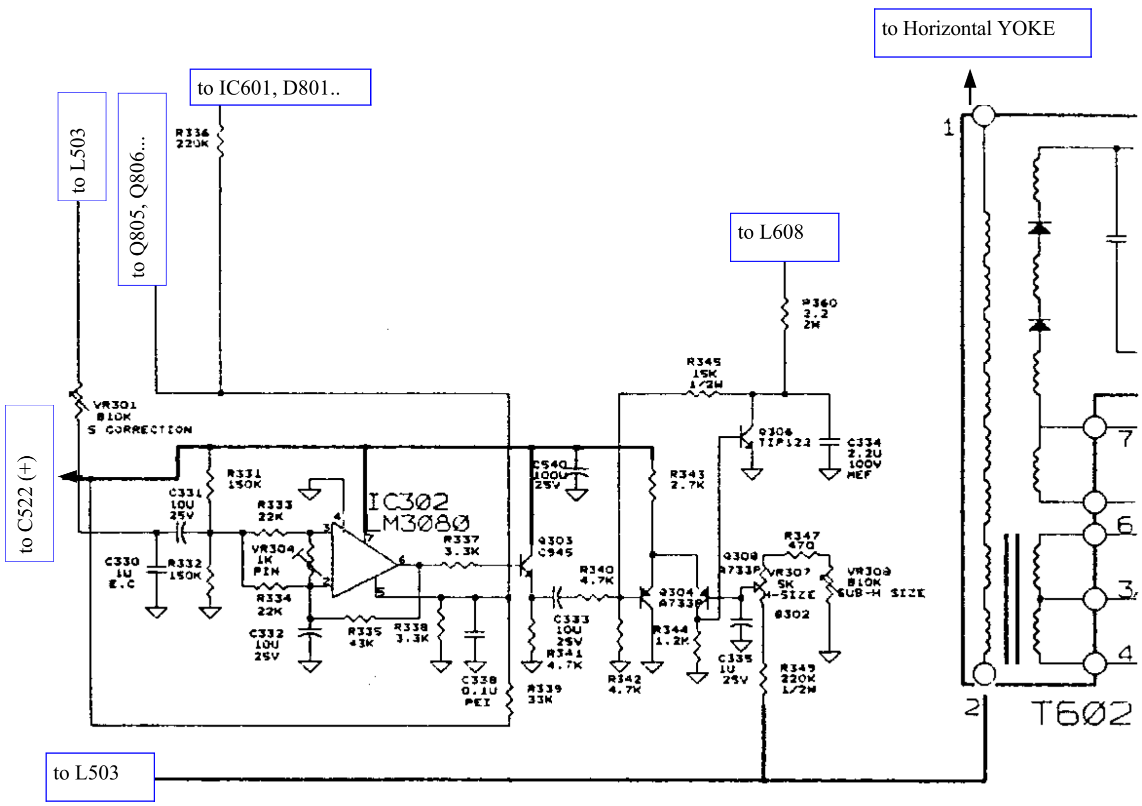
The IC 601 is a combination horizontal and vertical processor.
The vertical SYNC is applied to pin 14 of IC601. Oscillation is determined by C306, R303 and C305. The saw-tooth pulse generator built inside the IC can generate saw-tooth signal through a buffer stage to pin 15.



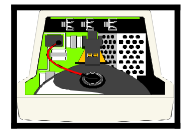


6. H-SIZE CONTROL and PIN COMPENSATION

The control of picture width and side pincushion compensation is achieved through changing the source voltage of the horizontal deflection circuit. There's need for some components to build a diode modulator. This circuit consist of C620, L602, C611, D602, D610 and H-DY.
The parabolic wave is fed to the base of Q303 via double integrated circuit wich can generate a side pincushion compensation wave. The H-width control voltage and parabolic wave are amplified by Q304 and Q306, then they are fed to the diode modulator for controlling the source voltage of the horizontal deflection circuit.



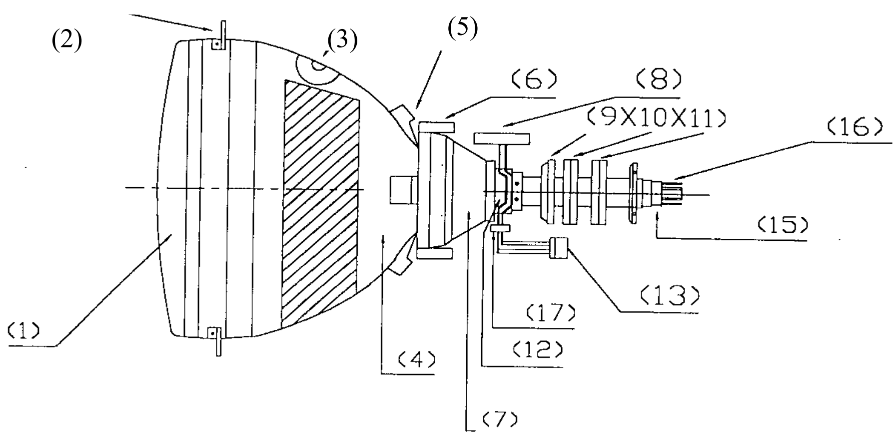
ELECTRONIC WIDTH CONTROL / schematic.



7. VIDEO AMPLIFIER CIRCUIT

The video circuit includes: video processing IC201 and video amplifier circuit (Q211, Q205 and Q208). The analog video processor IC201 includes gain control and DC restoration. Video signals RGB are input through the coupling capacitorsC206, C205, C204 and than sent to IC201.
A cascode circuit is used to amplify each R,G,B channel. The value for channel gain is calculated by collector and emitter resistances. The L205, L204 and L205 are series peaking inductors.
The output amplifier circuit stage, consisting of Q202, Q205, Q206 and Q205 is used to amplify video signal to 40Vp-p and is represent one of the R,G, B channels.
SG202, SG201 and SG203 respectively R252 and R253 are arc protection components which protect electrical components when CRT arc condition occurs.

8. CRT TECHNICAL DATA / CHUNGHWA 14" /



(1) PANEL
(2) SHRINKING BAND
(3) ANODE
(4) FUNNEL
(5) RUBBER WEDGE
(6) CANCELLATION COIL(MPRII TYPE)
(7) DEFLECTION YOKE
(8) & (17) TERMINAL BOARD
(9) 2-POLE PURITY MAGNET
(10) 4-POLE CONVERGENCE MAGNET (R/B)
(11) 6-POLE CONVERGENCE MAGNET (R/G)
(12) LEAD WIRE LENGTH
(13) PLUG
(14) NECK
(15) BASE
(16) PIN

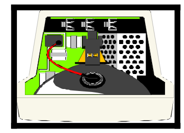
ELECTRICAL DATA AND RATINGS / CHUNGHWA 14" /

