

**For Service Manuals
MAURITRON SERVICES
8 Cherry Tree Road, Chinnor
Oxfordshire, OX9 4QY.
Tel (01844) 351694
Fax (01844) 352554
email:- sales@mauritron.co.uk**

EM1448

SERVICE MANUAL

INTRODUCTION:

The EM1448LR monitor is a 14" VGA colour monitor with a maximum scanning resolution of 1024 x 768 pixels. The video input is via a 15 way high density "D" type connector wired to the standard VGA pinout.

The CRT is one of the following type;

M34ECL13X37 Philips

M34KWW30XX Goldstar

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SAFETY PRECAUTIONS

All monitors contain hazardous voltages. Repair should only be attempted by fully qualified service personnel with a thorough understanding of the basic operation of CRT based products. Service personnel should familiarise themselves with the following warnings before attempting repairs.

WARNINGS

This product employs high voltages which are present in all CRT displays. These voltages may remain after the unit has been disconnected from the supply.

The CRT uses internal implosion protection. Always wear shatterproof safety goggles when servicing this type of product.

Heatsinks within the unit may be at hazardous potential when the power cord is connected.

CAUTIONS

This product contains MOS technology integrated circuits and transistors which are susceptible to static discharge.

Always replace faulty components with the same make and value. Failure to do so may result in potential fire, shock or X-radiation hazard.

Do not attempt to modify any circuits.

X RADIATION

CRT products can generate x radiation. For continued safety always measure the supply rails and eht with appropriate test equipment before and after repairing the unit.

RADIO INTERFERENCE

This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the instructions in this manual, may cause interference to radio communications.

ALIGNMENT PROCEDURE

1. Power Supply

- 1.1 Connect the power cord and VGA signal to the monitor. Position the monitor to give access to P101 on the main PCB.
- 1.2 Switch on the monitor and check for a display on the CRT.
- 1.3 Connect a DVM between J16 and ground. Adjust P101 for a reading of 115V DC (± 0.5 Volt).
- 1.4 Connect a DVM between J6 and chassis. With the contrast and brightness set to minimum (no visible display) adjust P404 for a reading of 91V DC (± 0.5 Volt).

2. Geometry Adjustment

- 2.1 Switch on the monitor and allow a 15 minute warm up period, displaying a full white block
- 2.2 Display a standard cross hatch pattern and centre the picture using P503 for vertical centering and the horizontal phase control on the user control board.
- 2.3 Using P403 set the width of the picture to the required size within the correct operational range of P403.
- 2.4 Use P401 and P402 to optimise the side pincushion and trapezoidal distortion.
- 2.5 Repeat 2.3 and 2.4 for optimum picture geometry.
- 2.6 Set the picture height control on the user's control panel to mid position.
- 2.7 Set the picture height to the required size using P502.
- 2.8 Adjust P501 to make the height of the cross hatch squares equal at the top and bottom of the display, centralise the picture using P503.
- 2.9 Repeat 2.7 and 2.8 for optimum.

3. Colour Alignment

Colour alignment requires a colour analyser calibrated to D9300.

- 3.1 Set the brightness and contrast controls on the user control panel to maximum light output. On the CRT base board adjust P306B, P301R, P302G, P303B fully anti-clockwise and P304R, P305G, fully clockwise.
- 3.2 Display a blank raster on the CRT and attach the colour analyser head to the CRT faceplate.
- 3.3 Set the "screen A1" control on the flyback transformer (T402) to give a reading of 0.5FL on the highest colour. This colour now being the lowlight reference.
- 3.4 Adjust only 2 out of the 3 background controls P304R, P305G & P306B to equalise the 2 lowest reading colours up to the lowlight reference value.
- 3.5 Display a 1/4 white block in the centre of the screen read the values of the Red Green & Blue from the analyser. The lowest reading colour becomes the highlight reference.
- 3.6 Adjust only 2 of the 3 highlight controls P301R, P302G & P303B to equalise the 2 highest reading colours down to the highlight reference value.

4. Focus Adjustment

- 4.1 Display a full screen of text. Adjust the upper control on the flyback transformer (T402) for optimum focus at a point midway between the centre of the screen and the top left hand corner of the screen.

5. EHT Check

- 5.1 **WARNING:** This check should only be carried out with an EHT probe capable of withstanding 30kV or more, with the understanding that the voltage on a CRT is very high and stored in a capacitor of 3nF or more (capacitor in flyback transformer T402 + CRT) therefore any contact with this source can potentially be lethal.

- 5.2 Switch off the monitor.
- 5.3 Connect the EHT probe under the anode cap of the CRT. Switch on the monitor and read the value of EHT, the reading should be between 23.0kV and 25.5kV depending on the flyback transformer used. If the reading is outside of this then check para 1.4, if this is correct then there is a fault which must be investigated.

CIRCUIT DESCRIPTIONS

The unit comprises two PCB's. The large PCB mounted in the bottom of the unit contains circuits to generate horizontal and vertical scanning currents, EHT and associated high voltages and a mains power supply. The second PCB mounted on the rear of the CRT contains red, green and blue video amplifiers.

Main PCB

Refer to the circuit diagrams sheets 1 to 6

Sheet 1

Is the hierarchical diagram for the main PCB showing the interconnections of the remaining sheets.

Sheet 2

Shows the main power supply for the unit. The power supply is a flyback converter operating in the continuous mode. A synchronisation signal from the flyback transformer T402 is used to operate the power supply at the scan frequency of the monitor thus reducing power supply noise on the screen. The safety isolation barrier from the non-isolated section of the power supply to the isolated section, is contained within the main switching transformer (T101) and the opto-isolator (U101) and the synchronisation lead.

AC from the mains supply enters the PCB at J102. It is filtered and fused by F101, F102, C101, L101, C122, C102, C103, C111.

The AC mains is then rectified by a discrete bridge rectifier D101-D104 to provide a DC supply for the switching convertor. Q103 is the main chopper transistor with Q102 as the drive transistor.

All the DC outputs are rectified and filtered. P101 allows adjustment of the highest rail with the others be proportional to it.

Sheet 3

Shows the horizontal and vertical signal input conditioning circuits. The horizontal sync signal is buffered by Q201 and fed to U201A. U201A and its output buffer transistor (Q202) ensure the output sync signal (H-Proc) is always negative going irrespective of the input polarity. The vertical sync is buffered by Q203. U201B and Q204 ensure that the polarity of the signal is always positive irrespective of the polarity of the input. The output (V-Proc) is fed to the remainder of the monitor. U201A, U201D and associated components form a monostable circuit. The output of the monostable circuit is integrated by R219 and C209 to give a DC voltage proportional to the vertical refresh frequency. This DC voltage is used by comparators U202A and U202B to modulate the vertical scan circuit via V-Size.

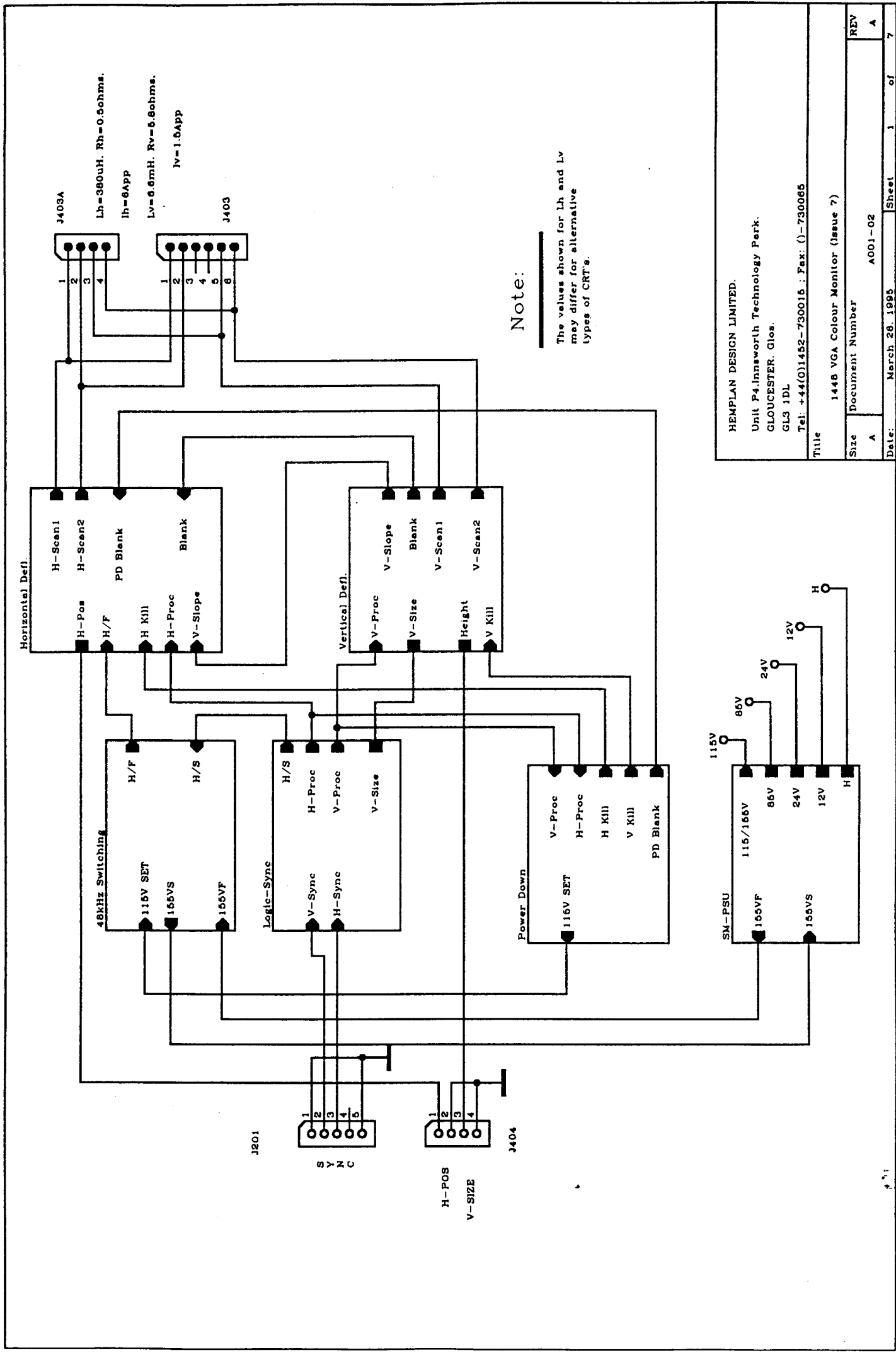
Sheet 4

The output of U201A (H-sync) is fed to U801C, U801D and associated components to form a monostable circuit. The output of the monostable circuit is integrated by R809 and C806 to give a DC voltage proportional to the horizontal sync frequency. This DC voltage is fed to Q804 which in turn prescales the free running frequency of U401.

Sheet 5

U401 generates the drive signal for the horizontal output stage. The output pulse at pin 4 is fed via a drive transistor (Q401) and drive transformer (T401) to the line output transistor (Q403). The collector load on Q403 is the flyback transformer (T402) used to generate the high voltages for the CRT. A feedback signal is taken from pin 3 of T402 to phase lock the line output stage to the incoming line sync pulse (H-proc). The signal at pin 3 of T402 is also rectified by D405 and fed to U401 via Q402 to act as an over voltage detector and switch off the EHT generator if the EHT exceeds a safe limit.

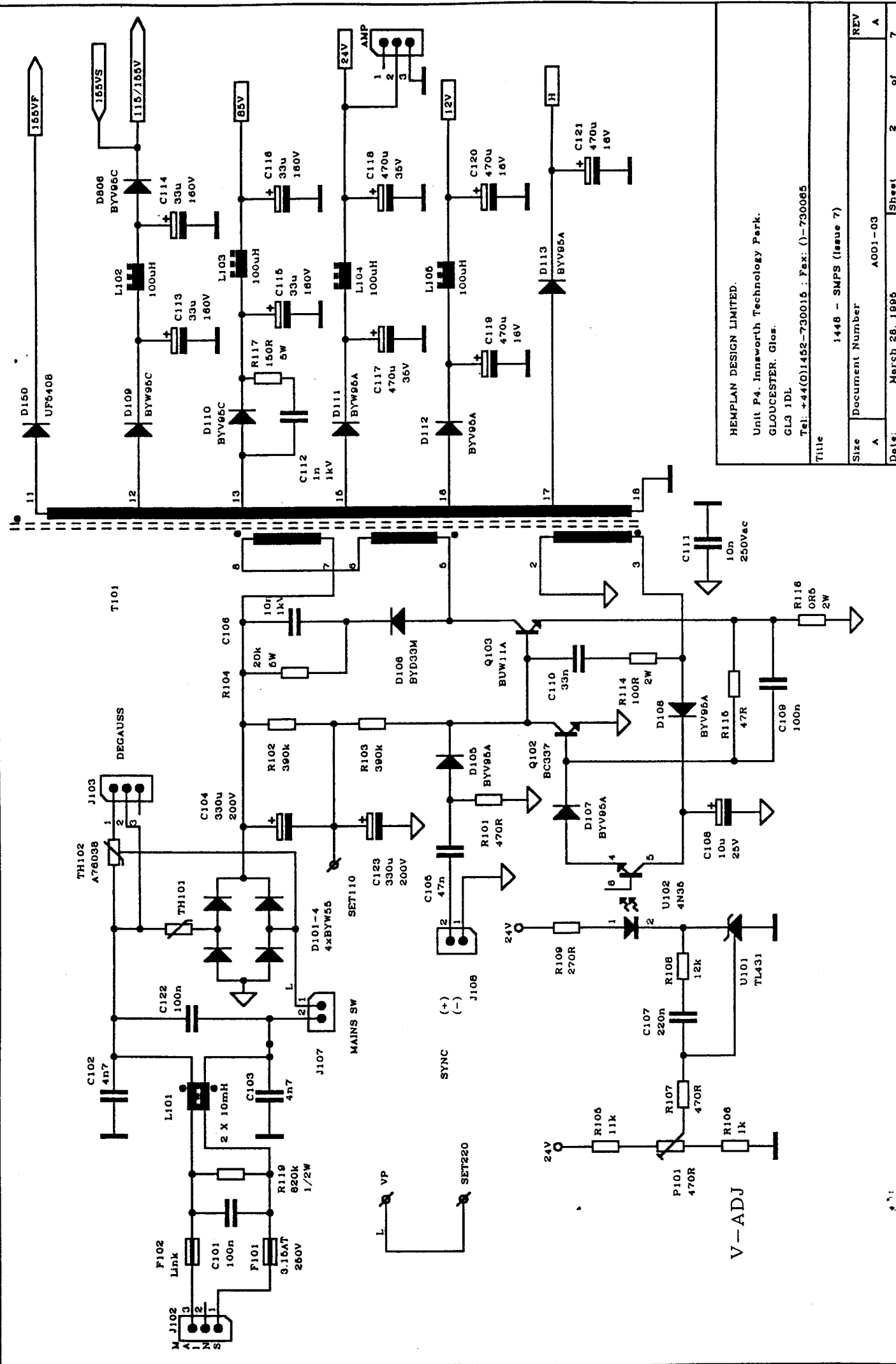
U402 is an East-West correction circuit. Using a ramp signal taken from the vertical deflection stage generates a signal (parabola) suitable for insertion into the diode modulator via L405.



Note:

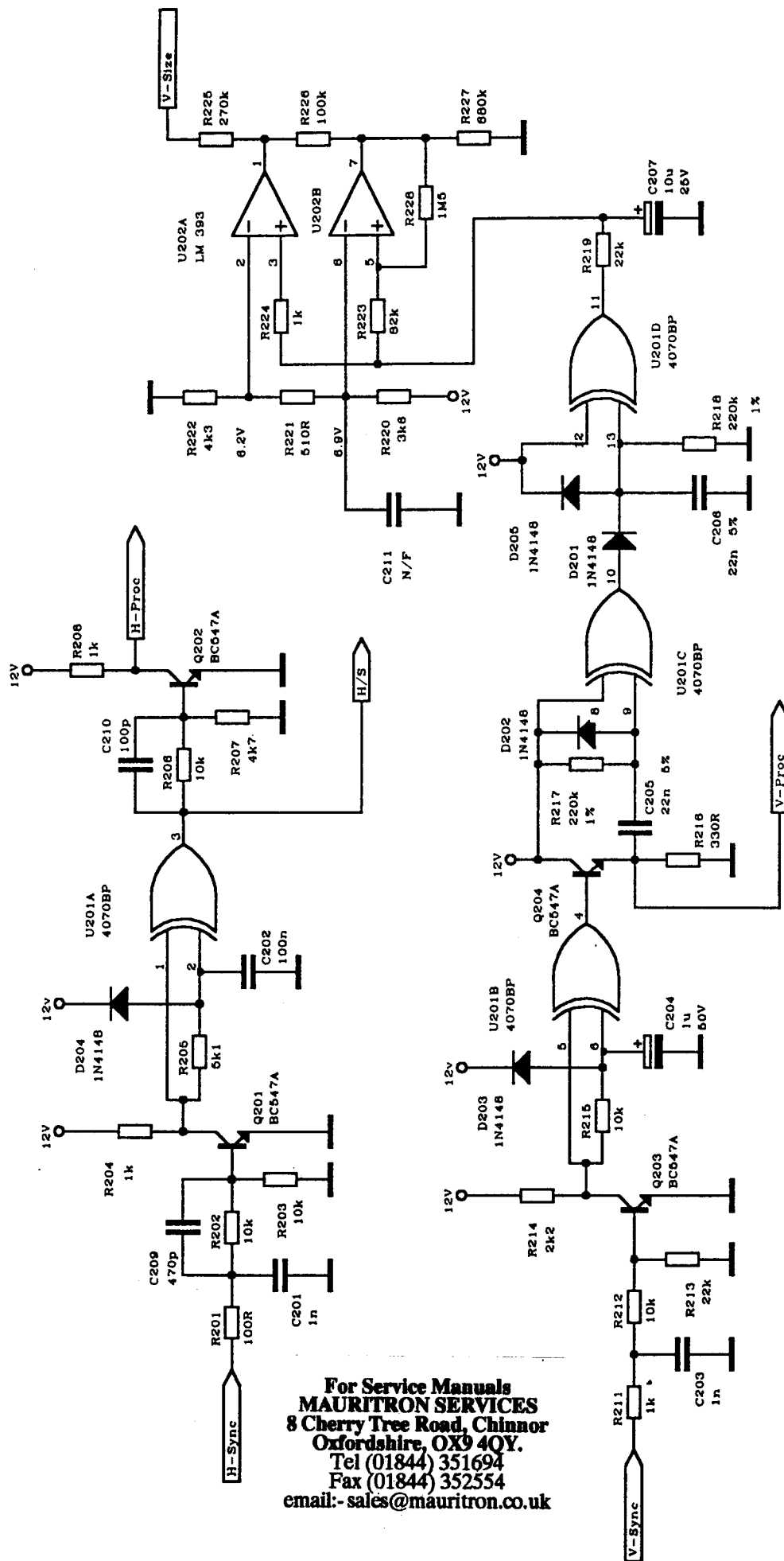
The values shown for Lh and Lv may differ for alternative types of CRT's.

