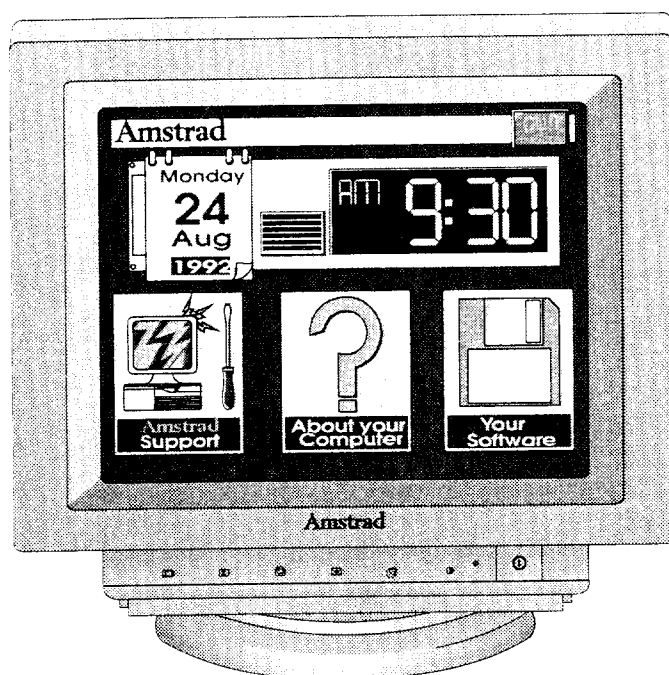


# Amstrad



## PC14M28LR

## PC14M39 Y2

## SVGA MONITOR

## SERVICE MANUAL

### **Note:**

PC14M28LR has a magnetic cancellation coil fitted around the deflection yoke. When replacing the CRT, remove this coil and refit in the same way around the deflection yoke of the replacement CRT.

The monitor incorporates a number of adjustments which are listed below, and will have been correctly aligned before leaving the factory. Adjustments should only be carried out if necessary

### **Alignments**

#### **Main PCB**

HT Adjust	RV832
B+ Adjust	RV503
VGA Frequency	RV429
30 $\mu$ s Monostable	RV406
13 $\mu$ s Monostable	RV407
Keystone	RV491
East / West Amplitude	RV450
H-Shift	SK403
V-Size (Master)	RV422
V-Frequency	RV303
V-Linearity	RV316
A1 / Screen Voltage	FBT
Focus	FBT

#### **Video PCB**

Red Gain	RV219
Green Gain	RV220
Blue Gain	RV221
Red Cut-Off	RV225
Green Cut-Off	RV226
Blue Cut-Off	RV227

All test patterns refer to SVGA test Programme, Issue 001, used in conjunction with a Trident MVGA-T8900a Video Card.

### **HT AND B+ SETTING**

N.B. Number in square brackets refer to the calculator numeric keypad.  
Numbers without brackets refer to the typewriter numeric keys.

Select MODE 3, BLANK RASTER. "3,F9" [1] from keyboard.  
Select CONTRAST to minimum and BRIGHTNESS to DETENT.  
Check the voltage at C819 is  $110\text{v} \pm 0.5\text{v}$ . Adjust RV832, if necessary.  
Check the voltage at C425 is  $84\text{V} \pm 0.5\text{v}$ . Adjust RV503, if necessary.  
for Y2 and Y2V chassis

### **VERTICAL HOLD**

Select MODE 7, 50Hz Sync "7" from Keyboard.  
Set CONTRAST to mid range and BRIGHTNESS to DETENT.  
Turn VR303 (vertical hold) fully anti-clockwise. Then slowly turn RV303 clockwise until the display becomes stable. Stop turning RV303 immediately.

## FOCUS SETTING

Set CONTRAST to mid range and BRIGHTNESS to DETENT  
Set Focus Pattern Green "3,F6,[5]" from keyboard  
Adjust Focus control so that the resolution is optimised

## HORIZONTAL CENTRE

Select MODE 3, BLANK RASTER "3,F9,[1]" from keyboard  
Set BRIGHTNESS to maximum  
Check for a centred raster within  $\pm 2.0\text{mm}$   
Adjust the position of jumper SK403, if necessary

## HORIZONTAL PHASE (VGA)

Select FOUR BY FOUR GRID "3,F3,[8]" from keyboard  
Set contrast to mid-range and BRIGHTNESS to MAXIMUM.  
Adjust RV429 (H. Freq.) to centre display image within the display consistent with a voltage of  $4.0\text{V} \pm 0.5\text{V}$  on IC404, pin 5.

## VERTICAL LINEARITY

Set BRIGHTNESS to DETENT  
Select Square grid "3,F8" from keyboard.  
Adjust RV316 (Vertical Linearity) for best linearity, if necessary  
Check that Vertical Linearity is better than 70%.

