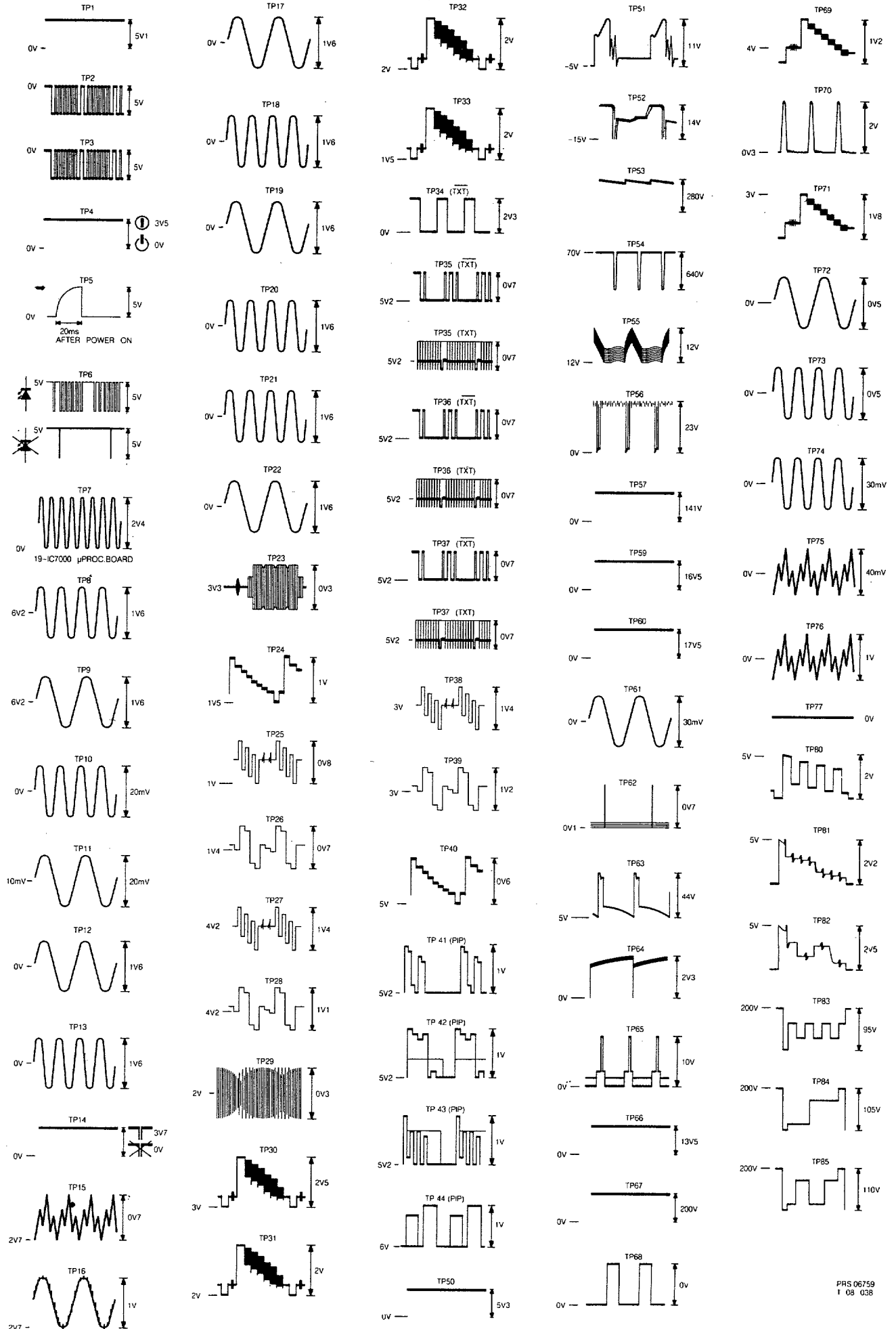
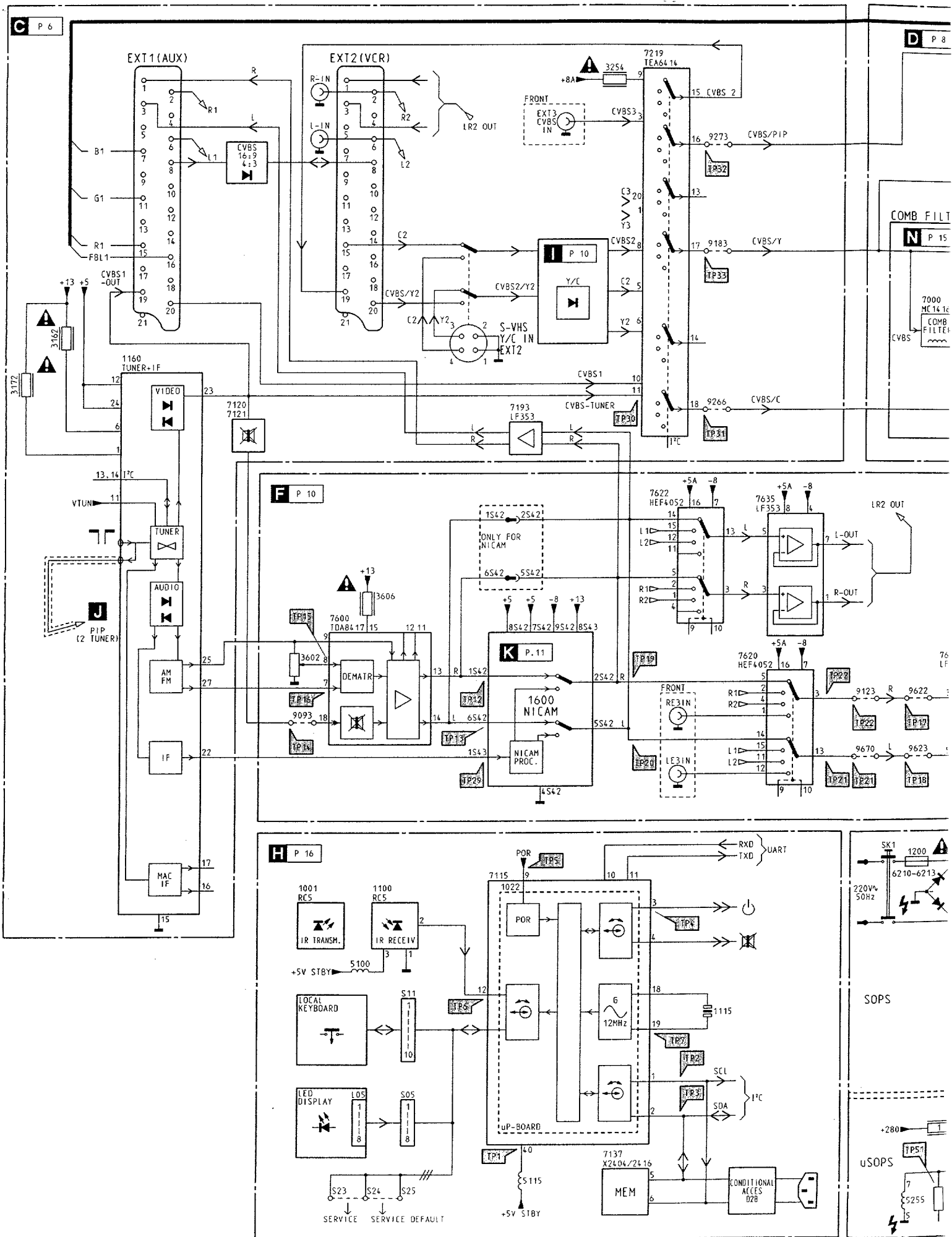


