Colour television Chassis

Service
Service
Service

FL 1.14 FL 2.14
FL 1.16 FL 2.16
FL 1.17

AA

ServiceManual

Contents

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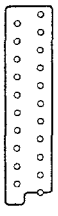
1.Technical data

Mains voltage	: 220 - 240 V (± 10%)
	: 50 Hz - 60 Hz (± 5%)
Aerial input impedance	: 75 Ω - koaxial
Minimum aerial voltage	: 30 µV (VHF), 40 µV (UHF)
Maximum aerial voltage VHF/S/UHF	: 180 mV
Programmes	: 0 - 59
VCR programmes	: 0, 50 - 59

2.Connection facilities

pecification of the connectors

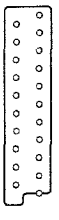
EXT1 (AUX): RGB+CVBS



1 -Audio ⊖→ R(0,5VRMS ≤ 1kΩ)
2 -Audio ⊖← R(0,5VRMS ≥ 10kΩ)
3 -Audio ⊖→ L(0,5VRMS ≤ 1kΩ)
4 -Audio ⊥
5 -Blue ⊥
6 -Audio ⊖← L(0,5VRMS ≥ 10kΩ)
7 -Blue (0,7Vpp/75Ω)
8 -CVBS-status ⊖← 0-2V: INT
4,5-7V: EXT 16:9
9,5-12V: EXT 4:3

9 -Green ⊥
10 --
11 -Green (0,7Vpp/75Ω)
12 --
13 -Red ⊥
14 -RGB-status
15 -Red (0,7Vpp/75Ω)
16 -RGB-status (0-0,4V: INT; 1-3V: EXT/75Ω)
17 -CVBS ⊥
18 -CVBS ⊥
19 -CVBS ⊖→ (1Vpp/75Ω)
20 -CVBS ⊖← (1Vpp/75Ω)
21 -Earthscreen

EXT2 (VCR): Y/C+CVBS



1 -Audio ⊖→ R(0,5VRMS ≤ 1kΩ)
2 -Audio ⊖← R(0,5VRMS ≥ 10kΩ)
3 -Audio ⊖→ L(0,5VRMS ≤ 1kΩ)
4 -Audio ⊥
5 -
6 -Audio ⊖← L(0,5VRMS ≥ 10kΩ)
7 --
8 -CVBS-status ⊖← 0-2V: int
4,5-7V: EXT 16:9
9,5-12V: EXT 4:3
⊖← 4,5 : EXT 16:9

9 --
10 --
11 --
12 --
13 -CHROMA ⊥
14 --
15 -CHROMA ⊖← (1Vpp/75Ω)
16 --
17 -CVBS ⊥
18 -CVBS ⊥
19 -CVBS ⊖→ (1Vpp/75Ω)
20 -CVBS/Y ⊖← (1Vpp/75Ω)
21 -Earthscreen

EXT3 (front)

SVHS

1 - ⊥
2 - ⊥
3 - Y ⊖← (1Vpp; 75Ω)
4 - C ⊖← (0,3Vpp; 75Ω)

◎ CINCH Video ⊖← 300mVpp/75Ω
◎ CINCH Audio ⊖← L(0,2 - 2VRMS; ≥ 10kΩ)
◎ CINCH Audio ⊖← R(0,2 - 2VRMS; ≥ 10kΩ)

3.5mm / 6.3mm 32-2000Ω ≥ 10mW

Audio out (rear)

◎ CINCH Audio ⊖→ L(0,5VRMS; ≤ 1kΩ)
◎ CINCH Audio ⊖→ R(0,5VRMS; ≤ 1kΩ)

front : 2 x 16W / 8Ω
rear : 2 x 6W / 8Ω

EXT2 (SVHS) (rear)

SVHS

1 - ⊥
2 - ⊥
3 - Y ⊖← (1Vpp; 75Ω)
4 - C ⊖← (0,3Vpp; 75Ω)

◎ CINCH Audio ⊖← L(0,2 - 2VRMS; ≥ 10kΩ)
◎ CINCH Audio ⊖← R(0,2 - 2VRMS; ≥ 10kΩ)

SVHS

1 - ⊥
2 - ⊥
3 - Y ⊖→ (1Vpp; 75Ω)
4 - C ⊖→ (0,3Vpp; 75Ω)

◎ CINCH Audio ⊖→ L(0,2 - 2VRMS; ≤ 1kΩ)
◎ CINCH Audio ⊖→ R(0,2 - 2VRMS; ≤ 1kΩ)

Warnings and Notes

Safety regulations require that the unit should be returned in its original condition and that components identical to the original components are used. The safety components are indicated by the symbol ⚠

In order to prevent damage to ICs and transistors, all high-voltage flashovers 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 OV (after approx. 30s).

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.

When repairing a unit, always connect it to the mains voltage via an isolating transformer.

Be careful when taking measurements in the high-voltage section and on the picture tube.

Never replace modules or other components while the unit is switched on.

It is recommended that safety goggles are worn when replacing the picture tube.

When making settings, use plastic rather than metal tools. This will prevent any short circuits and the danger of a circuit becoming unstable.

After repair the wiring should be fastened once more in the cable clamps for this purpose.

In order to prevent measuring errors, the heat sinks should not be used as reference points for measurements. **The heat sink for the sound output amplifier is connected to the -11 volts.**

On this unit the 140 volt supply voltage is not supplied via an interconnection on the deflection yoke to the line output transformer. When the deflection cable is detached, the +140 volt supply remains loaded. In order to unload the +140 volts, coil 5511 should be removed.

Together with the deflection unit and any multipole unit, the flat square picture tubes used form an integrated unit. The deflection and the multipole units are set optimally at the factory. Adjustment of this unit during repair is therefore not recommended.

1. The direct voltages and oscillograms should be measured with regard to the tuner earth (⊥), or hot earth (⊥ϟ) as this is called.

2. The direct voltages and oscillograms shown in the diagrams should be measured in the **Service Default Mode** (see chapter 8) with a colour bar signal and stereo sound (L: 3 kHz, R: 1 kHz unless stated otherwise) and picture carrier at 475.25 MHz.

3. Where necessary, the oscillograms and direct voltages are measured with (⊓⊓) and without aerial signal (⋊) Voltages in the power supply section are measured both for normal operation (⏀) and in standby (⏻). These values are indicated by means of the appropriate symbols.

4. The picture tube PCB has printed spark gaps. Each spark gap is connected between an electrode of the picture tube and the Aquadag coating.

5. The semiconductors indicated in the circuit diagram and in the parts lists are completely interchangeable per position *with the semiconductors in the unit, irrespective of the* type indication on these semiconductors.

6. The connectors used for the modules (board to board) are gold-plated and should only be replaced by the same type.

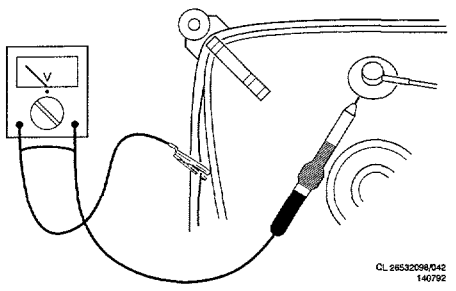


Fig. 3.1

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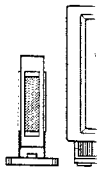

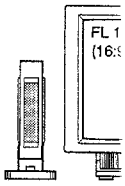

2. Rem

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FL1:(
subw
FL2:F
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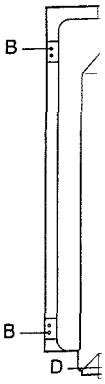


4. Mechanical instructions

It is extremely important that following disassembly all cables are replaced in their original positions in order that safety and sound and picture quality may be guaranteed.

1. Model overview (fig.1)

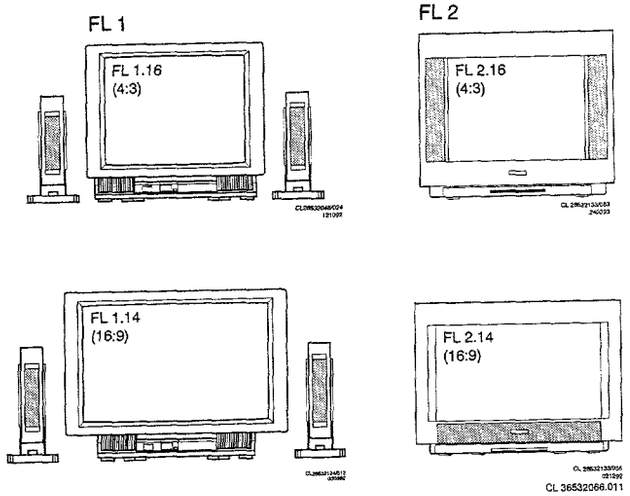


Fig.1

2. Removing the rear panel (fig.2 + 3)

Before the rear panel is removed the connection to the subwoofer should first be disconnected:
FL1:Open the flap in the rear panel. Disconnect the subwoofer cable. (connector L36)
FL2:Remove the three screws A with which the grille is fixed. Tap the grille downwards as indicated by arrow 1, so that the grille becomes loose. Remove the grille from the rear panel by pulling it in the direction indicated by arrow 2.
Disconnect the cable from the subwoofer as indicated by arrow 3. Remove screws B and C, and also screws D if present.
Remove the rear panel from the set.

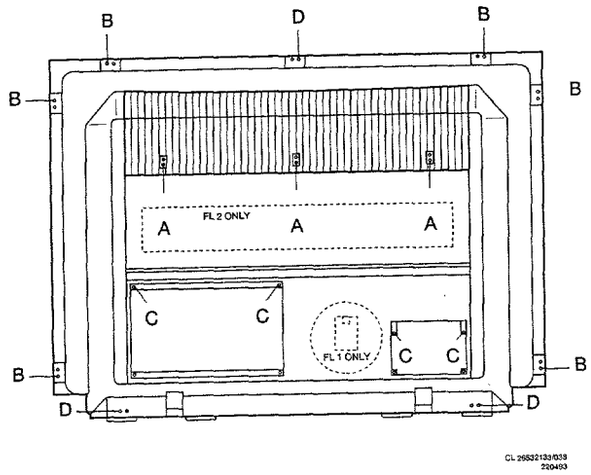


Fig.2

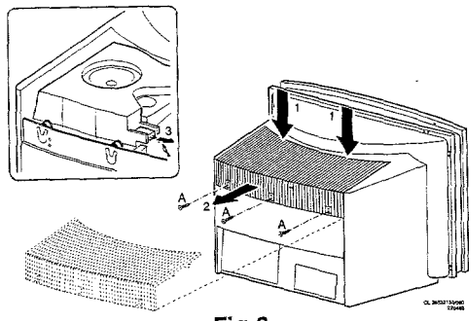


Fig.3

3. Service positions FL1

FL1 can be placed in two service positions. (Fig.4)
Remove the rear panel.
Remove the screw behind the flap on the front side of the set.

Service position 1:

If present, press down the lugs with which the chassis is secured and pull both panels simultaneously to the rear, removing any hindering cables from the cable ties if necessary.
Place the panels vertically behind the set as illustrated in figure 4a.

Service position 2:

Disconnect connectors L01, L02 and L03 that connect the small (SSP) and large signal panel (LSP) together. Pull the panel concerned backwards out of the set. Using extension cable set 4822 320 20209 (fig.5) reconnect both panels together. Place the panel concerned behind the set as illustrated in figure 4b.

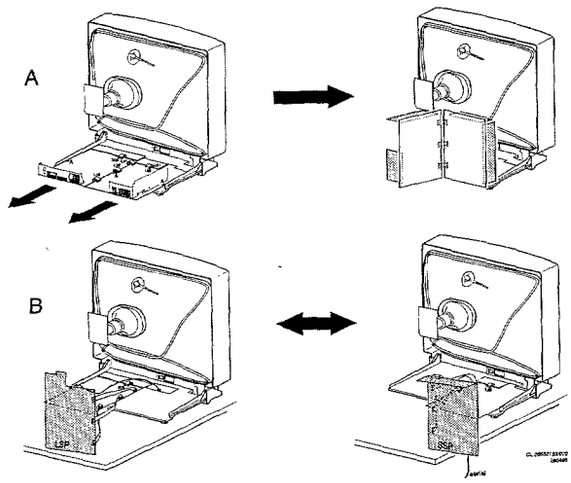


Fig.4

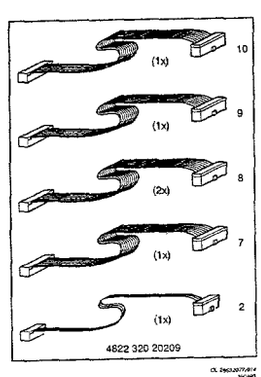


Fig.5

4. Service positions FL2

FL2 can be placed in two service positions. (fig.6)
Remove the rear panel.

Service position 1:

Disconnect connectors E47 and E48. These connectors are located on the side of the set and connect the chassis with the audio, video and headphone connections (FRONT).
Lift the chassis frame at the rear and remove it from the cabinet, removing any hindering cables from the cable ties if necessary. Place the frame one position to the rear, taking care to ensure that the chassis frame lugs are located into the correct recesses.

Service position 2:

Place the chassis in service position 1.
Click the infra-red receiver (IR) out of the retainer located under the picture tube.
Remove the cables to the panel with buttons for local operation from their ties and then click the operating panel out of its holder.
Disconnect the cable to the degaussing coil on the picture tube from the mains filter panel. Remove the cables from and to the mains filter from their cable ties. Click the two service legs loose and place them vertically in the holes as indicated in the diagram. Tilt the entire chassis frame and place the entire unit on both service legs so that the solder side is accessible.

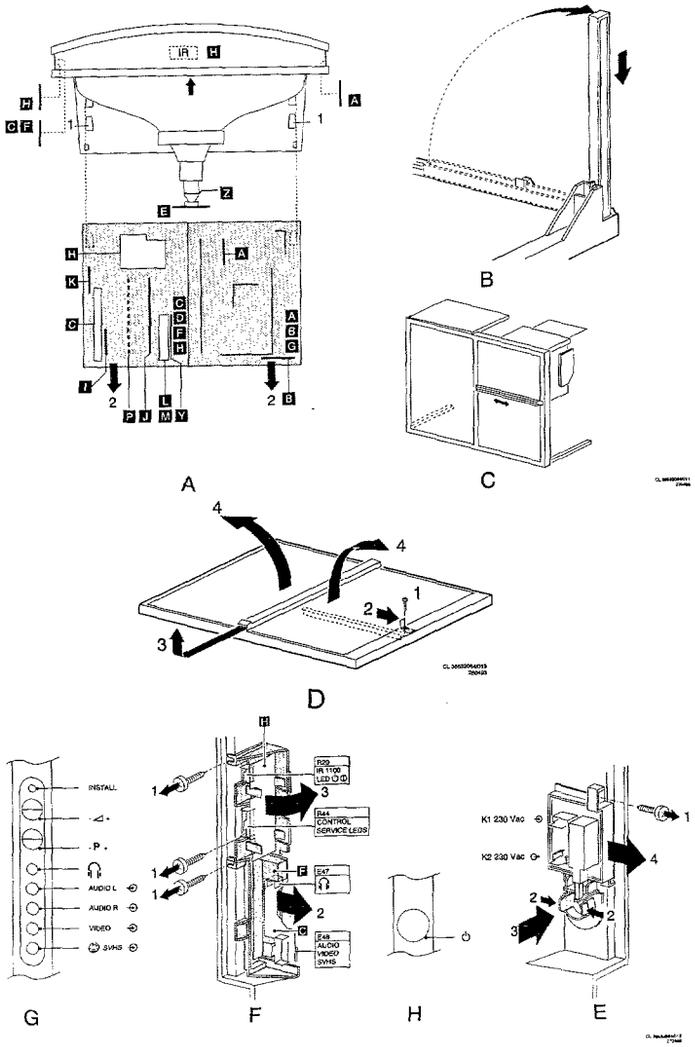


Fig.6

5. Removing the mask from FL2 (fig.7)

Remove the rear panel.
Remove the chassis frame with the chassis from the cabinet.
Remove screws E as indicated in the diagram. Loosen the snap connection under the picture tube. Remove the masker in the manner illustrated in the diagram.

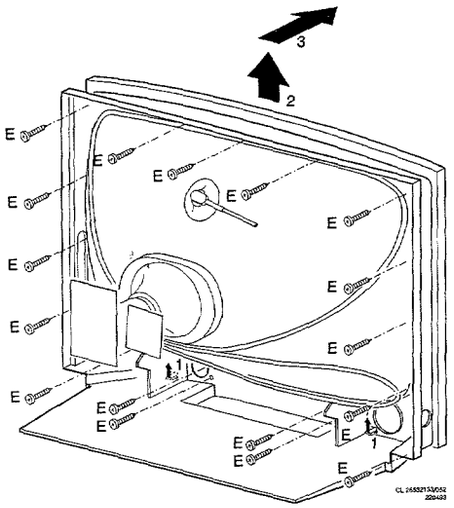


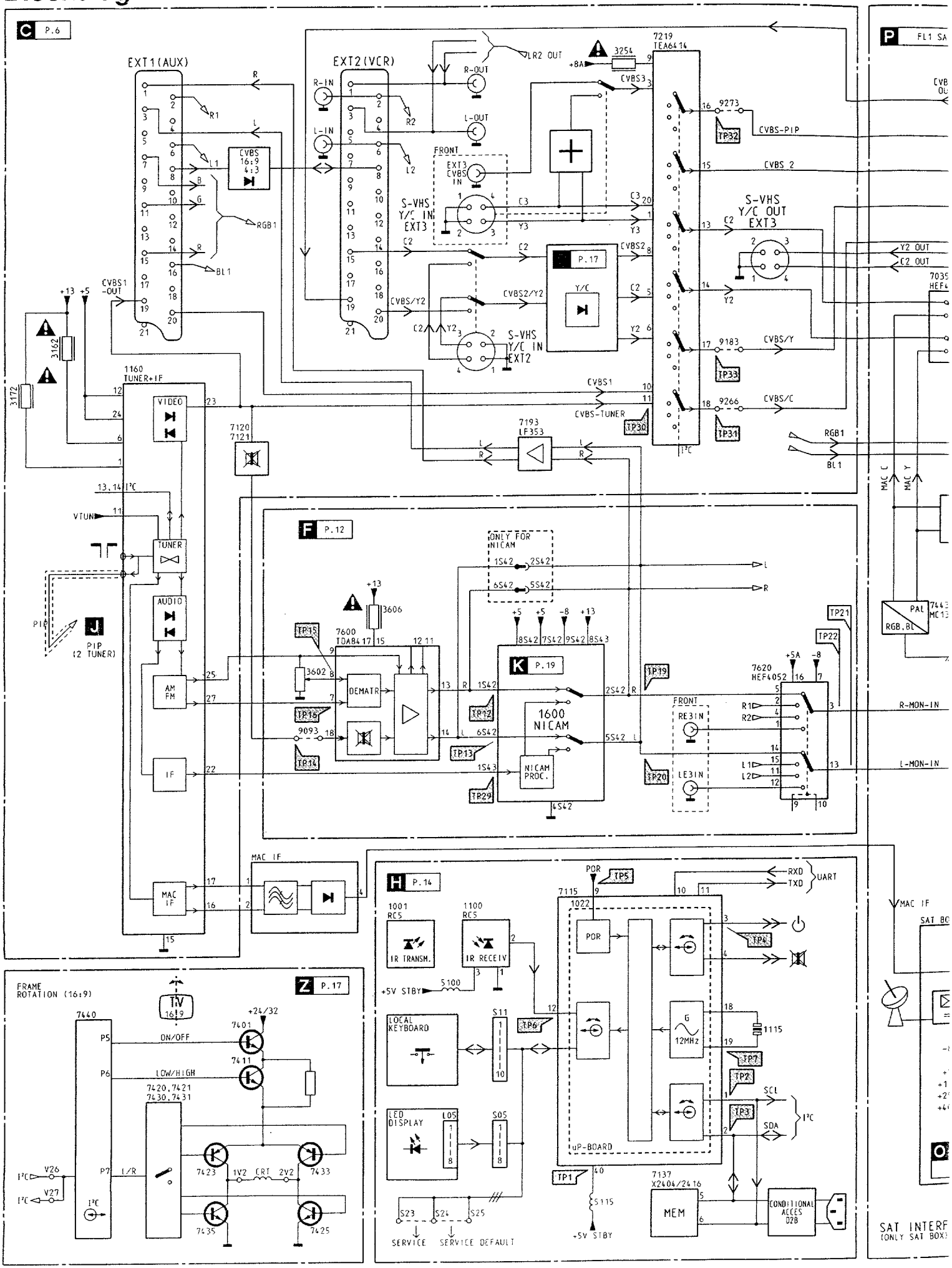
Fig.7

6. Replacing the picture tube.

Remove the rear panel.
Discharge the picture tube in the manner described in chapter 3.
Remove the chassis, or the chassis with the chassis frame from the cabinet.
Disconnect all cabling to the picture tube.
Tilt the set so that the front of the picture tube is pointing downwards, taking care that the picture tube comes to rest on a soft and clean surface.
Loosen the four bolt on the picture tube corners and drop the cabinet gently down onto the work surface. The picture tube can now be removed from the cabinet.

In FL2 special nylon picture tube tubular rivets have been applied. In order to guarantee optimum strength these should not be re-used. Take care to fit correctly when replacing.
Tighten the picture tube screws one-by-one until a torque of approximately 1kgm (10Nm) is achieved.
The picture tube tubular rivets are obtainable under code numbers:
For 28" picture tubes and smaller:4822 532 12243 (28")
For 29" picture tubes and larger:4822 404 31294 (28")
Four tubular rivets are required per picture tube.

Blockdiagram / Blockschaltbild /



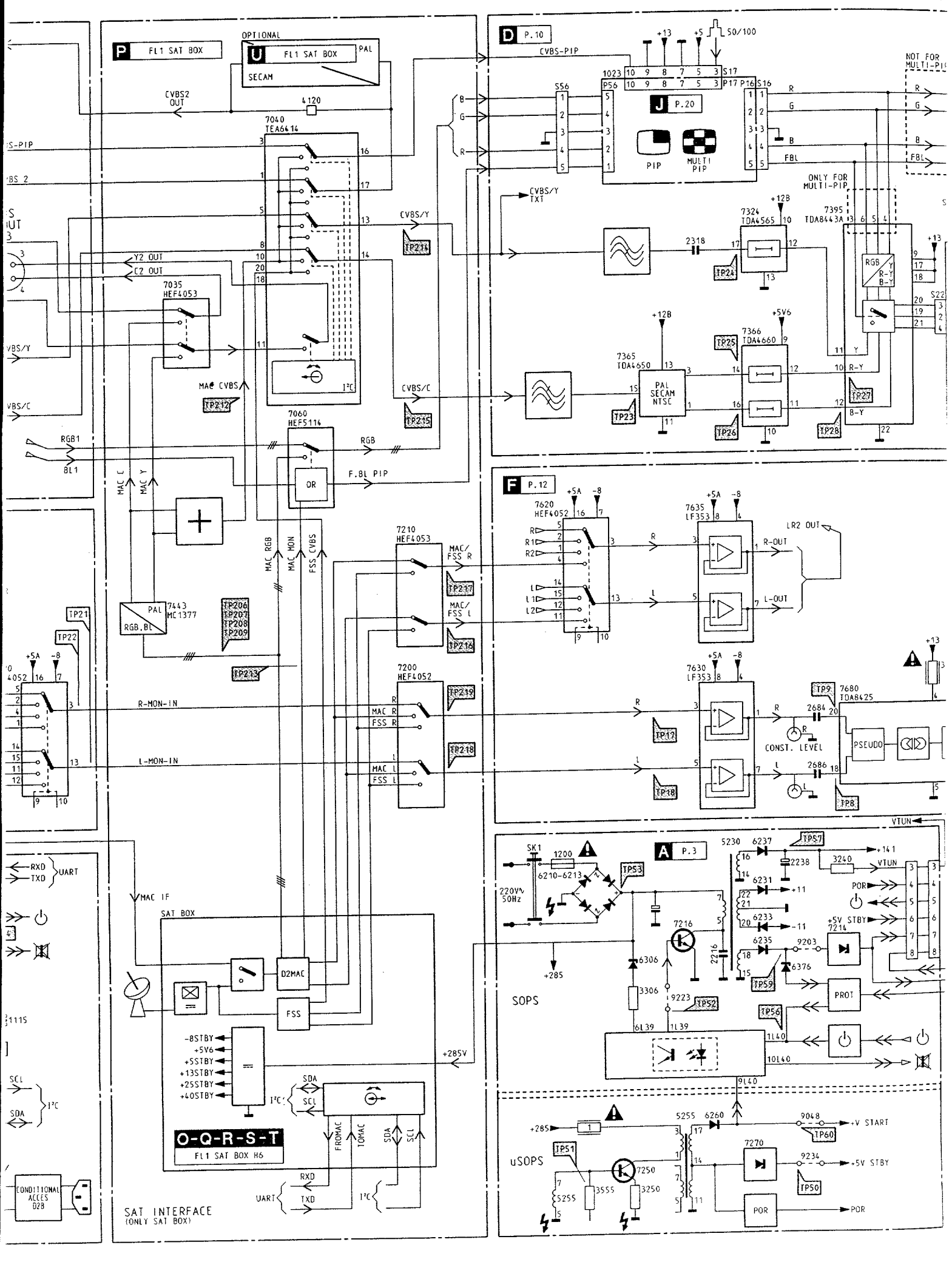
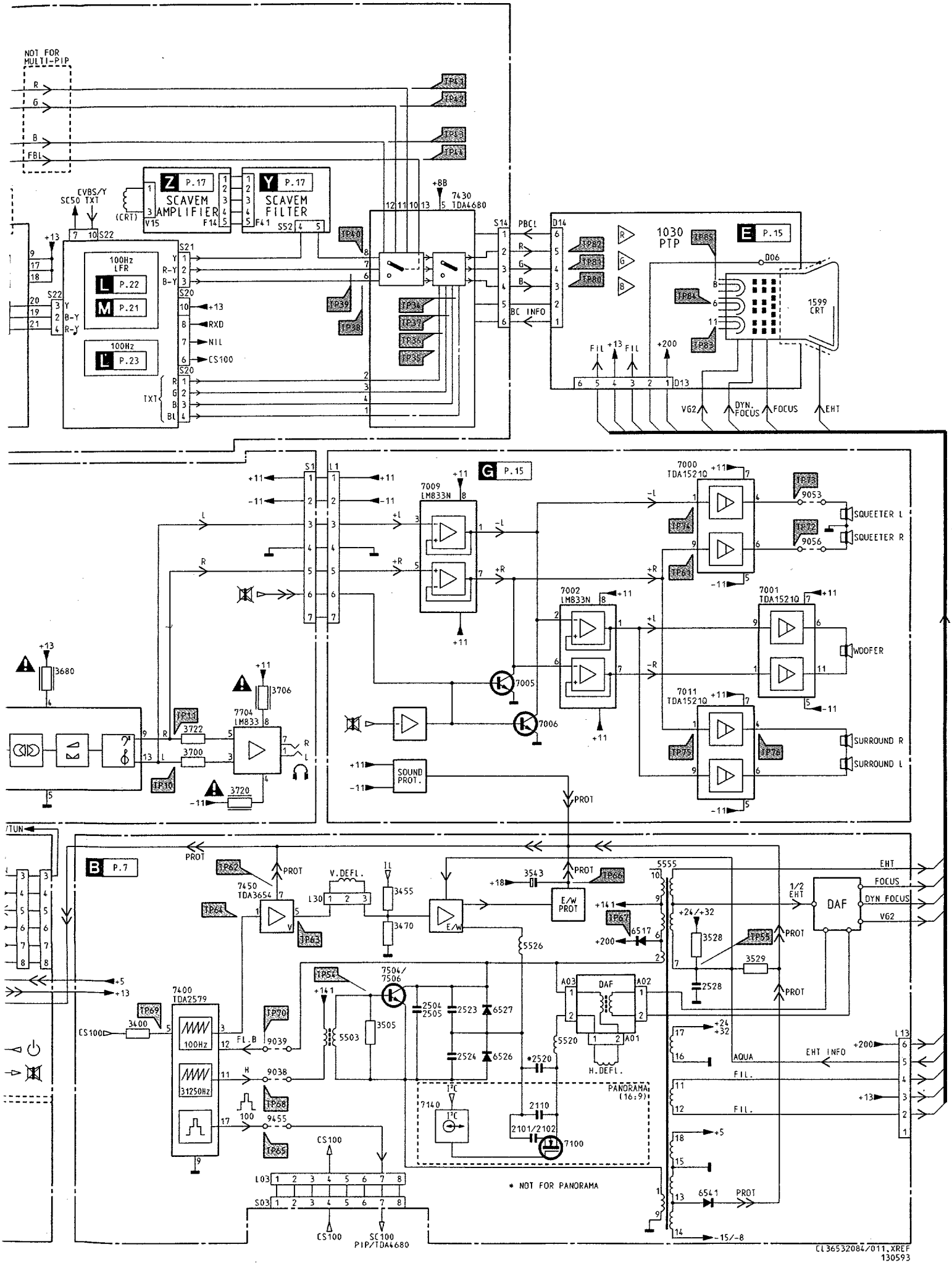
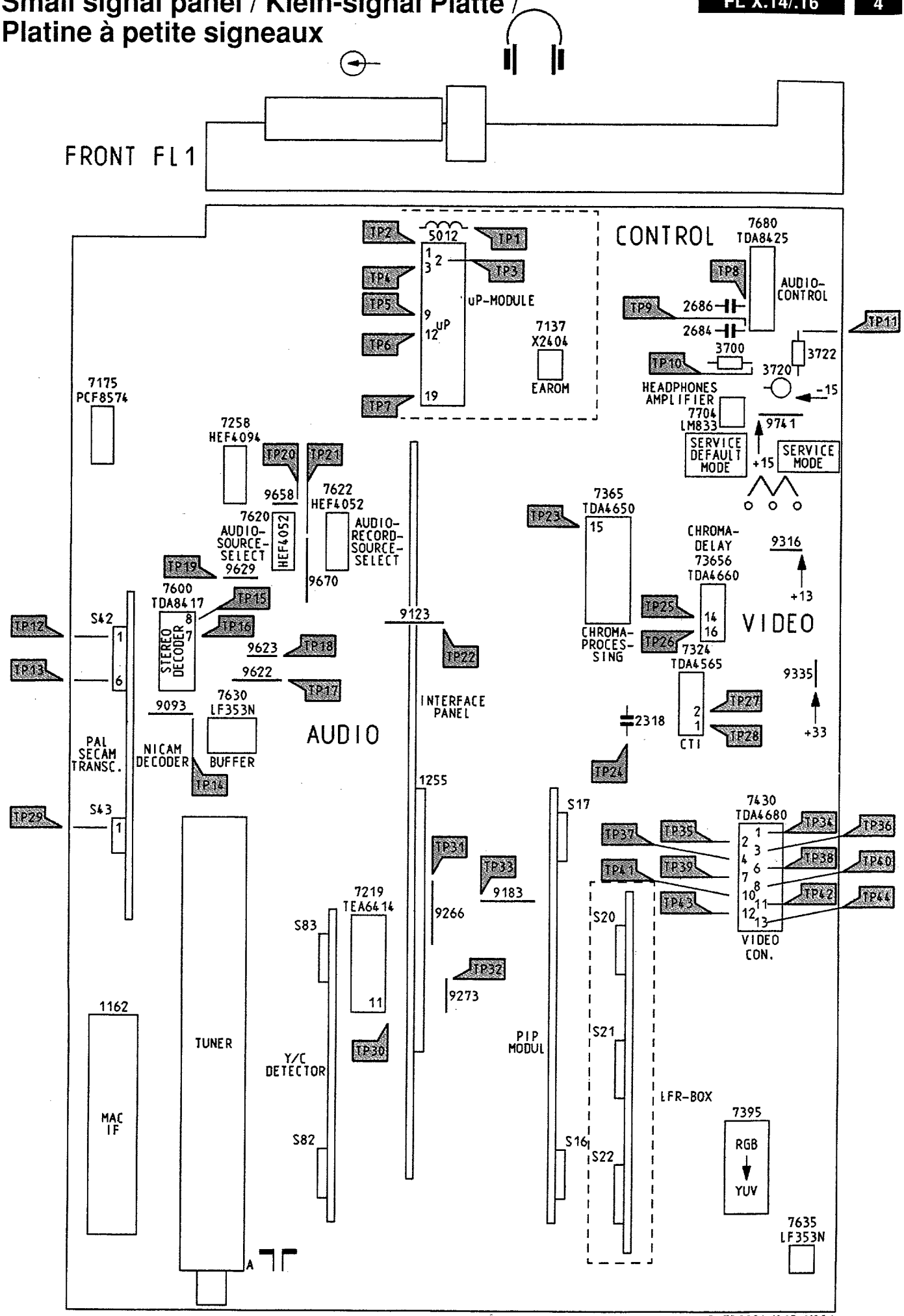

P FL1 SAT BOX
OPTIONAL
U FL1 SAT BOX PAL SECAM
CVBS2 OUT
4120
7040 TEA6414
CVBS/Y
CVBS/C
Y2 OUT
C2 OUT
7035 HEF4053
MAC CVBS
TP212
7060 HEF5114
RGB
F.BL PIP
OR
MAC C
MAC Y
7210 HEF4053
MAC/ FSS R
MAC/ FSS L
TP217
TP216
MAC RGB
MAC MON
FSS CVBS
PAL RGB.BL 7443 MC1377
TP206 TP207 TP208 TP209
TP213
7200 HEF4052
TP219
TP218
R-MON-IN
L-MON-IN
TP21
TP22
D P.10
CVBS-PIP
S56
P56
1023
S17
P17
S16
P16
J P.20
PIP
MULTI PIP
NOT FOR MULTI-PIP
ONLY FOR MULTI-PIP
CVBS/Y TXT
7324 TDA4565
2318
TP24
7395 TDA8443A
RGB / R-Y B-Y
7365 TDA4650
PAL SECAM NTSC
7366 TDA4660
TP25
TP23
TP26
TP27
TP28
F P.12
7620 HEF4052
7635 LF353
LR2 OUT
R-OUT
L-OUT
7630 LF353
7680 TDA8425
TP9
TP17
TP18
TP8
2684
2686
CONST. LEVEL
PSEUDO
A P.3
SK1
1200
6210-6213
TPS3
220V~ 50Hz
5230
6237
TPS7
2238
3240
VTUN
6231
POR
6233
+5V STBY
7214
6235
9203
6376
TPS9
PROT
7216
6306
3306
2216
9223
TPS2
SOPS
+285
6L39
1L39
1L40
10L40
9L40
5255
6260
9048
+V START
TP60
uSOPS
TPS1
7250
3555
3250
7270
9234
+5V STBY
TP50
POR
UART
RXD
TXD
I²C
SCL
SDA
MAC IF
SAT BOX
D2MAC
FSS
-8STBY
+5V6
+5STBY
+13STBY
+25STBY
+40STBY
+285V
FROMAC
TOMAC
O-Q-R-S-T
FL1 SAT BOX H6
SAT INTERFACE
(ONLY SAT BOX)
CONDITIONAL ACCES D2B

Diagramme schématique



Small signal panel / Klein-signal Platte / Platine à petite signeaux



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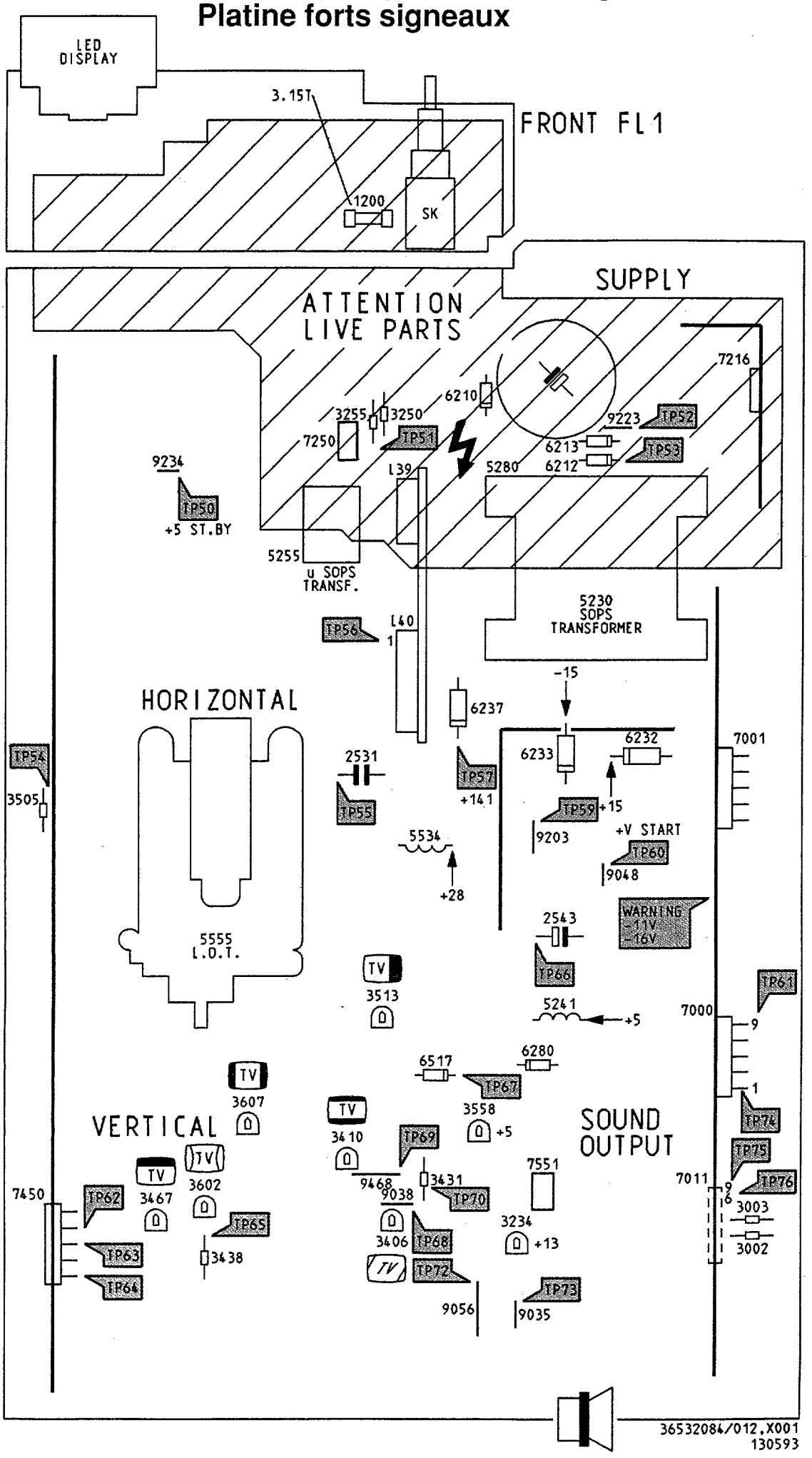
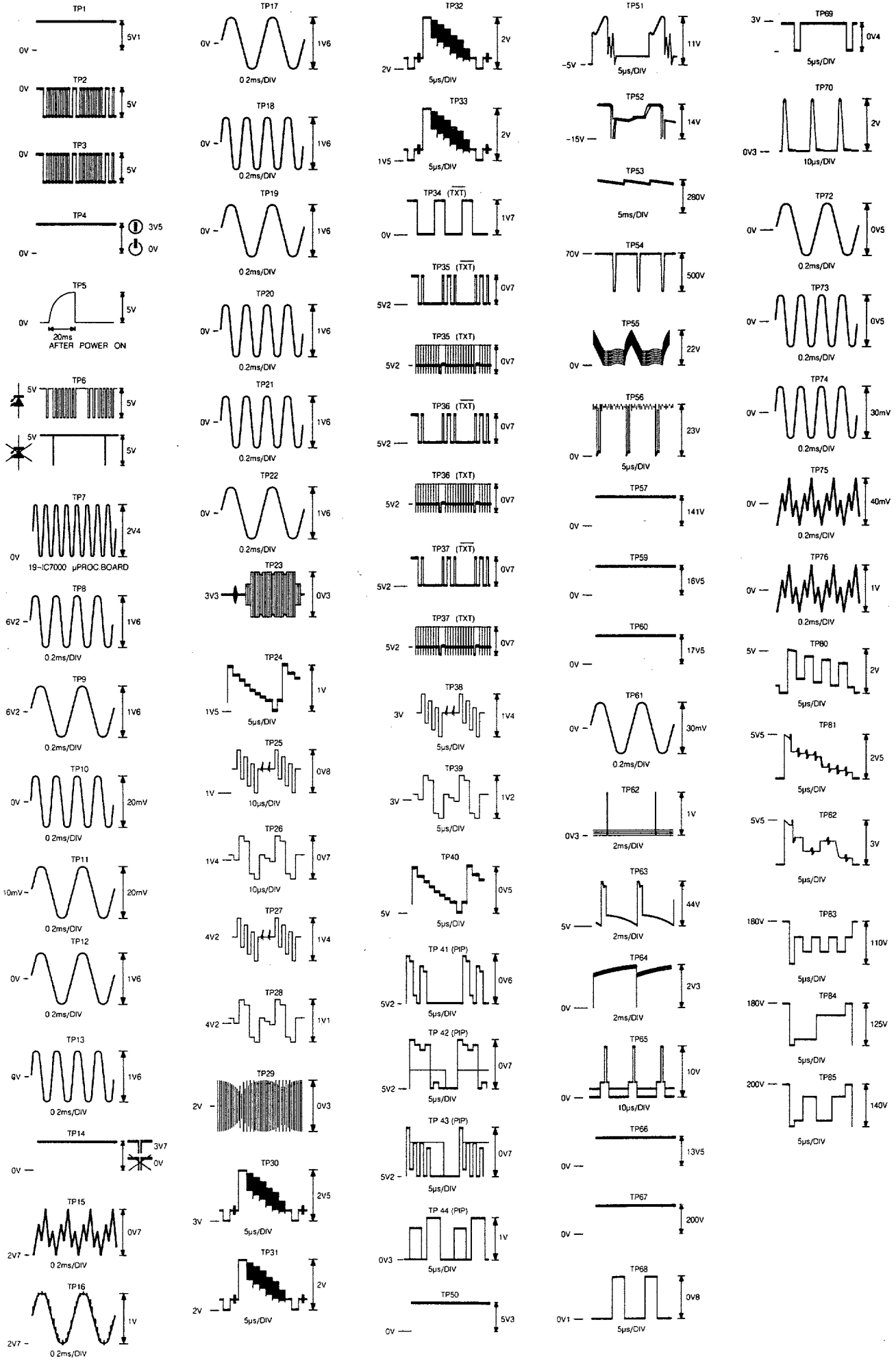
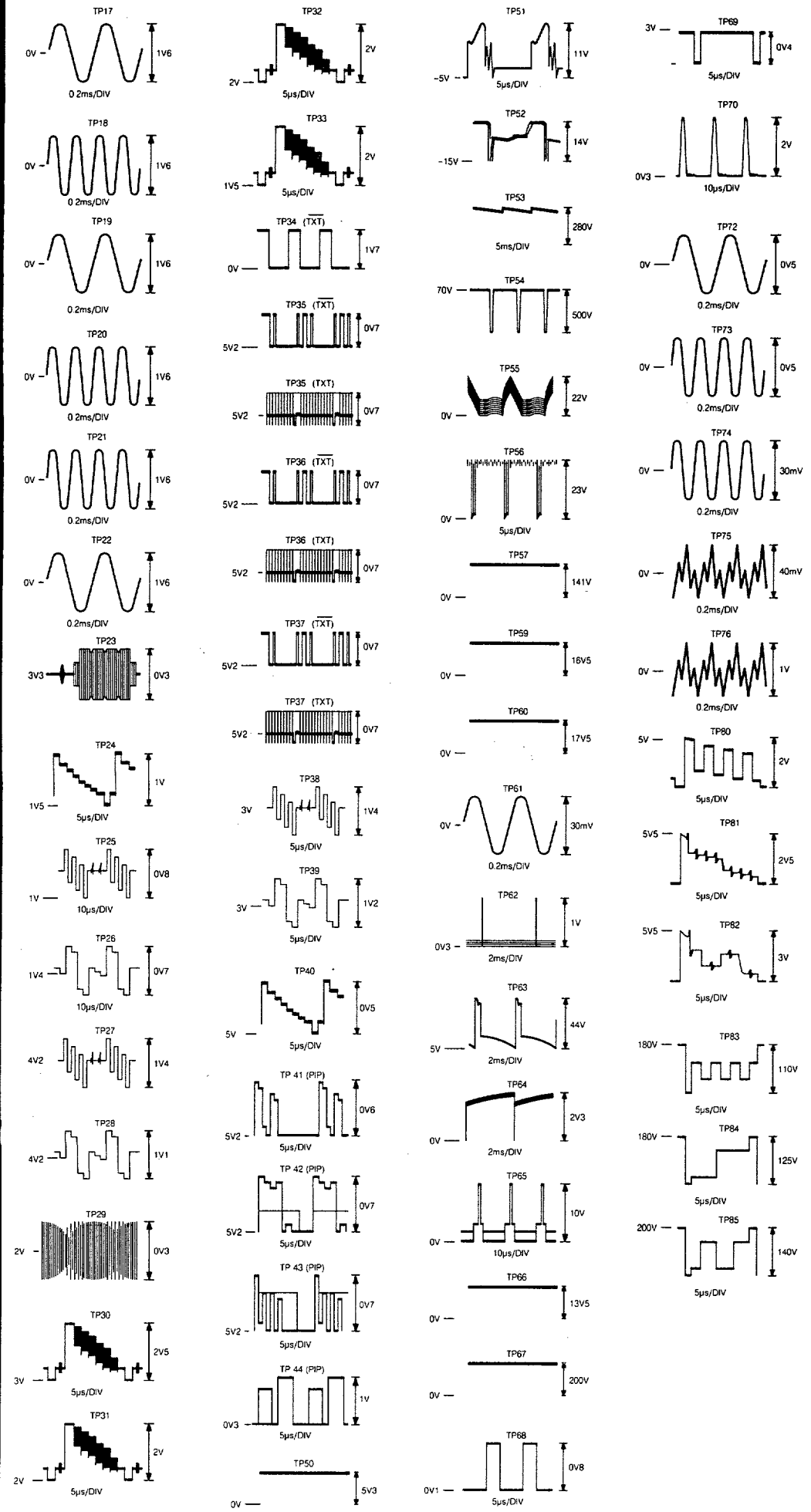
Large signal panel / Groß-signal Platte / Platine forts signeaux