## HORIZONTAL WIDTH

Select MODE 3, WHITE SCREEN, NO BORDER "3,F9" from keyboard  
Set Brightness to DETENT and Contrast to give  $100 \pm 20 \text{ Cd/m}^2$   
Adjust RV451 USER WIDTH and check that a width of 245mm is available.  
Set RV451 to DETENT

## VERTICAL SIZE

Select MODE 3 WITH SCREEN, NO BORDER "3,F9" FROM keyboard  
Set BRIGHTNESS to DETENT and contrast to give  $100 \pm 20 \text{ Cd/m}^2$   
Adjust RV422 (480 size) for  $183\text{mm} \pm 1\text{mm}$  display size.

Select mode 2 with screen, no border "2,F9" from keyboard  
Check the display size  $183\text{mm} \pm 3\text{mm}$ .

Select MODE 1 White Screen, No Border "1,F9" from keyboard  
Check for display size  $183\text{mm} \pm 3\text{mm}$ .

Select MODE 4 WHITE SCREEN, NO BORDER "4,F9" From Keyboard.  
Adjust RV433 USER HORIZONTAL PHASE for a locked, central display  
Check for display size  $183\text{mm} \pm 3\text{mm}$ .

Select MODE 5 WHITE SCREEN, NO BORDER "5,F9" from keyboard.  
Adjust RV433 USER HORIZONTAL PHASE for a locked display and check that  $183\text{mm}$  display size can be obtained using RV409 SVGA SIZE USER CONTROL.  
Set RV409 for  $183\text{mm} \pm 3\text{mm}$  display size.

## VERTICAL CENTRE

SET CONTRAST TO MID RANGE and BRIGHTNESS to DETENT.  
Select FOUR BY FOUR GRID "3,F3" from keyboard  
Adjust RV313 (Vertical Centre) for a centred display within  $\pm 2.0\text{mm}$ .

## GEOMETRIC DISTORTION

Select FOUR BY FOUR GRID "3,F3" from keyboard.  
Check the total distortion.  
Adjust RV450 E/W Amp for straight vertical edges, if necessary.  
Adjust RV491 for a trapezoidal display.

## VIDEO Cut-Off

Select MODE 3 BLANK SCREEN "3,F10" from keyboard.  
Set BRIGHTNESS TO minimum.  
Check the screen emission is  $3 \pm 0.5 \text{ Cd/m}^2$ . Adjust A1 if necessary.  
Select Mode 3 WHITE BLOCK "3,F1,[\*]" from the keyboard.  
Set BRIGHTNESS to DETENT and CONTRAST to give screen emission of  $17 \pm 1 \text{ Cd/m}^2$ .  
Using the cut-off presets adjust as required to obtain:  
 $x = 0.281 \pm 0.005$   
 $y = 0.311 \pm 0.005$

(Adjusting a minimum number of the presets to meet the required limit).  
Do not make COARSE adjustment

## VIDEO GAIN

Select MODE 3 GREEN BLOCK "3,F1,[8],[5]" from keyboard.  
Set BRIGHTNESS to DETENT and CONTRAST to MAXIMUM.  
Set GREEN gain RV220 for a screen emission of  $76 \pm 1 \text{ Cd/m}^2$ .

Select MODE 3 WHITE BLOCK "3,F1,[8]" from keyboard.  
Without further adjustment to RV220, set RED and BLUE GAIN, RV219, RV221 to obtain a white balance of  $x = 0.281 \pm 0.005$   $y = 0.311 \pm 0.005$  (Note the measurements)  
Check the screen emission is  $100 \pm 15/-10 \text{ Cd/m}^2$ . If not, readjust RV220.  
Reduce CONTRAST to give a screen emission of  $17 \pm 1 \text{ Cd/m}^2$ .  
Check the x and y co-ordinates are within  $\pm 0.015$  of the measurement taken in Horizontal Phase (VGA) (at CONSTANT maximum).  
If not using the MINIMUM of the adjustment, carefully re-adjust the appropriate Cut-Off preset (RV225, RV226, RV227) to bring the colour co-ordinates just within the limits stated below.  
Verify the following conditions.

Screen brightness: "3,F1"	$100 \pm 15/-10 \text{ Cd/m}^2$	BRIGHTNESS DETENT CONTRAST MAXIMUM.
Colour Point	$x = 0.281 \pm 0.015$ $y = 0.311 \pm 0.015$	BRIGHTNESS DETENT $90 \text{ Cd/m}^2$ WHITE SCREEN
Colour Tracking	$x = \pm 0.015$ $y = \pm 0.015$	CONTRAST VARIABLES 20 to $90 \text{ Cd/m}^2$ .
Background Brightness "3,F10"	$3 \pm 0.5 \text{ Cd/m}^2$	BRIGHTNESS MAXIMUM. CONTRAST MINIMUM

N.B. In all measurements co-ordinate x must be less than y.

