

Scheme Service Manual

TV

BEKO. 16328

BEKO. 16328NX.

BEKO. AT-3.

**INTOARCERE
PRIMA PAG.**

**INTOARCERE
LA CUPRINS**

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 equipped 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 on 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
DISASSEMBLY INSTRUCTIONS
EXPLODED VIEWS
WIRING DIAGRAM
TECHNICAL SPECIFICATIONS
OPERATION INSTRUCTIONS
CIRCUIT DESCRIPTIONS
BLOCK DIAGRAM
POWER SUPPLY
IR TRANSMITTER KS51800
TDA 5931-6 VIDEO IF IC
TBA 121 FM SOUND IF IC
TDA 4680 VIDEO CONTROL IC
TDA 4555 MULTISTANDARD DECODER IC
TDA 4565 COLOUR TRANSIENT IMPROVEMENT IC
TEA 2029 C COLOUR TV SCANNING AND POWER SUPPLY PROCESSOR IC
TELETEXT MODULE
NICAM MODULE
CRT MODULE
MONO IF MODULE
STEREO IF MODULE
STEREO AF MODULE WITH DECODER AND POWER AMPLIFIER
PAL/SECAM DECODER MODULE
PAL DECODER MODULE
EAST/WEST MODULE
CHASSIS LAYOUT
SERVICE ADJUSTMENTS
CONVERGENCE ADJUSTMENTS
CRT TABLE
TROUBLE SHOOTING GUIDE
OSCILLOSCOPE WAVE FORMS
CHANNEL TABLE FOR STANDARD B/G
CHANNEL TABLE FOR STANDARD I +
CHANNEL TABLE FOR STANDARD D/K
CHANNEL TABLE FOR STANDARD L
CIRCUIT DIAGRAMS

For Service Manuals
MAURITRON SERVICES
8 Cherry Tree Road, Chinnor
Oxfordshire, OX9 4QY.
Tel (01844) 351694
Fax (01844) 352554
email:- mauritron@dial.pipex.com

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

RADIATION

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

IMPORTANT SAFETY NOTICE

Electrical and mechanical parts in BEKO receivers have special safety related characteristics. These characteristics are often not apparent from visual inspection nor can the safety be afforded by them necessarily be guaranteed by using replacement components rated for the same voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified by marking with a Δ on the schematics. Use of a substitute replacement component which does not have the same safety characteristics as the BEKO recommended component one, may create electrical shock, fire, radiation, or other hazards.

DISCHARGE

The output stage can develop voltages in excess of 25kV; if the E.H.T. cap is required to be discharged, discharge the anode cap to chassis via a 100k resistor, prior to its removal from the

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 excess of design levels. The high voltage must not, under any circumstances exceed 26kV on the chassis.

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 locations and anchor points. Ensure all leads, especially in areas of high voltage, are properly routed/anchored in their correct locations when reassembling the receiver.
5. Always use the manufacturer's replacement components. 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 thoroughly 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.

TECHNICAL SPECIFICATIONS

1. OPERATING CONDITIONS

1.1	POWER SUPPLY	140 TO 270 VAC 50/60 Hz
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 B/G	UK I	FRANCE L	OIRT D/K
VHF BAND				
BAND I	CH 2-4	CH 1-5	CH 2-4	CH 1-5
BAND III	CH 5-12	CH 6-12	CH 5-12	CH 6-12
CABLECH ANNELS	S1-S19,S20-S41	S1-S19,S20-S41	S1-S16, S21-S41	S1-S19-S22-S341

UHF BAND				
BAND IV-V	CH 21-69	CH 21-69	CH 21-69	CH 21-69

2.2	GAIN LIMITED SENSITIVITY INPUT SIGNAL LEVEL FOR STANDARD VIDEO OUTPUT VOLTAGE		MIN	NOM	MAX	UNIT
	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	I	L	D/K	
	Picture Carrier	38.9	38.9	38.9	38.9	
	Sound Carrier	33.4	32.9	32.4	32.4	
	Colour Carrier	34.47	34.47	34.47	34.47	
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 4/5		: 100 dB μV (MAX)			

3. VIDEO OUTPUT SECTION

3.1	VIDEO OUTPUT VOLTAGE (measured on cathode with lowest output level, contrast control and drive control at max.		: MIN	NOM	MAX	UNIT
			: 90	100	—	V
3.2.	FREQUENCY RESPONSE		:			
a)	INPUT AERIAL STANDARD, HF SIGNAL		:			
	STANDARD B/G · D/K · I+ · L		: -10	-7	—	dB
b)	INPUT: SCART PIN 20		:			
	STANDARD B/G · D/K · I+ · L		: —	-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 SUPPRESSION RATIO AM MODULATION=39%		: 60 db (NOMINAL)			
5.1.4	HARMONIC DISTORTION fm= 1 KHz		: 10%			
5.2	POWER OUTPUT (at 10% distortion) fm= 1KHz		: 4.0 W Rms (for mono sets) 2x7 W Rms (for stereo sets)			

6. SYNCHRONISATION

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

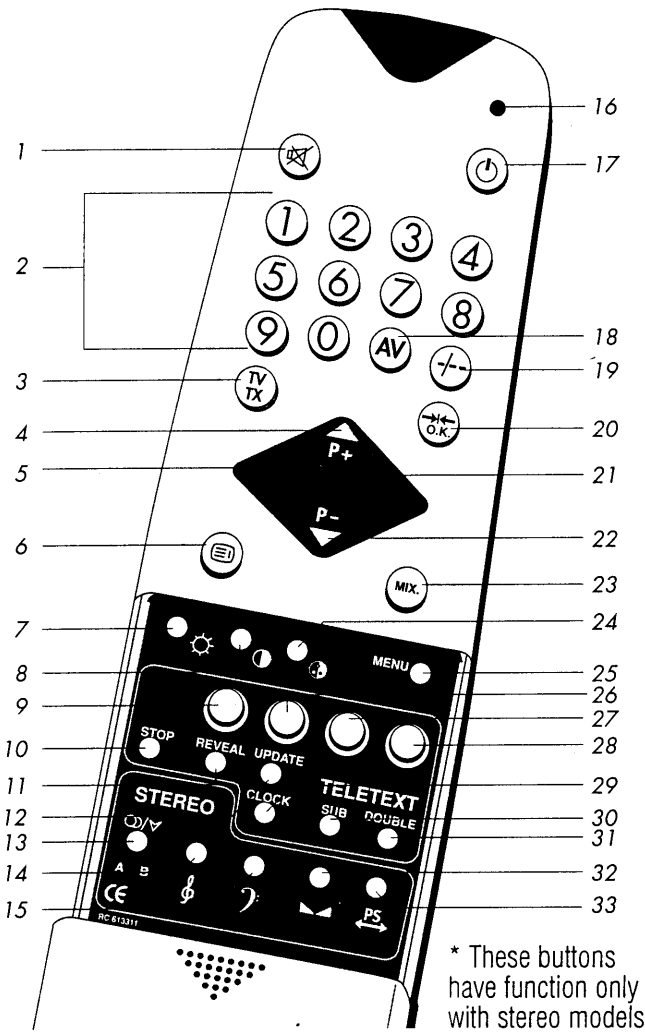
7. PICTURE TUBE DRIVE SECTION

			25" / 28"	20" / 21"	14" / 15"
7.1	B+SUPPLY VOLTAGE (AT Ib=0)	:	145+1 VDC	125+- 1 VDC	--
7.2	EHT	:	27+-0,5 kV	25.0 +- 0.5 kV	23.0-0.5 kV
7.3	FOCUS VOLTAGE	:	MIN 25,6 % MAX 38%	--	--
7.4	GRID 2 VOLTAGE RANGE	:	MIN 300 V MAX 1350 V	--	--
7.5	HEATER VOLTAGE	:	6.2+- 0.2 Vms	--	--
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	:	21+- 0.5 VDC	--	--
7.11	5V OUTPUT	:	5.0+- 0.5 VDC	--	--
7.12	8V OUTPUT	:	8.0+-0,5 VDC	--	--
7.13	RETRACE TIME	:	11.0+- 0.5 MS	--	--

8. OTHERS

8.1	AMBIENT OPERATING TEMPERATURE	:	0-45 DEGREES C
8.2	STORAGE TEMPERATURE	:	-10 TO + 85 DEGREES C
8.3	POWER CONSUMPTION	:	90 Watts (max) 14", 15", 20", 21" 120 Watts (max) 20", 21" (Stereo models) 135 Watts (max) 25", 28"
8.4	SAFETY	:	IEC 65
8.5	X-RAY RADIATION	:	ACC. IEC 65
8.6	Picture Tube Dimensions	:	14" (37 cm), 15" (40 cm) 20" (51 cm), 21" (55 cm) 25" (63 cm), 28" (70 cm)

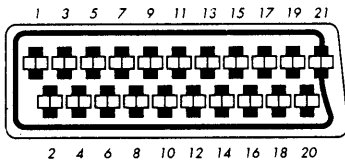
REMOTE CONTROL HANDSET



* These buttons have function only with stereo models

1. MUTE button
2. Ten Key Programme buttons
3. Programme Up button
4. Programme Up button
5. Volume Decrease button
6. Index page/Info button
7. Brightness control
8. Contrast control
9. Red Fasttext button
10. STOP button
11. Reveal button
12. Update button
- * 13. Stereo-Mono/Dual A-Dual B selection
- * 14. Treble control
- * 15. Bass control
16. LED Display.
17. Stand - by button
18. AV button
19. Two digit programme button
20. Memory/Normalisation button
21. Volume increase button
22. Programme Down button
23. Mix button
24. Colour control
25. Menu button
26. Green Fasttext button / CHILD LOCK
27. Yellow Fasttext button
28. Blue Fasttext button/OFF Timer
29. Clock button
30. Subpage button
31. Enlarge button
- * 32. Balance button
- * 33. Space sound/Quasi stereo button

Assignment Of Connections For Scart Socket



1. Audio output Right
2. Audio input Right
3. Audio output Left (Mono)
4. Audio ground
5. Blue ground
6. Audio input Left (Mono)
7. RGB input, Blue
8. Switching voltage
9. Green ground
- 10.
11. RGB input, Green
- 12.
13. Red ground
14. Ground
15. RGB input, Red
16. Blanking Signal
17. Video output ground
18. Video input ground
19. Video output
20. Video input
21. Screening

SPECIAL FEATURES

Your TV set is equipped with an **“On-Screen Display”** system. This enables the user to see the functions of the TV on-screen and to control them efficiently.

This television will automatically switch to **“Stand-by”** five minutes after a channel ceases to transmit.

Digital Electronic Tuning: This television has been fitted with a combined VHF/UHF (including cable channels S1-S41) tuner with PLL to ensure the channel settings are as simple as possible.

Scart Socket: Video cassette recorder, satellite receiver, video disc player, TV games or a home computer can be connected to this AV (audio-video) socket with an appropriate connecting cable. To view this input, select AV on the remote handset.

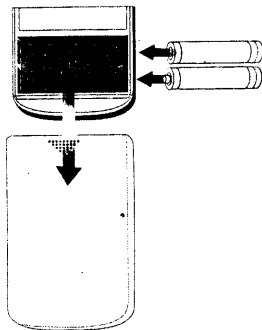
External Speaker Sockets – On some NICAM/STEREO models only.

100 Programme Memory

Child lock function enables locking out of unwanted programmes and protection of the tuning procedure.

3. PREPARATIONS

CONNECTIONS

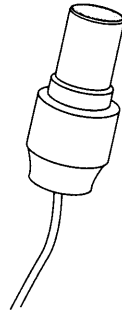
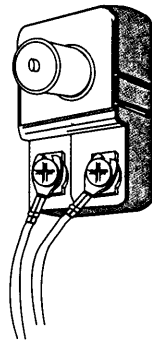


Battery Change/Installation

Remove slide cover by pulling it down in the direction of the arrow. Install the two AA size batteries observing the correct polarity and refit the cover.

AERIAL CONNECTION

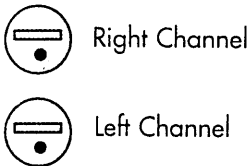
Using a 75 Ω aerial lead connect your TV to the aerial outlet in your home. If a 300 Ω flat two wire lead is used, a 300 Ω /75 Ω adaptor should be



Connect the TV mains plug into your domestic mains socket outlet (240V 50Hz AC.) To switch on press the TV on/off switch then any numbered button on the remote handset or +/- buttons under the control flap.

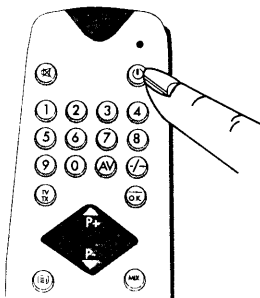
EXTERNAL SPEAKERS (25/28" NICAM /STEREO models only)

Two 16 Ω surround speakers can be connected to the speaker sockets in the back cover to give rear speaker channels. The volume of these speakers is controlled in the normal way, however the rear speaker volume has a lower level than the TV's main speakers.



Note- If any speakers other than 16 Ω are used, the TV may be damaged.

4. OPERATING YOUR TV



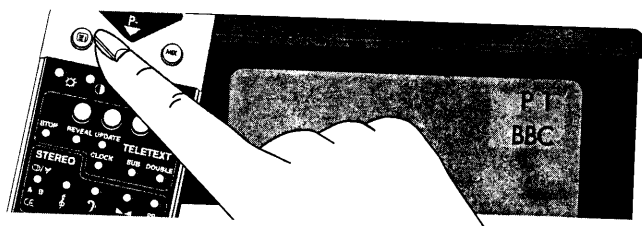
STAND -BY

By pushing the red stand-by button on the upper left side of the R/C Handset, your TV will go into the stand-by mode.

Attention: Always switch the television off by the TV on/off switch when leaving the TV



Mute: To temporarily mute the sound press the "⊗" button. The "⊗" sign will appear on the screen and the sound will mute. By pushing the volume + button or "⊗" button the sound will be restored.

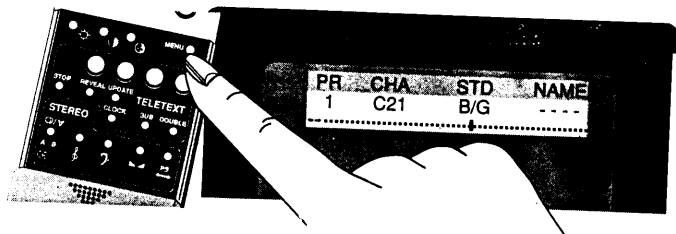


Display Button "⊞": By pressing this button the programme number and programme name (if preset) will appear in the upper right corner of the screen. After a short while this will disappear automatically.

TUNING AND MEMORY

Menu

This TV has an advanced menu tuning system, also making it possible to give each TV channel a 4-character alphanumeric name, for example BBC1 or ITV.

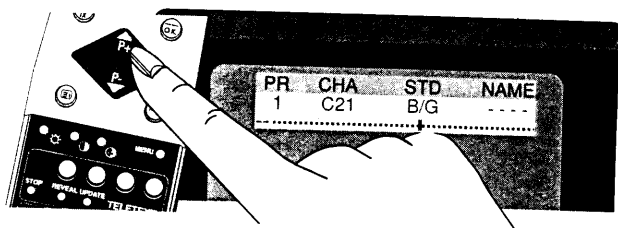


When this MENU appears on your screen the number below PR will start to flash. See Programme Number Selection.

PR	CHA	STD	NAME
1	C21	B/G	ABCD
Fine Tuning Section			
Programme section Programme numbers 0-99 can be used to set specific TV stations, eg PR1 = BBC1 Channel Section This section indicates the channel number of the selected TV station See Page 11 TV transmission Standard can not be changed. Name Section This section is used to name the channel for your own identification purposes.			

Use + and - buttons to shift position to the left and right. The chosen character will be red. Use P+/P- buttons to bring values to your chosen position.

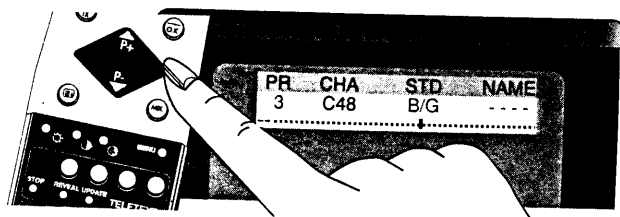
Tuning Procedure continued



Programme Number Selection

Press PR/CH-Menu button. The number below PR will then flash. This is the TV programme number to be set. For example BBC1=PR1, ITV = PR3. The PR Number can be changed using the P+/P- buttons.

The programme number can be chosen by pressing one of the programme buttons. If the desired programme number has two digits, first press "- / -" button and then the two digits of the desired programme.

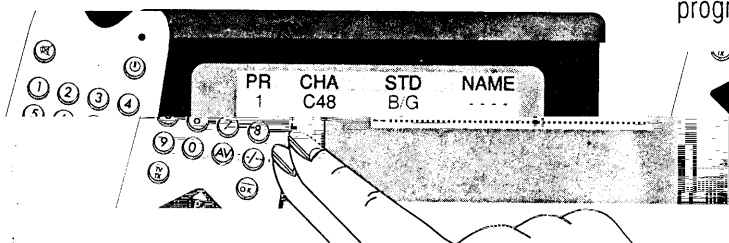


Tuning of Programmes with unknown channel numbers

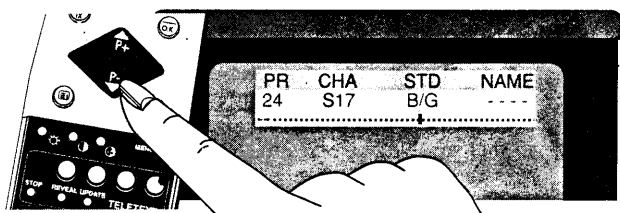
Using the -/+ buttons move the flashing cursor across to the two digit number immediately after letter 'C'. With one push of either the P+ or P- buttons the TV will automatically tune up or down to the nearest channel. If this channel is not the required one continue searching until the required channel is found. When the desired channel is found press the "→|← O.K." button.

Tuning of Programmes with known channel numbers

Manual tuning is done in the same way as search



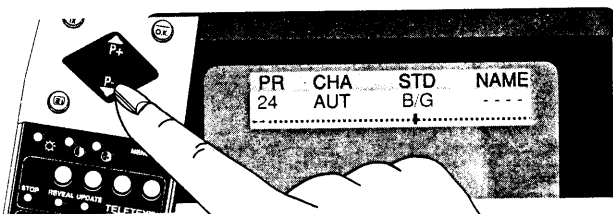
tuning, however when setting the two digit channel number for each programme the known channel number can be entered using the number key pad on the remote control handset. To store the selected channel press " → ← O.K. " button.



Tuning of Cable Channels

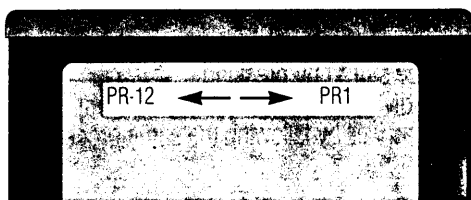
Using +/- buttons move the flashing cursor to letter C. Push P+ or P- button. Display below CHA will turn to

S -. Using + button move the flashing cursor to the two digit section after the letter S. Enter the channel number of your desired cable channel. To store this channel press " → ← O.K. " button. The menu will disappear and the selected channel will be stored.

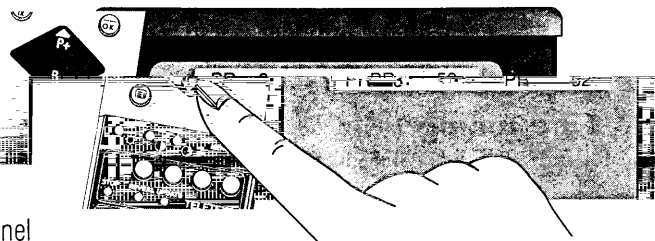


Automatic Random Tuning

Press PR/ CH- Menu button. Move the flashing cursor so "C" flashes below CHA heading, then press the P- button twice. "AUT" will appear as illustrated, then press the " → ← O.K. " button on remote control handset. All channels being broadcast will be automatically stored starting from the chosen Programme onwards. This will continue until all "PR"ogrammes have been set. Following this, the Programmes Rearranging MENU will appear.



It is used to rearrange TV programmes already registered with the automatic random tuning method. (See **Rearranging** in the next section) Otherwise press the Menu button and the programme rearranging MENU will disappear.



Rearranging TV programmes already registered in the memory

To obtain the rearranging Menu:

Press PR/CH-Menu button. Press + or - buttons on the remote control handset to move the flashing cursor until "C" is flashing. Press P+ or P- button 3 times until " → ← " is flashing on your screen. Press " → ← O.K. " button. The Rearranging MENU will appear.

Rearranging:

To rearrange the programmes follow the example below.

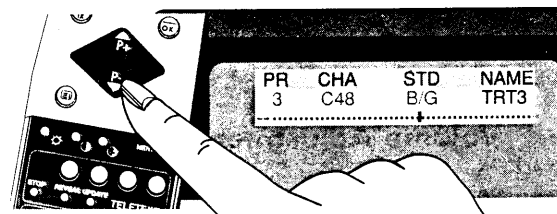
Press "-" button until the left hand side programme number flashes, if not already flashing. Press P+ or P- button until you see PR1 on the left hand side. The right hand side PR represents the channel showing on the screen.

By pressing the "-" button, the right hand side PR will flash. Press P+ or P- button until you find the programme you want to place into PR1.

Press " → ← O.K. " button to move the channel on the right hand side to the left hand side and vice versa.

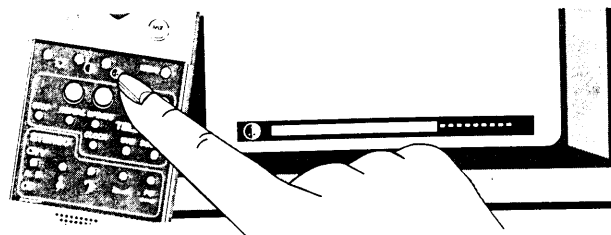
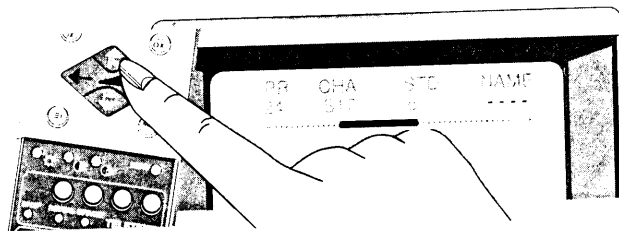
Repeat the same procedure for PR2 and so on.

To store all your rearrangements press the PR/CH button, otherwise they will not be stored.



Programme Naming:

Press PR/CH- Menu button. Using the "-/+ " buttons move the flashing cursor across to the four digits below the NAME heading. These four digits can be set to any letter or number combination up to four characters e.g. BBC1, BBC2, ITV and CH4. This is done by using the "-" or "+" buttons to move the cursor to each of the four characters individually and using the "P+" or "P-" buttons to set each digit. When you have finished press " → ← O.K. " to store the name in the memory. From now on whenever you call this programme the code name you have given will appear momentarily in the corner of the screen.

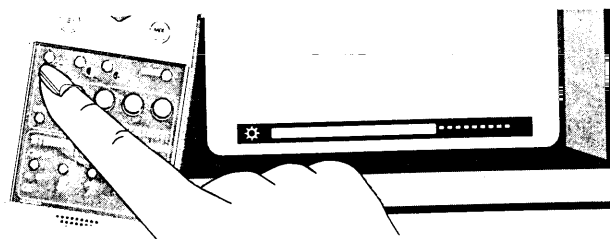
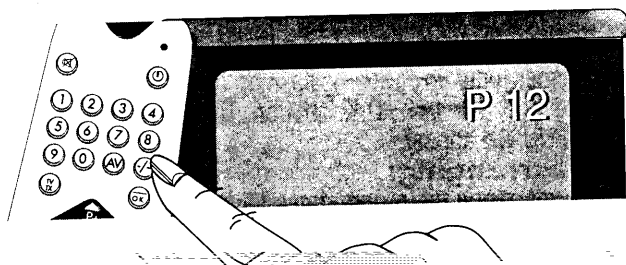


Fine Tuning

It may now be necessary to fine tune your TV to optimise reception. First press the PR/CH-Menu button on the remote control handset, move the flashing cursor down by pressing "—" button to the FINE TUNING line, then using "P+/P-" buttons on the remote control an optimum setting should be found. To store this setting press "→|← O.K. ".

Colour Adjustment

Press the colour button. The colour display will appear on the screen, "+" or "-" buttons will increase or decrease the colour to your required level.



Brightness Adjustment

Press the brightness button. The brightness display will appear on the screen, "+" or "-" buttons will increase or decrease brightness.

Programme Recall

You can recall any programme by pressing the programme buttons. When the desired programme number has two digits first press "-/-" button.

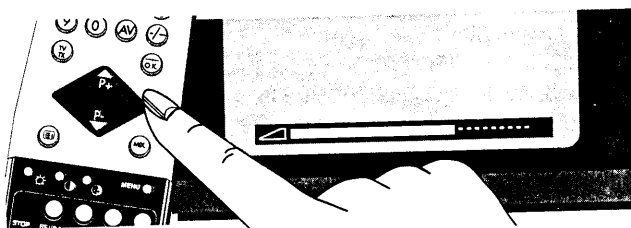
Press PR/CH-Menu button, then "→|← O.K." button to store your desired settings.

t
systems.
and the

appear.
volume
lay will

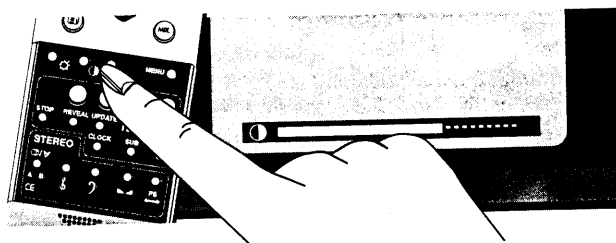
ME
CD

buttons.
programme
O.K. "
sted for
dure.



Volume Adjustment

"+" button increases, "-" button decreases the volume level which can be seen on the screen.



Contrast Adjustment

Press contrast button. The contrast display will appear on the screen. Press "+" or "-" buttons to increase or decrease contrast to the desired level.

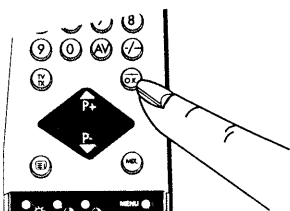
Individual Volume

This TV has 2 different volume levels. One is individual for every channel, the other one affects all programmes.

Press PR/CH-Menu button. Press the "-" button to enter the individual volume menu at the bottom of the screen. The menu will start flashing.

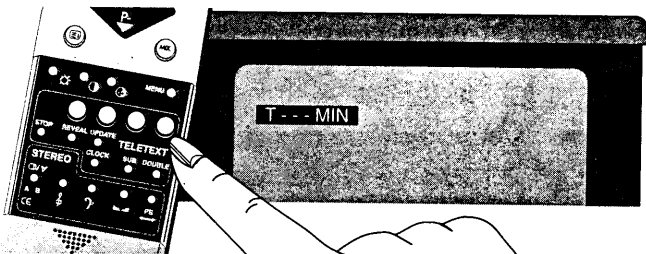
PR	CHA	S
1	C21	
←→		

Adjust Individual volume level. This volume level is individual for every channel and can be stored by pressing the "P" button. Individual volume level can be set in AV mode as well by following the same procedure.



Normalisation

Pressing this button when the tuning menu is not on screen restores the picture and sound to your pre-set levels after any changes.



Sleep Timer

The TV set can be switched off in steps of 30, 60, 90 or 120 minutes. Press the blue framed button to select Sleep timer mode.

Press the same button to select desired off time. Then press " →|← O.K. "; the on screen display will then disappear. When this time has elapsed the set will switch to stand-by.

Child Lock

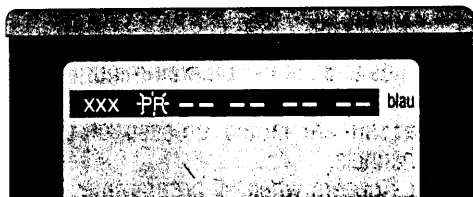
In this mode you can lock either

- a) The programming procedure or
- b) Four programmes and the programming procedure or
- c) All 100 programmes and the programming procedure

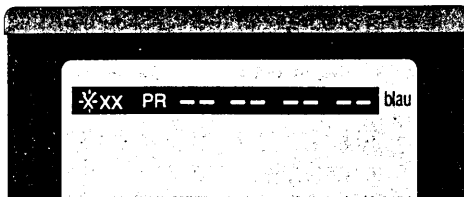
Child Lock can be unlocked temporarily or cancelled completely as explained in this section:

a) Locking of Programming Procedure

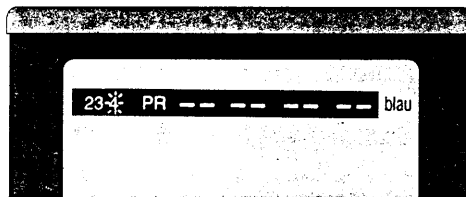
Press the green framed button twice.



The above display appears.
Press " - " button. The display will be:



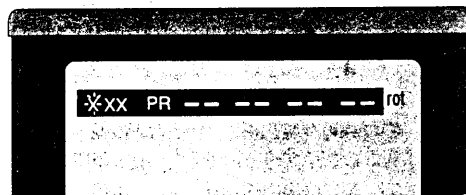
Now enter a 3 digit password of your choice. The display will be:



Press the " →|← O.K. " button. Programming and reprogramming is now locked. If you press PR/CH-Menu the tuning menu will not appear. But you can watch all channels already programmed.

Temporary Unlocking of programming procedure

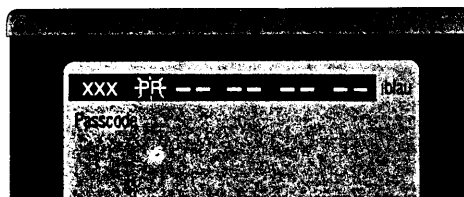
Press the green framed button twice. The display will be:



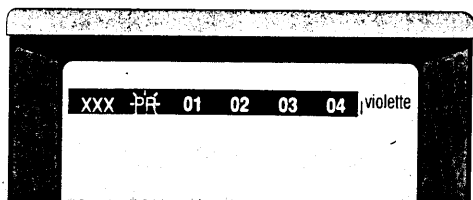
Enter your three digit password. The display will disappear and programming/reprogramming can be used. The programming procedure will be locked automatically, if you switch your TV set OFF and ON again.

b) Locking of 4 programmes

Press the green framed button twice to select child lock.

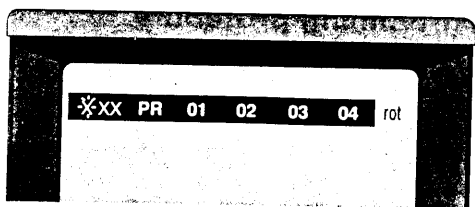


The above display will appear. Press the "+" button on your R/C Handset. The first -- will flash. Choose the first programme to be locked by using the "P+" and "P-" buttons. Press the "+" button. The second -- will flash. Choose the second programme to be locked by using the "P+" and "P-" buttons. Repeat this procedure for all four programmes to be locked and press the "+" button. The first digit of the password section will flash. Enter your 3 digit password.



Press the "→|←" O.K. "button. The Child lock display disappears and 4 programmes are locked. These programmes can not be watched and programming is not possible until the unlocking procedure is used.

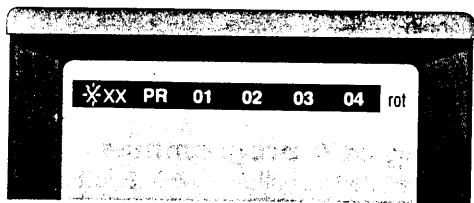
Temporary Unlocking of the four locked programmes



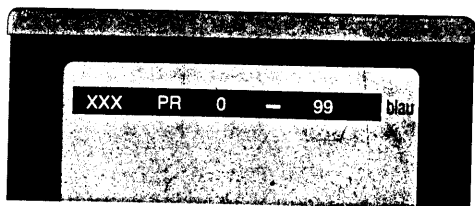
Press the green framed button twice. The above display will appear. Enter your password (eg 234). The display will disappear, locked programmes can be watched, programming is possible. Four programmes will be locked automatically, if you switch your TV set OFF and ON again.

c) Locking of all 100 Programmes

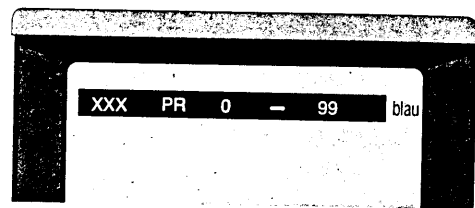
Press the green framed button twice. The display will be:



Press P+ or P- button. The display will change to:



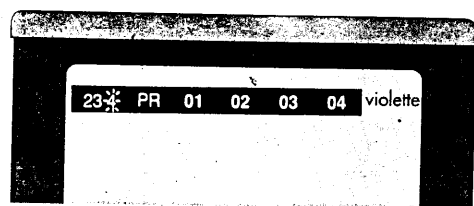
Press the "+" or "-" button. First digit of password will flash. Enter your 3 digit password. (eg 234)



Press "→|←" O.K. "button. The screen turns black. Only PR 0-99 is visible on the screen, this means it is necessary to enter the password. Otherwise no function will be possible at all. If you don't enter the right password the TV will switch off to stand-by after approximately one minute.

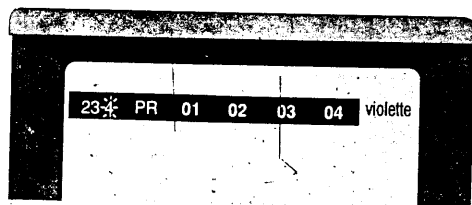
Temporary Unlocking of 100 Programmes

Enter your password, locked programmes can be watched, programming is possible. All programmes will be locked automatically, if you switch your TV set OFF and ON again.



Changing Locked Programmes

Press green framed button twice.



The last programmed child lock display will appear. To change any of the locked PR numbers or to lock all programmes see the preceding sections.

Cancelling of Child Lock

If you want to cancel the child lock (eg. because you don't remember your password) switch off the TV at the ON / OFF switch.

Press and hold "+" and "-" buttons on the TV set at the same time as pressing the ON/OFF button on the TV set. The TV set will be turned ON and the child lock completely cleared.

Explanation of Child Lock MENU colours

Blue: Child lock has not been preset.

Red: Child lock has been set to lock the programming procedure or four selected programmes and the programming procedure.

Purple: You are in the process of changing locked channels.

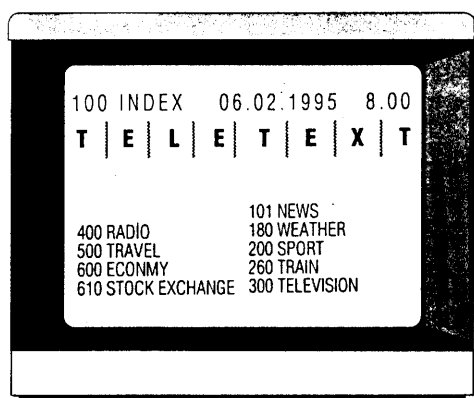
Black: Appears when all programmes and the programming procedure have been locked.

TELETEXT

Depending on model, your TV may be fitted with teletext.

Teletext is an information and news service available on all BBC and ITV programme channels. It enables you to get up to the minute information on such diverse subjects as international events, holidays, shopping or even the local weather for your area.

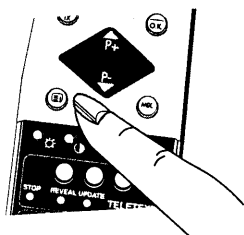
The signal for teletext is combined with the transmitted signal which provides you with your programmes. To get best results for both, we would recommend that an outdoor aerial is used. Poor reception will either stop teletext being received or will cause errors in the text displayed on the screen, i.e. words missing from sentences or letters missing from words. Even with good reception some errors can occur, however, these should correct themselves within a few seconds. Such errors or word corruptions usually indicate a reception fault rather than a fault with your television.



Your TV's Teletext Decoder has some Multipage Features:

- Toptext
- Fasttext
- 32 page memory
- 4 page favourite

Press TV-TX button on the handset. This will take you from picture mode to TELETEXT mode. Make sure that the channel you are on broadcasts Teletext. When pressed again it will take you back to picture mode.



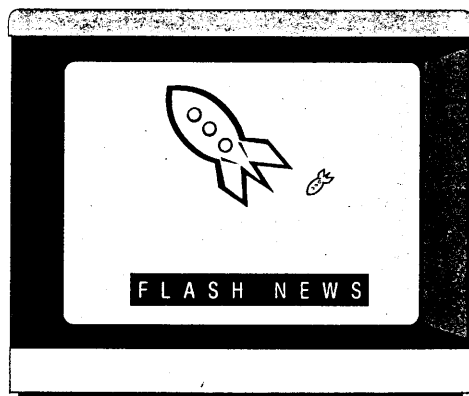
Page Selection

Use number buttons to reach the desired page in three-digit form. You will see your entry on the left of the header line.

If the selected page is not broadcast, the decoder will detect this and display "Page XXX is not available..."

Index

Press this button to return to the preceding index page. Depending on the way information is transmitted by each TV channel, this index button may need to be pressed more than once to return to the main index page. (Page 100).



Update

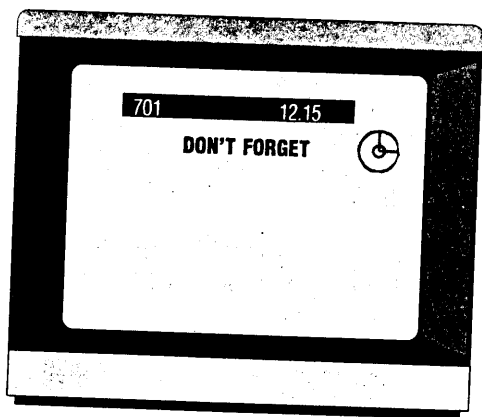
This button allows you to clear the text and return to a TV programme but the TV still displays the page number it is searching for. When the page is found "Page XXX now searching..." disappears. When it is found press the Update button to return to the page you wanted.

If there is a NEWS FLASH page, see subject index to view this page.

Whenever an updated newsflash is available, the updated news item will appear over the normal TV programme. Press the UPDATE button to make the news information disappear. Updated news will appear again when the news changes.

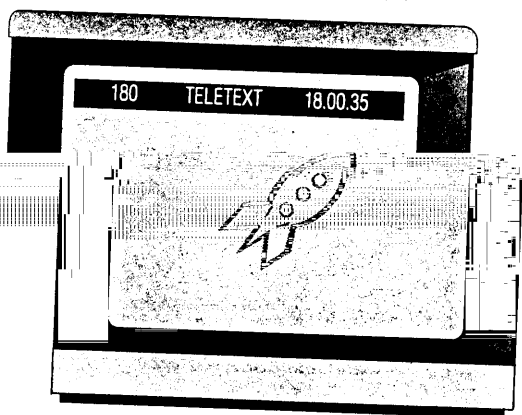
Alarm Page

Some teletext programmes transmit an alarm page. Select this page as instructed on screen and then set an alarm time. When the set time is reached a warning label appears on screen.



