BEKO

COLOUR TELEVISIONS

823

BEKO

AT-2 CHASSIS

1922 INX

11225 T

15225 T

16228 T/NX

12220/T

10214

ALSO ≡

GOLDSTAR

SAMSUNG

ORION

HITACHI

TOSHIBA

PHILIPS

VIDEOCOLOUR

NOKIA

WF

GENERAL SERVICING PRECAUTIONS

— Disconnect the TV from the mains supply before discharging the picture tube anode or before removing or refitting any component, circuit board, module or connector.
— Fitting a wrong component or with incorrect polarity of electrolytic capacitors may result in an explosion.
— Measure high voltage only with a high voltage meter or a multimer equippied with a suitable high voltage probe, do not test high voltage by drawing an arc.
— Do not spray any chemicals on or near this instrument or any of its assemblies.
— Ensure that all power transistors and integrated circuits have their heat sinks correctly fitted before connecting power. Use heatsink compound where necessary.

CONTENTS

SAFETY INSTRUCTIONS

SAFETY-PRECAUTIONS

WARNING: The following precautions should be observed.

1. Although the chassis is isolated from the mains supply, some areas of the main PCB are at mains potential. An isolation transformer (250-500 VA) should therefore be connected between the mains and the receiver before service is attempted.

2. Do not install, remove, or handle the picture tube in any manner unless safety, goggles are worn. People not equipped should be kept away while picture tubes are handled. Keep the picture tube away from the body while handling.

3. When replacing chassis in the cabinet, ensure all the protective devices are put back in place, such as: barriers, non-metallic knobs, adjustments and compartment cover or shields, isolation resistor-capacitor, etc.

4. When service is required note the original lead locations and anchor points. Ensure all leads, especially in areas of high voltage, are routed/anchored in their correct locations when reassembling the receiver.

5. Always use the manufacturer's replacement component. Always replace original spacers and maintain lead lengths. Especially critical components which should not be replaced by other makers. Furthermore where a short circuit has occurred, replace those components that indicate evidence of overheating.

6. Before returning a serviced receiver to the customer, the service technician must throughly test the unit to be certain that it is completely safe to operate without danger of electrical shock, and be sure that no protective device built into the instrument by the manufacturer has become defective, or inadvertently damaged during servicing. Therefore, the following checks are recommended for the continued protection of customers and service technicians.

INSULATION

Insulation resistance should not be less than 10M at 500V DC between the mains poles and any accessible metal parts.
Also, no flashover or breakdown should occur during the dielectric strength test applying 3kV AC or 4.25kV DC for two seconds between the main poles and accessible metal parts

HIGH VOLTAGE

High voltage should always be kept at rated value of the chassis and no higher. Operating at higher voltage may cause a failure of the picture tube or high voltage supply and also, under certain circumstances could produce x-ray radiation moderately in eexcess of design levels. The high voltage must not, under any circumstances exceed 26 kV on the chassis.

X-RAY RADIATION

TUBES: The primary source of x-ray radiation in this receiver is the picture tube. the tube utilised for the above mentioned function in this chassis is specially constructed to limit x-ray radiation for continued x-ray radiation protection, replace tube with the same type as the original BEKO approved type.

PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in BEKO television receivers have special safety related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc.
Replacement parts which have these special safety characteristics are identified by marking with a ⚠ on the schematics and replacement parts list in this Service Manual.
The use of a substitute replacement component which does not have the same safety characteristics as the BEKO recommended replacement one, shown in the parts list in this Service Manual, may create electrical shock, fire, X-radiation, or other hazards.

TUBE DISCHARGE

The line output stage can develop voltages in excess of 25kV; if the E.H.T. cap is required to be removed, discharge the anode cap to chassis via a high value resistor, prior to its removal from the tube.

DISASSEMBLY INSTRUCTONS
(See also Exploded Views)

BACK COVER REMOVAL
(For 20"-21" Models)

1. Remove 2 csrews at the bottom of the back cover
2. Push in 4 side locks by pushing with a screw driver and pull back the cover carefully. Taking care not to pull the speaker cable.
3. Disconnect the speaker cable from the chassis and take out the power cord from the cable way at the bottom of the back cover. Figure 1

(FOR 14" - 15" Models)

1. Remove 4 screws holding the back cover.
2. Remove the screw fixing the power cord holder to the back cover.
3. Pull back the cover carefully, taking care not to pull the speaker cable.
4. Disconnect the speakercable form the chassis.

NOTE!

When reassembling the back cover, take care to slide the main chassis board into the guideways located on the back cover on both sides. Figure 2

SPEAKER ASSEMBLY REMOVAL (For 20"-21" Models)

1. Remove the 2 csrews fixing the speaker assembly to the back cover.
2. Release the four locks and push the assembly out.
3. Remove the 4 screws holding the speakers on the speaker assembly. Figure 4

SPEAKER REASSEMBLY (For 14"-15" Models)

1. Place the speaker on the speaker assembly; the speaker terminals should be placed towards the front of the TV set.
2. Slide the locks on the assembly through the holes of the back cover until hearing a "click" sound which means that the assembly has fitted in place.
3. Attach the screws (2 pcs) fixing the speaker assembly to the back cover. Figure 3

MAIN CHASSIS REMOVAL (FOR 20"-21" Models)

1. Open two guide locks on both sides of the chassis and pull the chassis out.
2. Take the cables, connected to the power switch, out from the chassis frame.
3. Pull the chassis back carefully.

(For 14"-15" Models)

1. Pull the chassis back carefully.

CPT REMOVAL

1. Disconnect power (ST01, 02), degaussing (ST101) and control unit cables (ST03,04) from the chassis.
2. Discharge the tube and disconnect the E.H.T. cap as told in Safety Instructions.
3. Disconnect the tube earthing cable coming from the CPT board.
4. Disconnect the ST802 connector on the chassis, and cable ties holding the cables of ST802 and ST801.
5. Disconnect the CPT board from the neck of the tube, taking care not to damage the tube pins.
6. Place the front cover on soft material so as not to mar the front surface or damage the controls.
7. Remove 4 screws securing the picture tube brackets to the front cover.
8. Carefully separate the CPT from the front cover.

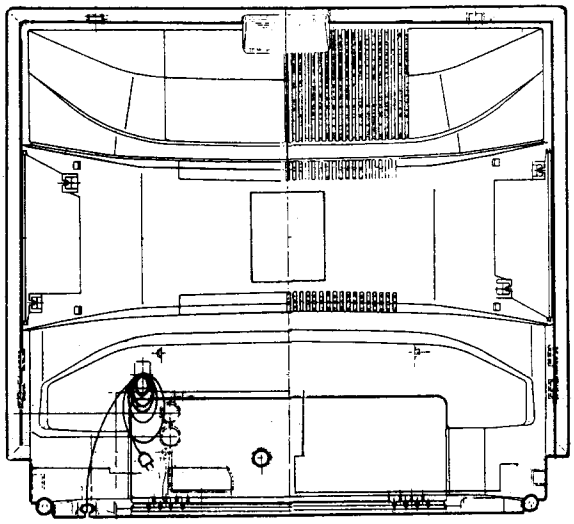
CAUTION

Great care must be taken when handling the picture tube.

Always lift the picture tube by holding it firmly arround the face plate. DO NOT LIFT THE BY ITS NECK.
The picture tube must not be scratched or subjected to excessive pressure.

DISASSEMBLY INTRUCTIONS

20"-21" Models



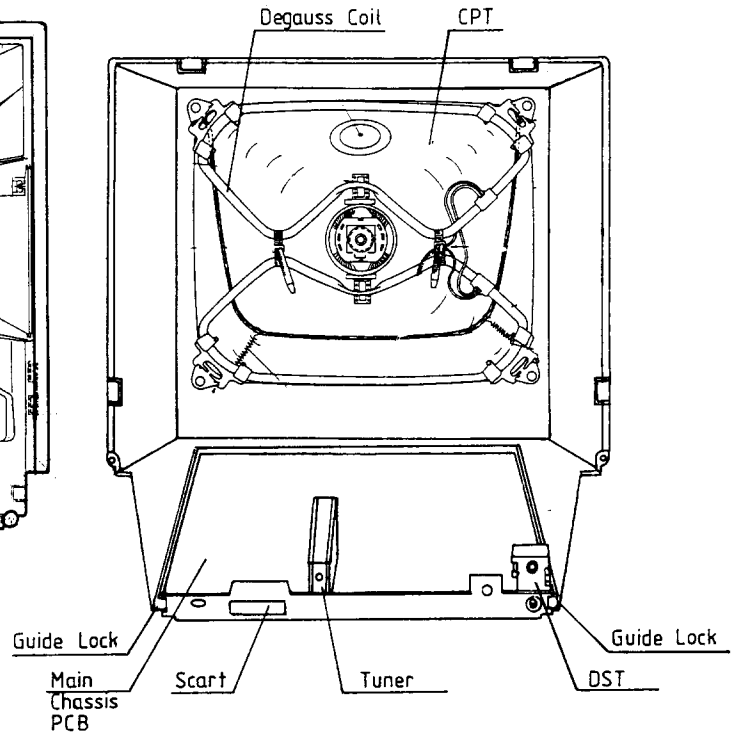
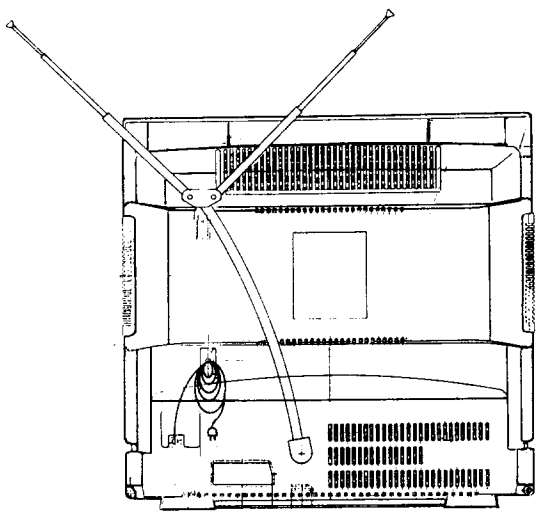


