PROSONIC CTV-21T1

MODEL

SERVICE MANUAL

SERVICE MANUAL

MODEL: SM-1 CHASSIS (MONO)

COLOUR TELEVISION RECEIVER

INDEX

RECOMMENDATION FOR SERVICE REPAIRS

1- Use only original spare parts. Only use components with the same specifications for replacement.
2- Original fuse value only should be used.
3- Main leads and connecting leads should be checked for external damage before connection.
Check the insulation.
4- Parts contributing to the safety of the product must not be damaged or obviously unsuitable.
This is valid especially for insulators and insulating parts.
5- Thermally loaded solder pads are to be sucked off and re-soldered.
6- Ensure that the ventilation slots are not obstructed.
7- Potentials as high as 25 KV are present when this receiver is operating. Operation of the receiver outside the cabinet or with back cover removed involve a shock hazard from the receiver.
Servicing should not be attempted by anyone who is not thoroughly familiar with the precautions necessary when working on high voltage equipment.
Perfectly discharge the high potential of the picture tube before handling the tube. The picture tube is highly evacuated and if broken.
Glass frogments will be violently expelled.
Always discharge the picture tube anode to the receiver chassis to keep of the shock hazard before removing the anode cap.
8- Keep wire away from the high voltage or high temperature components.
9- When replacing a wattage resistor in circuit board, keep the resistor 10 mm away from circuit board.

HANDLING OF MOS CHIP COMPONENTS

Mos circuit requires special attention with regard to static charges. Static charges may occur with any highly insulating plastics and can be transferred to persons wearing clothes and shoes made of synthetic materials. Protective circuits on the inputs and outputs of mos circuits give protection to a limited extend only due to time of reaction.
Please observe the following instructions to protect the components against damage from static charges.
1- Keep mos components in conductive package until they are used. Most components must never be stored in styropor materials or plastic magazines.
2- Persons have to rid themselves of electrostatic charges by touching mos components.
3- Hold the component by the body touching the terminals.
4- Use only grounded instruments for testing and processing purposes.
5- Remove or connect mos ics when operating voltage is disconnected.

X-RAY RADIATION PRECAUTION

1- Excessive high voltage can be produce potentially hazardous X-RAY radiation. To avoid such hazard, the high voltage must not be above the specified limit. The nominal value of the high voltage of this receiver is 25KV at zero beam current (minimum brightness) under 220V AC power source. The high voltage must not under any circumstance, exceed 30KV. It is recommended the reading of the high voltage be recorded as a part of the service record. It is important to use an accurate and reliable high voltage meter.
2- The primary source of X-RAY radiation in this TV receiver is the picture tube. For continued X-RAY radiation protection, the replacement tube must be exactly the same type tube as specified in the part list.

SPECIFICATION

POWER SUPPLIES

Nominal: 220V AC 50 Hz. The chassis is fully mains isolated and is stabilized across mains voltage range from 165V to 265V for less than 0.75 % change in picture size. No mains input adjustment is required.

POWER CONSUMPTION

Typically: 75 W. Maximum: 95 W (for 20" and 21" models)

FREQUENCY COVERAGE

Hyperband (VHF CH 2 to UHF CH 69 including CATV): 47-862 MHz
UHF (CH 21-69): 471-862 MHz

IF FREQUENCIES (in MHz)

	VISION	SOUND
B/G (EUROPE)	: 38.9	33.4
(UK)	: 39.5	33.5
L' (FRANCE)	: 32.7	39.2
L (FRANCE)	: 39.2	32.7
D/K (USSR)	: 38.0	31.5

FOCUS ADJUSTMENT

Adjust the thickness of lines until being minimum, by focus trimpot on the eht transformer. By using cross hatch of multi-burst test pattern.

WHITE BALANCE ADJUSTMENT

1- Apply Philips pattern.
2- Adjust VR53, VR55, are trimpots to middle position and VR51, VR52 and VR54 are trimpots to minimum.
3- Adjust brt, cont, col to min.
4- Adjust at lower grey bar of Philips pattern by screen trimpot that two bars should be seen.
5- Increase brt control little and adjust white balance by using VR51, VR52, VR54 with eyes.
6- Apply white pattern. Settle screen probe of Minolta. Adjust Y=5nits with brightness.
7- Increase contrast adjust X=Y=270÷276nits by means of VR53, VR55.
8- Set contrast to minimum. Adjust X=Y=270÷276nits at Y=5 nits by means of VR51, VR52, VR54.
9- Check white balance at high and low contrast level. Again make adjustment if it's necessary.

AFT ADJUSTMENT

1- Disconnect the if output of tuner from if input.
2- Apply 38.9 MHz signal with signal generator to if input.
3- Connect a digital voltmeter to aft pin of IC476.
4- Adjust T181 coil until the voltage of IC476 is being 2.5Vdc
5- Connect the if input which input is disconnected in the beginning.

NOTE: Aft adjustment will be done at 39.5 MHz on pal I chassis.

FTZT ADJUSTMENT

1- Disconnect the if output of tuner from if input.
2- Apply 30.9 MHz signal with a signal generator.
3- Connect oscilloscope probe L151 by Q151 adjust signal at oscilloscope by T27 coil that the signal should be minimum level.
4- Apply 40.4 MHz signal with a signal generator.
5- Connect oscilloscope probe L151 by Q151 adjust signal at oscilloscope by T26 coil that the signal should be minimum level.
6- Connect the if input which is disconnected in the beginning.

SERVICING ADJUSTMENTS AND ALIGNMENTS

HIGH VOLTAGE TEST

There is no high voltage adjustment component on the chassis. Changing of +120 depends on the supply voltage. If high voltage is to measured.

1- Connect the + probe of high voltage tester to the anode of cpt.
2- Adjust contrast and brightness to minimum.
3- Measure the high voltage as 23.0+5%KVdc for 14". That voltage is 25. 5±5%KVdc KV for 20" (51 cm) screen size.
4- For maximum brightness, high voltage regulation should be 2KVdc max.

AGC ADJUSTMENT

1- Apply Philips pattern signal which is 60 dB uV amplitude (1V) to the rf input.
2- Adjust VR182 until find a picture without snowy.

VERTICAL ADJUSTMENT

1- Apply Philips pattern.
2- Cut down vertical amplitude with VR576.
3- Center picture with three position key.
4- Make vertical adjustment with VR576 that will see lower and top lines of picture.

HORIZONTAL ADJUSTMENT

1- Apply Philips pattern signal.
2- Center the picture while shifting to right and left with VR181.