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Unit P4,Innsworth Technology Park.		
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Tel: +44(0)1452-730015 ; Fax: (-)730065		
Title 144B VGA Colour Monitor (Issue 7)		
Size A	Document Number A001-02	REV A
Date: March 28, 1995	Sheet 1	of 7

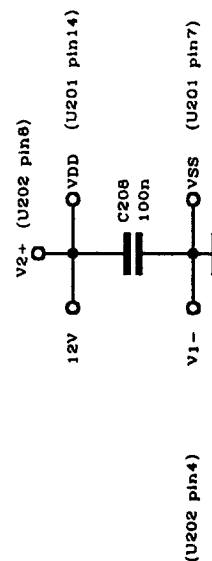


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Title		1448 - SMPS (Issue 7)	
Size	Document Number	A001-03	REV
A			A
Date:	March 28, 1995	Sheet	2 of 7



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Title
 1448 Sync & Vertical Autosize (Issue 7)

Size
 A

Document Number
 A001-04

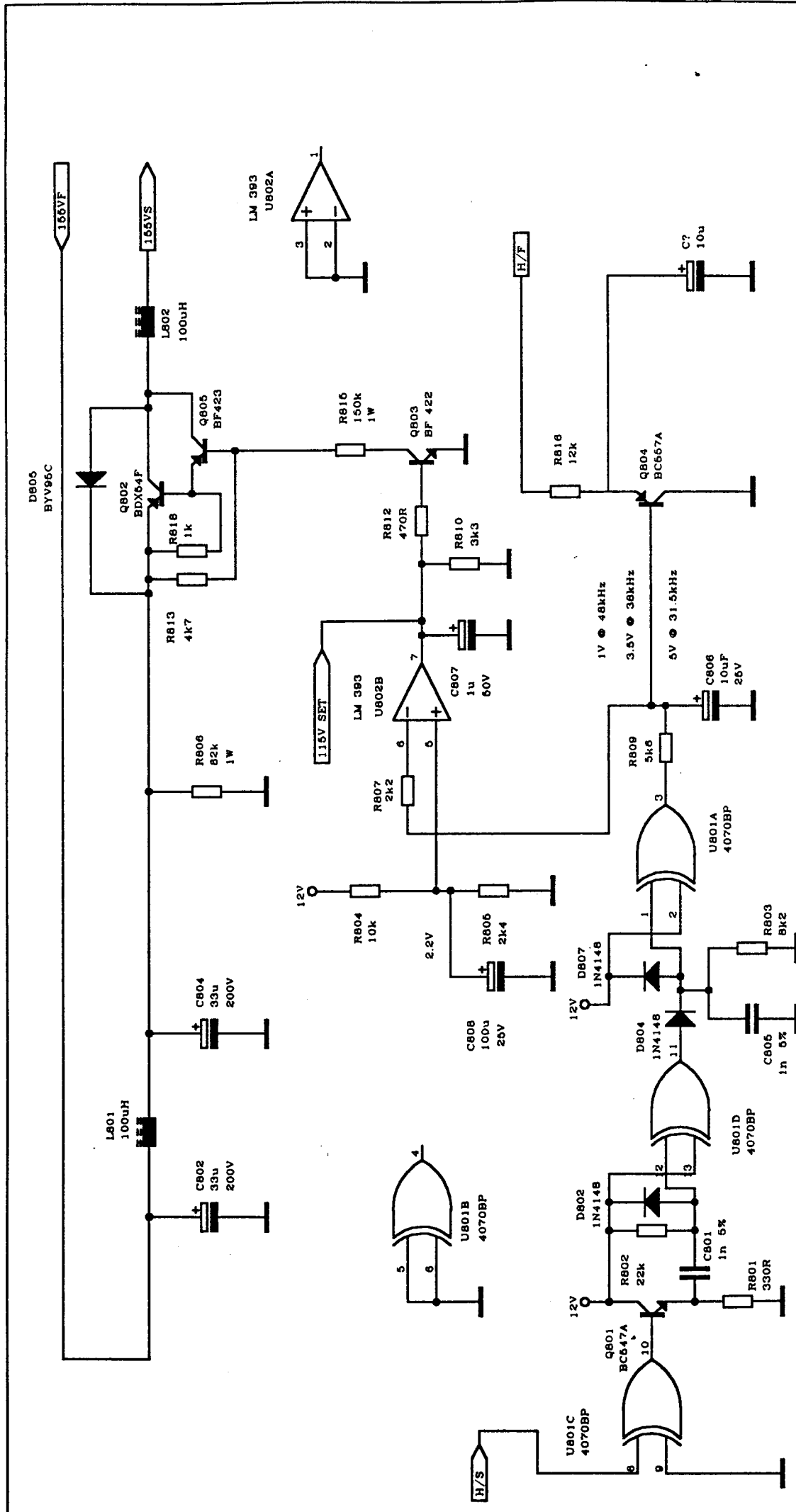
REV
 A

7

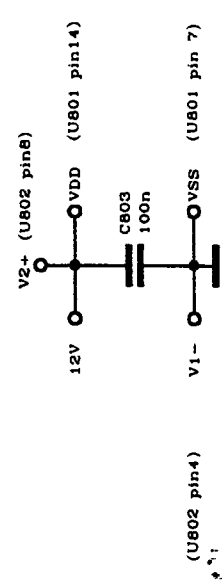
N/F = Not Fitted

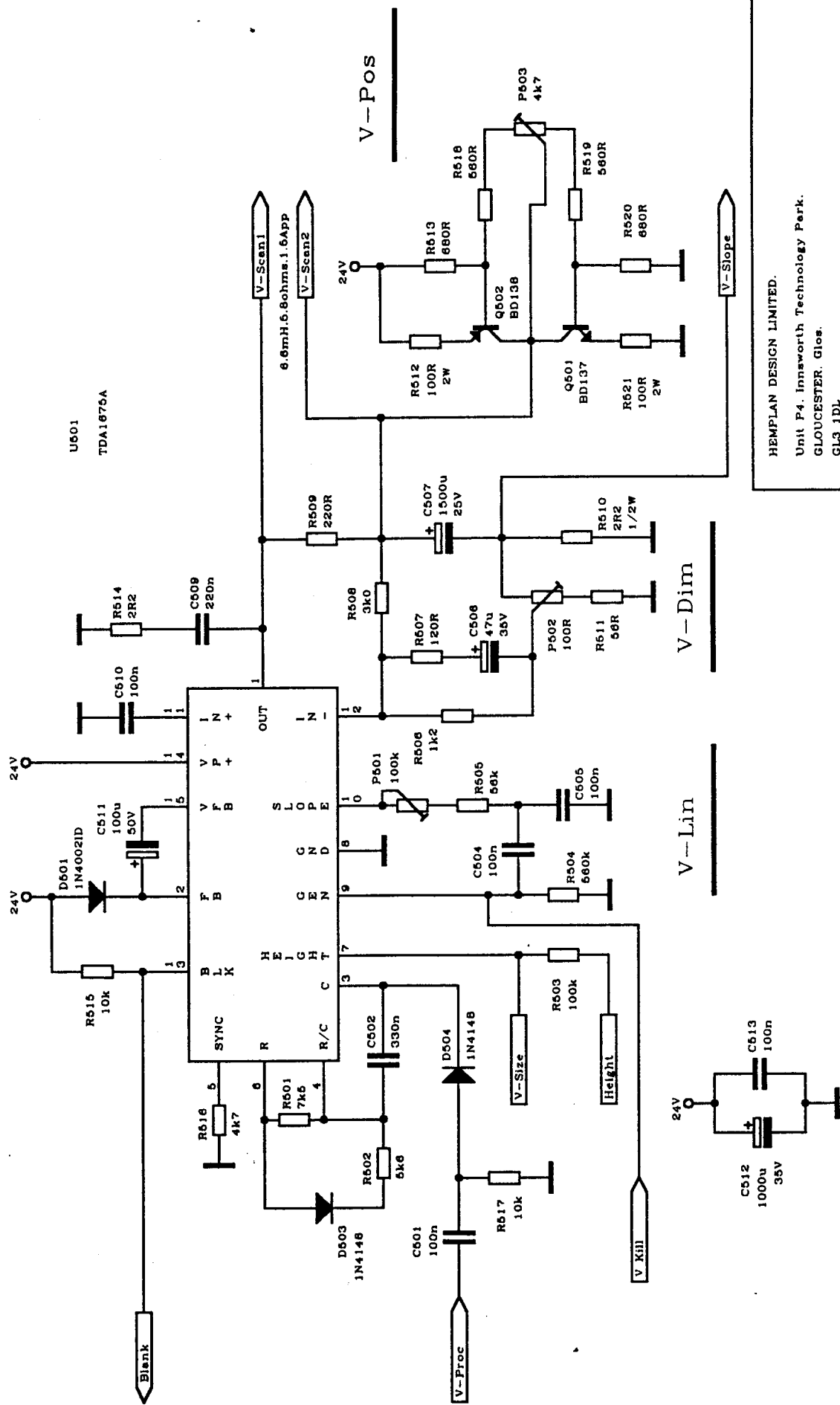
Date: March 28, 1995

Sheet 3 of 7



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Title 1448 Switching (Issue 7)			
Size A	Document Number A001-06	Sheet 4	of 7
REV A			

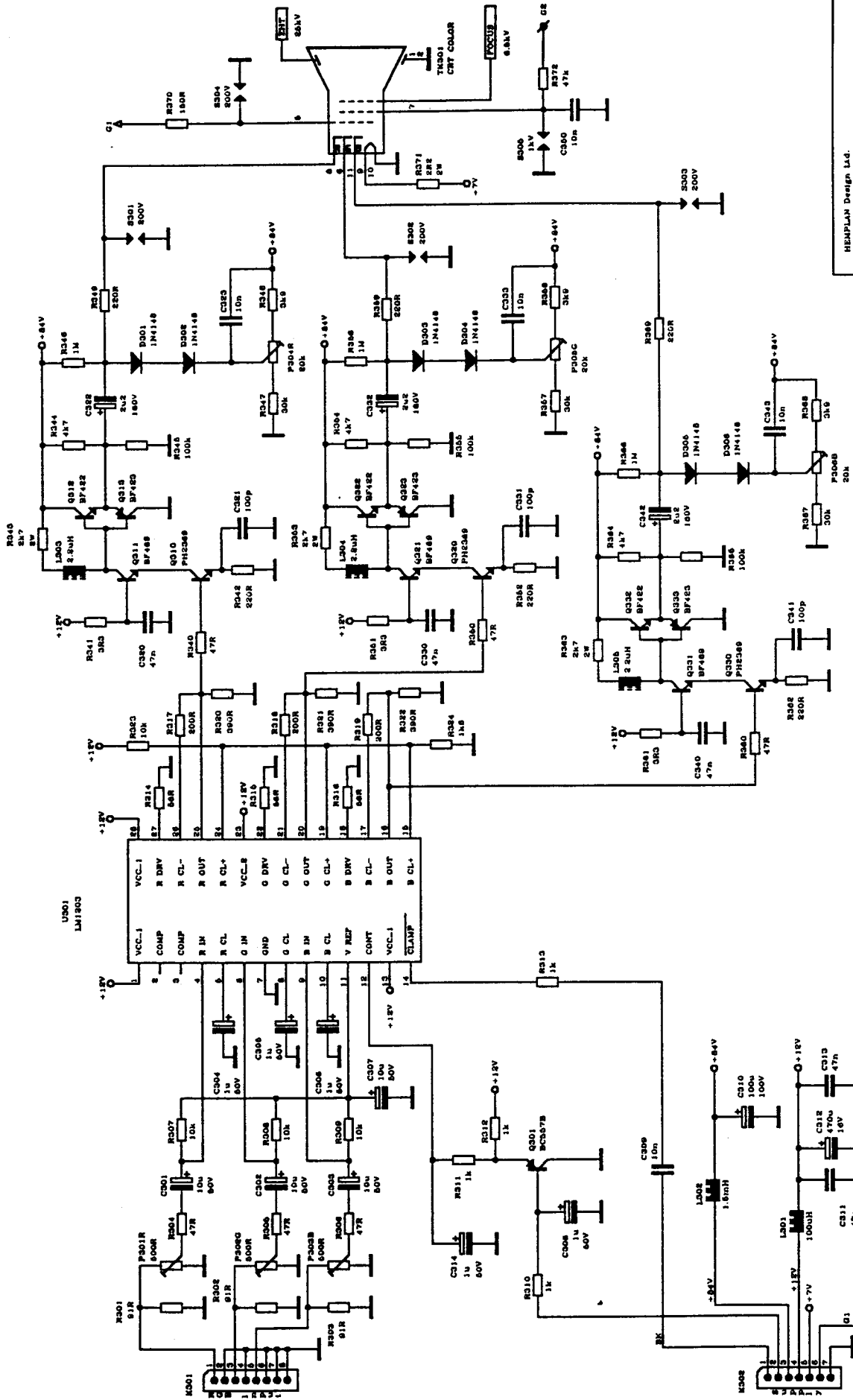




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Title		1448 Vertical Deflection (Issue 7)	
Size	A	Document Number	A001-07
REV	B		
Date:	March 28, 1995	Sheet	6 of 7



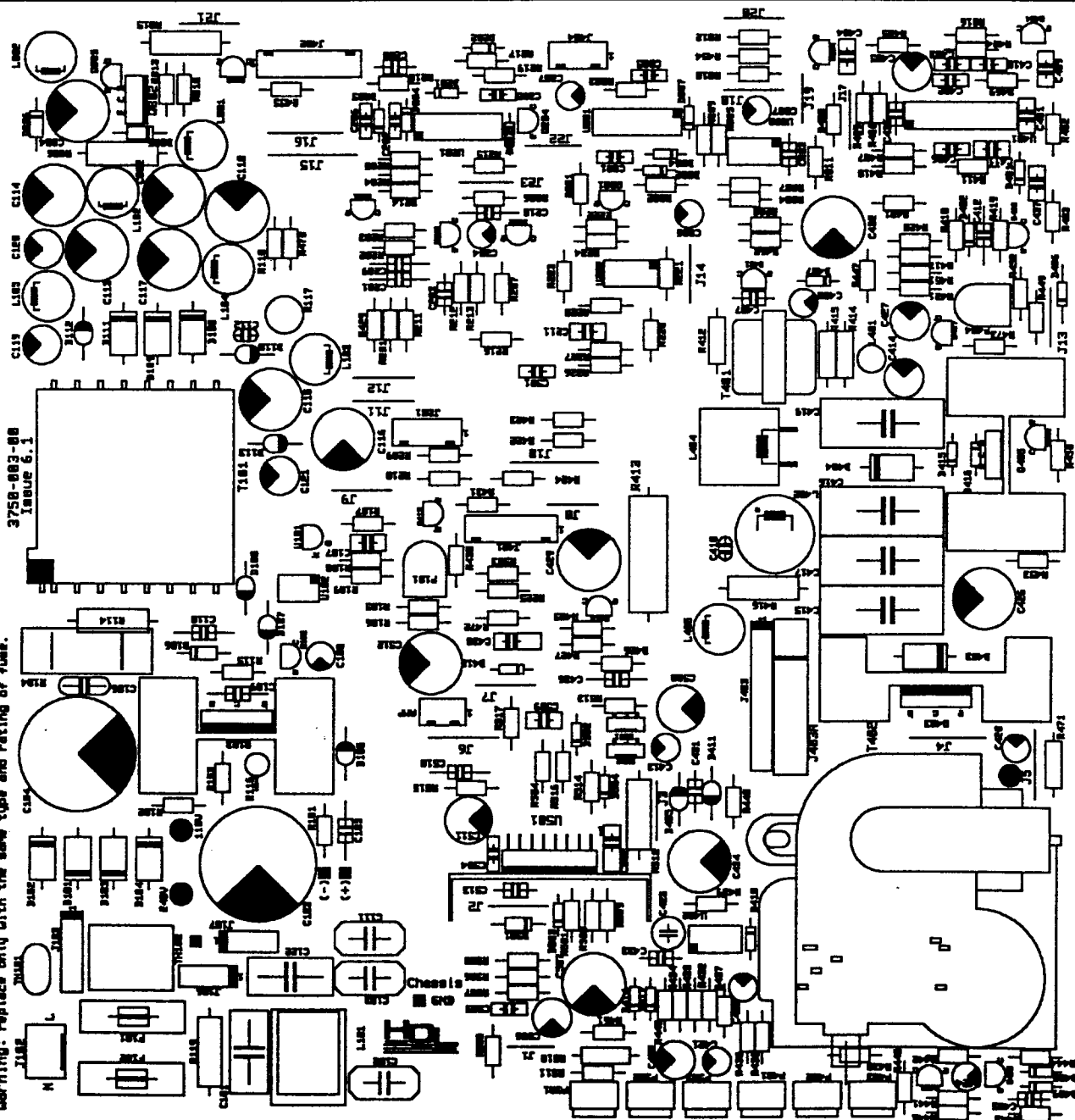


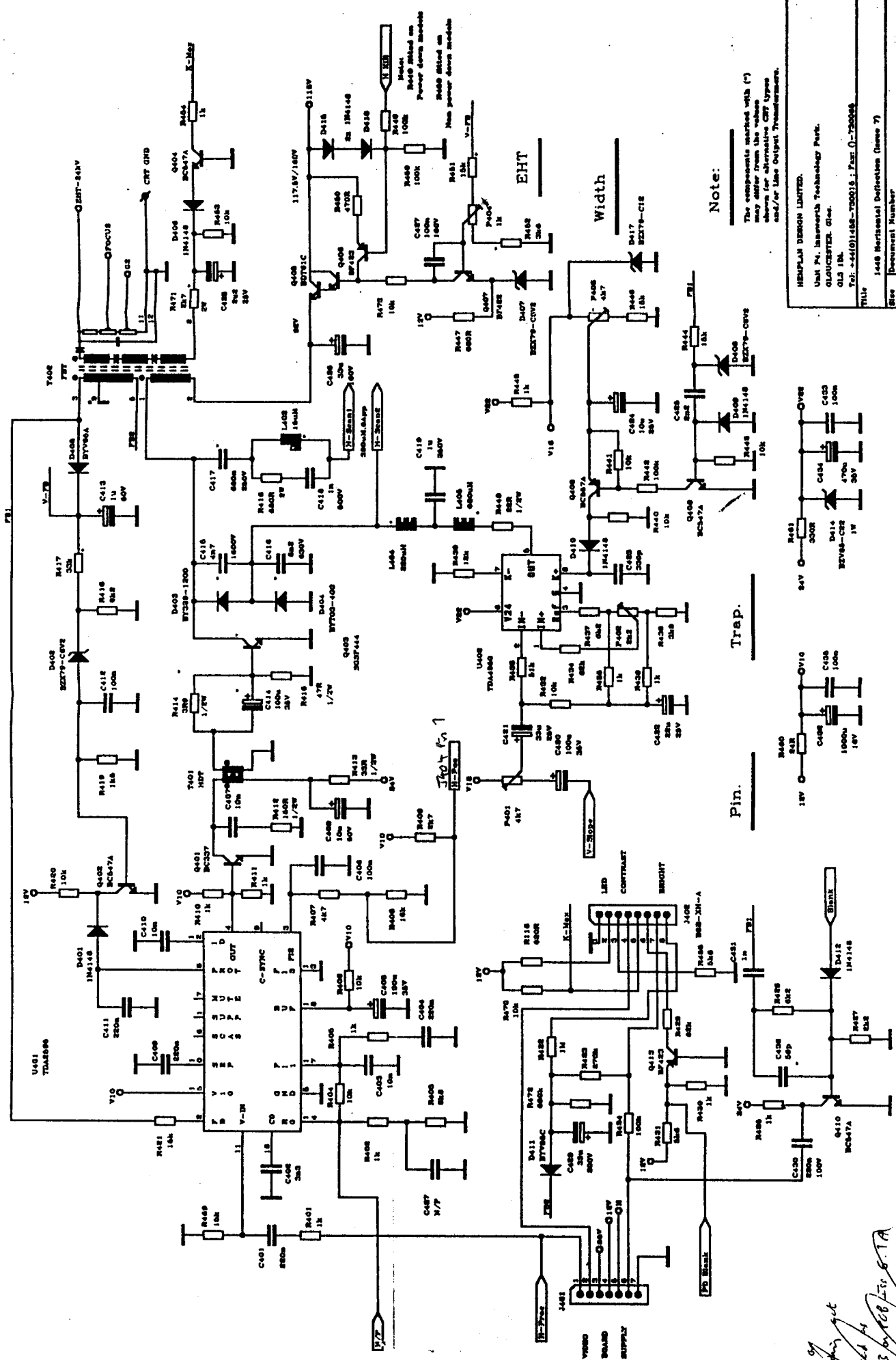
HEMPLAN Design Ltd.
Unit P4, Innersouth Technology Park,
Innersouth Lane, Gile.
GL3 1DL
Tel: 04101458-750018 : Fax: 04101458-750048

Title	80MHz RGB Video Board
Doc	Document Number
Rev	9800-037-01 Rev1
Date	May 11 1995

3758-802-88
Issue 6.1

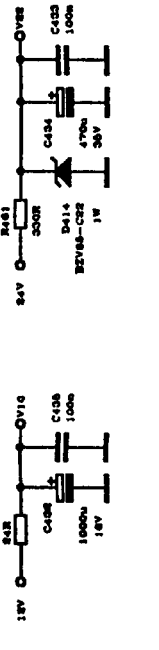
For continued protection against risk of fire
Warning: replace only with the same type and rating of fuse.





