

## General Information

1995

Covers Models:

Nokia 7295 / 7296 / 8296

Chassis: FP

CRT's:

W66EDX013X001

W76EDL013X101

Remote Control: ERNC600

Door Flap: E80420576

Door Latch: E80425234

Main Power Button:

E80413473

Battery Cover: 80418036

## Matrix

Item	See Model
X-Ray Notice	Nokia FS Chassis
PIP Diagram	Nokia FS Chassis
Subwoofer Amp Diagram	Nokia FS Chassis
Surround Sound Diagram	Nokia FS Chassis

## Specifications

Mains Power:	230V (-10% ... +6%) 50Hz
Power Consumption:	
Stand-by:	Max. 10W
Average:	120W
(Depends on accessories)	
Picture Tube:	28" (16:9)
Programme Memory Locations:	99
AV Memory Locations:	4
Sound Output:	2 x 12W (8 W)
Internal Subwoofer:	14W (16 W)
Dolby Surround:	
Surround Channel:	2 x 6W (16 W)
Centre Channel:	6W (16 W)
Chassis:	Mains isolated, Digital Controlled
Connections:	
On the Front Panel	
3 x Chinch:	Audio in 0.5V 10k W
	Video in 1V 75 W
	Y/C in (S-VHS)
Headphones:	3.5mm/8 ... 600 W
On the Rear Panel:	
SCART 1	Audio out 0.5V 1k W
	Audio out 0.5V 10k W
	Video out 1V 75 W
	Video in 1V 75 W
	Y/C in (S-VHS)
SCART 2	Audio out 0.5V 1k W
	Audio out 0.5V 10k W
	Video out 1V 75 W
	Video in 1V 75 W
	RGB in 0.7V 75 W
Extra Loudspeakers:	2 x DIN
Aerial:	75 W

## Service Adjustments

### Safety Regulations

#### X-Ray Regulations

The picture tube type and the maximum permissible high voltage ensure that the X-ray intensity of the receiver remains far below the permissible value. The high voltage must not exceed 30 kV. The high voltage is within permissible limits when the operating voltage of the horizontal deflection stage equals 155 V at the minimum beam current. In servicing, check and adjust this voltage to the normal value with Pot.

### Service Mode Selection

Switch on the receiver by pressing the main switch and within 5 seconds press the remote control buttons MENU, TV and "I" successively. See fig 1.

### Operating Instructions

#### NVRAM (Ic2)

#### Installation of NVRAM

In case that the NVRAM is replaced, it must be initialised and configured.

- 1: Set the receiver to the service mode by switching on the receiver with the main switch and within 5 seconds pressing

### A menu B menu

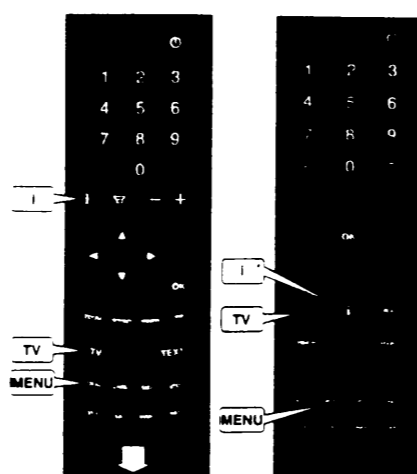


Fig 1.

- the buttons MENU, TV and "I" successively.  
**Note:** The receiver is in the service mode although it looks like the receiver is in standby mode.
- 2: Initialise the NVRAM by pressing the Red button. The green LED flashes once. Wait approximately 15 seconds. When the initialisation is completed, the green LED will light up.
- 3: Switch off the receiver by pressing the mains switch.
- 4: Start the receiver to the TV mode by pressing the main switch. Tune in one or more TV channels.
- 5: Switch off the receiver by pressing the main switch.

- 6: Start the receiver into the service mode. If the receiver remains in stand-by mode, press the TV button twice and then press the "I" button.
- 7: Configure the receiver by pressing the Red button. The configuration menu will show up.
- 8: Press the OK button.
- 9: After that make all of the service adjustments (see section "Service Adjustments Via IIC Bus")
- 10: Switch off the receiver by pressing the mains switch.

### Re-initialisation of NVRAM

For example when the receiver doesn't start to normal picture, the NVRAM may need re-initialisation.

- 1: Set the receiver to the service mode by switching on the receiver with the main switch and within 5 seconds pressing the buttons MENU, TV and "I" successively.  
**Note:** the receiver is in the service mode although it looks like the receiver is in stand-by mode.
- 2: Select the initialisation of the NVRAM by pressing the Red button. The Green LED will light up. Wait approximately 2 seconds. After that press the Blue (then wait approximately 2 seconds) 2, 5, and 4 (then wait approximately 2 seconds) buttons.
- 3: Press the OK button to initialise the NVRAM. Initialisation will take approximately 15 seconds.
- 4: Switch off the receiver by pressing the mains switch.
- 5: Start the receiver to the TV mode by pressing the main switch. Tune in one or more channels.
- 6: Switch off the receiver by pressing the mains switch.
- 7: Start the receiver into the service mode. If the receiver remains in stand-by mode, press the TV button twice and then press the "I" button.
- 8: Configure the receiver by pressing the Red button. The configuration menu will show up.
- 9: Press the OK button.
- 10: After that make all of the service adjustments (see section "Service Adjustments Via IIC Bus")
- 11: Switch off the receiver by pressing the mains switch.

## Service and Adjustments

### Service Mode Selection

- 1: The receiver is set to the service mode by switching on the receiver with the mains switch and within 5 seconds press the remote control buttons MENU, TV and "I" successively.

**Note:** If the receiver remains in stand-by mode after selecting the service mode, switch on the receiver by pressing the TV button twice and select the service mode by pressing the "I" button.

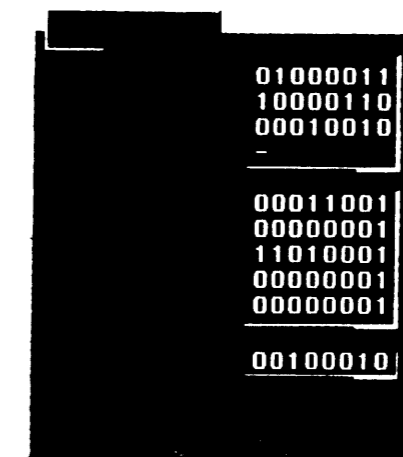
- 2: Return from the service mode by switching off the receiver with the main switch.

