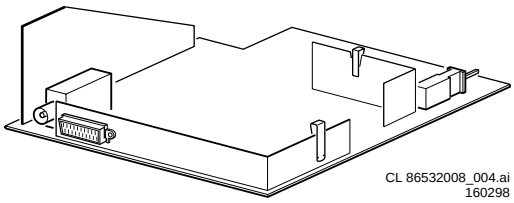
Colour Television

Chassis

L7.2E

AA

Service
Service
Service



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Service Manual

Table of contents

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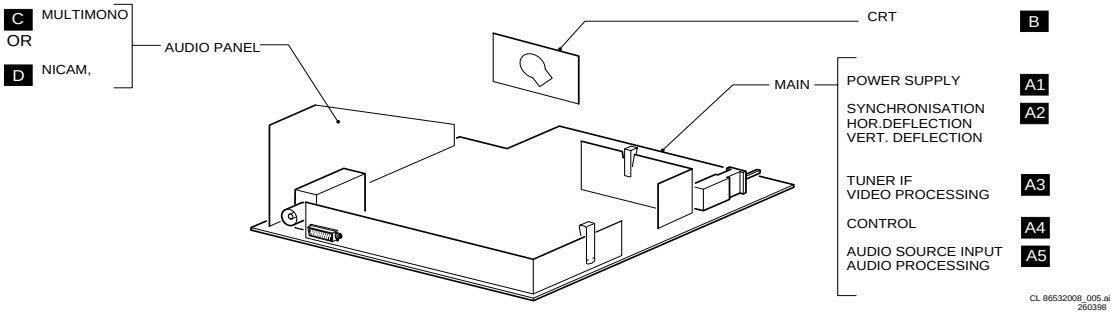
PHILIPS

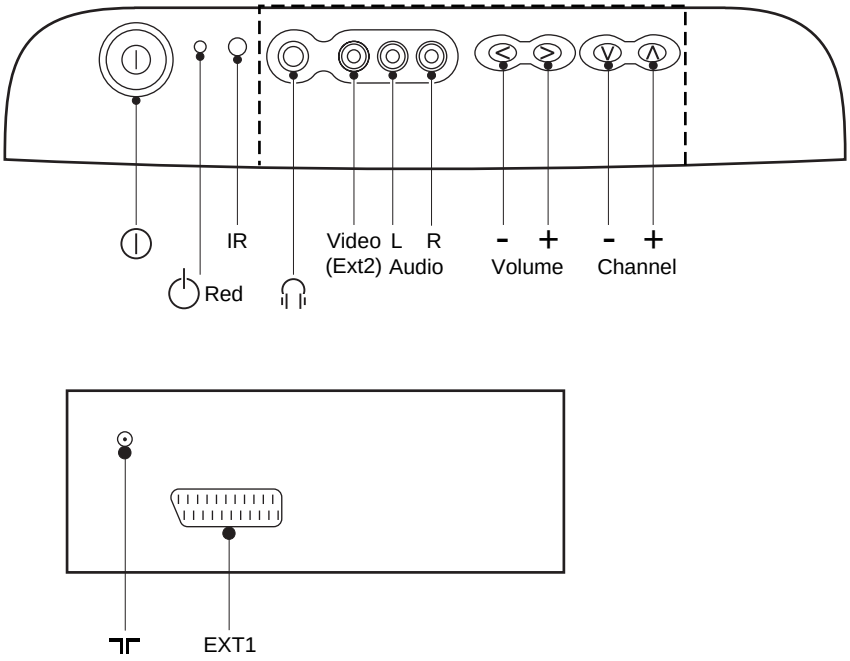
1 Technical specifications

Mains Voltage:	:	220 - 240 V AC
	:	(+/- 10%)
Power consumption	:	17” 50 W
	:	(stand by < 7 W)
	:	21” 57 W
	:	(stand by < 7 W)
Pull in range colour sync	:	+/- 300 Hz
Pull in range horizontal sync	:	+/- 600 Hz
Pull in range vertical sync	:	45 - 64.5 Hz

Location of panels



2 Connection facilities



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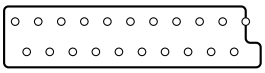
2.1 Cinch

-	Video	1Vpp/75Ω	⊙
-	Audio	L(0.5Vrms ≥10kΩ)	⊙
-	Audio	R(0.5Vrms ≥10kΩ)	⊙

2.2 Head phone

-	(32-600Ω ≥10mW)	3.5mm

2.3 Euroconnector



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	0-1.3V: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-	Earth socket		

3 Safety instructions, Maintenance instruction,

3.1 Safety instructions for repairs

Figure 3-1

1. Safety regulations require that during a repair:
   – the set should be connected to the mains via an isolating transformer;
   – safety components, indicated by the symbol (see fig. 3.1), should be replaced by components identical to the original ones;
   – when replacing the CRT, safety goggles must be worn.

2. Safety regulations require that after a repair the set must be returned in its original condition. In particular attention should be paid to the following points.
   – As a strict precaution, we advise you to resolder the solder joints through which the horizontal deflection current is flowing, in particular:
     • all pins of the line output transformer (LOT);
     • fly-back capacitor(s);
     • S-correction capacitor(s);
     • line output transistor;
     • pins of the connector with wires to the deflection coil;
     • other components through which the deflection current flows.

     Note: This resoldering is advised to prevent bad connections due to metal fatigue in solder joints and is therefore only necessary for television sets older than 2 years. The wire trees and EHT cable should be routed correctly and fixed with the mounted cable clamps.

   – The insulation of the mains lead should be checked for external damage.
   – The mains lead strain relief should be checked for its function in order to avoid touching the CRT, hot components or heat sinks.
   – The electrical DC resistance between the mains plug and the secondary side should be checked (only for sets which have a mains isolated power supply). This check can be done as follows:
     • unplug the mains cord and connect a wire between the two pins of the mains plug;
     • set the mains switch to the on position (keep the mains cord unplugged!);
     • measure the resistance value between the pins of the mains plug and the metal shielding of the tuner or the aerial connection on the set. The reading should be between 4.5 MW and 12 MW;
     • switch off the TV and remove the wire between the two pins of the mains plug.

   – The cabinet should be checked for defects to avoid touching of any inner parts by the customer.

3.2 Maintenance instruction

It is recommended to have a maintenance inspection carried out by a qualified service employee. The interval depends on the usage conditions:

– When the set is used under normal circumstances, for example in a living room, the recommended interval is 3 to 5 years.
– When the set is used in circumstances with higher dust, grease or moisture levels, for example in a kitchen, the recommended interval is 1 year.
– The maintenance inspection contains the following actions:
  • Execute the above mentioned 'general repair instruction'.
  • Clean the power supply and deflection circuitry on the chassis.
  • Clean the picture tube panel and the neck of the picture tube.

3.3 Warnings

1. ESD
   All ICs and many other semiconductors are susceptible to electrostatic discharges (ESD). Careless handling during repair can reduce life drastically. When repairing, make sure that you are connected with the same potential as the mass of the set by a wristband with resistance. Keep components and tools also at this same potential.
   – Available ESD protection equipment:
   – anti-static table mat (large 1200x650x1.25mm) 4822 466 10953
   – anti-static table mat (small 600x650x1.25mm) 4822 466 10958
   – anti-static wristband 4822 395 10223
   – connection box (3 press stud connections, 1 M ohm) 4822 320 11307
   – extension cable (2 m, 2 M ohm; to connect wristband to connection box) 4822 320 11305
   – connecting cable (3 m, 2 M ohm; to connect table mat to connection box) 4822 320 11306
   – earth cable (1 M ohm; to connect any product to mat or connection box) 4822 320 11308
   – complete kit ESD3 (combining all 6 prior products - small table mat) 4822 310 10671
   – wristband tester 4822 344 13999
2. 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. 3.2 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 0V (after approx. 30s).
3. Together with the deflection unit and any multipole unit, the flat square picture tubes used from 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.
4. Be careful during measurements in the high-voltage section and on the picture tube.
5. Never replace modules or other components while the unit is switched on.
6. When making settings, use plastic rather than metal tools. This will prevent any short circuits and the danger of a circuit becoming unstable.
7. Wear safety goggles during replacement of the picture tube

3.4 Notes

1. The direct voltages and oscillograms should be measured with regard to the tuner earth , or hot earth as this is called (see fig. 3.3)
2. The direct voltages and oscillograms shown in the diagrams are indicative and 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 (see fig. 3.3).
4. The picture tube PWB 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.

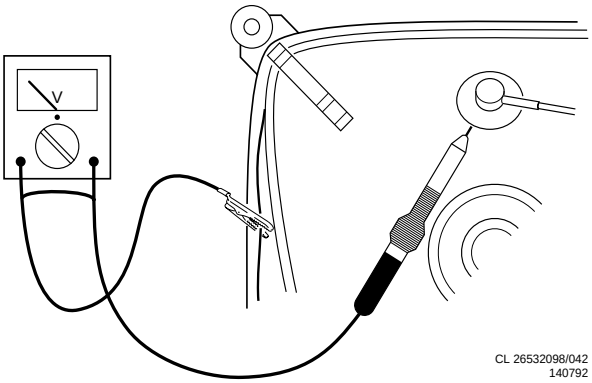


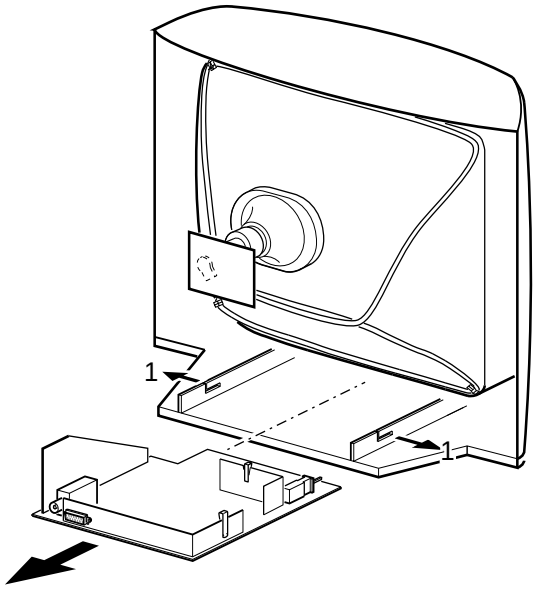
Figure 3-2

tuner earth tuner aarde la masse du tuner Tuner-Erde massa del tuner tierra del sintonizador	hot earth hete aarde la terre directe heißen Erde massa calda tierra caliente
with aerial signal met antenne signaal avec signal d'antenne mit Antennensignal con segnale d'antenna con la señal de antena	without aerial signal zonder antenne signaal sans signal d'antenne .ohne Antennensignal senza segnale d'antenna sin la señal de antena
normal condition normaal bedrijf fonctionnement normal normaler Betrieb funzionamento normale funcionamiento normal	stand by stand by position de veille in Bereitschaft modo di attesa posición de espera

Figure 3-3

4 Mechanical instructions

For the service position of the main carrier see Fig. 4.1.
The main carrier can be removed by releasing the 2 carrier blocking lips (1) and pulling the carrier panel backwards.



A

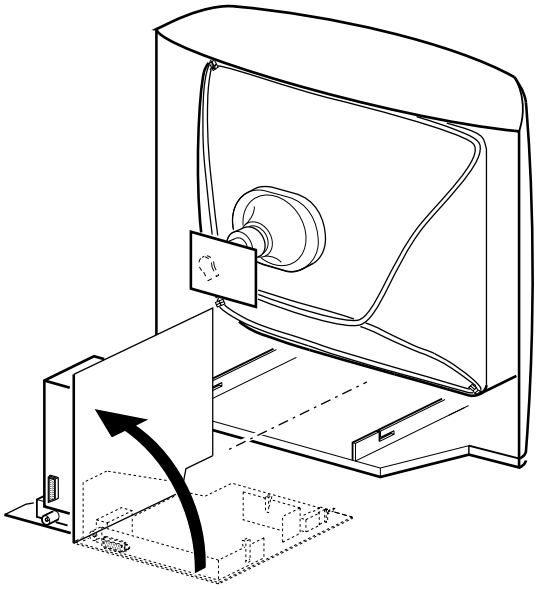


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Figure 4-1

5 Repair facilities

5.1 Test points

The PWB boards have service printing on both sides. In the service printing test points are included. These test points are referring to the electrical function as mentioned below:

Test pointElectrical function

- A1,A2, etc.: Audio
- C1,C2, etc.: Control
- F1,F2, etc.: Frame drive and frame output
- L1,L2, etc.: Line drive and line output
- P1, P2,etc.: Power supply
- S1,S2- etc.: Synchronisation
- V1,V2, etc.: Video

The numbering is done in a for diagnostics logical sequence.

Example: Checking the power supply, start with test point P1, P2 etc.).

5.2 Service mode

The service mode is split into two parts:

– Service Default Mode (SDM).
– Service Alignment Mode (SAM).

5.2.1 Entering and leaving SDM and SAM

1. Entering SDM
   - To entry the SDM , there are two possibilities:
     – Via the "DEFAULT" button on the DST (Dealer Service Tool)
     – Via short circuiting the service pins 0025 and 0024 (mass), while switching on the set via the mains switch. For 0025 and 0024 see Diagram A4 and the PWB drawing of the main panel.
   - In the SDM mode a S (in green) and the SDM menu (in red) is displayed.(see Fig.6.1).
2. Entering SAM
   - To entry the SAM , there are two possibilities.
     – Via the "ALIGN" button on the DST (Dealer Service Tool)
     – Via short circuiting the Service pins M28 and M29 (mass), while switching on the set via the mains switch. For M28 and M29 see Diagram A4 and the PWB drawing of the main panel.
   - In the SAM mode a S (in green) and the SAM main menu (in red) is displayed.(see Fig.6.2).

Remark: After the set is in the SDM or SAM mode the short circuit can be removed.

5.2.2 Leaving SDM or SAM

To leave the SDM or SAM mode , push the stand-by button on the remote control

Remark: After switching off and on by the mains switch , the set remains in the SDM or SAM mode.

5.3 Initial states

The initial state after switching on in the SDM or SAM mode is:

System:

– For Multi-Europe setsPAL-BG
– For Multi-France setsSECAM-L

Tuning:

– For sets with VST tuner: Programme number 1 is selected .

Further settings:

– The automatic switch off (no IDENT) timer and the sleep timer will be ignored.
– The child lock will be disabled.
– If the TV set was in hotel mode, this mode is disabled as long as the TV is in SDM or SAM mode.
– Brightness, saturation, sharpness, contrast and balance are initialised on 50% level.
– The volume is set to 25% level.
– The TV set is normally controllable.
– All displayed text in SDM and SAM menu are in English.

5.4 SDM (Service Default Mode)

5.4.1 SDM menu

Below in Fig.6.1 an example of the SDM menu is shown.

Between clamps a short explanation of each item is added.

001E	2.17.6	S
(life timer)	(software indication)	(service mode indication)
AS		ON
(option abbreviation)		(option status)
ERR		0 0 0 0 0
(error)		(error buffer)
OPT	36C8 B805 2401	
(option)	(12 digit option code)	

Fig.6.1

Below a more detailed information of each item is given

5.4.2 Life timer

The indication is in hexadecimal notation. Each hour the set is switched on (not standby) the number is incremented by 1. Also each time the set is switched on the number is incremented by 1.

5.4.3 Software indication number.

For each software change this number will be changed.

5.4.4 Service mode indication.

The S indicates that the set is in SDM or SAM mode.

5.4.5 ERROR and ERROR buffer

(ERR refers to the "ERROR BUFFER")

00000 represent the contents of the so called "ERROR BUFFER". This buffer consist of 5 digits. In each digit an ERROR code can be displayed. The last five errors, are stored in the EEPROM, and are shown in this buffer. An error will be added to the buffer if this error differs from the last error in the buffer. The last detected error is displayed on the most left digit.

Example: Suppose the display shows: 3 4 1 3 1. This means the last found error is error code 3; the last found error but one is error code 4, etc.

Remark: The ERROR BUFFER is erased when the set is switched from SDM or SAM in stand by , or via code 99 via DST.(Dealer service Tool).

The following error codes have been defined:

Error code	Error description	Possible defective omponent
0	No error	
1	Internal RAM error of æC	IC7600
2	General I2C error	
3	EEPROM Configuration error (Checksum error)	Set not correct configured
4	I2C error audio processor	MSP3410 on NICAM panel
5	I2C error TV processor	TDA8373/74
6	EEPROM error	ST24C04
7	I2C error PLL tuner	PLL tuner
8	POR bit high (43-IC7600)	

5.4.6 ERROR code indication via blinking stand by LED

The ERROR codes 2, 5 and 8 are also indicated via blinking of the stand by LED. This is important if no OSD function or picture is available.

The method is to show LED blinks as many as the error code.

Example: Error code 5 will result in five blinks (0.25 seconds ON and 0.25 seconds OFF).

After this sequence the LED will be OFF for 3 seconds.

5.4.7 Option abbreviation and Option status.

To select another option abbreviation use the MENU UP/ DOWN buttons and to change the status use the MENU LEFT/ RIGHT buttons.

Elucidation:

With above items the option statuses stored in the EEPROM can be changed.

This is necessary if the EEPROM is replaced by a fresh EEPROM, because a fresh EEPROM is initial loaded with default options and statuses by the microcomputer. The options stored in the factory can differ per type and stroke number. Therefore it is necessary to load the EEPROM with the correct statuses These options with statuses are indicated on a sticker glued on the CRT. For an example of the sticker see table 6.1 (this table is valid for 21PT1663/00).

Table 6.1

Option abbreviation	Status
AT	ON
AV	ON
BA	ON
BL	ON
CO	OFF
GM	ON
HO	ON
MT	PH
PG	ON
PR	99
SA	ON
SB	IN
SP	ON
SS	ON
SU	ON
SY	EW
TR	ON
UH	OFF
VI	OFF
XT	ON

(Table only valid for 21PT1663/00)

Loading a fresh EEPROM

- Switch on the TV via the power switch.
- Audio mute the TV (to get no big noise).
- Change the option statuses as indicated on the sticker on theCRT.
- Put TV in stand by via the remote control.
- Switch on the TV again via the remote control.

5 Repair facilities

– Switch OFF the TV via the power switch
– Switch on the TV again via the power switch.

In table 2 all the possible option abbreviation with full option name and possible statuses for "Europe" sets are listed. The status can be "ON", "OFF" or can have another indication.

Table 2 : Options

Option abbr	Option full name	Status possibilities
AT	Auto tuning system	ON/OFF
AV	AVL	ON/OFF
BA	Bass	ON/OFF
BL	Balance	ON/OFF
CO	Clock In Menu	ON/OFF
GM	Game mode	ON/OFF
HO	Hotel mode	ON/OFF
MT	Menu type	PH = Philips
		NB = National brand
		MV = Magnavox
PG	Program guide	ON/OFF
PR	Presets	99
		59
		79
SA	Spatial	ON/OFF
SB	Sound Board	IN = ITT NICAM
		IT = ITT 2CS
		MA = MONO ALL
		MM = Multi Mono
SP	Smart picture	ON/OFF
SS	Smart Sound Full	ON/OFF
SU	Surf	ON/OFF
SY	System Cluster	EW = Europe West
		EE = Europe East
		EM = Europe Manual
		SS = Single System
TR	Treble	ON/OFF
UH	UHF only	ON/OFF
VI	Virgin Mode	ON/OFF
XT	EXT 2 Available	ON/OFF

5.4.8 OPTION code

OPT is the abbreviation of OPTION, this abbreviation refers to the following 12 digit hexadecimal option codes (36C8 B805 2401)

The option code can not be selected. It only give a quick indication in hexadecimal form of the options settings of the relevant set.

5.5 SAM (Service Alignment Mode)

Via the SAM, service software alignments can be executed.

When entering SAM a main menu is displayed Via the main menu sub menus can be selected.

5.5.1 SAM main menu (see Fig. 6.2)

In the main menu the items of the basic software alignments are indicated.

The items can be selected with the UP(+)/DOWN(-) arrow keys on the remote control. Entry into the sub menus is executed with the VOL.(+)/VOL.(-) arrow keys.

SAM MAIN MENU

	S
AKB	ON
TUN.FOA	ON
TUN.FOB	ON
EXT.FOA	ON
EXT.FOB	OFF
TUNER	>
WHITE TONE	>
GEOMETRY	>

Fig.6.2

Below each item is explained.

5.5.2 AKB (Auto Kine Biasing)

With the option AKB the "black current loop" can be enabled or disabled

ON =enabled, OFF = disabled.

5.5.3 TUNER Speed setting.

With the items TUN.FAO and TUN.FOB the speed (time constant) for internal signals is set. The speed can be set to normal, slow or fast.

Table 3: Options for Tuner Speed settings

TUN.FOA	TUN.FOB	Speed
OFF	OFF	Normal
OFF	ON	Slow
ON	X	Fast

5.5.4 EXTERNAL A/V Speed setting

With the items EXT.FAO and EXT.FOB the speed (time constant) for external signals is set. The speed can be set normal, slow and fast.

Table 4: Options for External AV Speed settings

EXT.FOA	EXT.FOB	Speed
OFF	OFF	Normal
OFF	ON	Slow
ON	X	Fast

5.5.5 Tuner

Below an example of the sub menu Tuner is shown.

Tuner	S
AGC	23
F-PLL	3
IF PLL L'	0
AFW	240 KHz
AFA	0
AFB	1

Item AGC:

For the setting of the item AGC see RF AGC adjustment paragraph 8.1.4 of chapter 8.

Item IF-PLL, IF-PLL L ACCENT, AFW, AFA and AFB,

When the main signal processor IC TDA8373/74 is changed, the IF-PLL and IF-PLL L ACCENT need to be realigned

For the settings of IF-PLL, IF-PLL L ACCENT and AFW see the picture demodulator adjustments paragraph 8.1.5 of chapter 8.

Remark: AFA and AFB are adjusting indicators and therefore not selectable.

5.5.6 White tone

Below an example of the white tone sub menu and the derived "WARM", "COOL" and "NORMAL" sub menus are given. With these menus the WARM, COOL and NORMAL colour temperatures can be changed.

MAIN WHITE TONE MENU

	S
WARM	<
COOL	<
NORMAL	<

WARM TEMPERATURE SUB MENU

WARM	S
RED	39
GREEN	39
BLUE	25

COOL TEMPERATURE SUB MENU

COOL	S
RED	39
GREEN	39
BLUE	25

NORMAL TEMPERATURE SUB MENU

NORMAL	S
RED	39
GREEN	39
BLUE	25

Remark:

Only one of the 3 items (RED, GREEN or BLUE) will be displayed on the screen. Via "scrolling with the UP/DOWN keys the items can be changed.

The item's red, green or blue can be changed by first pressing the control left/right keys to highlight the desired setting. With the desired setting high lighted, the user can increment or decrement the setting by using the control up/down key. All

changed data are stored into the EEPROM after returning to the SAM main menu via the OK key.

The initial default value for all setting is 37.

The factory settings of the colour temperatures are:

WARM; R = 45, G = 32, B = 26

NORMAL; R = 37, G = X, B = Y

COOL; R = 37, G = 32, B = 31

Remark: In NORMAL position the values X (G) and Y (B) are adjusted for 8500K colour temperature.

5.5.7 GEOMETRY

The geometry menu contains the following information:

	S
HSH	25
VSL	32
VAM	23
SC	13
VSH	27

Upon enter into the picture geometry menu, the first item will be highlighted.

The value can be incremented or decremented by pressing the control right or left key.

The rest of the parameters can be scrolled through by using the control up/down keys.

All changed data will be stored into the EEPROM after returning to the service main menu via the OK key.

Abbreviation explanation

- HSH - Horizontal shift
- VSL - Vertical linearity
- VAM - Vertical amplitude
- SC - S-correction
- VSH - Vertical shift

5.6 Use of Dealer Service Tool (DST)

With the SDM, under mentioned extra service features can be executed

- Direct entering SDM via the "DEFAULT" button on the DST.
- Direct entering SAM via the "ALIGN" button on the DST.
- In case of no (OSD) picture the error buffer can be read out using the "BLINKING LED" procedure (see also paragraph 6.7) by pressing the "DIAGNOSE" button on the DST.

Remark:

- Entry of the SDM and SAM via the DST is possible in all states, except from stand-by.
- All software is suspended till the DST mode is left.
- The dealer mode status is left if the stand-by command is received

5.7 Hotel-mode

Entering the hotel-mode :

- Select channel 38
- Push the menu button on the local keyboard (vol. + & vol. -) and the OSD-button of the RC simultaneously for 3 seconds.
- The screen shows the "HOTEL MODE SUB MENU "ON". Via this menu the wanted blanked channels can be selected.

Leaving the hotel mode :

- Same as entering the hotel mode.
- The screen shows the "HOTEL MODE SUB MENU "OFF".

Remarks:

- In the HOTEL mode the Installation menu cannot be entered.
- When entering the hotel mode the maximum volume will be the current value.
- The set will always switch to a selectable channel when set is switched on.

HOTEL MODE SUB MENU "ON"

38	HOTEL ON
EXIT	>
HOTEL CHANNEL	38

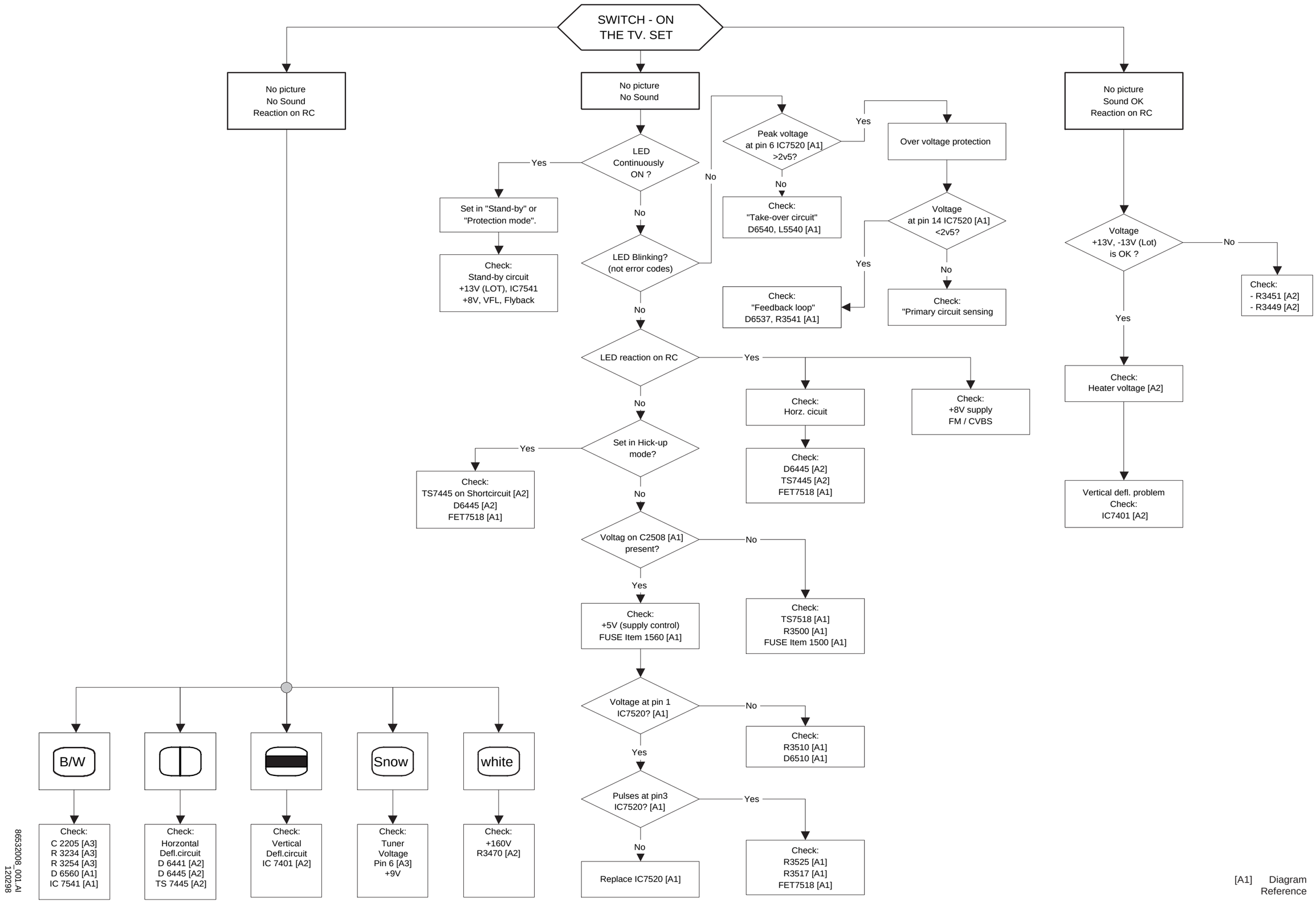
HOTEL MODE SUB MENU " OFF "

38	HOTEL OFF

Remark: The Hotel mode can only be activated if the Hotel mode option status (HO=ON), see table 2.