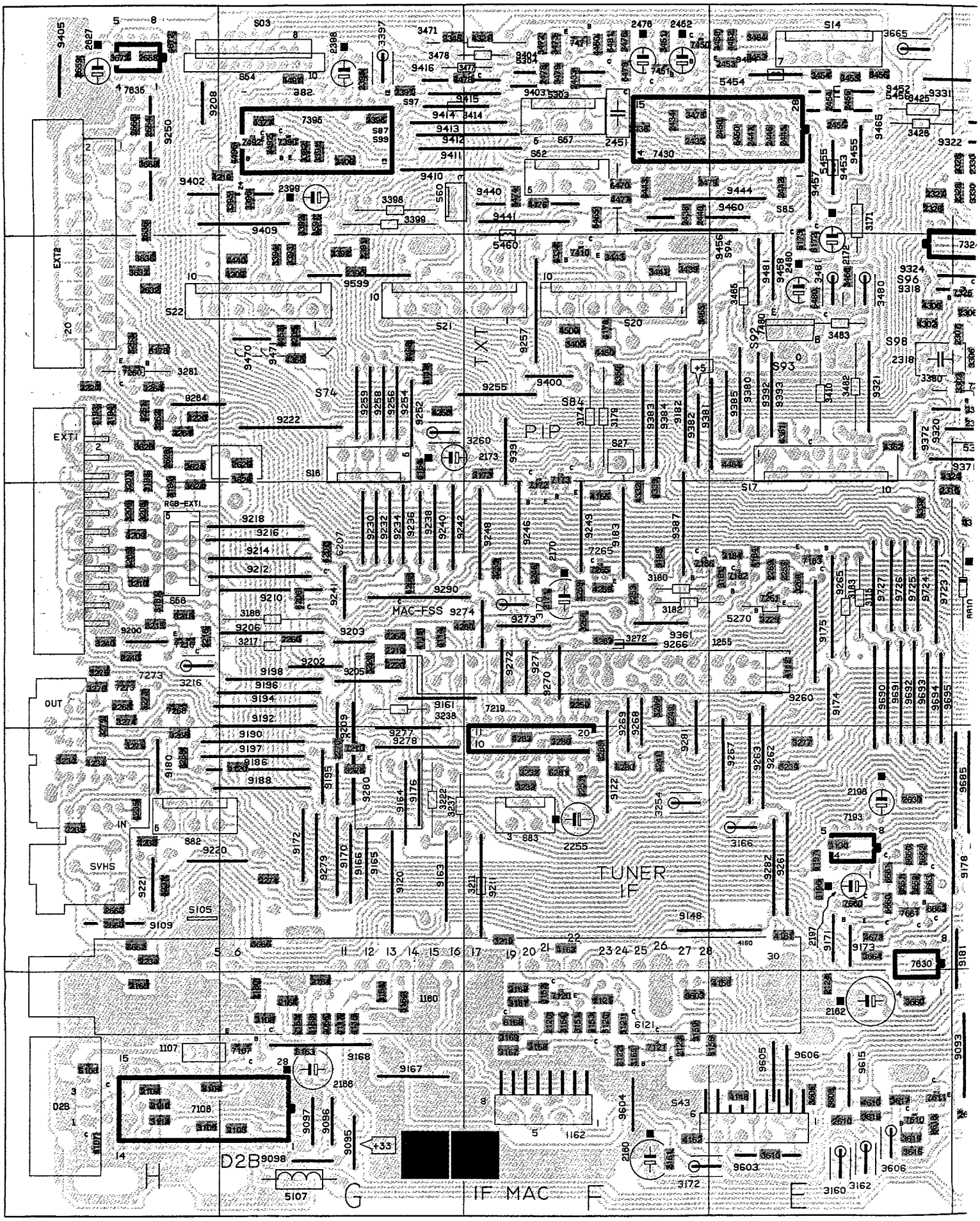
Oscillograms / Oscillogrammes



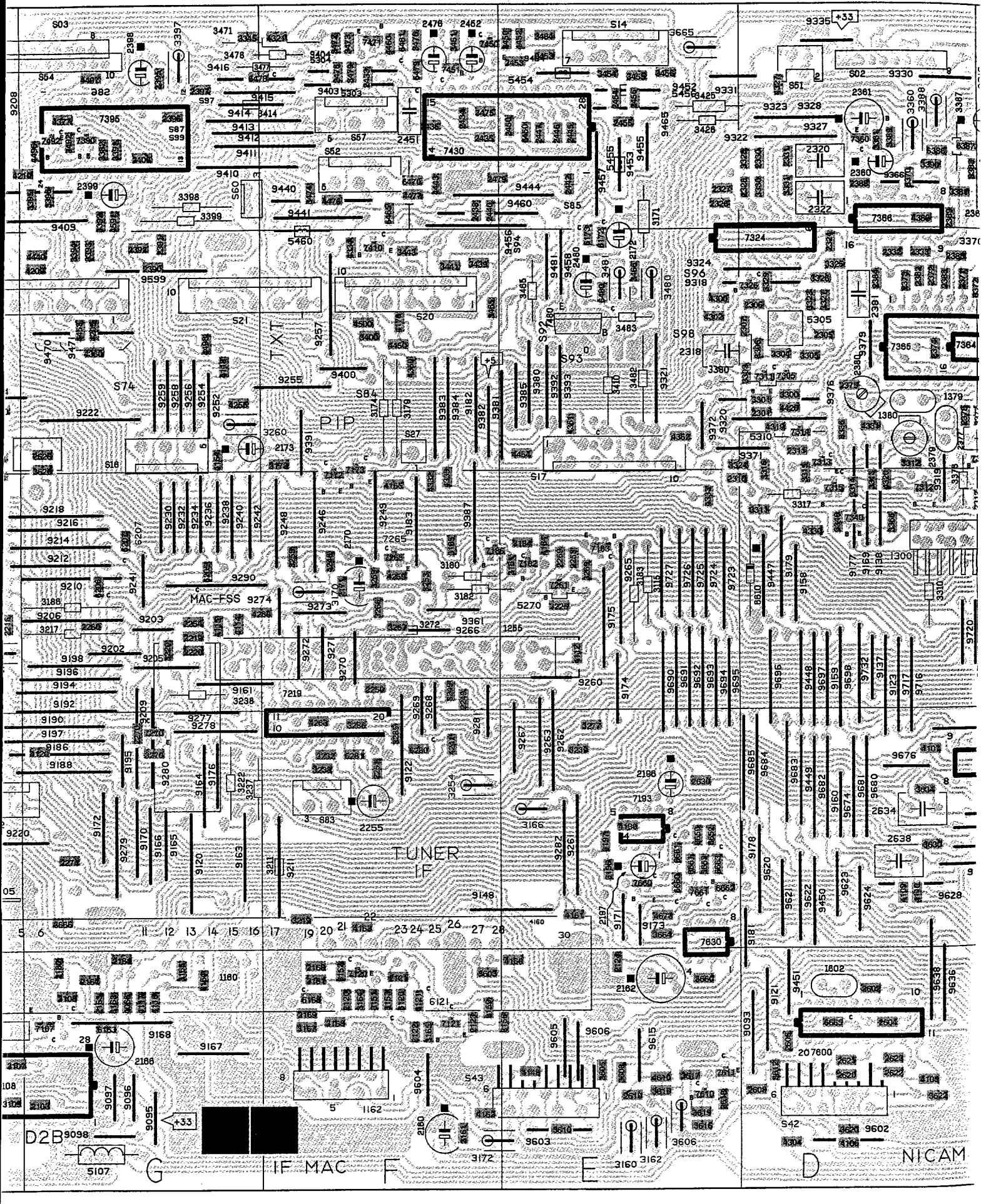
Oscillogrammes

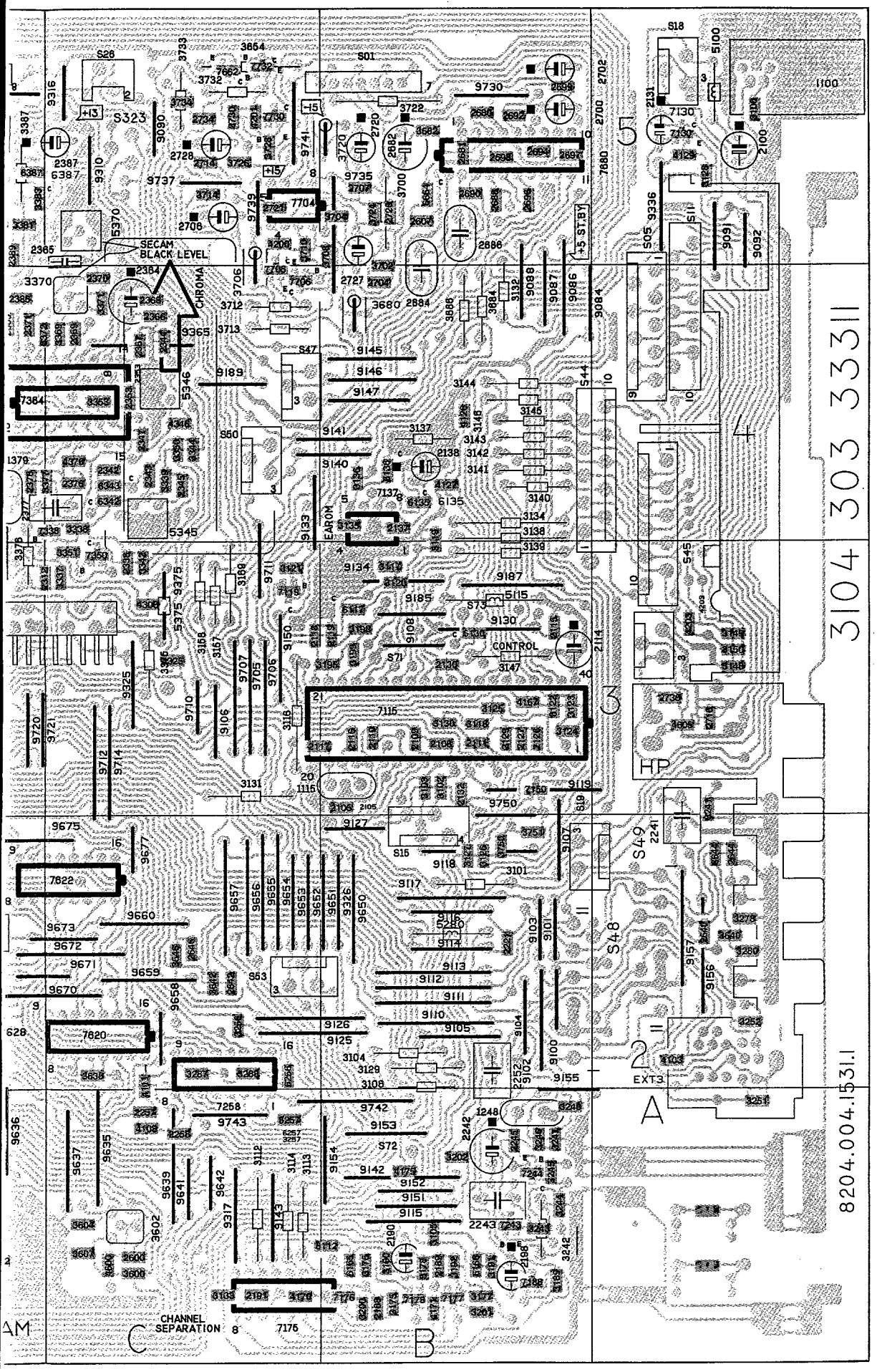


Small signal panel / Klein-signal Platte /



ıel / Klein-signal Platte /





D2B	H1	2250	F3	2636	F
EXT1	H3	2251	F2	2638	D
EXT2	H4	2252	B2	2640	A
EXT3	A3	2253	E3	2642	C
SVHS	H2	2254	G3	2644	A
S01	B5	2255	F2	2646	C
S02	D5	2257	C1	2658	F
S03	H5	2258	C1	2659	F
S05	A4	2260	G3	2660	F
S11	A5	2261	H4	2662	F
S14	E5	2268	H3	2664	F
S15	B2	2269	E3	2666	F
S16	G4	2270	G2	2680	E
S17	E4	2274	G2	2681	E
S18	A5	2301	D4	2682	E
S19	B2	2305	D4	2684	E
S20	F4	2306	D4	2686	E
S21	F4	2307	D4	2688	E
S22	G4	2310	D3	2690	E
S26	C5	2311	D4	2692	E
S27	F4	2312	C3	2694	E
S42	D1	2318	E4	2696	E
S43	E1	2320	D5	2697	E
S44	B4	2322	D5	2698	E
S45	A4	2324	D4	2699	E
S46	A3	2326	E5	2700	E
S47	C4	2327	E5	2702	E
S48	B2	2328	D5	2704	E
S49	A2	2330	D5	2706	C
S50	C4	2331	D5	2707	E
S51	D5	2332	D4	2714	C
S52	F5	2333	D4	2716	A
S53	C2	2338	C3	2720	E
S54	H5	2342	C4	2721	C
S56	H3	2343	C4	2726	E
S57	F5	2344	C4	2727	E
S60	G5	2345	C4	2728	C
S82	G2	2347	C4	2734	C
S83	F2	2353	C4	2736	A
S100	F4	2360	D5	3100	A
S101	D3	2361	D5	3101	E
S105	H2	2364	C4	3102	E
1100	A5	2365	C4	3103	E
1107	G1	2366	C4	3104	E
1115	B3	2367	C4	3105	E
1160	E2	2368	C4	3106	E
1162	F1	2369	C4	3107	F
1248	B1	2370	C4	3108	C
1300	D3	2371	D4	3109	F
1379	D4	2372	D4	3110	F
1380	D4	2373	D4	3111	F
1602	D1	2374	D4	3112	C
2100	A5	2375	D4	3113	C
2103	G1	2376	C4	3114	C
2105	B3	2377	C4	3115	E
2107	H1	2378	D4	3116	C
2108	B3	2379	D4	3117	E
2109	B3	2380	D4	3118	E
2110	B3	2381	D4	3119	E
2111	B3	2382	D4	3120	E
2114	B3	2383	D4	3121	C
2115	B3	2384	D4	3122	E
2116	B3	2385	D4	3123	E
2117	B3	2387	C5	3124	F
2118	C3	2388	D5	3125	I
2119	B3	2389	D5	3126	I
2120	F1	2390	G4	3127	E
2121	F1	2391	G4	3128	A
2122	F1	2392	G4	3129	I
2123	F1	2395	G5	3130	I
2124	E1	2396	G5	3131	C
2126	B3	2397	G5	3132	I
2127	B3	2398	G5	3133	C
2129	B3	2399	G5	3134	F
2130	B3	2400	G5	3135	
2131	A5	2433	F5	3136	
2132	B3	2434	F5	3137	I
2137	B4	2435	F5	3138	I
2138	B4	2436	F5	3139	
2160	F1	2438	F5	3140	
2161	F1	2440	F5	3141	
2162	E1	2442	E5	3142	
2163	G1	2445	E5	3143	
2164	G1	2446	E5	3144	
2165	H1	2447	E5	3145	
2166	G1	2450	E5	3146	
2168	F1	2451	F5	3147	
2169	F1	2452	F5	3148	
2170	F3	2453	E5	3149	
2171	F3	2454	E5	3150	
2172	E4	2455	E5	3151	
2173	G4	2456	E5	3152	
2180	G1	2476	F5	3153	
2181	G1	2478	F5	3154	
2188	B1	2479	E5	3155	
2189	B1	2480	E4	3156	
2190	B1	2600	C1	3157	
2191	C1	2602	D1	3158	
2193	H4	2604	D1	3159	
2194	H4	2606	D1	3160	
2196	E2	2607	B5	3161	
2197	E2	2608	D1	3162	
2198	B1	2610	E1	3163	
2216	H3	2620	D1	3164	
2219	G3	2621	D1	3165	
2220	G3	2622	D1	3166	
2221	B2	2623	D1	3167	
2234	H2	2624	H4	3168	
2240	H3	2626	G4	3169	
2241	A2	2627	H5	3170	
2242	B1	2628	H4	3171	
2243	B1	2630	E2	3172	
2245	B1	2632	H4	3173	
2249	F3	2634	D2	3174	

Platine à petites signeaux

H1	2250	F3	2636	H4	3175	B1	3329	D4	3682	B5	4591	G5	7390	G5	9186	G2	9414	G5
H3	2251	F2	2638	D2	3176	B1	3330	D5	3684	B4	4600	C1	7395	G5	9187	B3	9415	F5
H4	2252	B2	2640	A2	3177	B1	3331	D5	3686	B4	4605	A3	7410	F4	9188	G2	9416	F5
A3	2253	E3	2642	C2	3178	B1	3336	D4	3700	B5	4610	E1	7430	E5	9189	C4	9440	F5
H2	2254	G3	2644	A2	3179	F4	3337	C3	3702	B4	4672	H5	7450	F5	9190	G2	9441	F5
B5	2255	F2	2646	C2	3180	F3	3338	C4	3704	B5	4673	E2	7451	F5	9192	G2	9444	E5
D5	2257	C1	2658	H5	3181	E3	3339	C4	3706	C4	5100	A5	7471	F5	9194	G3	9447	D3
H5	2258	C1	2659	H5	3182	F3	3342	C3	3708	B5	5107	G1	7480	E4	9195	G2	9448	D3
A4	2260	G3	2660	H2	3183	E3	3344	C4	3710	C5	5115	B3	7492	G5	9196	G3	9449	D2
A5	2261	H4	2662	H2	3184	E3	3345	G5	3712	C4	5270	E3	7600	D1	9197	G2	9450	D2
E5	2268	H3	2664	H5	3185	F3	3346	D3	3713	C4	5280	B2	7610	E1	9198	G3	9451	D1
B2	2269	E3	2666	H5	3186	G3	3350	C4	3714	C5	5303	F5	7611	E1	9200	H3	9452	E5
G4	2270	G2	2680	B5	3187	H3	3351	C3	3720	B5	5304	F5	7620	C2	9202	G3	9453	E5
E4	2274	G2	2681	B5	3189	B1	3353	C4	3722	B5	5305	D4	7622	C2	9203	G3	9454	E5
A5	2301	D4	2682	B5	3190	B1	3360	D5	3724	B5	5310	D4	7630	E1	9205	G3	9455	E5
B2	2305	D4	2684	B4	3191	B1	3361	D5	3726	C5	5345	C4	7635	H5	9206	G3	9456	F4
F4	2306	D4	2686	B5	3192	B1	3365	D3	3728	C5	5346	C4	7660	E2	9208	H5	9457	E5
F4	2307	D4	2688	B5	3193	H3	3369	C4	3730	C5	5370	C5	7661	E2	9209	G2	9458	E4
G4	2310	D3	2690	B5	3194	H3	3370	C4	3732	C5	5375	C3	7662	C5	9210	G3	9460	F5
C5	2311	D4	2692	B5	3195	B3	3371	C4	3733	C5	5454	E5	7680	B5	9211	F2	9465	E5
F4	2312	C3	2694	B5	3196	E2	3372	C4	3734	C5	5455	E5	7704	C5	9212	G3	9466	E4
D1	2318	E4	2696	B5	3197	E2	3375	C3	3750	B2	5456	E5	7706	C4	9214	G3	9470	G4
E1	2320	D5	2697	B5	3198	B3	3376	D3	3751	B2	5460	F4	7708	C4	9216	G3	9471	G4
B4	2322	D5	2698	B5	3199	B3	3377	C4	3996	A1	6107	H1	7730	C5	9218	G3	9481	E4
A4	2324	D4	2699	B5	3200	B1	3380	D4	3997	A1	6108	H1	7732	C5	9220	G2	9599	G4
A3	2326	E5	2700	B5	3201	B1	3381	D5	3998	A1	6112	B1	9084	B4	9221	H2	9602	D1
C4	2327	E5	2702	B5	3202	B1	3382	G5	3999	A1	6117	B3	9086	B4	9222	G4	9603	E1
B2	2328	D5	2704	B4	3205	H3	3383	D5	4066	G1	6120	F1	9087	B4	9230	G3	9604	F1
A2	2330	D5	2706	C5	3206	H3	3387	D5	4103	A2	6121	F1	9088	B4	9232	G3	9605	E1
C4	2331	D5	2707	B5	3207	H3	3388	D5	4105	D1	6130	B3	9089	G2	9234	G3	9606	E1
D5	2332	D4	2714	C5	3208	H3	3389	D5	4106	D1	6135	B4	9090	C5	9236	G3	9615	E1
F5	2333	D4	2716	A3	3209	H3	3390	D5	4107	D2	6136	B4	9091	A5	9238	G3	9620	D2
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H5	2342	C4	2721	C5	3211	F2	3392	G5	4109	D2	6165	B1	9093	D1	9241	G3	9622	D2
H3	2343	C4	2726	B5	3215	H3	3393	G4	4110	D2	6166	B1	9095	G1	9242	G3	9623	D2
F5	2344	C4	2727	B5	3216	H3	3394	G4	4111	C2	6168	F1	9096	G1	9246	F3	9624	D2
G5	2345	C4	2728	C5	3217	G3	3395	G5	4112	E3	6172	E4	9097	G1	9248	F3	9628	D2
G2	2347	C4	2734	C5	3218	H3	3396	G5	4114	G3	6173	E4	9098	G1	9249	F3	9635	C1
F2	2353	C4	2736	A3	3219	F2	3397	G5	4115	G3	6178	H4	9100	B2	9250	H5	9636	D1
F4	2360	D5	3100	A5	3220	G3	3398	G5	4116	G1	6205	G3	9101	B2	9252	G4	9637	C1
D3	2361	D5	3101	B2	3222	G2	3399	G5	4117	G1	6206	G3	9102	B2	9254	G4	9638	D1
H2	2364	C4	3102	B3	3224	H4	3400	F4	4118	G4	6207	G3	9103	B2	9255	F4	9639	C1
A5	2365	C4	3103	B3	3225	E3	3410	E4	4120	G2	6256	C2	9104	B2	9256	G4	9641	C1
G1	2366	C4	3104	B2	3232	F2	3414	G5	4126	B4	6257	C1	9105	B2	9257	F4	9642	C1
B3	2367	C4	3105	B1	3233	F2	3425	E5	4127	B4	6280	F2	9106	C3	9258	G4	9650	B2
E2	2368	C4	3106	B2	3234	H2	3426	E5	4129	A5	6281	F2	9107	B2	9259	G4	9651	B2
F1	2369	C4	3107	H1	3235	H2	3439	F4	4130	E2	6342	C4	9108	B3	9260	E3	9652	C2
B1	2370	C4	3108	G1	3237	G2	3441	F4	4148	E1	6343	C4	9109	H2	9261	E2	9653	C2
D3	2371	D4	3109	H1	3238	G3	3443	F4	4161	E2	6345	E4	9110	B2	9262	E2	9654	C2
D4	2372	D4	3110	H1	3239	E2	3450	E5	4162	F1	6370	D5	9111	B2	9263	E2	9655	C2
D4	2373	D4	3111	H1	3240	H3	3451	F5	4163	F2	6386	D5	9112	B2	9264	H4	9656	C2
D1	2374	D4	3112	C1	3241	A3	3453	E5	4164	G4	6387	D5	9113	B2	9265	E3	9657	C2
A5	2375	D4	3113	C1	3242	B1	3454	E5	4165	F3	6450	E5	9114	B2	9266	F3	9658	C2
G1	2376	C4	3114	C1	3243	B1	3455	E5	4166	E1	6465	F5	9115	B1	9267	E2	9659	C2
B3	2377	C4	3115	E3	3244	B1	3456	E5	4167	B3	6470	F5	9116	B2	9268	F3	9660	C2
H1	2378	D4	3116	C3	3245	B1	3465	F4	4170	C1	6471	F5	9117	B2	9269	F2	9670	C2
B3	2379	D4	3117	B3	3246	B1	3466	E4	4171	B1	6478	F5	9118	B2	9270	F3	9671	C2
B3	2380	D4	3118	B3	3247	B1	3471	F5	4175	B1	6479	F5	9119	B3	9271	F3	9672	C2
B3	2381	D4	3119	B3	3248	B1	3472	F5	4176	F4	6480	E4	9120	G2	9272	F3	9673	C2
B3	2382	D4	3120	B3	3249	F3	3473	F5	4184	E3	6481	F5	9121	D1	9273	F3	9674	D2
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B3	2385	D4	3123	B3	3253	F3	3476	F5	4203	A3	6660	E2	9125	C2	9278	G2	9677	C2
B3	2387	C5	3124	B3	3254	F2	3477	F5	4205	G4	6661	E2	9126	C2	9279	G2	9680	D2
C3	2388	D5	3125	B3	3255	F3	3478	F5	4209	G4	6662	E2	9127	B2	9280	G2	9681	D2
B3	2389	D5	3126	B2	3256	C2	3479	F5	4210	G5	6663	E2	9130	B3	9281	F2	9682	D2
F1	2390	G4	3127	B2	3257	C1	3480	E4	4220	H4	6664	B5	9131	G2	9282	E2	9683	D2
F1	2391	G4	3128	A5	3259	F3	3481	E4	4234	H2	6665	D1	9132	F2	9290	G3	9684	D2
F1	2392	G4	3129	B2	3260	G4	3482	E4	4235	H2	7107	G1	9133	C4	9310	C5	9685	D2
F1	2395	G5	3130	B3	3261	H4	3483	E4	4236	H2	7108	G1	9134	B3	9316	C5	9690	E3
E1	2396	G5	3131	C3	3262	H4	3484	E5	4237	H2	7115	B3	9137	D3	9317	C1	9691	E3
B3	2397	G5	3132	B4	3263	H4	3492	G5	4241	F2	7119	C3	9138	D3	9318	D4	9692	E3
B3	2398	G5	3133	C1	3264	H4	3600	C1	4246	F3	7120	F1	9140	B4	9319	D3	9693	E3
B3	2399	G5	3134	B4	3265	H2	3602	C1	4255	G4	7121	F1	9141	B4	9320	D4	9694	E3
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F1	2440	F5	3141	B4	3272	F3	3610	E1	4306	C3	7176	B1	9150	C3	9327	D5	9707	C3
E1	2442	E5	3142	B4	3273	H3	3612	D1	4319	D4	7177	B1	9151	B1	9328	D5	9710	C3
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G1	2450	E5	3146	B4	3277	E2	3618	E1	4327	D5	7186	E3	9155	B1	9336	A5	9716	D3
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F1	2452	F5	3148	A3	3279	H2	3620	D1	4331	D4	7193	E2	9157	A2	9365	C4	9720	D3
F3	2453	E5	3149	A3	3280	A2	3622	D1	4332	F3	7216	H3	9158	D3	9366	D5	9721	C3
F3	2454	E5	3150	A3	3281	H4	3624	H3	4333	E3	7219	F2	9159	D3	9371	D4	9723	E3
E4	2455	E5	3151	F1	3285	F2	3626	G3	4334	F4	7243	B1	9160	D2	9372	E4	9724	E3
G4	2456	E5	3152	F1	3286	F2	3628	H4	4335	F3	7244	B1	9161	G3	9375	C3	9725	E3
G1	2476	F5	3153	F1	3287	C2	3630	D2	4346	C4	7258	C1	9163	G2	9376	D4	9726	E3
G1	2478	F5	3154	F1	3288	C2	3632	H4	4350	F4	7260	H4	9164	G2	9379	D4	9727	E3
B1	2479	E5	3155	F1	3300	D4	3634	D2	4360	G4	7261	E3	9165	G2	9380	E4	9730	B5
B1	2480	E4	3156	E1	3301	D4	3636	H4	4361	E4	7265	F3	9166	G2	9381	E4	9732	D3
B1	2600	C1	3157	C3	3303	D4	3638	C2	4362	E4	7268	H3	9167	G1	9382	F4	9735	B5
C1	2602	D1	3158	C3	3304	D4	3640	A2	4376	C4	7270	G2	9168	G1	9383	F4	9737	C5
H4	2604	D1	3159	F1	3305	D4	3642	C2	4377	G5	7273	H3	9169	D3	9384	F4	9739	C5
H4	2606	D1	3160	E1	3306	D4	3644	A2	4386	D5	7305	D4	9170	G2	9385	E4	9741	C5
E2	2607	B5	3161	F1	3310	D3	3646	C2	4420	D4	7311	D4	9171	E2	9387	F3	9742	B1
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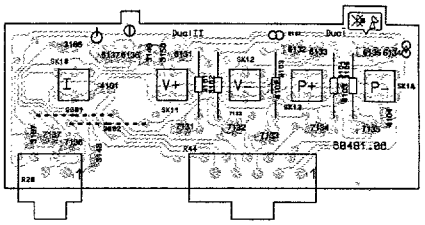
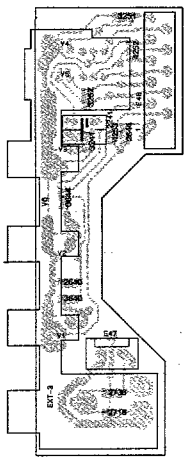
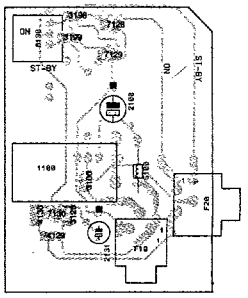
B1	2610	E1	3163	G1	3312	D4	3651	E2	4443	F5	7313	D4	9173	E2	9392	E4	9750	B2
H3	2620	D1	3164	G1	3313	D3	3652	E2	4450	F4	7314	D4	9174	E3	9393	E4		
G3	2621	D1	3165	G1	3314	D3	3653	E2	4452	E5	7315	D3	9175	E3	9400	F4		
G3	2622	D1	3166	E2	3315	D3	3654	C5	4453	G4	7324	E5	9176	G2	9402	G5		
B2	2623	D1	3167	F1	3316	D3	3660	E1	4454	E4	7326	D4	9177	D3	9403	F5		
H2	2624	H4	3168	F1	3317	D3	3662	H2	4460	F5	7338	C4	9178	D2	9404	F5		
H3	2626	G4	3169	C3	3323	D4	3664	E2	4476	F5	7340	D3	9179	D3	9405	H5		
A2	2627	H5	3170	F3	3324	D4	3665	E5	4477	F5	7350	C3	9180	H2	9409	G5		
B1	*2628*	*H4*	3171	E5	3325	D4	3666	G2	4496	G5	7360	D5	9181	D2	9410	G5		
B1	2630	E2	3172	E1	3326	D4	3668	H5	4497	G5	7364	D4	9182	F4	9411	F5		
B1	2632	H4	3173	F4	3327	D4	3672	H5	4498	G4	7365	D4	9183	F3	9412	F5		
F3	2634	D2	3174	F4	3328	D5	3680	B4	4500	F4	7366	D5	9185	B3	9413	F5		







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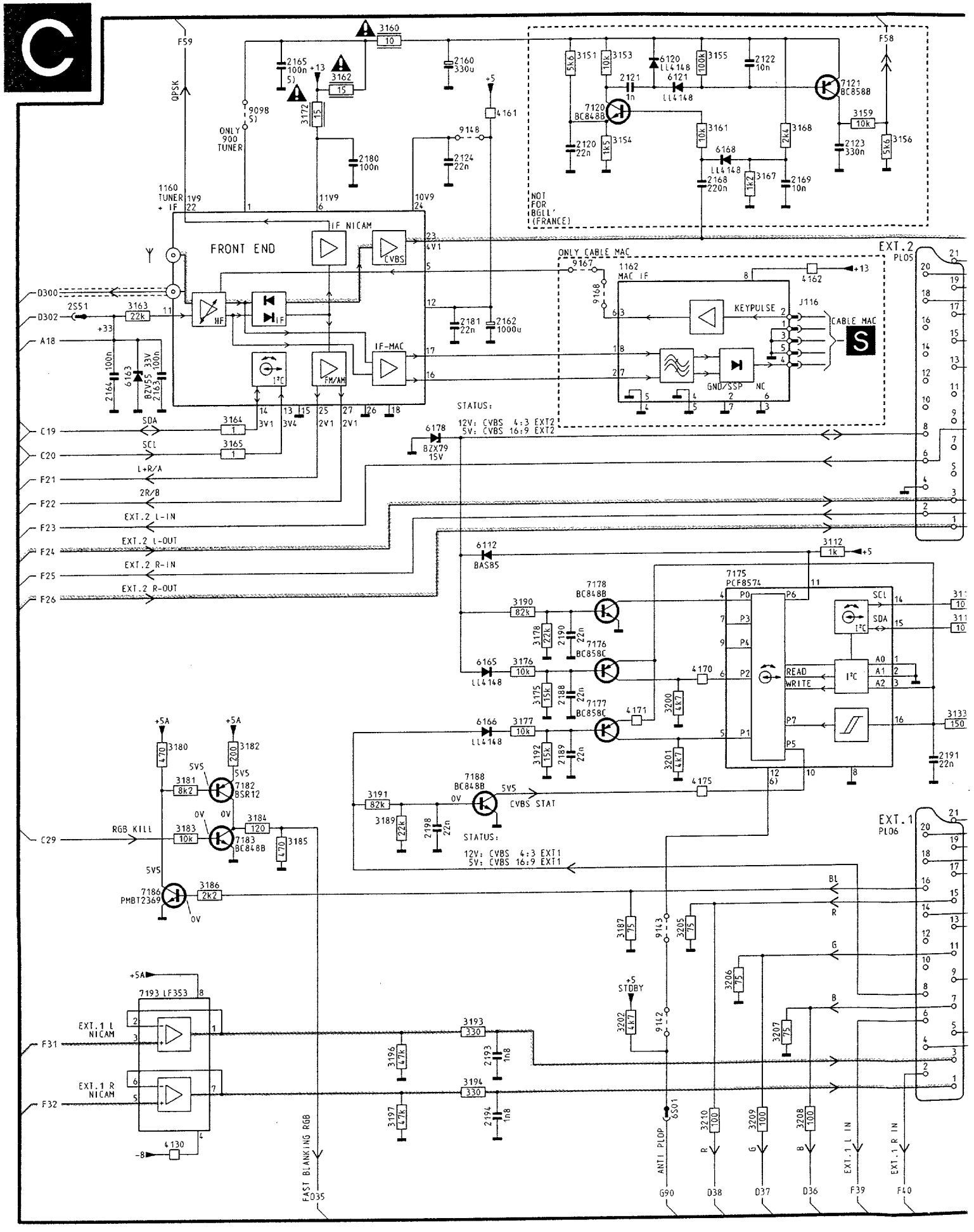
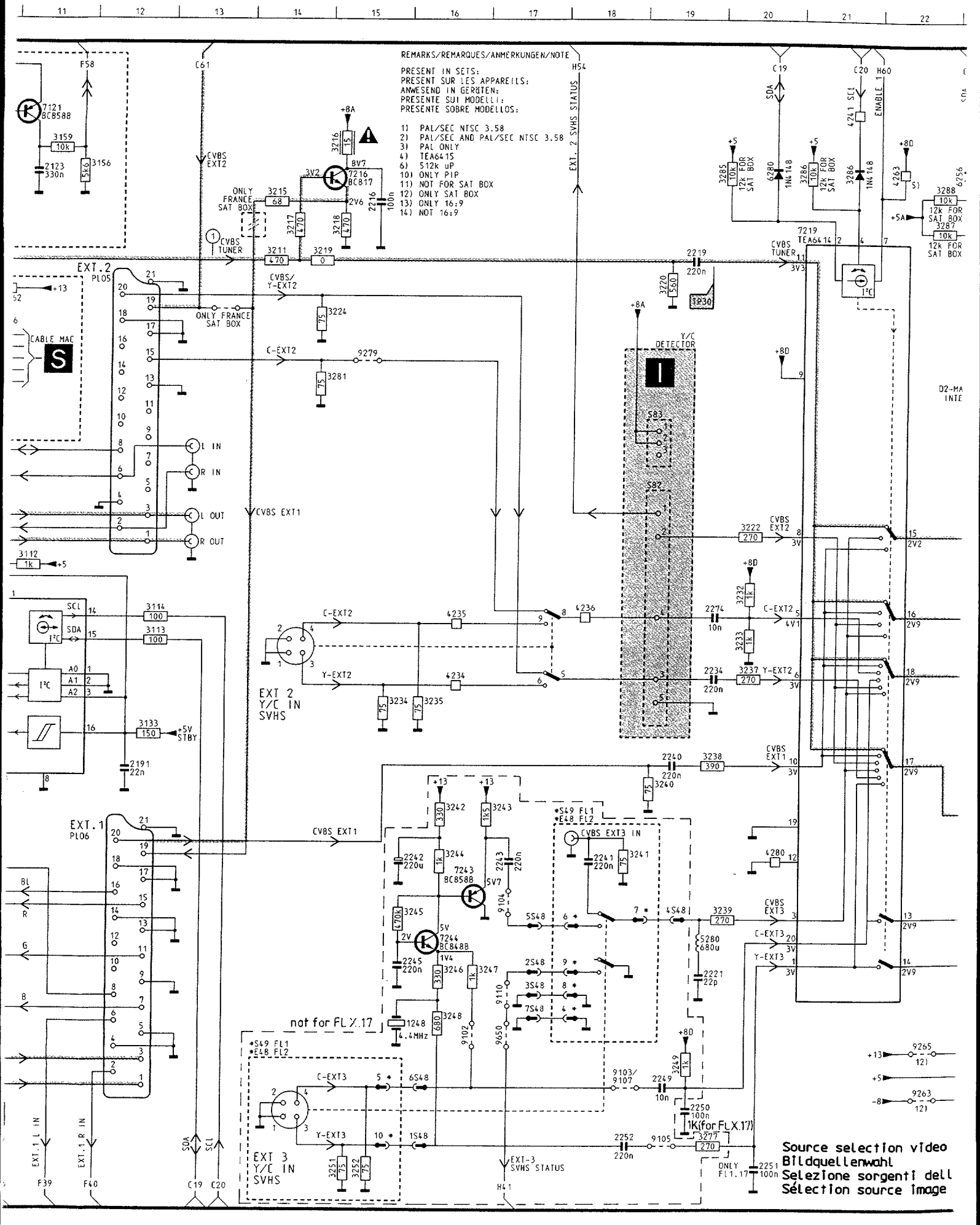
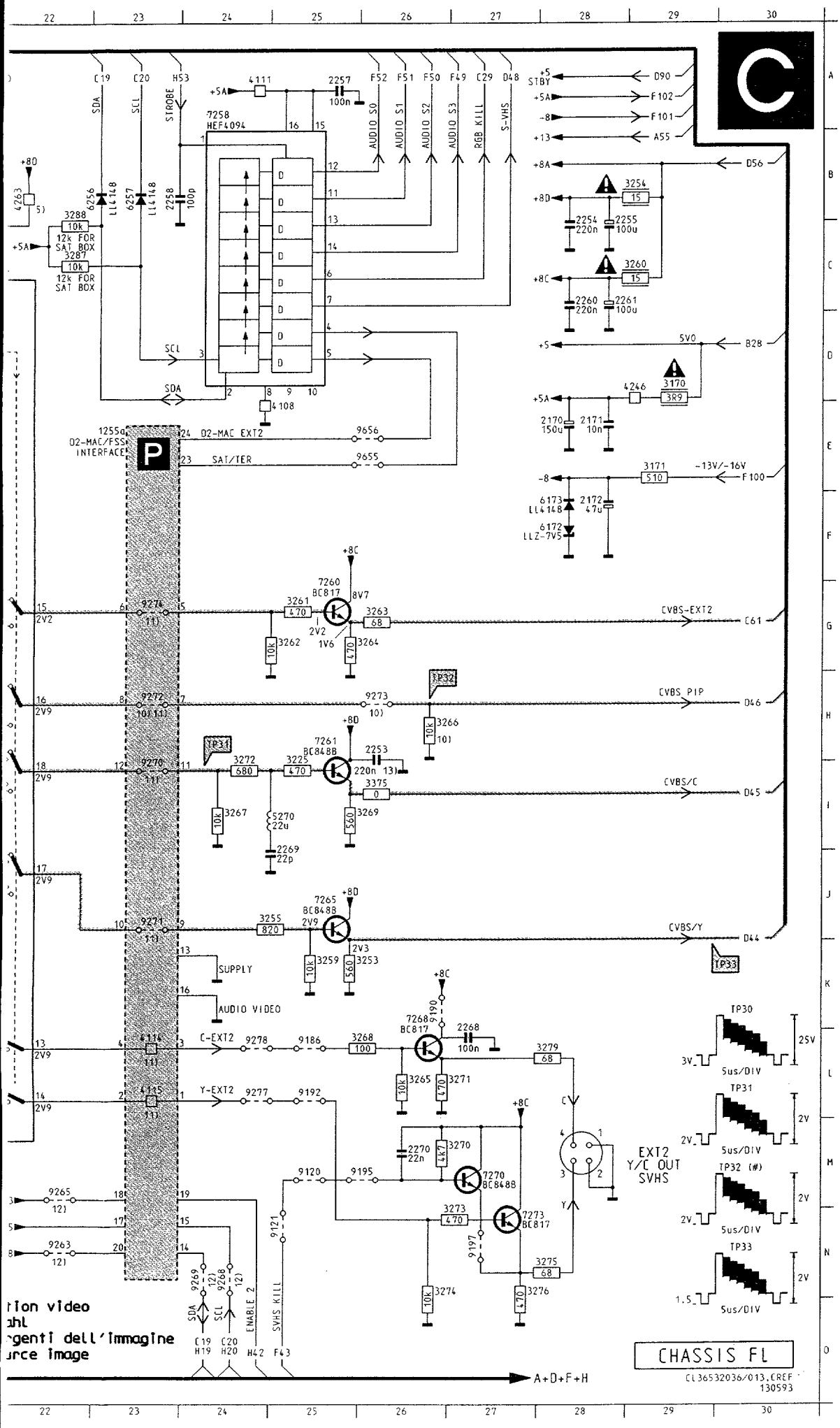


Sélection de source





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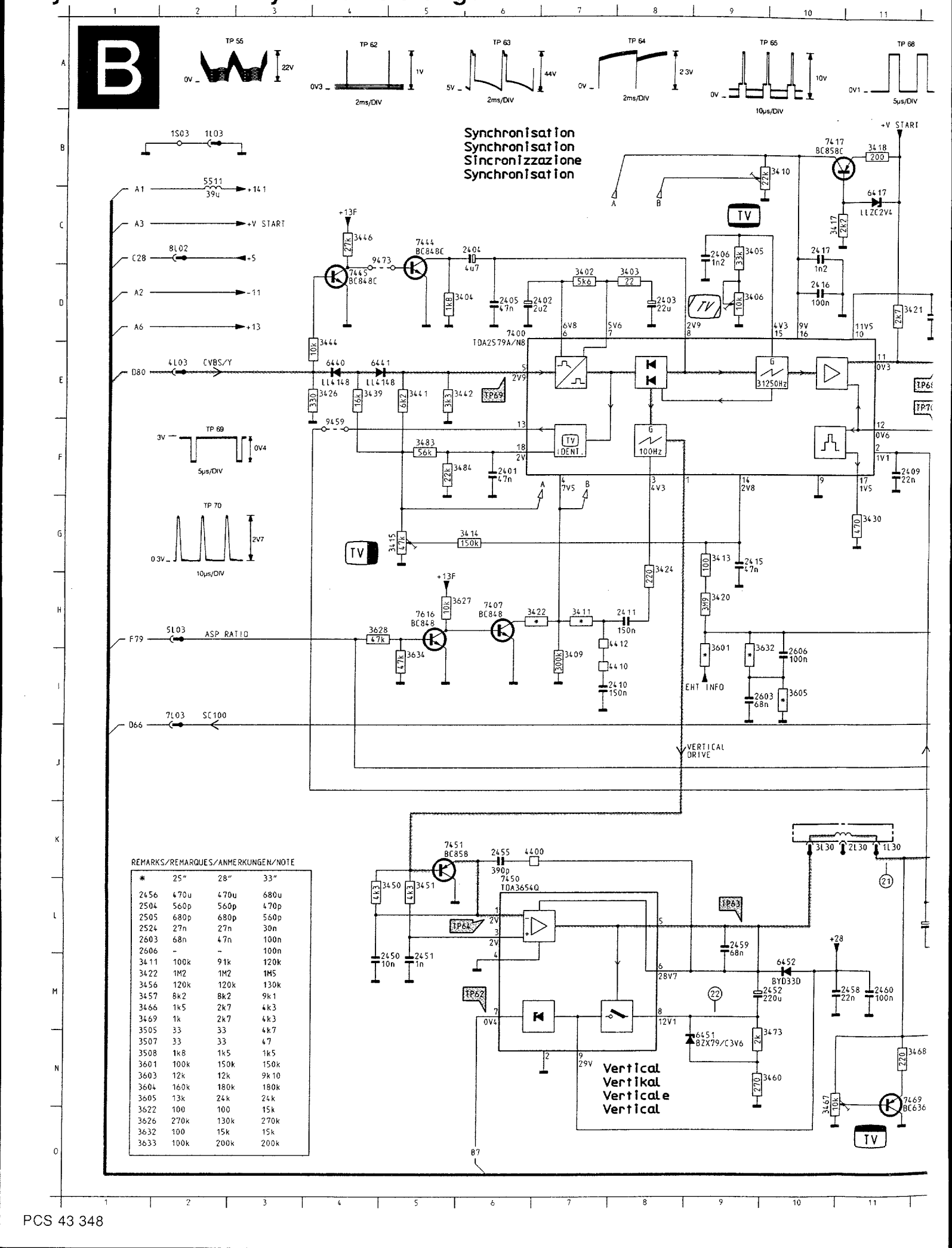

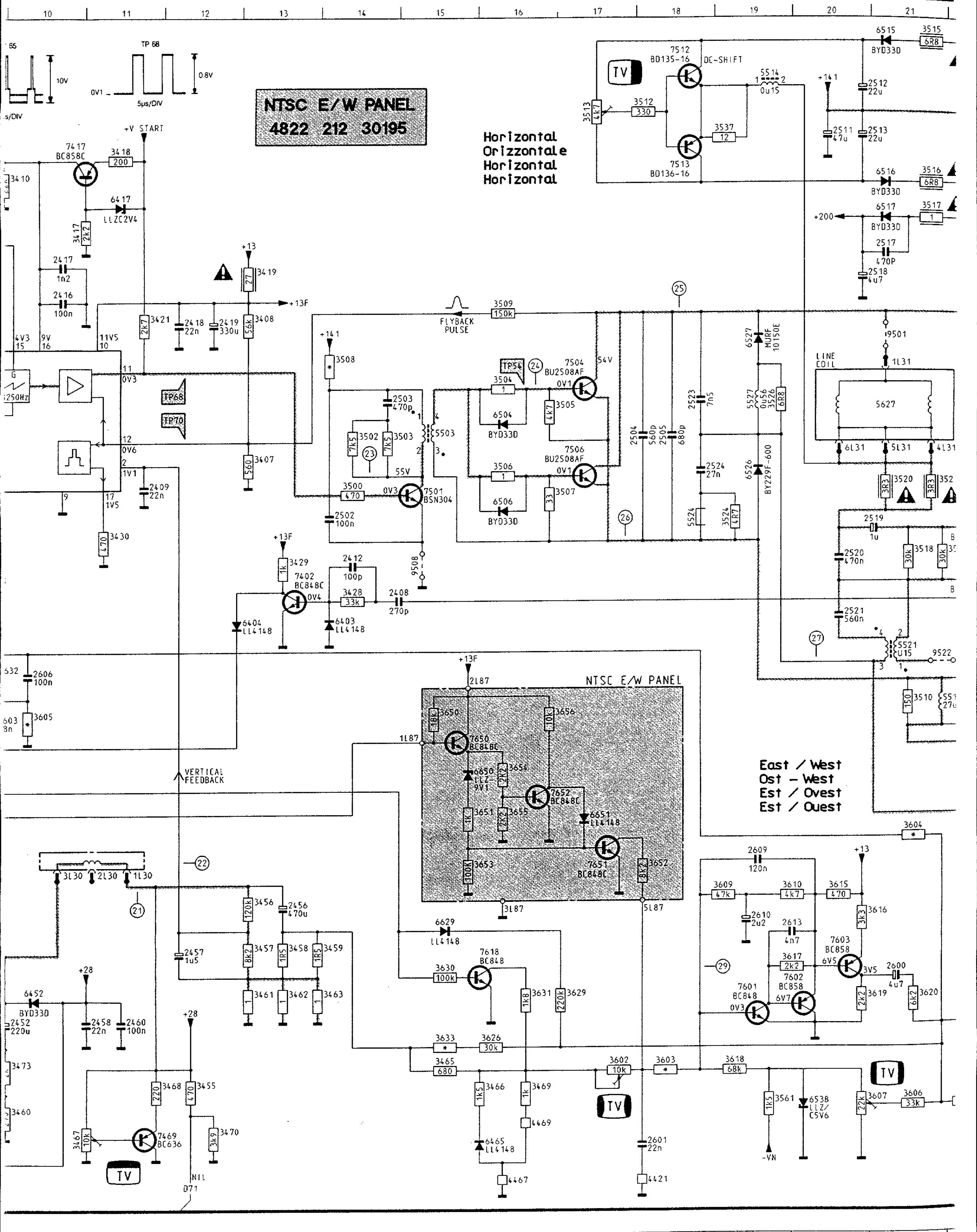
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5µs/DIV
10V
+V START
FLYBACK PULSE
VERTICAL FEEDBACK
LINE COIL
DC-SHIFT
NTSC E/W PANEL
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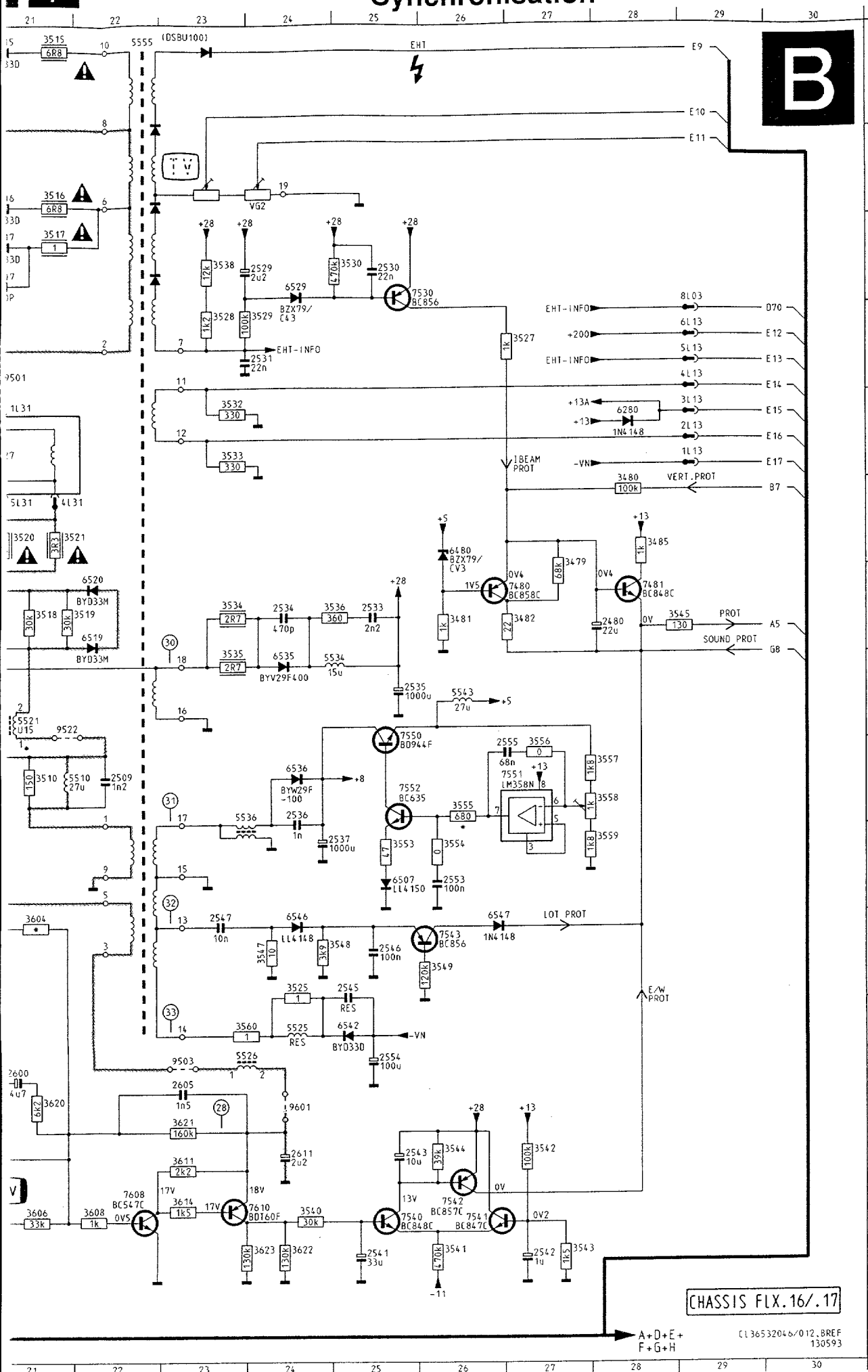
Synchronisation