Figure 1

14"-15" Models



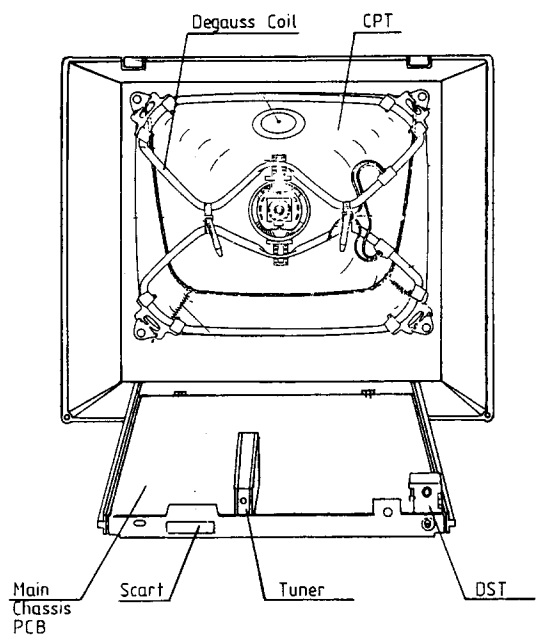


Figure 2

EXPLODED VIEW

(14"-15" MODELS)

NO	PART NO	DESCRIPTION	QTY
38	056.060	CPT, 15"	1
37	056.737	CPT, 14"	1
36	64A.214	CHASSIS FRONT BRACKET-2	1
35	64A.213	CHASSIS FRONT BRACKET	1
34	033.929	SHIELD WIRE	1
33	011.360	SCREW 3.9x13	2
32	50V.188	TELETEXT MODULE	1
31	54K.208	HOLDER TELETEXT	1
30	54G.203	HOLDER, TX ASSY	2
29	011.814	SCREW 2.9x9.5	2
28	833.215	POWER CORD HANGER	1
27	60U.903	RUBBER CONTACT	1
26	60U.207	PLATE FUNCTION	1
25	011.956	SCREW 3.9x13	1
24	64A.204	POWER CORD HANGER	1
23	60U.203	LENS LED	1
22	51A.301	SPRING POWER KNOB	1
21	64A.211	PLATE REMOTE CONTROL	1
20	60U.206	PLATE FUNCTION I	1
19	60U.210	PLATE FUNCTION II	1
18	60U.212	DECO PANEL	2
17	64A.206	CONTROL UNIT DOOR	1
16	60U.202	LED COVER	1
15	60U.208	POWER KNOB	1
14	64A.202	PANEL	2
13	60U.902	RUBBER CONTACT-II	1
12	60U.901	RUBBER CONTACT-I	1
11	011.814	SCREW	5
10	64A.172	CONTROL UNIT	1
9	".110	CHASSIS PCB	1
8	505.220	CHASSIS BRACKET	1
7	011.507	SCREW CPT (EJOT)	4
6	011.507	SCREW CPT (EJOT)	4
5	710.107	SPEAKER	1
4	011.950	SCREW 3.9x13	4
3	64A.203	HOLDER, BACK COVER	1
2	64A.205	BACK COVER	1
1	65A.201/64A.201	FRONT FRAME 15"/14"	1