## STATIC CONVERGENCE

Select MODE 3 SQUARE GRID MULTICOLOUR "3.F8.[9]" from keyboard.  
Adjust CRT CONVERGENCE RINGS for best alignment of colour segments, if necessary

## VOLTAGE & WAVEFORM SUMMERY

### POWER SUPPLY

Assuming normal operation

supply	voltage	measured at
+110v	110.0 $\pm$ 0.5v	CE819 Adj RV832
+21v	20.5 $\pm$ 0.5v	CE820
+12v	12.0 $\pm$ 0.5v	CE823
+6v	6.2 $\pm$ 0.2v	CE821

### Derived Supplies

All checks and adjustments must be done in VGA mode 3 (31.5kHz).

IC801 supply +5v	12.5 $\pm$ 0.5v	CE813 *NON ISOLATED*
	5.0 $\pm$ 0.25	CE405
IC405 SUPPLY -15V	8.9V $\pm$ 0.2V	CE411
	-15.3 $\pm$ 2V	CE429 *31.5kHz Operation
Brightness Supply B+	-64.0 $\pm$ 5v	CE428
(31.5kHz)	84.0 $\pm$ 0.5v	CE425 *Black Screen*
		Adjust RV503 31.5kHz operation
EHT	24.5 $\pm$ 1kV	CRT anode *CAUTION*

### SETTINGS

30us Monostable: measure waveform timing at IC402 pin 13 / D412.

13ms Monostable: measure waveform timing at IC402 pin 12 / R496

### HORIZONTAL MONOSTABLE ADJUSTMENT

Select Sync Mode 3

Set RV406 for 1.3us  $\pm$  0.1us duration of TTL low on IC402 pin 13

### VERTICAL MONOSTABLE ADJUSTMENT

Set RV407 for 13.0ms  $\pm$  0.5ms duration of TTL high on IC402 pin 12

N.B. These are voltage measurements for correct operation using DVM only.

Warning: All measurements are with respect to mains earth unless otherwise indicated.  
High voltages exist on the primary side of the power supply, testing should only be carried out with the unit connected to the mains supply via an isolation transformer.

### Test Point Voltage

PSU	
D802 cathode with respect to pin 5 ic801	335v dc
T801 pin 1 with respect to pin 5 ic801	335v dc
IC801 pin 7 with respect to pin 5 ic 801	12.5v dc
D813 cathode	110v dc
D814 cathode	21v dc
IC803 output	12v dc
D815 cathode	6.2v dc
D416 cathode	5v dc

