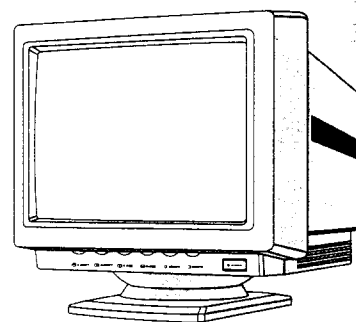


14" tripple vga colour monitor 7CM3209/60T/65T/66T/67T/68T/69T

7CM3279/60T/65T/66T

Service
Service
Service



Service Manual

TY60

Horizontal frequencies
31.47- 35.2- 35.5 KHz

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General

Mains voltage : 195.5 - 264.5 V
 Mains frequency : 50 Hz
 Power consumption : 80 W (typical)
 100 W (max.)
 Operating temperature : 10°C to 40°C
 Weight : 12.8 kg
 Width : 356mm
 Depth : 395mm
 Height : 359mm

Picture tube

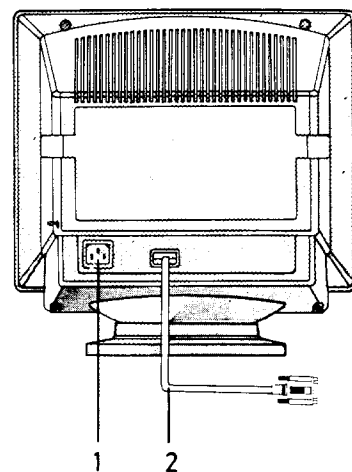
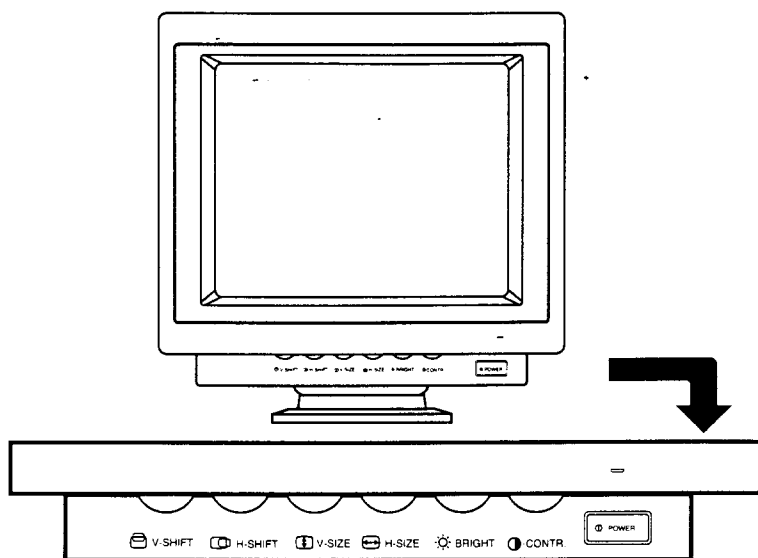
Size : 14 inch
 Light transmission : 57 %
 (dark glass)
 Deflection angle : 90 Degrees
 EHT voltage : 24.5 kVolt
 Pitch : 0.28 mm

Video

Dot rate : 45 MHz
 Display area : horizontal 270mm
 vertical 199mm
 Image area : horizontal 240mm +/- 3mm
 vertical 180 mm +/- 3mm (5 mm for 35.5 kHz)
 Vertical frequency : 50 - 90 Hz
 Sync. polarity : positive or negative
 Vertical shift range : 10 mm Min.
 Horizontal frequency : 31.47/35.2/35.5 kHz
 Catch-in range : +/- 600 Hz
 Sync. polarity : positive or negative
 Horizontal shift : 10 mm Min.

RESOLUTION MODES

Modes	Horizontal frequencies	Vertical frequencies	H. sync. polarity	V. sync. polarity	Resolution Dot * lines
VGA	31.5 kHz	70 Hz	Positive (+)	Negative (-)	640 * 350
VGA	31.5 kHz	70 Hz	Negative (-)	Positive (+)	640 * 400
VGA	31.5 kHz	60 Hz	Negative (-)	Negative (-)	640 * 480
VGA +	35.2 kHz	56 Hz	Positive (+) Negative (-)	Positive (+) Negative (-)	800 * 600
8514A	35.5 kHz	87 Hz	Positive (+) Negative (-)	Positive (+) Negative (-)	1024 * 768 (interlaced)

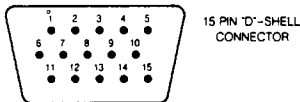


- 1. Power connector
- 2. "D" Shell interface cable



INPUT- OUTPUT SIGNALS

Pin	Signal	Sensitivity	Terminal impedance
1	Red Video input	RGB- analog 0-0.7 Vpp	75 Ω
2	Green Video input	RGB- analog 0-0.7 Vpp	75 Ω
3	Blue Video input	RGB- analog 0-0.7 Vpp	75 Ω
4	Ident output (connected to pin 10)		
5	Self test input (ground)		
6	Red Video ground		
7	Green Video ground		
8	Blue Video ground		
9	Not connected (no pin)		
10	Logic ground		
11	Ident output (connected to pin 10)		
12	Ident output (not connected)		
13	Horizontal sync.	TTL Level L=0 - 0.8 V H=2.4 - 5 V	2.2 k Ω (pull down)
14	Vertical sync.	TTL Level L=0 - 0.8 V H=2.4 - 5 V	2.2 k Ω (pull down)
15	Not connected		

INPUT-OUTPUT SIGNALS



Warnings

1. Safety regulations require that the unit should be returned in its original conditions and that components identical to the original components are used. The safety components are indicated by the symbol .
2. In order to prevent damage to ICs and transistors, all high-voltage flash-overs must be avoided. In order to prevent damage to the picture tube, the method shown in Fig. 3.1 should be used to discharge the picture tube. Use a high-voltage probe and a multimeter (position DC-V). Discharge until the meter reading is 0 V (after approx. 30s).
3. **ESD** 
All ICs and many other semiconductors are sensitive to electrostatic discharges (ESD). Careless handling during repair can drastically shorten the life. Make sure that during repair you are connected by a pulse band with resistance to the same potential as the earth of the unit. Keep components and tools also at this same potential.
4. When repairing a unit, always connect it to the mains voltage via an isolating transformer.
5. Be careful when taking measurements in the high-voltage section and on the picture tube panel.
6. It is recommended that safety goggles are worn when replacing the picture tube.
7. When making settings, use plastic rather than metal tools.
This will prevent any short-circuit and the danger of a circuit becomes unstable.
8. Never replace modules or other components while the unit is switched on.
9. Together with the deflection unit the picture tube is used as an integrated unit.
Adjustment of this unit during repair is therefore not recommended.
10. After repair the wiring should be fastened once more in the cable clamps for this purpose.

Notes

1. The direct voltages and oscillograms are average voltages. They have been measured by using the Service testsoftware and under the following conditions:
 - Signal pattern: cross hatch
 - Adjust brightness and contrast control for the mechanical mid-position (click position)
2. The picture tube panel has printed spark gaps. Each spark gap is connected between an electrode of the picture tube and the Aquadag coating.
3. The semiconductors indicated in the circuit diagram(s) and in the parts lists are completely interchangeable per position with the semiconductors in the unit, irrespective of the type indication on these semiconductors.

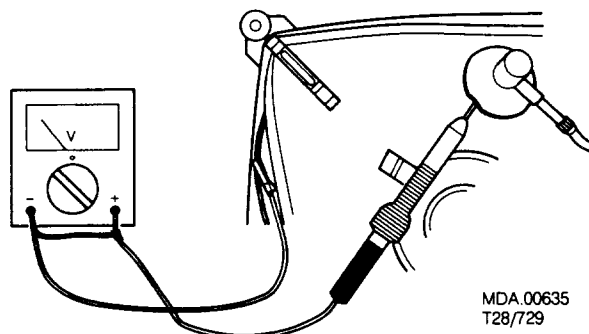


Fig. 3.1

General:

When carry-out the electrical settings in many cases a video signal must be applied to the monitor. A computer with an "ATI1024 V6-1.04/PH Beta4" interface card (1024 * 768) is used as the video signal source. The signal pattern are selected from the "Service test software" package.

Installation instruction for the ATI card:

- Place the ATI interface card in the computer.
- Select the "VSETUP" file from the utility disk belonging to the card.
- Select "ANALOG MONITOR".
- Select the "NEC 3D" option.
- Re-boot your computer again !
- Put the floppy with the "Service test software" package in the computer and select the test pattern indicated for the following settings.

Electrical adjustments(Fig.7.1)

1. B+ supply voltage (3131, 3138)

- Select the "cross-hatch" pattern.
- Set the brightness control 3318 and the contrast control 3312 to minimum.
- Set trimming potentiometer 3138 and 3131 in the mid position (that is a pre-setting).
- Connect a DC voltmeter between capacitor 2123 and ground (B+ output).
- Switch on the monitor.
- First apply a video signal in the 31.5 kHz mode, then adjust trimming potentiometer 3131 until the D.C. voltmeter reads 87V.
- Switch the video signal to 35.2/35.5 kHz mode, adjust trimming potentiometer 3138 for the following supply voltages:
 - a) 35.2 kHz mode ... $99V \pm 0.5 V$
 - b) 35.5 kHz mode ... $99.2V \pm 0.5 V$

2. Horizontal synchronisation (3425, 3421)

- Select the "cross-hatch" pattern.
- Short the junction of resistor 3423 and capacitor 2410 to ground.
- First apply a video signal in the 31.5 kHz mode, then adjust trimming potentiometer 3425 until the picture is straight.
- Then switch video signal to 35.2/35.5 kHz mode, adjust trimming potentiometer 3421 until the picture is straight.
- Remove the short-circuit (to ground).

3. Picture geometry setting (general)

- For the following settings apply a video signal (cross-hatch) to the monitor.
- Pre-set H-Shift 3416 and V-Shift 3524 (external controls) to mid-position.
- Pre-set contrast control 3312 to click position and brightness control 3318 to maximum.

3.1 Horizontal image centring (3452,3413,3922)

- Apply a video signal in the 31.5 kHz mode (480 lines). Adjust potentiometer 3452 for the correct horizontal centring of the hole raster.
- Adjust potentiometer 3413 for the correct horizontal centring of the video display.
- Switch video signal to 35.2/35.5 kHz mode. Adjust potentiometer 3922 for the correct horizontal centring of the video display.

3.2 Vertical height (3539, 3926, 3537, 3923,3919)

- Apply a video signal in the 31.5 kHz mode (480 lines).
- Set external V-size control 3567 to minimum position.
- Adjust potentiometer 3539 for a picture height of 160mm.
- Adjust external V-size control 3567 for a picture height of 180mm.
- With the same signal mode but with 400 lines.
- Set external V-size control 3567 to minimum position.
- Adjust potentiometer 3926 for a picture height of 160mm.
- Adjust external V-size control 3567 for a picture height of 180mm.
- With the same signal mode but with 350 lines.
- Set external V-size control 3567 to min position.
- Adjust potentiometer 3537 for a picture height of 160mm.
- Adjust external V-size control 3567 for a picture height of 180mm.
- Switch video signal to 35.2kHz (600 lines).
- Set external V-size control 3567 to minimum position.
- Adjust potentiometer 3923 for a picture height of 160mm.
- Adjust external V-size control 3567 for a picture height of 180mm.
- Switch video signal to 35,5kHz (768 lines).
- Set external V-size control 3567 to minimum position.
- Adjust potentiometer 3919 for a picture height of 160mm.
- Adjust external V-size control 3567 for a picture height of 180mm.

3.3 Picture width (3553, 3925)

- Apply a video signal in the 31.5 kHz mode(480 lines).
- Set external H-size control 3568 to minimum position.
- Adjust potentiometer 3553 for a picture width of 225mm.
- Adjust external H-size control 3568 for a picture width of 240mm.
- Switch video signal to 35.2/35.5 kHz mode.
- Set external H-size control 3568 to minimum position.
- Adjust potentiometer 3925 for a picture width of 225mm.
- Adjust external H-size control 3568 for a picture width of 240mm.

3.4 East-west correction (3544, 3924)

- Apply a video signal in the 31.5 kHz (480 lines). Adjust potentiometer 3544 until the vertical lines on the left- and right-hand sides of the screen are as straight as possible.
- Switch video signal to 35.2/35.5 kHz mode. Adjust potentiometer 3924 until the vertical lines on the left- and right-hand sides of the screen are as straight as possible.

4. Adjustments of:

- * VG2 (bottom knob on the line output transformer)
- * Cut-off points of the picture tube (3373, 3376, 3379)
- * White "D" (3321, 3324, 3327, 3316)
- Pre-set potentiometers 3321, 3324, 3327, 3379, 3376 and 3373 to the mid-position.
- Apply a video signal (full-white) in the 31.5 kHz mode (480 lines).
- Set brightness control 3318 at click

position and contrast 3312 and sub-contrast 3316 to minimum.

- Set VG2 potentiometer on the line output transformer to minimum.
- Adjust VG2 potentiometer to increase VG2 voltage until any colour among red, green and blue becomes "just visible"
- Adjust the potentiometer of the "two remaining" colours (3373, 3376 and 3379) to the same light output level, so that an optimal background (raster) colour is obtained.
- Adjust brightness control 3318 to maximum to double check the background (raster) colour. Then return it to click position.
- Set sub-contrast potentiometer 3316 at the mid-position and contrast control 3312 at click position.
- Adjust potentiometers 3321, 3324 and 3327 to the same light output level so that an optimal display colour (White "D") is obtained.
- If necessary, adjust sub-contrast potentiometer 3316 for the optimal light output of the video display.
- Adjust contrast control 3312 to maximum to double check the displayed colours.

5. Focussing

- Apply a video signal ("M" characters) in the 31.5 kHz mode (480 lines).
- Set brightness control 3318 at click position and contrast control 3312 to maximum.
- Adjust focus potentiometer (top knob on the line output transformer) so that the picture at 2/3 of the diagonal lines (from centre to four corners) of the displayed screen is as sharp as possible.

6. Pulse duration setting monostable multivibrator (3819)

- Apply a signal in the 31.5 kHz mode.
- Connect an oscilloscope to pin 6 of 7801.
- Using trimming potentiometer 3819, set the time of the positive period of the pulse at pin 6 of 7801 to $30 \pm 0.3\mu s$.