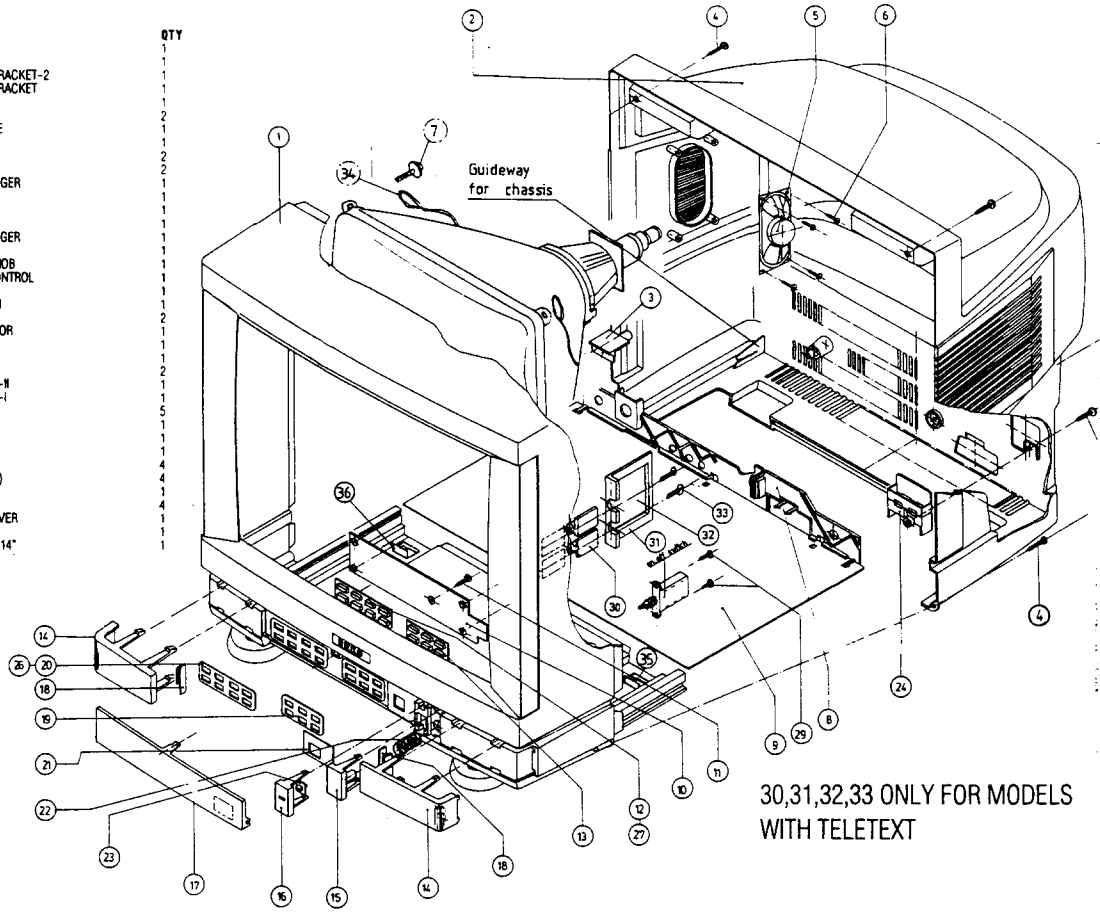


Figure 3

30,31,32,33 ONLY FOR MODELS
WITH TELETEXT

27,28,29 ONLY FOR MODELS
WITH TELETEXT
28 ONLY FOR 21" MODELS

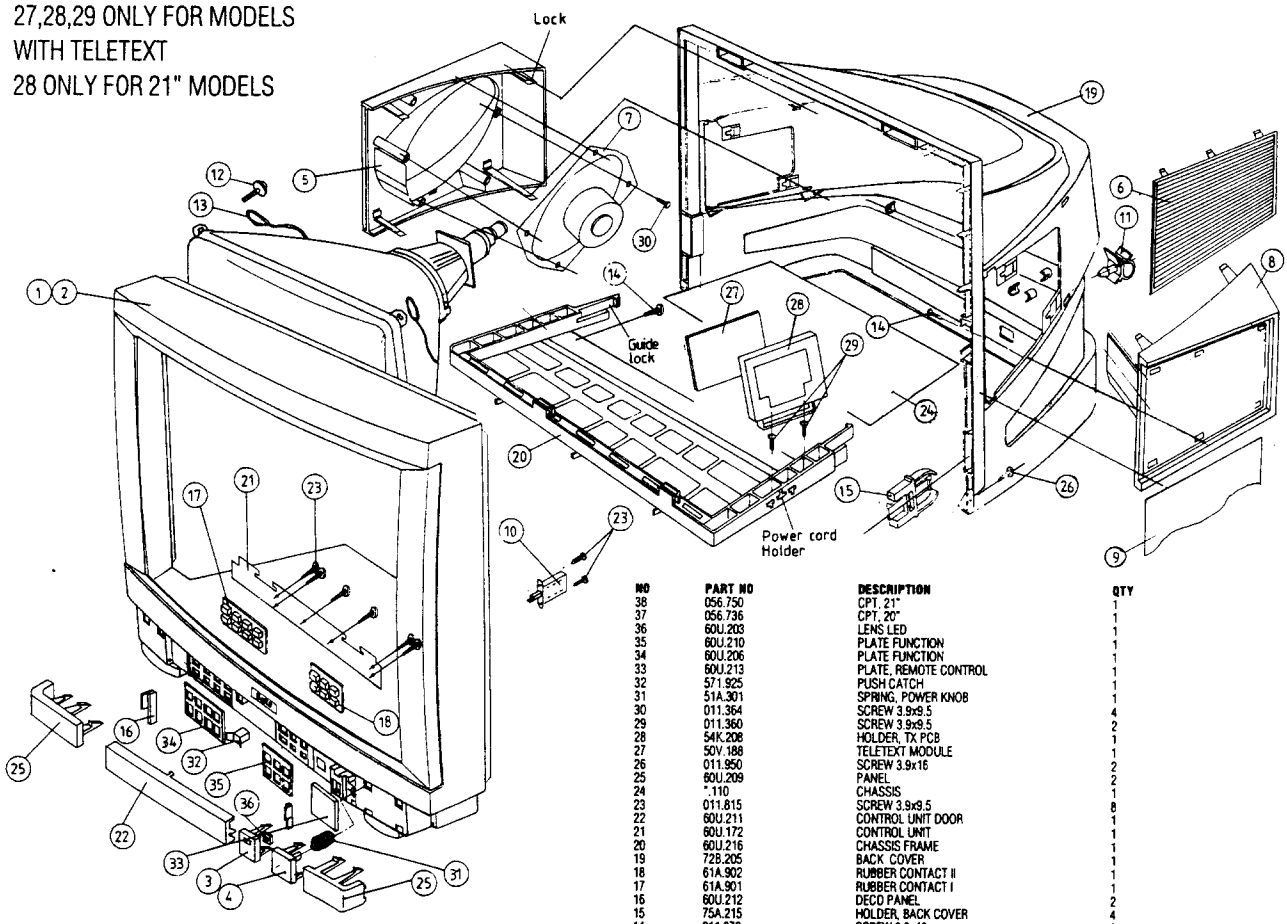


Figure 4

(20"-21" MODELS)

NO	PART NO	DESCRIPTION	QTY
38	056.750	CPT, 21"	1
37	056.736	CPT, 20"	1
36	60U.203	LENS LED	1
35	60U.210	PLATE FUNCTION	1
34	60U.206	PLATE FUNCTION	1
33	60U.213	PLATE, REMOTE CONTROL	1
32	571.925	PUSH CATCH	1
31	51A.301	SPRING, POWER KNOB	1
30	011.364	SCREW 3.9x9.5	4
29	011.360	SCREW 3.9x9.5	2
28	54K.208	HOLDER, TX PCB	1
27	50V.188	TELETEXT MODULE	1
26	011.950	SCREW 3.9x16	2
25	60U.209	PANEL	2
24	".110	CHASSIS	1
23	011.815	SCREW 3.9x9.5	8
22	60U.211	CONTROL UNIT DOOR	1
21	60U.172	CONTROL UNIT	1
20	60U.216	CHASSIS FRAME	1
19	72B.205	BACK COVER	1
18	61A.902	RUBBER CONTACT II	1
17	61A.901	RUBBER CONTACT I	1
16	60U.212	DECO PANEL	2
15	75A.215	HOLDER, BACK COVER	4
14	011.370	SCREW 3.9x16	6
13	033.929	SHIELD WIRE	1
12	011.507	SCREW CPT (EJOT)	4
11	833.215	POWER CORD HANGER	1
10	010.770	POWER SWITCH	1
9	72B.901	CLOTH, SPEAKER	2
8	72W.207	HOLDER SPEAKER	1
7	850.107	SPEAKER	1
6	72B.240	GRID, SPEAKER	2
5	72B.206	HOLDER SPEAKER	2
4	60U.208	POWER KNOB	1
3	60U.202	LED COVER	1
2	81G.201	FRONT FRAME (21")	1
1	72B.201	FRONT FRAME (20")	1

WIRING DIAGRAM

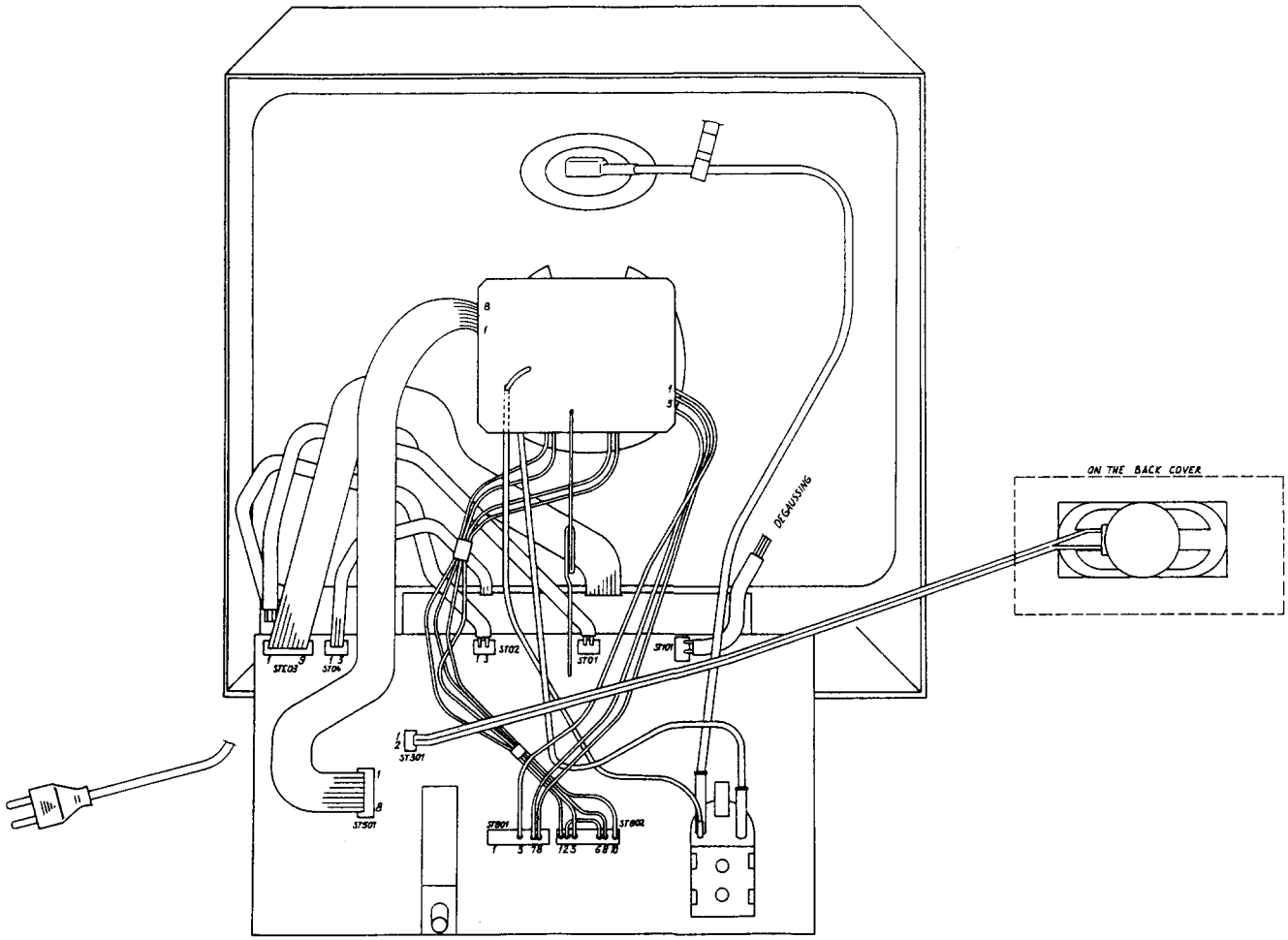


Figure 5

TECHNICAL SPECIFICATIONS

1. OPERATING CONDITIONS

1.1	POWER SUPPLY	140 TO 265 VAC
1.2	NOMINAL OPERATING VOLTAGE	220 VAC
1.3	TEMPERATURE RANGE	0 TO 45 DEGREES C
1.4	HUMIDITY RANGE	YEAR'S MEAN = 75% MAX = 95%

2. RF SECTION

2.1 RECEIVING CHANNELS FOR VHF/UHF BAND

	CCIR			OIRT		
VHF BAND				VHF		
BAND I	CHANNEL	2-4		Band I	Channel	1-4
BAND III	CHANNEL	5-12		Band III	Channel	5—12
CABLE CH	CABLE CH.	81-99	(S1-S19) (S20-S41)	Cable Ch.		S1-S19 S20-S41
UHF BAND				UHF		
BAND IV-V	CHANNEL	21-69		Band IV-V	Channel	21-69

		MIN	NOM	MAX	UNIT
2.2	GAIN LIMITED SENSITIVITY INPUT SIGNAL LEVEL FOR STANDARD VIDEO OUTPUT VOLTAGE				
	BAND 1/3	—	20	—	dB (μV)
	BAND 4/5	—	23	—	dB (μV)
2.3	NOISE LIMITED SENSITIVITY INPUT SIGNAL LEVEL FOR 30 dB (S+N)/N-RATIO, WEIGHTED, CCIR REC 567				
	BAND 1/3/4/5	—	30	—	dB (μV)
2.4	SELECTIVITY HF+IF				
2.4.1	IF FREQUENCIES	B/G	D/K		
	PICTURE CARRIER	38.9 MHz	38.9		
	SOUND CARRIER	33.4 MHz	32.4		
	COLOUR CARRIER	34.47 MHz	34.47 MHz		
2.5	VOLTAGE STANDING WAVE RATIO	**MIN**	**NOM**	**MAX**	**UNIT**
	BAND 1/3	—	2	4	—
	BAND 4/5	—	2	4	—
2.6	MAXIMUM INPUT SIGNAL LEVEL				
	BAND 1/3	100 dB μV (MAX)			
	BAND 4/	100 dB μV (MAX)			