5 Repair facilities

6 Fault finding, Block diagram



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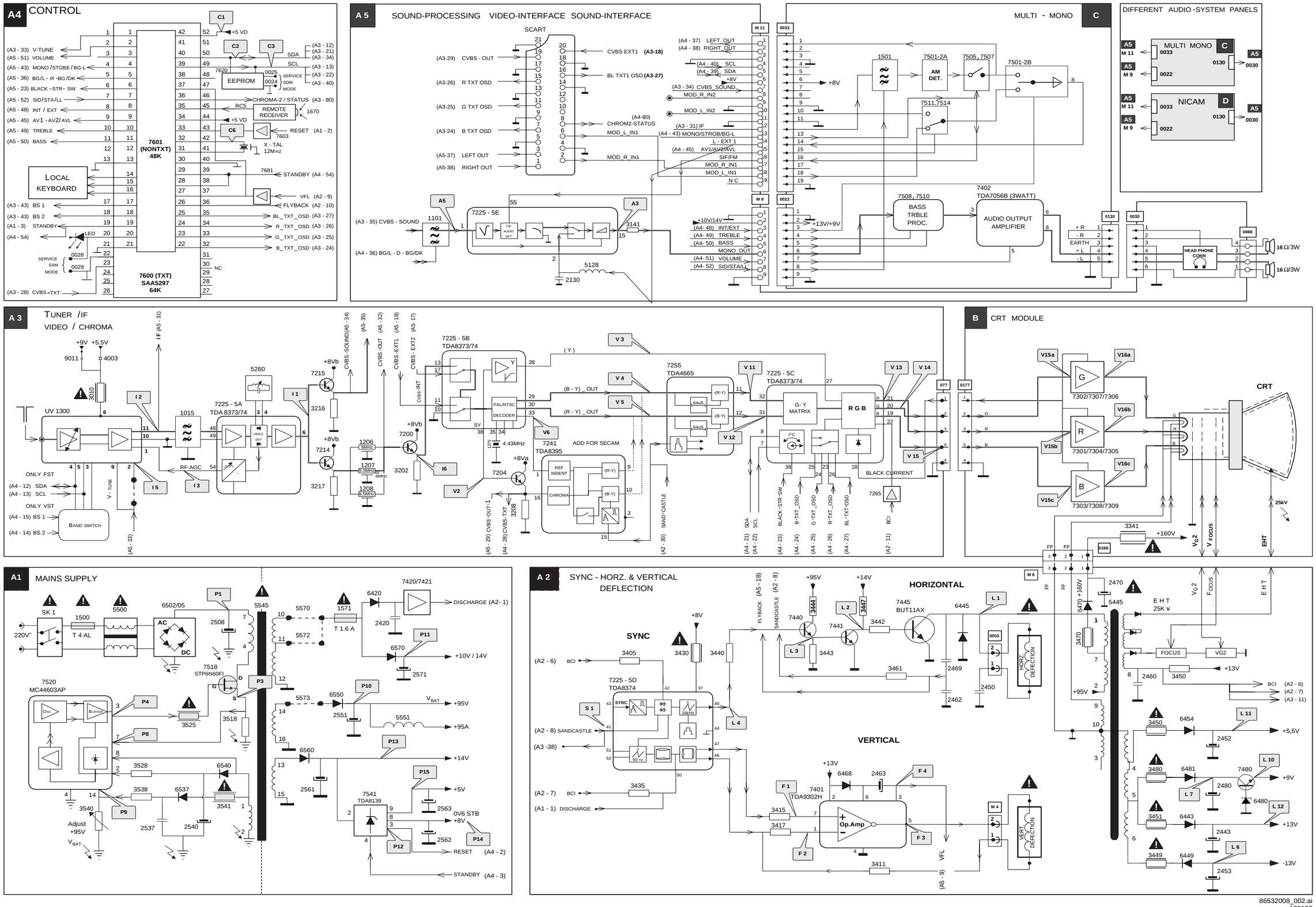
[A1] Diagram Reference

6 Fault finding, Block diagram



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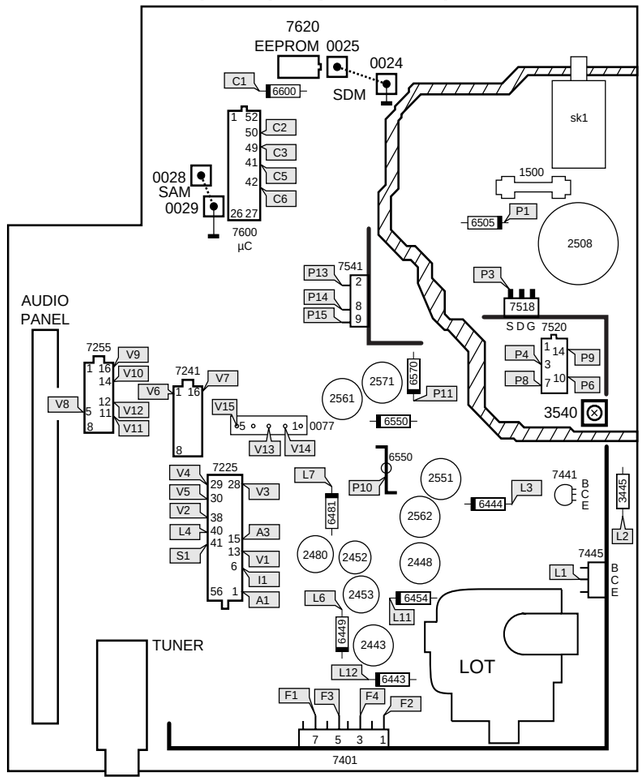
6 Fault finding, Block diagram

Main panel (component side)



A1 (1 - 7225 - 5E)
0.1V / div AC
0.1ms / div

P1 (7 - 5545)
100V / div DC
5ms / div

F1 (7- 7401)
0.5V / div DC
5ms / div

A2 (55 - 7225 - 5E)
5V / div AC
1ms / div

P3 (S - 7518)
0.5V / div DC
5µs / div

F2 (1 - 7401)
0.5V / div DC
5ms / div

C1 (52 - 7600)
5V DC

P4 ⓘ (3 - 7520)
2V / div DC
5µs / div

F3 (5- 7401)
20V / div DC
5ms / div

C2 (50 - 7600)
1V / div DC
5ms / div

P4 ⏻ (3 - 7520)
2V / div DC
5µs / div

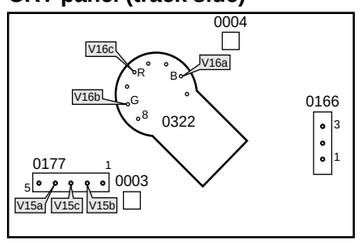
F4 (3 - 7401)
10V / div DC
5ms / div

C3 (49 - 7600)
1V / div DC
5ms / div

P6 (10 - 7520)
1V / div DC
5µs / div

L1 (C - 7445)
100V / div DC
20µs / div

CRT panel (track side)



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170298

V1 (13 - 7225 - 5B)
1V / div DC
20µs / div

C6 (42 - 7600)
1V / div DC
0.5µs / div

P8 (7 - 7520)
0.5V / div DC
5µs / div

L2 (3445 / 3442)
2V / div DC
20µs / div

V2 (38 - 7225 - 5B)
1V / div DC
20µs / div

V5 (30 - 7225 - 5B)
0.5V / div DC
20µs / div

P9 (14 - 7520)
0.5V / div DC
5µs / div

L3 (E- 7440)
2V / div DC
20µs / div

V15a,b,c (4M7)
1V / div DC
20µs / div

V16b (Green)
20V / div DC
20µs / div

S1 (41 - 7225 - 5D)
1V / div DC
20µs / div

V3 (28 - 7225 - 5B)
1V / div DC
20µs / div

V6 (11 - 7225 - 5B)
3.5V DC (PAL)

V12 (12 - 7225)
0.5V / div DC
20µs / div

L4 (40 - 7225 - 5D)
2V / div DC
20µs / div

V16a (Blue)
20V / div DC
20µs / div

V16c (Red)
20V / div DC
20µs / div

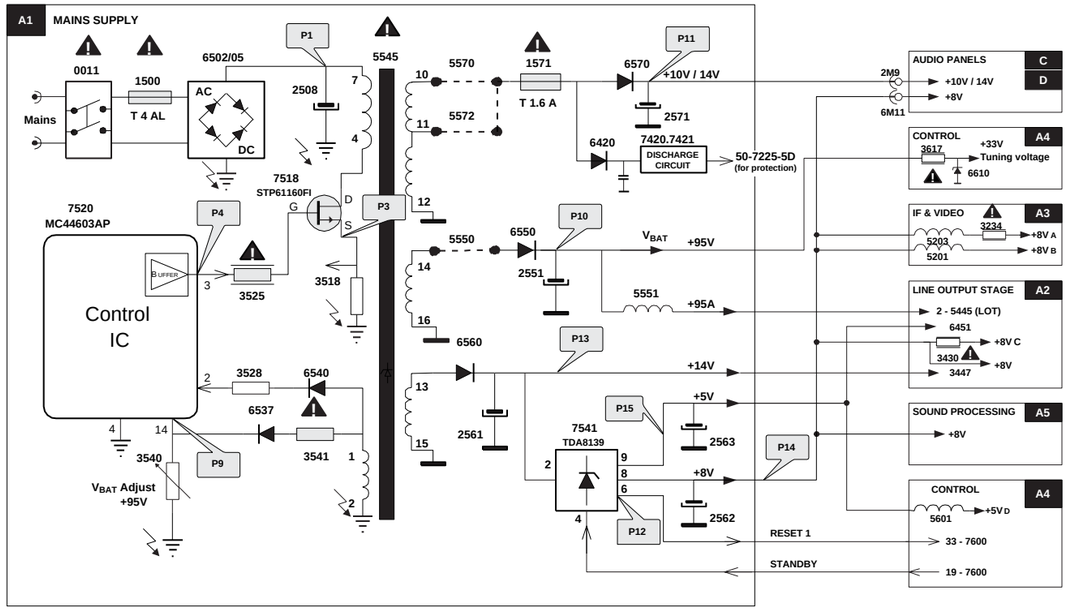
I1 (6 - 7225 - 5A)
1V / div DC
20µs / div

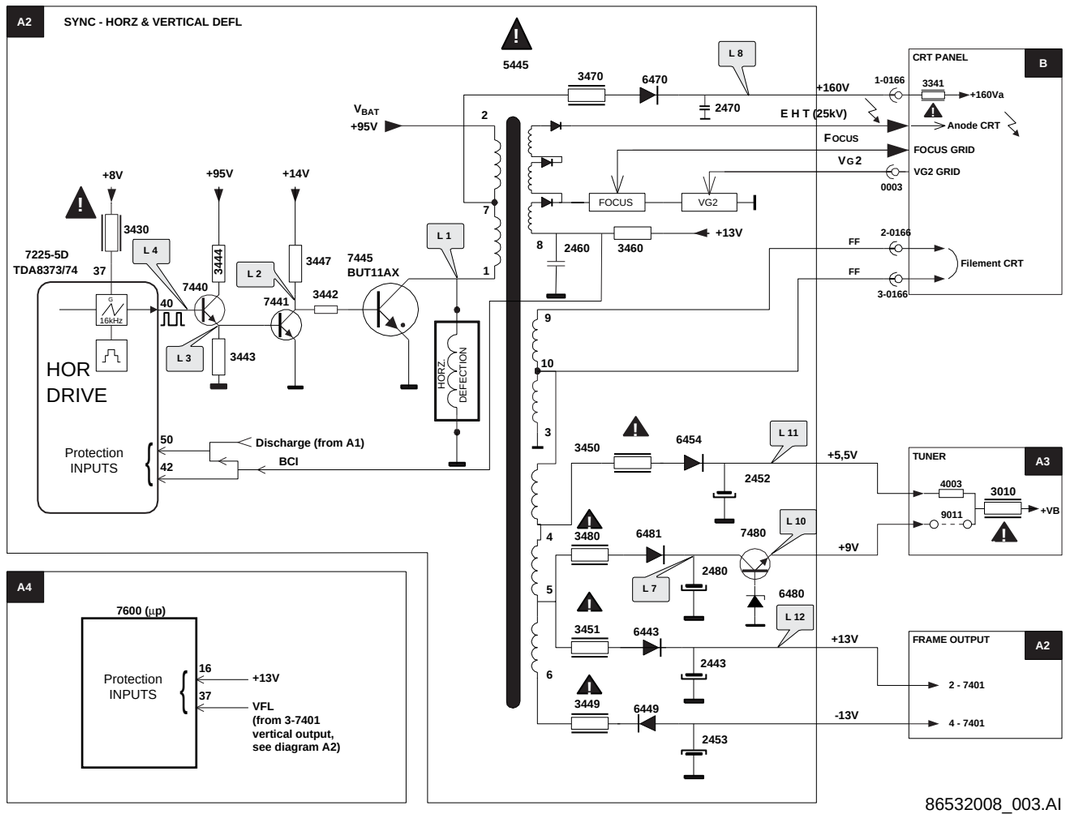
V4 (29 - 7225 - 5B)
0.5V / div DC
20µs / div

V11 (11 - 7255)
0.5V / div DC
20µs / div

V13 (3M7)
1V / div DC
20µs / div

V14 (2M7)
1V / div DC
20µs / div





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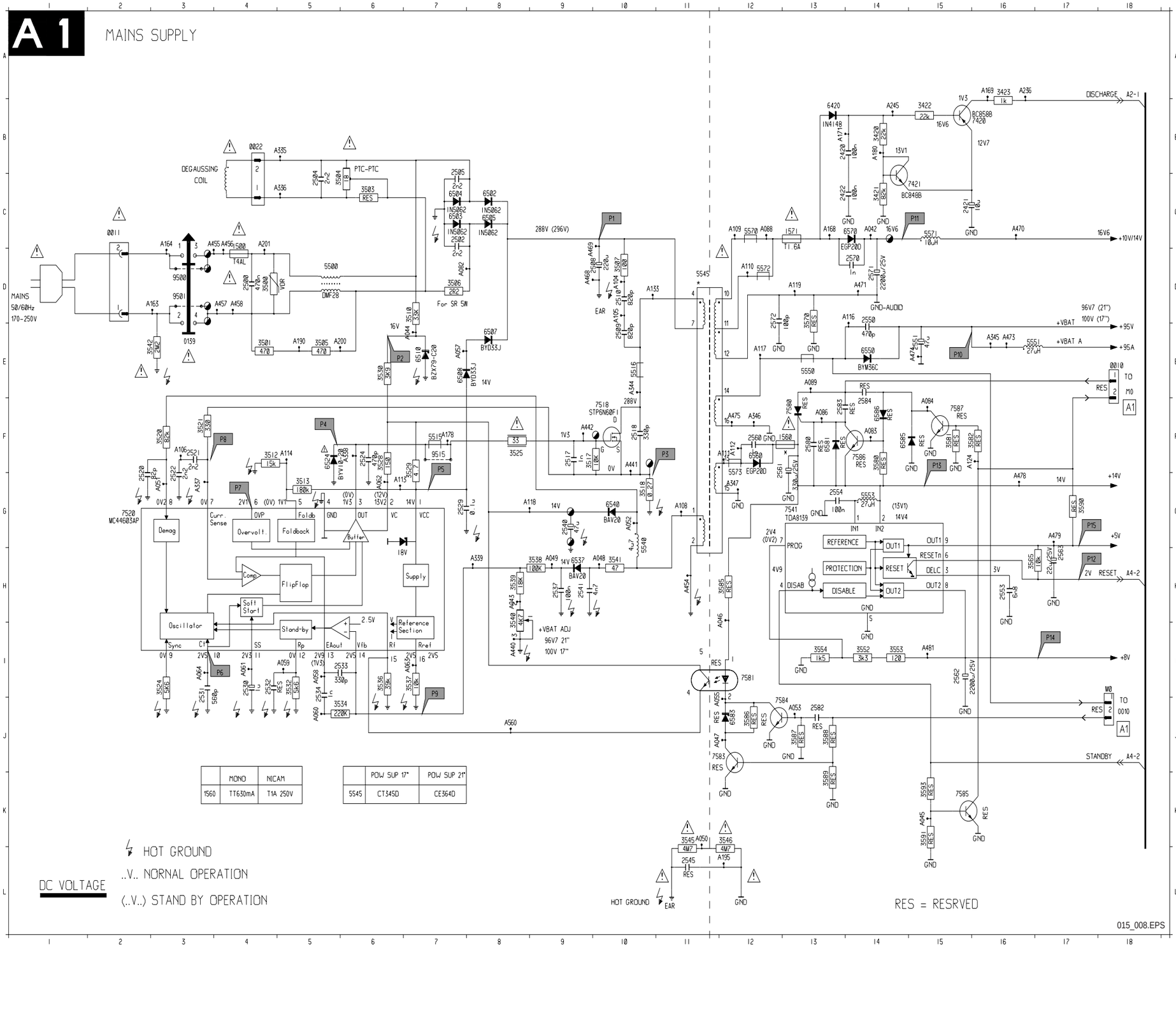
200298



	MONO	NICAM
1560	TT630mA	T1A 250V

	POW SUP 17"	POW SUP 21"
5545	CT345D	CE364D

P1 (7 - 5545)
100V / div DC
5ms / div

P8 (7 - 7520)
0.5V / div DC
5µs / div

P2 (C - 6510)
5V / div DC
5ms / div

P9 (14 - 7520)
0.5V / div DC
5µs / div

P3 (S - 7518)
0.5V / div DC
5µs / div

P10 ⏀ (C - 6550)
95V DC

P10 ⏻ (C - 6550)
104V DC

P4 ⏀ (3 - 7520)
2V / div DC
5µs / div

P11 ⏀ (C - 6570)
16V DC

P11 ⏻ (C - 6570)
14.4V DC

P4 ⏻ (3 - 7520)
2V / div DC
5µs / div

P12 ⏀ (6 - 7541)
2.1V DC

P12 ⏻ (6 - 7541)
2V DC

P5 (1 - 7520)
14V DC

P13 ⏀ (2 - 7541)
14.5V DC

P13 ⏻ (2 - 7541)
13.6V DC

P6 (10 - 7520)
1V / div DC
5µs / div

P14 ⏀ (8 - 7541)
8V DC

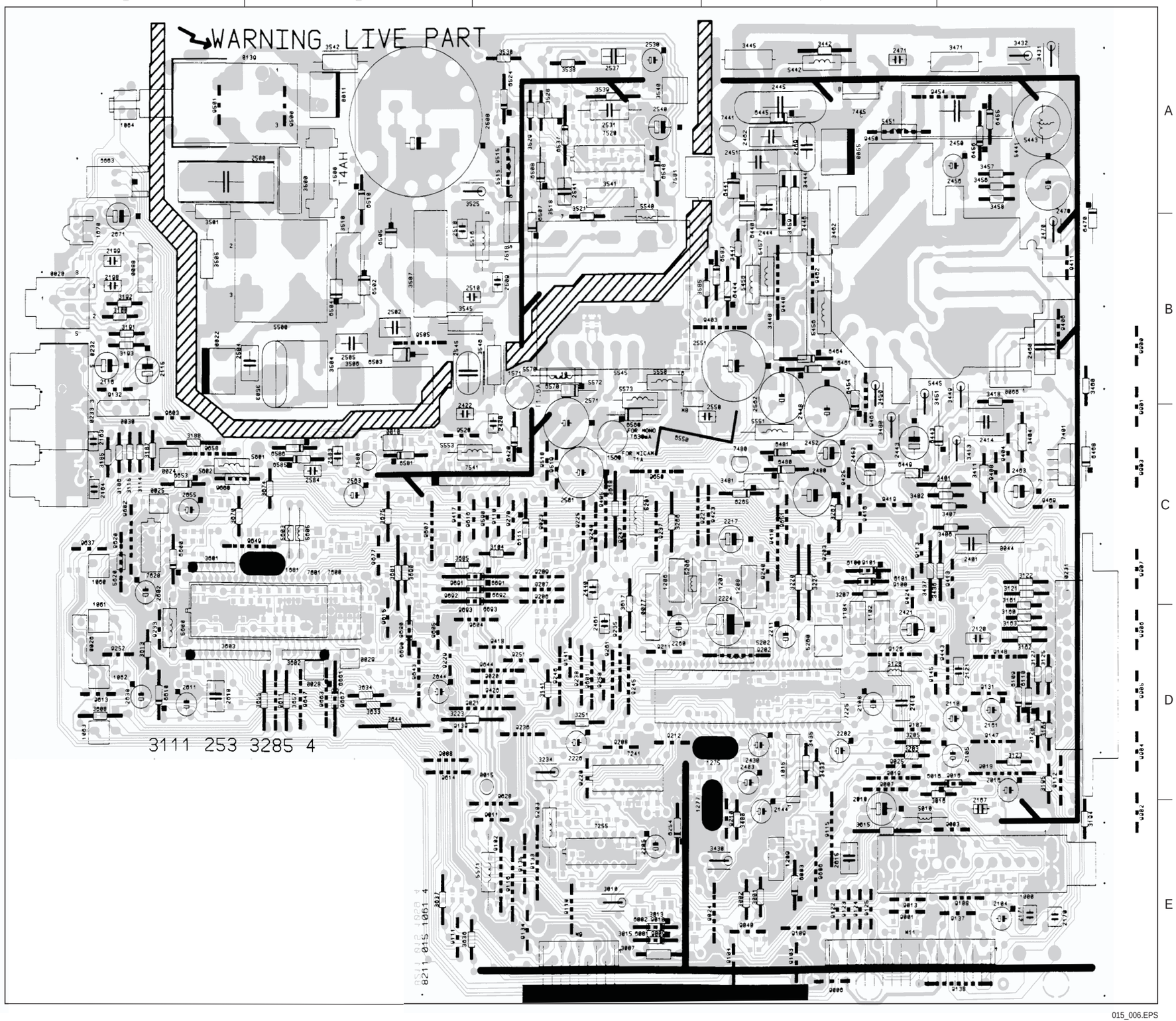
P14 ⏻ (8 - 7541)
0.6V DC

P7 (6 - 7520)
0.5V / div DC
5µs / div

P15 ⏀ (9 - 7541)
5V DC

P15 ⏻ (9 - 7541)
5V DC

7 Diagrams and print lay-outs



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0003 E2 2222 E3 * 2607 D2 * 3216 C4 * 3505 B1 4003 E3 * 6455 A5 9103 E4 9615 C2
0004 D1 2224 D4 2608 D2 * 3217 C4 * 3506 B2 4004 D4 * 6456 A5 9104 E4 9616 C3
0010 C2 2226 D3 2610 D1 3218 C4 * 3507 B2 4007 D5 * 6461 B4 9107 D4 9620 C1
0011 A2 2240 D3 * 2611 D1 3220 C4 3510 B2 4008 D4 * 6464 B4 9108 E5 9628 D3
0015 D3 2241 D3 * 2613 D1 * 3221 C4 3512 A3 * 4011 E5 * 6468 C5 9109 E4 9637 C1
0020 B1 2242 D3 * 2615 E4 3223 D3 3513 A3 * 4013 E5 * 6470 B5 9110 E3 9643 D2
0022 B1 2248 E3 * 2621 C1 * 3224 D3 * 3517 A3 * 4014 E5 * 6480 C4 9111 E2 9644 D3
0024 C1 2249 D3 * 2622 C1 * 3225 D3 * 3518 A3 4026 E4 * 6481 C4 9112 D5 9647 D2
0025 C1 2251 E3 * 2623 C1 * 3227 D4 * 3520 A3 * 4052 D4 * 6502 B2 9113 C4 9649 C2
0026 D1 2252 E3 * 2630 D1 3229 D4 * 3521 A3 4100 B1 * 6503 B2 9115 E4 9650 C3
0028 D2 2254 E3 * 2639 D2 * 3234 D3 3524 A3 * 4101 E3 * 6504 B2 9116 E3 9651 C4
A 0029 D2 2260 D3 2644 D2 3248 E3 * 3525 A3 4102 B1 * 6505 B2 9118 C3 9658 C1
0030 B1 2261 C3 * 2650 D1 * 3249 D3 * 3528 A3 4107 B1 * 6507 B3 9122 E4 9660 C2
0044 C5 2272 D4 * 2652 D1 * 3250 D3 * 3529 A3 4113 C5 * 6508 A3 9123 E4 9663 D2
0055 A4 2273 D3 * 2655 C1 3251 D3 3530 A3 4116 C4 * 6510 A2 9124 E4 9667 D2
0066 B5 2275 D4 * 2660 D2 * 3252 E3 * 3532 A3 * 4121 D5 * 6524 A3 9125 E4 9677 C2
0077 D3 2277 D4 * 2661 D2 * 3253 E3 * 3534 A3 * 4177 E2 * 6537 A3 9126 D4 9690 D2
0088 B1 2283 C3 * 2663 D3 * 3254 E3 * 3536 A3 * 4178 E5 * 6540 A3 9131 D5 9691 C3
0139 A1 2284 C3 * 2664 D2 * 3265 C3 * 3537 A3 * 4180 C5 * 6550 C3 9132 B1 9692 C3
0166 E1 2285 C3 * 2666 D2 * 3266 C3 3538 A3 4200 E3 * 6560 B3 9133 E3 9693 C3
0177 E2 2313 E2 * 2670 C1 * 3267 C4 3539 A3 4201 E3 * 6570 B3 9134 E3 9900 B5
0231 C5 2321 E2 * 2671 A1 3273 D4 * 3540 A3 4202 D4 * 6581 C2 9135 E3 9901 B5
0232 B1 2323 E2 * 2674 C2 * 3280 D3 * 3541 A3 4211 D4 * 6583 B4 9137 E5 9902 D5
0233 D1 2333 E1 * 2680 C2 * 3311 E2 3542 A2 4212 D4 * 6585 C2 9138 E5 9903 C5
0321 E1 2341 E1 2682 C2 * 3312 E2 * 3545 B2 4213 D4 * 6586 C2 9139 D2 9904 D5
0322 E1 2342 D1 2683 C2 * 3313 E2 * 3546 B3 4214 C4 * 6600 C1 9141 D3 9905 D5
1000 E5 2373 E1 2684 C2 * 3314 D2 3552 C3 * 4216 C4 * 6610 D1 9145 D5 9906 D5
1015 D4 2401 C5 2685 C2 * 3315 E2 3553 C3 * 4217 B1 * 6653 C1 9147 D5 9907 C5
1060 C1 2403 D4 2690 C2 * 3316 D2 3554 C3 * 4219 D2 * 6661 D2 9148 D5 M0 B3
1061 D1 2406 D4 * 2691 C2 * 3317 E2 3565 C2 * 4235 C4 * 6663 A1 9202 D4 M11 E4
1062 D1 2409 D4 * 2692 C2 * 3321 E2 * 3570 B3 * 4236 C5 * 6690 D2 9203 C4 M9 E3
1063 D1 2410 D4 2693 C2 * 3322 E2 * 3580 C2 * 4251 E3 * 6691 C3 9206 C3
B 1064 A1 2414 C5 2694 C2 * 3323 E2 * 3581 C2 * 4421 C4 * 6692 C3 9207 C3 *=chip
1100 B1 * 2420 C3 2695 C2 * 3324 E2 3582 C2 * 4555 C2 * 6693 C3 9208 D3 component
1102 D4 2421 D4 3000 E4 * 3325 E2 3585 B4 4600 C1 * 7001 E3 * 9209 C3
1103 B1 * 2422 B2 3001 E4 3326 E2 3586 B4 * 4601 C2 * 7002 E3 * 9210 E4
1104 D4 2430 D4 3002 E4 3327 E2 3587 B3 * 4603 C2 * 7003 E3 * 9211 D3
1105 C1 * 2434 D4 * 3004 E4 * 3331 E1 * 3588 B4 * 4605 C2 * 7100 C3 * 9212 D3
1106 B1 * 2436 D4 * 3005 E3 * 3332 E1 * 3589 B3 * 4609 C2 * 7101 C3 * 9220 D3
1107 B1 * 2437 D4 * 3006 E3 * 3333 E1 * 3590 C2 * 4613 D2 * 7115 D5 * 9221 C3
1108 C5 * 2440 C3 3007 E3 3334 E1 3591 C2 * 4621 D2 * 7118 E5 * 9225 C3
1109 C5 * 2442 A4 * 3008 E3 * 3335 E2 3593 C2 * 4647 C2 * 7200 C4 * 9229 D2
1110 D5 * 2443 C4 3009 E3 * 3336 E1 3601 C1 4677 E1 * 7204 D3 * 9233 D1
1111 C5 * 2444 A4 3010 E3 3337 D1 3602 D2 4682 C2 * 7214 C4 * 9235 D3
1112 D5 * 2445 A4 3013 E3 3341 E1 3603 D1 4684 C2 * 7215 C4 * 9236 D3
1120 B1 * 2448 B4 3015 E3 3342 D1 3604 C2 * 4694 C2 * 7220 D3 * 9237 C3
1121 B1 * 2450 A5 3016 D5 3347 E2 3605 C2 * 4695 C2 * 7225 D4 9238 D3
1122 B1 * 2451 A4 3020 E5 * 3371 E1 3606 C2 * 4696 C2 * 7241 D3 9240 C4
1123 B1 * 2452 C4 3022 E5 * 3372 E1 3607 C2 * 5010 E4 7255 E3 9245 D3
1206 C3 2453 C4 3040 E4 * 3374 E2 3608 D1 5128 D4 7265 C3 * 9246 D3
1207 C4 2456 A5 3100 B1 3400 E4 3610 D1 * 5201 C3 7301 E2 9247 C3
1208 C4 2460 B5 3104 C3 3401 C5 3612 D1 * 5202 D4 7302 E2 9248 C3
1209 E4 2461 D3 3105 C3 * 3402 C5 3613 D1 5203 E3 7303 E1 9250 D3
C 1275 D4 2462 A4 3106 C3 * 3403 D4 * 3614 D1 * 5206 C3 7304 E2 9251 D3
1277 D4 2463 C5 3107 C3 * 3404 C5 3615 E4 5260 D4 7305 E2 9252 D1
1500 A2 2464 B5 * 3108 C4 * 3405 E4 * 3616 D1 * 5370 E1 7306 E2 9261 D3
1560 C3 2465 B5 * 3114 C1 3406 C5 3617 C3 5441 A5 7307 E2 9270 C3
1571 B3 2466 C5 * 3115 C1 3407 C5 3618 C3 5442 A4 7308 E1 9313 E1
1670 B1 2467 C5 * 3121 C5 3408 E4 * 3621 C1 * 5443 A5 7309 E1 9317 D1
1681 C2 2468 C5 * 3122 C5 3410 D4 * 3622 C1 * 5445 B4 7401 C5 9334 E2
2008 E5 * 2469 A4 3123 D5 3411 C5 3623 C1 * 5451 A4 7420 D5 * 9337 E1
2010 D4 2470 A5 3124 D5 * 3412 B5 * 3624 C1 * 5456 B4 7421 C4 * 9341 E2
2011 E4 * 2471 A4 3125 D5 3413 C5 3625 C1 * 5457 B4 7440 C3 * 9347 E2
2016 D5 2476 C5 * 3126 C3 * 3415 C5 * 3628 E3 * 5458 B4 7441 A4 9370 E1
2042 E4 * 2480 C4 3127 D5 3417 C5 * 3629 C1 * 5500 B2 7445 A4 9372 E1
2043 E4 * 2485 B5 * 3128 D5 3418 B5 3630 D1 * 5515 A3 7518 B3 9377 E1
2104 E5 2487 C5 * 3129 C3 * 3420 C4 * 3632 D2 * 5516 B3 7520 A3 9403 B4
2105 D5 2500 A1 3130 C3 * 3421 D4 * 3633 D2 5540 A3 7541 C3 9404 C5
2108 D4 2502 B2 3141 D3 3422 D4 * 3634 D2 5545 B3 7581 A4 9405 C3
2110 D5 2504 B2 3144 D4 * 3423 D4 * 3636 E3 5550 B3 7583 B3 * 9406 B5
2115 B1 2505 B2 3160 D5 3430 E4 3637 E2 5551 C4 7584 B4 * 9408 C5
2116 B1 2508 A2 3161 C5 3431 A5 3640 E2 * 5553 C3 7585 C2 * 9410 C4
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2124 C1 * 2518 B2 3165 D5 * 3435 D4 3654 D2 * 5573 B3 7601 C2 9417 C2
2125 C1 * 2520 A3 * 3166 D5 * 3436 C5 3655 D2 5600 D1 7603 C2 * 9418 D3
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2161 D5 2530 A3 3178 E5 * 3443 B4 * 3662 D2 * 5620 C1 7655 C1 * 9426 D3
2163 C1 2531 A3 3179 E5 * 3444 A4 3663 C1 * 6001 E3 7681 C2 * 9443 D5
2164 C1 2532 A3 * 3180 E5 * 3445 A4 3664 D3 * 6002 E3 7682 C2 * 9448 B4
2166 C5 * 2533 A3 * 3181 E5 * 3446 A4 3665 D2 * 6003 E4 7683 C2 * 9450 A4
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2202 D4 2561 C3 3202 D4 * 3461 C3 * 3686 C2 * 6331 D2 9016 D5 9520 C2
E 2203 D4 * 2562 B4 3203 D4 3462 B4 3688 C2 * 6332 E1 9018 D5 9590 C3
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2217 C4 2584 C2 3211 C4 * 3501 A1 3699 D2 * 6445 A4 9100 C4 9611 D2
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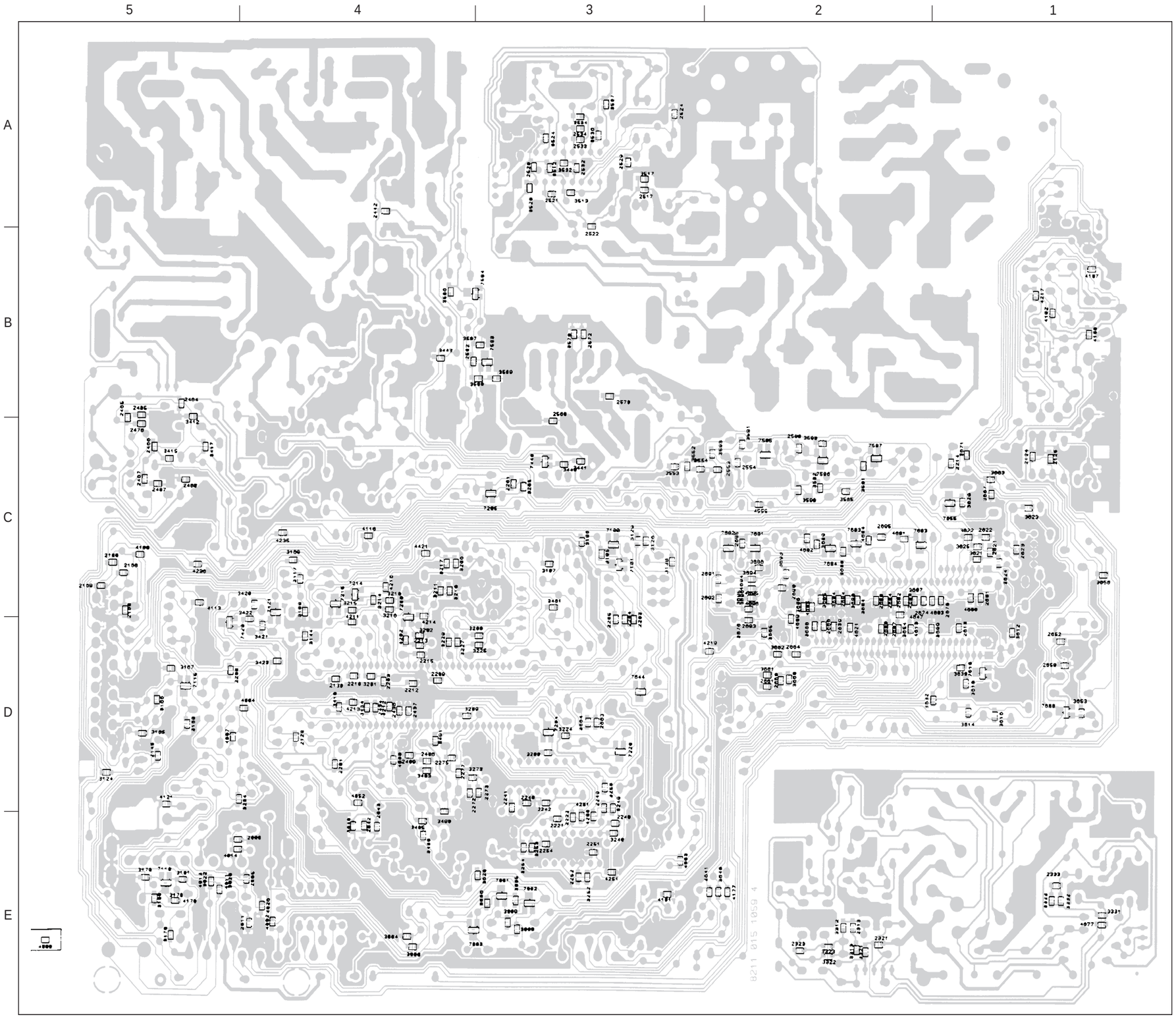