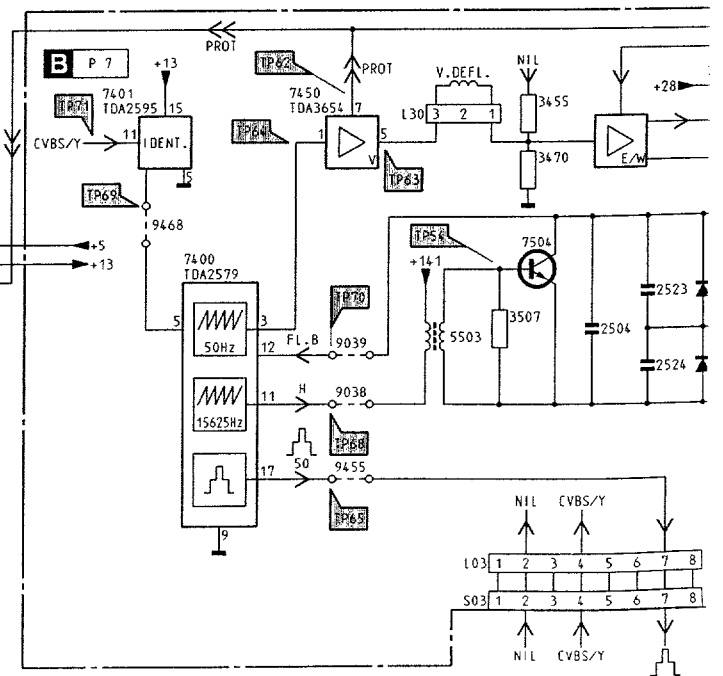
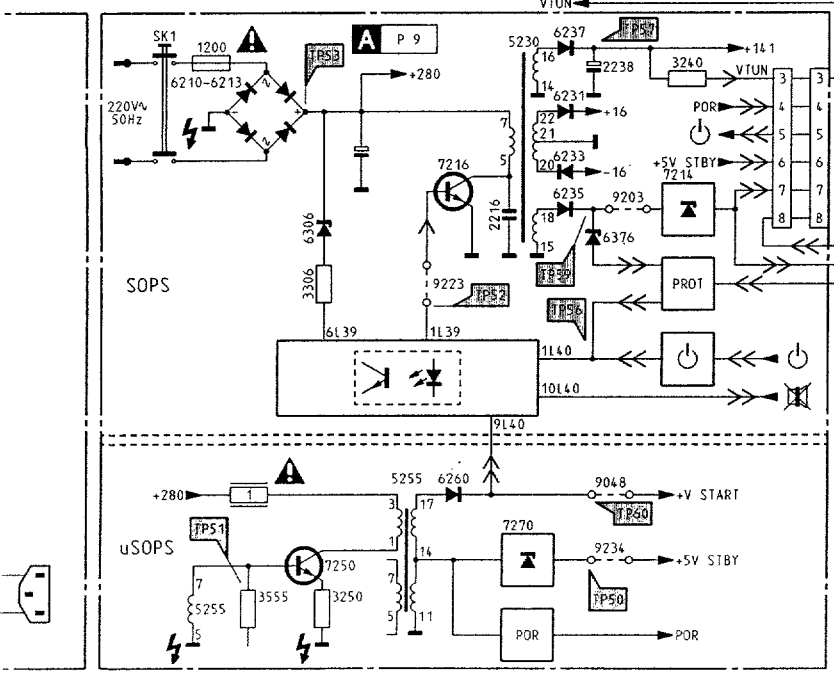
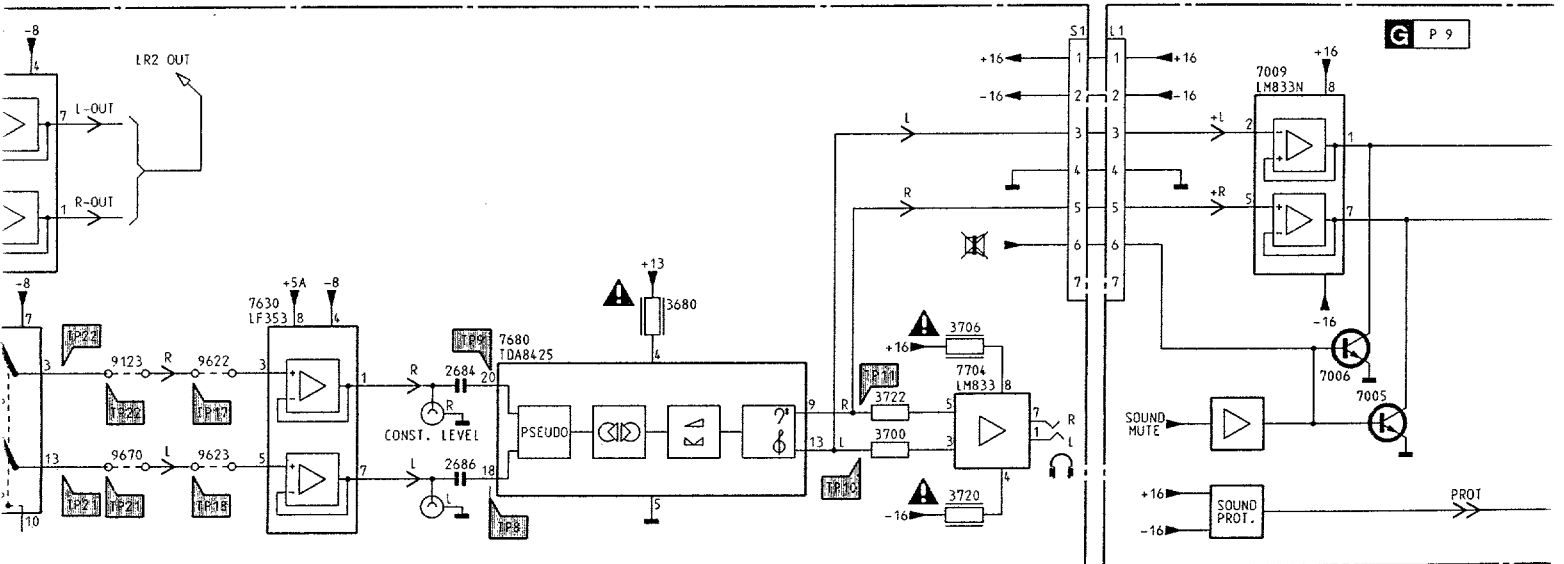
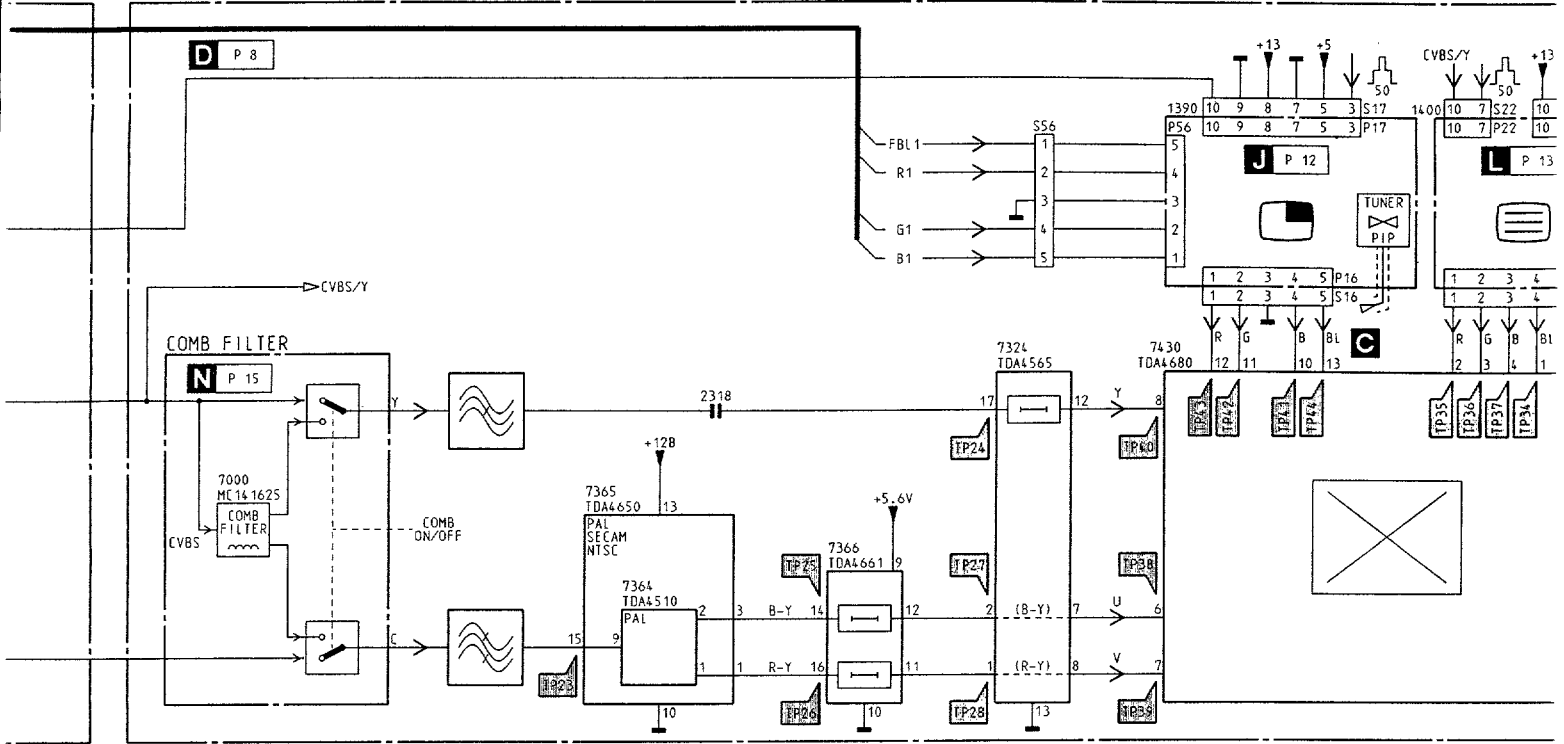