Double

This will expand the top and bottom halves of the page to double height when repeatedly pressed.

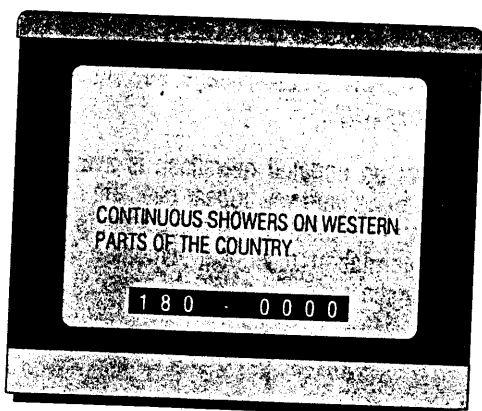


Mix

Press this button to superimpose the text over the TV picture on the screen. Press again to return to full teletext page.

Reveal

Sometimes a teletext page contains concealed information, for example in a quiz or puzzle. To display the concealed information press this button.



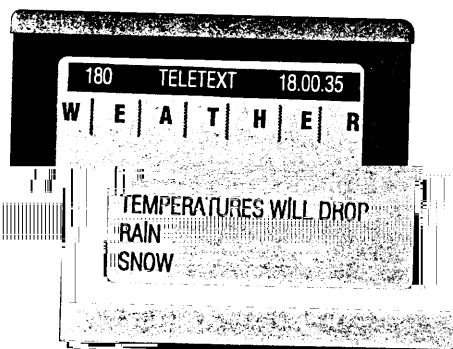
Sub

Some text pages have extensions or sub-pages containing additional information. These can be viewed by keying in the four digit number using the numeric keypad.

It may take some time for the automatic changing of the subpages to reach the sub page you require. It is possible to enter your required sub-page and continue watching the normal programme until the correct sub-page is found using SUB button again. To return to normal text functions press 'SUB' button again.

Stop

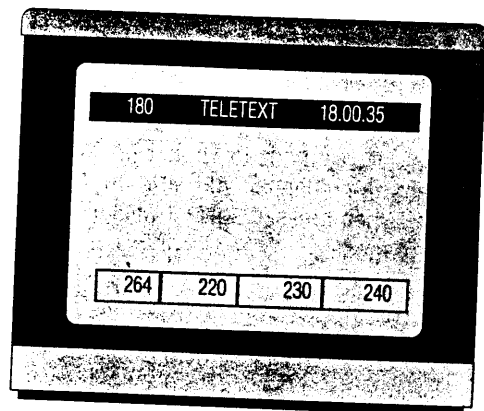
This button allows you to "hold" certain pages of teletext information until pressed again to cancel "hold" and to proceed to the next page.



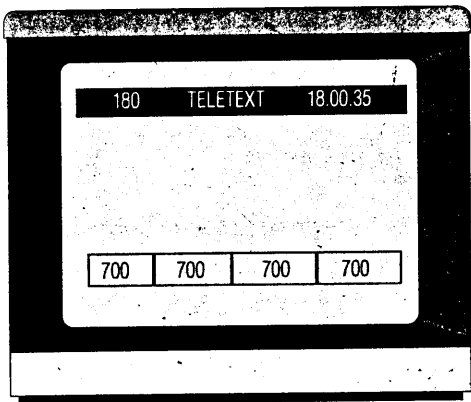
Clock

This button has two functions:
First-a real time clock transmitted constantly whilst the channel is being broadcast which will be displayed,
second-you can preset four favourite pages in the teletext mode.

To programme a favorite page, press "CLOCK" whilst in text mode. The display will be:



Use +/- to move the flashing cursor to each coloured block, and enter the number of each page using the number key pad. Press "→←" O.K. " button to store.



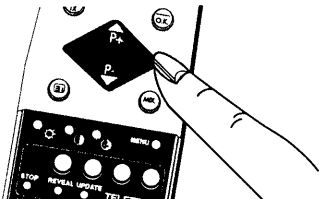
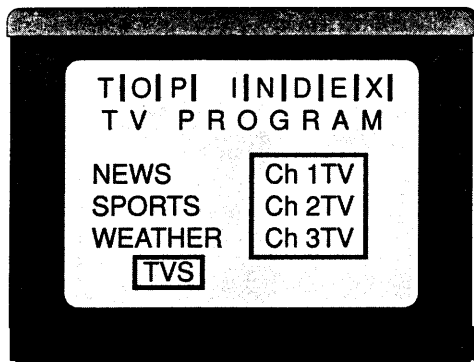
To select a favorite page press "CLOCK" followed by the colour coded button of your choice.

Fastext

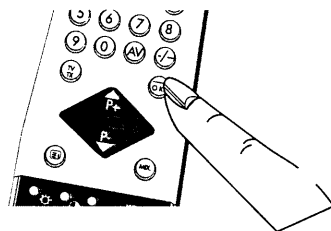
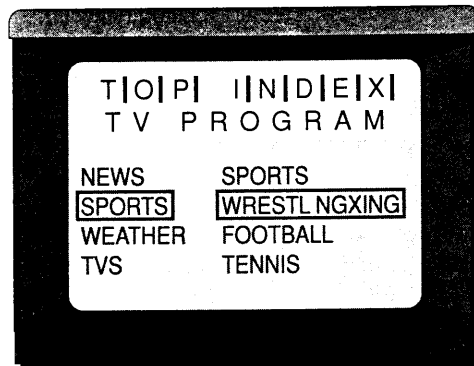
Colour coded buttons are employed for FASTEXT. Whenever you have selected a page, several subject titles may appear at the bottom in coloured forms. By pressing one of the four colour coded buttons you will go directly to that particular page without having to select the page using the numeric pad.

Toptext (available only on some broadcast channels)

The Toptext system provides menu-prompted guidance to enable you to select text pages quickly and easily. Menu prompting is performed with colour coding, in two different ways: with the Top index page or with the coloured menu line below the text page. Individual subjects within a particular subject area in the left hand

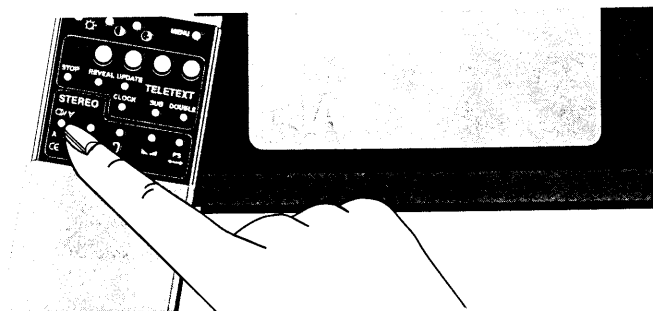


index page shows the subject areas of a text programme in the right-hand blue text field, and the yellow text field. Once the page has been written on the screen the menu line will show the next possible subject (yellow) and the next possible subject area (blue).



NICAM Digital Stereo (Nicom Models only)

Your TV set is equipped with both NICAM and Analog Stereo (A2) decoders. The NICAM digital system provides either stereo or two-language audio with a sound quality similar to that of CD. The television will automatically switch to NICAM when the decoder detects a NICAM Stereo signal and "STEREO" will be displayed on the screen.



Dual Language

Some programmes are transmitted in two different languages instead of stereo sound. To switch from language to language use "A/B" button

Some NICAM models have an additional indicator adjacent to the standby light. This is a 3 colour LED indicating the following.

Orange -NICAM stereo is being received.

Red -Dual language A transmission.

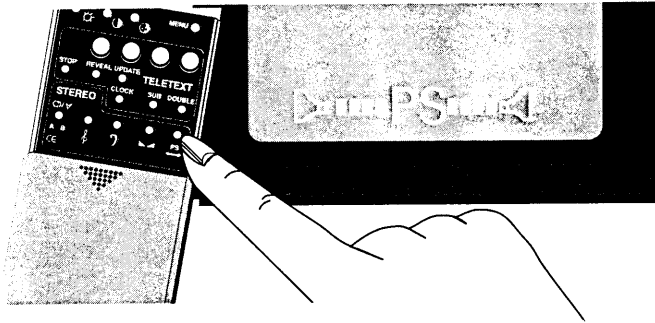
Green -Dual language B transmission.

LED light off -Normal mono broadcast being received.

Space Sound

This function gives the impression of enlarging the distance between left and right speakers so that a special acoustic effect is attained. Space sound function can be activated only if broadcast is in stereo.

By pressing the same button again you can cancel this effect.

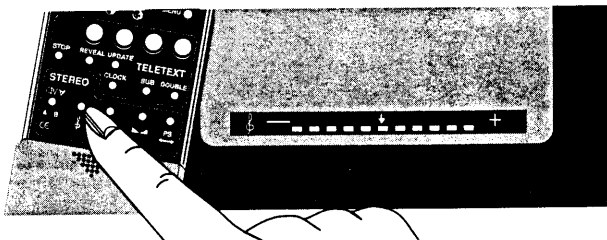


Stereo Sound Adjustments

Treble

Press the "🎵" button, the treble level will be displayed

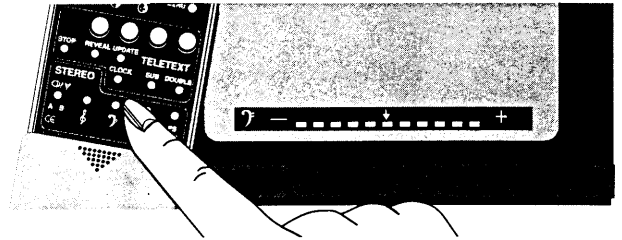
Adjust the treble level with "+" or "-" buttons.



Bass

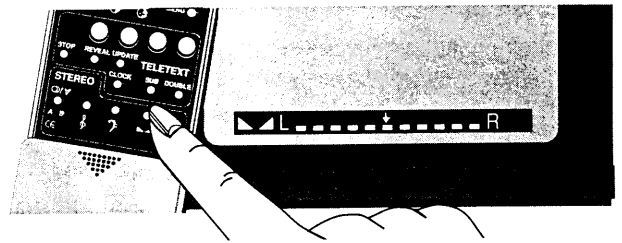
Press the "🎵" button, the bass level will be displayed

Adjust the bass level with "+" or "-" buttons.



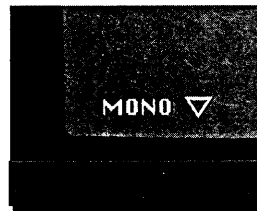
Balance

Press the "▴ ▾" button, the balance level will be displayed. Adjust the balance with "+" or "-" buttons.



Quasi-Stereo

During mono transmissions this give the effect of stereo.



To store your desired pre-set levels:

Press PR/CH- Menu button, then "→|←O.K." button to store your desired settings.

CIRCUIT DESCRIPTIONS

1. MICROCONTROLLER SDA 20563

1.1. SIESTA-MB Overview

SIESTA-MB TV tuning and control system is based on the SDA 20563 microcontroller. The systems offer a very comfortable teletext, on screen display (OSD), and IR remote control of all functions. Further the SIESTA-MB system is able to control the stereo sound device TDA 6612, the video processor TDA 4680 and a single chip NICAM solution.

As additional ICs are used:

Nonvolatile memory	SDA 2546 SDA 2586
Stereo sound control	TDA 6610/6612
PLL	SDA 3202-3 SDA 3302
Teletext decoder	SDA 5248
Data slicer	SDA 5231-2
(PIP PLL	SDA 9086)
ADIIP	SDA 9087 or SDA 9187-2
PIP	SDA 9088 or SDA 9188-3
IR transmitter	KS 51800
IR preamplifier	SFH 505A or SFH 506-38
Video processor	TDA 4680
NICAM processor	TB 1204N/F SAA 7280

1.2. SALIENT FEATURES

General:

- Display of program number, channel number, tv standard, station label, analog values, space sound, stereo sound, dual sound, quasi-stereo and mute is done by OSD (On Screen Display).
- Single LED's for IR active and stereo (tone 1, tone 2) indication.
- Local control
- IR remote control
- Control of contrast, brightness and saturation by I2C-Bus (TDA 4680) or analog voltages (programmable)
- Nonvolatile memory for 100 programs, station label, optimum analog values and system parameters.

- individual color or volume level for each program
- Control line for AV (programs 0, 49, AV1 AV2, RGB, SVHS)

- Control lines for 4 external sources
- Control lines for tv standard selection
- Automatic switch-off when carrier disappears for more than 5 minutes
- Software protection against tube flashovers with internal watchdog timer
- Sleep timer (30, 60, 90, 120 min.)
- Parental Control (MB only)

TUNING:

- Frequency synthesis tuning (62.5 kHz steps)
- 192 step fine tuning
- Channels corresponding to standards B/G, OIRT, L and I (I+)
- 100 programs selectable by directly entering a program number or by up/down function depending on the NVM size.
- Channel selection by directly entering a channel number or by up/down function
- Channel search function in two directions
- Automatic program storage function
- Program exchange function

Sound:

- Mono sound control by analog voltage
- Stereo sound control by I2C-Bus (TDA 6610/11/12)
- Headphone-Control (optional)
- NICAM control (optional)

Teletext:

NORMAL	TEXT	8 Page Memory
FAST	TEXT	16 Page Memory
TOP	TEXT	32 Page Memory

Service mode:

- System configuration with service mode
- Automatic white balance
- TDA 4680 service
- Picture in Picture

1.3. LOCAL CONTROL

The local control keyboard of the system involves 8 or 4 possible keys. Each key is scanned by the microcontroller with a 7 Hz scan rate, so the maximum repeat rate of commands is 7/s. If more than one key is pressed, the system will give no response.

1.4 KEY ASSIGNMENT

The microcontroller uses one row with eight columns each, for scanning the local control keyboard. The relationship between key numbers and key functions is given as follows;

key no.	function
0	down (cursor ↓)
1	up (cursor ↑)
2	tuning/finetuning
3	scart
4	analog select
5	store
6	analog + (cursor →)
7	analog - (cursor ←)

LOCAL CONTROL KEY FUNCTIONS

Although the control system was designed especially for remote control usage, basic TV operation is possible even if only the local control keyboard is used.

In the following a description of the normal function of all local control keys is given.

UP, DOWN

The UP/Down keys are used to select the program number, channel type, channel number, tv standard and station label.

TUNING/FINETUNING

The first keystroke switches the system to tuning mode, the tuning menu appears at the top of the screen. In the TUNING menu the user may select: program number, channel type, channel number, tv

standard and the station label.

Additionally the features automatic program storage and program exchange are started from tuning menu. With a further keystroke the tuning menu disappears and the finetuning bargraph is displayed at the bottom of the screen. Finetuning is now possible with the ANALOG +/- keys.

The next keystroke of the TUNING/FINETUNG key switches the system back to normal mode, and display on screen is cleared.

SCART

Pressing this key switches sequential to the different scart sources (up to 4, depends on the system configuration).

AV1, AV2, S-VHS, AV1-RGB

ANALOG SELECT

This key is used to preselect an analog function (ring counter).

STORE

Pressing this key stores the actual tuning values as well station label, and analog values (normal values) in the nonvolatile memory. The adjusted value for saturation will be stored as individual saturation for the selected program number as well as default saturation value.

Store will be acknowledged by the status display.

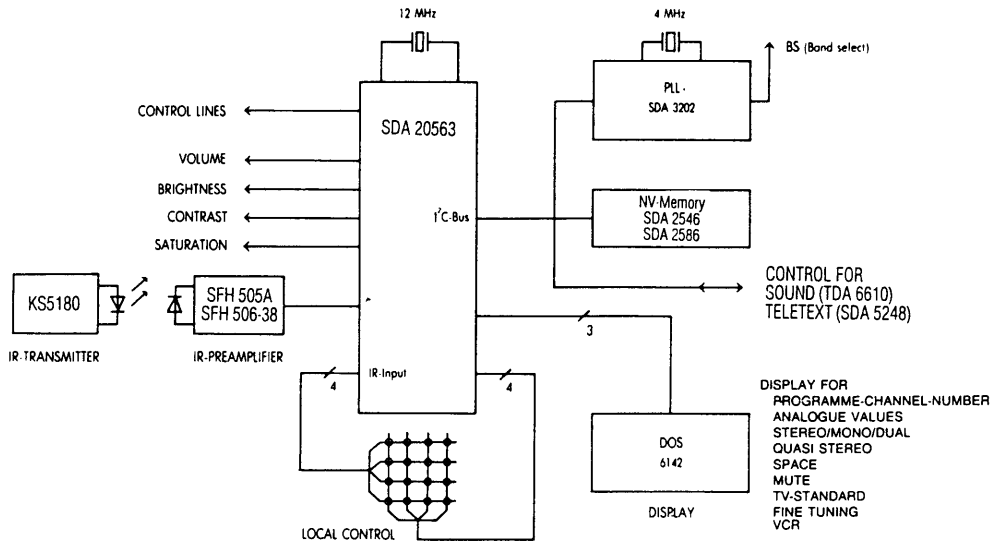
ANALOG +/- CURSOR LEFT/RIGHT

This keys increase resp. decrease the preselected analog value. Without preselection volume is affected.

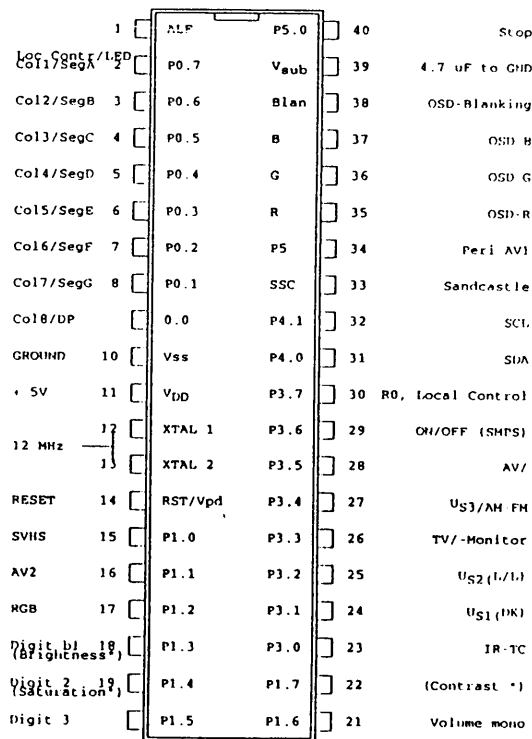
During tuning mode (tuning menu is displayed on screen) the keys are used as cursor keys.

DIFFERENCES OF MICROPROCESSOR VERSIONS

	SDA-20563-A508	SDA-20563-A512	SDA-20563-A516	SDA-20563-A518
VOLUME LEVEL MEMORY	COMMON FOR ALL PROGRAMS	INDIVIDUAL FOR ALL PROGRAMS	INDIVIDUAL FOR ALL PROGRAMS	INDIVIDUAL FOR ALL PROGRAMS
COLOUR SAT LEVEL MEMORY	INDIVIDUAL FOR ALL PROGRAMS	COMMON FOR ALL PROGRAMS	COMMON FOR ALL PROGRAMS	COMMON FOR ALL PROGRAMS
FORCED MONO	NOT AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE
STEREO IDENTIFICATION TIME	2 SECOND	4 SECOND	4 SECOND	4 SECOND
FLASHOVER PROTECTION	NOT AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE
FINE TUNING IN MENU	NOT AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE
R/C HAND SET	WITH FINE TUNING FUNCTION	WITHOUT FINE TUNING FUNCTION	WITHOUT FINE TUNING FUNCTION	WITHOUT FINE TUNING FUNCTION
FINE TUNING	ON R/C HAND SET	IN MENU	IN MENU	IN MENU
VOLUME LEVEL CONTROL	LOGANIKPLIC	LINEAR	LINEAR	LINEAR
OSD AT MIN BRIGHT&CONT	NOT VISIBLE	VISIBLE	VISIBLE	VISIBLE
AUTO SEARCH PROGRAM	00-99	49-99	49-99	00-99
EARPHONE SELECTION	VISIBLE AS OSD AT AV MODE	SELECTABLE AT SERVICE MODE	SELECTABLE AT SERVICE MODE	SELECTABLE AT SERVICE MODE
CANCELING THE CHILD LOCK	WITH UP/DOWN BUTTONS	WITH +/- BUTTONS	WITH +/- BUTTONS	WITH +/- BUTTONS
TINT CONTROL	NOT VISIBLE	AVAILABLE	AVAILABLE	AVAILABLE
STAND - BY AFTER MAINS INTERRUPTION	NO	YES	YES	YES

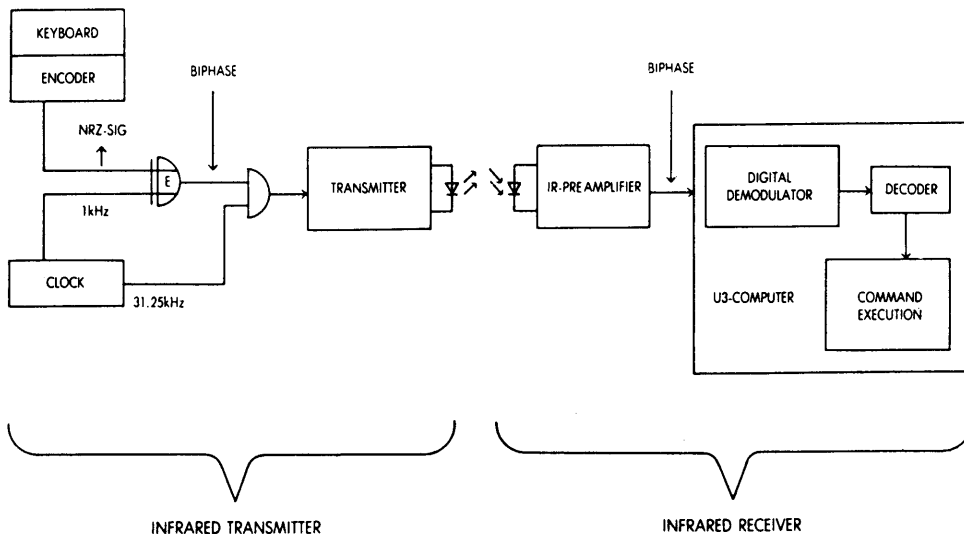


SYSTEM BLOCK DIAGRAM

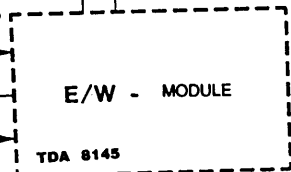
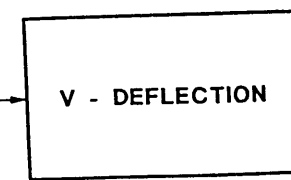
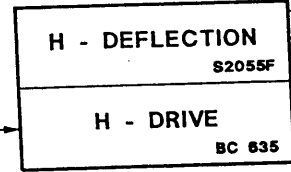
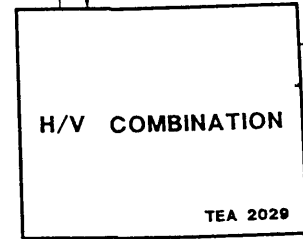
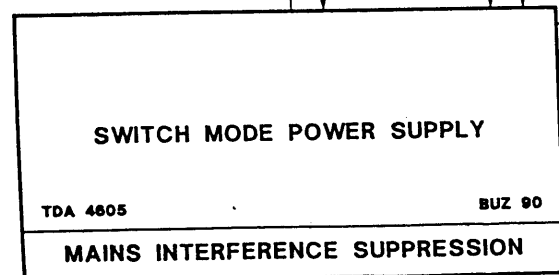
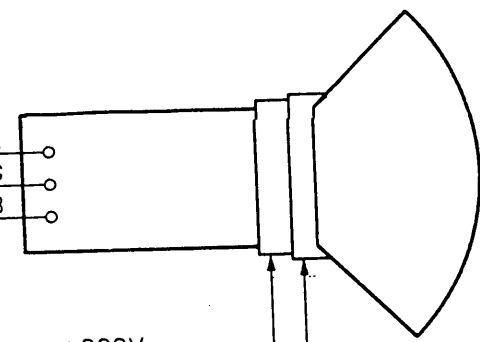
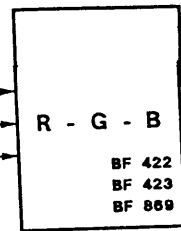
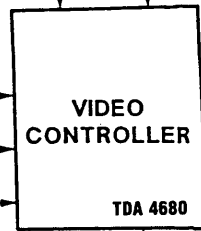
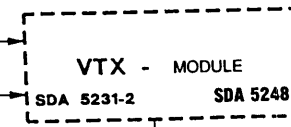
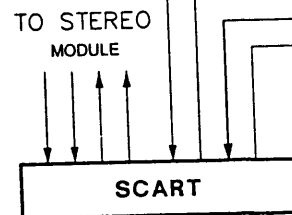
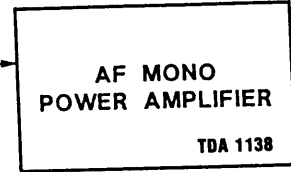
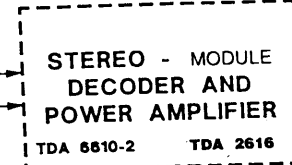
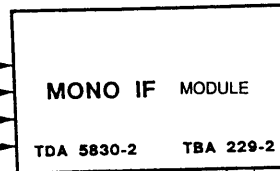
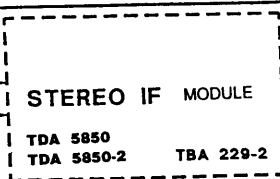
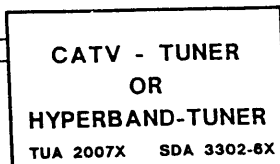
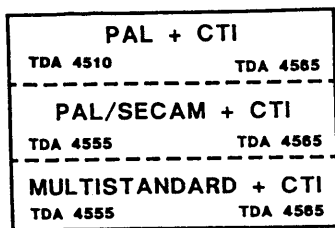
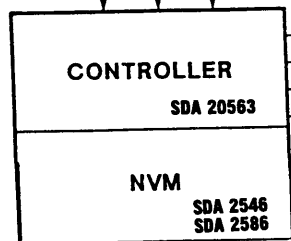
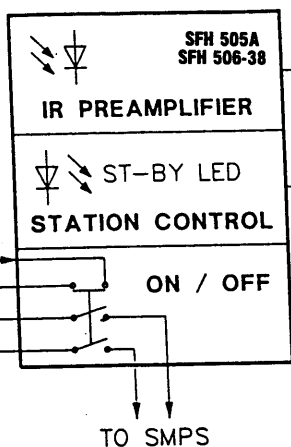
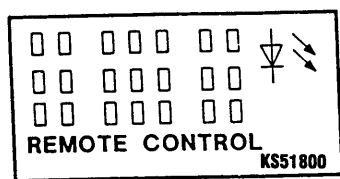


* Option selectable in Service mode

MICROCONTROLLER PIN CONFIGURATION



IR REMOTE CONTROL BLOCK DIAGRAM



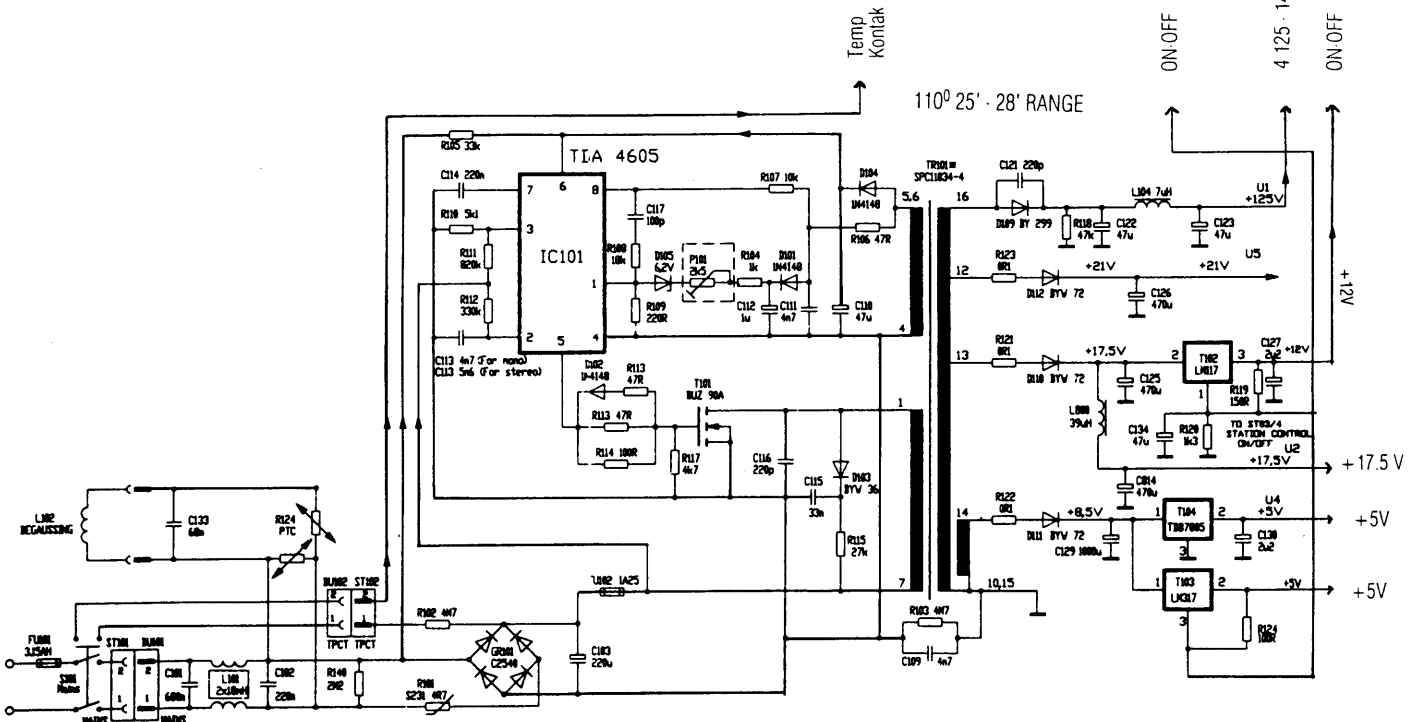
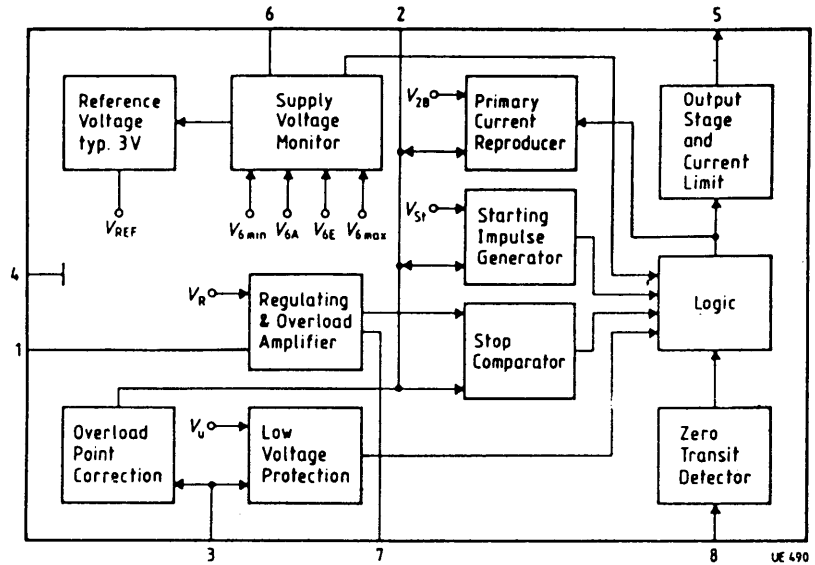
STEREO- MODULE NOT USED MONO VERSION
STEREO IF- MODULE NOT USED MONO VERSION

E/W - MODULE ONLY FOR 110° DEFLECTION

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, which 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 various 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 rectified 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 6.2V zener diode 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.

IR TRANSMITTER KS51800

DESCRIPTION

KS51800, a 4-bit single-chip CMOS microcontroller, consists of the reliable SMCS-51 CPU core with on-chip ROM and RAM. Eight input pins and 11 output pins provide the flexibility for various I/O requirements. The KS51800 microcontroller has been designed for use in small system control applications that require a low-power, cost-sensitive design solution. In addition, the KS51800 has been optimized for remote control transmitter.

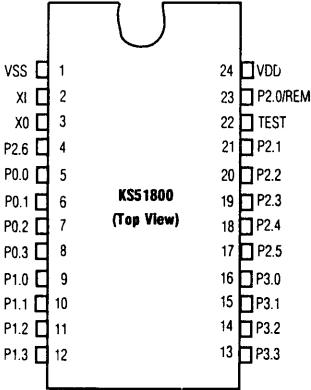
FEATURES

- ROM Size 1,024 bytes
- RAM Size 32 nibbles
- Instruction Set 39 instructions
- Instruction Cycle Time 13.2 μsec at 455 kHz
- Input Ports Two 4-bit ports (P0,P1)
- Output Ports One 4-bit port (P3), One 7-bit port (P2)
- Built-in Oscillator Crystal/Ceramic resonator
- Built-in Power-on reset and auto reset circuit for generating reset pulse every 131,072/Fosc (288 ms at 455 KHz)
- Four Transmission Frequencies Fosc/12 (1/4 duty), Fosc/12 (1/3 duty), Fosc/8 (1/2 duty) and no-carrier frequency.
- Supply Voltage 2.2 V - 5.5 V
- Power Consumption Halt mode: 1 μA (maximum)
Normal mode: 0.34 mA (typical) at 700 KHz
- Operating temperature -20°C – 85°C
- Package Type 24 DIP-SK, 24 SOP

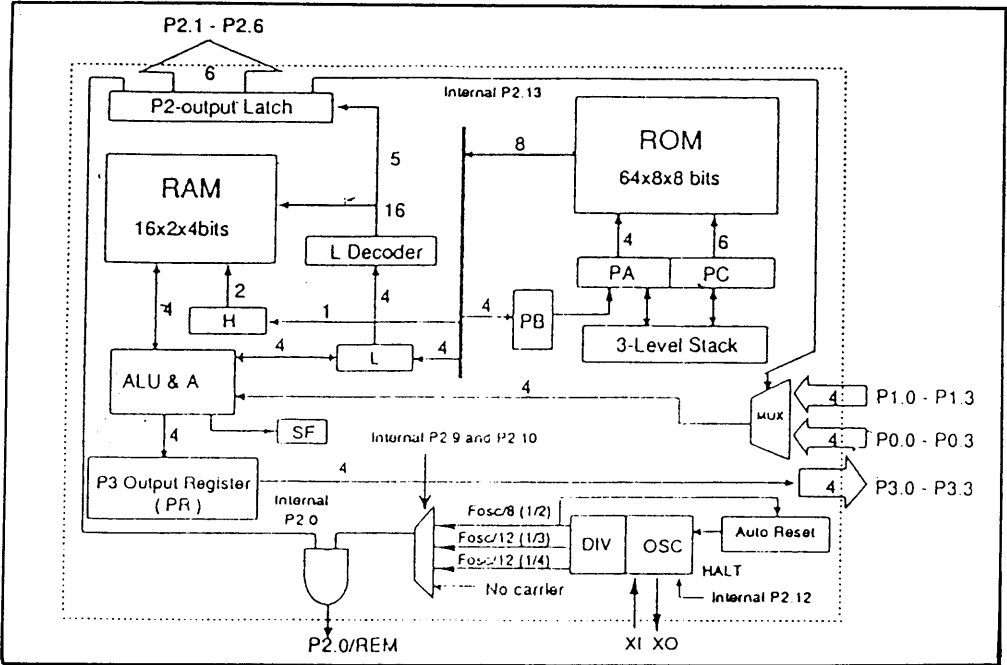
PIN DESCRIPTION

Symbols	Pin No.	Type	Functions	I / O Circuit Type
P0.0 – P0.3	5,6,7,8	Input	4-bit input port when P2.13 is low	A
P1.0 – P1.3	9,10,11,12	Input	4-bit input port when P2.13 is high	A
P2.0/REM	23	Output	1-bit individual output for remote carrier frequency *	B
P2.1 – P2.6	21,20,19,18,17,4	Output	1-bit individual output port	C
P3.0 – P3.3	16,15,14,13	Output	4-bit parallel output port	C
TEST	22	Input	Input pin for test (Normally connected to VSS)	
XI	2	Input	Oscillation clock input	
XO	3	Output	Oscillation clock output	
VDD	24		Power supply	
VSS	1		Ground	

Note: Package type can be selected as 24 DIP-SK or 24 SOP



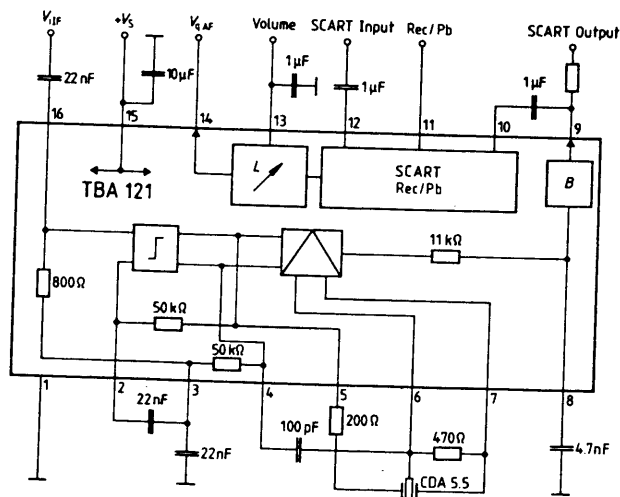
Block Diagram



Block Diagram

TBA 121 FM Sound IF with SCART Switch and Volume Control

Blok Diagram



Features

- Outstanding limiting qualities
- Few external components
- Integrated deemphasis resistor
- Low harmonic distortion factor

PIN FUCTIONS

Pin No. Function

1.	Ground
2.	Limiter amplifier operating point feedback
3.	Limiter amplifier operating point feedback and low end
4.	IF amplifier output (emitter follower)
5.	IF amplifier output (emitter follower)
6.	Demodulator input with high impedance input and internal 15 kΩ supply resistor
7.	Demodulator input with high impedance input and internal 15 kΩ supply resistor
8.	Connection for demphasis capacitor
9.	AF output of the SCART interface
10.	AF input 1 of the SCART interface (IF branch)
11.	Rec/Pb switch input
12.	AF input 2 of the SCART interface (SCART input)
13.	Volume control
14.	IF output (emitter follower)
15.	Supply voltage
16.	IF input

In its FM section the device incorporates an eight-stage-balanced limiter amplifier followed by a coincidence demodulator. The AF section includes an analog switch for the SCART record/playback function and an analog volume control with AF output..