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0003 E2	2222 E3 *	2607 D2 *	3216 C4 *	3505 B1	4003 E3 *	6455 A5	9103 E4	9615 C2
0004 D1	2224 D4	2608 D2 *	3217 C4 *	3506 B2	4004 D4 *	6456 A5	9104 E4	9616 C3
0010 C2	2226 D3	2610 D1	3218 C4 *	3507 B2	4007 D5 *	6461 B4	9107 D4	9620 C1
0011 A2	2240 D3 *	2611 D1	3220 C4	3510 B2	4008 D4 *	6464 B4	9108 E5	9628 D3
0015 D3	2241 D3 *	2613 D1 *	3221 C4	3512 A3 *	4011 E5 *	6468 C5	9109 E4	9637 C1
0020 B1	2242 D3 *	2615 E4	3223 D3	3513 A3 *	4013 E5 *	6470 B5	9110 E3	9643 D2
0022 B1	2248 E3 *	2621 C1 *	3224 D3 *	3517 A3 *	4014 E5 *	6480 C4	9111 E2	9644 D3
0024 C1	2249 D3 *	2622 C1 *	3225 D3 *	3518 A3	4026 E4 *	6481 C4	9112 D5	9647 D2
0025 C1	2251 E3 *	2623 C1 *	3227 D4 *	3520 A3 *	4052 D4 *	6502 B2	9113 C4	9649 C2
0026 D1	2252 E3 *	2630 D1	3229 D4 *	3521 A3	4100 B1 *	6503 B2	9115 E4	9650 C3
0028 D2	2254 E3 *	2639 D2 *	3234 D3	3524 A3 *	4101 E3 *	6504 B2	9116 E3	9651 C4
0029 D2	2260 D3	2644 D2	3248 E3 *	3525 A3	4102 B1 *	6505 B2	9118 C3	9658 C1
0030 B1	2261 C3 *	2650 D1 *	3249 D3 *	3528 A3	4107 B1 *	6507 B3	9122 E4	9660 C2
0044 C5	2272 D4 *	2652 D1 *	3250 D3 *	3529 A3	4113 C5 *	6508 A3	9123 E4	9663 D2
0055 A4	2273 D3 *	2655 C1	3251 D3	3530 A3	4116 C4 *	6510 A2	9124 E4	9667 D2
0066 B5	2275 D4 *	2660 D2 *	3252 E3 *	3532 A3 *	4121 D5 *	6524 A3	9125 E4	9677 C2
0077 D3	2277 D4 *	2661 D2 *	3253 E3 *	3534 A3 *	4177 E2 *	6537 A3	9126 D4	9690 D2
0088 B1	2283 C3 *	2663 D3 *	3254 E3 *	3536 A3 *	4178 E5 *	6540 A3	9131 D5	9691 C3
0139 A1	2284 C3 *	2664 D2 *	3265 C3 *	3537 A3 *	4180 C5 *	6550 C3	9132 B1	9692 C3
0166 E1	2285 C3 *	2666 D2 *	3266 C3	3538 A3	4200 E3 *	6560 B3	9133 E3	9693 C3
0177 E2	2313 E2 *	2670 C1 *	3267 C4	3539 A3	4201 E3 *	6570 B3	9134 E3	9900 B5
0231 C5	2321 E2 *	2671 A1	3273 D4 *	3540 A3	4202 D4 *	6581 C2	9135 E3	9901 B5
0232 B1	2323 E2 *	2674 C2 *	3280 D3 *	3541 A3	4211 D4 *	6583 B4	9137 E5	9902 D5
0233 D1	2333 E1 *	2680 C2 *	3311 E2	3542 A2	4212 D4 *	6585 C2	9138 E5	9903 C5
0321 E1	2341 E1	2682 C2 *	3312 E2 *	3545 B2	4213 D4 *	6586 C2	9139 D2	9904 D5
0322 E1	2342 D1	2683 C2 *	3313 E2 *	3546 B3	4214 C4 *	6600 C1	9141 D3	9905 D5
1000 E5	2373 E1	2684 C2 *	3314 D2	3552 C3 *	4216 C4 *	6610 D1	9145 D5	9906 D5
1015 D4	2401 C5	2685 C2 *	3315 E2	3553 C3 *	4217 B1 *	6653 C1	9147 D5	9907 C5
1060 C1	2403 D4	2690 C2 *	3316 D2	3554 C3 *	4219 D2 *	6661 D2	9148 D5	M0 B3
1061 D1	2406 D4 *	2691 C2 *	3317 E2	3565 C2 *	4235 C4 *	6663 A1	9202 D4	M11 E4
1062 D1	2409 D4 *	2692 C2 *	3321 E2 *	3570 B3 *	4236 C5 *	6690 D2	9203 C4	M9 E3
1063 D1	2410 D4	2693 C2 *	3322 E2 *	3580 C2 *	4251 E3 *	6691 C3	9206 C3	
1064 A1	2414 C5	2694 C2 *	3323 E2 *	3581 C2 *	4421 C4 *	6692 C3	9207 C3	*=chip
1100 B1 *	2420 C3	2695 C2 *	3324 E2	3582 C2 *	4555 C2 *	6693 C3	9208 D3	component
1102 D4	2421 D4	3000 E4 *	3325 E2	3585 B4	4600 C1 *	7001 E3 *	9209 C3	
1103 B1 *	2422 B2	3001 E4	3326 E2	3586 B4 *	4601 C2 *	7002 E3 *	9210 E4	
1104 D4	2430 D4	3002 E4	3327 E2	3587 B3 *	4603 C2 *	7003 E3 *	9211 D3	
1105 C1 *	2434 D4 *	3004 E4 *	3331 E1 *	3588 B4 *	4605 C2 *	7100 C3 *	9212 D3	
1106 B1 *	2436 D4 *	3005 E3 *	3332 E1 *	3589 B3 *	4609 C2 *	7101 C3 *	9220 D3	
1107 B1 *	2437 D4 *	3006 E3 *	3333 E1 *	3590 C2 *	4613 D2 *	7115 D5 *	9221 C3	
1108 C5 *	2440 C3	3007 E3	3334 E1	3591 C2 *	4621 D2 *	7118 E5 *	9225 C3	
1109 C5 *	2442 A4 *	3008 E3 *	3335 E2	3593 C2 *	4647 C2 *	7200 C4 *	9229 D2	
1110 D5 *	2443 C4	3009 E3 *	3336 E1	3601 C1	4677 E1 *	7204 D3 *	9233 D1	
1111 C5 *	2444 A4	3010 E3	3337 D1	3602 D2	4682 C2 *	7214 C4 *	9235 D3	
1112 D5 *	2445 A4	3013 E3	3341 E1	3603 D1	4684 C2 *	7215 C4 *	9236 D3	
1120 B1 *	2448 B4	3015 E3	3342 D1	3604 C2 *	4694 C2 *	7220 D3 *	9237 C3	
1121 B1 *	2450 A5	3016 D5	3347 E2	3605 C2 *	4695 C2 *	7225 D4	9238 D3	
1122 B1 *	2451 A4	3020 E5 *	3371 E1	3606 C2 *	4696 C2 *	7241 D3	9240 C4	
1123 B1 *	2452 C4	3022 E5 *	3372 E1	3607 C2 *	5010 E4	7255 E3	9245 D3	
1206 C3	2453 C4	3040 E4 *	3374 E2	3608 D1	5128 D4	7265 C3 *	9246 D3	
1207 C4	2456 A5	3100 B1	3400 E4	3610 D1 *	5201 C3	7301 E2	9247 C3	
1208 C4	2460 B5	3104 C3	3401 C5	3612 D1 *	5202 D4	7302 E2	9248 C3	
1209 E4	2461 D3	3105 C3 *	3402 C5	3613 D1	5203 E3	7303 E1	9250 D3	
1275 D4	2462 A4	3106 C3 *	3403 D4 *	3614 D1 *	5206 C3	7304 E2	9251 D3	
1277 D4	2463 C5	3107 C3 *	3404 C5	3615 E4	5260 D4	7305 E2	9252 D1	
1500 A2	2464 B5 *	3108 C4 *	3405 E4 *	3616 D1 *	5370 E1	7306 E2	9261 D3	
1560 C3	2465 B5 *	3114 C1	3406 C5	3617 C3	5441 A5	7307 E2	9270 C3	
1571 B3	2466 C5 *	3115 C1	3407 C5	3618 C3	5442 A4	7308 E1	9313 E1	
1670 B1	2467 C5 *	3121 C5	3408 E4 *	3621 C1 *	5443 A5	7309 E1	9317 D1	
1681 C2	2468 C5 *	3122 C5	3410 D4 *	3622 C1 *	5445 B4	7401 C5	9334 E2	
2008 E5 *	2469 A4	3123 D5	3411 C5	3623 C1 *	5451 A4	7420 D5 *	9337 E1	
2010 D4	2470 A5	3124 D5 *	3412 B5 *	3624 C1 *	5456 B4	7421 C4 *	9341 E2	
2011 E4 *	2471 A4	3125 D5	3413 C5	3625 C1 *	5457 B4	7440 C3 *	9347 E2	
2016 D5	2476 C5 *	3126 C3 *	3415 C5 *	3628 E3 *	5458 B4	7441 A4	9370 E1	
2042 E4 *	2480 C4	3127 D5	3417 C5 *	3629 C1 *	5500 B2	7445 A4	9372 E1	
2043 E4 *	2485 B5 *	3128 D5	3418 B5	3630 D1 *	5515 A3	7518 B3	9377 E1	
2104 E5	2487 C5 *	3129 C3 *	3420 C4 *	3632 D2 *	5516 B3	7520 A3	9403 B4	
2105 D5	2500 A1	3130 C3 *	3421 D4 *	3633 D2	5540 A3	7541 C3	9404 C5	
2108 D4	2502 B2	3141 D3	3422 D4 *	3634 D2	5545 B3	7581 A4	9405 C3	
2110 D5	2504 B2	3144 D4 *	3423 D4 *	3636 E3	5550 B3	7583 B3 *	9406 B5	
2115 B1	2505 B2	3160 D5	3430 E4	3637 E2	5551 C4	7584 B4 *	9408 C5	
2116 B1	2508 A2	3161 C5	3431 A5	3640 E2 *	5553 C3	7585 C2 *	9410 C4	
2117 C4 *	2509 B3	3162 D5	3432 A5	3641 E2 *	5570 B3	7586 C2 *	9411 B5	
2120 D5	2510 B3	3163 D5	3433 D4	3644 D2	5571 E3	7587 C2 *	9413 C5	
2121 D5	2517 A3 *	3164 D5	3434 D4 *	3653 D1 *	5572 B3	7600 C2	9416 C4	
2124 C1 *	2518 B2	3165 D5 *	3435 D4	3654 D2 *	5573 B3	7601 C2	9417 C2	
2125 C1 *	2520 A3 *	3166 D5 *	3436 C5	3655 D2	5600 D1	7603 C2 *	9418 D3	
2128 D4 *	2521 A3 *	3167 D5 *	3437 C4	3656 C1 *	5601 C1	7608 D1 *	9419 C4	
2130 D4 *	2522 A3 *	3168 D5 *	3440 C3 *	3657 D2	5602 C2	7610 D1 *	9423 C4	
2144 D4	2524 A3 *	3169 C4 *	3441 C3 *	3660 D2 *	5603 C2	7620 C1	9424 C4	
2145 D5 *	2529 A3 *	3170 E5 *	3442 A4	3661 D2 *	5605 C2	7644 D3 *	9425 C4	
2161 D5	2530 A3	3178 E5 *	3443 B4 *	3662 D2 *	5620 C1	7655 C1 *	9426 D3	
2163 C1	2531 A3	3179 E5 *	3444 A4	3663 C1 *	6001 E3	7681 C2 *	9443 D5	
2164 C1	2532 A3 *	3180 E5 *	3445 A4	3664 D3 *	6002 E3	7682 C2 *	9448 B4	
2166 C5 *	2533 A3 *	3181 E5 *	3446 A4	3665 D2 *	6003 E4	7683 C2 *	9450 A4	
2167 D5	2534 A3 *	3185 C1	3447 B4	3666 D2 *	6016 D5	7684 C2 *	9454 A5	
2168 C5 *	2537 A3	3186 C1	3448 B4	3667 C1 *	6100 C4	9001 E4	9461 B4	
2169 C5 *	2540 A3	3187 C1	3449 B5	3670 C2	6101 C4	9003 E5	9462 B4	
2170 E5	2541 A3	3188 C1	3450 B4	3671 C1 *	6109 D5	9006 E4	9469 C5	
2171 E5	2545 B3	3191 B1	3451 B4	3674 C2	6110 D5	9007 D4	9500 A2	
2180 C5 *	2550 B4	3192 B1	3456 A5	3675 C2	6111 C3	9008 D2	9501 A1	
2198 B1	2551 B4	3193 B1	3457 A5	3676 C2 *	6254 E3	9009 E3	9505 B2	
2199 B1	2553 C2 *	3194 E5	3458 A5	3681 C2	6265 C4	9010 E3	9515 A3	
2200 D5 *	2554 C2 *	3195 D5	3459 A4	3684 C2 *	6311 E2	9011 E3	9518 C3	
2201 D4 *	2560 B3 *	3201 D4 *	3460 B5	3685 C2	6321 D2	9013 E4	9519 C3	
2202 D4	2561 C3	3202 D4 *	3461 C3 *	3686 C2 *	6331 D2	9016 D5	9520 C2	
2203 D4 *	2562 B4	3203 D4	3462 B4	3688 C2 *	6332 E1	9018 D5	9590 C3	
2205 E3	2563 C2	3204 D5 *	3470 B5	3689 C2 *	6341 E2	9019 D4	9601 D3	
2209 D4 *	2570 B3 *	3205 D4	3471 A5	3690 C2	6347 E2	9020 D3	9602 C1	
2211 D4	2571 C3	3206 C4 *	3480 C4	3693 C2 *	6420 C3	9021 D3	9603 B1	
2212 D4 *	2572 B3 *	3207 C4	3481 C4	3694 C2 *	6440 A4	9023 C3	9604 D3	
2213 D4 *	2580 C2 *	3208 D3 *	3490 D4 *	3695 C2 *	6441 A4	9024 E4	9605 D2	
2214 C1 *	2582 B4 *	3209 D4 *	3491 D4 *	3696 C2 *	6443 C5	9025 D4	9606 E4	
2215 D4 *	2583 C2	3210 C4 *	3500 A2	3698 C2 *	6444 B4	9040 E4	9607 C2	
2217 C4	2584 C2	3211 C4 *	3501 A1	3699 D2 *	6445 A4	9100 C4	9611 D2	
2218 D4 *	2601 C1 *	3214 C4 *	3503 B2	4000 E5 *	6449 C4	9101 C4	9613 D1	
2221 E3 *	2602 C1	3215 C4 *	3504 B2	4002 E4 *	6454 B4	9102 E3	9614 D2	

A2

SYNC/LINE-DRIVE + OUTPUT

SYNC

LINE / HORIZONTAL

FRAME/VERTICAL

TO CRT PANEL 0066 OF B

TO B CRT PANEL

HORIZONTAL DEFLECTION COIL

VERTICAL DEFLECTION COIL

	AUX SUP 17	AUX SUP 21
2471	10n	10n
3450	2R7	5R6
3471	39R	22R
5451	47uH	39uH

	LOT 17*	LOT 21*
2444	-	1u
2445	9n1	10n
2450	390n	470n
2460	390n	560n
2461	27p	18p
2462	2n2	4n7
2469	220p	470p
3401	4R7	3R3
3402	4R7	3R3
3441	47K	120R
3447	-	1K
3448	4R7	4R7
3460	15k	11k
9448	-	-

015_009.EPS

S1 (41 - 7225 - 5D)
1V / div DC
20µs / div

L1 (C - 7445)
100V / div DC
20µs / div

L2 (3445 / 3442)
2V / div DC
20µs / div

L3 (E- 7440)
2V / div DC
20µs / div

L4 (40 - 7225 - 5D)
2V / div DC
20µs / div

L11 (C - 6454)
5V DC

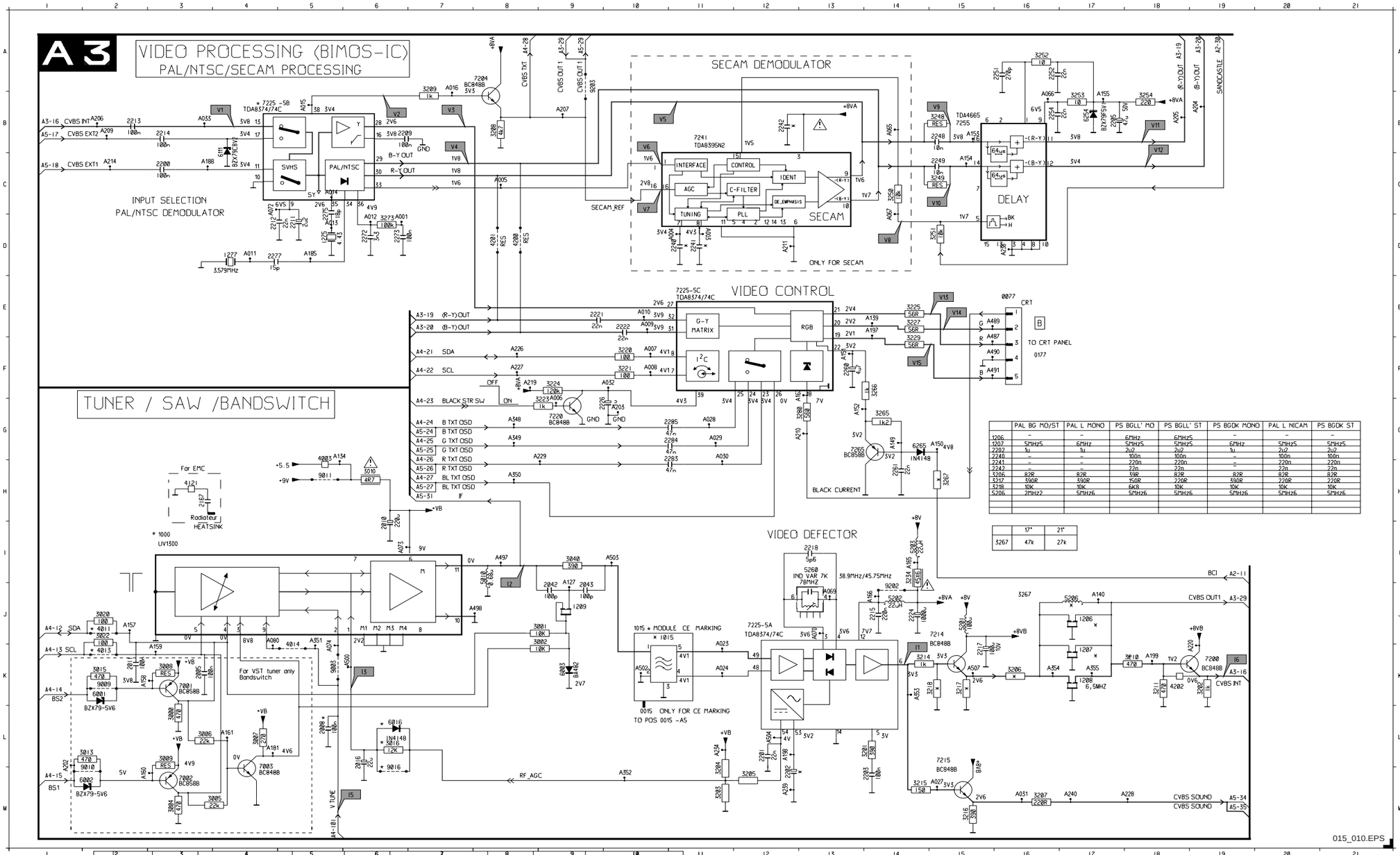
L12 (C - 6443)
13V DC

F1 (7- 7401)
0.5V / div DC
5ms / div

F2 (1 - 7401)
0.5V / div DC
5ms / div

F3 (5- 7401)
20V / div DC
5ms / div

F4 (3 - 7401)
10V / div DC
5ms / div



	PAL BG MO/ST	PAL L MONO	PS BGLL' MO	PS BGLL' ST	PS BGDK MONO	PAL L NICAM	PS BGDK ST
1206	–	–	6MHz	6MHz5	–	–	–
1207	5MHz5	6MHz	5MHz5	5MHz5	6MHz	5MHz5	5MHz5
2202	1u	1u	2u2	2u2	1u	2u2	2u2
2240	–	–	100n	100n	–	100n	100n
2241	–	–	220n	220n	–	220n	220n
2242	–	–	22n	22n	–	22n	22n
3206	82R	82R	56R	82R	82R	82R	82R
3217	390R	390R	150R	220R	390R	220R	220R
3218	10K	10K	6K8	10K	10K	10K	10K
5206	2MH2	5MH26	5MH26	5MH26	5MH26	5MH26	5MH26

	17"	21"
3267	47k	27k

	BS1	BS2
VHF1	0	1
VHF2	1	0
UHF	1	1

	U MONO UK	U NICAM UK	UVS MONO BG	UVS STEREO	UVSH MO BGLL'	UVSH MO BG	UVSH MO BGDK	UVSH MO IRL	UVSH NIC IRL	UVSH NIC BGLL'	UVSH NIC BGDK	UVSH NIC BG
	TEBI	TEBI	TEBI	TEB4	TEB4	TEB4	TEB4	TEB4	TEB4	TEB4	TEB4	TEB4
1000												
1015	OFWJ1952	J1980	G1961	G1984	OFWJG1965	G1961	MOD/MARKING	J1952	J1980	K5953	K5953	G1984
2010	–	–	2200U	–	2200U	–	–	–	–	2200U	–	–
3000	–	–	1k	1k	1k	1k	1k	1k	1k	1k	1k	1k
3004	–	–	1k	1k	1k	1k	1k	1k	1k	1k	1k	1k
3005	–	–	22k	22k	22k	22k	22k	22k	22k	22k	22k	22k
3006	–	–	22k	22k	22k	22k	22k	22k	22k	22k	22k	22k
3007	STRAP	STRAP	270R	270R	270R	270R	270R	270R	270R	270R	270R	270R
3008	–	–	1k	1k	1k	1k	1k	1k	1k	1k	1k	1k
3009	–	–	1k	1k	1k	1k	1k	1k	1k	1k	1k	1k
3016			12K							12K		
5010	0.68MHz	0.68MHz	0.68MHz	0.68MHz	0.39MHz	0.68MHz	0.68MHz	0.68MHz	0.68MHz	220n	220n	220n
6001	–	–	BZX79C5V6	BZX79C5V6	BZX79C5V6	BZX79C5V6	BZX79C5V6	BZX79C5V6	BZX79C5V6	BZX79C5V6	BZX79C5V6	BZX79C5V6
6002	–	–	BZX79C5V6	BZX79C5V6	BZX79C5V6	BZX79C5V6	BZX79C5V6	BZX79C5V6	BZX79C5V6	BZX79C5V6	BZX79C5V6	BZX79C5V6
6016	–	–	–	–	–	1N4148	–	–	–	1N4148	–	–
7001	–	–	BC858B	BC858B	BC858B	BC858B	BC858B	BC858B	BC858B	BC858B	BC858B	BC858B
7002	–	–	BC858B	BC858B	BC858B	BC858B	BC858B	BC858B	BC858B	BC858B	BC858B	BC858B
7005	–	–	BC847B	BC847B	BC847B	BC847B	BC847B	BC847B	BC847B	BC847B	BC847B	BC847B