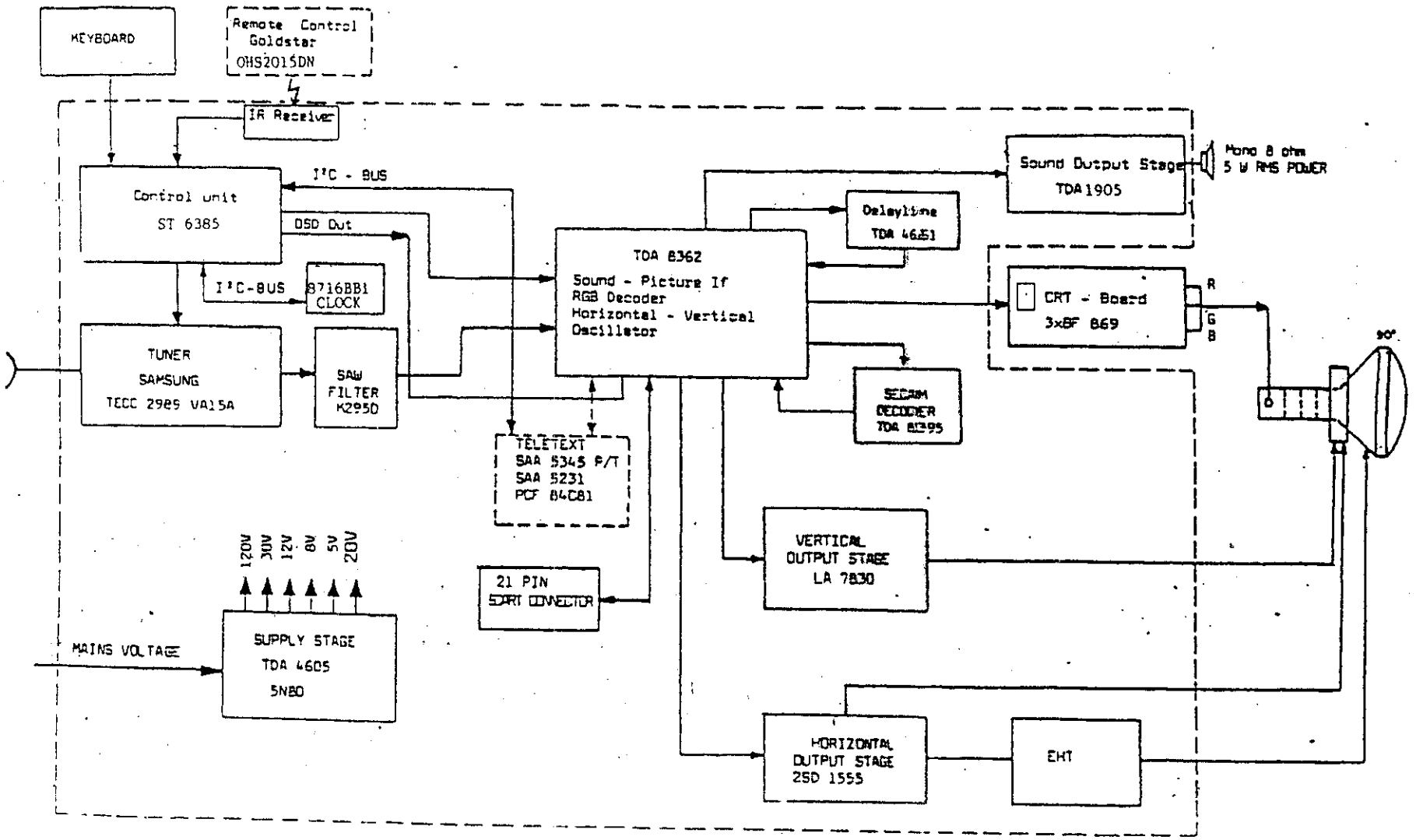
TELETEXT ADJUSTMENT

1- Apply one channel signal with teletext publication.
2- Cut video signal which gone IC730.
3- Stop horizontal shifting of picture with VC 726.
4- Again connect video signal to IC730 and check picture.

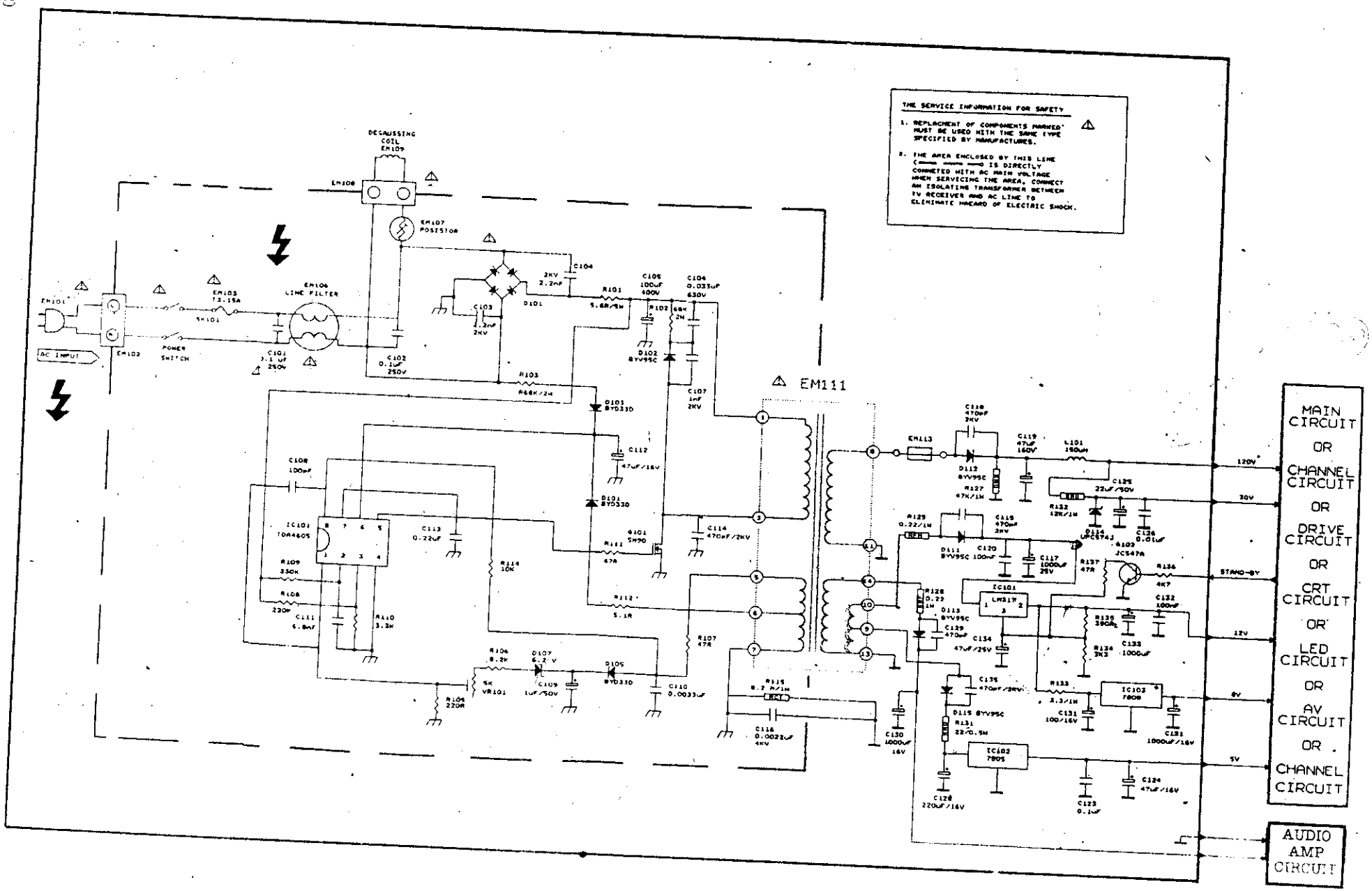
ADJUSTMENT OF SUPPLY VOLTAGE

1- Apply Philips pattern signal.
2- Make the volume, brightness and contrast adjustment to minimum.
3- Adjust the supply voltage on the pin cathode of D112 as Vsys=120±0.5 by using VR101.

SM1 MONO CHASSIS WITH TELETEXT



SWITCH MODE POWER SUPPLY SECTION


THE SERVICE INFORMATION FOR SAFETY
1. REPLACMENT OF COMPONENTS MARKED ⚠ MUST BE USED WITH THE SAME TYPE SPECIFIED BY MANUFACTURES.
2. THE AREA ENCLOSED BY THIS LINE IS DIRECTLY CONNETED WITH AC MAIN VOLTAGE WHEN SERVICING THE AREA, CONNECT AN ISOLATING TRANSFORMER BETWEEN TV RECEIVER AND AC LINE TO ELEIMINATE HAZARD OF ELECTRIC SHOCK.
DEGAUSSING COIL EM109
EM108
EM107 POSISTOR
EM101
EM102
AC INPUT
EM103 T3.15A
EM104 LINE FILTER
POWER SWITCH
C101 0.1 uF 250V
C102 0.1uF 250V
C103 2.2nF 2KV
D101
C104 2KV 2.2nF
R101 5.6R/5W
C105 100uF 400V
C106 0.033uF 630V
R102 68K 2W
D102 BYV95C
C107 1nF 2KV
R103 R68K/2W
D103 BYD330
C112 47uF/16V
D104 BYD330
C108 100pF
IC101 TDA4605
C113 0.22uF
R109 330K
R108 220R
C111 6.8nF
R110 3.3K
R114 10K
R111 47R
Q101 SK90
R112 5.1R
R107 47R
R104 8.2K
D107 6.2 V
C109 1uF/50V
VR101 5K
R105 220R
D105 BYD330
C110 0.0033uF
R115 8.2 M/1W
C116 0.0022uF 4KV
C114 470pF/2KV
EM111
EM113
C118 470pF 2KV
C119 47uF 160V
L101 150uH
D112 BYV95C
R127 47K/1W
C125 22uF/50V
R132 12K/1W
D114 UF-C674J
C126 0.01uF
R129 0.22/1W
D111 BYV95C
C120 100nF
C117 1000uF 25V
Q102 JCS47A
R137 47R
R136 4K7
R128 0.22 1W
D113 BYV95C
C129 470nF
C134 47uF/25V
IC101 LM317
R135 390R
C132 100nF
C133 1000uF
R134 3K3
C135 470nF/25V
D119 BYV95C
R131 22/0.5W
R133 3.3/1W
C131 100/16V
IC103 7809
C121 1000uF/16V
IC102 7805
C128 220uF/16V
C123 0.1uF
C124 47uF/16V
120V
30V
STAND-BY
12V
8V
5V
MAIN CIRCUIT OR CHANNEL CIRCUIT OR DRIVE CIRCUIT OR CRT CIRCUIT OR LED CIRCUIT OR AV CIRCUIT OR CHANNEL CIRCUIT
AUDIO AMP CIRCUIT