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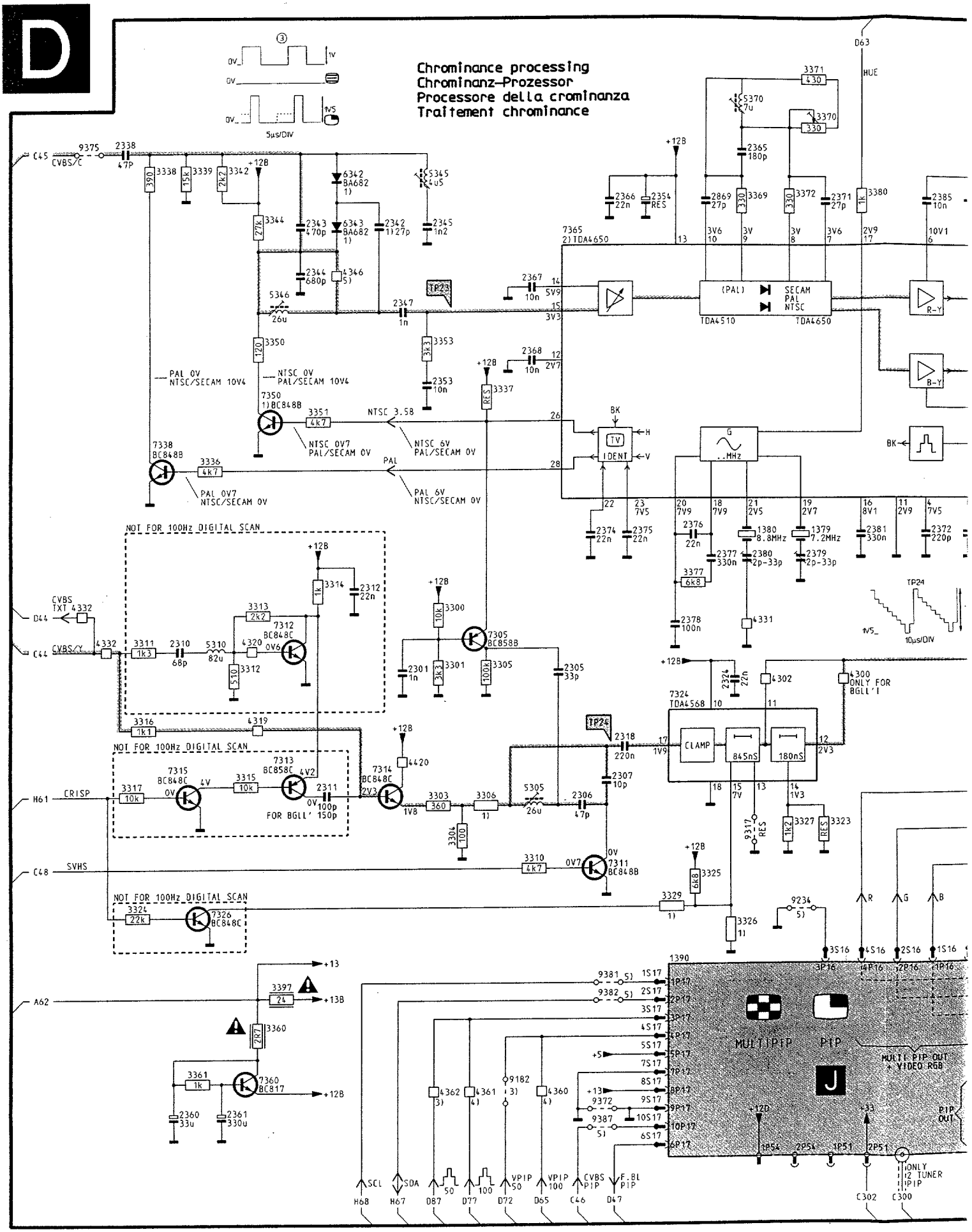
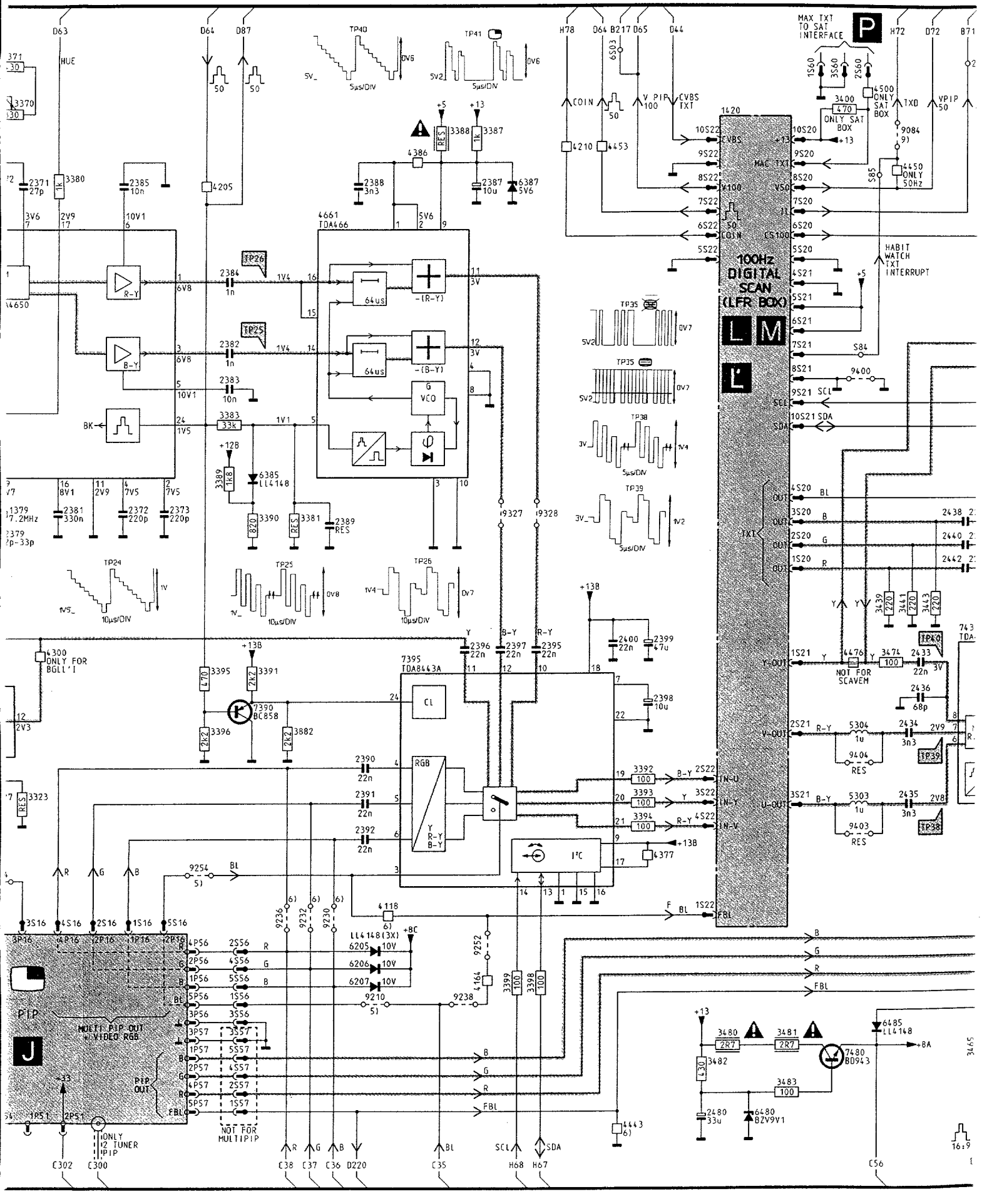
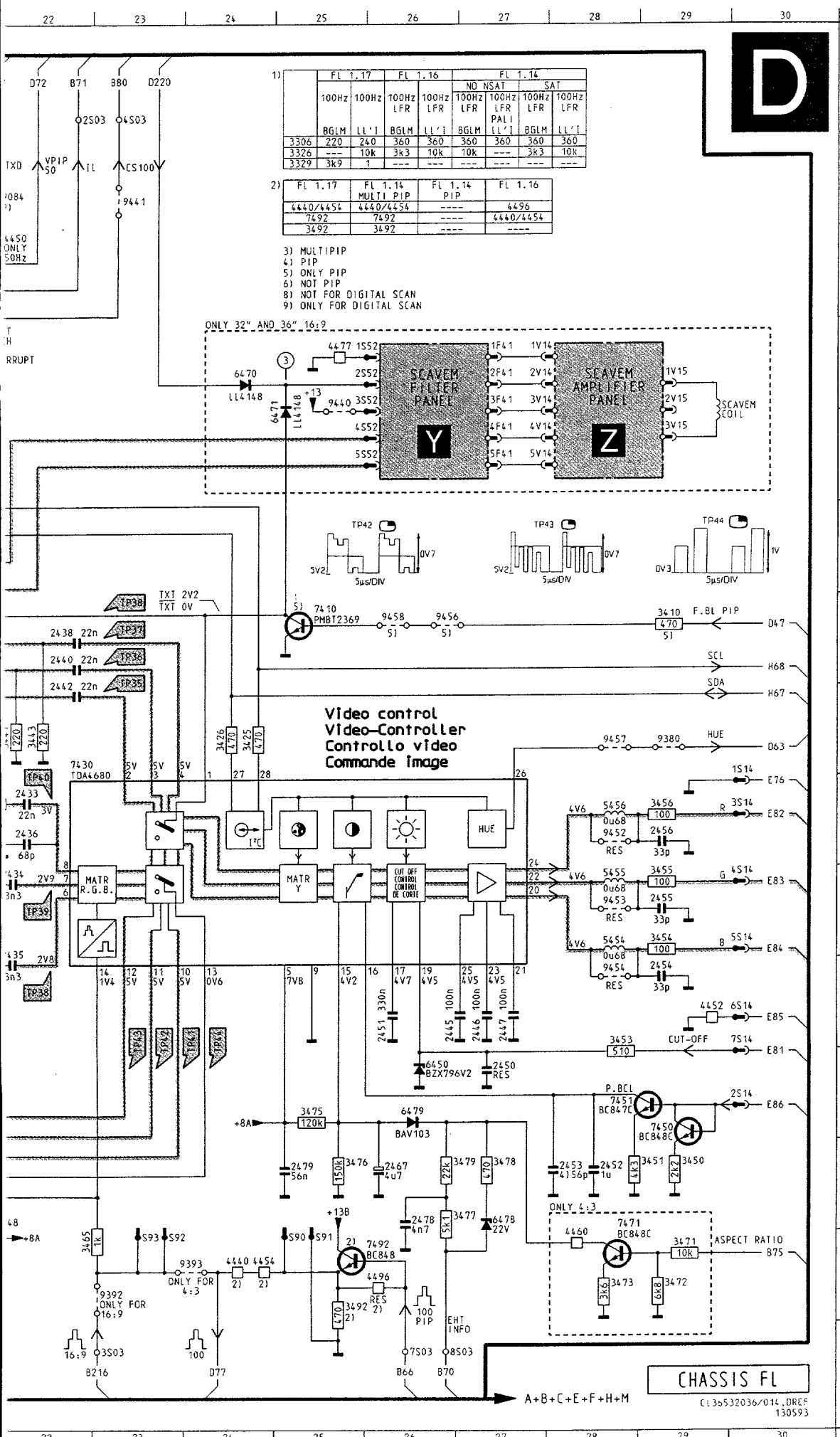
D

Chrominance processing
Chrominanz-Prozessor
Processore della crominanza
Traitement chrominance



Traitement vidéo





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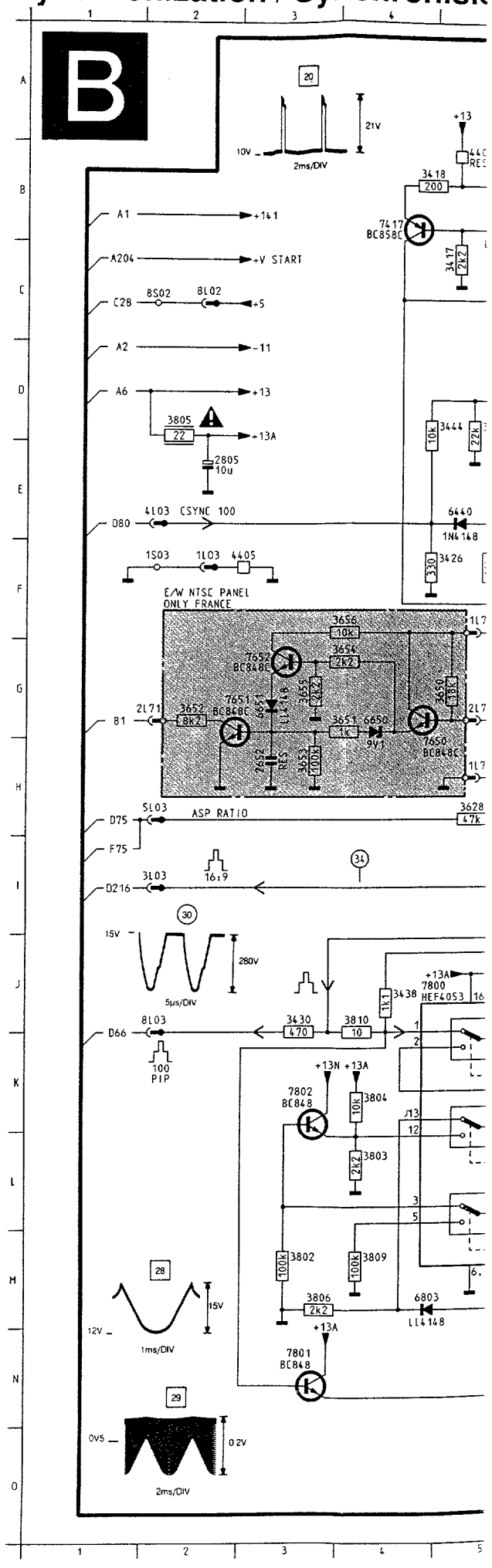
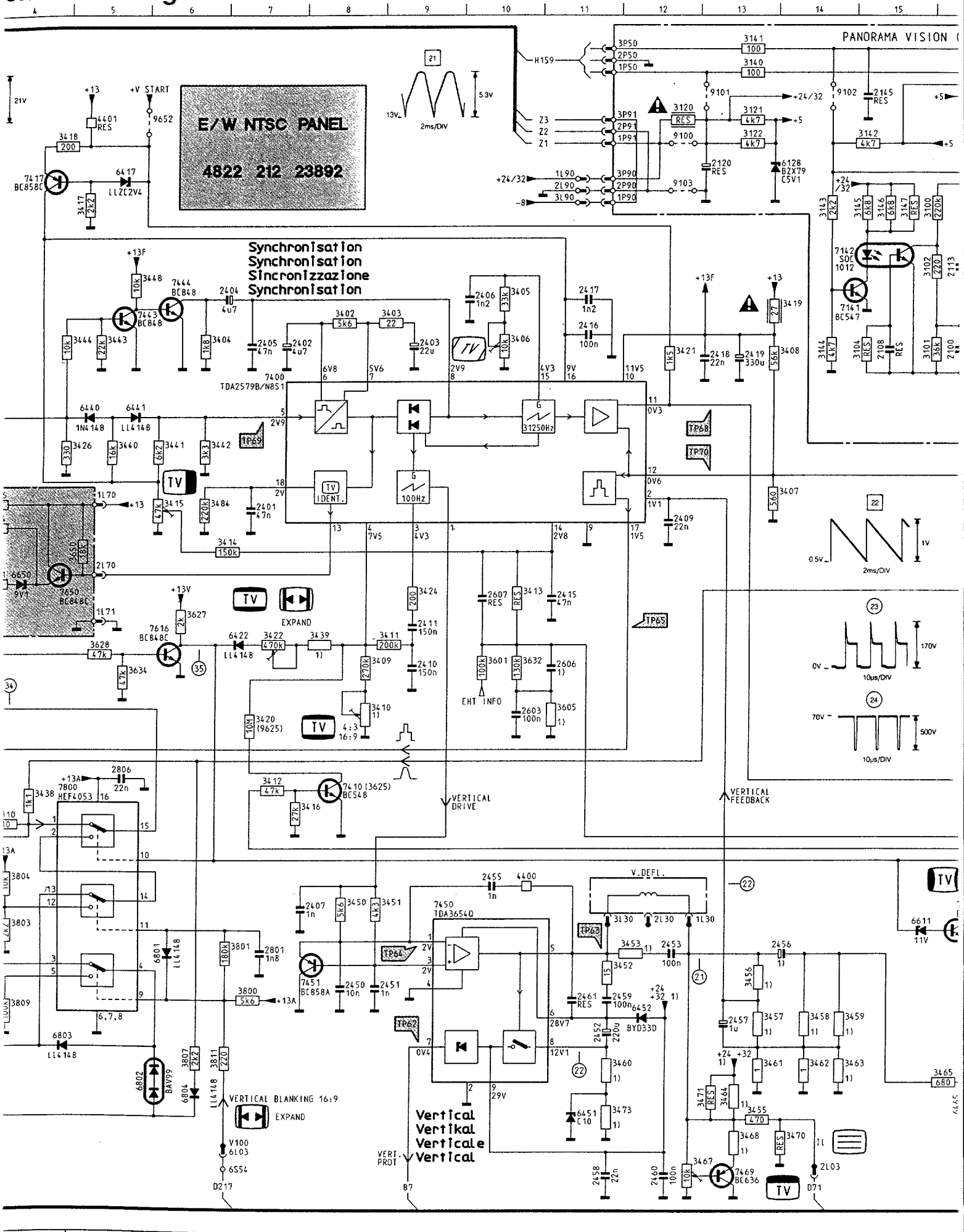
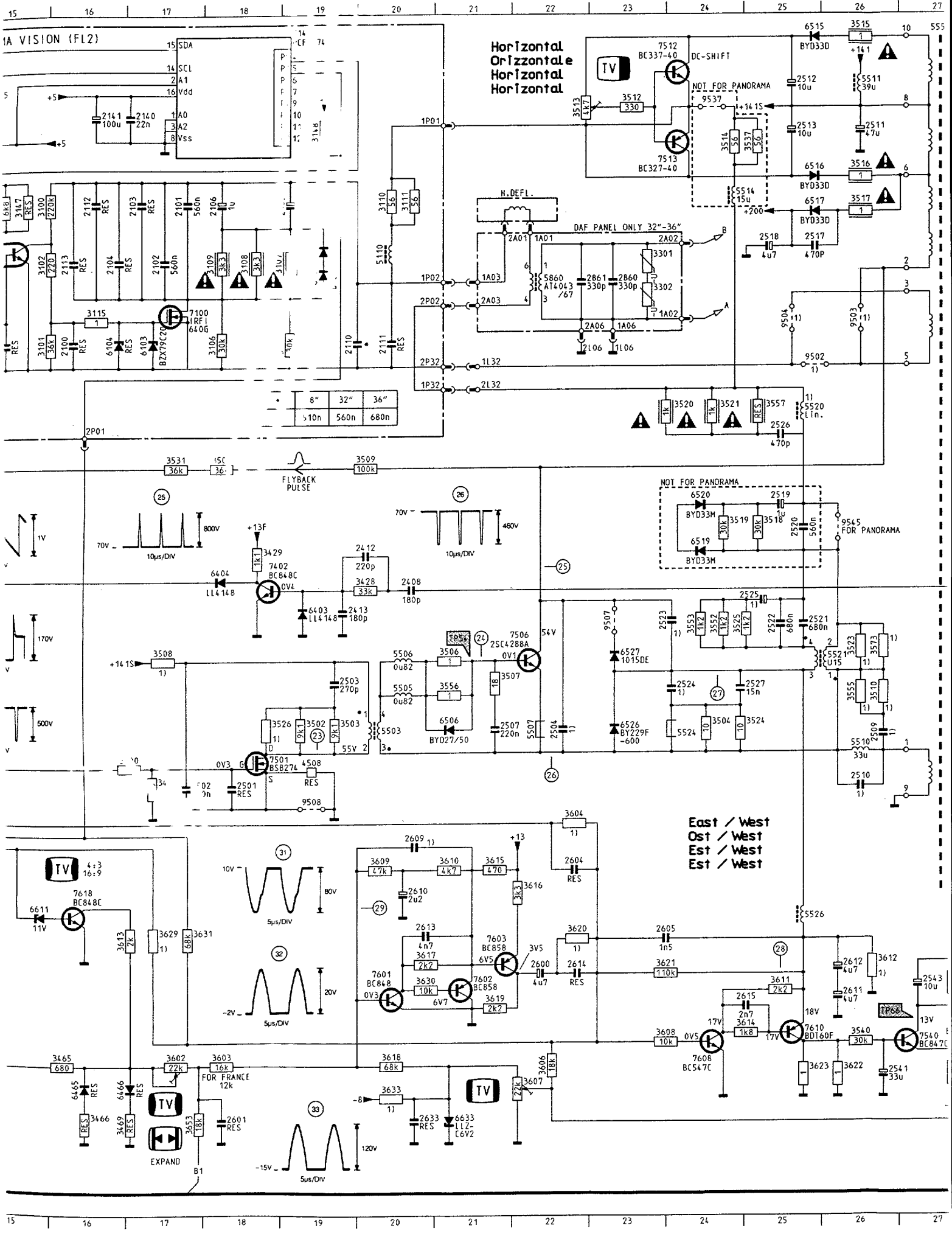
Synchronization / Synchronisie



chronisierung /

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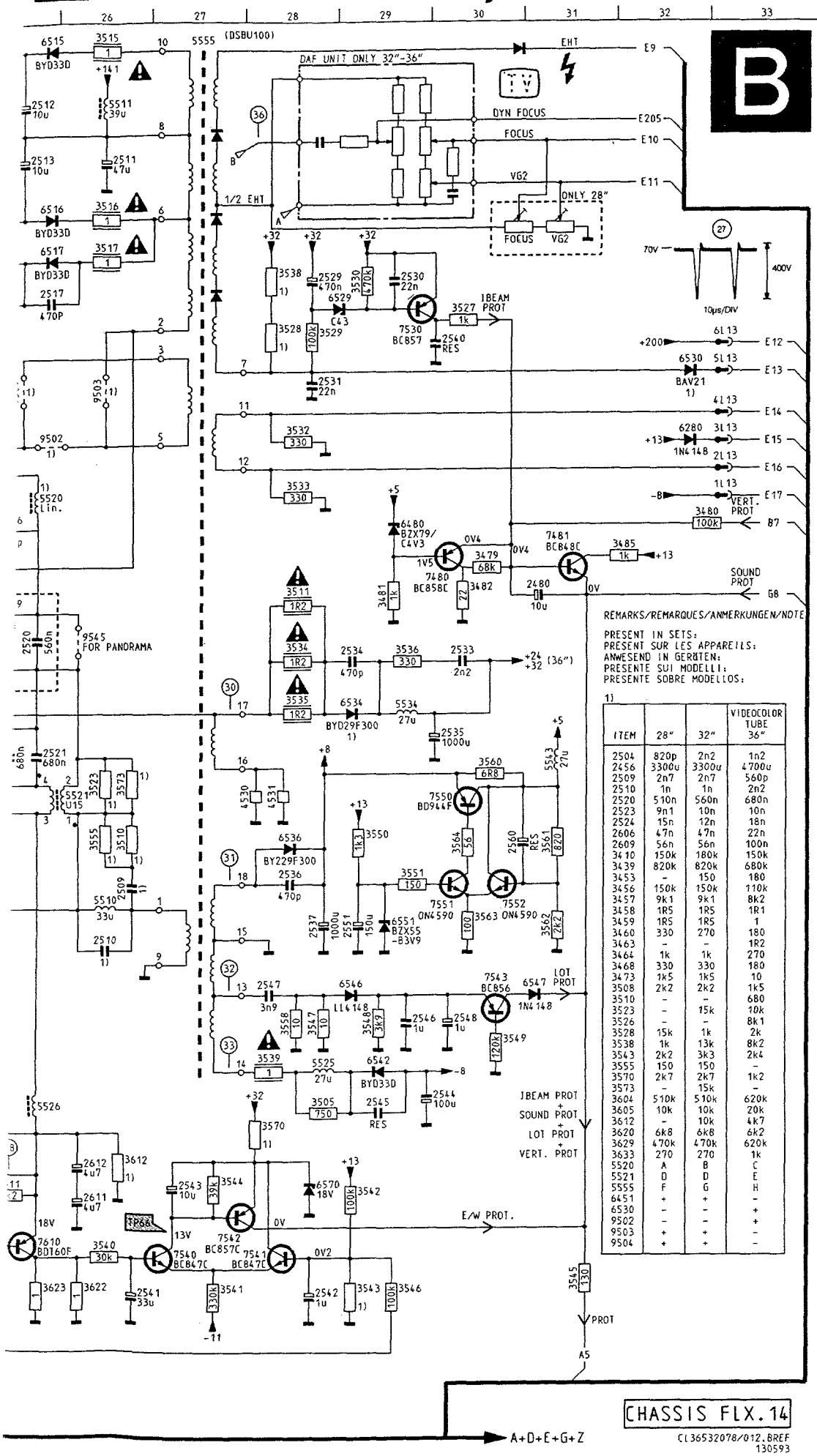
NOT FOR PANORAMA
H.DEFL.
DAF PANEL ONLY 32"-36"
FLYBACK PULSE
FOR PANORAMA
East / West
Ost / West
Est / West
Est / West
FOR FRANCE
EXPAND

Synchronisation

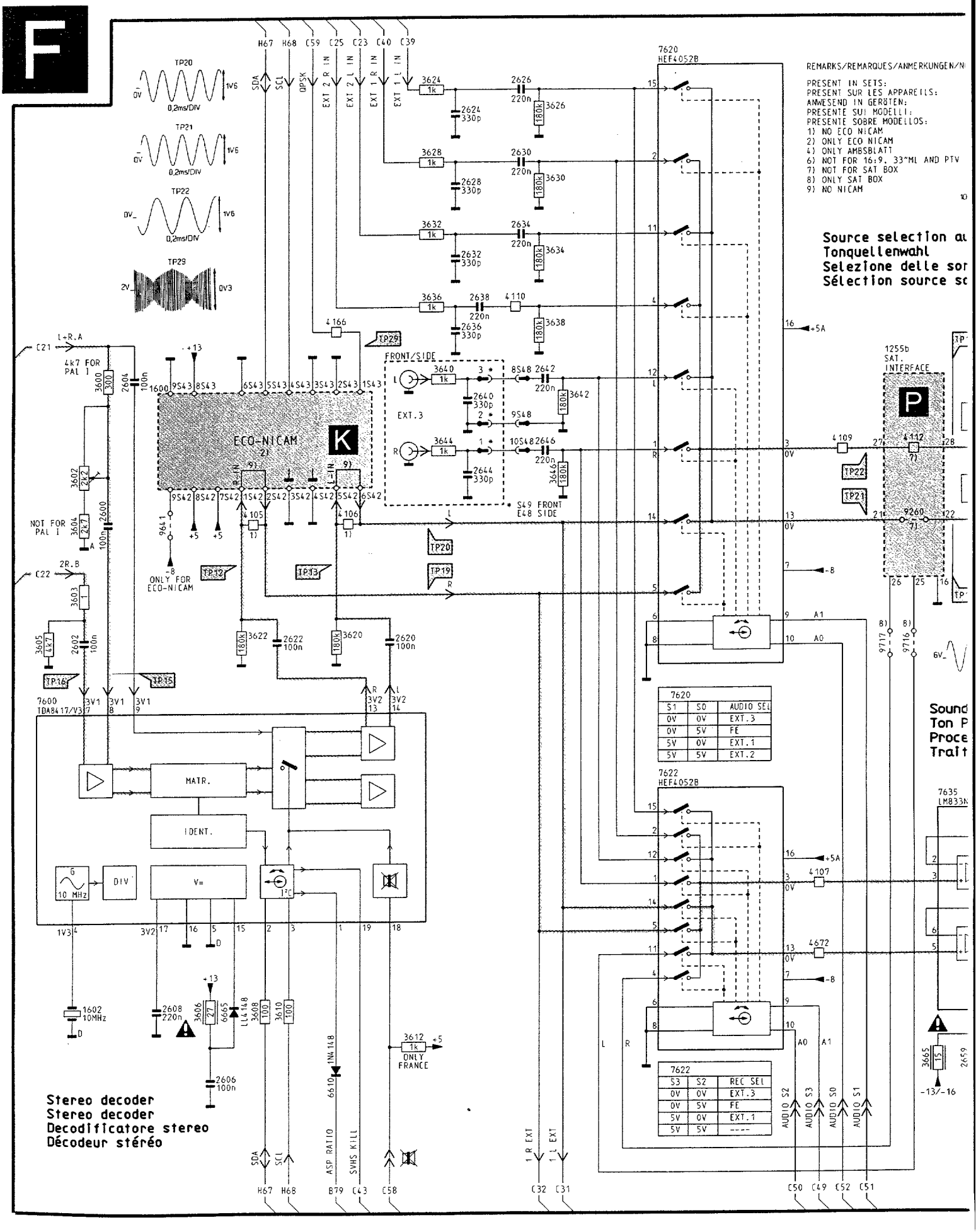


1)

ITEM	28"	32"	VIDEOCOLOR TUBE 36"
2504	820p	2n2	1n2
2456	3300u	3300u	4700u
2509	2n7	2n7	560p
2510	1n	1n	2n2
2520	510n	560n	680n
2523	9n1	10n	10n
2524	15n	12n	18n
2606	47n	47n	22n
2609	56n	56n	100n
3410	150k	180k	150k
3439	820k	820k	680k
3453	-	150	180
3456	150k	150k	110k
3457	9k1	9k1	8k2
3458	1R5	1R5	1R1
3459	1R5	1R5	1
3460	330	270	180
3463	-	-	1R2
3464	1k	1k	270
3468	330	330	180
3473	1k5	1k5	10
3508	2k2	2k2	1k5
3510	-	-	680
3523	-	15k	10k
3526	-	-	8k1
3528	15k	1k	2k
3538	1k	13k	8k2
3543	2k2	3k3	2k4
3555	150	150	-
3570	2k7	2k7	1k2
3573	-	15k	-
3604	510k	510k	620k
3605	10k	10k	20k
3612	-	10k	4k7
3620	6k8	6k8	6k2
3629	470k	470k	620k
3633	270	270	1k
5520	A	B	C
5521	D	D	E
5555	F	G	H
6451	+	+	-
6530	-	-	+
9502	-	-	+
9503	+	+	-
9504	+	+	-

	ON45	J30	3108	C18	3536	G29	6452	M12
	DN45	J30	3109	C18	3537	B25	6465	N16
	2100	D16	3110	C20	3538	C28	6466	N16
	2101	C17	3111	C20	3539	K28	6480	F29
A	2102	C17	3115	D16	3540	M26	6506	I21
	2103	C17	3121	B13	3541	N27	6515	A25
	2104	C16	3122	B13	3542	M29	6516	B25
	2105	C19	3140	A13	3543	N29	6517	C25
	2106	C18	3141	A13	3544	M27	6519	G24
	2108	D15	3142	B15	3545	N31	6520	F24
	2110	D19	3143	C14	3546	N29	6526	I23
	2111	D20	3144	D14	3547	K28	6527	I23
B	2112	C16	3145	C15	3548	K29	6529	C29
	2113	C16	3146	C15	3549	K30	6530	D32
	2120	B13	3147	C15	3550	I29	6534	H29
	2140	B17	3148	B19	3551	I29	6536	I28
	2141	B16	3301	C23	3552	H24	6542	K29
	2145	A15	3302	D23	3553	H24	6546	K29
	2401	G 7	3402	D 8	3555	I26	6547	K31
	2402	D 7	3403	D 9	3556	I21	6551	J29
C	2403	D 9	3404	D 6	3557	E25	6570	M28
	2404	D 7	3405	D10	3558	K28	6611	L15
	2405	D 7	3406	D10	3560	H30	6633	N21
	2406	D10	3407	F14	3561	I31	6650	G 4
	2407	L 8	3408	D14	3562	J31	6651	G 3
	2408	H20	3409	H 8	3563	J30	6801	L 6
	2409	G12	3410	I 8	3564	I30	6802	N 5
D	2410	I 9	3411	H 9	3570	L28	6803	M 4
	2411	H 9	3412	J 7	3573	H26	6804	N 6
	2412	G20	3413	G10	3601	H10	7100	D17
	2413	H19	3414	G 7	3602	N17	7140	A19
	2415	H11	3415	F 6	3603	N18	7141	D15
	2416	D11	3416	J 7	3604	K22	7142	C14
	2417	D11	3417	C 5	3605	I11	7400	E 7
	2418	E13	3418	B 4	3606	N22	7402	G18
E	2419	E13	3419	D14	3607	N22	7410	J 8
	2450	M 8	3420	I 7	3608	M23	7417	B 4
	2451	M 8	3421	D12	3609	K20	7443	D 5
	2452	M11	3422	H 7	3610	K21	7444	D 6
	2453	L12	3424	G 9	3611	M25	7450	L 9
	2455	K10	3426	F 5	3612	I26	7451	L 8
	2456	L14	3428	H20	3613	L16	7469	O13
	2457	M13	3429	G18	3614	M25	7480	F30
F	2458	O11	3430	J 3	3615	K21	7481	F31
	2459	M11	3438	J 4	3616	K22	7501	J18
	2460	O12	3439	H 8	3617	L20	7506	H22
	2461	M11	3440	F 5	3618	N20	7512	A24
	2480	F31	3441	F 6	3619	M21	7513	B24
	2501	J18	3442	F 6	3620	L22	7530	D29
	2502	J17	3443	D 5	3621	M23	7540	M27
G	2503	I19	3444	D 5	3622	N26	7541	M28
	2504	I22	3448	D 5	3623	N25	7542	M27
	2507	I21	3450	K 8	3625	J 8	7543	K30
	2509	J26	3451	K 9	3627	H 6	7550	I30
	2510	J26	3452	L11	3628	H 5	7601	M20
	2511	B26	3453	L12	3629	L17	7602	M21
	2512	A25	3454	J17	3630	M20	7603	L21
H	2513	B25	3455	N13	3631	L17	7608	N24
	2517	C25	3456	L13	3632	H10	7610	M25
	2518	C25	3457	M13	3633	N20	7616	H 6
	2519	G25	3458	M14	3634	H 5	7618	L16
	2520	G25	3459	M14	3650	G 5	7650	G 4
	2521	H25	3460	M11	3651	G 4	7651	G 3
	2522	H25	3461	M13	3652	G 2	7652	G 3
	2523	H24	3462	M14	3653	H 3	7800	J 4
I	2524	I24	3463	M14	3653	O17	7801	N 3
	2525	H25	3464	N13	3654	G 4	7802	K 3
	2526	F25	3465	N16	3655	G 3	9100	B12
	2527	I25	3466	N16	3656	F 4	9101	A13
	2529	C28	3467	O12	3800	M 7	9102	A14
	2530	C29	3468	N13	3801	L 7	9103	B12
	2531	D28	3469	O16	3802	M 3	9502	E25
J	2533	G30	3470	N14	3803	L 4	9503	D26
	2534	G29	3471	N13	3804	K 4	9504	D25
	2535	H30	3473	N11	3805	D 2	9507	H23
	2536	I28	3479	F30	3806	M 3	9508	J19
	2537	J28	3480	F32	3807	M 6	9537	A24
	2540	D30	3481	F29	3809	M 4	9545	G26
	2541	N26	3482	F30	3810	J 4	9625	I 7
	2542	N28	3484	F 6	3811	M 6	9652	B 6
K	2543	M27	3485	F32	4400	K10		
	2544	L30	3500	J17	4401	B 5		
	2545	L29	3501	F18	4405	F 3		
	2546	K29	3502	I19	4508	J19		
	2547	K28	3503	J19	4530	I28		
	2548	K30	3504	I24	4531	I28		
	2551	J29	3505	L28	5110	C20		
L	2560	I30	3506	H21	5503	I20		
	2600	M22	3507	I21	5505	I20		
	2601	N18	3508	H17	5506	I20		
	2603	I10	3509	F20	5507	I22		
	2604	K22	3510	I26	5510	J26		
	2605	L23	3511	F28	5511	A26		
	2606	I11	3512	A23	5514	C24		
	2607	H10	3513	B22	5520	E25		
M	2609	K20	3514	B24	5521	I26		
	2610	L20	3515	A26	5524	I24		
	2611	M26	3516	B26	5525	K28		
	2612	M26	3517	C26	5526	L25		
	2613	L20	3518	G25	5534	H29		
	2614	M22	3519	G24	5543	H31		
	2615	M25	3520	E24	5555	A27		
	2633	N20	3521	E24	5860	D22		
N	2652	H 3	3523	H26	6100	C19		
	2801	L 7	3524	I25	6101	D19		
	2805	E 2	3525	H24	6103	D17		
	2806	J 5	3526	I18	6104	D16		
	2860	D23	3527	C30	6128	B14		
	2861	D22	3528	C28	6280	E32		
	3100	C15	3529	D28	6403	H19		
	3101	D15	3530	C29	6404	G18		
O	3102	C15	3531	F17	6417	B 5		
	3104	D15	3532	E28	6422	H 7		
	3105	D19	3533	E28	6440	E 5		
	3106	D18	3534	G28	6441	E 5		
	3107	C19	3535	H28	6451	N11		

F


REMARKS/REMARQUES/ANMERKUNGEN/N
PRESENT IN SETS:
PRESENT SUR LES APPAREILS:
ANWESEND IN GERÄTEN:
PRESENTE SUI MODELLI:
PRESENTE SOBRE MODELLOS:
1) NO ECO NICAM
2) ONLY ECO NICAM
4) ONLY AMBSBLATT
6) NOT FOR 16:9, 33"ML AND PTV
7) NOT FOR SAT BOX
8) ONLY SAT BOX
9) NO NICAM
Source selection au
Tonquellenwahl
Selezione delle sor
Sélection source so
Stereo decoder
Stereo decoder
Decodificatore stereo
Décodeur stéréo
Sound
Ton P
Proce
Trait
7620 HEF4052B
7622 HEF4052B
7600 TDA8417/V3
ECO-NICAM
FRONT/SIDE
EXT.3
1255b SAT. INTERFACE
MATR.
IDENT.
DIV
V=
ONLY FOR ECO-NICAM
NOT FOR PAL I
4k7 FOR PAL I
ONLY FRANCE
S49 FRONT E48 SIDE
7620
S1 S0 AUDIO SEL
0V 0V EXT.3
0V 5V FE
5V 0V EXT.1
5V 5V EXT.2
7622
S3 S2 REC SEL
0V 0V EXT.3
0V 5V FE
5V 0V EXT.1
5V 5V ----
TP20
TP21
TP22
TP23
TP29
TP32
TP13
TP16
TP15
TP19
TP18
SDA
SCL
QPSK
EXT 2 R IN
EXT 2 L IN
EXT 1 R IN
EXT 1 L IN
ASP RATIO
SVHS KILL
1 R EXT
1 L EXT
AUDIO S2
AUDIO S3
AUDIO S0
AUDIO S1
H67 H68 C59 C25 C23 C40 C39
C32 C31
C50 C49 C52 C51
B79 C43 C58

Traitement audio

F

REMARKS/REMARQUES/ANMERKUNGEN/NOTE

PRESENT IN SETS:
PRESENT SUR LES APPAREILS:
ANWESEND IN GERÄTEN:
PRESENTE SUI MODELLI:
PRESENTE SOBRE MODELLOS:
1) NO ECO NICAM
2) ONLY ECO NICAM
4) ONLY AMBSBLATT
6) NOT FOR 16:9, 33"ML AND PTV
7) NOT FOR SAT BOX
8) ONLY SAT BOX
9) NO NICAM

Source selection audio
Tonquellenwahl
Selezione delle sorgenti sonore
Sélection source son