V1 (13 - 7225 - 5B)
1V / div DC
20µs / div

V2 (38 - 7225 - 5B)
1V / div DC
20µs / div

V3 (28 - 7225 - 5B)
1V / div DC
20µs / div

V4 (29 - 7225 - 5B)
0.5V / div DC
20µs / div

V5 (30 - 7225 - 5B)
0.5V / div DC
20µs / div

V6 (11 - 7225 - 5B)
3.5V DC (PAL)

V7 (16 - 7241)
0.5V / div DC
20µs / div

V8 (5 - 7255)
1V / div DC
20µs / div

V9 (16 - 7255)
0.5V / div DC
20µs / div

V10 (14 - 7255)
0.5V / div DC
20µs / div

V11 (11 - 7255)
0.5V / div DC
20µs / div

V12 (12 - 7225)
0.5V / div DC
20µs / div

V13 (3M7)
1V / div DC
20µs / div

V14 (2M7)
1V / div DC
20µs / div

V15 (4M7)
1V / div DC
20µs / div

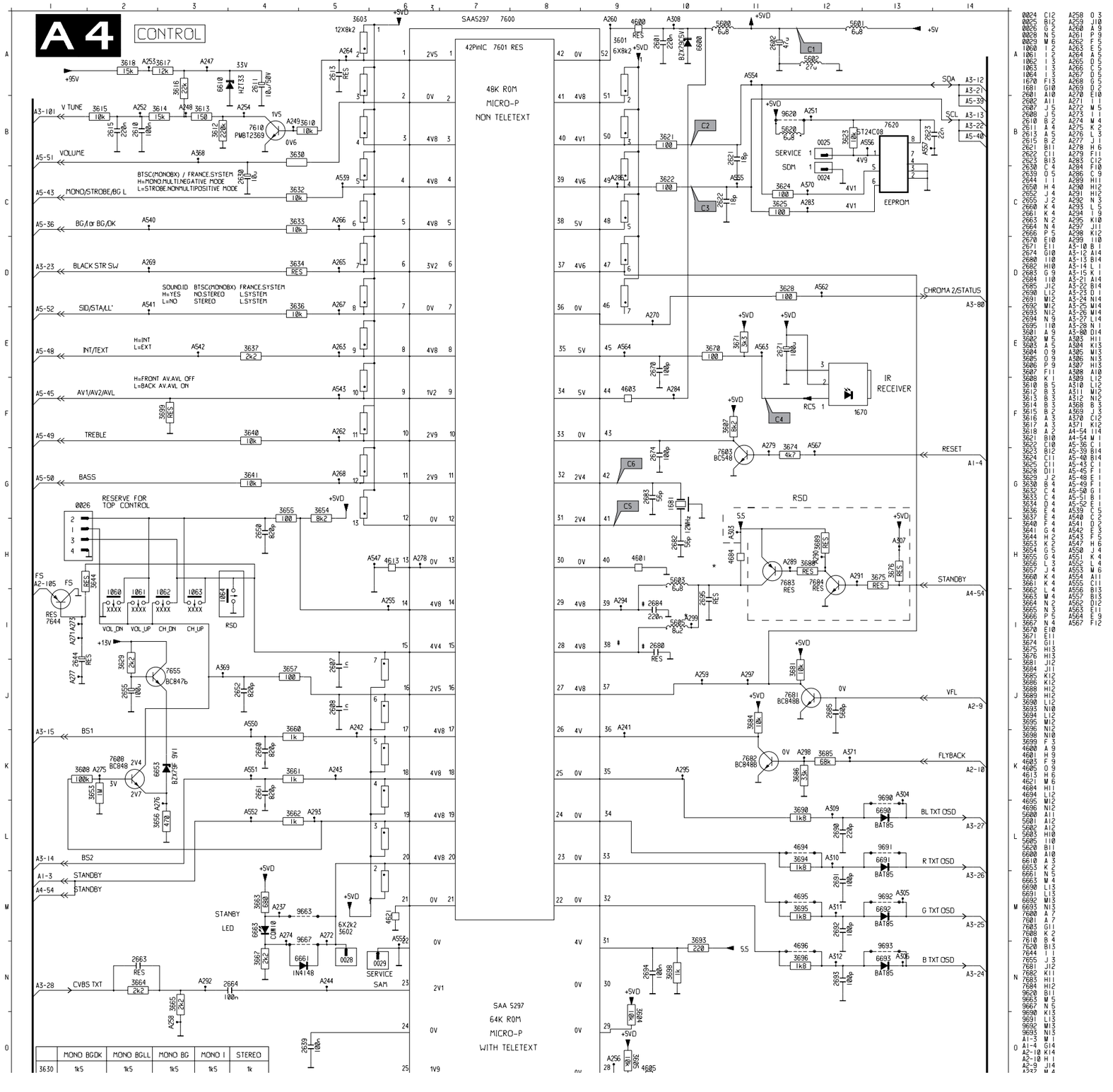
I1 (6 - 7225 - 5A)
1V / div DC
20µs / div

I2 (IF - Tuner)
0.2V / div AC
20µs / div

I3 (1 - Tuner)
0.5V / div DC
20µs / div

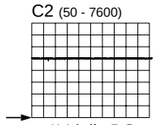
I4 (1 - Tuner)
only FST tuner

I5 (2 - Tuner)
2V DC



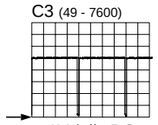
C1 (52 - 7600)
5V DC

C2 (50 - 7600)



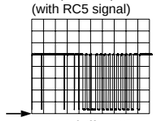
1V / div DC
5ms / div

C3 (49 - 7600)



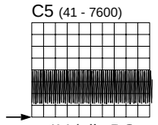
1V / div DC
5ms / div

C4 (1 - 1670)
(with RC5 signal)



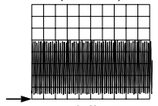
1V / div DC
5ms / div

C5 (41 - 7600)

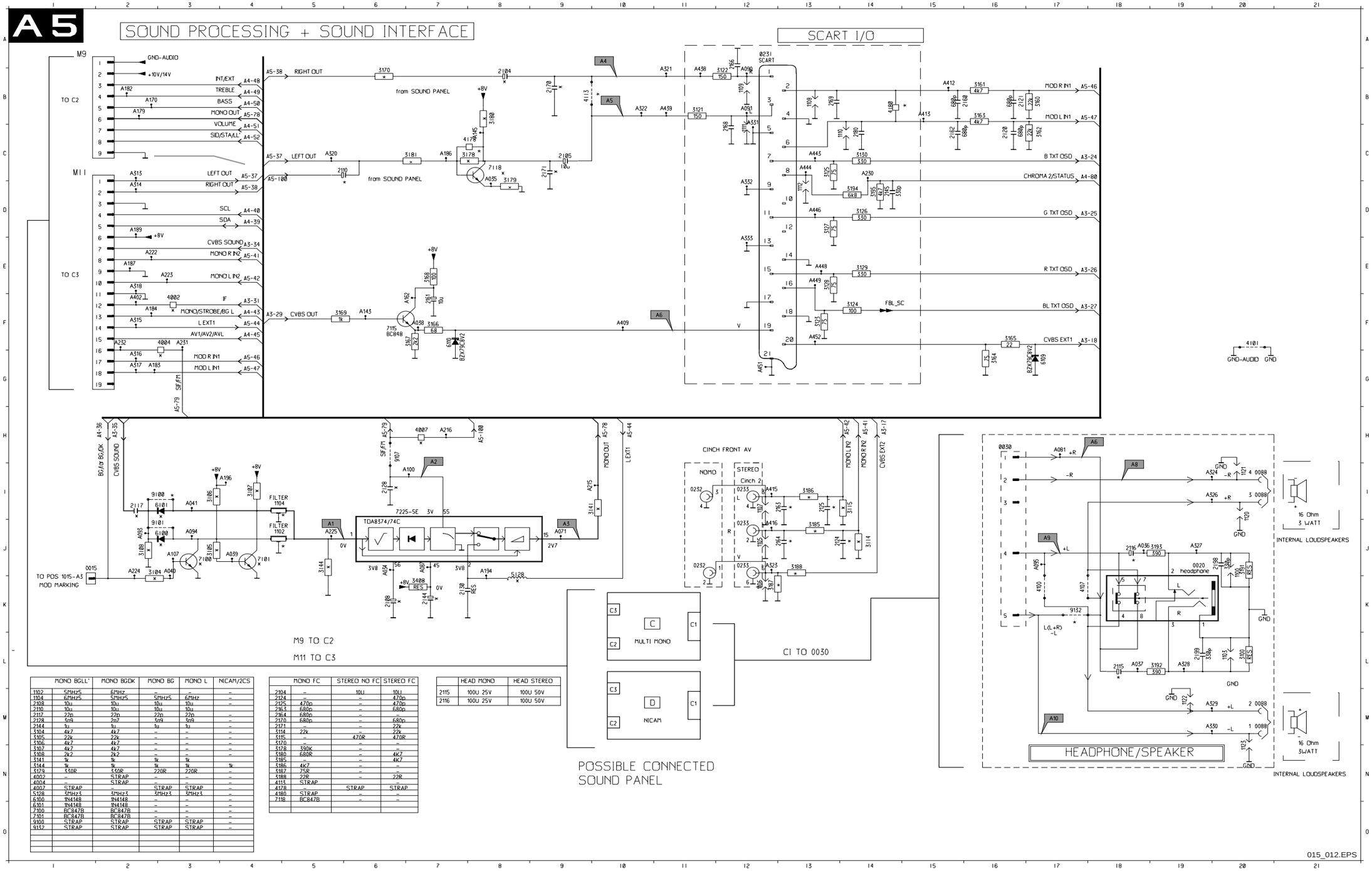


1V / div DC
0.5µs / div

C6 (42 - 7600)



1V / div DC
0.5µs / div



	MONO BGLL'	MONO BGDK	MONO BG	MONO L	NICAM/2CS
1102	5MHz5	6MHz	–	–	–
1104	6MHz5	5MHz5	5MHz5	6MHz	–
2108	10u	10u	10u	10u	–
2110	10u	10u	10u	10u	–
2117	22n	22n	22n	22n	–
2128	5n6	2n7	5n6	5n6	–
2144	1u	1u	1u	1u	–
3104	4k7	4k7	–	–	–
3105	22k	22k	–	–	–
3106	4k7	4k7	–	–	–
3107	4k7	4k7	–	–	–
3108	2k2	2k2	–	–	–
3141	1k	1k	1k	1k	–
3144	1k	1k	1k	1k	1k
3179	330R	330R	220R	220R	–
4002	–	STRAP	–	–	–
4004	–	STRAP	–	–	–
4007	STRAP	–	STRAP	STRAP	–
5128	5MHz5	5MHz5	5MHz5	5MHz5	–
6100	1N4148	1N4148	–	–	–
6101	1N4148	1N4148	–	–	–
7100	BC847B	BC847B	–	–	–
7101	BC847B	BC847B	–	–	–
9100	STRAP	STRAP	STRAP	STRAP	–
9132	STRAP	STRAP	STRAP	STRAP	–

	MONO FC	STEREO NO FC	STEREO FC
2104	–	10U	10U
2124	–	–	470n
2125	470n	–	470n
2163	680n	–	680n
2164	680n	–	–
2170	680n	–	680n
2171	–	–	22k
3114	22k	–	22k
3115	–	470R	470R
3170	–	–	–
3178	390K	–	–
3180	680R	–	4K7
3185	–	–	4K7
3186	4K7	–	–
3187	75R	–	–
3188	22R	–	22R
4111	STRAP	–	–
4178	–	STRAP	STRAP
4180	STRAP	–	–
7118	BC847B	–	–

	HEAD MONO	HEAD STEREO
2115	100U 25V	100U 50V
2116	100U 25V	100U 50V

A1 (1 - 7225 - 5E)
0.1V / div AC
0.1ms / div

A2 (55 - 7225 - 5E)
5V / div AC
1ms / div

A3 (15 - 7225 - 5E)
1V / div DC
0.5ms / div

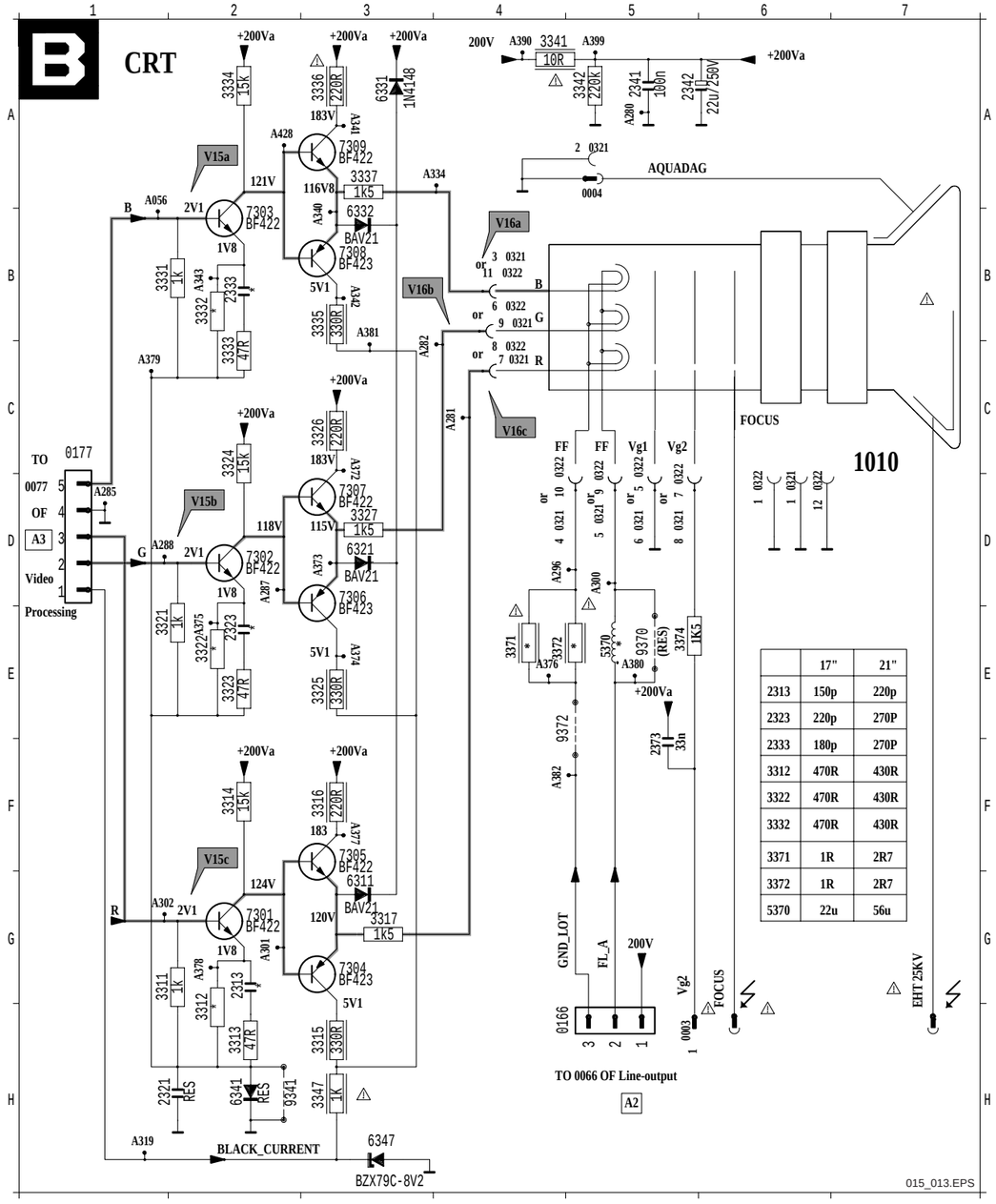
A4 (Audio out)
1V / div DC
0.5ms / div

A5 (Audio out)
1V / div DC
0.5ms / div

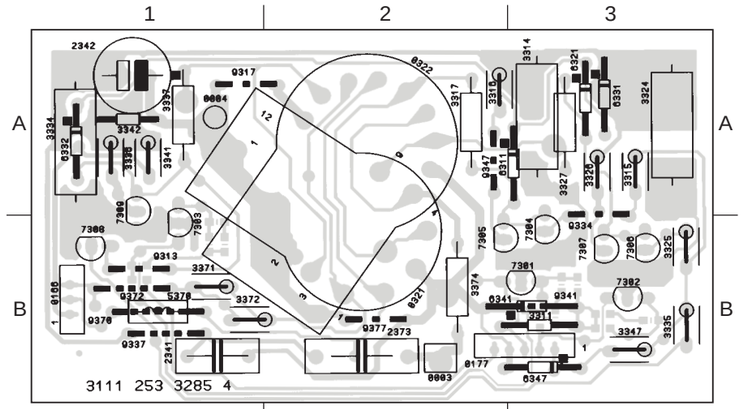
A6 (Video out)
1V / div DC
20µs / div

A7, A8, A9, A10
0.1V / div DC
1ms / div

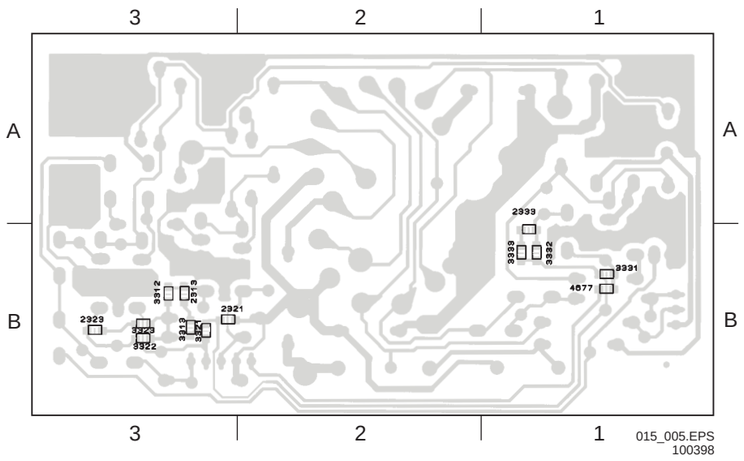
0003	H 5	0321	C 4	0322	B 4	3312	G 2	3325	E 3	3341	A 4	6332	B 3	7308	B 3	A287	D 2	A342	B 3	A380	E 5
0004	A 5	0321	D 5	0322	D 6	3313	H 2	3326	C 3	3342	A 5	6341	H 2	7309	A 3	A288	D 2	A343	B 2	A381	B 3
0166	H 4	0321	B 4	2313	G 2	3314	F 2	3327	D 3	3347	H 3	6347	H 5	9341	H 2	A296	D 4	A372	C 3	A382	F 4
0177	C 1	0322	D 6	2321	H 2	3315	H 3	3331	B 2	3371	E 4	7301	G 2	9370	E 5	A300	D 5	A373	D 3	A390	A 4
0321	D 6	0322	D 5	2323	F 2	3316	F 3	3332	B 2	3372	E 4	7302	D 2	9372	E 5	A301	G 2	A374	E 3	A399	A 5
0321	A 5	0322	B 4	2333	B 2	3317	G 3	3333	C 2	3374	E 5	7303	B 2	A056	A 2	A302	G 2	A375	D 2	A428	A 2
0321	B 4	0322	D 5	2341	A 5	3321	D 2	3334	A 2	5370	E 5	7304	G 3	A280	A 5	A319	H 1	A376	E 4		
0321	D 4	0322	C 4	2342	A 5	3322	E 2	3335	B 3	6311	G 3	7305	F 3	A281	C 4	A334	A 4	A377	F 3		
0321	D 5	0322	D 5	2373	F 5	3323	E 2	3336	A 3	6321	D 3	7306	D 3	A282	C 3	A340	A 3	A378	G 2		
0321	D 5	0322	D 4	3311	G 2	3324	C 2	3337	A 3	6331	A 3	7307	D 3	A285	C 1	A341	A 3	A379	C 1		



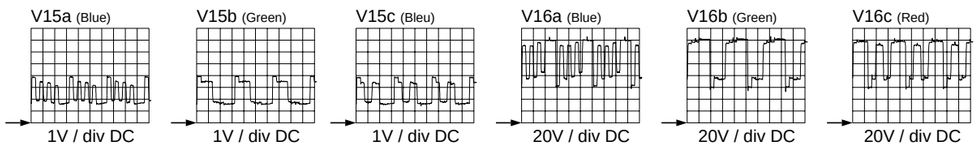
	17"	21"
2313	150p	220p
2323	220p	270P
2333	180p	270P
3312	470R	430R
3322	470R	430R
3332	470R	430R
3371	1R	2R7
3372	1R	2R7
5370	22u	56u



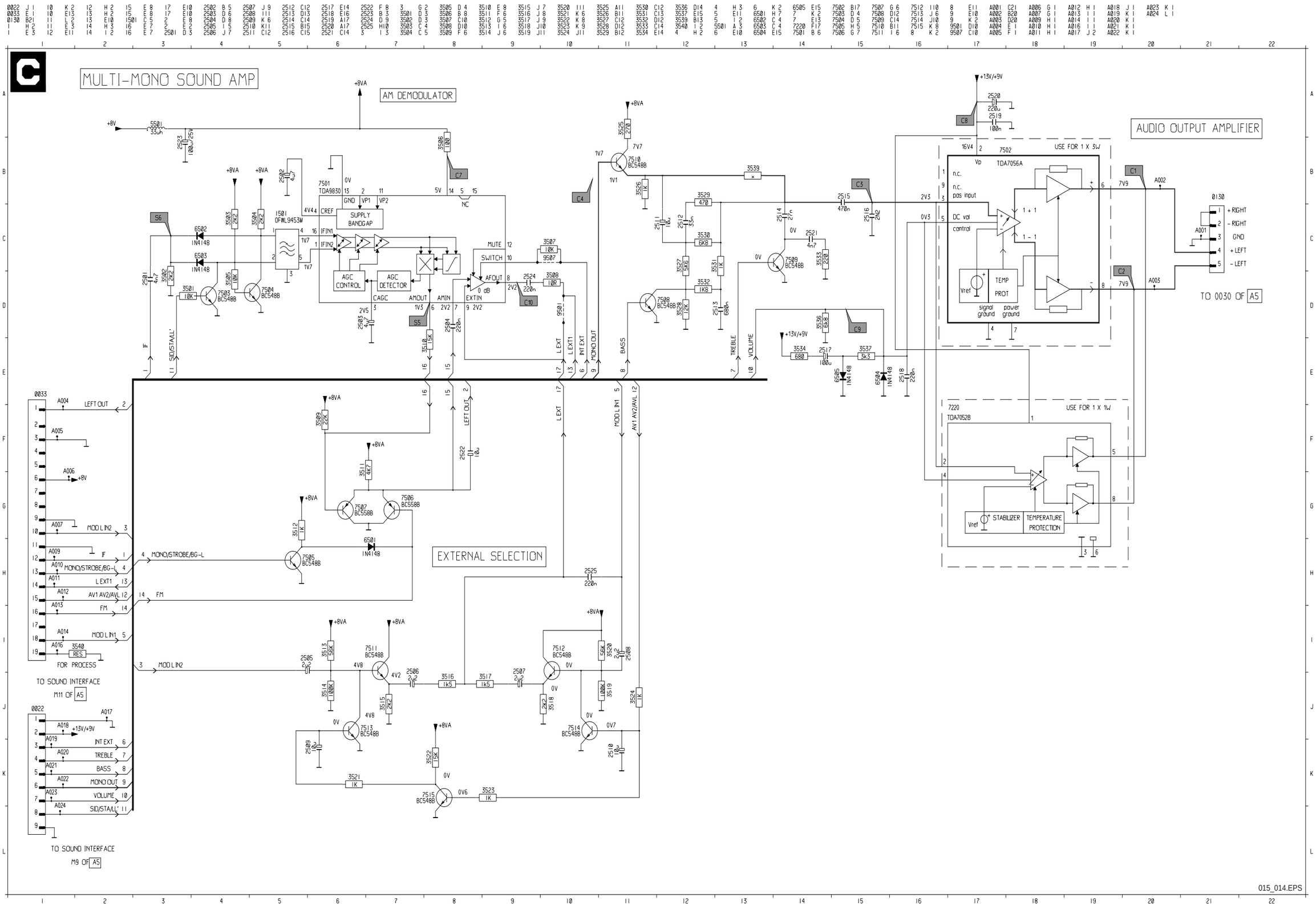
0003 B2	2321 B3 *	3313 B3 *	3324 A3	3335 B3	3374 B2	6347 B3	7308 B1	9347 A2
0004 A1	2323 B3 *	3314 A3	3325 B3	3336 A1	4677 B1 *	7301 B3	7309 A1	9370 B1
0166 B1	2333 A1 *	3315 A3	3326 A3	3337 A1	5370 B1	7302 B3	9313 B1	9372 B1
0177 B3	2341 B1	3316 A2	3327 A3	3341 A1	6311 A2	7303 A1	9317 A1	9377 B2
0233 A1	2342 A1	3317 A2	3331 B1 *	3342 A1	6321 A3	7304 B3	9334 A3	
0321 B2	2373 B2	3321 B3 *	3332 B1 *	3347 B3	6331 A3	7305 B2	9337 B1	*=chip component
0322 A2	3311 B3	3322 B3 *	3333 B1 *	3371 B1	6332 A1	7306 B3	9341 B3	
2313 B3 *	3312 B3 *	3323 B3 *	3334 A1	3372 B1	6341 B3	7307 B3	9347 A2	
	3313 B3 *							

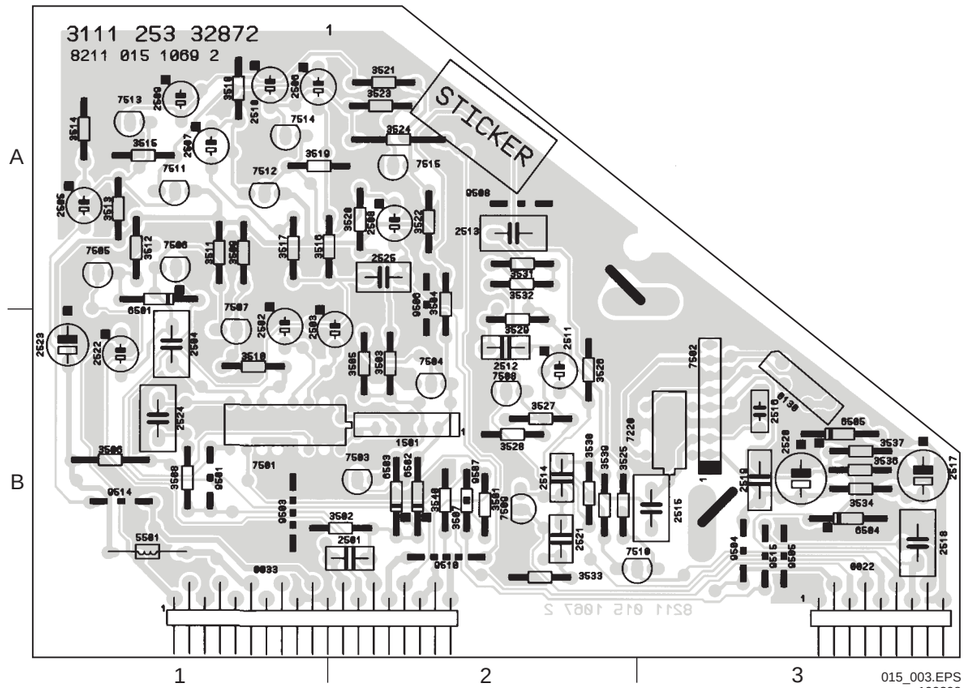


0003 B2	2321 B3 *	3313 B3 *	3324 A3	3335 B3	3374 B2	6347 B3	7308 B1	9347 A2
0004 A1	2323 B3 *	3314 A3	3325 B3	3336 A1	4677 B1 *	7301 B3	7309 A1	9370 B1
0166 B1	2333 A1 *	3315 A3	3326 A3	3337 A1	5370 B1	7302 B3	9313 B1	9372 B1
0177 B3	2341 B1	3316 A2	3327 A3	3341 A1	6311 A2	7303 A1	9317 A1	9377 B2
0233 A1	2342 A1	3317 A2	3331 B1 *	3342 A1	6321 A3	7304 B3	9334 A3	
0321 B2	2373 B2	3321 B3 *	3332 B1 *	3347 B3	6331 A3	7305 B2	9337 B1	*=chip component
0322 A2	3311 B3	3322 B3 *	3333 B1 *	3371 B1	6332 A1	7306 B3	9341 B3	
2313 B3 *	3312 B3 *	3323 B3 *	3334 A1	3372 B1	6341 B3	7307 B3	9347 A2	
	3313 B3 *							