PARTS INDICATED ON EXPLODED VIEW, MAIN PANEL

PARTS INDICATED ON
EXPLODED VIEW

CABINET PARTS

100	4822 430 10369	Front 7CM3209
100	4822 430 10371	Front 7CM3279
101	4822 413 31659	Knob
102	4822 492 70913	Spring
103	4822 410 61332	Button (Power)
104	4822 502 30619	Screw
105	4822 438 10363	Back cover
106	4822 432 92585	Cover
107	4822 432 10828	Rotary disc
108	4822 462 10419	Pedestal
109	4822 462 40831	Pad

ELECTRICAL PARTS NOT ON PCB

150	4822 526 20183	Spoiler
151	4822 131 20425	CRT (M34KBV80X17) for 7CM3209/ 60T/65T/66T/ 67T/69T
151	4822 131 20403	CRT (M34KBV80X17-S) for 7CM3209/68T
151	4822 131 20428	CRT (M34KBV280X18) for 7CM3279/60T/ 65T/66T
152	4822 157 63287	Degaussing coil for /60T/65T/66T/ 68T/69T
152	4822 157 63308	Degaussing coil for /67T
153	4822 321 61371	Interface cable for /60T/65T/66T/68T
153	4822 321 61489	Interface cable for /67T/69T
154	4822 285 20403	Power socket
155	5322 253 30373	Fuse (2A) for /60T/65T/66T
155	4822 253 30175	Fuse (3A) for /67T
155	4822 070 32002	Fuse (2A) for /68T/69T

ACCESSORIES

200	4822 321 10676	Mains cord for /60T/69T
200	4822 321 10621	Mains cord for /65T/68T
200	4822 321 22554	Mains cord for /66T
200	4822 321 10764	Mains cord for /67T

MAIN PANEL

Various

4822 276 11504	power switch
4822 265 20235	2p (J15)
4822 267 30987	2p (M102)
4822 267 31461	2p
4822 264 30312	2p (M105)
4822 265 30896	3p

4822 265 30375	4p (M405)
4822 492 62076	spring for 7409
5322 390 20011	silicon grease
4822*466 92891	isol.pl. 7409
4822 255 40893	isol.pl. 7101



2102	4822 126 10177	4.7nF 400V
2103	4822 126 10177	4.7nF 400V
2104	4822 121 43516	47nF 400V
2108	4822 124 41819	100µF 20%
2108	4822 124 22682	330µF 10% (67T)
2109	4822 121 43516	47nF 400V
2111	4822 124 41996	470µF 20% 35V
2112	4822 122 32569	220pF 2kV
2113	4822 121 41689	100nF 250V
2114	4822 124 22669	1µF 20% 50V
2115	4822 121 43917	15nF 20% 400V
2116	4822 121 43918	100nF 10% 400V
2117	4822 124 41996	470µF 20% 35V
2121	4822 122 33691	330pF 2kV
2122	4822 126 10783	100pF 5% 2kV
2123	4822 124 41991	100µF 20% 200V
2125	4822 124 41469	100µF 100V
2126	4822 121 43696	100nF 100V
2126	4822 124 42199	22µF 20% 50V (67T)
2127	4822 122 33645	220pF 500V
2128	4822 124 41996	470µF 20% 35V
2129	4822 122 33645	220pF 500V
2131	4822 124 42143	1500µF 20% 25V
2132	4822 124 42145	100µF 20% 25V
2133	4822 124 42172	1000µF 16V
2134	4822 122 33645	220pF 500V
2135	4822 124 22681	47µF 20% 16V
2136	4822 122 33966	10nF 50V
2137	4822 124 42177	47µF 16V
2140	4822 122 33966	10nF 50V
2401	4822 121 43769	2.7nF 50V
2402	4822 122 33496	100nF 10% 63V
2404	4822 122 33496	100nF 10% 63V
2405	4822 121 43824	1.5nF 63V
2406	4822 121 43919	3.3nF 5% 63V
2407	4822 122 32442	10nF 50V
2408	5322 121 54065	2.7nF 1% 160V
2409	4822 122 32442	10nF 50V
2410	4822 122 32442	10nF 50V
2411	4822 124 22678	100µF 20% 16V
2412	4822 122 31784	4.7nF 10% 50V
2413	4822 124 22669	1µF 20% 50V
2414	4822 121 43686	220nF 10% 100V
2415	4822 122 33496	100nF 10% 63V
2416	4822 122 33969	27pF 5% 500V
2417	4822 121 43515	10nF 400V
2418	4822 124 42166	2.2µF 20% 63V
2419	4822 124 42177	47µF 16V
2420	4822 126 11454	470pF 2KV
2421	4822 121 43916	330nF 10% 250V
2422	4822 126 10783	100pF 5% 2KV only in 7CM3209
2423	4822 121 43677	5.6nF 5% 1.6KV
2424	4822 121 43678	15nF 5% 400V
2427	4822 121 43679	47nF 5% 250V
2428	4822 124 22461	6.8µF 50V
2429	4822 121 43679	47nF 5% 250V
2430	4822 122 33645	220pF 500V
2431	4822 124 22365	47µF 160V
2432	5322 124 41817	220µF 16V
2433	4822 121 40336	47nF 250V
2435	4822 124 22678	100µF 20% 16V
2436	4822 124 22681	47µF 20% 16V
2438	4822 124 40387	4.7µF 50% 160V
2440	4822 122 33496	100nF 10% 63V

2461	4822 121 43698	470nF 100V
2462	4822 121 43698	470nF 100V
2463	4822 121 43698	470nF 100V
2501	4822 122 32442	10nF 50V
2502	4822 121 43685	100nF 10% 100V
2503	4822 121 43696	100nF 100V
2504	4822 121 43713	330nF 100V
2505	4822 124 42173	220µF 35V
2506	4822 124 22362	1000µF 35V
2507	4822 122 32542	47nF 10% 63V
2508	4822 124 42173	220µF 35V
2509	4822 124 22669	1µF 20% 50V
2511	4822 121 43686	220nF 10% 100V
2512	4822 124 42357	33µF 25V
2514	4822 124 21502	4700µF 10% 25V
2515	4822 124 22686	10µF 16V
2516	4822 124 22669	1µF 20% 50V
2517	4822 124 22336	100µF 20% 40V
2518	4822 121 43686	220nF 10% 100V
2519	4822 122 32442	10nF 50V
2521	4822 122 33496	100nF 10% 63V
2522	4822 122 33496	100nF 10% 63V
2523	4822 122 33496	100nF 10% 63V
2524	4822 122 31644	2.2nF 10% 63V
2526	4822 124 22678	100µF 20% 16V
2527	4822 124 22678	100µF 20% 16V
2528	4822 122 32442	10nF 50V
2529	4822 122 33496	100nF 10% 63V
2531	4822 124 41659	4.7µF 20% 25V
2532	4822 124 41659	4.7µF 20% 25V
2801	4822 121 51592	3.9nF 5% 63V
2805	4822 122 32442	10nF 50V
2808	4822 121 51592	3.9nF 5% 63V



3101	4822 116 40209	PTC
3101	4822 116 40126	PTC (67T)
3102	4822 116 30341	6Ω 15%
3103	4822 050 23904	390k
3104	4822 050 23904	390k
3105	4822 116 80388	22k 5W
3106	4822 116 81822	68Ω 5% 1W
3107	4822 116 82453	0Ω43 5%
3108	4822 116 82453	0Ω43 5%
3109	4822 116 82453	0Ω43 5%
3110	4822 116 82451	2Ω0 5%
3111	4822 050 24701	470Ω
3112	4822 050 22702	2k7
3113	4822 050 21002	1k
3114	4822 050 22002	2k
3115	4822 050 24709	47Ω
3117	4822 050 21002	1k
3118	4822 050 21002	1k
3119	4822 113 80516	8Ω2 5% 10W
3119	4822 113 80517	5Ω6 10W (67T)
3120	4822 116 52187	24Ω
3121	4822 050 23302	3k3
3122	4822 050 22203	22k
3123	4822 050 22203	22k
3124	4822 050 21004	100k
3125	4822 050 21002	1k
3126	4822 050 23901	390Ω
3127	4822 050 24302	4k3
3129	4822 050 21303	13k
3130	4822 052 10158	1.5Ω NFR25
3131	4822 101 10927	470Ω
3132	4822 050 22202	2k2
3135	4822 050 22203	22k
3136	4822 050 22702	2k7
3137	4822 050 21503	15k
3138	4822 100 11213	22k 30%
3139	4822 050 24303	43k

MAIN PANEL

3141	4822 050 21502	1k5	3467	4822 116 52215	220Ω	3804	4822 050 12403	24k 1% 0.4W
3150	4822 116 30341	6Ω 15%	3469	4822 051 10223	22k 2% 0.25W	3811	4822 051 10822	8k2 2% 0.25W
3151	4822 116 52191	33Ω	3470	4822 050 28203	82k	3812	4822 051 10123	12k 2% 0.25W
3152	4822 116 52188	27Ω	3471	4822 051 10182	1k8 2% 0.25W	3815	4822 051 10203	20k 2% 0.25W
3153	4822 050 22003	20k	3472	4822 050 22702	2k7	3819	4822 100 11392	47k potmeter
3154	4822 116 82872	82Ω 5%	3473	4822 050 24701	470Ω			
3155	4822 116 52188	27Ω	3474	4822 051 10272	2k7 2% 0.25W			
3311	4822 051 10681	680Ω 2% 0.25W	3475	4822 051 10103	10k 2% 0.25W			
3312	4822 102 10428	10k potmeter	3501	4822 051 20222	2k2 5% 0.1W			
3318	4822 102 10429	100k 20%	3502	4822 051 10102	1k 2% 0.25W	5101	4822 146 30882	power trafo
3401	4822 051 10272	2k7 2% 0.25W	3503	4822 051 10102	1k 2% 0.25W	5104	4822 157 52233	10μH
3402	4822 051 10472	4k7 2% 0.25W	3504	4822 050 21009	10Ω	5121	4822 156 21399	10μH
3403	4822 050 22702	2k7	3505	4822 051 10822	8k2 2% 0.25W	5123	4822 157 52234	100μH
3404	4822 051 10332	3k3 2% 0.25W	3506	4822 051 10392	3k9 2% 0.25W	5124	4822 157 52234	100μH
3405	4822 051 10104	100k 2% 0.25W	3507	4822 051 10472	4k7 2% 0.25W	5401	4822 148 81081	hor. drive trafo
3406	4822 051 10332	3k3 2% 0.25W	3508	4822 052 10228	2.2Ω NFR25	5402	4822 157 63715	4μH
3407	4822 051 10472	4k7 2% 0.25W	3509	4822 051 10472	4k7 2% 0.25W	5403	4822 157 62268	linearity coil
3408	4822 050 25604	560k	3510	4822 051 20222	2k2 5% 0.1W	5404	4822 157 62267	coil for 7CM3209
3409	4822 051 10104	100k 2% 0.25W	3511	4822 051 10824	820k 2% 0.25W	5404	4822 157 62675	coil for 7CM3279
3410	4822 051 10272	2k7 2% 0.25W	3512	4822 050 22208	2.2Ω	5405	4822 157 53185	drum coil
3412	4822 051 10123	12k 2% 0.25W	3513	4822 116 52215	220Ω	5406	4822 140 10388	LOT for 7CM3209
3413	4822 100 11141	10k trimpotmeter	3514	4822 116 82988	1k 2 1% 0.25W	5406	4822 140 10405	LOT for 7CM3279
3415	4822 051 10103	10k 2% 0.25W	3515	4822 050 22202	2k2			
3416	4822 102 10444	2k 0.2W	3516	4822 051 10101	100Ω 2% 0.25W			
3417	4822 051 10123	12k 2% 0.25W	3517	4822 051 10479	47Ω 2% 0.25W			
3418	4822 050 24701	470Ω	3518	4822 050 21001	100Ω	6101	4822 130 31933	1N5061
3419	4822 051 10103	10k 2% 0.25W	3519	4822 116 82642	2Ω 1W	6102	4822 130 31933	1N5061
3420	4822 050 26803	68k	3521	4822 116 82452	220Ω 5%	6103	4822 130 31933	1N5061
3421	4822 100 11163	100k potmeter	3522	4822 050 21802	1k8	6104	4822 130 31933	1N5061
3422	4822 050 27503	75k	3523	4822 050 25602	5k6	6105	5322 130 81917	SB140
3423	4822 050 21502	1k5	3524	4822 102 10428	10k potmeter	6106	4822 130 31393	RGP10J
3424	4822 050 21802	1k8	3525	4822 116 80553	150Ω 5% 1W	6107	4822 130 31393	RGP10J
3425	4822 100 11319	4k7	3526	4822 050 21004	100k	6108	4822 130 30621	1N4148
3426	4822 050 12202	2k2 1% 0.4W	3527	4822 051 10471	470Ω 2% 0.25W	6109	5322 130 31971	RGP15D
3427	4822 050 21802	1k8	3528	4822 051 10102	1k 2% 0.25W	6110	4822 130 30621	1N4148
3428	4822 116 80551	180Ω 5% 2W	3531	4822 050 21003	10k	6111	4822 130 34167	BZX79-C6V2
3429	4822 051 10154	150k 2% 0.25W	3532	4822 050 22202	2k2	6114	4822 130 30621	1N4148
3430	4822 050 21303	13k	3533	4822 050 24703	47k	6115	4822 130 30621	1N4148
3431	4822 050 26801	680Ω	3534	4822 051 10393	39k 2% 0.25W	6116	5322 130 81917	SB140
3432	4822 050 22201	220Ω	3535	4822 051 10682	6k8 2% 0.25W	6117	4822 130 31393	RGP10J
3433	4822 051 10123	12k 2% 0.25W	3537	5322 100 11544	220k	6121	5322 130 33885	RGP15J
3434	4822 050 22203	22k	3539	5322 100 11544	220k	6122	5322 130 34574	1N4004G
3435	4822 050 21505	1M5	3540	4822 050 21003	10k	6124	5322 130 33885	RGP15J
3436	4822 116 82454	820Ω 5%	3541	4822 050 21004	100k	6125	5322 130 33885	RGP15J
3437	4822 052 10478	4.7Ω NFR25	3542	4822 050 21503	15k	6126	4822 130 31024	BZX79-B18
3438	4822 113 80582	27Ω 10% 5W	3544	4822 100 11141	10k trimpotmeter	6127	4822 130 31607	RGP10D
3439	4822 050 26809	68Ω	3545	4822 050 21004	100k	6128	5322 130 33885	RGP15J
3440	4822 116 82455	7k 5 0.25W	3547	4822 053 20106	10M	6129	5322 130 31971	RGP15D
3442	4822 051 10104	100k 2% 0.25W	3548	4822 051 10224	220k 2% 0.25W	6130	4822 130 34167	BZX79-F6V2
3443	4822 052 10101	100Ω NFR25	3549	4822 050 24705	4M7	6131	5322 130 81917	SB140
3444	4822 052 10158	1.5Ω NFR25	3550	4822 052 10478	4.7Ω NFR25	6132	4822 130 30621	1N4148
3448	4822 116 82053	470Ω 5% 1W	3551	4822 051 10125	1M 2 5% 0.25W	6134	4822 130 30842	BAV21
3449	4822 116 82053	470Ω 5% 1W	3552	4822 050 24705	4M7	6135	4822 130 34398	BZX79-B24
3450	4822 050 21803	18k 1% 0.6W	3553	4822 100 11141	10k trimpotmeter	6401	4822 130 30621	1N4148
3451	4822 052 10158	1.5Ω NFR25	3554	4822 050 22704	270k	6402	4822 130 30621	1N4148
3452	4822 100 20847	100Ω 2W potm.	3555	4822 051 10472	4k7 2% 0.25W	6403	4822 130 30621	1N4148
3453	4822 116 80542	82Ω 1W	3556	4822 051 10681	680Ω 2% 0.25W	6404	4822 130 31607	RGP10D
3454	4822 116 80542	82Ω 1W	3557	4822 051 10272	2k7 2% 0.25W	6405	4822 130 31607	RGP10D
3455	4822 050 21004	100k	3559	4822 050 21003	10k	6406	4822 130 30842	BAV21
3456	4822 116 80545	1k 0.5W	3561	4822 052 10278	2.7Ω NFR25	6407	4822 130 42489	RGP10G
3457	4822 050 24703	47k	3562	4822 052 10478	4.7Ω NFR25	6408	5322 130 81132	MUR4100E
3458	4822 051 10104	100k 2% 0.25W	3563	4822 052 10478	4.7Ω NFR25	6409	4822 130 80445	HER305
3459	4822 051 10102	1k 2% 0.25W	3565	4822 050 23304	330k	6410	5322 130 81132	MUR4100E
3460	4822 116 52215	220Ω	3566	4822 051 10124	120k 2% 0.25W	6412	5322 130 31971	RGP15D
3461	4822 050 21002	1k	3567	4822 101 21188	100k 20% 0.2W	6414	4822 130 30621	1N4148
3462	4822 050 22203	22k	3568	4822 102 10428	10k potmeter	6415	4822 130 30621	1N4148
3463	4822 050 21004	100k	3569	4822 051 10472	4k7 2% 0.25W	6417	4822 130 34233	BZX79-C5V1
3464	4822 051 10103	10k 2% 0.25W	3801	4822 051 10103	10k 2% 0.25W	6419	4822 130 31607	RGP10D
3465	4822 051 10103	10k 2% 0.25W	3802	4822 051 10103	10k 2% 0.25W	6420	4822 130 30621	1N4148
3466	4822 116 80556	120k	3803	4822 050 12403	24k 1% 0.4W			

MAIN PANEL, VIDEO PANEL

6421	4822 130 20245	SFOR5D43
6422	4822 130 30621	1N4148
6423	4822 130 30621	1N4148
6501	4822 130 30621	1N4148
6502	4822 130 30621	1N4148
6503	4822 130 30621	1N4148
6504	4822 130 30621	1N4148
6505	4822 130 31878	1N4003
6506	4822 130 30842	BAV21
6507	4822 130 30621	1N4148
6508	4822 130 30621	1N4148
6509	4822 130 31253	BZX79-C2V4
6511	4822 130 30621	1N4148
6801	4822 130 30621	1N4148
6802	4822 130 30621	1N4148