Sound processing
Ton Prozessor
Processore del suono
Traitement son

1255b SAT. INTERFACE

7630 LM833N

7680 TDA8425/V7

7704 LM833N

7635 LM833N

7660 BC848B

7661 BC848B

7662 BC848B

7706 BC848B

7708 BC858B

7730 BC848B

7732 BC858B

FRONT/SIDE

* S46 FRONT
E47 SIDE

CHASSIS FL

CL36532036/016,FREF 130593

B+C+D+H+G

PCS 43 351

1255	E11	4110	D 7
1600	E 2	4112	F12
1602	M 1	4166	D 5
2600	G 2	4200	K17
2602	H 1	4201	M17
2604	E 2	4672	L11
2606	N 3	4673	C15
2608	M 2	6610	N 5
2620	H 5	6660	B16
2622	H 4	6661	B17
2624	B 6	6662	D16
2626	A 7	6663	D17
2627	M13	6664	H14
2628	C 6	6665	M 3
2630	B 7	7600	I 1
2632	D 6	7620	A 9
2634	C 7	7622	J 9
2636	D 6	7630	E12
2638	D 6	7635	J12
2640	E 6	7660	B16
2642	E 7	7661	C16
2644	F 6	7662	B18
2646	F 7	7680	E15
2658	J13	7704	I16
2659	M12	7706	J17
2660	C16	7708	K17
2662	E16	7730	L17
2664	N14	7732	N17
2666	N13	9145	M19
2680	H14	9146	M19
2681	H15	9147	K19
2682	H14	9260	G12
2684	F14	9641	G 2
2686	G14	9716	H12
2688	H16	9717	H11
2690	H16		
2692	H17		
2694	H18		
2696	E17		
2697	G19		
2698	E18		
2699	H19		
2700	F19		
2702	G19		
2704	K15		
2706	J18		
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2714	K18		
2716	K20		
2720	O17		
2721	O17		
2726	N15		
2727	L15		
2728	N15		
2734	N19		
2736	N20		
3600	E 2		
3602	F 1		
3603	H 1		
3604	G 1		
3605	H 1		
3606	M 3		
3608	M 4		
3610	M 4		
3612	M 6		
3620	H 5		
3622	H 3		
3624	A 6		
3626	B 7		
3628	B 6		
3630	C 7		
3632	C 6		
3634	C 7		
3636	D 6		
3638	D 7		
3640	E 6		
3642	E 7		
3644	F 6		
3646	F 7		
3650	B17		
3651	B17		
3652	D17		
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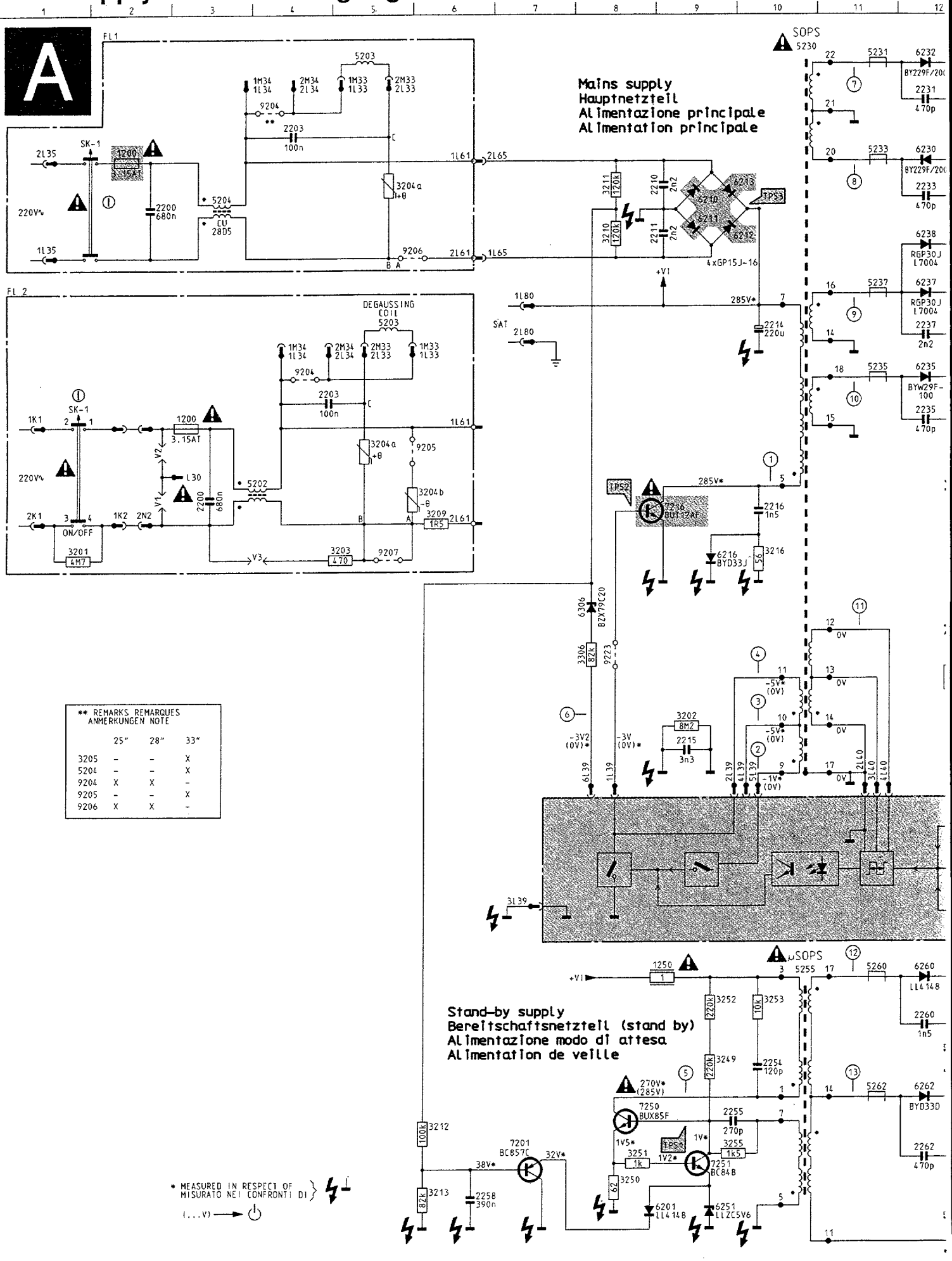
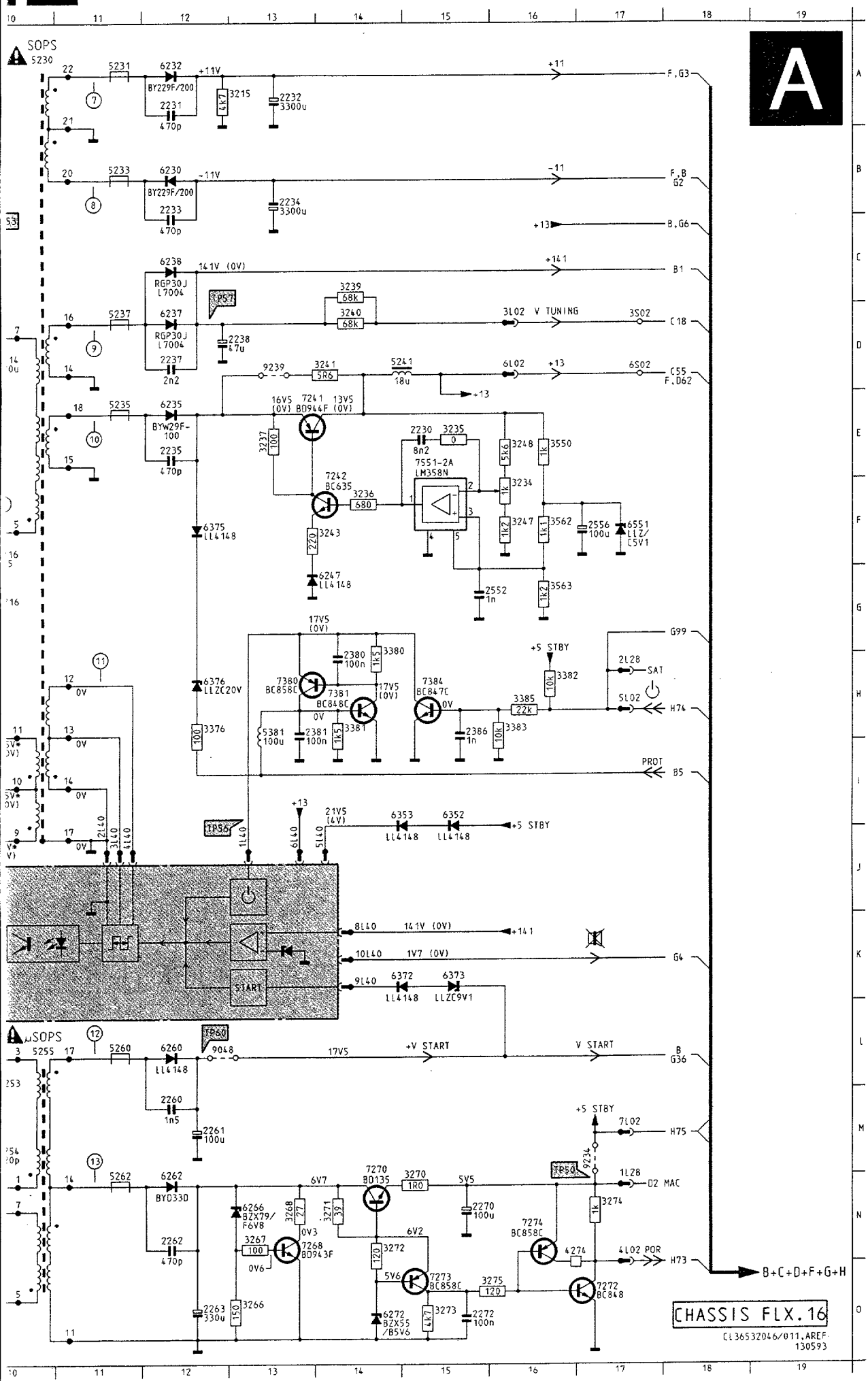
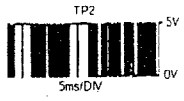
3654	B18		
3660	C14		
3662	C15		
3664	D14		
3665	M12		
3666	O15		
3668	N14		
3672	N13		
3680	G14		
3682	H14		
3684	D17		
3686	E17		
3700	J14		
3702	K14		
3704	K15		
3706	J19		
3708	J17		
3710	K17		
3712	K18		
3713	K18		
3720	N18		
3722	L14		
3724	N14		
3726	N15		
3728	M17		
3730	M17		
3732	M18		
3733	M18		
3734	N18		
4105	G 4		
4106	G 5		
4107	K11		
4109	F11		

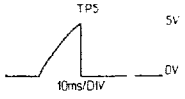

A
FL1
FL 2
Mains supply
Hauptnetzteil
Alimentazione principale
Alimentation principale
DEGAUSSING COIL
SOPS
μSOPS
Stand-by supply
Bereitschaftsnetzteil (stand by)
Alimentazione modo di attesa
Alimentation de veille
** REMARKS REMARQUES ANMERKUNGEN NOTE
25" 28" 33"
3205 - - X
5204 - - X
9204 X X -
9205 - - X
9206 X X -
* MEASURED IN RESPECT OF MISURATO NEI CONFRONTI DI
(...V)
220V~
285V*
270V* (285V)
38V*
32V*
+V1
SAT
4xGP15J-16
BUT12AF
BUX85F
BC857C
BC848
BZX79C20
BYD33J
BYD33D
BY229F/200
BYW29F-100
RGP30J L7004
LL4148
LLZC5V6
ON/OFF
SK-1

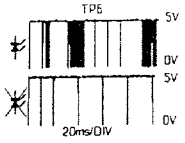


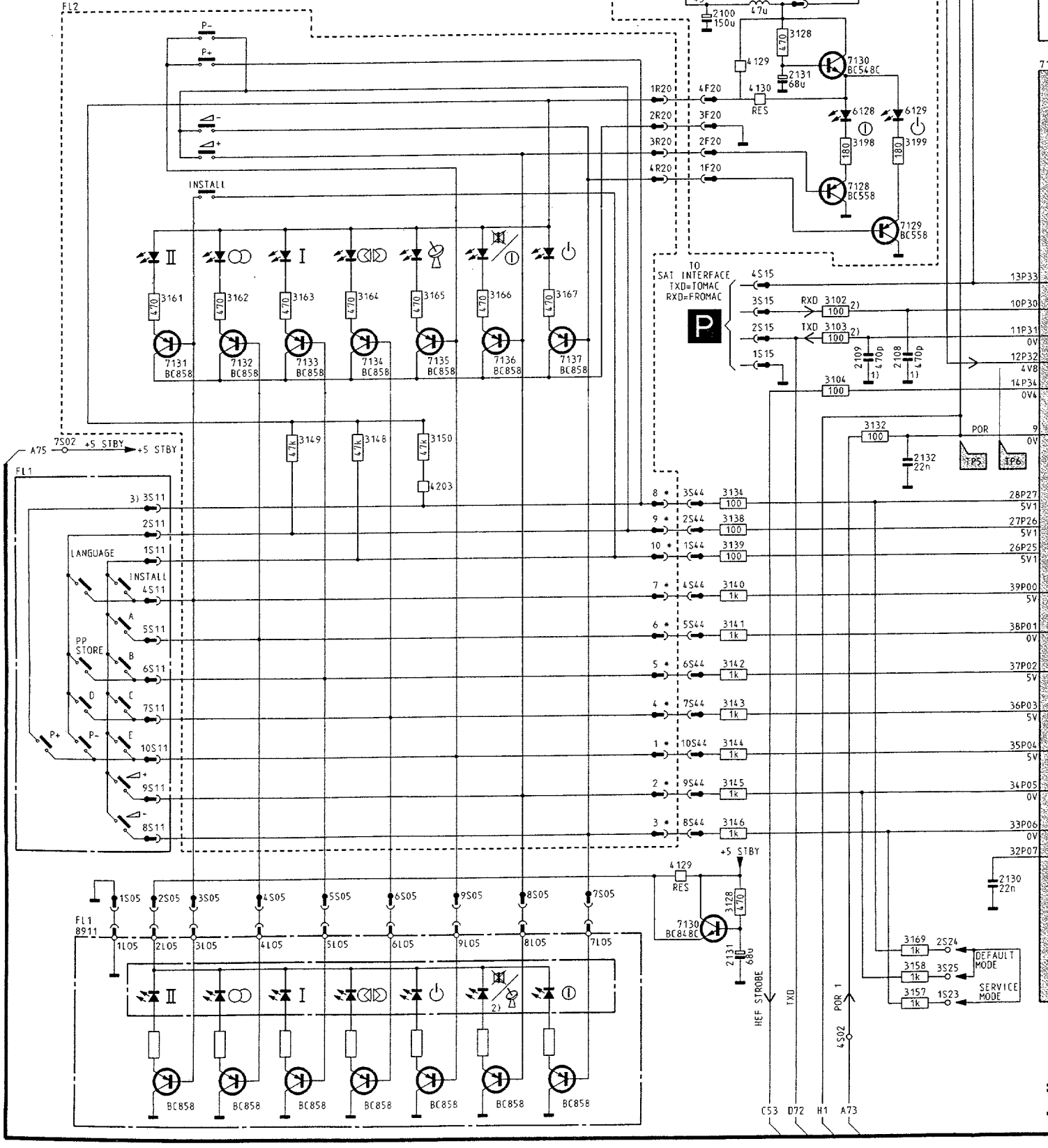
	1200	B 2	6352	I 15
	1200	E 3	6353	I 14
	1250	L 9	6372	K14
	2200	F 3	6373	K15
A	2200	C 2	6375	F12
	2203	E 4	6376	H12
	2203	B 4	6551	F17
	2210	B 9	7201	N 7
	2211	C 9	7216	F 9
	2214	D10	7241	E13
	2215	I 9	7242	F14
	2216	F10	7250	N 8
B	2230	E15	7251	N 9
	2231	A12	7268	N13
	2232	A13	7270	M14
	2233	B12	7272	O17
	2234	B13	7273	O15
	2235	E12	7274	N16
	2237	D12	7380	H13
	2238	D12	7381	H14
C	2254	M10	7384	H15
	2255	N 9	7551	E15
	2258	O 6	9048	L12
	2260	M12	9204	A 4
	2261	M12	9204	E 4
	2262	N12	9205	F 6
	2263	O12	9206	C 5
D	2270	N15	9207	G 5
	2272	O15	9223	H 8
	2380	H14	9234	M17
	2381	H13	9239	D13
	2386	H15		
	2552	G15		
	2556	F17		
	3201	G 1		
E	3202	I 9		
	3203	G 5		
	3204	B 5		
	3204	E 5		
	3204	F 6		
	3209	F 6		
	3210	C 8		
F	3211	B 8		
	3212	N 6		
	3213	O 6		
	3215	A13		
	3216	G10		
	3234	E16		
	3235	E15		
	3236	F14		
G	3237	E13		
	3239	C14		
	3240	D14		
	3241	D14		
	3243	F14		
	3247	F16		
	3248	E16		
H	3249	M 9		
	3250	O 8		
	3251	N 8		
	3252	L 9		
	3253	L10		
	3255	N 9		
	3266	O13		
	3267	N13		
I	3268	N13		
	3270	N15		
	3271	N14		
	3272	N14		
	3273	O15		
	3274	N17		
	3275	O16		
J	3306	H 8		
	3376	H12		
	3380	G14		
	3381	H14		
	3382	H16		
	3383	H16		
	3385	H16		
	3550	E16		
K	3562	F16		
	3563	G16		
	4L02	N17		
	4274	N16		
	5202	F 4		
	5203	A 5		
	5203	D 5		
	5204	C 3		
L	5230	A10		
	5231	A11		
	5233	B11		
	5235	E11		
	5237	D11		
	5241	D14		
	5255	L10		
M	5260	L11		
	5262	N11		
	5381	H13		
	6201	O 9		
	6210	C 9		
	6211	C 9		
	6212	C 9		
	6213	B 9		
N	6216	G 9		
	6230	B12		
	6232	A12		
	6235	E12		
	6237	D12		
	6238	C12		
	6247	G14		
	6251	O 9		
O	6260	L12		
	6262	N12		
	6266	N13		
	6272	O14		
	6306	H 8		

Controls / Bedienung / Commande

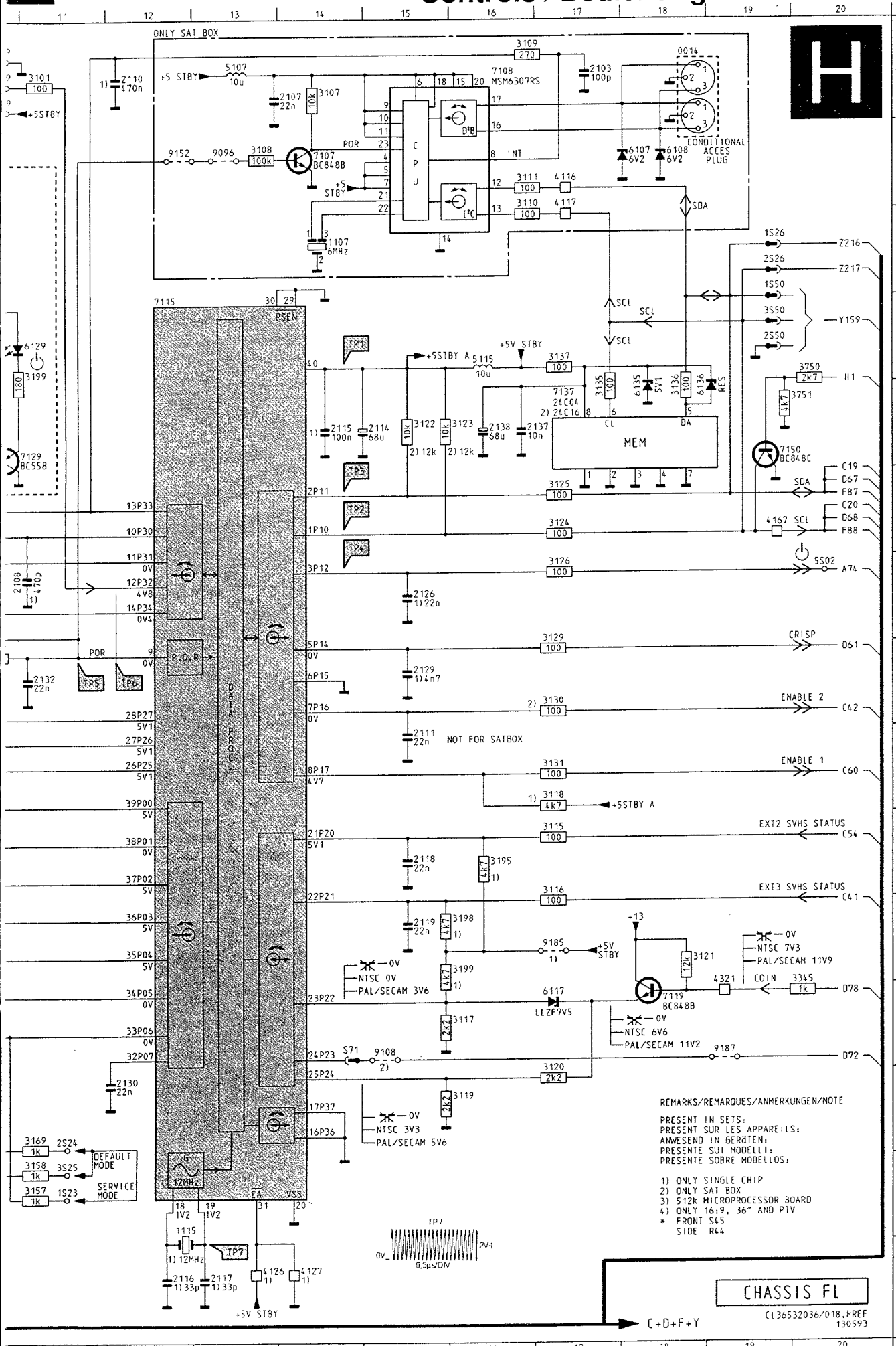




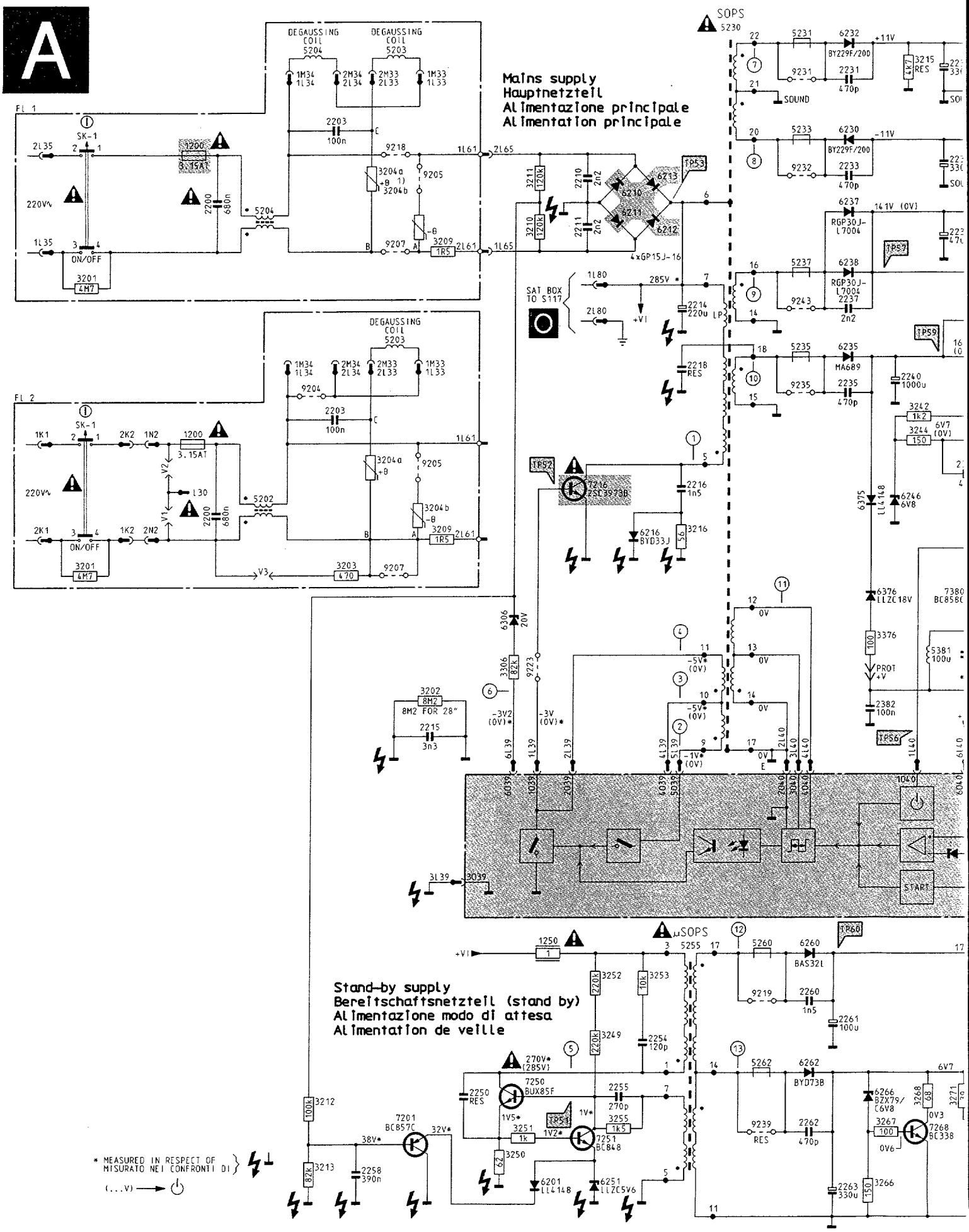


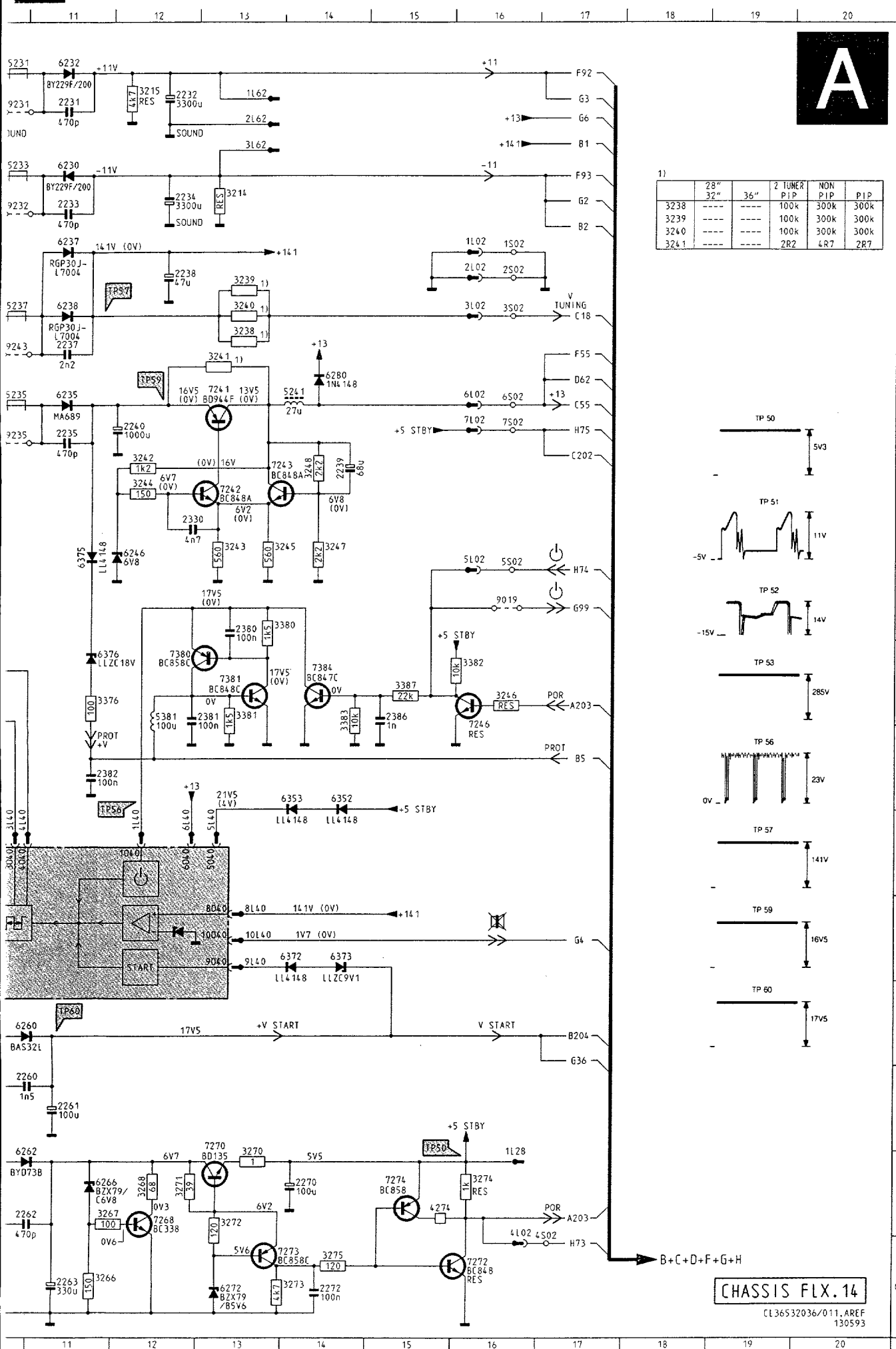


Controls / Bedienung / Commande



0014	A18	7128	E10
1001	A 6	7129	E10
1100	A 8	7130	M 8
1100	B 8	7130	D10
1105	N12	7132	G 3
2100	B 8	7133	G 4
2100	C 8	7134	G 4
2103	A17	7135	G 5
2107	A14	7136	G 6
2108	G11	7137	G 7
2109	G10	7137	E17
2110	A12	7150	E19
2111	I15	8911	M 1
2114	E15	9096	B13
2115	E14	9108	L15
2116	O12	9152	B12
2117	O13	9185	K17
2118	J15	9187	L19
2119	K15		
2126	G15		
2129	H15		
2130	M12		
2131	M 9		
2131	D 9		
2132	H11		
2137	E16		
2138	E16		
3100	A 9		
3100	B 9		
3101	A11		
3102	F10		
3103	F10		
3104	G10		
3107	A14		
3108	B13		
3109	A16		
3110	B16		
3111	B16		
3115	J17		
3116	J17		
3117	L16		
3118	I17		
3119	M16		
3120	M17		
3121	K18		
3122	E15		
3123	E16		
3124	F17		
3125	F17		
3126	G17		
3128	M 9		
3128	C 9		
3129	H17		
3130	H17		
3131	I17		
3132	H10		
3134	H 9		
3135	E17		
3136	E18		
3137	D17		
3138	I 9		
3139	I 9		
3140	I 9		
3141	J 9		
3142	J 9		
3143	K 9		
3144	K 9		
3145	L 9		
3146	L 9		
3148	H 4		
3149	H 4		
3150	H 5		
3157	N11		
3158	N11		
3161	F 2		
3162	F 3		
3163	F 4		
3164	F 4		
3165	F 5		
3166	F 6		
3167	F 7		
3169	M11		
3195	J16		
3198	D10		
3198	K16		
3199	D11		
3199	K16		
3345	L20		
3750	D20		
3751	E19		
4116	B17		
4117	B17		
4126	O13		
4127	O14		
4129	L 8		
4129	D 9		
4130	D 9		
4167	F19		
4203	H 5		
4321	L19		
5100	A 9		
5100	C 9		
5107	A13		
5115	D16		
6107	B18		
6108	B18		
6117	L17		
6128	D10		
6129	D11		
6135	E18		
6136	E18		
7107	B14		
7108	A16		
7115	D12		
7119	L18		

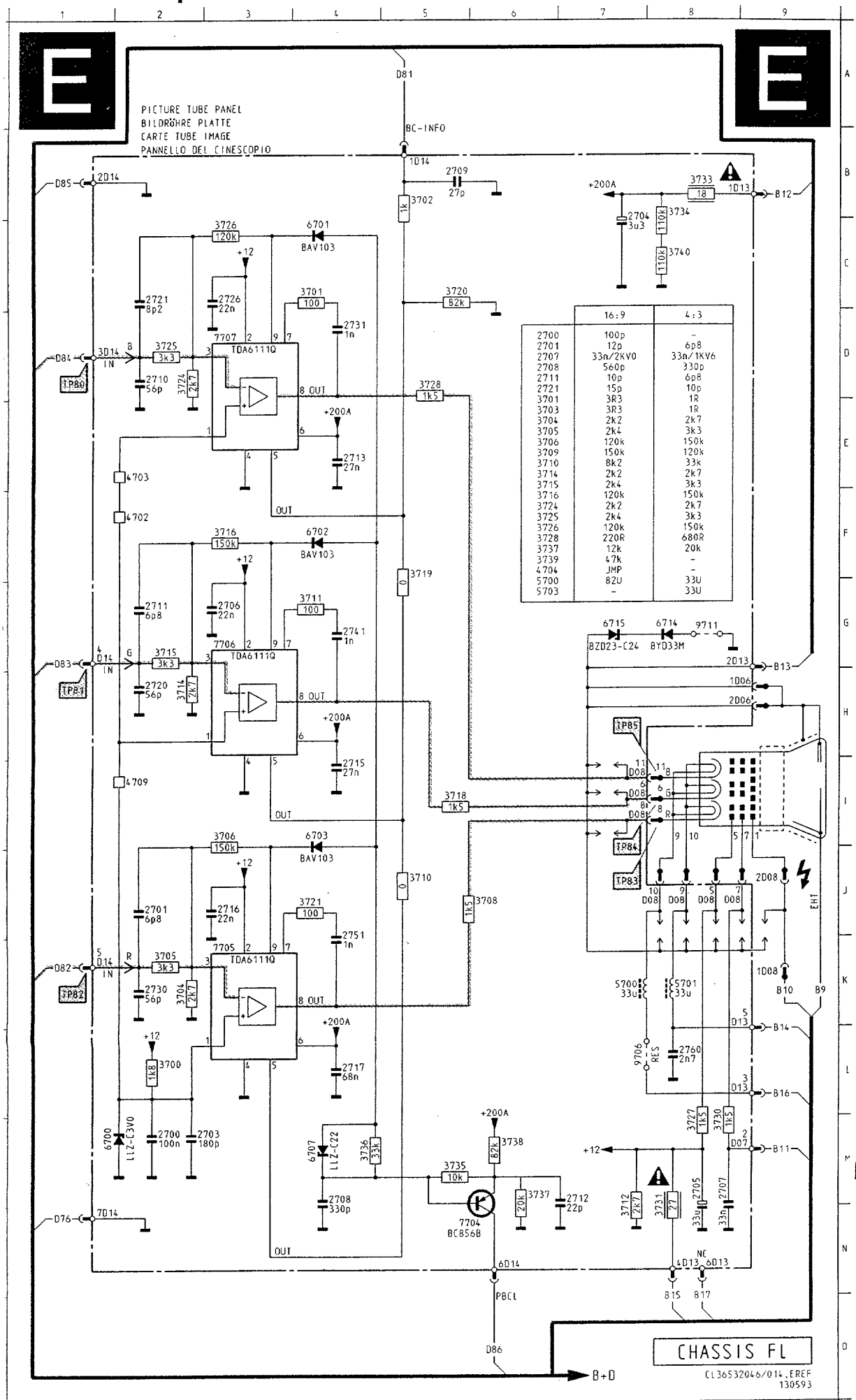

A
Mains supply
Hauptnetzteil
Alimentazione principale
Alimentation principale
Stand-by supply
Bereitschaftsnetzteil (stand by)
Alimentazione modo di attesa
Alimentation de veille
FL 1
FL 2
SK-1
ON/OFF
DEGAUSSING COIL
SOPS
µSOPS
SAT BOX TO S117
SOUND
PROT +V
START
* MEASURED IN RESPECT OF
MISURATO NEI CONFRONTI DI
(...V)



1)

	28" 32"	36"	2 TUNER PIP	NON PIP	PIP
3238	----	----	100k	300k	300k
3239	----	----	100k	300k	300k
3240	----	----	100k	300k	300k
3241	----	----	2R2	4R7	2R7

1200	B 2	6237	C11
1200	F 2	6238	D11
2200	C 2	6246	G12
2200	G 2	6251	O 8
2202	B 3	6260	L11
2203	B 4	6262	N11
2203	E 4	6266	N11
2210	C 8	6272	O13
2211	C 8	6280	D14
2214	D 9	6306	H 7
2215	I 6	6352	I14
2216	F 9	6353	I14
2218	E 9	6372	K14
2231	A11	6373	K14
2232	A12	6375	G11
2233	B11	6376	H11
2234	B12	7201	N 6
2235	E11	7216	F 8
2237	D11	7241	E13
2238	C12	7242	F13
2239	E14	7243	F13
2240	E12	7246	H16
2250	N 6	7250	N 7
2254	M 9	7251	N 8
2255	N 8	7268	N12
2258	O 5	7270	M13
2260	M11	7272	O16
2261	M11	7273	O13
2262	N11	7274	N15
2263	O11	7380	H12
2270	N14	7381	H13
2272	O14	7384	H14
2330	F12	9019	G16
2380	G13	9204	E 4
2381	H12	9205	C 5
2382	I11	9205	F 5
2386	H15	9206	C 5
3201	D 2	9206	G 5
3201	G 2	9207	D 5
3202	I 6	9207	G 5
3203	C 5	9218	B 5
3203	G 4	9219	M10
3204	B 5	9223	I 7
3204	C 5	9231	A10
3204	F 5	9232	B10
3204	F 5	9235	E10
3209	C 5	9239	N10
3209	G 5	9242	B 5
3210	C 7	9242	E 5
3211	C 7	9243	D10
3212	N 4		
3213	O 4		
3214	B13		
3215	A12		
3216	G 9		
3235	L 7		
3238	D13		
3239	C13		
3240	D13		
3241	D13		
3242	E12		
3243	F13		
3244	F12		
3245	F13		
3246	H16		
3247	F14		
3248	E14		
3249	M 8		
3250	O 7		
3251	N 7		
3252	L 8		
3253	L 9		
3255	N 8		
3266	O11		
3267	N11		
3268	N12		
3270	N13		
3271	N12		
3272	N13		
3273	O14		
3274	N16		
3275	O14		
3275	N14		
3275	N16		
3306	I 7		
3376	H11		
3380	G13		
3381	H13		
3382	H16		
3383	H14		
3387	H15		
4274	N15		
5202	G 3		
5203	A 5		
5203	E 5		
5204	C 3		
5204	A 4		
5230	A 9		
5231	A10		
5233	B10		
5235	E10		
5237	D10		
5241	E14		
5255	L 9		
5260	L10		
5262	N10		
5381	H12		
6201	O 7		
6210	C 8		
6211	C 8		
6212	C 9		
6213	C 9		
6216	G 8		
6230	B11		
6232	A11		
6235	E11		

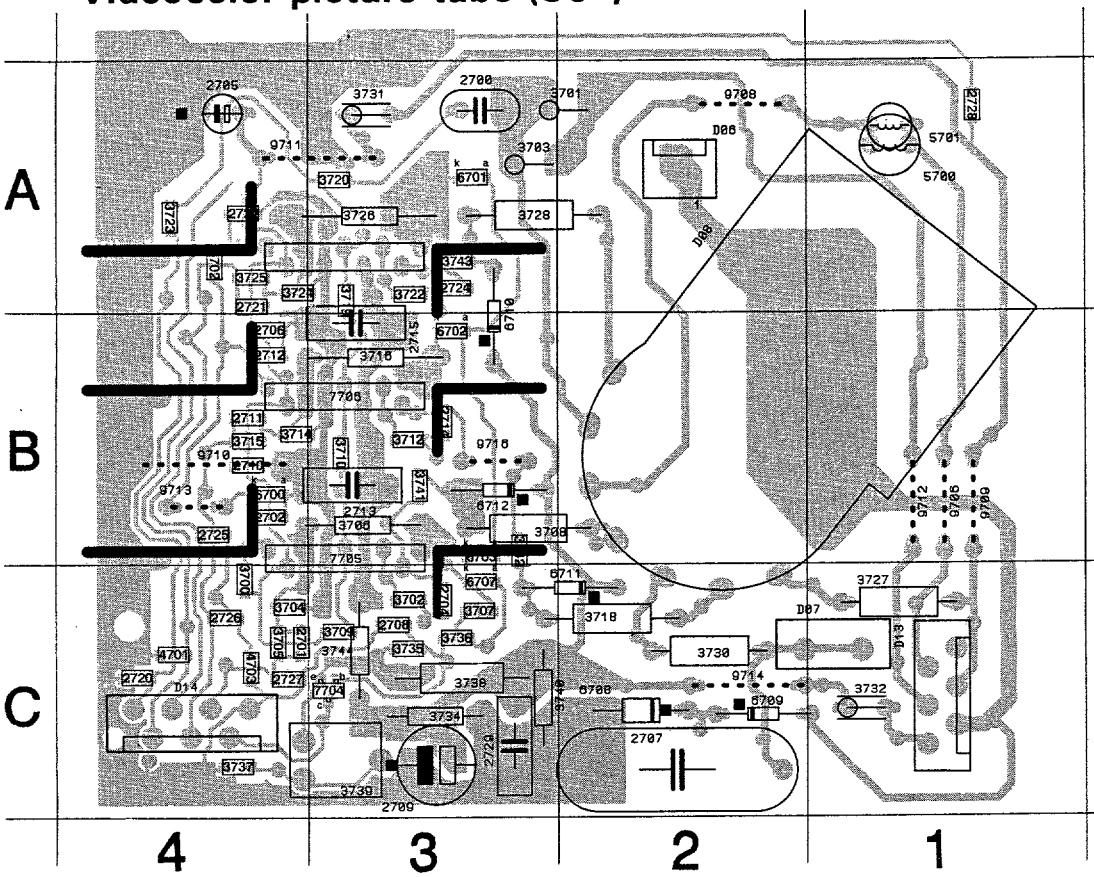


	16:9	4:3
2700	100p	-
2701	12p	6p8
2707	33n/2KV0	33n/1KV6
2708	560p	330p
2711	10p	6p8
2721	15p	10p
3701	3R3	1R
3703	3R3	1R
3704	2k2	2k7
3705	2k4	3k3
3706	120k	150k
3709	150k	120k
3710	8k2	33k
3714	2k2	2k7
3715	2k4	3k3
3716	120k	150k
3724	2k2	2k7
3725	2k4	3k3
3726	120k	150k
3728	220R	680R
3737	12k	20k
3739	47k	-
4704	JMP	-
5700	82U	33U
5703	-	33U

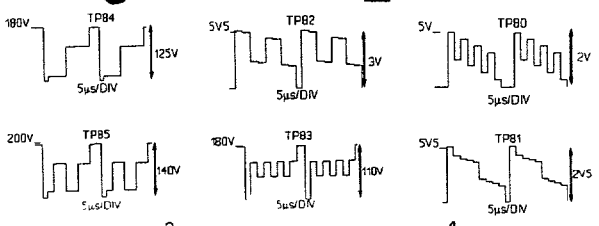
2700	M 2
2701	J 2
2703	M 2
2704	C 7
2705	M 8
2706	G 3
2707	M 8
2708	M 4
2709	B 5
2710	D 2
2711	G 2
2712	M 7
2713	E 4
2715	I 4
2716	J 3
2717	L 4
2720	H 2
2721	C 2
2726	C 3
2730	K 2
2731	D 4
2741	G 4
2751	K 4
2760	L 8
3700	L 2
3701	C 4
3702	B 5
3704	K 2
3705	K 2
3706	I 3
3708	J 6
3710	J 5
3711	G 4
3712	M 7
3714	H 2
3715	G 2
3716	F 3
3718	I 5
3719	F 5
3720	C 5
3721	J 4
3724	D 2
3726	C 3
3727	M 8
3728	D 5
3730	M 8
3731	M 8
3733	B 8
3734	B 8
3735	M 5
3736	M 4
3737	M 6
3738	M 6
3740	C 8
4702	F 2
4703	E 2
4709	I 2
5700	K 7
5701	K 8
6700	M 1
6701	C 4
6702	F 4
6703	I 4
6707	M 4
6714	G 8
6715	G 7
7704	N 6
7705	K 3
7706	G 3
7707	D 3
9706	L 7
9711	G 8

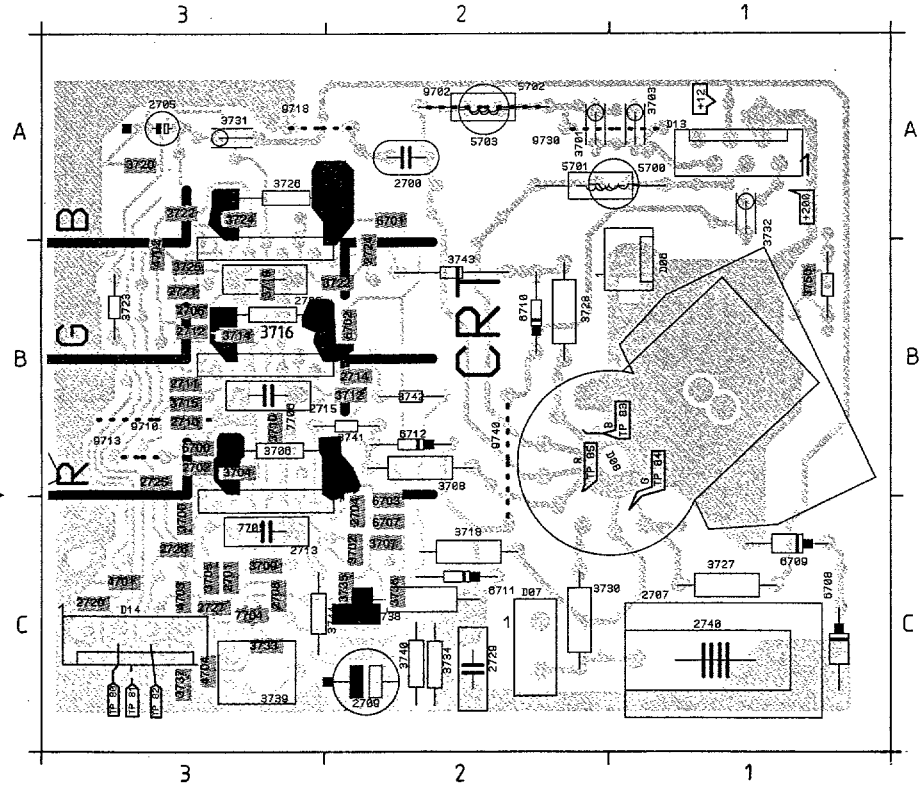
Platines Tube-image

Videocolor picture tube (36")



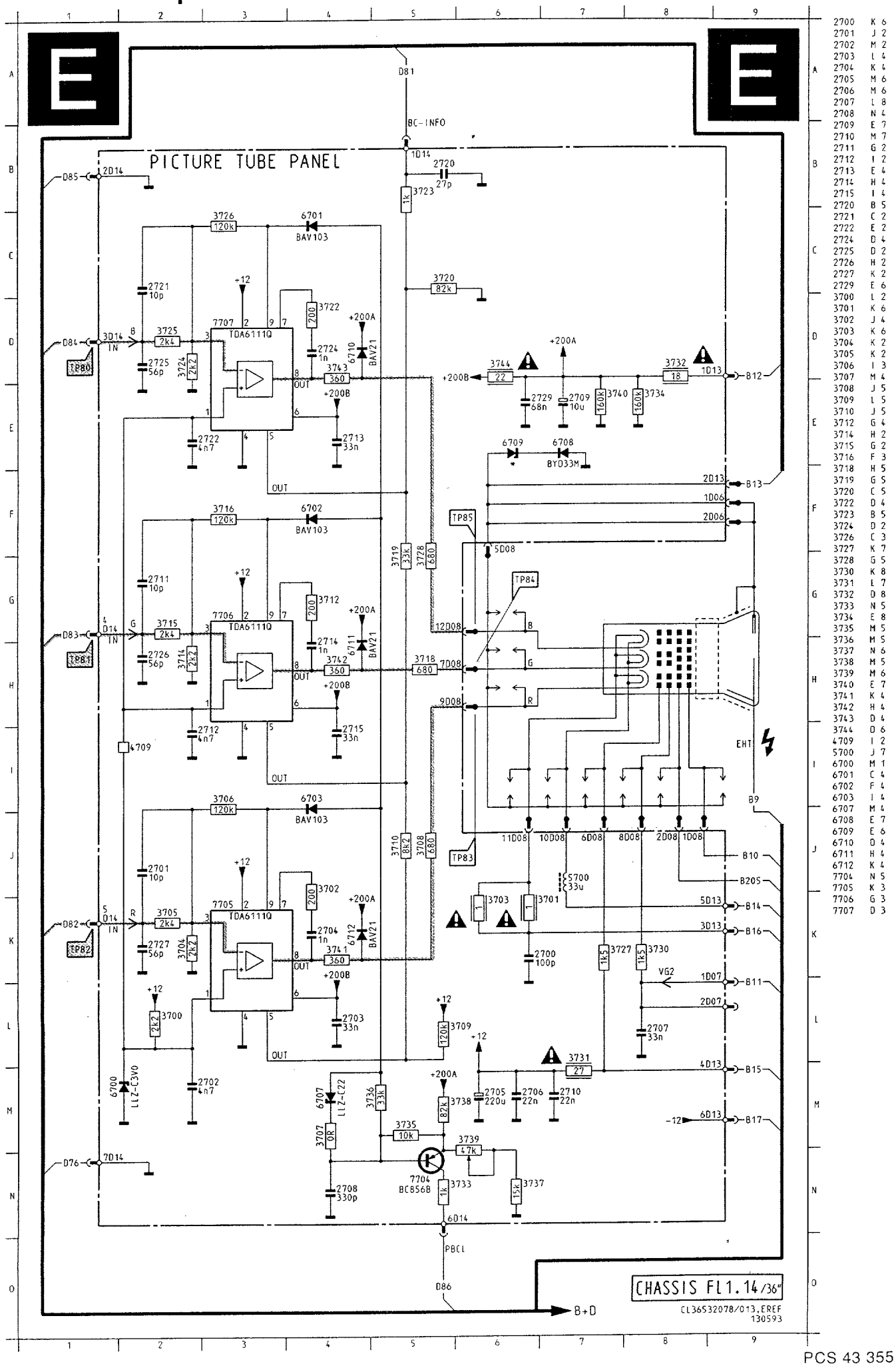
D06 A2	3708 B3	6701 A3
D07 C1	3709 C3	6702 B3
D08 B2	3710 B3	6703 B3
D13 C1	3712 B3	6707 C3
D14 C4	3714 B4	6708 C2
2700 A3	3715 B4	6709 C2
2701 C4	3716 B3	6710 B3
2702 B4	3718 C2	6711 C3
2704 C3	3719 A3	6712 B3
2705 A4	3720 A3	7704 C4
2706 B4	3722 A3	7705 B3
2707 C3	3723 A4	7706 B3
2708 C3	3724 A4	7707 A3
2709 C3	3725 A4	9706 B1
2710 B4	3726 A3	9708 A2
2711 B4	3727 C1	9709 B1
2712 B4	3728 A3	9710 B4
2713 B3	3730 C2	9711 A4
2714 B3	3731 A3	9712 B1
2715 B3	3732 C1	9713 B4
2720 C4	3734 C3	9714 C2
2721 A4	3735 C3	9716 B3
2722 A4	3736 C3	
2724 A3	3737 C4	
2725 B4	3738 C3	
2726 C4	3739 C3	
2727 C4	3740 C3	
2728 A1	3741 B3	
2729 C3	3742 B3	
3700 C4	3743 A3	
3701 A3	3744 C3	
3702 C3	4701 C4	
3703 A3	4702 A4	
3704 C4	4703 C4	
3705 C4	5700 A1	
3706 B3	5701 A1	
3707 C3	6700 B4	