7 Diagrams and print lay-outs





015_003.EPS
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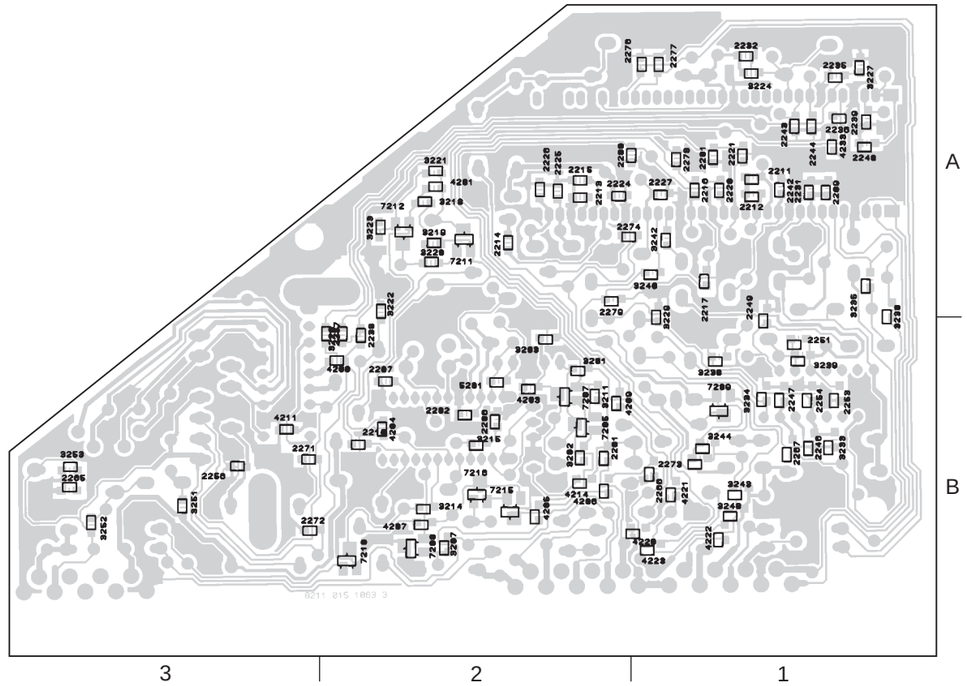

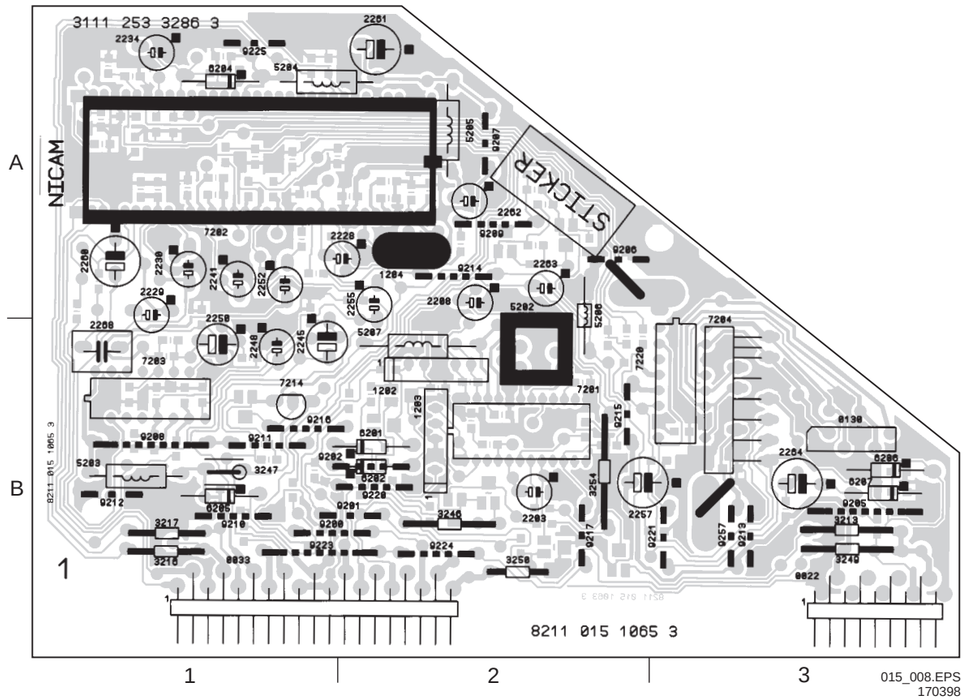

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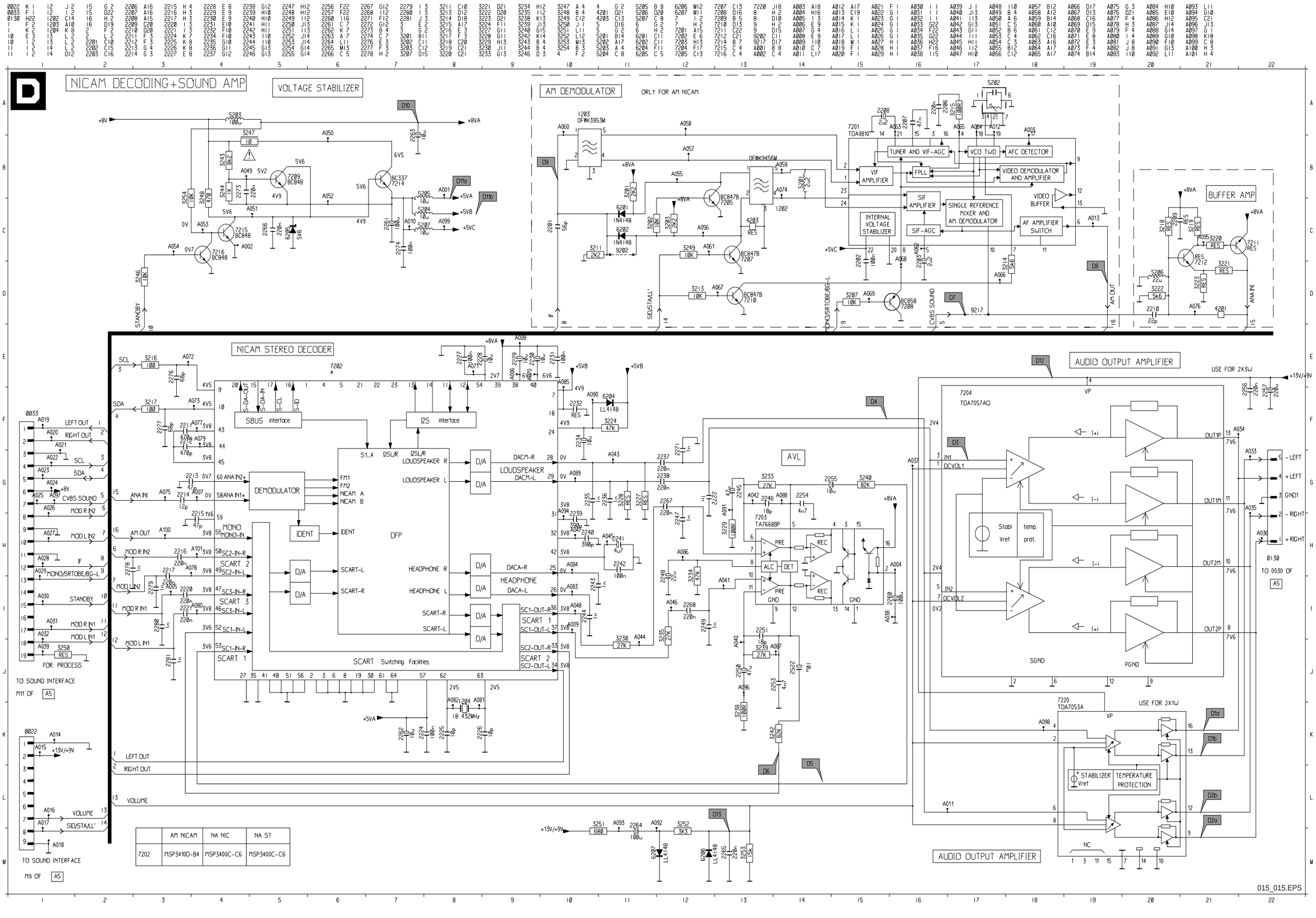
0022 B3 2507 A1 2517 B3 3502 B2 3522 A2 3532 B2 6503 B2 7507 B1 9503 B1
0033 B1 2508 A2 2518 B3 3503 B2 3523 A2 3533 B2 6504 B3 7508 B2 9504 B3
0130 B3 2509 A1 2519 B3 3504 B2 3524 A2 3534 B3 6505 B3 7509 B2 9505 B3
1501 B2 2510 A1 2520 B3 3505 B2 3525 B2 3536 B3 7220 B3 7510 B2 9506 B2
2501 B2 2511 B2 2521 B2 3506 B1 3526 B2 3537 B3 7501 B1 7511 A1 9507 B2
2502 B1 2512 B2 2522 B1 3507 B2 3527 B2 3539 B2 7502 B3 7512 A1 9508 A2
2503 B1 2513 A2 2523 B1 3508 B1 3528 B2 3540 B2 7503 B2 7513 A1 9510 B2
2504 B1 2514 B2 2524 B1 3509 A1 3529 B2 5501 B1 7504 B2 7514 A1 9514 B1
2505 A1 2515 B3 2525 A2 3510 B1 3530 B2 6501 B1 7505 A1 7515 A2 9515 B3
2506 A1 2516 B3 3501 B2 3511 A1 3531 A2 6502 B2 7506 A1 9501 B1

0022 B3 3229 B1 *
0033 B1 3230 B1 *
0130 B3 3233 B1 *
1202 B2 3234 B1 *
1203 B2 3235 A1 *
1204 A2 3238 B1 *
2201 B2 * 3239 B1 *
2202 B2 * 3240 A1 *
2203 B2 3242 A1 *
2206 B2 * 3243 B1 *
2207 B2 * 3244 B1 *
2208 A2 3246 B2
2209 A1 * 3247 B1
2210 B2 * 3248 B1 *
2211 A1 * 3249 B3
2212 A1 * 3250 B2
2213 A2 * 3251 B3 *
2214 A2 * 3252 B3 *
2215 A2 * 3253 B3 *
2216 A1 * 3254 B2
2217 A1 * 4200 B2 *
2220 A1 * 4201 A2 *
2221 A1 * 4203 B2 *
2224 A2 * 4204 B2 *
2225 A2 * 4205 B2 *
2226 A2 * 4206 B2 *
2227 A1 * 4207 B2 *
2228 A2 4209 B2 *
2229 B1 4211 B3 *
2230 A1 4214 B2 *
2231 A1 * 4220 B1 *
2232 A1 * 4221 B1 *
2234 A1 4222 B1 *
2235 A1 * 4223 B1 *
2236 A1 * 4233 A1 *
2237 B2 * 5201 B2 *
2238 B2 * 5202 B2
2239 A1 * 5203 B1
2240 A1 * 5204 A1
2241 A1 5205 A2
2242 A1 * 5206 B2
2243 A1 * 5207 B2
2244 A1 * 6201 B2
2245 B1 6202 B2
2246 B1 * 6204 A1
2247 B1 * 6205 B1
2248 B1 6206 B3
2249 B1 * 6207 B3
2250 B1 7201 B2
2251 B1 * 7202 A1
2252 A1 7203 B1
2253 B1 * 7204 B3
2254 B1 * 7205 B2 *
2255 A2 7207 B2 *
2256 B3 * 7208 B2 *
2257 B3 7209 B1 *
2260 A1 7210 B2 *
2261 A2 7211 A2 *
2262 A2 7212 A2 *
2263 A2 7214 B1
2264 B3 7215 B2 *
2265 B3 * 7216 B2 *
2266 B1 * 7220 B3
2267 B1 * 9200 B1
2268 B1 9201 B2
2271 B3 * 9202 B2
2272 B3 * 9205 B3
2273 B1 * 9206 A2
2274 A1 * 9207 A2
2276 A1 * 9208 B1
2277 A1 * 9209 A2
2278 A1 * 9210 B1
2279 A2 * 9211 B1
2280 A1 * 9212 B1
2281 A1 * 9213 B3
3201 B2 * 9214 A2
3202 B2 * 9215 B2
3203 B2 * 9216 B1
3207 B2 * 9217 B2
3211 B2 * 9220 B2
3213 B3 9221 B3
3214 B2 * 9223 B1
3215 B2 * 9224 B2
3216 B1 9257 B3
3217 B1
3218 A2 *
3219 A2 *
3220 A2 *
3221 A2 *
3222 B2 *
3223 A2 *
3224 A1 *
3227 A1 *
3228 B2 *

*=chip component



	AM NICAM	NA NIC	NA ST
7202	MSP3410D-B4	MSP3400C-C6	MSP3400C-C6

8 Electrical adjustments

Note:
Unless stated otherwise, the supply voltage used is:
220V to 240V +/- 10%, 50 - 60 Hz +/- 5%.
Voltage and wave forms are measured in respect to earth.
Remarks:

- Never use the heatsink as earth.
- Where in the adjustment a pattern generator is mentioned, a colour pattern generator PM5418 has been used with an RF output voltage of 1mV.
- For some adjustments the set has to be put in the SAM (Service Alignment Mode).
- When in the text "Enter SAM" is mentioned proceed as follows:
- Enter SAM by Dealer Service Tool (button "ALIGN"), or via short-circuit the service pins 0028 and 0029 on the main PCB while switching on the set via the mains switch.
- The SAM menu is displayed when the SAM mode is entered (see also chapter 5).

8.1 Settings on the main chassis panel

8.1.1 (95V supply voltage (17", 21")

- Connect a multi meter (DC) across C2551.
- Set brightness and contrast to minimum
- Tune to a colour-bar test signal
- Apply a colour bar pattern.
- Adjust potentiometer R3540 to:
  - 96.7V +/- 1V for 21" sets
  - 100V +/- 1V for 17" sets.

8.1.2 Geometry adjustments (software adjustment)

- Apply a cross hatch pattern
- Enter SAM.
- Enter into GEOMETRY menu.
- The value of the geometry settings can be decrement or increment by pressing the right or left key on the remote control.

Remark: Before doing the geometry alignment HSH,VSH and VAM, set first item VS (vertical slope) to 25 and SC (Vertical S-correction) to 13 for 21" and to 15 for 17".

* Horizontal centring

Select item HSH for horizontal shift.

* Vertical centring

Select item VSH for vertical shift

* Picture height

Select item VAM for vertical amplitude .

8.1.3 Focusing

- Apply a cross hatch pattern.
- Set brightness and contrast at maximum.
- Adjusted with focusing potentiometer (upper knob of LOT 5445) for maximum sharpness of the picture.

8.1.4 RF-AGC adjustment (software adjustment)

- Apply a PAL colour bar pattern and set RF-frequency on 189.25MHz (output voltage 1mV).
- Enter SAM
- Enter into TUNER menu, select item AGC for RF AGC adjustment.
- Connect a multi-meter (DC) at pin 1 of the tuner.
- The "AGC" value can be increment or decrement by pressing the remote control right or left key. Adjust so that the voltage at pin 1 of the tuner is 5V (0.5V DC

8.1.5 Picture demodulator adjustment.

- Enter SAM .
- Enter into TUNER menu
- Connect a signal generator (PM5326) to pin 11 of the tuner

* IF-PLL setting (for all versions)

- Set generator signal to 38.9MHz (negative modulation).
- Set AFW = 80 and adjust IF PLL until AFA = 1 and AFB is just switching from 1 to 0 or 0 to 1.

* IF-PLL L ACCENT setting

- Set generator signal to 33.9MHz (positive modulation) in Band I & System L for Mono BGLI version
- Set generator signal to 34.0MHz (positive modulation) in Band I & System L for Nicam BGLI version.
- Set AFW = 80 and adjust IF PLL ACCENT until AFA = 1 and AFB is just switching from 1 to 0 or 0 to 1.

Remark: For IF PLL ACCENT adjustment, the set has to be tuned on system France, VHF 1 and varicap voltage <9V.

8.2 Vg2 and white-D settings

8.2.1 Vg2 cut off alignment

- Apply a black picture pattern.
- Connect an oscilloscope to the picture tube cathodes for red, green and blue. Set the oscilloscope to DC 50V/Div and 2ms/Div.
- Measure the DC level of the measuring pulses at the end of the frame blanking (see Fig 8.1)
- Adjust the VG2 potmeter (lower knob on the LOT) so that the measuring pulses with the highest level are:
  - 140V +/- 2V for 21"
  - 130V +/- 2V for 17"

8.2.2 White-D adjustment (software adjustment)

- Enter into WHITE TONE menu, select item WARN, COOL or NORMAL, only one of the three items Apply a white raster pattern.
- Enter SAM (see chapter 6).
- (R, G or B) will be displayed on the screen.
- The initial default value for all setting is 37.
- The factory settings of the colour temperatures are :
  - WARM(R = 45, G = 32, B = 26)
  - NORMAL(R = 37, G = X, B = Y)
  - COOL(R = 37, G = 32, B = 31)

Remark: X and Y values in NORMAL setting are adjusted for 8500K colour temperature.

8 Electrical adjustments

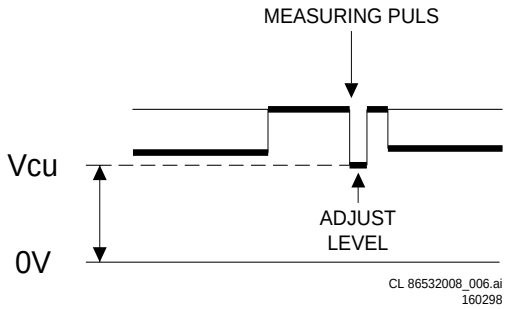


Figure 8-1

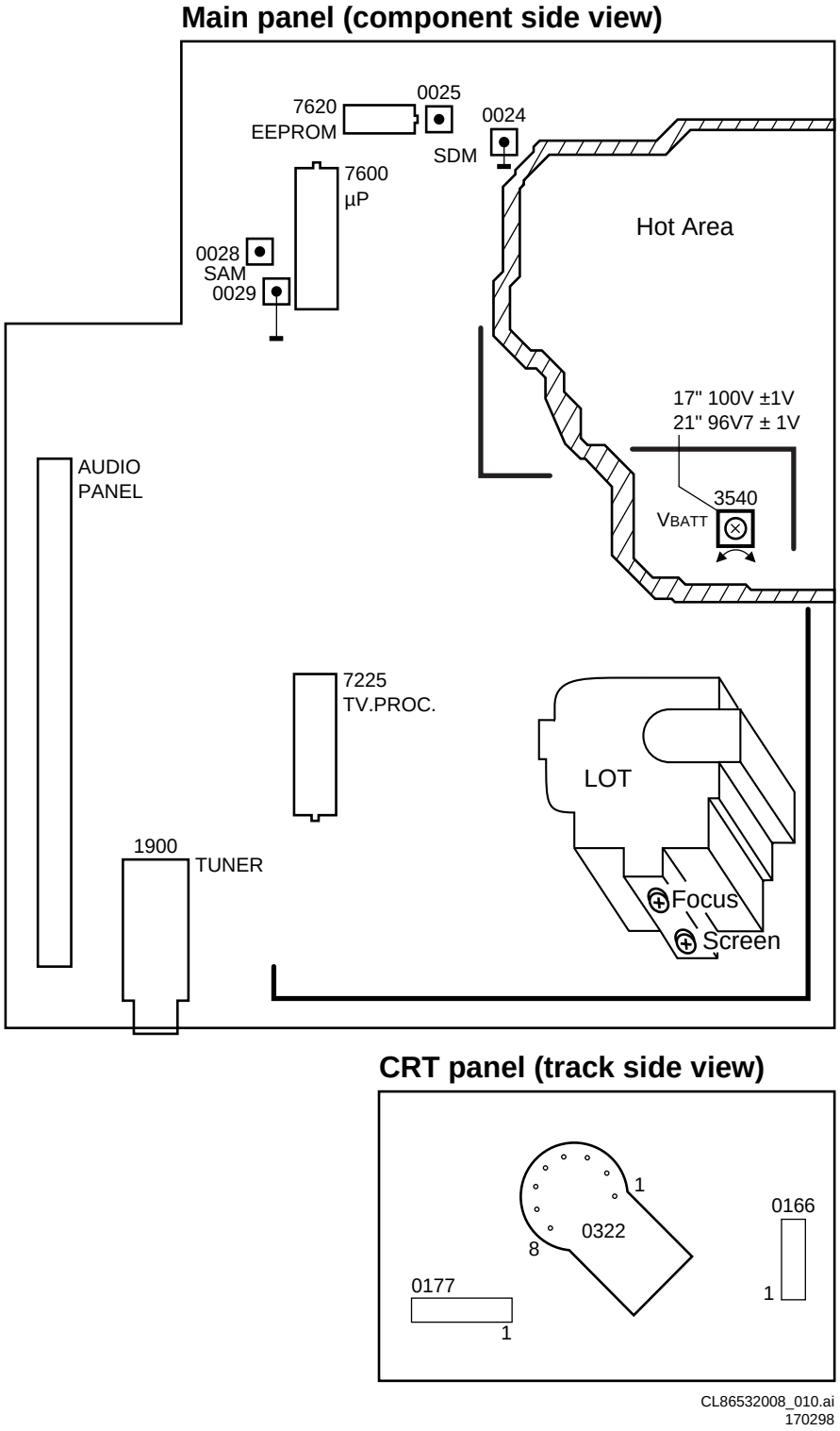


Figure 8-2

9 Circuit diagram description

Introduction

For a quick overall view of all diagrams see the block diagram on sheet 4.

This chassis is executed with:

- A mains isolated SMPS (switched mode power supply)
- A single chip TV processor with software controlled picture geometry adjustments
- Micro computer with teletext function (execution depended)-
- Separate audio module (multi mono or NICAM) with output amplifier

9.1 Power supply (Diagram A1)

9.1.1 Mains input and degaussing

The mains voltage is filtered by L5500, L5501 and L5502, full wave rectified by a diode bridge (6502-6505) and smoothed by C2508. The DC voltage for the SMPS is applied at pin 7 of T5545 (e.g. 300V DC for 220V AC mains).

The degaussing current is applied via dual PTC resistor R3504 After switching "on" the set, the PTC is cold so low-ohmic and therefore the degaussing current is very high. During degaussing, the PTC is heated up and is getting high-ohmic, as a result the current through the PTC becomes very low.

9.1.2 Switched mode power supply

The switched mode power supply (SMPS) is mains isolated. The control device IC7520 (MC44603AP) delivers duty cycle controlled pulses for driving switching FET 7518. The pulses have a fixed frequency of 70 kHz in normal operation.

For a detailed block diagram of IC7520 (MC44603) see Fig. 9.1.

9.1.3 Start up and take over circuitry.

Via the start-up circuitry R3530 and R3529 one side of the 220V AC mains is used to start-up IC7520 via the supply pin (Vpin 1). As long as Vpin 1 has not reached 14V5, IC7520 does not start up and only sinks 0.3mA. As soon as Vpin 1 reaches the 14V5, IC7520 starts driving FET 7518 into conduction and pin 1 sinks a typical supply current of 17mA. This supply current can not be delivered by the start-up circuit, so a take-over circuit has to be available. If no take-over take's place, the voltage on pin 1 will decrease and IC7520 switches off . In that case the restart will start again. During start-up a voltage across winding 1 - 2 is built up. At the moment the voltage across winding 1 - 2 reaches approx. (12V, D6540 start conducting and takes over the supply voltage Vpin 1 of IC7520 (take over current is approx. 17mA).

9.1.4 Secondary output voltages sensing (pin 14 of IC7520)

Winding 1 - 2 has the same polarity as the secondary windings witch are supplying the load. During the FET is not conducting the secondary windings and winding 1-2 are positive. D6537 conducts and charges C2537; the DC level across C2537 is a reference for the secondary output voltages e.g. the +95V((VBATT). This control voltage (feedback voltage) is applied via voltage divider R3538, R3539 and potentiometer R3540 (for adjusting the +VBATT) to the error amplifier input IC7520 pin 14.

9.1.5 Primary current (I-prim) sensing (pin 7 of IC7520)

The current sense voltage Vpin 7 is a measure for the I-prim through FET 7518. The I-prim is converted into a voltage by R3518. The current sense voltage Vpin 7 is used to control both the secondary output voltages and the maximum I-prim.

9.1.6 Demagnetization control (pin 8 0f IC7520)

The voltage across winding 1 - 2 has the same polarity as the voltage across the secondary windings. As a result the voltage across this winding is negative during the FET is conducting, and positive during the FET is not conducting. The so called demagnetization "DEMAG" function in IC7520 (input pin 8) is used for blocking the output Vpin3 during the time that there is still energy in the transformer (Isec not zero). This is realized by delaying the switch "on" point of the FET until the demagnetization is completely finished.

9.1.7 Standby mode

In the standby mode the load decreases under a certain threshold level. The SMPS is than switching to the so called "reduced frequency mode". The switching frequency is than reduced to 20 kHz. The minimal load threshold level is determined by R3532 connected to pin 12.

In normal operation mode the internal oscillator is adjusted at 70 kHz. This frequency is determined by C2531 and R3537 connected to pin 10 and pin 16 respectively of the IC7520.

In standby mode the internal oscillator is adjusted at 20 KHz. This frequency is determined by R3536 connected to pin 15 IC7520.

9.1.8 FET 7518 gate regulation

D6524 prevents pin 3 of IC7520 from becoming negative (this will destroy the IC) due to stray inductance in the gate part of the FET. The safety resistor R3525 limits the drive current to the gate of the FET 7518

9.1.9 Over voltage protection of the secondary voltages

After start-up is the supply voltage Vpin 1 taken over by positive winding 1 - 2, and so after start up Vpin 1 is a measuring point for the secondary output voltages. After start-up (via an internal switch) this Vpin 1 is internally tapped (voltage divided) to a voltage which can be measured at pin 6 (so Vpin 6 is also a measuring point for the secondary output voltages). As soon as the voltage Vpin 6 > 2V5 the logic in IC 7520 will shut down the output at pin 3. This 2V5 threshold at Vpin 6 is equivalent to a Vpin1 of 16V DC which is equivalent to a voltage at the supply voltage (VBATT of approx. 95V DC (normal operation) and 102V DC (standby). After switching "off" because of over voltage protection, the IC starts up again In case an over voltage situation is sensed at the secondary output voltages, the SMPS will go in over voltage protection. In case the over voltage situation remains present, the SMPS will give over voltage protection slow-start, over voltage protection slow-start, etc. (a very good audible hick-up mode).

9.1.10 Undervoltage protection of the secondary voltages

If the supply voltage Vpin 1 < 9V DC the output pulse at pin 3 will be shut down. As soon as Vpin 1 < 7V5, the IC7520 will be totally shut "off". Vpin 1 of 9V DC is equivalent to a voltage at (VBATT of approx. 70V DC (normal operation) and 95V DC(standby). Vpin 1 of 7V5 is equivalent to a voltage at

(VBATT of approx. 55V DC (normal operation) and 65V DC (standby).

In case an under voltage situation is sensed at the secondary output voltages, the SMPS will first switch "off" the pulse and then switch "off" the complete IC 7520.

In case the IC 7520 is switched "off", the SMPS will switch "off". In case the under voltage situation remains present, the SMPS will give under voltage protection, slow-start, under-voltage protection, slow-start, etc. (a very good audible hick-up mode).

9.1.11 Unload protection

In case the load goes down (e.g. the line deflection goes down because of standby mode or some failure in the line deflection circuit) this is detected by IC7520 via I-prim and secondary output voltages sensing. In case the load decreases below a certain threshold the SMPS will switch in "reduced frequency mode" of 20 kHz (this threshold is determined by the voltage level at pin 12 IC7520);

In case of an unload situation the set will switch to "low frequency mode" or standby mode. Whether this unload situation of the SMPS is caused by the standby command or by a failure (e.g. in the line circuit),can only be determined by switching on the set again which the remote control, in case of standby mode the TV will switch "on" again, in case of unload situation the set will not switch "on".

9.1.12 Overload (short-circuit) protection

If the secondary load becomes too high, I-prim becomes too high which is sensed by the current sense voltage Vpin 7. This voltage Vpin 7 is not allowed to exceed 1V DC by IC 7520 and so gives current limiting.

As the I-prim is limited, the secondary output voltages will also drop and so supply voltage Vpin 1 will drop. As soon as Vpin 1<9V DC the driving pulse at pin 3 will stop.

As a result of these 2 mechanism in case of an overload the secondary voltages will drop very fast. This is called the fold-back mechanism, the fold-back point can be adjusted by pin 5 IC7520 this point is adjusted to a maximum tolerable output power of 85W at 90V AC and 165W at 276VAC.

After this fold-back, the IC starts up again. In case the overload situation remains present, the SMPS will give fold back again, slow-start, fold-back, slow-start, etc.;

As a result in case of short-circuit (or overload) the TV will be in a very good audible hick-up mode.

9.1.13 Output voltages

- +VBATT (95V) used for the line output stage and the tuning system.
- 10V / 14V used for the audio amplifier.
- 14V used for the horizontal synchronization circuit and as input voltage for IC7541.
- +5V (pin 9 of IC7541).used for the control circuit The 5V is also available in the standby mode).
- +8V (pin 8 of IC7541) used for the video processing. The +8V output is determined by the voltage on pin 7 of IC 7541 This voltage is adjusted via voltage divider 3552 and 3554.

