

Product Overview

ADI

LM 1764 / A / N

1. Technical Specification

Cathode Ray Tube	17" (16" diagonal viewable area) flat square tube (FST) with enhanced contrast, dark-tinted CRT, 90-degree deflection, 0.26 (MicroScan 5V+) / 0.28 (MicroScan 5V) trio dot pitch, dot type black matrix, medium-short persistence phosphor, Invar shadow mask, dual-beam dynamic focus, advanced anti-reflection, anti-glare, and anti-static coating with low electromagnetic field.
Display Area	Factory Setting: 300 mm x 225 mm with specified geometric distortion
	Active Area: 324 mm x 243 mm
Power Source	Voltage 90 - 265 V, 60/50 Hz Autosense
	Current 2.0 A/110 V, 1.0 A/240 V
	Inrush current max. 30 A
Power Dissipation	110 W Normal Operation (max.)
	< 15 W Stand-by typical
	< 15 W Suspend
	< 8 W Auto power off
Misconvergence	Less than 0.5 mm
Geometric Distortion	Within 2 mm window in both vertical and horizontal dimensions
Luminance	Min. 95 NIT at center, with full white field
Video Input	Input Signal: RGB, analog, positive, max. 0.7 V/75 Ω
	Horizontal addressability: 1280 dots maximum
	Vertical addressability: 1024 dots maximum
Synchronization Range	Horizontal : 30 kHz to 64 kHz automatic
	Vertical: 50Hz to 100Hz automatic
Synchronization Signal	Separate TTL, positive/negative
Video Bandwidth	110 MHz
Ambient Temperature	Operating: 0°C to 40°C Storage: -20°C to 65°C
Humidity	Operating: 20% to 95% Storage: 10% to 95%
Size	416 mm (L) x 402 mm (W) x 435 mm (H)
Weight	Net weight : 17.5 kg.

2. Preset Display Modes

Display Mode →	1	2	3	4	5	6	7	8	9	10
H Resolution	720	640	640	640	800	1024	832	1024	1024	1280
V Resolution	400	480	480	480	600	768	624	768	768	1024
Dot Frequency/MHz	28.3212	25.175	30.240	31.500	49.500	65.000	57.280	75.000	78.750	108.00
H/V sync Polarity	-/+	-/-		-/-	+/+	-/-	-/-	-/-	+/+	+/+
H Frequency/KHz	31.4680	31.469	35.000	37.500	46.875	48.363	49.722	56.476	60.023	63.981
H Period/ μ s	31.7783	31.778	28.571	26.667	21.333	20.677	20.211	17.707	16.660	15.630
H Active Video/ μ s	25.4227	25.422	21.164	20.317	16.162	15.754	14.525	13.653	13.003	11.852
H Sync Width/ μ s	3.8134	3.813	2.116	2.032	1.616	2.092	1.117	1.813	1.219	1.037
H Front Porch/ μ s	0.3178	0.318	2.116	0.508	0.323	0.369	0.559	0.320	0.203	0.444
H Back Porch/ μ s	1.5889	1.589	3.175	3.810	3.232	2.462	3.911	1.920	2.235	2.296
V Frequency/Hz	70	60	66.667	75	75	60	74.546	70	75	60
V Period/Lines	449	525	525	500	625	806	667	806	800	1066
V Sync Width/Lines	2	2	3	3	3	6	3	6	3	3
V Front Porch/Lines	6	2	3	1	1	3	1	3	1	1
V Back Porch/Lines	27	25	39	16	21	29	39	29	28	38
Interlacing	No	No	No	No	No	No	No	No	No	No

3. Pin Configuration:

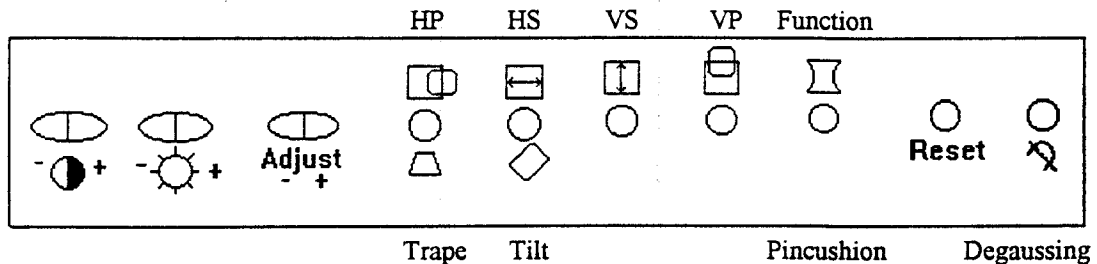
Pin		Signal	
1	<-	RV	RGB Red
2	<-	GV	RGB Green
3	<-	BV	RGB Blue
4	->	ID2	Monitor Identification (LG)
5		ST	Not used
6	<-	RG	Ground (red)
7	<-	GG	Ground (green)
8	<-	BG	Ground (blue)
9			Not used
10		LG	Ground (logic)
11	->	ID0	Monitor Identification (LG)
12	->	ID1	SDA (For DDC)
13	<-	HS	Horizontal sync.
14	<-	VS	Vertical clk (For DDC)
15			SCL (For DDC)

<- Input
 -> Output

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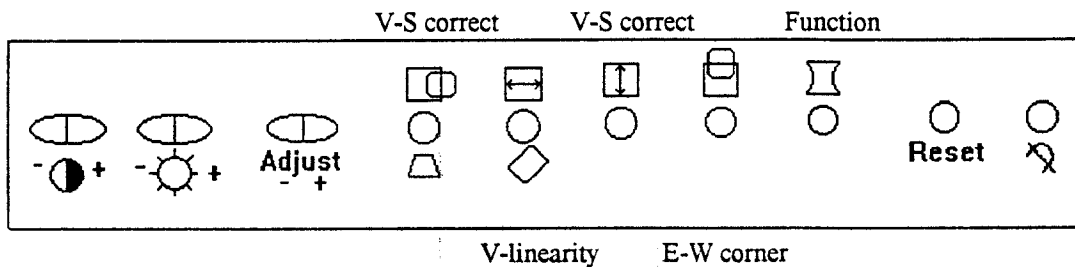
4. Front Panel Function Control

4.1. User's Mode Function. (Total 13 buttons)



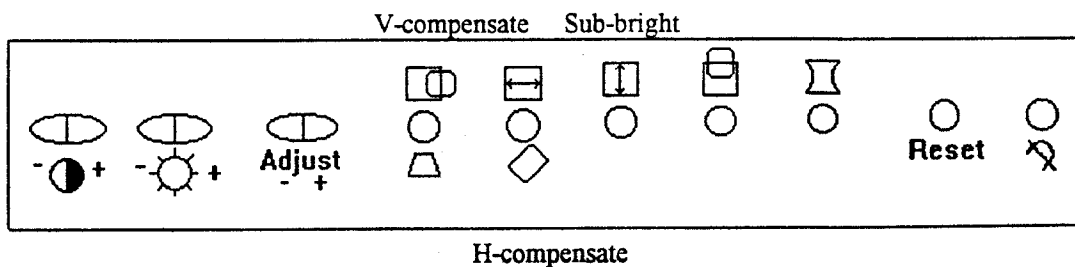
4.2. Service Mode Function 1

Press "Func" key when you turn on the power, then press the "Func" key twice to enter service mode function 1.



4.3. Service Mode Function 2

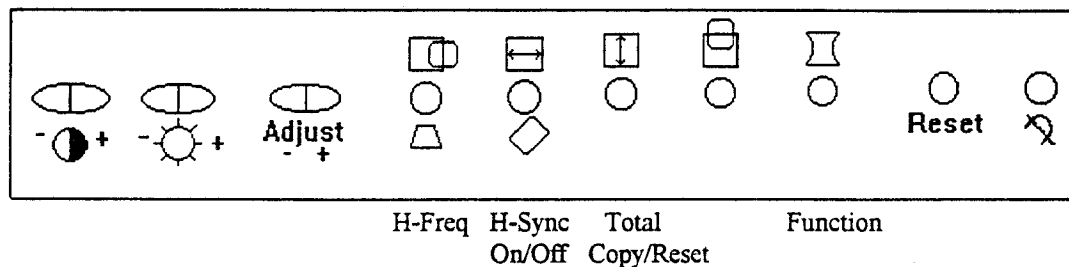
Under service mode function 1, press the "Func" key to enter service mode 2.



4.4. Service function mode 3 :

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Under service mode function 2, press the "Func" key to enter service mode 3 .



Press the "Func" key to return to user's mode function.

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Adjustment Procedures

Let the monitor warm up for more than 30 minutes before starting the adjustments. For your own safety, use safety isolating transformer when repairing the monitor.

1. Voltage setting

Select 31k 640 X 480 cross hatch pattern.

1.1. B+ voltage confirm :

Adjust VR 901 so that the voltage of J921 meet $80 \pm 0.5\text{v}$ as measured by the high voltage meter.

1.2. High voltage confirm :

Adjust VR301 so that the anode voltage of CRT meet $26 \pm 0.5\text{kv}$.

1.3. Screen voltage alignment :

Adjust the screen VR located at the FBT, adjust the G2 voltage according to the different type of CRT:

HITACHI CRT : $420 \pm 10\text{V}$

NEC CRT : $550 \pm 10\text{V}$

TOSHIBA CRT : $660 \pm 10\text{V}$

PHILIPS CRT : $510 \pm 10\text{V}$

1.4. Hold down voltage setting.

Measure the voltage between TP31 and TP32, adjust VR 302 to meet $1.2 \pm 0.05\text{v}$.

2. White balance alignment

Select 31k 640 X 480 model, cross hatch pattern.

Adjust horizontal width and vertical size close to 225 X 300 mm.

2.1. For raster white balance alignment:

2.1.1 Select 31k 640 X 480 mode, no video pattern.

2.1.2 Set Contrast to minimum and Brightness at maximum.

Turn clockwise the VR704, VR705 and VR706 to the end.

2.1.3 According to the original color of raster, set color temperature at:

$x = .281 \pm .020$ $y = .311 \pm .020$ $Y = 0.80 \text{ FL}$

2.2. For video white balance alignment : (video output = 0.8Vp-p)

2.2.1 Change alignment signal to full white pattern.

2.2.2 Measure probe put on the center of pattern

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2.2.3 Set Brightness at minimum and Contrast setting at 10 FL.