### B+ Regulator

R501 (both ends)	-260v dc
D502 cathode	84v dc

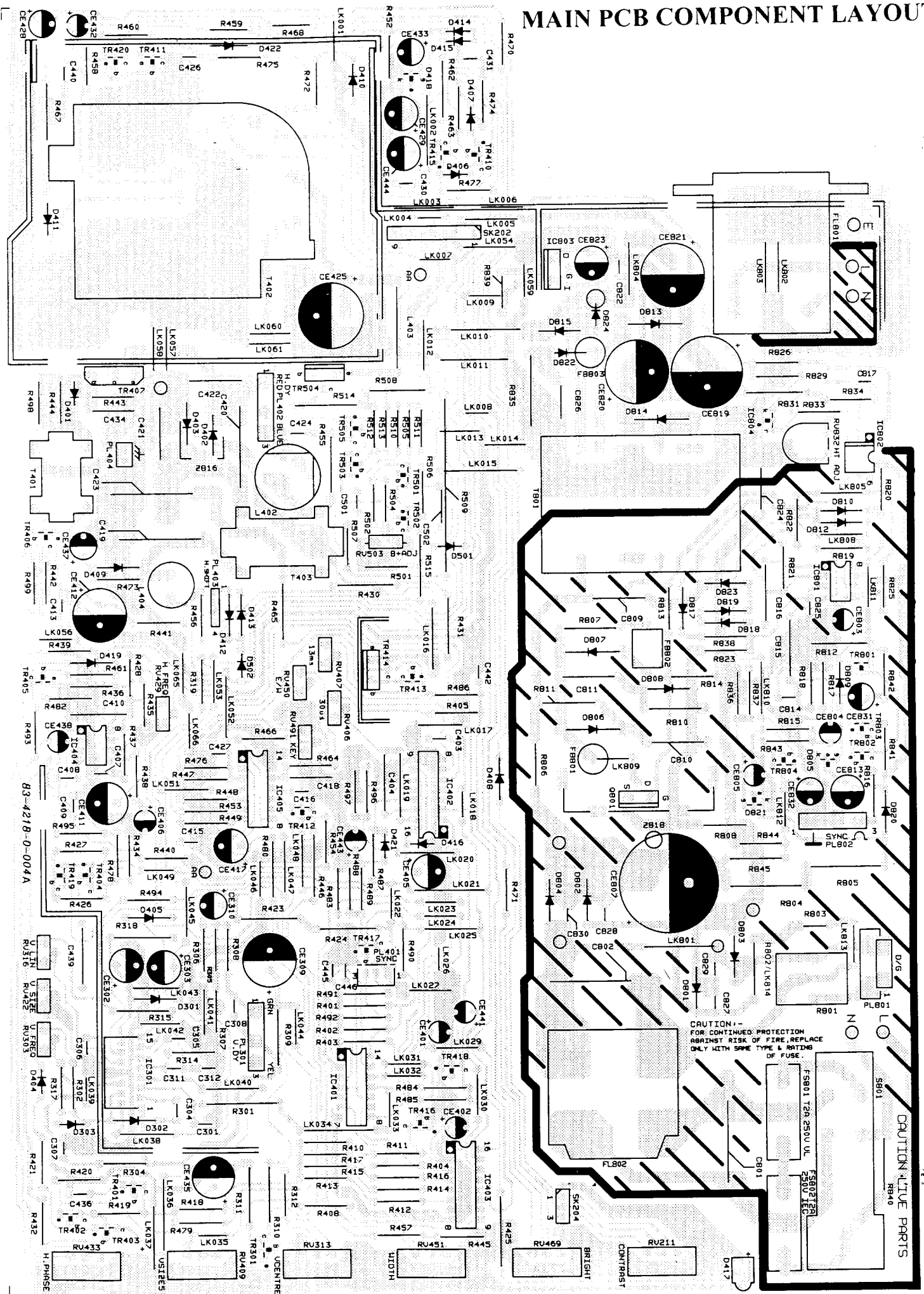
### Mode Detection

IC403 pin 6,7	(VGA mode 1)	< 0.1v dc
IC403 pin 5	(VGA mode 2)	< 0.1v dc
IC403 pin 4	(VGA mode 3)	< 0.1v dc
TR416 collector	(IBM 8514/a mode)	< 0.1v dc
IC403 pin 9-12	(SVGA 800x600 mode)	< 0.1v dc