# Oscillograms Oscillograms / Oscillogrammes





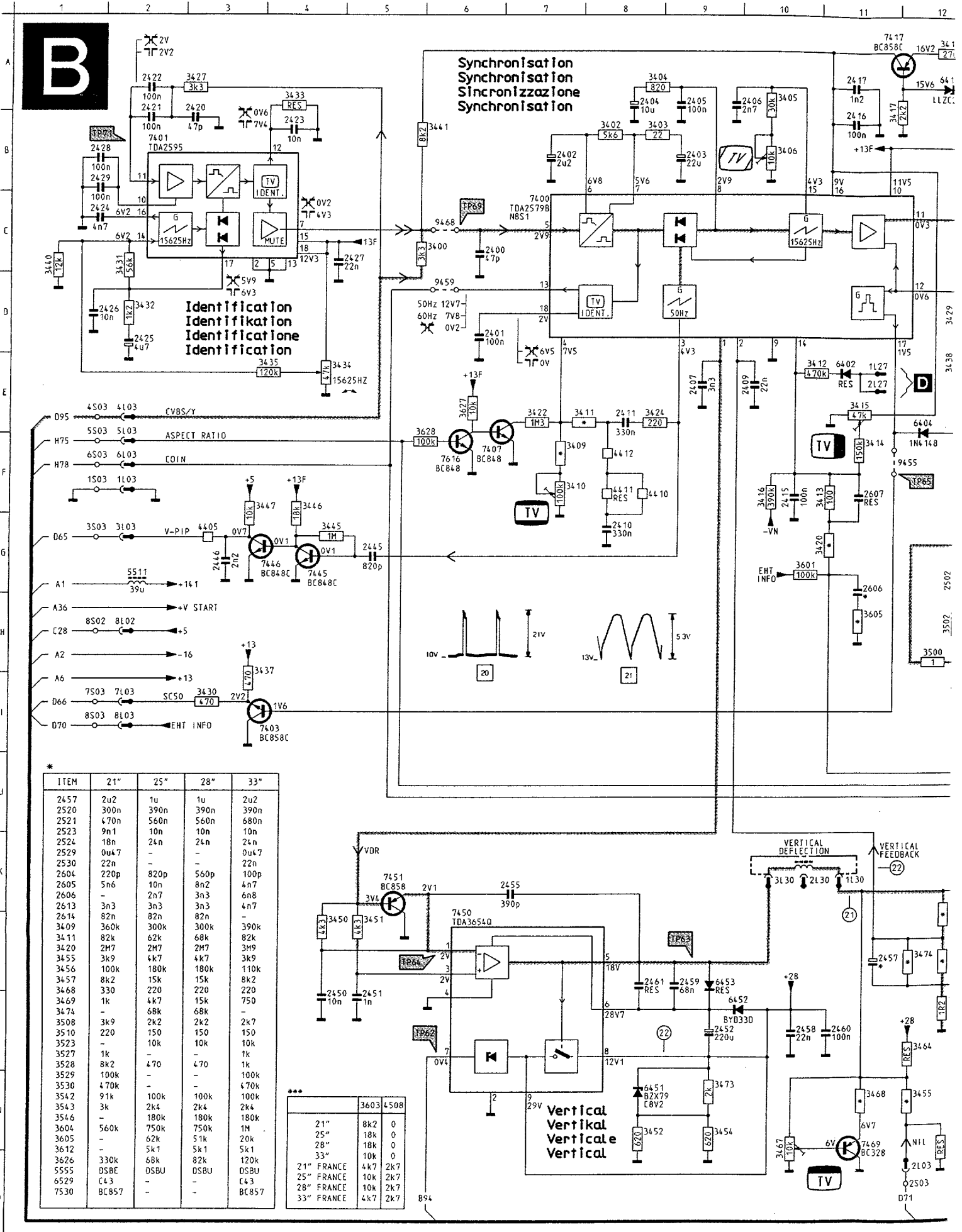
# Blockdiagram / Blockschaltbild /





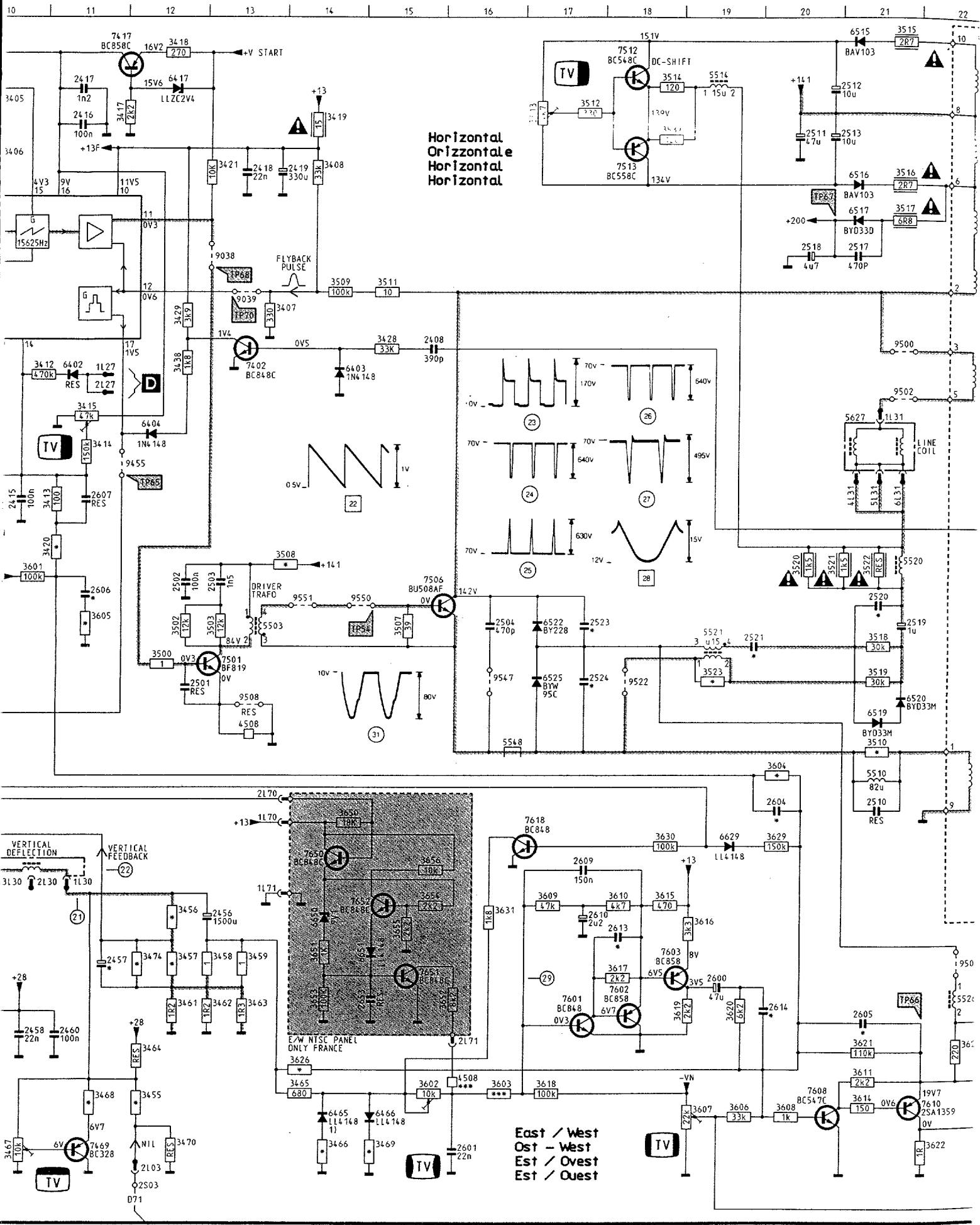
# Synchronisation / Synchronisierung /

# Sync

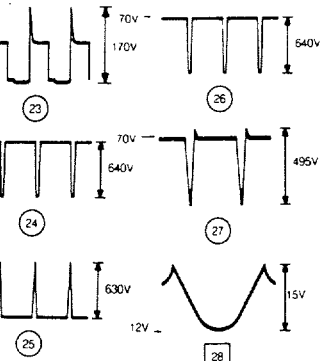


ITEM	21"	25"	28"	33"
2457	2u2	1u	1u	2u2
2520	300n	390n	390n	390n
2521	470n	560n	560n	680n
2523	9n1	10n	10n	10n
2524	18n	24n	24n	24n
2529	0u47	-	-	0u47
2530	22n	-	-	22n
2604	220p	820p	560p	100p
2605	5n6	10n	8n2	4n7
2606	-	2n7	3n3	6n8
2613	3n3	3n3	3n3	4n7
2614	82n	82n	82n	-
3409	360k	300k	300k	390k
3411	82k	62k	68k	82k
3420	2M7	2M7	2M7	3M9
3455	3k9	4k7	4k7	3k9
3456	100k	180k	180k	110k
3457	8k2	15k	15k	8k2
3468	330	220	220	220