3. VIDEO OUTPUT SECTION

		MIN	NOM	MAX	UNIT
3.1	VIDEO OUTPUT VOLTAGE (measured on cathode with lowest output level, contrast control and drive control at max.	90	100	—	V
3.2	FREQUENCY RESPONSE				
a)	INPUT AERIAL STANDARD, HF SIGNAL STANDARD B/G · D/K	—10	—7	—	dB
b)	INPUT: SCART PIN 20 STANDARD B/G · D/K	—8	—6	—	dB

4. CHROMA SECTION

4.1	PAL/SECAM				
4.1.1	COLOUR CAPTURE RANGE	+—300	+—500	—	HZ
4.1.2	PHASE ERROR OF REFERENCE CARRIER	—	+—5	10	DEGRESS
4.1.3	COLOUR KILLER	30 dB μV (NOMINAL)			

5. SOUND SECTION

		MIN	NOM	MAX	UNIT
5.1	SCART OUTPUT				
5.1.1	S/N RATIO	40	45	—	dB
5.1.2	NOISE LIMITED SENSITIVITY	38 db/V (NOMINAL)			
5.1.3	AM SUPRESSION RATIO AM MODULATION=30%	60 db (NOMINAL)			
5.1.4	HARMONIC DISTORTION fm=1 KHZ	10%			
5.2	POWER OUTPUT (at 10% distortion) fm=1 KHz	4.0 Wrms			

6. SYNCHRONISATION

6.1	LINE FREQUENCY LOCKING RANGE	:	+−300 HZ
6.2	VERTICAL FREQUENCY LOCKING RANGE	:	+−5 HZ

7. PICTURE TUBE DRIVE SECTION

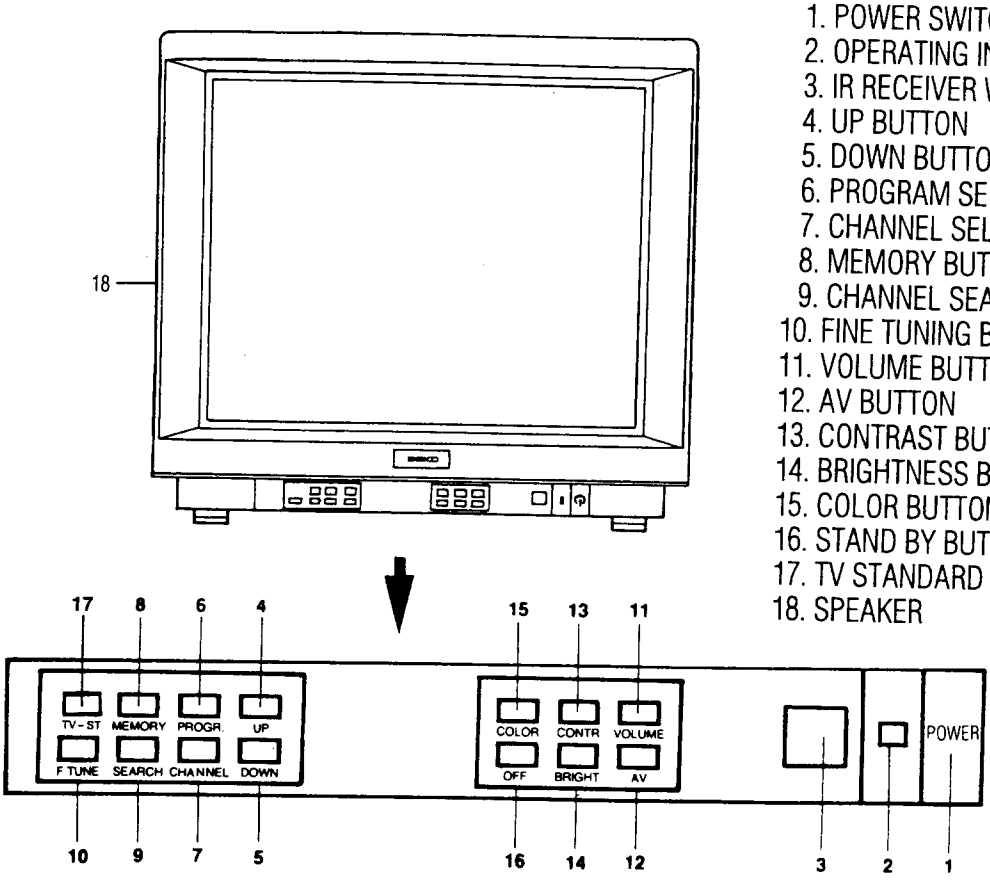
			20" / 21"	14" / 15"
7.1	B+ SUPPLY VOLTAGE (AT Ib=0)	:	125+− 1 VDC	− −
7.2	EHT	:	25.0+−0.5 KV	23.0−0.5 KV
7.3	FOCUS VOLTAGE	:	MIN 25.6%	− −
		:	MAX 28%	
7.4	GRID 2 VOLTAGE RANGE	:	MIN 300 V	− −
			MAX 1350 V	
7.5	HEATER VOLTAGE	:	6.2+−0.2 Vrms	− −
7.6	FRAME OUTPUT VOLTAGE	:	250+−8 Vpp	− −
7.7	200V OUTPUT	:	200+−5VDC	− −
7.8	12V OUTPUT	:	12.0+−0.5 VDC	− −
7.9	17.5V OUTPUT	:	17.5+−0.5 VDC	− −
7.10	21V OUTPUT	:		− −
7.11	5V OUTPUT	:	5.0+−0.5 VDC	− −
7.12	RETRACE TIME	:	11.0+−0.5 VDC	− −

8. OTHERS

8.1	AMBIENT OPERATING TEMPERATURE	:	0−45 DEGRESS C
8.2	STORAGE TEMPERATURE	:	−10 TO + 85 DEGRESS C
8.3	POWER CONSUMPTION	:	90 W (14") 90 W (20") 90 W (21") 10 W (Standby)
8.4	SAFETY	:	IEC 65
8.5	X-RAY RADIATION	:	ACC. IEC 65

Components and specification are subject to change for improvment.

LOCATION OF CONTROLS



1. POWER SWITCH
2. OPERATING INDICATOR
3. IR RECEIVER WINDOW
4. UP BUTTON
5. DOWN BUTTON
6. PROGRAM SELECTION BUTTON
7. CHANNEL SELECTION BUTTON
8. MEMORY BUTTON
9. CHANNEL SEARCH BUTTON
10. FINE TUNING BUTTON
11. VOLUME BUTTON
12. AV BUTTON
13. CONTRAST BUTTON
14. BRIGHTNESS BUTTON
15. COLOR BUTTON
16. STAND BY BUTTON
17. TV STANDARD SELECTION BUTTON
18. SPEAKER

Figure 6

REMOTE CONTROL UNIT

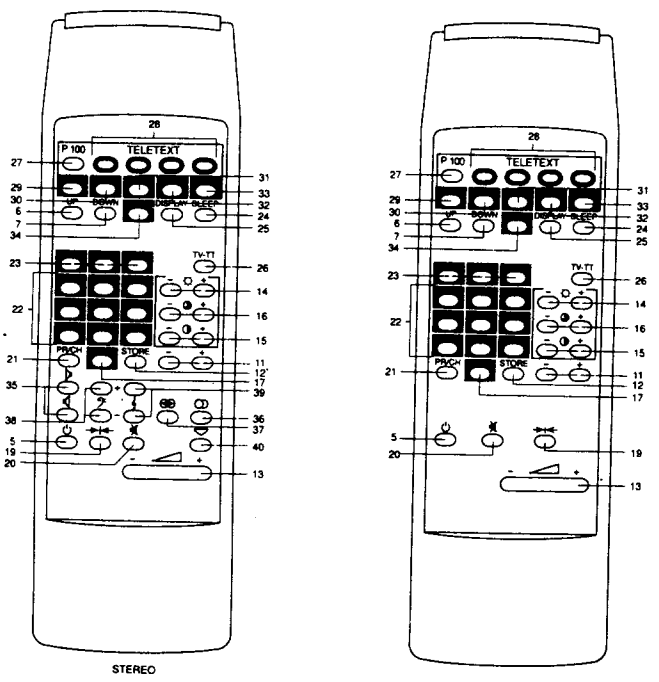


Figure 7

1-Power switch
2-Ir indicator
3-Operating indicator
4-Ir receiver
5-Stand-By button
6-Up button
7-Down button
8-Channel search button
9-Programme selection button
10-Channel selection button
11-Fine tunning button
12-Memory button (press twice to store)
13-Volume adjustment button
14-Brightness adjustment button
15-Contrast adjustment button
16-Colour adjustment buttton*
17-AV button
18-Speakers
19-Normalization button
20-Mute button
21-Programme/channel selection button
22-Ten key buttons
23-Two digit buttons
24-Sleep timer button
25-Display button
26-Teletext selection button*
27-Index page button (P100)*
28-Colour linket buttons*
29-Reveal*
30-Subpage*
31-Double height*
32-Update*
33-Clock*
34-Stop*
35-Balance buttons**
36-Quasi-Stereo**
37-Space Wide**
38-Bass Controls**
39-Treble Controls**
40-Stereo/Mono (Dual/A-Dual/B)**

* These buttons are for TELETEXT use only
** These buttons are for STEREO function only.