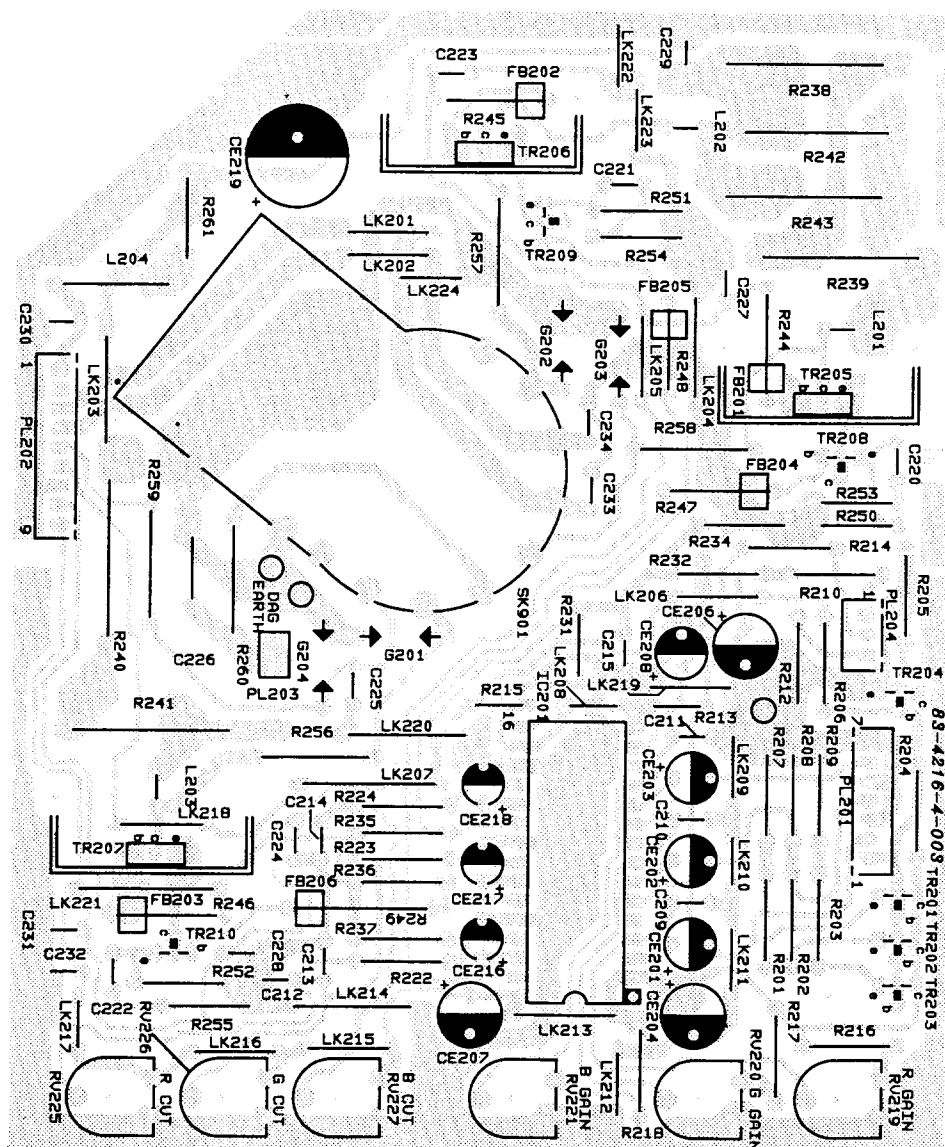
### Line Stage

IC404 pin 6	8.8v dc
IC 404 pin 5	4v $\pm$ 1v dc
T402 pin 2	84v dc
R441 (both end)	20.5v dc
D410 anode	-15v dc
CE428 cathode	-55v dc

# MAIN PCB COMPONENT LAYOUT



# CRT PCB COMPONENT LAYOUT



# PSU SCHEMATIC DIAGRAM

MONITOR CHASSIS TYPES Y,Y2U AND Y3

79-1536-5-002

- \* - NOT FITTED
- ① - 110V OPTION
- ☐ - NOT FITTED ON 110V
- ② - USED WITH Y CHASSIS 0.39 CRT AND ALL Y2 CHASSIS
- ③ - CANCELLATION COIL FITTED ON Y2U CHASSIS ONLY
- ⚠ - CRITICAL SAFETY COMPONENT

NOTE: B+ VOLTAGE VARIES WITH CHASSIS TYPE  
(SEE SERVICE MANUAL FOR DETAILS)

## SAFETY AND ISOLATION.

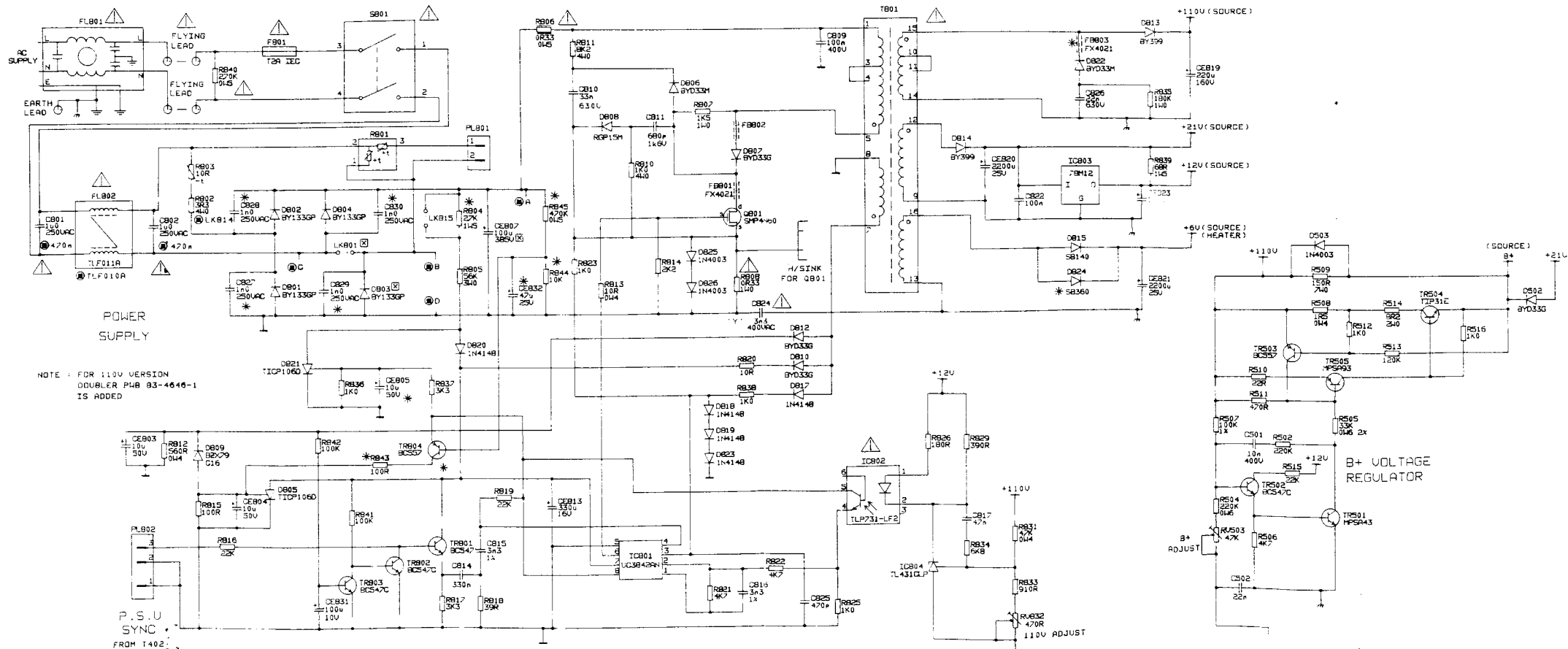
THE POWER SUPPLY IS ALWAYS LIVE REGARDLESS OF THE MAINS SUPPLY POLARITY. THEREFORE, FOR SERVICING, THE MONITOR SHOULD BE SUPPLIED THROUGH A MAINS ISOLATION TRANSFORMER.