## Configuration and Fault Diagnosis

The set must be configured after adding or removing some options. By pressing the red button in the service mode, the processor checks all possible addresses of bus driven circuits and shows the settings on screen. This feature can also be used in fault finding; if an option bit is not "1" when it should be or if it not possible to set it to "1" by using the number buttons, the IC is either not present or faulty.

### Changing the Option Bytes

- 1: When in service mode, select the configuration mode by pressing the RED button.



### Description

SW VER. = uP software version.  
NVM VER. = NVM software version.

- 2: Select IIC Device byte 1 - 4 or Option byte 1 - 5 with the cursor button (up/downwards). Selected byte is shown highlighted.
- 3: Set the bits with the number buttons (0 - 7).
- 4: Store the settings by pressing the OK button.
- 5: Return to the service mode by pressing the RED button again.

### Option Byte Descriptions

#### Option bits to be set automatically

Bit	Description	Setting	1	0
00000001				
0	TV tuner		YES	NO
1	Decoder TDA9141		YES	NO
4	Deflection controller TDA9151		YES	NO
5	RGB processor TDA4780		YES	NO
6	Video switch TDA6417		YES	NO
7	PIP controller SDA9188		YES	NO
10000100				
0	PIP tuner		YES	NO
2	Megalex SDA5274		YES	NO
7	MSP3400 34°C		YES	NO
00011111				
0	DSP (surround)		YES	NO
1	Subwoofer		YES	NO
2	Display processor SDA9280		YES	NO
3	PALplus processor 187C752		YES	NO
4	Comb filter (SVHS line low)		YES	NO
01011011				
0-3	Loudspeaker configuration (Set in user mode)			

Bit	Description	Setting	1	0
00000001				
0	TXT with external RAM		YES	NO
11010001				
4	NTSC 3.58 Mhz		YES	NO
00000001				
0	B/G system		YES	NO
1	I system		YES	NO
2	D/K system		YES	NO
3	L/L system		YES	NO
5	Baseband		YES	NO
01011011				
4	Bass splitting		YES	NO
6	Pre-equalization for surround DSP		YES	NO
00000001				
2	Flof text enabled		YES	NO
11010001				
0	Camera connector installed		YES	NO
6	NICAM enabled		YES	NO
7	Loudness enable		YES	NO
00000001				
7	Only UHF tuner		YES	NO

### Service Adjustments via IIC Bus

#### Remote Control Buttons in Service Mode

When the receiver is in service mode you can select the normal TV mode by pressing the TV button and return to the service mode by pressing the "I" button. Number and cursor buttons are used for service adjustment. The yellow button hides, temporarily, the service menu. The OK button stores the settings. **Note:** Before other adjustments U1 voltage must be adjusted.

#### Adjustments for different picture format

First make all adjustments with normal 4:3 picture format. The TV uses these adjustment values for all picture formats if no other adjustment were made. In each adjustment it is mentioned if the adjustment must be done separately for different picture formats, repeat only those adjustments.

**Note:** The picture geometry adjustments must be done with 16:9 format.

#### Making the Service Adjustment

- 1: Give a two numbered code which determines the adjustment (e.g. 05 = horizontal phase, see the following tables) with the number buttons.

**Note:** The adjustment can also be selected with the cursor button (up/downwards).



## Service Adjustments Cont'd.

2: Adjust with the cursor button (left/right).



3: Store the new value by pressing the OK button.

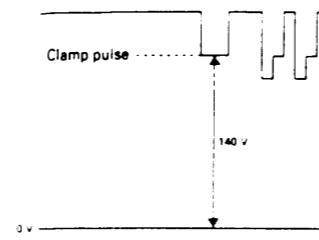
**Note:** To avoid incomplete adjustments store each adjustment in the memory immediately after adjusting. If the has to be made separately for different picture formats, select the normal user mode by pressing the TV button and change the picture format with the zoom button. Return to service mode by pressing the "i" button.

### O Power Supply Block

#### U1 Voltage and Protection Circuit

- 1: Set the brightness and contrast to normal level. Connect an universal voltmeter to the cathode of Do11.
- 2: Adjust with Po1 the DC voltage (U1) for +155V (±1V)
- 3: Check the over-current protection after making any service operations in the primary circuit of the power supply. Set the receiver to the stand-by mode. Short circuit the cathode of Do 13 to the ground and keep the short circuit connected. When the over-current works

OTHER ADJUSTMENTS CONT'D.				
Gamma correction	24	GAMMA	32	Normally no need to adjust
Tuner AGC	25	TV AGC	170	Apply a 1 mV 50dBuV test signal. Adjust the picture just without noise
CTI length	26	CTI LEN	15	Normally no need to adjust
CTI sensitivity	27	CTI SENS	7	Normally no need to adjust
Chrominance/luminance delay	28	Y 138	7	Normally no need to adjust
Black curtain, right edge	29	BCK POS	201	Separate adjustment for RGB signal and PALplus picture! Normally no need to adjust
Black curtain, left edge	30	BCK WID	90	Normally no need to adjust



picture for optimum resolution.

#### Ug2 Voltage (Screen Grid Voltage)

- 1: Set contrast to minimum, brightness and colour saturation to normal level.
- 2: At the end of vertical blanking, there is a black current measurement pulse (clamp pulse) at pins 9, 12 and 15 of Ich1. Use an oscilloscope and find the output stage with the highest cut-off (i.e. the highest voltage during the black current measurement pulse).
- 3: Adjust the voltage of the clamp pulse to +140V with Ug2 (see figure below).

#### LL Picture and Sound IF Module

#### Video Demodulator

- 1: Apply a test signal (1mV = 60 dBmV).
- 2: Connect an universal voltmeter to the module connector X1 pin 6.
- 3: Adjust with LL6 the DC voltage to the point where it changes from 0 to 5V.

#### Sound Demodulator

- 1: Apply a CCIR B/G standard (FM modulated sound) test signal.
- 2: Connect a universal voltmeter to IC1 pin 13.
- 3: Adjust with LL1 the DC voltage for +3.7V.

works correctly the power supply stops. Remove the short circuit and switch on the receiver by pressing the mains button.