TDA4680 Video Processor

with automatic cut-off and white level control

FEATURES

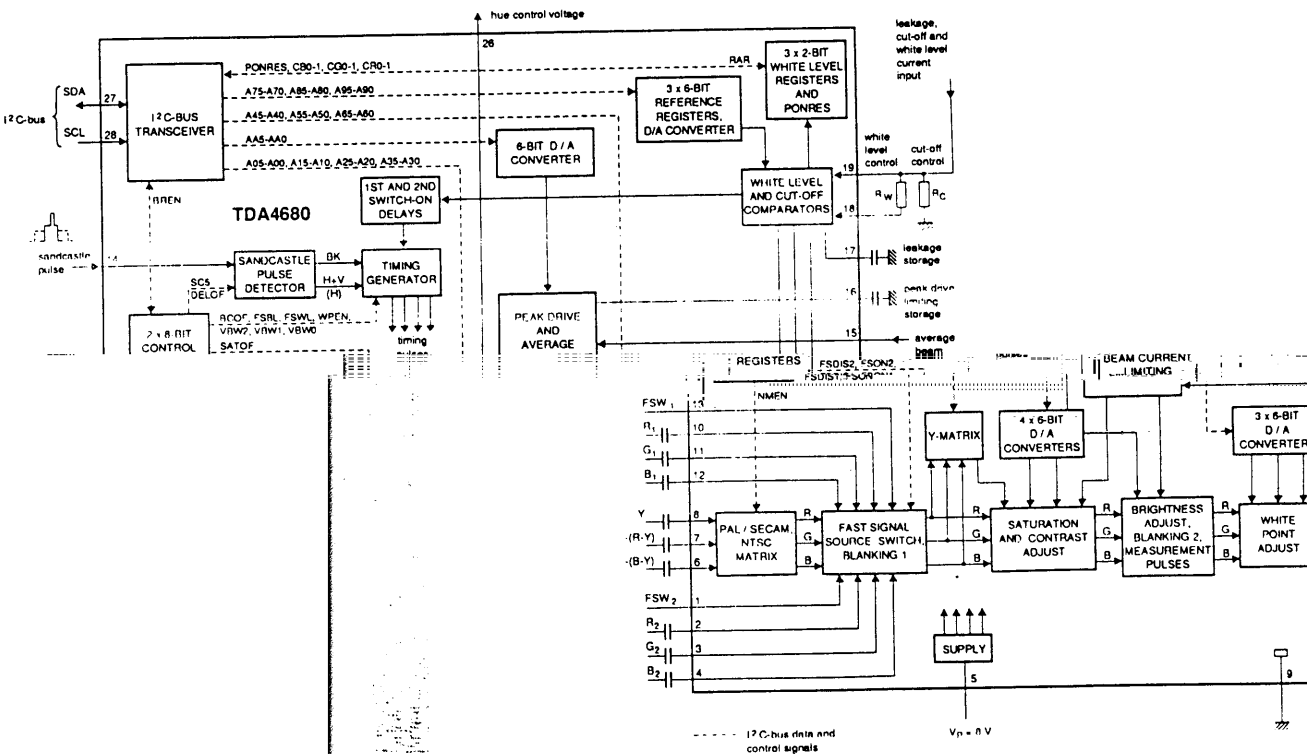
- ◆ Operates from an 8 V DC supply
- ◆ Black level clamping of the colour-difference, luminance and RGB input signals with coupling-capacitor DC level storage
- ◆ Two fully-controlled, analog RGB inputs, selected either by fast switch signals or via I²C-bus
- ◆ Saturation, contrast and brightness adjustment via I²C-bus
- ◆ Same RGB output black levels for Y/C D and RGB input signals
- ◆ Timing pulse generation from either a 2- or 3-level sandcastle pulse for clamping, horizontal and vertical synchronization, cut-off and white level timing pulses
- ◆ Automatic cut-off control with picture tube leakage current compensation
- ◆ Software-based automatic white level control or fixed white levels via I²C-bus
- ◆ Cut-off and white level measurement pulses in the last 4 lines of the vertical blanking interval (I²C bus selection for PAL, SECAM, or NTSC, PAL-M)
- ◆ Increased RGB signal bandwidths for progressive scan and 100 Hz operation (selected via I²C bus)
- ◆ Two switch-on delays to prevent discolouration before steady-state operation
- ◆ Average beam current and peak drive limiting

DESCRIPTION

The TDA4680 is a monolithic, integrated circuit with a colour-difference interface for video processing in TV receivers.

SYMBOL	PARAMETER	MIN	TYP.	MAX.	UNIT
V _p	supply voltage range (pin 5)	7.2	8	8.8	V
I _p	supply current (pin 5)	—	85	—	mA
V ₈ (p-p)	luminance input (peak-to-peak value)	—	0.45	—	V
V ₆ (p-p)	(B-Y) input (peak-to-peak value)	—	1.33	—	V
V ₇ (p-p)	(R-Y) input (peak-to-peak value)	—	1.05	—	V
V ₁₄	three-level sandcastle pulse: H+V H BK	—	2.5	—	V
		—	4.5	—	V
		—	8	—	V
	two-level sandcastle pulse: H+V BK	—	2.5	—	V
		—	4.5	—	V
V _i	RGB input signals at pins 2, 3, 4, 10, 11 and 12 (black-to-white value)	—	0.7	—	V
V _o (p-p)	RGB outputs at pins 24, 22 and 20 (peak-to-peak value)	—	2.0	—	V
T _{amb}	operating ambient temperature range	0	—	—	°C

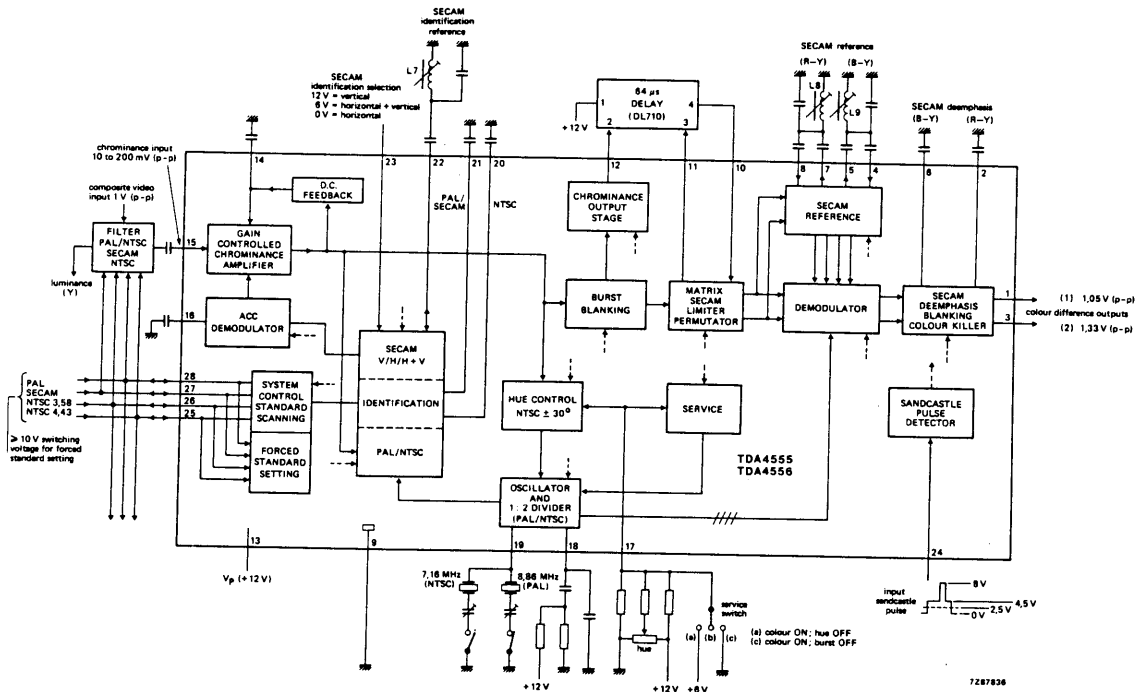
Blok Diagram



TDA 4555 MULTISTANDARD DECODER

The TDA4555 is a monolithic integrated multistandard colour decoder for PAL, SECAM, NTSC 3.58 MHz and NTSC 4.43 MHz standard.

Blok Diagram



FEATURES

Chrominance part includes gain controlled chrominance amplifier and ACC rectifier circuits for PAL, SECAM and NTSC. Chrominance output stage drives the 64 μ s glass delay line (Pal, Secam). There are SECAM permutator and limited stages for direct and delayed SECAM SIGNAL.

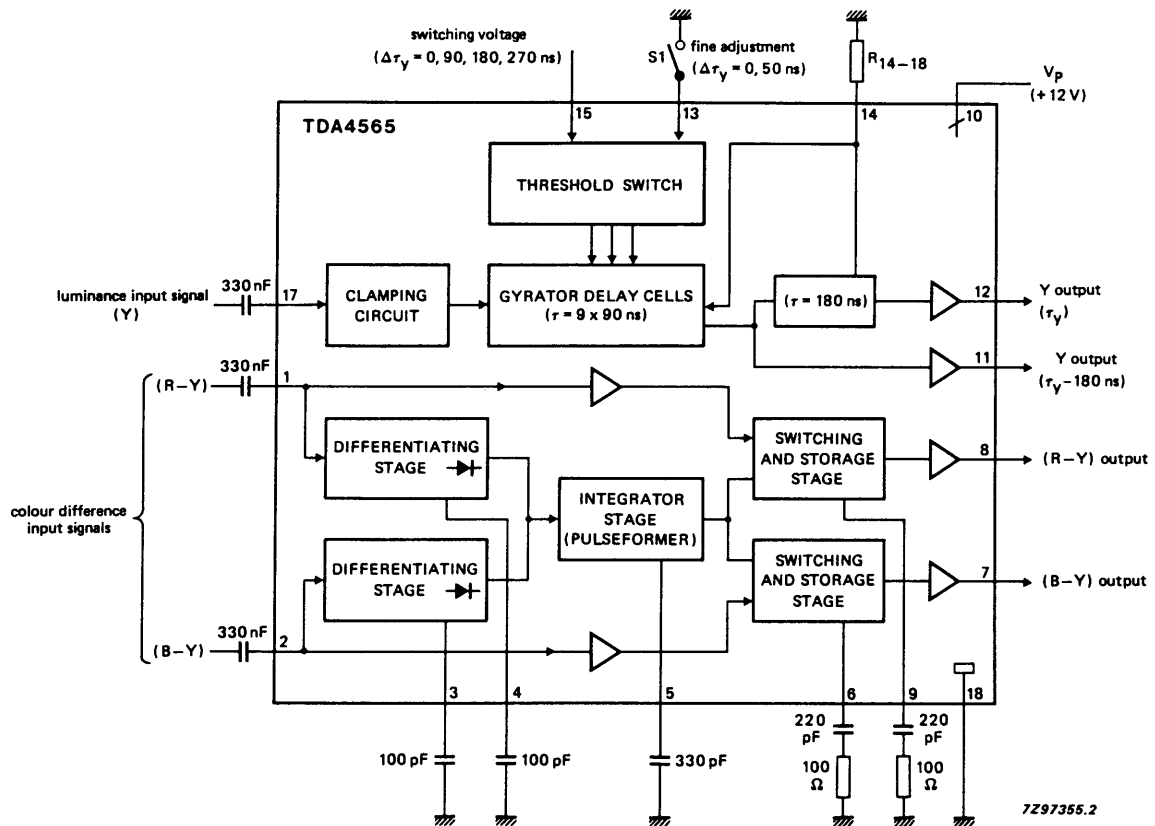
Demodulator part PAL switch, internal PAL matrix, de-emphasis, two quadrature demodulators with external reference tuned circuits (SECAM). Flyback blanking incorporated in the two synchronous demodulators (PAL, NTSC), and residual carrier is filtered internally.

Identification part performs automatic standard recognition by sequential inquiry, delay for colour-on and scanning-on. SECAM identification is reliable by PAL priority circuit. Forced switch-on is possible. IC includes two identification circuit for PAL/SECAM (H/2) and NTSC and PAL/SECAM flip-flop. Crystal oscillator includes divider stages and PLL circuitry (PAL, NTSC) for double colour subcarrier frequency.

TDA 4565 COLOUR TRANSIENT IMPROVEMENT CIRCUIT

GENERAL DESCRIPTION

The TDA 4565 is a monolithic integrated circuit for colour transient improvement (CTI) and luminance delay line in gyrator technique in colour television receivers.



Features

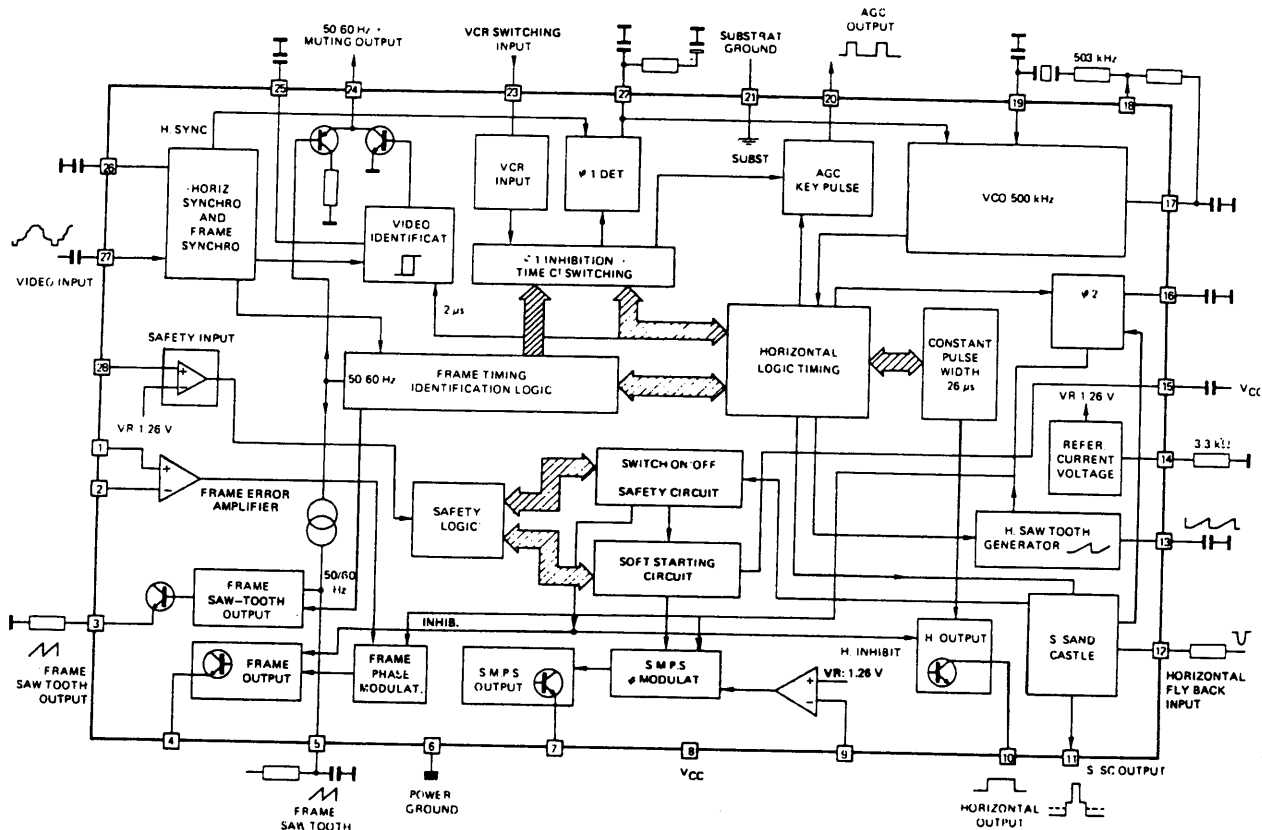
- Colour transient improvement for colour difference signals (R-Y) and (B-Y) with transient detecting, store- and switching stages resulting in high transients of colour difference output signals.
- A luminance -signal path (Y) which substitutes the conventional Y-delay coil with an integrated Y-delay line.
- Switchable delay time from 730 ns to 1000 ns in steps of 90 ns and additional fine adjustment of 50 ns
- Two Y output signals; one of 180 ns less delay

TEA2029 C COLOUR TV SCANNING AND POWER SUPPLY PROCESSOR

DESCRIPTION

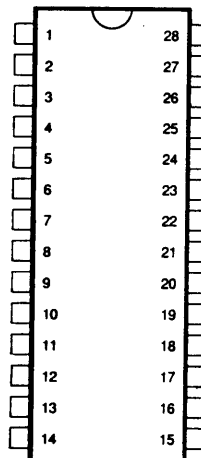
The TEA2029 is a complete (horizontal and vertical) deflection processor with secondary to primary SMPS control for color TV sets.

BLOCK DIAGRAM



PIN CONNECTIONS

+ INPUT FRAME AMPLIFIER
- INPUT FRAME AMPLIFIER
FRAME SAW-TOOTH OUTPUT
FRAME OUTPUT
FRAME RAMP GENERATOR
GROUND POWER
SWITCH MODE POWER SUPPLY OUTPUT
Vcc
B.M.P.S. INPUT REGULATION
HORIZONTAL OUTPUT
SUPER SANCSTLE OUTPUT
HORIZANÇAL FLY-BACK INPUT
HORIZONTAL SAW-TOOTH
CURRENT REFERENCE



SAFETY INPUT
VIDEO INPUT
HORIZONTAL SYNCHRO CAPACITOR (tip level)
VIDEO IDENTIFICATION CAPACITOR
MUTING +50/60Hz IDENTIFICATION OUTPUT
V.C.R. INPUT
PHASE COMPARATOR $\phi 1$ CAPACITOR
GROUND SUBSTRAT
A.G.C. KEY PULSE OUTPUT
V.C.O. INPUT
V.C.O. OUTPUT
V.C.O. 90° REFERENCE
PHASE COMPARATOR $\phi 2$ CAPACITOR
STARTING AND SAFETY CAPACITOR

GENERAL DESCRIPTION

This integrated circuit uses I^2L bipolar technology and combines analog signal processing with digital processing.

Timing signals are obtained from a voltage-controlled oscillator (VCO) operating at 500KHz by means of a ceramic resonator. This avoids the frequency adjustment normally required with line and frame oscillators. A chain of dividers and appropriate logic circuitry produce very accurately defined sampling pulses and the necessary timing signals.

The principal functions implemented are:

- Horizontal scanning processor.
- Frame scanning processor. Two applications are possible:
 - **D Class** Power stage using an external thyristor.
 - **B Class** Power stage using an external power amplifier with fly-back generator such as the TDA8170
- Secondary switch mode power regulation. The SMPS output synchronizes a primary I.C. (TEA2164 or TEA2260/61) at the mains part. This concept allows ACTIVE STANDBY facilities.
- Dual phase-locked loop horizontal scanning.
- High performance frame and line synchronization with interlacing control.
- Video identification circuit.
- Super sandcastle.
- AGC key pulse output..
- Automatic 50-60Hz standard identification.
- VCR input for PLL time constant and frame synchro switching.
- Frame saw-tooth generator and phase modulator.
- Switching mode regulated power supply, comprising error amplifier and phase modulator.
- Security circuit and start-up processor.
- 500KHz VCO.

The circuit is supplied in a 28 pin DIP case.

$V_{cc} = 12V$.

SYNCHRONIZATION SEPARATOR

Line synchronization separator is clamped to black level of input video signal with synchronization pulse bottom level measurement.

The synchronization pulses are divided centrally between the black level and the synchronization pulse bottom level, to improve performance on video signals in noise conditions.

FRAME SYNCHRONIZATION

Frame synchronization is fully integrated (no external capacitor required).

The frame timing identification logic permits automatic adaptation to 50 - 60 Hz standard or non-interlaced video.

An automatic synchronization window width system provides:

- fast frame capture (6.7 ms wide window).
- good noise immunity (0.4ms narrow window).

The internal generator starts the discharge of the saw-tooth generator capacitor so that it is not disturbed by line fly back effects.

Thanks to the logic control, the beginning of the charge phase does not depend on any disturbing effect of the line fly-back.

A 32 μ s timing is automatically applied on standardized transmissions, for perfect interlacing.

In VCR mode, the discharge time is controlled by an internal monostable independent of the line frequency and gives a direct frame synchronization.

HORIZONTAL SCANNING

The horizontal scanning frequency is obtained from the 500kHz VCO.

The circuit uses two phase-locked loops (PLL):

the first one controls the frequency, the second one controls the relative phase of the synchronization and line fly-back signals.

The frequency PLL has two switched time constants to provide:

- capture with a short time constant.
- good noise immunity after capture with a long time constant.

The output pulse has a constant duration of $26\mu\text{s}$, independent of V_{CC} and any delay in switching off the scanning transistor.

VIDEO IDENTIFICATION

The horizontal synchronization signal is sampled by a $2\mu\text{s}$ pulse within the synchronization pulse. The signal is integrated by an external capacitor.

The identification function provides three different levels:

- 0V : no video identification
- 6V : 60Hz video identification
- 12V : 50Hz video identification

This information may be used for timing research in the case of frequency or voltage synthesizer type receivers, and for audio muting.

SUPER SANDCASTLE with 3 levels : burst, line flyback, frame blanking.

In the event of vertical scanning failure, the frame blanking level goes high to protect the tube. Frame blanking time (start with reset of Frame divider) is 24 lines.

VCR INPUT

This provides for continuous use of the short time constant of the first phase-locked loop (frequency).

In VCR mode, the frame synchronization window widens out to search window and there is no delay of frame fly-back (direct synchronization).

FRAME SCANNING

FRAME SAW-TOOTH GENERATOR. The current to charge the capacitor is automatically switched to 60Hz operation to maintain constant amplitude.

Frame phase modulator (With two differential inputs). The output signal is a pulse at the line frequency, pulse width modulated by the voltage at the differential pre-amplifier input.

This signal is used to control a thyristor which provides the scanning current to the yoke. The sawtooth output is a low impedance, however, and can therefore be used in class B operation with a power amplifier circuit.

SWITCH MODE POWER SUPPLY (SMPS) SECONDARY TO PRIMARY REGULATION

This power supply uses a differential error amplifier with an internal reference voltage of 1.26 and a phase modulator operating at the line frequency. The power transistor is turned off by the falling edge of the horizontal saw-tooth.

The "soft start" device imposes a very small conduction angle on starting up, this angle progressively increases to its nominal regulation value.

The maximum conduction angle may be monitored by forcing a voltage on pin 15. This pin may also be used for current limitation.

SECURITY CIRCUIT AND START UP PROCESSOR

When the security input (pin 28) is at a voltage exceeding 1.26V the three outputs are simultaneously cut off until this voltage drops below the 1.26 V threshold again. In this case the switch mode power supply is restarted by the "soft start" system.

If this cycle is repeated three times, the three outputs are cut off definitively. To reset the safety logic circuits, V_{CC} must be zero volt.

This circuit eliminates the risk to switch OFF the TV receiver in the event of a flash affecting the tube.

TELETEXT MODULE

1.3.5 TELETEXT DATA SLICER SDA 5231

The SDA 5231 data slicer is used in the teletext decoding section to separate the teletext data signal from the CVBS signal. Information consists of eight bits, where the most significant bit is a parity bit, followed by seven data bits. The teletext signal amplitude is reduced to 50 percent of its incoming value by the SDA 5231 to reduce the possibility of interference from other sources. A phase shifting circuit together with a crystal oscillator regenerate the data synchronous clock. So clock and data signal can be supplied to the teletext decoder device.

A synchronous separator generates line and field sync pulses. The line sync signal is used to control an on-chip 6MHz oscillator which passes on the clock signal to the teletext decoder.

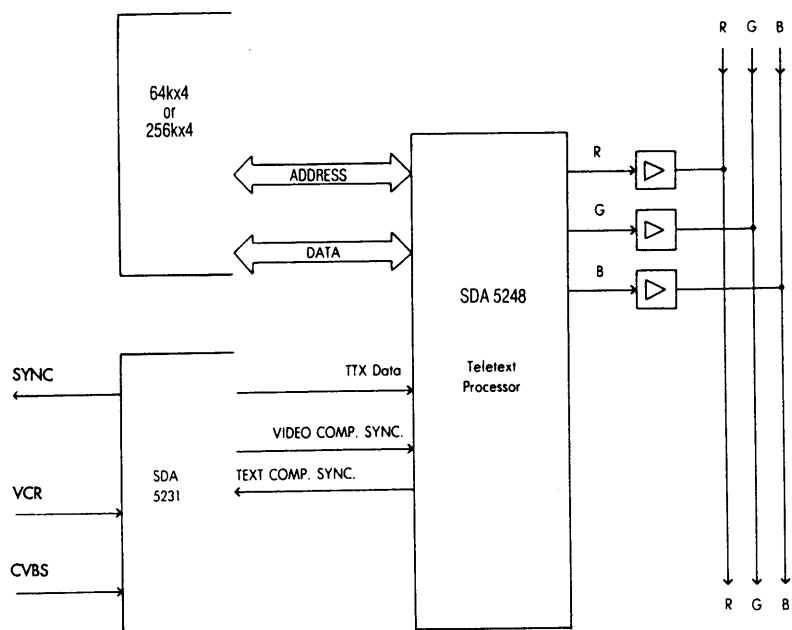
After attaining line frequency (15,625kHz), the signal is transmitted to the slicer. Here a phase comparator synchronizes the, 5.5MHz oscillator rigidly to the video signal so that, if video signal quality is sufficient, fading in a text into a TV picture (e.g. subtitles) is possible synchronous to CVBS signal. The SDA 5231 is manufactured in bipolar technology and housed in a DIP 28 case.

1.3.6 THE TELETEXT PROCESSOR SDA 5248

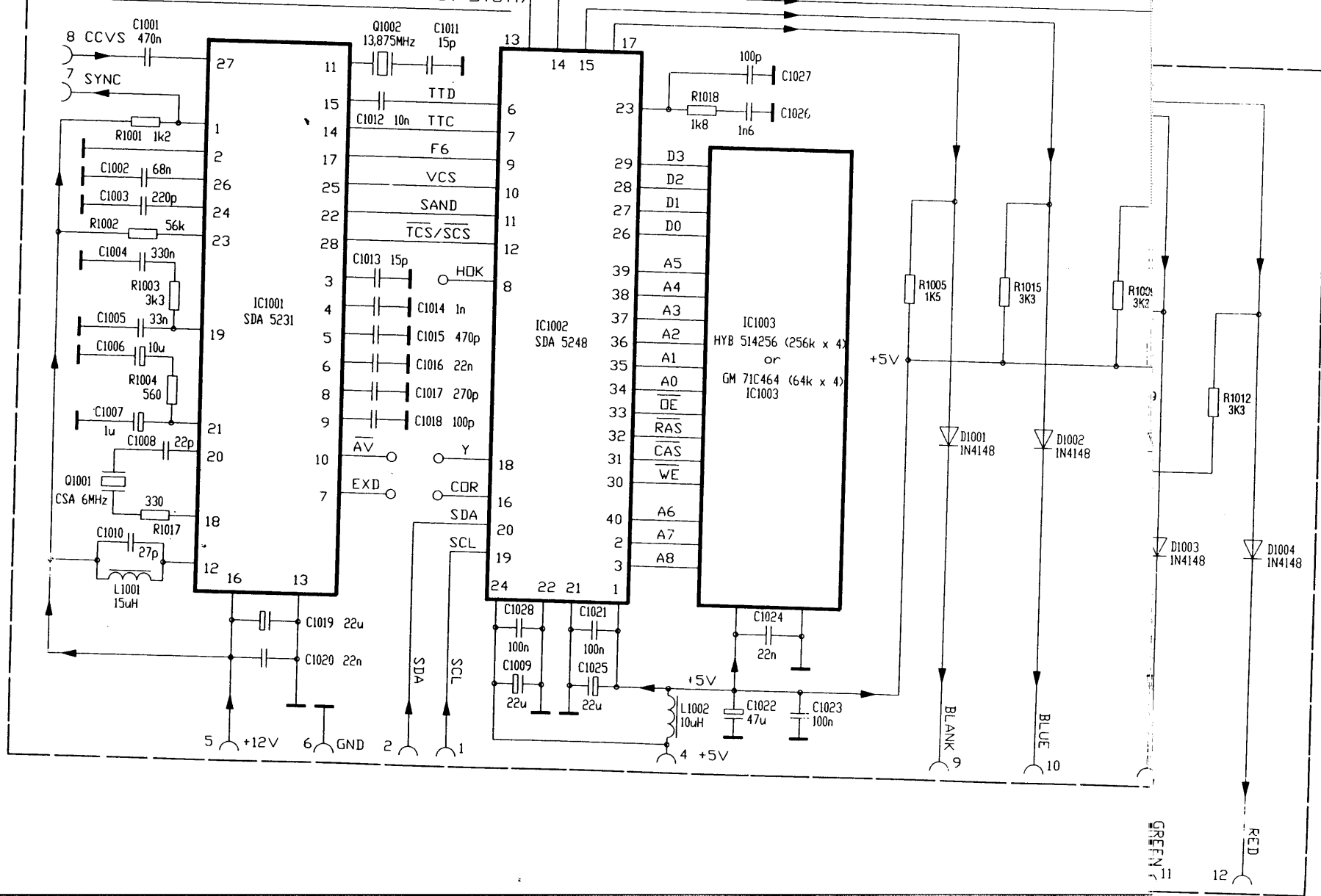
The teletext processor SD 5248 and IIC bus controlled devices to process all functions which are necessary to use the teletext service of broadcasters, only in 6 foreign languages as English, German, French, Turkish, Spanish, Italian.

Serial teletext data is received from the SDA 5231 data slicer. Four independent acquisition circuits are responsible for selecting the requested data. After acquisition the data is loaded via a memory interface to an external DRAM. Using DRAM it is possible to store up to 16 pages for fastext 32 pages for toptext. The external DRAM is read out cyclically and the data is processed in a character generator into R-, G-, B-information. Further a blanking signal, a contrast reduction signal and a Y-signal to control a black and white monitor are generated. Via the IIC bus interface 12 registers can be loaded by the microcontroller and one register can be read and written too.

The SDA 5248 is mounted in a 40 pin DIP case.



TELETEXT DECODER BLOCK DIAGRAM



NICAM MODUL

SINGLE CHIP NICAM-728 RECEIVER SAA7283

FEATURES

The SAA7283 builds on the established SA7282 Nicam decoder by integrating a system independent high performance DQPSK demodulator. The IC comprises the DQPSK demodulation, Nicam-728 decoding, digital to analogue conversion, FM/Nicam audio level matching and switching functions necessary to produce a complete Nicam receiver on a single integrated circuit.

The SAA7283 uses a high performance analogue CMOS process to achieve a level of demodulation performance necessary to provide high quality sound reproduction even under severe field conditions.

The SAA7283 implements the widely acclaimed Bitstream Conversion technique. Like the SAA7282 it is the only nicam device to support a Digital Audio Interface output, enabling direct connection to digital hi-fi systems for digital amplification, trapping and signal processing. The format conforms to the IEC 958 Digital Audio Interface specification, which is developing as the audio industry standard.

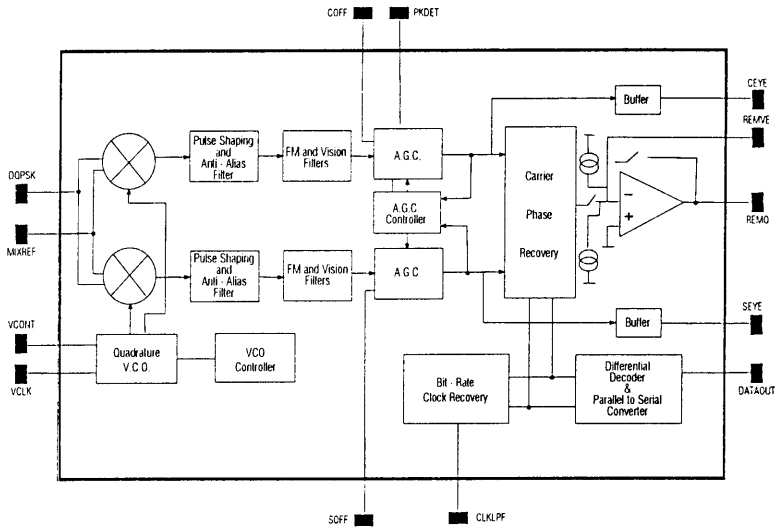
Moreover, a unique feature of the new decoder IC is an IEC/EBU 958 Digital Audio Interface that allows the NICAM-728 digital TV sound signals to be transferred to external digital recording/reproduction equipment which uses digital signal processing techniques for functions such as listening room simulation and equalisation.

The application has been reduced to just a few passive components only, with no external pre-amplification, bandpass or pulse-shaping filters to produce a very compact solution using a single crystal oscillator.

- Dual standard DQPSK demodulation with automatic selection between PAL system I and BG incorporating system L Nicam).
- Integrated wide dynamic range AGC to provide high quality performance in poor reception conditions.
- Full EBU NICAM-728 decoding and output configuration depending upon transmission
- - digital stereo
- - digital mono and data
- - 2 independent digital mono signals
- Microcomputer controllable via I²C (up to 400 kHz specification)
- Minimal software requirements.
- Automatic mute function which silences the digital data and switches to the conventional FM sound (if valid) when the error rate exceeds user definable limit.
- User controlled mute function to enable user to perform muting to their own algorithm.
- Integrated 4 times oversampling digital filter.
- Selectable digital de-emphasis.
- State of the art "Bitstream Conversion" DAC.
- Integrated switching network allowing selection between NICAM sound, FM sound or external "digital audio chain" input
- Automatic Nicam level adjustment and programmable attenuation network on FM inputs to permit matching of the Nicam and FM audio levels at the output of the device for both system and BG.
- Industry standard DAI for interfacing to digital hi-fi.
- Single low level sinusoidal crystal oscillator for improved EMC.

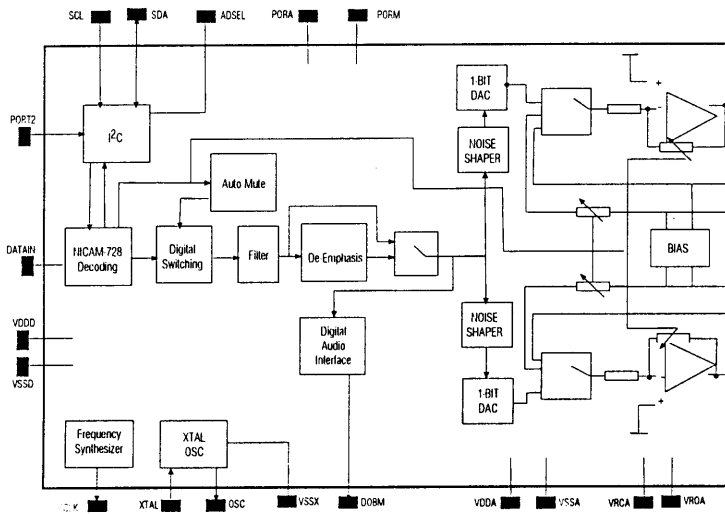
DQPSK Demodulation

A simplified block diagram of the demodulation section is shown in Figure below.

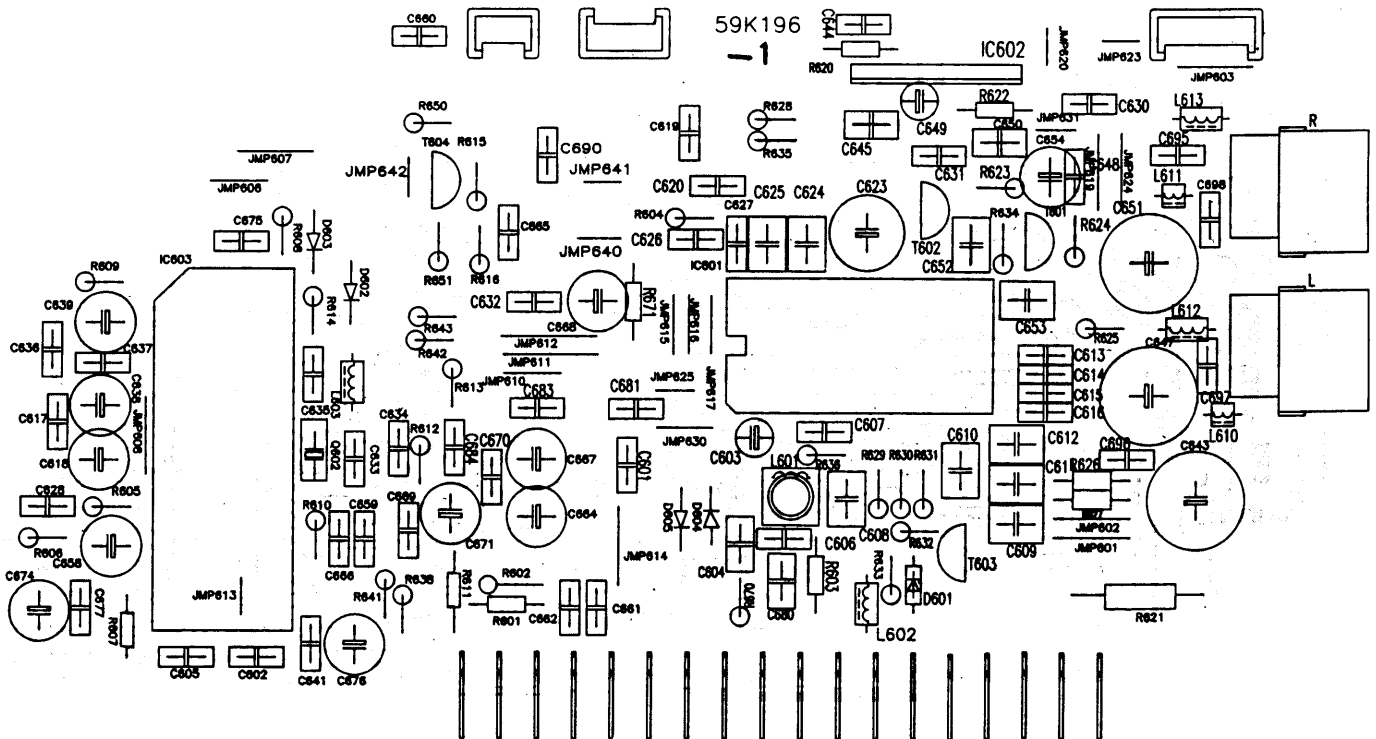


Decoding

A simplified block diagram of the decoder section is shown in Figure below.