THE POWER SUPPLY REMAINS CHARGED FOR ABOUT 30 SECS AFTER SWITCHING OFF. AVOID TOUCHING THIS AREA DURING THIS TIME.

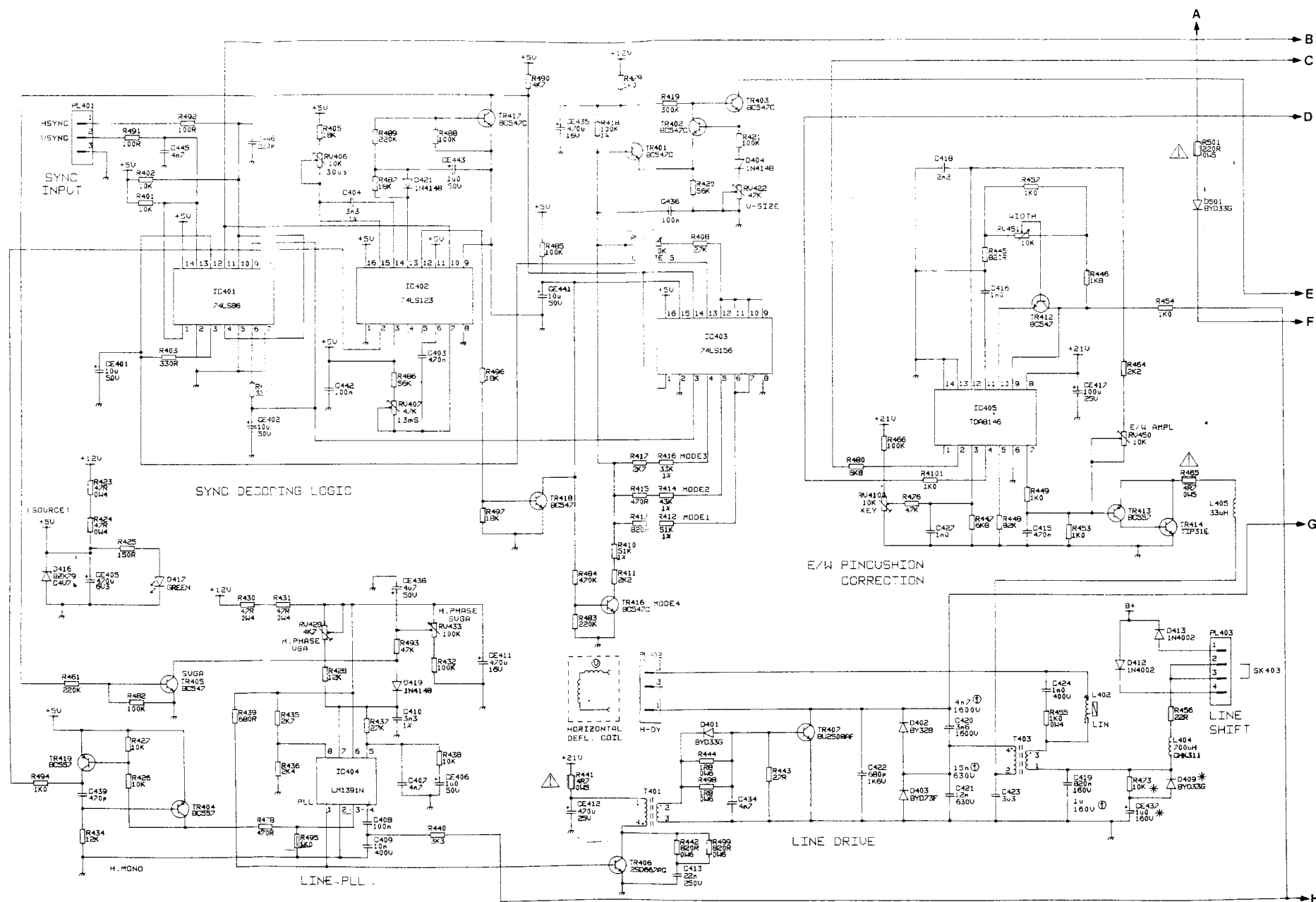
MOST OF THE MONITOR, OTHER THAN THE POWER SUPPLY, IS ISOLATED FROM THE MAINS BY TB01, IC802, CB24 AND AN AIR GAP OF 6MM OR MORE. TO MAINTAIN SAFETY, ENSURE THAT AFTER REPAIR THE AIR GAPS ARE NOT REDUCED BY PROTRUDING WIRES ETC.