1. MAXIMUM AND MINIMUM RATINGS (Design maximum values)

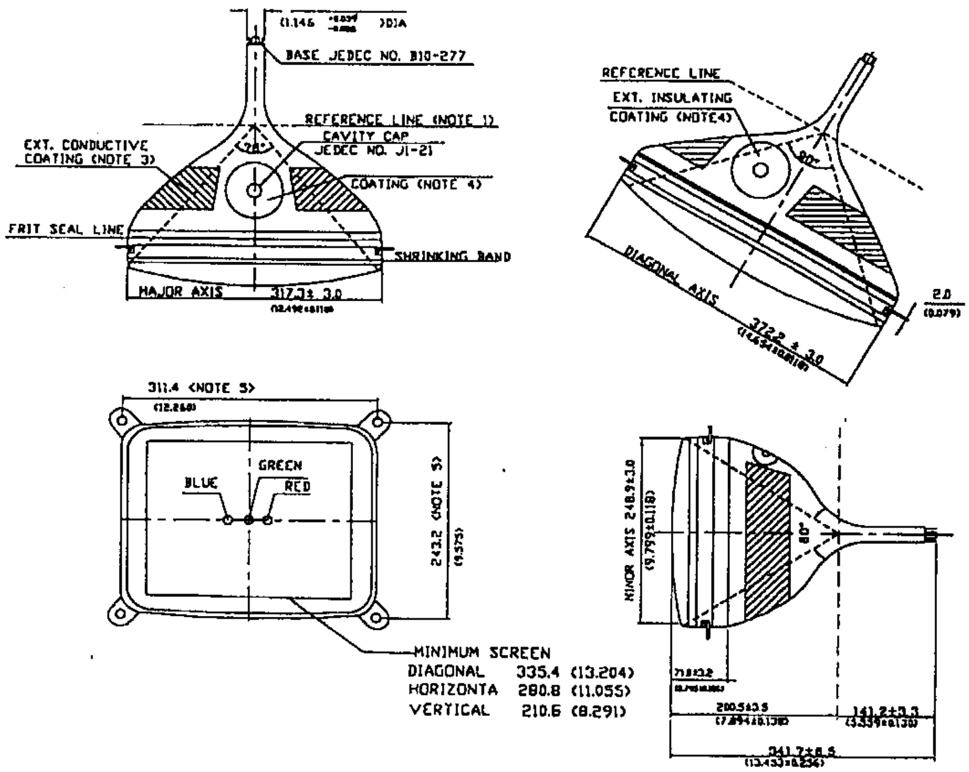
Unless otherwise specified, voltage values are for each gun and are positive with respect to Grid No.1.

Anode voltage	Max. 27.5 KV
	Min. 20.0 KV
Total anode current, long-term average	Max. 450 uA
Grid No.3 (focusing eletrode) voltage	Max. 10 KV
Grid No.2 peak voltage, including video signal voltage	Max. 1,000 V
Cathode voltage	
Positive bias value	Max. 400 V
Positive operating cutoff value	Max. 200 V
Negative bias value	Max. 0 V
Negative peak value	Max. 2 V
Heater voltage (AC or DC)	
Under operating conditions	6.3 V
Heater current	600 mA ± 10%
Peak heater cathode voltage	
Heater negative respect to cathode	
During equipment warm-up period not exceeding 15 seconds	Max. 350 V
After equipment warm-up period	Max. 200 V
Heater positive with respect to cathode	AC max. 200 V
	DC max. 0 V

NOTE:
a. Absolute maximum rating system.
b. For optimum emission stability and cathode life, it is recommended that the heater supply be regulated at 6.3 V.

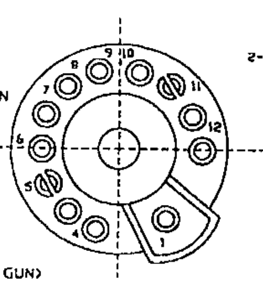


DIMENTIONAL OUTLINE / CHUNGHWA 14" CRT /



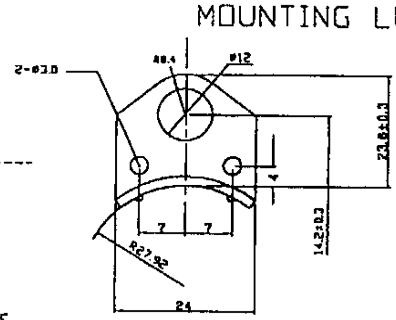
BASE SPECIFICATIONS

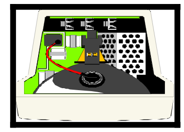
PIN 1 : GRID NO.3
PIN 4 : IC (GRID NO.1)
PIN 5 : GRID NO.1
PIN 6 : CATHODE OF GREEN GUN
PIN 7 : GRID NO.2
PIN 8 : CATHODE OF RED GUN
PIN 9 : HEATER
PIN 10 : HEATER
PIN 11 : CATHODE OF BLUE GUN
PIN 12 : IC (CATHODE OF BLUE GUN)



BOTTOM VIEW OF BASE

MOUNTING LUG





GENERAL ADJUSTMENT

FACTORY SPECIFICATION

Unless being specified, “Factory spec.” means the final adjustment made by the operator in the factory. This adjustment is intended to be close to the standard display characteristics.

TEST SIGNAL

R,G,B video signals are identical and specified signals for standard VGA mode of 480 lines.

WARM-UP TIME

Minimum 15 minutes is required for warming up the monitor. Direction CRT faces East. Ambient lighting environment: 400 to 600 lux.

AMBIENT TEMPERATURE

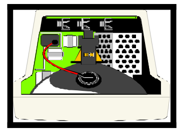
25°C (77° F)

TESTING MODE

640x480 / 800x600 upon request;

TOOLS and TEST EQUIPMENT Required

- miniature flat screw driver
- plastic Hex wrench
- ass’t clips and 1µF/50v capacitor
- external degaussing coil
- color analyzer / recommended: MINOLTA CA-100 /
- IBM / PC compatible
- digital multimeter



- CRT diagnostic software included in Kristel 3.5” diskette
- hipot tester
- video generator
- TEST Bezel - fixture model / depending on customer availability

PROCEDURE

⇒ Apply AC recommended power and video signal from customer supplied generator or use IBM compatible computer

⇒ Adjust screen control (FBT) to be able to view screen & focus control to best possible setting.

⇒ Convergence: some fine adjustment with pre-mated yokes to CRT can be achieved with magnetic tabs (see instructions and theoretical considerations - how to provide a best convergence.

⇒ Adjust B+ from VR501 / per CRT requirement:

- connect the positive lead of multimeter to D508, negative to chassis
- adjust VR 501 to obtain the voltage resulted from the spec. of the CRT

⇒ Select crosshatch pattern from video source / 31.5KHz (640x480)

⇒ Vertical linearity adjustment: adjust VR310 to allow no more than 3.0mm max. misadjustment.

⇒ Vertical size is performed from VR309 remote control potentiometer

⇒ Width size adj. is performed from VR307 and VR501. maximum attention for heater voltage / maximum permissible value must be between 5.9 - 6.5vDC /

⇒ Horizontal raster centering is performed from VR604

⇒ Horizontal Phase adjustment:

- input 31.5kHz timing with crosshatch pattern
- adjust VR604 to center the picture per specs.

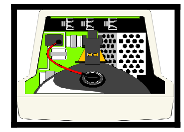
⇒ Pincushion adjustment: VR304 and VR301

- input 31.5 kHz (640x480) timing with crosshatch pattern
- adjust VR304 and 301 to obtain the best pincushion pattern

⇒ Focus adjustment:

- display any character all over the screen, set contrast in max. and brightness in cut off position. Adjust focus for best resolution possible.

⇒ Horizontal Oscillating Frequency, connect a capacitor 10µF/50volt, to Hsync from video PCB to GND, than adjust VR601 till the sync slash blanking bar is vertically stable possible after that remove the jumper



⇒ Background white balance adjustment:

- set all bias VR’s (204, 205 and 206) to max. and let the raster to be invisible
- display black pattern (all video signals are disable) and adjust SCREEN VR,
- as soon as the raster appears, check out which color (red, green or blue) comes out first
- adjust bias VR of the other 2 colors to get gray raster
- adjust SCREEN (from FBT) to let the gray raster no larger than 1FT - L

⇒ White balance adjustment:

- use color analyzer photometer, display center block patern, set the brightness to minimum than adjust the contrast VR to let brightness to be 35 FL and RGB balanced per Minolta reading.