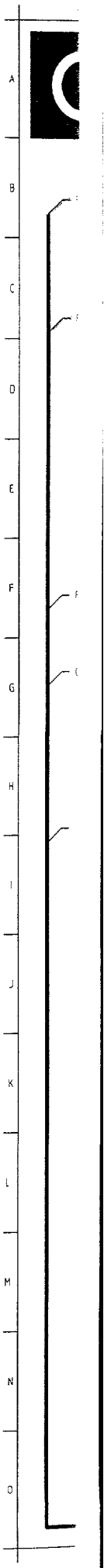




D06	B1	3708	B2	5701	A2
D07	C2	3709	C3	5702	A2
D08	B1	3710	B3	5703	A2
D13	A1	3712	B2	6700	B3
D14	C3	3714	B3	6701	A2
2700	A2	3715	B3	6702	B2
2701	C3	3716	B3	6703	C2
2702	B3	3718	C2	6707	C2
2703	B3	3719	B3	6708	C1
2704	C2	3720	A3	6709	C1
2705	A3	3722	B2	6710	B2
2706	B3	3723	B3	6711	C2
2707	C1	3724	A3	6712	B2
2708	C3	3725	B3	7704	C3
2709	C2	3726	A3	7705	C3
2710	B3	3727	C1	7706	B3
2711	B3	3728	B2	7707	B3
2712	B3	3730	C2	9702	A2
2713	C3	3731	A3	9710	B3
2714	B2	3732	A1	9713	B3
2715	B3	3733	C3	9718	A3
2720	C3	3734	C2	9730	A1
2721	B3	3735	C2	9740	B2
2722	A3	3736	C2		
2724	B2	3738	C2		
2725	B3	3739	C3		
2726	C3	3740	C2		
2727	C3	3741	B2		
2729	C2	3742	B2		
2740	C1	3743	B2		
3700	C3	3744	C3		
3701	A2	3750	B1		
3702	C2	3751	B1		
3703	A1	4701	C3		
3704	B3	4702	B3		
3705	C3	4703	C3		
3706	B3	4704	C3		
3707	C2	5700	A1		

Picture tube panel 36"

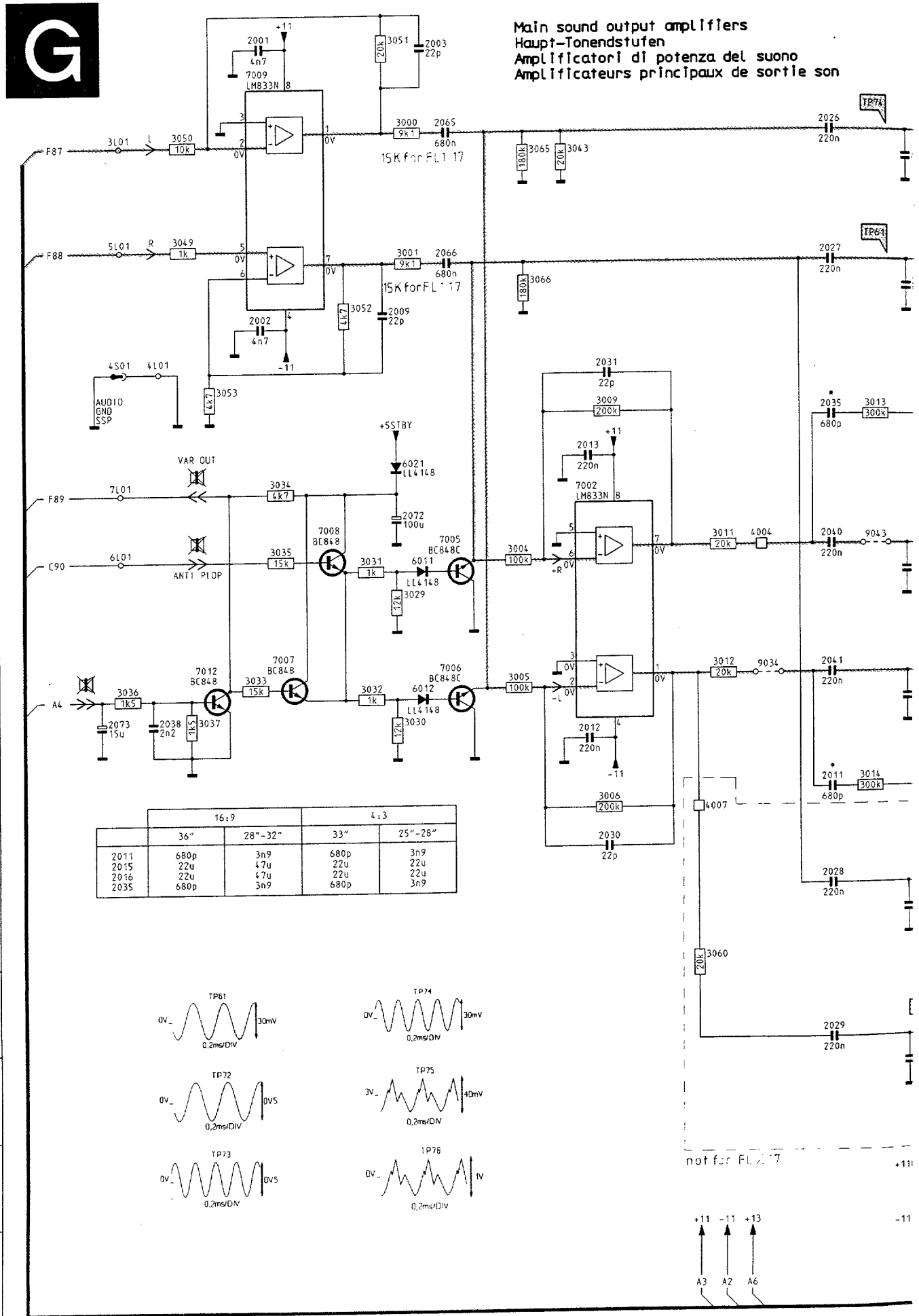



A
B
C
D
E
F
G
H
I
J
K
L
M
N
O

Audio amplification / Tonsignal Verstärker /

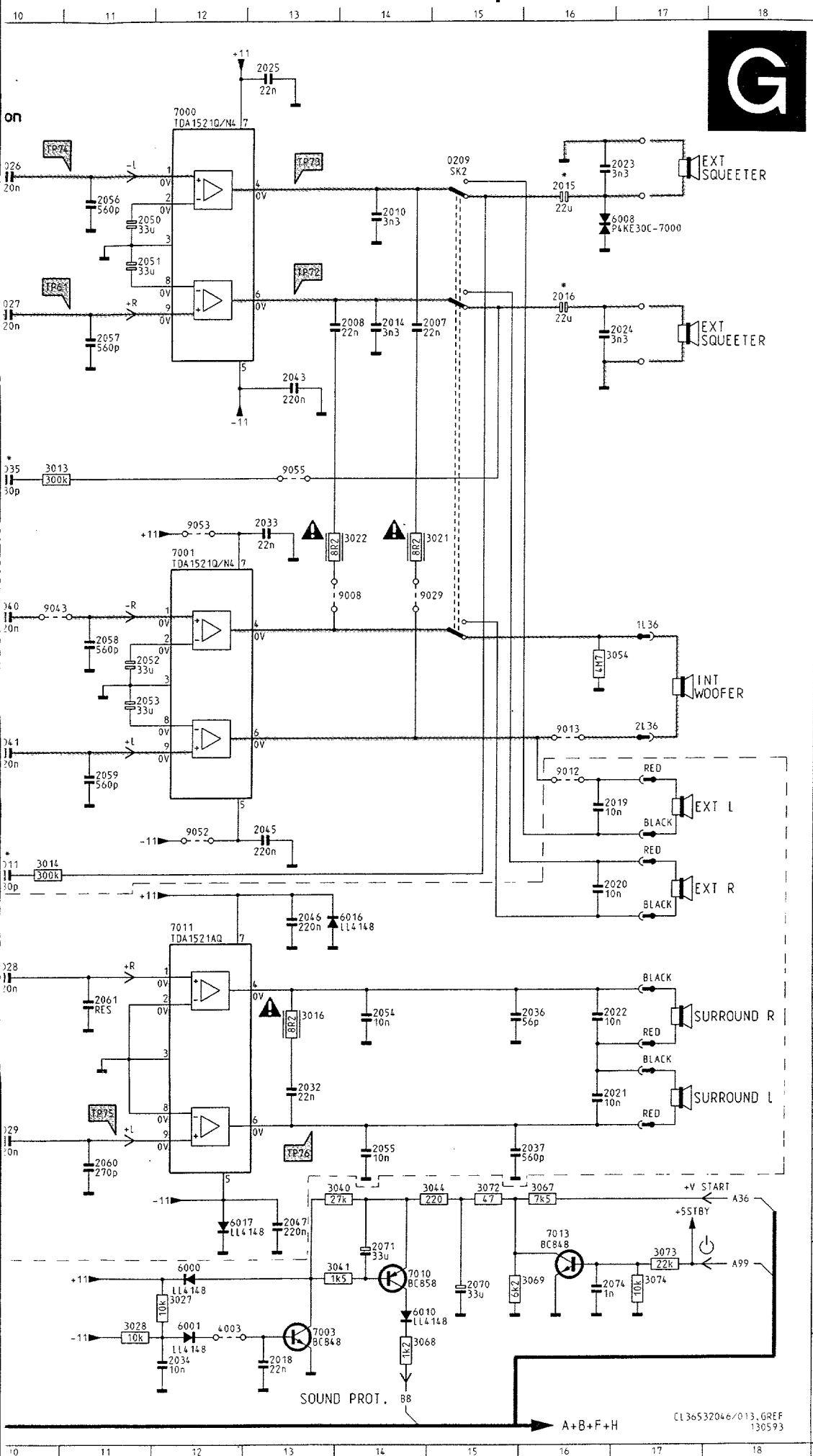
G

Main sound output amplifiers
Haupt-Tonendstufen
Amplificatori di potenza del suono
Amplificateurs principaux de sortie son



	16:9		4:3	
	36"	28"-32"	33"	25"-28"
2011	680p	3n9	680p	3n9
2015	22u	47u	22u	22u
2016	22u	47u	22u	22u
2035	680p	3n9	680p	3n9

Amplificateur audio



	0209	B15	7001	F12
	2001	A 3	7002	F 7
	2002	D 3	7003	O13
	2003	A 5	7005	G 5
A	2007	D14	7006	H 5
	2008	D14	7007	H 3
	2009	D 5	7008	G 4
	2010	B14	7009	A 3
	2011	I10	7010	N14
	2012	I 7	7011	J12
	2013	F 7	7012	H 3
	2014	D14	7013	M16
B	2015	B16	9008	F14
	2016	C16	9012	H16
	2018	O13	9013	H16
	2019	I16	9029	F14
	2020	J16	9034	H 9
	2021	L16	9043	G10
	2022	K16	9052	I12
	2023	B16	9053	F12
C	2024	D16	9055	E13
	2025	A13		
	2026	B10		
	2027	C10		
	2028	K10		
	2029	L10		
	2030	J 7		
D	2031	E 7		
	2032	L13		
	2033	F13		
	2034	O12		
	2035	E10		
	2036	K16		
	2037	M16		
	2038	I 2		
E	2040	G10		
	2041	H10		
	2043	D13		
	2045	I13		
	2046	J13		
	2047	M13		
	2050	B11		
F	2051	C11		
	2052	G11		
	2053	H11		
	2054	K14		
	2055	M14		
	2056	B11		
	2057	D11		
	2058	G11		
G	2059	H11		
	2060	M11		
	2061	K11		
	2065	B 5		
	2066	C 5		
	2070	N15		
	2071	N14		
H	2072	F 5		
	2073	I 2		
	2074	N16		
	3000	B 5		
	3001	C 5		
	3004	G 6		
	3005	H 6		
	3006	J 7		
I	3009	E 7		
	3011	G 9		
	3012	H 9		
	3013	E10		
	3014	I10		
	3016	K13		
	3021	F14		
J	3022	F14		
	3027	N12		
	3028	N11		
	3029	G 5		
	3030	I 5		
	3031	G 5		
	3032	H 5		
	3033	H 3		
K	3034	F 4		
	3035	G 4		
	3036	H 2		
	3037	J 3		
	3040	M14		
	3041	N14		
	3043	B 7		
L	3044	M15		
	3049	C 2		
	3050	B 2		
	3051	A 5		
	3052	D 4		
	3053	E 3		
	3054	G16		
	3060	K 8		
M	3065	B 6		
	3066	D 6		
	3067	M16		
	3068	O14		
	3069	N16		
	3072	M15		
	3073	N17		
	3074	N17		
N	4003	N12		
	4004	G 9		
	4007	J 8		
	6000	N12		
	6001	N12		
	6008	B16		
	6010	N14		
	6011	G 5		
O	6012	H 5		
	6016	J14		
	6017	M12		
	6021	F 5		
	7000	A12		

Large signal panel FL X.16/.17 /

L01	F1	2072	D4	2524	D1	3214	E5	3421	B3	3548	D2	4538	C3	6417	B3	7380	E3	9045	D4	9406	B2
L02	E1	2073	D4	2526	C1	3215	E5	3422	B3	3549	D2	5204	H2	6440	B3	7381	E3	9046	D4	9407	B2
L03	A1	2074	A5	2527	C1	3216	F4	3423	B3	3550	B4	5230	F4	6441	B3	7384	E3	9047	E5	9450	B1
L08	C4	2200	H3	2528	C1	3220	G4	3424	B2	3553	B4	5231	E5	6451	B1	7400	B3	9048	D4	9451	A1
L13	C4	2202	G2	2529	F1	3230	F3	3425	B3	3554	B4	5233	E4	6452	B1	7402	C3	9050	A3	9453	B2
L27	B3	2203	H2	2530	F1	3234	B4	3426	A2	3555	B3	5235	E4	6453	B1	7403	A1	9051	D4	9454	B2
L28	G1	2210	F4	2531	D3	3235	B4	3427	B3	3556	B3	5237	E3	6465	A1	7407	B3	9052	D4	9456	B2
L30	A1	2211	F4	2533	D3	3236	B4	3428	C3	3557	C4	5241	C4	6466	A1	7417	B3	9053	D5	9457	A1
L31	E2	2214	G4	2534	D3	3237	C4	3429	B3	3558	B3	5255	F3	6467	A1	7444	B2	9054	D4	9459	A3
L33	G2	2215	G4	2535	C4	3238	C4	3430	B3	3559	B4	5260	E3	6480	F1	7445	B2	9055	A4	9460	B2
L34	G2	2216	G5	2536	D3	3239	D3	3431	B3	3560	C3	5262	E3	6481	F1	7450	A1	9056	A4	9461	B3
L35	G3	2218	F5	2537	D3	3240	E3	3437	A1	3561	C3	5308	H5	6504	D1	7451	A1	9057	C5	9462	C4
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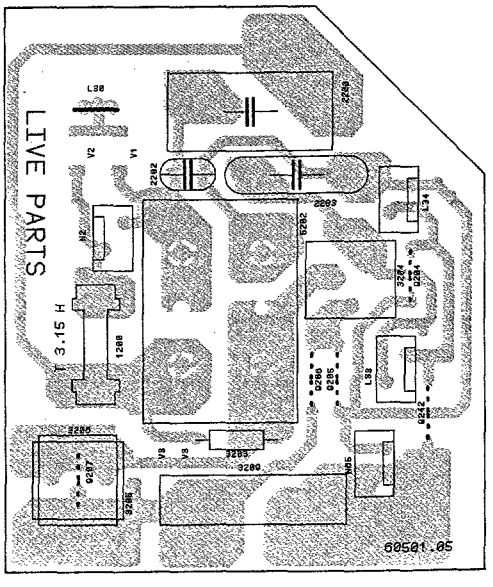

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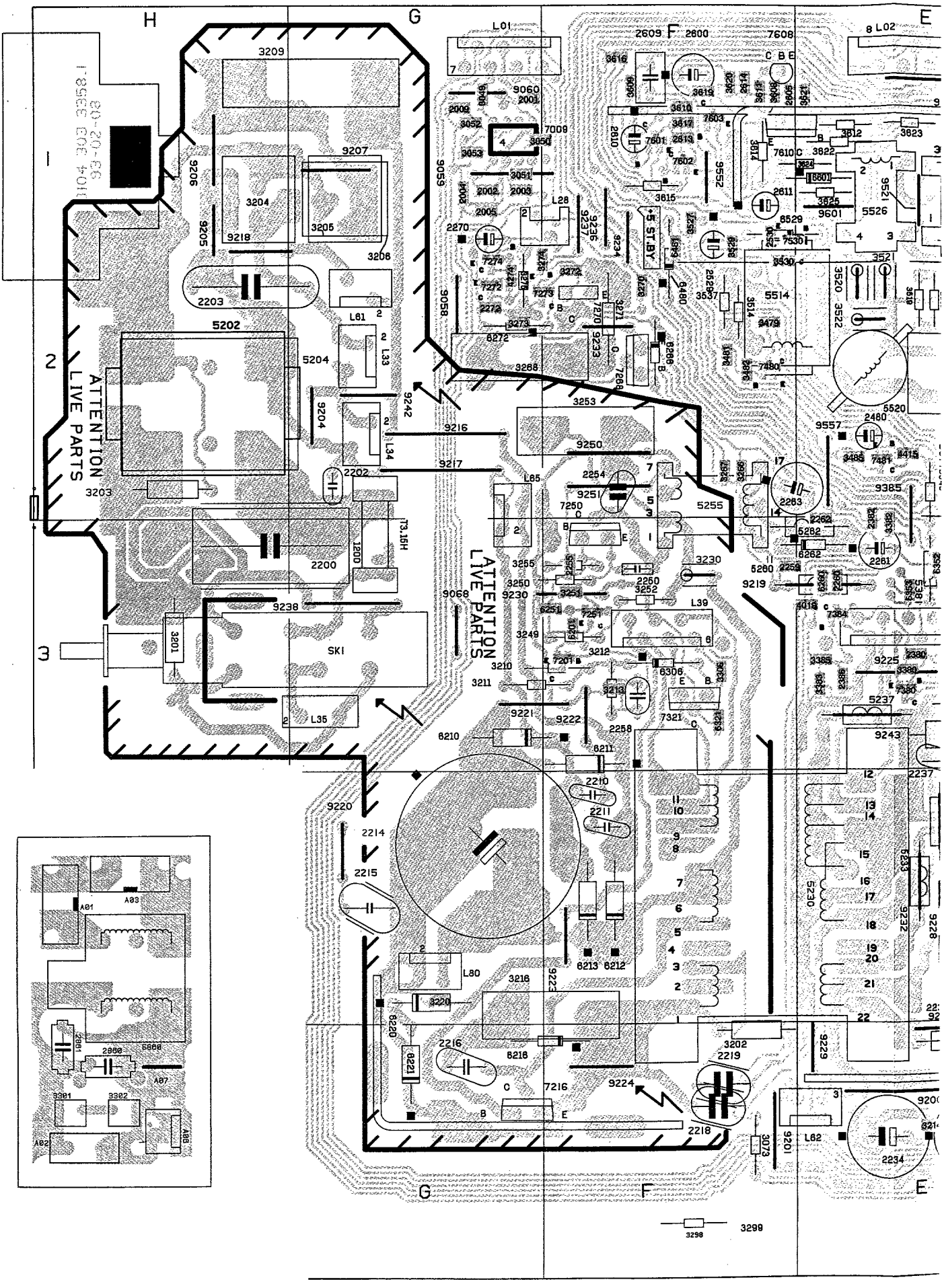

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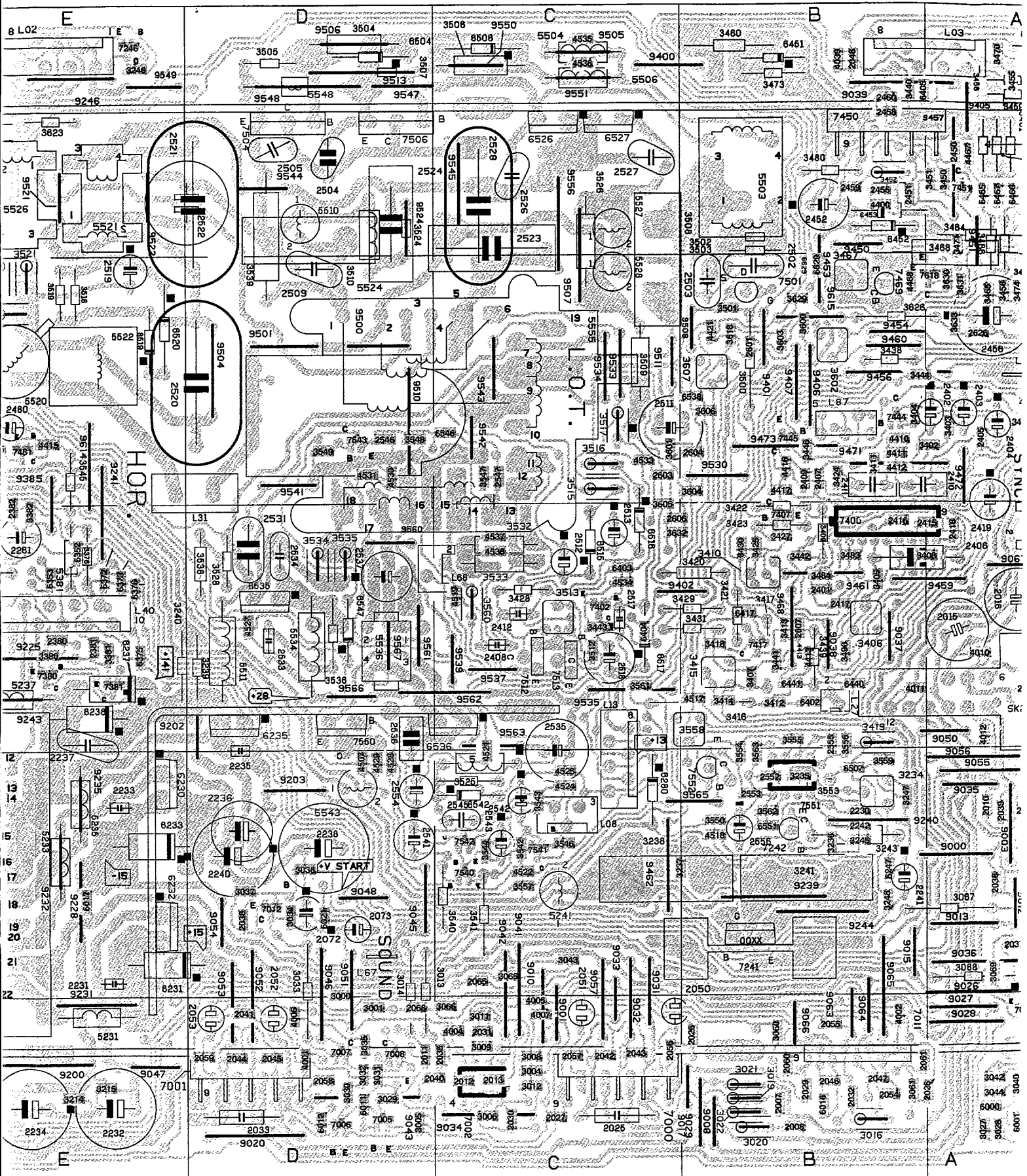

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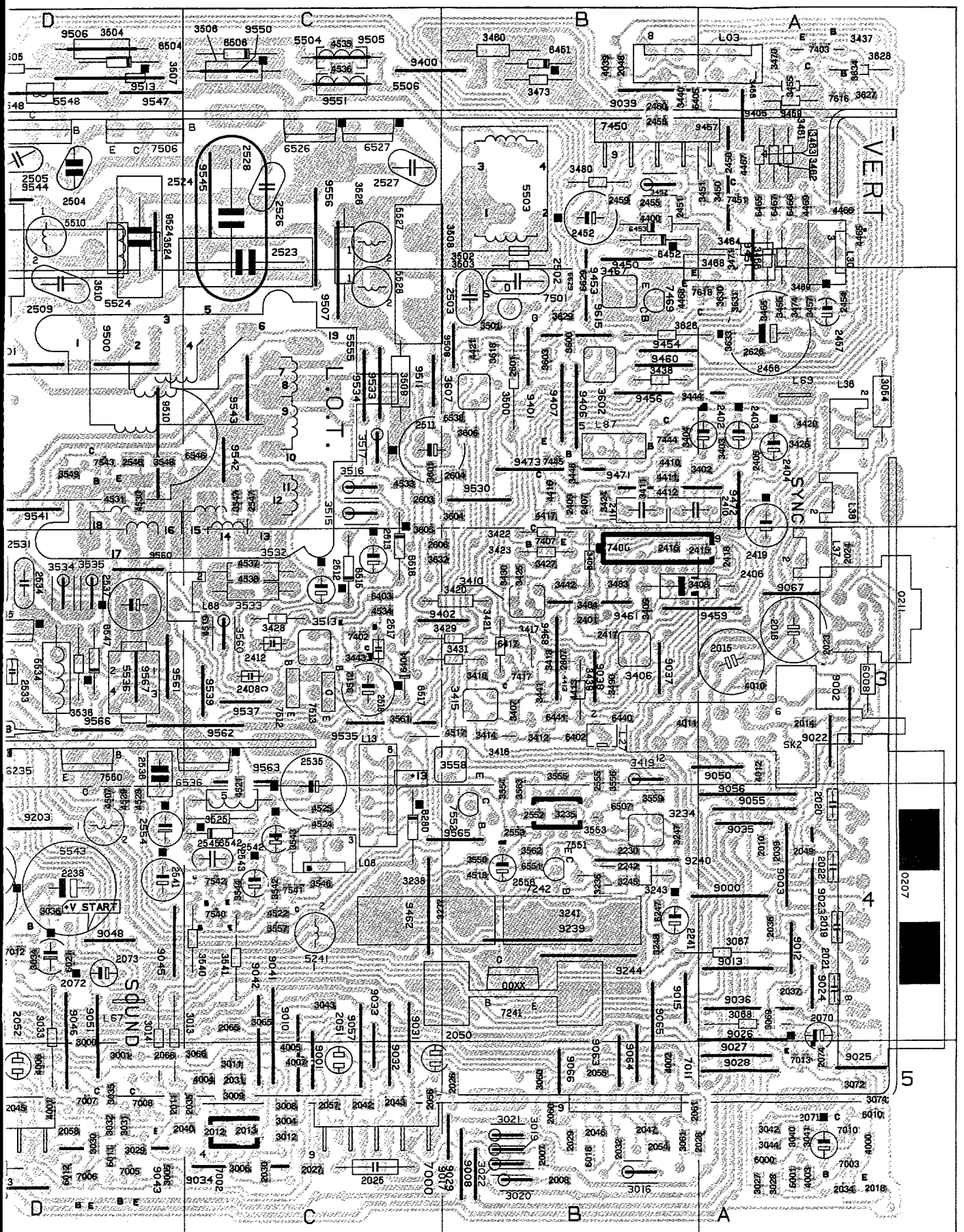
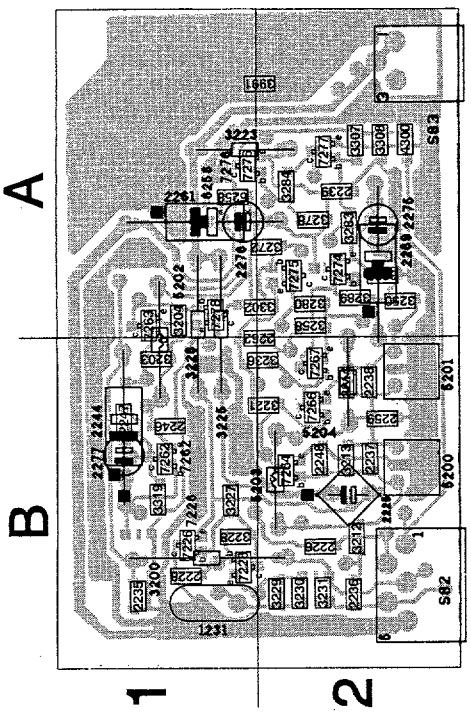


4 004 16081

Y - C Detector / Y - C Detektor / Détecteur Y - C



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1231 B1	2246 B1	3190 A2	3225 A1	3272 A2
2225 B2	2247 B1	3200 B1	3226 A1	3278 A2
2226 B2	2248 B2	3201 A1	3227 B1	3280 A2
2228 B1	2259 B2	3203 B1	3228 B1	3282 A2
2235 B1	2261 A1	3204 A1	3229 B2	3283 A2
2236 B2	2262 B2	3212 B2	3230 B2	3284 A2
2237 B2	2269 A2	3213 B2	3231 B2	3289 A2
2238 B2	2275 A2	3214 B2	3236 B2	3302 A2

3307 A2	6258 A1	7276 A1
3308 A2	7226 B1	7277 A2
3319 B1	7228 B1	7278 A1
3991 A2	7262 B1	
4300 A2	7263 A1	
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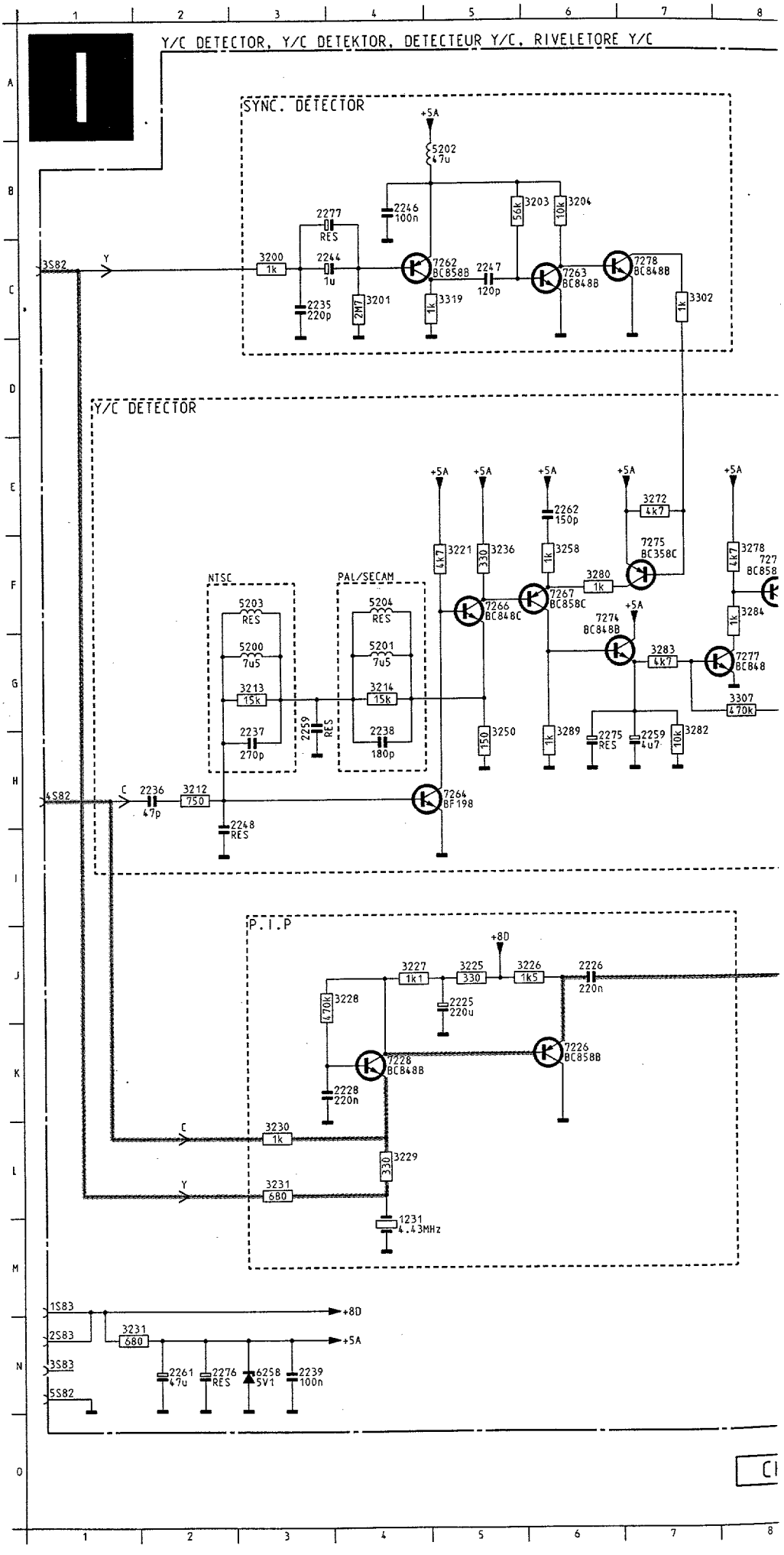

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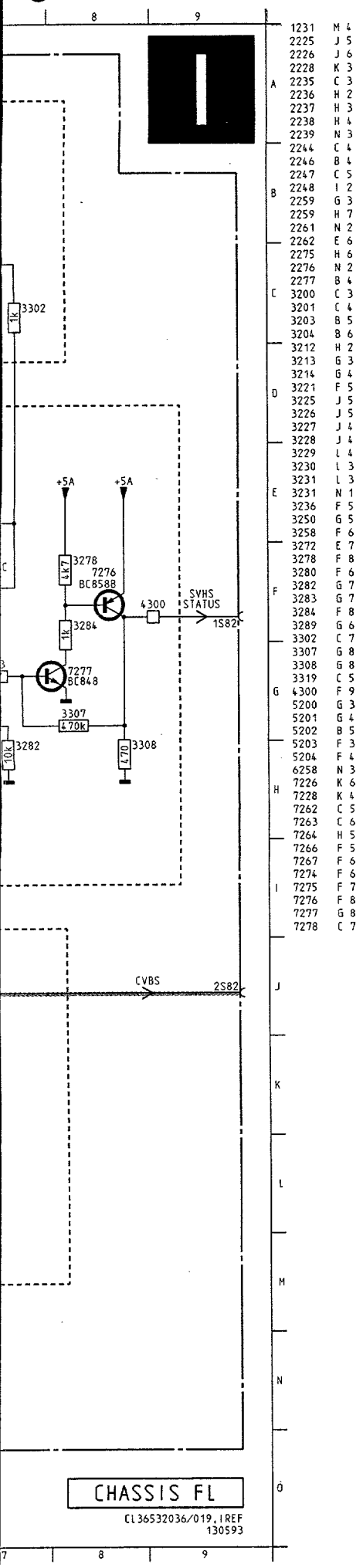

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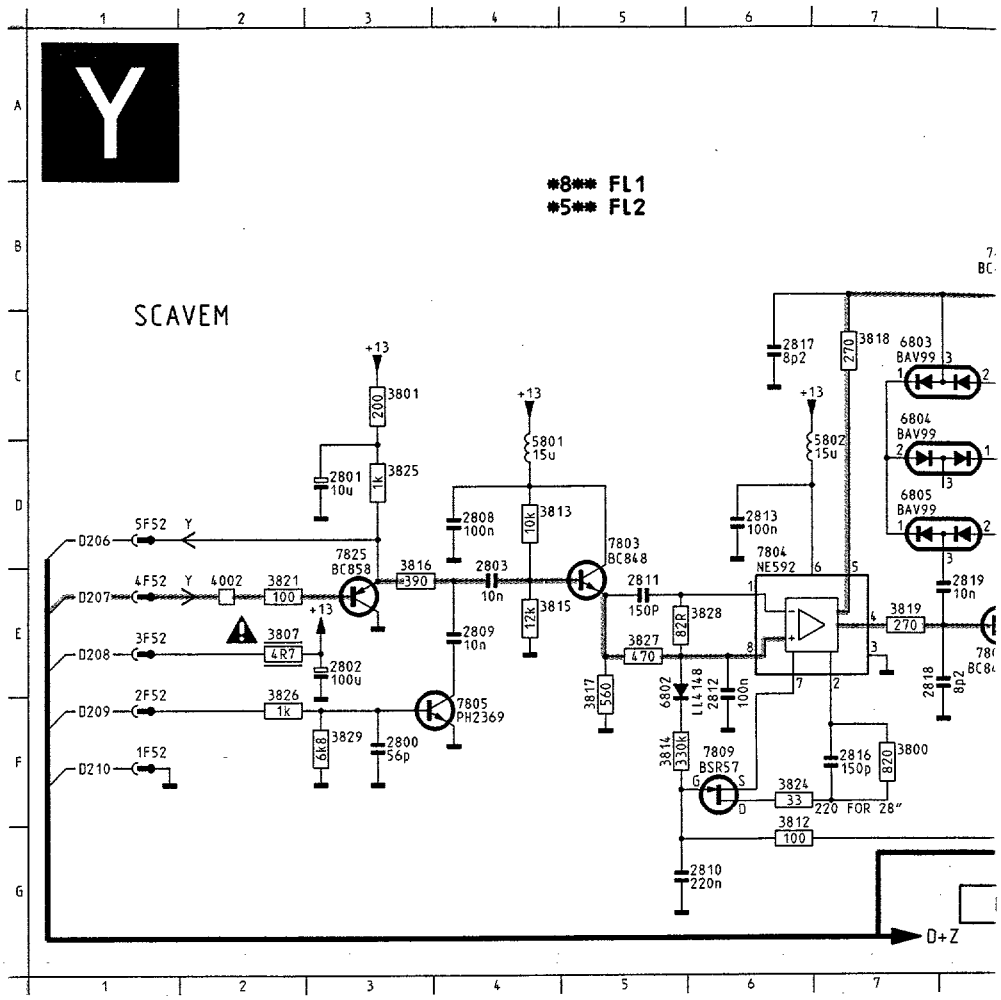

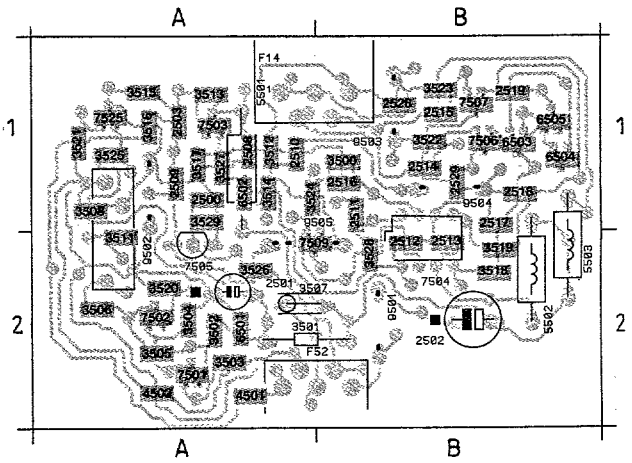

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2502	B2	2514	B1	3500	B1	3508	A1	3518	B2				
2503	A1	2515	B1	3501	A2	3511	A1	3519	B2				
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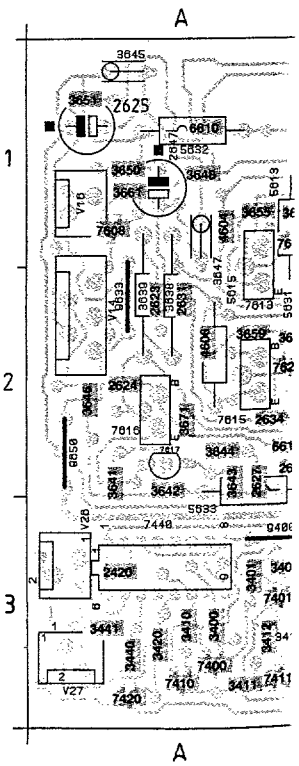

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V16	A1	2633	B1	3430	B3	3642	A2	4604	A1	7421	B3	9401	B3
V26	A3	2634	A2	3431	B3	3643	A2	4605	B2	7423	B3	9615	B1
V27	A3	2635	A2	3432	B3	3644	A2	4606	A2	7425	B3	9633	A2
V90	B2	2636	B1	3433	B3	3645	A1	4612	A2	7430	B3	9640	B2
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2607	B2	3402	A3	3609	B2	3653	B1	5632	A1	7611	B1		
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2625	A1	3421	A3	3635	B1	3659	A2	6616	A2	7617	A2		
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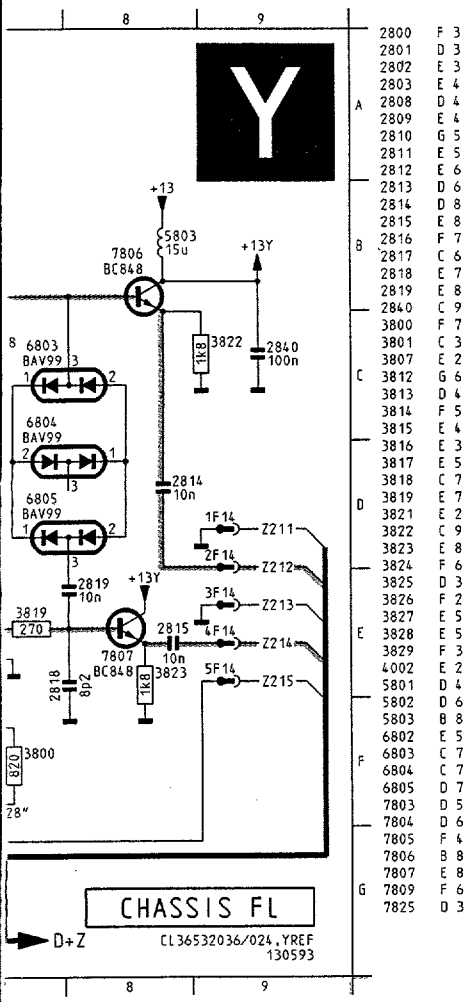

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A1	3519	B2	3527	A1	9504	B1	6502	A1	7505	A2
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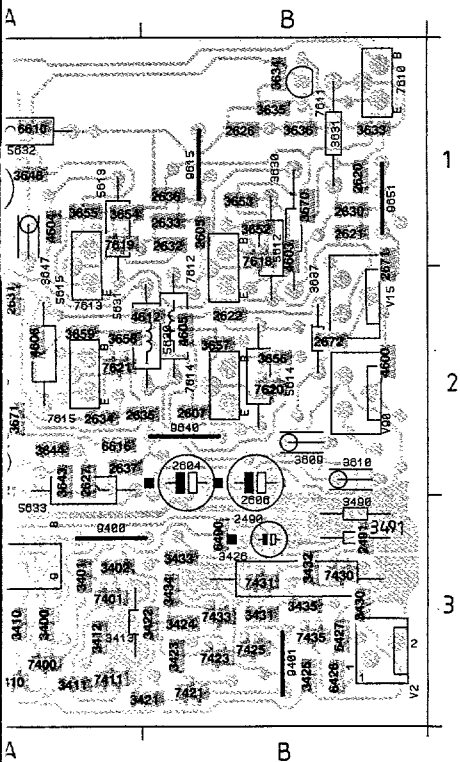

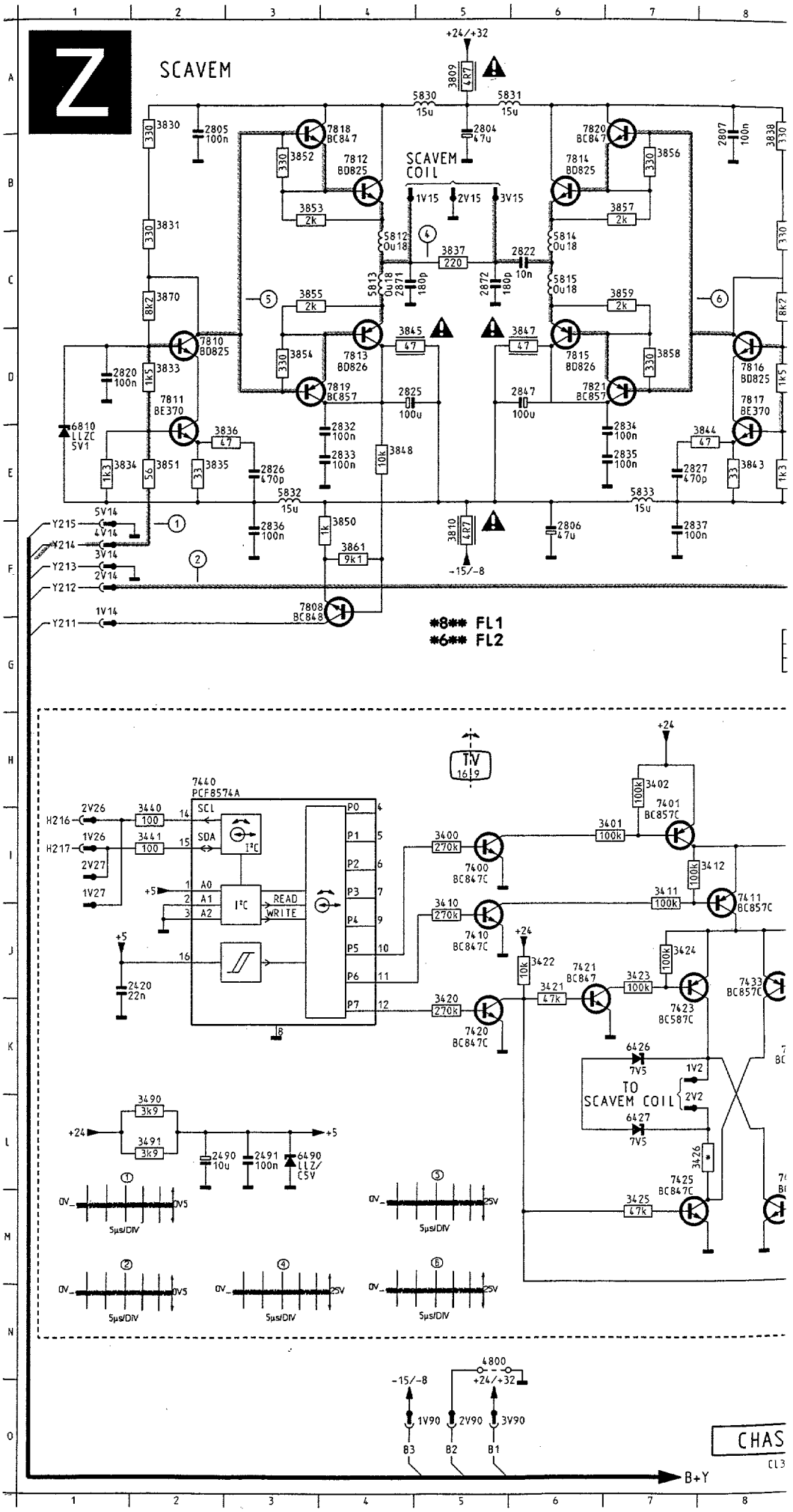

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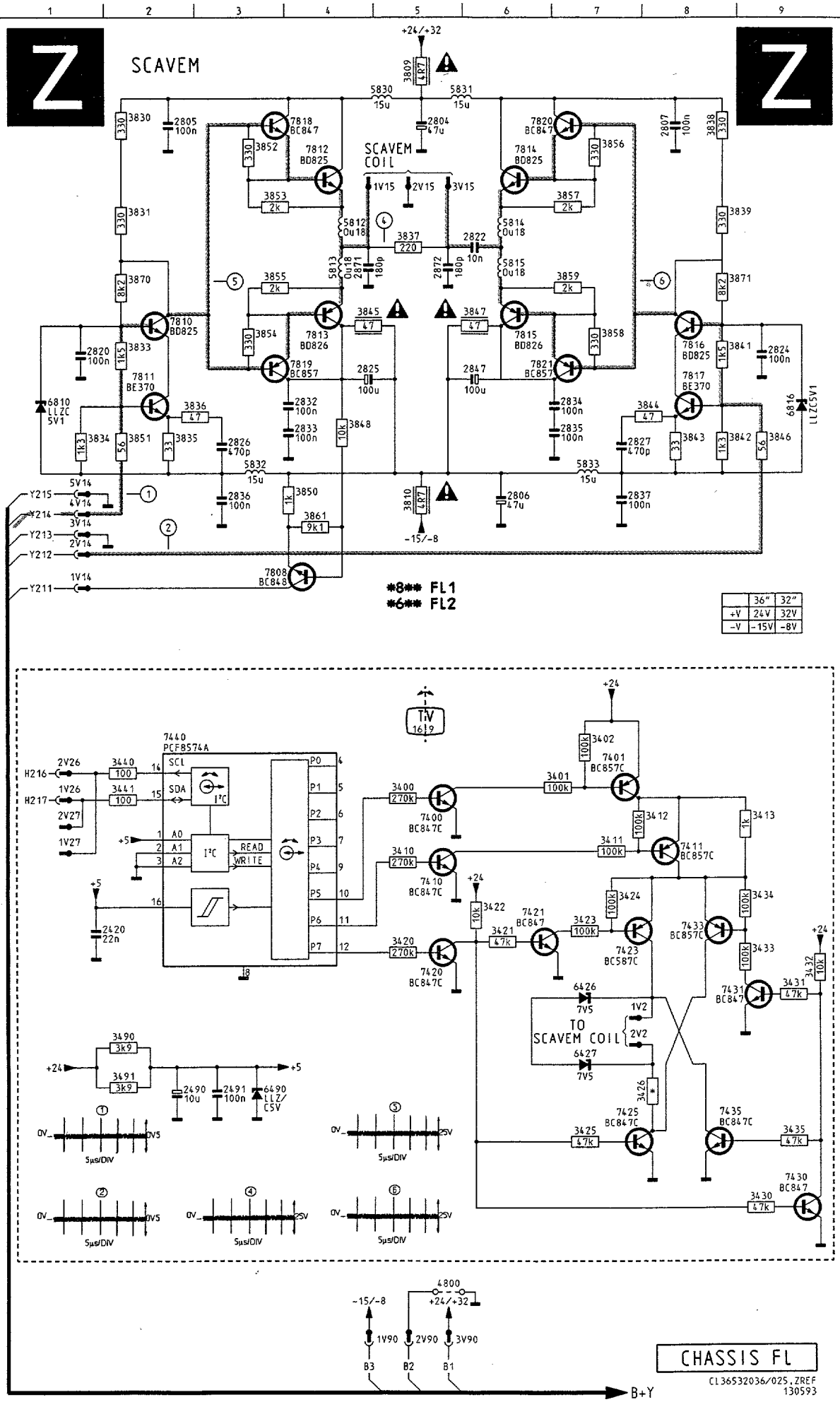