2.2.4 Set VR701 VR702 VR703 at mechanical center.

2.2.5 According to the original color of raster, set color temperature at: $x = .281 \pm .020$, $y = .311 \pm .020$.

2.2.6 Set Brightness at maximum and Contrast at 20FL

Set color temperature at $x = .281 \pm .030$ $y = .311 \pm .030$

2.3. For ABL setting :

2.3.1 Set Brightness at maximum and Contrast at maximum

2.3.2 Adjust VR802, set Brightness on pattern center at $35 \pm 2FL$.

2.4. For video gain alignment :

2.4.1 Change to mini block pattern.

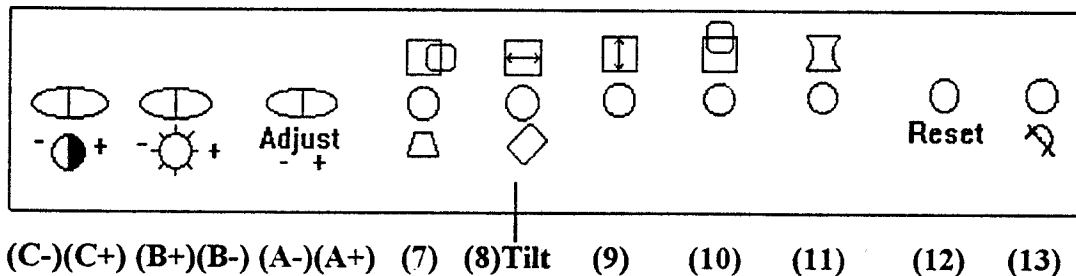
2.4.2 Enter function 1. (Refer to key function table)

2.4.3 Press "C+" or "C-", set Brightnes on mini block at $75 \pm 2FL$.

3. Tilt alignment

3.1. Press the 8th key twice to select tilt adjustment function.

User's Mode Function



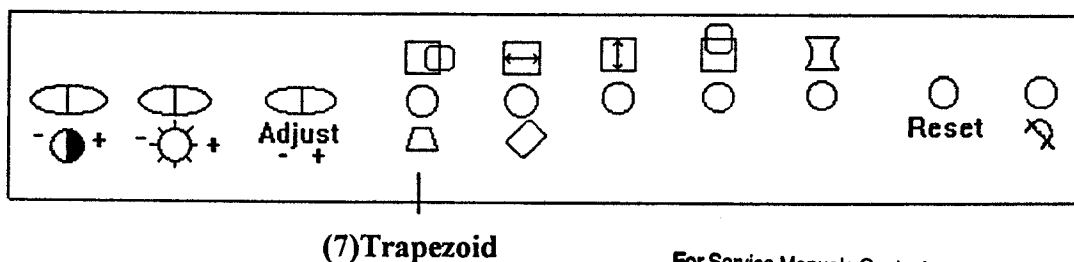
3.2. Press "A+" or "A-" until picture tilt is adjusted to minimum.

4. Parallelogram alignment

select 48k 1024 X 768 cross hatch pattern.

4.1. Press the 7th key twice to select trapezoid distortion adjustment function.

User's Mode Function



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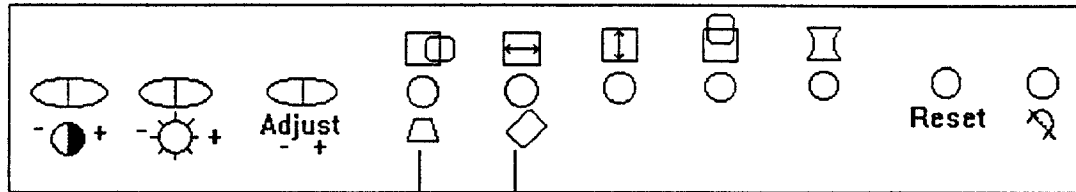
- 4.2. Press "A+" or "A-" until picture trapezoid distortion is adjusted to minimum.
- 4.3. Adjust VR602 until parallelogram distortion is adjusted to minimum.

5. High voltage regulation alignment

Select 48k 1024 X 768 HV regulation dynamic test pattern.

- 5.1. Enter function 2. (Refer to key function table)
- 5.2. Press the 7th key to select vertical HV regulation adjustment function.

Service Mode Function 2



(7) (8) HV-regulation

- 5.3. Press "A+" or "A-", make sure that there is no difference on the vertical size under reverse and normal condition.
- 5.4. Press the 8th key to select horizontal HV regulation adjustment function.
- 5.5. Press "A+" or "A-", make sure that there is no difference on the horizontal width under reverse and normal condition.

Change to HV regulation static test pattern.

- 5.6. Adjust VR803 to make the vertical edge of pattern straight.

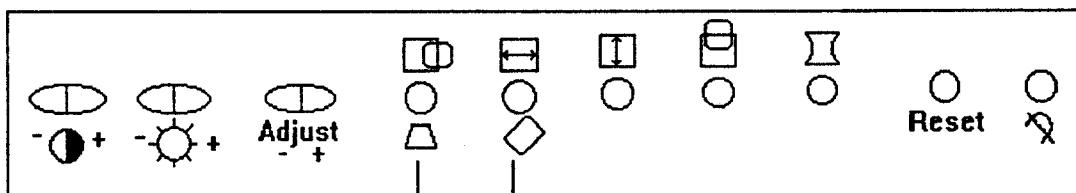
6. H hold alignment

Use 64k 1280 X 1024 cross hatch pattern.

- 6.1. Enter function 3. (Refer to key function table)
- 6.2. Press the 8th key to select sync. switch function.

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Service Mode Function 3



(7) H-freq. H-sync (8)
On/Off

- 6.3. Press "A-" key to set H sync. off.
- 6.4. Press the 7th key to select frequency adjustment function.
- 6.5. Press "A+" or "A-" to set picture stable.
- 6.6. Press the 8th key to return to sync. switch function.
- 6.7. Press "A+" key to set H sync. ON.

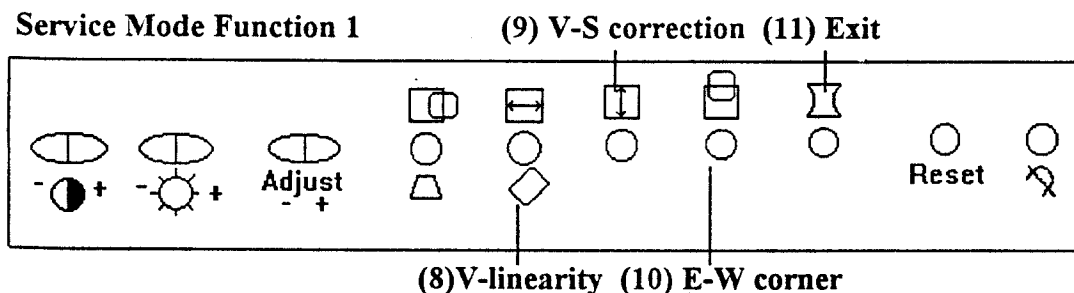
Change to 31k 640 X 480 cross hatch pattern.

- 6.8. Press the 8th key to select sync. switch function.
- 6.9. Press "A-" to set H sync. off.
- 6.10. Press the 7th key to select frequency adjustment function.
- 6.11. Press "A+" or "A-" to set the picture stable.
- 6.12. Press the 8th key to return to sync. switch function.
- 6.13. Press "A+" to set H sync. ON.
- 6.14. Press " RESET" to exit function 3.

7. Geometric distortion alignment

Use 64k 1280 X 1024 cross hatch pattern.

- 7.1. For front panel control adjustment, select H phase, H width, V size, V center, tilt, trapezoid respectively and press "A+" or "A-", ensure that the picture size and center are within spec.
- 7.2. Enter service function 1. (Refer to key function table)
- 7.3. Press the 8th key to select V linear adjustment function.



- 7.4. Press "A+" or "A-", make sure that there is no difference on the vertical size between the top row and bottom row.
- 7.5. Press the 9th key to select V-S correct adjustment function.
- 7.6. Press "A+" or "A-", make sure that there is no difference on the vertical size between the top row and center row.
- 7.7. Press the 10th key to select E-W corner adjustment function.

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7.8. Press "A+" or "A-" to make the vertical edge of pattern straight.

7.9. Press the 11st key exit function 1.

Change the alignment signal according to different modes and follow the procedures as mentioned above.

Pre-setting mode as following:

64k	1280 X 1024	60k	1024 X 768	56k	1024 X 768
49k	832 X 642	48k	1024 X 768	46k	800 X 600
38k	640 X 480	35k	640 X 480	31k	720 X 400
31k	640 X 480				

Picture width : 300mm Picture high : 225mm

8. Total copy

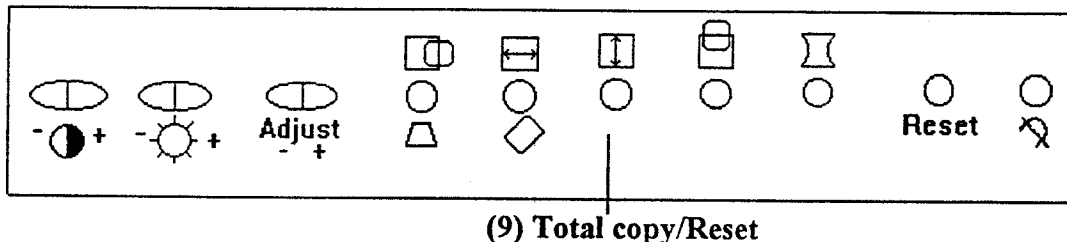
Save all adjusted data to the EEPROM.

8.1. Use 31k 640 X 480 mode .

8.2. Enter function 3. (Refer to key function table)

8.3. Press the 9th key for total copy.

Service Mode Function 3



9. Total reset

9.1. Use 64k 1280 X 1024 mode .

9.2. Enter function 3. (Refer to key function table)

9.3. Press the 9th key for total reset.

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10. Focus alignment

10.1. Change to 48.9k 1024 X 768 "me" pattern.

10.2. Set Contrast to maximum and Brightness at a point when raster started to disappear.

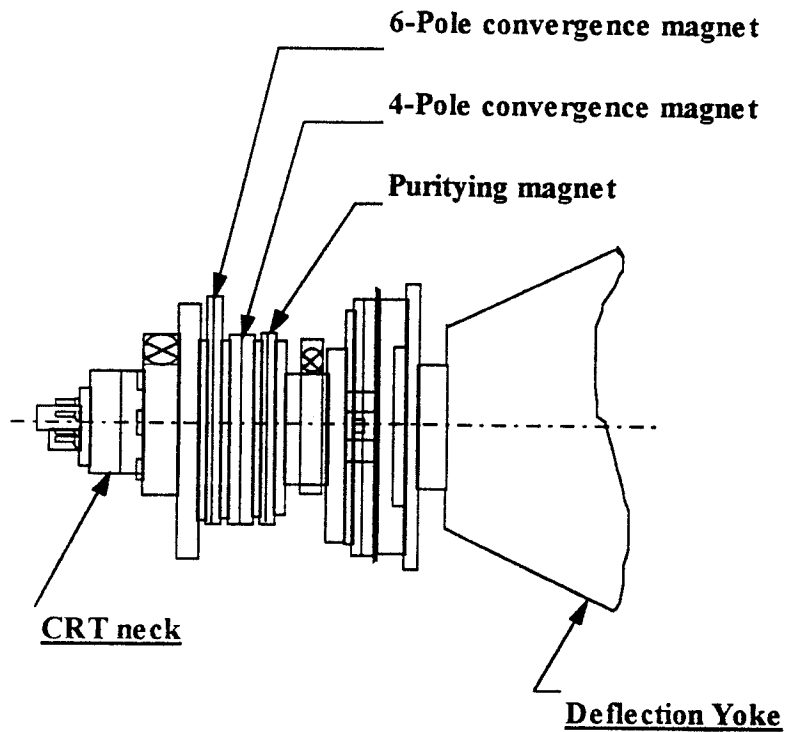
10.3. Adjust focus VR lacted at the FBT, make sure all of the characters have the best focus.