#### Focusing

- 1: Set brightness and contrast to normal level.
- 2: Use cross hatch pattern and adjust the

#### K Horizontal Deflection Block

#### VERTICAL PICTURE ADJUSTMENTS

Adjustment	Code	OSD name	Init. value	Note!
Vertical amplitude	00	V-ampl	43	Adjust the picture height to correct ration
Vertical off-centre shift	01	V-shift	3	Adjust the colour edge to the centre of the picture
Vertical start scan	02	V-start	6	Adjust the lower part of the picture to correct ratio
Vertical S-correction	03	S-corr	27	Separate adjustment for 4:3 fromat!
Vertical slope 4:3 zoom (coarse)	12	Zoom-H	71	Select 4:3 zoom picture format and adjust the picture to correct ratio.
Vertical slope 4:3 zoom (fine)	13	Zoom-L	0	
Centre value, 4:3 zoom shift (V-wait)	14	Shift	28	Separate adjustment for 60Hz NTSC transmission! Before adjustment select 4:3 zoom picture format!

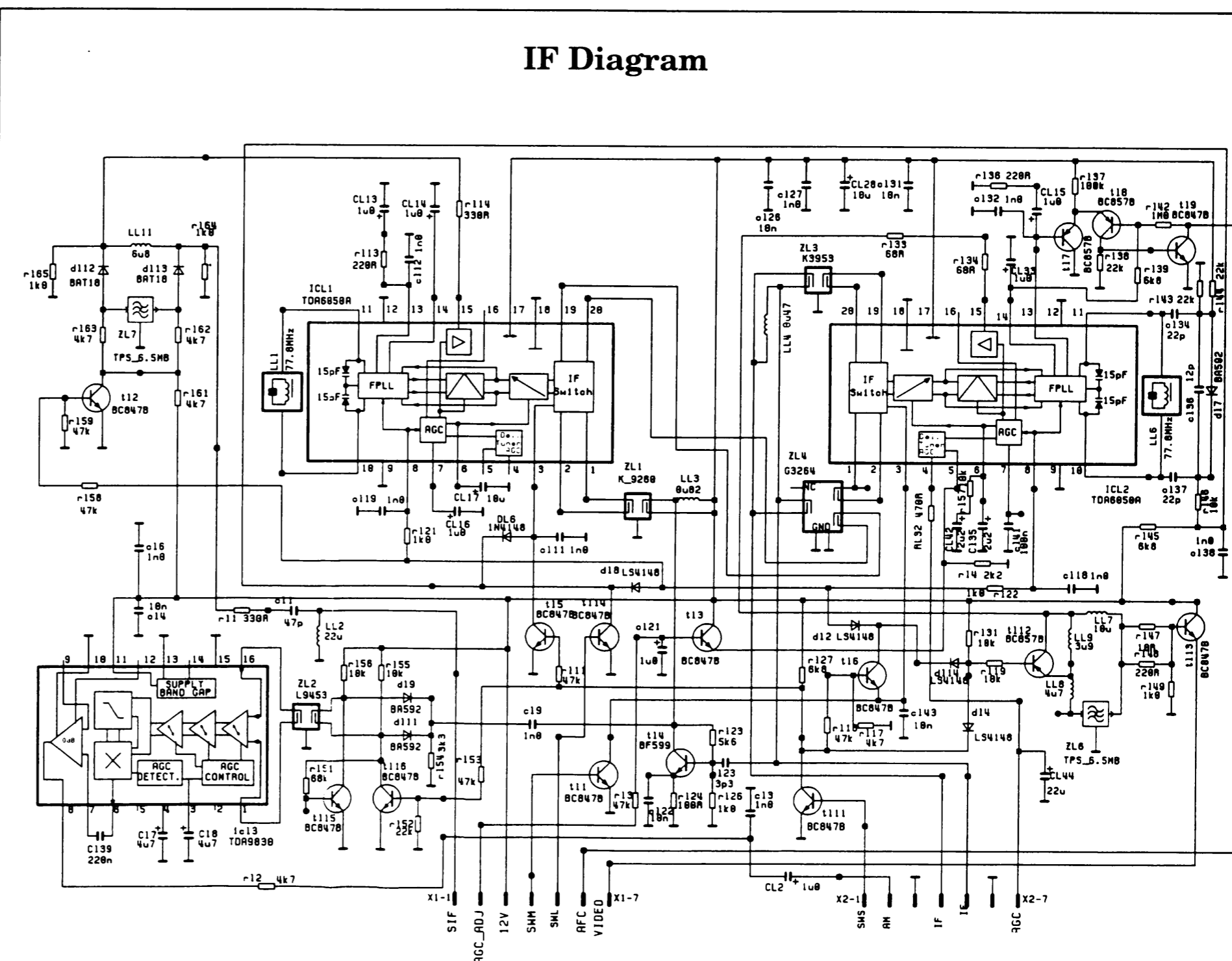
#### HORIZONTAL PICTURE ADJUSTMENTS

Adjustment	Code	OSD name	Init. value	Note!
EW width	04	Width	35	
Horizontal phase	05	H-shift	27	Separate adjustments for normal 4:3, H-phase zoom 4:3 zoom and full screen picture format (either 4:3 zoom 1, 4:3 zoom 2, 16:9 or PALplus format: adjust with only one of these picture formats!) In addition make same adjustments by using RGB signal!
H-phase RGB				
H-phase RGB zoom				
EW parabola	06	Parab.	13	
EW corner	07	Corner	0	
EW trapezium	08	Trapez	2	
EHT compensation	09	EHT	36	Set brightness and contrast to 90% and compensate the change in c ture size