7101	4822 130 62282	2SC3679-0
7101	4822 130 62296	2SC3680 (67T)
7102	4822 130 41344	BC337-40
7103	4822 130 80908	CNX62A
7104	4822 209 81726	L7812CV
7105	4822 130 41344	BC337-40
7106	4822 130 40995	BD434
7107	4822 130 41344	BC337-40
7108	4822 130 41087	BC638
7121	4822 130 62284	BDT60C
7122	4822 130 41782	BF422
7123	5322 130 24081	BT151-500R
7125	4822 130 44503	BC547C
7401	4822 130 41594	PH2369
7402	4822 130 41594	PH2369
7403	4822 209 10223	HEF4077BP
7404	5322 209 85602	N74LS123N
7405	5322 130 60068	BC558C
7406	4822 209 72804	MC1391P
7407	5322 130 60068	BC558C
7408	4822 130 41053	BC639
7409	4822 130 62933	BU2508A
7410	4822 130 41594	PH2369
7413	4822 130 44503	BC547C
7414	5322 130 60068	BC558C
7415	4822 130 44196	BC548C
7501	4822 130 44196	BC548C
7502	4822 209 62369	TDA1675
7503	4822 130 44104	BC328
7504	4822 130 44121	BC338
7505	4822 130 42231	BC557C
7506	4822 130 42231	BC557C
7507	4822 130 44196	BC548C
7508	4822 209 10263	HEF4052BP
7509	4822 130 44196	BC548C
7511	4822 130 42231	BC557C
7512	4822 130 60784	BDT61
7513	4822 130 44196	BC548C
7514	4822 130 44196	BC548C
7516	5322 130 60068	BC558C
7801	5322 209 10422	HEF4538BP

VIDEO PANEL

Various

1202	4822 212 23684	video panel for /60T/65T/66T/68T
1202	4822 212 23706	video panel assy for /67T/69T

4822 265 30888	6p (M305)
4822 701 12251	7p (M302)
4822 265 41185	11p (M307)
4822 255 70245	CRT holder F301
4822 265 20366	1p (M304)



2301	4822 124 22686	10μF 16V
2302	4822 124 22686	10μF 16V
2303	4822 124 22686	10μF 16V
2304	4822 124 22686	10μF 16V
2305	4822 124 22669	1μF 20% 50V
2306	4822 126 10206	2.2nF 500V
2307	4822 122 33967	680pF 500V
2308	4822 122 33496	100nF 10% 63V
2309	4822 122 33496	100nF 10% 63V
2310	4822 122 40427	470pF 2kV
2311	4822 122 33496	100nF 10% 63V
2312	4822 122 33496	100nF 10% 63V
2313	4822 122 33496	100nF 10% 63V
2314	4822 122 33496	100nF 10% 63V
2315	4822 124 40804	22μF 20% 63V
2317	4822 124 22678	100μF 20% 16V
2319	4822 124 22681	47μF 20% 16V
2322	4822 122 33966	10nF 50V
2324	4822 124 22675	1μF 20% 160V
2326	4822 124 22675	1μF 20% 160V
2327	4822 124 40387	4.7μF 50% 160V
2328	4822 124 22686	10μF 16V
2331	4822 122 33966	10nF 50V
2333	4822 122 31765	100pF 5% 50V
2334	4822 122 31765	100pF 5% 50V
2335	4822 122 31765	100pF 5% 50V
2336	4822 122 33966	10nF 50V
2337	4822 124 42148	22μF 20% 100V
2338	4822 124 42147	10μF 20% 100V
2339	4822 124 42147	10μF 20% 100V
2340	4822 124 42147	10μF 20% 100V
2342	4822 121 43913	470nF 100V
2343	4822 121 43913	470nF 100V
2344	4822 121 43913	470nF 100V
2346	4822 124 42148	22μF 20% 100V
2351	4822 122 31971	10pF 10% 50V
2352	4822 122 31971	10pF 10% 50V
2353	4822 122 31971	10pF 10% 50V
2391	4822 122 32442	10nF 50V



3301	4822 051 10759	75Ω 2% 0.25W
3302	4822 051 10759	75Ω 2% 0.25W
3303	4822 051 10759	75Ω 2% 0.25W
3304	4822 116 80547	1k5 5% 0.5W
3305	4822 116 80548	15k 5% 0.5W
3307	4822 051 10103	10k 2% 0.25W
3308	4822 051 10103	10k 2% 0.25W
3309	4822 051 10103	10k 2% 0.25W
3310	4822 051 10562	5k6 2% 0.25W
3313	4822 051 20222	2k2 5% 0.1W
3314	4822 051 20222	2k2 5% 0.1W
3315	4822 051 10472	4k7 2% 0.25W
3316	4822 100 11141	10k trimpotmeter
3319	4822 051 10109	10Ω 2% 0.25W
3320	4822 051 10472	4k7 2% 0.25W
3321	4822 100 11597	100Ω trimpotmeter
3322	4822 051 10103	10k 2% 0.25W
3323	4822 051 10109	10Ω 2% 0.25W
3324	4822 100 11597	100Ω trimpotmeter
3325	4822 051 10103	10k 2% 0.25W
3326	4822 051 10339	33Ω 2% 0.25W
3327	4822 100 11597	100Ω trimpotmeter
3328	4822 051 10103	10k 2% 0.25W
3329	4822 052 10478	4.7Ω NFR25

3330	4822 051 10103	10k 2% 0.25W
3331	4822 051 10103	10k 2% 0.25W
3332	4822 051 10122	1k2 2% 0.25W
3333	4822 050 24703	47k
3334	4822 051 10472	4k7 2% 0.25W
3335	4822 116 80929	10k 5% 2W
3336	4822 051 10153	15k 2% 0.25W
3337	4822 050 21004	100k
3338	4822 051 10224	220k 2% 0.25W
3338	4822 051 10624	620k 2% 0.25W
3339	4822 050 21004	100k
3340	4822 052 10109	10Ω NFR25
3341	4822 051 10391	390Ω 2% 0.25W
3342	4822 050 22201	220Ω
3344	4822 050 22201	220Ω
3345	4822 051 10391	390Ω 2% 0.25W
3346	4822 050 22201	220Ω
3347	4822 050 28209	82Ω
3348	4822 116 83553	1k3 12% 3W
3349	4822 051 10391	390Ω 2% 0.25W
3350	4822 051 10273	27k 2% 0.25W
3352	4822 051 10829	82Ω 2% 0.25W
3353	4822 116 90536	120Ω 1% 0.125W
3354	4822 051 10829	82Ω 2% 0.25W
3355	4822 116 90536	120Ω 1% 0.125W
3356	4822 051 10829	82Ω 2% 0.25W
3357	4822 051 10391	390Ω 2% 0.25W
3358	4822 051 10102	1k 2% 0.25W
3359	4822 050 25601	560Ω
3361	4822 050 26801	680Ω
3362	4822 051 10479	47Ω 2% 0.25W
3364	4822 051 10479	47Ω 2% 0.25W
3365	4822 116 83553	1k 3 12% 3W
3366	4822 052 10109	10Ω NFR25
3367	4822 051 10479	47Ω 2% 0.25W
3370	4822 052 10109	10Ω NFR25
3371	4822 116 83553	1k 3 12% 3W
3372	4822 051 10223	22k 2% 0.25W
3373	5322 100 11539	100k trimpotmeter
3374	4822 051 10154	150k 2% 0.25W
3375	4822 051 10223	22k 2% 0.25W
3376	5322 100 11539	100k trimpotmeter
3377	4822 051 10154	150k 2% 0.25W
3378	4822 051 10223	22k 2% 0.25W
3379	5322 100 11539	100k trimpotmeter
3381	4822 051 10154	150k 2% 0.25W
3382	4822 051 10104	100k 2% 0.25W
3383	4822 051 10104	100k 2% 0.25W
3384	4822 051 10104	100k 2% 0.25W
3385	4822 051 10334	330k 2% 0.25W
3386	4822 051 10334	330k 2% 0.25W
3387	4822 051 10334	330k 2% 0.25W
3388	4822 051 20222	2k2 5% 0.1W
3391	4822 116 80549	220Ω 5% 0.5W
3392	4822 116 80549	220Ω 5% 0.5W
3393	4822 116 80549	220Ω 5% 0.5W



5302	4822 152 20587	7.5μH
5303	4822 157 52493	3.3μH
5304	4822 157 52493	3.3μH
5305	4822 157 52493	3.3μH



6301	4822 130 30621	1N4148
6302	4822 130 31878	1N4003
6303	4822 130 30621	1N4148
6304	4822 130 30842	BAV21
6305	4822 130 30842	BAV21
6306	4822 130 30842	BAV21

VIDEO PANEL, LED PANEL, EMI PANEL, TRI FREQ. PANEL

6307	4822 130 30621	1N4148
6308	4822 130 30621	1N4148
6309	4822 130 30621	1N4148
6310	4822 130 42489	BYD33G
6311	5322 130 33635	BZV85-C8V2
6315	4822 130 30842	BAV21
6316	4822 130 30842	BAV21
6317	4822 130 30842	BAV21
6318	4822 130 30842	BAV21
6319	4822 130 30842	BAV21
6321	4822 130 30842	BAV21
6322	4822 130 31878	1N4003
6323	4822 130 31878	1N4003



7301	4822 209 62364	LM1203
7303	5322 130 42136	BC848C
7304	4822 130 41053	BC839
7306	4822 130 42513	BC858C
7307	4822 130 62278	2SC3950E
7308	4822 130 62278	2SC3950E
7309	4822 130 62278	2SC3950E
7311	4822 130 62279	2SC3953E
7312	4822 130 62279	2SC3953E
7313	4822 130 62279	2SC3953E
7314	4822 130 41782	BF422
7315	4822 130 41646	BF423
7316	4822 130 41782	BF422
7317	4822 130 41646	BF423
7318	4822 130 41782	BF422
7319	4822 130 41646	BF423
7321	4822 130 41646	BF423
7322	4822 130 41646	BF423
7323	4822 130 41646	BF423

LED PANEL

Various

4822 267 31366 2p connector



6137	4822 130 81701	LTL3238AS
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EMI PANEL

Various

1330	4822 212 23683	EMI panel for /60T/65T/66T/68T
1330	4822 212 23968	EMI panel assy for /67T/69T
	4822 265 20367	2p connector



2183	4822 121 43385	47nF 20% 250V
2186	4822 122 33652	2.2nF 20% 400V
2186	4822 126 10788	220pF 250V
2188	4822 122 33652	2.2nF 20% 400V
2188	4822 126 10788	220pF 250V
2189	4822 121 51265	470nF 250V



3186	4822 053 21334	330k VR37
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5102	4822 157 62256	line choke
5105	4822 157 62256	line choke

TRI FREQ. PANEL

Various

1208	4822 212 23974	Tri freq. panel assy
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2901	4822 121 50539	4.7nF 1% 63V
2902	4822 122 33496	100nF 10% 63V
2903	4822 124 22686	10μF 16V
2904	4822 124 42031	2.2μF 20% 25V



3901	4822 051 10103	10k 2% 0.25W
3902	4822 050 25601	560Ω
3903	4822 051 10332	3k3 2% 0.25W
3904	4822 051 10104	100k 2% 0.25W
3905	4822 051 10104	100k 2% 0.25W
3906	4822 051 10332	3k3 2% 0.25W
3907	4822 051 10103	10k 2% 0.25W
3908	4822 051 10332	3k3 2% 0.25W
3910	4822 051 10273	27k 2% 0.25W
3911	4822 051 10103	10k 2% 0.25W
3912	4822 051 10103	10k 2% 0.25W
3913	4822 051 10273	27k 2% 0.25W
3914	4822 051 10103	10k 2% 0.25W
3915	4822 051 10273	27k 2% 0.25W
3916	4822 051 10103	10k 2% 0.25W
3917	4822 050 12002	2k 1% 0.4W
3918	4822 051 10103	10k 2% 0.25W
3919	4822 101 11003	220k 30% 0.1W
3920	4822 050 24702	4k7
3921	4822 051 10273	27k 2% 0.25W
3922	4822 100 11163	100k 30% LIN 0.1W
3923	4822 101 11003	220k 30% 0.1W
3924	4822 105 11023	1k 30% 0.1W
3925	4822 100 11213	22k 30%
3926	4822 101 11003	220k 30% 0.1W
3928	4822 051 10103	10k 2% 0.25W
3929	4822 050 12203	22k 1% 0.4W
3930	4822 051 10273	27k 2% 0.25W
3931	4822 051 10154	150k 2% 0.25W
3932	4822 050 22105	2M 1 1% 0.6W
3934	4822 051 10332	3k3 2% 0.25W



6901	4822 130 34233	BZX79-F5V1
6902	4822 130 30621	1N4148
6903	4822 130 30621	1N4148



7901	4822 209 80775	NE555N
7902	4822 130 44196	BC548C
7903	4822 130 44196	BC548C

7904	4822 130 44196	BC548C
7905	4822 130 44196	BC548C
7906	4822 130 44196	BC548C
7907	5322 130 60068	BC558C
7908	4822 130 44196	BC548C
7909	4822 130 44196	BC548C
7910	4822 130 44196	BC548C

General

To be able to perform measurements and repairs on the "main circuit board", the unit should first place it in the service position.

The connection between the interface cable and the "video board" should then be extended by means of an extension cable 4822 321 61254 (Fig.4.1).

The power connection may be made in one of the following ways:

- A- Dismount the "EMI panel" and put it (isolated) aside the main panel.
- B- Connect the cable from the power socket directly to the connector M105 on the main panel (in this case the main switch is not operative !!).
- C- Use some of the extension cables (cable A) of the set 4822 321 60582 (Fig.4.2).

Repair instructions**1. EMI panel.**

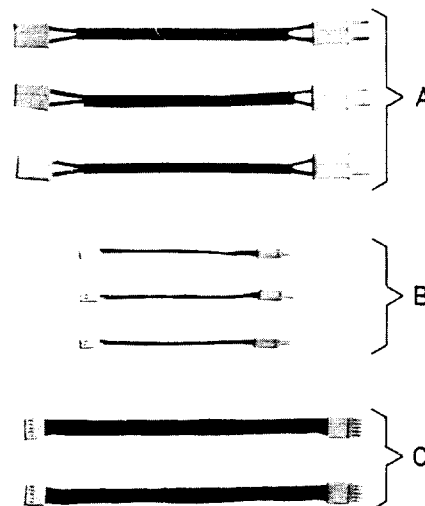
- Remove the back cover with pedestal assy.
- Remove the cable tie.
- Remove the 2-pins connectors cables.
- Remove the metal screws and plastic screw.
- Remove the EMI-panel assy.

2. Video / CRT panel.

- Remove the back cover with pedestal assy.
- Remove Video/CRT-panel assy.
- De-solder and remove one ground lead.
- De-solder six soldering tags and remove the metal shielding.