3469	1k	4k7	15k	750
3474	-	68k	68k	-
3508	3k9	2k2	2k2	2k7
3510	220	150	150	150
3523	-	10k	10k	10k
3527	1k	-	-	1k
3528	8k2	470	470	1k
3529	100k	-	-	100k
3530	470k	-	-	470k
3542	91k	100k	100k	100k
3543	3k	2k4	2k4	2k4
3546	-	180k	180k	180k
3604	560k	750k	750k	1M
3605	-	62k	51k	20k
3612	-	5k1	5k1	5k1
3626	330k	68k	82k	120k
5555	DSBE	DSBU	DSBU	DSBU
6529	C43	-	-	C43
7530	BC857	-	-	BC857

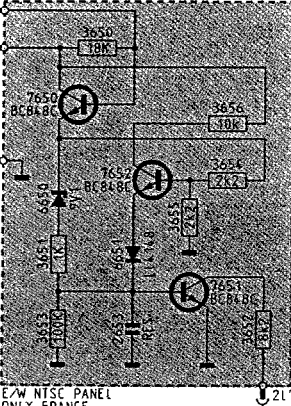
	3603	4508
21" FRANCE	8k2	0
25" FRANCE	18k	0
28" FRANCE	18k	0
33" FRANCE	10k	0
21" FRANCE	4k7	2k7
25" FRANCE	10k	2k7
28" FRANCE	10k	2k7
33" FRANCE	4k7	2k7



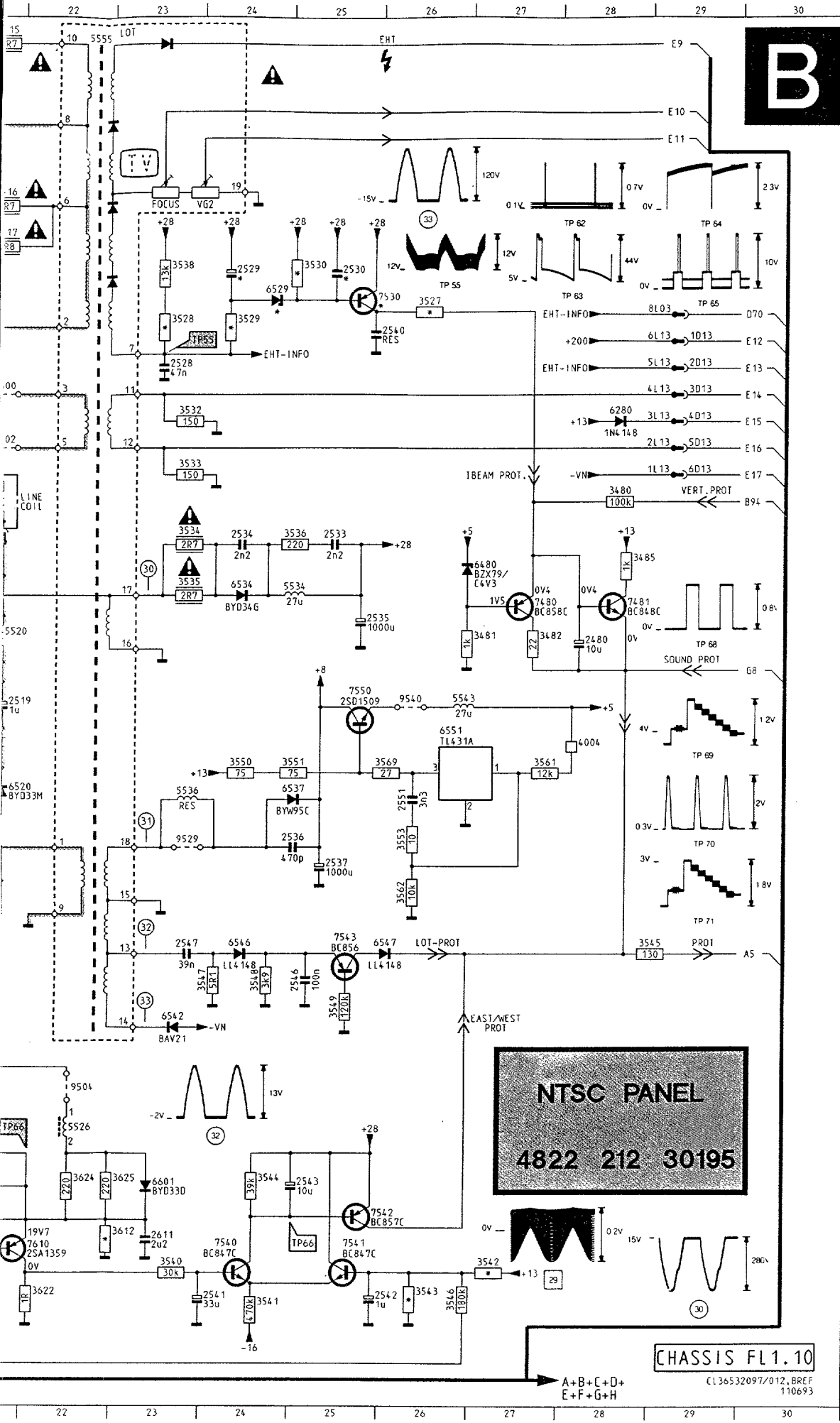
Horizontal  
Orizzontale  
Horizontal  
Horizontal