OPERATION INSTRUCTIONS

CONNECTIONS

Connect the mains plug into the mains socket, 220V AC, 50/60 Hz.

Connect the aerial lead to the aerial socket (75 ohm coaxial) at the back.

ON SCREEN DISPLAY

This function is automatically displayed on the TV screen whenever a control is pressed. It shows you what is happening by a series of graphics moving left (decrease) or right (increase). If you wish the setting to become permanent (normal), press the "MEMORY" button, a prompt message "MEMORY ?" will be displayed on the screen, to confirm, press the "MEMORY" button twice then setting new levels.

TV STANDARD SELECTION

Press the TV-Standard . PAL/SECAM, SECAM DK etc. will be displayed on the screen. After selection press the MEMORY button, a prompt message "MEMORY ?" will be displayed, press MEMORY button once more (Within four seconds) and the selected standard will be stored.

TUNING

METHOD 1:

To select a program, first press SEARCH button and either UP or DOWN buttons. The tuner will automatically search and locate all valid channels being broadcast. To store these individual channels press the button marked MEMORY, a prompt message "MEMORY ?" will be displayed on the screen : Press MEMORY button once more (within four seconds) and that individual channel will be stored in the memory. Repeat operation untill all channels have been found and stored.

METHOD 2:

If the channel numbers are known, obtain "C.." at the upper right corner of the screen by either pressing PR/CH on Remote Control Handset or CHANNEL button on TV set. Select the channel number with Remote Control handset by using ten Key buttons. Press the MEMORY button, a prompt message "MEMORY ?" will be displayed, press MEMORY button once more (within 4 seconds) and that individual channel will be stored in the memory.

FINE TUNING

The button marked "F TUNE" on the television or the handset will allow you to manually gain the optimum reception within the badwidth, should the auto search facility not tune the channel to your satisfaction.

PICTURE ADJUSTMENTS

The following 3 controls should be used in conjunction with each other to give you a well balanced picture without any glare.

Contrast

Press the button marked "CONTRAST" to adjust light and dark shades.

Brightness

Press the button marked "BRIGHT" to ensure overall clarity of definition.

Colour

Press the button marked "COLOUR" to ensure all objects are seen in their natural colours.

VOLUME CONTROL

Press the button marked "VOLUME" on the hadset or "volume + up" on the control panel to increase the volume. By pressing the button marked "volume" or " volume + down", will decrease the volume.

DECADAL CONTROL

The buttons marked "1-, 2-, 3-, are to be used if you require to go to a programme exceding number 9, ie should you require programme 23, press "2- +3" and it will instantly take you to programme 23.

DISPLAY

The button marked "DISPLAY" on the handset, will show the programme number that you are currently viewing, in the top right corner of the television screen.

SLEEP/TIMER

Adjacent to the display button is the TIMER. This will give you the option of automatically switching the television to STANDBY after a period of 30, 60, 90 or 120 minutes. When the word "OFF" is displayed on screen or if the receiver is switched OFF/STANDBY, the timer settings will be cancelled.

MUTE

The button marked "MUTE" on the handset, will prevent any sound being emitted from the speakers, and the word "MUTE" will be displayed on screen until this button has been pressed again, whereupon previous volume levels are restored.

NORMAL SETTINGS

When the receiver is first switched ON or whenever the "NORMAL" button is pressed., all picture and sound adjustments should be as you -prefer them- this is provided that you have initially adjusted them to your satisfaction and stored these settings in the electronic memory. They will always revert to these settings even if temporarily altered to suit unusual reception conditions etc (provided the temporary settings have not been memorised).

MEMORY / STORE

This button, when pressed twice (within 4 seconds), will override any previous control setting if used in conjunction with a particular control. To memorise any alteration, press the "MEMORY" BUTTON once, the receiver will advise it will accept this command by displaying "memory?", to confirm press "MEMORY" once more. This new setting will then be regarded as permanent or normal.

STANDBY

The button marked "⏻" allows you to switch the television to "standby". This control shuts down all functions except a sensory circuit. To return to television programmes either press the standby button again or key in a valid programme number by using the numeric pad on the handset. It should be noted that the television is "not" switched off in this mode. If you are not going to use the television for long periods of time, it is recommended that you switch the power on the television to "OFF" and remove the mains plug from the socket.

AUDIO VIDEO CONNECTIONS

When the button marked "AV" is pressed, it enables you to connect most types of VCR's, Computers and Satellite Receivers to this television, either directly to the aerial socket or by the SCART connector.

SCART - EUROSOCKET

The term SCART or Eurosocket is a 21 pin connector, recognised by International Standards, which will allow you to connect any relevant equipment, regardless of make or country or origin, to this television and will operate according to manufacturers specification.

VIDEO CONNECTION

This television has been produced so that a video recorder can be connected direct to the aerial socket, by using the standard co-axial lead supplied with all makers V.C.R.

Follow the instructions from the VCR to connect the 2 units togethernd switch on the VCR's test signal or play a pre-recorder video cassette. Tune the television to the signal from the VCR. This will usually be either channel 36 or 37, however, check the information plate at the rear of the VCR. Although you can store the video tuning position to any channel, we suggest that you store the video on channel "0", to prevent any confusion of possible new channel additions.

It should be noted that some makers of VCR's, Computers and Satellite receivers etc, will automatically switch the television into "AV" mode. If this happens then you must obviously disregard the previous instruction to manually select "AV".

CIRCUIT DESCRIPTIONS

1.1 GENERAL

Chassis AT-2 has a modular designed frequency synthesis tuning and control system which can be used in a wide range of TV receivers. The system involves frequency tables of standars B/G-D/K channels.
The basic system, providing 40 permanently stored programmes, local control of main TV functions and display of programme, channel number and analogue values on the screen (OSD) can be realized with only four integrated circuits.:

Microcontroller	SDA 20160
Nonvolatile memory	SDA · 2526
OSD-IC (NEC)	6142

IR remote control of all TV functions is possible if two additional ICs are used:

IR TRANSMITTER	SDA 2208
IR PREAMPLIFIER	SDA 4050B

Teletext function may be included by using the following devices:

Data slicer	SDA5231
Teletext decoder	SDA5243
Memory device	8k*8

1.2 SALIENT FEATURES

Frenguency synthesis tuning (62.5kHz steps)
Channels correspending to standard B/G · D/K.
Software protection against tube flashovers
40 programs selectable by directly entering a programme number or by up/down function.
Channel selection by directly entering a channel number or up/down function.
Channel search function in two directions.
Nonvolatile memory for 40 programme and optimal analogue values.
128 step fine tuning.
Local control (14/13 Keys)
IR remote control
Control lines for AV (programmes 0,AV,39)
Display of programme number, channel number, analogue values, mute illustrated by OSD (On screen display).
Automatic muting if no carrier detected.
Automatic switch-off when carrier disappears for more than 5 minutes
Sleep-timer (30,60,90, 120 min)
Full telext control
Linked page control (row 27)
· Pin programmable tuner-selection
Broadcasting standard selection.

1.3 CONTROL COMPONENTS

In the following sections abbreviated reference data of the control components is given. For more detailed information use corresponding data sheets.

1.3.1 MICROCONTROLLER SDA 20160

The SDA20160 is an one-chip microcontroller with an 8 bit CPU, 16 kByte code memory (ROM), 256 byte date memory (RAM), two independent 16 bit timers/counters, a five-source/two-priority-level nester interrupt structure and four on chip D/A converters. Manufactured in NMOS silicon gate technology and working with a single 5 Volt supply voltage it has a cycle time of 1 S (crystal frequency 12MHz) with one, two or four cycles per instruction. A total of up to 34 digital I/0 lines are available, configurated as four 8 bit ports (port0 to port3) and the serial IIC bus interface with clock (SCL) and data (SDA) line. Port 3 is a multifunction port. All special functions can be enabled/disabled by software. P3.0 input is able to process signals modulated with approx. 30 kHz. It contains a digital demodulator deriving the envelope curve from a modulated digitial signal and can be used as an input for infrared transmitter signals. Further port3 includes two interrupt inputs and two counter inputs. Port 1 also contains four multifunction lines which can be used either as normal port input/output or as PWM (pulse width modulated) outputs, controlled by the four on-chip D/A converters. For the application a special software has been located in the microcontroller ROM. Fig1 shows a pinning diagram of the SIESTA-OSD microcontroller, named SDA 20160. The SDA 20160 microcontroller is housed in a DIP 40 package.