- 10.4. Change to reverse "me" pattern to check all of the characters if they also have the best focus.

11. Convergence alignment

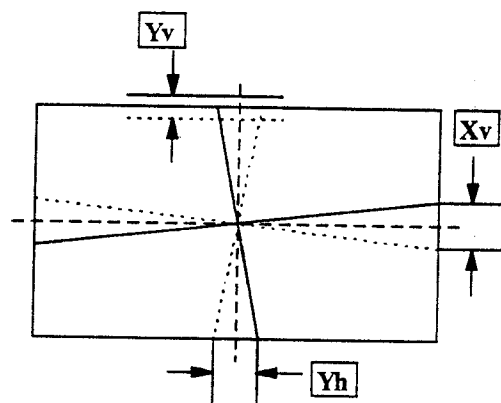
- 11.1. Use 48.9k 1024 X 768 violet cross hatch pattern.
- 11.2. Set Contrast to maximum and Brightness at a point when raster started to disappear.
- 11.3. Adjust the different coil to correct cross misconvergence of horizontal red and blue line. (as drawing 5)
- 11.4. Adjust VR1 to correct misconvergence of vertical red and blue line. (as drawing 6)
- 11.5. Adjust VR2 to correct unbalance misconvergence of horizontal red and blue line. (as drawing 7)
- 11.6. Varying angle between two tabs of 4 pole magnets to correct misconvergence of vertical red and blue line. (as drawing 1)
- 11.7. Varying the two tabs together, keep the angle between them constant to correct misconvergence of horizontal red and blue line. (as drawing 2)
- 11.8. Change to white cross hatch pattern.
- 11.9. Varying angle between two tabs of 6 pole magnets to correct misconvergence of vertical green and violet line.(as drawing 3)
- 11.10. Varying the two tabs together, keep the angle between them constant to correct misconvergence of horizontal green and violet line. (as drawing 4)

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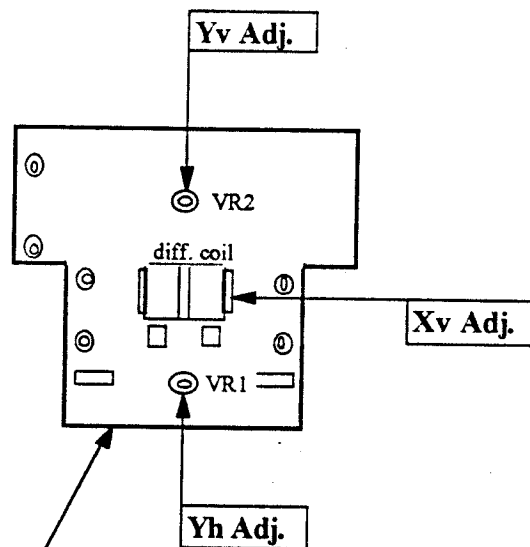


Drawing 1, 2, 3, 4

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1. Yv VR(VR2) : To correct unbalance misconvergence of horizontal red and blue lines.
2. Yh VR(VR1) : To correct misconvergence of vertical red and blue lines.
3. Xv coil(diff. coil) : To adjust cross misconvergence of horizontal red and blue lines.
4. ————— : Red color
 - - - - - : Blue color