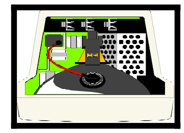
⇒ X-RAY protection seeting: VR602

- input 31.5 kHz (640x489) with crosshatch pattern
- connect the positive lead of multimeter to ZD601 (+)
- adjust VR 604 to obtain a 3.5 - 5.4vDC reading

⇒ Purity adjustment:

- is associated with convergence alignment / see procedure - required previous experience/
- display magenta color pattern
- adjust the purity magnet so that the picture is in magenta color. By turning two overlapping pawls in opposite directions, move them until they are at the same angle, 9 o’clock and 3 o’clock respectively. / as shown in fig.1 /
- for static convergence adj. / as shown in fig.2 and fig.3 / follow the next steps:

a/ display magenta crosshatch pattern
b/ open the two pawls of the 4-pole magnets to allow the red and blue vertical line to unite
c/ open and rotate the two pawls at a constant angle so that the red and blue horizontal lines can unite
d/ if the vertical line deviates, open the two pawls at the deviation position and make a minor adjustment by changing its angle.
e/ display cross hatch pattern
f/ make the red and blue vertical lines at the center unite whith the green by opening the two 6-pole pawls.
g/ rotate the two pawls at constant angle so that red and blue horizontal libes can unite with the green.
f/ if the vertical lines deviate, change the angle of pawls from the deviation pos.



CONVERGENCE and PURITY

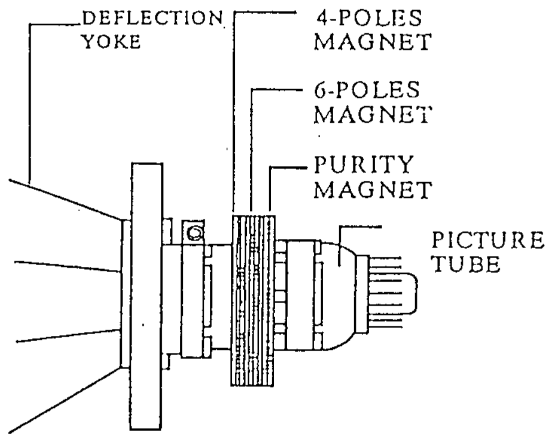


FIG. 1

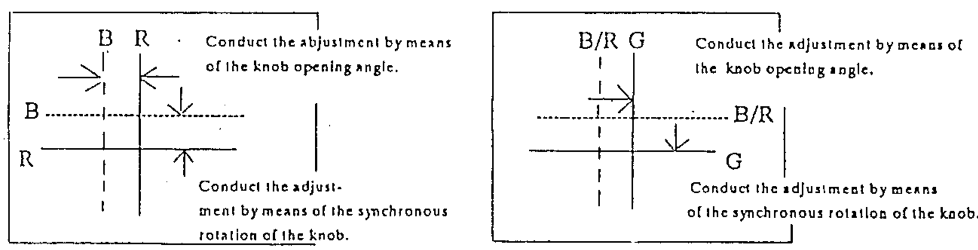
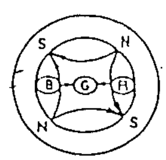
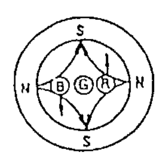


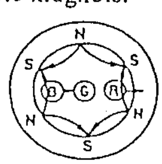
FIG. 2



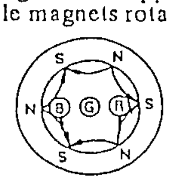
Beam migration in application of 4-pole magnets.



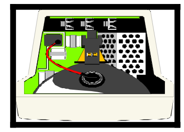
Beammigration in application of 4-pole magnets rotated.



Beammigration in application of 6-pole magnets.



Beam migration in application of 6-pole magnets rotated.



MORE INFORMATION regarding convergence and purity:

All of the following procedures have been performed at the factory and should require no further attention. If the monitor is serviced for any reason, it should be observed afterward to determine whether any of these procedures need to be performed again.

OUTLINE OF CONVERGENCE AND SET-UP PROCEDURE

DEGAUSSING: Demagnetize the shadow mask and all surrounding metal parts with an external degaussing coil.
PURITY: Adjust the purity magnets and the yoke position.
STATIC CONVERGENCE: Converge Red and Blue on Green in the center of the screen.
DYNAMIC CONVERGENCE: Converge Red and Blue at the edges of the screen.
WHITE BALANCE: Set Gray and White brightness tracking.

NOTE: Purity and convergence adjustment interact.

DEGAUSSING

The monitor is equipped with an automatic degaussing circuit. However, if the CRT shadow mask has become excessively magnetized, it may be necessary to degauss it with a manual coil. Do not switch the coil OFF while the raster shows any effect from the coil.

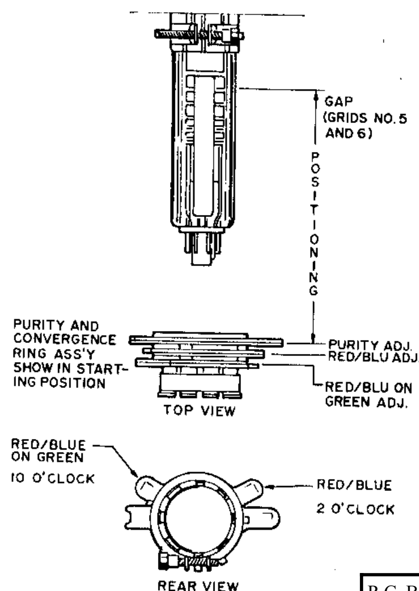
COLOR PURITY ADJUSTMENT

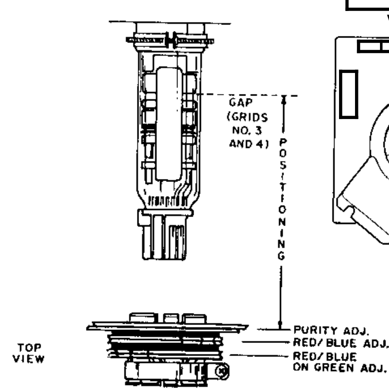
1 For best results, it is recommended that the purity adjustment be made in the final monitor location. If the monitor will be moved, perform this adjustment with it facing west or east. The monitor must have been operating 15 minutes prior to this procedure.

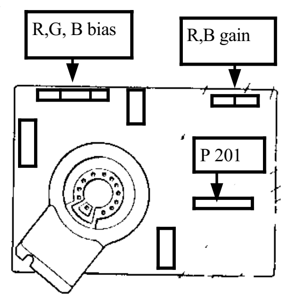
2 On picture tubes with a 22.5 mm neck diameter, set the ring assembly on the CRT neck with the center line of the purity ring-pair over the gap between grids No. 5 and 6.

3 Make certain that the magnetic ring-pairs are in their correct starting positions before beginning this procedure. The correct starting position for the purity ring-pair is not necessarily
The correct starting position will vary from ring assemblies from one manufacturer to another. It will be necessary to determine the correct starting position–also known as the zero correction position.

Figure shows a ring assembly in which each of the rings of the purity ring-pair has two tabs–one long and one short. With some ring assemblies of this type, the zero correction position is with the long tab of one ring aligned with the short tab of the other ring. On other ring assemblies of this type, the zero correction position is with the long tab of one ring aligned with the long tab of the other ring. The way to determine which is which is by trying one of these orientations and then rotating the two rings together, as a pair, without changing their orientation with respect to each other. If this rotation of the ring-pair causes no change in the purity, then it is the zero correction position. If the purity does change, then try the other orientation.