Fig. 4.1



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Fig. 4.2

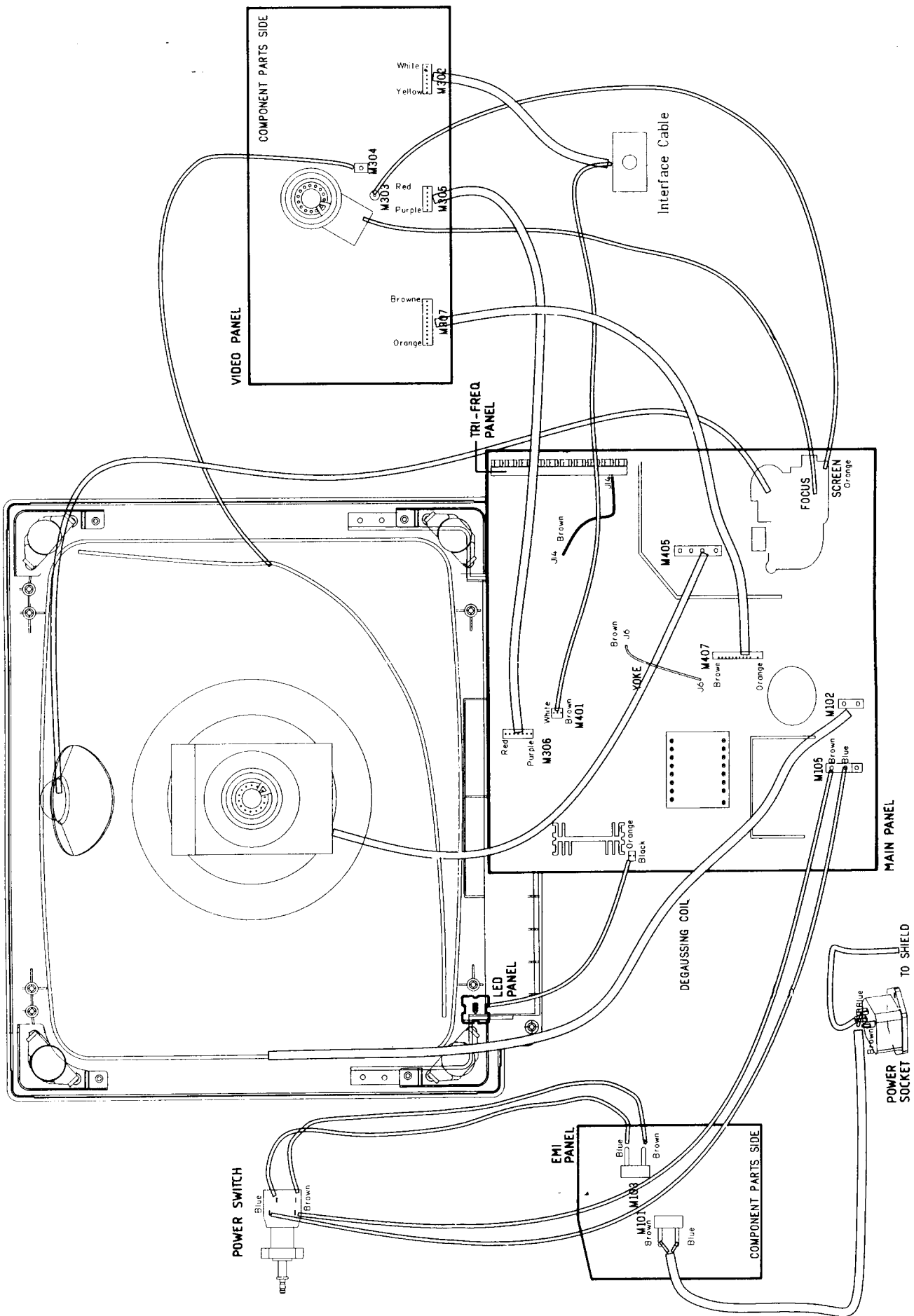
A

B

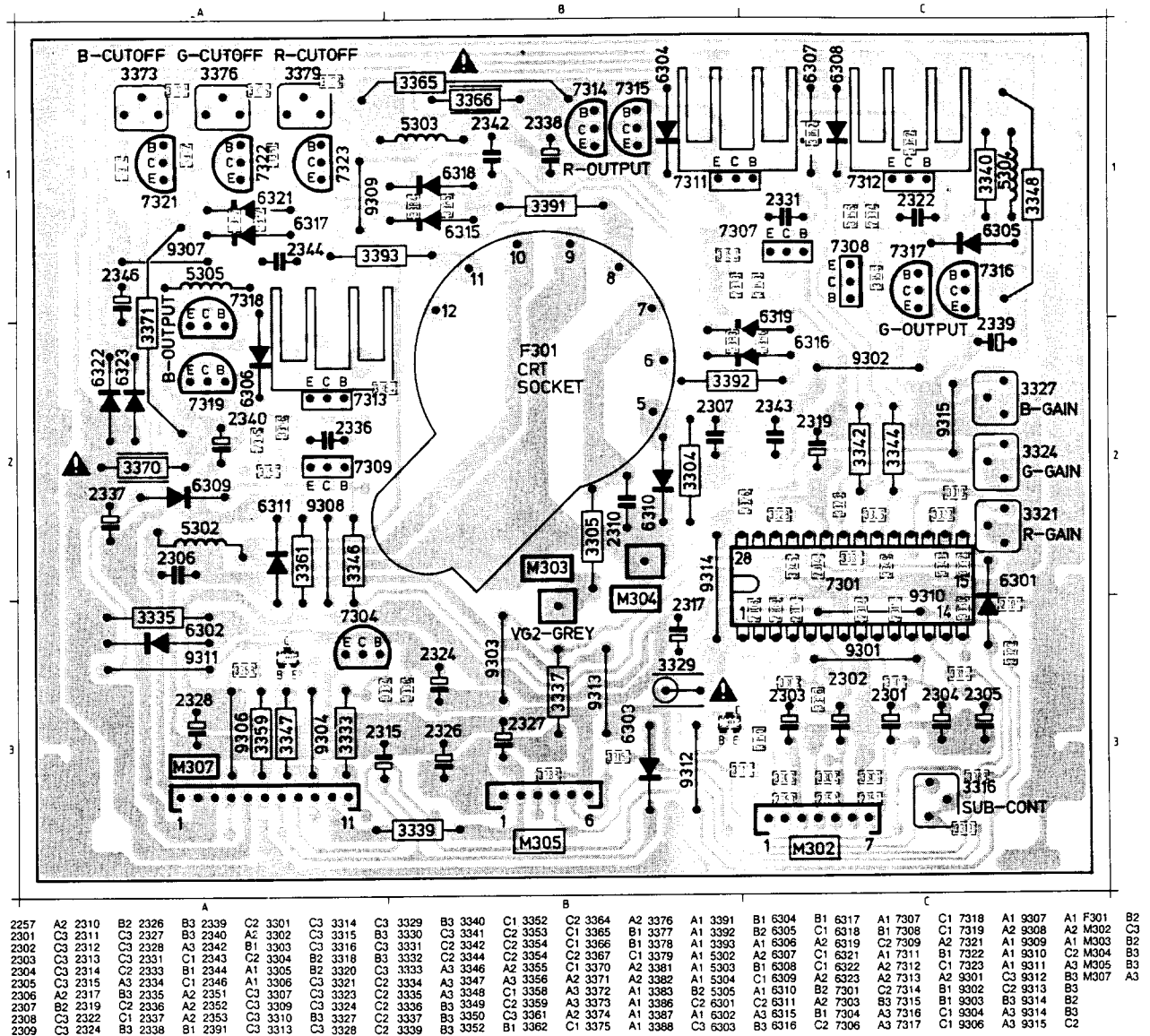
C

A11

WIRING DIAGRAM

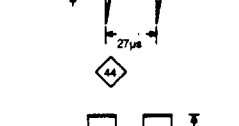
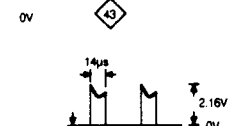
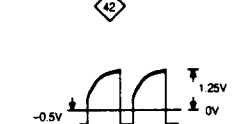
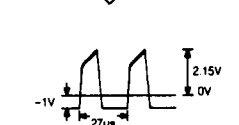
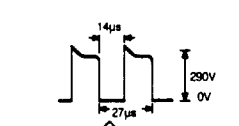
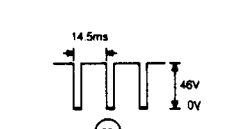
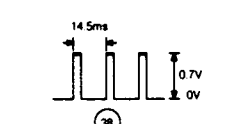
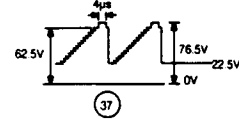
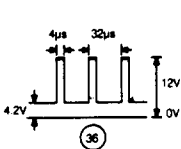
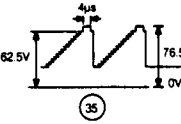
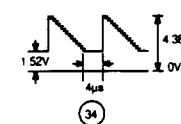
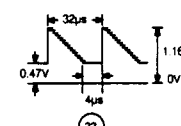
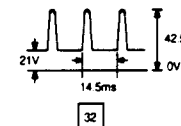
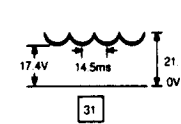
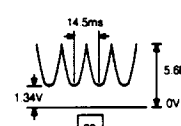
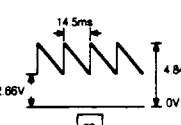
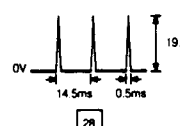
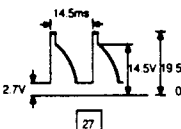
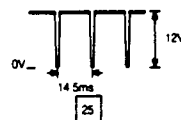
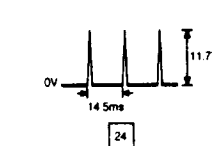
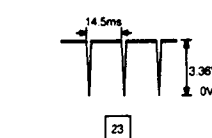
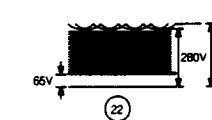
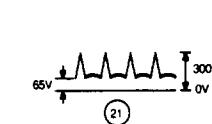
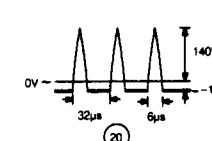
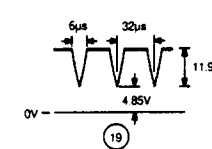
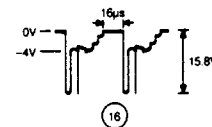
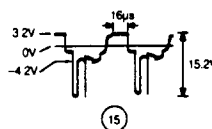
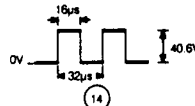
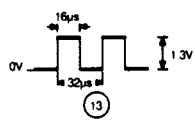
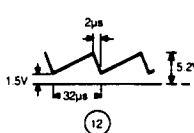
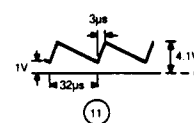
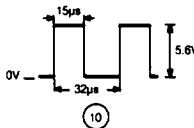
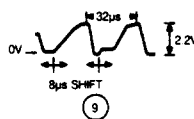
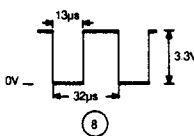
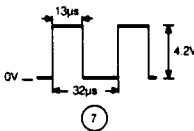
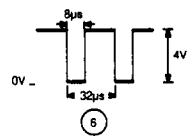
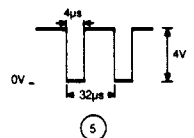
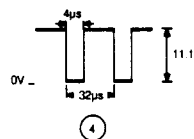
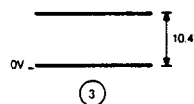
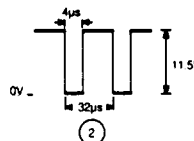
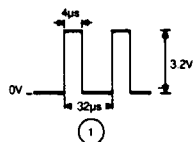


VIDEO PCB BOARD (viewed from the component side)



Electrical diagrams and P.C.B. lay-outs

WAVE FORMS



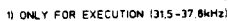
○ LINE FREQUENCY

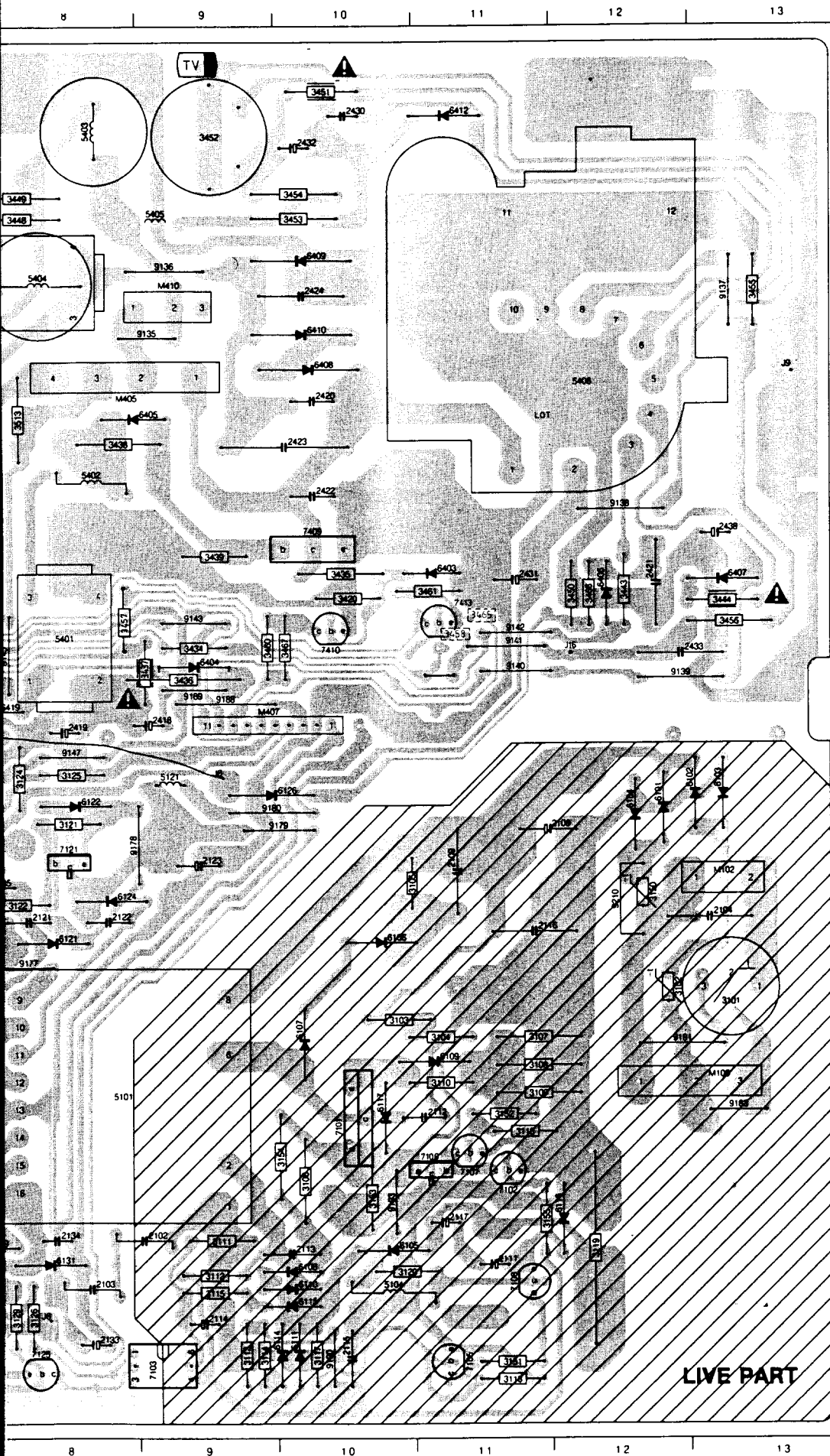
□ FRAME FREQUENCY

◇ SUPPLY

MDA 02355
T-26/012

MAIN PCB BOARD
(viewed from the component side)