1.3.2 NONVOLATILE MEMORY SDA 2516/2526

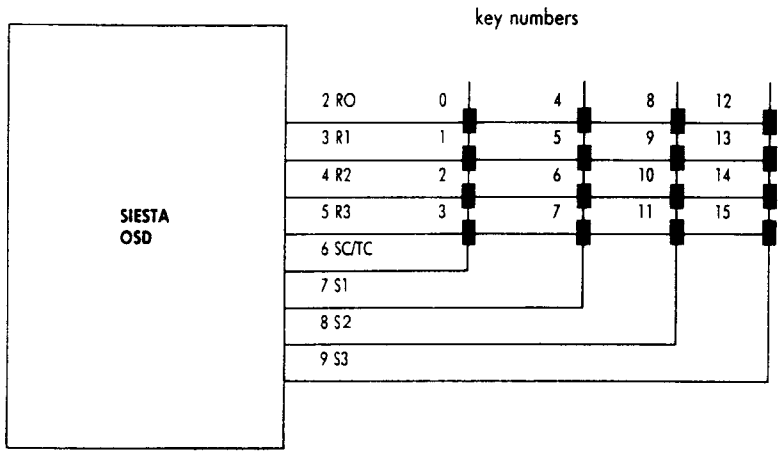
The SDA 2516 and SDA 2526 are nonvolatile, electrically programmable and eraseable memory devices 128* 8 bit rsp. 256 * 8 bit (SDA 2526) memory size. Data transfer is done via an IIC bus interface. Programming time is typically 15ms. Data retention is unlimited and independent of power-on or power-off status. The number of reprogramming cycles per address is greater than 1000. SDA 2516 and SDA 2526 are manufactured in MOS technology and mounted in a DIP 8 case.

1.3.3 INFRARED PREAMPLIFIER TDA 4060

The bipolar integrated circuits TDA 4060 is designed for universal use as preamplifier for infrared remote control signals. The TDA 4060 uses only a single 5V supply.

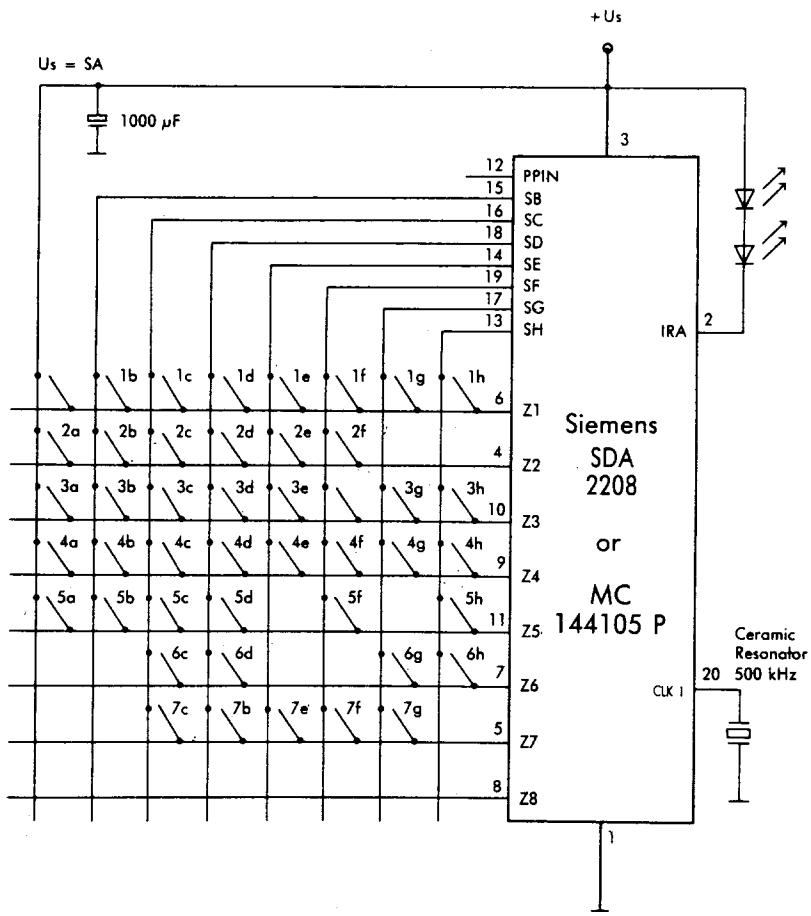
1.3.4 IR TRANSMITTER SDA 2208

The IR transmitter circuit SDA 2208, manufactured in a bipolar technology converts instructions obtained from an 8*§ keyboard matrix to a 9 bit bipolar phase code. The keyboard matrix could be enlarged to an 8*64 array by means of shift keys or additional working, so a total of 512 different instructions could be transmitted. As including an on-chip IR diode driver, the IR transmitter diode (s) are directly connected to the SDA 2208. The keyboard is completely locked against multiple closure. The internal oscillator is controlled by an AM-IF ceramic resonator or by an existing clock signal (430..530kHz). Current consumption during operation is typically 10mA (supply voltage 4...10V) When no key on the board is pressed (standby) the SDA 2208 is produced in a DIP 20 case.

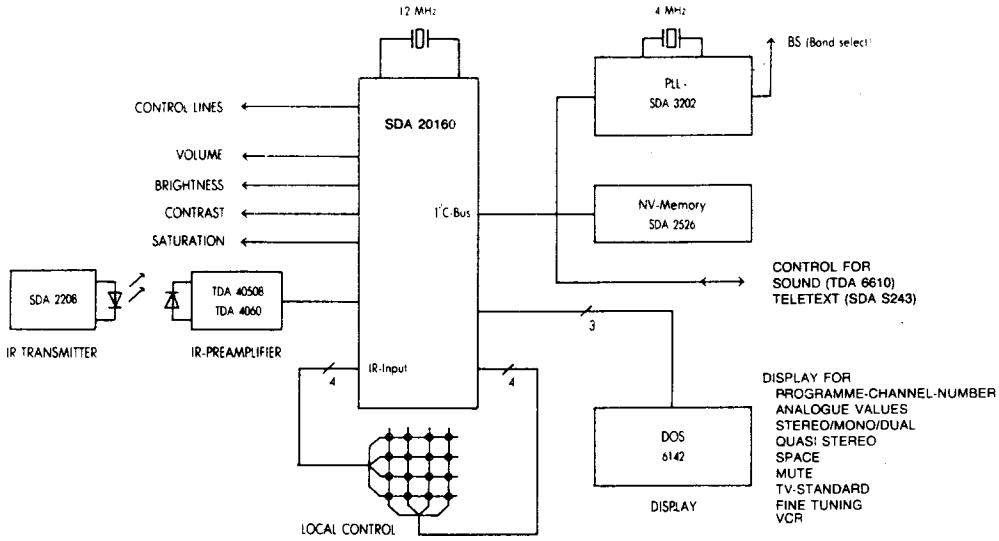


key no.	Function
1	off/on
2	store
3	down
4	up
5	AF mode
6	search
7	channel
8	programme
9	scart
10	volume
11	TV-standard
12	finetuning
13	saturation
14	contrast
15	brightness