SWITCHED MODE POWER SUPPLY STAGE

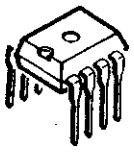
(IC101) TDA4605 and 5N90 mos transistor are used in SMPS circuit. The circuit operates between 165 and 265 V AC (50 Hz) C101, EM106, C102 filter circuit prevents the network noises and the effects of high frequency which is produced in TV set. After rectifying DC voltage is filtered by using C105. The start-up voltage of TDA4605 is obtained from R103 at the same a square wave is produced from pin 5 of IC (TDA4605). This square wave reaches Q101 passing through R111. After that Q101 from and induction on EM111, which produces a voltage on pin 6. This voltage rectified by D101 is used as supply voltage of IC101. IC101 does not operates SMPS by stopping pulses at pin 5 when the network is higher or lower than fixed limits. Pin 2 is control input of overload. If secondary is overload. SMPS is not operated by pin 2.

TDA 4605

Control IC for Switched-Mode Power Supplies using MOS Transistors (IC 101)

FEATURES

- Fold-back characteristic provides overload protection for external components
- Burst operation under short-circuit conditions
- Loop error protection
- Switch-off if line voltage is too low (undervoltage switch-off)
- Line voltage compensation of overload point
- Soft start for quiet start-up
- Chip over-temperature protection (thermal shutdown)
- On-chip parasitic transformer oscillation suppression circuitry



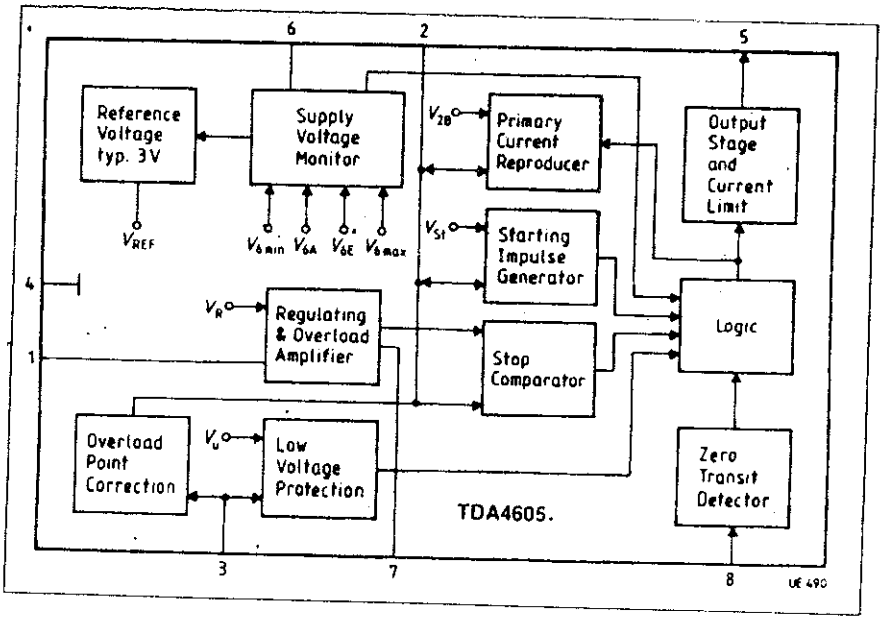
VPD 05025

P-DIP-8

The IC TDA 4605 controls the MOS-power transistor and performs all necessary regulation and monitoring functions in free running flyback converters. Since good load regulation over a wide load range is attained, this IC is applicable tor consumer and industrial power supplies.

The serial circuit of power transistor and primary winding of the flyback transformer is connected to the input voltage. During the switch-on period of the transistor, energy is stored in the transformer and during the switch-off period it is fed to the load via the secondary winding. By varying switch-on time of the power transistor, the IC controls each portion of energy transferred to the secondary side such that the output voltage remains nearly independent ot load variations.

The required control information is taken from the input voltage during the switch-on period and from a regulation winding during the swich off period.



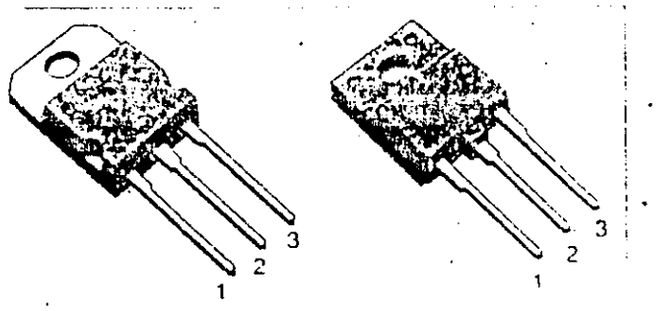
Pin Definitions and Functions

Pin No.	Function
1	**Regulating Voltage:** Information input concerning secondary voltage. By comparing the regulating voltage - obtained from the regulating winding at the transformer - with the internal reference voltage, the outpout impulse width on pin 5 is adapted to the load at the secondary side (normal, overload, short circuit, no load).
2	**Primary Current Simulation:** Information input regarding the primary current. The primary current rise in the primary winding is simulated at pin 2 as a voltage rise by means at external RC-element. When a value is reached that is derived from the regulating voltage at pin 1, the output impulse at pin 5 is terminated. The RC-element serves to set the maximum power at the overload point set.
3	**Primary Voltage Detector:** Input for primary voltage monitor. When the line voltage is too low, the IC is switched off by comparing V_3 with an internal reference. Voltage at pin 3 is used for overload point compensation. Overload point compensation will work 7 times the under voltage limit set.
4	**Ground**
5	**Output:** Push-pull-output provides ± 1 A for rapid charge and discharge of the gate capacitance at the power MOS transistor.
6	**Supply Voltage:** Supply voltage input. From it a stable internal reference voltage V_{REF} and the switching thresholds V_{6A}, V_{6E}, $V_{6\ max}$ and $V_{6\ min}$ for the supply voltage detector is formed. If $V_6 > V_{6E}$ then V_{REF} is switched on and swiched off when $V_6 < V_{6A}$. In addition the logic is only enable tor V6 min > V6.
7	**Soft-Start:** Input for soft start. Start up will begin with short pulses by connecting a capacitor from pin 7 to ground.
8	**Zero Detector:** Input tor the oscillation feedback. After starting oscillation, every zero transit of the feedback voltage (falling edge) triggers an output impulse at pin 5. The trigger threshold is at 50 mV typical.

STH5N90
STH5N90FI
N-CHANNEL ENHANCEMENT MODE
POWER MOS TRANSISTOR (Q101)

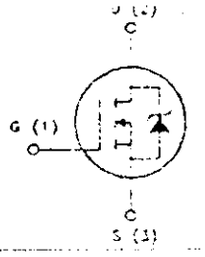
TYPE	V_{DSS}	$R_{DS(on)}$	I_D
STH5N90	900 V	< 2.4 Ω	5.3 A
STH5N90FI	900 V	< 2.4 Ω	3.5 A

- Typical $R_{DS(on)}$ = 1.9 Ω
- Avalanche Rugged technology
- 100% avalanche tested
- Repetitive avalanche data at 100°C
- Low input capacitance
- Low gate charge
- Application oriented characterization



TO-218 ISOWATT218

INTERNAL SCHEMATIC DIAGRAM



APPLICATIONS
- High current, high speed switching
- Switch mode power supplies (SMPS)
- Consumer and industrial lighting
- DC-AC inverters for welding equipment and uninterruptible power supply (UPS

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value		Unit
		STH5N90	STH5N90FI	
V_{DS}	Drain-source Voltage (V_{GS} = 0)	900		V
V_{DGR}	Drain-gate Voltage (R_{GS} = 20 kΩ)	900		V
V_{GS}	Gate-source Voltage	± 20		V
I_D	Drain Current (continuous) at T_C = 25 °C	5.3	3.5	A
I_D	Drain Current (continuous) at T_C = 100 °C	3.3	2.2	A
I_{DM} (•)	Drain Current (pulsed)	20	20	A
P_{tot}	Total Dissipation at T_C = 25 °C	150	60	W
	Derating Factor	1.2	0.48	W/°C
V_{ISO}	Insulation Withstand Voltage (DC)		4000	V
T_{stg}	Storage Temperature	-65 to 150		°C
T_j	Max. Operating Junction Temperature	150		°C