9.1.14 DC Output Voltages Protections

- +5V protection :When any overload for the +5V supply occurs (pin 1 of IC7541 < 6.5V) the protection circuit in IC7541 turns on. and shuts down the +5V supply. and also +8V supply.
- +8V protection : When any overload for the +8V supply occurs (pin 1 of IC7541 < 6.5V) the protection circuit in IC7541 turns on and shut down the output +8V supply. If the voltage on pin 7 is < 2.4V the +8V will also shut down.

9.2 Single chip TV-processor IC7225 (TDA8374)

Introduction :

In this chip most of the video, audio and sync circuits are integrated.

In the diagrams the IC is split up in next 5 parts (5A,5B,5C,5D and 5E).

- IC7225-5A, video detector (see diagram A3).
- IC7225-5B, source select en PAL demodulator (see diagram A3).
- IC7225-5C, video control (see diagram A3).
- IC7225-5D, horizontal and vertical synchronization (see diagram A2)
- IC7225-5E, mono sound FM demodulator (see diagram A5)

9.3 Micro computer (Diagram A4)

Two kinds of microprocessors are used, one with and one without teletext function The (C with teletext (IC7600) is drawn in the diagram with the outer pin numbering. In case of no TXT a (C (IC7601) is used with fewer pins. This (C is drawn in the diagrams with the internal pin numbering. In case of the (C with integrated teletext function, the CVBS-TXT signal is fed to pin 23. The TXT and OSD information are combined at pins 32-33-34.

9.4 The line output circuitry (see diagram A2)

Pin 40 IC 7225-5D delivers the drive signal for the line output stage. Via TS7440 and TS7441 the drive signal is applied to the line output transistor 7445 and line output transformer (LOT) 5445. The line output stage supplies the line deflection current. Via secondary windings of the LOT the following supply voltages are generated:

- EHT voltage (25kV)
- Vg2 voltage
- Focus voltage
- Filament supply voltage (ff)
- (160V for RGB amplifiers on the CRT panel
- +5.5V for the control circuit and tuner supply
- + 9V for the tuner supply
- +13V for the control and vertical drive output circuit
- -13V for the vertical drive output circuit

9.5 Frame output circuitry

IC 7401 (TDA9302) is used for the vertical deflection. This IC is controlled on pins 1 and 3 by the vertical drive signal delivered by IC 7225-5D. The deflection current is generated on pin 5. The vertical fly-back voltage is generated on pin 3 of the IC.

9 Circuit diagram description

9.6 Protections

General: In the set next protections are build in:

9.6.1 Fast discharge circuit.

TS7420 and TS7421 (see diagram A1) formed a fast discharge circuit. When the voltage on the collector of TS7421is >6V the circuit will switch off the horizontal drive immediately via pin 50 IC7225-5D (see diagram A2).

9.6.2 CRT flash protection.

The BCI information is applied to pin 42 of IC7225-5D.(diagram A2) If due to a flash in the picture tube the voltage on pin 42 is >6V, the horizontal drive is switched off immediately. If the voltage is again <6V the horizontal drive is switched on again.

9.6.3 EHT over voltage protection.

The BCI information is also applied to pin 50-IC7225-5D (diagram A2). First the BCI compensate vertical picture amplitude variations due to beam current variations. The control range is between 1.2V and 2.8V. However if the voltage on pin 50 exceeds 3.9V the EHT over voltage protection is activated and the horizontal drive is switched off.

9.6.4 +13V protection

Protection input pin 16 of IC7600 (see diagram A4). If this pin is connected to ground, the set is switched in protection. At this pin the +13V is monitored via the circuit 7655,7608. The emitter of 7608 becomes "low" (0V7 lower than the base voltage) if the +13V drops. This will force pin 16 of the (C "low" and will switches the set in protection.

9.6.5 +13V and -13V protection

Vertical deflection output IC7401(see diagram A2) is supplied by +13V and -13V. When the current delivered by the +13V or 13V is increasing to much will this result in a voltage drop of <6.5V.at pin 3 of the IC (VFL) . This voltage drop is applied to pin 37-IC7600 (micro computer). The micro-computer will place the set in the standby mode.

BLOCK DIAGRAM MC44603P

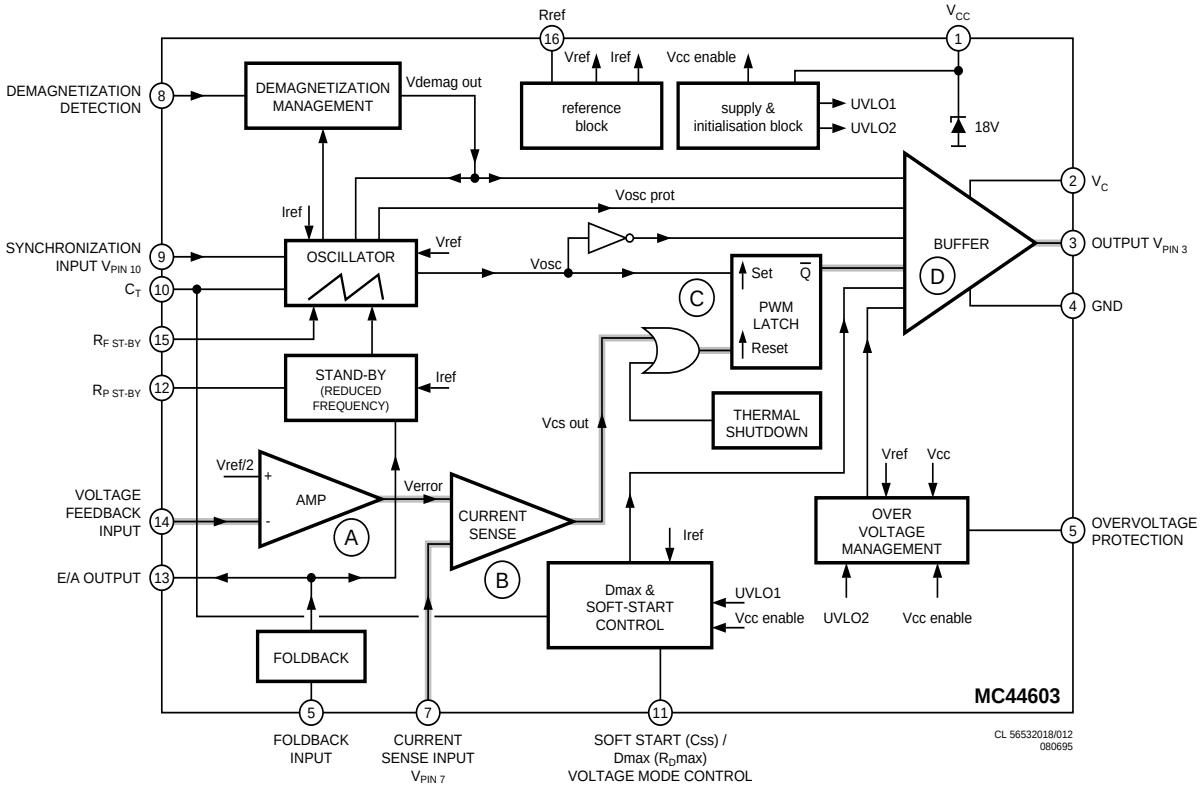
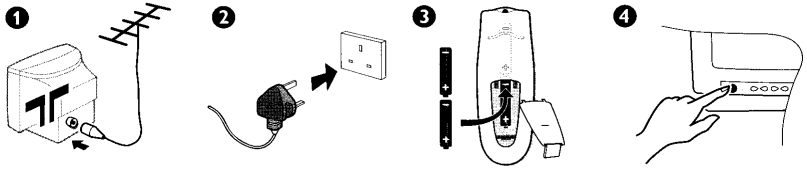


Figure 9-1

Introduction

Thank you for purchasing this television set.
This handbook has been designed to help you install and operate your TV set.
We would strongly advise you read it thoroughly.
We hope our technology meets entirely with your satisfaction.

Installation



Insert the aerial plug in to the socket at the rear of the set.

Insert the mains plug into a wall socket (220-240V/50Hz).

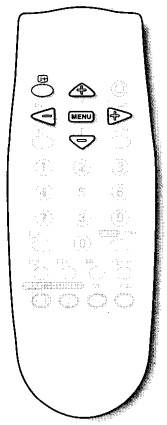
Insert the 2 LR03-type batteries (supplied) making sure they are the right way around.

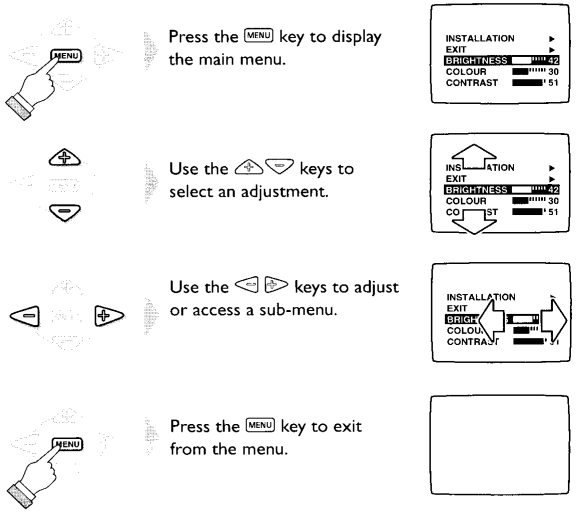
Press the on/off key to switch on the television. If the television remains in standby mode, press the P key on the remote control.

Remark: When you switch on the TV set for the first time, the INSTALLATION menu automaticaly appears on the screen.

Using the menus

The menus are displayed on the television screen. They are used to tune in the channels and to access all settings. They are used in the following way:





❶ Press the MENU key to display the main menu.

❷ Use the keys to select an adjustment.

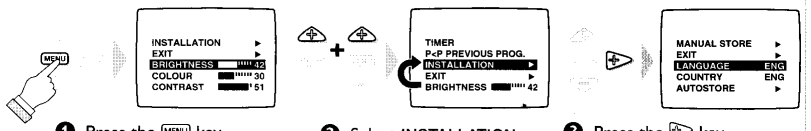
❸ Use the keys to adjust or access a sub-menu.

❹ Press the MENU key to exit from the menu.

N.B.: The main menu automatically disappears after 30 seconds if no action is taken. The i+ key also allows you to exit the menus.

Tuning-in the TV channels

To call-up the Installation menu



❶ Press the MENU key.

❷ Select INSTALLATION.

❸ Press the key. The INSTALLATION menu appears on the screen.

N.B.: If the INSTALLATION menu is not displayed the childlock function is enabled

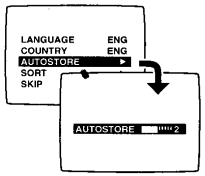
Selecting the menu language and the country

From the **INSTALLATION** menu:

❶ Select **LANGUAGE** and choose the language you wish to use (key). The text for all the menus will appear in the language you have chosen.

❷ Select **COUNTRY** (key) and choose the country (GB for Great Britain).

Automatic store

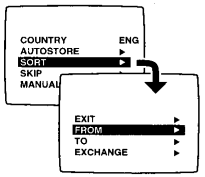


From the **INSTALLATION** menu (once the **COUNTRY** has been selected):

❶ Press the 0 key.

❷ Select **AUTOSTORE** (key) and press .
The TV set searches and stores all the programmes it finds. The search operation takes a few minutes. When the search is complete, the **INSTALLATION** menu reappears automatically.
The programmes found will be numbered in ascending order starting from **1, 2, 3, 4, ...** Use the **SORT** menu to re-number the programmes correctly.
The search starts from the programme number displayed on the screen.
If the transmitter emits the automatic sort signal, the programmes are correctly numbered.
If some programme have no sound, check that you have the correct SYSTEM (see MANUAL STORE p.3). If no programme is found, refer to the chapter entitled «Tips» (p. 8).
To exit or interrupt the search, press the MENU key.

Programme sort



This menu allows you to re-number the programmes in the order you prefer.
From the **INSTALLATION** menu:

❶ Select **SORT** using the key and press .
The **SORT** menu is displayed.

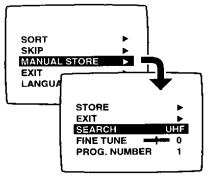
❷ Select **FROM** (key) and choose the programme to be re-numbered using the or using keys 0 to 9.
If, for example, you want to re-number programme 10 as 2: Type: 1 0 .

❸ Select **TO** (key) and enter the new number using the keys or using keys 0 to 9 (in our example, type 2).

❹ Select **EXCHANGE** (key) and press .
The message **OK** appears and the exchange is made (can be used to cancel). In our example programme 10 is re-numbered as programme 2 (and programme 2 is re-numbered as programme 10).
Repeat this operation for as many programmes as you wish to re-number.

❺ To exit from the **SORT** menu, press the MENU key several times.

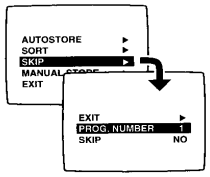
Manual store



This menu allows you to store each programme manually.
From the **INSTALLATION** menu:

1. Select **MANUAL STORE** (key) and press .
   The **MANUAL STORE** menu appears.
2. Select **SYSTEM** (according to model). Use the key to select the standard reception, **FRANCE** (standard **LL'**), **EUR. W (BG)** or **UK (I)**.
3. Select **SEARCH** and press . The search begins.
   As soon as a programme is found, the search will stop.
   The frequency band is displayed (**VHF1**, **VHF3** or **UHF**).
   Use the key to select the frequency band.
   If no programme is found, refer to the «Tips» chapter (page 8).
4. If the reception is not satisfactory, select **FINE TUNE** and hold down key or to adjust.
5. Select **PROG. NUMBER** and enter the required programme number using the keys or using keys 0 to 9.
6. Select **STORE** and press .
   The message **OK** appears. The programme is stored.
7. Repeat steps 3 to 6 for each programme to be stored.
8. To exit from the **MANUAL STORE** menu, press the MENU key several times.

Skip the programmes



This menu allows you to skip programmes which can be accessed using the P keys on the remote control.
From the **INSTALLATION** menu:

1. Select **SKIP** (key) and press .
   The **SKIP** menu appears
2. Select **PROG. NUMBER** (key) and use the keys or keys 0 to 9 to select the programme you wish to skip.
3. Select **SKIP** and use the keys to choose **YES** to skip the programme or **NO** so that it remains accessible
   Only the programmes found during the search are set to NO (all other programmes are set to YES by default).
4. Repeat steps 2 and 3 for as many programmes as you wish to skip.
5. Press the MENU key 3 times to exit from the **INSTALLATION** menu.
   The P keys on the remote control can now be used to access those programmes and **EXT** sockets which are set to **NO** in the list.
   The programmes skipped can always be accessed using keys 0 to 9.

To exit from the menus ...

Press the MENU key several times.

The remote control keys

Selecting TV programmes
Use the P and keys to move up or down a programme. To sequentially display all of the programmes hold the key down for 3 seconds. Press again to cancel.
For some programmes equiped with teletext, the title of the programme appears briefly at the bottom of the screen.
N.B.: Programmes which have been skipped or locked are not accessible (refer to SKIP and CHILDLOCK menus, pages 3 and 7).

Screen information
To briefly display the programme number and the sound mode (stereo models).

Volume
Use keys and to adjust the volume.

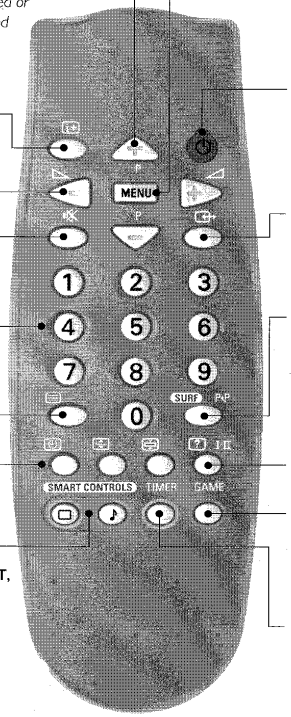
Mute key
To disable or enable the sound.

Numerical keys
For direct access to programmes. For a 2 figure programme number, the second figure must be entered before the dash disappears.

Switch teletext on/off
To call-up or exit from teletext.

Teletext features
Refer to next page.

Smart controls
Press the key to obtain the following picture settings: **RICH**, **SOFT**, **NATURAL** and return to **MANUAL**.
Press the key to obtain the following sound settings: **THEATRE**, **MUSIC**, **SPEECH** and **NORMAL** (or **MANUAL** for stereo models).



Menu
To call-up or exit from the menus. Use the keys for selection and the keys for adjustment.

Standby
To set the TV to standby mode. The red indicator lights up. To switch the TV set on again, press P , P or keys 0 to 9 .

Select EXT sockets
This key is used to select **EXT(1)** (rear socket), **EXT2** (front socket: on certain versions) and to return to the TV programme.

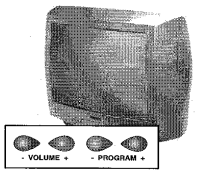
Surf P◂P
Use this key to return to the previous programme or to display the surf list (page 6).

Sound mode (stereo models)
Pressing this key allows you to switch from **STEREO** to **MONO** sound or to choose between language **I** and language **II** in the event of bilingual transmissions.

Game
This key is used for the direct selection of the front (on certain versions) and rear **EXT** sockets with a picture preset that is adapted to game consoles.

Timer
This key provides direct access to the **TIMER** menu (page 7).
To exit from this menu, press the MENU key twice.

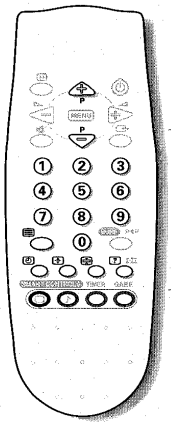
The keys on the TV set



The TV set has 4 keys (on some models these are located behind a flap).
The **VOLUME - +** keys are used to adjust sound levels.
The **PROGRAMME - +** keys are used to select the required programmes.
To access the menus, hold down the **VOLUME -** and **VOLUME +** keys.
The **PROGRAMME - +** keys may then be used to select an adjustment and the **VOLUME - +** keys to make that adjustment.
To exit from the menus, select the **EXIT** item (by using the **PROGRAMME - +** keys) and press the **VOLUME +** key.

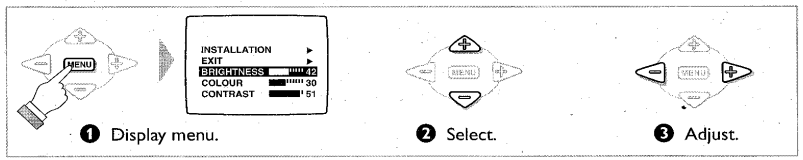
Using teletext

Teletext is an information system, broadcast by certain TV channels, which can be consulted in the same way as a newspaper. It also provides subtitles.

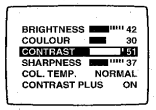


Press:	Result:
Time display	When the teletext is switched off, press this key to display the time in the top right-hand corner of the screen. *The time is not displayed if the channel selected does not broadcast teletext.*
Switch teletext on/off	To call-up or exit from teletext. The main index page presents a list of subjects to which you have access. Each subject has a corresponding 3 digit page number. *If the selected TV channel does not broadcast teletext,* 100 *is displayed and the screen remains black (if this is the case, switch off teletext and choose another TV channel).*
0/9 **Selecting a teletext page**	Use keys 0 to 9 to enter the page number required. E.g. page 120, type 1 2 0. The number is displayed in the top left-hand corner of the screen, the page counter starts searching and then the page selected is displayed. Keys P ∧ and ∨ allow you to access previous or following pages. *If* > xxx < *flashes briefly or the counter continues searching, this means that the selected page is not broadcast. If this is the case, choose another number.*
Direct access to a subject	Coloured zones are displayed at the bottom of the screen. The 4 keys with coloured borders allow access to the subjects or their corresponding pages. *The coloured zones flash when the page or the subject is not yet available.*
Enlarging a page	Press this key to display the upper part, the lower part and then to return to the normal page size.
Direct selection of a sub-page	Certain pages have sub-pages which follow on automatically. To access a sub-page directly, press the key. The page number is replaced by 4 dashes. Type the number of the sub-page required using 4 numbers, e.g. type 0002 to consult sub-page 2. The number of the current page reappears, the page counter searches and then the sub-page is displayed.
Stop the sequence of sub-pages	Pressing this key enables and disables the sequence of sub-pages. The message appears in the top left-hand corner of the screen.
Reveal	Use this key to reveal/conceal hidden information (solutions to games).

Other menu adjustments

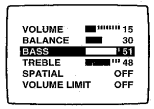


❶ Display menu. ❷ Select. ❸ Adjust.



Picture adjustment

Display the Picture menu. You can now access the adjustments for **BRIGHTNESS, COLOUR, CONTRAST, SHARPNESS** and **COL. TEMP.**: which adjusts the colour temperature of the picture; **COOL** (blue white), **NORMAL** (balanced) or **WARM** (red white).
CONTRAST PLUS: which enables clarity of the contrast.

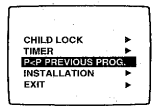


Sound adjustment

Display the Sound menu. You can now set the **VOLUME**, and make the following adjustments for stereo equipment: **BALANCE, TREBLE, BASS** and:
SPATIAL: this function enhances the stereo effect, giving the impression that the speakers are positioned further apart.
VOLUME LIMITER: this function is used for automatic level control in order to avoid sudden increases in volume (particularly when changing channels or during advertisements).

Storing adjustments

Storing is automatic: once an adjustment is made using the menus, it is stored automatically (this happens after 1 minute if no action is taken or as soon as an other programme is selected). The adjustments for the EXT sockets and for programmes 0 to 11 are stored individually: a different adjustment is possible for each of these programmes (except for the volume). The adjustments for programmes 12 to 99 are stored in the same way.
To restore the factory picture adjustments, set the smart controls on NATURAL and modify one of the Picture menu items (this will automatically store the settings).

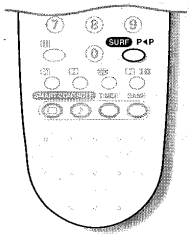


Surf function

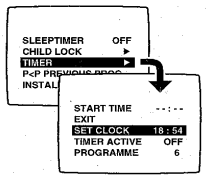
This menu is used to select the function to be attributed to the **P<P** SURF key on the remote control. Display the menu, then:
❶ Select **P<P** and choose **PREVIOUS PROG.** or **SURF LIST**.
❷ Press the MENU key to exit the menu.

PREVIOUS PROG. mode: the **P<P** SURF key on the remote control is used to access the last programme watched.

SURF LIST mode: the **P<P** SURF key is used to display a list of favourite programmes (maximum of 8). To store this list:
❶ Display one of your favourite programmes (e.g. number 4).
❷ Before the number disappears, press the **P<P** SURF key.
The SURF LIST message appears. The programme is stored.
❸ Repeat operations ❶ and ❷ for each programme to be stored (e.g. programme No. 9, 1 and 12).
❹ Use the **P<P** SURF key to access you favourite programmes directly (in our example Nos. 4, 9, 1 and 12).
To reset the surf list, set the **P<P** *menu to* **PREVIOUS PROG** *and then to* **SURF LIST**.



Timer



This menu allows you to program the TV to automatically switch on with the programme of your choice.

❶ Display the menu, select **TIMER** and then press ▷.
The **TIMER** menu appears.

❷ Select **SET CLOCK** and enter the time using keys ⓪ to ⑨.
N.B.: Every time the TV is switched on the clock is automatically updated on the basis of the teletext information in programme No. 1.
If the TV set does not feature teletext, this update will not occur.

❸ Select **START TIME** and enter the time at which you wish the TV to switch on.

❹ Select **PROGRAMME** and enter the programme number required.

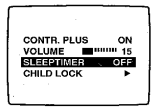
❺ Select **TIMER ACTIVE** and set to **ON**. (**OFF** to disable).

❻ Press twice on the MENU key to exit from the menu.
If you now switch the TV set to standby (⏻ key), it will automatically switch on at the time programmed.

To cancel: Switch **TIMER ACTIVE** back to **OFF**.

N.B.: The programming will not function correctly if you use the on/off key on the front of the TV to switch off the TV set.

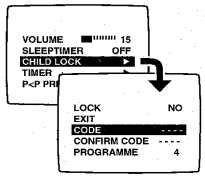
Sleeptimer



Display the menu, select **SLEEPTIMER** and use the ▷ key to enter the length of time after which the TV will switch to standby mode (up to 120 mins).

Press the i+ key on the remote control to display the length of time remaining.

Childlock



This menu allows you to lock the TV set and to disable access to certain or all of the programmes.

N.B.: When a programme is locked, the search function is no longer possible (the INSTALLATION menu is no longer accessible).

❶ Display the menu, select **CHILDLOCK** and press ▷.
The **CHILDLOCK** menu appears.

❷ Select **PROGRAMME** and enter the number of the programme you wish to lock. To lock all programmes, select **ALL** using the ◁ key (above programme No. 0) .

❸ Select **LOCK** and then **YES**. The screen turns black. Repeat operations ❷ and ❸ for each programme to be locked (maximum of 5).

❹ Select **CODE** and enter your confidential 4 digit code.

❺ Select **CONFIRM CODE** and enter the same code number again.
The **LOCK** menu is replaced by a **CODE** menu.
The TV set is now locked. The locked programmes are no longer visible: a black screen appears with a **LOCKED** message.

To cancel: Select **CODE** and enter your confidential number.
The **CHILDLOCK** menu reappears. Now repeat operations ❷ to ❸ by selecting **LOCK** and then **NO**.

❻ Press the MENU key to exit from the menu.

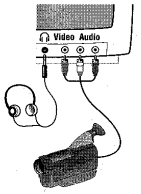
N.B.: The childlock will not function with EXT sockets that receive an RGB signal (most game consoles).
Should you forget your confidential code, enter the universal code 8888.

Connecting peripheral equipment

Rear connection

You can connect any equipment that has a euroconnector socket to your TV set (video recorder, decoder, etc.).

For further information on connecting a video recorder, refer to its user manual.



Front connections

When the headphones are connected, the sound on the TV set is automatically muted. Press keys ◁ and ▷ to adjust the volume.
Some models have **AUDIO / VIDEO** connections on the front of the TV set.
There is 1 video input + 1 sound input (mono models) or 2 (**L**) and (**R**) sound inputs for stereo models. For a mono sound camcorder, connect the audio signal to the **AUDIO L** input. Use the **I-II** key to reproduce the sound on the left and right loudspeakers of the television.

To select the connected equipment

Use the ⇥ key on the remote control to select the **EXT(1)** (rear socket) or **EXT2** (front socket: on certain models).

Most equipment (decoder, video recorder) carries out the switching itself.
When a peripheral device provides RGB signals (game, satellite receiver, ...), it has priority over the TV programmes. The peripheral device has to be switched off if you want to watch the TV channels. If you wish to avoid this inconvenience, configure the peripheral equipment to provide composite video signals (CVBS PAL/SECAM) instead of RGB signals (refer to the peripherasl user manual).

Tips

Installation

To avoid any dangerous situations and operating faults, do not place anything on the TV set and leave a space of at least 5 cm around the appliance.

Impossible to call up the INSTALLATION menu?

The **CHILDLOCK** function is enabled (refer to page 5). To rapidly unlock all programmes, call up the **CHILDLOCK** menu and enter your confidential code.
Set the **PROGRAMME** item to **ALL**. Set the **LOCK** item to **YES** and then to **NO**.
All the programmes are now unlocked.

Poor reception or no picture

The proximity of mountains or high buildings may be responsible for ghost pictures, echoing or shadows. If this is the case, modify the orientation of the outside aerial and check that the TV channel is tuned in correctly (refer to **FINE TUNE** page 3).
Does your antenna enable you to receive broadcasts in this frequency range? Have you chosen the correct system (page 3)?
Are your aerial and euroconnector sockets correctly connected?
If the peripheral equipment connected to the **EXT1** is on switch it off.

Standby

To save electricity it is advisable to switch the TV set off using the on/off key on the front of the set. If the set receives no signal for 15 mins, it automatically switches to standby mode.

Still no results?

If you have a problem with your TV set, never attempt to repair it yourself: contact your dealer's after-sales service.

Recycling directive

Your TV set uses materials which are reusable or which can be recycled.
To minimise the amount of waste in the environment, specialist companies recover used sets for dismantling and collection of reusable materials (consult your dealer).