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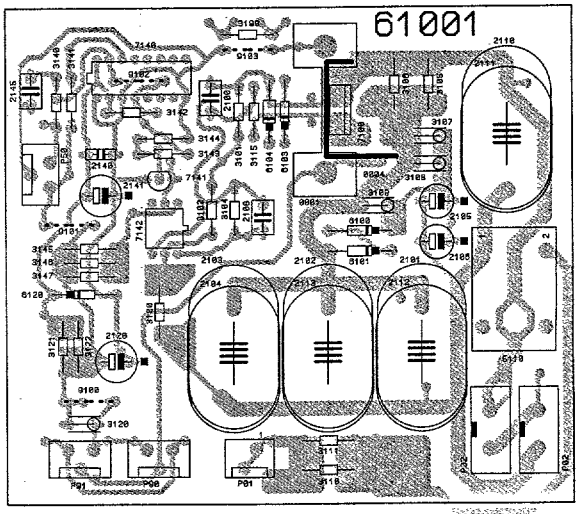
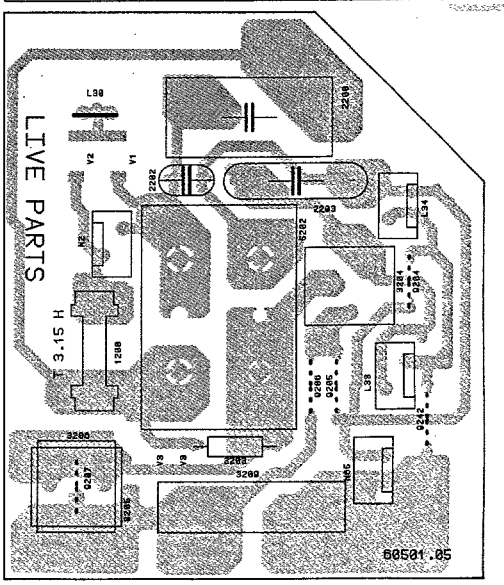
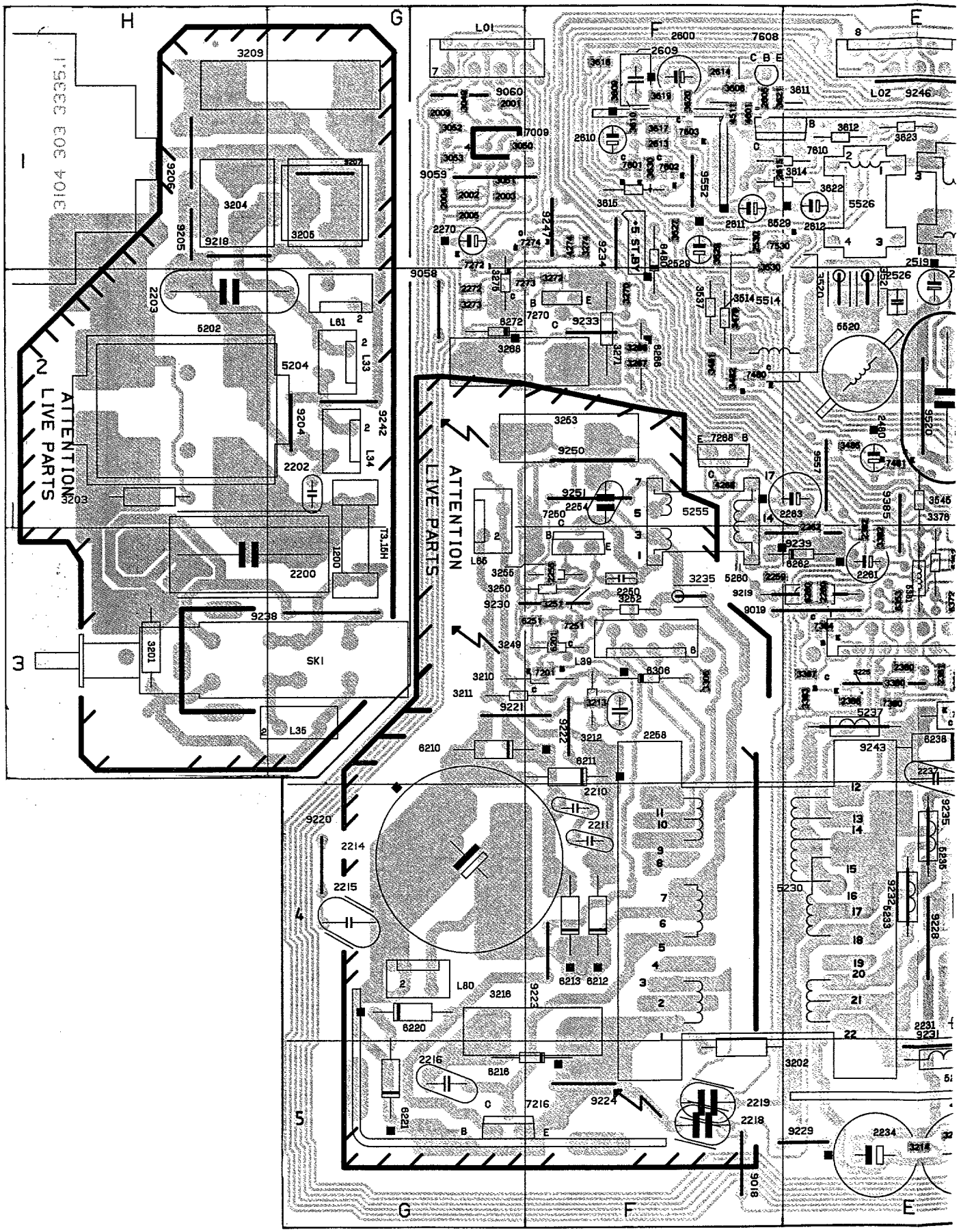




Large signal panel FL X.14 / Groß-signal Platte FL X.14 /



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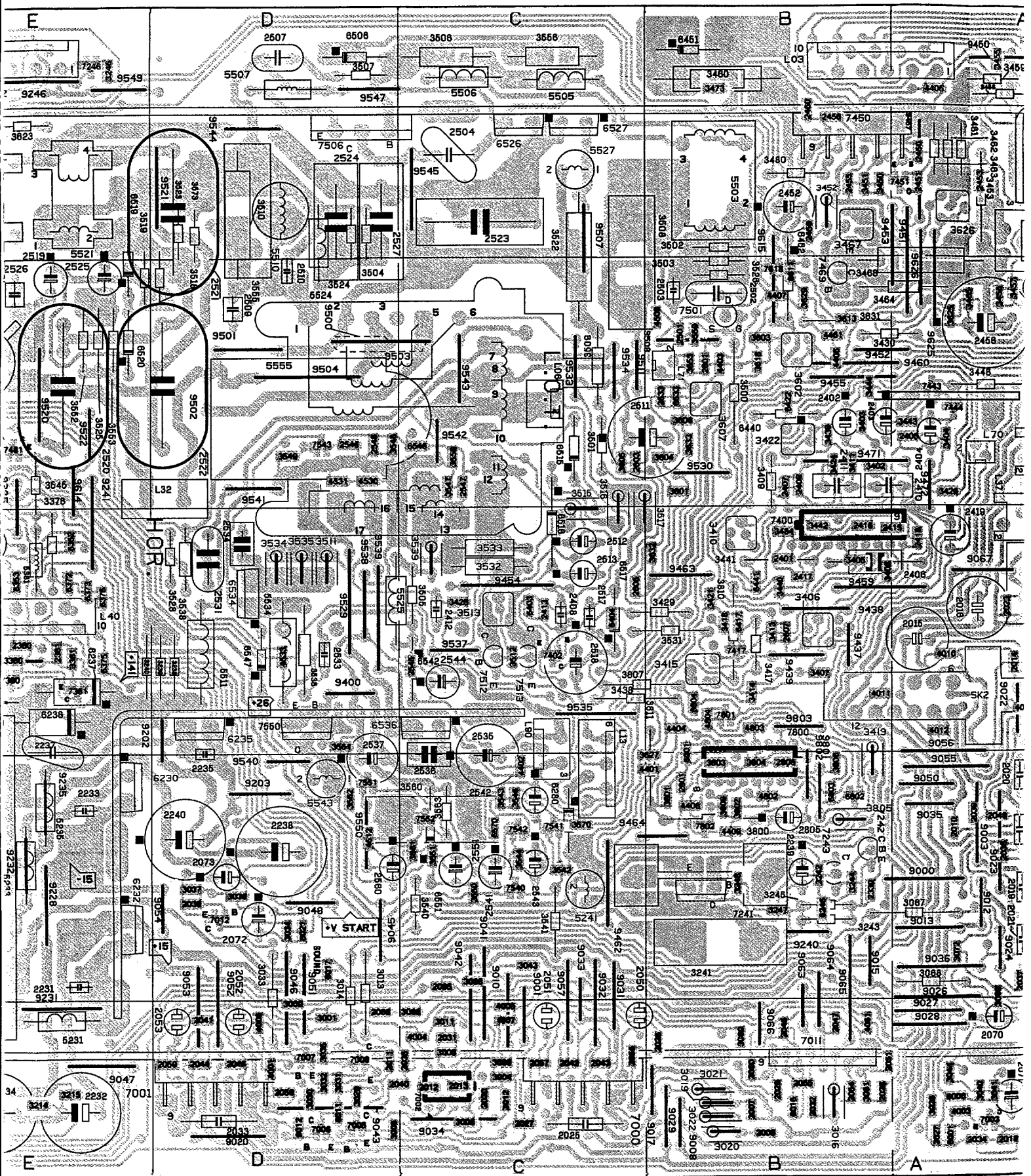

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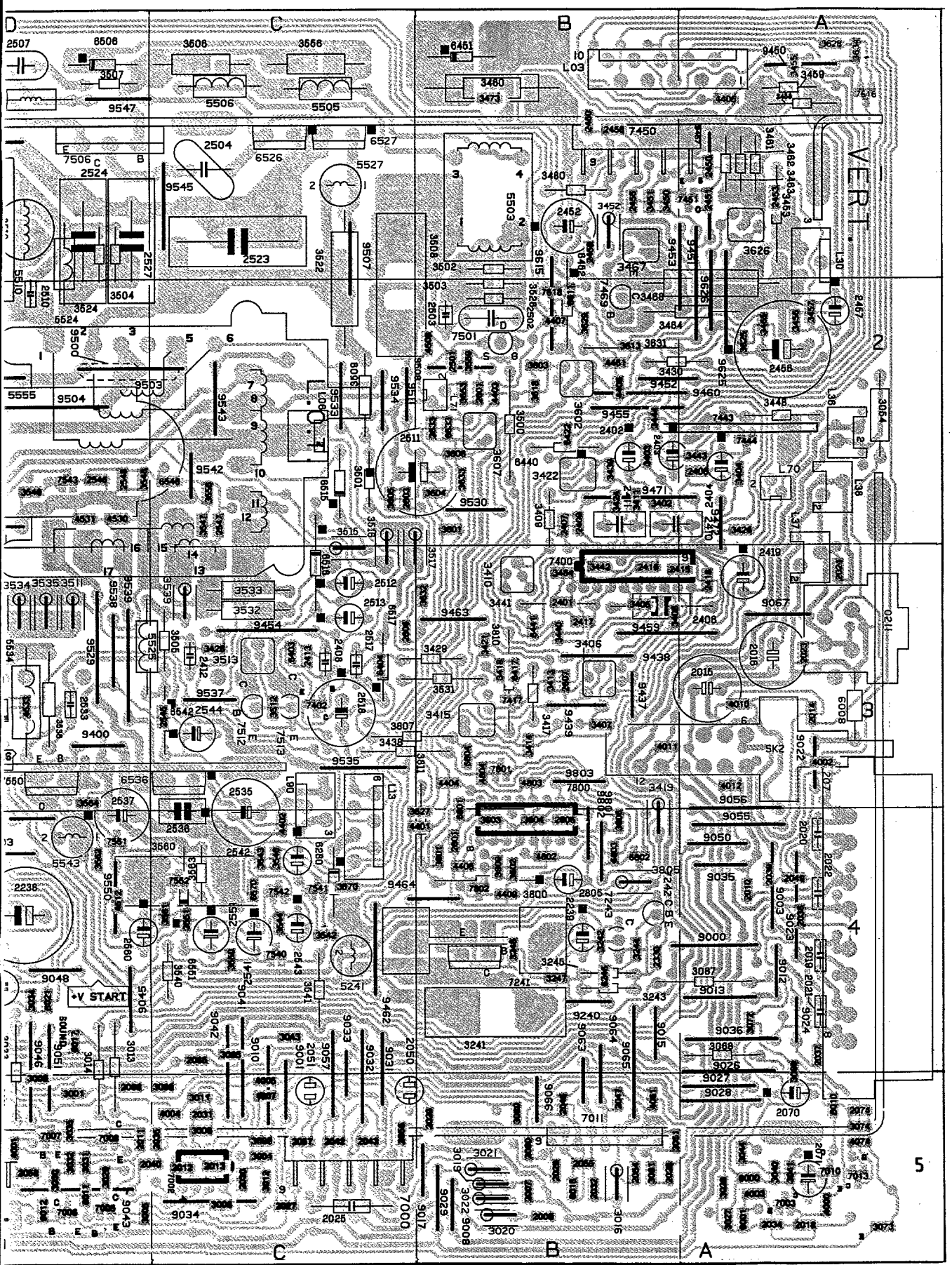
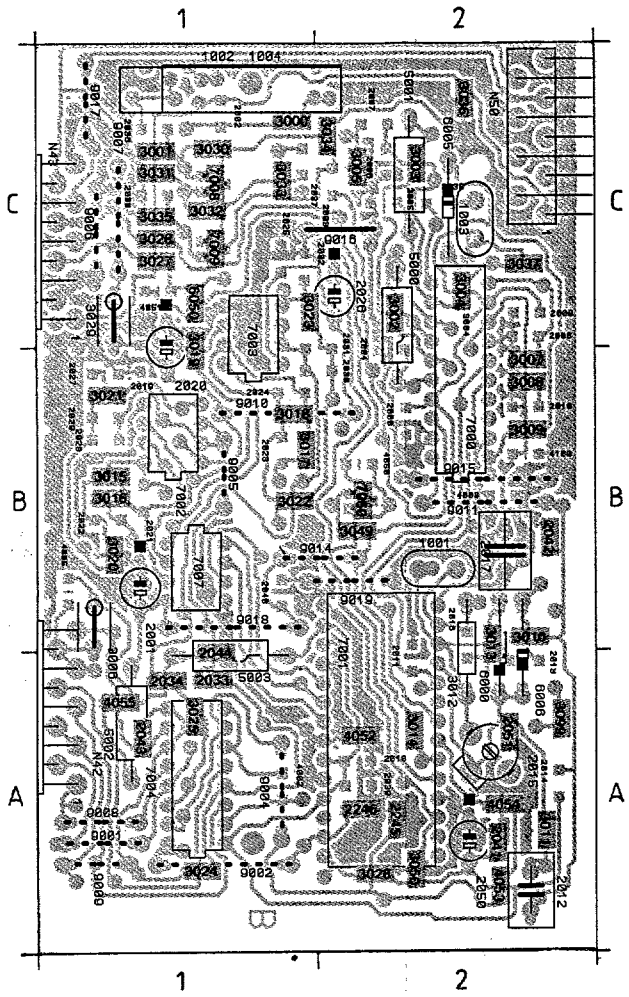


ECO NICAM



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N50	C2	2020	B1	2050	A2	3021	B1	4052	A2	9005	B1
1001	B2	2021	B1	2051	A2	3022	B1	4053	A2	9006	C1
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2001	B1	2026	C2	3002	C2	3027	C1	5001	C2	9011	B2
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2005	C2	2030	B2	3006	B1	3031	C1	6005	C2	9017	C1
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2007	C2	2032	C1	3008	B2	3033	C1	6050	C1	9019	B2
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2010	B2	2035	C2	3011	A2	3036	C2	7002	B1		
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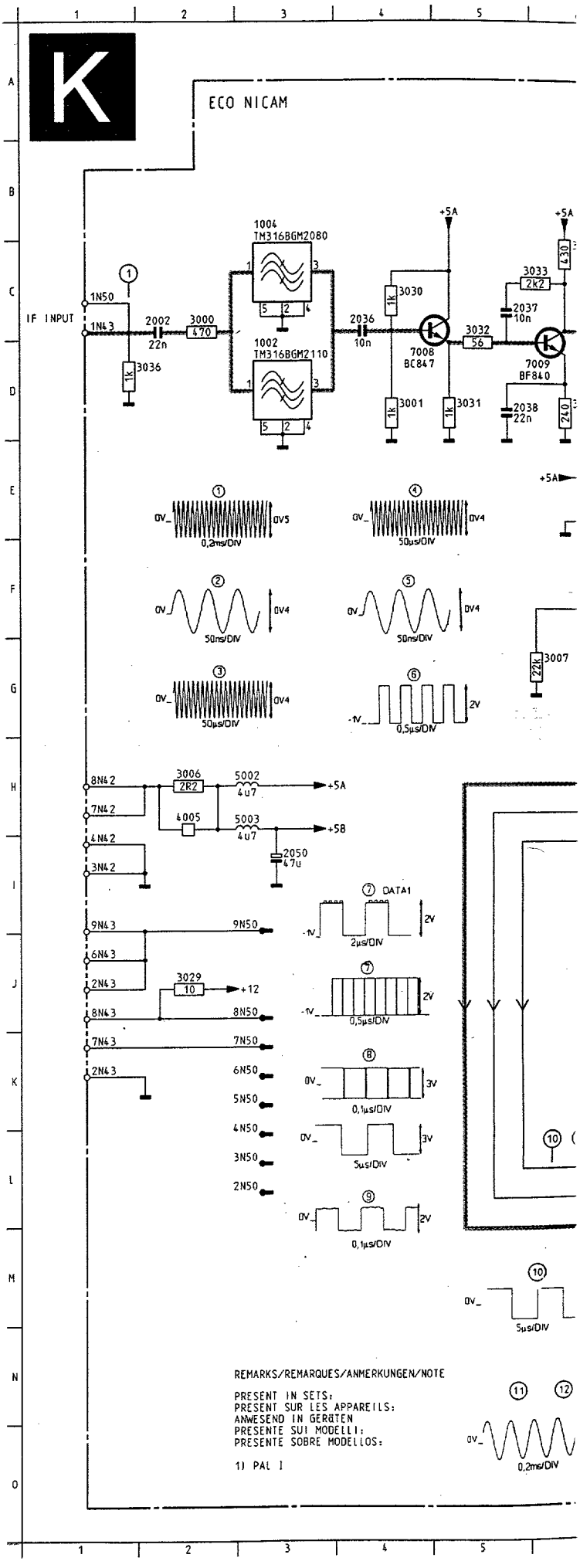

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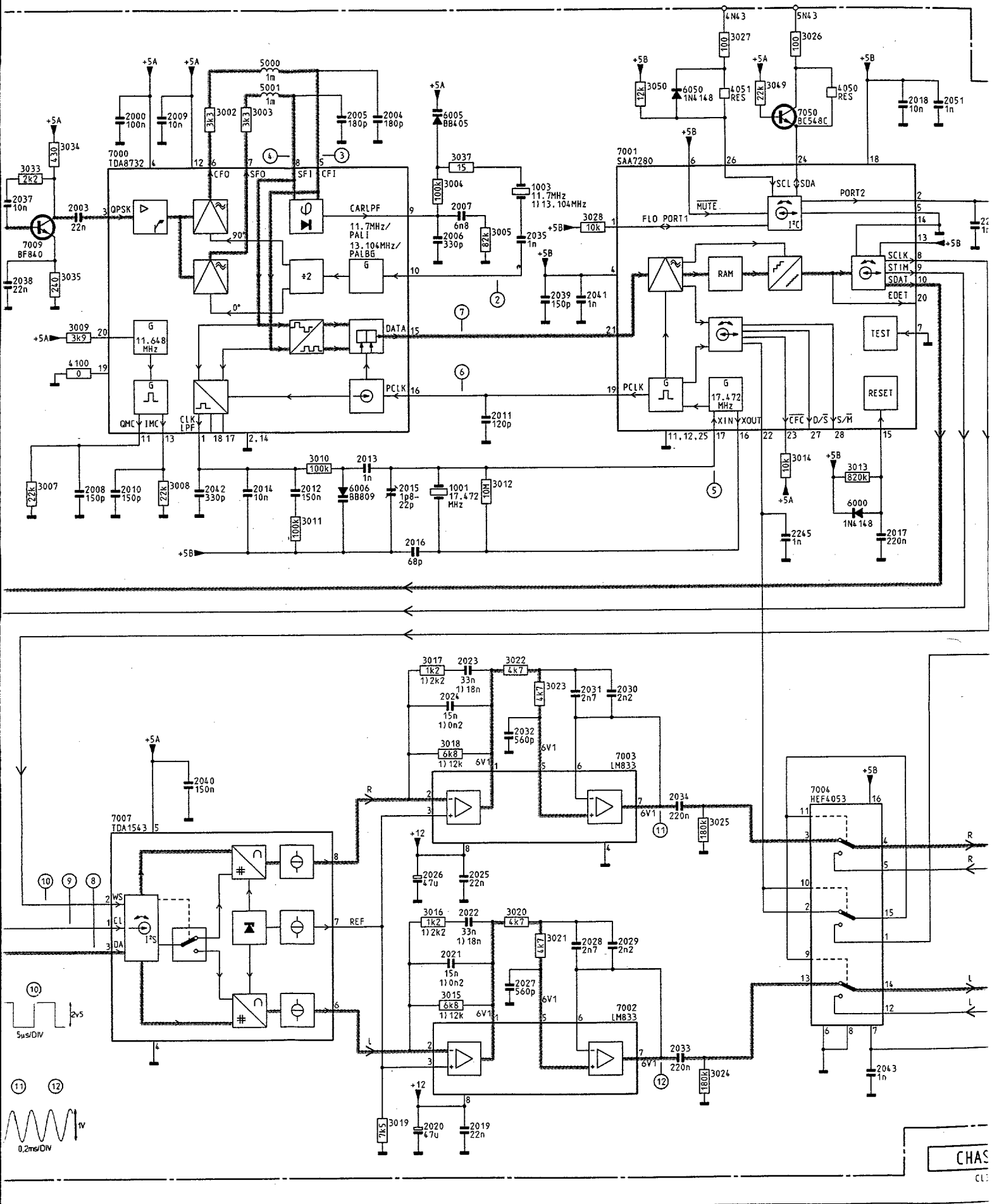
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5000 1m
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CARLPF
11.7MHz/ PALI 13.104MHz/ PALBG
QPSK
DATA
PCLK
QMC
IMC
CLK LPF
CFO
SFO
SFI
CFI
MUTE
FLO PORT1
PORT2
SCL
SDA
SCLK
STIM
SDAT
EDET
RAM
TEST
RESET
XIN
XOUT
CFC
D/S
S/M
REF
WS
CL
DA
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I²C
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+5B
+12
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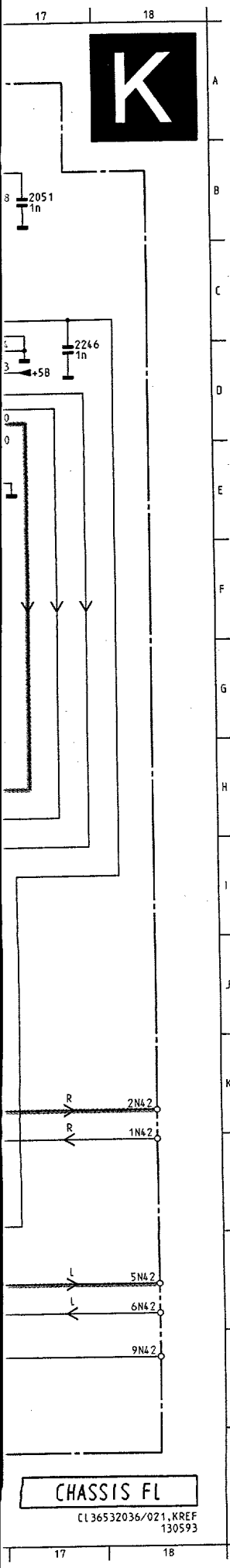
1V
CHAS

PIP panel



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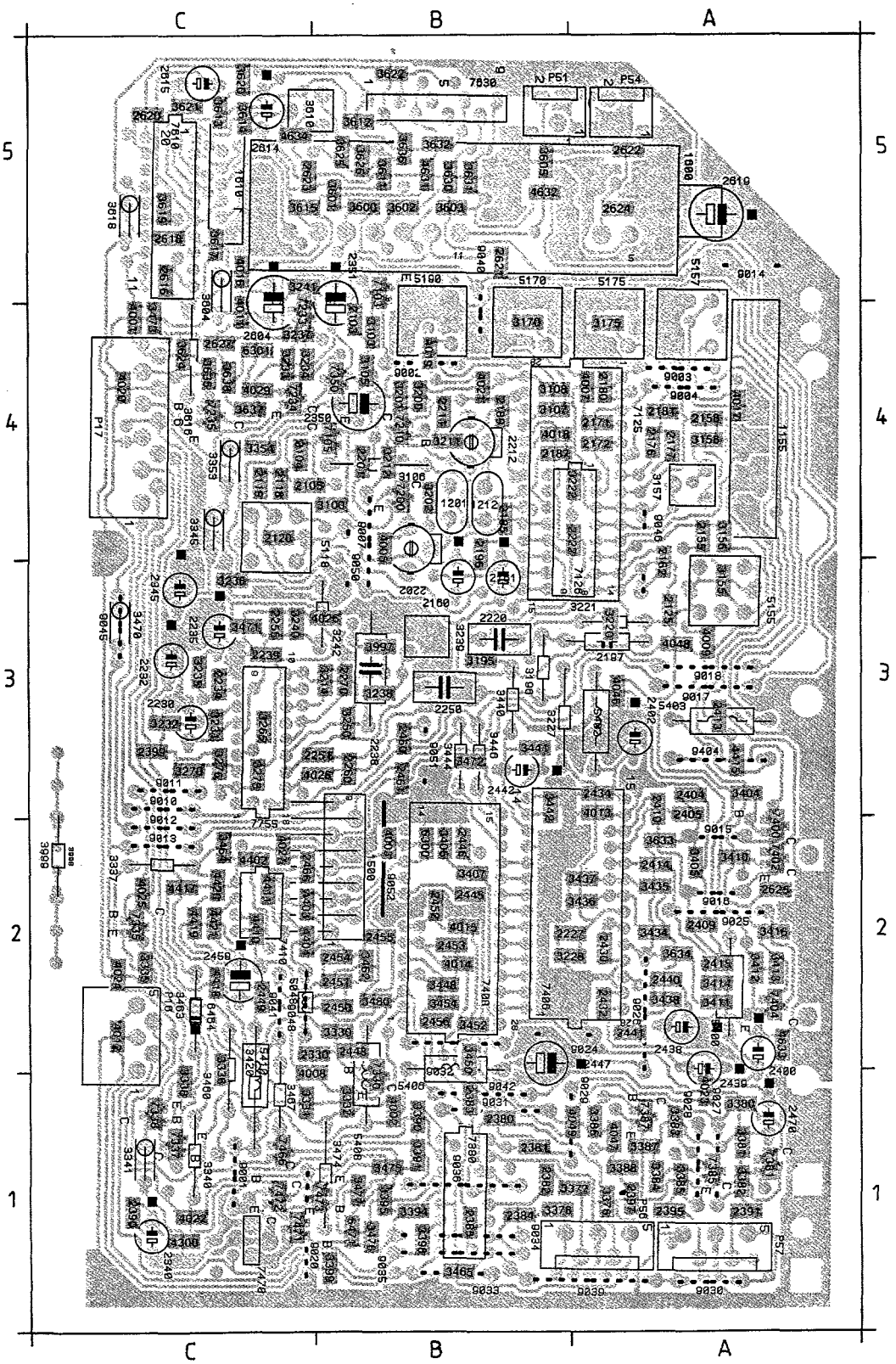

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2010	G 7	3380	A1	4013	A3	9014	A5
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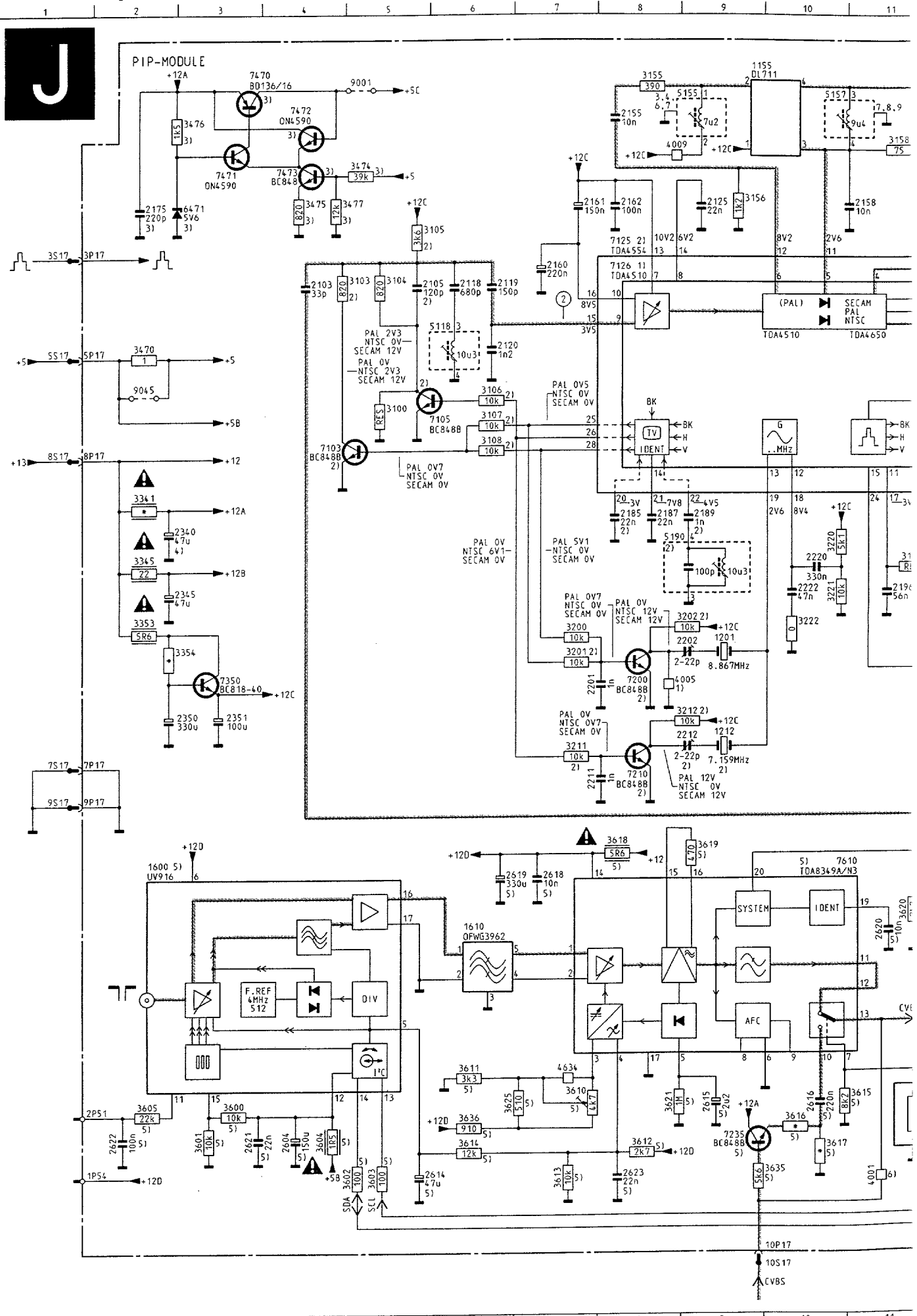

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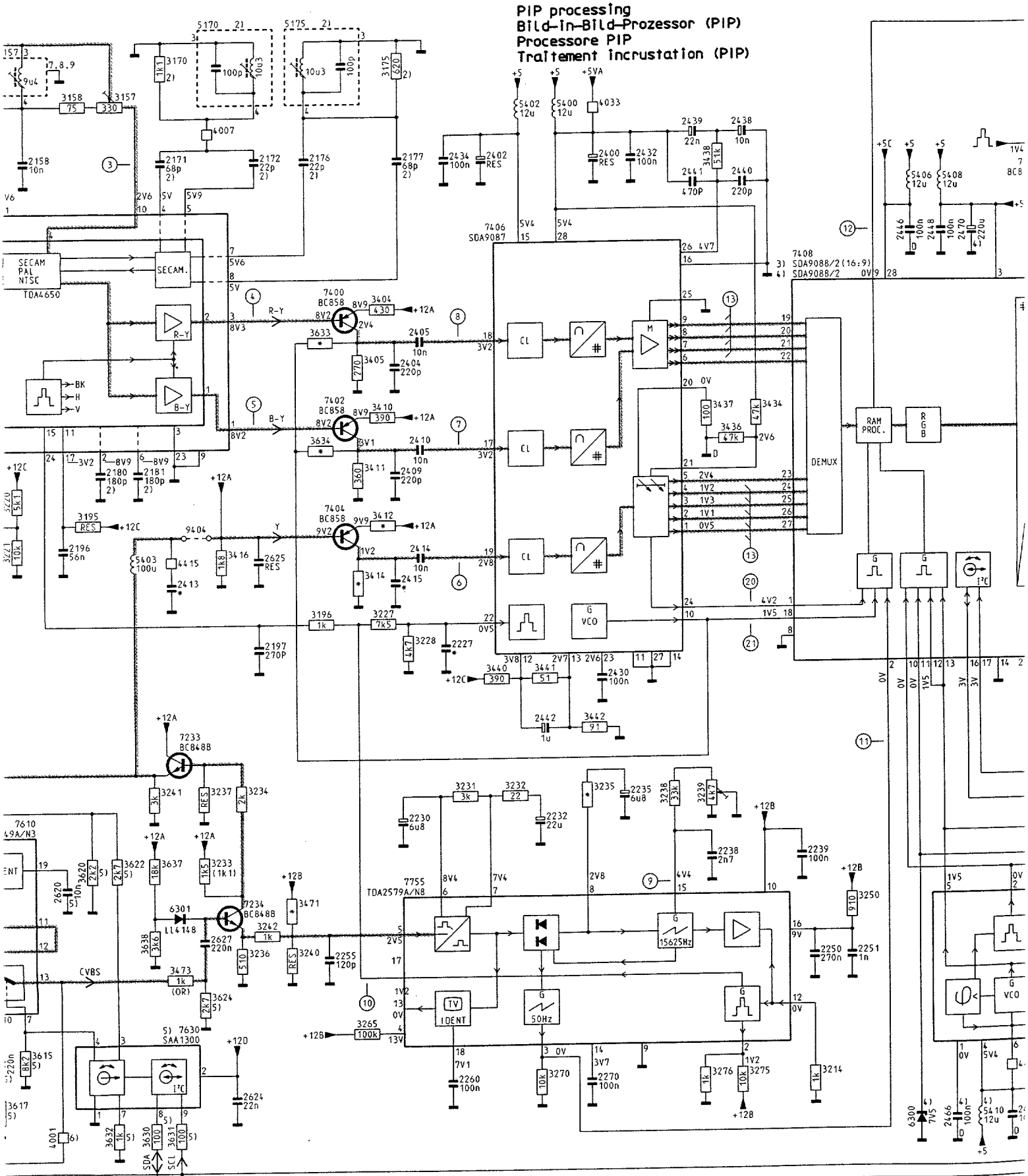

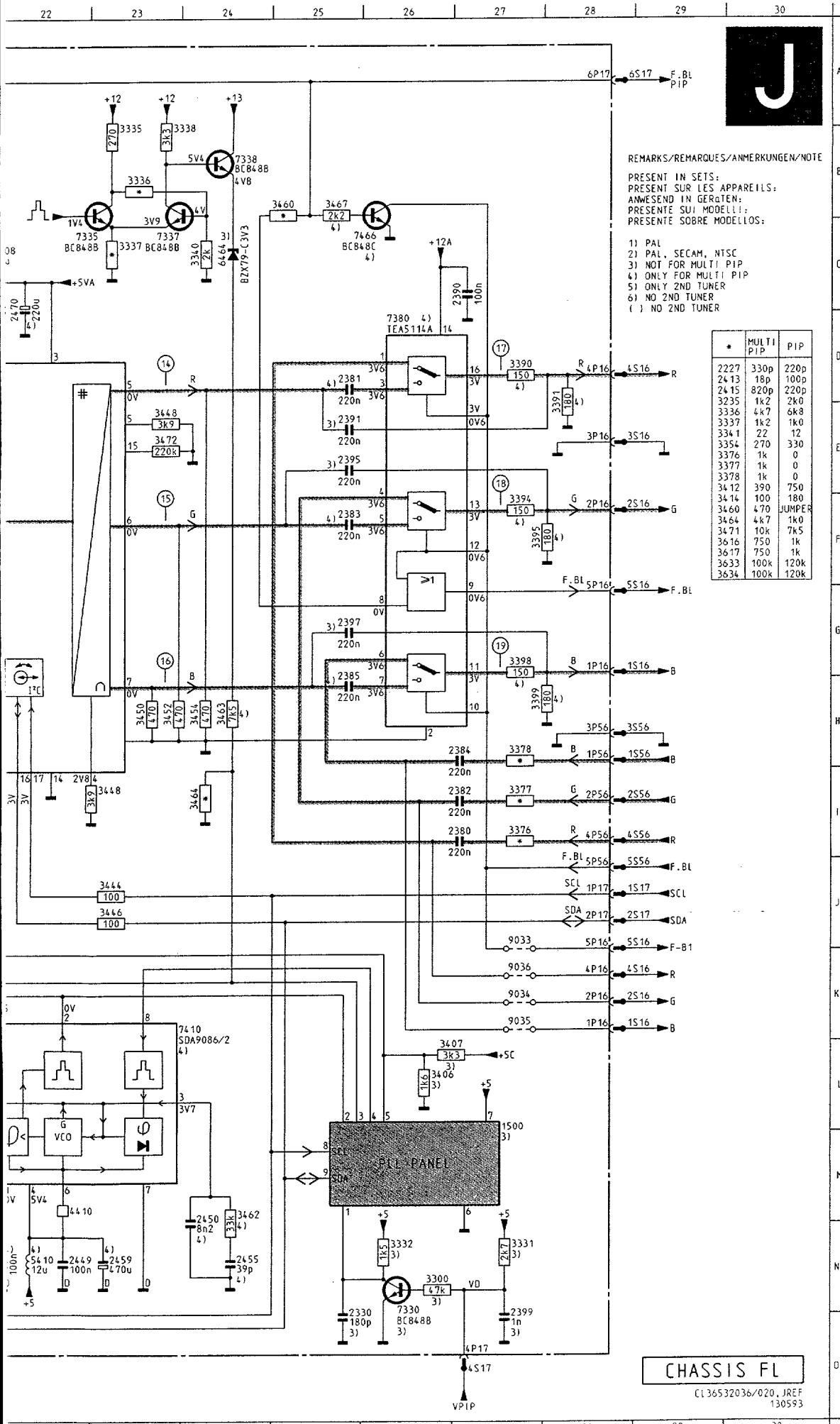

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7210	I 8
7233	I 12
7234	K13
7235	N 9
7330	N26
7335	C23
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7338	B24
7350	H 3
7380	D26
7400	D14
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7404	G14
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7408	D20
7410	K23
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7470	A 3
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7472	A 4
7473	B 4
7610	J11
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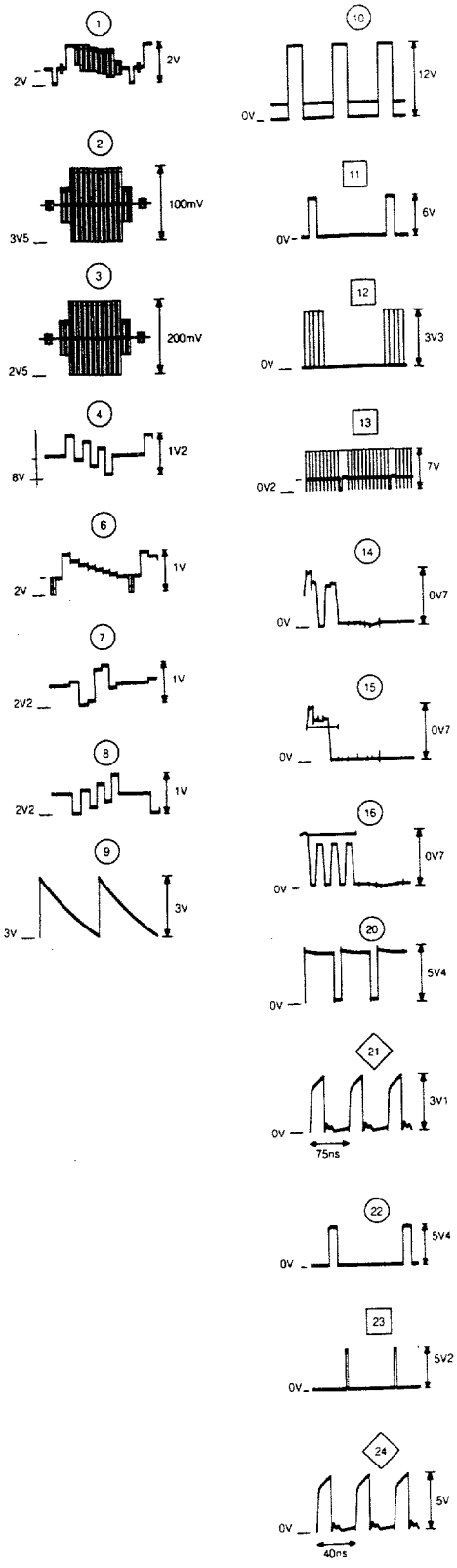