(•) *Pulse width limited by safe operating area*

			TO-218	ISOWATT218	
$R_{thj\text{-}case}$	Thermal Resistance Junction-case	Max	0.83	2.08	°C/W
$R_{thj\text{-}amb}$	Thermal Resistance Junction-ambient	Max	30		°C/W
$R_{thc\text{-}sink}$	Thermal Resistance Case-sink	Typ	0.1		°C/W
T_l	Maximum Lead Temperature For Soldering Purpose		300		°C

AVALANCHE CHARACTERISTICS

Symbol	Parameter	Max Value	Unit
I_{AR}	Avalanche Current, Repetitive or Not-Repetitive (pulse width limited by T_j max, $\delta < 1\%$)	5.3	A
E_{AS}	Single Pulse Avalanche Energy (starting Tj = 25 °C, $I_D = I_{AR}$, V_{DD} = 50 V)	300	mJ
E_{AR}	Repetitive Avalanche Energy (pulse width limited by T_j max, $\delta < 1\%$)	14	mJ
I_{AR}	Avalanche Current, Repetitive or Not-Repetitive (T_c = 100 °C, pulse width limited by T_j max, $\delta < 1\%$)	3.1	A

ELECTRICAL CHARACTERISTICS (T_{case} = 25 °C unless otherwise specified)

OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source Breakdown Voltage	I_D = 250 µA V_{GS} = 0	900			
I_{DSS}	Zero Gate Voltage Drain Current (V_{GS} = 0)	V_{DS} = Max Rating V_{DS} = Max Rating x 0.8 T_c = 125 °C			250 1000	µA µA
I_{GSS}	Gate-body Leakage Current (V_{DS} = 0)	V_{GS} = ± 20 V			± 100	nA

ON (*)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS} I_D = 250 µA	2	3	4	V
$R_{DS(on)}$	Static Drain-source On Resistance	V_{GS} = 10V I_D = 2.5 A V_{GS} = 10V I_D = 2.5 A T_c = 100 °C		1.9	2.4 4.8	Ω Ω
$I_{D(on)}$	On State Drain Current	$V_{DS} > I_{D(on)} \times R_{DS(on)max}$ VGS = 10 V	5.3			A

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g_{fs} (*)	Forward Transconductance	$V_{DS} > I_{D(on)} \times R_{DS(on)max}$ I_D = 2.5 A	2	4		S
C_{iss}	Input Capacitance	V_{DS} = 25 V f = 1 MHz V_{GS} = 0		1190	1450	pF
C_{oss}	Output Capacitance			165	200	pF
C_{rss}	Reverse Transfer Capacitance			70	85	pF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Time	V_{DD} = 400 V I_D = 2.5 A		50	65	ns
t_r	Rise Time	R_G = 50 Ω V_{GS} = 10 V (see test circuit, figure 3)		85	105	ns
$(di/dt)_{on}$	Turn-on Current Slope	V_{DD} = 640 V I_D = 5.5 A R_G = 50 Ω V_{GS} = 10 V (see test circuit, figure 5)		200		A/µs
Q_g	Total Gate Charge	V_{DD} = V I_D = 6 A V_{GS} = 10 V		75	95	nC
Q_{gs}	Gate-Source Charge			9		nC
Q_{gd}	Gate-Drain Charge			33		nC

SWITCHING OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{r(Voff)}$	Off-voltage Rise Time	V_{DD} = 640 V I_D = 5.5 A		120	150	ns
t_f	Fall Time	R_G = 50 Ω V_{GS} = 10 V		30	40	ns
t_c	Cross-over Time	(see test circuit, figure 5)		160	200	ns

SOURCE DRAIN DIODE

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD}	Source-drain Current				5.3	A
I_{SDM} (•)	Source-drain Current (pulsed)				20	A
V_{SD} (*)	Forward On Voltage	I_{SD} = 5.3 A V_{GS} = 0			2	V
t_{rr}	Reverse Recovery Time	I_{SD} = 5.3 A di/dt = 100 A/µs V_{DD} = 80 V T_j = 150°C (see test circuit, figure 5)		700		ns
Q_{rr}	Reverse Recovery Charge			7.7		µC
I_{RRM}	Reverse Recovery Current			22		A

(*) *Pulsed: Pulse duration = 200 µs, duty cycle 15%* (•) *Pulse width limited by safe operating area*

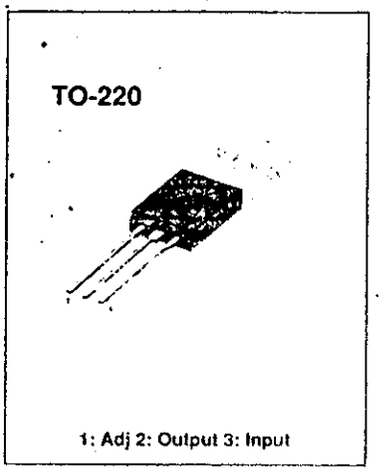
Safe Operating Areas For TO-218

Safe Operating Areas For ISOWATT218

LM317
LINEAR INTEGRATED CIRCUIT

3-TERMINAL POSITIVE ADJUSTABLE REGULATOR

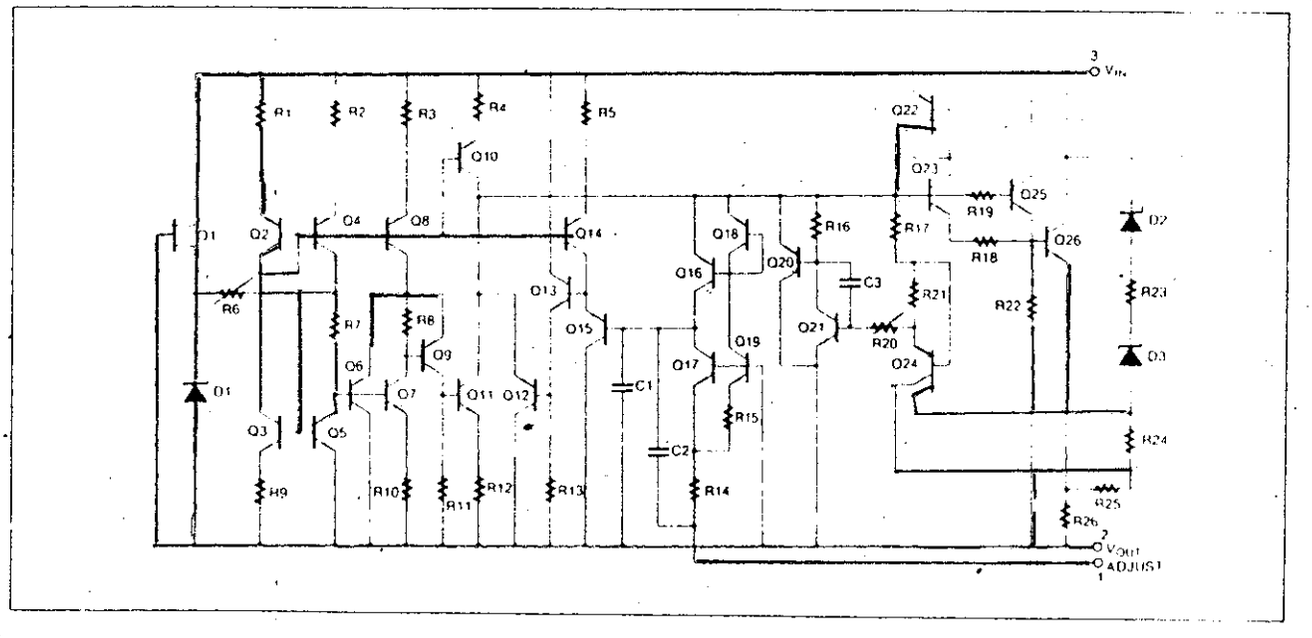
The LM317 is a 3-terminal adjustable positive voltage regulator capable of supplying in excess of 1.5A over an output voltage range of 1.2V to 37V. This voltage regulator is exceptionally easy to use and requires only two external resistors to set the output voltage. Further, it employs internal current-limiting, thermal-shutdown and safe area compensation, making it essentially blow-out proof. The LM317 serves a wide variety of applications including local, on card regulation. This device also makes an especially simple adjustable switching regulator, and a programmable output regulator, or by connecting a fixed resistor between the adjustment and output, the LM317 can be used as a precision current regulator.