11 Abbreviations

(R-Y)_OUT	R-Y output from chroma demodulator
uC	Microcomputer
AQUA	Aquadag layer on the outside of the picture tube
AV_MUTE	Signal to mute the sound on the Audio-out cinch
AVL_AV2/AVL	Switching signal from UP to the Auto Volume leveller on the ITT on Panel
B_TXT_OSD	Blue TXT or OSD signal from (C to the video controller IC7225-5C
BASS	Control signal for BASS
BCI	Beam Current information
BG/1_or_BG/0 K	Monochrome TV system sound carrier + 5.5MHz (BG), Sound carrier + 6MHz(I), Sound carrier + 6.5MHz(DK)
BL_TXT_OSD	Fast blanking signal to IC7725-5C to display OSD and TXT
BLACKSTR_SW	Black stretch switch
BS1	TV band selection 1 signal
BS2	TV band selection 2 signal
CHROMA_O/ NTSC_SW	Switch on signal for NTSC chroma oscillator (3.575MHz)
CHROMA_1/BG/L	Switch on signal for BG/L chroma oscillator (3.582MHz)
CHROMA_1/ STATUS	Switch on signal for NTSC chroma oscillator (3.579MHz)
CHROMA_2/ STATUS	Signal to select the correct system in case of trinorma
CVBS_EXT1	CVBS external 1 input signal
CVBS_EXT2	CVBS external 2 signal
CVBS_IN	CVBS internal 1 (from tuner)
CVBS_OUT	CVBS output signal
CVBS_OUT_1	CVBS output signal 1
CVBS_SOUND	CVBS for inter carrier sound detector
CVBS_TXT	CVBS for TXT processing in uC
DISCHARGE	To have a fast discharge after switching off the set
EAR	Earth
EEPROM	Electrical Erasable Programmable Read Only Memory
ESD	Electrical Static Discharge
ff	Filament (heater voltage) from LOT to the picture tube
FL_A	Filament voltage for CRT
G_TXT_OSD	Green TXT or OSD signal from the microcomputer to IC7225-5C
GND	Ground
GRD_LOT	Ground of LOT
HOR.FLYBACK	Horizontal flyback pulse used for looking the horizontal oscillator
12C	Digital Control bus of the microcomputer
IF	Intermediate frequency signal for sound processing
INT/EXT	Switching signal for Internal or external audio + video switching
L_EXT1	Audio left external 1
LEFT_OUT	Audio left out
MOD_L_1N1	SCART I/P 1 in left
MOD_L_1N2	SCART I/P 2 in left
MOD_R_1N1	SCART I/P 1 in right
MOD_L_1N2	SCART I/P 2 in right
MONO/STROBE/ BG_L	Strobe signal for HEF 4094 on multi-mono sound panel
MONO_OUT	Audio mono out
NTSC	NTSC colour system
PAL/SECAM	PAL or SECAM colour system
R_TXT_OSD	Blue TXT or OSD signal from the microcomputer to the video controller IC72255C
RAM	Random Access Memory
RESET1	Reset signal for the uC
RF_AGC	Automatic gain control signal I for tuner
RIGHT_OUT	Audio right out
ROM	Read Only Memory
SAM	Service Alignment Mode
SANDCASTLE	Sand castle signal from IC7225-5D to delay line IC7255 and SECAM chrominance decoder IC7241.
SCL	Clock line of the 12C-bus
SDA	Data line of the 12C-bus
SDM	Service Default Mode; predefined mode for faultfinding
SECAM_REF	SECAM reference
SID/STA/LL	Sound identification / stereo available / France system "L"
SIF	Sound IF signal for FM demodulator
STANDBY	Switching signal from microcomputer "low" for standby (power supply will be switched to stand-by mode), "high" for normal operation
TREBLE	Treble control signal
V_TUNE	Tuning voltage for tuner
VFB	Vertical flyback pulse
VFL	50 Hz vertical flyback pulse used to inform the microcomputer that flyback takes place. This is important for OSD and TXT
VG2	Voltage on grid 2 of the picture tube
VOLUME	Control signal (from uC, but on DC level via RC nework) for volume control of sound processing in sound panel

Main carrier [A1-A5]

Various

0024Δ	4822 267 31858	Con. 1P
0011Δ	4822 265 20723	Con. 2P
0022Δ	4822 267 10774	Con. 2P
0055	4822 267 10775	Con. 2P
0044	4822 267 10538	Con. 3P
0088	4822 267 10542	Con. 4P
0030	4822 267 10537	Con. 5P
M9	4822 265 10422	Con. 9P (F-pin)
M11	4822 267 10421	Con. 19P (F-pin)
0231Δ	4822 267 60243	21P scart
0232	4822 265 10392	2P Cinch
0233	4822 267 10687	3P Cinch
0020	4822 267 31014	Headphone socket
0138Δ	4822 276 13603	Mains switch
Δ	4822 492 70289	Spring fix. Ts
Δ	4822 265 11253	Fuse holder
	4822 492 70788	Spring fix. IC
Δ	4822 492 62076	

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1000	4822 210 10812	VHF/UHF tuner
1000	4822 210 10815	UHF tuner
1002	4822 242 10743	OFWK6272K (38.9MHz)
1015	4822 242 10575	OFWJ1980M (38.9MHz)
1015	4822 242 70936	OFWJ1952 (38.9MHz)
1015	4822 242 81388	OFWG1961M (38.9MHz)
1015	4822 242 81436	OFWK3953M (38.9MHz)
1015	4822 242 81737	OFWG1965M (38.9MHz)
1015	4822 242 81964	OFWG1984M (38.9MHz)
1060	4822 276 13775	Switch
1061	4822 276 13775	Switch
1062	4822 276 13775	Switch
1063	4822 276 13775	Switch
1102	4822 242 10314	Filter 5,5MHz
1102	4822 242 10362	Filter 6,0MHz
1104	4822 242 10314	Filter 5,5MHz
1104Δ	4822 242 10316	Filter 6,5MHz
1104	4822 242 10362	Filter 6,0MHz
1204	4822 242 10434	X-tal 18,432MHz
1206	4822 242 81301	Filter 6,5MHz
1206	4822 242 81572	Filter 6,0MHz
1207	4822 242 81572	Filter 6,0MHz
1207	4822 242 81712	Filter 5.5/5.74MHz
1209	4822 242 10875	X-tal 40MHz
1275	4822 242 10356	X-tal 4,433619MHz
1277	4822 242 10355	X-tal 3,579545MHz
1500	4822 070 34002	Fuse 4A/desc>
1501	4822 242 81423	OFWL9453M (38.9MHz)
1560Δ	4822 071 51002	Fuse 1A
1560Δ	4822 071 56301	Fuse 630MA
1571Δ	4822 071 51602	Fuse 1.6A
1670	4822 218 11573	RC rec. GP1U28QP
1681	4822 242 10694	X-tal 12MHz

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2008Δ	4822 126 13838	100nF 50V 20%
2010Δ	4822 124 40196	220µF 20% 16V
2010	4822 124 41545	220µF 20% 16V
2016Δ	4822 124 40433	47µF 20% 25V
2042	5322 122 32531	100pF 5% 50V
2043	5322 122 32531	100pF 5% 50V
2104Δ	4822 124 41579	10µF 20% 50V
2105Δ	4822 124 41579	10µF 20% 50V
2108	4822 124 40248	10µF 20% 63V
2108Δ	4822 124 41579	10µF 20% 50V
2110Δ	4822 124 41579	10µF 20% 50V
2115	4822 124 40255	100µF 20% 63V
2115	4822 124 81029	100µF 20% 25V
2116	4822 124 40255	100µF 20% 63V
2116	4822 124 81029	100µF 20% 25V
2117	4822 126 13695	82pF 1% 63V
2120	4822 126 10334	470pF 10% 50V
2121	4822 126 10334	470pF 10% 50V
2124	5322 122 32268	470pF 10% 50V
2125	5322 122 32268	470pF 10% 50V
2128Δ	4822 122 32627	2.7nF 10% 50V
2128	5322 126 10465	3.9nF 10% 50V
2130	5322 126 10511	1nF 5% 50V
2144	4822 124 40242	1µF 20% 63V
2145	5322 122 31863	330pF 5% 50V
2161Δ	4822 124 41579	10µF 20% 50V
2163	4822 126 13461	680pF 10% 50V
2164	4822 126 13461	680pF 10% 50V
2166	5322 122 32268	470pF 10% 50V
2167	4822 126 13461	680pF 10% 50V
2168	5322 122 32268	470pF 10% 50V
2169	5322 122 32268	470pF 10% 50V
2170	4822 126 13461	680pF 10% 50V
2171	4822 126 13461	680pF 10% 50V
2180	5322 122 32268	470pF 10% 50V
2198	4822 126 13512	330pF 10% 50V
2199	4822 126 13512	330pF 10% 50V
2200Δ	4822 126 13838	100nF 50V 20%
2201Δ	5322 122 32654	22nF 10% 63V
2202	4822 124 40242	1µF 20% 63V
2202	4822 124 41576	2.2µF 20% 50V
2203	4822 126 14087	100nF 10% 63V
2205	4822 124 11566	47µF 20% 50V
2205	4822 124 41751	47µF 20% 50V
2209Δ	4822 126 13838	100nF 50V 20%
2210	5322 122 32658	22pF 5% 50V
2211	4822 124 41576	2.2µF 20% 50V
2212Δ	5322 122 32654	22nF 10% 63V
2213	4822 126 13061	220nF 20% 25V
2213	4822 126 13692	47pF 1% 63V
2214	4822 122 33926	12pF 50V
2214Δ	4822 126 13838	100nF 50V 20%
2215	4822 126 13061	220nF 20% 25V
2215	4822 126 13692	47pF 1% 63V
2216	4822 126 13473	220nF 80-20% 50V
2217	4822 124 41584	100µF 20% 10V
2217	4822 126 13473	220nF 80-20% 50V
2218	5322 122 32967	5.6pF 10% 63V
2220	4822 126 13473	220nF 80-20% 50V
2221	4822 126 13473	220nF 80-20% 50V
2221Δ	4822 126 13838	100nF 50V 20%
2222Δ	4822 126 13838	100nF 50V 20%
2224	4822 123 14024	1000µF 16V 20%
2224Δ	4822 126 13838	100nF 50V 20%
2225	5322 122 32448	10pF 5% 50V
2226	4822 124 40242	1µF 20% 63V
2226	5322 122 32448	10pF 5% 50V
2227Δ	4822 126 13838	100nF 50V 20%
2228Δ	4822 124 41579	10µF 20% 50V
2229Δ	4822 124 41579	10µF 20% 50V
2230Δ	4822 124 41579	10µF 20% 50V
2231Δ	4822 126 13838	100nF 50V 20%
2234Δ	4822 124 41579	10µF 20% 50V
2235	5322 126 10511	1nF 5% 50V
2236	5322 126 10511	1nF 5% 50V
2237	4822 126 13561	220nF 10% 16V
2238	4822 126 13561	220nF 10% 16V
2240	4822 126 14087	100nF 10% 63V
2241Δ	4822 124 40246	4.7µF 20% 63V
2241	4822 126 13561	220nF 10% 16V
2242Δ	4822 126 13838	100nF 50V 20%
2242Δ	5322 122 32654	22nF 10% 63V
2243	5322 126 10511	1nF 5% 50V
2244	5322 126 10511	1nF 5% 50V
2245	4822 124 41751	47µF 20% 50V
2246	5322 122 32448	10pF 5% 50V
2247	5322 126 10511	1nF 5% 50V
2248	4822 124 81151	22µF 50V
2248	5322 126 10511	1nF 5% 50V
2249	5322 126 10511	1nF 5% 50V
2250	4822 124 41751	47µF 20% 50V
2251	4822 122 33216	270pF 5% 50V
2251	5322 122 32448	10pF 5% 50V
2252Δ	4822 124 41579	10µF 20% 50V
2252Δ	5322 122 32654	22nF 10% 63V
2253Δ	5322 126 10223	4.7nF 10% 63V
2254Δ	5322 122 32654	22nF 10% 63V
2254Δ	5322 126 10223	4.7nF 10% 63V
2255Δ	4822 124 41579	10µF 20% 50V
2256	4822 126 13561	220nF 10% 16V
2257	4822 124 22263	220µF 20% 25V
2260Δ	4822 124 40246	4.7µF 20% 63V
2260	4822 124 40255	100µF 20% 63V
2260Δ	4822 124 41579	10µF 20% 50V
2261	4822 124 40255	100µF 20% 63V
2261Δ	5322 122 32654	22nF 10% 63V
2262Δ	4822 124 41579	10µF 20% 50V
2263Δ	4822 124 41579	10µF 20% 50V
2264	4822 124 81029	100µF 20% 25V
2265	4822 126 13561	220nF 10% 16V
2266	4822 126 13561	220nF 10% 16V
2267	4822 126 13561	220nF 10% 16V
2268	4822 121 42868	220nF 5% 50V
2271	5322 126 10511	1nF 5% 50V
2272	5322 122 33446	3.3nF 10% 63V
2272	5322 126 10511	1nF 5% 50V
2273	4822 126 13561	220nF 10% 16V
2273	4822 126 14087	100nF 10% 63V
2274Δ	4822 126 13838	100nF 50V 20%
2275	4822 126 13486	15pF 2% 63V
2276	4822 126 13694	68pF 1% 63V
2277	4822 126 13486	15pF 2% 63V
2277	4822 126 13694	68pF 1% 63V
2278	5322 126 10511	1nF 5% 50V
2279	5322 126 10511	1nF 5% 50V
2280	5322 126 10511	1nF 5% 50V
2281	5322 126 10511	1nF 5% 50V
2283	4822 126 13751	47nF 10% 63V
2284	4822 126 13751	47nF 10% 63V
2285	4822 126 13751	47nF 10% 63V
2403	4822 124 40242	1µF 20% 63V
2406	4822 122 33127	2.2nF 10% 63V
2409Δ	5322 126 10223	4.7nF 10% 63V
2410	5322 121 42386	100nF 5% 63V
2414	4822 121 42868	220nF 5% 50V
2420	5322 121 42386	100nF 5% 63V
2421Δ	4822 124 41579	10µF 20% 50V
2422	5322 121 42386	100nF 5% 63V
2430Δ	4822 124 41579	10µF 20% 50V
2434Δ	4822 126 13838	100nF 50V 20%
2436	5322 126 10511	1nF 5% 50V
2437	5322 126 10511	1nF 5% 50V
2440	4822 121 70654	2N210% 50V
2442	4822 126 13473	220nF 80-20% 50V
2443	4822 124 80791	470µF 16V 20%
2444	4822 121 51319	1µF 10% 63V
2445Δ	4822 121 70617	10nF 5% 1.6KV
2445Δ	4822 121 70649	9.1nF 5% 1.6KV
2447Δ	4822 126 14078	220pF 10% 2KV
2448	4822 121 43368	47µF 160V
2450	4822 121 10507	250V 470nF 5%
2450Δ	4822 121 10518	250V 390nF 5%
2451	4822 121 51319	1µF 10% 63V
2452	4822 124 80195	470µF 20% 10V
2453	4822 124 80791	470µF 16V 20%
2456	4822 124 80069	1µF 20% 160V
2460	4822 121 51385	33nF 20% 100V
2461	4822 126 11131	18pF 5% 50V
2461	4822 126 13645	27P 50V
2462	4822 126 13866	4.7nF 10% 1KV
2462	4822 126 14079	2.2nF 10% 1KV
2463	4822 124 40255	100µF 20% 63V
2464Δ	4822 126 13838	100nF 50V 20%
2465	5322 126 10184	680P 5% 50V.
2466Δ	4822 122 33172	390pF 5% 50V
2467	5322 126 10184	680P 5% 50V.
2468Δ	4822 126 13838	100nF 50V 20%
2469	4822 126 14237	470pF 10% R 2KV
2470	4822 124 11845	22µF 20% 250V
2471	4822 122 30043	10nF 80% 63V
2476Δ	4822 122 33172	390pF 5% 50V
2480	4822 123 14024	1000µF 16V 20%
2485	5322 126 10184	680P 5% 50V.
2487	5322 126 10184	680P 5% 50V.
2500Δ	4822 126 13589	470nF 275V
2501	4822 121 10686	4.7nF 10% 50V
2502Δ	4822 124 40246	4.7µF 20% 63V
2502Δ	4822 126 12793	2.2nF 10% 2KV
2503Δ	4822 124 40246	4.7µF 20% 63V
2504	4822 121 42868	220nF 5% 50V
2504Δ	4822 126 12793	2.2nF 10% 2KV
2505	4822 124 41576	2.2µF 20% 50V
2505Δ	4822 126 12793	2.2nF 10% 2KV
2506Δ	4822 124 41579	10µF 20% 50V
2507Δ	4822 124 41579	10µF 20% 50V
2508Δ	4822 124 41556	100µF 20% 385V
2508	4822 124 41576	2.2µF 20% 50V
2509Δ	4822 124 41579	10µF 20% 50V
2509	4822 126 13517	820pF 10% 1000V
2510Δ	4822 124 41579	10µF 20% 50V
2510	4822 126 13517	820pF 10% 1000V
2511Δ	4822 124 41579	10µF 20% 50V
2512Δ	4822 121 43996	33nF 5% 50V
2514	4822 121 51472	39nF 5% 250V
2515Δ	4822 121 43823	470nF 5% 50V
2516	4822 121 43925	2.2nF 5% 50V
2517	4822 124 81029	100µF 20% 25V
2517Δ	5322 122 34123	1nF 10% 50V
2518	4822 121 42868	220nF 5% 50V
2518Δ	4822 122 50116	470pF 10% 1KV
2519	5322 121 42386	100nF 5% 63V
2520	4822 124 22263	220µF 20% 25V
2520	4822 126 13695	82pF 1% 63V
2521	4822 121 10686	4.7nF 10% 50V
2521	4822 122 33127	2.2nF 10% 63V
2522	4822 122 33127	2.2nF 10% 63V
2522Δ	4822 124 41579	10µF 20% 50V
2523	4822 124 81029	100µF 20% 25V
2524	4822 121 42868	220nF 5% 50V
2524	5322 122 32268	470pF 10% 50V
2529Δ	4822 126 13838	100nF 50V 20%
2530	4822 124 40242	1µF 20% 63V
2531	4822 121 10673	560pF 1% 630V
2532	5322 126 10511	1nF 5% 50V
2533	5322 122 31863	330pF 5% 50V
2534	5322 126 10511	1nF 5% 50V
2537	5322 121 42386	100nF 5% 63V
2540Δ	4822 124 40433	47µF 20% 25V
2541	4822 121 10686	4.7nF 10% 50V
2545Δ	4822 126 14037	2.2nF 20% 250V
2550Δ	4822 122 50116	470pF 10% 1KV
2551	4822 124 42336	47µF 20% 160V
2553	5322 122 31866	6.8nF 10% 63V
2554	4822 126 13061	220nF 20% 25V
2561	4822 124 80707	2200µF 20% 25V
2562	4822 124 80707	2200µF 20% 25V
2563	4822 124 41097	220µF 20% 16V
2563	4822 124 42403	220µF 20% 16V
2571	4822 124 80707	2200µF 20% 25V
2572	5322 122 32531	100pF 5% 50V
2601	4822 126 13061	220nF 20% 25V
2602Δ	4822 124 40433	47µF 20% 25V
2607Δ	5322 122 34123	1nF 10% 50V
2608Δ	5322 122 34123	1nF 10% 50V
2610	5322 121 42386	100nF 5% 63V
2611Δ	4822 124 41579	10µF 20% 50V
2615	4822 121 42868	220nF 5% 50V
2621	4822 126 13695	82pF 1% 63V
2622	4822 126 13695	82pF 1% 63V
2623Δ	5322 122 32654	22nF 10% 63V
2630Δ	4822 124 41579	10µF 20% 50V
2650	5322 126 10184	680P 5% 50V.
2655	4822 124 41643	100µF 20% 16V
2660	5322 126 10184	680P 5% 50V.
2661	5322 126 10184	680P 5% 50V.
2664Δ	4822 126 13838	100nF 50V 20%
2666Δ	4822 126 13838	100nF 50V 20%
2670	5322 122 32531	100pF 5% 50V
2671	4822 124 81029	100µF 20% 25V
2674	5322 122 32531	100pF 5% 50V
2680	4822 126 13061	220nF 20% 25V
2682	4822 126 13693	56pF 1% 63V
2683	4822 126 13693	56pF 1% 63V
2684	4822 126 13061	220nF 20% 25V
2685	4822 122 33127	2.2nF 10% 63V
2690	5322 122 32531	100pF 5% 50V
2691	5322 122 32531	100pF 5% 50V
2692	5322 122 32531	100pF 5% 50V
2693	5322 122 32531	100pF 5% 50V
2695Δ	4822 126 13838	100nF 50V 20%

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3000	4822 051 10102	1k 2% 0.25W
3001	4822 116 83864	10k 5% 0.5W
3002	4822 116 83864	10k 5% 0.5W
3004	4822 051 10102	1k 2% 0.25W
3005	4822 051 20223	22k 5% 0.1W
3006	4822 051 20223	22k 5% 0.1W
3007Δ	4822 050 22701	270Ω 1% 0.6W
3008	4822 051 10102	1k 2% 0.25W
3009	4822 051 10102	1k 2% 0.25W
3010Δ	4822 052 10478	4Ω7 5% 0.33W
3016	4822 116 52238	12k 5% 0.5W
3040Δ	4822 051 20109	10Ω 5% 0.1W
3040	4822 051 20391	390Ω 5% 0.1W
3100Δ	4822 051 20472	4k7 5% 0.1W
3101	4822 117 10833	10k 1% 0.1W
3104	4822 116 52283	4k7 5% 0.5W
3105	4822 051 20223	22k 5% 0.1W
3106Δ	4822 051 20472	4k7 5% 0.1W
3107Δ	4822 051 20472	4k7 5% 0.1W
3108	4822 117 11449	2k2 1% 0.1W
3114	4822 116 52257	22k 5% 0.5W
3115	4822 116 52257	22k 5% 0.5W
3121	4822 116 83868	150Ω 5% 0.5W
3122	4822 116 83868	150Ω 5% 0.5W
3123	4822 116 52201	75Ω 5% 0.5W
3124Δ	4822 051 20101	100Ω 5% 0.1W
3125	4822 116 52201	75Ω 5% 0.5W
3126	4822 051 20331	330Ω 5% 0.1W
3127	4822 116 52201	75Ω 5% 0.5W
3128	4822 116 52201	75Ω 5% 0.5W
3129	4822 051 20331	330Ω 5% 0.1W
3130	4822 051 20331	330Ω 5% 0.1W
3141	4822 050 11002	1k 1% 0.4W
3144	4822 051 10102	1k 2% 0.25W
3160	4822 116 52257	22k 5% 0.5W
3161	4822 116 80175	4k7 5% 0.5W
3162	4822 116 52257	22k 5% 0.5W
3163	4822 116 80175	4k7 5% 0.5W
3164	4822 116 52201	75Ω 5% 0.5W
3165Δ	4822 051 20229	22Ω 5% 0.1W
3166	4822 051 20689	68Ω 5% 0.1W
3167	4822 117 11449	2k2 1% 0.1W
3168Δ	4822 051 20101	100Ω 5% 0.1W
3169	4822 051 10102	1k 2% 0.25W
3170Δ	4822 051 20471	470Ω 5% 0.1W
3178	4822 051 20394	390k 5% 0.1W
3179	4822 051 20331	330Ω 5% 0.1W
3179	4822 117 11503	220Ω 1% 0.1W
3180	4822 051 20681	680Ω 5% 0.1W
3181	4822 051 10102	1k 2% 0.25W
3181Δ	4822 051 20471	470Ω 5% 0.1W
3185	4822 116 80175	4k7 5% 0.5W
3186	4822 116 80175	4k7 5% 0.5W
3187	4822 116 52201	75Ω 5% 0.5W
3188Δ	4822 050 12201	220Ω 1% 0.4W
3192	4822 116 83881	390Ω 5% 0.5W
3193	4822 116 83881	390Ω 5% 0.5W
3194	4822 116 83961	6k8 5%
3195	4822 116 80175	4k7 5% 0.5W
3201	4822 051 20391	390Ω 5% 0.1W
3203	4822 116 52257	22k 5% 0.5W
3204	4822 051 20822	8k2 5% 0.1W
3205Δ	4822 050 12201	220Ω 1% 0.4W
3205	4822 116 83872	220Ω 5% 0.5W
3206	4822 051 20399	39Ω 5% 0.1W
3206	4822 051 20829	82Ω 5% 0.1W
3207	4822 116 52231	820Ω 5% 0.5W
3208Δ	4822 051 20472	4k7 5% 0.1W
3209	4822 051 10102	1k 2% 0.25W
3210Δ	4822 051 20471	470Ω 5% 0.1W
3211Δ	4822 051 20471	470Ω 5% 0.1W
3214	4822 051 10102	1k 2% 0.25W
3215	4822 117 10353	150Ω 1% 0.1W
3216	4822 051 20391	390Ω 5% 0.1W
3216	4822 116 52175	100Ω 5% 0.5W
3217	4822 051 20391	390Ω 5% 0.1W
3217	4822 116 52175	100Ω 5% 0.5W
3217	4822 117 10353	150Ω 1% 0.1W
3217	4822 117 11503	220Ω 1% 0.1W