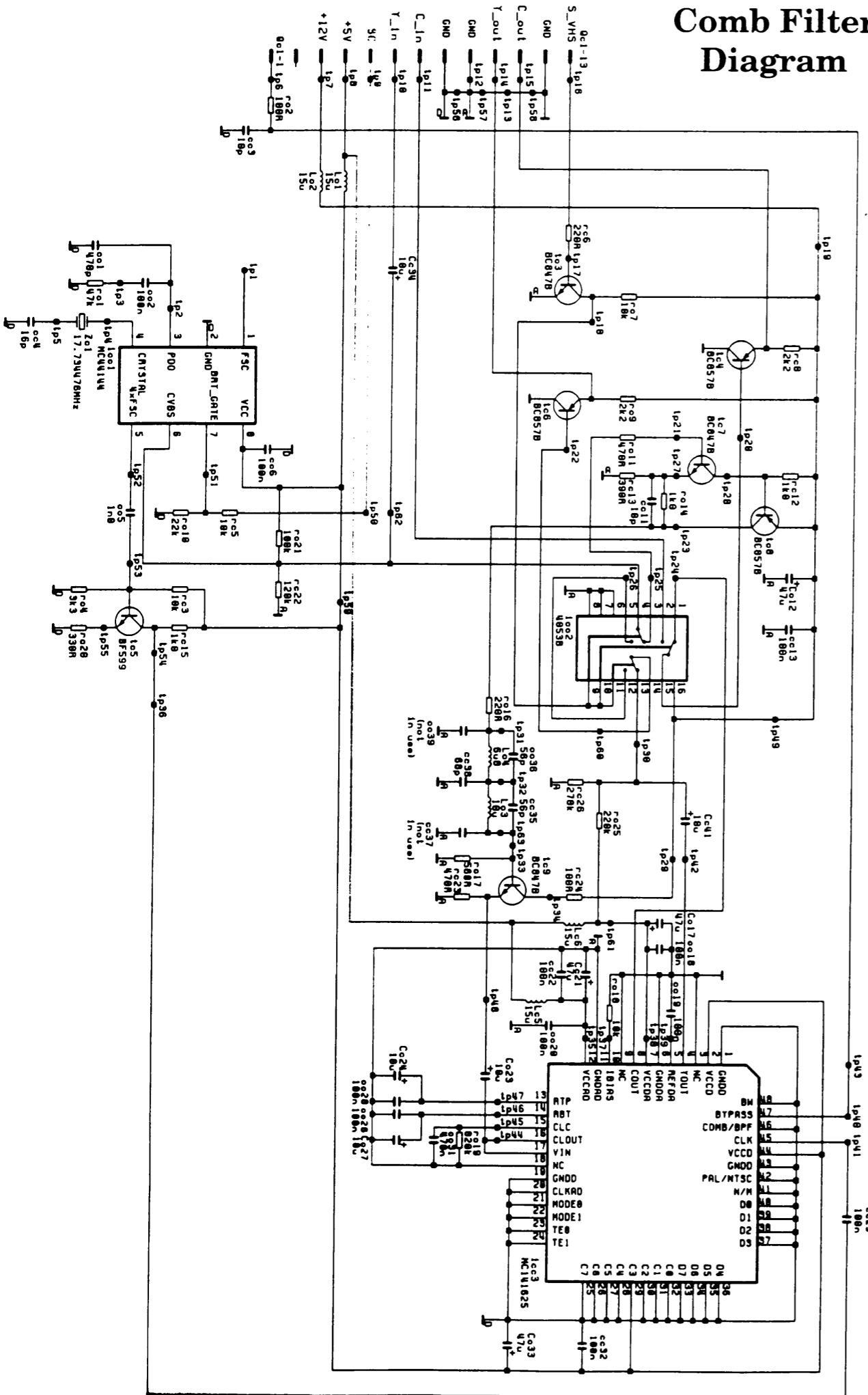
#### OTHER ADJUSTMENTS

Adjustment	Code	OSD name	Init. value	Note!
Red gain	17	R gain	41	This procedure is necessary e.g. when the picture tube, CRT-module etc. has been replaced!
Green gain	18	G gain	32	
Blue gain	19	B gain	32	Apply a test picture and adjust the R, G and B references. Then adjust the R, G and B gains.
Red reference	20	R ref.	52	
Green reference	21	G ref.	21	
Blue reference	22	B. ref	16	
Clamp shift	11	Clamp	0	Normally no need to adjust.
Peak white limit	23	PWL	63	Normally no need to adjust.