VERTICAL DEFLECTION  
VERTICAL FEEDBACK



East / West  
Ost - West  
Est / Ovest  
Est / Ouest



**B**

**NTSC PANEL**  
 4822 212 30195

CHASSIS FL1.10

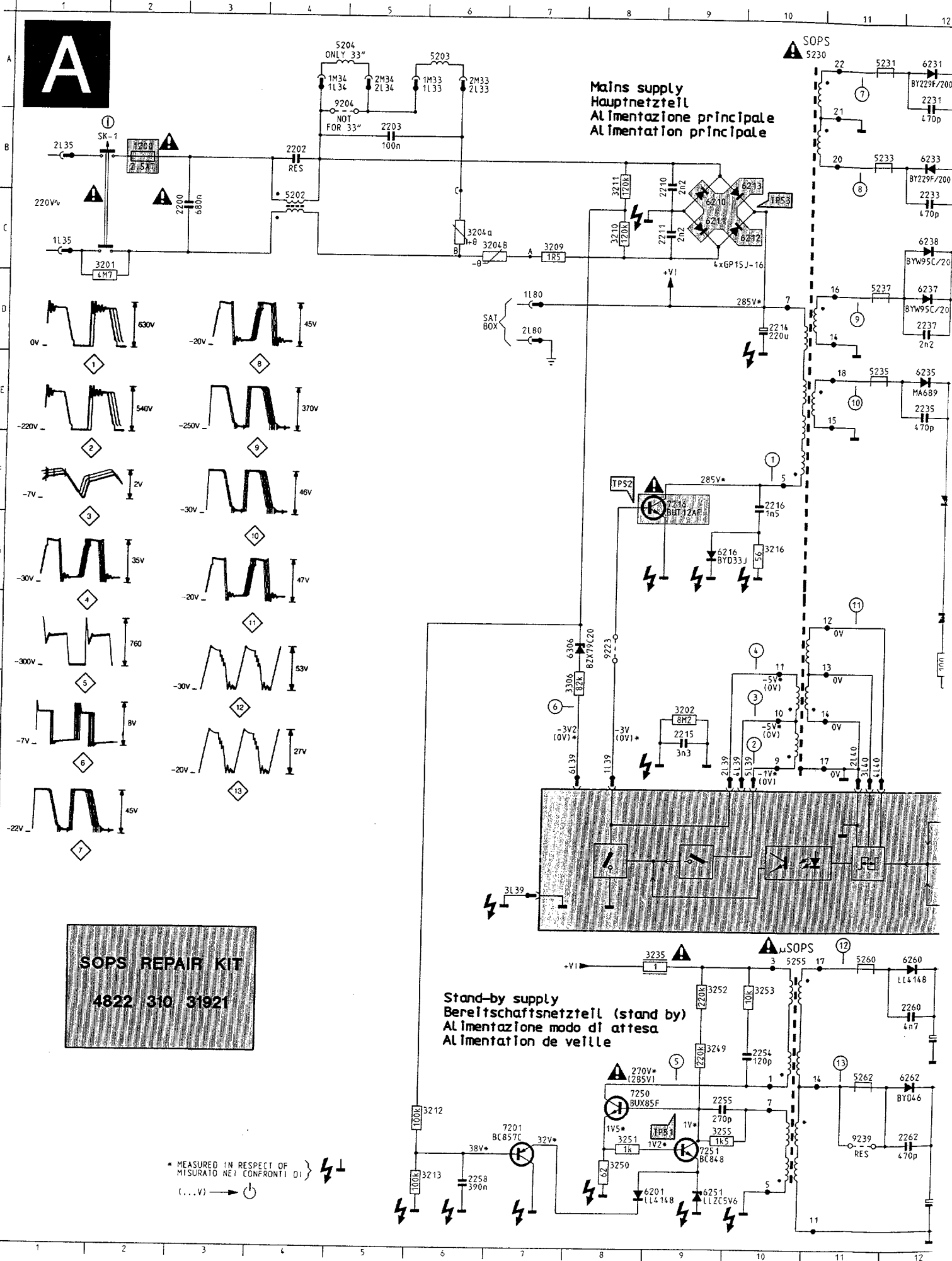
2400	C 6	3438	E12	4410	F 8
2401	D 6	3440	C 1	4411	F 8
2402	B 7	3441	B 6	4412	F 8
2403	B 9	3445	G 4	4508	I13
2404	A 8	3446	F 4	4508	N16
2405	A 9	3447	F 3	5503	H13
2406	A 9	3450	L 4	5510	J21
2407	E 9	3451	L 5	5511	G 2
2408	D15	3452	N 8	5514	A19
2409	E10	3454	N 9	5520	G21
2410	G 8	3455	N12	5521	H19
2411	E 8	3456	K12	5526	M22
2415	F10	3457	L12	5534	G25
2416	B11	3458	L13	5536	I23
2417	A11	3459	L13	5543	H26
2418	B13	3461	M12	5548	I16
2419	B14	3462	M13	5555	A22
2420	B 3	3463	M13	5627	E21
2421	B 2	3464	M12	6280	E28
2422	A 2	3465	N14	6402	E11
2423	B 4	3466	N14	6403	E14
2424	C 1	3467	N10	6404	E12
2425	D 2	3468	N11	6417	A12
2426	D 1	3469	N15	6451	N 8
2427	C 4	3470	N12	6452	H10
2428	B 1	3473	N 9	6453	L 9
2429	B 1	3474	L12	6465	N14
2445	G 5	3480	F28	6486	N15
2446	G 3	3481	G27	6480	F27
2450	M 4	3482	G27	6515	A21
2451	M 5	3485	F28	6516	B21
2452	M 9	3500	H12	6517	C21
2455	K 7	3502	H12	6519	I21
2456	L13	3503	H13	6520	I21
2456	L13	3507	H15	6522	H17
2457	L11	3508	G14	6525	I17
2458	M10	3509	D14	6529	C24
2459	L 9	3510	I21	6534	G24
2460	M11	3511	D15	6537	I25
2461	L 8	3512	A17	6542	K23
2480	G28	3513	A17	6546	K24
2501	I12	3514	A18	6547	K26
2502	G12	3515	A21	6551	H26
2503	G13	3516	B21	6601	H23
2504	H16	3517	C21	6629	K19
2510	J21	3518	H21	6650	L14
2511	B20	3519	I21	6651	L15
2512	A20	3520	G20	7400	C 7
2513	B20	3521	G20	7401	B 2
2517	C21	3522	G21	7402	E13
2518	C20	3523	I19	7403	I 3
2519	H21	3527	C26	7407	F 6
2520	H21	3528	D23	7417	A12
2521	H19	3529	D24	7445	G 4
2523	H17	3530	C25	7446	G 3
2524	I17	3532	E23	7450	L 6
2528	D23	3533	E23	7451	K 5
2529	C24	3534	F23	7469	N11
2530	C25	3535	G23	7480	G27
2533	F25	3536	F25	7481	G28
2534	F24	3537	B18	7501	H13
2535	G25	3538	C23	7506	G16
2536	I25	3540	N23	7512	A18
2537	J25	3541	N24	7513	B18
2540	O25	3542	N27	7530	C25
2541	O24	3543	N26	7540	N24
2542	O25	3544	H24	7541	N25
2543	M25	3545	K29	7542	N25
2546	K25	3546	O26	7543	K25
2547	K23	3547	K24	7550	H25
2551	I26	3548	K24	7601	M17
2600	L19	3549	K25	7602	M18
2601	N16	3550	I24	7603	L19
2604	J20	3551	I25	7608	N20
2605	M21	3553	I26	7610	N22
2606	G11	3561	I27	7616	F 6
2607	F11	3562	J26	7618	J17
2609	K17	3569	I26	7650	K14
2610	L17	3601	G10	7651	L15
2611	N23	3602	N15	7652	K15
2613	L18	3603	N16	9038	C13
2614	M20	3604	J20	9039	D13
2653	M15	3605	H11	9455	F11
3400	C 6	3606	N19	9459	D 6
3402	B 8	3607	N19	9468	C 6
3403	B 8	3608	N20	9500	D21
3404	A 8	3609	K17	9502	E21
3405	A10	3610	K18	9504	L22
3406	B10	3611	N21	9508	I13
3407	D13	3612	M23	9522	I18
3408	B14	3614	N21	9529	I23
3409	F 7	3615	K18	9540	H26
3410	F 7	3616	L19	9547	I16
3411	E 8	3617	L18	9550	H14
3412	E10	3618	N17	9551	H14
3413	F11	3619	M19		
3414	F11	3620	M19		
3415	E11	3621	M21		
3416	F10	3622	M22		
3417	A11	3624	M22		
3418	A12	3625	M23		
3419	A14	3626	M14		
3420	G11	3627	E 6		
3421	B13	3628	F 6		
3422	E 7	3629	K20		
3424	E 8	3630	K18		
3427	A 3	3631	K16		
3428	D15	3650	J14		
3429	D12	3651	L14		
3430	I 3	3652	M16		
3431	C 2	3653	M14		
3432	D 2	3654	K15		
3433	A 4	3655	L15		
3434	E 4	3656	K15		
3435	E 4	4004	H28		
3437	H 3	4405	G 3		

CL36532097/012, BREF 110693



# Power supply / Stromversorgung / L'alimentation

# A



Mains supply  
Hauptnetzteil  
Alimentazione principale  
Alimentation principale

Stand-by supply  
Bereitschaftsnetzteil (stand by)  
Alimentazione modo di attesa  
Alimentation de veille