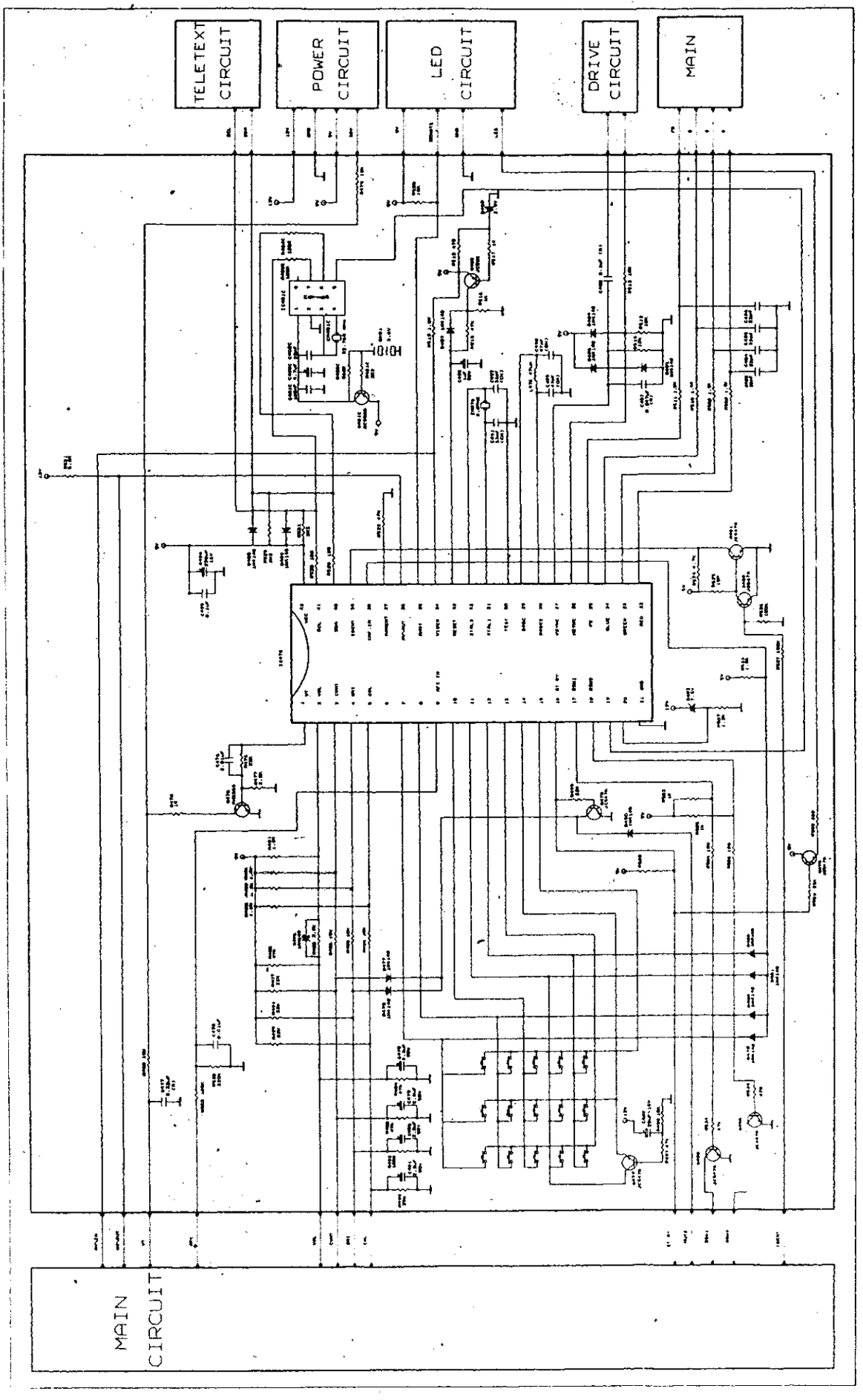
FEATURE

- Output current in excess of 1.5A
- Output adjustable between 1.2V ando 37V
- Internal thermal-overload protection
- Internal short-circuit current-limiting constant with temperature
- Output transistor safe-area compensation
- Floating operation for high-voltage applications
- Standard 3-pin transistor packages.