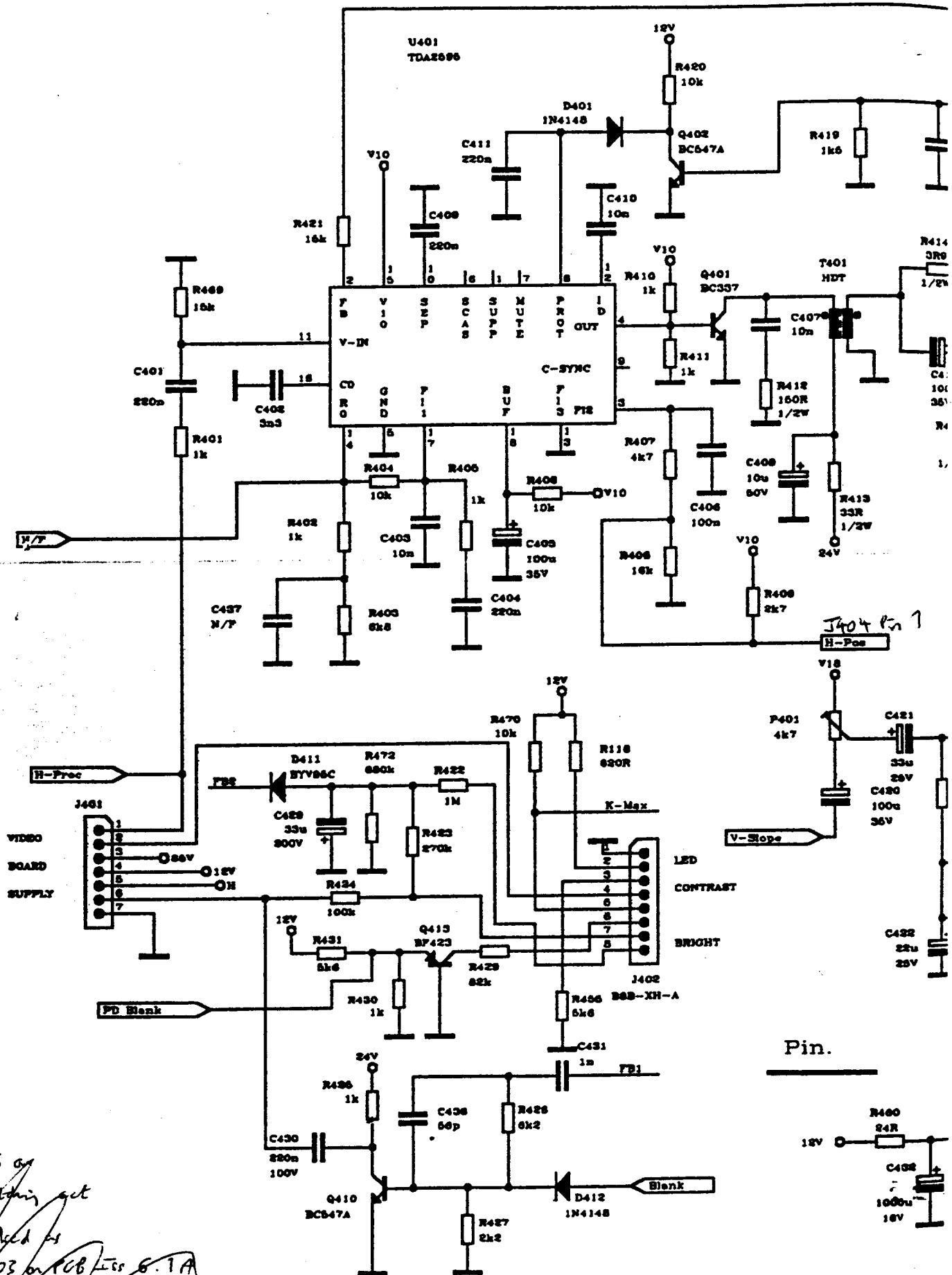
Note:
The components marked with (*) may differ from the values shown for alternative CRT types and/or Line Output Transformer.

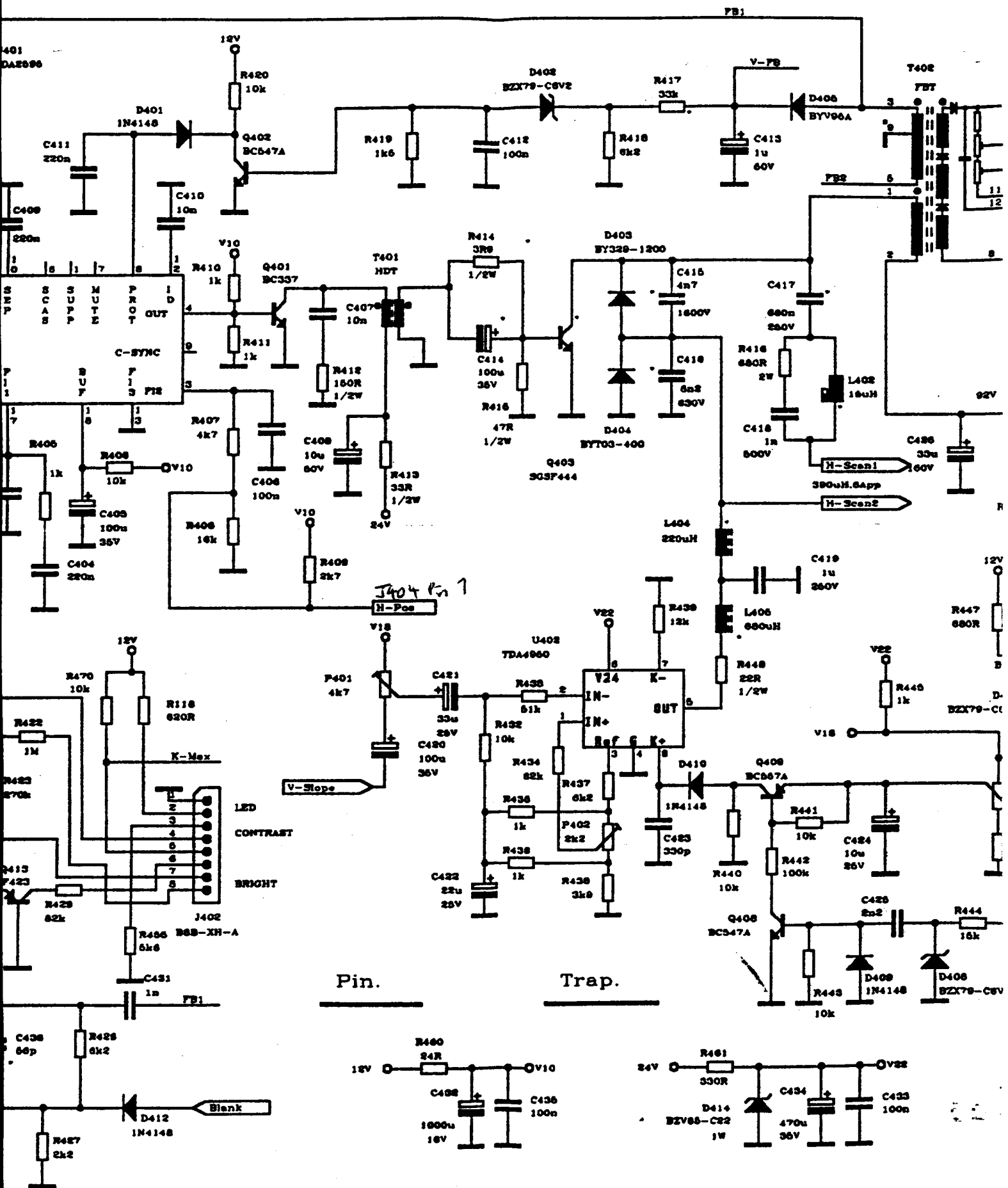
Trap.
Pin.

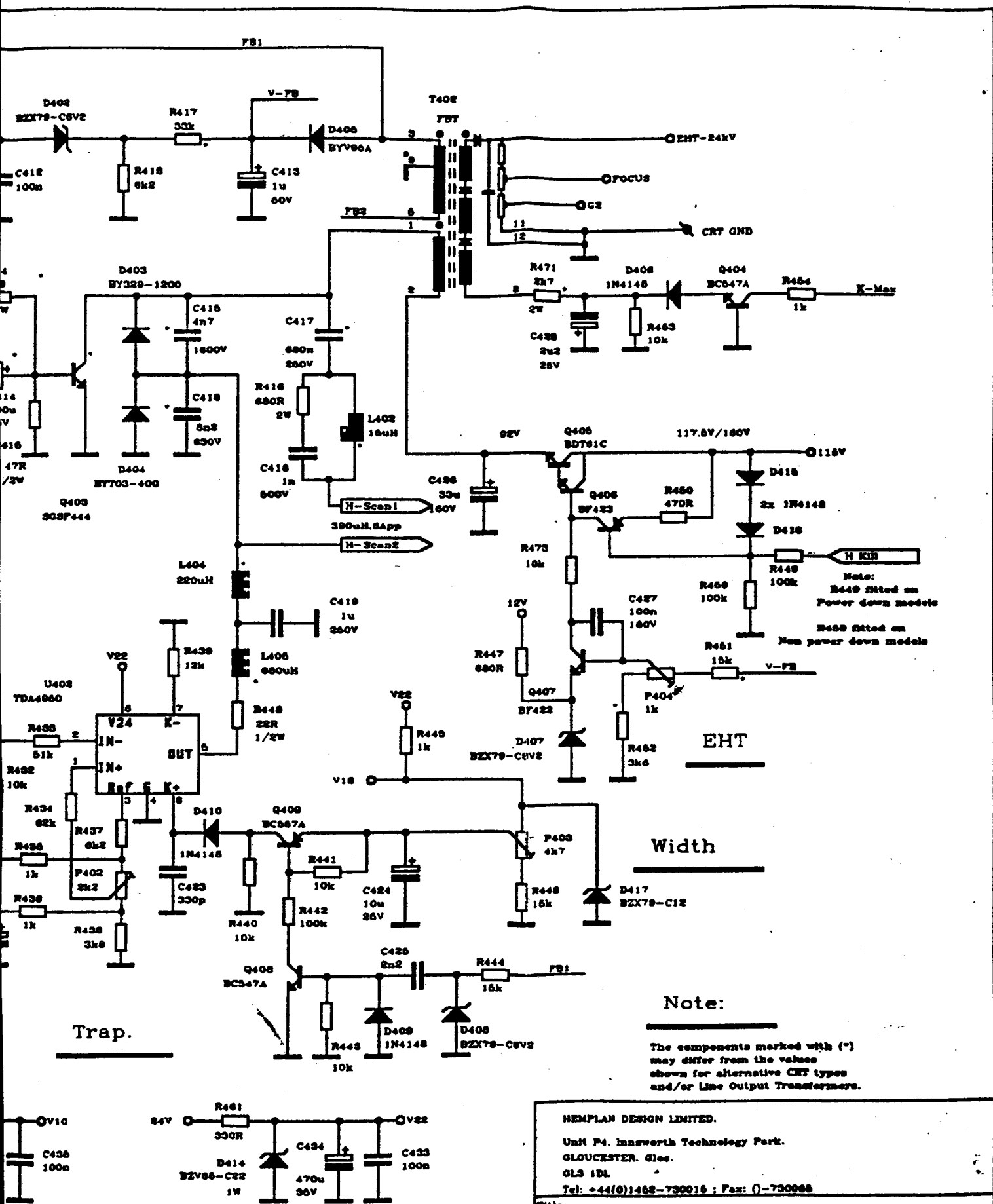


QPS of
Purchasing
Impulse
Q803 by 108-10-8-1A
80

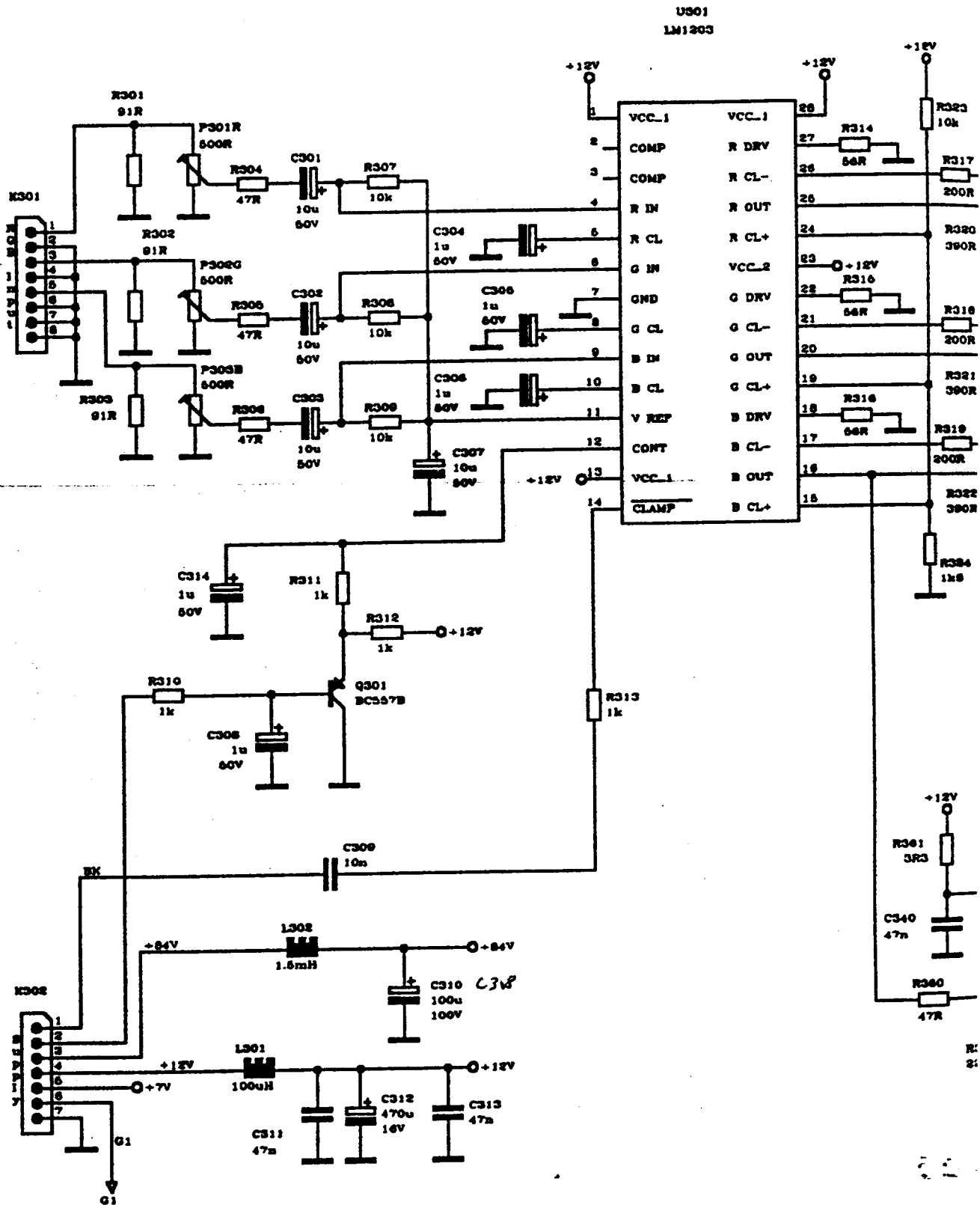
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Unit P4, Bannockburn Technology Park, GLASGOW, G12 8LN.	
Title: 22(0148-750015 : Part 0-750005	
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Size	Document Number
Date:	March 25, 1985
Rev	4001-06
	1