**SOPS REPAIR KIT**  
4822 310 31921

\* MEASURED IN RESPECT OF  
MISURATO NEI CONFRONTI DI  
(...V) →

SOPS

5230

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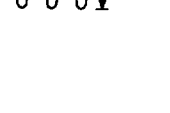
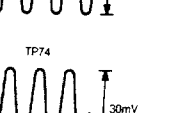
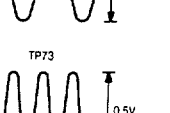
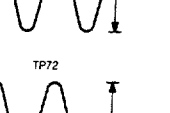
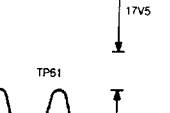
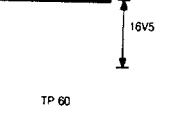
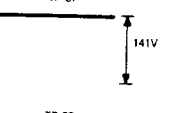
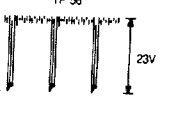
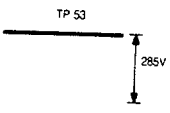
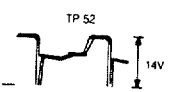
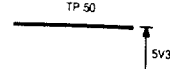
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1200	B 2	7242	E 14
2200	C 2	7243	E 15
2202	B 4	7250	N 8
2203	B 5	7251	N 9
2210	B 9	7268	N 13
2211	C 9	7270	M 14
2214	D 10	7273	O 15
2215	I 9	7274	O 16
2216	F 10	7380	H 13
2230	F 14	7381	H 14
2231	A 12	7384	H 15
2232	A 13	9034	M 16
2233	B 12	9048	L 12
2234	B 13	9203	E 13
2235	E 12	9204	A 4
2236	E 12	9223	H 8
2237	D 12	9239	N 11
2238	D 12	9290	D 14
2239	E 16		
2254	M 10		
2255	N 9		
2258	O 6		
2260	M 12		
2261	M 12		
2262	N 12		
2263	O 12		
2270	M 15		
2272	O 15		
2380	G 14		
2381	H 13		
2385	I 16		
2386	H 16		
3201	C 1		
3202	I 9		
3204	C 6		
3204	C 6		
3209	C 7		
3210	C 8		
3211	B 8		
3212	N 6		
3213	O 6		
3215	A 13		
3216	G 10		
3235	I 9		
3240	D 14		
3241	D 14		
3242	E 13		
3243	F 14		
3244	E 13		
3245	F 15		
3247	F 15		
3248	E 15		
3249	M 9		
3250	O 8		
3251	N 8		
3252	L 9		
3253	L 10		
3255	N 9		
3266	O 13		
3267	N 13		
3268	N 13		
3270	N 15		
3271	N 14		
3272	N 14		
3273	O 15		
3275	O 16		
3306	I 7		
3376	H 12		
3380	G 14		
3381	H 14		
3382	G 16		
3383	H 16		
3387	H 16		
4019	G 17		
4200	H 15		
4274	O 17		
5202	C 4		
5203	A 6		
5204	A 4		
5230	A 10		
5231	A 11		
5233	B 11		
5235	E 11		
5237	D 11		
5241	D 15		
5255	L 10		
5260	L 11		
5262	N 11		
5381	H 13		
6201	O 9		
6210	C 9		
6211	C 9		
6212	C 9		
6213	B 9		
6216	G 9		
6231	A 12		
6233	B 12		
6235	E 12		
6237	D 12		
6238	C 12		
6246	F 13		
6251	O 9		
6260	L 12		
6262	N 12		
6266	N 13		
6272	O 14		
6306	H 7		
6352	I 15		
6353	I 14		
6372	K 14		
6373	K 15		
6375	F 12		
6376	H 12		
7201	N 7		
7216	F 9		
7241	E 14		



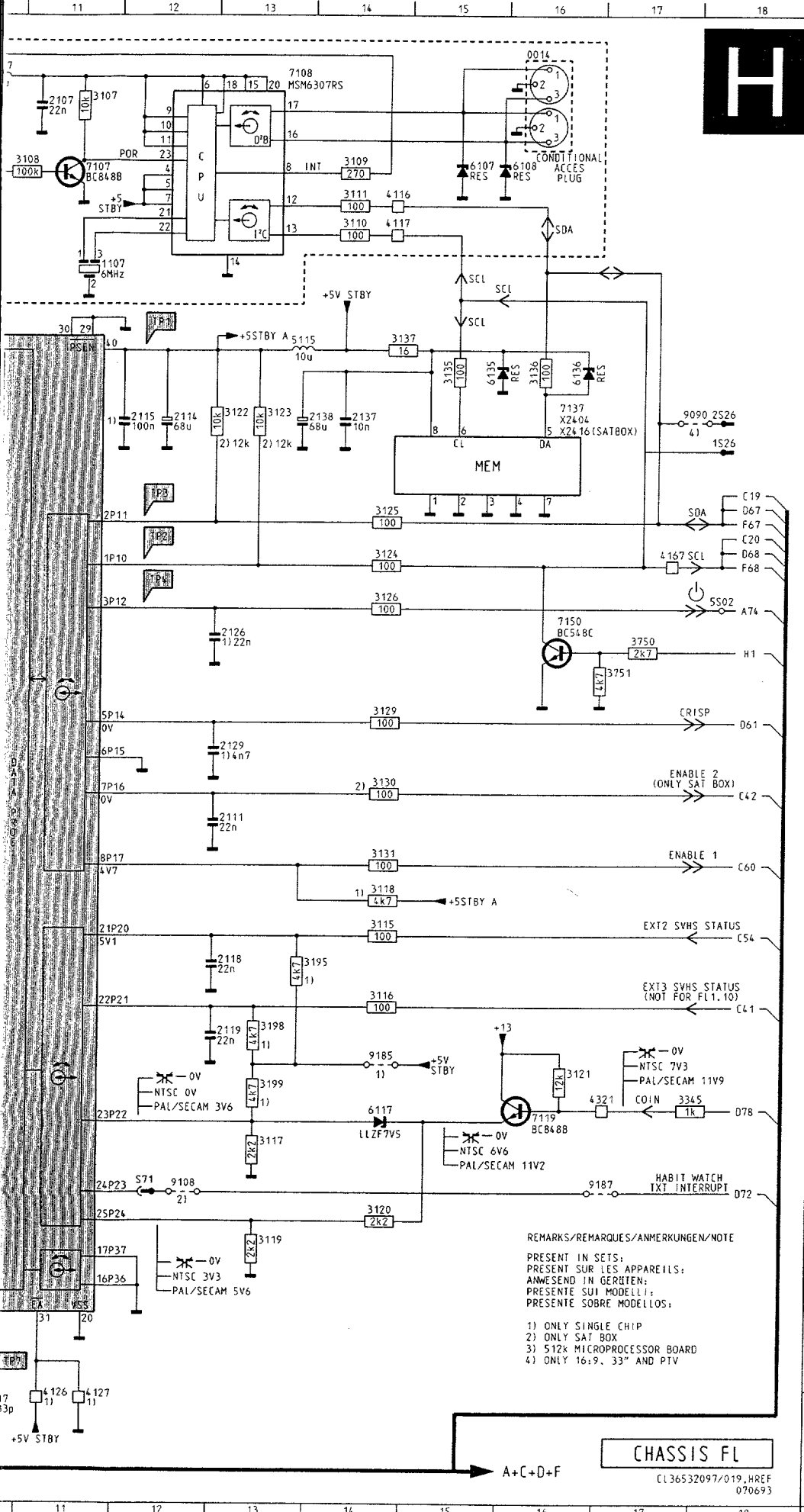
CHASSIS FL 1.10

CL36532097/011, AREF 070693

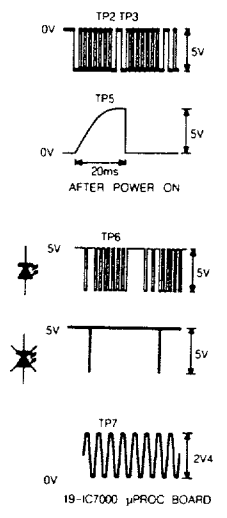
B+C+D+F+G+H



# Controls / Bedienung / Commande



0014	A16
1001	A 2
1100	A 3
1107	C11
1115	H10
2100	C 4
2107	A11
2108	E 7
2109	E 6
2110	A 8
2111	I13
2114	D12
2115	D12
2116	O10
2117	O10
2118	J13
2119	K13
2126	G13
2129	H13
2130	L 9
2131	L 1
2132	F 6
2137	D14
2138	D13
3100	A 7
3101	C 8
3102	D 5
3103	D 5
3104	E 5
3107	A11
3108	B11
3109	B14
3110	B14
3111	B14
3115	J14
3116	J14
3117	L13
3118	I14
3119	M13
3120	M14
3121	K16
3122	D13
3123	D13
3124	F14
3125	E14
3126	F14
3128	K 1
3129	H14
3130	H14
3131	I14
3132	F 5
3134	G 8
3135	D15
3136	D16
3137	D14
3138	G 8
3139	G 8
3140	H 8
3141	H 8
3142	I 8
3143	I 8
3144	J 8
3145	J 8
3146	K 8
3147	M 9
3148	F 4
3149	F 3
3150	F 4
3157	L 8
3158	K 8
3169	K 8
3195	J13
3198	K13
3199	K13
3345	L17
3750	G17
3751	G17
4116	B14
4117	B14
4126	O11
4127	O11
4129	K 2
4167	F17
4203	G 4
4321	L17
5100	B 4
5107	A10
5115	O13
6107	B15
6108	B16
6117	L14
6130	M 9
6135	D15
6136	D16
7107	B11
7108	A13
7115	D10
7119	L16
7130	L 1
7137	D16
7150	G16
8911	M 1
9090	D17
9096	B10
9108	L12
9152	B10
9185	K14
9187	L17