SCHEMATIC DIAGRAM



CHANNEL SECTION


TELETEXT CIRCUIT
POWER CIRCUIT
LED CIRCUIT
DRIVE CIRCUIT
MAIN
MAIN CIRCUIT

MULTISTANDART TV
PROCESSOR
ANOLOG OPERATION SECTION

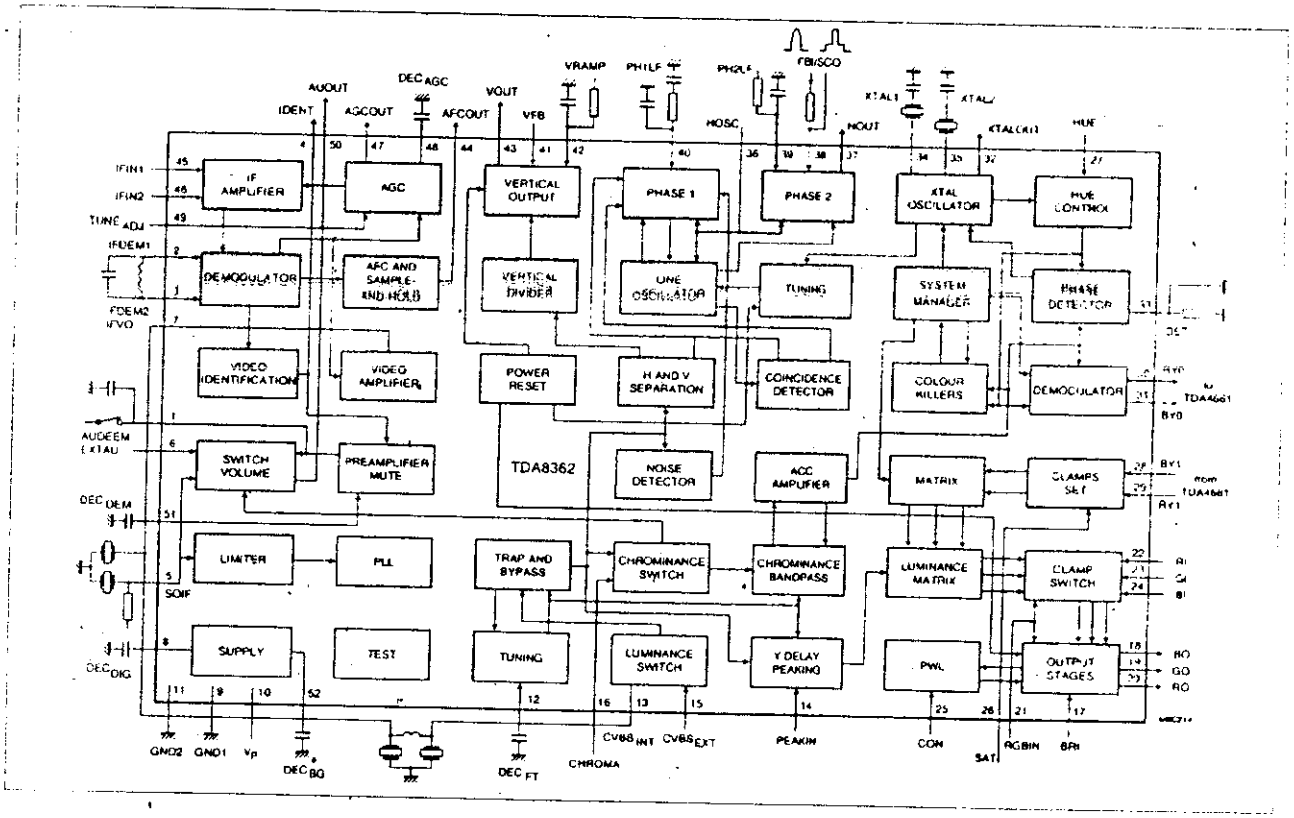
ANALOG OPERATION PART

IC181 (TDA8362) which mounted on chassis does following operations: Picture IF, sound IF, colour decoder, horizantal oscillator, vertical oscillator and AFC.
The outputs of FI183 filter are connected to PIN 45 and 46 of IC181. Which are picture IF inputs. Here picture is amplified min 64 dB and given PIN 7. There is a buffer made of Q181. CCVS divide into two parts: Picture and sound. The picture IF gain is proportional to AGC voltage fixed by VR182 and R205. The AGC voltage output PIN is 47. PIN 44 is AFC output. When any station has been found exactly, there should be 4Vdc at PIN 44 (half of the supply voltage). PIN 4 is mute output and connected PIN 34 of uP. Approximately 5 minutes after station sign-off or a transmission failure, uP checks voltage at PIN 4. Five minutes after supply voltage cut-off, uP switched-on TV-set to standby. PIN 17, 25, 26 are brightness, contrast and colour inputs. T181 is demodulator coil and connected pins 2 and 3 of IC181. PIN 6 is external sound input, PIN 15 is external video input. When PIN 16 of IC181 has 0 Vdc, IC has been at normal TV operation. If PIN 16 of IC181 has 8Vdc IC has been at AV mode. PIN 22, 23, 24 external RGB inputs. PIN21 is fast blanking (FB). PIN 30 and 31 are R-Y, B-Y outputs. This signals goes to B-Y, R-Y inputs at PINS 28 and 29 of IC181 VIA IC241 (base band delay line). IC251 secam decoder. PIN 35 is 4,43 MHz (EM182) crystal oscillator input. This crystal produces suitable frequency for colour decoder and after divides horizontal and vertical oscillator frequencies are obtained from this crystal. PIN 42 provides necessary voltage for operating of vertical RAMP generator. PIN 43 is vertical oscillator output and PIN 37 is horizontal oscillator output. PINS 18, 19, 20 are RGB output. After the signals are amplified on CRT board, the CRT is driven by signal. PIN 50 is sound output and comes to IC401 (TDA8425)

NOTE: Pin 50 is sound output and comes to IC401 and sound amplified by IC401 (TDA 1905) for mono chassis.

Block diagram

TDA8362



TDA8362 (IC181)

Multistandard TV processor

FEATURES

- Multistandard vision IF circuit (positive and negative modulation)
- Multistandard FM sound demodulator (4.5 MHz to 6.5 MHz)
- Video and audio switches
  (CVBS internal/external, S-VHS and audio internal/external)
- Integrated chrominance trap and bandpass filters (automatically calibrated)
- Integrated luminance delay line
- PAL/NTSC colour decoder with automatic search system
- Easy interfacing with the TDA8395 (SECAM decoder)
  for multistandard applications
- RGB control circuit with linear RGB inputs and fast blanking
- Horizontal synchronization with two control loops and alignment-free horizontal oscilator
- Vertical count-down circuit and vertical preamlifier
- Low dissipation (600 mW)
- Small amount of peripheral components compared with competition ICs
- Only one adjustment (video IF demodulator).

QUICK REFERENCE DATA

SYMBOL	PARAMETER	MIN.	TYP.	MAX.	UNIT
V_P	positive supply voltage	-	8.0	-	V
I_P	positive supply current	-	80	-	mA

Input voltages

$V_{45;46(RMS)}$	video IF amplifier sensitivity (RMS value)	-	70	-	µV
$V_{5(RMS)}$	sound IF amplifier sensitivity (RMS value)	-	1.0	-	mV
$V_{6(RMS)}$	external audio input (RMS value)	-	350	-	mV
$V_{15(p-p)}$	external CVBS input (peak-to-peak value)	-	1.0	-	V
$V_{21(p-p)}$	RGB inputs (peak-to-peak value)	-	0.7	-	V

Control voltages

$V_{control}$	control voltages for Volume, Contrast, Saturation, Brighness, Hue and Peaking	0	-	5.0	V

Output signals

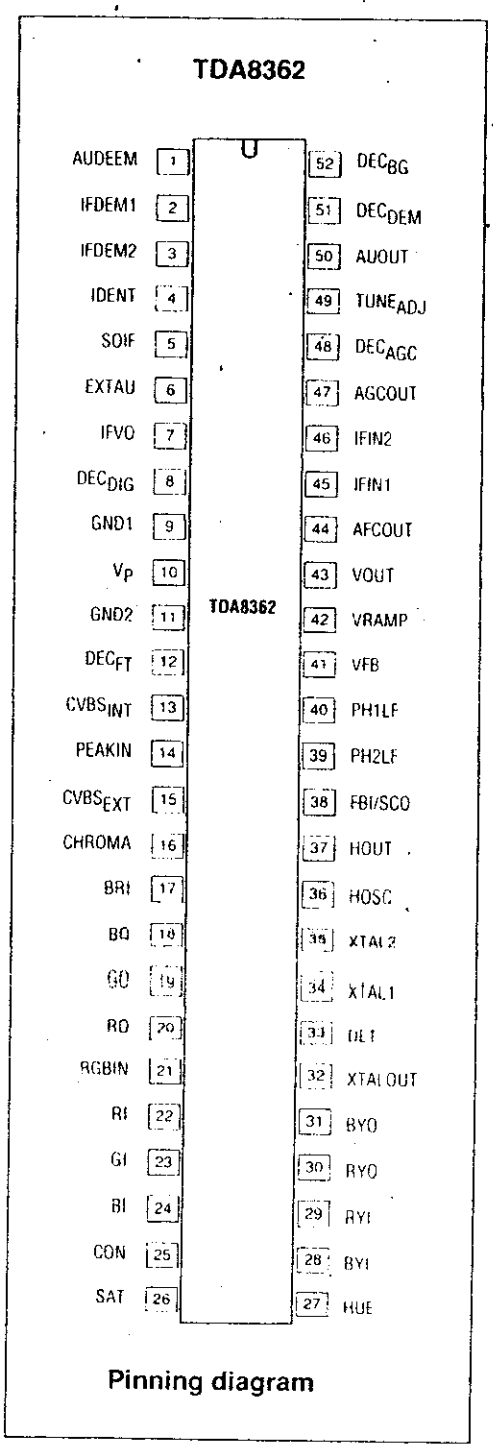
$V_{O(p-p)}$	demodulated CVBS output (peak-to peak value)	-	2.5	-	V
V_{47}	tuner AGC control voltage range	0	-	10	V
V_{44}	AFC output voltage swing	-	6.0	-	V
$V_{50(RMS)}$	audio output voltage	-	700	-	mV
$V_{18,20(p-p)}$	RGB output signal amplitudes (peak-to peak value)		4.0	-	V
I_{37}	horizontal output current	10	-	-	mA
I_{43}	vertical output current	1	-	-	mA

GENERAL DESCRIPTION

The TDA8362 contains nearly all small signal functions that are required for a colour television receiver. For a complete receiver the following circuits need to be added: a base-band delay line (TDA4661), a tuner and output stages for audio, video and horizontal and vertical deflection.

PINNING

SYMBOL	PIN	DESCRIPTION
AUDEEM	1	audio de-emphasis
IFDEM1	2	IF demodulator tuned circuit
IFDEM2	3	IF demodulator tuned circuit
IDENT	4	video identification output
SOIF	5	sound IF input and volume control
EXTAU	6	external audio input
IFVO	7	IF video output
DEC_{DIG}	8	decoupling digital supply
GND1	9	ground 1
V_P	10	positive supply voltage (+8V)
GND2	11	ground 2
DEC_{FT}	12	decoupling filter tuning
$CVBS_{INT}$	13	internal CVBS input
PEAKIN	14	peaking control input
$CVBS_{EXT}$	15	external CVBS input
CHROMA	16	chrominance and A/V switch input
BRI	17	brightness control input
BO	18	blue output
GO	19	green output
RO	20	red output
RGBIN	21	RGB insertion and blanking input
RI	22	red output
GI	23	green output
BI	24	blue output
CON	25	contrast control input
SAT	26	saturation control input
HUE	27	hue control input (or chrominance outp.)
BYI	28	B-Y input signal
RYI	29	R-Y input signal
RYO	30	R-Y output signal
BYO	31	B-Y output signal
XTALOUT	32	4.43 MHz output for TDA8395
DET	33	loop filter burst phase detector
XTAL1	34	3.58 MHz XTAL connection
XTAL2	35	4.43 MHz XTAL connection
HOSC	36	start horizontal oscillator
HOUT	37	horizontal output
FBI/SCO	38	flyback input/sandcastle output
PH2LF	39	phase 2 loop filter
PH1LF	40	phase 1 loop filter
VFB	41	vertical feedback input
VRAMP	42	vertical ramp generator
VOUT	43	vertical output
AFCOUT	44	AFC output
IFIN1	45	IF input 1
IFIN2	46	IF input 2
AGCOUT	47	tuner AGC output
DEC_{AGC}	48	AGC decoupling capacitor
$TUNE_{ADJ}$	49	tuner take-over adjustment
AUOUT	50	audio output
DEC_{DEM}	51	decoupling sound demodulator
DEC_{BG}	52	decoupling bandgap supply