COMPONENTS MARKED ⚠ ON THE PARTS LIST OR CIRCUIT DIAGRAM ARE SAFETY APPROVED TYPES AND SHOULD BE REPLACED ONLY WITH APPROVED COMPONENTS AS GIVEN ON THE PARTS LIST. IT IS RECOMMENDED THAT OTHER REPLACED PARTS SHOULD BE OF THE TYPE ORIGINALLY FITTED, PARTICULARLY RESISTORS STOOD OFF THE PRINTED BOARD.

FAILURE TO OBSERVE THE ABOVE MAY RENDER THE CHASSIS AND EXTERNAL ACCESSIBLE PARTS LIVE, OR CAUSE OTHER HAZARDS.

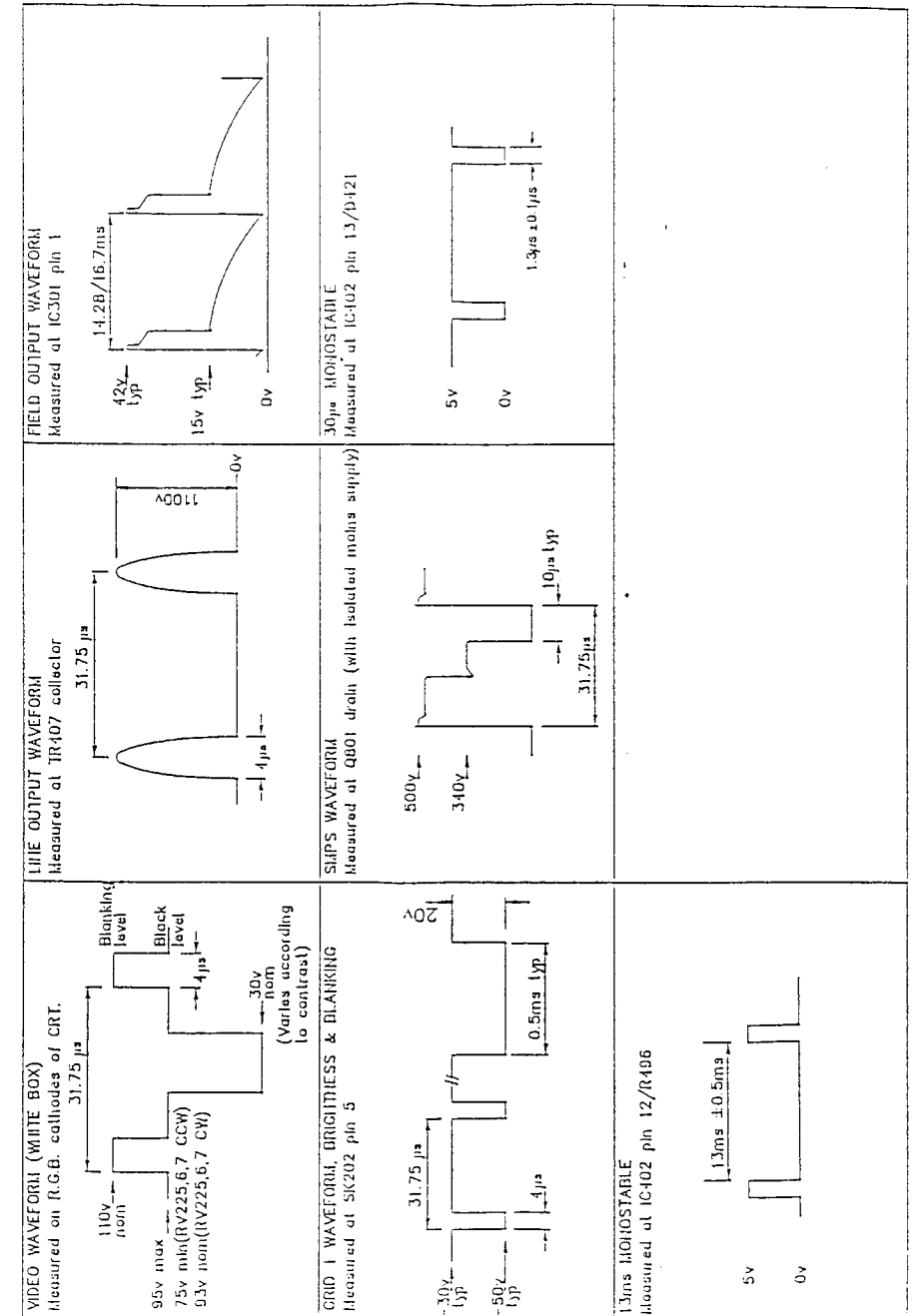
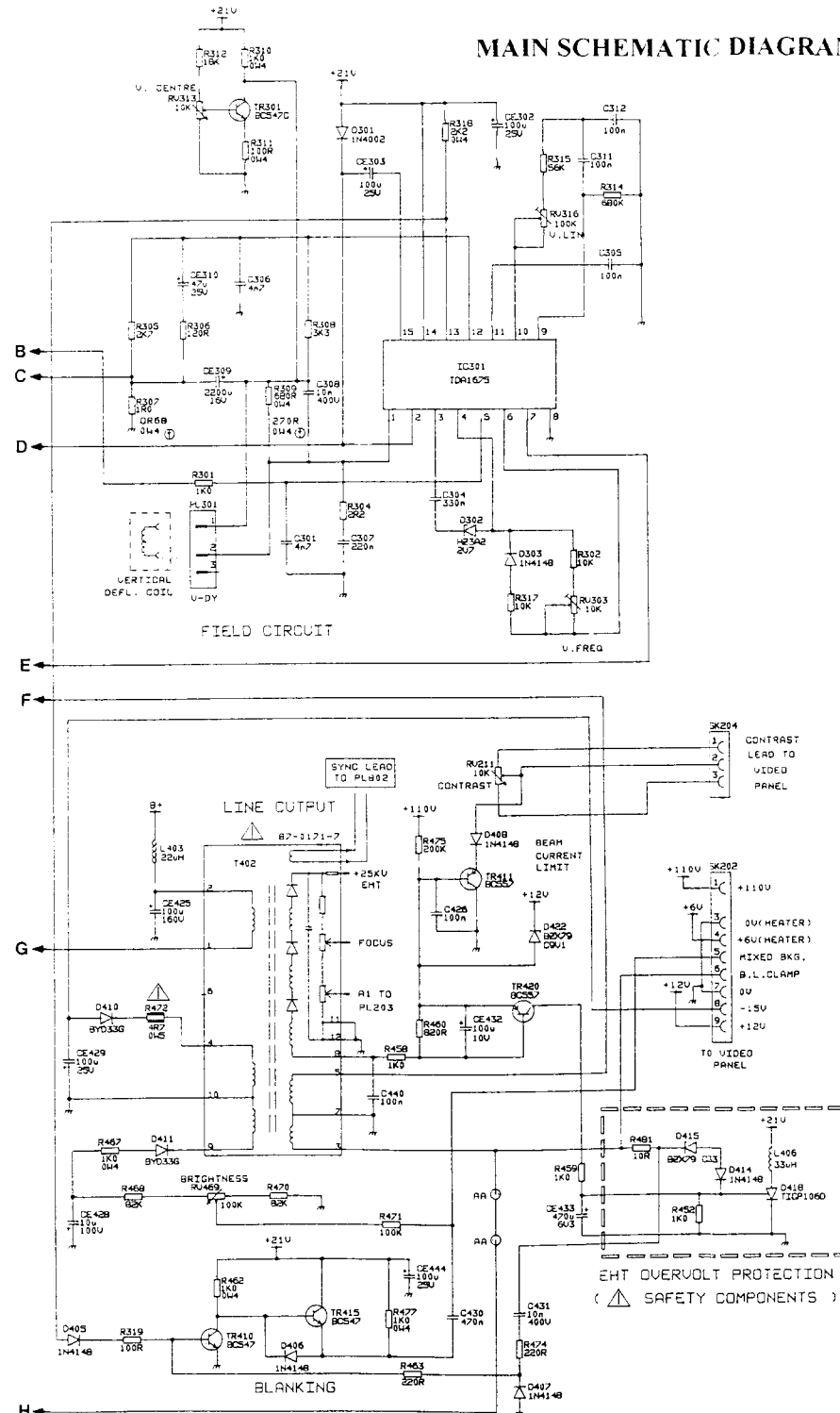


### MAIN SCHEMATIC DIAGRAM 1.1





# MAIN SCHEMATIC DIAGRAM 2/3 & WAVEFORMS



# MAIN SCHEMATIC DIAGRAM 3/3