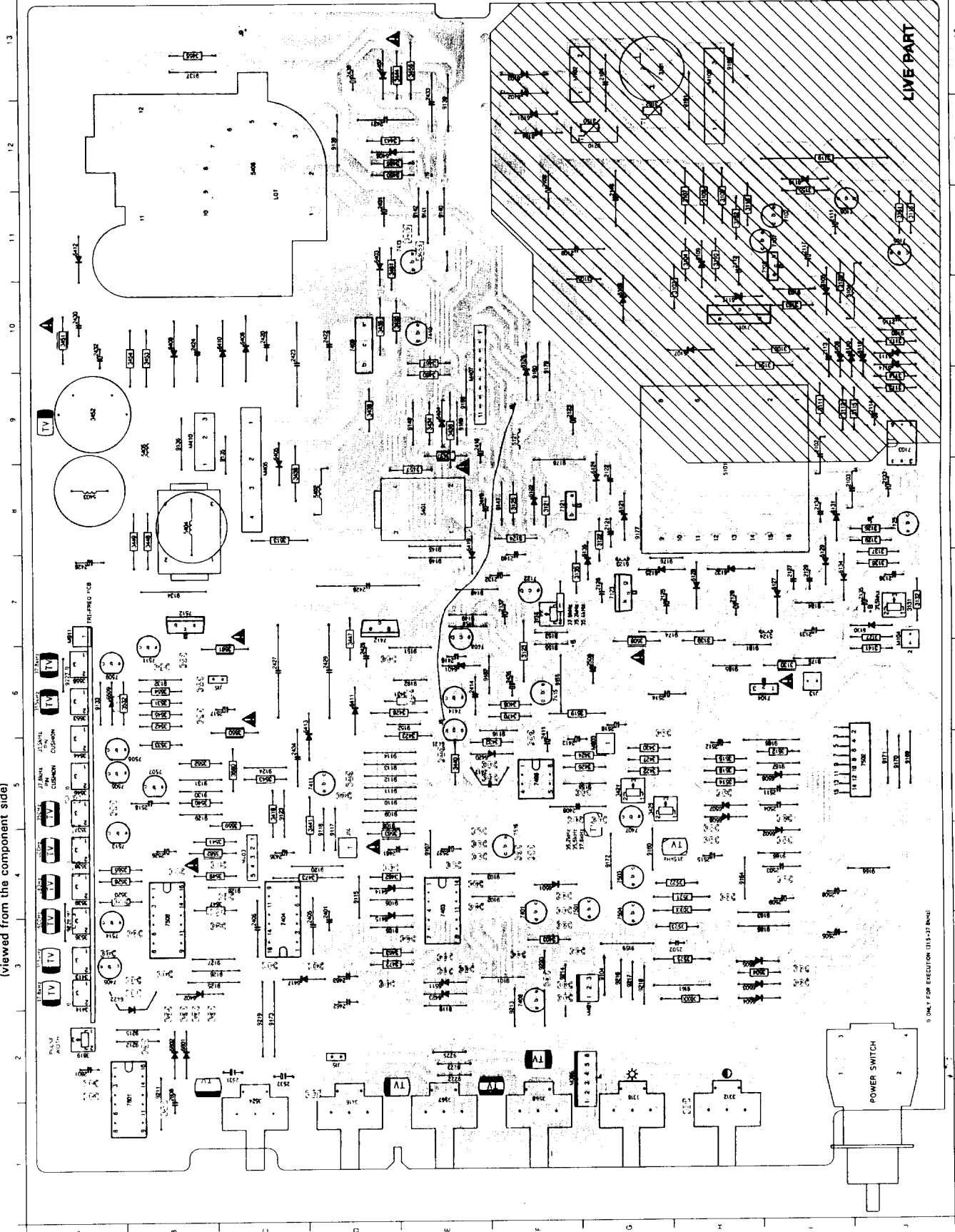




2102	I9	3153	I10	3562	G4	9111	D5
2103	I8	3154	I10	3563	G4	9112	D5
2104	G13	3155	I11	3565	B4	9113	D5
2108	F12	3311	H2	3566	B3	9114	D5
2109	I11	3312	F2	3567	E1	9115	D4
2111	I11	3313	H1	3568	E1	9116	F6
2112	I10	3318	E2	3569	B3	9117	D4
2113	I10	3401	F3	3570	A5	9118	D4
2114	J9	3402	G3	3571	A4	9119	E2
2115	I10	3403	F3	3572	A4	9120	D4
2116	G11	3404	E4	3573	G3	9123	C5
2117	I11	3405	E4	3801	B2	9124	C3
2121	G8	3406	F3	3802	B2	9125	C3
2122	G8	3407	F3	3803	B2	9126	C5
2123	F9	3408	F6	3804	B2	9127	C3
2125	G7	3409	E3	3811	A2	9128	C4
2126	G7	3410	F3	3812	B1	9129	B5
2128	I7	3412	B3	3813	A2	9130	B5
2129	I7	3413	A3	5101	H8	9132	B6
2131	I7	3414	A3	5104	J10	9133	A6
2132	F7	3415	B3	5121	F9	9134	B7
2133	J8	3416	D2	5123	G7	9135	C7
2134	I8	3418	C5	5124	I7	9136	B8
2135	I7	3419	C5	5401	E9	9137	D5
2136	F7	3419	D3	5402	B8	9138	D12
2137	F7	3420	E10	5403	A8	9139	E1
2140	F7	3421	G5	5404	B8	9140	E11
2401	D3	3422	G5	5405	B9	9141	E1
2402	E3	3423	E6	5406	C12	9142	E11
2403	E3	3424	G5	5407	E1	9143	E1
2405	D3	3425	G5	6102	F13	9144	E9
2406	C3	3426	G5	6103	F13	9145	E8
2407	D3	3427	G5	6104	F12	9146	E7
2408	F5	3428	E6	6105	I10	9147	F8
2409	F5	3429	G5	6106	I10	9148	E7
2410	F5	3430	G5	6107	E10	9149	E7
2411	F5	3431	E6	6108	I10	9150	E7
2412	G5	3432	F5	6109	H11	9151	E5
2413	F5	3433	G5	6110	J10	9152	E6
2414	E6	3434	D10	6110	J10	9153	F7
2415	E6	3435	D10	6111	J10	9155	F6
2416	E6	3436	E9	6111	J10	9156	F6
2417	E5	3437	E9	6116	I12	9158	G5
2418	E9	3438	C8	6117	H10	9159	D3
2419	E8	3439	D9	6121	G8	9160	G4
2420	C10	3440	E5	6122	H8	9161	H3
2421	D12	3441	E6	6124	G8	9163	I3
2422	D10	3442	E6	6125	G7	9164	H4
2423	C10	3443	E12	6126	F16	9165	I3
2424	D10	3444	E13	6127	I7	9166	I4
2425	D6	3445	D5	6128	H7	9167	I5
2426	D7	3447	D6	6129	I7	9168	I5
2427	C8	3448	B8	6130	J7	9169	I5
2428	D6	3449	B8	6131	I8	9170	I5
2429	D6	3450	E12	6132	H7	9171	I5
2430	A10	3451	A10	6134	I7	9172	G4
2431	D11	3452	A9	6135	G7	9173	C2
2432	A10	3453	B10	6401	E6	9174	H7
2433	E12	3454	B10	6402	B3	9175	I6
2434	E12	3455	G13	6403	C11	9176	H7
2435	A4	3456	E13	6404	E9	9177	H7
2436	F6	3457	E8	6405	C9	9178	F9

MAIN PCB BOARD

(viewed from the component side)



9. ONLY FOR EXECUTION 015.27 Bm40

LOCATION OF ADJUSTING COMPONENTS

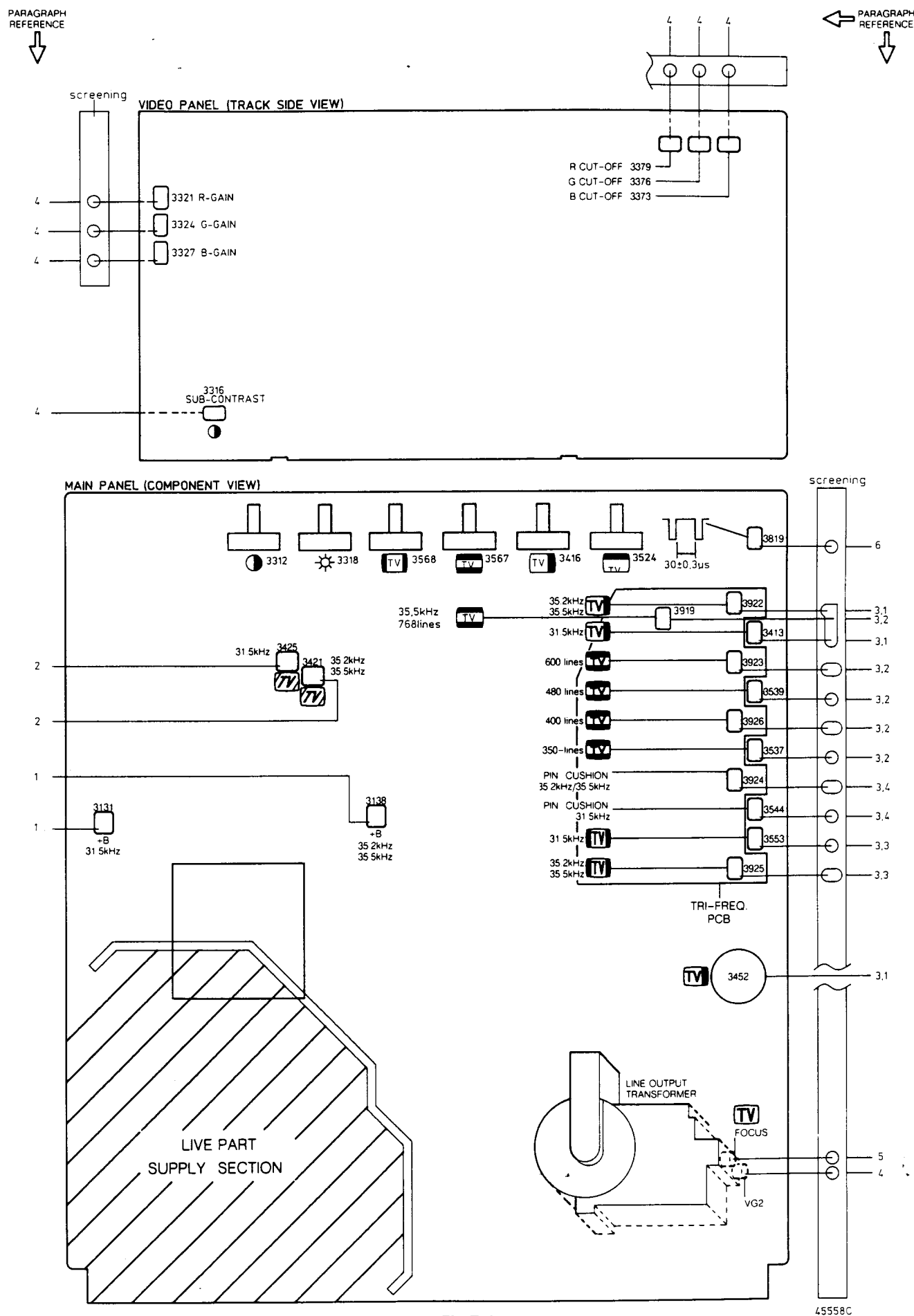


Fig.7.1

Repair tips

1. Servicing of SMDs (Surface Mounted Devices)

1.1 General cautions on handling and storage

- a. Oxidation on the terminals of SMDs results in poor soldering. Do not handle SMDs with bare hands.
- b. Avoid using storage places that are sensitive to oxidation such as places with sulphur or chlorine gas, direct sunlight, high temperatures or a high degree of humidity.
The capacitance or resistance value of the SMDs may be affected by this.
- c. Rough handling of circuit boards containing SMDs may cause damage to the components as well as the circuit boards. Circuit boards containing SMDs should never be bent or flexed. Different circuit board materials expand and contract at different rates when heated or cooled and the components and/or solder connections may be damaged due to the stress. Never rub or scrape chip components as this may cause the value of the component to change. Similarly, do not slide the circuit board across any surface.

1.2. Removal of SMDs

- a. Heat the solder (for 2-3 seconds) at each terminal of the chip. By means of litz wire and a slight horizontal force, small components can be removed with the soldering iron. They can also be removed with a solder sucker (see Fig. 8.1A) or:
- b. While holding the SMD with a pair of tweezers, take it off gently using the soldering iron's heat applied to each terminal (see Fig. 8.1B).
- c. Remove the excess solder on the solder lands by means of litz wire or a solder sucker (see Fig. 8.1C).

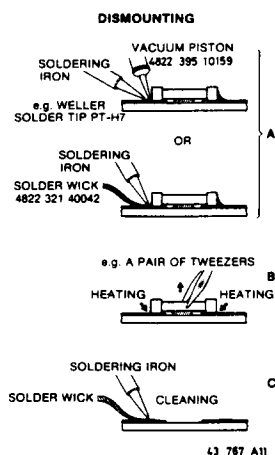


Fig. 8.1

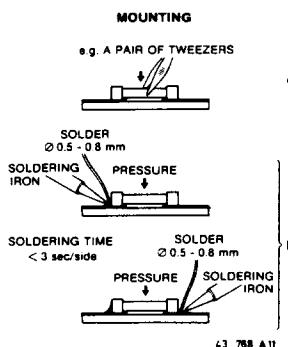


Fig. 8.2

Caution on removal:

- a. When handling the soldering iron, use suitable pressure and be careful.
- b. When removing the chip, do not use undue force with the pair of tweezers.
- c. The soldering iron to be used (approx. 30 W) should preferably be equipped with a thermal control (soldering temperature: 225 to 250°C).
- d. The chip, once removed, must **never** be reused.

1.3 Attachment of SMDs

- a. Locate the SMD on the solder lands by means of tweezers and solder the component on one side. Ensure that the component is positioned correctly on the solder lands (see Fig. 8.2A).
- b. Next complete the soldering of the terminals of the component (see Fig. 8.2B).

Caution when attaching SMDs:

- a. When soldering the SMD terminals, do not touch them directly with the soldering iron. The soldering should be done as quickly as possible; care must be taken to avoid damage to the terminals of the SMDs themselves.
- b. Keep the SMD's body in contact with the printed board when soldering.
- c. The soldering iron to be used (approx. 30 W) should preferably be equipped with a thermal control (soldering temperature: 225 to 250°C).
- d. Soldering should not be done outside the solder land.
- e. Soldering flux (of rosin) may be used, but should not be acidic.
- f. After soldering, let the SMD cool down gradually at room temperature.
- g. The quantity of solder must be proportional to the size of the solder land. If the quantity is too great, the SMD might crack or the solder lands might be torn loose from the printed board (see Fig. 8.3).