NICAM MODULE PATTERN DRAWING

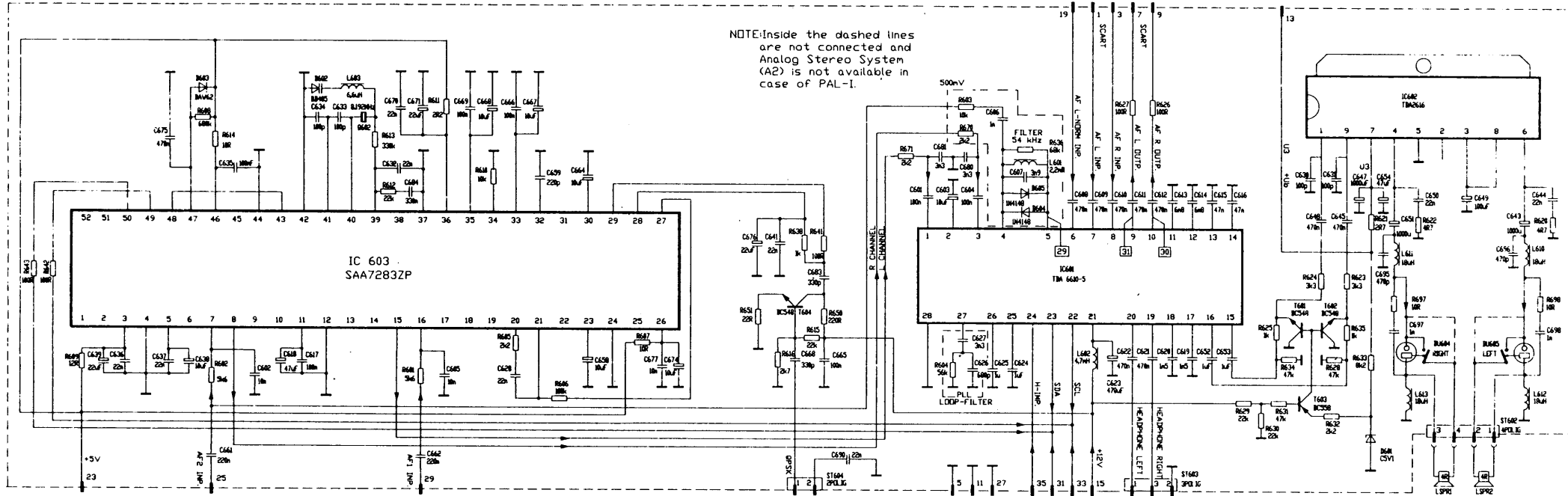


STEREO AF AND NICAM MODULE WITH POWER AMPLIFIER

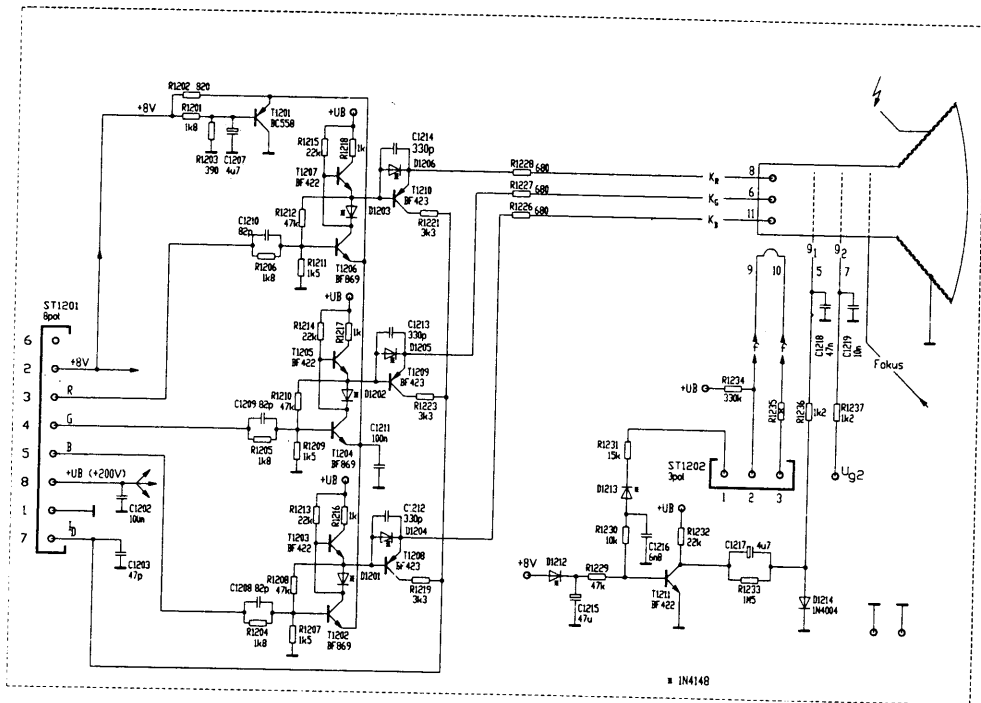
(Not used when stereo AF module with Decoder is available)

NICAM - DECODER

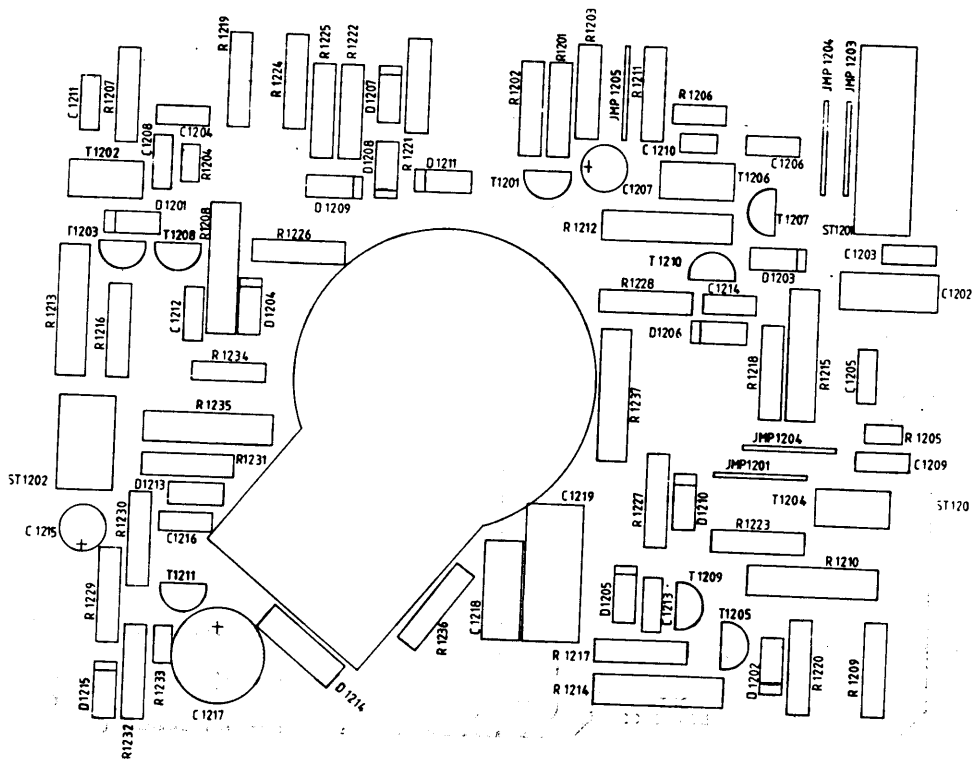
STEREO-DECODER AND POWER AMPLIFIER



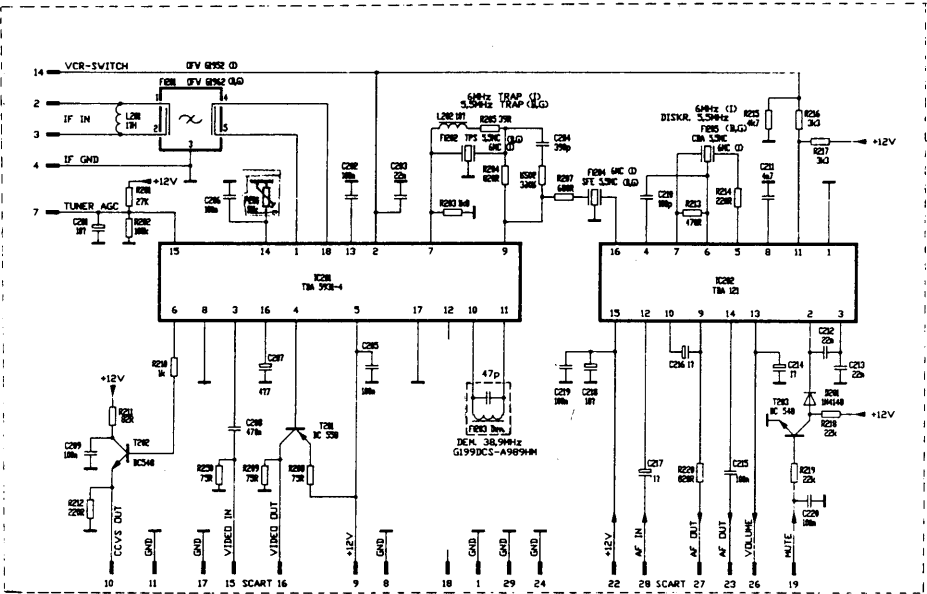
CRT MODULE



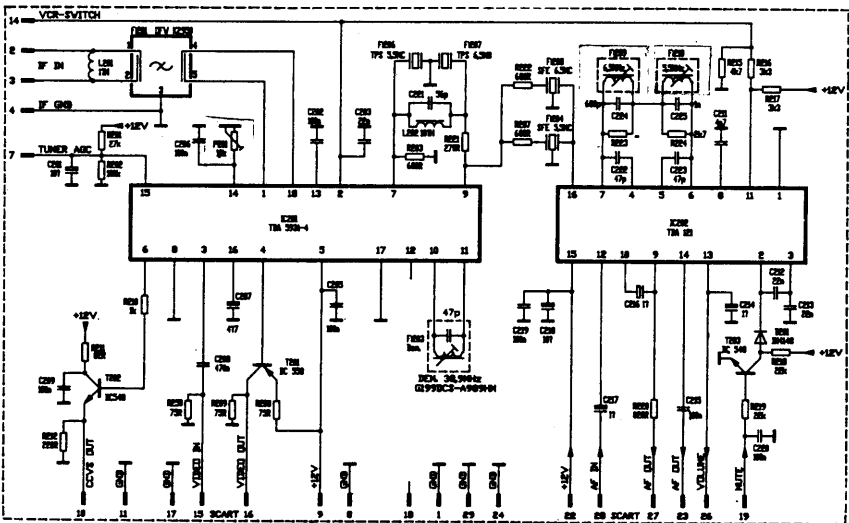
CRT MODULE PATTERN DRAWING



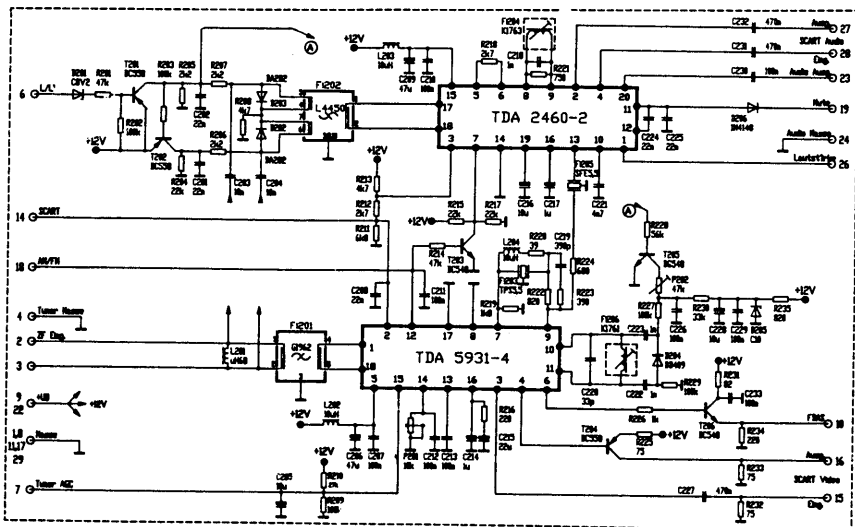
MONO IF B/G (I) MODULE



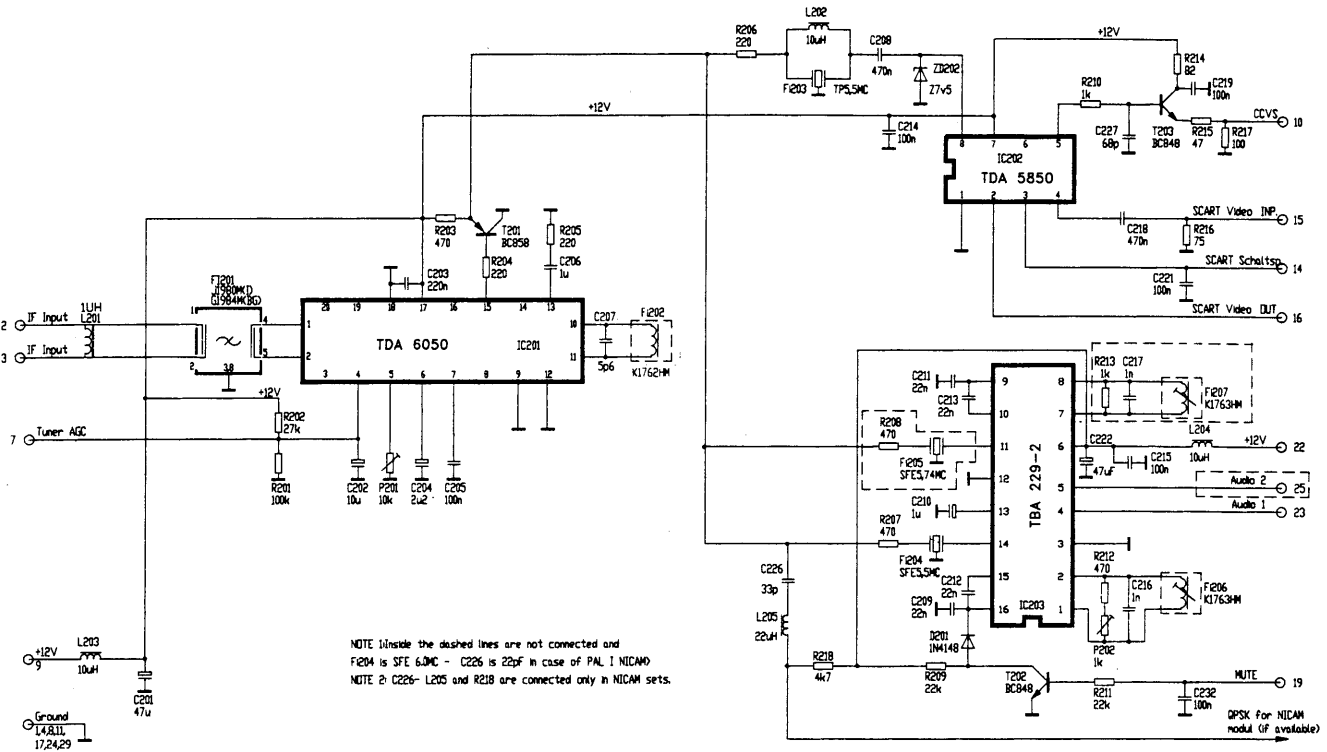
MONO IF BG/DK MODULE



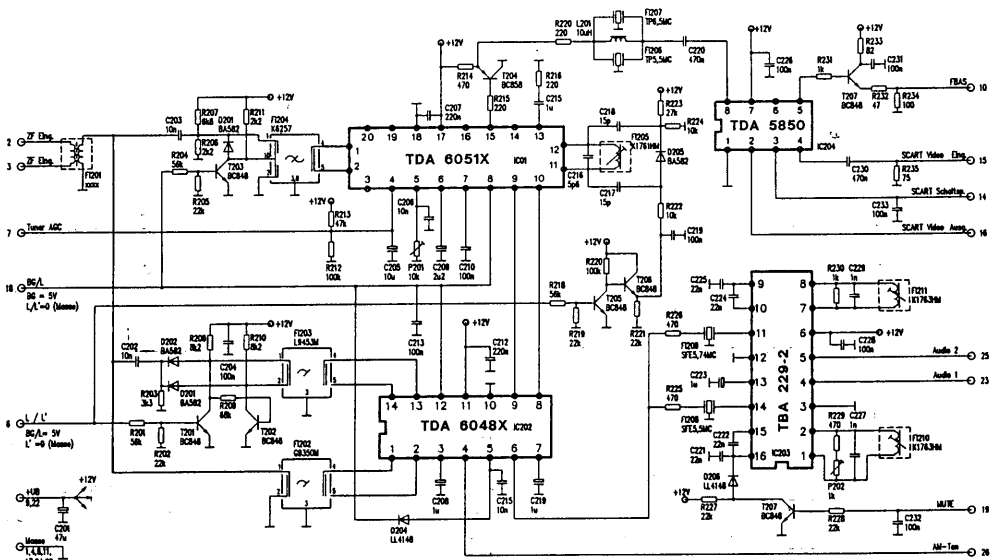
MONO IF BG/LL' MODULE



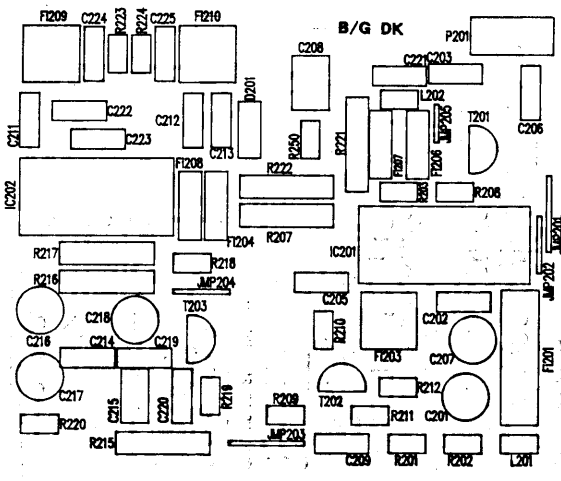
STEREO IF MODULE BG



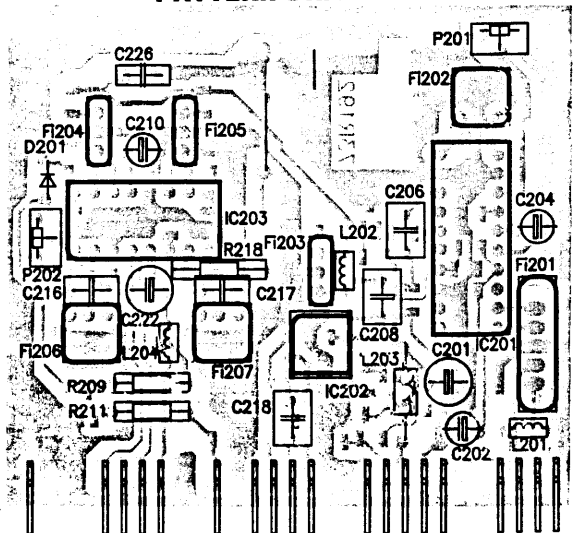
IF STEREO BG/LL' MONO



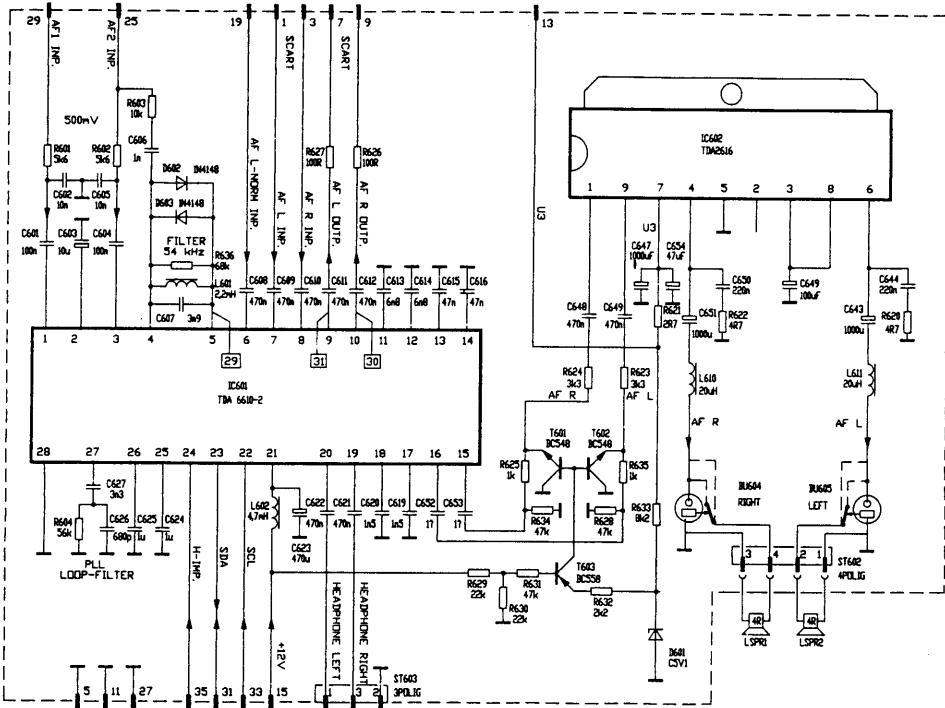
MONO IF PATTERN DRAWING



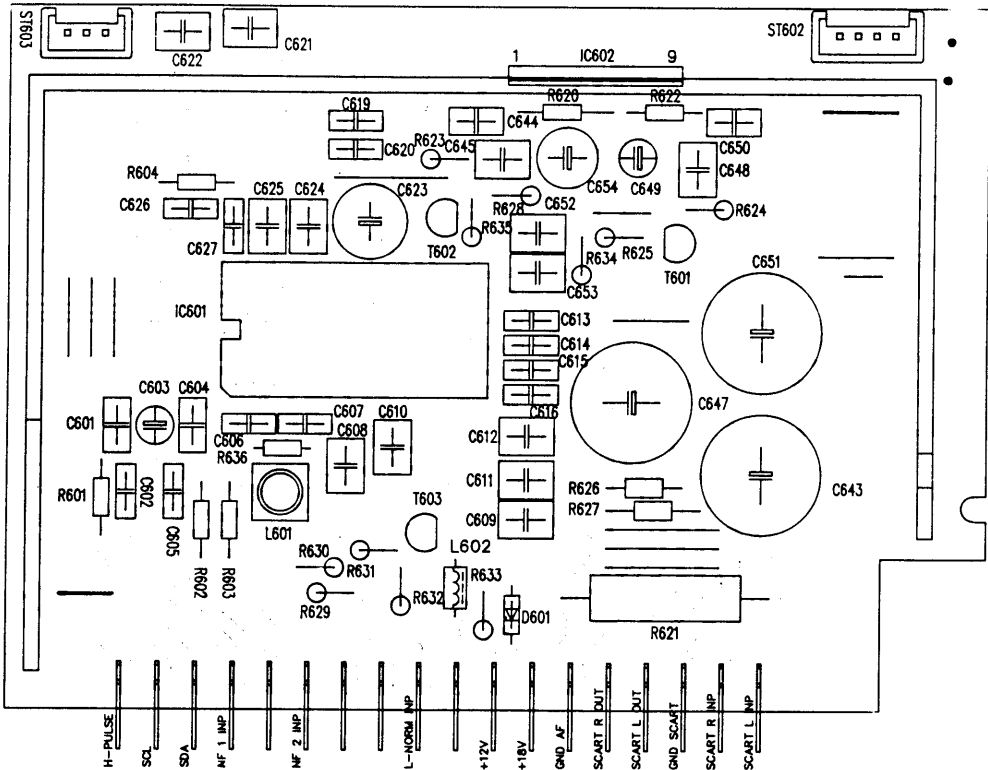
STEREO IF MODULE PATTERN DRAWING



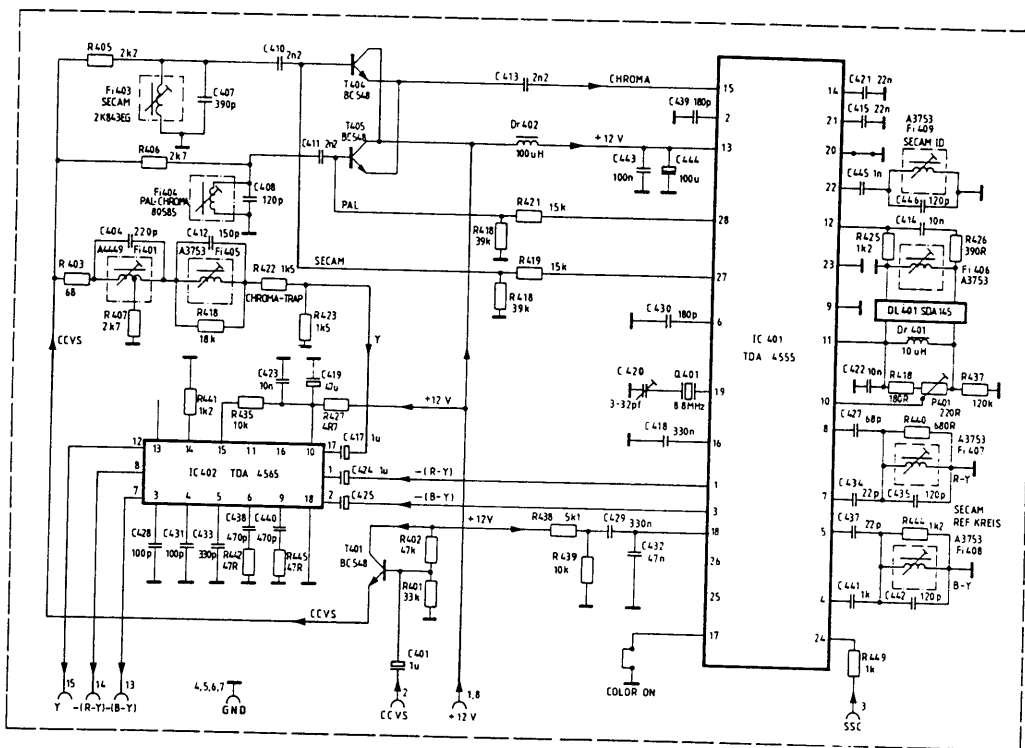
STEREO AF MODULE WITH DECODER AND POWER AMPLIFIER



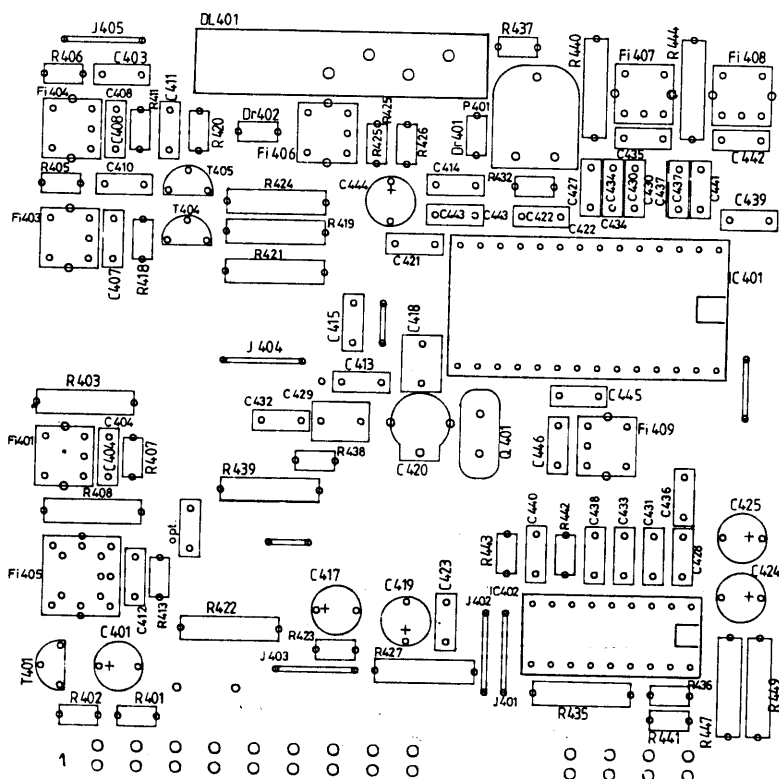
STEREO DECODER PATTERN DRAWING



PAL/SECAM DECOD WITH CTI

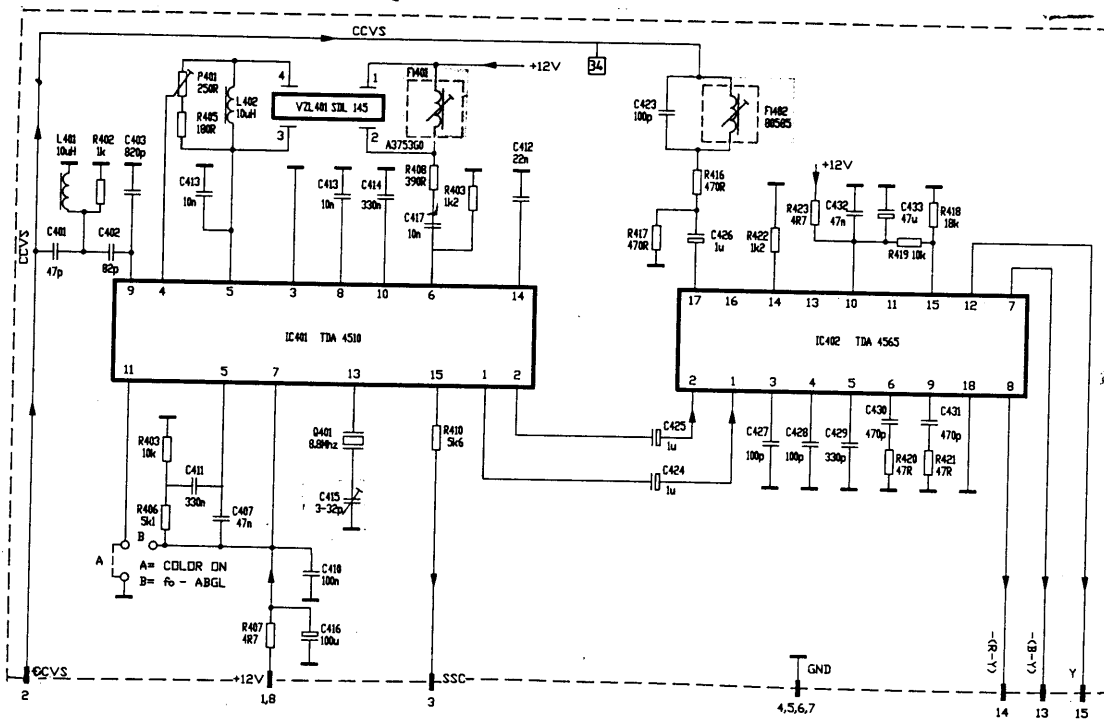


PAL/SECAM MODULE PATTERN DRAWING

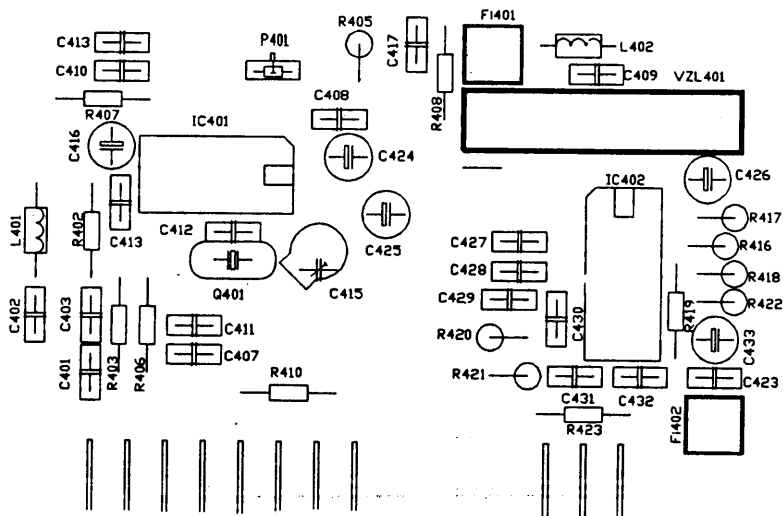


PAL/SECAM

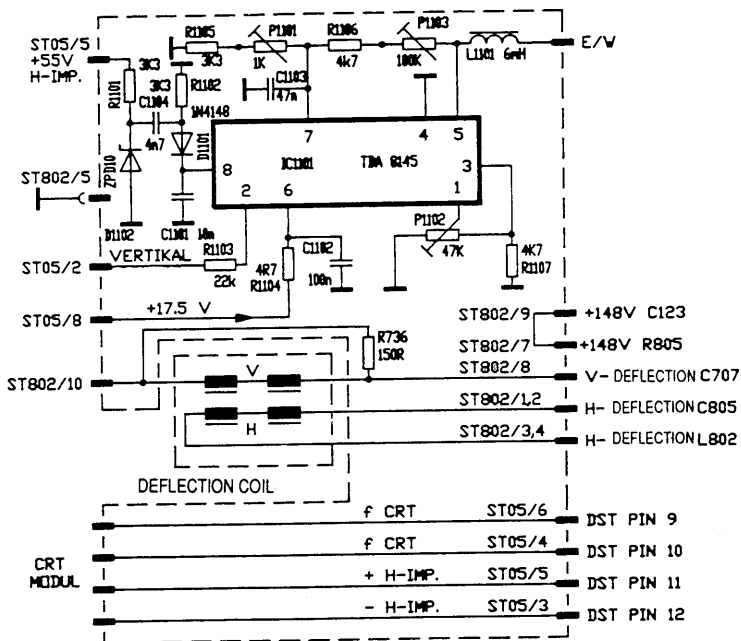
PAL DECODER WITH CTI



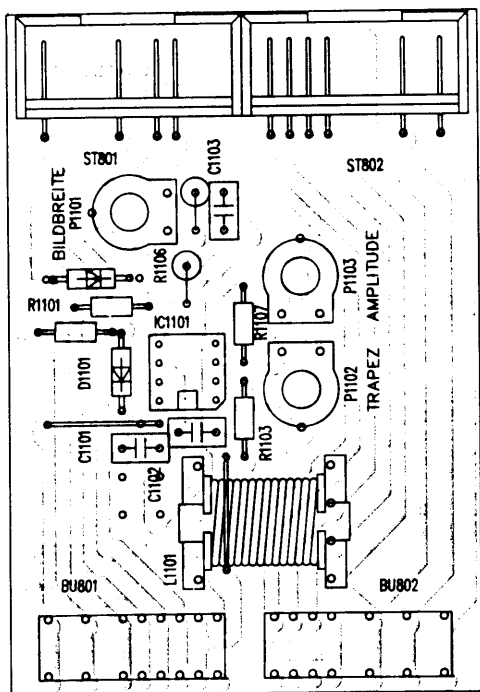
PAL MODULE PATTERN DRAWING



EAST/WEST MODULE



EAST/WEST MODULE PATTERN DRAWING



SERVICE ADJUSTMENTS

INTERMEDIATE FREQUENCY BOARD ADJUSTMENT AND CONTROL:

- 1- Apply 12V DC to 9th and 22nd pins of IF board.
- 2- Apply 38.5 MHz signal modulated with video signal (step or 2T) and 1kHz sound signal to 2nd or 3rd pins of IF board.
- 3- After connecting 7th pin of IF board to a voltmeter, see the AGC output change between 0 and 7.5V by adjusting P201 clockwise or counter clockwise. Leave it at its maximum level.
- 4- Adjust F 203 until obtaining the wave form in Figure 8.
- Apply a voltage of changing between 0.3V and 4.6V DC to 26th pin of the IF board and see the wave shape in Figure 8 from the 27th pin of the board.
- 5- After grounding 19th pin of the board, see the muting on oscilloscope.
- 6- Apply 38.9 MHz signal modulated with video signal and 1kHz (6.5 MHz carrier) to pin 3. Adjust Fi209 for optimum waveform on pin 23 or 27 (standard D/K) (Fig.9).
- 7- Apply 38.9 MHz signal modulated with video signal and 1kHz (5.5 MHz carrier) to pin 3. Adjust Fi210 for optimum waveform on pin 23 or 27. (Standard B/G) (Fig. 9).

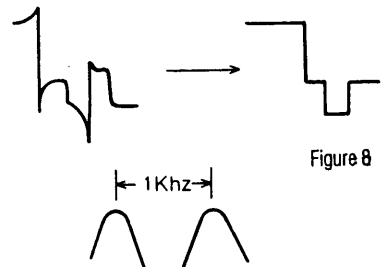
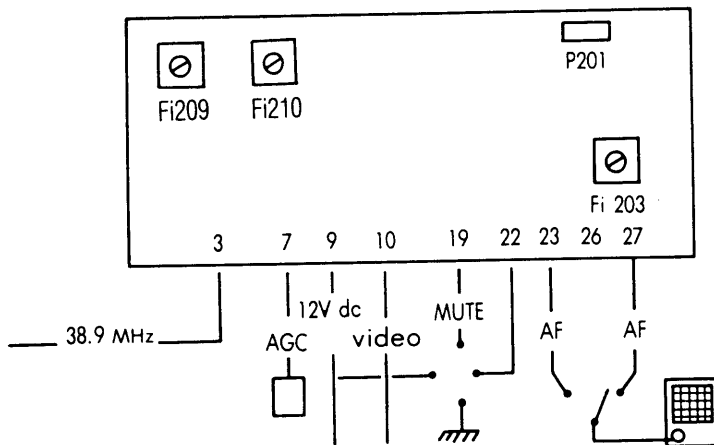


Figure 8

Figure 9

SUPPLY VOLTAGE ADJUSTMENT:

- 1 – While all controls are set to minimum, P101 is adjusted, so that the voltage difference between ground and R805 or D109 is 125 V DC + 1V for 90° Sets (148 VDC + 1V for 110° Sets)
- 2 – Screen potentiometer on DST is adjusted until snowy picture is just obtained. Depress the NORMAL button on the Remote Control to obtain the average contrast, brightness and colour settings.
- 3 – Using a Philips pattern generator or other suitable signal, adjust P701 (horizontal adjustment) and P702 (vertical adjustment) to correctly position the picture. Adjust vertical amplitude with P702 and horizontal amplitude with L901.

AGC ADJUSTMENT:

Input a colour test pattern, the signal input voltage should be $1.5\text{mV} = 64\text{ dBuV} + 2\text{dBuV}$, AGC voltage is observed. While adjusting P201 on IF board by rotating it clockwise, see the increase in DC level. After obtaining maximum DC value approximately at 8V, adjust P201 until DC level drops to 1V and becomes approximately 7VDC.

SCREEN ADJUSTMENT:

Contrast, Brightness and screen potentiometer are set to minimum. AV position is selected on TV.

The oscilloscope is connected to the highest test points (either 154, 155 or 156) on CRT.

Screen potentiometer is adjusted, so that the "X" length is 135V for 90° chassis (158 Vdc for 110° chassis) and check the same shape for other test points too.

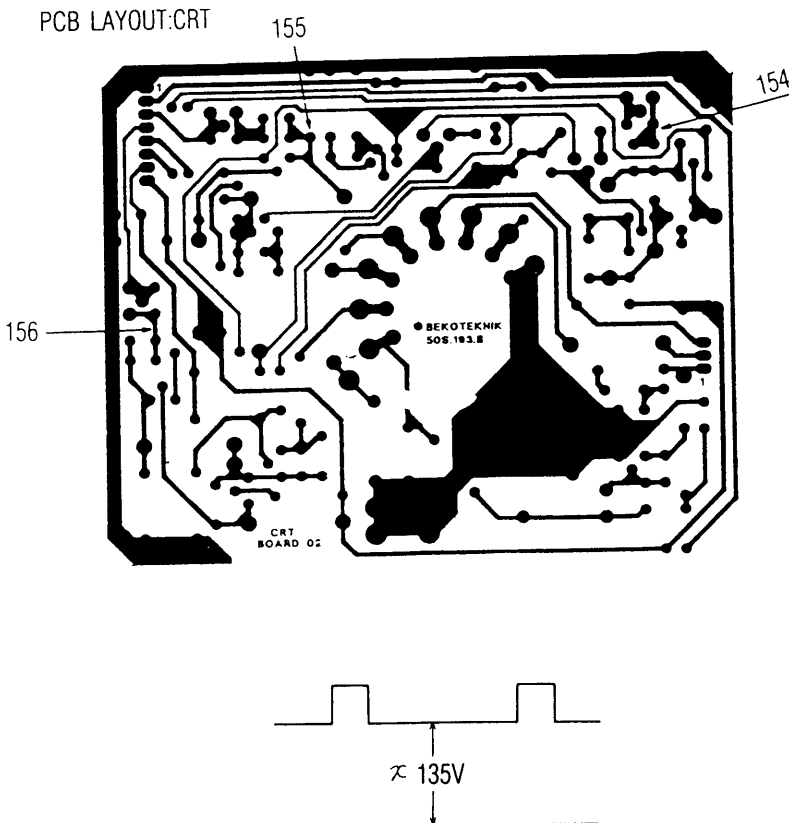
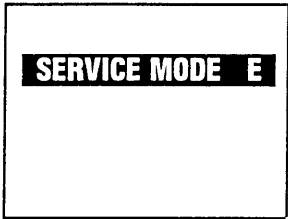


Figure 10

SERVICE MODE ADJUSTMENTS

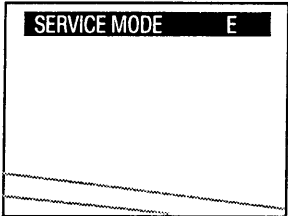
1.0. WHITE BALANCE ADJUSTMENT

1.1. Switch on TV over mains switch while pressing up/down buttons on control unit.



Appears on screen.