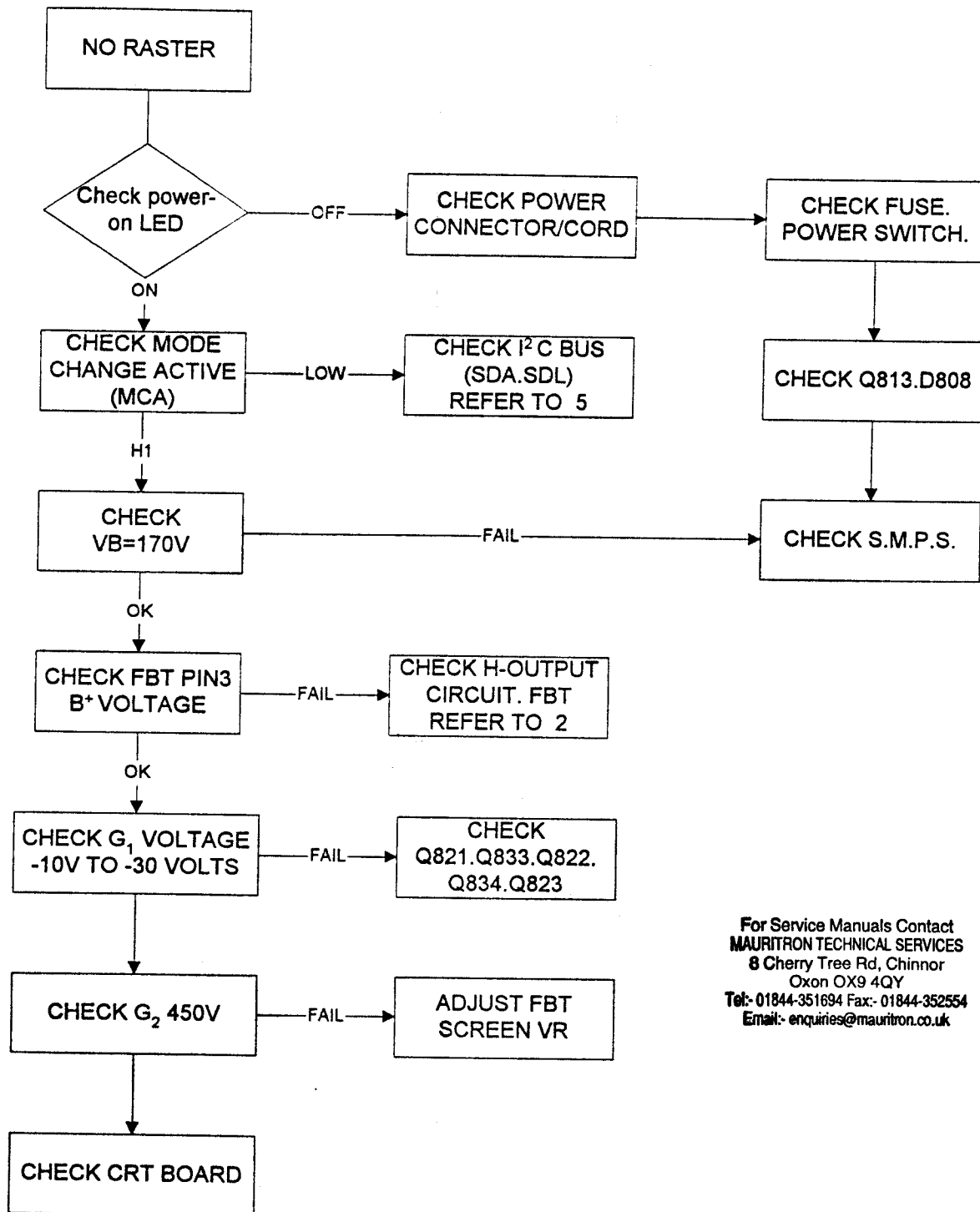
DY's terminal board of CRT

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Drawing 5, 6, 7

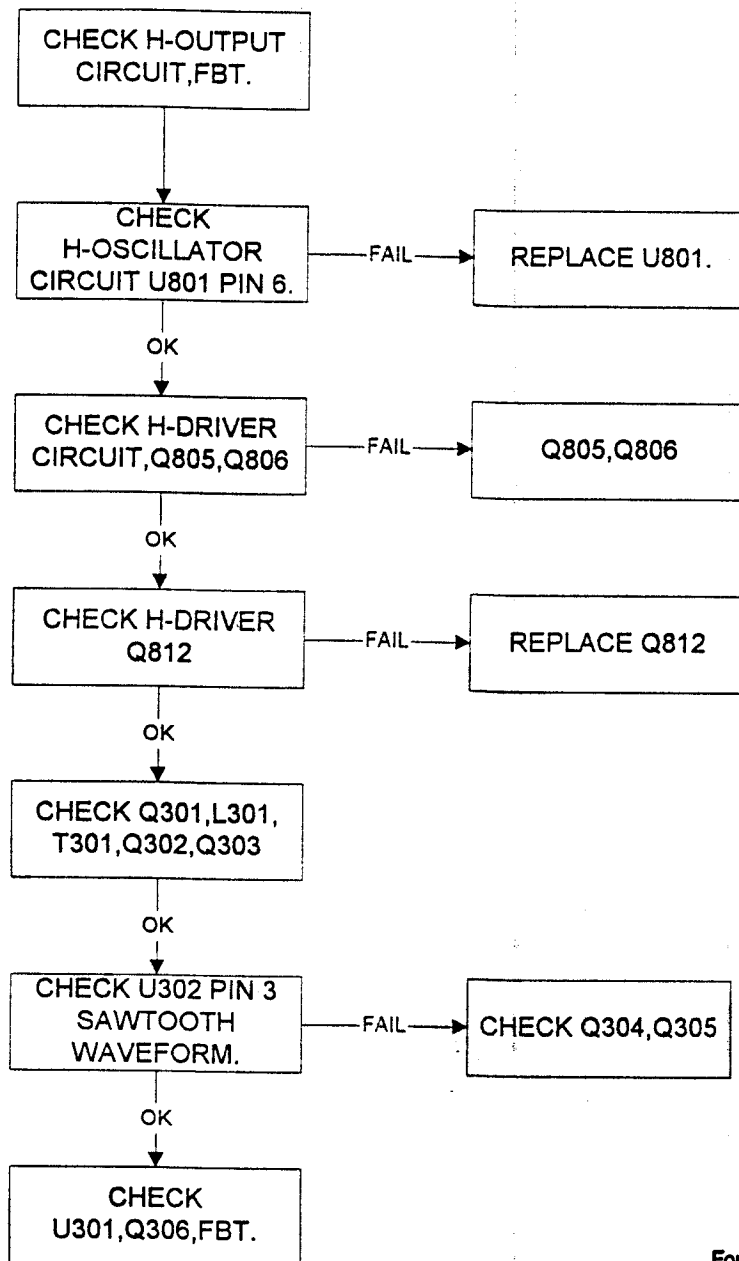
Trouble Shooting Flowchart

1. No raster



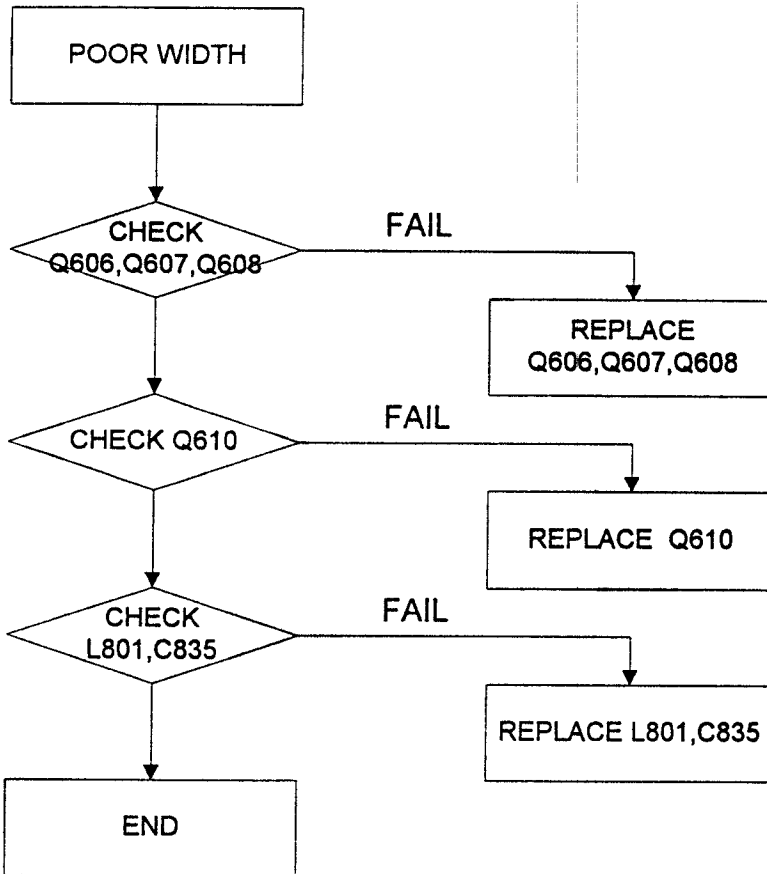
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2. Defective H-output circuit

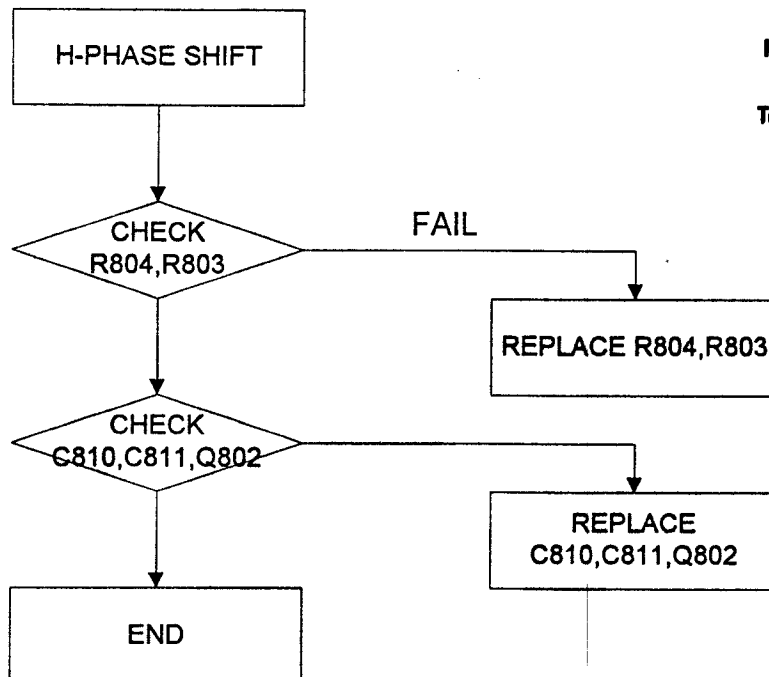


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3. Poor Width

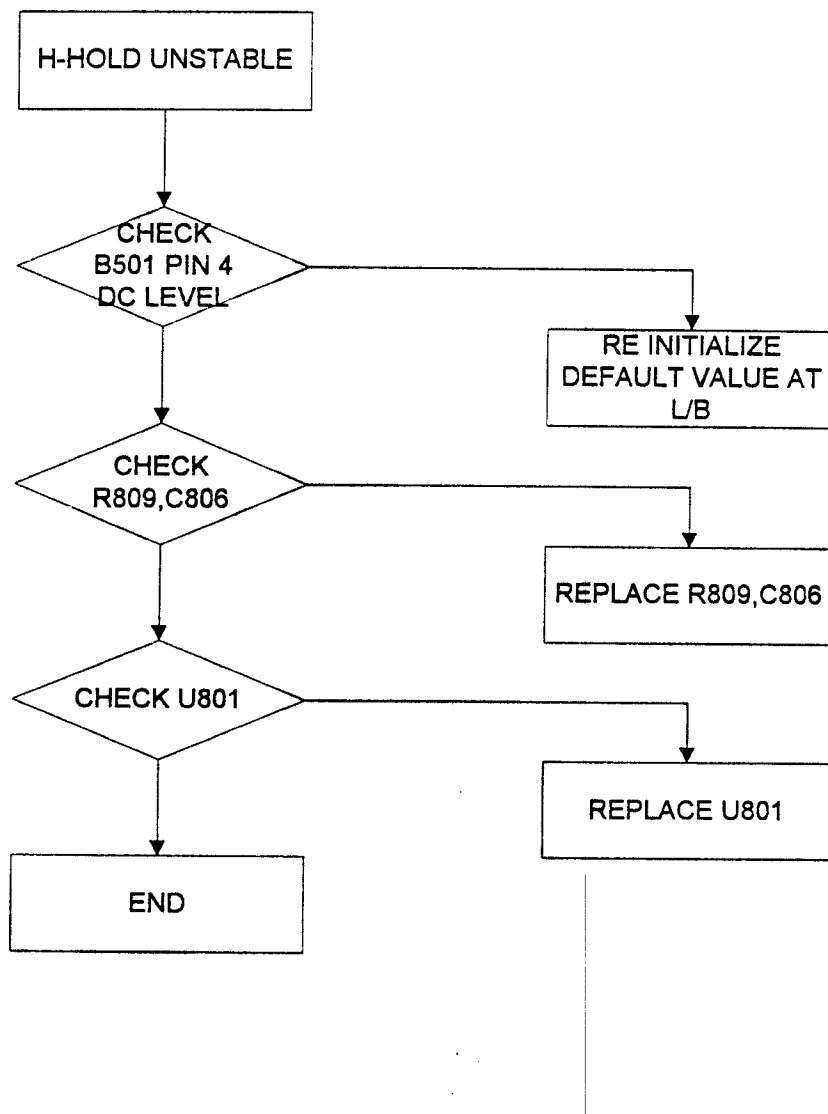


4. H-phase shifted



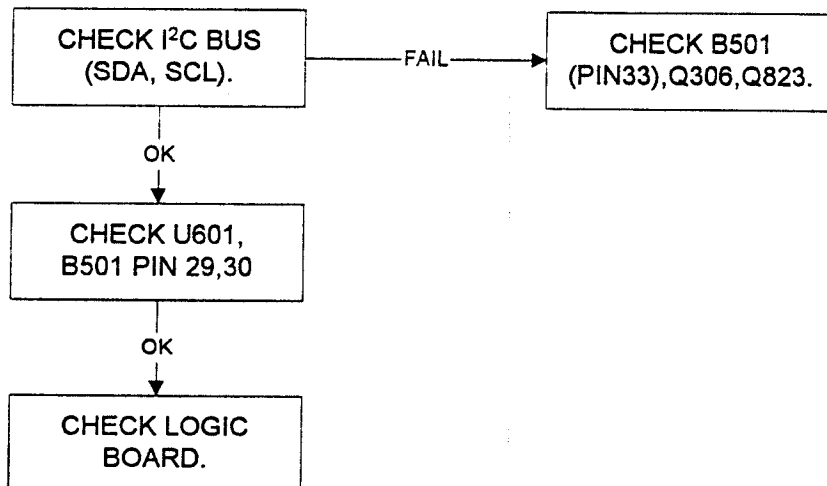
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5. H-Hold unstable