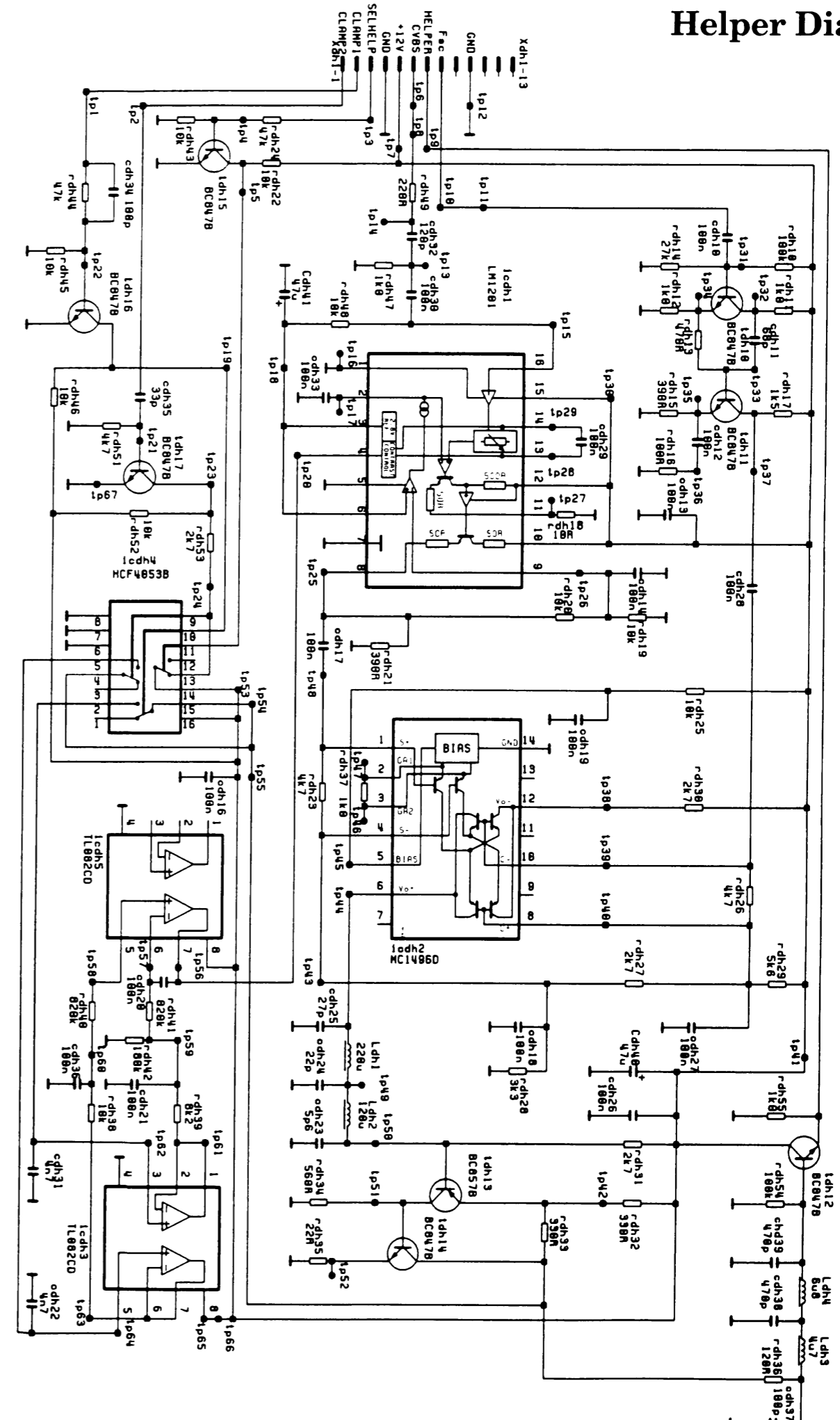
## IF Diagram



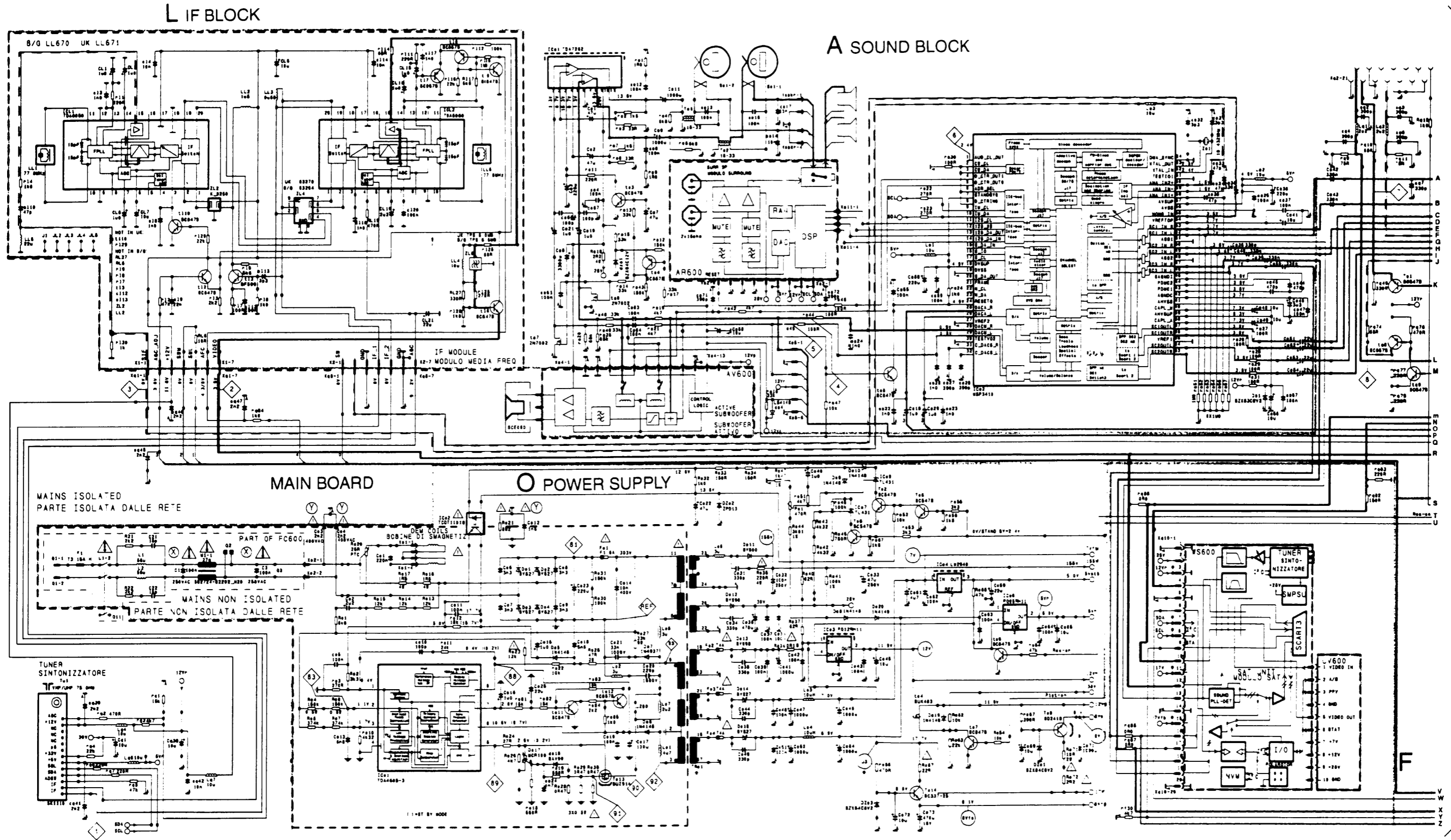
### Comb Filter Diagram



### Helper Diagram