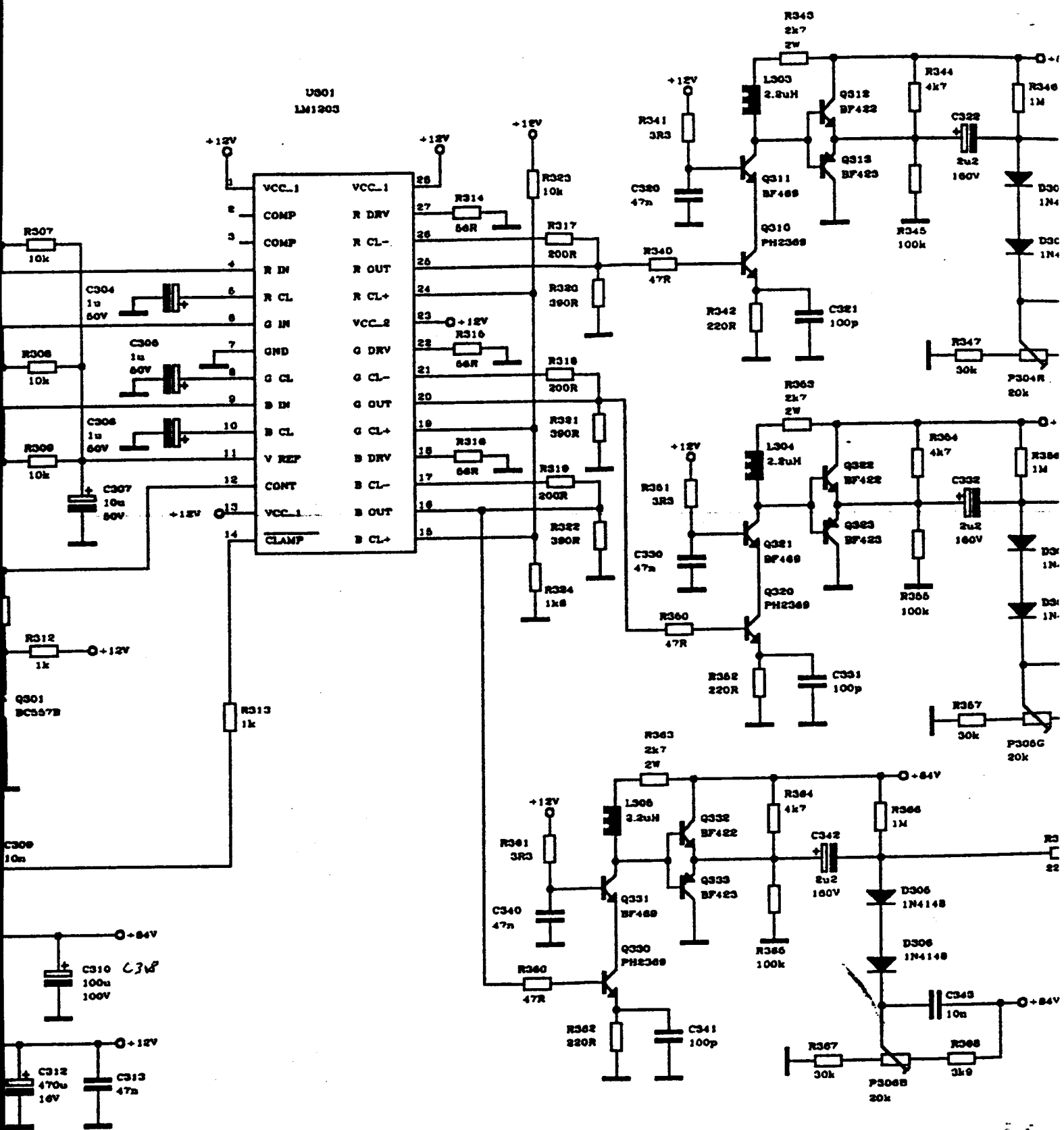


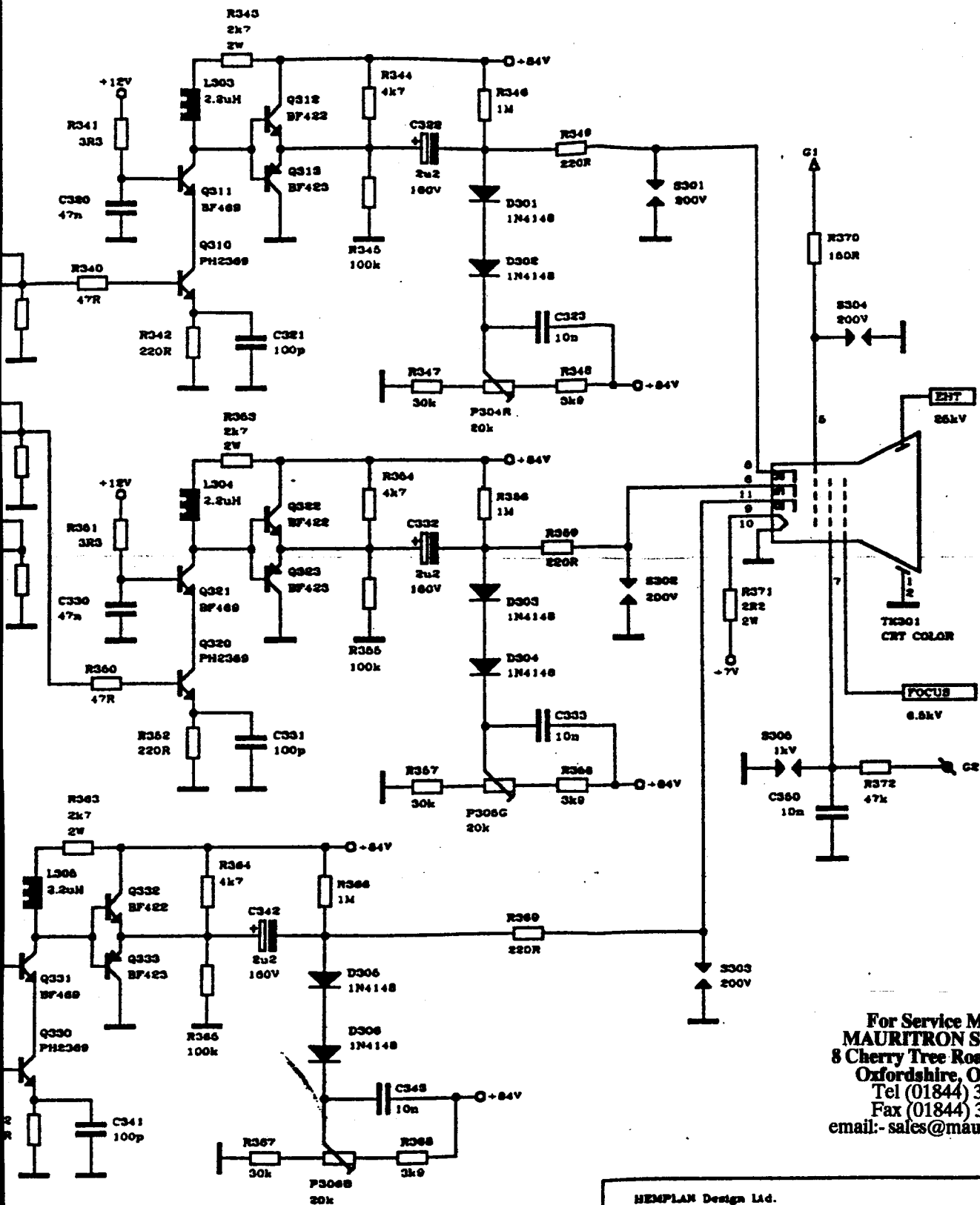




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Unit P4, Innesworth Technology Park.		
GLOUCESTER, Glos.		
GL3 1BL		
Tel: +44(0)1452-730015 ; Fax: (0)-730066		
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1448 Horizontal Deflection (Issue 7)		
Size	Document Number	REV
B	A001-06	A
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 Innesworth Lane, Glos.
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Title

60MHz RGB Video Board

Doc

Document Number

Rev

VB00-037-01 Iss1

REV

1.4

Date:

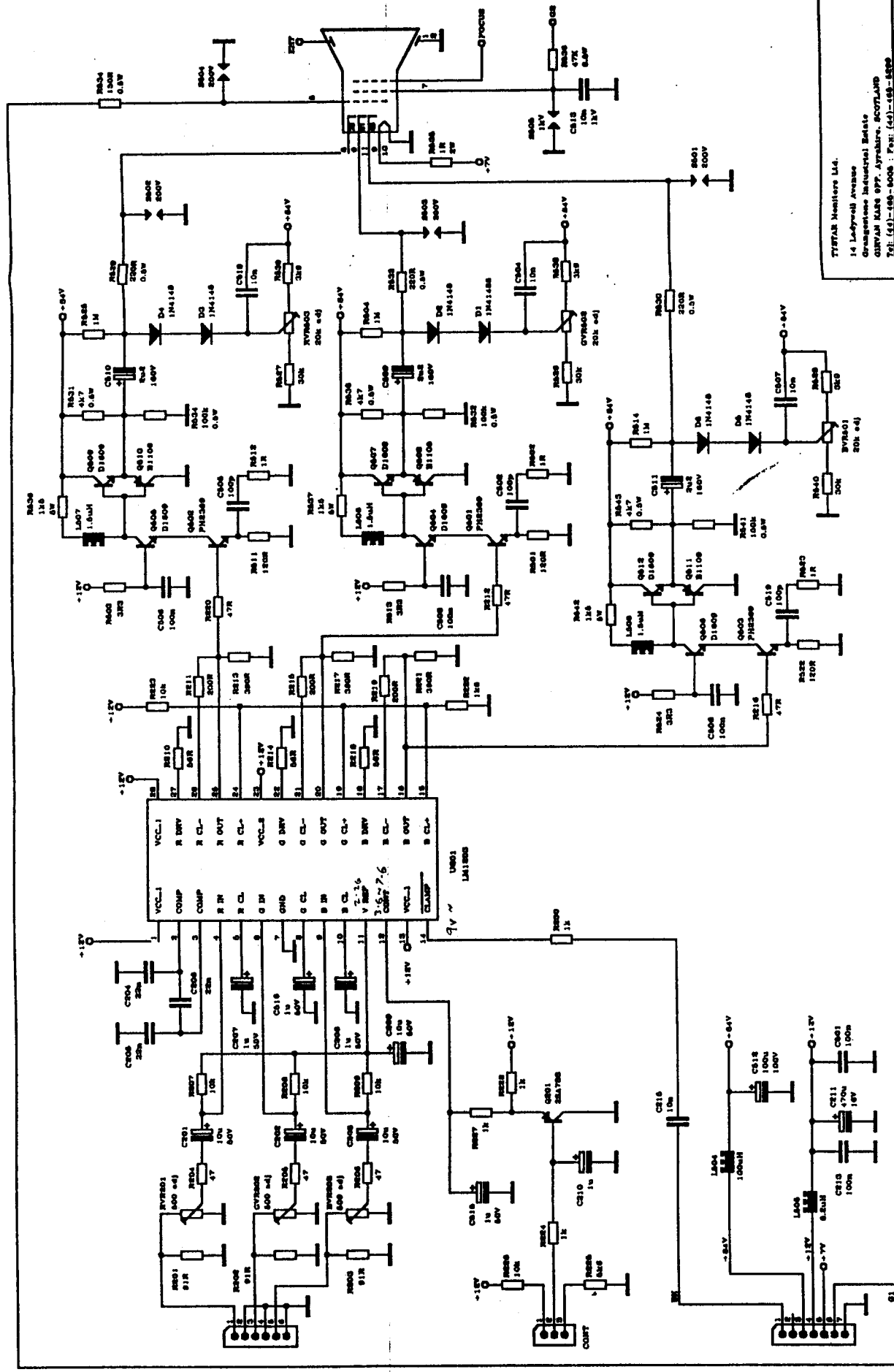
May 11, 1995

Sheet

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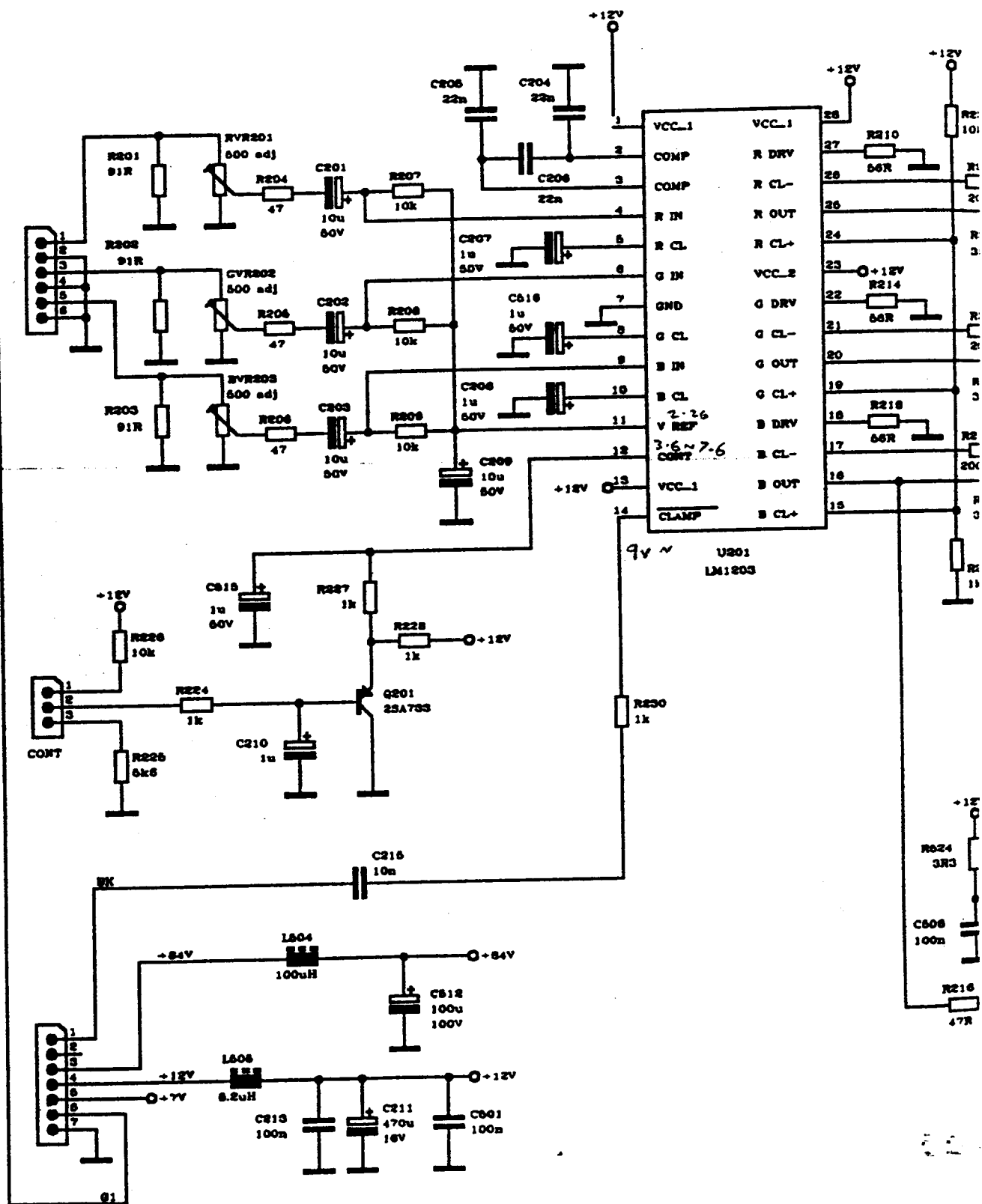
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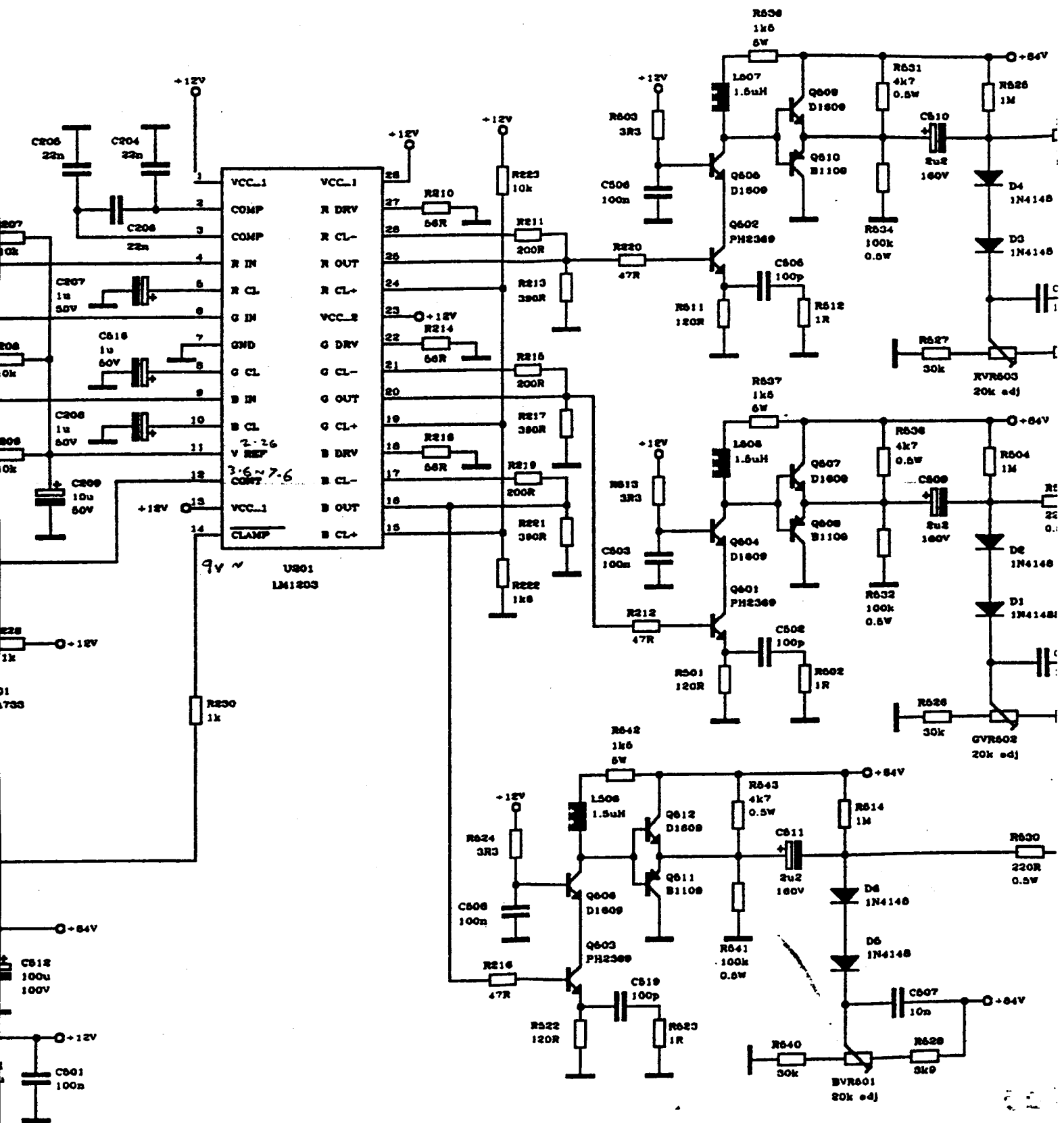


TYPSTAR Electronics Ltd.
 14 Ladywell Avenue
 Grangemore Industrial Estate
 GURVAY KIRK 977, Ayrshire, SCOTLAND
 Tel: (04) 185-5005 Fax: (04) 185-5585
 Title: VOA Video Board
 Date: December 23, 1982
 Document Number: M-011.0K
 Rev: 1.3

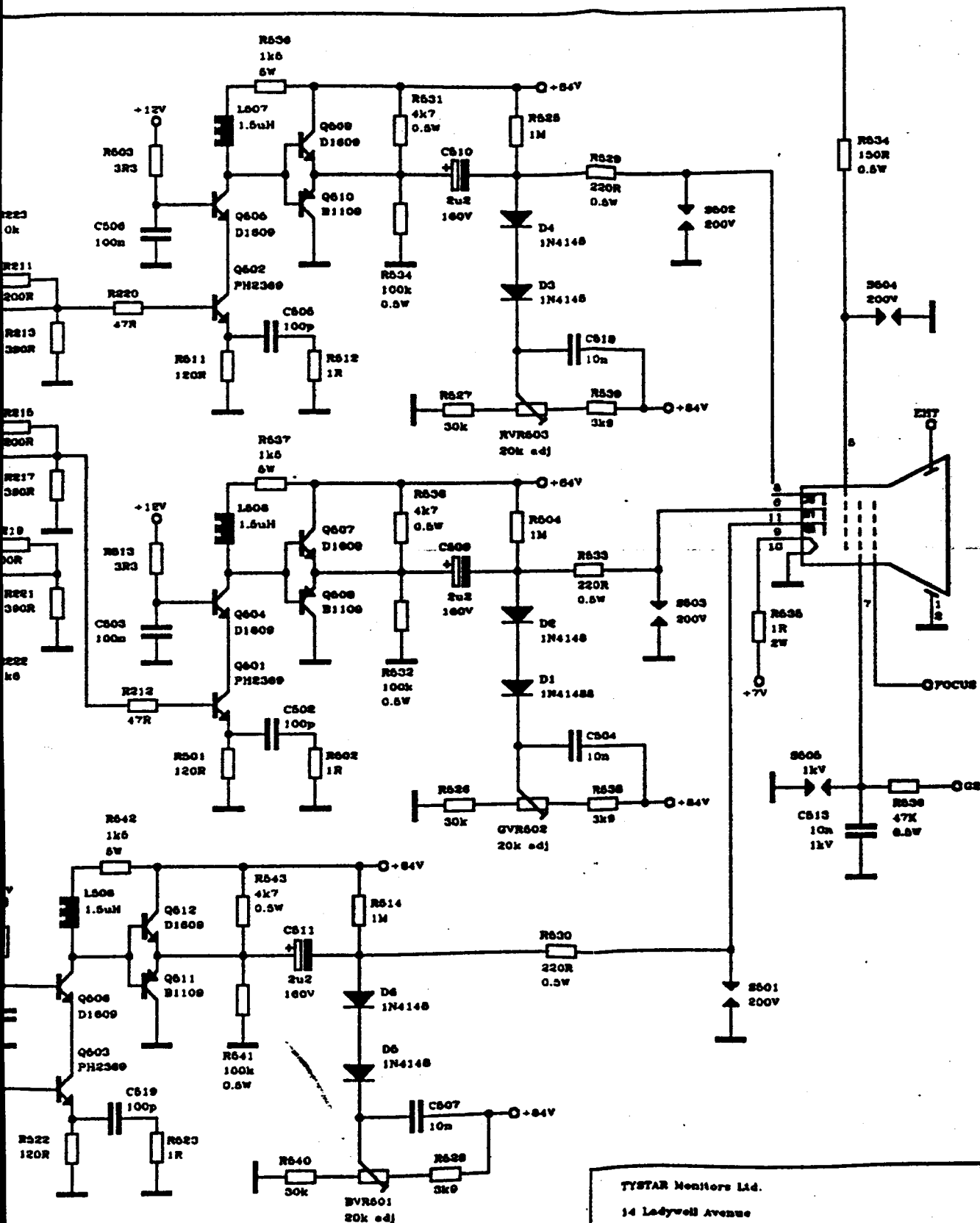
-37 ~ -61 V4C
 (Brightlinear Camera)



↗ -37 ~ -61 V dc
 (Brightness Control)



V dc
 (brl)



TYSTAR Monitors Ltd.