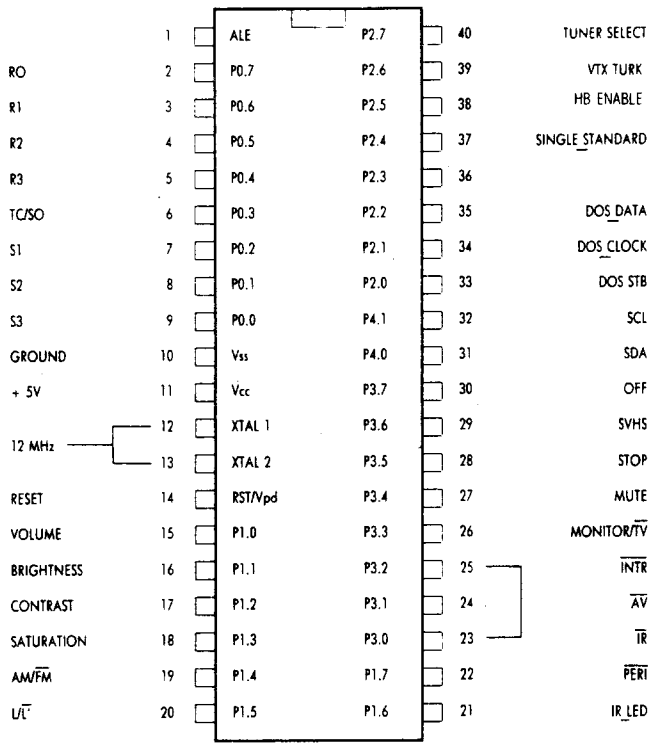
LOCAL CONTROL BLOCK DIAGRAM



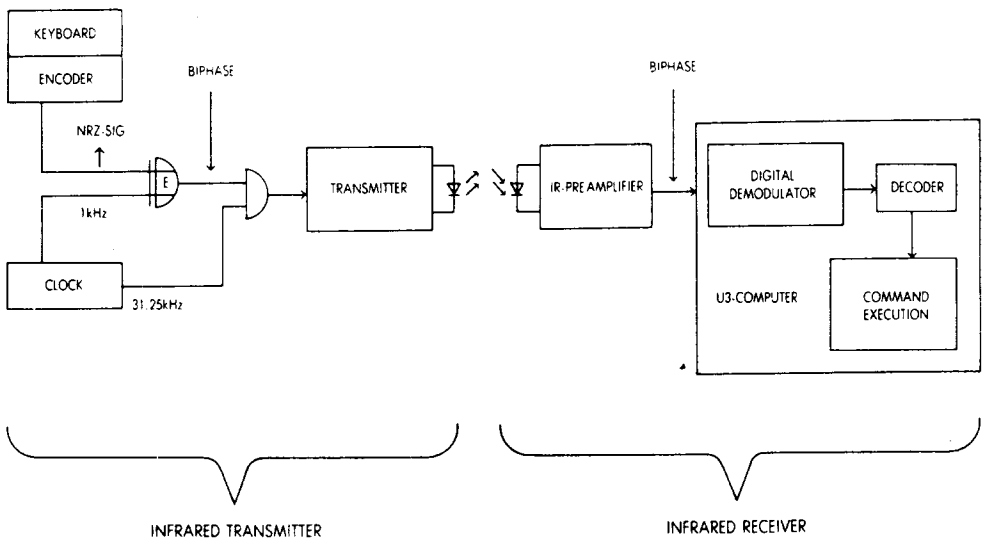
CIRCUIT FOR IR TRANSMITTER SDA 2208



SYSTEM BLOCK DIAGRAM



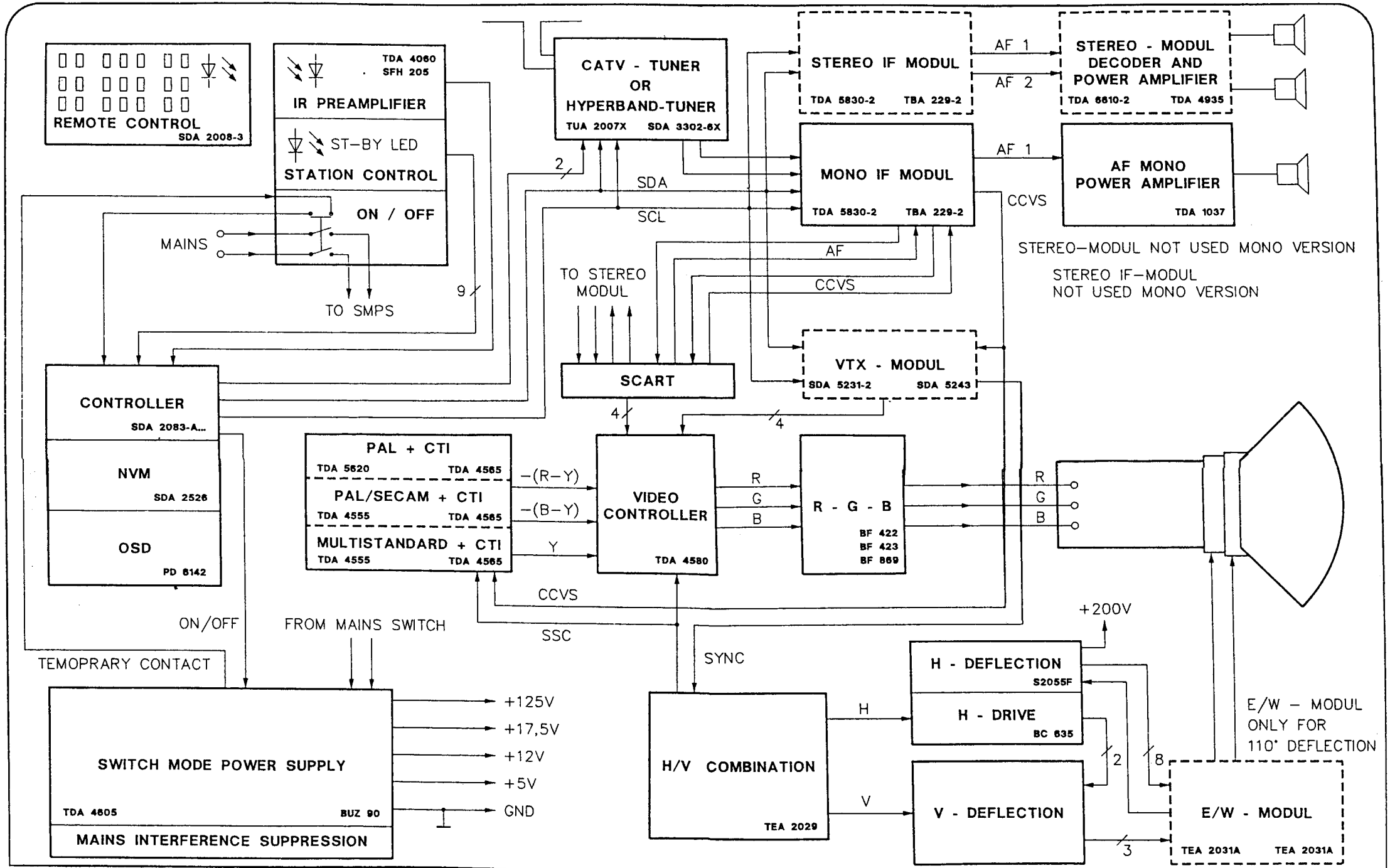
MICROCONTROLLER PIN CONFIGURATION



IR REMOTE CONTROL BLOCK DIAGRAM

CHANNEL TABLE FOR STANDARD B/G (CCIR)

Channel number (display)	Channel design.	Centre frequency (MHz)	Oscillator frequency (MHz)	Division ratio PLL (decimal)
01	AU 0	46.25	85.125	1,362
02	K2	48.25	87.125	1,394
03	K3	55.25	94.125	1,506
04	K4	62.25	101.125	1,618
05	K5	175.25	214.125	3,426
06	K6	182.25	221.125	3,538
07	K7	189.25	228.125	3,650
08	K8	196.25	235.125	3,762
09	K9	203.25	252.125	3,874
10	K10	210.25	249.125	3,986
11	K11	217.25	256.125	4,098
12	K12	224.25	263.125	4,210
13	A	53.75	92.625	1,482
14	B	62.25	101.125	1,618
15	C	82.25	121.125	1,938
16	D	175.25	214.125	3,426
17	E	183.75	222.625	3,562
18	F	192.25	231.125	3,698
19	G	201.25	240.125	3,842
20	H	210.25	249.125	3,986
21	K21	471.25	510.125	8,162
22	K22	479.25	518.125	8,290
23	K23	487.25	526.125	8,418
24	K24	495.25	534.125	8,546
25	K25	503.25	542.125	8,674
26	K26	511.25	550.125	8,802
27	K27	519.25	558.125	8,930
28	K28	527.25	566.125	9,058
29	K29	535.25	574.125	9,186
30	K30	543.25	582.125	9,314
31	K31	551.25	590.125	9,442
32	K32	559.25	598.125	9,570
33	K33	567.25	606.125	9,698
34	K34	575.25	614.125	9,826
35	K35	583.25	622.125	9,954
36	K36	591.25	630.125	10,082
37	K37	599.25	638.125	10,210
38	K38	607.25	646.125	10,338
39	K39	615.25	654.125	10,466
40	K40	623.25	662.125	10,594
41	K41	631.25	670.125	10,722
42	K42	639.25	678.125	10,850
43	K43	647.25	686.125	10,978
44	K44	655.25	694.125	11,106
45	K45	663.25	702.125	11,234
46	K46	671.25	710.125	11,362
47	K47	679.25	718.125	11,490
48	K48	687.25	726.125	11,618
49	K49	695.25	734.125	11,746
50	K50	703.25	742.125	11,874
51	K51	711.25	750.125	12,002
52	K52	719.25	758.125	12,130
53	K53	727.25	766.125	12,258
54	K54	735.25	774.125	12,386
55	K55	743.25	782.125	12,514
56	K56	751.25	790.125	12,642
57	K57	759.25	798.125	12,770
58	K58	767.25	806.125	12,898
59	K59	775.25	814.125	13,026
60	K60	783.25	822.125	13,154
61	K61	791.25	830.125	13,282
62	K62	799.25	838.125	13,410
63	K63	807.25	846.125	13,538
64	K64	815.25	854.125	13,666
65	K65	823.25	862.125	13,794
66	K66	831.25	870.125	13,922
67	K67	839.25	878.125	14,050
68	K68	847.25	886.125	14,178
69	K69	855.25	894.125	14,306
70	EX	863.25	902.125	14,434
71	EX	871.25	910.125	14,562
72	EX	879.25	918.125	14,690
73	EX	887.25	926.125	14,818
74	EX	69.25	108.125	1,730
75	EX	76.25	115.125	1,842
76	EX	83.25	122.125	1,954
77	EX	90.25	129.125	2,066
78	EX	97.25	136.125	2,178
79	20I	59.25	98.125	1,570
80	50I	93.25	132.125	2,114
81	S1	105.25	144.125	2,306
82	S2	112.25	151.125	2,418
83	S3	119.25	158.125	2,530
84	S4	126.25	165.125	2,642
85	S5	133.25	172.125	2,754
86	S6	140.25	179.125	2,866
87	S7	147.25	186.125	2,978
88	S8	154.25	193.125	3,090
89	S9	161.25	200.125	3,202
90	S10	168.25	207.125	3,314
91	S11	231.25	270.125	4,322
92	S12	238.25	277.125	4,434
93	S13	245.25	284.125	4,546
94	S14	252.25	291.125	4,658
95	S15	259.25	298.125	4,770
96	S16	266.25	305.125	4,882
97	S17	273.25	312.125	4,994
98	S18	280.25	319.125	5,106
99	S19	287.25	326.125	5,218
00	S20	294.25	333.125	5,330
C0	S21	303.25	342.125	5,474
C1	S22	311.25	350.125	5,602
C2	S23	319.25	358.125	5,730
C3	S24	327.25	366.125	5,858
C4	S25	335.25	374.125	5,986
C5	S26	343.25	382.125	6,050
C6	S27	351.25	390.125	6,242
C7	S28	359.25	398.125	6,370
C8	S29	367.25	406.125	6,498
C9	S30	375.25	414.125	6,626
CC	S31	383.25	422.125	6,754
E0	S32	391.25	430.125	6,882
E1	S33	399.25	438.125	7,010
E2	S34	407.25	446.125	7,138
E3	S35	415.25	454.125	7,266
E4	S36	423.25	462.125	7,394
E5	S37	431.25	470.125	7,522
E6	S38	439.25	478.125	7,650
E7	S39	447.25	486.125	7,778
E8	S40	455.25	494.125	7,906
E9	S41	463.25	502.125	8,034