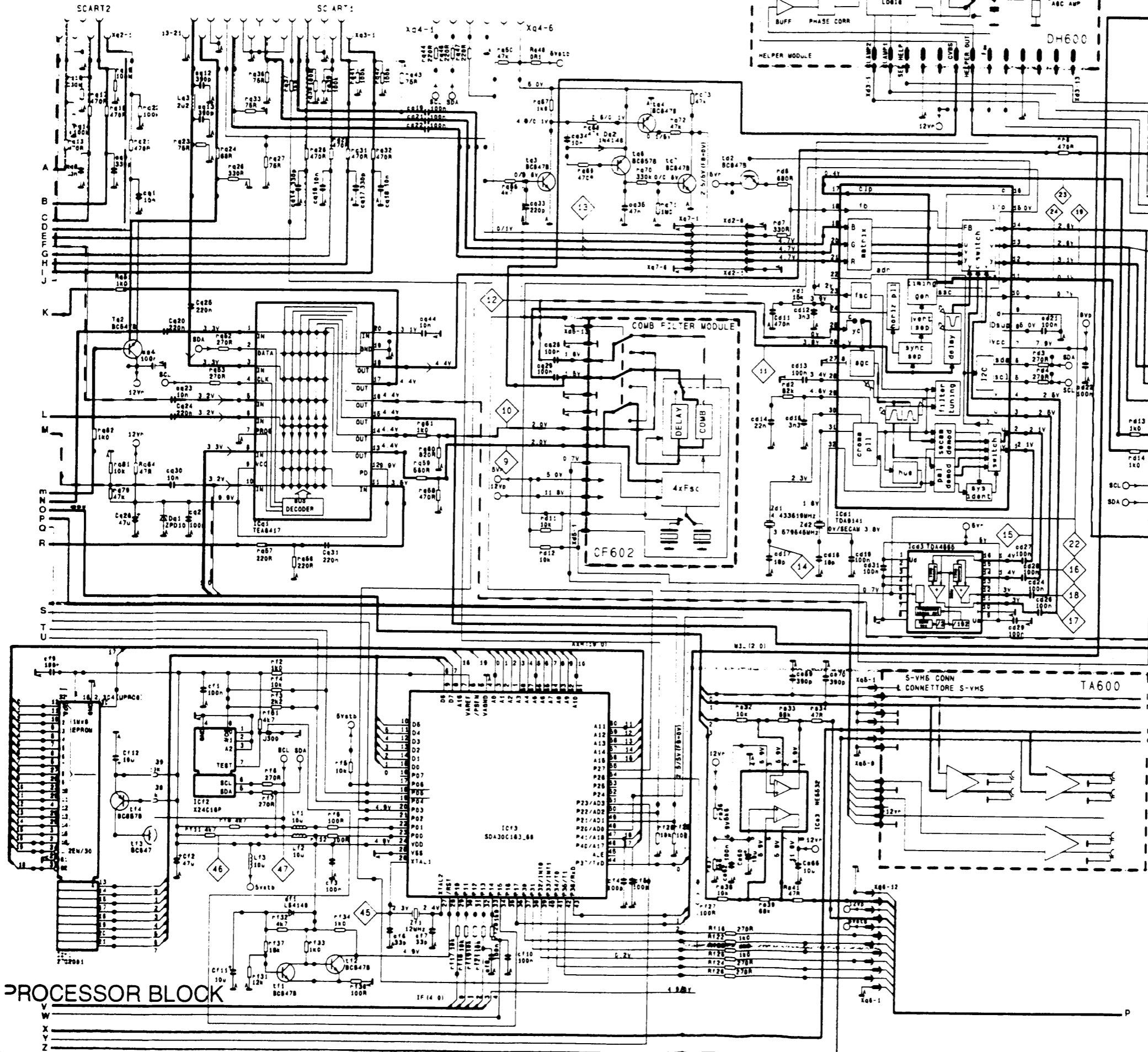
Main Diagram



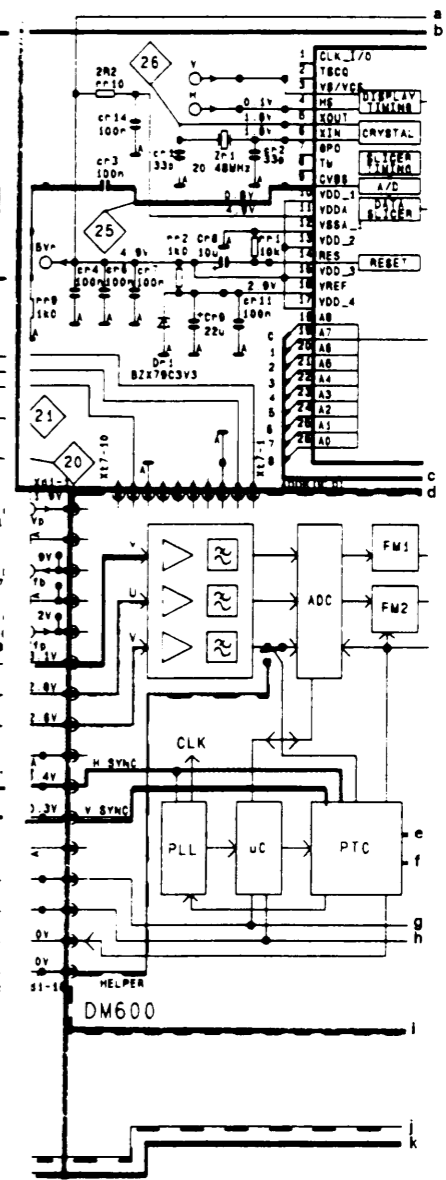
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Main Diagram Cont'd.