14 Ladywell Avenue
Grangestown Industrial Estate
GIRVAN KA96 9PP, Ayrshire, SCOTLAND
Tel: (44)-465-6006 ; Fax: (44)-465-6229

Title

VGA Video Board

Size

Document Number

N-011.UK

REV

1.3

Date:

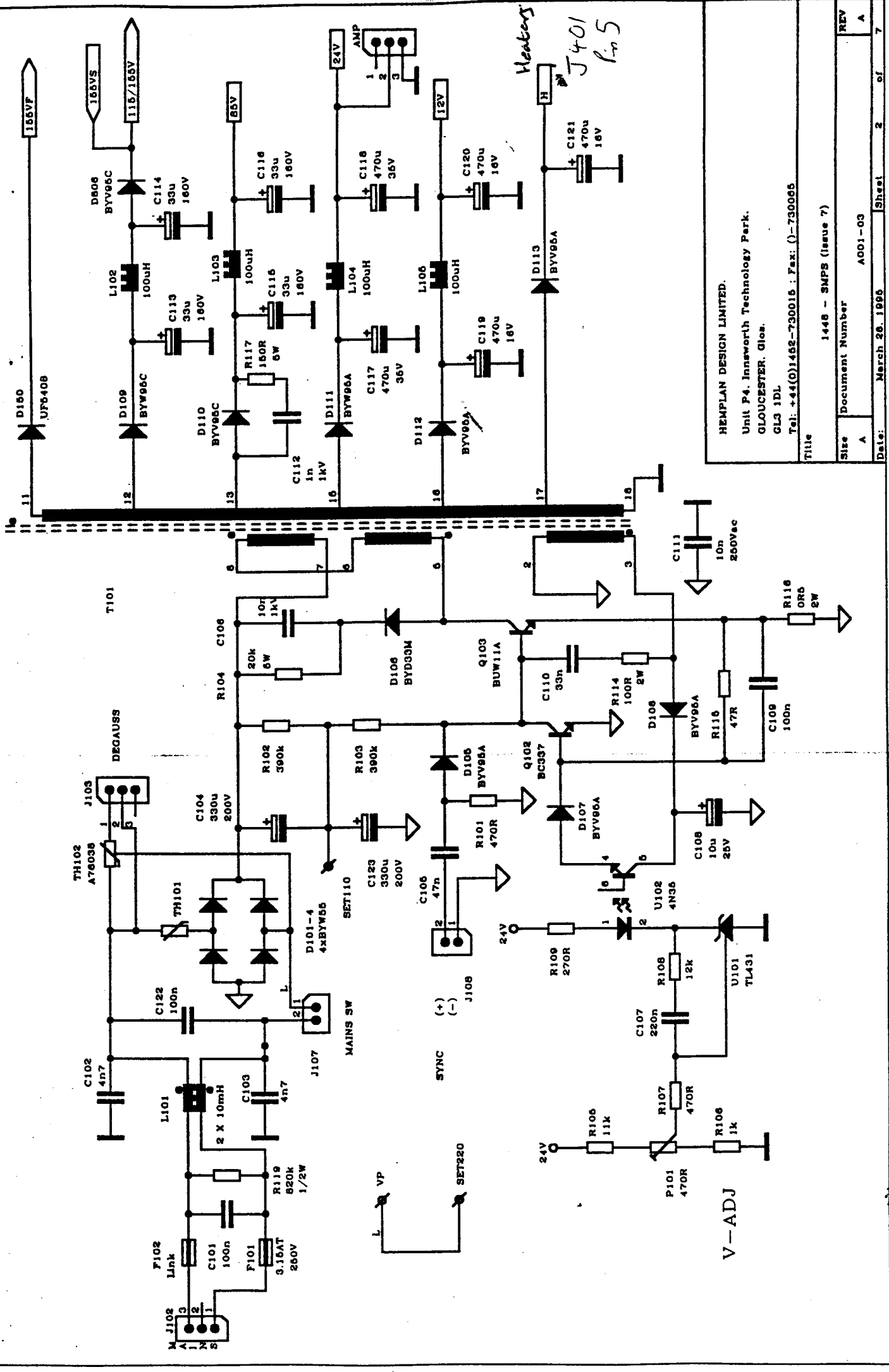
December 23, 1992

Sheet

2

of

4



Heaters
J401
Pin 5

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Title		1448 - SMPS (Issue 7)	
Size	Document Number	A001-03	REV
A			A
Date:	March 26, 1996	Sheet	2 of 7

EM1448LR 14" VGA Monitor

Used by Escom for their own brand PC's.

Manufactured by European Monitors (now EuroTech Manufacturing)

Original design by Tystar Monitors, recent additions by Hemplan Design Ltd

Spares available from Hemplan Design Ltd. (No Access or Visa facility)

Circuit Diagram Cautions:

Q802 on the circuit diagram is marked as Q803 on PCB (one of two!) - it's emitter & collector are connected to D805.

Q805 on the circuit diagram is marked as Q802 on the PCB (base to R815).

Fault List:

PSU permanently distressed (squealing) could be any (or all) of the following:

Q802 short circuit emitter - collector (BDX54F) . See above caution re PCB marking.

Q403 short circuit or leaky base - emitter (SGSF444 is the correct part but is very expensive, however a BU908 works reliably in this position and costs a lot less!)

Q405 short circuit or leaky base - emitter (BDT61C). This is the X-Ray Protection device (excessive EHT) and should be replaced with an identical part.

No width or parabola adjustment - Q405 defective.

Grey bands visible in raster (only in DOS) - IC201 defective
CD4070BP.

Incorrect picture geometry in DOS - IC201 (CD4070BP)

Working Voltage Measurements (DCVM)

U201 ^{NO PIC} (005)

U202

P_{in}

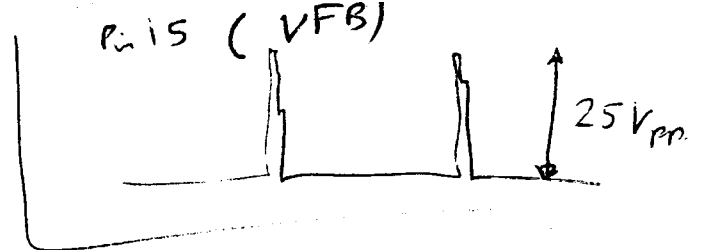
- 1 : 1.29v
- 2 : 1.31v
- 3 : 1.41v
- 4 : 0.02v
- 5 : 12.40v
- 6 : 12.39v
- 7 : -0.04v
- 8 : 12.48v
- 9 : 8.94v
- 10 : 2.43v
- 11 : 7.38v
- 12 : 12.47v
- 13 : 5.98v
- 14 : 12.47v

P_{in}

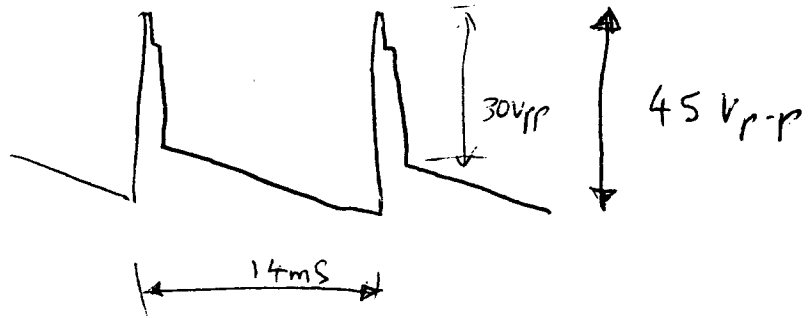
- 1 : 0.23v
- 2 : -0.02v
- 3 : -0.03v
- 4 : -0.03v
- 5 : 2.39v
- 6 : 5.36v
- 7 : 0.01v
- 8 : 12.47v

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IC 501



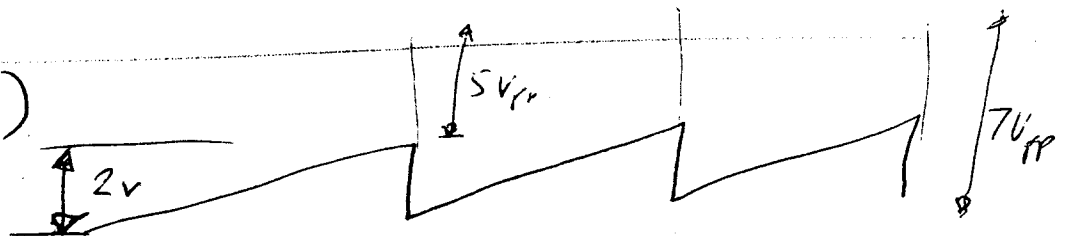
Pin 1 (V_{out})



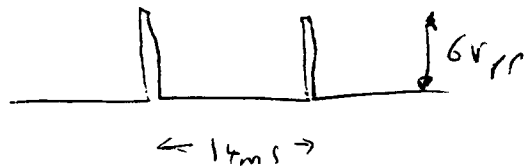
Pin 2 (FB)



Pin 3 (C)



Pin 6 (R)

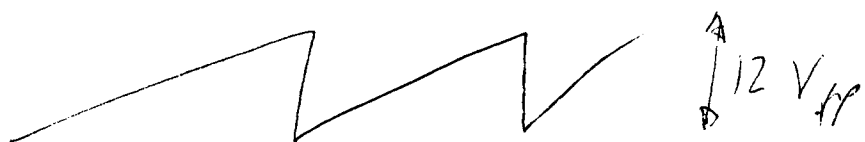


Pin 7 (No ~/form)
(Height) 6.64V_{dc}

Pin 9 (V/Kal?)



Pin 10 (Shogel)



ESCOM (EM) EM-1564LR

In the event of no line output, with
R705 burnt - replace the following parts.

R705 2R2 $\frac{1}{2}$ or 1W Carbon Film

C704 2.2 μ F 350v Electrolytic Capacitor

C426 33 μ F 200v 105°C Electrolytic Capacitor

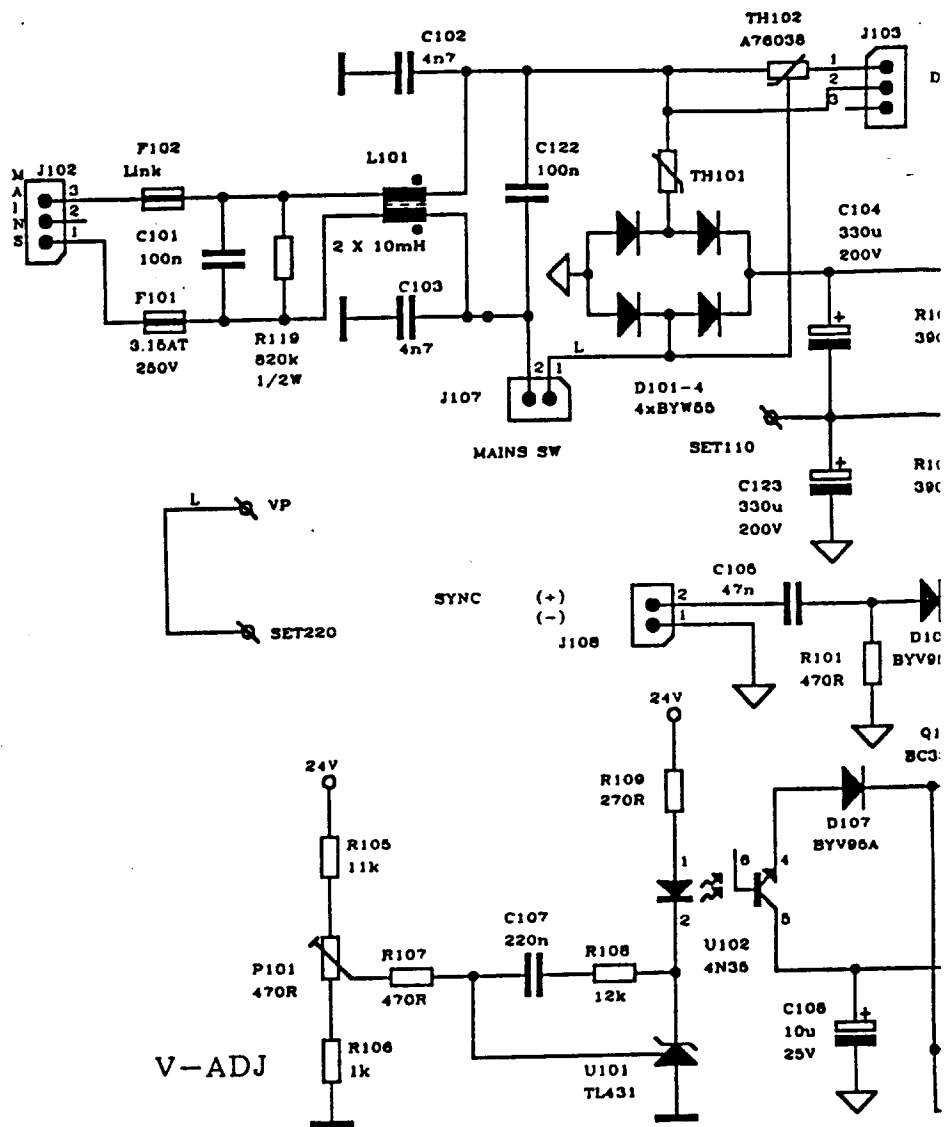
Q211 BF422

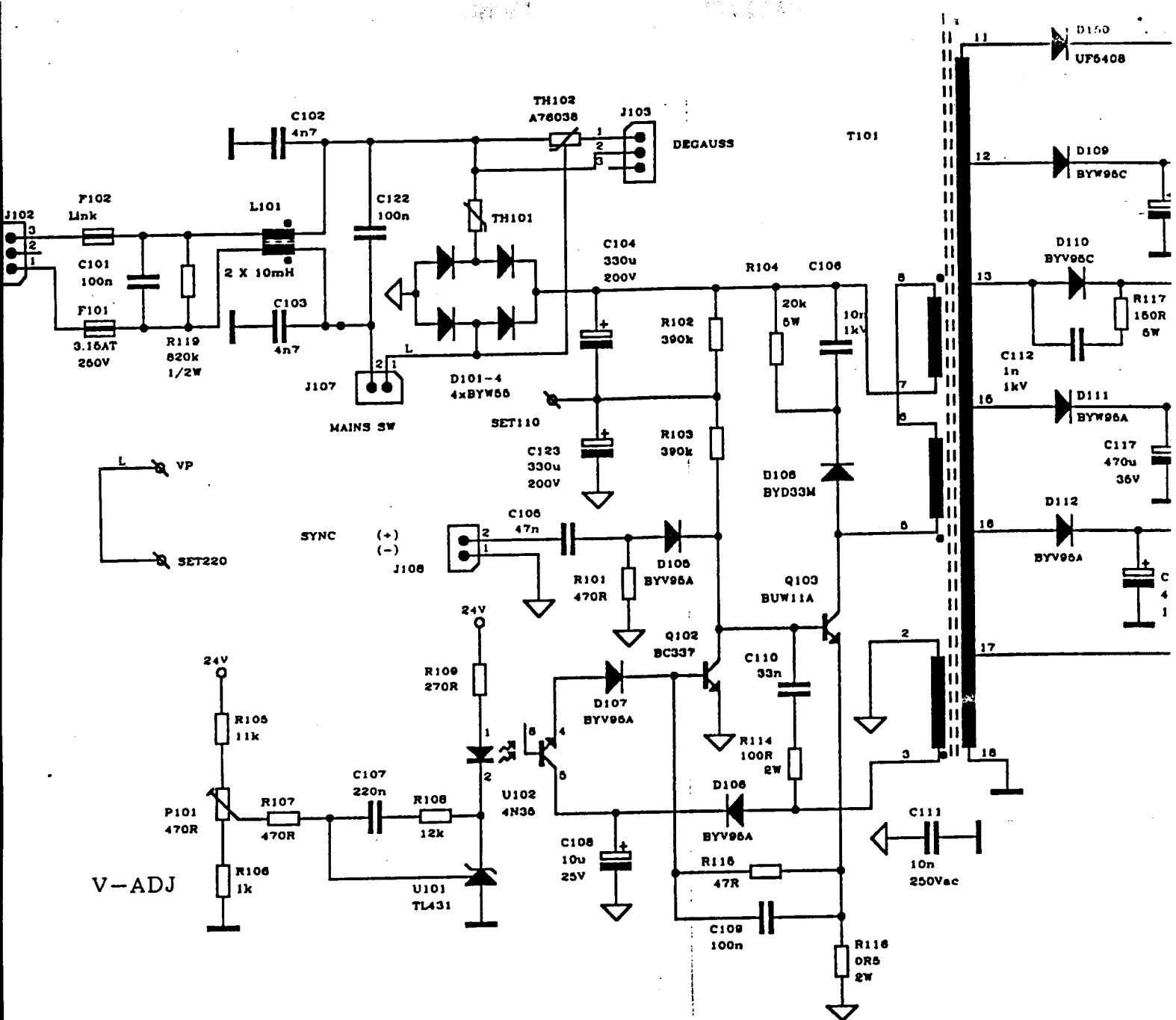
Q213 BDT61C may also have been destroyed
[Fixed to outside of RMS chassis arm].