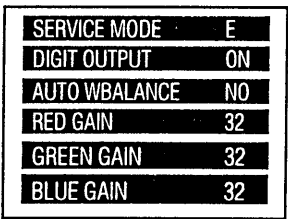
1.2. Push balance button on R/C hand set.



Appears on screen.

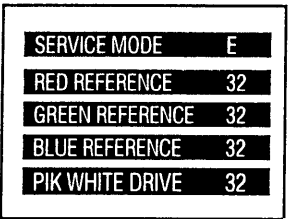
Adjust screen potentiometer until only two lower flyback lines are visible.

1.3. Push colour button on R/C hand set If auto WBalance is yes push up button.



Appears on screen.

1.4. Push colour button on remote control hand set repeatedly.



Appears on screen.

Digit output Yes

Adjust [Red reference, Green reference, Blue reference] to levels given in below table

Digit output No
Digit output Yes

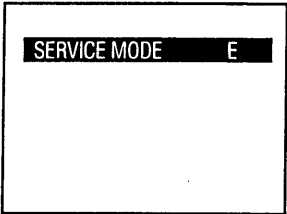
[Red gain, Green gain, Blue gain] Adjust to values 20 higher than the present ones to increase contrast when needed.

The value of flashing line can be changed by up or down button.

Switch off and on tv over main switch to Leave service mode.

2.0. Selection of external connections

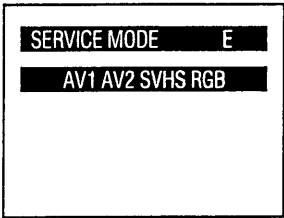
2.1. Switch on TV Over main switch while pressing up and down buttons on R/C control unit.



Appears on screen.

	SAMSUNG	PHILIPS	PANASONIC	VIDEO COLOR		
14 "		34				RED REF
		32				GREEN REF
		23				BLUE REF
		32				PEAK WHITE DRIVE
15 "		34				RED REF
		32				GREEN REF
		23				BLUE REF
		32				PEAK WHITE DRIVE
20 "		23				RED REF
		27				GREEN REF
		20				BLUE REF
		32				PEAK WHITE DRIVE
21 "			25	41		RED REF
			28	23		GREEN REF
			24	20		BLUE REF
			32	32		PEAK WHITE DRIVE
25 "			25	41		RED REF
			23	23		GREEN REF
			22	20		BLUE REF
			32	32		PEAK WHITE DRIVE
28 "			25	41		RED REF
			25	23		GREEN REF
			22	20		BLUE REF
			32	32		PEAK WHITE DRIVE

2.2 Push AV button on R/C hand set



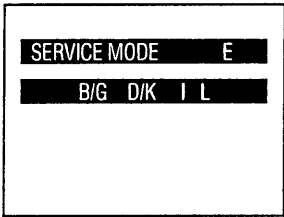
Appears on screen.

By pressing O.K. Button flashing character will turn from white to purple

By pressing (+) or (-) buttons flashing position changes
FOR MONO T.V. **AV1** indicates 1. scart

3.0. SYSTEM SELECTION

3.1. Push a/b button on r/c hand set



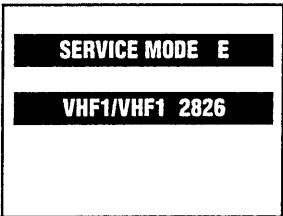
Appears on screen.

3.2. By pressing O.K. Button flashing character will turn from white to purple.

3.3. By pressing (+) or (-) buttons flashing position changes. White characters indicate receivable system.

4.0. CHANNEL COVERAGE SELECTION

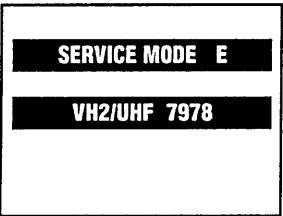
4.1. PUSH PS BUTTON ON R/C HAND SET



Appears on screen. check!

If not, to reach 2826 push up or down button. Mute button changes 3. digit of this number.

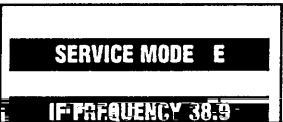
4.2. PUSH PS BUTTON ON R/C HAND SET



Appears on screen. Check!

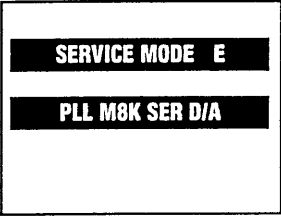
If not, to reach 7978 push up or down button. Mute button changes 3. Digit of this number

4.3. PUSH SERVICE SWITCH ON R/C HAND SET



Appears on screen. Check!

4.4. PUSH SERVICE SWITCH ON R/C HAND SET



Appears on screen.

Press O.K. Button and convert colour of flashing characters from purple to white. Repeat this procedure for all characters on this menu.

M8K WHITE 100Programme
M8K PURPLE 50Programme

5.0. PREPARING A SERVICE R/C HAND SET

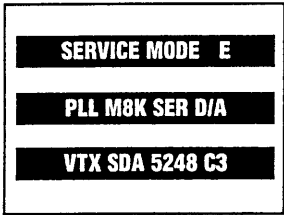
5.1. MOUNT A MICRO SWITCH ON R/C HAND SET

5.2. CONNECT PIN 10 AND 19 OF R/C IC KS 51800 BY A MICRO SWITCH.

When micro switch pushed these pins are short.

6.0. SETTINGS OF TELETEXT

6.1. PUSH T.V.-T.T. BUTTON ON R/C HAND SET

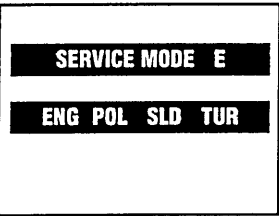


Appears on screen.

The digit behind C determines teletext decoding languages.
Change this digit by pushing up or down buttons.

- C1. English, German, Swedish, Italian, French, Spanish.
- C2. English, German, Scandinavian, German, Serbocroat, Czech-slovak, Romanian.
- C3. English, German, Swedish, Italian, French, Spanish, Turkish.

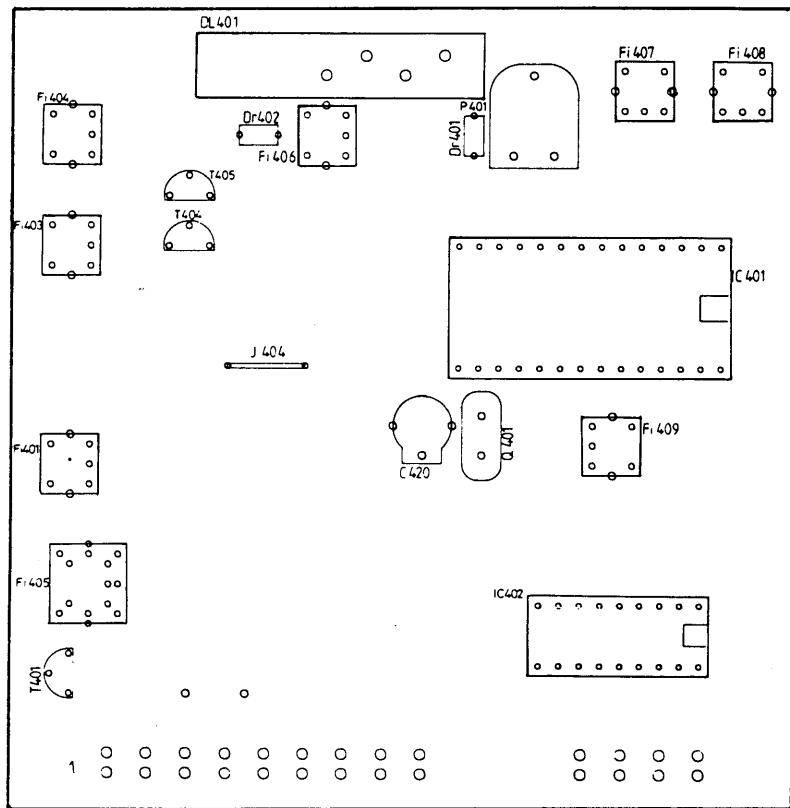
6.2. PUSH T.V.-T.T BUTTON



Appears on screen.

From this menu teletext message language can be choosen. Pressing O.K. Button changes colour and pressing up or down button changes position of flashing characters. White language indication shows teletext message language.

PAL/SECAM BOARD ADJUSTMENT AND CONTROL



PAL ADJUSTMENT:

- 1- FBAS Colour Bar signal is applied to 2nd pin of the board.
- 2- While the signal on the emitter of T405 is observed on the oscilloscope, colour carrier is adjusted to its maximum value with Fi404.

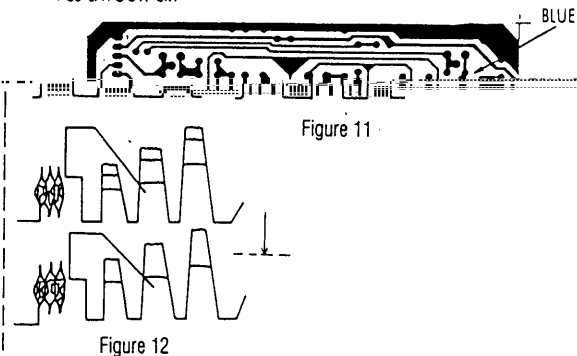
REFERENCE OSCILLATOR ADJUSTMENT:

- 1- The 17th pin of the TDA4555 is grounded.
- 2- Colour flow on screen is minimized with C420.

LUMINANCE ADJUSTMENT:

- 1- Colour carrier or 15th pin of the board is minimized with Fi401.

PCB LAYOUT: CRT



- ### PAL ADJUSTMENT:
- 1- Connect oscilloscope to the emitter of T405.
 - 2- Apply DEM test pattern.
 - 3- Adjust peaks as follows:

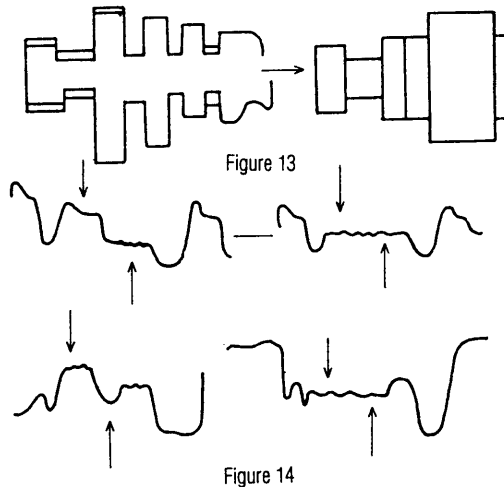
SECAM ADJUSTMENT:

CHROMA ADJUSTMENT:

- 1— Apply colour bar signal to pin 2 of module.
- 2— Observe the signal on the emitter of T404 with an oscilloscope.
Adjust the peaks with FI403 Bell filter as shown in Figure 13.

SECAM IDENTIFICATION ADJUSTMENT

- 1— Connect a multimeter with high internal resistance (10M) between pin 21 of TDA4555 and ground.
- 2— Adjust coil FI409 for maximum potential difference.



SECAM COLOUR TRAP ADJUSTMENT:

- 1— Observe Y Signal on pin 12 of IC402 with an oscilloscope, adjust colour carrier to its minimum level with FI405.

SECAM DISCRIMINATOR ADJUSTMENT:

- 1— Observe R-Y and B-Y signals on pins 14 and 15 of Pal/Secam module.
- 2— The signal peaks indicated with arrows in Figure 14 should be adjusted for the same level.

CONVERGENCE ADJUSTMENTS

Note: Before attempting any convergence adjustments, the receiver should be operated for at least fifteen minutes.

• Centre Convergence Adjustment

1. Receive crosshatch pattern with a colour bar signal generator.
2. Adjust the BRIGHTNESS and CONTRAST Controls for well defined pattern.
3. Adjust two tabs of the 4-Pole Magnets to change the angle between them (See figure 16.) and superimpose red and blue vertical lines in the central area of the picture screen. (See figure 17.)
4. Turn the both tabs at the same time keeping the constant angle to superimpose red and blue horizontal lines at the centre of the screen. (See figure 17.)
5. Adjust two tabs of 6-Pole Magnets to superimpose red/blue line and green one. Adjusting the angle affects the vertical lines and rotating both magnets affects the horizontal lines.
6. Repeat adjustments 3,4,5 to ensure best convergence, the adjustment must be undertaken with great care because of the interaction between 4 and 6 pole magnets.

• Circumference Convergence Adjustment

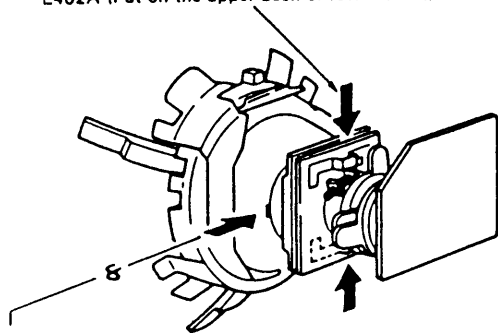
1. Loosen the clamping screw of deflection yoke to allow the yoke to tilt.
2. Put a wedge as shown in figure 15 temporarily. (Do not remove cover paper on adhesive part of the wedge.)
3. Tilt front of the deflection yoke up or down to obtain better convergence in circumference. (See figure 17.) Push the mounted wedge into the space between picture tube and the yoke to fix the yoke temporarily.
4. Put other wedge into bottom space and remove the cover paper to stick.
5. Tilt front of the yoke right or left to obtain better convergence in circumference. (See figure 17.)
6. Keep the yoke position and put another wedge in either upper space. Remove cover paper and stick the wedge on picture tube to fix the yoke.
7. Detach the temporarily mounted wedge and put it in another upper space. Stick it on picture tube to fix the yoke.
8. After fixing three wedges, recheck overall convergence. Tighten the screw firmly to fix the yoke and check the yoke is firm.
9. Stick 3 adhesive tapes on wedges.

CONVERGENCE COMPENSATOR

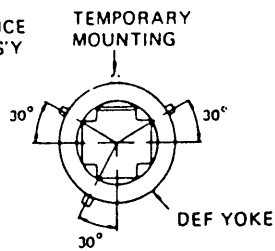
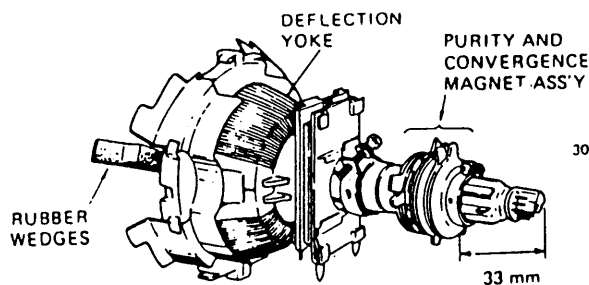
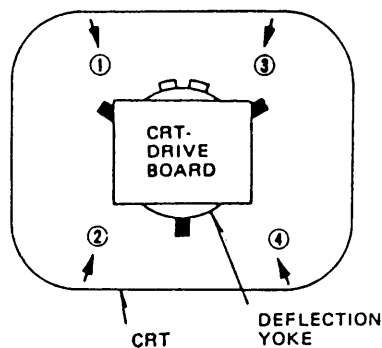
Compensators L462A and L462B are used to correct misconvergence (Red-Green) at the top center or bottom center on screen, when the misconvergence is still evident even though the yoke adjustment is tried. Compensator L462C is also used to correct misconvergence (Vertical shift of Red or Blue) at four corners on screen.

1. To correct horizontal misconvergence (Red-Green), put compensator L462A on the yoke back (see figure right) to find a position for minimizing misconvergence. Mark the position and remove protective paper on the rear of L462A to stick it in place. Apply adhesives on both yoke and L462A.
2. To correct vertical misconvergence (Red-Green), put the tips of compensator L462B into either of the holes on the yoke core and apply adhesives.
3. To correct up or down shift of Red at top right or bottom right corner, put compensator L462C at point 1 or 2 on the picture tube (see figure right.) to find a position for minimizing misconvergence. Mark the position and remove protective paper on the rear of L462C to stick it in place.

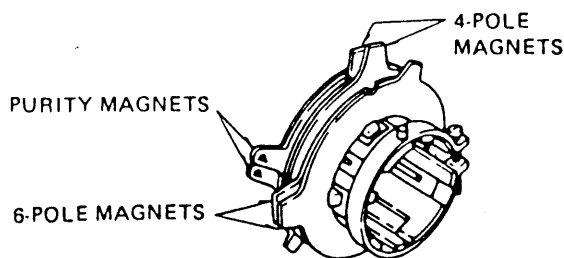
L462A (Put on the upper back or lower back.)



L462B (Put into the left hole or right hole.)

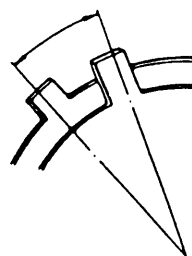


RUBBER WEDGES LOCATION

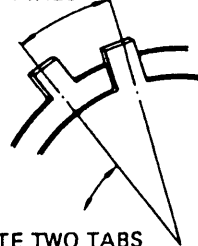


CONVERGENCE MAGNET ASSEMBLY

ADJUST THE ANGLE (VERTICAL LINES)

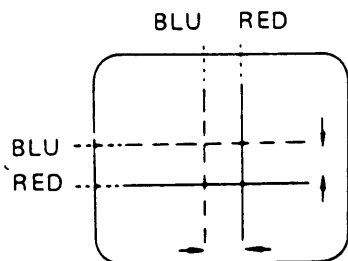


FIXED

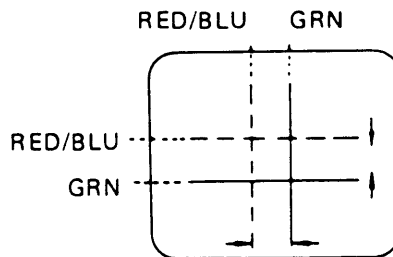


ROTATE TWO TABS AT THE SAME TIME (HORIZONTAL LINES)

ADJUSTMENT OF MAGNETS

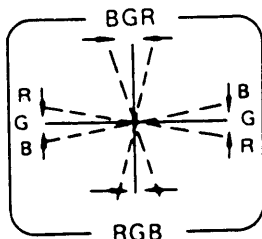


4-POLE MAGNETS MOVEMENT

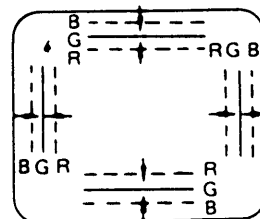


6-POLE MAGNETS MOVEMENT

Centre Convergence by Convergence Magnets



INCLINE THE YOKE UP (OR DOWN)



INCLINE THE YOKE RIGHT (OR LEFT)

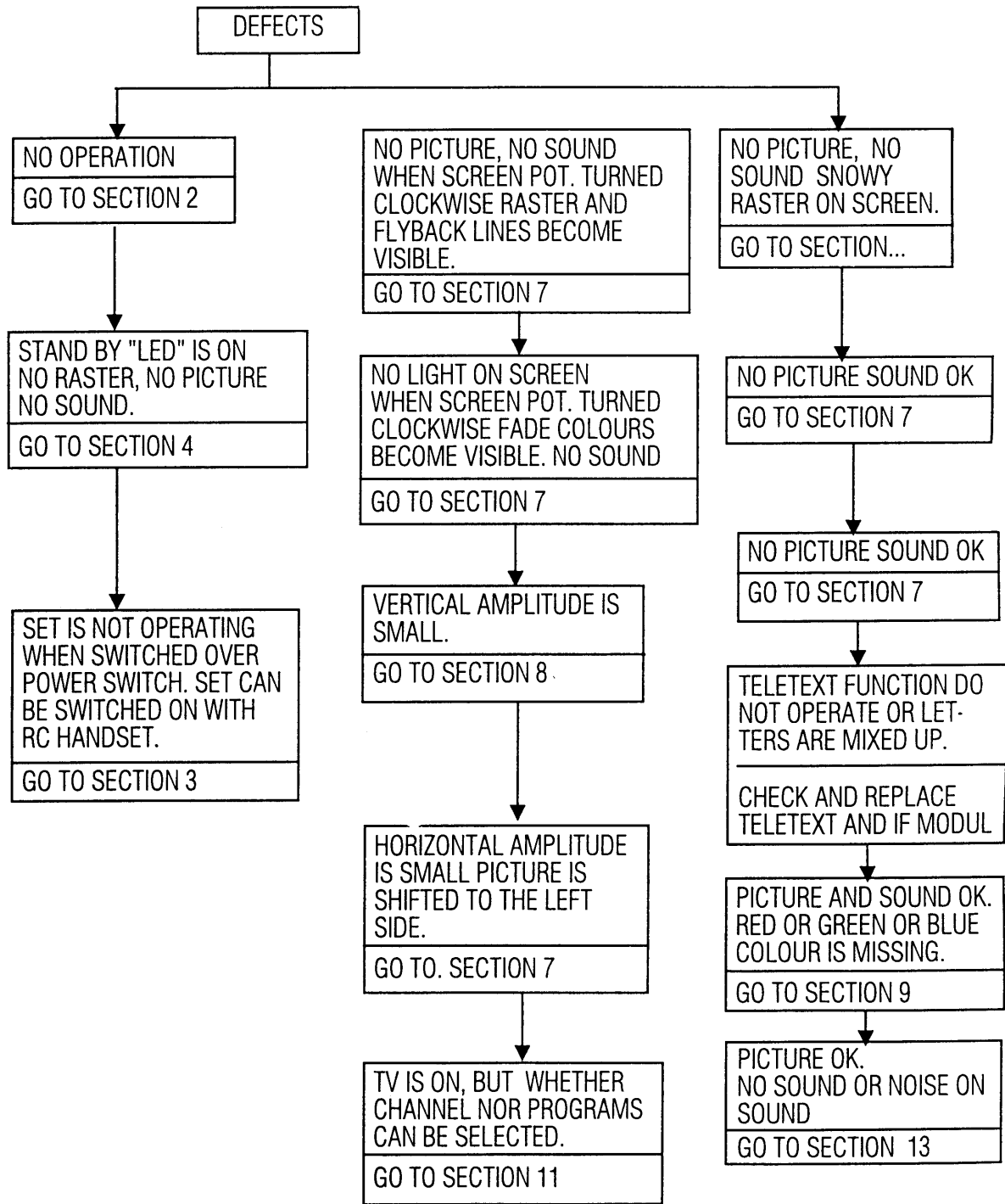
Circumference Convergence by DEF Yoke

CPT MANUFACTURES	CHASSIS SCREEN SIZES	14"	15"	20"	21"	25"	28"
GOLDSTAR	A34 KCQ-12XX01 (T) 370 HUB 22-TC01			A48 KCS 12XX27	A51 KAK 12XX05 (T)		
SAMSUNG	37 GGA 85X-TC01 3708B			A51 GGD95X-TC	54 HGB 99X-TC		
ORION	A343 LL70X23	A36 JSW 90X01	A48 ELL 90X01 (T)				
HITACHI		A36 JUF60X06	A48 JSK61X01 (T)	A51 JFC 61X13			
TOSHIBA		A36 JAR 40X03 (T)		A51 JRU 40X01 (T)			
PHILIPS		A36 EAM 00X01 (T)		A51 EAL 55X10	(A59 EAK71X11)		
VIDEOCOLOR				A51 EBV 13XX01	A59 ECY 13X38 R1235: 1 OHM, 1W L810: 90 uH	A66 ECY 13X38 R1235 : 1 OHM, 1W L810 : 70 uH	
PANASONIC				A51 ECQ 10X01	A59 ECF 10X05 R1235:2.2 OHM, 1W.	A66 ECF 10X05 R1235:2.2 OHM, 1W	
SEB			A48 ECR 11X01				

R1235 IS FOR ALL CRT's with 90° DEFLECTION ANGLE IS 0.1 OHM FUSEABLE TYPE RESISTOR.

1 TROUBLE SHOOTING

- 1 -TROUBLE SHOOTING GUIDE
- 2 -GENERAL POWER SUPPLY DEFECTS
- 3 -POWER I-POWER SUPPLY DEFECTS
- 4 -POWER II-POWER SUPPLY DEFECTS
- 5 -SWITCH MODE TRANSFORMER DEFECTS
- 6 -PROTECTION CIRCUIT DEFECTS
- 7 -DEFECTS RELATED TO DARK SCREEN
- 8 -DEFLECTION CIRCUIT DEFECTS
- 9 -TEA 2029 AND PERIPHERIAL DEFECTS
- 10 -COLOUR DECODER DEFECTS
- 11 -CRT DRIVE BOARD AND IC501 DEFECTS
- 12 -MICROPROCESSOR DEFECTS
- 13 -SOUND CIRCUIT DEFECTS

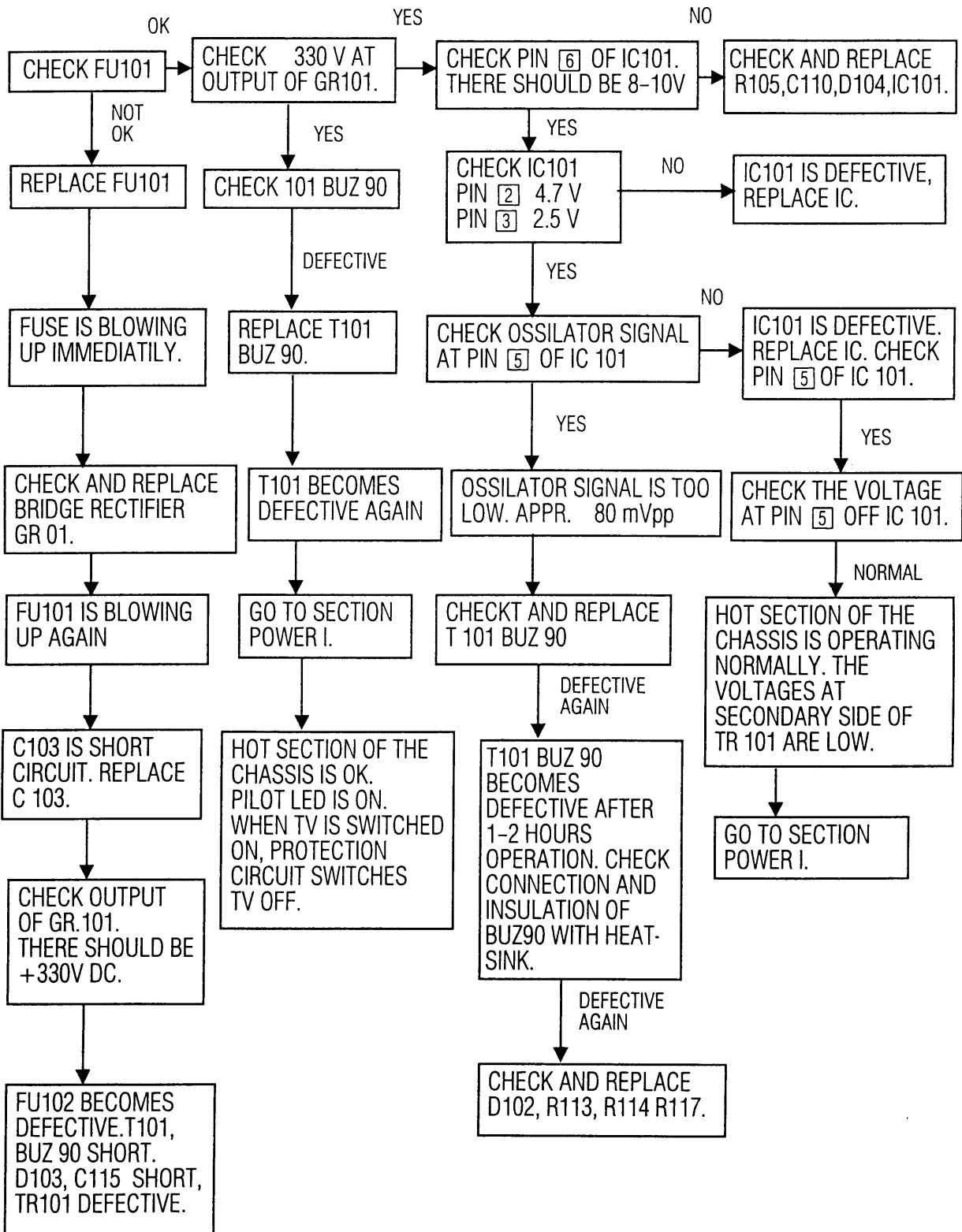


NOTE: ALL ANALOG CONTROL (LUMINANCE, CONTRAST, COLOUR, VOLUME), SHOULD BE AT MEDIUM LEVEL.

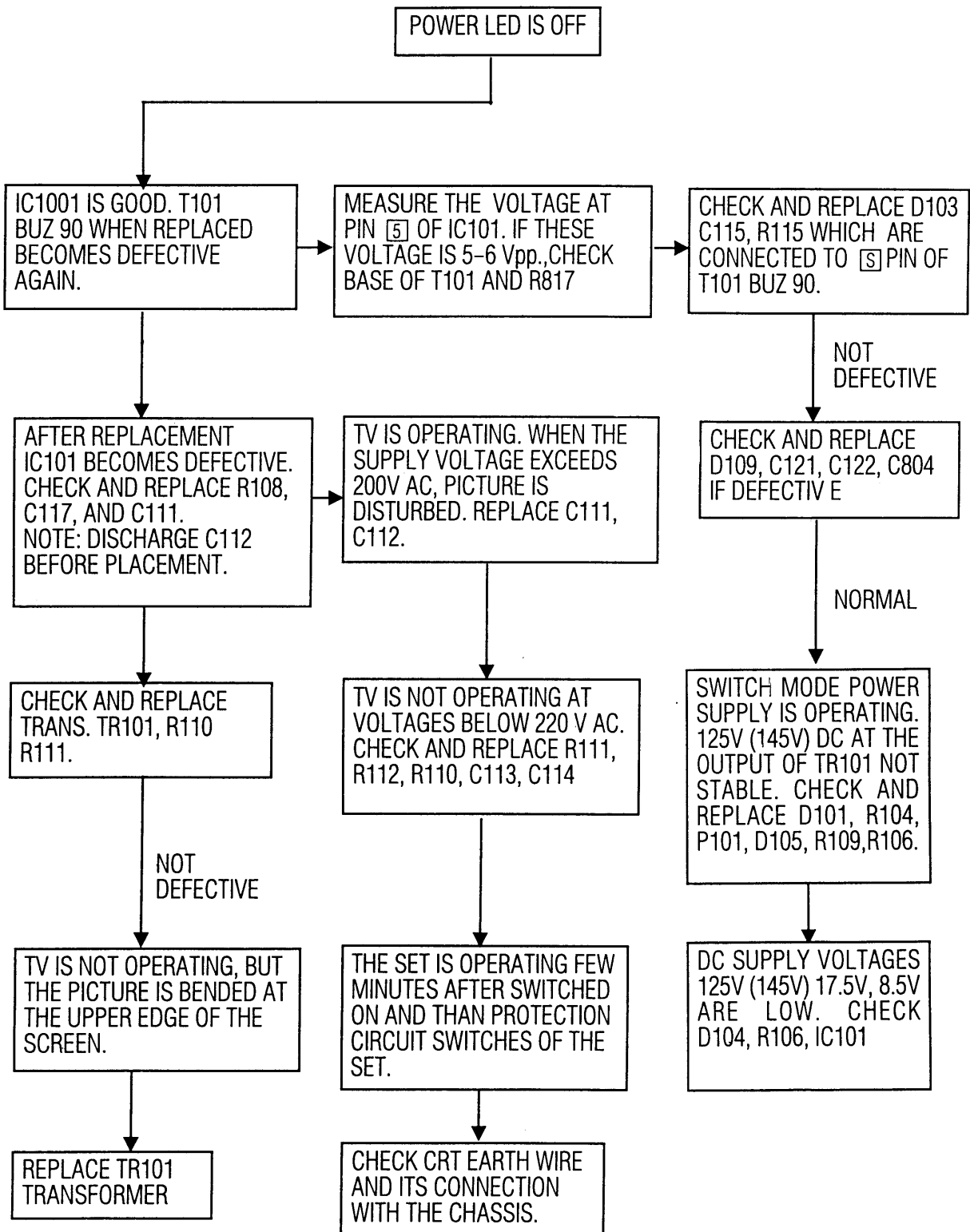
②

NO OPERATION

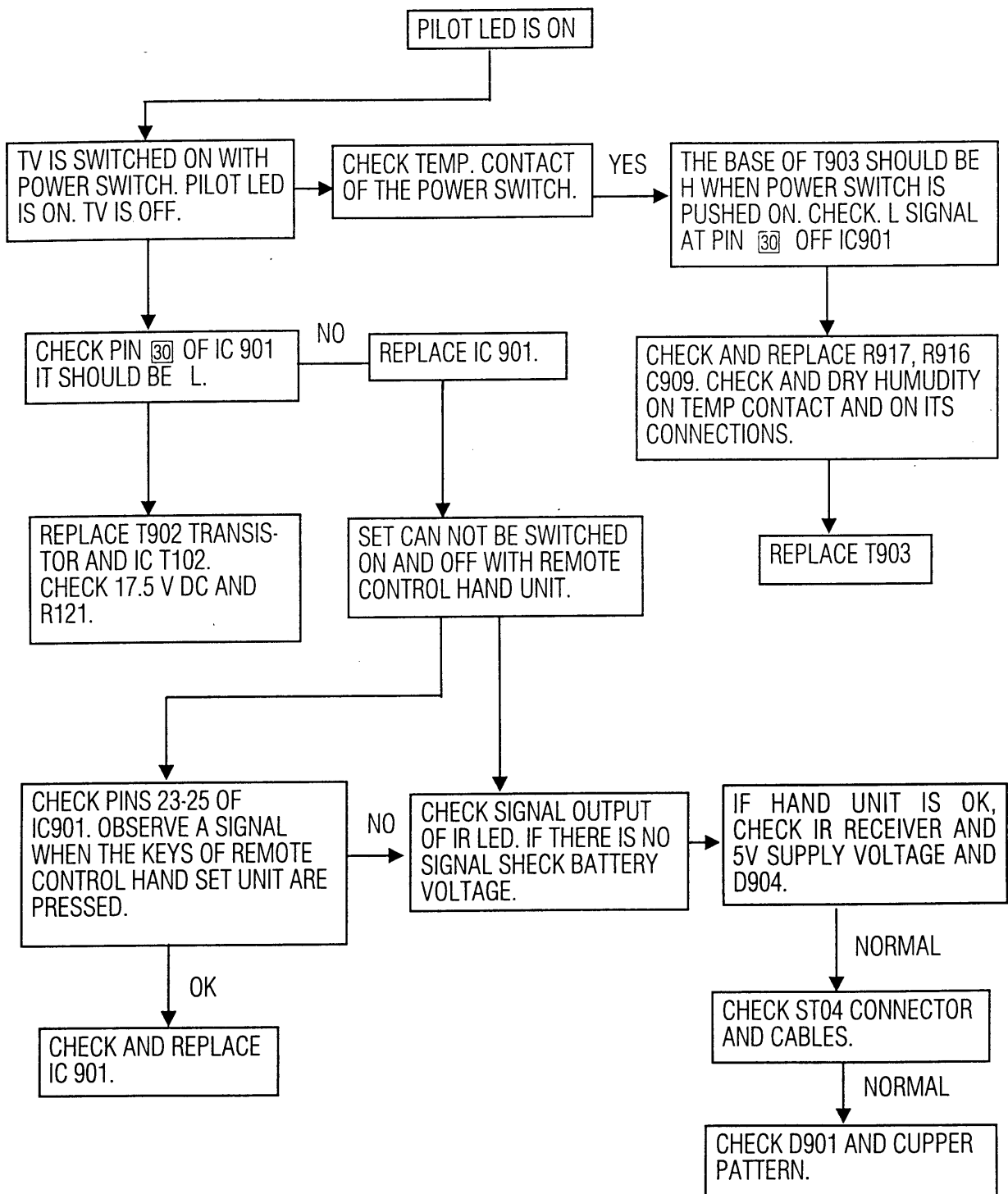
STAND BY LED IS OFF



POWER I DEFECTS

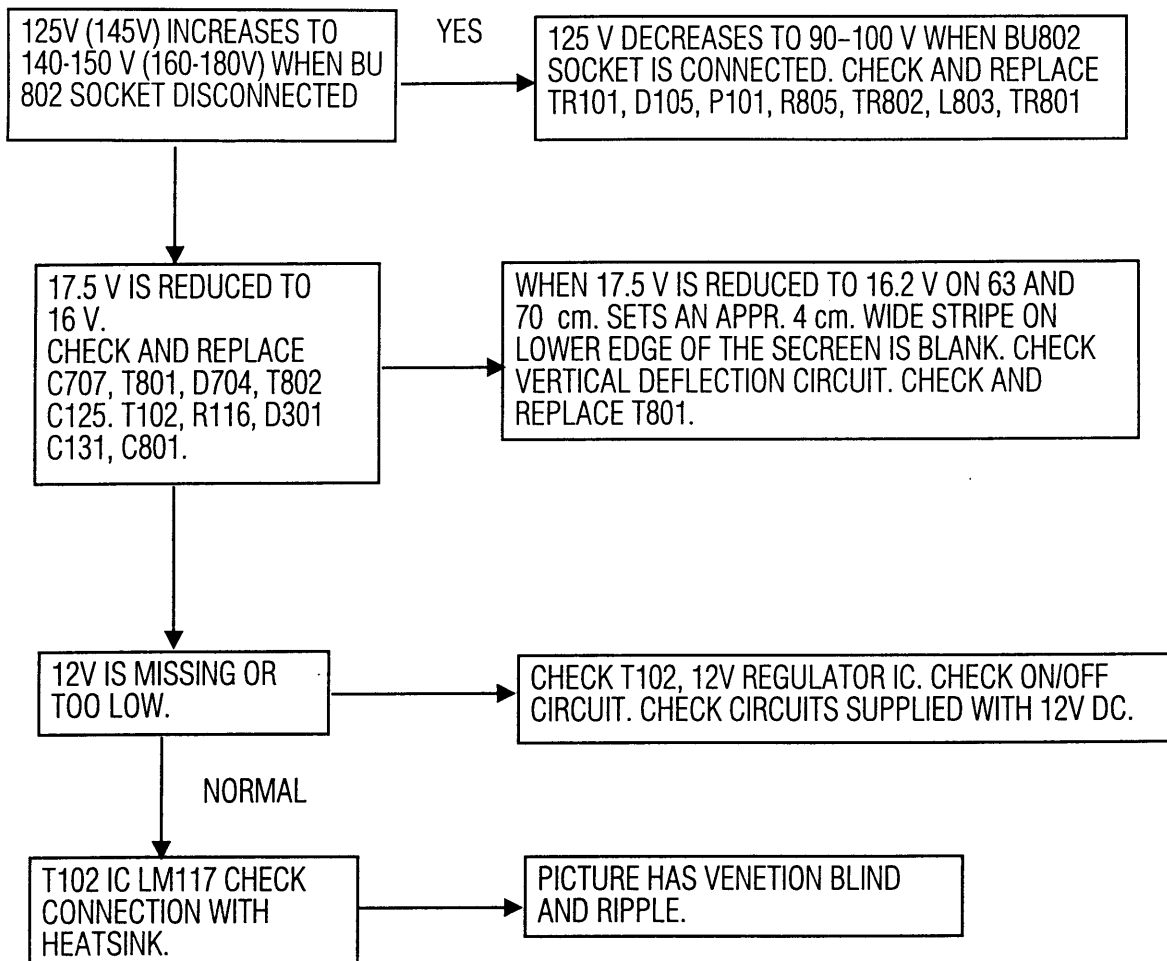


POWER II DEFECTS



5

SWITCH MODE TRANSFORMER TR101 AND PERIPHERAL DEFECTS



6

SET GOES TO STANDBY DURING OPERATION

12 V DC VOLTAGE
IS MISSING

IF PIN 30 IC901 IS AT 4V. THIS IC HAS SWITCHED OFF THE SET. STATIC DISCHARGE CAN CAUSE PROTECTION CIRCUIT TO REACT. CHECK CRT DRIVE BOARD AND ITS EART CONNECTION.