Pinning diagram

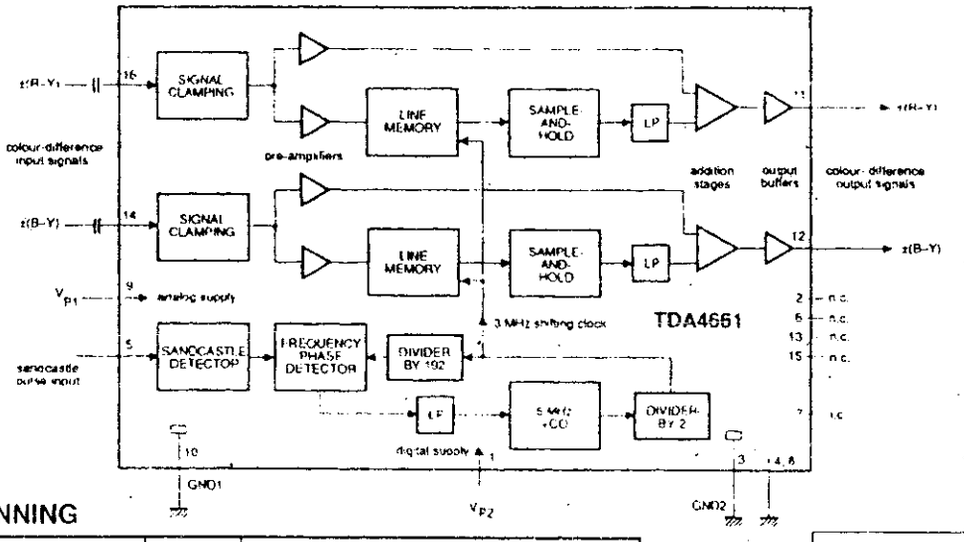
TDA4661 (IC241)
baseband delay line

FEATURES

- Two comb filters, using the switched-capacitor technique, for one line delay time (64 µs)
- Adjustment-free application
- No crosstalk between SECAM colour carriers (diaphoty)
- Handles negative or positive colour-difference input signals
- Clamping of AC-coupled input signals (±(R-Y) and ±(B-Y))
- VCO without external components
- 3 MHz internal clock signal derived from a 6 MHz VCO, line-locked by the sandcastle pulse (64 µs line)
- Sample-and-hold circuits and low-pass filters to suppress the 3 MHz clock signal
- Addition of delayed and non-delayed output signals
- Output buffer amplifiers
- Comb filtering functions for NTSC colour-difference signals to suppress cross-colour

QUICK REFERENCE DATA

SYMBOL	PARAMETER	MIN.	TYP.	MAX.	UNIT
V_{P1}	analog supply voltage (pin 9)	4.5	5	6	V
V_{P2}	digital supply voltage (pin 1)	4.5	5	6	V
$I_{P\,tot}$	total supply current	-	4.7	9.4	mA
V_i	±(R-Y) input signal PAL/NTSC (peak-to-peak value, pin 16)	-	525	-	mV
	±(B-Y) input signal PAL/NTSC (peak-to-peak value, pin 14)	-	665	-	mV
	±(R-Y) input signal SECAM (peak-to-peak value, pin 16)	-	1.05	-	V
	±(B-Y) input signal SECAM (peak-to-peak value, pin 14)	-	1.33	-	V
G_V	gain V_o / V_i of colour-difference output signals				
	V_{11} / V_{16} for PAL and NTSC	5.5	6.0	6.5	dB
	V_{12} / V_{14} for PAL and NTSC	5.5	6.0	6.5	dB
	V_{11} / V_{16} for SECAM	-0.5	0	+0.5	dB
	V_{12} / V_{14} for SECAM	-0.5	0	+0.5	dB



PINNING

SYMBOL	PIN	DESCRIPTION
V_{P2}	1	+5 V supply voltage for digital part
n.c.	2	not connected
GND2	3	ground for digital part (0 V)
i.c.	4	internally connected
SAND	5	sandcastle pulse input
n.c.	6	not connected
i.c.	7	internally connected
i.c.	8	internally connected
V_{P1}	9	+5 V supply voltage for analog part
GND1	10	ground for analog part (0 V)
$V_{o\,(R-Y)}$	11	±(R-Y) output signal
$V_{o\,(B-Y)}$	12	±(B-Y) output signal
n.c.	13	not connected
$V_{i\,(B-Y)}$	14	±(B-Y) input signal
n.c.	15	not connected
$V_{i\,(R-Y)}$	16	±(R-Y) input signal

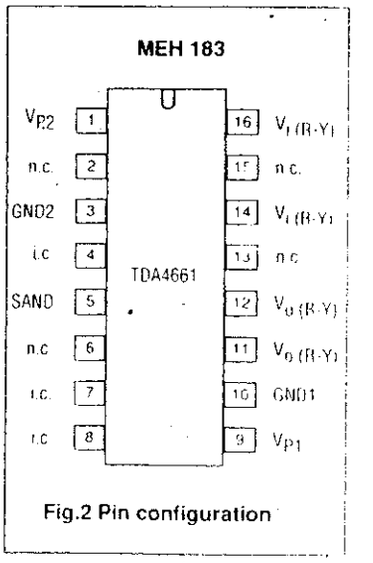


Fig.2 Pin configuration

SECAM decoder
TDA8395 (IC251)

FEATURES

- Fully integrated filters
- Alignment free
- For use with baseband delay

GENERAL DESCRIPTION

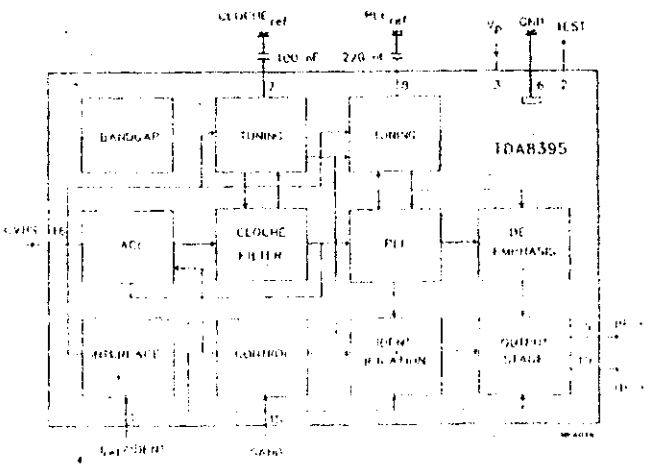
The TDA8395 is a self-calibrating, fully integrated SECAM decoder. The IC should preferably be used in conjunction with the PAL/NTSC decoder TDA8362 or TDA8366 and with the switched capacitor baseband delay circuit TDA4660. The IC incorporates HF and LF filters, a demodulator and an identification circuit (luminance is not processed in this IC). The IC needs no adjustments and very few external components are required. A highly stable reference frequency is required for calibration and a two level sandcastle pulse for blanking and burst gating.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	MIN.	TYP.	MAX.	UNIT
V_P	positive supply voltage (pin 3)	7.2	-	8.8	V
P_{tot}	total power dissipation	-	-	220	V
$V_{16(p-p)}$	composite video input voltage (peak-to-peak value); pin16	-	1.0	1.5	V
$V_{o(p-p)}$	±(R-Y) output voltage amplitude (peak-to-peak value); pin 9	-	1.05	-	V
$V_{o(p-p)}$	-(B-Y) output voltage amplitude (peak-to-peak value); pin 10	-	1.33	-	V

ORDERING INFORMATION

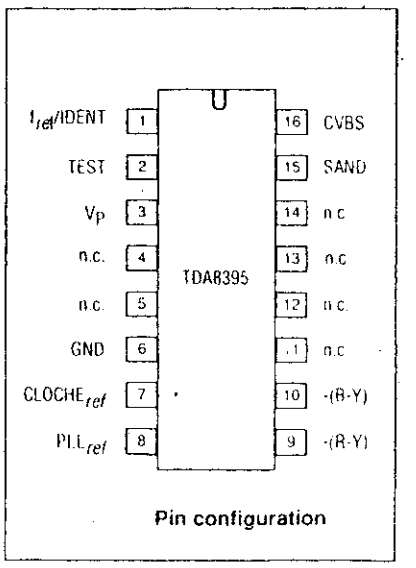
EXTENDED TYPE NUMBER	PACKAGE			
	PINS	PIN POSITION	MATERIAL	CODE
TDA8395	16	DIL	plastic	SOT38GE1