Further info from Richard at Hemplan Design

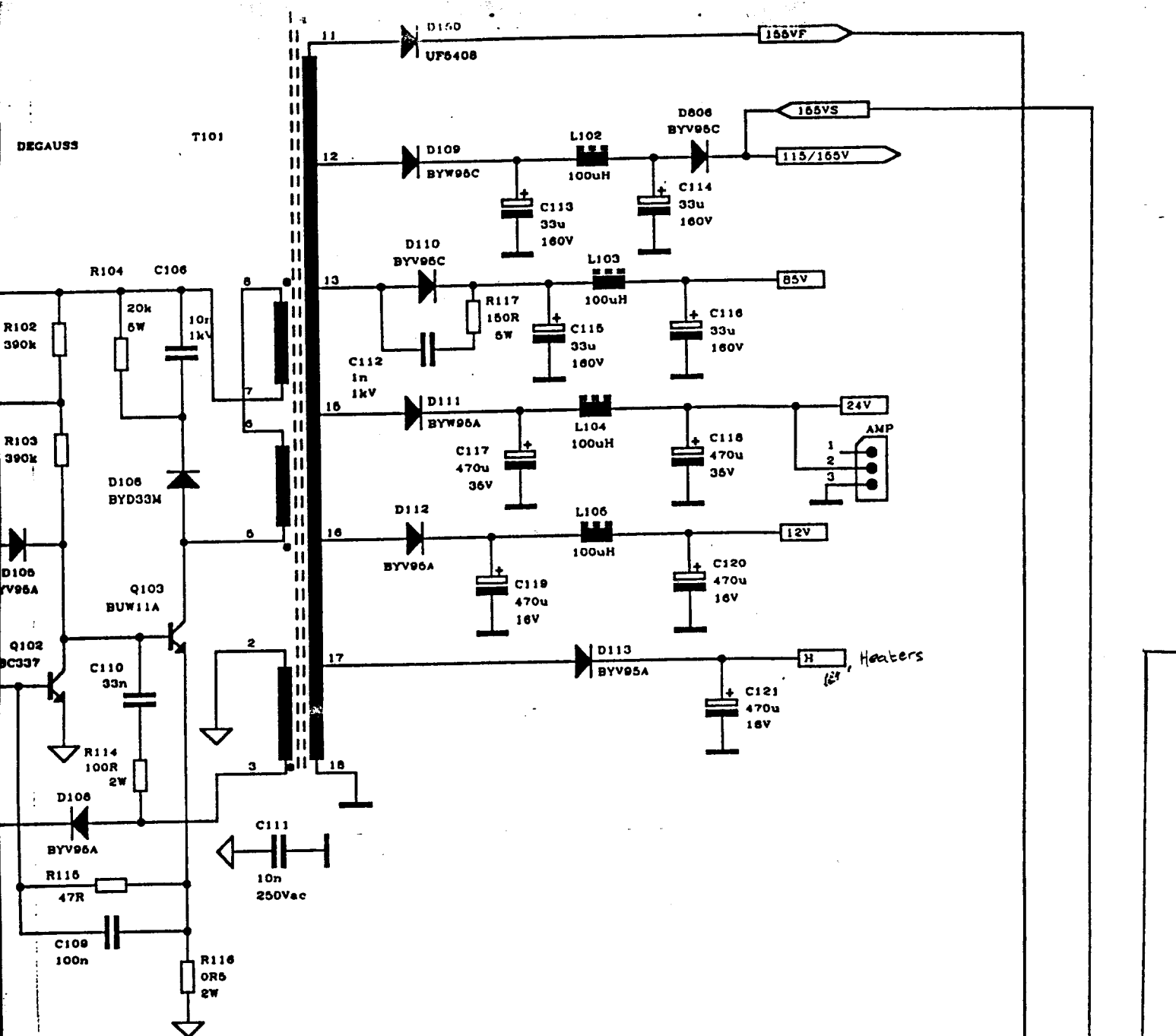
01452 730015

Tystar info from Mr. Barnsby

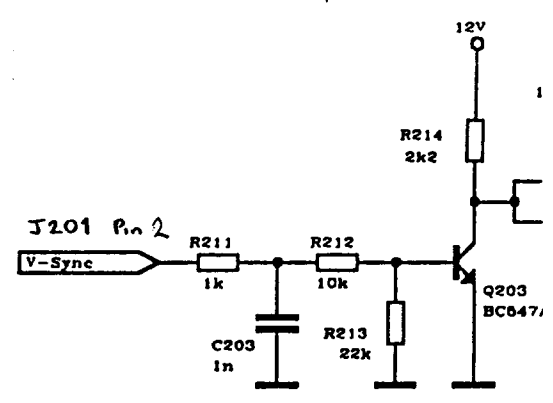
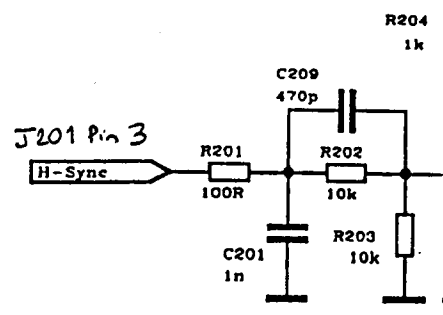
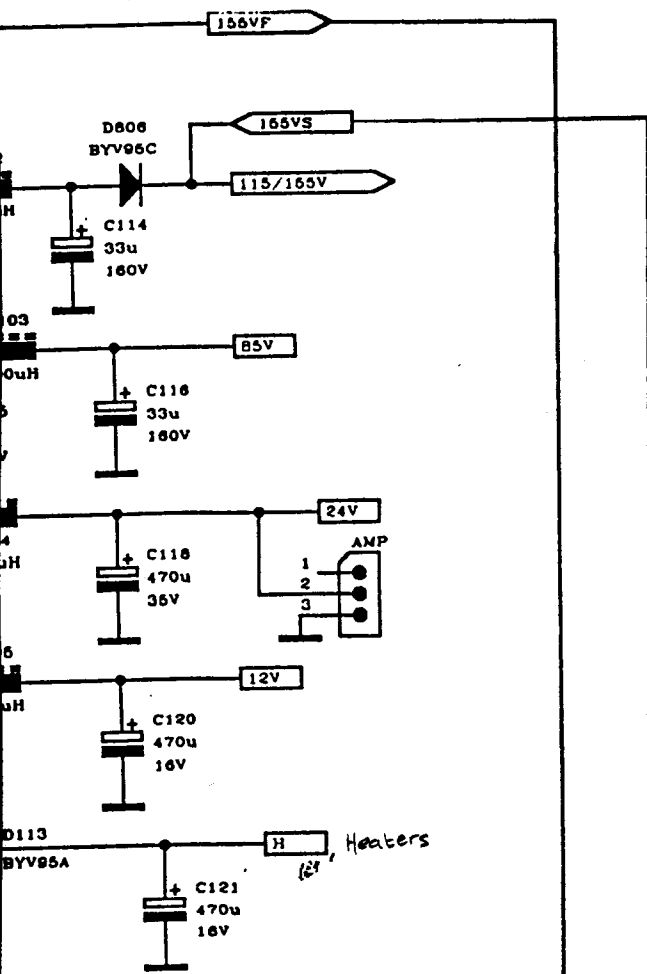


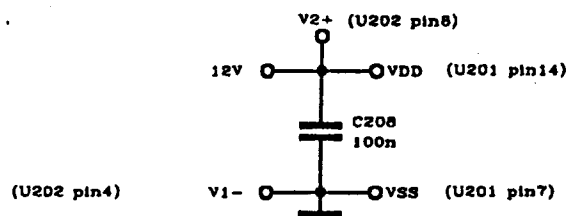
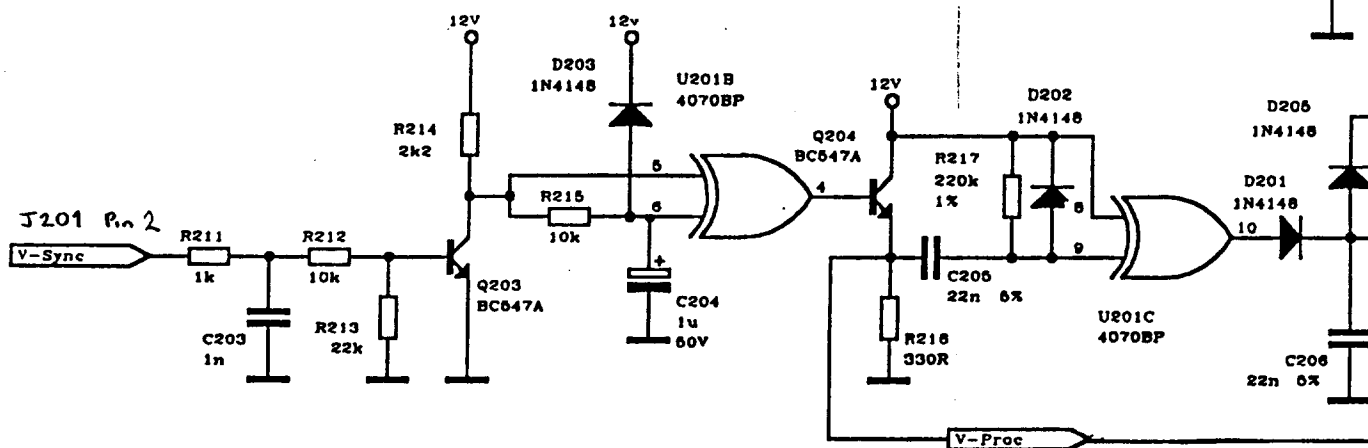
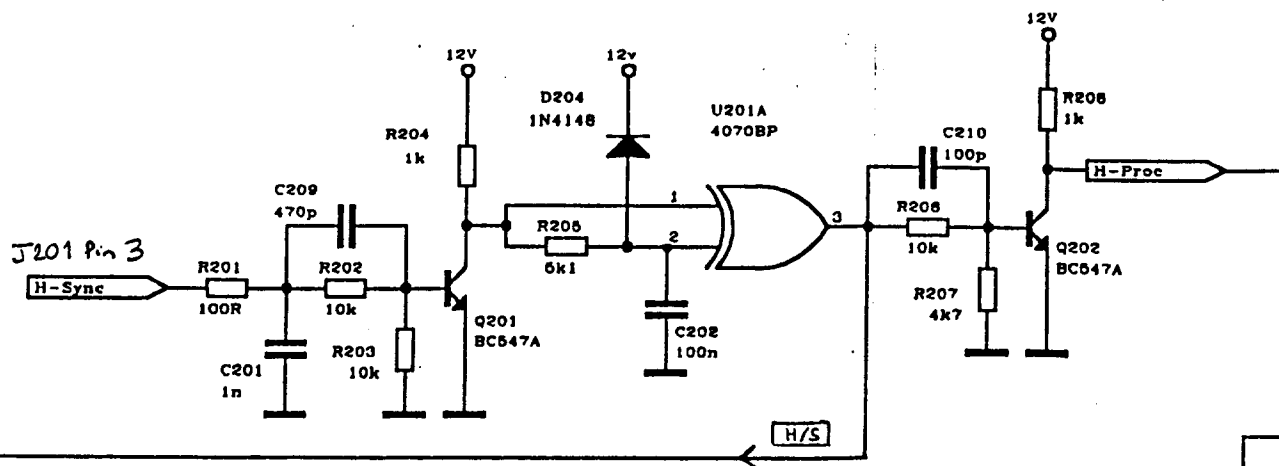


SWITCHED MODE POWER SUPPLY

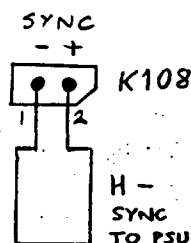


SWITCHED MODE POWER SUPPLY

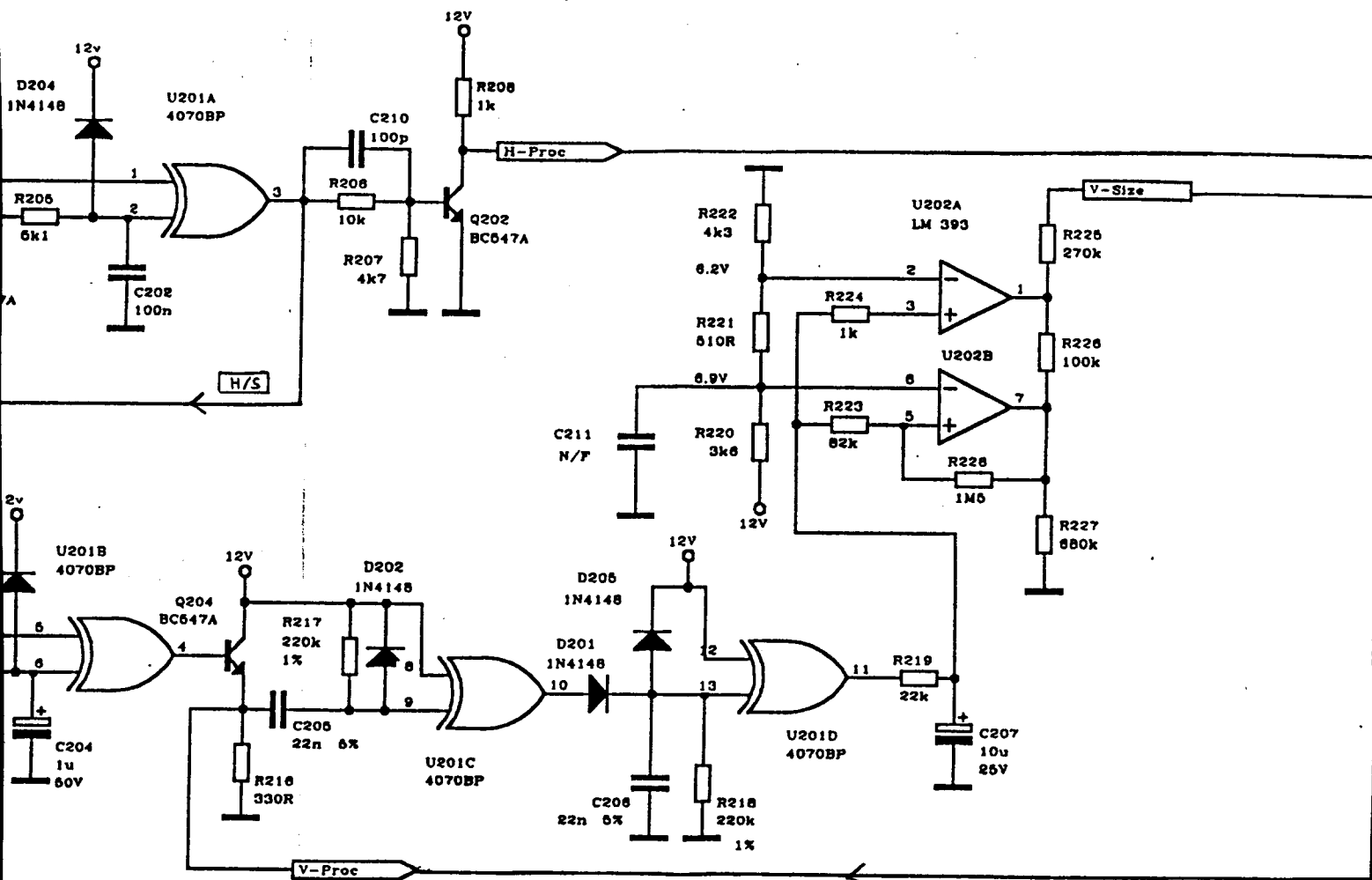




SYNC & VERT

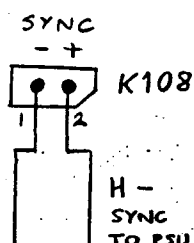


HORIZONTAL C



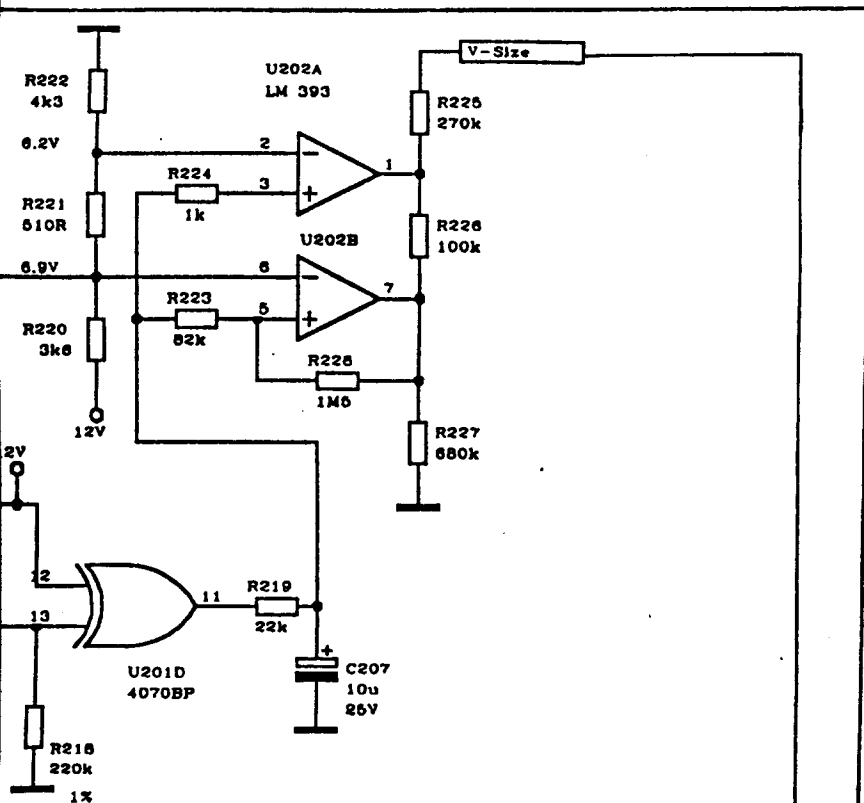
SYNC & VERTICAL AUTOSIZE

(U202 pin8)
VDD (U201 pin14)
C208 100n
VSS (U201 pin7)