CHECK EARTH PINS OF DST TRANSFORMER. RETOUCH-
SOLDERS OF DST PINS OR REPLACE DST.

MUTING SIGNAL ON PIN 28 OF IC701 IS MISSING
REPLACE IC 701.

12 V DC VOLTAGE
IS NORMAL.

CHECK VOLTAGE AT PIN 28 OF IC701. DURING NORMAL OPERATION THIS VOLTAGE IS LESS THAN 0.7 V. DURING PROTECTION, THIS VOLTAGE IS HIGHER THAN 0.7 V. CHECK + 17.5 AND DRY SOLDER ON VERTICAL CIRCUIT.

125V (145V) AND 12V DC
VOLTAGES ARE MISSING

HORIZONTAL OUTPUT STAGE INCLUDES A COMPONENT
CAUSING OVER CURRENT CHECK AND REPLACE T802,
TR802, C813, C810, D801.

CRT PRODUCES TOO
MUCH STATIC ELEKTRIC
CHARGE.

CHECK CRT EART WIRE, CRT-CHASSIS EART
CONNECTION, CRT SOCKET-CHASSIS EART
CONNECTION. WHEN OK REPLACE CRT.

SCREEN IS DARK. WHEN SCREEN POTENTIOMETER TURNED CLOCKWISE RASTER AND FLYBACK LINES APPEAR ON SCREEN.

CHECK SDA AND SCL SIGNALS AND 2-4 V DC AT PINS [31], [32] OF IC 901.

IF ONE OF SDA OR SCL IS MISSING.

IN MONO SETS SDA AND SCL SIGNAL LINES ARE SEPARATED FROM TELETXT BOARD TUNER AND MEMORY IC. THIS WAY SHORT CIRCUIT OF THIS SIGNALS CAN BE LOCALIZED. IN STEREO SETS SDA AND SCL SIGNAL LINES ARE SEPARATED FROM STEREO BOARD OR IF BOARD. SHORT CIRCUIT CAN BE LOCALIZED, AND DEFECTIVE MODULE CAN BE REPLACED.

SDA-SCL SIGNALS ARE NORMAL, SCREEN IS DARK.

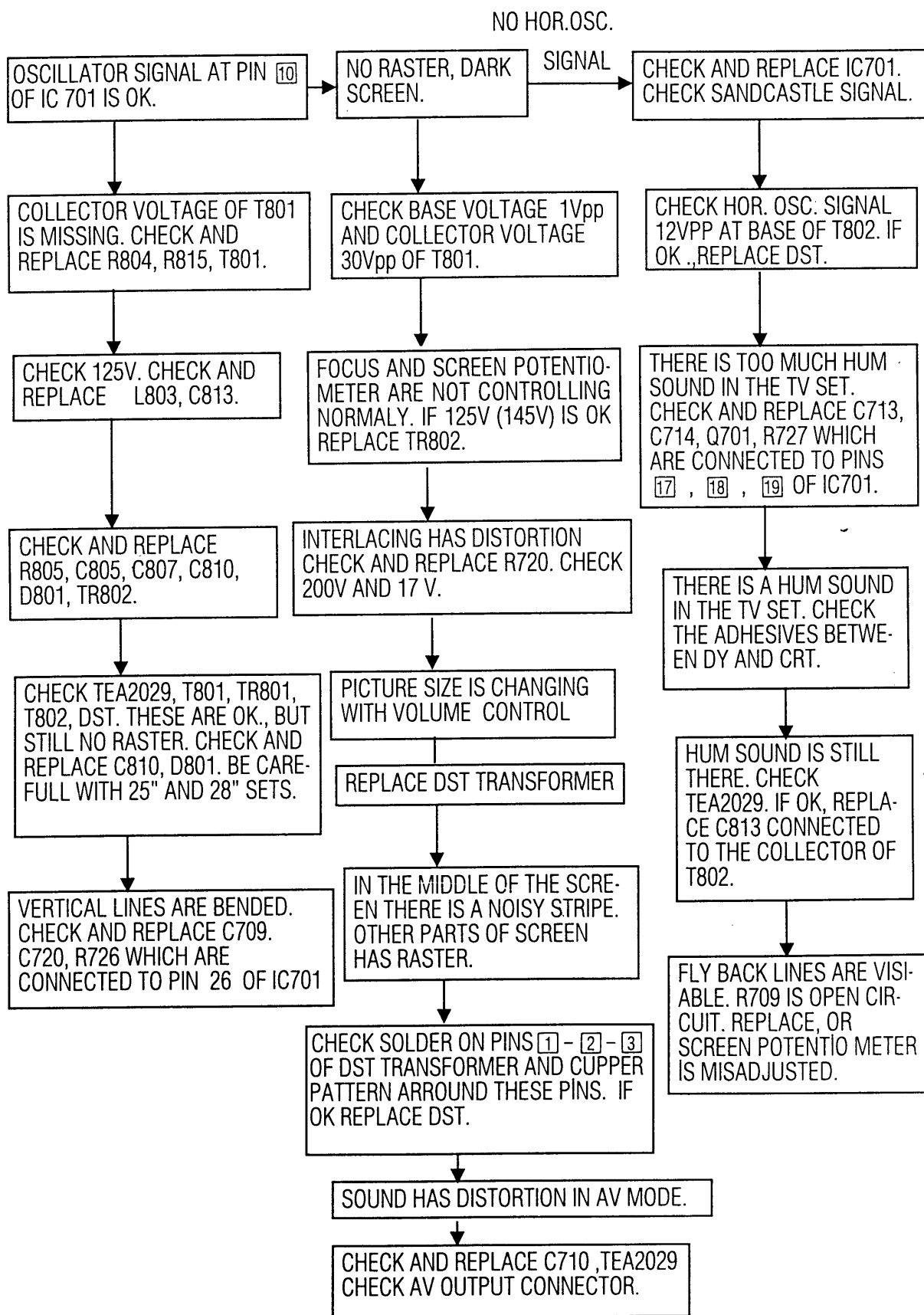
CHECK PIN VOLTAGES AND SURROUND COMPONENTS OF IC501. CHECK 5.3 V AT PIN [26]. PINS [19], [20] ARE FOR CONTRAST AND BRIGHTNESS. CHECK VOLTAGES AT THESE PINS VARIING BETWEEN 1-4.5 V. CHECK 12V DC AT PIN [6]. CHECK Y-LUMINANCE SIGNAL ON PIN [15]. IF ALL ITEMS ARE NORMAL, IC501 OR CRT DRIVE BOARD IS DEFECTIVE.

REPLACE CRT DRIVE BOARD. CHECK AND REPLACE D501, D503, C503. CHECK VOLTAGE AT PIN [9] OF IC501.

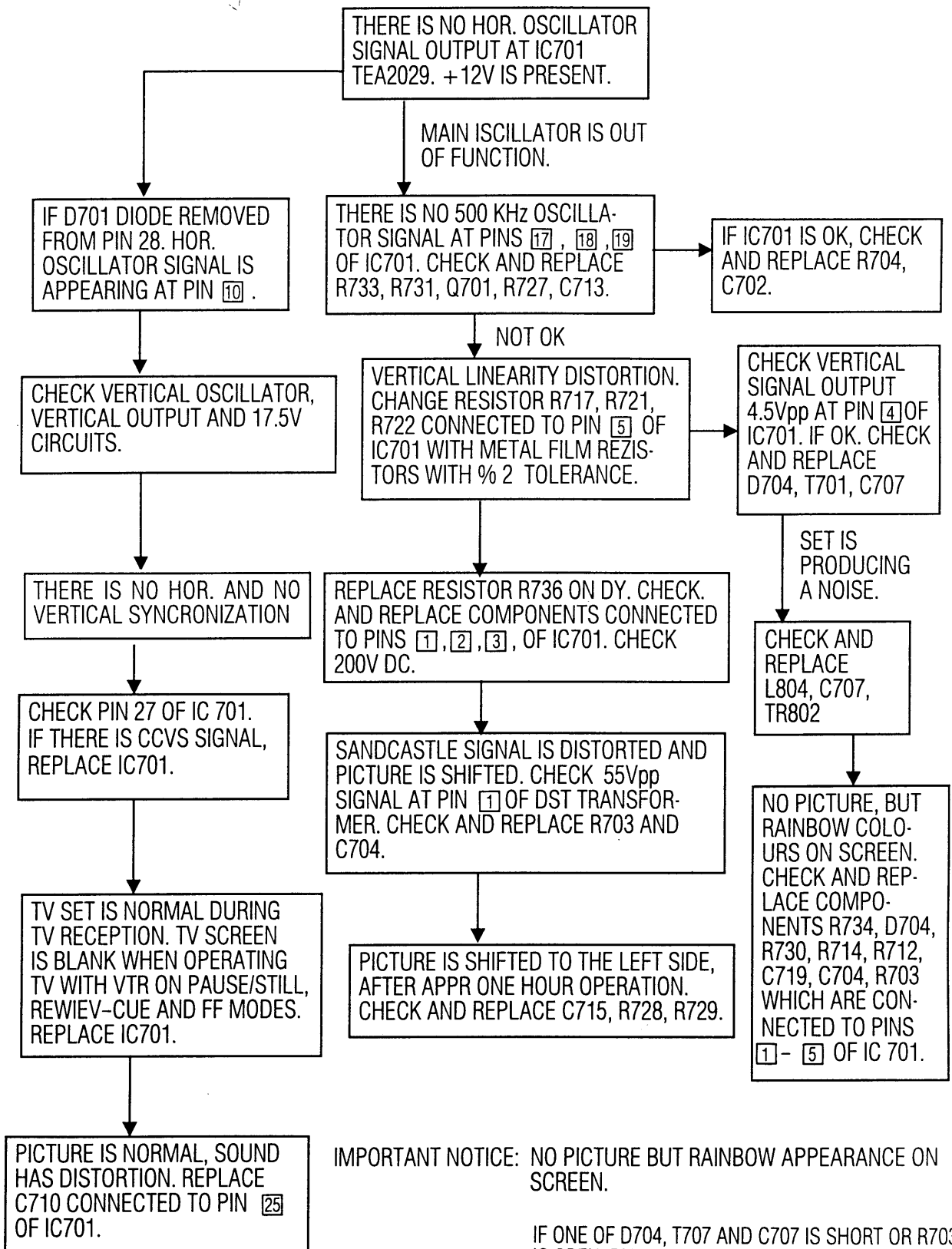
SCREEN IS DARK. RASTER IS AVAILABLE.

PUSH AV BUTTON ON REMOTE CONTROL HAND UNIT. CHECK SQUARE WAVE ON PIN [15] OF IC 501. IF OK, CHECK SQUARE WAVE AT PINS [1], [3], [5]. IF OK, CRT DRIVE BOARD IS DEFECTIVE. IF NOT, REPLACE IC501.

VERTICAL-HORIZONTAL OUTPUT AND DST CIRCUIT DEFECTS



TEA 2029 AND PERIPHERAL CIRCUIT DEFECTS



IMPORTANT NOTICE: NO PICTURE BUT RAINBOW APPEARANCE ON SCREEN.

IF ONE OF D704, T707 AND C707 IS SHORT OR R703 IS OPEN, DY WILL WARM UP AND BREAK CRT NECK.

THERE ARE COLOURED LINES AT UP-
PED EDGE OF THE SCREEN, IF VERTI-
CAL AMPLITUDE IS INCREASED WITH
P703. OSCILLATOR FREQUENCY CAN
BE HEARD.

CHECK AND REPLACE T701, D704 WHICH ARE
CONNECTED TO PIN 4 OF IC701.

PICTURE HAS DISTORTION AND IS FLICKE-
RING. HORIZONTAL LINES ARE SEPARATED.

CLEAN THE GAP BETWEEN PINS 16 - 17 OF
IC701 WITH ALCOHOL. CHECK AND REPLACE
C712, C711.

AT MAX VOLUME VERTICAL AMPLITUDE
OF THE PICTURE DECREASES. SAME
EFFECT IS OBSERVED AT ZAPPING.

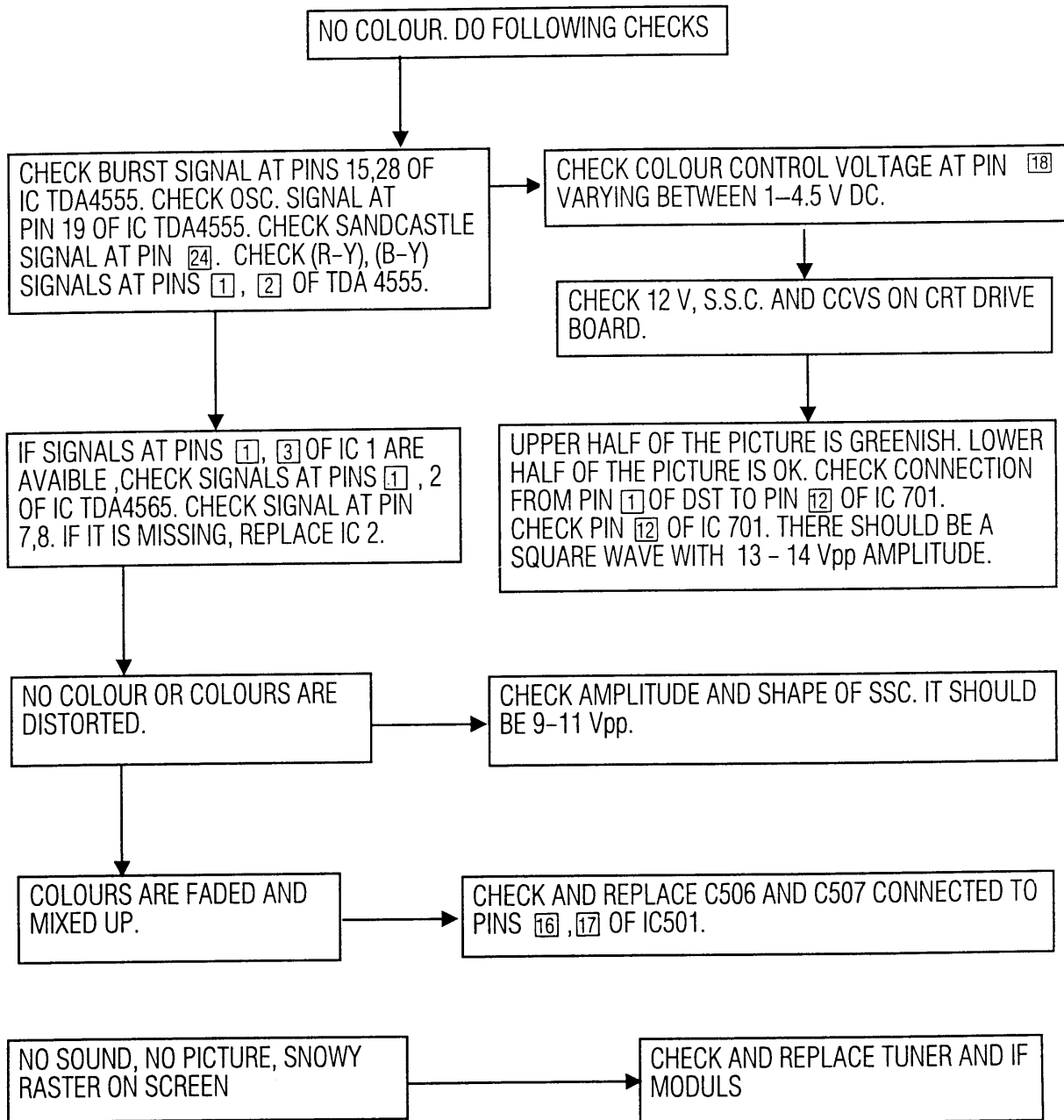
CHECK AND REPLACE R121 AND 17V RECTIFIER
DIODE D110. IF DEFECT REMAINS SAME REPLA-
CE DST. CHECK AND REPLACE R815 22R.

HORIZONTAL LINES ARE
SCROLLING.

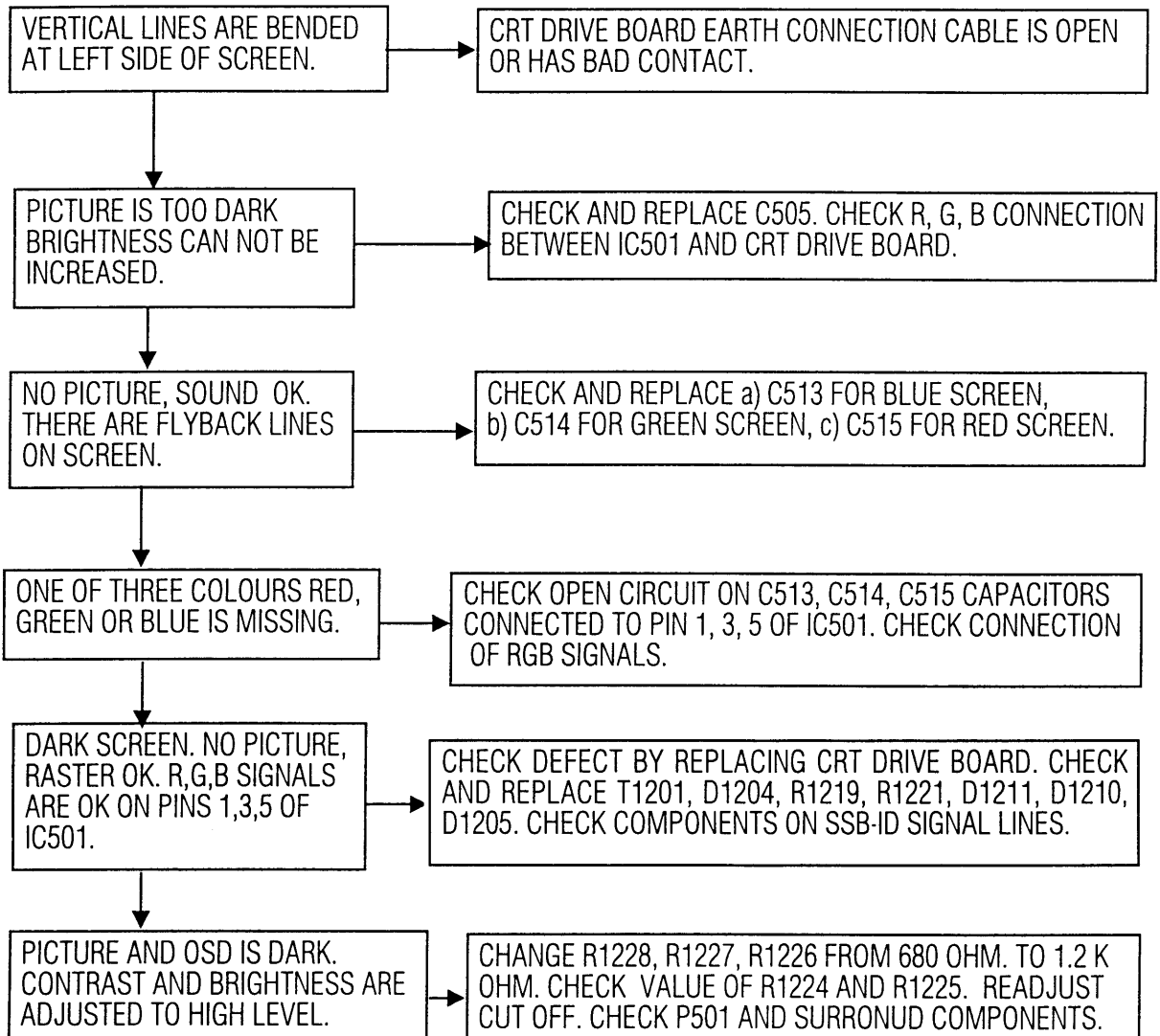
CHECK AND REPLACE Q701, C723. IF NOT OK. CHECK
AND REPLACE C703, R734, C719

10

COLOUR DECODER DEFECTS

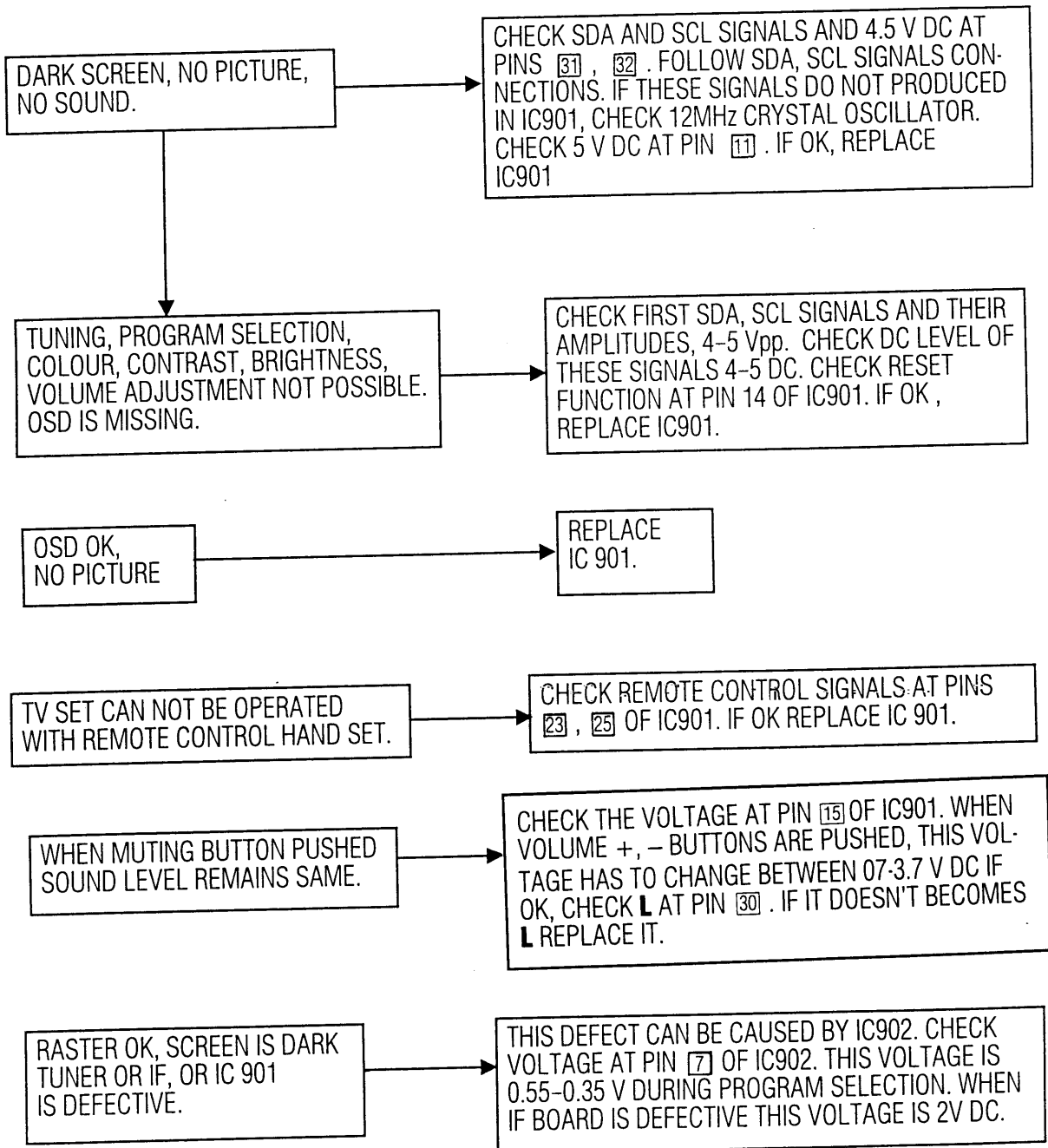


CRT DRIVE BOARD AND IC501 DEFECTS



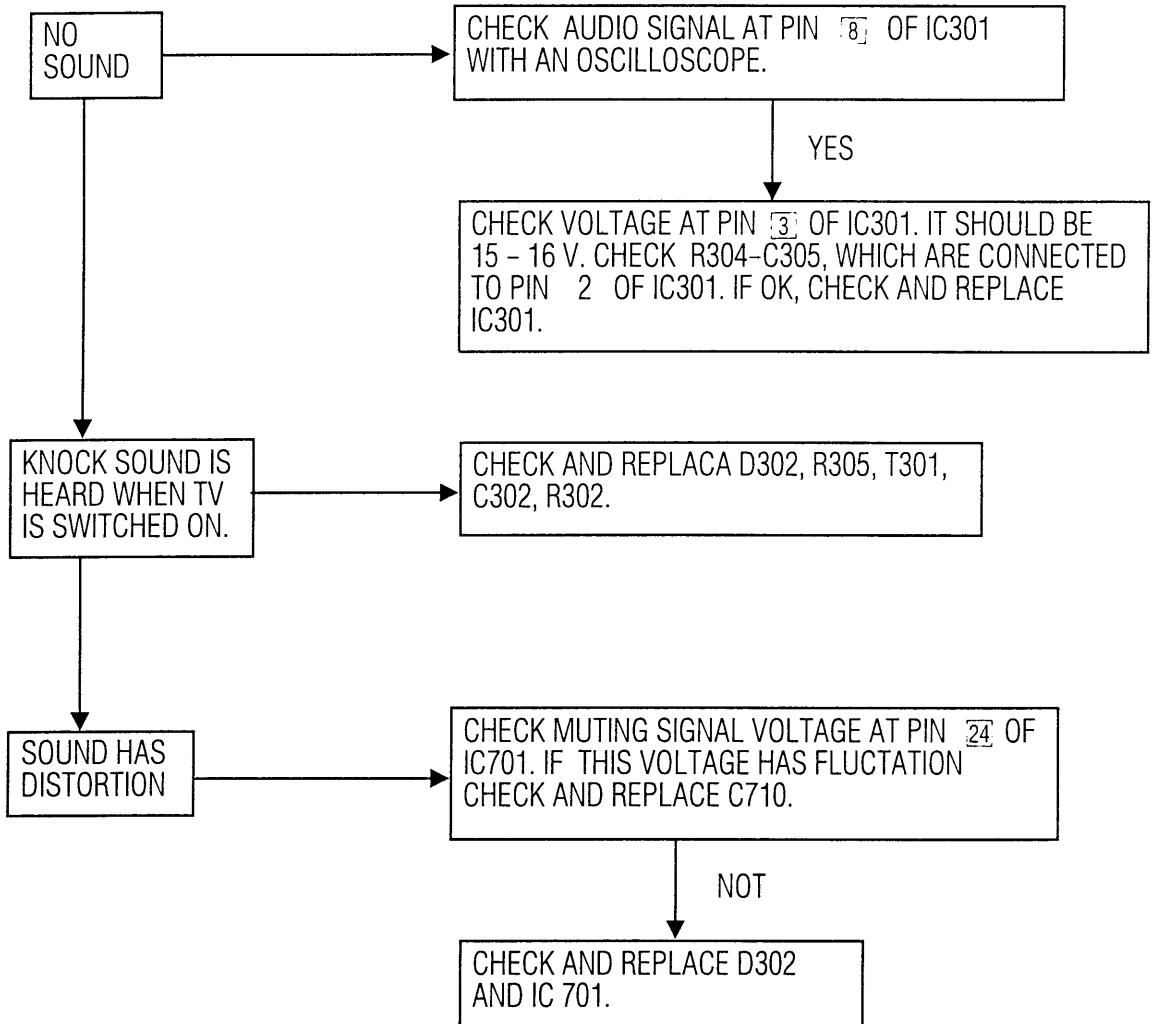
12

MICROPROCESSOR IC 901 AND PERIPHERAL CIRCUITRY DEFECTS



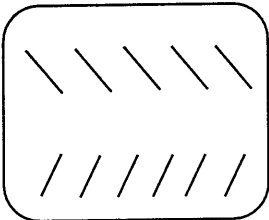
13

SOUND CIRCUIT DEFECTS

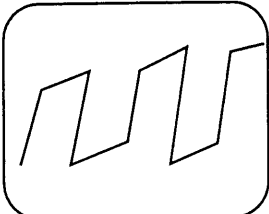


IC901 SDA 20563
OSCILLOSCOPE WAVE FORMS

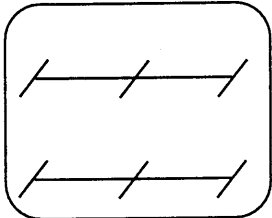
Pin No.
2
4
5
6
7
8



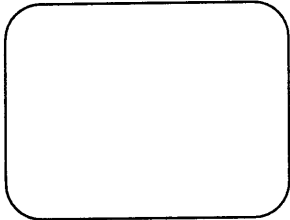
5 micro second
6v PP



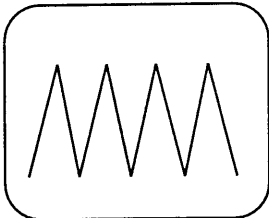
5m. second
4volt PP Pin 2



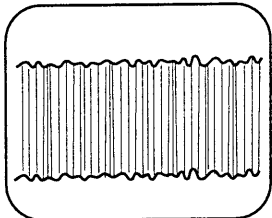
10 micro second
6 v PP



TEA 2029 Pin.1 460 mV

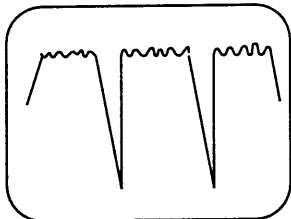


2 micro second
330 mV PP Pin 12-3

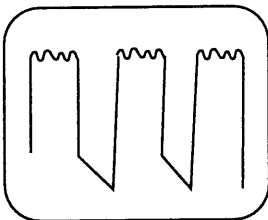


10 micro second
4,5 v PP Pin 31-32

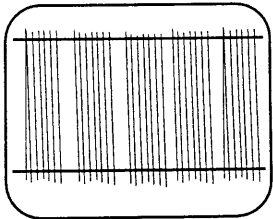
IC 501-TDA 4680
OSCILLOSCOPE WAVE FORMS



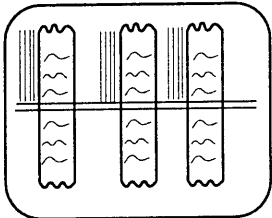
FUBK
0.6 v PP Pin-15



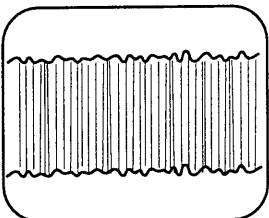
7 v PP
FUBK Pin 18/19



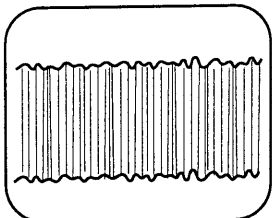
SDA-SCL
4,5 v PP Pin 27/28



SCL
4.5 v PP Pin 32

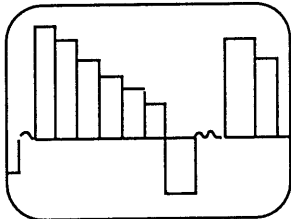


SDA
4,5 v PP Pin 31

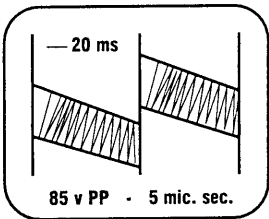


SCL
4,5 v PP Pin 30

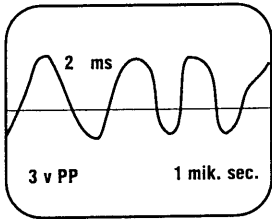
IC 701 TEA-2029
OSCILLOSCOPE WAVE FORMS



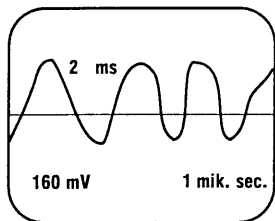
FUBK
0.6 v PP Pin 15



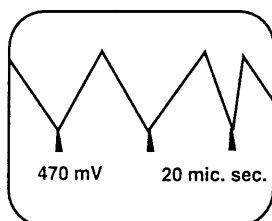
85 v PP - 5 mic. sec.
vert. deflection



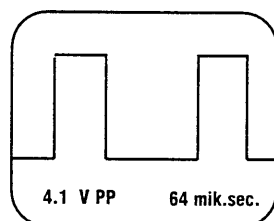
3 v PP
2 ms
1 mik. sec.
Pin 17



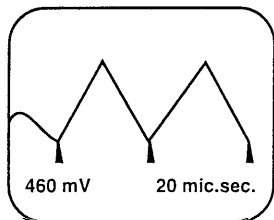
TEA 2029 Pin 18



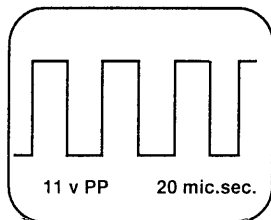
TEA 2029 Pin-2



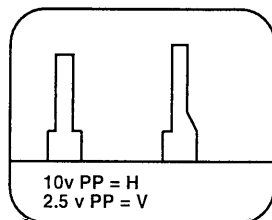
TEA 2029 Pin 10



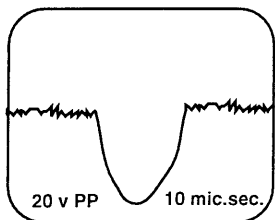
TEA 2029 Pin.1



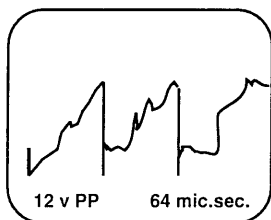
TEA 2029 Pin.4



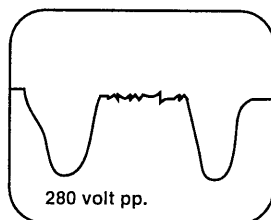
TEA 2029 Pin.11



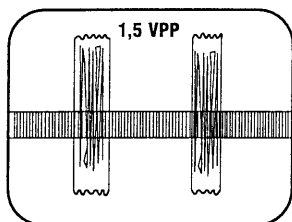
TEA 2029 Pin.12



Base of T802

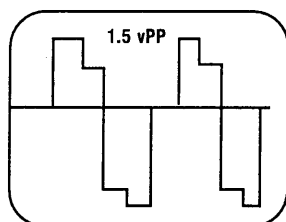


DST Transformer Pin 56



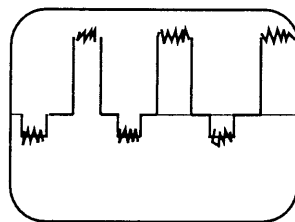
IC 501
R-Y
1.5 v PP

Pin 7

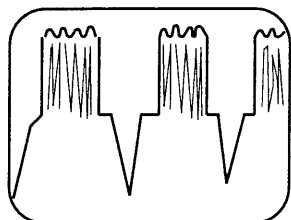


VERTICAL

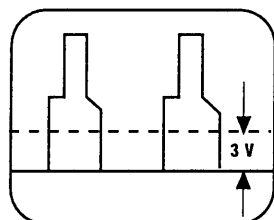
Pin 8



IC 501
Y. Luminans
0.7 v PP

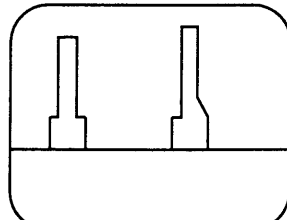


HORIZONTAL



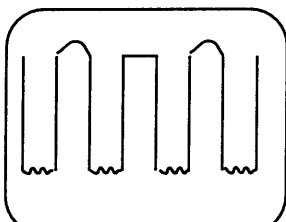
Pin

14
IC 501
SSC
9v PP



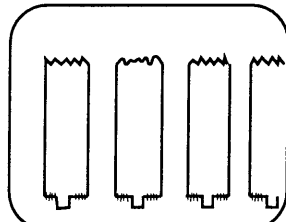
Pin 33

3.6v PP
10 Micro second



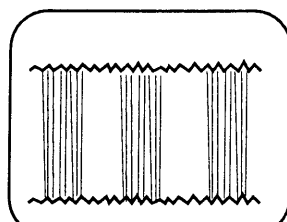
Pin 38

3.5v PP
20 micro second
When OSD visible



Pin 35, 36, 37

R.G.B.
650 m. volt
20 micro second



Pin :23

1.25v PP
20 micro second
When R/C ON

CHANNEL TABLE FOR STANDARD B/G (CCIR)