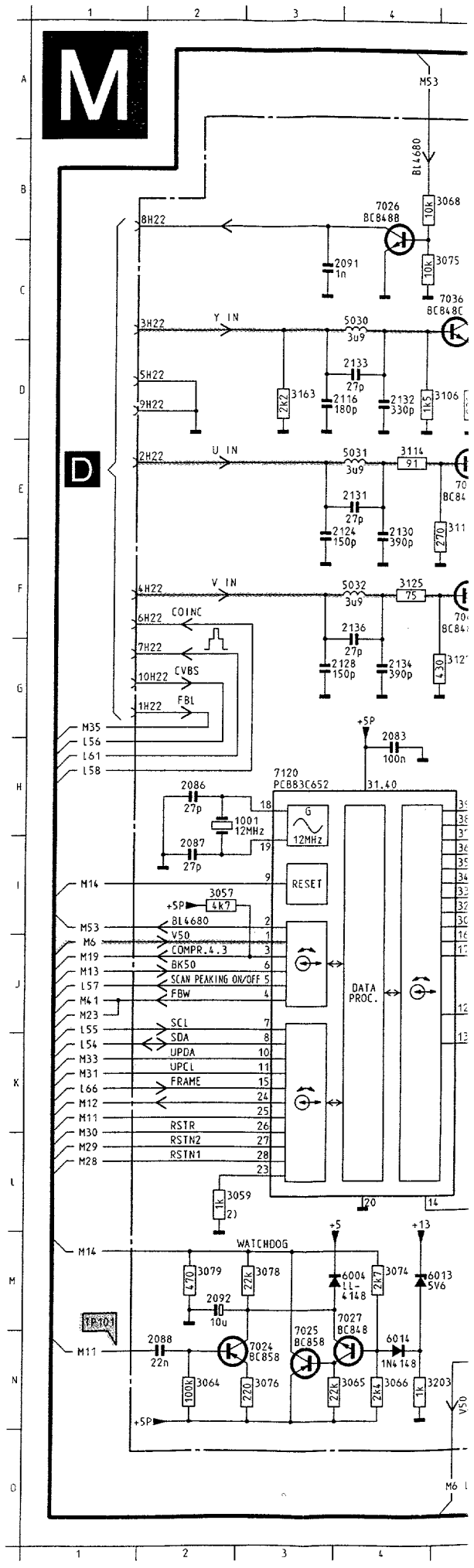
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3H22
Y IN
5030
3u9
5H22
9H22
2133
27p
2116
180p
2132
330p
2k2
3163
1k5
3106
2H22
U IN
5031
3u9
3114
91
2131
27p
2124
150p
2130
390p
270
4H22
V IN
5032
3u9
3125
75
6H22
COINC
7H22
10H22
CVBS
1H22
FBL
2136
27p
2128
150p
2134
390p
430
M35
L56
L61
L58
+5P
2083
100n
7120
PCB83C652
31.40
2086
27p
1001
12MHz
2087
27p
G
12MHz
RESET
M14
3057
4k7
+5P
BL4680
V50
COMPR.4.3
BK50
SCAN PEAKING ON/OFF
FBW
SCL
SDA
UPDA
UPCL
FRAME
RSTR
RSTN2
RSTN1
M53
M6
M19
M13
L57
M41
M23
L55
L54
M33
M31
L66
M12
M11
M30
M29
M28
DATA
PROC.
3059
1k
2)
20
14
WATCHDOG
M14
+5
+13
470
3079
22k
3078
2092
10u
6004
LL-
4148
2k7
3074
6013
5V6
TP10
M11
2088
22n
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BC858
7025
BC858
7027
BC848
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2k2
3066
1k
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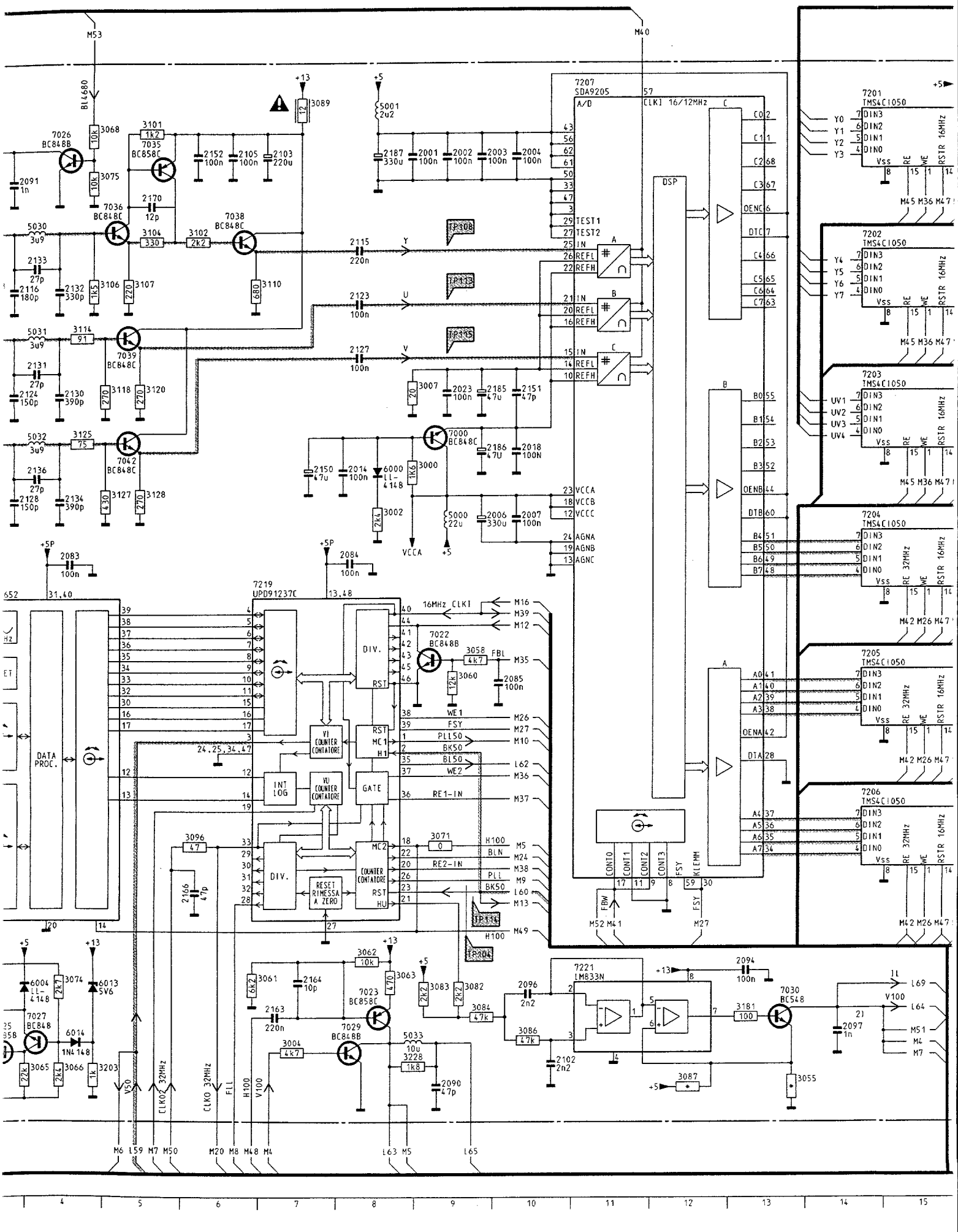
+5P
VSD
M6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7038 BC848C
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7042 BC848C
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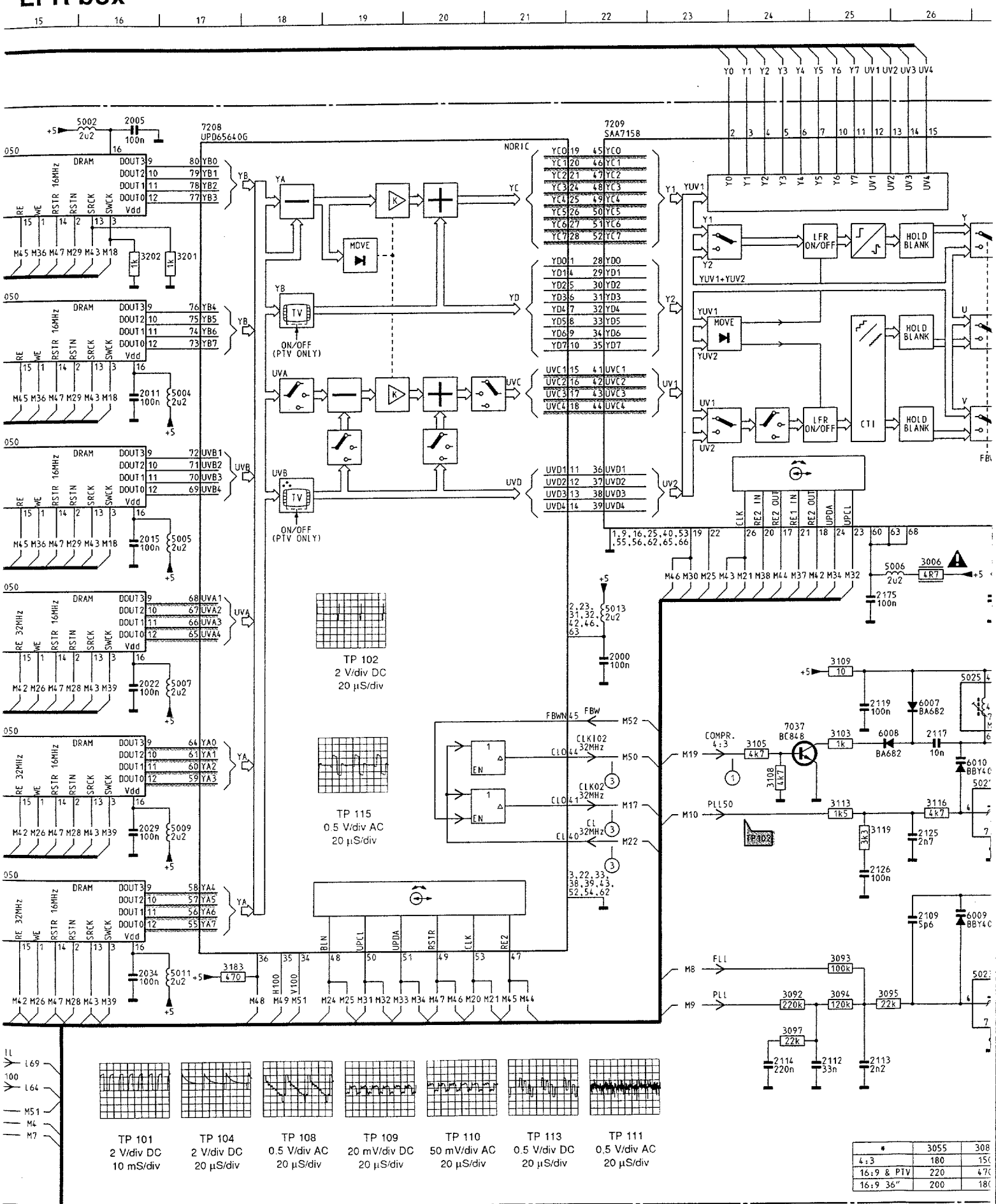
7207 SDA9205 A/D
DSP
7201 TMS4C1050
7202 TMS4C1050
7203 TMS4C1050
7204 TMS4C1050
7205 TMS4C1050
7206 TMS4C1050
7219 UPD91237C
7022 BC848B
7023 BC858C
7027 BC848
7029 BC848B
7030 BC548
7221 LM833N
DATA PROC.
DIV.
INT LOG
GATE
COUNTER CONTATORE
RESET RIMESSA A ZERO
VI COUNTER CONTATORE
VU COUNTER CONTATORE
16MHz CLK1
CLKO 32MHz
VCCA
AGNA
AGNB
AGNC
TP108
TP115
TP125
TP134
TP204

LFR box



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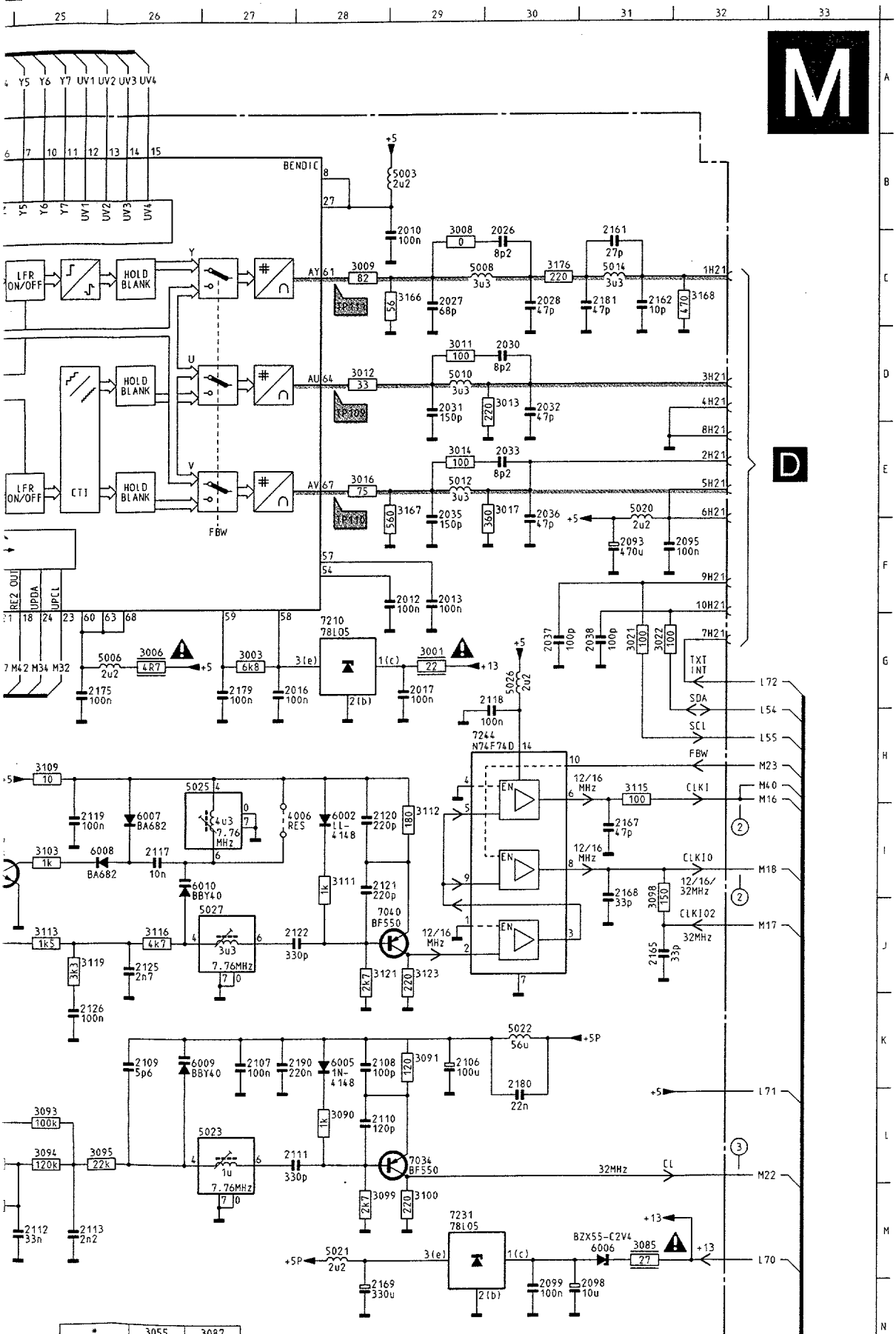
16:9 & PTV	220	47(
16:9 36"	200	18(

LFR box



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4:3	180	150
16:9 & PIV	220	470
16:9 36"	200	180

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16MHz 16:9 INPUT CLOCK
32MHz 4:3/16:9 OUTPUT CLOCK
27MHz TXT CLOCK

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	2000	H22	3022	G31	7029	N 8
	2001	B 9	3055	N13	7030	M13
A	2002	B 9	3057	I 2	7034	L29
	2003	B 9	3058	I 9	7035	B 5
	2004	B10	3059	L 2	7036	C 5
	2005	B16	3060	I 9	7037	I24
	2006	G 9	3061	M 6	7038	C 6
	2007	G10	3062	M 8	7039	E 5
	2010	C29	3063	M 8	7040	J29
	2011	E16	3064	N 2	7042	F 5
	2012	F29	3065	N 4	7120	H 3
B	2013	F29	3066	N 4	7201	B14
	2014	F 8	3068	B 4	7202	D14
	2015	G16	3071	K 9	7203	E14
	2016	G27	3074	M 4	7204	G14
	2017	G29	3075	C 4	7205	I14
	2018	F10	3076	N 3	7206	K14
	2022	H16	3078	M 3	7207	B11
	2023	E 9	3079	M 2	7208	B17
C	2026	C30	3082	M 9	7209	B22
	2027	C29	3083	M 9	7210	G28
	2028	C30	3084	M 9	7219	H 6
	2029	J16	3085	M31	7221	M11
	2030	D30	3086	N10	7231	M29
	2031	D29	3087	N12	7244	H29
	2032	D30	3089	B 7		
D	2033	E30	3090	L28		
	2034	L16	3091	K29		
	2035	F29	3092	L24		
	2036	F30	3093	L25		
	2037	G30	3094	L25		
	2038	G31	3095	L25		
	2083	H 4	3096	K 6		
	2084	H 8	3097	M24		
E	2085	I10	3098	I31		
	2086	H 2	3099	M28		
	2087	I 2	3100	M29		
	2088	N 2	3101	B 5		
	2090	N 9	3102	C 6		
	2091	C 3	3103	I25		
	2092	M 2	3104	C 5		
F	2093	F31	3105	I24		
	2094	M13	3106	D 4		
	2095	F32	3107	D 5		
	2096	M10	3108	J24		
	2097	N14	3109	H25		
	2098	N31	3110	D 7		
	2099	N30	3111	I28		
	2102	N10	3112	I29		
G	2103	B 7	3113	J25		
	2105	B 6	3114	E 4		
	2106	K29	3115	H31		
	2107	K27	3116	J26		
	2108	K28	3118	E 5		
	2109	K26	3119	J25		
	2110	L28	3120	E 5		
	2111	L28	3121	J28		
H	2112	M25	3123	J29		
	2113	M25	3125	F 4		
	2114	M24	3127	G 5		
	2115	D 8	3128	G 5		
	2116	D 3	3163	D 3		
	2117	I26	3166	C29		
	2118	G30	3167	E29		
I	2119	I25	3168	C32		
	2120	I28	3176	C30		
	2121	I28	3181	M13		
	2122	J28	3183	L17		
	2123	D 8	3201	C17		
	2124	E 3	3202	C16		
	2125	J26	3203	N 4		
	2126	K25	3228	N 8		
J	2127	E 8	4006	I27		
	2128	G 3	5000	G 9		
	2130	E 4	5001	B 8		
	2131	E 4	5002	B16		
	2132	D 4	5003	B29		
	2133	D 4	5004	E17		
	2134	G 4	5005	G17		
K	2136	F 4	5006	G26		
	2150	F 7	5007	H17		
	2151	E10	5008	C29		
	2152	B 6	5009	J17		
	2161	C31	5010	D29		
	2162	C31	5011	L17		
	2163	M 7	5012	E29		
	2164	M 7	5013	G22		
L	2165	J31	5014	C31		
	2166	L 6	5020	E31		
	2167	I31	5021	M28		
	2169	N28	5022	K30		
	2170	C 5	5023	L27		
	2175	G25	5025	H26		
	2179	G27	5026	G30		
M	2180	K30	5027	J27		
	2181	C31	5030	C 4		
	2185	E 9	5031	E 4		
	2186	F 9	5032	F 4		
	2187	B 8	5033	N 8		
	2190	K27	6000	F 8		
	3000	F 9	6002	I28		
	3001	G29	6004	M 4		
N	3002	G 8	6006	M31		
	3003	G27	6007	I26		
	3004	N 7	6008	I25		
	3006	G26	6009	K26		
	3007	E 9	6010	I26		
	3008	C29	6013	M 4		
	3009	C28	6014	N 4		
	3011	D29	7000	F 9		
O	3012	D28	7022	I 9		
	3013	D30	7023	M 8		
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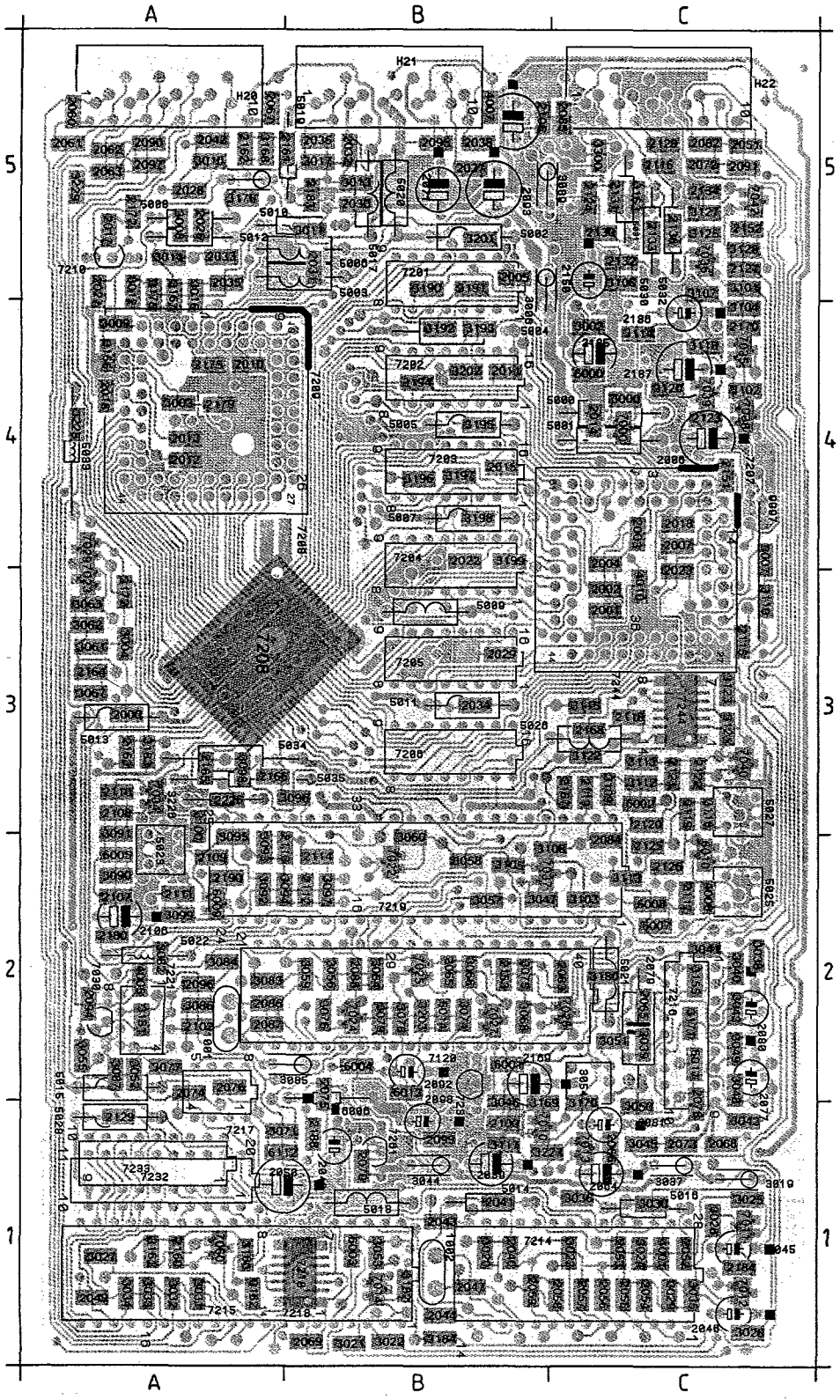
LFR Box



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H22	C5	2015	B4	2036	B5	2052	C1	2069	B1	2085	C5	2103	B5	2120	C3	2150	C5	2175	A4
1001	A2	2016	A4	2037	B5	2053	C1	2070	B1	2086	A2	2105	B5	2121	C3	2151	C4	2179	A4
1002	B1	2017	A5	2038	B5	2054	C1	2071	B5	2087	A2	2106	A2	2122	C3	2152	C5	2180	A2
2000	A3	2018	C4	2039	B1	2055	C1	2072	C5	2088	B2	2107	A2	2123	C4	2153	B2	2181	B5
2001	C3	2022	B4	2040	B1	2056	C1	2073	C1	2090	A5	2108	A3	2124	C5	2160	A1	2184	C1
2002	C3	2023	C4	2041	B1	2057	C1	2074	A2	2091	C5	2109	A2	2125	C2	2161	A5	2185	C4
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2004	C4	2027	A5	2043	B1	2059	B1	2076	A2	2093	B5	2111	A2	2127	C5	2163	A3	2187	C4
2005	B5	2028	A5	2044	B1	2060	A5	2077	C2	2094	A2	2112	B2	2128	C5	2164	A3	2188	B1
2006	C4	2029	B3	2045	C1	2062	A5	2078	C1	2095	B5	2113	A2	2129	A1	2165	A3	2190	A2
2007	C4	2030	B5	2046	C1	2063	A5	2079	C2	2096	A2	2114	B2	2130	C5	2166	A3	2226	A3
2010	A4	2031	B5	2047	B1	2064	C1	2080	C2	2097	A5	2115	C3	2131	C5	2167	C3	3000	C4
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2012	A4	2033	A5	2049	A1	2066	C1	2082	C5	2099	B1	2117	C2	2133	C5	2169	B2	3002	C4

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3017	B5	3087	A2	3151	A4	3219	C4	3287	C4	3355	C4	3423	C4	3491	C4	3559	C4	5032	C5
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3054	C2	3125	C5	3199	B4	3255	C4	5017	B5	3391	C4	3459	C4	3527	C4	3595	C4	7037	B2
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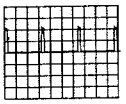
3056	B2	3128	C5	3201	B5	3257	C4			3393	C4	3461	C4	3529	C4	3597	C4	7039	C4
3057	B2	3155	C2	3202	B4	3258	C4			3394	C4	3462	C4	3530	C4	3598	C4	7040	C3
3058	B2	3160	A1	3203	B2	3259	C4			3395	C4	3463	C4	3531	C4	3599	C4	7042	C5
3059	B2	3161	A1	3226	A3	3260	C4			3396	C4	3464	C4	3532	C4	3600	C4	7060	A1
3060	B2	3162	A1	3227	B1	3261	C4			3397	C4	3465	C4	3533	C4	3601	C4	7120	B2
3061	A3	3163	C5	3228	A4	3262	C4			3398	C4	3466	C4	3534	C4	3602	C4	7201	B5
3062	A3	3166	A4	3229	A5	3263	C4			3399	C4	3467	C4	3535	C4	3603	C4	7202	B4
3063	A3	3167	A5	3300	C5	3264	C4			3400	C4	3468	C4	3536	C4	3604	C4	7203	B4
3064	B2	3168	A5	4001	C1	3265	C4			3401	C4	3469	C4	3537	C4	3605	C4	7204	B4
3065	B2	3169	B1	4005	A2	3266	C4			3402	C4	3470	C4	3538	C4	3606	C4	7205	B3
3066	B2	3170	C1	4006	C2	3267	C4			3403	C4	3471	C4	3539	C4	3607	C4	7206	B3
3067	A3	3171	C2	4007	B5	3268	C4			3404	C4	3472	C4	3540	C4	3608	C4	7207	C4
3068	B2	3172	A3	4010	C3	3269	C4			3405	C4	3473	C4	3541	C4	3609	C4	7208	A3
3071	A1	3175	A5	5000	C4	3270	C4			3406	C4	3474	C4	3542	C4	3610	C4	7209	A4
3074	B2	3176	A5	5001	C4	3271	C4			3407	C4	3475	C4	3543	C4	3611	C4	7210	A5
3075	B2	3180	C2	5002	B5	3272	C4			3408	C4	3476	C4	3544	C4	3612	C4	7214	C1
3076	B2	3181	A2	5003	B5	3273	C4			3409	C4	3477	C4	3545	C4	3613	C4	7215	A1
3077	A2	3182	B1	5004	B4	3274	C4			3410	C4	3478	C4	3546	C4	3614	C4	7216	C2
3078	B2	3183	A3	5005	B4													7217	A2
3079	B2	3184	B1	5006	B5													7218	B1
3082	A2	3190	B5	5007	B4													7219	B2
3083	A2	3191	B5	5008	A5													7221	A2
3084	A2	3192	B4	5009	B3													7231	B2
3085	B2	3193	B4	5010	B5													7232	A1
3086	A2	3194	B4	5011	B3													7233	A1
3087	A2	3195	B4	5012	A5													7244	C3
3089	B5	3196	B4	5013	A3													7261	B1
3090	A2	3197	B4	5014	B1													9997	C4
3091	A3	3198	B4	5015	A2														
		3199	B4	5016	C1														
		3200	B4	5017	B5														

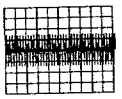
LFR Box

L

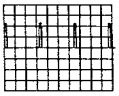
LFR BOX TXT-DECODER
DECODEUR TXT
DECODIFICATORE TELEVIDEO



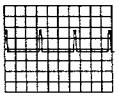
TP 100
2 V/div AC
20 µS/div



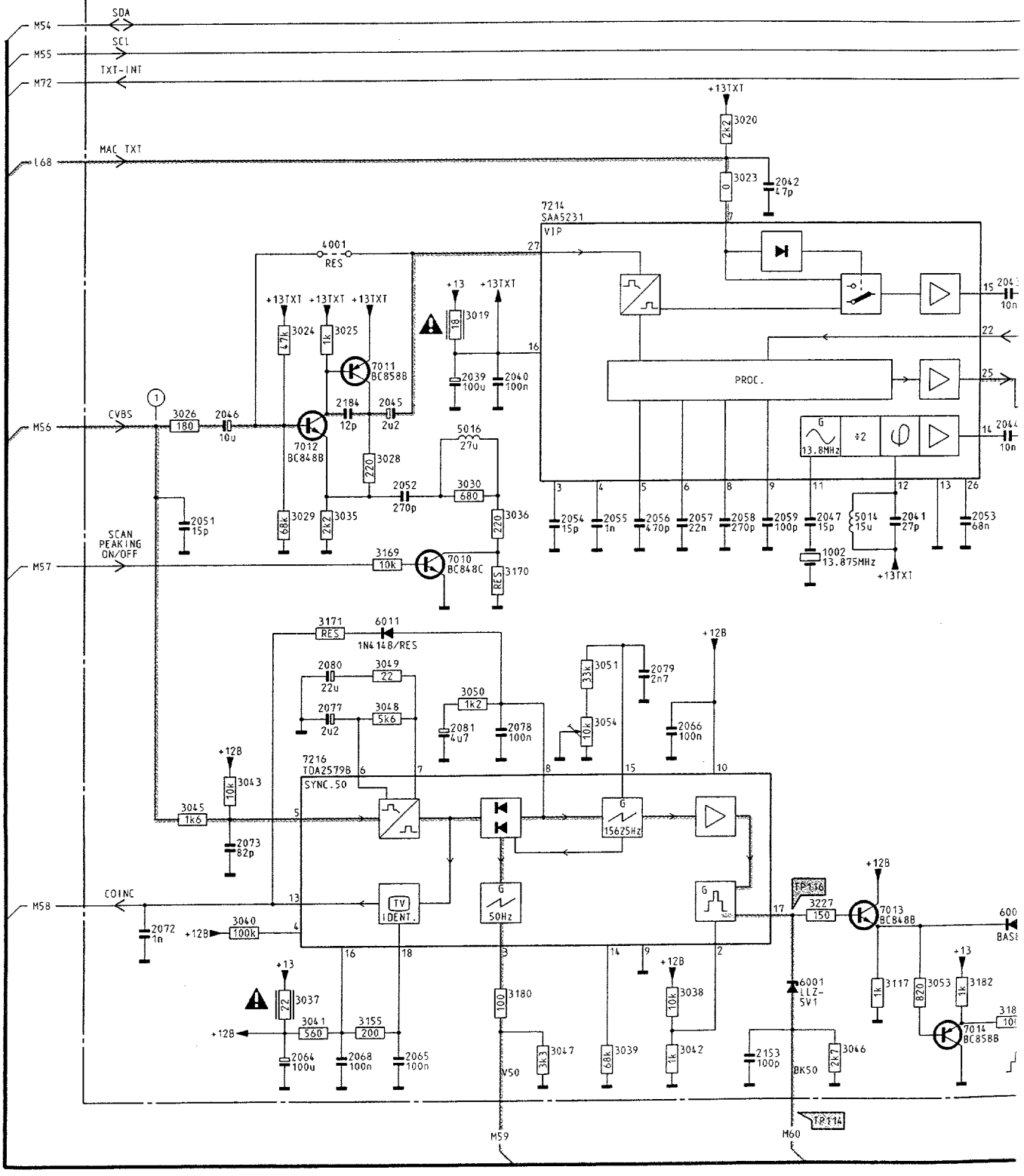
TP 103
0.5 V/div AC
2 µS/div



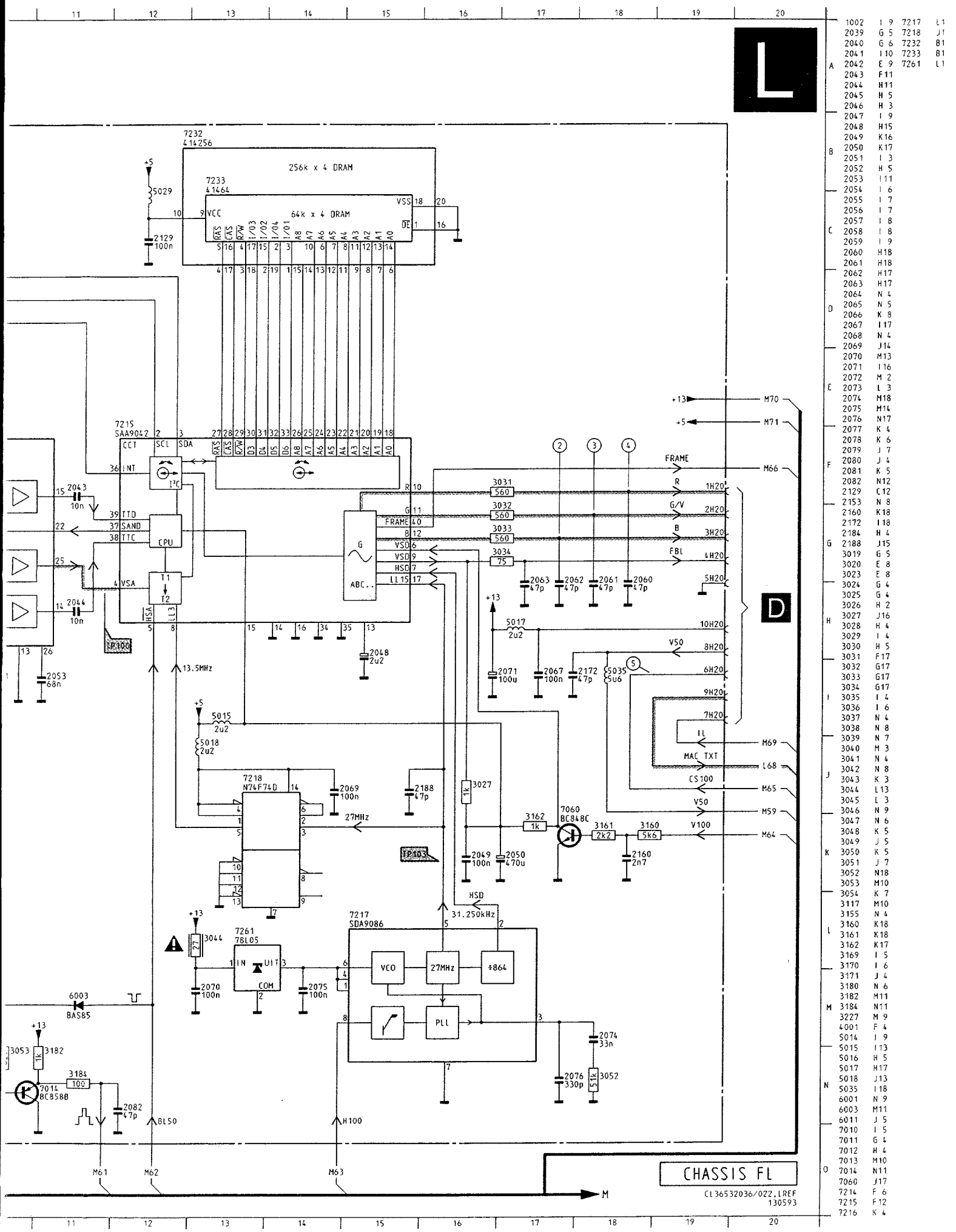
TP 114
2 V/div DC
20 µS/div



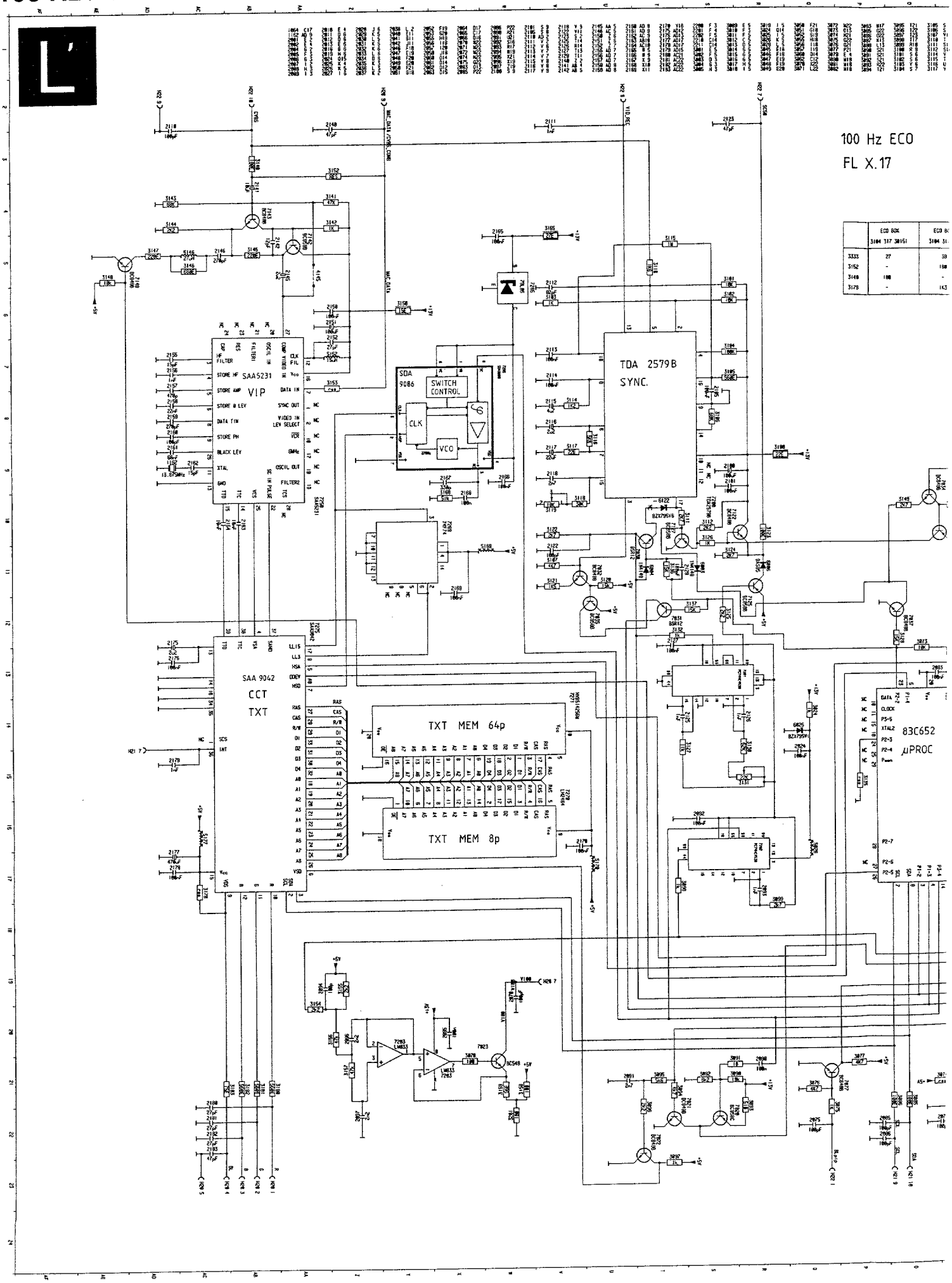
TP 116
5 V/div AC
20 µS/div

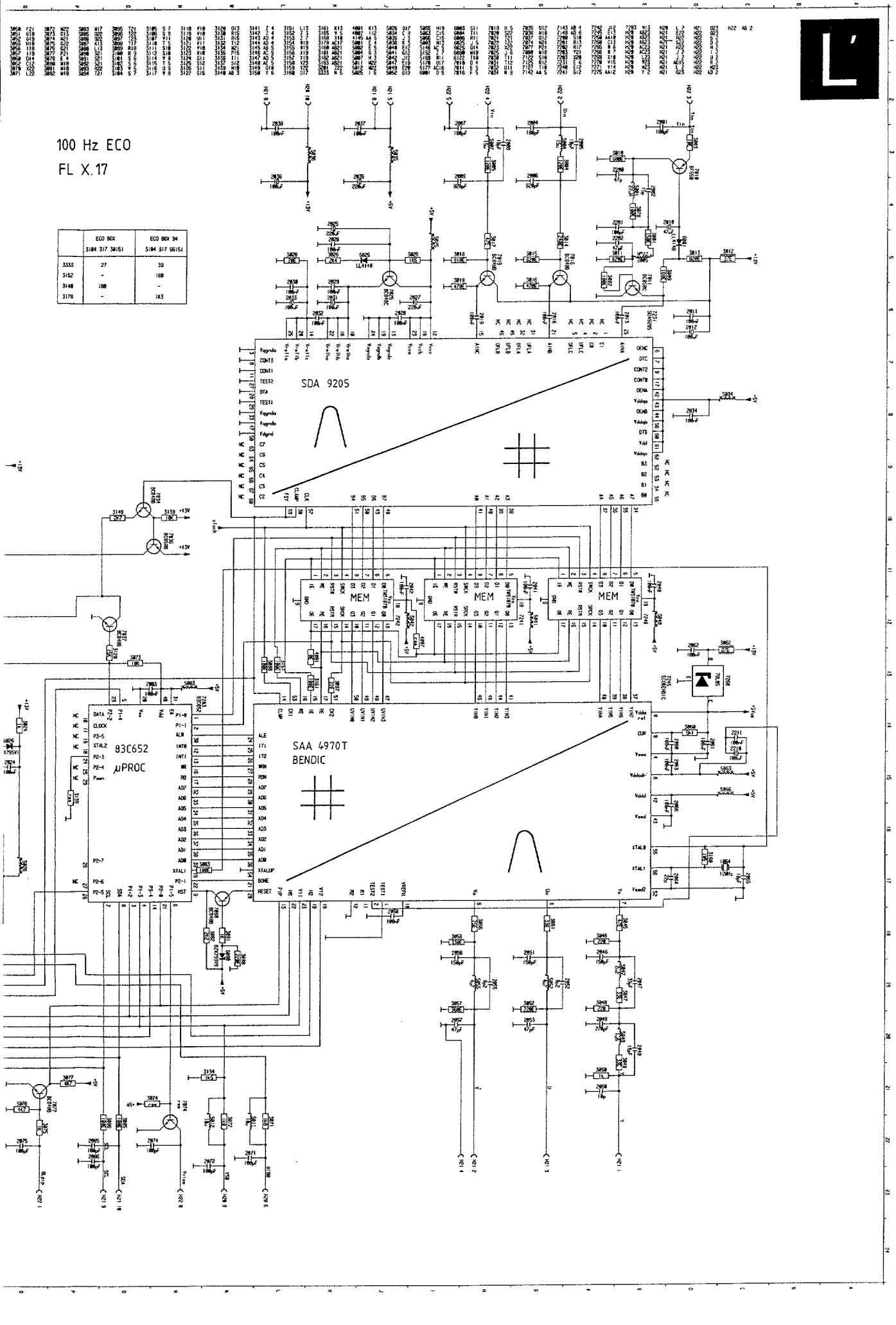


LFR Box


L
D
7232
414256
256k x 4 DRAM
7233
41464
64k x 4 DRAM
7215
SAA9042
CPU
7218
N74F74D
7060
BC848C
7217
SDA9086
VCO
27MHz
÷864
PLL
7261
78L05
7014
BC858B
6003
BAS85
TP100
TP103
13.5MHz
27MHz
31.250kHz
HSD
CHASSIS FL
CL36532036/022.LREF
130593
PCS 43 363

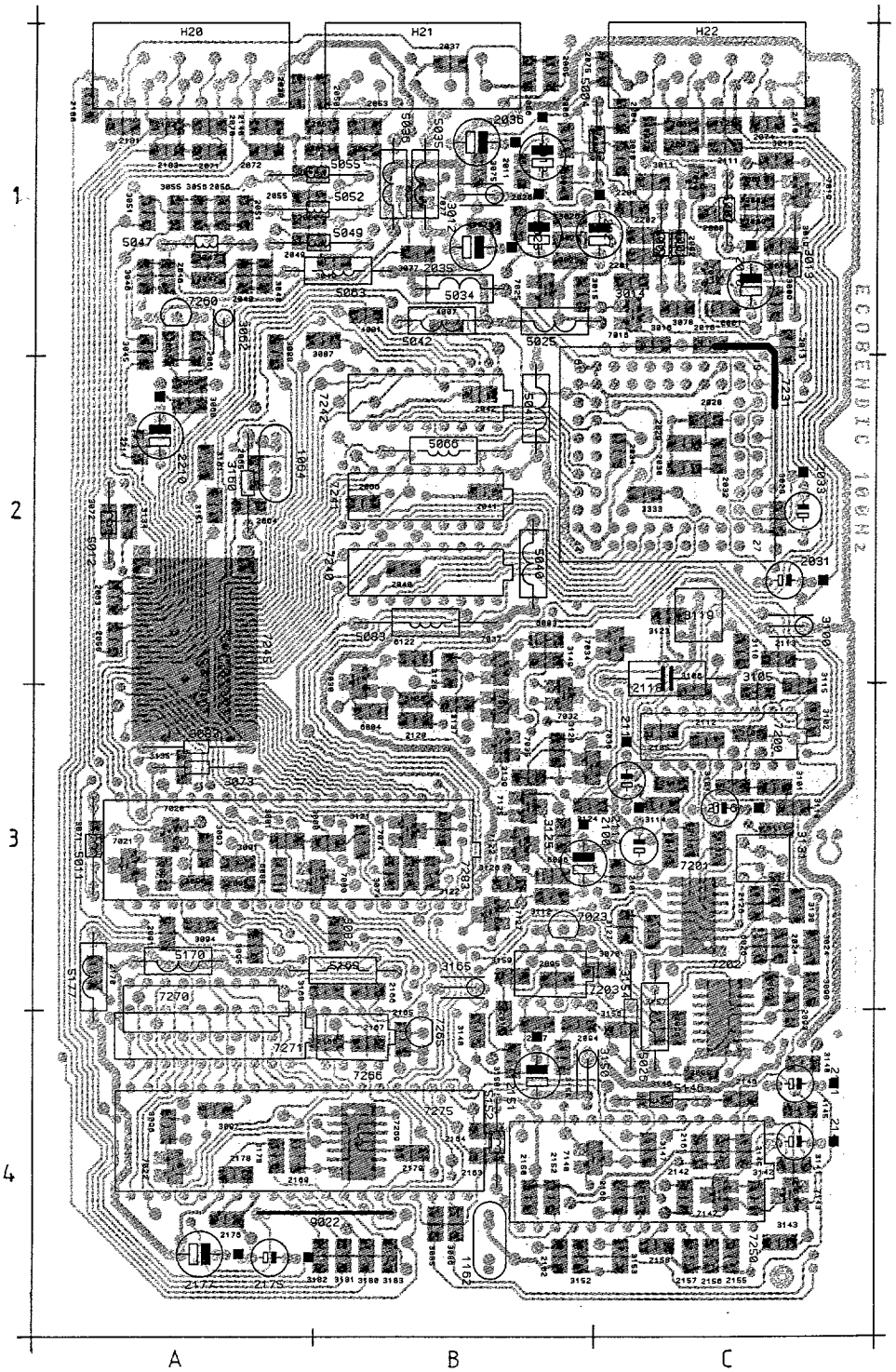
100 Hz / TXT


100 Hz ECO
FL X.17
TDA 2579B
SYNC.
SAA5231
VIP
SAA 9042
CCT
TXT
TXT MEM 64p
TXT MEM 8p
SDA
9086
SWITCH
CONTROL
CLK
VCO
83C652
µPROC



	ECO BOX 3104 317 59151	ECO BOX 94 3104 317 66151
3333	27	39
3152	-	180
3148	180	-
3178	-	1K5

100 Hz / TXT



H20 A1	2013 C1	2037 B1	2058 A2	2090 A3	2115 C3	2151 B4	2169 A4	3004 B1	3028 C2	3159 B3	3143 C4	7203 B3
H21 B1	2016 C1	2038 A1	2060 A2	2091 A3	2116 C3	2152 B4	2170 A3	3005 C1	3045 A1	3160 A2	3144 C4	7231 C2
H22 C1	2019 C1	2040 B2	2061 A1	2092 C3	2117 C3	2155 C4	2175 A4	3009 C1	3046 A1	3161 A2	3145 C4	7240 B2
1064 A2	2024 C3	2041 B2	2062 A1	2093 C3	2118 C2	2156 C4	2176 A4	3010 C1	3047 A1	3165 B3	3146 C4	7241 B2
1162 B4	2025 B1	2042 B2	2063 A2	2094 B4	2122 B3	2157 C4	2177 A4	3011 C1	3048 A1	3168 B3	3147 C4	7242 B2
2001 C1	2026 B1	2046 A1	2064 A2	2095 B3	2123 C1	2158 C4	2178 A4	3012 B1	3049 B1	3178 A4	3148 B4	7245 A2
2002 C1	2027 C1	2047 A1	2065 A2	2096 C4	2125 C3	2159 C4	2179 B4	3013 C1	3050 A1	3180 B4	3149 B2	7250 C4
2004 C1	2028 C2	2048 A1	2066 B2	2097 B4	2126 C3	2160 C4	2181 A1	3014 C1	3051 A1	3181 B4	3150 B4	7260 A1
2005 C1	2029 C2	2049 A1	2070 A1	2100 B3	2127 C3	2161 C4	2182 A1	3015 B1	3052 B1	3182 B4	3151 A2	7265 B4
2006 B1	2030 C2	2050 B1	2071 A1	2101 C3	2128 B3	2162 B4	2183 A1	3016 C1	3055 A1	3183 B4	3152 B4	7266 B4
2007 C1	2031 C2	2051 A1	2072 A1	2105 C3	2140 A1	2163 B4	2200 C1	3017 C1	3056 A1	3201 B4	3153 C4	7269 B4
2008 C1	2032 C2	2052 A1	2074 C1	2110 C1	2141 C4	2164 B4	2201 C1	3018 C1	3057 B1	3333 C2	3154 C4	7270 A3
2009 C1	2033 C2	2053 B1	2075 C1	2111 C1	2142 C4	2165 B4	2202 C1	3019 C1	3060 A2	4001 B1	3155 B4	7271 A4
2010 C1	2034 C2	2055 A1	2083 B3	2112 C3	2145 C4	2166 B3	2210 A2	3024 C3	3062 A1	4007 B1	3156 C4	7275 A4
2011 B1	2035 B1	2056 A1	2085 B1	2113 C2	2146 C4	2167 B4	2211 A2	3025 B1	3070 C3	4145 C4	3157 C4	7283 A3
2012 B1	2036 B1	2057 B1	2086 B1	2114 C3	2150 B4	2168 B4	3003 C1	3026 B1	3071 A3	5001 C1	3158 B4	9022 B4
									3072 A2	5002 C1		
									3073 A3	5004 C1		
									3074 B3	5007 C1		
									3075 B1	5011 A3		
									3076 B1	5012 A2		
									3077 B1	5025 B1		
									3078 C1	5026 C4		
									3080 B3	5034 B1		
									3081 A3	5035 B1		
									3082 B3	5036 B1		
									3083 A3	5040 B2		
									3085 B4	5041 B2		
									3086 B4	5042 B1		
									3087 B1	5047 A1		
									3088 A1	5049 B1		
									3090 A3	5052 B1		
									3091 A3	5055 B1		
									3092 A3	5063 B1		
									3093 A3	5066 B2		
									3094 A3	5083 B2		
									3095 A3	5146 C4		
									3096 A4	5152 B4		
									3097 A4	5169 B3		
									3098 C3	5170 A3		
									3099 C4	5177 A3		
									3100 C2	6001 C1		
									3101 C3	6003 B2		
									3102 C3	6004 B3		
									3103 C3	6006 B3		
									3104 C3	6025 B1		
									3105 C3	6026 C3		
									3106 C3	6080 A3		
									3110 C3	6122 B2		
									3111 C3	7010 C1		
									3112 B3	7011 C1		
									3114 C3	7016 C1		
									3115 C3	7019 C1		
									3116 C3	7020 A3		
									3117 C3	7021 A3		
									3118 C2	7022 A4		
									3119 C2	7023 B3		
									3120 B3	7025 B1		
									3121 B3	7030 B2		
									3122 B3	7031 B3		
									3123 C2	7032 B3		
									3124 B3	7034 C2		
									3125 B3	7035 B3		
									3126 B3	7036 B3		
									3127 C3	7037 B2		
									3128 B2	7074 B3		
									3130 C3	7077 B1		
									3131 C3	7080 B3		
									3132 C3	7122 B3		
									3134 A2	7125 B3		
									3135 A3	7127 B3		
									3136 B3	7142 C4		
									3137 B3	7143 C4		
									3139 B3	7148 C4		
									3140 C4	7200 C3		
									3141 C4	7201 C3		
									3142 C4	7202 C4		

7. Electrical adjustments

Setting conditions

Unless stated otherwise, the supply voltage used is:
220 - 240V 10%; 50 - 60Hz 5%
Voltages and oscillograms are measured in elation to tuner earth. **Never** use the cooling plates as earth.
Warming-up time 10 minutes
For all measurements it is true that:
probe Ri > 1MΩ; Ci < 10pF

1. Electrical settings on the large signal panel

1.1 +141V supply voltage
Supply the mains voltage; this must be isolated from the mains.
Connect a voltmeter over C2238.
Using R3371, on the SOPS DRIVE CIRCUIT (fig. 7.2) set the supply voltage to + 141V ±0.5V.