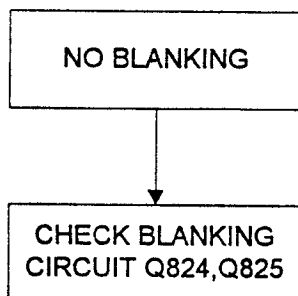


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6. Defective MCA

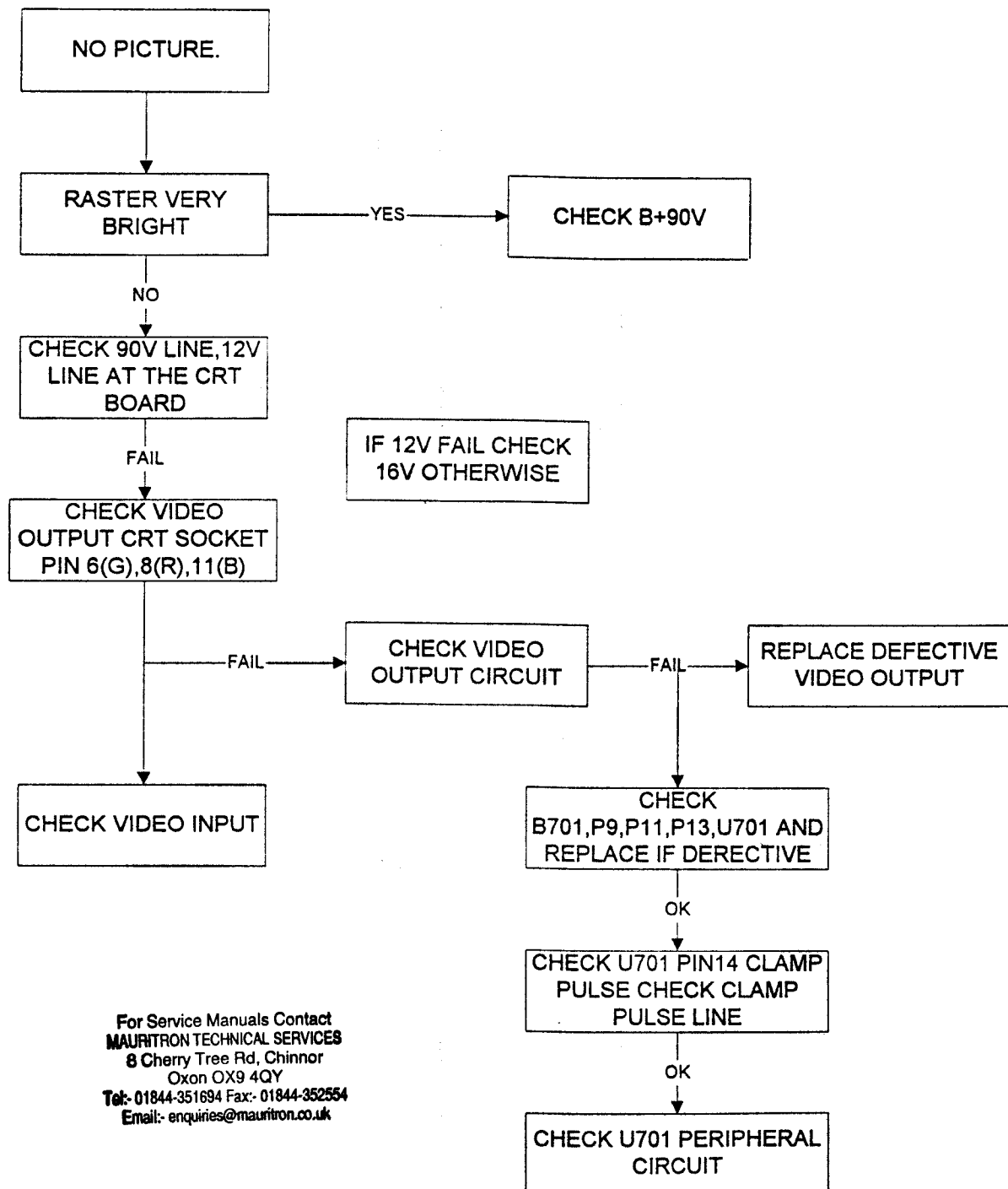


7. No blanking



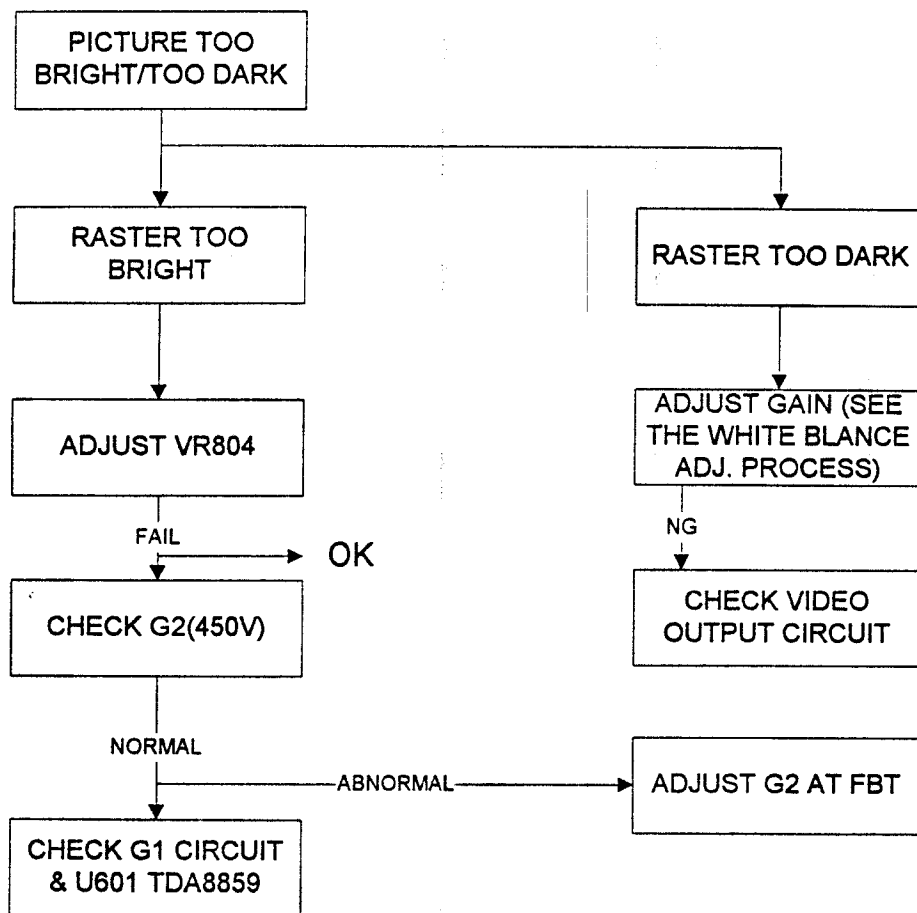
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8. No video, raster only



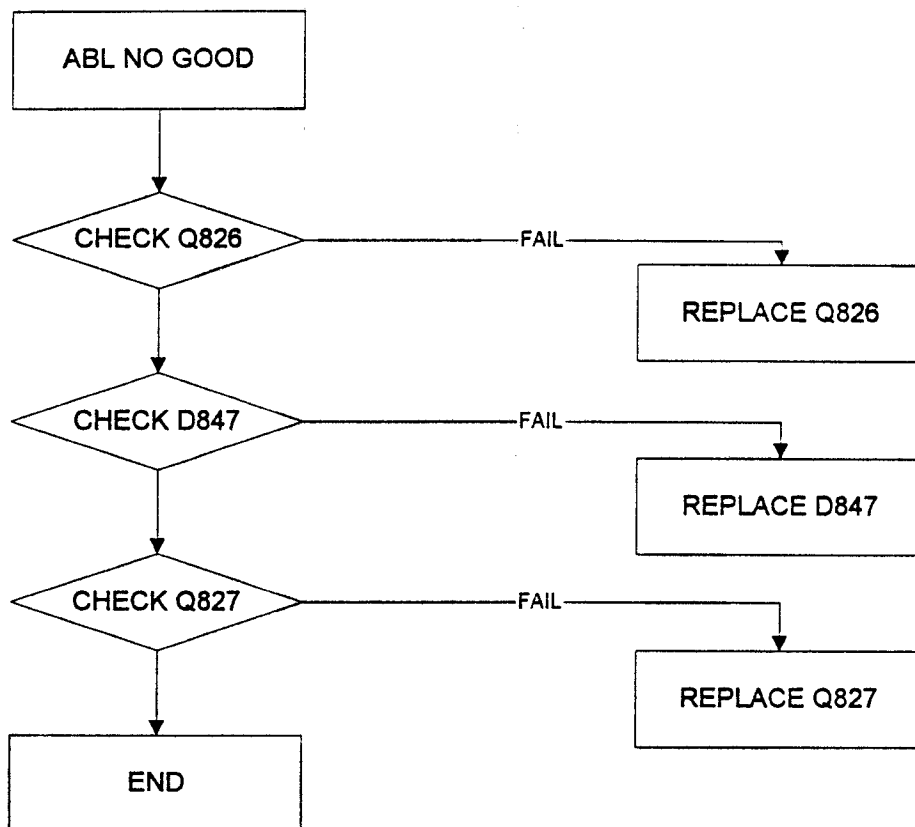
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9. Picture too bright/too dark