Channel number (display)	Channel design.	Centre frequency (MHz)	Oscillator frequency (MHz)	Division ratio PLL (decimal)	Channel number (display)	Channel design.	Centre frequency (MHz)	Oscillator frequency (MHz)	Division ratio PLL (decimal)
C01	AU 0	46.25	85.125	1.362	C61	K61	791.25	830.125	13.282
C02	K2	48.25	87.125	1.394	C62	K62	799.25	838.125	13.410
C03	K3	55.25	94.125	1.506	C63	K63	807.25	846.125	13.538
C04	K4	62.25	101.125	1.618	C64	K64	815.25	854.125	13.666
C05	K5	175.25	214.125	3.426	C65	K65	823.25	862.125	13.794
C06	K6	182.25	221.125	3.538	C66	K66	831.25	870.125	13.922
C07	K7	189.25	228.125	3.650	C67	K67	839.25	878.125	14.050
C08	K8	196.25	235.125	3.762	C68	K68	847.25	886.125	14.178
C09	K9	203.25	252.125	3.874	C69	K69	855.25	894.125	14.306
C10	K10	210.25	249.125	3.986	C70	EX	863.25	902.125	14.434
C11	K11	217.25	256.125	4.098	C71	EX	871.25	910.125	14.562
C12	K12	224.25	263.125	4.210	C72	EX	879.25	918.125	14.690
C13	A	53.75	92.625	1.482	C73	EX	887.25	926.125	14.818
C14	B	62.25	101.125	1.618	C74	EX	69.25	108.125	1.730
C15	C	82.25	121.125	1.938	C75	EX	76.25	115.125	1.842
C16	D	175.25	214.125	3.426	C76	EX	83.25	122.125	1.954
C17	E	183.75	222.625	3.562	C77	EX	90.25	129.125	2.066
C18	F	192.25	231.125	3.698	C78	EX	97.25	136.125	2.178
C19	G	201.25	240.125	3.842	C79	201	59.25	98.125	1.570
C20	H	210.25	249.125	3.986	C80	501	93.25	132.125	2.114
C21	K21	475.25	510.125	8.162	S01	S1	105.25	144.125	2.306
C22	K22	479.25	518.125	8.290	S02	S2	112.25	151.125	2.418
C23	K23	487.25	526.125	8.418	S03	S3	119.25	158.125	2.530
C24	K24	495.25	534.125	8.546	S04	S4	126.25	165.125	2.642
C25	K25	503.25	542.125	8.674	S05	S5	133.25	172.125	2.754
C26	K26	511.25	550.125	8.802	S06	S6	140.25	179.125	2.866
C27	K27	519.25	558.125	8.930	S07	S7	147.25	186.125	2.978
C28	K28	527.25	566.125	9.058	S08	S8	154.25	193.125	3.090
C29	K29	535.25	574.125	9.186	S09	S9	161.25	200.125	3.202
C30	R30	543.25	582.125	9.314	S10	S10	168.25	207.125	3.314
C31	R31	551.25	590.125	9.442	S11	S11	231.25	270.125	4.322
C32	K32	559.25	598.125	9.570	S12	S12	238.25	277.125	4.434
C33	K33	567.25	606.125	9.698	S13	S13	245.25	284.125	4.546
C34	K34	575.25	614.125	9.826	S14	S14	252.25	291.125	4.658
C35	K35	583.25	622.125	9.954	S15	S15	259.25	298.125	4.770
C36	K36	591.25	630.125	10.082	S16	S16	266.25	305.125	4.882
C37	K37	599.25	638.125	10.210	S17	S17	273.25	312.125	4.994
C38	K38	607.25	646.125	10.338	S18	S18	280.25	319.125	5.106
C39	K39	615.25	654.125	10.466	S19	S19	287.25	326.125	5.218
C40	K40	623.25	662.125	10.594	S20	S20	294.25	333.125	5.330
C41	K41	631.25	670.125	10.722	S21	S21	303.25	342.125	5.474
C42	K42	639.25	678.125	10.850	S22	S22	311.25	350.125	5.602
C43	K43	647.25	686.125	10.978	S23	S23	319.25	358.125	5.730
C44	K44	655.25	694.125	11.106	S24	S24	327.25	366.125	5.858
C45	K45	663.25	702.125	11.234	S25	S25	335.25	374.125	5.986
C46	K46	671.25	710.125	11.362	S26	S26	343.25	382.125	6.050
C47	K47	679.25	718.125	11.490	S27	S27	351.25	390.125	6.242
C48	K48	687.25	726.125	11.618	S28	S28	359.25	398.125	6.370
C49	K49	695.25	734.125	11.746	S29	S29	367.25	406.125	6.498
C50	K50	703.25	742.125	11.874	S30	S30	375.25	414.125	6.626
C51	K51	711.25	750.125	12.002	S31	S31	383.25	422.125	6.754
C52	K52	719.25	758.125	12.130	S32	S32	391.25	430.125	6.882
C53	K53	727.25	766.125	12.258	S33	S33	399.25	438.125	7.010
C54	K54	735.25	774.125	12.386	S34	S34	407.25	446.125	7.138
C55	K55	743.25	782.125	12.514	S35	S35	415.25	454.125	7.266
C56	K56	751.25	790.125	12.642	S36	S36	423.25	462.125	7.394
C57	K57	759.25	798.125	12.770	S37	S37	431.25	470.125	7.522
C58	K58	767.25	806.125	12.898	S38	S38	439.25	478.125	7.650
C59	K59	775.25	814.125	13.026	S39	S39	447.25	486.125	7.778
C60	K60	783.25	822.125	13.154	S40	S40	455.25	494.125	7.906
					S41	S41	463.25	502.125	8.034

CHANNEL FOR STANDARD I +

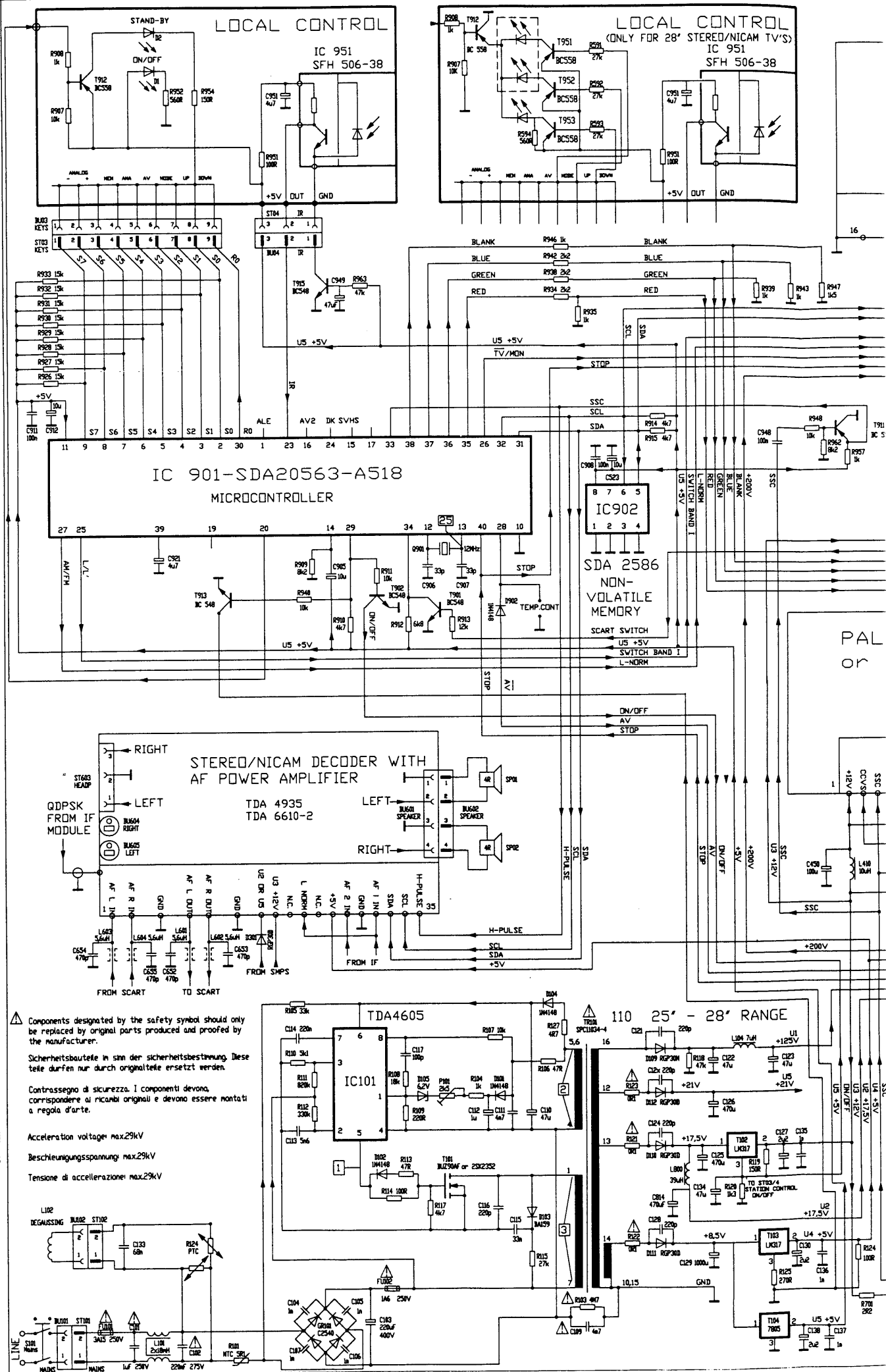
Channel number (display)	Channel design.	Centre frequency (MHz)	Oscillator frequency (MHz)	Division ratio PLL (decimal)	Channel number (display)	Channel design.	Centre frequency (MHz)	Oscillator frequency (MHz)	Division ratio PLL (decimal)
C01	R1	49.75	88.625	1,362	C61	R61	791.25	830.125	13,282
C02	R2	59.25	98.125	1,570	C62	R62	799.25	838.125	13,410
C03	R3	77.25	116.125	1,858	C63	R63	807.25	846.125	13,538
C04	R4	85.25	124.125	1,986	C64	R64	815.25	854.125	13,666
C05	R5	93.25	132.125	2,114	C65	R65	823.25	862.125	13,794
C06	R6	175.25	214.125	3,426	C66	R66	831.25	870.125	13,922
C07	R7	183.25	222.125	3,554	C67	R67	839.25	878.125	14,050
C08	R8	191.25	230.125	3,682	C68	R68	847.25	886.125	14,178
C09	R9	199.25	238.125	3,810	C69	R69	855.25	894.125	14,306
C10	R10	207.25	246.125	3,938	C70	170	863.25	902.125	14,434
C11	R11	215.25	254.125	4,066	C71	171	871.25	910.125	14,562
C12	R12	223.25	262.125	4,194	C72	172	879.25	918.125	14,690
C21	R21	471.25	510.125	8,162	C73	173	887.25	926.125	14,818
C22	R22	469.25	518.125	8,290	S01	S1	103.25	142.125	2,274
C23	R23	487.25	526.125	8,418	S02	S1	111.25	150.125	2,402
C24	R24	495.25	534.125	8,546	S03	S3	119.25	158.125	2,530
C25	R25	503.25	542.125	8,674	S04	S4	127.25	166.125	2,658
C26	R26	511.25	550.125	8,802	S05	S5	135.25	174.125	2,786
C27	R27	519.25	558.125	8,930	S06	S6	143.25	182.125	2,914
C28	R28	527.25	566.125	9,058	S07	S7	151.25	190.125	3,042
C29	R29	535.25	574.125	9,186	S08	S8	159.25	198.125	3,170
C30	R30	543.25	582.125	9,314	S09	S9	167.25	206.125	3,298
C31	R31	551.25	590.125	9,442	S10	S10	231.25	270.125	4,322
C32	R32	559.25	793.125	9,570	S11	S11	239.25	278.125	4,450
C33	R33	567.25	606.125	9,698	S12	S12	247.25	286.125	4,578
C34	R34	575.25	614.125	9,826	S13	S13	255.25	294.125	4,706
C35	R35	583.25	622.125	9,954	S14	S14	263.25	302.125	4,834
C36	R36	591.25	630.125	10,082	S15	S15	271.25	310.125	4,962
C37	R37	599.25	638.125	10,210	S16	S16	279.25	318.125	5,090
C38	R38	607.25	646.125	10,338	S17	S17	287.25	325.125	5,218
C39	R39	615.25	654.125	10,466	S18	S18	295.25	334.125	5,346
C40	R40	623.25	662.125	10,594	S19	S19	303.25	342.125	5,474
C41	R41	631.25	670.125	10,722	S11	S11	311.25	350.125	5,602
C42	R42	639.25	678.125	10,850	S23	S23	319.25	358.125	5,730
C43	R43	647.25	686.125	10,978	S24	S24	327.25	366.125	5,858
C44	R44	655.25	694.125	11,106	S25	S25	335.25	374.125	5,986
C45	R45	663.25	702.125	11,234	S26	S26	343.25	382.125	6,050
C46	R46	671.25	710.125	11,362	S27	S27	351.25	390.125	6,242
C47	R47	679.25	718.125	11,490	S28	S28	359.25	398.125	6,370
C48	R48	687.25	726.125	11,618	S29	S29	367.25	406.125	6,498
C49	R49	695.25	734.125	11,746	S30	S30	375.25	414.125	6,626
C50	R50	703.25	742.125	11,874	S31	S31	383.25	422.125	6,754
C51	R51	711.25	750.125	12,002	S32	S32	391.25	430.125	6,882
C52	R52	719.25	758.125	12,130	S33	S33	399.25	438.125	7,010
C53	R53	727.25	766.125	12,258	S34	S34	407.25	446.125	7,138
C54	R54	735.25	774.125	12,386	S35	S35	415.25	454.125	7,266
C55	R55	743.25	782.125	12,514	S36	S36	423.25	462.125	7,394
C56	R56	751.25	790.125	12,642	S37	S37	431.25	470.125	7,522
C57	R57	759.25	798.125	12,770	S38	S38	439.25	478.125	7,650
C58	R58	767.25	806.125	12,898	S39	S39	447.25	486.125	7,778
C59	R59	775.25	814.125	13,026	S40	S40	455.25	494.125	7,906
C60	R60	783.25	822.125	13,154	S41	S41	463.25	502.125	8,034

CHANNEL TABLE FOR STANDARD D/K (OIRT)

Channel number (display)	Channel design.	Centre frequency (MHz)	Oscillator frequency (MHz)	Division ratio PLL (decimal)	Channel number (display)	Channel design.	Centre frequency (MHz)	Oscillator frequency (MHz)	Division ratio PLL (decimal)
C01	R1	49.75	88.625	1.418	C61	R61	791.25	830.125	13.282
C02	R2	59.25	98.125	1.570	C62	R62	799.25	838.125	13.410
C03	R3	77.25	116.125	1.858	C63	R63	807.25	846.125	13.538
C04	R4	85.25	124.125	1.986	C64	R64	815.25	854.125	13.666
C05	R5	93.25	132.125	2.114	C65	R65	823.25	862.125	13.794
C06	R6	175.25	214.125	3.426	C66	R66	831.25	870.125	13.922
C07	R7	183.25	222.125	3.554	C67	R67	839.25	878.125	14.050
C08	R8	191.25	230.125	3.682	C68	R68	847.25	886.125	14.178
C09	R9	199.25	238.125	3.810	C69	R69	855.25	894.125	14.306
C10	R10	207.25	246.125	3.938					
C11	R11	215.25	254.125	4.066	S01	S1	103.25	142.125	2.274
C12	R12	223.25	262.125	4.194	S02	S2	111.25	150.125	2.402
					S03	S3	119.25	158.125	2.530
C21	R21	471.25	510.125	8.162	S04	S4	127.25	166.125	2.658
C22	R22	479.25	518.125	8.290	S05	S5	135.25	174.125	2.786
C23	R23	487.25	526.125	8.418					
C24	R24	495.25	534.125	8.546	S06	S6	143.25	182.125	2.914
C25	R25	503.25	542.125	8.674	S07	S7	151.25	190.125	3.042
					S08	S8	159.25	198.125	3.170
C26	R26	511.25	550.125	8.802	S09	S9	167.25	206.125	3.298
C27	R27	519.25	558.125	8.930	S10	S10	231.25	270.125	4.322
C28	R28	527.25	566.125	9.058					
C29	R29	535.25	574.125	9.186	S11	S11	239.25	278.125	4.450
C30	R30	543.25	582.125	9.314	S12	S12	247.25	286.125	4.578
					S13	S13	255.25	294.125	4.706
C31	R31	551.25	590.125	9.442	S14	S14	263.25	302.125	4.834
C32	R32	559.25	598.125	9.570	S15	S15	271.25	310.125	4.962
C33	R33	567.25	606.125	9.698					
C34	R34	575.25	614.125	9.826	S16	S16	279.25	318.125	5.090
C35	R35	583.25	622.125	9.954	S17	S17	287.25	326.125	5.218
					S18	S18	295.25	334.125	5.346
C36	R36	591.25	630.125	10.082	S19	S19	303.25	342.125	5.474
C37	R37	599.25	638.125	10.210					
C38	R38	607.25	646.125	10.338	S22	S22	311.25	350.125	5.602
C39	R39	615.25	654.125	10.466	S23	S23	319.25	358.125	5.730
C40	R40	623.25	662.125	10.594	S24	S24	327.25	366.125	5.858
					S25	S25	335.25	374.125	5.986
C41	R41	631.25	670.125	10.722					
C42	R42	639.25	678.125	10.850	S26	S26	343.25	382.125	6.050
C43	R43	647.25	686.125	10.978	S27	S27	351.25	390.125	6.242
C44	R44	655.25	694.125	11.106	S28	S28	359.25	398.125	6.370
C45	R45	663.25	702.125	11.234	S29	S29	367.25	406.125	6.498
					S30	S30	375.25	414.125	6.626
C46	R46	671.25	710.125	11.362					
C47	R47	679.25	718.125	11.490	S31	S31	383.25	422.125	6.754
C48	R48	687.25	726.125	11.618					
C49	R49	695.25	734.125	11.746	S32	S32	391.25	430.125	6.882
C50	R50	703.25	742.125	11.874	S33	S33	399.25	438.125	7.010
					S34	S34	407.25	446.125	7.138
C51	R51	711.25	750.125	12.002	S35	S35	415.25	454.125	7.266
C52	R52	719.25	758.125	12.130	S36	S36	423.25	462.125	7.394
C53	R53	727.25	766.125	12.258					
C54	R54	735.25	774.125	12.386	S37	S37	431.25	470.125	7.522
C55	R55	743.25	782.125	12.514	S38	S38	439.25	478.125	7.650
					S39	S39	447.25	486.125	7.778
C56	R56	751.25	790.125	12.642	S40	S40	455.25	494.125	7.906
C57	R57	759.25	798.125	12.770	S41	S41	463.25	502.125	8.034
C58	R58	767.25	806.125	12.898					
C59	R59	775.25	814.125	13.026					
C60	R60	783.25	822.125	13.154					
C61	K61	791.25	830.125	13.282					
C62	K62	799.25	838.125	13.410					
C63	K63	807.25	846.125	13.538					
C64	K64	815.25	854.125	13.666					
C65	K65	823.25	862.125	13.794					

CHANNEL TABLE FOR STANDARD L

Channel number (display)	Channel design.	Centre frequency (MHz)	Oscillator frequency (MHz)	Division ratio PLL (decimal)	Channel number (display)	Channel design.	Centre frequency (MHz)	Oscillator frequency (MHz)	Division ratio PLL (decimal)
C02	L2	55.75	90.125	1.442	C61	K61	791.25	830.125	13.282
C03	L3	60.50	94.875	1.518	C62	K62	799.25	838.125	13.410
C04	L4	63.75	98.125	1.570	C63	K63	807.25	846.125	13.538
C05	L5	176.00	214.875	3.438	C64	K64	815.25	854.125	13.666
					C65	K65	823.25	862.125	13.794
C06	L6	184.00	222.875	3.566					
C07	L7	192.00	230.875	3.694	C66	K66	831.25	870.125	13.922
C08	L8	200.00	238.875	3.822	C67	K67	839.25	878.125	14.050
C09	L9	208.00	246.875	3.950	C68	K68	847.25	886.125	14.178
C10	L10	216.00	254.875	4.078	C69	K69	855.25	894.125	14.306
					C70	EX	863.25	902.125	14.434
C11	LUX	189.25	228.125	3.650					
C12	K6	182.25	221.125	3.538	S01	B	116.75	155.625	2.490
C13	K8	196.25	235.125	3.762	S02	C	128.75	167.625	2.682
C14	K10	210.25	249.125	3.986	S03	D	140.75	179.625	2.874
					S04	E	152.75	191.625	3.066
C21	K21	471.25	510.125	8.162	S05	F	164.75	203.625	3.258
C22	K22	479.25	518.125	8.290					
C23	K23	487.25	526.125	8.418	S06	G	176.75	215.625	3.450
C24	K24	495.25	534.125	8.546	S07	S	188.75	227.625	3.642
C25	K25	503.25	543.025	8.674	S08	I	200.75	239.625	3.834
					S09	J	212.75	251.625	4.026
C26	K26	511.25	550.125	8.802	S10	K	224.75	263.625	4.218
C27	K27	519.25	558.125	8.930					
C28	K28	527.25	566.125	9.058	S11	L	236.75	275.625	4.410
C29	K29	535.25	574.125	9.186	S12	M	248.75	287.625	4.602
C30	K30	543.25	583.025	9.314	S13	N	260.75	299.625	4.794
					S14	O	272.75	311.625	4.986
C31	K31	551.25	590.125	9.442	S15	P	284.75	323.625	5.178
C32	K32	559.25	598.125	9.570	S16	Q	296.75	335.625	5.370
C33	K33	567.25	606.125	9.698					
C34	K34	575.25	614.125	9.826	S21	S21	303.25	343.025	5.474
C35	K35	583.25	623.025	9.954	S22	S22	311.25	350.125	5.602
					S23	S23	319.25	358.125	5.730
C36	K36	591.25	630.125	10.082	S24	S24	327.25	366.125	5.858
C37	K37	599.25	638.125	10.210	S25	S25	335.25	374.125	5.986
C38	K38	607.25	646.125	10.338					
C39	K39	615.25	654.125	10.466	S26	S26	343.25	383.025	6.050
					S27	S27	351.25	390.125	6.242
C40	K40	623.25	663.025	10.594	S28	S28	359.25	398.125	6.370
C41	K41	631.25	670.125	10.722	S29	S29	367.25	406.125	6.498
C42	K42	639.25	678.125	10.850	S30	S30	375.25	414.125	6.626
C43	K43	647.25	686.125	10.978					
C44	K44	655.25	694.125	11.106	S31	S31	383.25	423.025	6.754
C45	K45	663.25	702.125	11.234	S32	S32	391.25	430.125	6.882
C46	K46	671.25	710.125	11.362	S33	S33	399.25	438.125	7.010
C47	K47	679.25	718.125	11.490	S34	S34	407.25	446.125	7.138
C48	K48	687.25	726.125	11.618	S35	S35	415.25	454.125	7.266
C49	K49	695.25	734.125	11.746	S36	S36	423.25	463.025	7.394
C50	K50	703.25	742.125	11.874					
					S37	S37	431.25	470.125	7.522
C51	K51	711.25	750.125	12.002	S38	S38	439.25	478.125	7.650
C52	K52	719.25	758.125	12.130	S39	S39	447.25	486.125	7.778
C53	K53	727.25	766.125	12.258	S40	S40	455.25	494.125	7.906
C54	K54	735.25	774.125	12.386	S41	S41	463.25	503.025	8.034
C55	K55	743.25	782.125	12.514					
C56	K56	751.25	790.125	12.642					
C57	K57	759.25	798.125	12.770					
C58	K58	767.25	806.125	12.898					
C59	K59	775.25	814.125	13.026					
C60	K60	783.25	822.125	13.154					



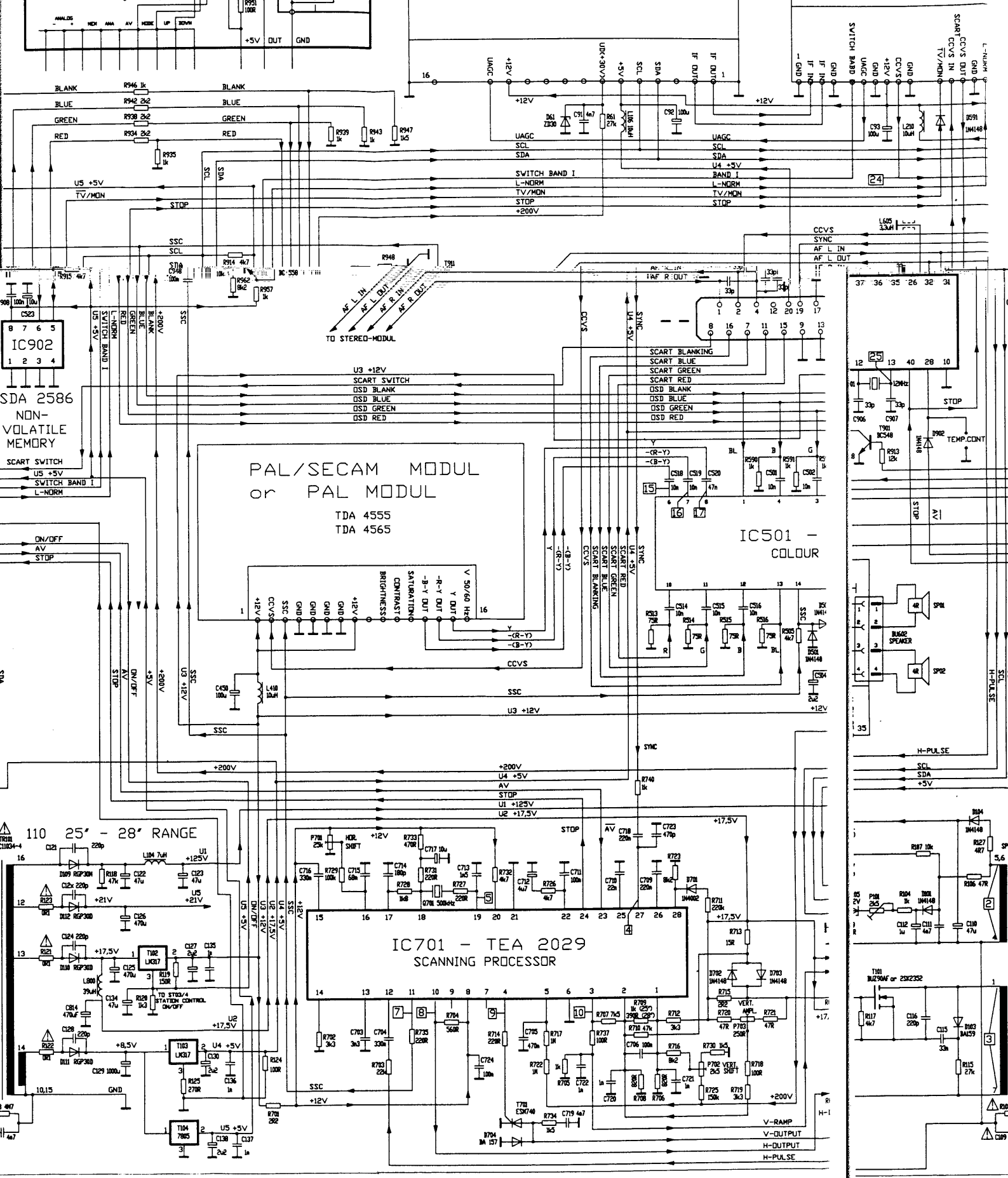
LOCAL CONTROL
(ONLY FOR 28" STEREO/NICAM TV'S)
IC 951
SFH 506-38