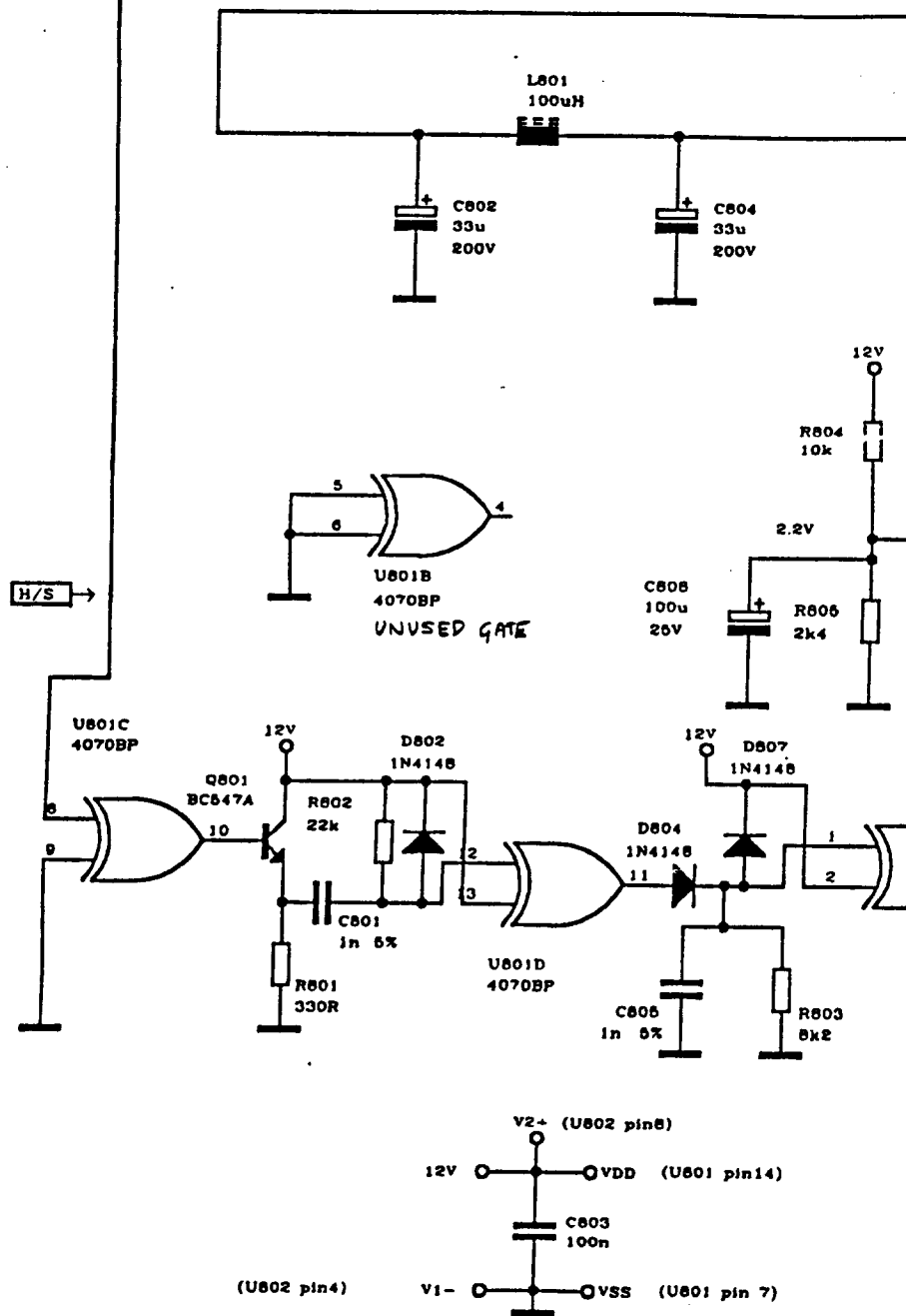
HORIZONTAL OUTPUT STAGE

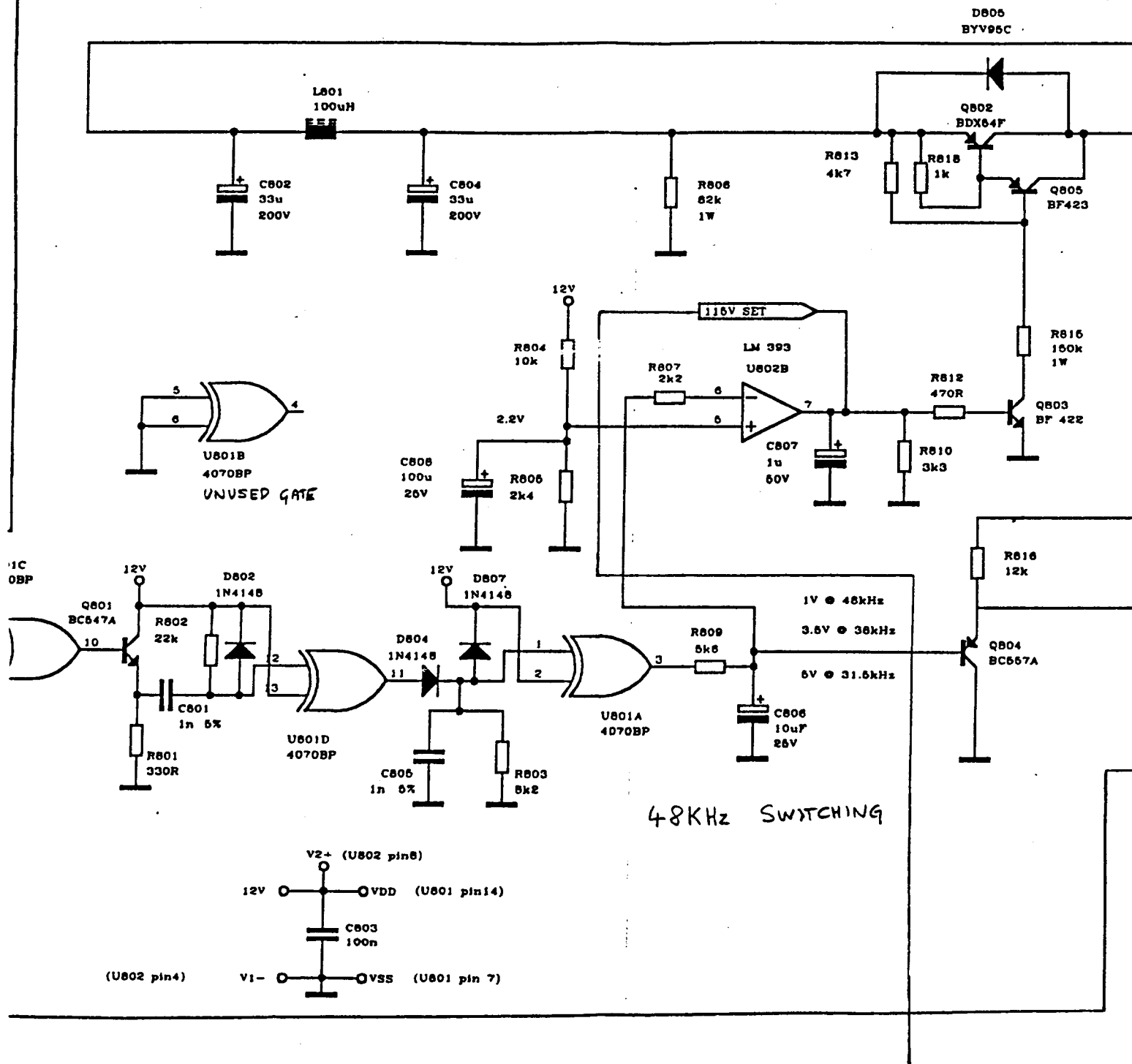
EM-1448 14" VGA Monitor Circuit Diagram

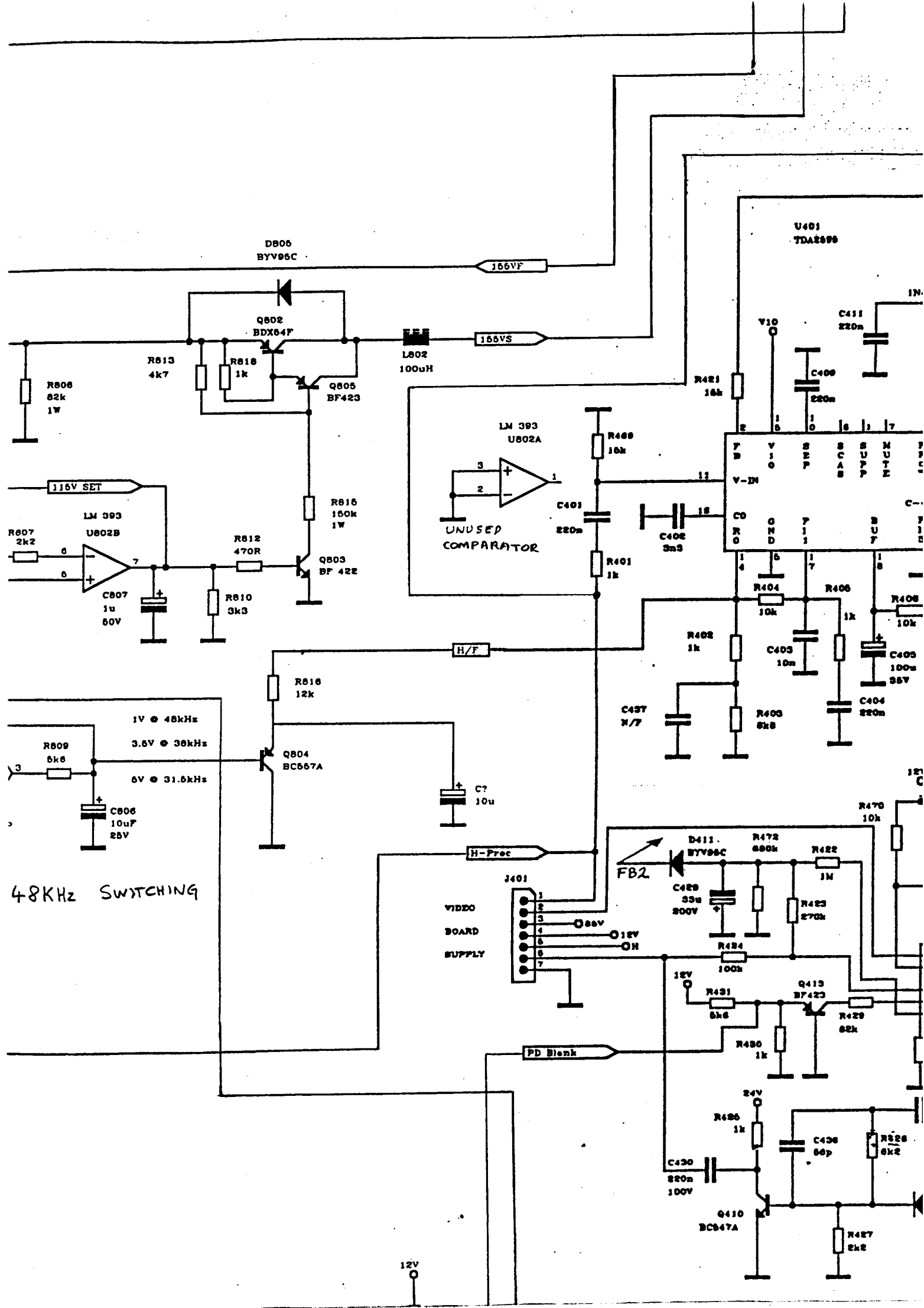


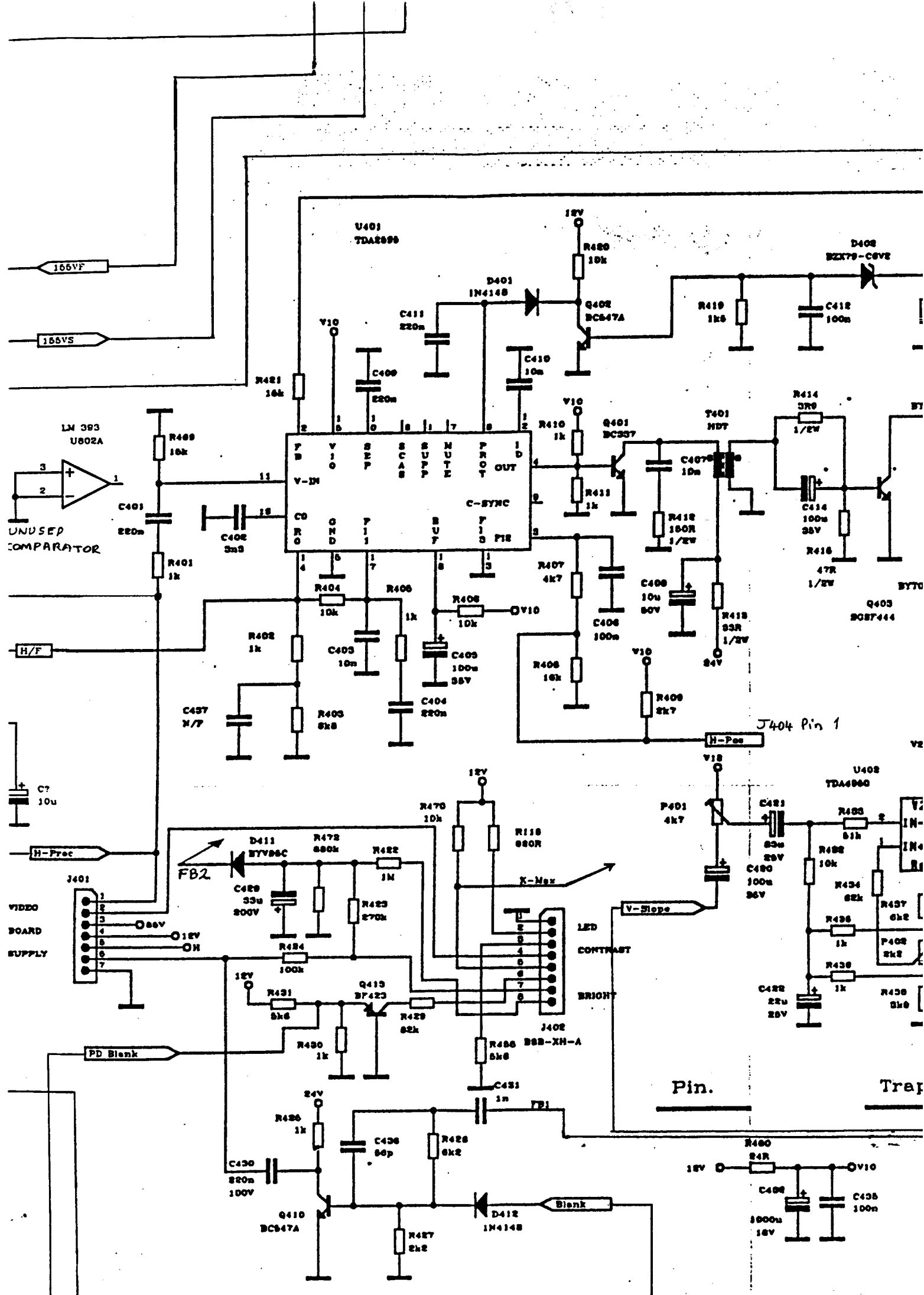
ICAL AUTOSIZE

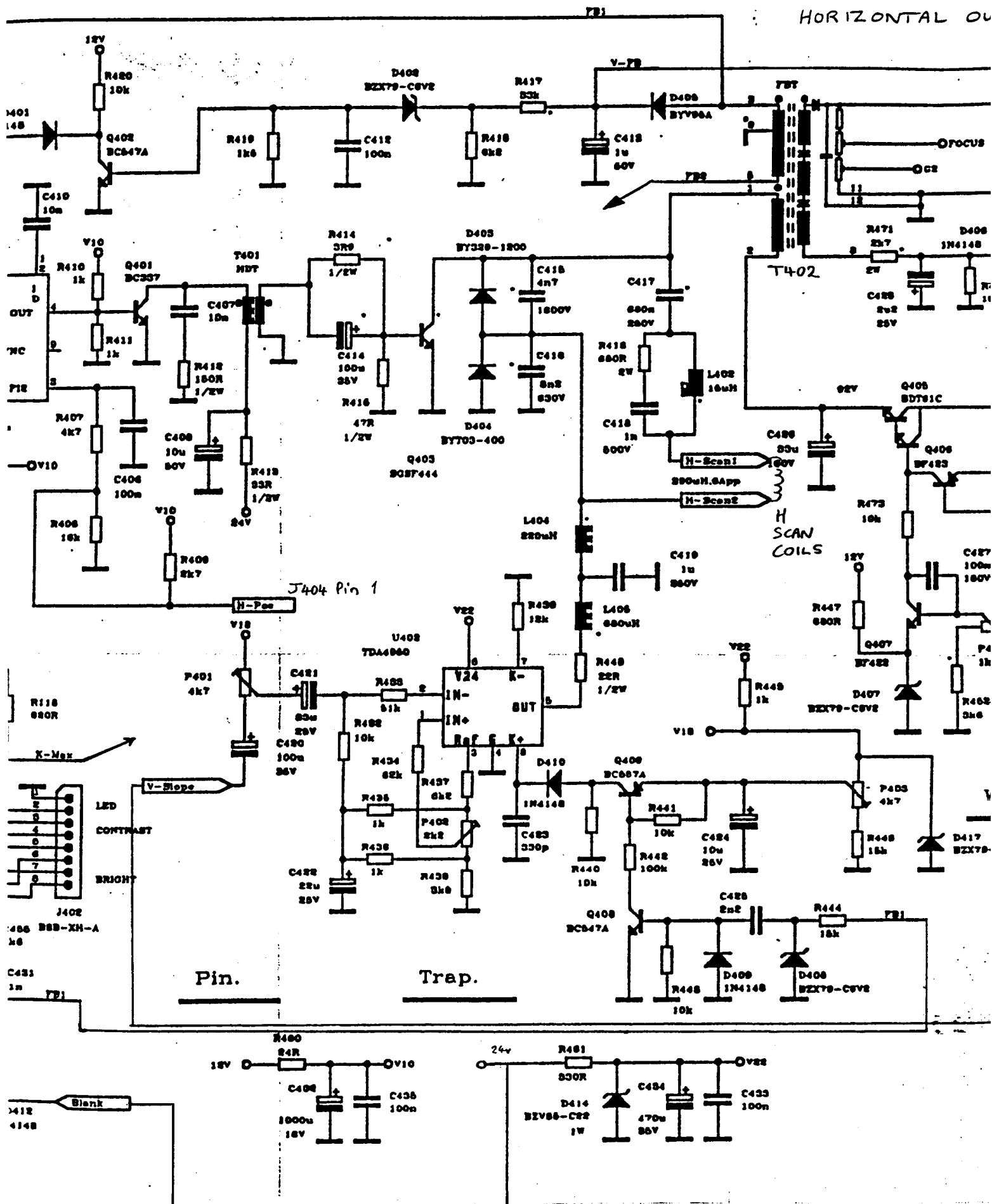
UTPUT STAGE

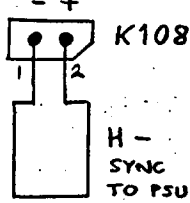




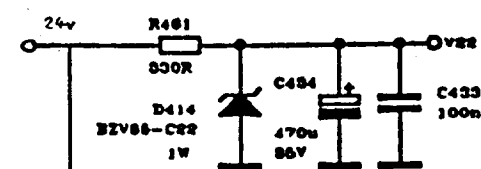
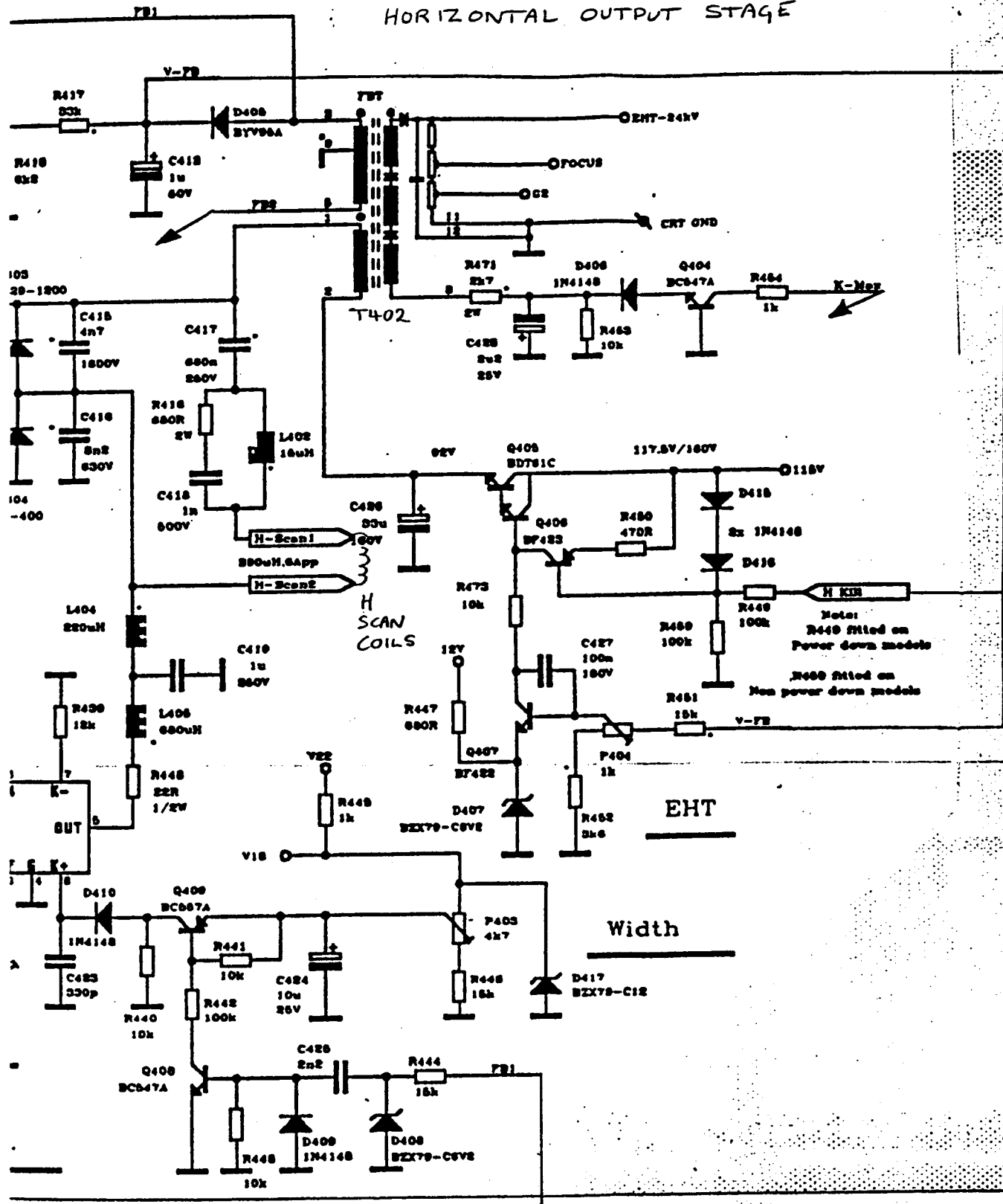




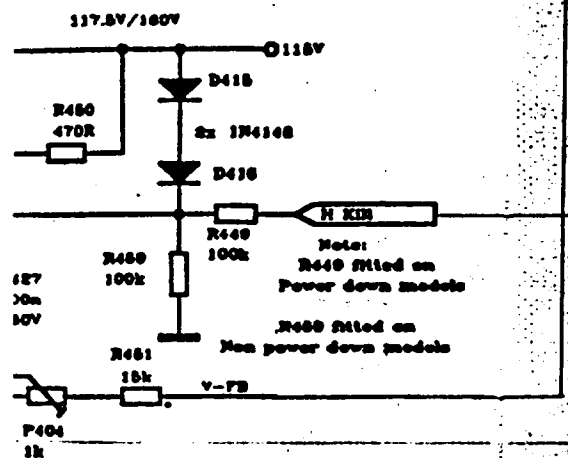
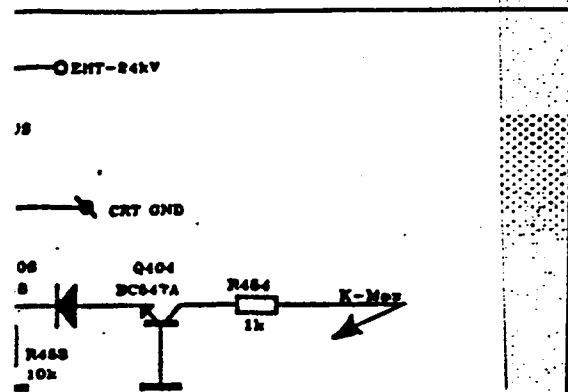