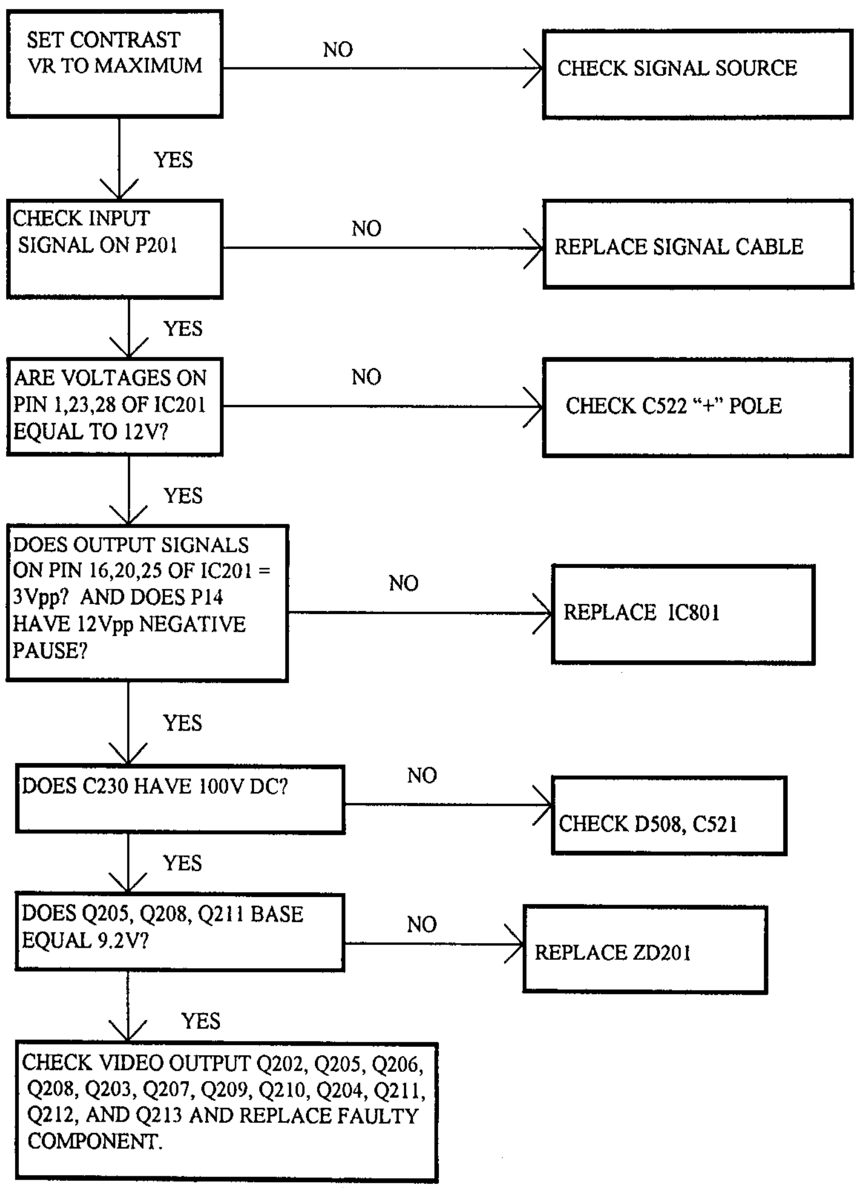




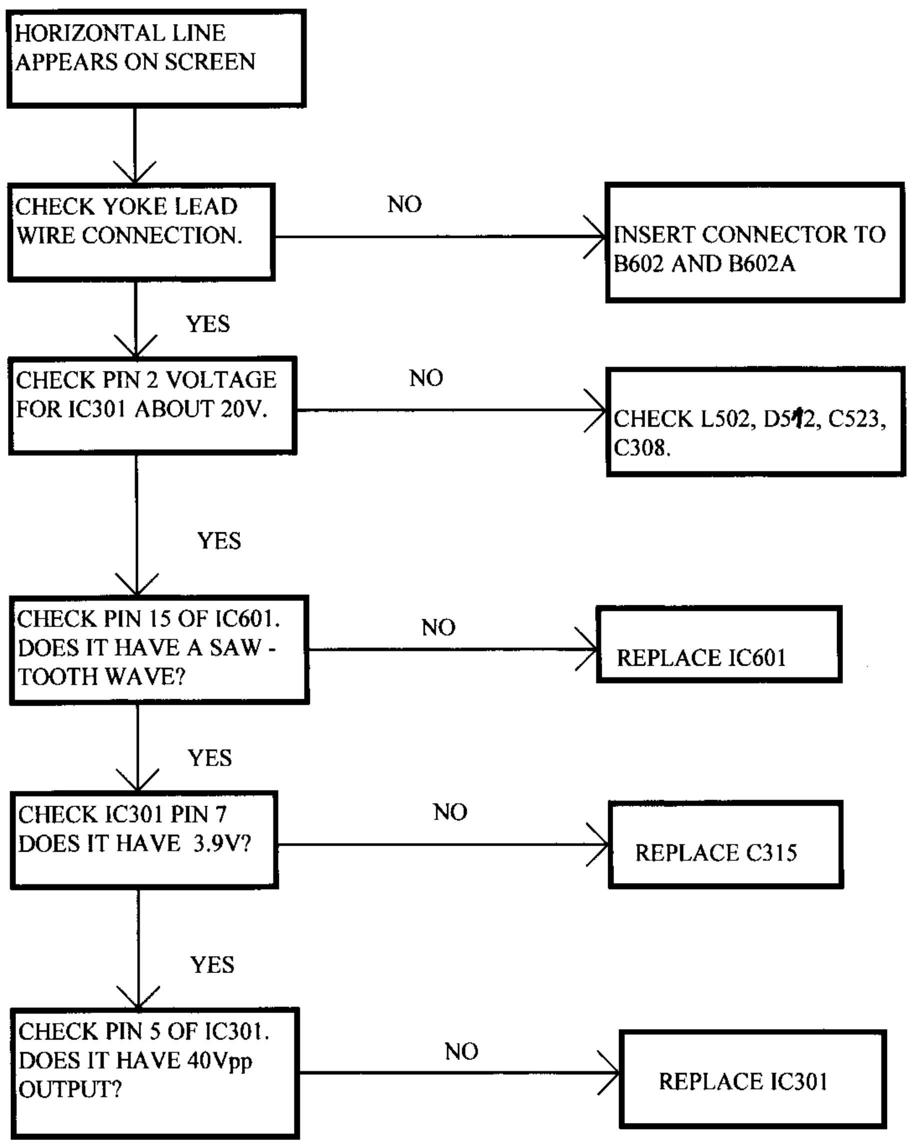
VIDEO NECK BOARD

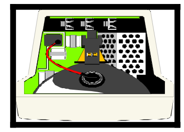
TROUBLE SHOOTING GUIDE

1.1 NO VIDEO



1.2 VERTICAL DEFLECTION





1.3 IMPROPER VERTICAL SIZE

VERTICAL SIZE DOES NOT AUTO-SWITCH DURING MODE CHANGE.

ADJUST VR309 TO GET PROPER VERT. HEIGHT ON 640X480 MODE.

CHECK VERT. HEIGHT IN 640X350, 640X400, IS HEIGHT WITHIN 5mm?

CHECK R805, R807, R808, R809, D802 AND D804.

NO GOOD

REPLACE BAD COMPONENT

GOOD

CHECK VOLTAGE ON PIN 10,11,12 OF IC801. IF IT IS LOW (0VOLTS) DURING MODE CHANGE.

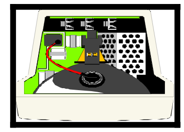
REPLACE IC801

1.4 PINCUSHION ADJUSTMENT

PINCUSHION MISADJUSTED

MEASURE IF WITHIN 1%

READJUST VR301, VR304



1.5 NO PICTURE

PICTURE DISAPPEARS AFTER WARMUP OR IMMEDIATELY ON STARTUP.

DOES CRT ANODE VOLTAGE = 23-24KV

NO → CHECK C524 B+ VOLTAGE. AT 31 Khz SHOULD =100V. IF NOT CHECK POWER SUPPLY.

YES

IS ZD601 CATHODE VOLTAGE 5.4V?

NO → ADJUST VR602 TO GET ZD601 CATHODE VOLTAGE TO 5.4V.

YES

CHECK ZD601, C615 AND S601

1.6 FOCUS ADJUSTMENT

PICTURE CANNOT BE ADJUSTED TO BEST FOCUS.

DOES CRT FOCUS G3 VOLTAGE EQUAL 5000-9000 VOLTS?

NO → REPLACE FLYBACK TRANSFORMER T603, CRT SOCKET.