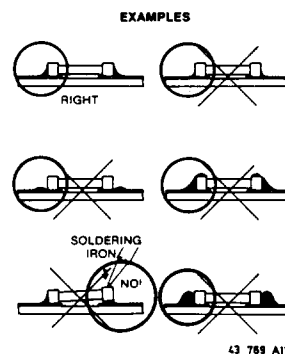
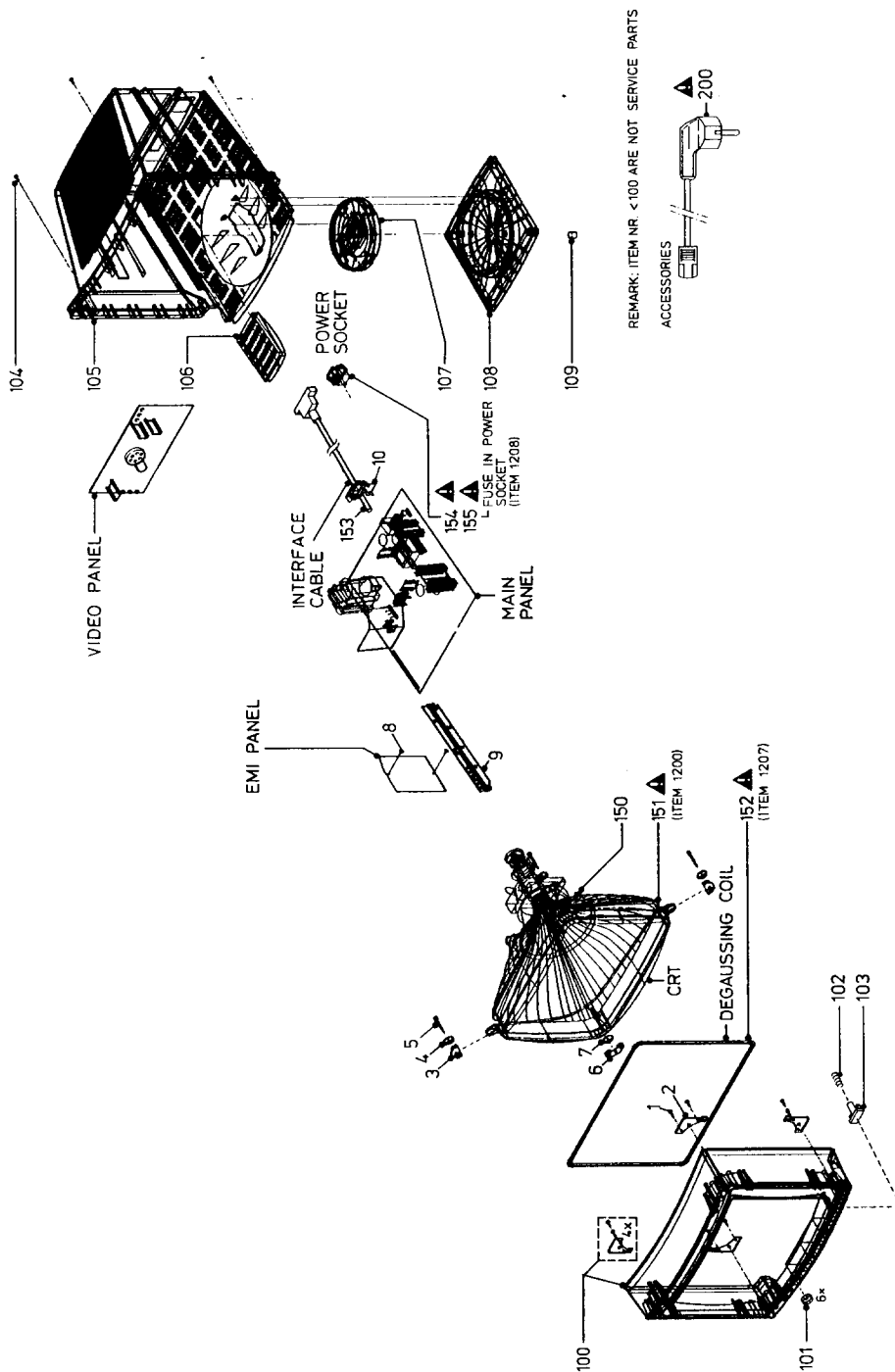
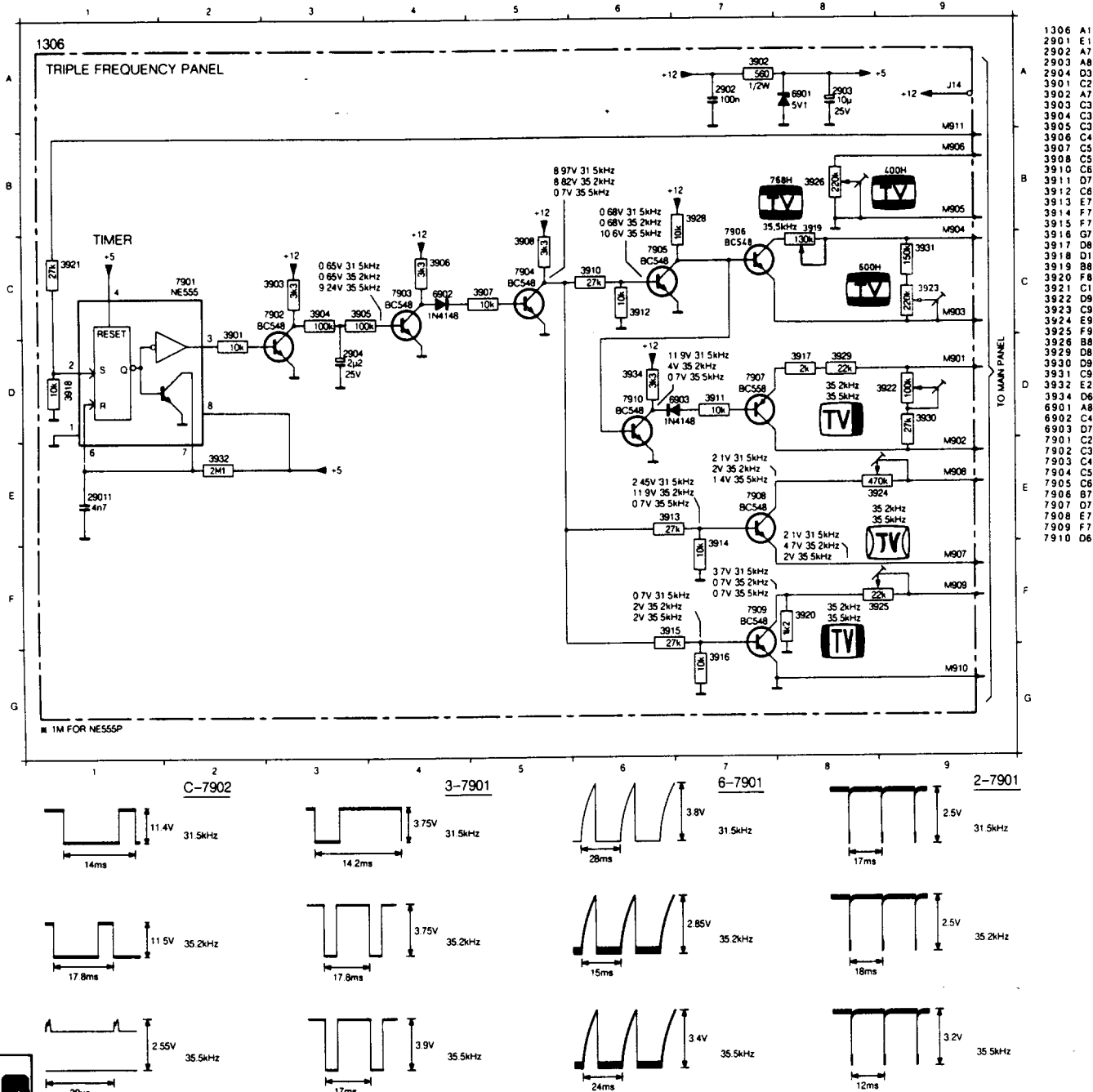


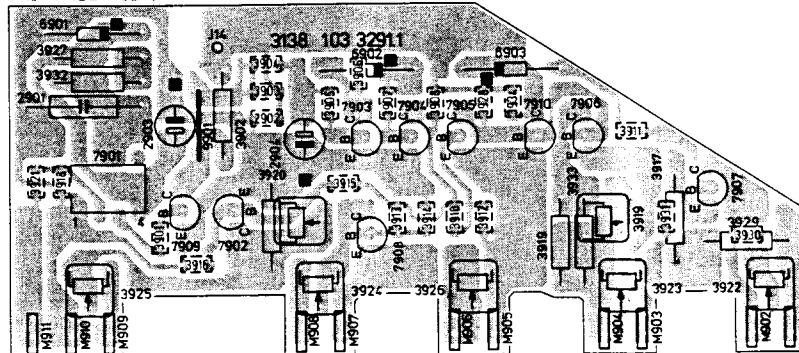
Fig. 8.3



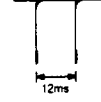
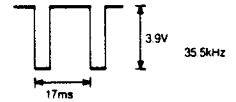
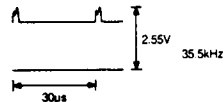
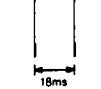
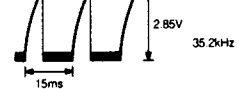
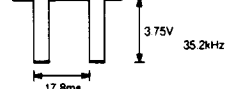
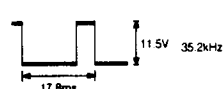
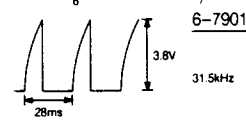
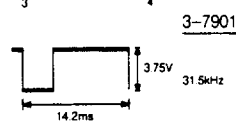
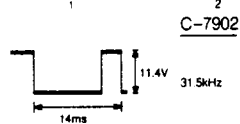
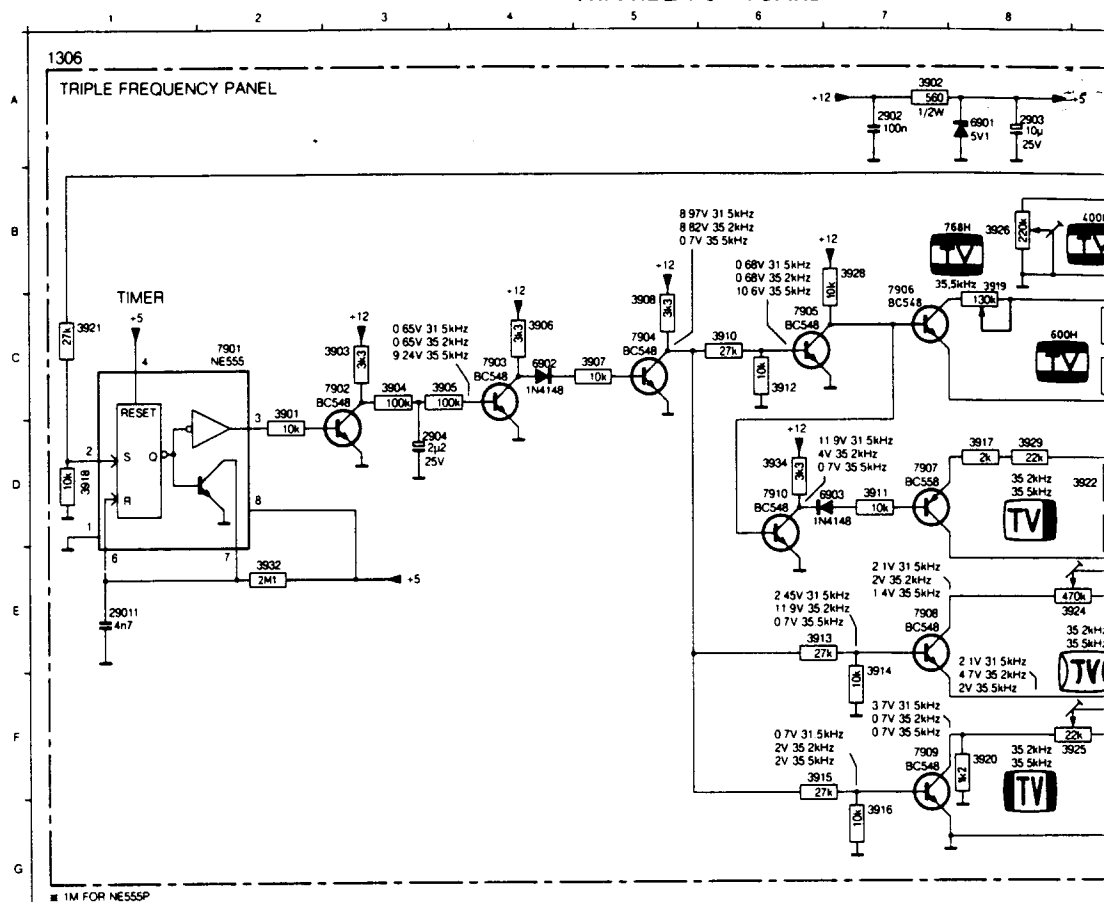
TRI-FREQ PCB BOARD



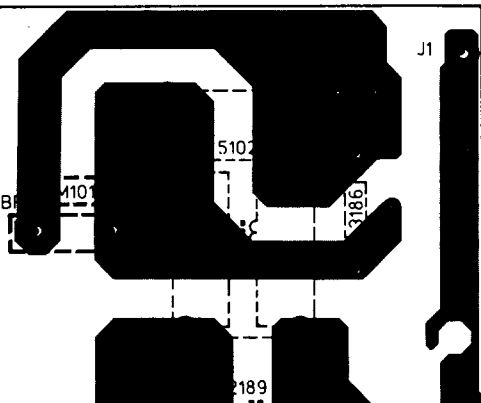
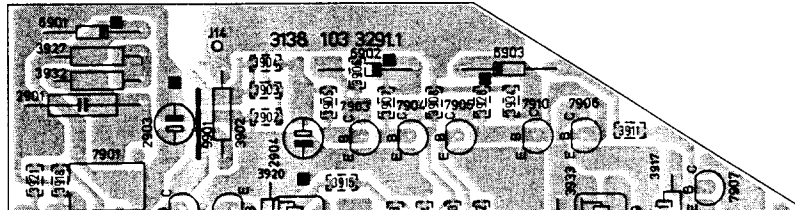
TRI-FREQ PCB (SMD EXECUTION)

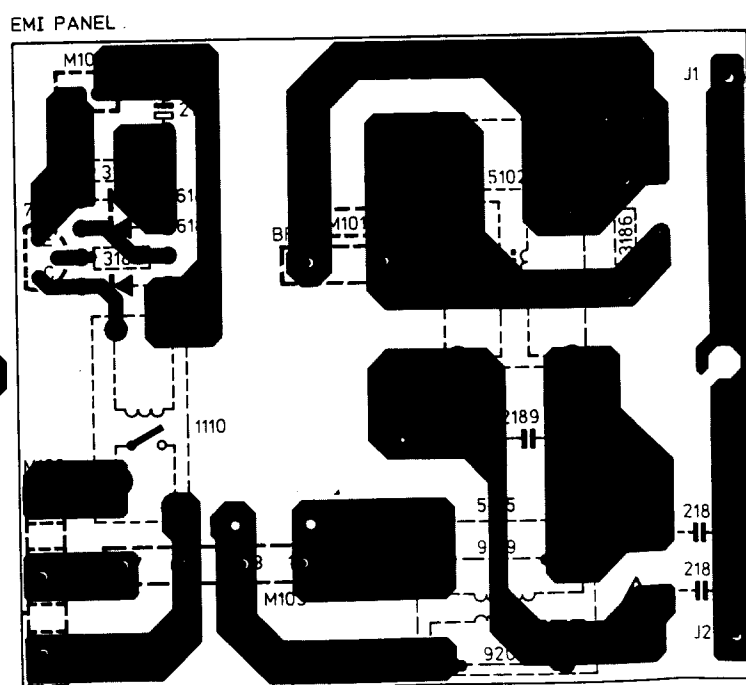
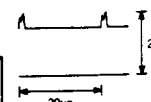
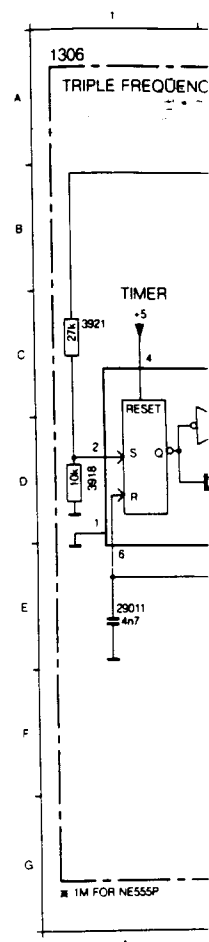


TRI-FREQ PCB BOARD

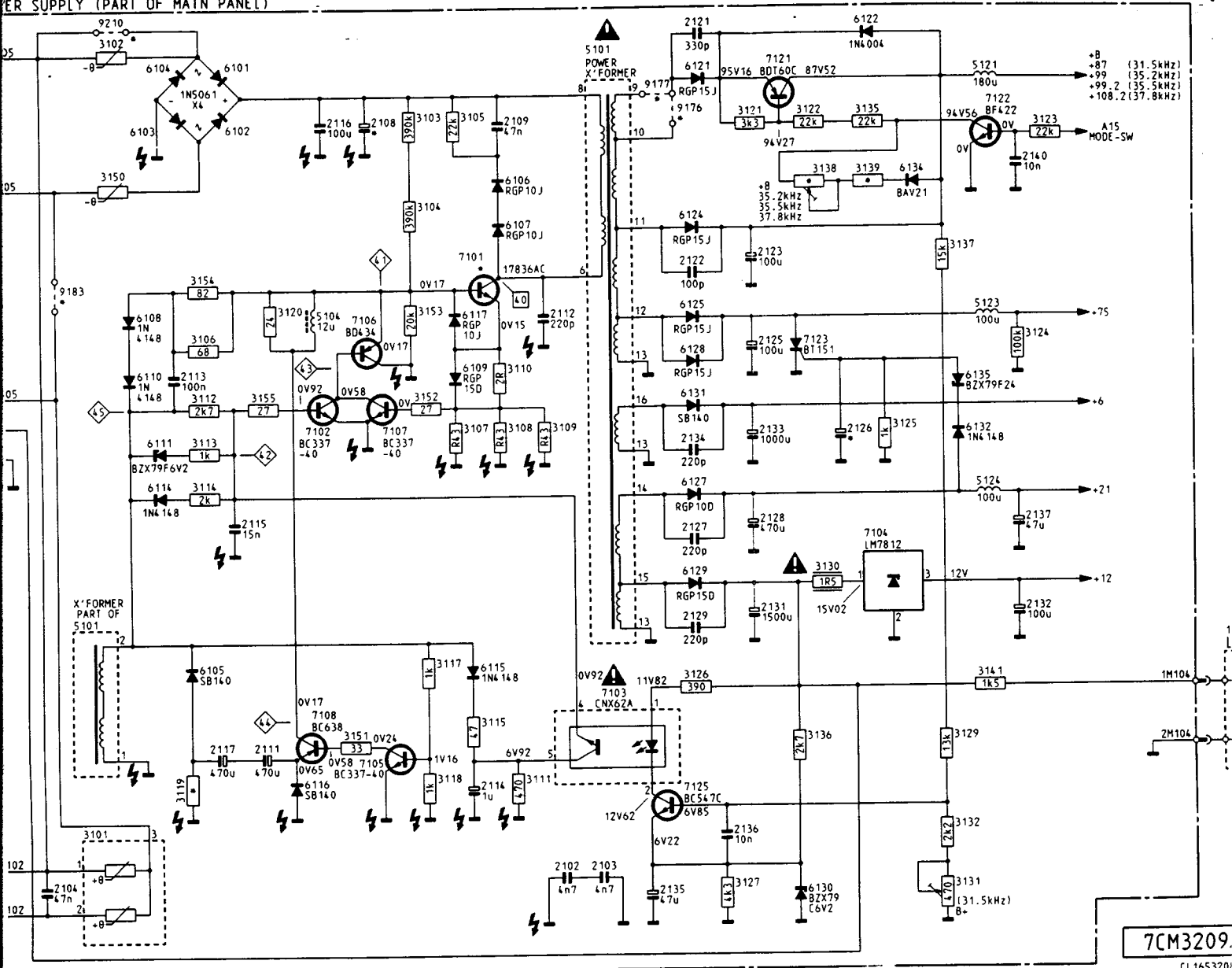


TRI-FREQ PCB (SMD EXECUTION)





POWER SUPPLY (PART OF MAIN PANEL)



ograms are average
asured under the following

trast for mechanical
i).