MAIN BOARD



R TEXT BLOCK



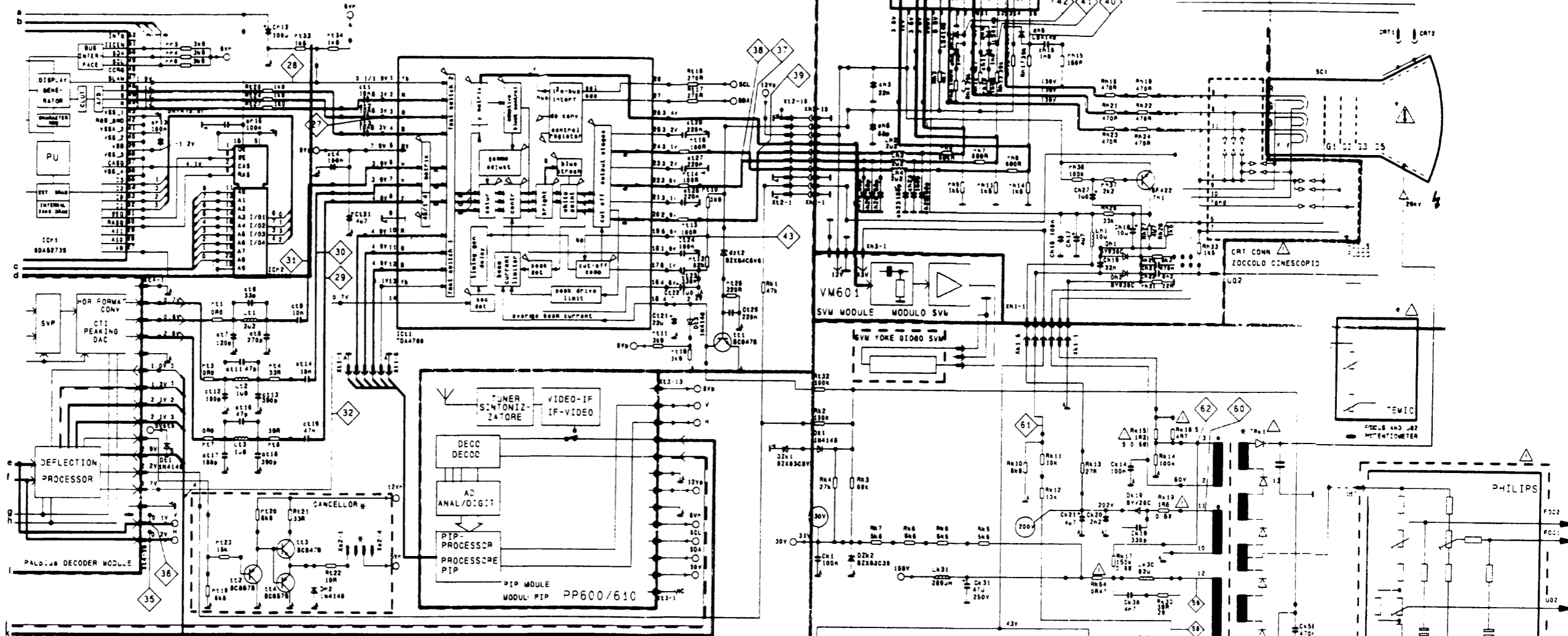
1

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Main Diagram Cont'd.