1.2 +5V supply voltage (FL1/2.16)
Connect a voltmeter to pin 8 of L02
Adjust the voltage to 5.4V using R3558

1.3 +13V supply voltage (FL1/2.16)
Connect a voltmeter to pin 6 of connector L02
Adjust the voltage to 14.2V using R3234.

1.4 Focusing
This is set with the focus potentiometer (top one on the *Line output transformer/DAF Unit*).

1.5 Dynamic 1) Astigmatic focus
This is set with the aid of the potentiometer on the bottom right of the DAF transformer. Repeat the adjustment of the Vg2 and focus.

1.6 Vg2 setting
Supply an aerial signal.
Set the contrast to maximum and the brightness and saturation to nominal.
Using an oscilloscope set to field frequency, measure the direct voltage level of the measurement pulse (fig. 7.1) on pin 9 of IC7705, IC7706 and IC7707 in relation to earth.
Now adjust the highest voltage level found with the aid of the Vg2 potentiometer (bottom left on the Line output transformer/DAF unit) to 150V ±2V.

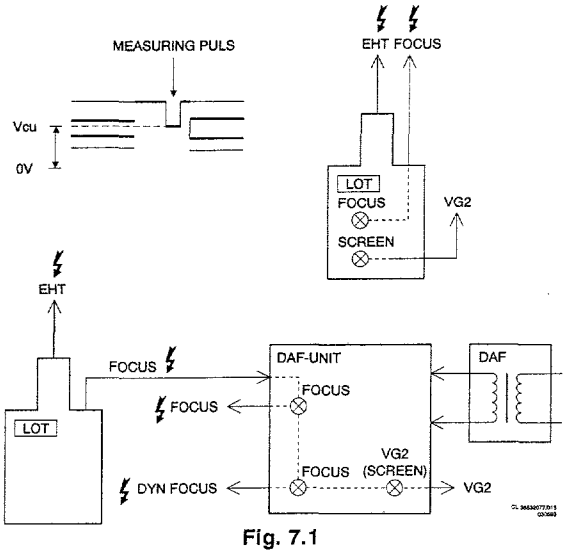


Fig. 7.1

1.7 Stable OSD
Short circuit pin 11 IC7401 to pin 13 IC7401
Short circuit pin 5 IC7755 to earth.
Measure the frequency on pin 16-IC7401 and set this to 15,625 Hz ±25 Hz with R3434.
Remove the short circuits.

1.8 Horizontal synchronisation
Connect point 5-IC7400 to point 9-IC7400.
Supply an aerial signal and set the receiver.
Adjust potentiometer R3406 until the picture is straight.
Break the through connection.

1.9 Horizontal centring
Feed in a test pattern that makes the horizontal linearity visible (e.g. a symmetrical cross pattern or a test circle).
Adjust the DC offset current through the horizontal deflection coil using R3513 so that the horizontal linearity is optimal (the distance between the two vertical lines should be equal on both the left and right hand sides of the picture). It is also possible to use a ruler for this purpose. The picture can then be centred using R3415.

1.10 Picture width
Set using potentiometer R3607.

1.11 Vertical centring
Set using potentiometer R3467.

1.12 Picture height
Set using potentiometer R3410.

1.13 Picture height
Movie expand off: set using potentiometer R3410.
Movie expand on: set using potentiometer R3422.

1.14 East/West correction
Set using potentiometer R3602.

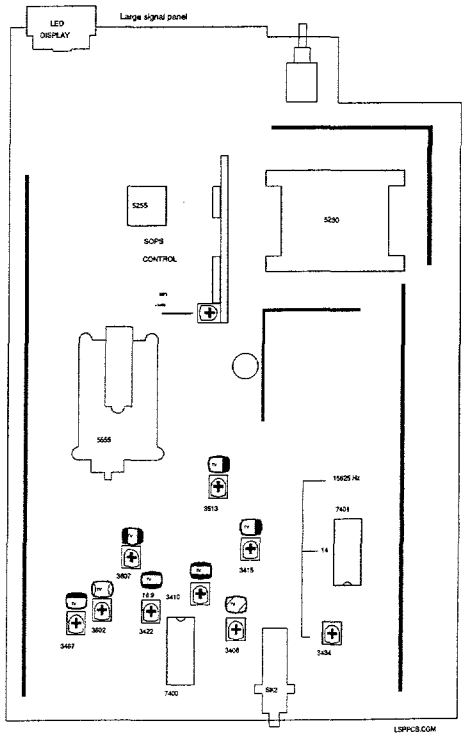


Fig. 7.2

2. E

2.1 S
C
si
S
th
C
U
ar

2.2 4.
S
pc
ar

2.3 E
2.3.1 C
C
th
4.
pi
os
S
R

2.3.2 4.
C
wi
C
C
S
R

2.3.3 6.
C
E
2
C
C
S
R

2.3.4 C
C
b
e
p

2.3.5 C
C
b
e
p

2.3.6 S
C
bl
3-
C
m

2. Electrical settings on the small signal panel

2.1 Stereo audio channel separation

Connect a signal generator with a 2 carrier stereo signal ("stereo" mode).
Select 1kHz for the right-hand channel and switch off the sound for the left-hand channel.
Connect an oscilloscope to pin 3 of Euroconnector EXT1
Using R3602 on the small signal panel, set the amplitude of the signal to minimum amplitude.

2.2 4.43 MHz chroma suppression circuit

Supply a colour bar signal. Connect an oscilloscope to point 17 of IC7324 and set L5305 to minimum amplitude of the chrominance signal.

2.3 Electrical settings IC7365 (TDA4650)

2.3.1 Chroma bandpassfilter

Connect a signal generator (e.g. PM 5326) to pin 20 of the euroconnector (EXT1) and set its frequency to 4.286 MHz/0.2 Vpp. Switch the unit to EXT1. Connect pin 27-IC7365 to pin 13-IC7365 (+12V). Connect an oscilloscope to pin 15-IC7365.
Set L5345 to maximum amplitude.
Remove the interconnection.

2.3.2 4.50 MHz NTSC sound suppression

Connect a generator to point 20 of Euroconnector EXT1 with a frequency of 4.50 MHz and 200mV$_{rms}$.
Connect point 26-IC7365 to point 13-IC7365.
Connect an oscilloscope to point 15 of IC7365.
Set L5346 to minimum amplitude.
Remove the short circuit.

2.3.3 6.50 MHz SECAM DK sound suppression

Connect a sine-wave generator to point 20 of Euroconnector EXT1 with a frequency of 6.50 MHz and 200mV$_{rms}$.
Connect point 28-IC7365 to point 13-IC7365.
Connect an oscilloscope to point 15 of IC7365.
Set L5346 to minimum amplitude.
Remove the short circuit.

2.3.4 Chroma 8,87 MHz auxiliary oscillator

Connect a pattern generator and supply a PAL colour bar pattern. Connect pin 17-IC7365 (TDA4650) to earth. Set C2380 so that the colour on the screen has practically stopped. Remove the interconnection.

2.3.5 Chroma 7,16 MHz auxiliary oscillator

Connect a pattern generator and supply a PAL colour bar pattern. Connect pin 17-IC7365 (TDA4650) to earth. Set R2379 so that the colour on the screen has practically stopped. Remove the interconnection.

2.3.6 SECAM demodulators

Connect a pattern generator and supply a SECAM black pattern. Connect an oscilloscope to pin 3-IC7365. Set L5370 to minimum amplitude.
Connect the oscilloscope to pin 1-IC7365. Set R3370 to minimum amplitude.

SMALL SIGNAL PANEL

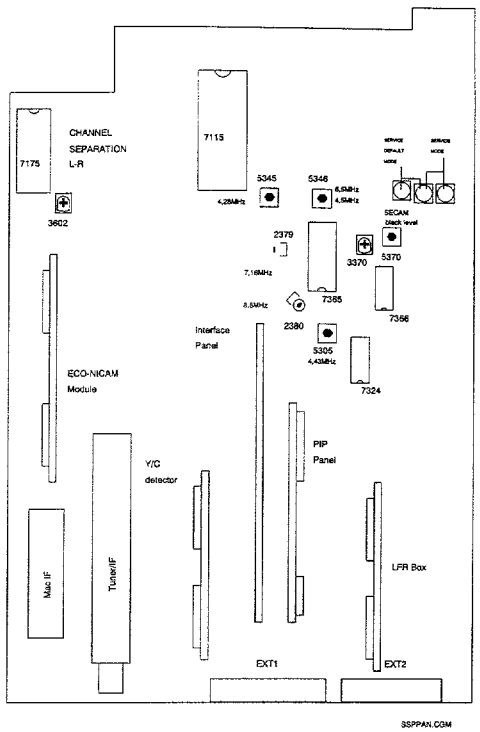


Fig. 7.3

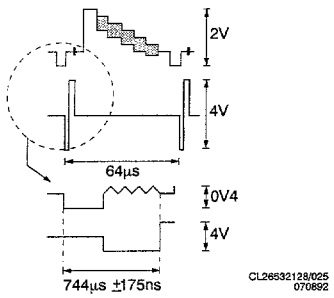


Fig. 7.4

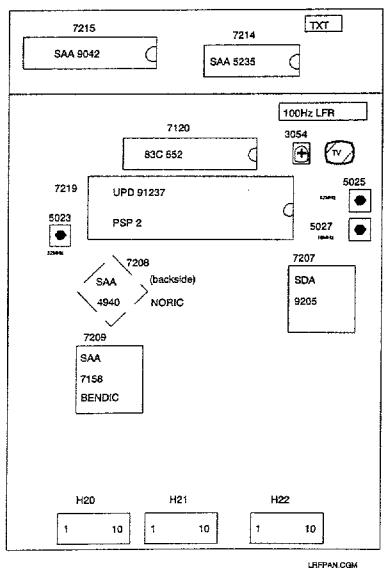


Fig. 7.5

Electrical adjustments

3. Electrical adjustments on the LFR box

3.1 Synchronisation

Connect point 5 of IC7216 to earth. Adjust R3054 until the picture is straight.
Remove the short circuit.

3.2 16MHz oscillator

Apply a PAL/SECAM signal. Measure the signals at point 1 of IC7219 and at point 5 of IC7216 simultaneously with an oscilloscope (fig. 7.9). Adjust coil L5027 so that the positive-going flank of the signal at point 1 of IC7219 comes 7.62 µsec after the negative-going flank of the sync pulse in the video signal (point 5 of IC7216).

3.3 32MHz oscillator

Force the STABLE OSD command to the microprocessor, by disconnecting the set from a possible antenna inputsignal. Measure the frequency at point 41 of IC7208. Using L5023 set the frequency to 32 MHz ±50 KHz.

3.4 12MHz oscillator

Switch on compress.
Measure the signals on point 1 of IC7219 and on point 5 of IC7216 simultaneously with an oscilloscope (fig. 7.9). Adjust coil L5025 so that the rising flank of the signal on point 1 of IC7219 comes 7.62 µsec after the negative flank of the sync pulse in the video signal (point 5 of IC7216).

4. Electrical settings on the ECO-NICAM decoder panel

4.1 Neutral frequency adjustment

Connect a frequency counter via a probe (Ci ≤15pF) to pin 19 of IC7001 (SAA 7280) and pin 15 (GND).
Adjust C2015 in such a manner that the clock frequency is set at 728.025 kHz. (±5Hz)

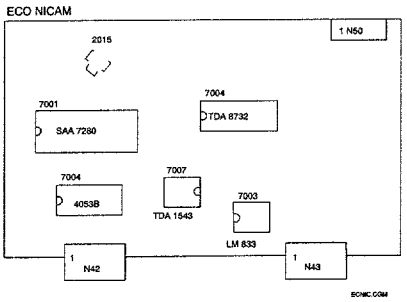


Fig. 7.6

5. Y/C detector adjustment

5.1 PAL/SECAM

Inject a chroma signal of 4.418 MHz/200mV on pin 15 of EXT2 SCART (PL05).
Connect an oscilloscope to the collector of T7266 (T7). Using L5201 adjust the 4.418 MHz signal to maximum amplitude.

5.2 NTSC

As PAL/SECAM but with a signal of 3.582 MHz/200mV. Adjust with L5200.

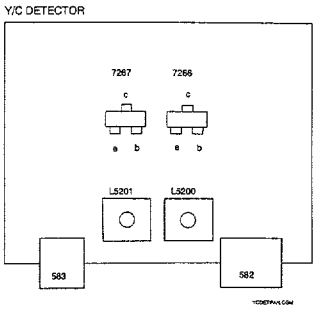


Fig. 7.7

6. Electrical settings on the PIP panel

Setting conditions
Before carrying out each setting, it should be ensured that a P.I.P. picture with colour bar is visible on the screen and the unit should have reached its operating temperature (after ≈20 min.).

6.1 Horizontal synchronisation

Supply an aerial or generator signal.
Connect pin 28-IC7125 to pin 13-IC7125.
Connect pin 5-IC7755 to earth.
Measure the frequency on pin 17-IC7755 and set this to 15,625 Hz ±25 Hz with R3239.
Remove the short circuits.

762 AGC

If the picture from a strong local transmitter is distorted, adjust 3160 until the picture is not distorted.

6.3 Setting for PIP modules with TDA4554

6.3.1 Chroma bandpass filter

Connect a signal generator (e.g. PM 5326) to pin 10 of P17 and set its frequency to 4.286 MHz/0.2 Vpp.
Connect pin 27-IC7125 to 13-IC7125.
Connect an oscilloscope to pin 15-IC7125.
Set L5118 to maximum amplitude.
Remove the interconnection.

6.3.2 PAL chroma auxiliary oscillator

Connect a pattern generator and supply a PAL colour bar pattern. Connect pin 17-IC7125 (TDA4554) to earth.
Set C2202 so that the colour of the PIP picture is practically still.
Remove the interconnection.

6.3.3 NTSC chroma auxiliary oscillator

Connect a pattern generator and supply an NTSC M colour bar pattern. Connect pin 17-IC7125 to earth. Set C2212 so that the colour of the PIP picture is practically still.
Remove the interconnection.

6.3.4 The delay line

Connect a pattern generator and supply a PAL colour bar signal. Connect the X-input of the oscilloscope to pin 1-IC7125 (TDA4554). Connect the Y-input of the oscilloscope to pin 3-IC7125 (TDA4554). Set the oscilloscope to the X-Y position.
Set L5155 and L5157 so that the vectors lie in one line (points which are furthest from the origin).
Set the pattern generator to the "DEM" mode.
Set R3157 so that the vectors lie on top of one another in the origin.

Electrical adjustments

6.3.5 SECAM identification

Connect a pattern generator and supply a SECAM colour bar signal.
Connect pin 27-IC7125 to pin 13-IC7125.
Connect an oscilloscope to pin 21-IC7125.
Adjust L5190 to maximum DC level.
Remove the interconnection.

6.3.6 SECAM demodulators

Connect a pattern generator and supply a SECAM signal without contents (black). Connect pin 27-IC7125 to pin 13-IC7125. Connect an oscilloscope to pin 1-IC7125. Using L5175, set the DC level during the scan equal to the DC level during the flyback.
In the same way set L5170, but now measure at pin 3-IC7125.
Remove the interconnection.

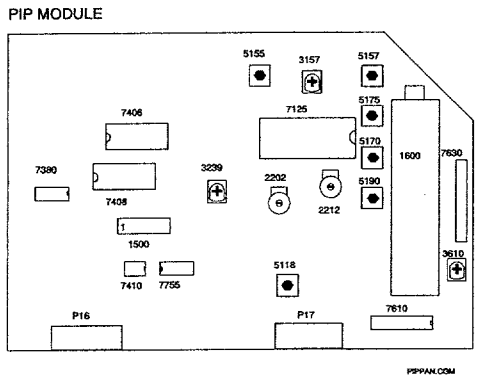


Fig. 7.8

6.4 Adjustment of PLL circuit (36", 16:9)

Connect a pattern generator and apply a PAL colour-bar pattern to the CVBS input.

6.4.1 Adjustment of the PLL oscillator

Movie expand off
Main picture 16:9
PIP-picture 16:9
With the aid of L5101 on the PLL PCB set the DC level on pin 5 of 1500 to 2.5V.

6.4.2 Adjustment of the duty cycle

Movie expand off
Main picture 16:9
PIP-picture 4:3
Connect an oscilloscope to pin 11 of IC7408 (SDA9088).
With the aid of R3130 on the PLL PCB set the time T to 13nsec (see fig. 7.9).

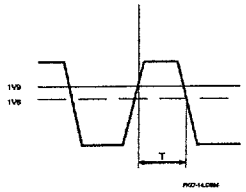


Fig. 7.9

7. Alignments in the Service Menu

7.1 Switch in the Service Menu by momentarily connecting together pins S23 and S24 on the small signal panel (diagram H). The Service Menu will then appear on the screen. The procedure is as follows:

- Select the required alignment with the coloured keys A to E.
- Change the values set using the "Menu +/-" key.
- Store the values set in the EAROM and leave the Service Menu by selecting STORE.

7.2 White Drive Alignment

Switch the set into 4:3 mode.
Switch out the DNR via the remote control.
Select a white picture. (A black picture (e.g. VCR1) set at maximum brightness is also suitable).
Switch the Service Menu in.
Select the required white drive alignment by adjusting the colours red and blue in relation to green (green is the reference colour).

Remarks: In the original factory settings "white" has a colour temperature of 7600K (White with a bluish tint).
The point of departure is green with a value of 44.
The factory setting for blue is then approx. 44.
The factory setting for red is then approx. 21.

7.3 Cut-off Alignment

Switch the set into 4:3 mode.
Switch out the DNR via the remote control.
Select a black picture (e.g. VCR1).
Switch the service menu in.
Set the brightness level so that the picture just (but clearly) illuminates.
Using the Cut-off adjustments align the colour temperatures in such a manner that at minimum illumination of the picture they are the same as the colour temperatures at maximum brightness.
(At minimum picture illumination it is possible that one colour may dominate. This is however normal and does not have to be (fully) compensated with the cut-off alignment).

Remarks: In the original factory settings "white" has a colour temperature of 7600K (White with a bluish tint).
The point of departure is green with a value of 28.
The factory setting for blue is then approx. 33.
The factory setting for red is then approx. 25.

7.4 D2-MAC Alignment

These alignments are described in the section: FL1 SAT box chapter 7.

7.5 Option Alignment

The microprocessor communicates with a great number of components in the set. For correct communication the microprocessor has to know what IC's and modules are present in the set. This is done using option codes. An incorrectly set option code will give a communication problem and an accompanying error code. Every function has been allocated a value. The sum of 8 values forms an option code. This number can vary from 0 to 255. The option code tables are given at the end of this paragraph.

For example, a set has:

Option code 1

Function	*Value*
Frontend FQ816/ME/IF	2
PIP Module	8
NTSC-M	16
NICAM module	64
2nd Frontend on PIP module	128 +

Option code 1 is now:	**218**

Option code 2

Function	*Value*
IC7175 present on SSP	1
100 Hz	4
ECO NICAM	32
100 Hz LFR	64 +

Option code 2 is now:	**101**

Option code 3

Function	*Value*
16:9	64 +

Option code 3 is now:	**64**

Option code 4:

Function	*Value*
Multi-PIP	2
FL2 model	4 +

Option code 4 is now:	**6**

Optioncode 1

Nbr.	Function
0	**Front end = FQ916** A reception of PAL BG or PAL BG and SECAM BG is now possible
1	**Front-End = FQ944** Only reception of the UHF band is now possible
2	**Front end = FQ916/ME/IF** Reception of SECAM L but not of SECAM L' is now possible (reception of NTSC-M is now usually also possible).
4	**Front end =FQ916/MF/IF** Reception of both SECAM L and SECAM L' is now possible (NTSC M reception is generally possible now via the Euroconnector).
8	**PIP module present** This makes it possible to show PIP (Picture in Picture) displays.
16	**NTSC-M reception possible** This is normally always in combination with front end FQ816/ME/IF or FQ816/MF/IF
32	**SECAM DK module fitted** In this case transmissions using the SECAM DK system can also be received.
64	**NICAM module fitted** In this case the digital sound with NICAM transmission can be received.
128	**Second front end for PIP fitted** If this second front end is fitted a second transmitter can be displayed in the PIP picture. The PIP function (number 8) still applies.

Optioncode 2

Nbr.	Function
1	**IC7175 present on SSP** This is always the case.
2	**Not in use**
4	**100Hz featuring present** This is always the case (see also number 64).
8	**Not in use**
16	**Not in use**
32	**ECO NICAM module present** In this case the digital sooun d broadcast in NICAM transmissions can also be received (see further the number 64 of option code 1).
64	**LFR box present** This is always the case (see also number 4).
128	**Not in use**

Electrical adjustments

Optioncode 3	
Nbr.	**Function**
1	**FSS reception only via SAT box** This switches the D2-MAC decoder off.
2	**Front-end on SAT box is: SF916** In this case it is possible to tune the SAT box to 2 GHz.
4	**Satellite front-end SF914/SF916 present (SAT MAC reception)** Switching on and off satellite reception via the satellite front-end. On switching off the front-end D2-MAC can only be received via cable-TV (CABLE MAC via MAC IF module).
8	**MAC IF module present (CABLE MAC reception)** This module makes it possible to decode a D2-MAC signal which is received via the cable front-end (FQ816/FQ844). In this case, besides satellite transmitters, MAC transmitters can also be received via the cable.
16	**SECAM "Telecom Audio" reception possible** This option generates an extra sound channel in the menu on FSS reception. This channel is necessary for the reception of the French "Telecom" satellite. The necessary hardware is present in all sets so that this option may be selected as desired.
32	**Cable-MAC reception only in hyperband** In this case the reception of MAC-transmitters via the cable is limited to the hyperband.
	16:9 present
64	**Not in use**
128	**"Videocolor 36" Picture tube**

Optioncode 4	
Nbr.	**Function**
1	Teletext Peaking Filter on/off for LFR box (Scandinavia) In Scandinavia this number must be selected .
2	**Multi-PIP** When the PIP-module operates on a 50Hz basis the Multi-PIP function is present and this option is active. (Multi-PIP provides 9 or 16 small pictures on the screen simultaneously).
4	**FL2 model** When the operating buttons are located on the side of the set, the set is an FL2 model. (see chapter 4 also).
8-128	**Not in use.**

3. Repair tips

1. The Service Default Mode

The FL1/2is equipped with a service default mode. The service default mode is a fixed, definite state to which the set can be switched.

1.1 *Definition state*

The definition of the fixed state in the service default mode is as follows:
- all sound and picture controls are in the central position (exception volume which is turned down)
- tuned to 475.25 MHz
- system:
  * PAL/SECAM BG for Multi Europe
  * PAL I for UK
  * SECAM L for Multi French

1.2 Switch on and off

The service default mode is switched on by shorting pins S24 and S25 on the small signal panel.

The service default mode can only be switched off by switching the set to stand-by. If the set is switched off and then on again using the mains switch or the mains plug, the service default mode will remain on.

If the set switches to stand-by immediately after switching-on, the set cannot be operated and also cannot be switched to the service default mode. The child-proof lock has already been activated.
To deactivate the child-proof lock the following series of commands has to be given using the remote control (see also Section 9):
<MENU>-<BLUE>-<RED>-<MENU+>-
<MENU OFF>

1.3 Fault signals

To indicate that the set is in the service default mode, the following is displayed on the screen:

SERVICE 00 00 05 06 05

The five numbers after the word "service" stand for the last five fault signals noted by the operator(s). The number on the extreme right represents the last fault signal, that on the extreme left the last fault signal but 4. Since this enables fault reports to be looked at afterward, it means that intermittent faults can be traced.
When the set leaves the service default mode, the fault-report memory is cleared.

1.4 *Operation*

During the service default mode the set will accept all operating commands. When, however, the set is switched off and on, it will return to the state as defined above.

2. Error messages

In both FL1 and FL2 models the IC error messages are indicated by a combination of flashing LED's. In FL1 7 LED's on the front of the set are used. In FL2 only 2 LED's have been fitted to the front of the set: 'on' and 'stand-by'; for service purposes the 7 LED's have been fitted inside the set in an SMD version. These are located on the solder side of the panel with buttons for local control on the side of the set. The 2 LED's on the front of the set are connected in parallel with the corresponding service LED's.

Figure 8.1 illustrates the situation for FL1 and FL2. A table of error messages is provided at the end of this chapter.

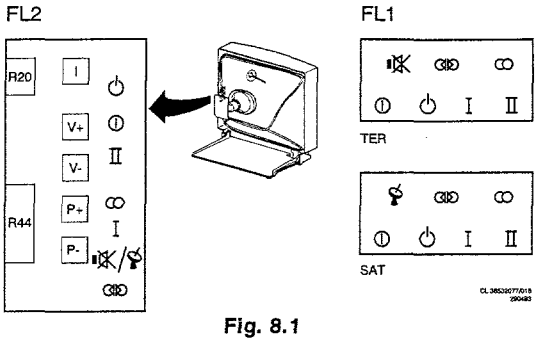


Fig. 8.1

3. Replacement of EEPROM IC7137

If, during a repair, the EEPROM has to be replaced, the microprocessor will detect that the EEPROM is empty. A fault signal (No. 21) will then be displayed.
If the service mode is now activated (see section 7), the microprocessor will load the EEPROM with a number of standard values for the white balance and the other linear settings. These values, however, must all be checked and, if necessary, re-adjusted.
All options have also to be set, the programs installed and the personal preference set.

4. Extension prints

To simplify the measurements ON the various modules extension prints are available for the modules fitted with BTB connectors. Modules can be placed in these connectors so that they stick out above the other prints when the chassis is in the service position.
The code numbers for the extension prints are:

5-fold	4822 395 30261
6-fold	4822 395 30259
8-fold	4822 214 31402
9-fold	4822 395 30258
10-fold	4822 395 30257

5. Removing the PIP module

The PIP module can be simply removed, leaving the set functioning normally (The LED display does however indicate an error condition). Following the removal of the PIP module the signal path is broken. The signal path can be restored by placing the 5-core flat cable with connector S56 in connector foot S16 (see diagram D).
The error message can be removed through the application of the option codes (see chapter 7).

6. Removing the SAT box

The SAT box (excluding the interface panel (p)) can be simply removed, leaving the set functioning normally (The LED display does however indicate an error condition).
The SAT box can also be partially removed: it is possible to remove both the D2-MAC(S) or FSS(T), leaving the SAT box functioning normally. The error message which remains following the total or partial removal of the SAT box can be removed through the application of the option codes (see chapter 7).

As all programs, including that for the SAT box, are stored in the main EAROM (IC7137), the settings for these programs will not be lost, even if the SAT box is replaced. The EAROM (IC7450) located on the D2-MAC panel stores all the settings for the D2-MAC panel.

7. Extension cables

Extension cables are available to lead the large signal and small signal panel signals (LSP and SSP) separately out of the set. These are made up as follows:

4822 320 20209	Set of 6 cables for LSP and SSP connections.

See chapter 4 also.

8. Central repair

For panels and modules which are difficult to repair there remains a possibility for central repair. Following receipt of a defective module a repaired and tested module is issued.
In order to guarantee the quality of the central repair service a certain amount of information regarding the defective panel is required. This information should be submitted together with the defective panel. This concerns the following information:

1. Clear description of the fault.
2. Indication of intermittent or continuous fault
3. Type/version number of the set
4. AG-production code and week/year number
5. Serial number

The defective modules should be complete and free of mechanical damage.
These facilities are offered for the modules below:

LFR box (L+M)	4822 212 30857
100Hz box [L'}	4822 212 30887

9 Diagnosis and protection

9.1 Hardware and software protection

In case any serious fault occurs in the set, one of the protection circuits will activate. A protection circuit switches of the main power supply (SOPS) via the stand-by input (STBY) of the SOPS control panel. This input is located on pin 1 of connector pin L40 with test point number TP56, and is illustrated on diagram A.
As the microprocessor is fed by a separate stand-by power supply (SOPS), the processor and the LED's will continue to operate, even when the main power supply is switched off.

A number of protection circuits can switch off the power supply independently and immediately (hardware protection). In two protection circuits the microprocessor itself switches off the power supply (software protection).

All protection circuits come together on the stand-by input (TP56 of the main power supply. A diagnosis determines which protection circuit is active.

9.2 Protection test point TP56 [diagram A]

The following voltages may be present on the stand-by input of the SOPS control panel (TP56): [see diagram A]

1 Approx. 17V during operation;
2 0.5 - 1V during hardware protection; (this value is maintained by a thyristor circuit formed by TS7380/TS7381);
3 0.5Vd uring stand-by and software protection.

9.3 Hardware protection:

1 Power supply voltage +13 from the SOPS too high (+V) [diagram A].
This protection circuit activates if the voltage in +13V circuit of the SOPS becomes too high during operation.

2 SOPS and/or +11/-11V for the audio output amplifier defective (SOUND-PROT).
[diagram G]
The protection circuit activates when the +11V and -11V voltages are no longer in balance, or when both voltages are absent. This protection circuit also operates when the SOPS does not function or is short-circuited.
This protection circuit is fed by the start-up voltage 'Vstart' from the SOPS.

3 Beam current too high (I-BEAM) [diagram B]
When the beam current becomes too high this protection circuit switches off the power supply. Before this protection circuit can activate the picture will first illuminate brightly. This fault occurs for example on the absence of the +200V power supply voltage on the picture tube panel.

4 Deviating LOT behaviour (EHT, LOT-PROT) [diagram B].
This protection circuit becomes active when a 'unusual' voltage forms appear on the LOT outputs (5555). This may indicate defective or loose components in the line deflection circuit. (LOT, switching transistors, capacitors).

5 East/west output stage defective [diagram B].
This protection circuit activates when the current through the east/west switching transistor T7610 exceeds a specific value. In this case transistor T7542 will conduct for a brief period. (the base-emitter voltage Ube from T7542 is then momentary greater than 0.6V).

6 Vertical deflection end stage (IC7450) defective [diagram B].
The frame output stage IC7450 has a protection output (pin 7, TP62). This output becomes momentarily high on any defect in this IC or during the absence of the power supply voltage.
During normal operation there are short pulses on this output.
The frame output stage is fed by a winding on the LOT (5555) (+28V or +32V).
During diagnosis a check should be made whether the +28/+32V power supply voltage continually drops before the protection circuit output is activated. If this is the case then one of the other protection circuits is responsible for switching out the power supply.

Repair tips

By measuring the timing pulses between the protection output (pin 7) and the power supply voltage (pin 6) in relation to earth (pin 2 or 4) it can be determined whether the protection is originating from the frame output stage. The protection circuit overview at the end of this chapter provides a schematic overview of the measurements.

9.4 Software protection

9.4.1 Error message 99

Error message 99 is displayed when software protection is generated by the microprocessor. Software protection becomes active when the +13V and or +5V power supply voltage is not present on the small signal panel (SSP). Due to the absence of the power supply the connected components are unable to provide an IC signal to the microprocessor. The processor then sets the SOPS in stand-by. If this is the case error message 99 is then displayed. Software protection can be switched out by activating the 'Service Default Mode' (see §1).

If the +13V or +5V are absent as a result of hardware protection switching out the power supply, error message 99 will be displayed by the LED's following a short period, as the microprocessor is no longer receiving any signal from the connected IC's. The processor now bridges the hardware protection via the STBY signal. Each hardware protection will therefore eventually result in software protection, resulting in error message 99 being displayed.

During hardware protection the microprocessor makes repeated attempts at communication with the connected IC IC's before making a decision for software protection. During this period (up to approximately 5 minutes) the set will not react to any operational commands. Because none of the IC IC's responds in this period various error messages will be displayed by the LED's. If error message 99 does not eventually appear then the protection circuits are not operational and the cause of the fault can be sought elsewhere.

When the microprocessor generates a STBY signal for implementing software protection TP56 will be made lower than 0.5V by the STBY signal, through which any eventual hardware protection on TP56 will be bridged. In order to determine whether hardware protection is active via TP56 the voltage on TP56 should be measured with the set in the 'Service Default Mode' or measured before error message 99 appears on the LED display.

9.4.2 Software protection

7 +5V on the small signal panel (SSP) [diagram B and C]
To test whether the +5V power supply voltage, from the LOT winding (5555) [diagram B], is reaching the small signal panel without short-circuiting the front-end (1160 [diagram C]) must provide a signal to the microprocessor via IC within a specific time. If this signal does not arrive, the microprocessor switches the main power supply into stand-by, and the LED's will indicate error message 99 once more.
To test whether the front-end is defective the service default mode will have to be selected. If the power supply voltages on the front-end are correct and a front-end error message persists (error 11), then the front-end is defective.

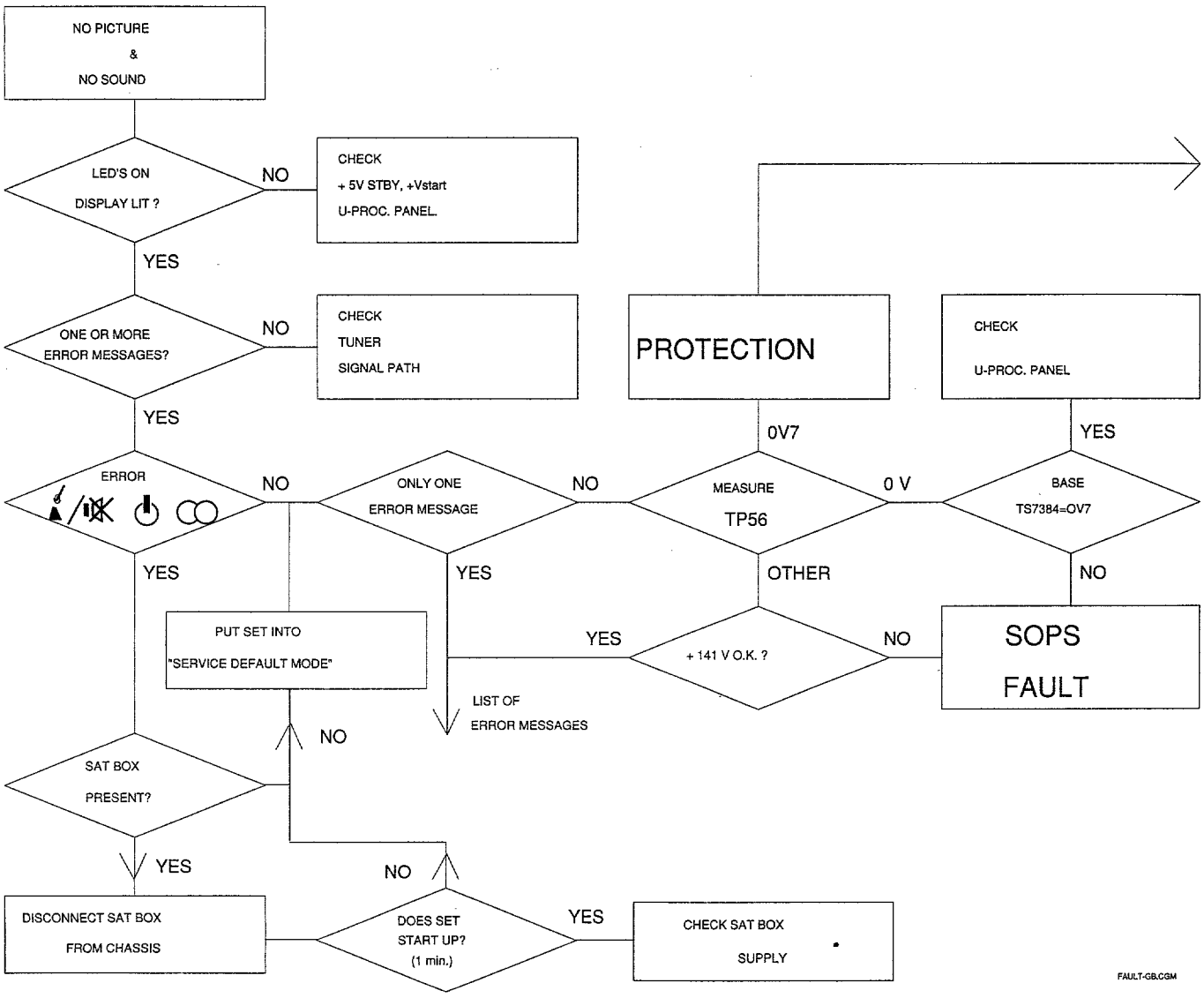
8 +13V on the small signal panel (SSP) [diagrams A, D and F]).
To test whether the +13V power supply voltage from the main power supply (SOPS) [diagram A] is reaching the small signal panel without short-circuiting, IC7430 (TDA4680 video processor, [diagram D]) or IC7600 (TDA8417, stereo decoder, [diagram F]) or IC7680 (TDA8425, audio processor [diagram F]) must provide a signal via IC to the microprocessor within a specific time. If none of these three IC's provides any signal the microprocessor switches the main power supply into stand-by. The LED's indicate error code 99.

9 SAT box power supply defective (only for set with a SAT box (D2-MAC)).
When the SAT box microprocessor does not send a signal to the main processor in the set, the main processor, following error message 51 (SAT box processor), will switch the software protection in. The LED's now indicate error code 99.
To test whether the SAT box processor is defective the service default mode must be selected. If only the error message from the SAT box is now indicated (error 51), and all power supply voltages on the processor are correct, then the SAT box processor is defective.
The operation of the SAT box power supply [diagram O] can be checked as followed:
Disconnect the SAT box and chassis from one another by disconnecting the band cable between the interface panel [diagram P] and the SAT box [diagram O].
When after a short time the set can be started up from stand-by the SAT box will have an incorrect power supply and error message 99 does not appear.

9.5 Measurements in the protection circuits.

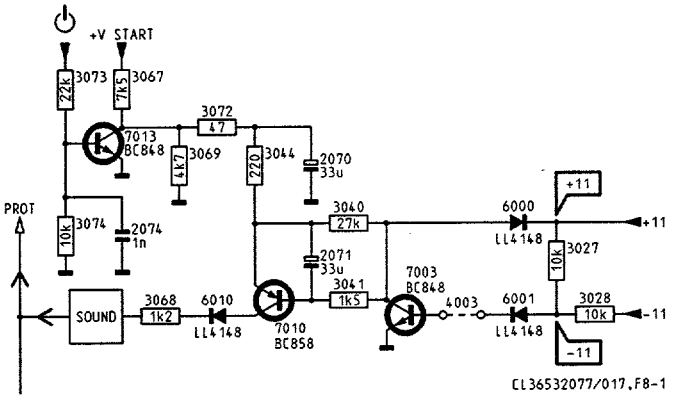
All hardware circuits are illustrated in figure 8.2.
The oscillograms indicate the voltages on the relevant test points immediately after the set is switched on.
In this case the signals illustrated are for during:
- normal operation
- protection caused by this circuit (PROT);
- protection caused by a different protection circuit (N-PROT).

Faultfindingtree

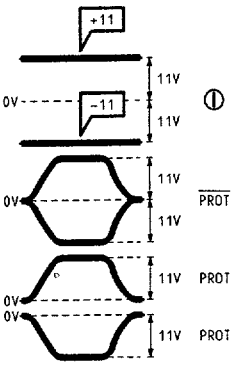


Protection

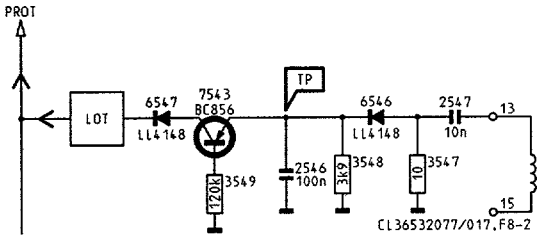
+11 V
-11 V



CL36532077/017.F8-1



EHT



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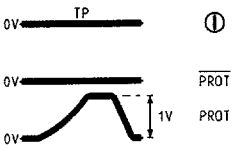
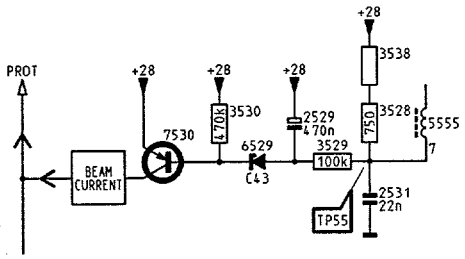
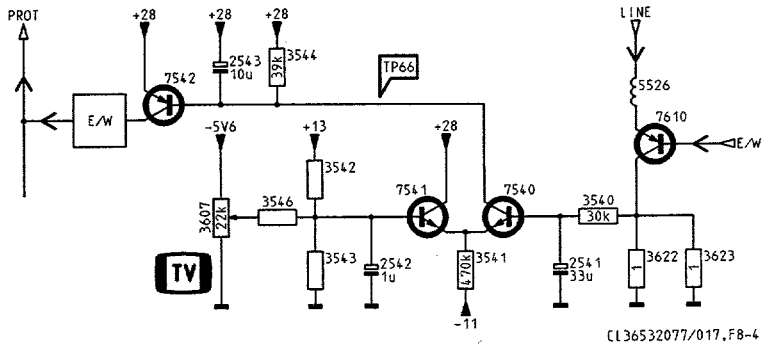
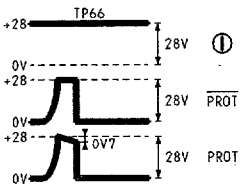




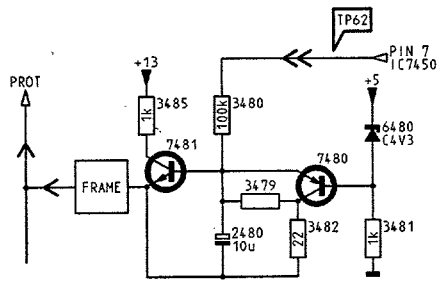
CL36532077/017.F8-3



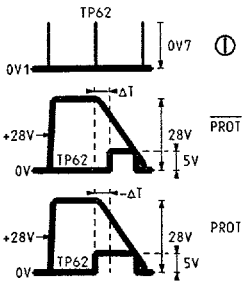
CL36532077/017.F8-4



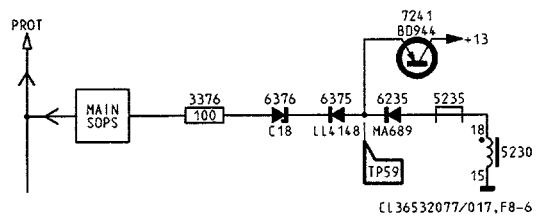
TV



CL36532077/017.F8-5



+V



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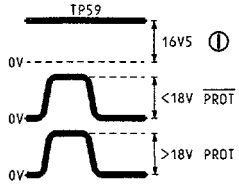

CL36532077/017.FREF
130593

Fig. 8.2

List of error messages

Error number on screen	Flashing LED							Description of error
	🔇			⏻	I	II		
1[1]			X		X	X		I²C,IC7108, SSP [H] (MSM6307)
3					X	X	II	I²C, IC7215, 100Hz [L] [L'] SAA9042
4				X			X	I²C, IC7220, 100Hz [M] [L'} 83C652
5				X				I²C, IC7408, PIP [J] (SDA9088)
6				X	X	X		I²C,IC7600, SSP [F] (TDA8417)
7							X	I²C,IC7680, SSP [F] (TDA8425)
8						X	X	IC7440, frame rotation [Z], PCF8574 (16:9)
9			X	X		X		I²C,IC7430, SSP [D] (TDA4680)
10				X	X		X	I²C,IC7395, SSP [D] (TDA8443)
11				X	X			I²C, front-end, SSP [C] (FQ 9XX)
12						X		I²C, IC7137, SSP [H] (X24C04)
13			X					I²C, bus on chassis blocked
14			X	X				I²C, IC7258, SSP [C] (HEF4094)
15			X	X	X			I²C, IC7219, SSP [C] (TEA6414)
16			X			X		I²C, IC7040, SAT Interface [P] (TEA6414)
17			X		X			IR-receiver on SSP [H] blocked (1100)
18				X		X	X	7115, SSP, µ proc. [H]
19			X	X	X	X		UART Bus blocked, 7115, SSP, µ proc. [H]
20				X	X	X	X	7115, SSP, µ proc. [H]
21				X				EAROM X24C04 empty, IC7137, SSP [H] (§ 8.3)
23	X				X			I²C, IC7080, convergence panel [V] (TDA8444)
28		X						I²C, PIP tuner [J]
29		X						I²C, IC7638, PIP-modulo [J] (SAA1300)
30			X		X		X	I²C, IC7175, SSP [C] (PCF8574)
31			X		X	X	X	I²C, IC7001, NICAM-panel [K] (SAA7280)
33		X						I²C, PLL (1500) PIP modulo [L]
34[1]	X		X				X	LNC supply on SAT box [Q,R] not correct
35[1]	X		X		X		X	IM-bus on SAT box [Q,S] blocked.
36[1]	X		X	X			X	I²C, bus on SAT box blocked.
37[1]	X		X	X	X		X	I²C, IC7450, D2-MAC [S] (X24C02)
38[1]	X		X			X	X	I²C, SAT Tuner [Q] (SF914; SF916)
39[1]	X		X		X	X	X	HEF STROBE 1, IC7925, FSS [T] (HEF4094)
40[1]	X		X	X		X	X	D2-MAC [S]
41[1]	X		X	X	X	X	X	HEF STROBE 2, IC7475, D2-MAC [S] (HEF4094)
42[1]	X				X		X	IC7250, TUNER/CONTROL [Q]
43[1]	X			X			X	UART bus blocked IC7250, TUNER/CONTROL [Q].
44[1]	X			X	X		X	SAT Tuner [Q] (SF914/916)
45[1]	X					X	X	IC7250, TUNER/CONTROL [Q]
46[1]	X				X	X	X	IC7250, TUNER/CONTROL [Q]
47[1]	X			X		X	X	IC7262, TUNER/CONTROL [Q]
48[1]	X			X	X	X	X	D2-MAC [S]
49[1]	X			X		X		EAROM X24C02 empty, 7450, D2-MAC [S] (§17)
51[1]					X	X	X	IC7250, TUNER/CONTROL [Q]
52[1]			X				X	D2B Bus EXT, SSP [H] blocked.
53			X			X	X	IC7330, MAC TXT [S], TPU2735
55			X	X		X	X	IC7140, Panorama [B], PCF8574 (16:9)
99	X		X		X			Protection

[1] This error is only possible on sets with built in SAT box.

In case an error indication on the set is not included in this table, then check the optional codes (see § 7).

11V ⏻ 11V
11V PROT 11V
11V PROT
11V PROT
⏻
PROT
1V PROT
PROT
PROT
28V ⏻
28V PROT
28V PROT
0V7 ⏻
28V PROT 5V
28V PROT 5V
16V5 ⏻
<18V PROT
>18V PROT

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