YES

REPLACE CRT

READJUST SCREEN AND FOCUS VR TO OPTIMUM SETTING.

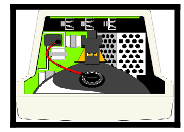
BILL OF MATERIAL

CRT BOARD 臥式自插(850-11N-1735) April 09,1997

Part No.	Description	Quantity	Location
200-200-1564	CRT BOARD	1	
210-122-0856	RES.1.2K1/8W,J TAP	1	R213
210-182-0856	RES.1.8K1/8W,J TAP	1	R211
210-102-0256	RES.1K1/2W,J TAP	1	R252
210-102-0856	RES.1K1/8W,J TAP	2	R207,R273
210-105-0456	RES.1M1/4W,J TAP	3	R241,R245,R249
210-472-0856	RES.4.7K1/8W,J TAP	2	R208,R282
210-562-0456	RES.5.6K1/4W,J TAP	3	R232,R235,R238
210-822-0856	RES.8.2K1/8W,J TAP	1	R212
210-103-0256	RES.10K1/2W,J TAP	1	R253
210-103-0856	RES.10K1/8W,J TAP	3	R204,R205,R206
210-303-0456	RES.30K1/4W,J TAP	3	R240,R244,R248
210-330-0856	RES.33H1/8W,J TAP	3	R217,R222,R228
210-470-0456	RES.47H1/4W,J TAP	3	R231,R234,R237
210-470-0856	RES.47H1/8W,J TAP	2	R223,R224
210-101-0256	RES.100H1/2W,J TAP	1	R229
210-101-0856	RES.100H1/8W,J TAP	1	R220
210-221-0256	RES.220H1/2W,J TAP	3	R242,R246,R250
210-391-0456	RES.390H1/4W,J TAP	3	R239,R243,R247
210-391-0856	RES.390H1/8W,J TAP	8	R214,R215,R218,R219 R225,R226,R271,R272
210-750-0856	RES.75H1/8W,J TAP	3	R201,R202,R203
210-560-0856	RES.56H1/8W,J TAP	3	R216,R221,R227
520-001-4148	DIODE.1N4148 TAP	7	D201,D202,D203,D214 D215,D216,D217
521-005-09A2	ZENER DIODE 9A2 TAP	1	ZD201
745-4R7-1062	PEAKING 4.7UH TAP	3	L203,L204,L205
745-561-1062	PEAKING 560UH TAP	2	L201,L202
622-106-0501	JUMPER 0.6D*5MM TAP	3	J211,J212,J224
622-106-9101	JUMPER 0.6D*7.5MM TAP	12	J202,J203,J204,J205, J210,J215,J218,J226 J228,J231,J240,J241
752-001-1035	BEAT CORE 穿 PIN TAP	3	Q215,Q216,Q217
622-106-1001	JUMPER 0.6D*10MM TAP	6	J207,J209,J213,J216 J217,J222

2

622-106-9201	JUMPER 0.6D*12.5MM TA	1	J201
622-106-1501	JUMPER 0.6D*15MM TAP	1	J214
CRT BOARD	立式自插(850-11T-1735)		
307-104-1580	CC.0.1UF/50V,Z TAP	11	C211,C212,C214,C215, C204,C205,C206,C250 C225,C227,C228
307-103-3570	CC.103PF/500V,M TAP	3	C231,C233,C235
308-560-1160	CC.56PF/50V,J NPO TAP	3	C221,C222,C223
300-1R0-0220	EC.1UF/160V,85C TAP	3	C232,C234,C236
300-4R7-2520	EC.4.7UF/25V,85C TAP	4	C201,C202,C203,C207
300-100-2520	EC.10UF/25V,85C TAP	3	C224,C226,C229
300-101-2520	EC.100UF/25V,85C TAP	4	C213,C216,C217,C218
302-1R0-0220	NP.1U/160V,85C TAP	3	C239,C240,C241
510-196-102M	TR.KRC102M TAP	1	Q219
510-200-0422	TR.BF422 TAP	3	Q206,Q209,Q212
510-200-0423	TR.BF423 TAP	3	Q207,Q210,Q213
510-190-2369	TR.PH2369 TAP	3	Q202,Q203,Q204
CRT BOARD	手插(851-111-1735)		
213-2R2-2059	MOF.2.2H2W,J 臥式	1	251
215-102-0559	水泥電阻 1K5W SQZ,J	3	R230,R233,R236
307-103-6572	CC.103PF/2KV,M	1	C238
307-472-4572	CC.472PF/1KV,M	1	C237
300-470-0222	EC.47UF/160V,85C	1	C230
504-551-1203	IC.TI1203	1	IC201
233-303-0673	VR.B-30K 6mm 立式	3	VR204,VR205,VR206
233-101-0673	VR.B-100H 6mm 立式	2	VR202,VR203
560-150-0001	SPARK GAP 150V	3	SG201,SG202,SG203
411-100-0003	14"15"大的 CRT SOCKET	1	
630-001-2001	BASE 1.56D 1P 6X9	1	B207
630-001-3001	BASE 2.36D 1P	1	B206
630-001-6001	BASE 2.5D 1P	1	B503
630-003-4001	BASE XH180 3P	1	B203
630-010-4001	BASE XH180 10P	1	B201
631-004-1001	CONN. 4P 400mm 紅黑白藍	1	7V,12V,B+,GND
631-004-1280	CONN. 4P 280mm 黃綠白橙	1	FOR B211
631-003-1400	CONN.3P 400mm 黃藍灰	1	FOR B202
560-150-0001	放電管 150V	3	SG201,SG202,SG203



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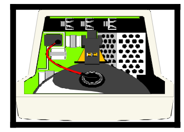
820-001-2682	TR ASS'Y (KSC2682)		Q205,Q208,Q211

TR. ASS'Y (KSC2682) 820-001-2682

510-200-2682	TR.KSC2682(2SC1609 可代	3	Q205,Q208,Q211
120-001-1428	HEAT SINK 10*15mm	3	
104-006-3032	SCREW R/W3*6mm ISO	3	



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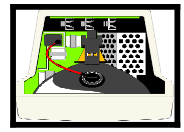
MAIN BOARD 臥式自插(850-00N-1735)

Part No.	Description	Quantity	Location
200-100-1428K	MAIN BOARD	1	
210-122-0456	RES.1.2K1/4W,J TAP	1	R344
210-152-0256	RES.1.5K1/2W,J TAP	2	R342,R912
210-152-0456	RES.1.5K1/4W,J TAP	5	R311,R602,R620,R802 R803
210-182-0456	RES.1.8K1/4W,J TAP	1	J58
210-1R5-0256	RES.1.5H1/2W,J TAP	1	R313
210-102-0456	RES.1K1/4W,J TAP	8	R318,R319,R510,R511 R634,R818,R902,R921
210-105-0456	RES.1M1/4W,J TAP	1	R804
210-222-0456	RES.2.2K1/4W,J TAP	2	J60,R903
210-272-0456	RES.2.7K1/4W,J TAP	1	R343
210-202-0456	RES.2K1/4W,J TAP	2	R913,R914
210-332-0456	RES.3.3K1/4W,J TAP	3	R606,R608,R801
210-392-0456	RES.3.9K1/4W,J TAP	2	R317,R807
210-472-0456	RES.4.7K1/4W,J TAP	4	R340,R341,R521,R816
210-472-0856	RES.4.7K1/8W,J TAP	5	R830,R831,R832,R833 R922
210-562-0456	RES.5.6K1/4W,J TAP	1	R305
210-682-0456	RES.6.8K1/4W,J TAP	4	R307,R310,R812,R905
210-822-0456	RES.8.2K1/4W,J TAP	2	R619,R908
210-822-0856	RES.8.2K1/8W,J TAP	1	R920
210-103-0456	RES.10K1/4W,J TAP	10	R509,R810,R811,R817 R819,R820,R822,R823 R910,R911
210-123-0456	RES.12K1/4W,J TAP	1	R308
210-153-0256	RES.15K1/2W,J TAP	1	R345
210-153-0456	RES.15K1/4W,J TAP	2	R327,R611
210-203-0456	RES.20K1/4W,J TAP	1	R808
210-223-0456	RES.22K1/4W,J TAP	1	R504
210-273-0456	RES.27K1/4W,J TAP	2	R506,R515
210-303-0456	RES.30K1/4W,J TAP	1	R508
210-333-0456	RES.33K1/4W,J TAP	3	R301,R346,R609
210-473-0456	RES.47K1/4W,J TAP	3	R304,R309,R314
210-563-0456	RES.56K1/4W,J TAP	1	R607
210-104-0456	RES.100K1/4W,J TAP	1	R906