HORIZONTAL OUTPUT STAGE



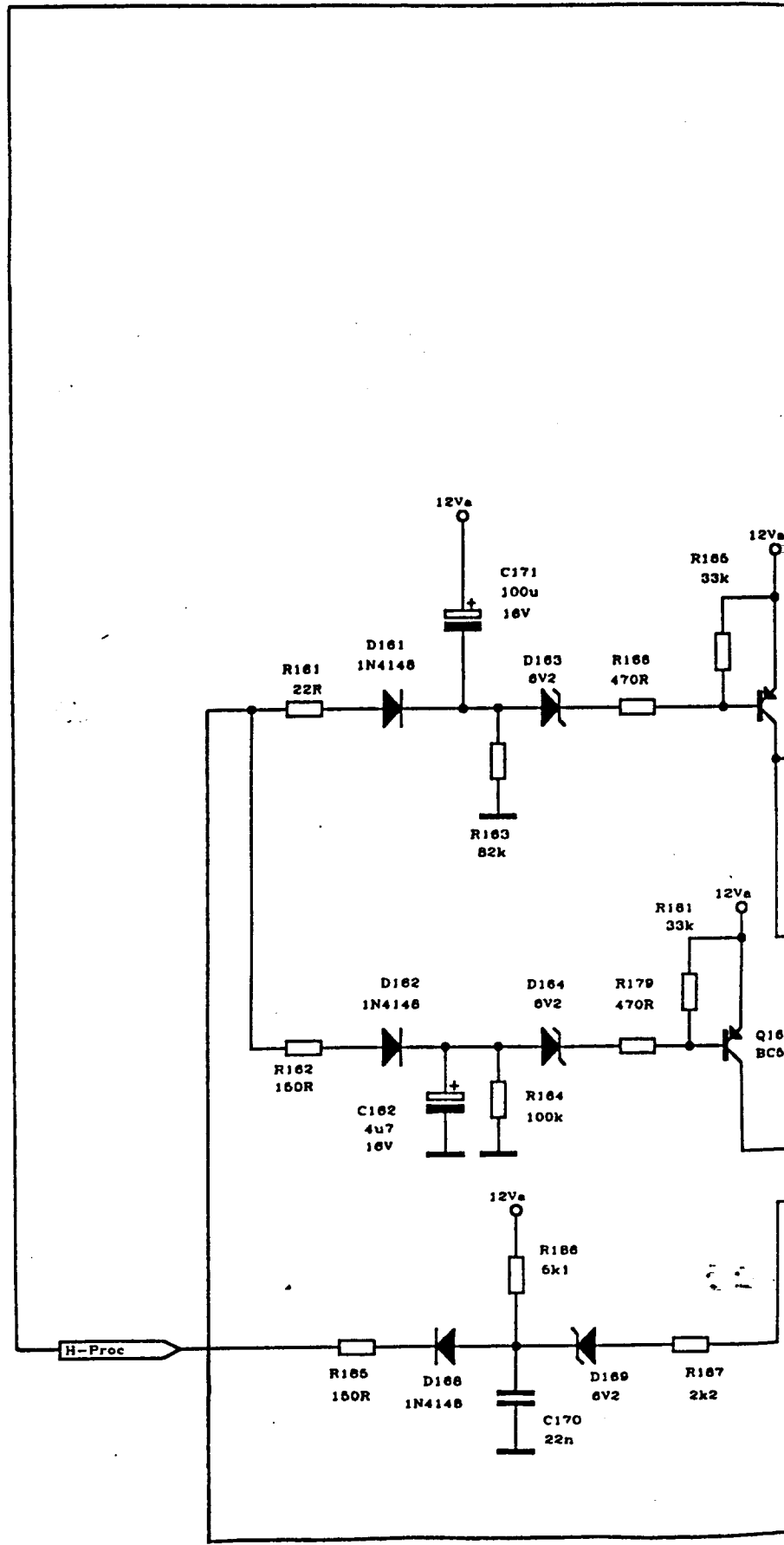
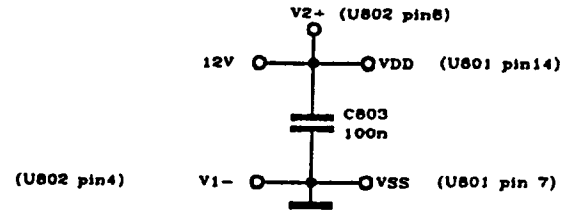
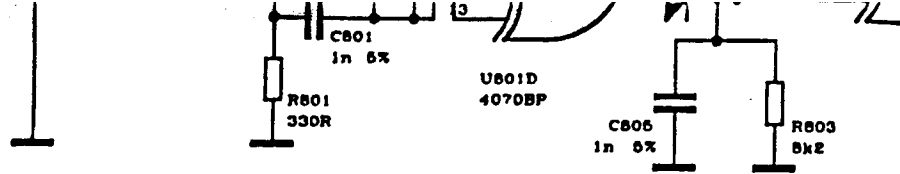
OUTPUT STAGE

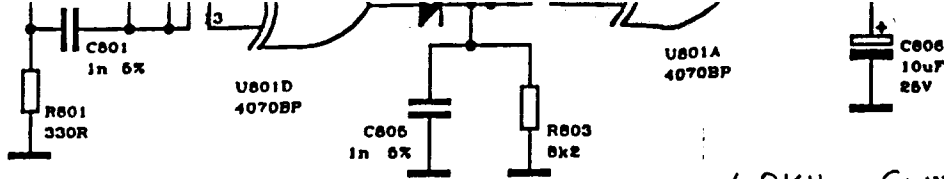


162
 16
 EHT

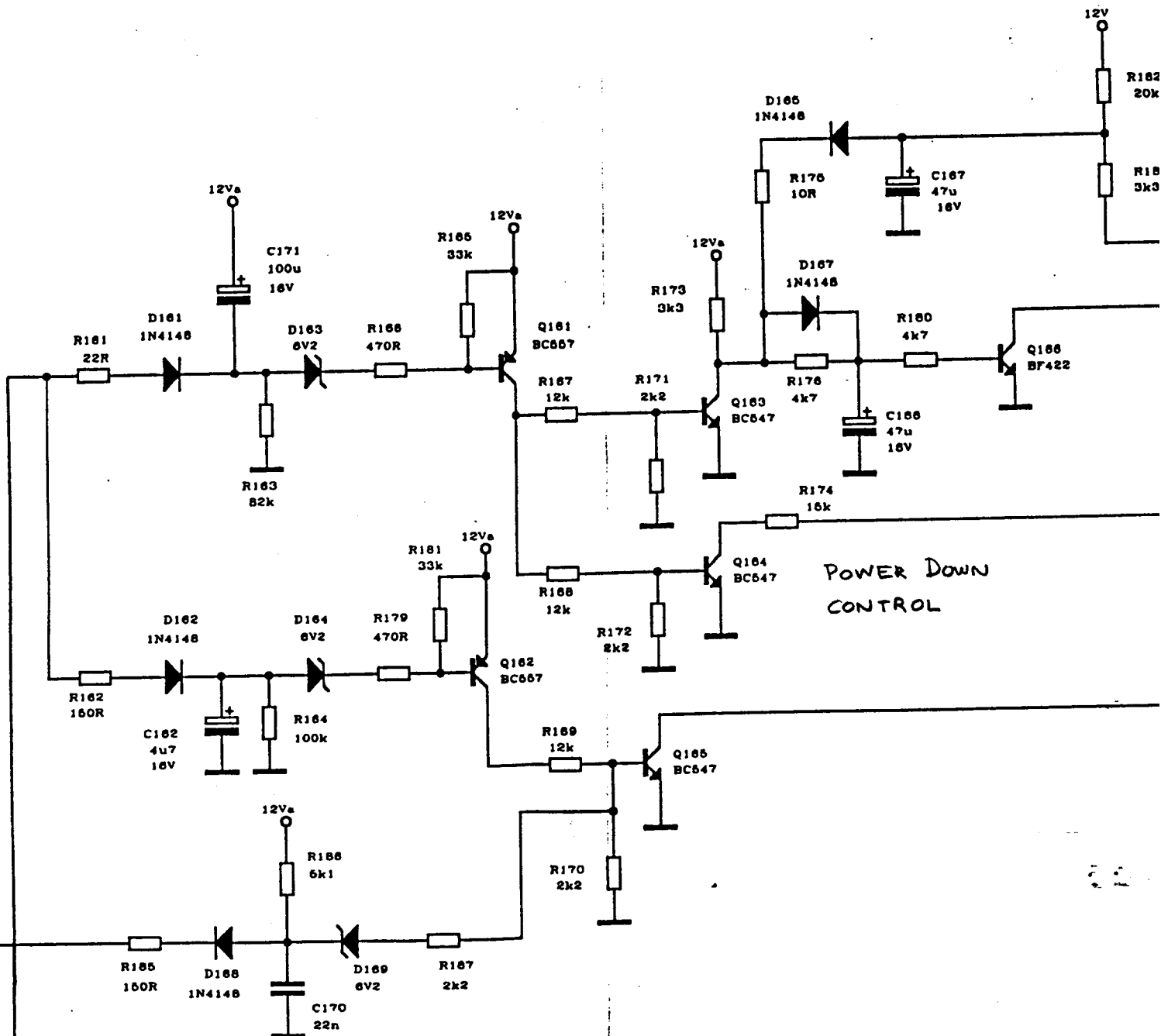
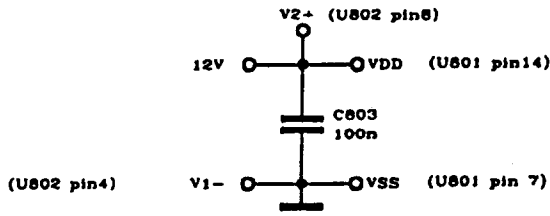
Width

7
 75-C12





48KHz SWITCHING



11A
OBP

C806
10uF
25V

C7
10u

48KHz SWITCHING

H-Freq

VIDEO
BOARD
SUPPLY

J401

FB2

12V

PD Blank

12V

D166
1N4148

R176
10R

C167
47u
16V

R182
20k

R183
3k3

115V SET

12Va

R173
3k3

161
557

167
2k

R171
2k2

Q163
BC647

D167
1N4148

R180
4k7

C166
47u
16V

Q166
BF422

H Kill

V Kill

POWER DOWN
CONTROL

R174
16k

Q164
BC647

168
2k

R172
2k2

169
12k

Q165
BC647

R170
2k2

24V

R178
1k

12Va

D168
12V

C169
100u
16V

C168
100n

C430
220n
100V

Q410
BC647A

R436
1k

24V

R430
1k

R431
8k6

Q413
BF423

R429
62k

R424
100k

C428
33u
200V

R423
270k

R422
1M

R472
880k

D411
BTY96C

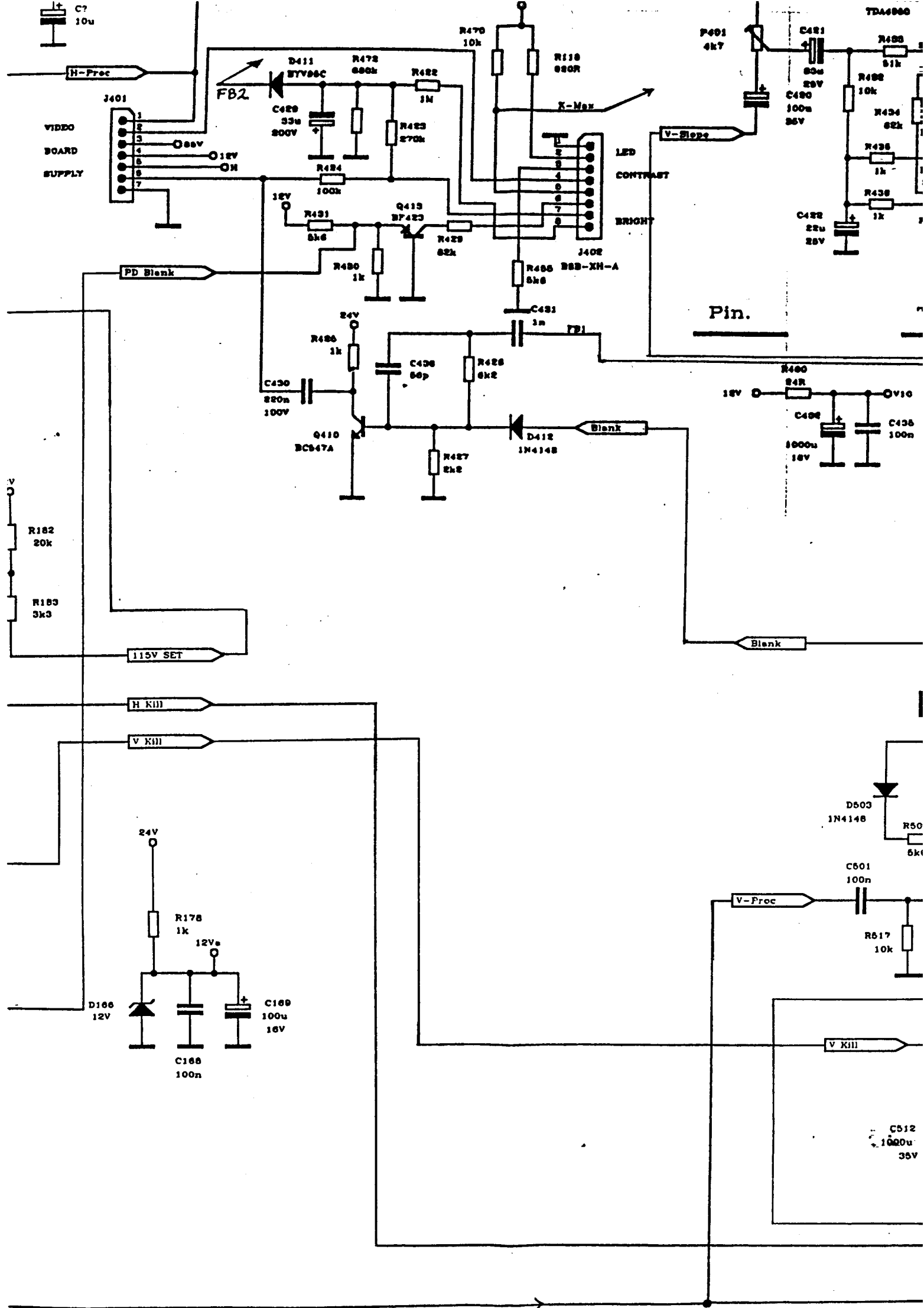
R470
10k

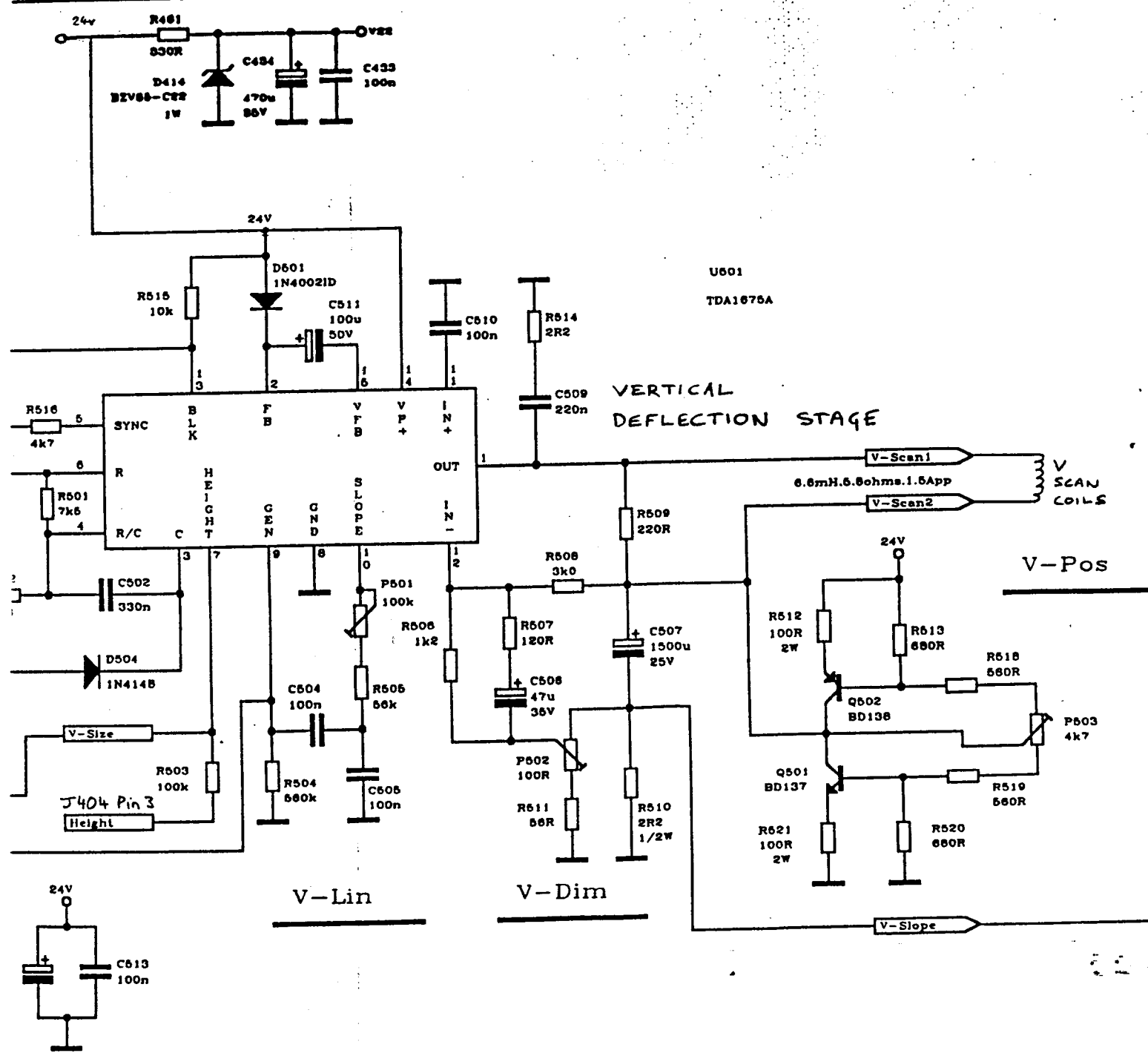
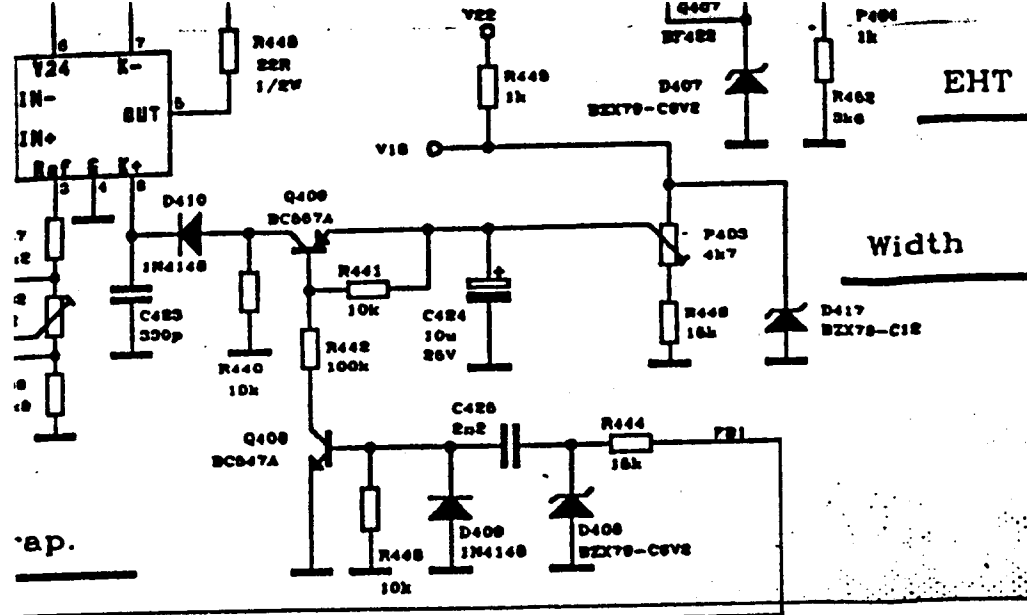
C436
56p

R426
1k

R427
2k2

R428
6k2





idth

218

U601

TDA1678A

TICAL
-ECTION STAGE