T RGB PROCESSOR BLOCK

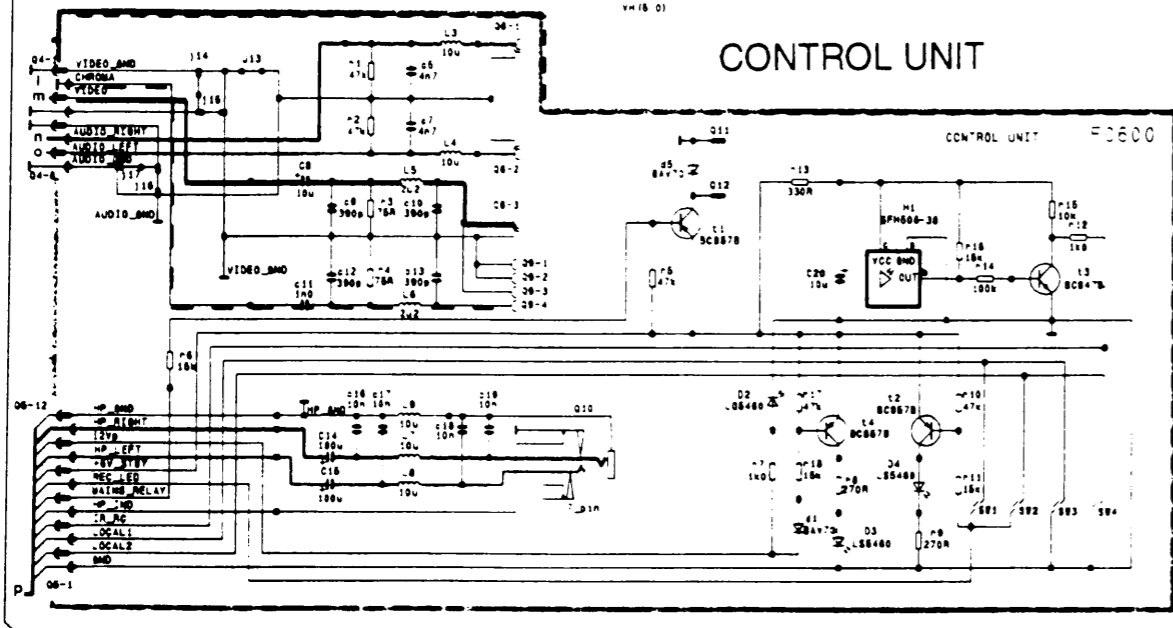
H CRT MODULE



CONTROL UNIT

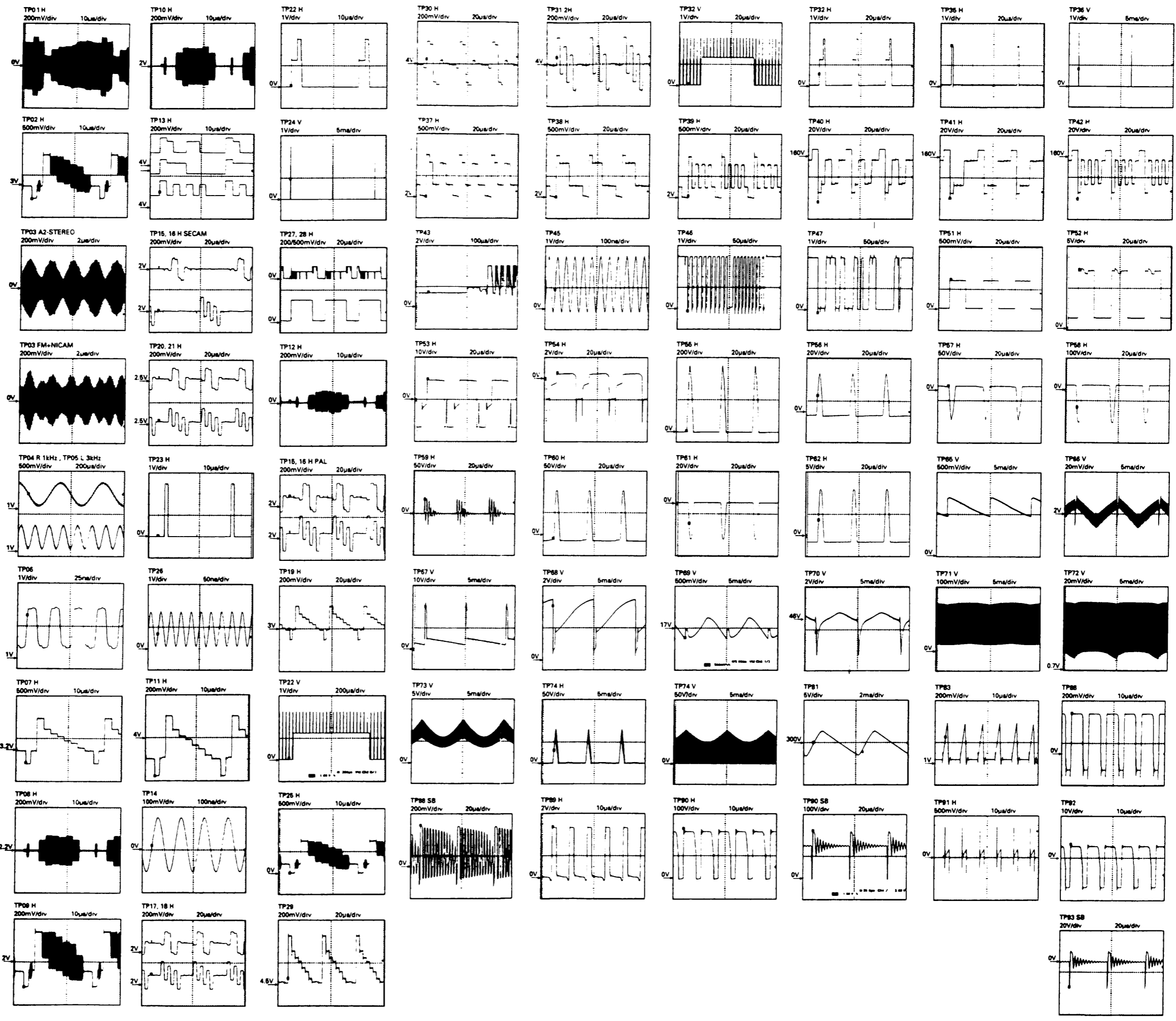
K HOR. DEFLECTION

S VERT. DEFLECTION

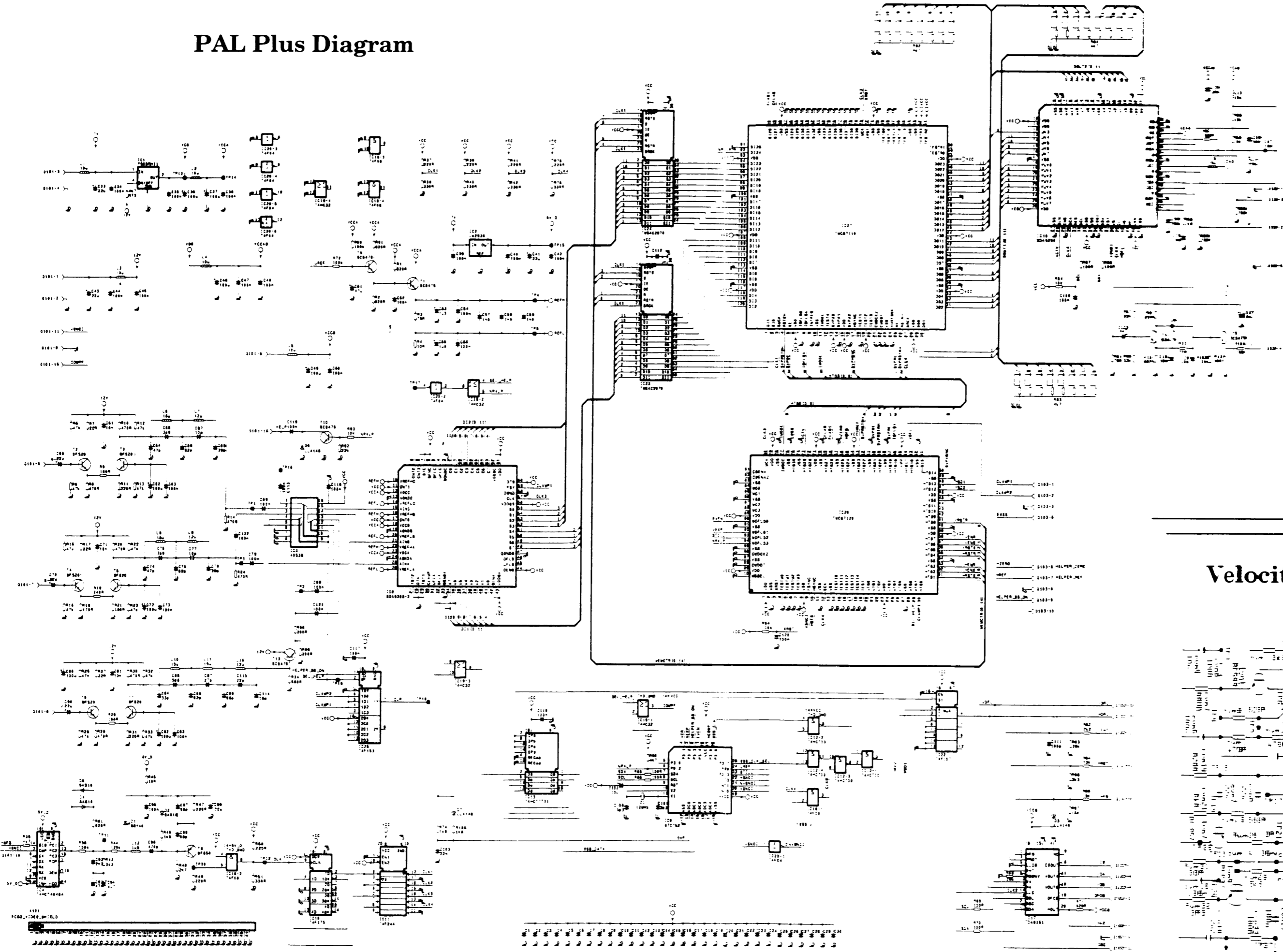


2

Main Diagram Waveforms



### PAL Plus Diagram



### Velocity Diagram