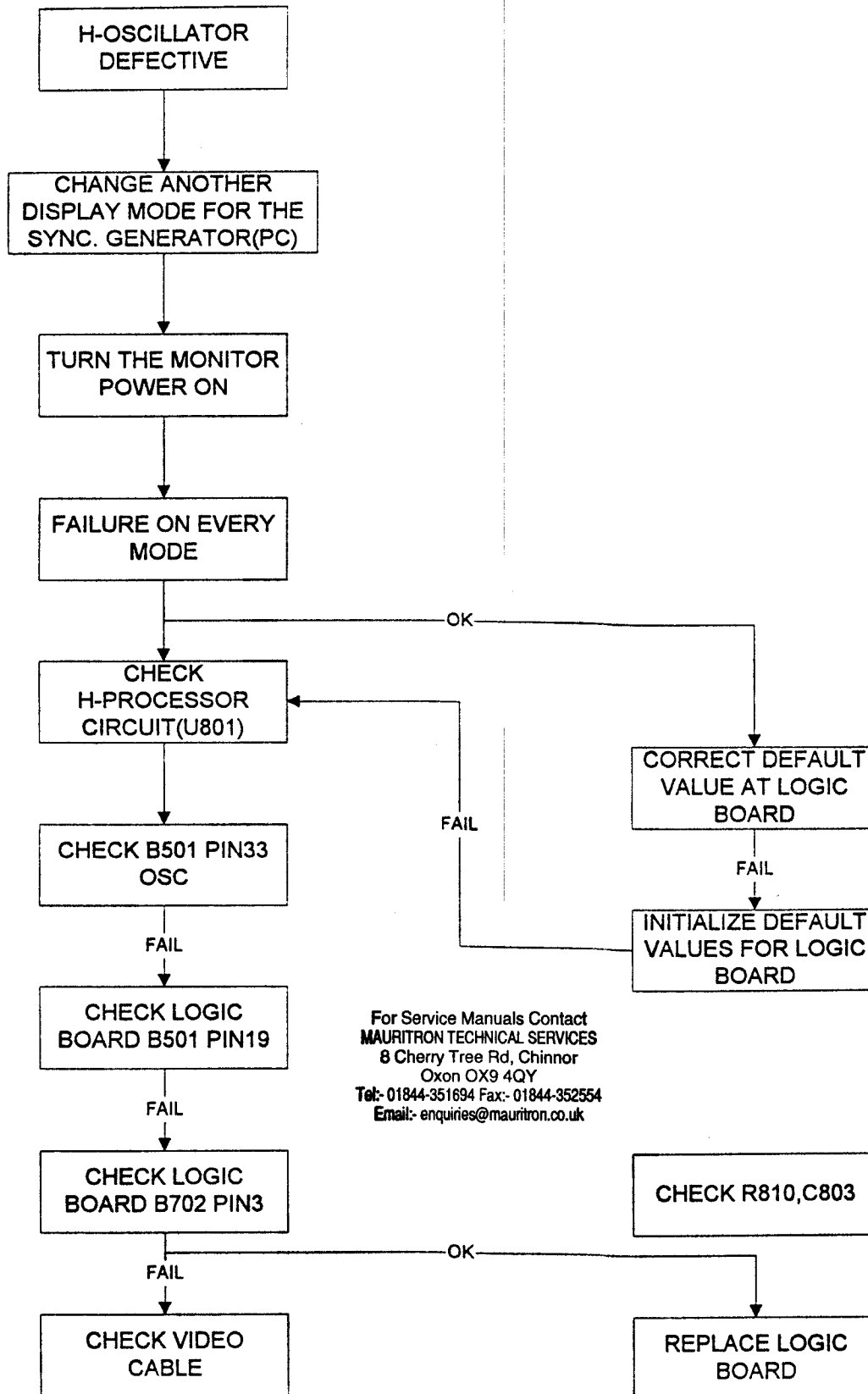


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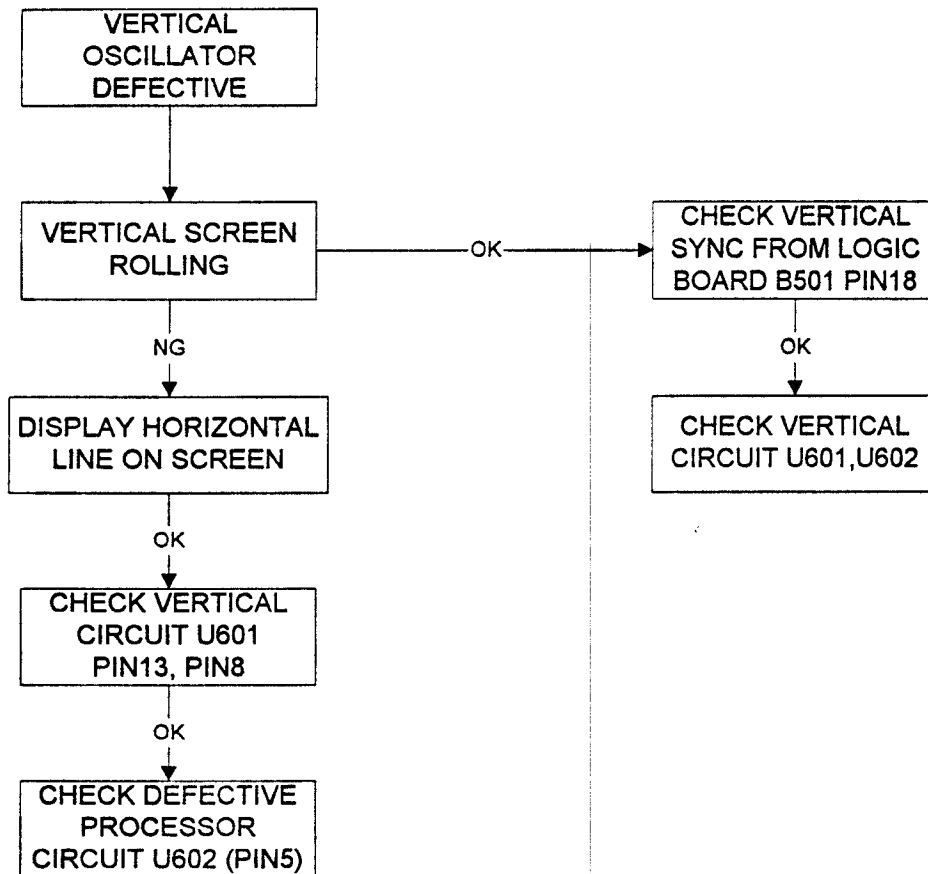
10. Defective ABL



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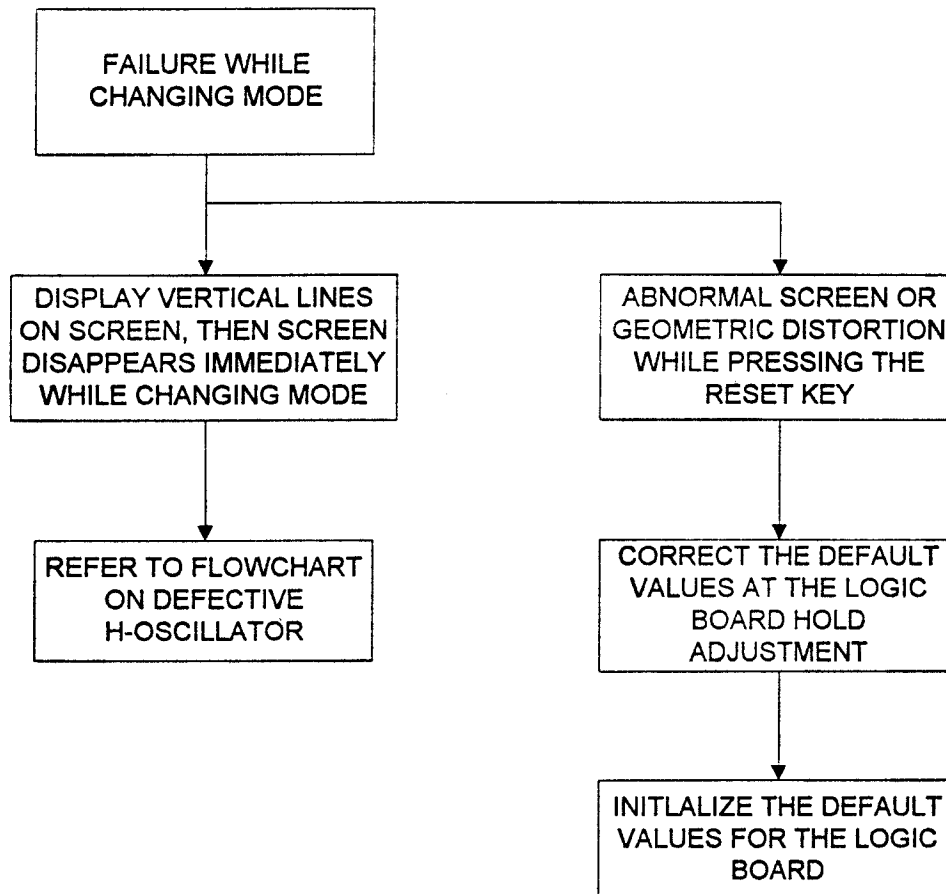
11. Defective H-oscillator

12. Vertical oscillator

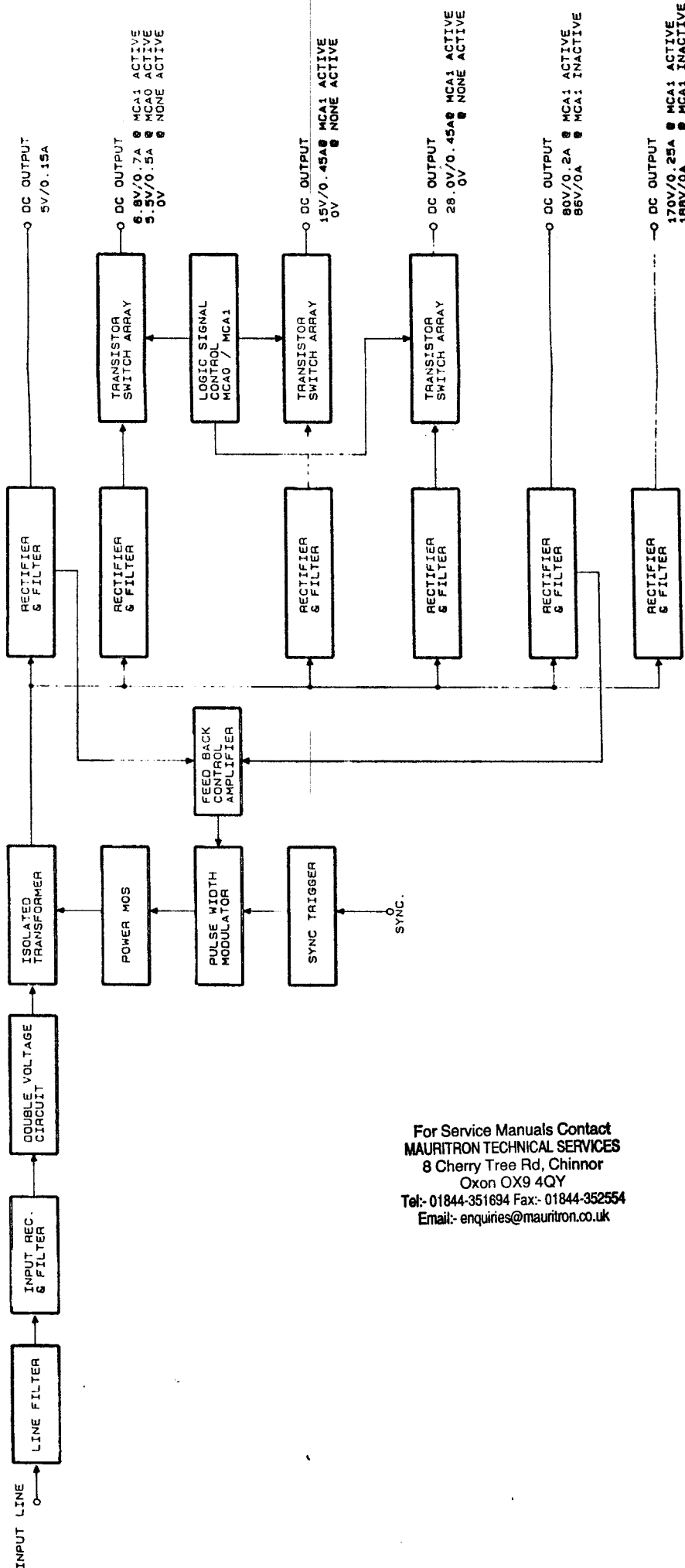


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13. Failure while changing mode