(GB) WARNING

All ICs and many other semi-conductors are susceptible to electrostatic discharges (ESD). Careless handling during repair can reduce life drastically.
When repairing, make sure that you are connected with the same potential as the mass of the set via a wrist wrap with resistance. Keep components and tools also at this potential.

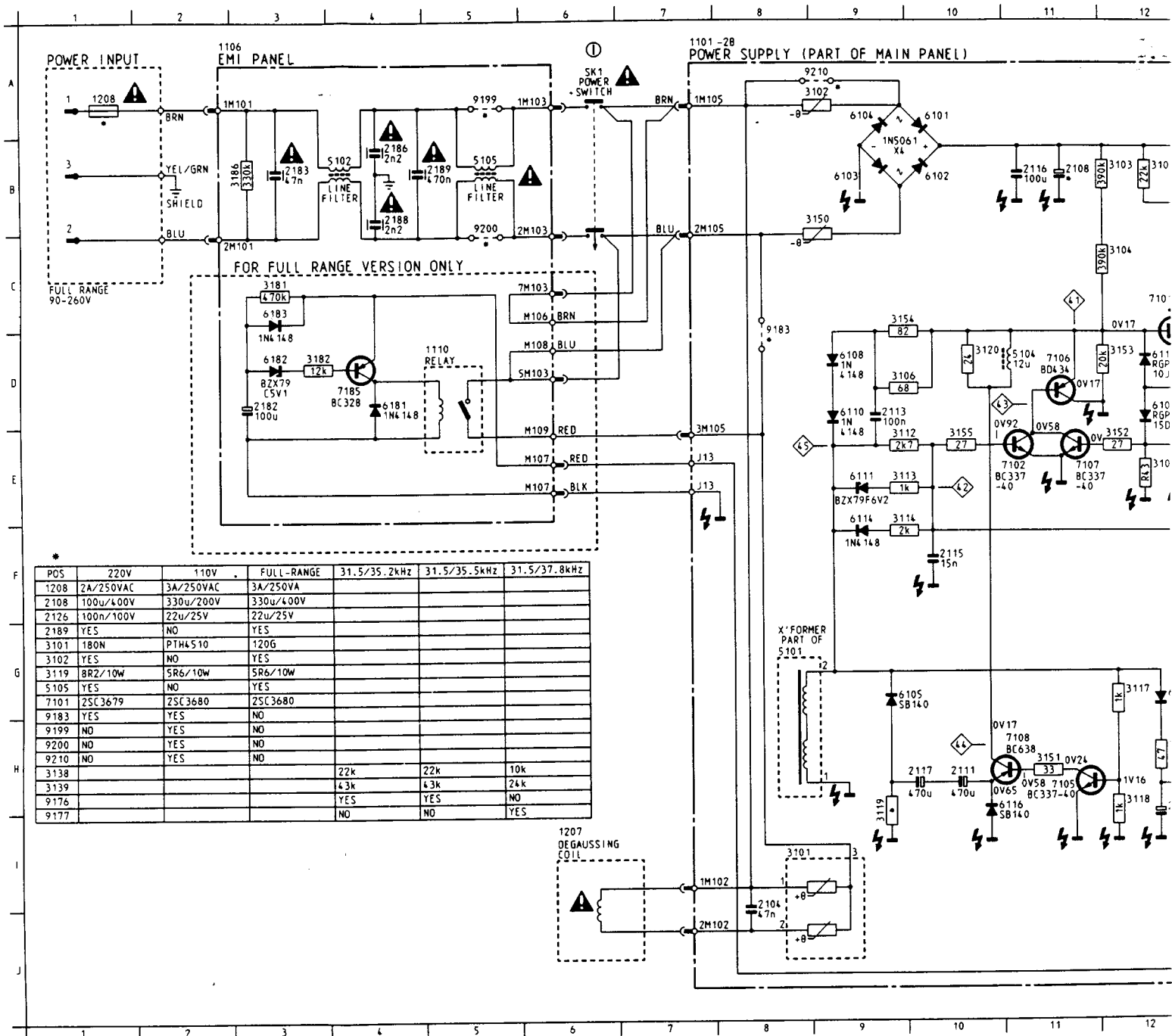
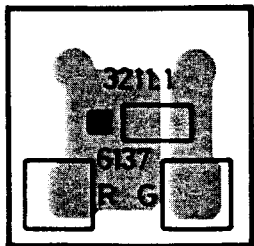
ESD



7CM3209

CL 165320

POWER SUPPLY SCHEMATIC DIAGRAM

LED PC BOARD
(viewed from the component side)

45 265 A11

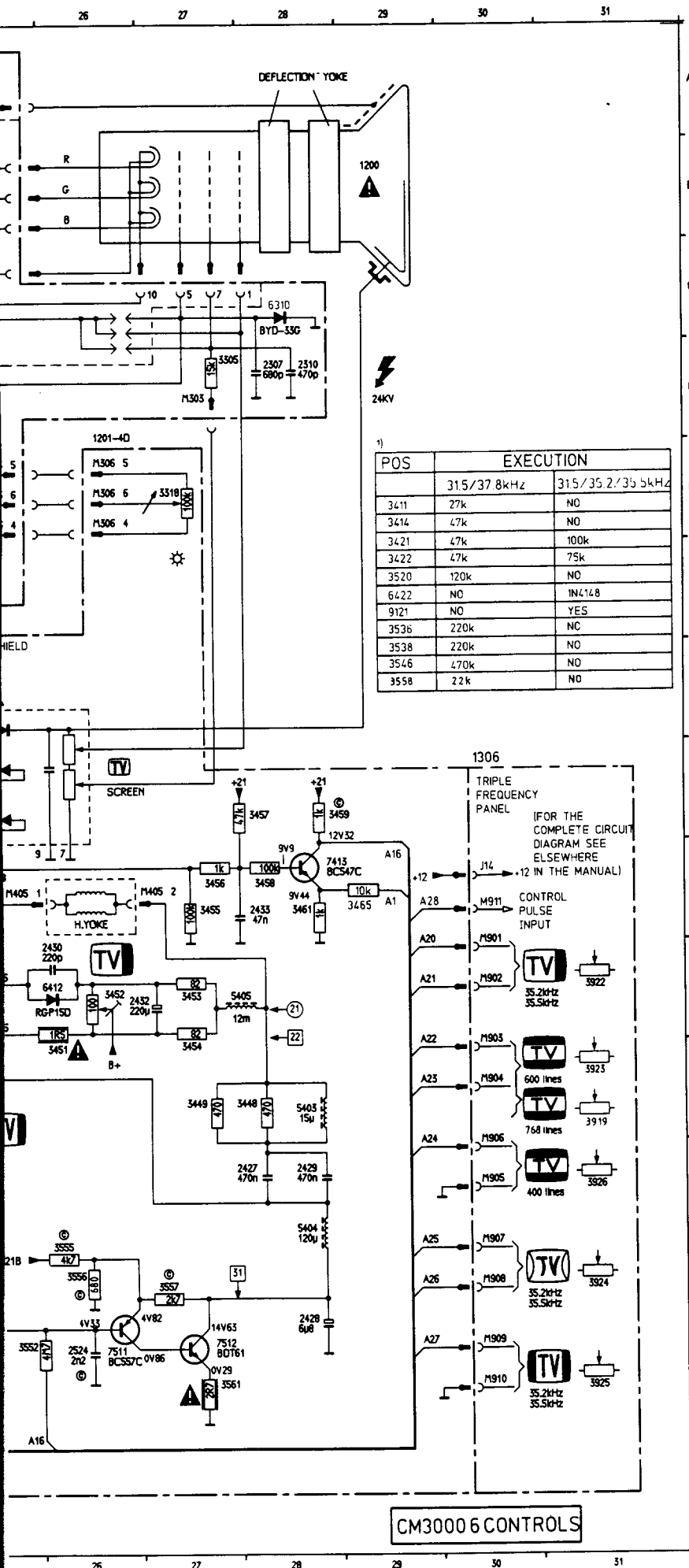
(GB) REMARKS

The direct voltages and oscillograms are average voltages. They have been measured under the following conditions.

- Signal pattern: cross hatch
- Adjust brightness and contrast for mechanical mid-position (click position).

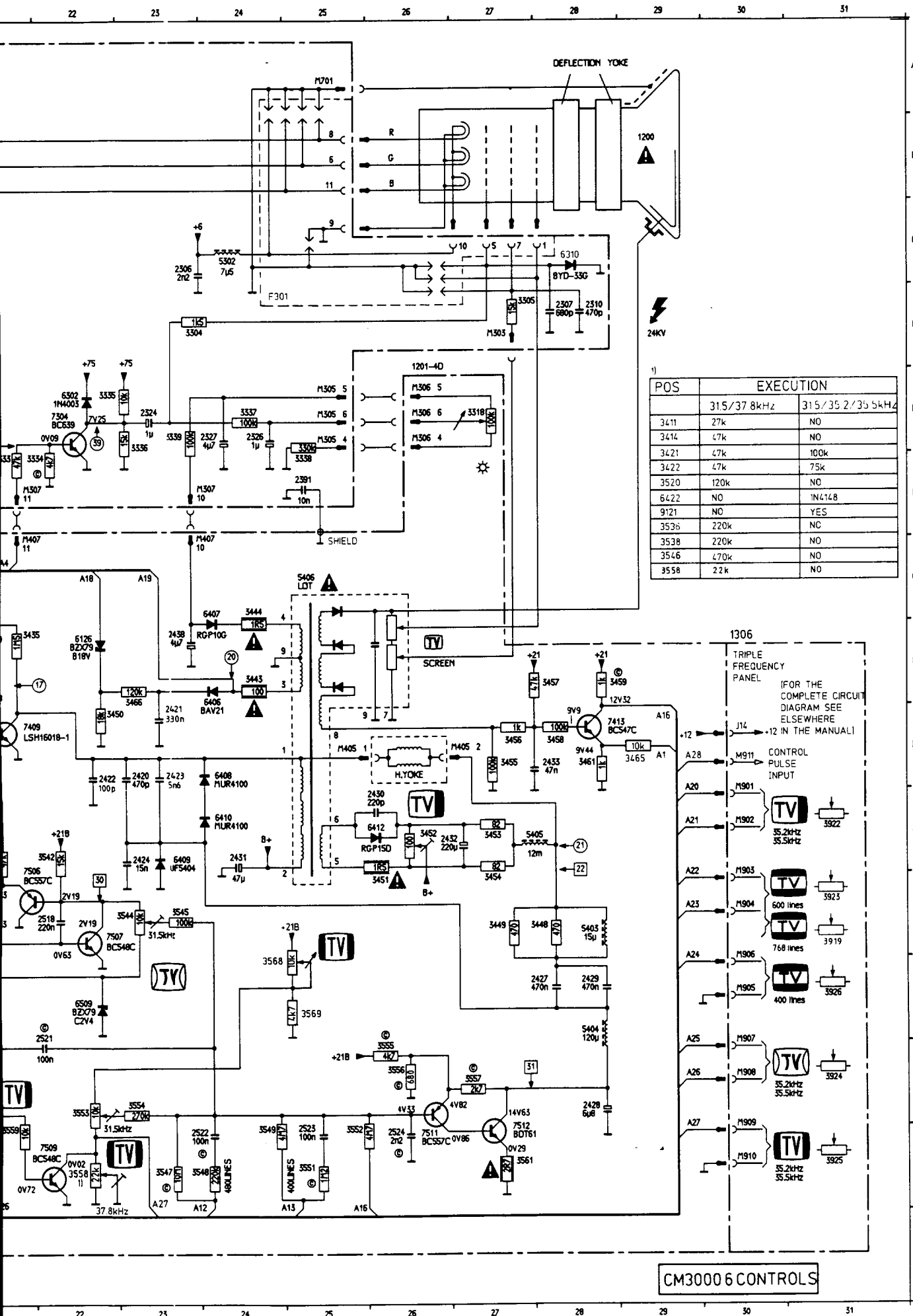
(GB) W

All ICs and susceptible Careless I drastically When rep connected of the set Keep com potential.