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3218	4822 117 10833	10k 1% 0.1W
3218	4822 117 11507	6k8 1% 0.1W
3220	4822 116 52175	100Ω 5% 0.5W
3221	4822 116 52175	100Ω 5% 0.5W
3223	4822 116 83864	10k 5% 0.5W
3224	4822 051 20564	560k 5% 0.1W
3224	4822 117 10834	47k 1% 0.1W
3225	4822 051 20569	56Ω 5% 0.1W
3227	4822 051 20569	56Ω 5% 0.1W
3229	4822 051 20561	560Ω 5% 0.1W
3229	4822 051 20569	56Ω 5% 0.1W
3230	4822 117 10834	47k 1% 0.1W
3233	4822 117 11449	2k2 1% 0.1W
3234Δ	4822 052 10228	2Ω2 5% 0.33W
3234	4822 117 10834	47k 1% 0.1W
3235	4822 117 10834	47k 1% 0.1W
3238	4822 051 20561	560Ω 5% 0.1W
3239	4822 117 11449	2k2 1% 0.1W
3240	4822 051 20333	33k 5% 0.1W
3242	4822 051 20333	33k 5% 0.1W
3243	4822 117 11437	8k2 1% 0.1W
3244	4822 117 11154	1k 1% 0.1W
3246	4822 116 83864	10k 5% 0.5W
3247Δ	4822 052 10109	10Ω 5% 0.33W
3248Δ	4822 051 20471	470Ω 5% 0.1W
3250	4822 116 52256	2k2 5% 0.5W
3250	4822 117 10833	10k 1% 0.1W
3250Δ	4822 117 11846	10k 5% 1/16W
3251	4822 051 20681	680Ω 5% 0.1W
3251	4822 116 83864	10k 5% 0.5W
3252Δ	4822 051 20109	10Ω 5% 0.1W
3252Δ	4822 051 20332	3k3 5% 0.1W
3253Δ	4822 051 20109	10Ω 5% 0.1W
3253Δ	4822 051 20153	15k 5% 0.1W
3254	4822 116 83864	10k 5% 0.5W
3254	4822 117 11503	220Ω 1% 0.1W
3265	4822 051 20122	1k2 5% 0.1W
3265	4822 051 20561	560Ω 5% 0.1W
3266	4822 050 11002	1k 1% 0.4W
3267	4822 116 52264	27k 5% 0.5W
3267	4822 116 83884	47k 5% 0.5W
3273	4822 051 20104	100k 5% 0.1W
3280	4822 051 20561	560Ω 5% 0.1W
3401Δ	4822 050 24708	4Ω7 1% 0.6W
3401	5322 116 53564	3Ω3 5% 0.5W
3402Δ	4822 050 24708	4Ω7 1% 0.6W
3402	5322 116 53564	3Ω3 5% 0.5W
3403Δ	4822 051 20153	15k 5% 0.1W
3404	4822 050 22202	2k2 1% 0.6W
3406	4822 116 83872	220Ω 5% 0.5W
3407	4822 116 83872	220Ω 5% 0.5W
3410	4822 051 20393	39k 5% 0.1W
3411	4822 050 22202	2k2 1% 0.6W
3412	4822 117 10833	10k 1% 0.1W
3413Δ	4822 052 10158	1Ω5 5% 0.33W
3415	4822 051 10102	1k 2% 0.25W
3417	4822 051 10102	1k 2% 0.25W
3418	4822 116 52234	100k 5% 0.5W
3420	4822 051 20223	22k 5% 0.1W
3421	4822 117 11149	82k 1% 0.1W
3422	4822 051 20223	22k 5% 0.1W
3423	4822 051 10102	1k 2% 0.25W
3430Δ	4822 052 10478	4Ω7 5% 0.33W
3431	4822 052 10152	1k5 5% 0.33W
3431Δ	4822 052 10472	4k7 5% 0.33W
3432	4822 052 10152	1k5 5% 0.33W
3432Δ	4822 052 10472	4k7 5% 0.33W
3433	4822 116 52271	33k 5% 0.5W
3434	4822 117 10833	10k 1% 0.1W
3435	4822 116 83878	270k 5% 0.5W
3436	4822 050 11002	1k 1% 0.4W
3437	4822 050 11002	1k 1% 0.4W
3440	4822 051 10102	1k 2% 0.25W
3441	4822 051 20124	120k 5% 0.1W
3442	4822 116 52186	22Ω 5% 0.5W
3443	4822 051 20561	560Ω 5% 0.1W
3444	4822 117 12819	10k 5% 3W
3445	4822 117 12624	10Ω 5% 2W
3446	4822 050 21502	1k5 1% 0.6W
3447	4822 050 11002	1k 1% 0.4W
3448	4822 117 12822	4Ω7 5% 5W
3449Δ	4822 052 11108	1Ω 5% 0.5W
3450Δ	4822 052 10278	2Ω7 5% 0.33W
3451Δ	4822 052 10228	2Ω2 5% 0.33W
3456	4822 116 52297	68k 5% 0.5W
3457	4822 116 52297	68k 5% 0.5W
3458	4822 116 52297	68k 5% 0.5W
3459Δ	4822 050 21202	1k2 1% 0.6W
3460Δ	4822 050 21503	15k 1% 0.6W
3460	4822 116 52251	18k 5% 0.5W
3461	4822 051 20273	27k 5% 0.1W
3462Δ	4822 117 12513	4k7 5% 3W
3470Δ	4822 052 11478	4Ω7 5% 0.5W
3471	4822 053 11399	39Ω 5% 2W
3480Δ	4822 052 10109	10Ω 5% 0.33W
3481	4822 117 12821	220Ω 5% 1W
3490	4822 051 20105	1M 5% 0.1W
3491	4822 117 12955	2k7 1% 0.1W 0805
3500	4822 116 21228	VDR 430V-710V
3501	4822 116 83864	10k 5% 0.5W
3501	4822 117 12181	470Ω 20% 0.5W
3502	4822 116 52256	2k2 5% 0.5W
3503	4822 116 52256	2k2 5% 0.5W
3504Δ	4822 116 40137	PTC 36Ω 365V
3504	4822 116 52256	2k2 5% 0.5W
3505	4822 116 83864	10k 5% 0.5W
3505	4822 252 60151	470Ω
3506	4822 116 52175	100Ω 5% 0.5W
3506	4822 117 12822	4Ω7 5% 5W
3507	4822 117 12654	100Ω 5% 5W
3508	4822 116 52176	10Ω 5% 0.5W
3509	4822 116 52257	22k 5% 0.5W
3510	4822 116 52244	15k 5% 0.5W
3510	4822 117 12647	33k 5% 3W
3511	4822 116 52283	4k7 5% 0.5W
3512	4822 050 11002	1k 1% 0.4W
3512Δ	4822 051 20153	15k 5% 0.1W
3513	4822 051 20184	180k 5% 0.1W
3513	4822 116 52291	56k 5% 0.5W
3514	4822 116 52234	100k 5% 0.5W
3515	4822 116 52256	2k2 5% 0.5W
3516	4822 116 52243	1k5 5% 0.5W
3517	4822 116 52243	1k5 5% 0.5W
3517	4822 117 10833	10k 1% 0.1W
3518	4822 116 52256	2k2 5% 0.5W
3518	4822 117 10422	0.33Ω 5% 3W
3519	4822 116 52234	100k 5% 0.5W
3520	4822 116 52291	56k 5% 0.5W
3520	4822 117 11149	82k 1% 0.1W
3521	4822 050 11002	1k 1% 0.4W
3521	4822 116 52219	330Ω 5% 0.5W
3522	4822 116 52244	15k 5% 0.5W
3523	4822 050 11002	1k 1% 0.4W
3524	4822 050 11002	1k 1% 0.4W
3524Δ	4822 051 20008	0Ω jumper
3525Δ	4822 052 10229	22Ω 5% 0.33W
3525	4822 116 83876	270Ω 5% 0.5W
3526	4822 050 11002	1k 1% 0.4W
3527	4822 116 52289	5k6 5% 0.5W
3528	4822 116 52238	12k 5% 0.5W
3528	4822 116 83868	150Ω 5% 0.5W
3529Δ	4822 050 24708	4Ω7 1% 0.6W
3529	4822 116 83883	470Ω 5% 0.5W
3530	4822 116 52276	3k9 5% 0.5W
3530	4822 116 83961	6k8 5%
3531	4822 116 52249	1k8 5% 0.5W
3532	4822 051 20562	5k6 5% 0.1W
3532	4822 116 52249	1k8 5% 0.5W
3533	4822 116 83872	220Ω 5% 0.5W
3534	4822 051 20224	220k 5% 0.1W
3534	4822 116 52228	680Ω 5% 0.5W
3536	4822 051 20393	39k 5% 0.1W
3536	4822 116 83961	6k8 5%
3537	4822 116 52269	3k3 5% 0.5W
3537	4822 117 10833	10k 1% 0.1W
3538	4822 116 52234	100k 5% 0.5W
3539	4822 116 52251	18k 5% 0.5W
3539	4822 116 52276	3k9 5% 0.5W
3540	4822 101 11189	4.7k 30%LIN 0.1W
3540	4822 116 52256	2k2 5% 0.5W
3540	4822 116 52257	22k 5% 0.5W
3541	4822 117 12653	47Ω 5% 2W
3542Δ	4822 053 21475	4M7 5% 0.5W
3545Δ	4822 053 21475	4M7 5% 0.5W
3546Δ	4822 053 21475	4M7 5% 0.5W
3552Δ	4822 051 20332	3k3 5% 0.1W
3553Δ	4822 051 20121	120Ω 5% 0.1W
3554	4822 117 11139	1k5 1% 0.1W
3565	4822 117 10833	10k 1% 0.1W
3570Δ	4822 051 20109	10Ω 5% 0.1W
3601	4822 116 90885	8k2X6
3602	4822 117 12168	2k2 X 6
3603	4822 117 12167	8k2 X 12
3607	4822 051 20822	8k2 5% 0.1W
3608	4822 116 52234	100k 5% 0.5W
3610	4822 117 10833	10k 1% 0.1W
3612	4822 051 20224	220k 5% 0.1W
3613	4822 116 83868	150Ω 5% 0.5W
3614Δ	4822 051 20153	15k 5% 0.1W
3615	4822 116 83864	10k 5% 0.5W
3616	4822 051 20223	22k 5% 0.1W
3617	4822 116 52238	12k 5% 0.5W
3618	4822 116 52244	15k 5% 0.5W
3621Δ	4822 051 20101	100Ω 5% 0.1W
3622Δ	4822 051 20101	100Ω 5% 0.1W
3623	4822 117 10833	10k 1% 0.1W
3624Δ	4822 051 20101	100Ω 5% 0.1W
3625Δ	4822 051 20101	100Ω 5% 0.1W
3628Δ	4822 051 20101	100Ω 5% 0.1W
3629	4822 117 11449	2k2 1% 0.1W
3630	4822 051 10102	1k 2% 0.25W
3630	4822 117 11139	1k5 1% 0.1W
3632	4822 117 10833	10k 1% 0.1W
3633	4822 116 83864	10k 5% 0.5W
3634	4822 116 52283	4k7 5% 0.5W
3636	4822 116 83864	10k 5% 0.5W
3637	4822 116 52256	2k2 5% 0.5W
3640	4822 117 10833	10k 1% 0.1W
3641	4822 117 10833	10k 1% 0.1W
3653	4822 051 20105	1M 5% 0.1W
3654	4822 051 20822	8k2 5% 0.1W
3655	4822 116 52175	100Ω 5% 0.5W
3656Δ	4822 051 20471	470Ω 5% 0.1W
3657	4822 116 52175	100Ω 5% 0.5W
3660	4822 051 10102	1k 2% 0.25W
3661	4822 051 10102	1k 2% 0.25W
3662	4822 051 10102	1k 2% 0.25W
3663	4822 051 20331	330Ω 5% 0.1W
3664Δ	4822 051 20008	0Ω jumper
3666	4822 051 20273	27k 5% 0.1W
3667	4822 051 20122	1k2 5% 0.1W
3670	4822 116 52175	100Ω 5% 0.5W
3671Δ	4822 051 20332	3k3 5% 0.1W
3674	4822 116 52283	4k7 5% 0.5W
3681	4822 116 83864	10k 5% 0.5W
3684	4822 117 10833	10k 1% 0.1W
3685	4822 116 52297	68k 5% 0.5W
3686	4822 051 20333	33k 5% 0.1W
3690	4822 116 52249	1k8 5% 0.5W
3693	4822 117 11503	220Ω 1% 0.1W
3694	4822 051 20182	1k8 5% 0.1W
3695	4822 051 20182	1k8 5% 0.1W
3696	4822 051 20182	1k8 5% 0.1W
3698	4822 051 10102	1k 2% 0.25W
4xxx	4822 051 10008	0Ω 5% 0.25W
4xxx	4822 051 20008	0Ω 5% 0.25W

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5010	4822 157 11533	390µH 10%
5010	4822 157 11615	220µH
5010	4822 157 63065	0.68µH
5128	4822 157 53575	3.3µH
5201Δ	4822 157 53941	100µH
5203	4822 157 50961	22µH
5203	4822 157 53139	4.7µH
5204Δ	4822 157 51462	10µH
5205Δ	4822 157 51462	10µH
5206	4822 153 20251	18µH 10%
5206Δ	4822 156 21721	2.2µH
5206	4822 157 53634	5.6µH 10%
5207Δ	4822 157 51462	10µH
5260	4822 157 11534	Coil 78MHz
5260	4822 157 11607	Coil 38.9MHz
5441Δ	4822 157 11076	Linearity coil
5441	4822 157 11539	Linearity cor. coil
5442	4822 157 53139	4.7µH
5445Δ	4822 140 10634	LOT for 17" CRT
5445Δ	4822 140 10637	LOT for 21" CRT
5451	4822 157 11167	47µH 5%
5456	4822 156 20915	33µH
5457	4822 156 20915	33µH
5458	4822 156 20915	33µH
5500Δ	4822 157 11399	30mH
5501	4822 152 20678	33µH
5516	4822 157 60171	Bead coil 100MHz
5540	4822 157 52007	4U7 10%
5545Δ	4822 146 10866	Mains trafo for 21"
5545Δ	4822 146 10931	Mains trafo for 17"
5550	4822 157 60171	Bead coil100MHz
5551	4822 157 71157	27µH 5%
5553	5322 157 53016	10µH
5570	4822 157 60171	Bead coil 100MHz
5571Δ	4822 157 51462	10µH
5573	4822 157 60171	Bead coil 100MHz
5600Δ	4822 157 50963	2.2µH
5601Δ	4822 158 10604	6.8 µH
5602	4822 157 53001	27µH 10%
5603	4822 157 62767	8.2µH
5605	4822 157 62767	8.2µH
5620	4822 157 60123	6.8µH

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6001Δ	4822 130 34173	BZX79-B5V6
6002Δ	4822 130 34173	BZX79-B5V6
6003	5322 130 34955	BA482
6016Δ	4822 130 30621	1N4148
6100Δ	4822 130 30621	1N4148
6100	4822 130 80888	BA682
6101Δ	4822 130 30621	1N4148
6109	4822 130 34382	BZX79-B8V2
6110	4822 130 34382	BZX79-B8V2
6111	4822 130 34382	BZX79-B8V2
6204Δ	4822 130 30621	1N4148
6205Δ	4822 130 34173	BZX79-B5V6
6206Δ	4822 130 30621	1N4148
6207Δ	4822 130 30621	1N4148
6254	4822 130 34233	BZX79-B5V1
6265Δ	4822 130 30621	1N4148
6420Δ	4822 130 30621	1N4148
6440Δ	4822 130 80791	BYV28-200/20
6441	5322 130 31938	BYV27-200
6443	4822 130 42488	BYD33D
6444	4822 130 34145	BZX79-B39
6445Δ	4822 130 32896	BYD33M
6449	4822 130 42488	BYD33D
6454	4822 130 42488	BYD33D
6455	4822 130 42606	BYD33J
6456	4822 130 42606	BYD33J
6461Δ	4822 130 30621	1N4148
6464Δ	4822 130 30621	1N4148
6468	4822 130 42488	BYD33D
6470	4822 130 42606	BYD33J
6480Δ	4822 130 61219	BZX79-B10
6481	4822 130 42488	BYD33D
6501Δ	4822 130 30621	1N4148
6502Δ	4822 130 30621	1N4148
6502Δ	4822 130 31933	1N5061
6503Δ	4822 130 30621	1N4148
6503Δ	4822 130 31933	1N5061
6504Δ	4822 130 30621	1N4148
6504Δ	4822 130 31933	1N5061
6505Δ	4822 130 30621	1N4148
6505Δ	4822 130 31933	1N5061
6510Δ	4822 130 34499	BZX79-B20
6537	4822 130 30842	BAV21
6540	4822 130 30842	BAV21
6550	4822 130 10807	BYM36C
6560	4822 130 10256	EGP20DL-5300
6570	4822 130 10256	EGP20DL-5300
6600	4822 130 34233	BZX79-B5V1
6610	4822 130 82037	HZT33
6653	4822 130 30862	BZX79-B9V1
6661Δ	4822 130 30621	1N4148
6663	4822 130 10859	TLDR5400
6690Δ	4822 130 31983	BAT85
6691Δ	4822 130 31983	BAT85
6692Δ	4822 130 31983	BAT85
6693Δ	4822 130 31983	BAT85

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7001	5322 130 41983	BC858B
7002	5322 130 41983	BC858B
7003	4822 130 60511	BC847B
7100	4822 130 60511	BC847B
7101	4822 130 60511	BC847B
7115	4822 130 60511	BC847B
7118	4822 130 60511	BC847B
7202	4822 209 13099	MSP3400C/C6
7203	4822 209 71873	TA7668BP
7204	4822 130 60511	BC847B
7204	4822 209 13646	TDA7057AQ/N2
7209	4822 130 60511	BC847B
7214	4822 130 40855	BC337
7214	4822 130 60511	BC847B
7215	4822 130 60511	BC847B
7216	4822 130 60511	BC847B
7220	4822 130 60511	BC847B
7225	4822 209 15828	TDA8347C/N3
7225	4822 209 16326	TDA8374/N3
7241	4822 209 90129	TDA8395/N2
7255	4822 209 12635	TDA4665/V4
7265	5322 130 60508	BC857B
7401	4822 209 13176	TDA9302H
7420	5322 130 60508	BC857B
7421	4822 130 60511	BC847B
7440	4822 130 60511	BC847B
7441	5322 130 44647	BC368
7445Δ	4822 130 10206	BUT11AX
7480	5322 130 44647	BC368
7501	4822 209 31555	TDA9830/V1
7502	4822 209 90462	TDA7056B/N1
7503	4822 130 40937	BC548B
7504	4822 130 40937	BC548B
7505	4822 130 40937	BC548B
7506Δ	4822 130 44197	BC558B
7507Δ	4822 130 44197	BC558B
7508	4822 130 40937	BC548B
7509	4822 130 40937	BC548B
7510	4822 130 40937	BC548B
7511	4822 130 40937	BC548B
7512	4822 130 40937	BC548B
7513	4822 130 40937	BC548B
7514	4822 130 40937	BC548B
7515	4822 130 40937	BC548B
7518Δ	4822 130 10806	STP6NA60FI
7520	4822 209 15684	MC44603AP
7541	4822 209 15829	TDA8139
7600	4822 209 16325	SAA5297PS/044
7600	4822 209 16332	SAA5297PS/057
7600	4822 209 16333	SAA5297PS/048
7600	4822 209 16435	SAA5297PS/060
7603	4822 130 60511	BC847B
7608	4822 130 60511	BC847B
7610Δ	4822 209 73852	PMBT2369
7620	4822 816 10769	ST24W04B6
7655	4822 130 60511	BC847B
7681	4822 130 60511	BC847B
7682	4822 130 60511	BC847B
7682Δ	5322 130 41982	BC848B

CRT panel [B]

Various

CRT	4822 212 11703	CRTPanel 17"
CRT	4822 212 11704	CRT Panel 21"
Δ	4822 255 70293	CRT socket 17"
Δ	4822 255 70261	CRT socket 21"

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2313	4822 122 33575	220pF 5% 50V
2313	5322 122 33538	150pF 2% 63V
2323	4822 122 33216	270pF 5% 50V
2323	4822 122 33575	220pF 5% 50V
2333	4822 122 33216	270pF 5% 50V

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2333	4822 126 10326	180pF 5% 63V
2341	4822 121 41689	100nF 10% 250V
2342Δ	4822 124 11508	22µF 250V 20%
2373	4822 121 41926	33nF 5% 630V

3311	4822 050 11002	1k 1% 0.4W
3313	4822 051 20479	47Ω 5% 0.1W
3314	4822 117 12818	18k 5% 3W
3315Δ	4822 052 10331	330Ω 5% 0.33W
3316Δ	4822 052 10221	220Ω 5% 0.33W
3317	4822 117 11896	1k5 20% 0.5W
3321	4822 051 10102	1k 2% 0.25W
3322Δ	4822 051 20471	470Ω 5% 0.1W
3322	4822 117 11452	430Ω 1% 0.1W
3323	4822 051 20479	47Ω 5% 0.1W
3324	4822 117 12818	18k 5% 3W
3325Δ	4822 052 10331	330Ω 5% 0.33W
3326Δ	4822 052 10221	220Ω 5% 0.33W
3327	4822 117 11896	1k5 20% 0.5W
3331	4822 051 10102	1k 2% 0.25W
3332Δ	4822 051 20471	470Ω 5% 0.1W
3332	4822 117 11452	430Ω 1% 0.1W
3333	4822 051 20479	47Ω 5% 0.1W
3334	4822 117 12818	18k 5% 3W
3335Δ	4822 052 10331	330Ω 5% 0.33W
3336Δ	4822 052 10221	220Ω 5% 0.33W
3337	4822 117 11896	1k5 20% 0.5W
3341Δ	4822 052 11109	10Ω 5% 0.5W
3342	4822 116 83874	220k 5% 0.5W
3347Δ	4822 052 10102	1k 5% 0.33W
3371Δ	4822 052 10108	1Ω 5% 0.33W
3371Δ	4822 052 10278	2Ω7 5% 0.33W
3372Δ	4822 052 10108	1Ω 5% 0.33W
3372Δ	4822 052 10278	2Ω7 5% 0.33W
3374	4822 117 11896	1k5 20% 0.5W
3312Δ	4822 051 20471	470Ω 5% 0.1W
3312	4822 117 11452	430Ω 1% 0.1W

5370	4822 157 50961	22µH
5370	4822 157 70468	56µH

6311	4822 130 30842	BAV21
6321	4822 130 30842	BAV21
6331Δ	4822 130 30621	1N4148
6332	4822 130 30842	BAV21
6341Δ	4822 130 30621	1N4148
6347	4822 130 34382	BZX79-B8V2

7301	4822 130 41782	BF422
7302	4822 130 41782	BF422
7303	4822 130 41782	BF422
7304	4822 130 41646	BF423
7305	4822 130 41782	BF422
7306	4822 130 41646	BF423
7307	4822 130 41782	BF422
7308	4822 130 41646	BF423
7309	4822 130 41782	BF422

Mono panel [C]

Various

1020	4822 212 11558	Audio panel Mono + AM sound
1020	4822 212 11559	Audio panel Mono no AM sound
	4822 267 10755	Con 19P
	4822 267 10537	Con 5P
	4822 492 70788	Spring fix. IC
1501	4822 242 81423	Filter OFWL9453M (38.9MHz)

2501	4822 121 10686	4.7nF 10% 50V
2502Δ	4822 124 40246	4.7µF 20% 63V
2503Δ	4822 124 40246	4.7µF 20% 63V
2504	4822 121 42868	220nF 5% 50V
2505	4822 124 41576	2.2µF 20% 50V
2506Δ	4822 124 41579	10µF 20% 50V
2507Δ	4822 124 41579	10µF 20% 50V
2508	4822 124 41576	2.2µF 20% 50V
2509Δ	4822 124 41579	10µF 20% 50V
2510Δ	4822 124 41579	10µF 20% 50V
2511Δ	4822 124 41579	10µF 20% 50V
2512Δ	4822 121 43996	33nF 5% 50V
2514	4822 121 51472	39nF 5% 250V
2515Δ	4822 121 43823	470nF 5% 50V
2516	4822 121 43925	2.2nF 5% 50V
2517	4822 124 81029	100µF 20% 25V
2518	4822 121 42868	220nF 5% 50V
2519	5322 121 42386	100nF 5% 63V
2520	4822 124 22263	220µF 20% 25V
2521	4822 121 10686	4.7nF 10% 50V
2522Δ	4822 124 41579	10µF 20% 50V
2523	4822 124 81029	100µF 20% 25V
2524	4822 121 42868	220nF 5% 50V

3501	4822 116 83864	10k 5% 0.5W
3502	4822 116 52256	2k2 5% 0.5W
3503	4822 116 52256	2k2 5% 0.5W
3504	4822 116 52256	2k2 5% 0.5W
3505	4822 116 83864	10k 5% 0.5W
3506	4822 116 52175	100Ω 5% 0.5W
3508	4822 116 52176	10Ω 5% 0.5W
3509	4822 116 52257	22k 5% 0.5W
3510	4822 116 52244	15k 5% 0.5W
3511	4822 116 52283	4k7 5% 0.5W
3512	4822 050 11002	1k 1% 0.4W
3513	4822 116 52291	56k 5% 0.5W
3514	4822 116 52234	100k 5% 0.5W
3515	4822 116 52256	2k2 5% 0.5W
3516	4822 116 52243	1k5 5% 0.5W
3517	4822 116 52243	1k5 5% 0.5W
3518	4822 116 52256	2k2 5% 0.5W
3519	4822 116 52234	100k 5% 0.5W
3520	4822 116 52291	56k 5% 0.5W
3521	4822 050 11002	1k 1% 0.4W
3522	4822 116 52244	15k 5% 0.5W
3523	4822 050 11002	1k 1% 0.4W
3524	4822 050 11002	1k 1% 0.4W
3525	4822 116 83876	270Ω 5% 0.5W
3526	4822 050 11002	1k 1% 0.4W
3527	4822 116 52289	5k6 5% 0.5W
3528	4822 116 52238	12k 5% 0.5W
3529	4822 116 83883	470Ω 5% 0.5W
3530	4822 116 83961	6k8 5%
3531	4822 116 52249	1k8 5% 0.5W
3532	4822 116 52249	1k8 5% 0.5W
3533	4822 116 83872	220Ω 5% 0.5W
3534	4822 116 52228	680Ω 5% 0.5W
3536	4822 116 83961	6k8 5%
3537	4822 116 52269	3k3 5% 0.5W
3539	4822 116 52276	3k9 5% 0.5W
3540	4822 116 52256	2k2 5% 0.5W
3540	4822 116 52257	22k 5% 0.5W

5501	4822 152 20678	33µH

6501Δ	4822 130 30621	1N4148
6502Δ	4822 130 30621	1N4148
6503Δ	4822 130 30621	1N4148
6504Δ	4822 130 30621	1N4148
6505Δ	4822 130 30621	1N4148

7501	4822 209 31555	TDA9830/V1
7502	4822 209 90462	TDA7056B/N1
7503	4822 130 40937	BC548B
7504	4822 130 40937	BC548B
7505	4822 130 40937	BC548B
7506Δ	4822 130 44197	BC558B
7507Δ	4822 130 44197	BC558B
7508	4822 130 40937	BC548B
7509	4822 130 40937	BC548B
7510	4822 130 40937	BC548B
7511	4822 130 40937	BC548B
7512	4822 130 40937	BC548B
7513	4822 130 40937	BC548B
7514	4822 130 40937	BC548B
7515	4822 130 40937	BC548B

Nicam +2CS panel [D]

Various

1020	4822 212 11561	Nicam panel + AM Sound
1020	4822 212 11562	Nicam panel no AM sound
1020	4822 212 11563	2CS stereo panel
	4822 267 10755	Con. 19P
	4822 267 10537	Con. 5P
Δ	4822 492 62076	Spring fix IC
1202	4822 242 10688	OFWK9456M 38.9MHZ
1203	4822 242 81436	OFWK3953M 38.9MHz
1204	4822 242 10434	X-tal 18,432MHz

2201	4822 126 13693	56pF 1% 63V
2202Δ	4822 126 13838	100nF 50V 20%
2203	4822 124 41576	2.2µF 20% 50V
2206	4822 126 13473	220nF 80-20% 50V
2207	4822 126 13751	47nF 10% 63V
2208	4822 124 41576	2.2µF 20% 50V
2210	5322 122 32658	22pF 5% 50V
2213	4822 126 13692	47pF 1% 63V
2214	4822 122 33926	12pF 50V
2215	4822 126 13692	47pF 1% 63V
2216	4822 126 13473	220nF 80-20% 50V
2217	4822 126 13473	220nF 80-20% 50V
2220	4822 126 13473	220nF 80-20% 50V
2221	4822 126 13473	220nF 80-20% 50V
2224Δ	4822 126 13838	100nF 50V 20%
2225	5322 122 32448	10pF 5% 50V
2226	5322 122 32448	10pF 5% 50V
2227Δ	4822 126 13838	100nF 50V 20%
2228Δ	4822 124 41579	10µF 20% 50V
2229Δ	4822 124 41579	10µF 20% 50V
2230Δ	4822 124 41579	10µF 20% 50V
2231Δ	4822 126 13838	100nF 50V 20%
2234Δ	4822 124 41579	10µF 20% 50V
2235	5322 126 10511	1nF 5% 50V
2236	5322 126 10511	1nF 5% 50V
2237	4822 126 13561	220nF 10% 16V
2238	4822 126 13561	220nF 10% 16V
2241Δ	4822 124 40246	4.7µF 20% 63V
2242Δ	4822 126 13838	100nF 50V 20%
2243	5322 126 10511	1nF 5% 50V
2244	5322 126 10511	1nF 5% 50V
2245	4822 124 41751	47µF 20% 50V
2246	5322 122 32448	10pF 5% 50V
2247	5322 126 10511	1nF 5% 50V
2248	4822 124 81151	22µF 50V
2249	5322 126 10511	1nF 5% 50V
2250	4822 124 41751	47µF 20% 50V
2251	5322 122 32448	10pF 5% 50V
2252Δ	4822 124 41579	10µF 20% 50V
2253Δ	5322 126 10223	4.7nF 10% 63V
2254Δ	5322 126 10223	4.7nF 10% 63V
2255Δ	4822 124 41579	10µF 20% 50V
2256	4822 126 13561	220nF 10% 16V
2257	4822 124 22263	220µF 20% 25V
2260	4822 124 40255	100µF 20% 63V
2261	4822 124 40255	100µF 20% 63V
2262Δ	4822 124 41579	10µF 20% 50V
2263Δ	4822 124 41579	10µF 20% 50V
2264	4822 124 81029	100µF 20% 25V
2265	4822 126 13561	220nF 10% 16V
2266	4822 126 13561	220nF 10% 16V
2267	4822 126 13561	220nF 10% 16V
2268	4822 121 42868	220nF 5% 50V
2271	5322 126 10511	1nF 5% 50V
2272	5322 126 10511	1nF 5% 50V
2273	4822 126 13561	220nF 10% 16V
2274Δ	4822 126 13838	100nF 50V 20%
2276	4822 126 13694	68pF 1% 63V
2277	4822 126 13694	68pF 1% 63V
2278	5322 126 10511	1nF 5% 50V
2279	5322 126 10511	1nF 5% 50V
2280	5322 126 10511	1nF 5% 50V
2281	5322 126 10511	1nF 5% 50V

3201	4822 117 11449	2k2 1% 0.1W
3202	4822 117 10833	10k 1% 0.1W
3203	4822 117 11449	2k2 1% 0.1W
3207	4822 117 10833	10k 1% 0.1W
3211	4822 117 11449	2k2 1% 0.1W
3213	4822 116 83864	10k 5% 0.5W
3214	4822 051 20562	5k6 5% 0.1W
3215Δ	4822 051 20101	100Ω 5% 0.1W
3216	4822 116 52175	100Ω 5% 0.5W
3217	4822 116 52175	100Ω 5% 0.5W
3222	4822 051 20562	5k6 5% 0.1W
3224	4822 117 10834	47k 1% 0.1W
3229	4822 051 20561	560Ω 5% 0.1W
3230	4822 117 10834	47k 1% 0.1W
3233	4822 117 11449	2k2 1% 0.1W
3234	4822 117 10834	47k 1% 0.1W
3235	4822 117 10834	47k 1% 0.1W
3238	4822 051 20561	560Ω 5% 0.1W
3239	4822 117 11449	2k2 1% 0.1W
3240	4822 051 20333	33k 5% 0.1W
3242	4822 051 20333	33k 5% 0.1W
3243	4822 117 11437	8k2 1% 0.1W
3244	4822 117 11154	1k 1% 0.1W
3246	4822 116 83864	10k 5% 0.5W
3247Δ	4822 052 10109	10Ω 5% 0.33W
3248Δ	4822 051 20471	470Ω 5% 0.1W
3249	4822 116 83864	10k 5% 0.5W
3250	4822 116 52175	100Ω 5% 0.5W
3250	4822 116 52256	2k2 5% 0.5W
3250	4822 116 83884	47k 5% 0.5W
3251	4822 051 20681	680Ω 5% 0.1W
3252Δ	4822 051 20332	3k3 5% 0.1W
3253Δ	4822 051 20153	15k 5% 0.1W
3254	4822 116 83864	10k 5% 0.5W
4xxx	4822 051 10008	0Ω 5% 0.25W (1206)
4xxx	4822 051 20008	0Ω 5% 0.25W

5201	4822 157 10586	2.2µH 10%
5202	4822 157 11014	Coil 78MHz
5203	4822 157 53139	4.7µH
5204Δ	4822 157 51462	10µH
5205Δ	4822 157 51462	10µH
5206	4822 153 20251	18µH 10%
5207Δ	4822 157 51462	10µH

6201Δ	4822 130 30621	1N4148
6202Δ	4822 130 30621	1N4148
6204Δ	4822 130 30621	1N4148
6205Δ	4822 130 34173	BZX79-B5V6
6206Δ	4822 130 30621	1N4148
6207Δ	4822 130 30621	1N4148

7201	4822 209 16441	TDA9810/V1
7202	4822 209 13099	MSP3400C/C6
7202	4822 209 15832	MSP3410D-PP-B4
7203	4822 209 71873	TA7668BP
7204	4822 209 13646	TDA7057AQ/N2
7205	4822 130 60511	BC847B
7207	4822 130 60511	BC847B
7208	5322 130 41983	BC858B
7209	4822 130 60511	BC847B
7210	4822 130 60511	BC847B
7214	4822 130 40855	BC337
7215	4822 130 60511	BC847B
7216	4822 130 60511	BC847B