TUNER

TFK 2002PHC
MSG TECC2989PA3G
SLCM SK1101

IF STEREO

TDA5830-2
TDA5850
TBA229-2



R

PHC
2989PA3G
01

MODUL

1 - TEA 2029
ANNING PROCESSOR

0

9

8

7

6

5

4

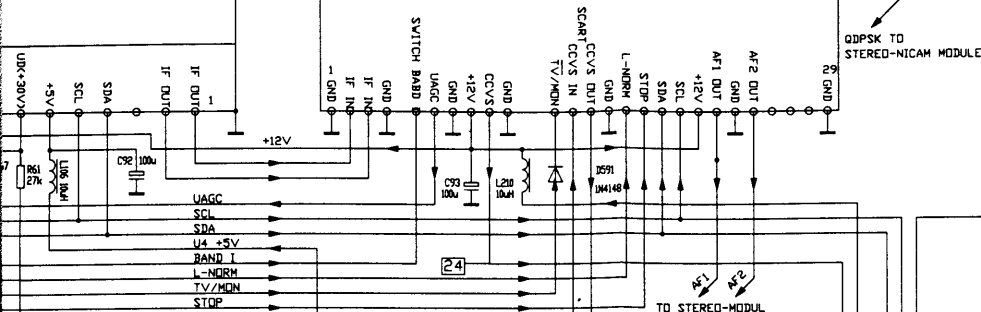
3

2

1

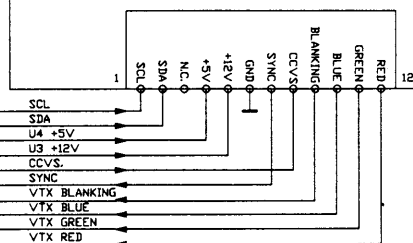
IF STEREO MODUL

TDA5830-2
TDA5850
TBA229-2

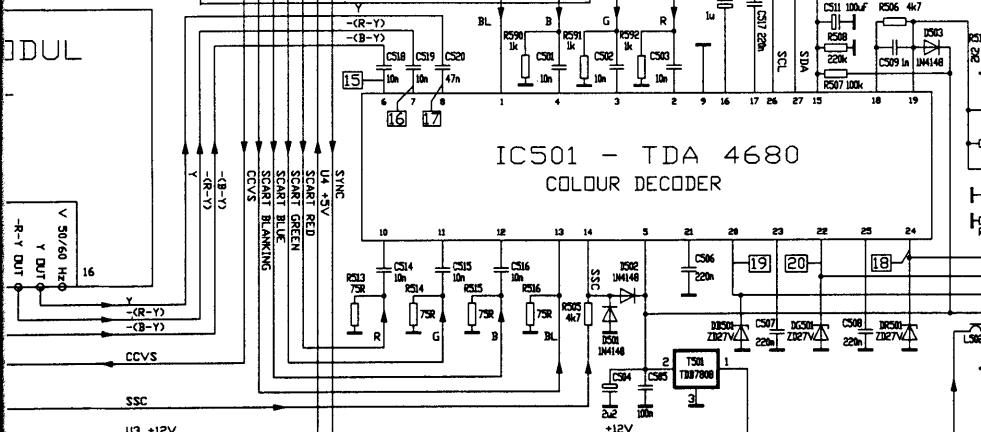


TELETEXT MODUL

SDA 5231
SDA 5248
uPD 4364-15L OR HYB 514256A-10

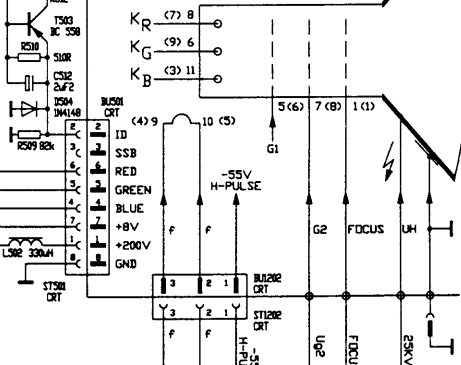


IC501 - TDA 4680 COLOUR DECODER

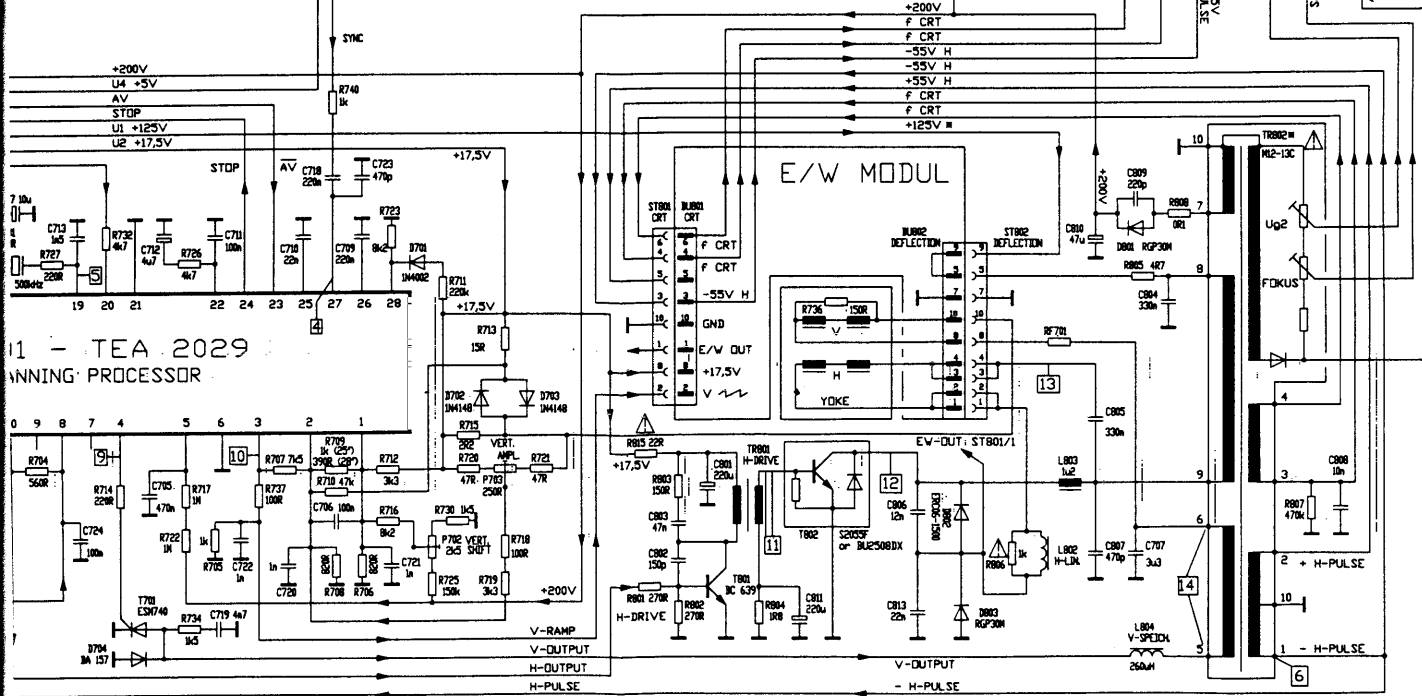


CRT MODUL

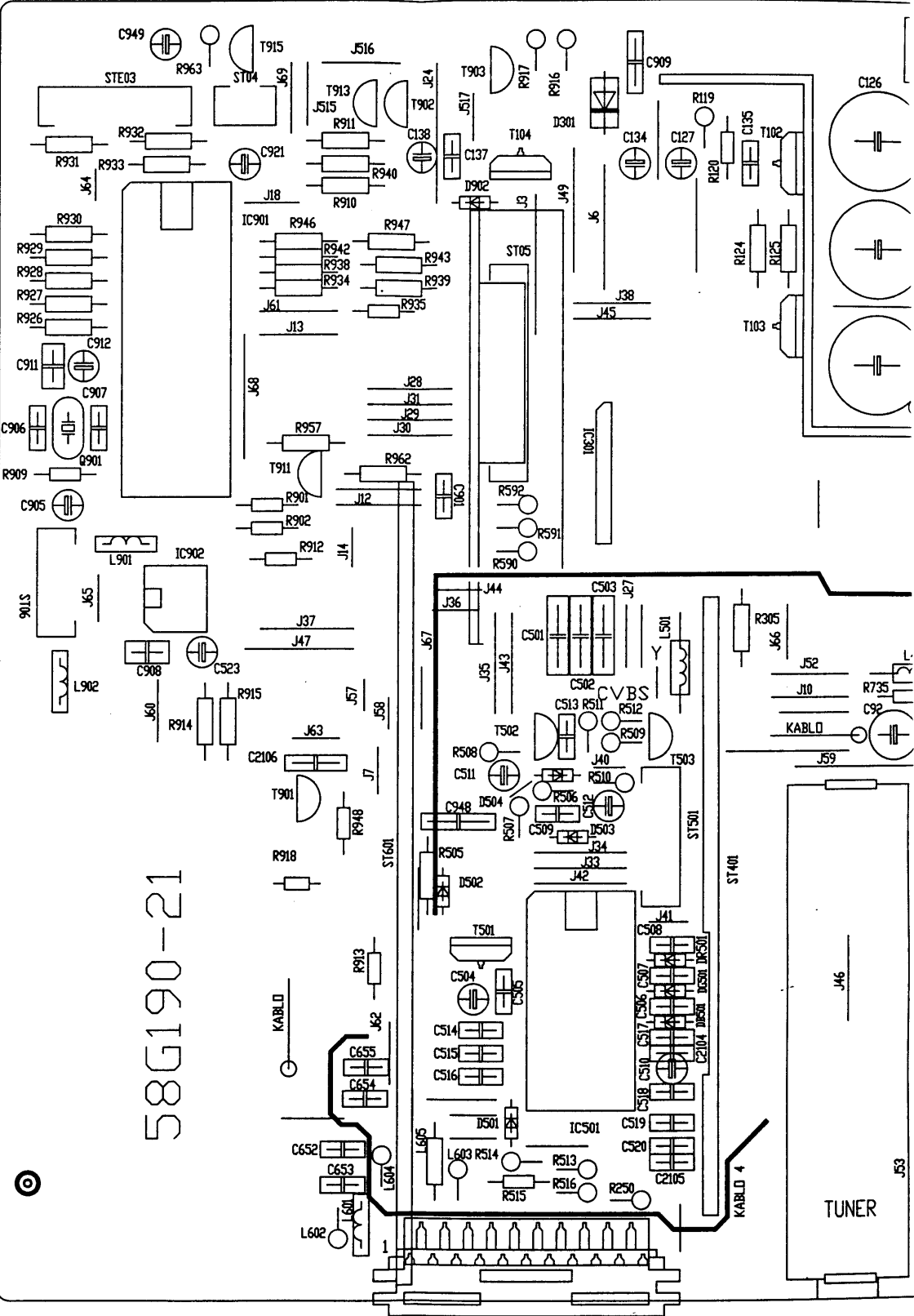
MAX ANODE VOLTAGE IS 29kV

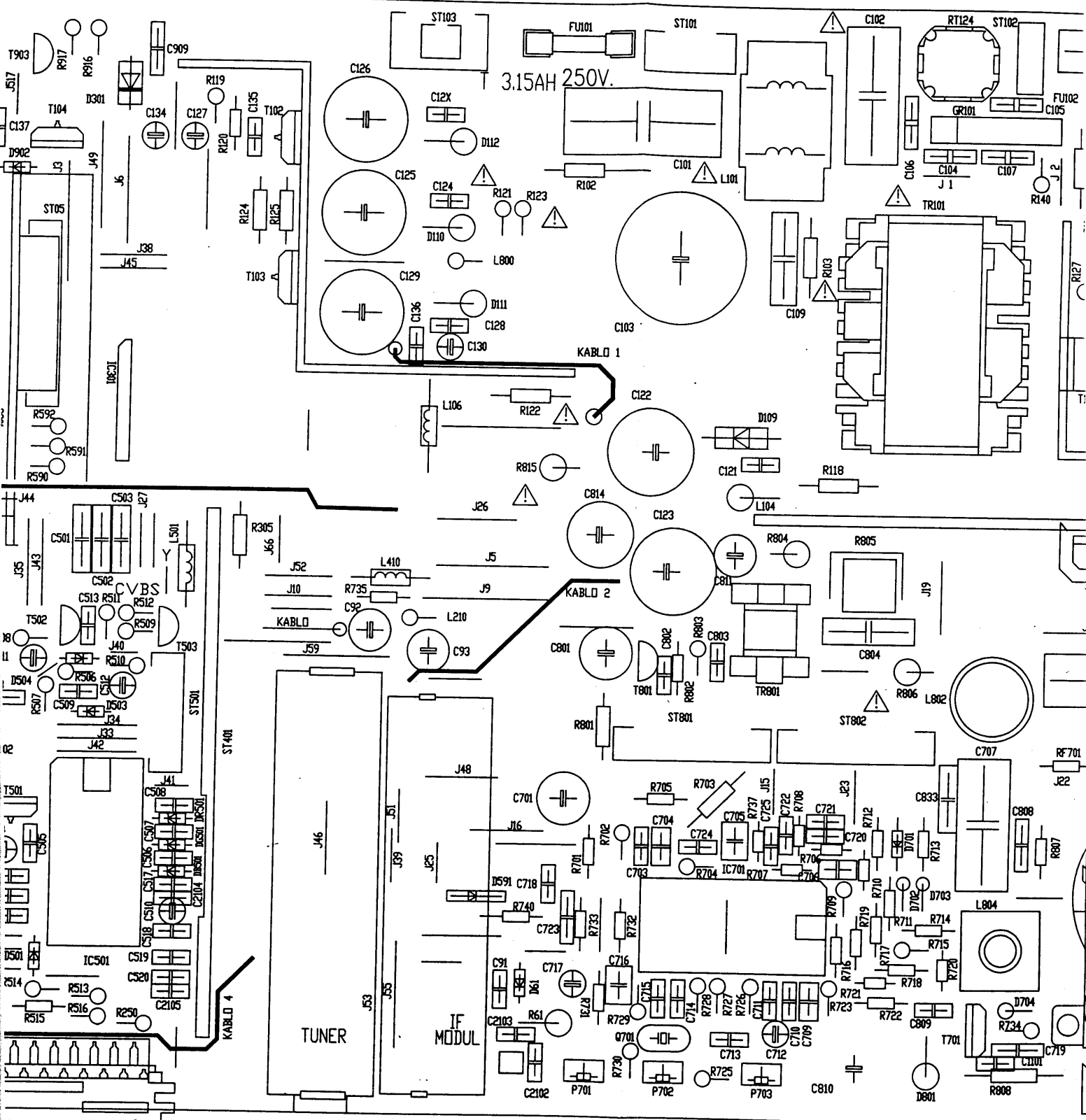


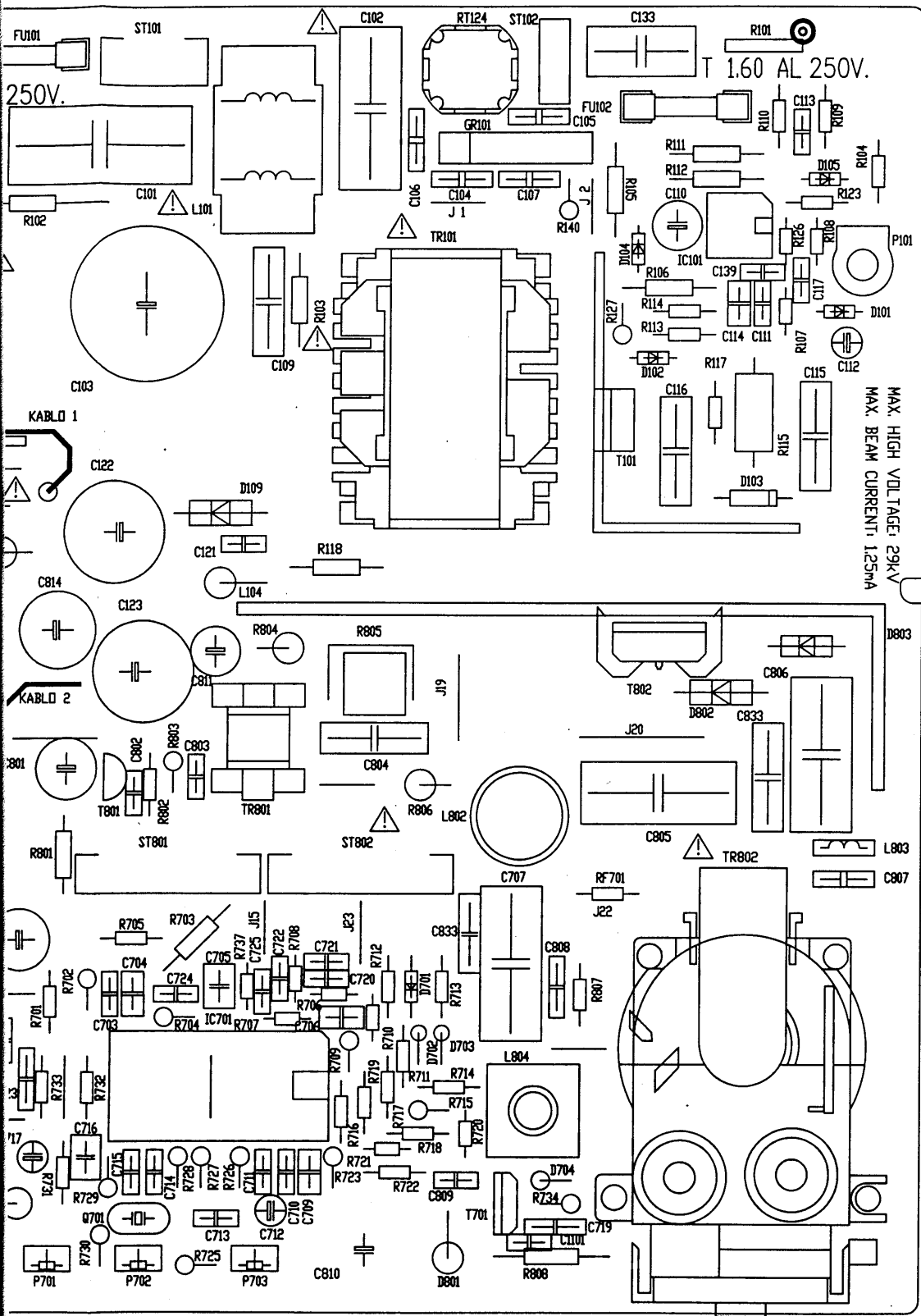
E/W MODUL

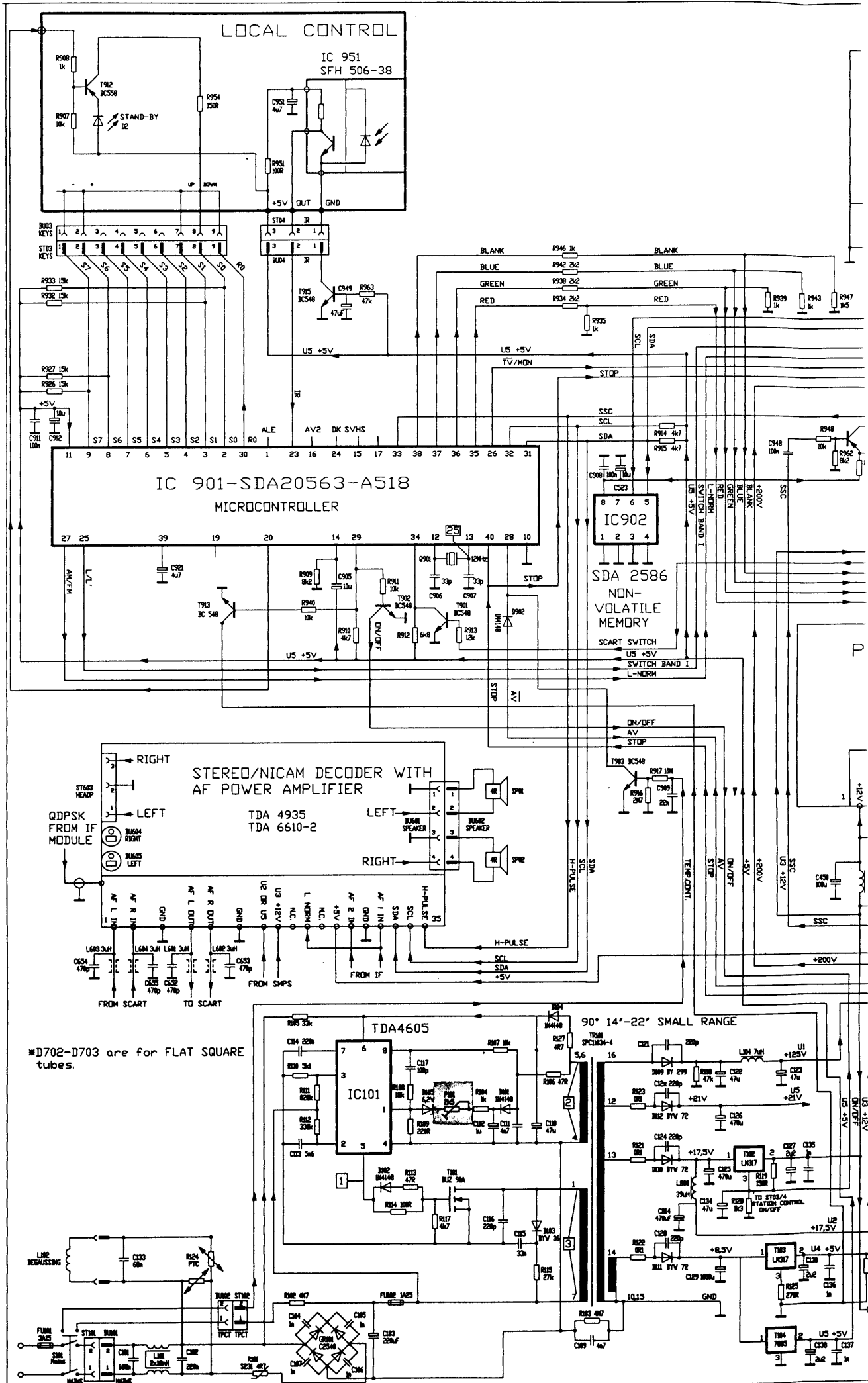


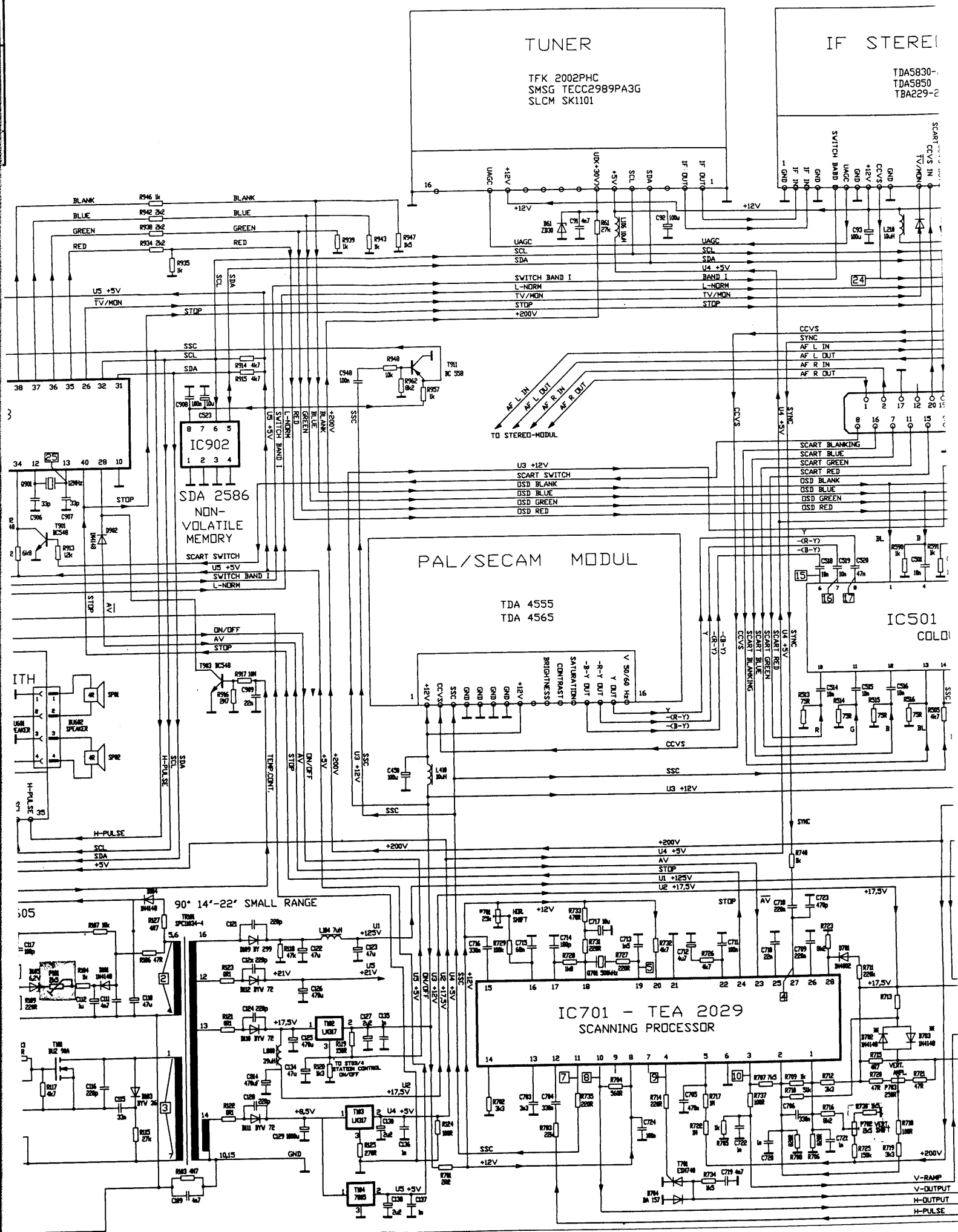
MAIN CHASSIS 110° STEREO







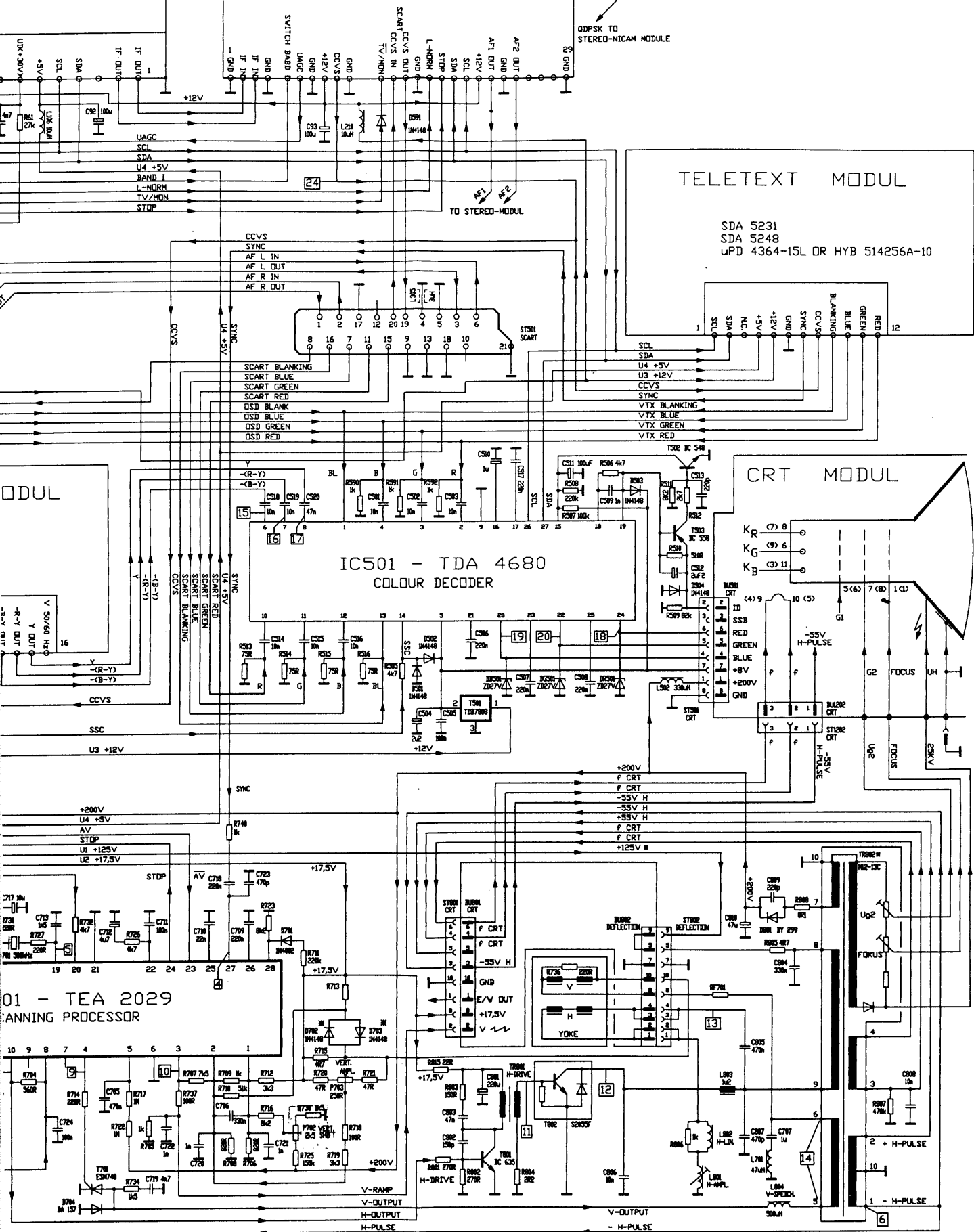




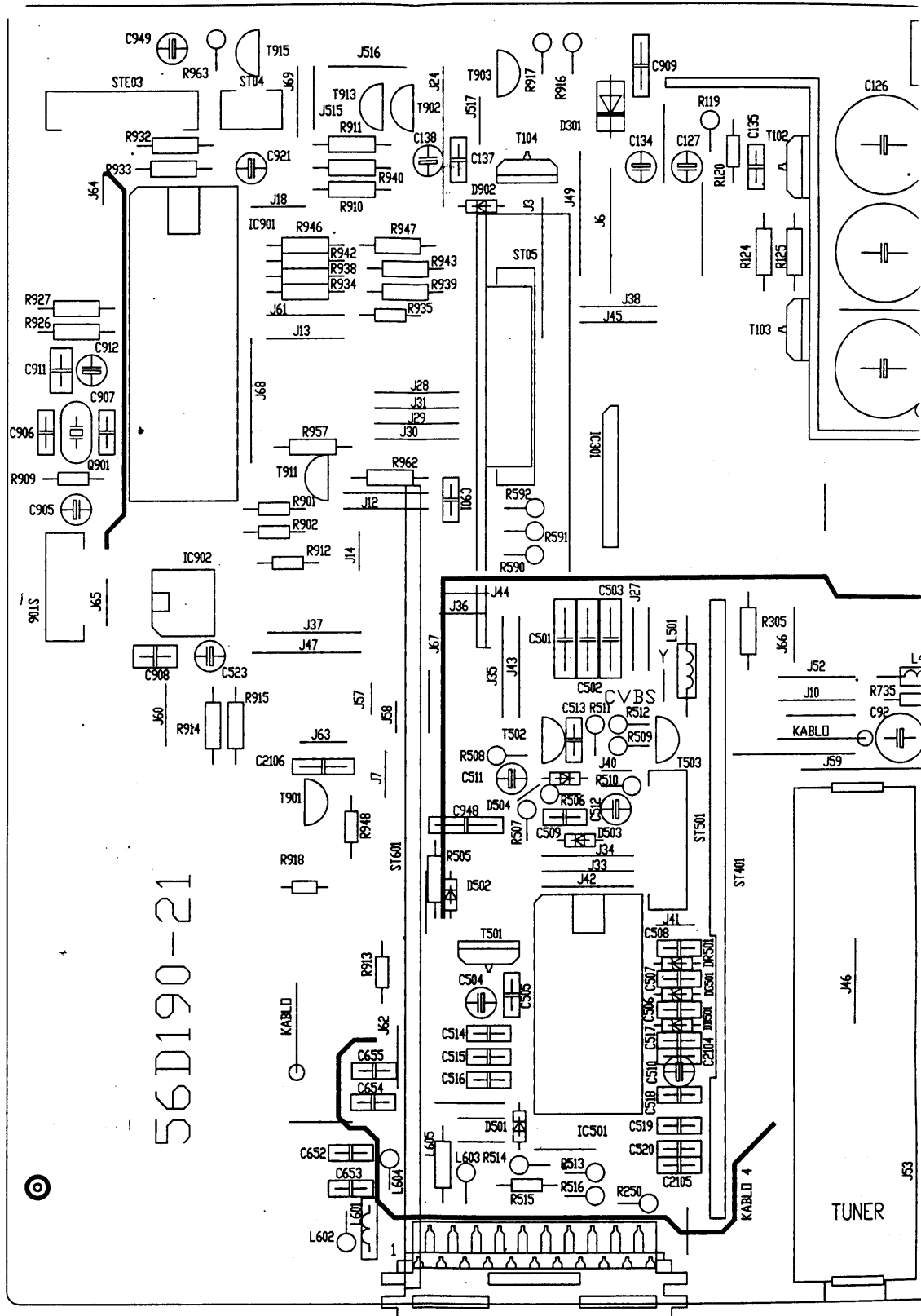
R

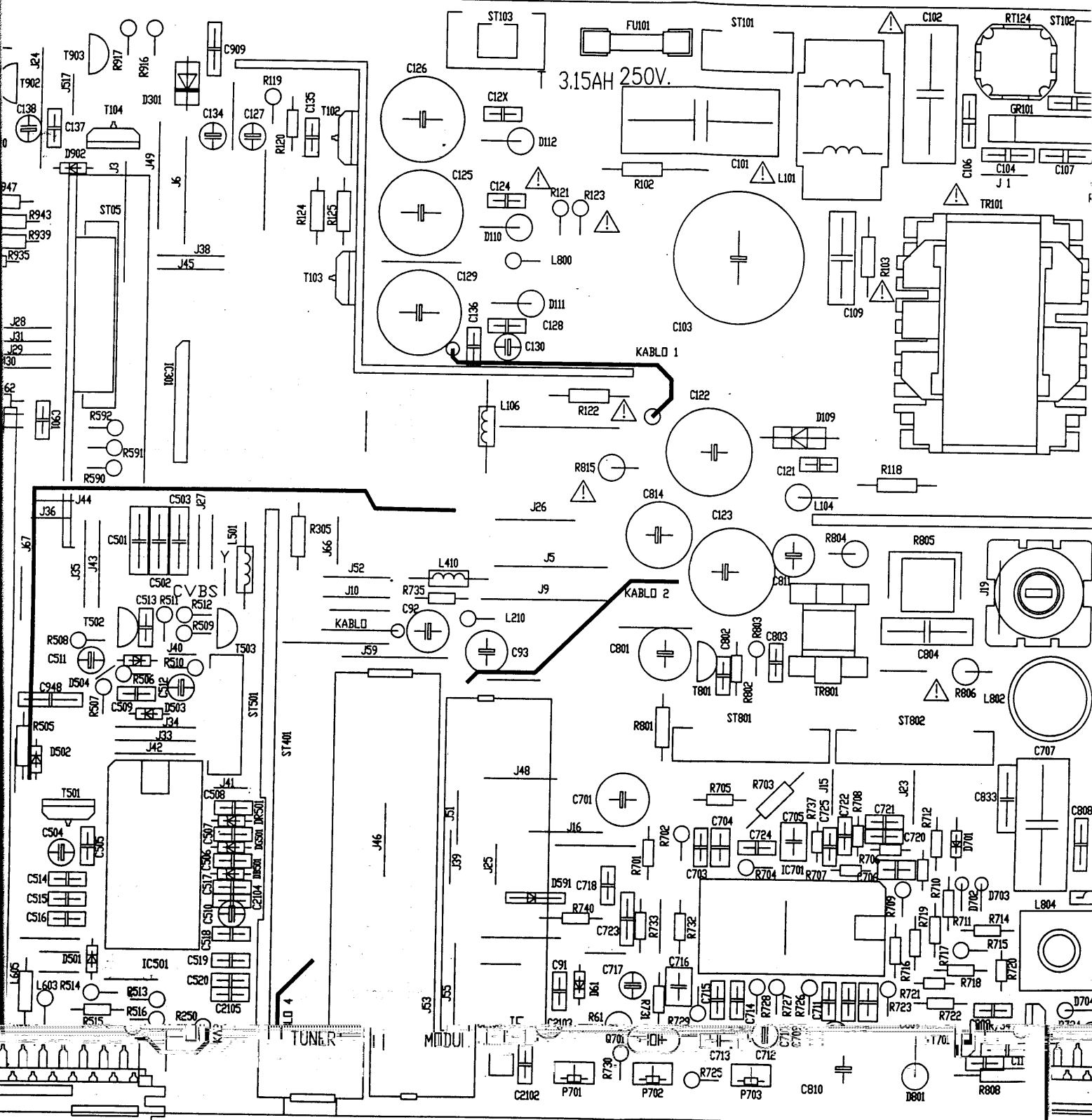
PHC
CC2989PA3G
101

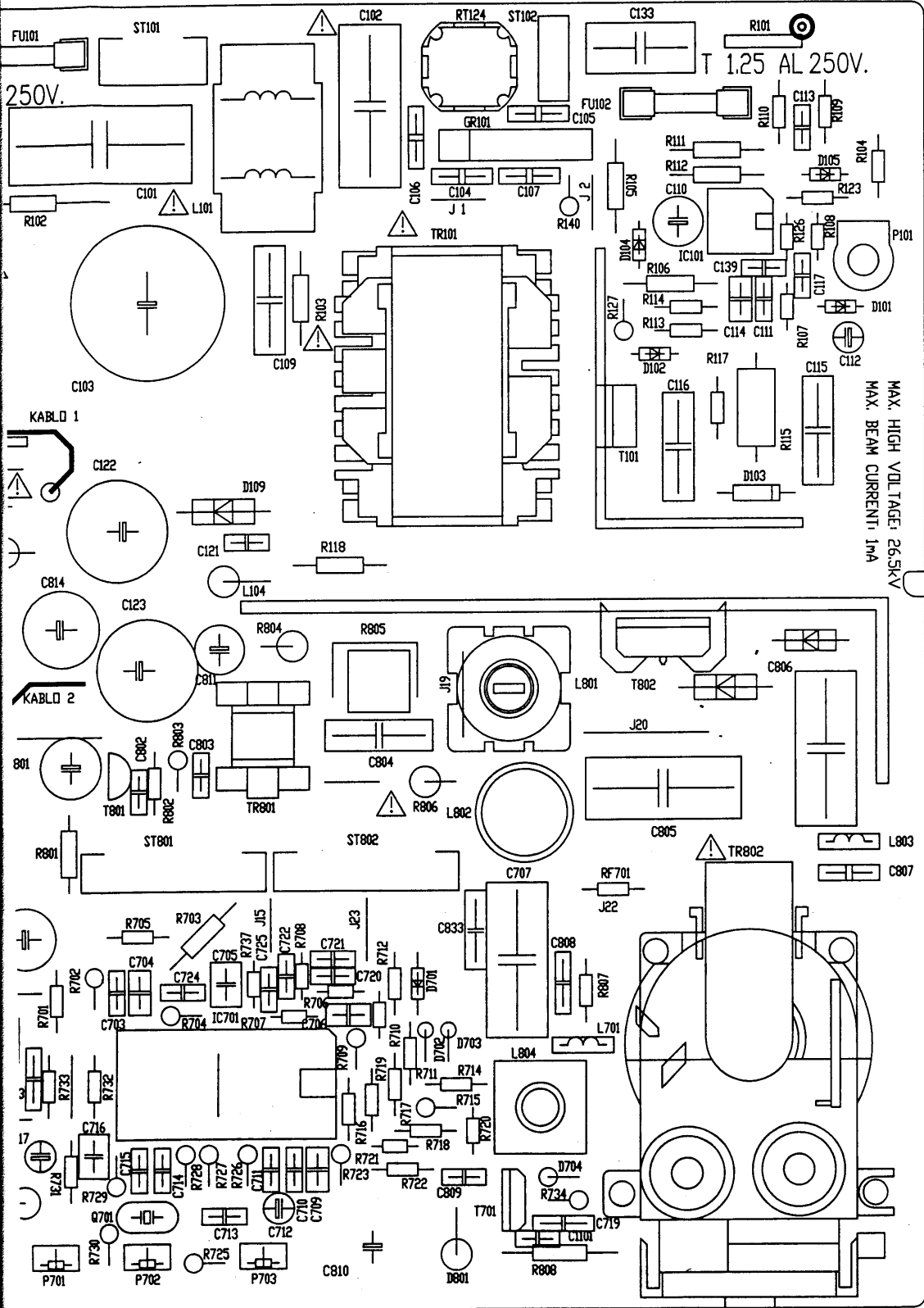
IF STEREO MODUL

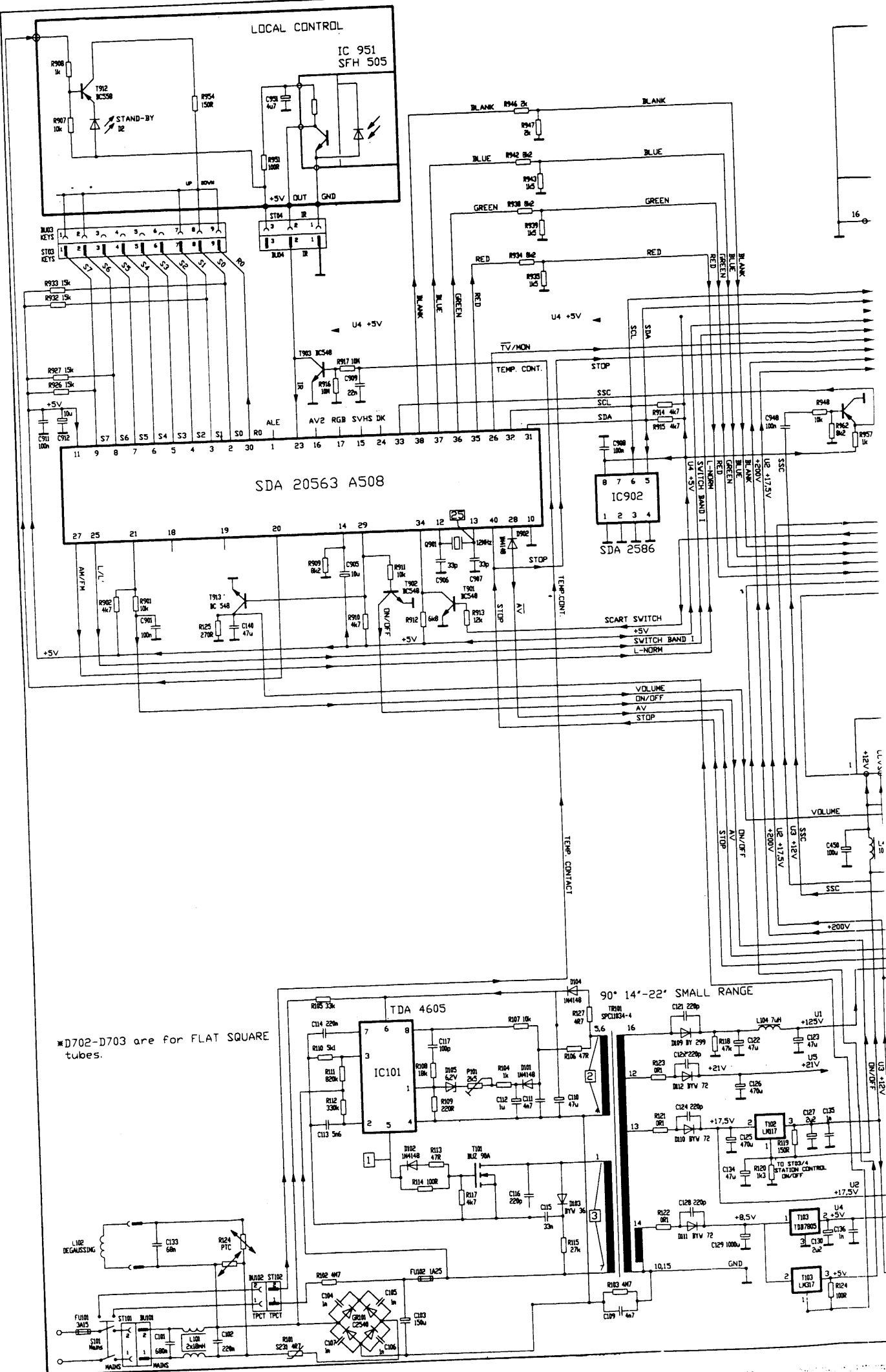
TDA5830-2
TDA5850
TBA229-2

MAIN CHASSIS 90° STEREO









IC 951
SFH 505

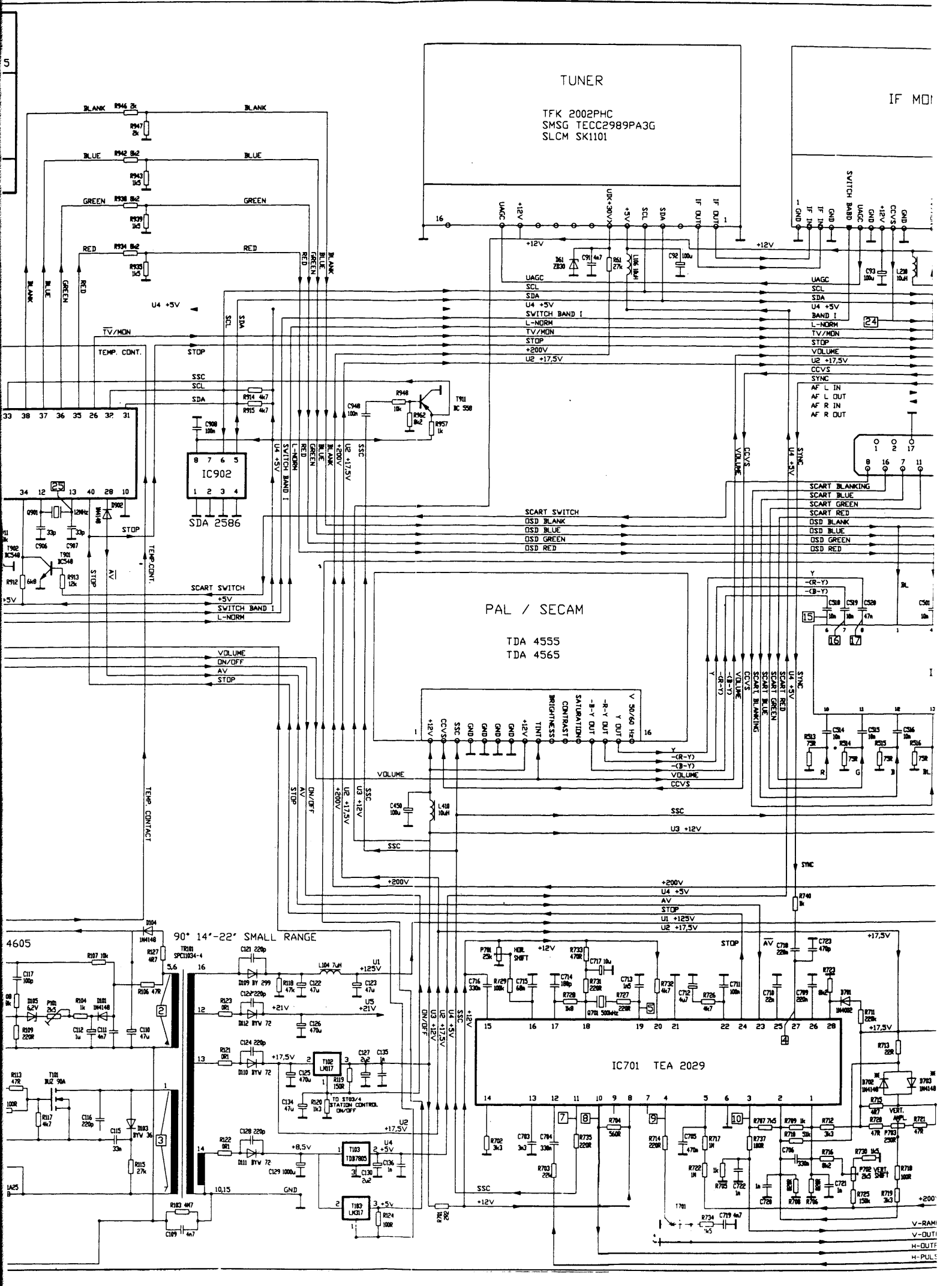
SDA 20563 A508

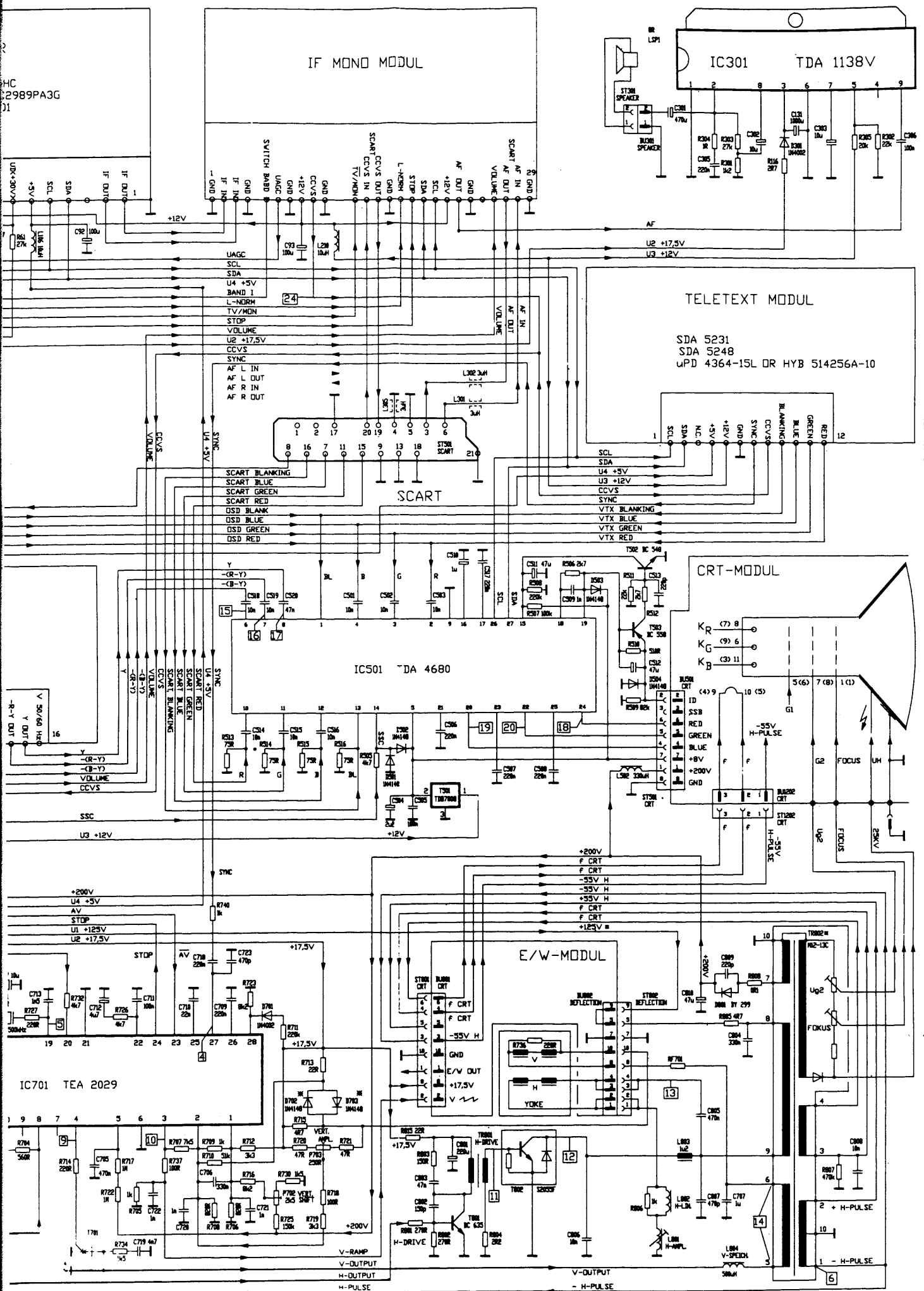
IC902
SDA 2586

TDA 4605

90° 14'-22' SMALL RANGE

*D702-D703 are for FLAT SQUARE tubes.





MAIN CHASSIS 90° MONO