REMARKS/REMARQUES/ANMERKUNGEN/NOTE  
 PRESENT IN SETS:  
 PRESENT SUR LES APPAREILS:  
 ANWESEND IN GERÄTEN:  
 PRESENTE SUI MODELLI:  
 PRESENTE SOBRE MODELOS:  
 1) ONLY SINGLE CHIP  
 2) ONLY SAT BOX  
 3) 512K MICROPROCESSOR BOARD  
 4) ONLY 16:9, 33" AND PTV

CHASSIS FL

CL 36532097/019, HREF 070693

# Electrical adjustments

## 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

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

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 FQ916/ME/IF	2
	PIP Module	8
	NTSC-M	16
	NICAM module	64 +

Option code 1 is now: 218

Option code 2	Function	Value
	Comb filter	128+

Option code 2 is now: 128

Option code 3	Function	Value
	-	0 +

Option code 3 is now: 0

Option code 4:	Function	Value
	IC 7000 = MC 141625	16 +

Option code 4 is now: 16

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

Optioncode	Nbr.
	1-32
	64
	128

Optioncode	Nbr.
	1
	2
	4
	8
	16
	32-128

Optioncode 2	
Nbr.	Function
1	Not in use
2	Not in use
4	100Hz featuring present
8-32	Not in use
64	100 Hz LFR box present
128	Comb filter (see further the number 16 of option code 4).

Optioncode 3	
Nbr.	Function
1-32	Not in use
64	16:9 present
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 (100 Hz, LFR) 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.
8	Not in use
16	Comb filter: IC 7000 = MC 141625 (see further the number 128 of option code 2).
32-128	Not in use

## 8. Repair tips

### 1. The Service Default Mode

The FL1/2 is 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 (see also Section 9).

#### 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.

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DK

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

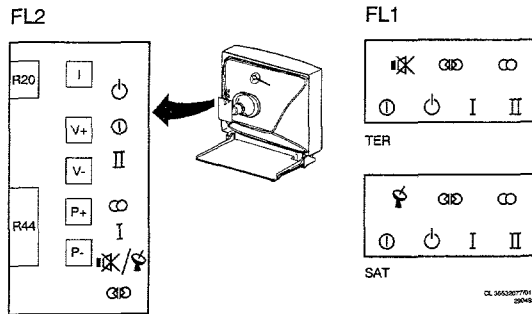


Fig. 8.1

### 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. 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.

## 7 Diagnosis and protection

### 7.1 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.

### 7.2 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 <0.5V during stand-by and software protection.

### 7.3 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/+16/-11/-16V for the audio output amplifier defective (SOUND-PROT). [diagram G]  
The protection circuit activates when the +11/+16V and -11/-16V 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  $U_{be}$  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.

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.

## 4 Software protection

### 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 I<sup>2</sup>C 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 §8.1).

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 I<sup>2</sup>C 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 I<sup>2</sup>C 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.

### 7.4.2 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 I<sup>2</sup>C 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.

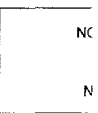
8 +13V on the small signal panel (SSP) [diagrams A, D and F].

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 I<sup>2</sup>C 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.

### 7.5 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

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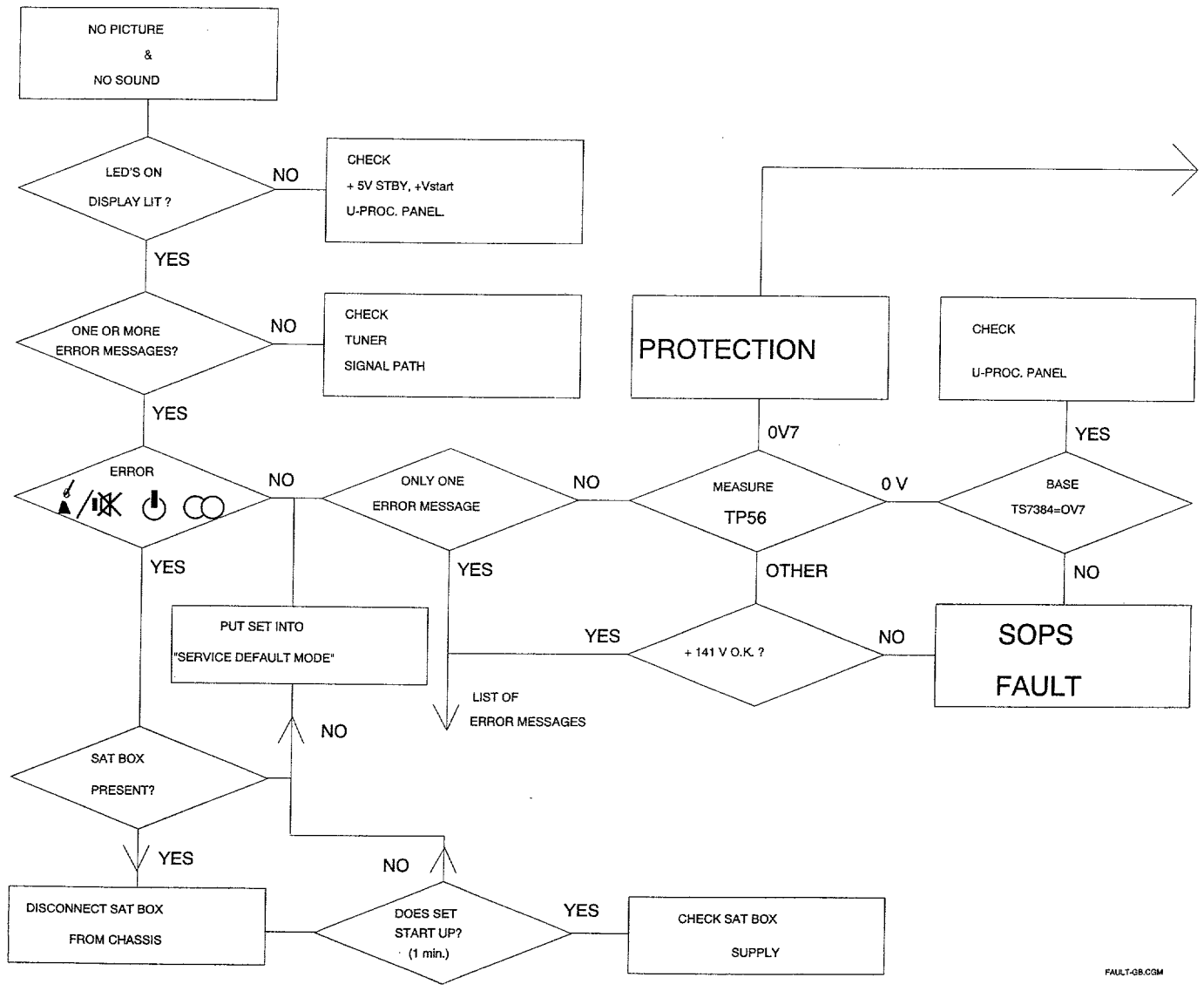
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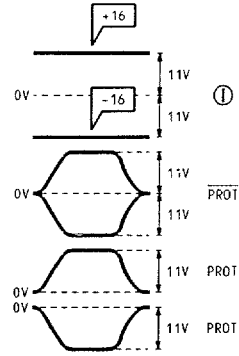
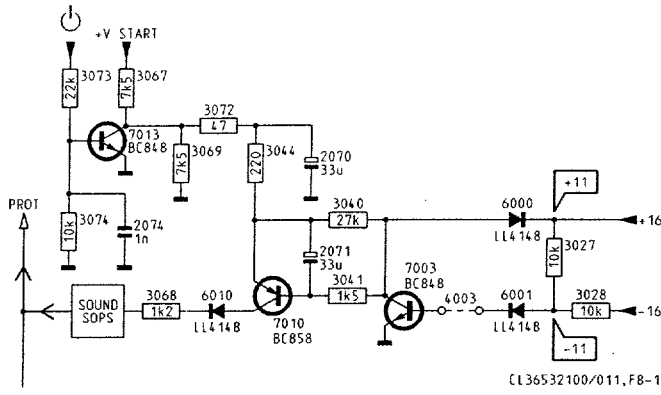
event  
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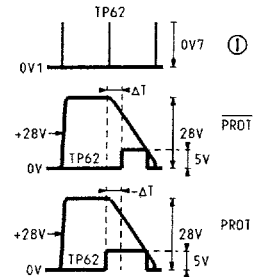
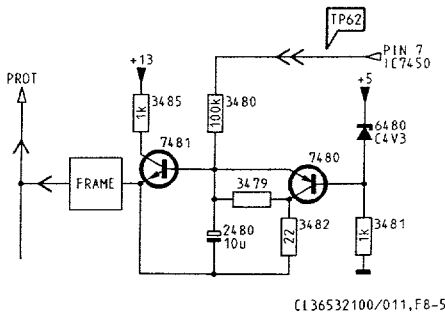
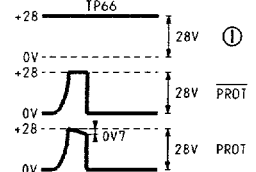
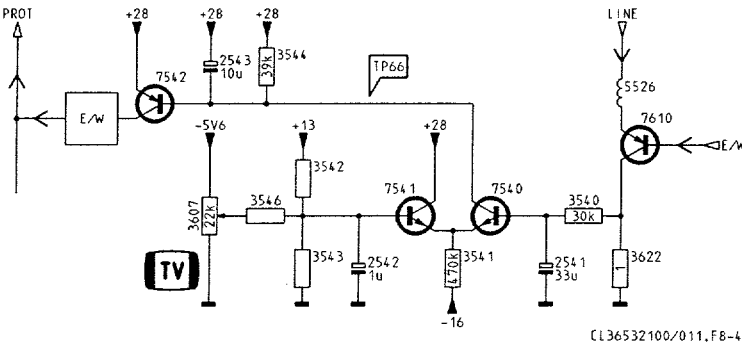
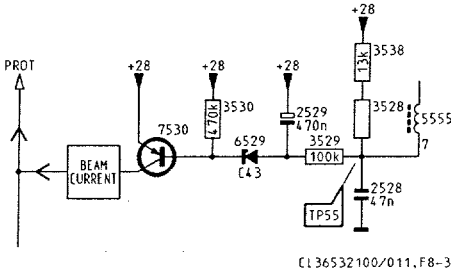
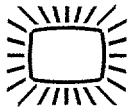
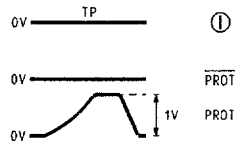
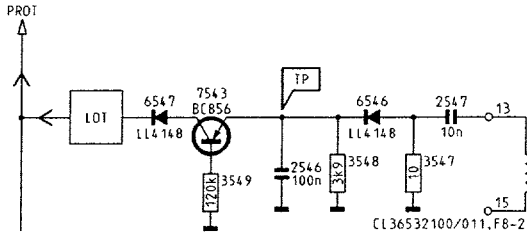