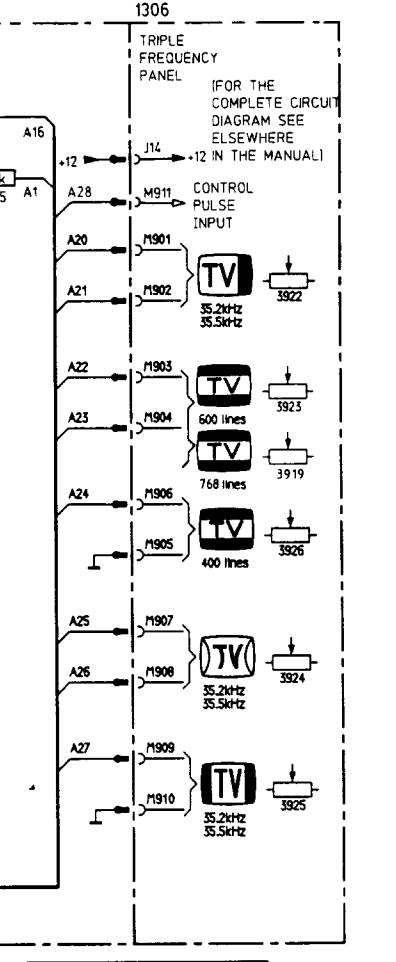


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1201	G2	3341	B12	3539	N12	7511	N26
1201	D2	3342	B13	3540	M19	7512	N27
1201	E26	3343	C12	3541	L12	7513	M20
1202	A3	3344	C13	3542	J22	7514	N10
2301	B7	3345	E12	3543	K23	7516	G5
2302	C7	3346	D13	3545	K23	7802	J3
2303	O8	3347	F13	3546	M21	7802	J5
2304	B6	3348	C17	3547	N23	9121	N11
2305	E9	3350	E7	3548	N23		
2306	C23	3352	C14	3549	N24		
2307	D28	3353	B13	3550	N1		
2308	O8	3354	D14	3551	N25		
2309	O8	3355	C13	3552	N25		
2310	D28	3356	E14	3553	M22		
2311	O9	3357	E13	3554	M23		
2312	D8	3358	E13	3555	M26		
2313	E10	3359	F15	3556	M26		
2314	E10	3361	A13	3557	M27		
2315	F8	3362	B15	3558	O22		
2317	A8	3364	D18	3559	N21		
2319	A8	3365	A17	3561	N27		
2322	D15	3366	A17	3562	L10		
2324	E23	3367	C15	3563	L1		
2326	E24	3370	E17	3565	M9		
2327	E24	3371	E17	3566	N10		
2328	A7	3372	E20	3567	L12		
2331	B16	3373	E20	3568	K25		
2333	C13	3374	E20	3569	L25		
2334	D13	3375	C20	3601	J7		
2335	E13	3376	C20	3602	K7		
2336	E16	3377	D20	3603	J7		
2337	B6	3378	A20	3604	K7		
2338	A17	3379	B20	3611	I3		
2339	C17	3381	B20	3612	I5		
2340	E17	3382	E19	3615	I3		
2342	B17	3383	C19	3619	I3		
2343	D17	3384	A19	3622	J31		
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2351	C7	3387	E18	3625	N31		
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2402	L3	3401	H2	3635	E16		
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2405	M8	3403	L1	3637	I20		
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2407	M2	3405	K2	3639	L28		
2408	I15	3406	G2	3640	J28		
2409	H11	3407	H1	3641	G25		
2410	H14	3408	N3	3642	H22		
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2412	H13	3410	H1	3644	E22		
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2415	G16	3413	N7	3647	B16		
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2419	I20	3417	K8	3651	C14		
2421	I23	3418	M1	3652	D15		
2422	I22	3419	H11	3653	E15		
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2424	J23	3421	H12	3655	A13		
2425	L28	3422	H12	3656	B18		
2426	M28	3423	H13	3657	D18		
2429	L28	3424	I16	3658	E18		
2430	J28	3425	I12	3659	B18		
2431	J24	3426	I16	3660	D19		
2432	J26	3427	I13	3661	E19		
2433	K28	3428	I10	3662	A5		
2436	M2	3429	I14	3663	A5		
2436	O3	3430	I12	3664	I18		
2438	H23	3431	H17	3665	M9		
2440	H19	3432	H17	3666	H20		
2481	N18	3433	H13	3667	I19		
2482	N18	3434	G17	3668	H20		
2483	N19	3435	H21	3669	H24		
2501	H6	3436	I19	3670	G24		
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2503	K10	3438	H21	3672	J23		
2504	J12	3439	I21	3673	J24		
2505	N2	3440	H19	3674	J26		
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2509	L11	3445	K26	3678	H19		
2511	L15	3446	K27	3679	H17		
2512	L15	3447	I22	3680	H18		
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2515	L20	3449	J27	3682	K5		
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2517	O2	3451	I27	3684	K10		
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2524	N26	3457	I28	3690	L18		
2526	M10	3458	K28	3691	L22		
2527	M2	3459	N20	3692	H4		
2528	M2	3460	M16	3693	J7		
2529	N10	3461	J28	3694	J7		
2531	K18	3462	H23	3695	A9		
2532	K19	3463	G19	3696	E7		
2801	I4	3464	N8	3697	E22		
2805	J6	3465	N4	3698	F14		
2806	I5	3466	L4	3699	B13		
31.5k	N22	3467	K4	3700	C13		
3301	C6	3468	L5	3701	D13		
3302	C6	3469	L2	3702	B15		
3303	D7	3470	O8	3703	C15		
3304	D23	3501	H5	3704	E15		
3305	D27	3502	H6	3705	B16		
3307	B7	3503	H7	3706	B16		
3308	B7	3504	J10	3707	C18		
3309	B8	3505	J11	3708	D16		
3310	E7	3506	K11	3709	E16		
3311	D9	3507	K10	3710	F16		
3312	D3	3508	N1	3711	E19		
3313	E6	3509	J14	3712	C19		
3314	D8	3510	G4	3713	C19		
3315	D7	3511	L1	3714	K2		
3316	E7	3512	L15	3715	H2		
3318	E27	3513	J16	3716	M17		
3319	E12	3514	L18	3717	L3		
3320	E8	3515	K18	3718	G3		
3321	B12	3516	L17	3719	M19		
3322	C12	3517	L17	3720	M5		
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3325	C12	3520	N11	3723	H11		
3326	D12	3521	J17	3724	H18		
3327	D12	3522	L18	3725	I21		
3328	D12	3523	L18	3726	G20		
3329	A7	3524	L17	3727	I28		
3330	E9	3525	G6	3728	M4		
3331	E12	3526	G6	3729	N4		
3332	F12	3527	G5	3730	G6		
3333	F21	3528	J21	3731	K11		
3334	F22	3529	K20	3732	K18		
3335	E22	3530	J21	3733	L18		
3336	E23	3531	K21	3734	J21		
3337	E24	3532	L21	3735	J21		
3338	F25	3533	M11	3736	K22		
3339	E23	3534	N12	3737	L11		

Electrical diagrams and P.C.B. lay-outs



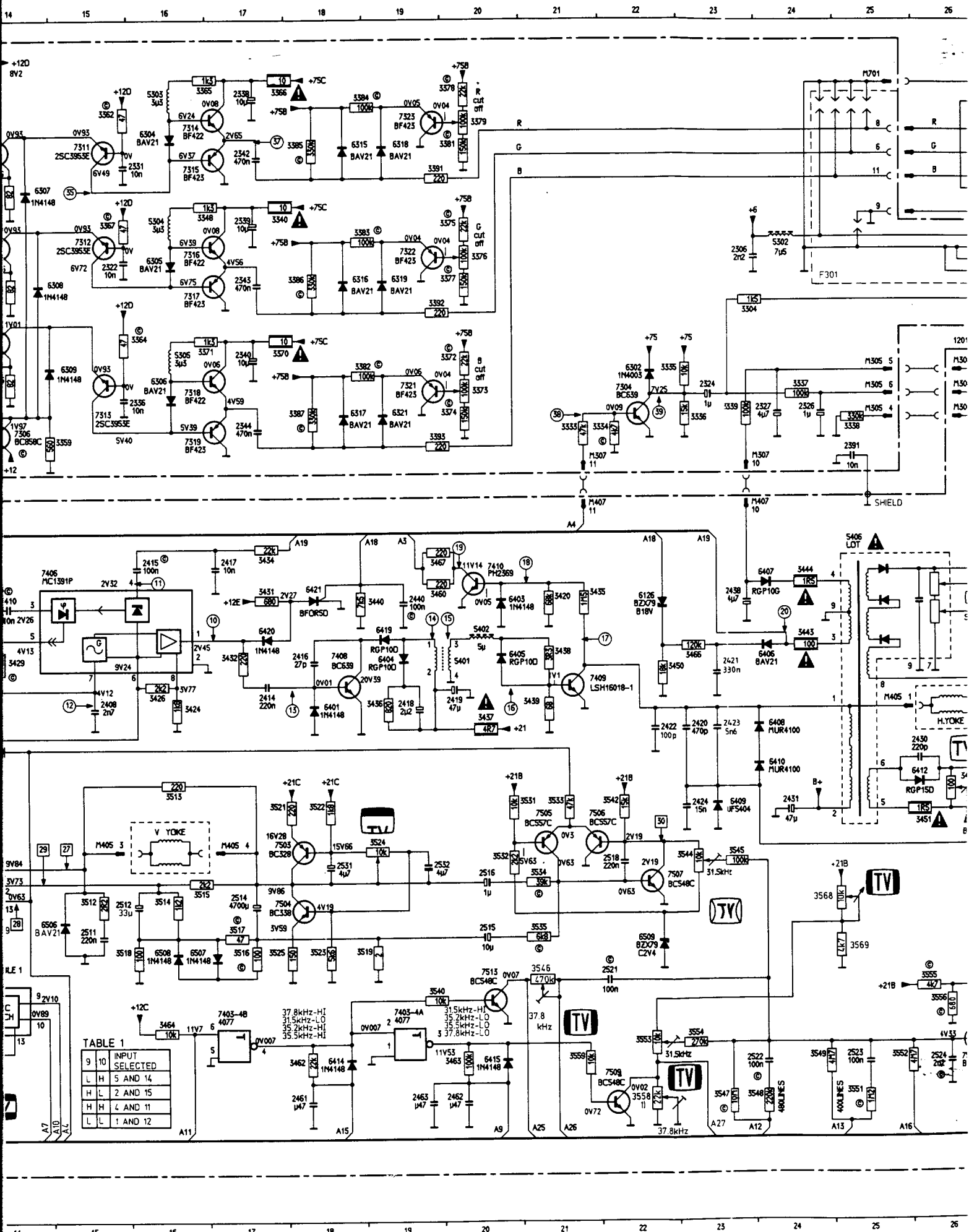
POS	EXECUTION
315/37.8kHz	315/35.2/35.5kHz
3411 27k	NO
3414 47k	NO
3421 47k	100k
3422 47k	75k
3520 120k	NO
6422 NO	1N4148
9121 NO	YES
3536 220k	NC
3538 220k	NO
3546 470k	NO
3558 22k	NO



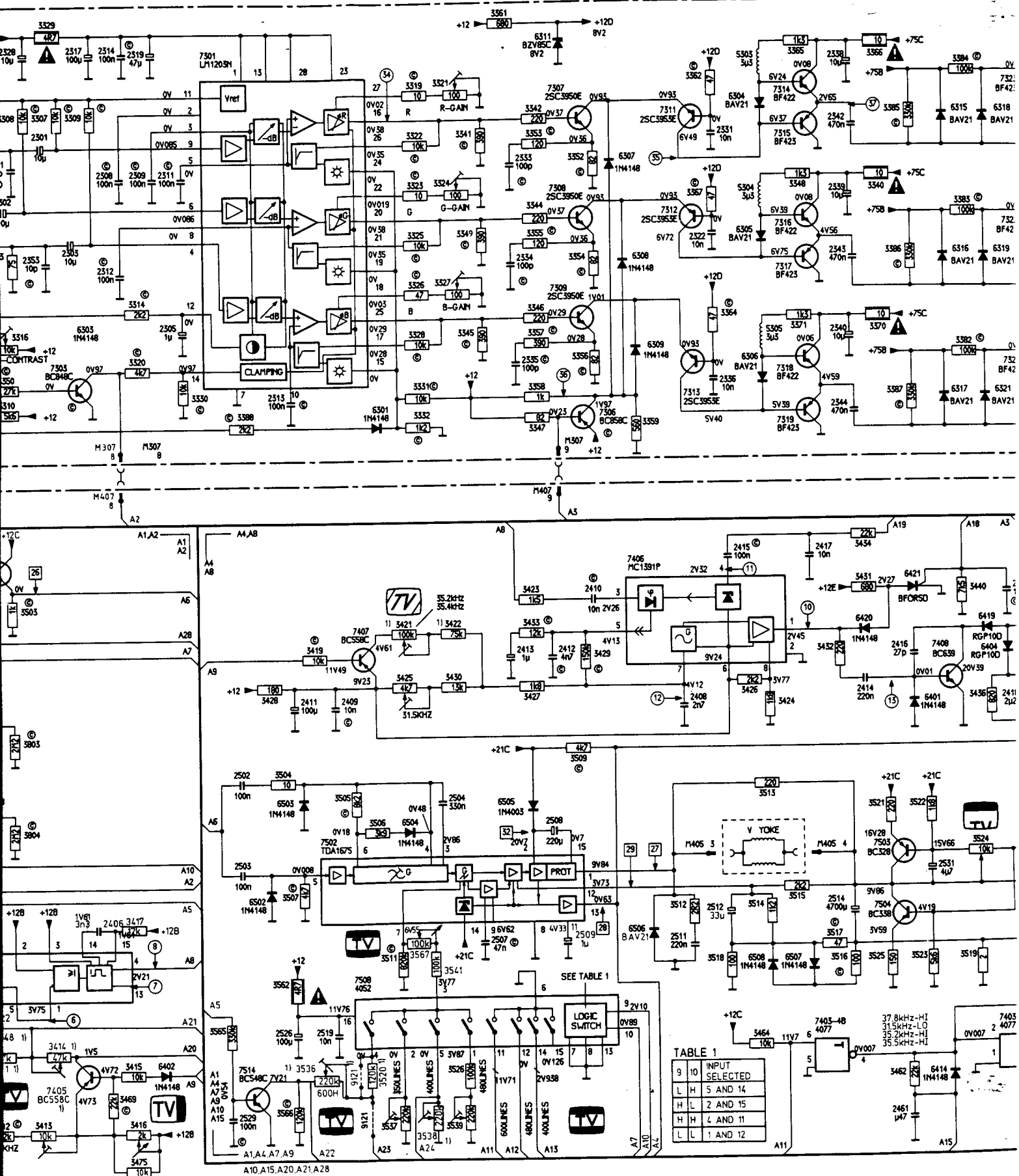
CM3000 6 CONTROLS

- 1200 B29 3340
- 1201 G2 3341
- 1202 D2 3342
- 1203 E26 3343
- 1204 A3 3344
- 1205 B7 3345
- 1206 C7 3346
- 1207 D8 3347
- 1208 B6 3348
- 1209 E9 3349
- 1210 C23 3350
- 1211 D28 3351
- 1212 C8 3352
- 1213 D8 3353
- 1214 E10 3354
- 1215 F8 3355
- 1216 A8 3356
- 1217 D15 3357
- 1218 E23 3358
- 1219 E24 3359
- 1220 E24 3360
- 1221 A7 3361
- 1222 B16 3362
- 1223 C13 3363
- 1224 D13 3364
- 1225 E13 3365
- 1226 E16 3366
- 1227 B6 3367
- 1228 A17 3368
- 1229 C17 3369
- 1230 E17 3370
- 1231 B17 3371
- 1232 D17 3372
- 1233 F17 3373
- 1234 A6 3374
- 1235 C7 3375
- 1236 D6 3376
- 1237 D7 3377
- 1238 F25 3378
- 1239 N6 3379
- 1240 L3 3380
- 1241 H3 3381
- 1242 M8 3382
- 1243 K8 3383
- 1244 M2 3384
- 1245 I15 3385
- 1246 I11 3386
- 1247 H14 3387
- 1248 H14 3388
- 1249 H14 3389
- 1250 H14 3390
- 1251 H14 3391
- 1252 H14 3392
- 1253 H14 3393
- 1254 H14 3394
- 1255 H14 3395
- 1256 H14 3396
- 1257 H14 3397
- 1258 H14 3398
- 1259 H14 3399
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- 1261 H14 3401
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- 1271 H14 3411
- 1272 H14 3412
- 1273 H14 3413
- 1274 H14 3414
- 1275 H14 3415
- 1276 H14 3416
- 1277 H14 3417
- 1278 H14 3418
- 1279 H14 3419
- 1280 H14 3420
- 1281 J23 3421
- 1282 L28 3422
- 1283 M28 3423
- 1284 L28 3424
- 1285 J28 3425
- 1286 J24 3426
- 1287 J26 3427
- 1288 J23 3428
- 1289 M2 3429
- 1290 O3 3430
- 1291 H23 3431
- 1292 H19 3432
- 1293 H18 3433
- 1294 N20 3434
- 1295 H19 3435
- 1296 H6 3436
- 1297 J10 3437
- 1298 K10 3438
- 1299 J12 3439
- 1300 N2 3440
- 1301 L13 3441
- 1302 K13 3442
- 1303 L11 3443
- 1304 L15 3444
- 1305 L17 3445
- 1306 L20 3446
- 1307 K20 3447
- 1308 O2 3448
- 1309 K22 3449
- 1310 M11 3450
- 1311 L22 3451
- 1312 N23 3452
- 1313 N25 3453
- 1314 N26 3454
- 1315 M10 3455
- 1316 M2 3456
- 1317 M2 3457
- 1318 N10 3458
- 1319 K18 3459
- 1320 K19 3460
- 1321 I4 3461
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- 1323 I5 3463
- 1324 N22 3464
- 1325 O6 3465
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- 1329 D27 3469
- 1330 B7 3470
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- 1335 D3 3475
- 1336 D3 3476
- 1337 D8 3477
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- 1339 E7 3479
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- 1343 C12 3483
- 1344 C12 3484
- 1345 D12 3485
- 1346 D12 3486
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- 1348 E9 3488
- 1349 E12 3489
- 1350 F12 3490
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- 1352 F22 3492
- 1353 E22 3493
- 1354 E23 3494
- 1355 E24 3495
- 1356 F25 3496
- 1357 E23 3497

Electrical diagrams and P.C.B. lay-outs



GRAM



SIGNAL PROCESSING SCHEMATIC DIAGRAM