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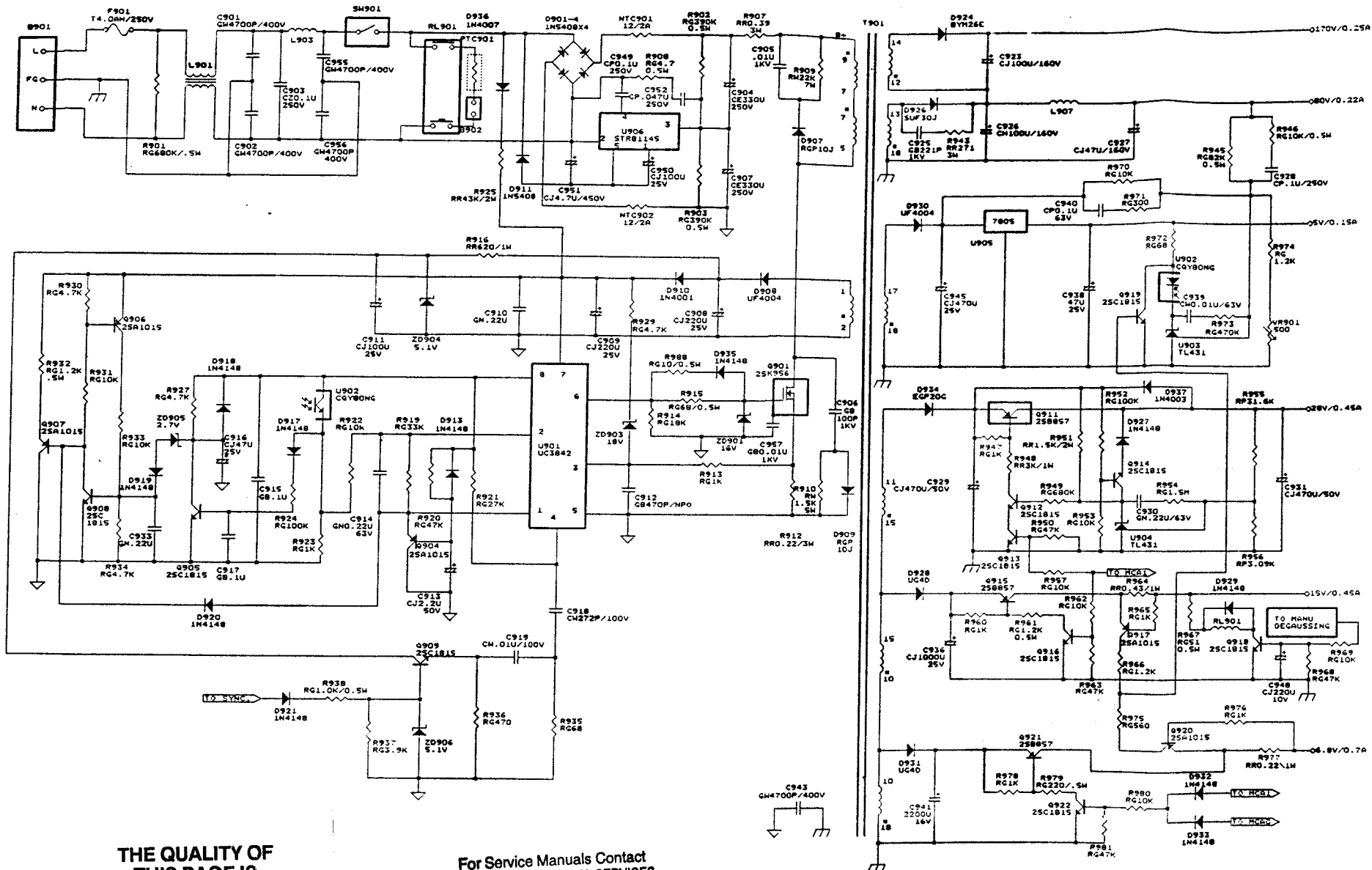


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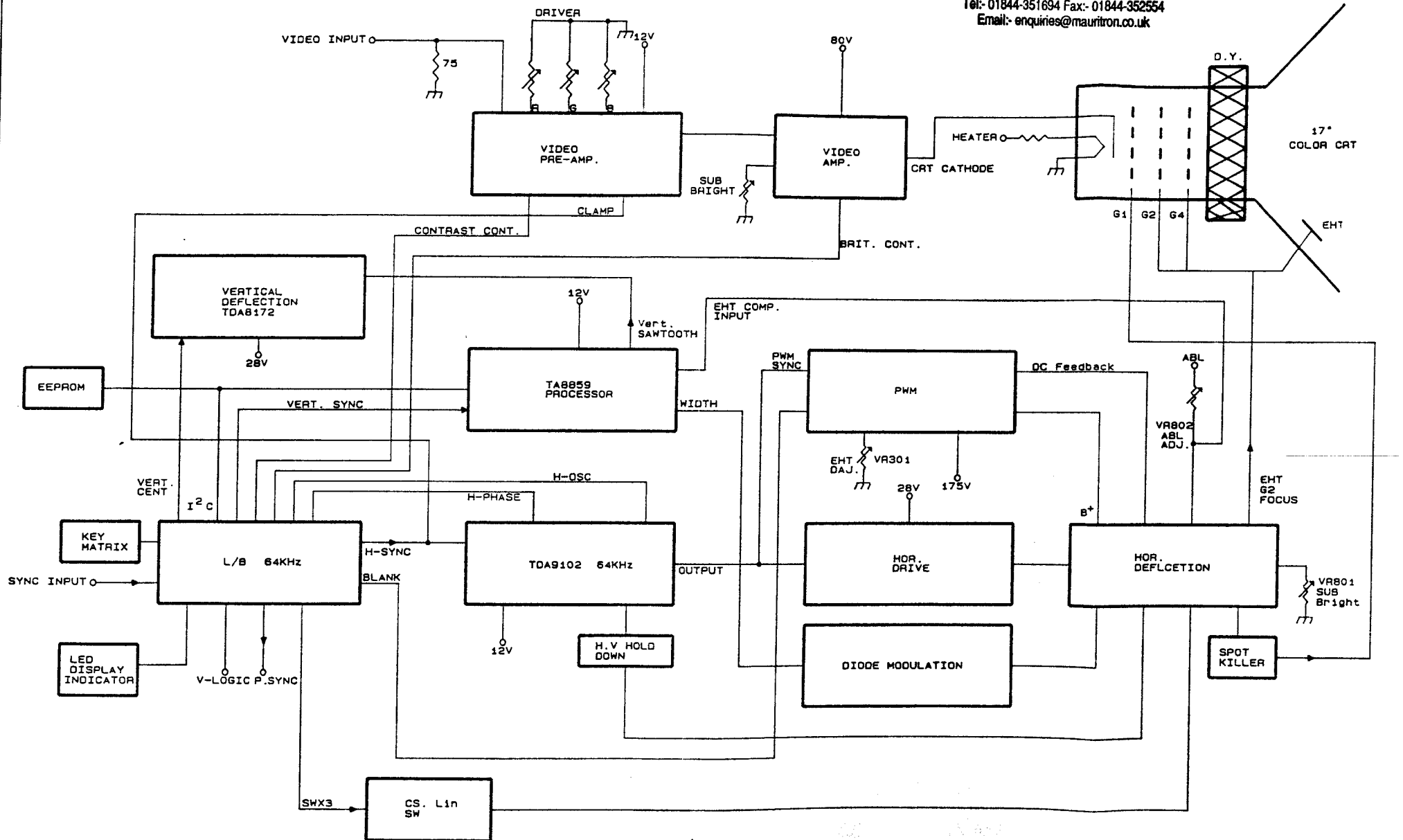
DRWN	M.T. J. 16/04	DATE	11/03/95	Title	ADI CORP.
CHK	K. S. J. 16/04	DATE	11/06/95	LM-1764/A/N S.P.S. BLOCK DIAGRAM	
APVD		DATE	11/06/95	Size Document Number	REV
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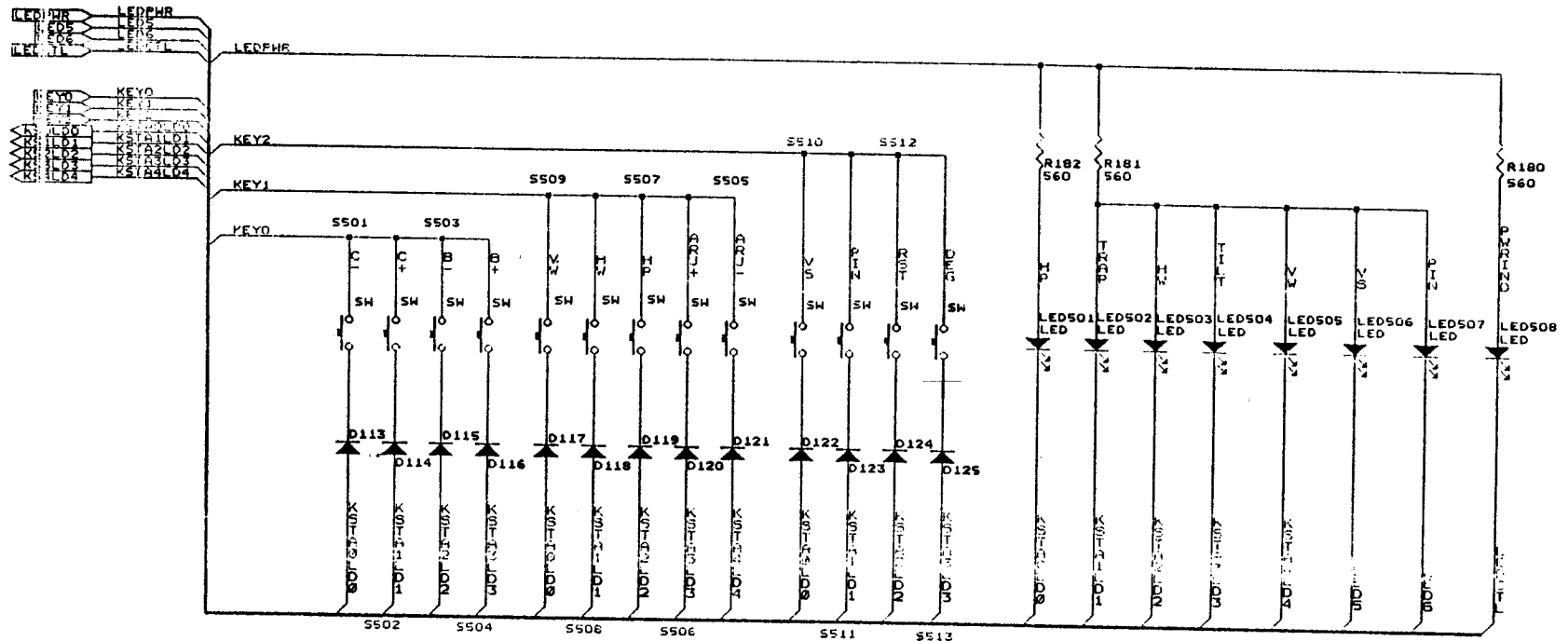
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DRW	M. J. Hsu	DATE	04/01/96	TITLE	ADI CORP.
CHK	K. S. Fan	DATE	04/02/96	LM-1764/A/N SWITCHING POWER SUPPLY	
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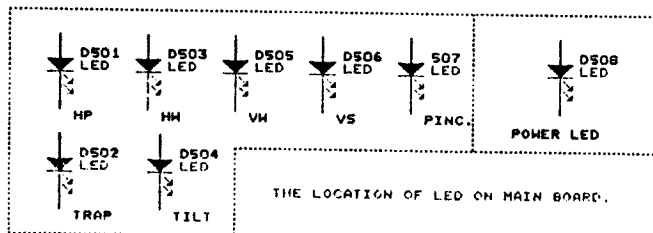