FAULT-GB.COM

**SOPS**  
+ 16  
- 16



**EHT**



**+V**

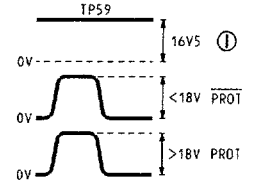
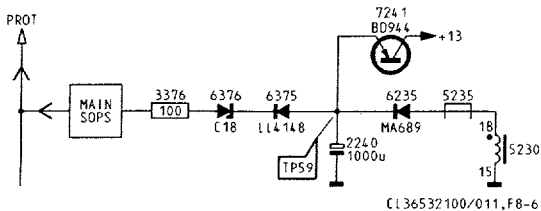







Fig. 8.2

CL36532100/011, FREF 110693

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## List of error messages

Error number on screen	Flashing LED							Description of error
								
1 <sup>1)</sup>			X		X	X		I <sup>2</sup> C, IC7108, SSP [H] (MSM6307)
3					X	X		I <sup>2</sup> C, IC7215, TXT SAA 9042 [L] [L'] I <sup>2</sup> C, IC7111, TXT SAA 9042 [L]
4				X			X	I <sup>2</sup> C, IC7220, 100Hz [M] [L'] 83C652
5				X				I <sup>2</sup> C, IC7408, PIP [J] (SDA9088)
6				X	X	X		I <sup>2</sup> C, IC7600, SSP [F] (TDA8417)
7							X	I <sup>2</sup> C, IC7680, SSP [F] (TDA8425)
8						X	X	IC7440, frame rotation [Z], PCF8574 (16:9)
9			X	X		X		I <sup>2</sup> C, IC7430, SSP [D] (TDA4680)
10				X	X		X	I <sup>2</sup> C, IC7395, SSP [D] (TDA8443)
11				X	X			I <sup>2</sup> C, front-end, SSP [C] (FQ 9XX)
12						X		I <sup>2</sup> C, IC7137, SSP [H] (X24C04)
13			X					I <sup>2</sup> C, bus on chassis blocked
14			X	X				I <sup>2</sup> C, IC7258, SSP [C] (HEF4094)
15			X	X	X			I <sup>2</sup> C, IC7219, SSP [C] (TEA6414)
16			X			X		I <sup>2</sup> C, IC7040, SAT Interface [P] (TEA6414)
17			X		X			IR-receiver on SSP [H] blocked (1100)
18				X		X	X	7115, SSP, $\mu$ proc. [H]
19			X	X	X	X		UART Bus blocked, 7115, SSP, $\mu$ proc. [H]
20				X	X	X	X	7115, SSP, $\mu$ proc. [H]
21				X				EAROM X24C04 empty, IC7137, SSP [H] (§ 8.3)
23	X					X		I <sup>2</sup> C, IC7080, convergence panel [V] (TDA8444)
28		X						I <sup>2</sup> C, PIP tuner [J]
29		X						I <sup>2</sup> C, IC7638, PIP-modulo [J] (SAA1300)
30			X		X		X	I <sup>2</sup> C, IC7175, SSP [C] (PCF8574)
31			X		X	X	X	I <sup>2</sup> C, IC7001, NICAM-panel [K] (SAA7280)
33		X						I <sup>2</sup> C, PLL (1500) PIP modulo [L]
34 <sup>1)</sup>	X		X				X	LNC supply on SAT box [Q,R] not correct
35 <sup>1)</sup>	X		X		X		X	IM-bus on SAT box [Q,S] blocked.
36 <sup>1)</sup>	X		X	X			X	I <sup>2</sup> C, bus on SAT box blocked.
37 <sup>1)</sup>	X		X	X	X		X	I <sup>2</sup> C, IC7450, D2-MAC [S] (X24C02)
38 <sup>1)</sup>	X		X			X	X	I <sup>2</sup> C, SAT Tuner [Q] (SF914; SF916)
39 <sup>1)</sup>	X		X		X	X	X	HEF STROBE 1, IC7925, FSS [T] (HEF4094)
40 <sup>1)</sup>	X		X	X		X	X	D2-MAC [S]
41 <sup>1)</sup>	X		X	X	X	X	X	HEF STROBE 2, IC7475, D2-MAC [S] (HEF4094)
42 <sup>1)</sup>	X				X		X	IC7250, TUNER/CONTROL [Q]
43 <sup>1)</sup>	X			X			X	UART bus blocked IC7250, TUNER/CONTROL [Q].
44 <sup>1)</sup>	X			X	X		X	SAT Tuner [Q] (SF914/916)
45 <sup>1)</sup>	X					X	X	IC7250, TUNER/CONTROL [Q]
46 <sup>1)</sup>	X				X	X	X	IC7250, TUNER/CONTROL [Q]
47 <sup>1)</sup>	X			X		X	X	IC7262, TUNER/CONTROL [Q]
48 <sup>1)</sup>	X			X	X	X	X	D2-MAC [S]
49 <sup>1)</sup>	X			X		X		EAROM X24C02 empty, 7450, D2-MAC [S] (§17)
51 <sup>1)</sup>					X	X	X	IC7250, TUNER/CONTROL [Q]
52 <sup>1)</sup>			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).