Bekoteknik

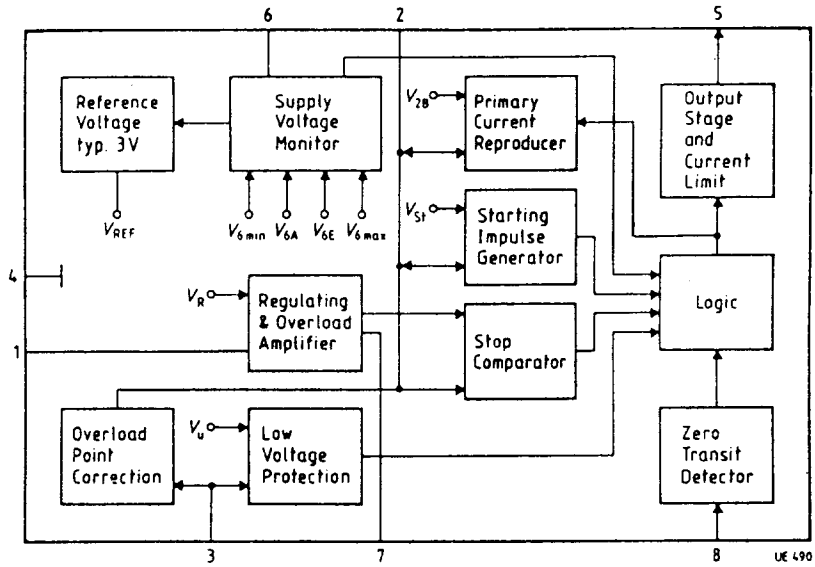
SIESTA

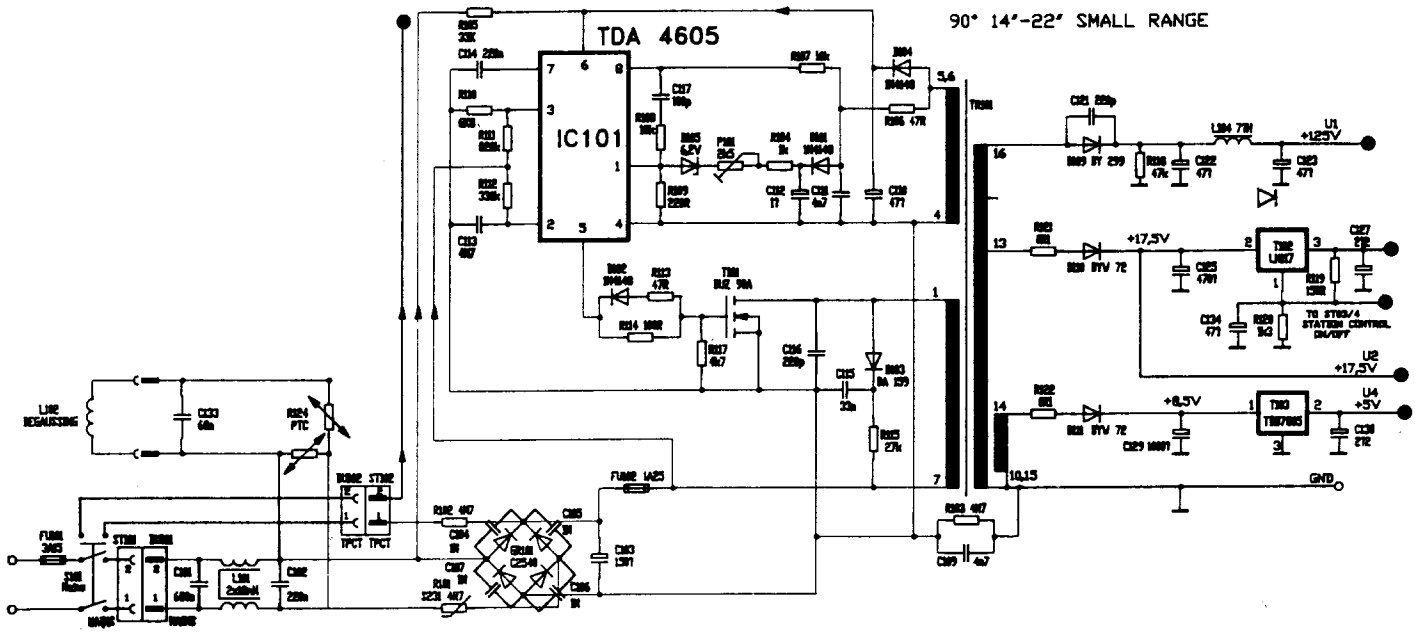
BLOKCKDIAGRAMM

POWER SUPPLY

TDA 4605
Control IC for Switched-Mode
Power Supplies using
MOS Transistors

Block Diagram





START UP

When TV is switched ON a start voltage (9V) is generated over R105 at pin 6 of IC 101, TDA4605. IC101 produces a 50 kHz squarewave, whic is supplied to the base of T101, BUZ90A over D102, R113 and R114. Collector of T101 is connected to 330 V with switch mode transformer TR101. 330 V is chopped at primary side of the transformer. This generates varios voltages at pins 5, 6, 13, 14, 16 of the secondary side of the transformer TR101.

NORMAL OPERATION

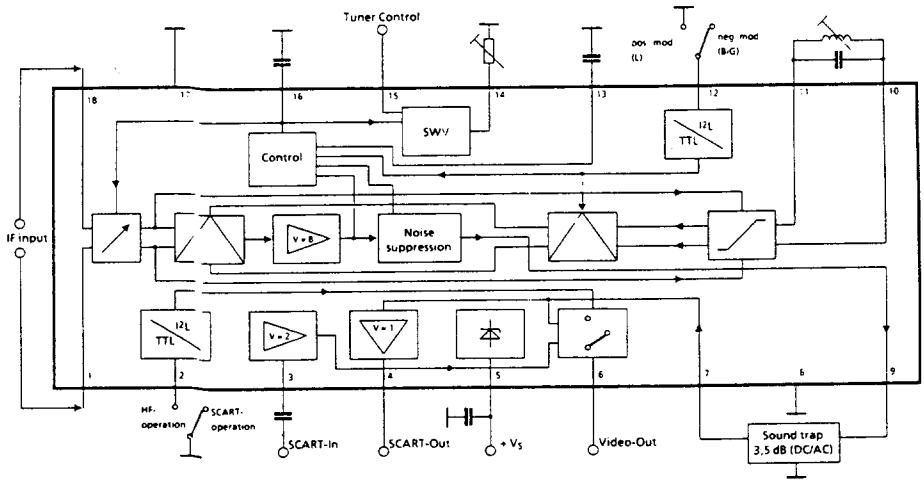
Voltage from pin 5, 6 of transformer TR101 is reftified with D104 and applied to pin 6 of IC101. When this stable voltage 12 V DC reaches pin 6, start voltage is interrupted.

VOLTAGE REGULATION

Voltage obtained from D104 goes over D101, R104, P101, D105 6.2 zener diod to pin 1 of IC101, TDA 4605. This circuit regulates the main supply voltage U1 125V. Pin 8 of IC101 is connected over R107 to pin 8 of TR101, which performs automatic voltage control.

TDA 5931- 6 VİDEO–IF AMPLİFİER AND DEMODULATOR WITH FULLSCART

Block Diagram



Pin Functions

1 Video IF input
2 SCART Switch A / W
3 SCART input
4 SCART Input Output
5 Supply voltage
6 Positive video output
7 Video output of the sound trap (2 Vpp
8 Ground
9 Video input of the sound trap (3 Vpp)
10 Demodulator tank circuit
11 Demodulator tank circuit
12 TV standart switch-over (B/G) - (L)
13 Low-pass filter (averaging)
14 Tuner AGC threshold
15 Tuner AGC output
16 AGC time constant
17 Ground
18 Video IF input

Circuit Description

The component includes a four-stage, capacitatively coupled, symmetrically designed and controlled amplifier a limiter with selection, and a mixer for quasi-synchronous demodulation of positive and negative modulated IF signals. In addition a video output amplifier and noise suppression circuitry are included. This output is used for generating the AGC voltage. The AGC for both modulation types has been realized as integral AGC with noise free peak and mean value detector (only for positive modulation). For SCART applications this output is switched a video switch with two inputs (for the demodulator signal or SCART socket) and two outputs (SCART-and TV output). The demodulator output (pin 9) provides a video signal output level 3 dB higher than the level required for the operation of the TV set or to drive the SCART connector. Therefore it is possible to insert a sound trap inbetween this output and the input of the SCART switch (pin 7). The insertion loss of the sound trap has to attenuate the signal level at pin 9 by a factor 2/3 or 3 dB (AC and DC) to avoid distortions in the SCART switch.

The delayed tuner AGC is generated by a threshold amplifier driven by the control voltage. The amplifier response can be controlled by means of an external potentiometer. (The increase of the tuner AGC voltage shall create a higher tuner gain = positive control)