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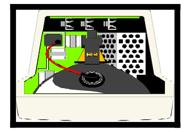
210-154-0456	RES.150K1/4W,J TAP	3	R302,R503,R604
210-224-0256	RES.220K1/2W,J TAP	1	R349
210-224-0456	RES.220K1/4W,J TAP	2	R336,R809
210-220-0456	RES.22H1/4W,J TAP	1	R507
210-470-0256	RES.47H1/2W,J TAP	1	R617
210-470-0456	RES.47H1/4W,J TAP	1	R512
210-514-0456	RES.510K1/4W,J TAP	1	R505
210-564-0456	RES.560K1/4W,J TAP	1	R907
210-181-0456	RES.180H1/4W,J TAP	1	R524
210-221-0256	RES.220H1/2W,J TAP	2	R603,R612
210-221-0456	RES.220H1/4W,J TAP	1	R613
210-391-0456	RES.390H1/4W,J TAP	1	R614
210-471-0456	RES.470H1/4W,J TAP	1	R347
210-751-0456	RES.750H1/4W,J TAP	1	R806
210-821-0456	RES.820H1/4W,J TAP	1	R909
210-512-0456	RES.5.1K1/4W,J TAP	1	R635
221-041-3602	RES.36K1/4W,F TAP	1	R303
520-001-4148	DIODE 1N4148 TAP	7	D907,D908,D909,D801 D802,D803,D804
520-010-4002	DIODE 1N4002 TAP	1	D301
522-010-H105	DIODE HER105 TAP	1	D904
522-010-T52M	DIODE BYT52M TAP	1	D508
522-010-R103	DIODE FR103 TAP	2	D504,D901
520-010-A159	DIODE BA159 TAP	2	D502,D503
520-010-1003	DIODE FF1003 TAP	2	D505,D605
522-020-H205	DIODE HER205 TAP	3	D509,D510,D511
521-005-05C2	ZENER DIODE 5.1V TAP	1	ZD801
521-005-06C2	ZENER DIODE 6.2V TAP	1	ZD601
521-005-09A2	ZENER DIODE 9A2 TAP	1	ZD901
521-005-18C2	ZENER DIODE 18V TAP	2	ZD501,ZD502
745-561-1062	PEAKING 560UH,J TAP	2	L601,L801
622-106-0501	JUMPER 0.6D*5mm TAP	1	J59
622-106-9101	JUMPER 0.6D*7.5mm TAP	14	J3,J5,J6,J12,J13,J21,J23 J41,J44,J50,J51,J52,J53 J61
622-106-1001	JUMPER 0.6D*10mm TAP	19	J9,J8,J11,J14,J15,J16,J17 J18,J20,J22,J25,J36,J38 J39,J45,J47,J48,J49,J55



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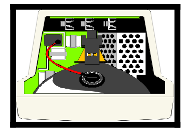
622-106-9201	JUMPER 0.6D*12.5mm TA	17	J2,J4,J10,J24,J26,J27,J28 J29,J35,J40,J42,J43,J46 J54,J56,J57,J37
622-106-1501	JUMPER 0.6D*15mm TAP	4	J1,J30,J33,J34

MAIN BOARD 立式自插(850-00T-1735)

307-104-1580	CC.0.1UF/50V,Z TAP	8	C303,C507,C511,C801 C806,C808,C321,C814
307-103-1170	CC.0.01UF/50V,K TAP	1	C621
307-560-1160	CC.56PF/50V,K TAP	2	C802,C803
307-101-1160	CC.100PF/50V,K TAP	1	C509
307-221-4570	CC.220PF/1KV,K TAP	2	C519,C541
307-221-1160	CC.220PF/50V,K TAP	1	C608
307-471-4560	CC.470PF/1KV,K TAP	1	C613
307-681-1160	CC.680PF/50V,K TAP	1	C513
307-102-4570	CC.1000PF/1KV,M TAP	1	C514
305-223-0550	PEI.0.022UF/50V,J TAP	1	C605
305-222-0550	PEI.0.0022UF/50V,J TAP	1	C360
305-472-0550	PEI.0.0047UF/50V,J TAP	1	C341
318-104-6350	MEF.0.1UF/63V,J TAP	2	C315,C905
318-224-6350	MEF.0.22UF/63V,J TAP	3	C305,C314,C508
318-334-6350	MEF.0.33UF/63V,J TAP	1	C306
313-153-0150	PPN.0.015UF/100V,J TAP	1	C602
313-222-0150	PPN.0.0022UF/100V,J TAP	1	C510
313-102-0150	PPN.102PF/100V,J TAP	1	C601
300-1R0-5020	EC.1UF/50V,85C TAP	3	C335,C606,C903
300-2R2-2520	EC.2.2UF/25V,85C TAP	1	C603
300-4R7-2520	EC.4.7UF/25V,85C TAP	1	C615
300-4R7-5020	EC.4.7UF/50V,85C TAP	1	C616
300-100-2520	EC.10UF/25V,85C TAP	4	C302,C333,C809,C904
300-470-2520	EC.47UF/25V,85C TAP	3	C310,C311,C320
300-470-5020	EC.47UF/50V,85C TAP	1	C512
300-101-2520	EC.100UF/25V,85C TAP	5	C309,C506,C609,C804 C805
300-221-2520	EC.220UF/25V,85C TAP	1	C312
302-1R0-2520	NP.1UF/25V,85C TAP	1	C304
302-100-2520	NP.10UF/25V,85C TAP	1	C313



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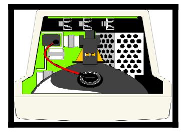
510-000-0733	TR.2SA733 TAP	7	Q301,Q304,Q308,Q805 Q806,Q807,Q902
510-023-0945	TR.2SC945 TAP	6	Q303,Q801,Q802,Q804 Q903,S601
510-023-1213	TR.2SC1213 TAP	3	Q302,Q601,Q904
510-200-0422	TR.BF422 TAP	1	Q504
510-200-0423	TR.BF423 TAP	1	Q306

MAIN BOARD 手插(851-001-1735)

213-R68-1059	MOF.0.68H/1W,J 臥式	1	R315
213-101-1059	MOF.100H/1W,J 臥式	2	R316,R815
213-331-1059	MOF.330H/1W,J 臥式	1	R618
213-R22-2059	MOF.0.22H/2W,J 臥式	1	R513
213-103-2059	MOF.10K/2W,J 臥式	1	R522
213-181-2059	MOF.180H/2W,J 臥式	2	R548,R615
213-122-2055	MOF.1.2K/2W,J 立式	1	R520
213-2R2-2055	MOF.2.2H/2W,J 立式	1	R339
213-100-2055	MOF.10H/2W,J 立式	1	R518
213-1R0-3055	MOF.1H/3W,J 立式	1	R633
213-273-3059	MOF.27K/3W,J 臥式	2	R514,R526
213-124-3059	MOF.120K/3W,J 臥式	1	R502
213-331-3059	MOF.330H/3W,J 臥式	1	R516
218-5R0-0871	熱敏電阻 NTC 5H	1	R501
219-140-0872	熱敏電阻 PTC 14H	1	PT501
307-103-4572	CC.0.01UF/1KV,M	3	C516,C530,C550
319-471-2062	CC.470PF/2KVTan<0.5%	1	C612
315-104-2563	X-CAP 0.1UF/250VAC,M	1	C501
317-222-2572	Y-CAP 0.0022UF/250VAC,M	2	C503,C504
317-472-4072	Y-CAP 4700PF/400V,M	1	C517
313-103-0652	PPN.0.01UF/630V,J	1	C620
309-824-0252	MPP.0.82UF/250V,J	1	C630
310-472-2052	PHM.0.0047UF/2KV,J	1	C611
300-102-2522	EC.1000UF/25V,85C	3	C308,C523,C525
300-100-0422	EC.10UF/200V,85C 短腳	1	C902
300-220-0322	EC.22UF/200V,85C	1	C521
300-470-0222	EC.47UF/160V,85C	2	C520,C527
300-221-0522	EC.220UF/400V,85C	1	C505
300-471-2522	EC.470UF/25V,85C	1	C524
300-471-3522	EC.470UF/35V,85C	1	C526