DRWN	Betty Wang	DATE	9.6.'95	ADI CORP.		
CHK	J. Yang	DATE	9.6.'95	Title	LM-1784/A MONITOR BLOCK DIAGRAM	
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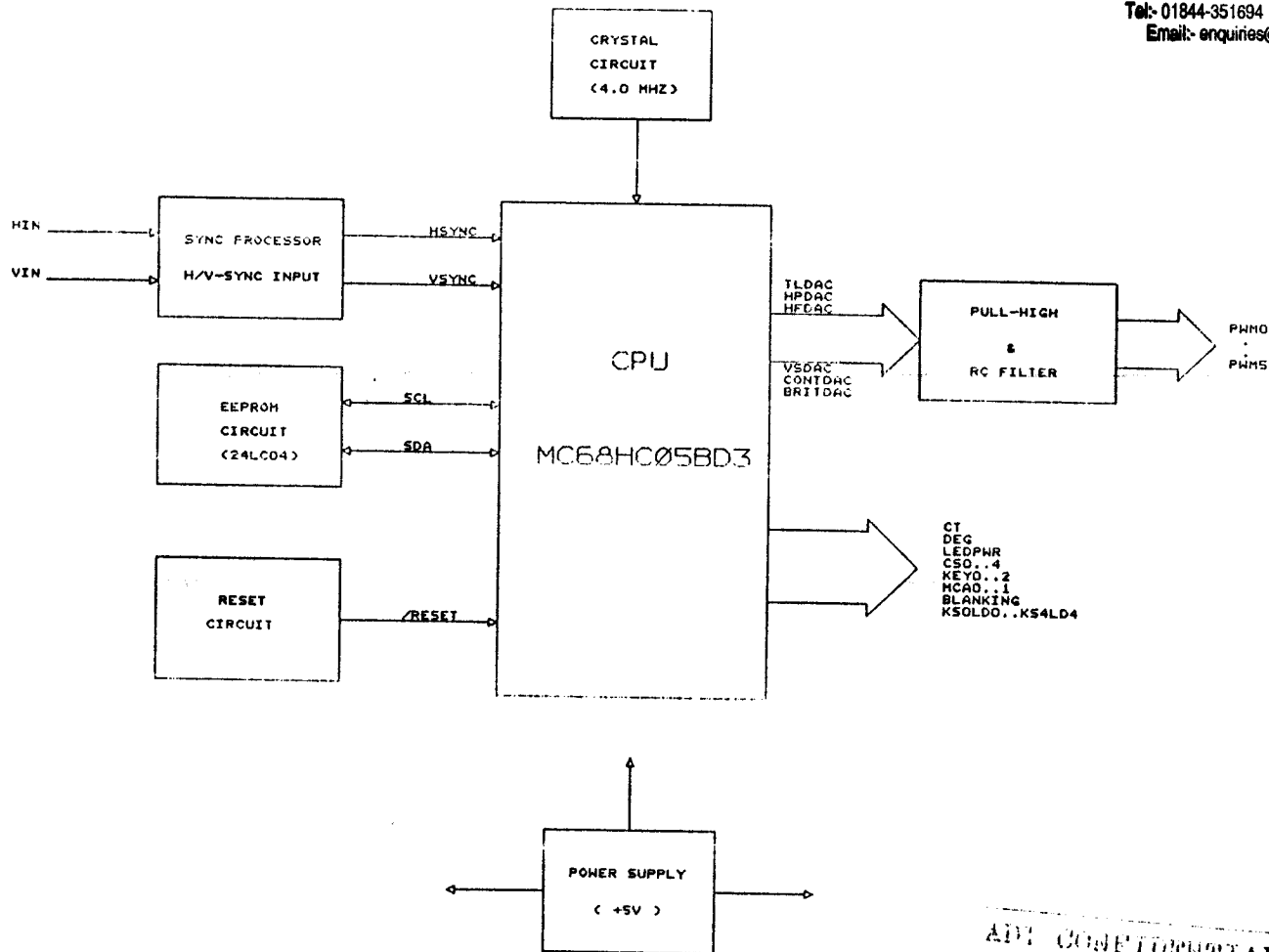


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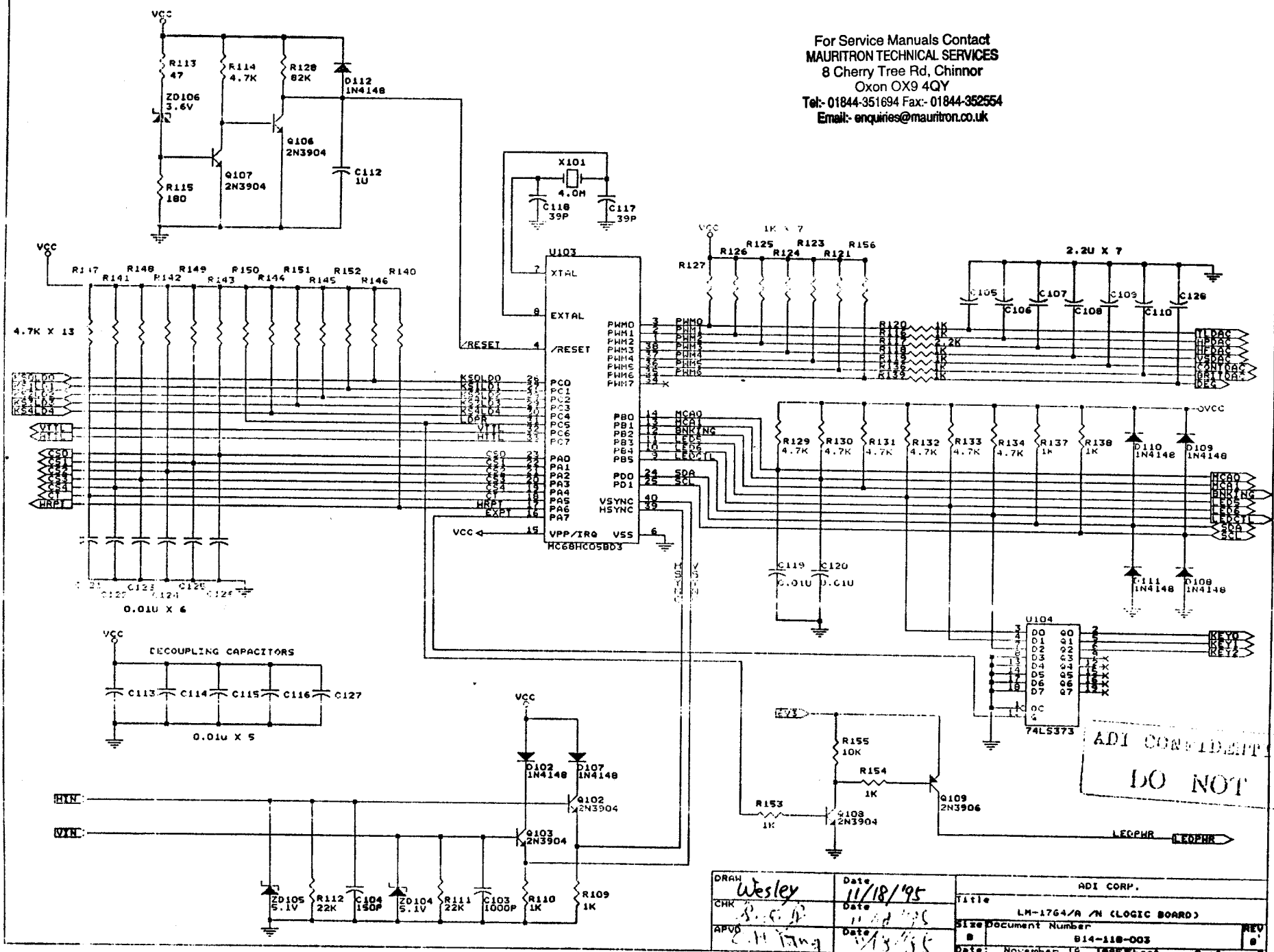
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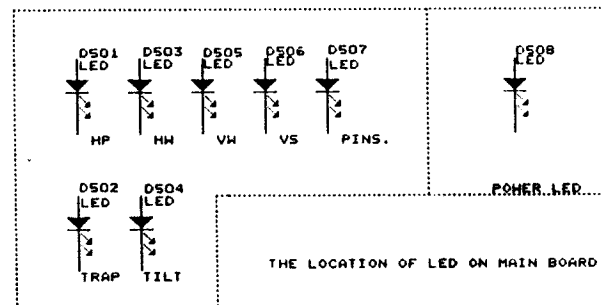
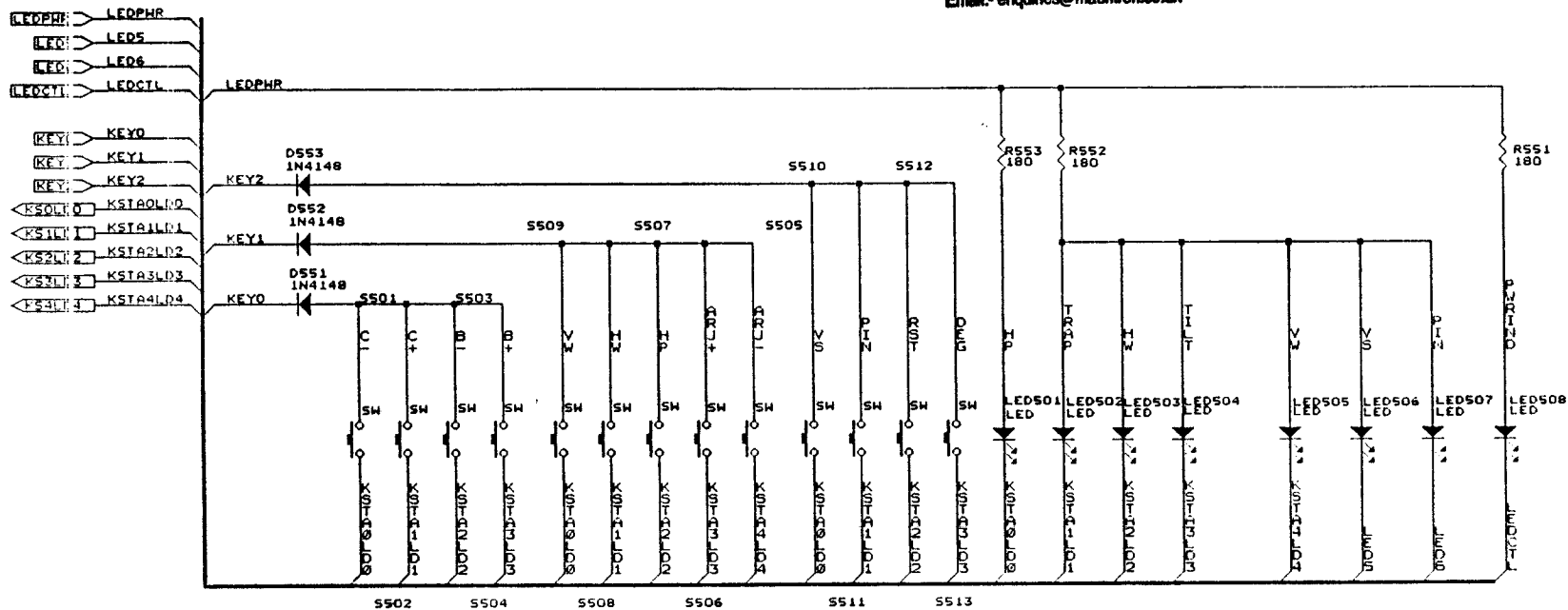
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