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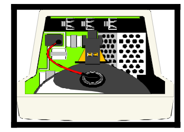
300-102-1622	EC.1000UF/16V,85C	1	C307
300-222-1622	EC.2200UF/16V,85C	1	C316
316-4R7-5072	BP.4.7UF/50V	1	C334
523-030-6001	BRIDGE DIODE KBL06 4A	1	BD501
522-020-H306	DIODE HER306	1	D610
522-020-H307	DIODE HER307 3A/800	2	D602,D609
522-020-H308	DIODE HER308 3A/1KV	2	D506,D507
510-010-0988	TR.2SB988Y	1	Q503
233-302-0677	VR.B-3K 6mm 臥式	1	VR310
233-502-0677	VR.B-5K 6mm 臥式	2	VR501,VR602
233-103-0677	VR.B-10K 6mm 臥式	1	VR601
233-104-0677	VR.B-100K 6mm 臥式	1	VR901
234-202-0877	VR.B-2K 8mm 臥式	1	VR305
745-180-2063	CHOKE 18UH	3	L502,L503,L604
745-181-2063	CHOKE 180UH 14*17	1	L602
740-9R9-3083	H-LINEARITY 9.9UH	1	L603
750-255-1415	LINE FILTER 25MH(EI-28)	1	L501
730-202-1448	TRANSFORMER H-DRIVER	1	T601
730-102-1735	TRANSFORMER EI40	1	T501
531-358-1436	RESONATOR 3.58MHZ	1	X801
730-302-1436	FBT	1	T602
120-002-1436	大的 FBT 固定具	1	FOR FBT
100-008-3032	SCREW R3*8mm ISO	1	FOR FBT 固定具
104-008-4012	SCREW T4*8mm TP1	1	FOR FBT 固定具
550-141-3000	FUSE 3A/250V 20mm	1	F501
551-021-0001	FUSE CLIP 20mm	2	FOR F501
524-002-0201	LED GREEN 3mm 2PIN	1	B504
504-800-9102	IC.TDA9102C	1	IC601
504-200-3842	IC.KA3842B	1	IC501
504-150-4N35	IC.T4N35(TOSHIBA)	1	IC501
503-100-8041	IC.WT8041	1	IC801
630-001-2001	BASE 1.56D 1P 6X9	2	TP2,TP3
630-002-2002	BASE 1.56D 2P 6X9	1	B502
630-002-5002	WAFER 3.96 3P 抽 1P	1	B501
630-003-4001	BASE XH180 3P	3	B302,B303,B903
630-004-4001	BASE XH180 4P	3	B503,B801,B902
630-006-4001	BASE XH180 6P	1	B601
630-004-3001	BASE 2.36D 4P DY	1	B602
630-006-2001	BASE 1.56D 6P 6X9 DY	1	B602A



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621-100-0501	CONN. 1015#22 100mm 棕	1	TP1
620-050-0400	WIRE 1015#18 50mm 黑	1	A-A
735-014-1436	DEGAUSSING COIL	1	
635-001-1428	GROUNDING	1	
610-091-1003	SIGNAL CABLE (1436)	1	
621-395-0212	1015#18 3.96D3P 抽 1,395mm	1	
820-001-8172	IC ASS'Y (TDA8172)		IC301
820-001-2485	MOSFET.ASS'Y(2SK2485)		Q501
820-001-5149	TR.ASS'Y(2SC5149)		Q602
820-001-1414	TR.ASS'Y(2SD1414)		Q306
830-002-1735	VR ASS'Y		
850-002-1735	POWER BOARD ASS'Y		

垂直 IC 加工組品(820-001-8172)IC ASS'Y TDA8172

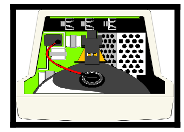
504-900-8172	IC. TDA8172	1	IC301
120-001-8172	HEAT SINK	1	
100-010-3032	SCREW R3*10mm ISO	1	
111-314-0032	3D SPRING WASHER	1	
110-003-2054	NUT	1	
540-100-T220	矽膠片 TO-220	1	

水平晶體加工組品(820-001-5149) TR.ASS'Y 2SC5149

510-023-5149	TR.2SC5149	1	Q602
120-002-5250	HEAT SINK 沒禿點	1	
100-012-3032	SCREW R3*12mm ISO	1	
111-314-0032	3D SPRING WASHER	1	
110-003-2054	NUT	1	

POWER MOSFET 加工組品(820-001-2485)TR.ASS'Y 2SK2485

511-001-2485	MOSFET 2SK2485	1	Q501
120-001-1794	HEAT SINK	1	
106-014-3032	SCREW R3*14mm ISO	1	
111-314-0032	3D SPRING WASHER	1	
110-003-2054	NUT	1	
540-100-1001	絕緣片 SRTO-3P	1	



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TR.ASS'Y TIP122(820-001-P122)

510-070-0122	TR.TIP122	1	Q306
120-001-P122	HEAT SINK 15X23X60	1	
104-006-3032	SCREW R/W3*6mm ISO	1	

VR ASS'Y(830-002-1735)

200-700-1428K	VR PCB	1	
234-103-0877	VR.B-10K 8mm 臥式	3	VR201,VR309,VR604
234-502-0877	VR.B-5K 8mm 臥式	2	VR302,VR307
234-104-0877	VR.B-100K 8mm 臥式	1	VR902
631-017-1735	CONNECTOR 17-18P	1	

POWER BOARD ASS'Y(850-002-1735)臥式自插

200-300-1428K	POWER PCB	1	
210-154-0456	RES.150K1/4W,J TAP	2	R331,R332
210-223-0456	RES.22K1/4W,J TAP	2	R333,R334
210-332-0456	RES.3.3K1/4W,J TAP	2	R337,R338
210-433-0456	RES.43K1/4W,J TAP	1	R335

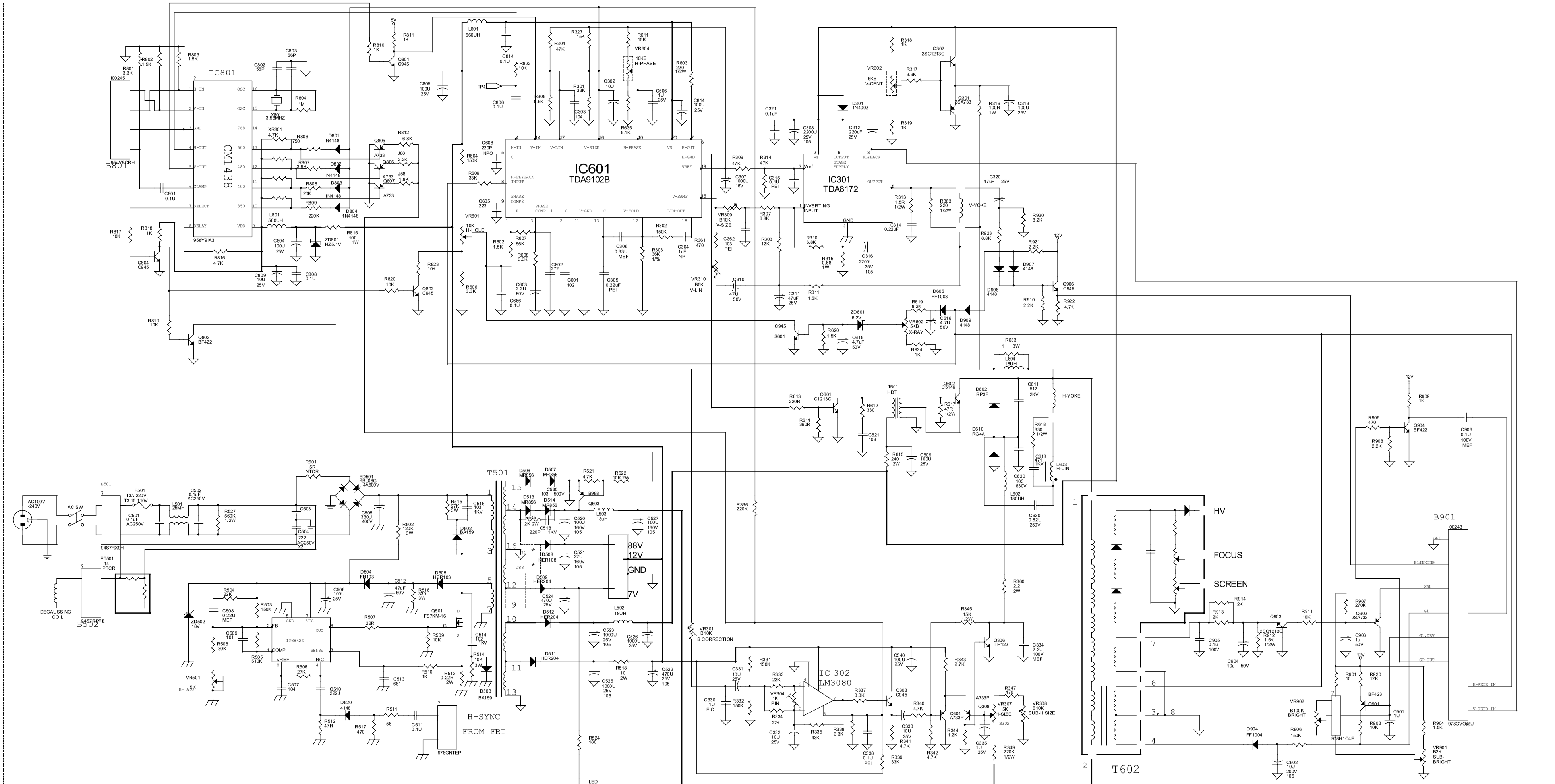
POWER BOARD ASS'Y(850-22T-1735)立式自插

318-104-6350	MEF.0.1UF/63V,J TAP	1	C338
300-100-2520	EC.10UF/25V 85C TAP	2	C331,C332
300-R47-5020	EC.0.47U/50V 85C TAP	1	C330

POWER BOARD ASS'Y(851-002-1735)手插件

233-103-0677	VR.B-10K 6mm 臥式	1	VR301
233-102-0677	VR.B-1K 6mm 臥式	1	VR304
504-200-3080	IC.CA3080E H9627	1	IC302
630-009-4001	WAFTER 9P2.54 插 PCB90	1	P301

DOUBLE FOCUS CIRCUIT (17" USE)



NOTES

1. RESISTOR VALUES ARE IN O(OHM) K=1,000 M=1,000,000
2. ALL RESISTOR ARE 1/8WATT. EXCEPT WHERE OTHERWISE INDICATED
3. CAPACITOR VALUES ARE IN uf UNLESS OTHERWISE INDICATED P=pf
4. ALL CAPACITOR ARE 50 VOLTS EXCEPT WHERE OTHERWISE INDICATED
5. J88:15" USE J4:14" USE.

KRISTEL Corporation

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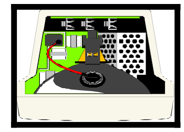
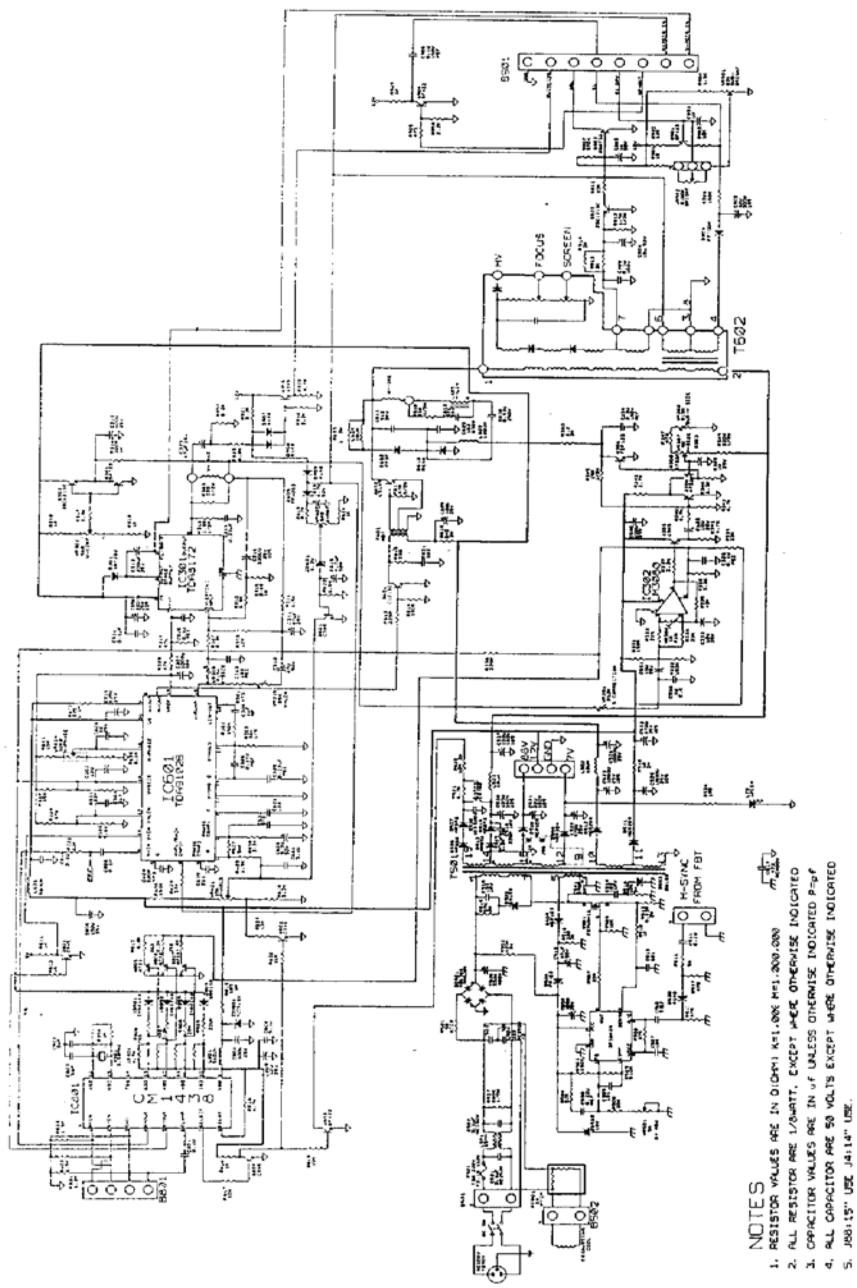
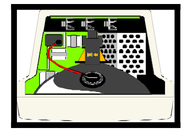




SCHEMATIC DIAGRAM

1428-30K AUTO BIAS



CREATION, PERFECTION, TEAMWORK

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