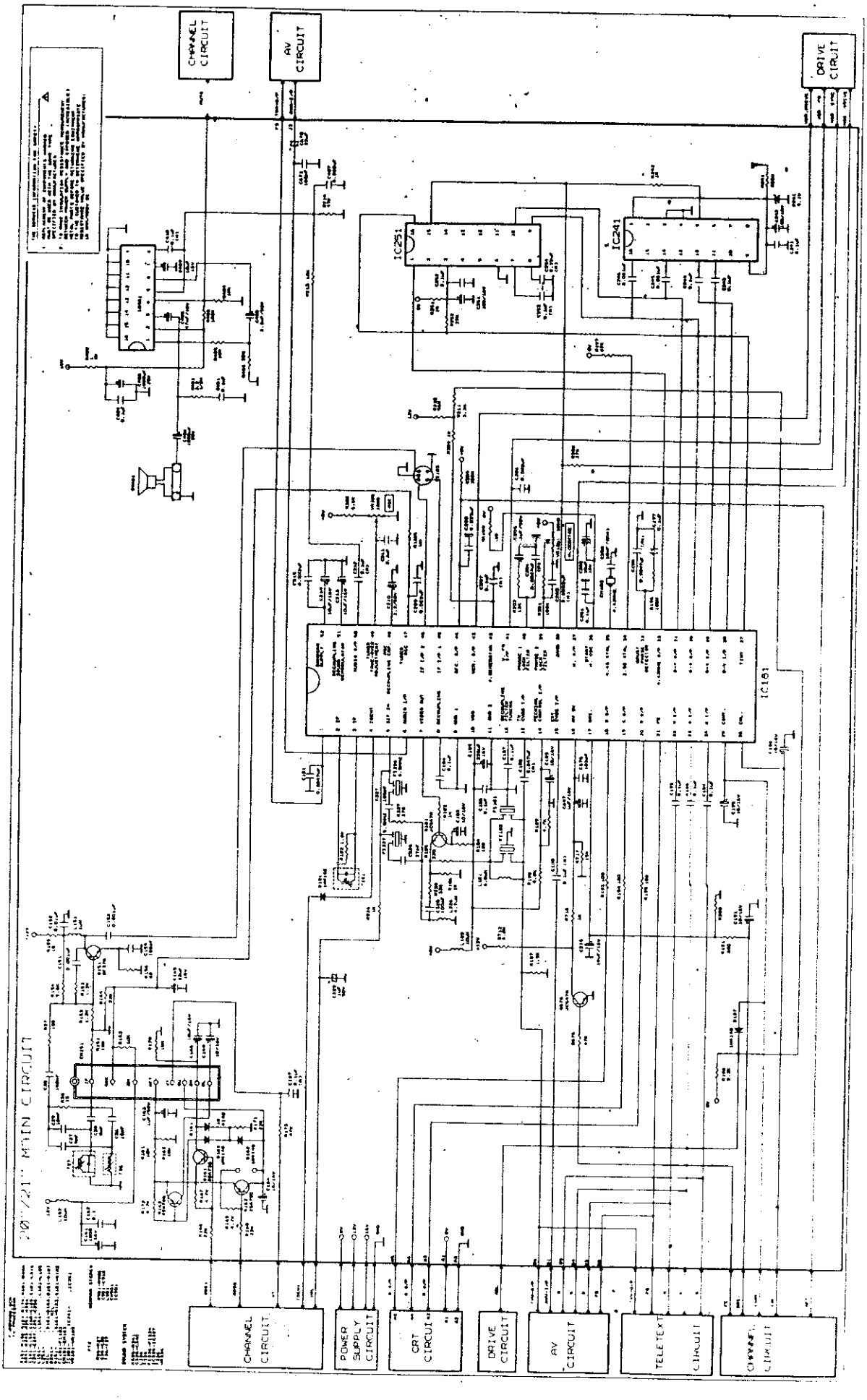
Block diagram

PINNING

SYMBOL	PIN	DESCRIPTION
f_{ref}/IDENT	1	reference frequency input/dentification input
TEST	2	test output
V_P	3	positive supply voltage
n.c.	4	not connected
n.c.	5	not connected
GND	6	ground
$CLOCHE_{ref}$	7	Cloche reference filter
PLL_{ref}	8	PLL reference
-(R-Y)	9	-(R-Y) output
-(B-Y)	10	-(B-Y) output
n.c.	11	not connected
n.c.	12	not connected
n.c.	13	not connected
n.c.	14	not connected
SAND	15	sandcastle pulse input
CVBS	16	video (chrominance) input



Pin configuration

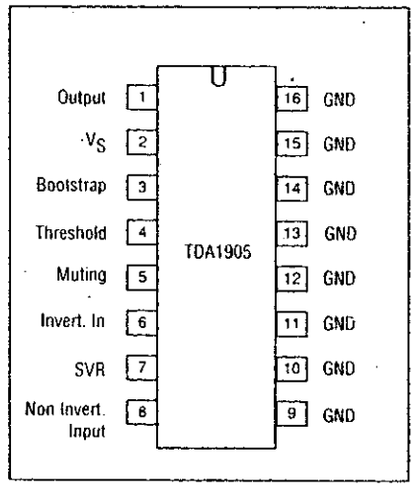

CHANNEL CIRCUIT
AV CIRCUIT
DRIVE CIRCUIT
IC251
IC241
IC161
CHANNEL CIRCUIT
POWER SUPPLY CIRCUIT
CRT CIRCUIT
DRIVE CIRCUIT
AV CIRCUIT
TELETEXT CIRCUIT
CHANNEL CIRCUIT

AF AMPLIFIER CIRCUIT

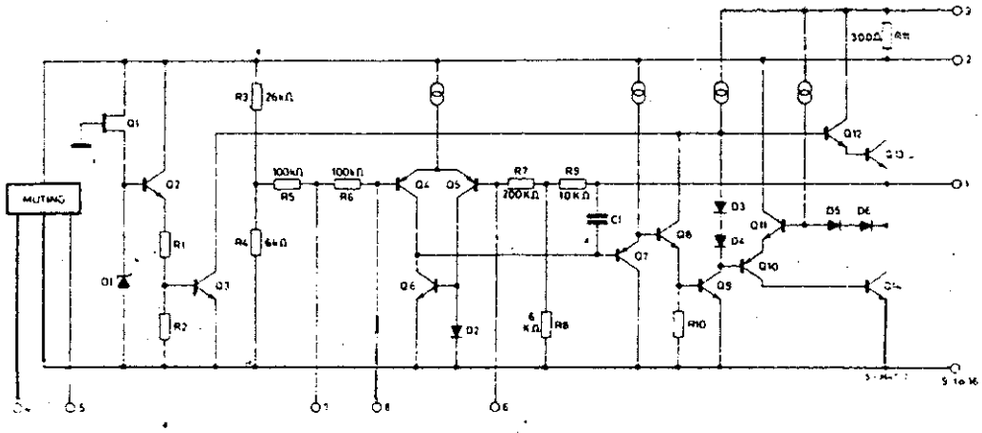
TDA1905 is used as the amplifier element in SM-1 mono chassis.
This IC is enclosed in a dual in-line envelope with 16 pins, of which 8 pins (all on one side) are connected with the internal copper frame so that, together with a small copper heat sink plate. Good dissipation of waste heat is insured. The heat sink is immersion soldered together with the IC.
An internal, thermal overload circuit prevents damage due to overheating should there be a short at the load resistance. A frequency dependent degenerative feedback is realized with the components between pins 1 and 6.
The low frequencies are thus boosted by about 4 db, rounding out the sound. The bootstrap condensor C 405 improves efficiency by elevating the voltage in the driver stage, which at the same time means higher performance. C 409 serves to suppres hum.

CONNECTION DIAGRAM

(Top view)



SCHEMATIC DIAGRAM



THERMAL DATA

$R_{th\,j\,case}$	Thermal resistance junction-pins	max	15 °C/W
$R_{th\,j\,amb}$	Thermal resistance junction-amb	max	70 °C/W

PFC84C81/C (IC727)

SINGLE-CHIP 8-BIT MICROCONTROLLERS WITH I²C-BUS INTERFACE

DESCRIPTION

An advanced CMOS process is used to manufacture the PCF84C00, PCF84C21/C, PCF84C41/C and PCF84C81/C microcontrollers. The PCF84C21C, PCF84C41C and PCF84C81C operate at a higher clock frequency. Each device has 20 quasi-bidirectional I/0 port lines, a serial I/0 interface, a single, level vectored interrupt structure, an 8-bit timer/event counter and on-chip clock oscillator and clock circuits. On-chip RAM and ROM content is as follows:

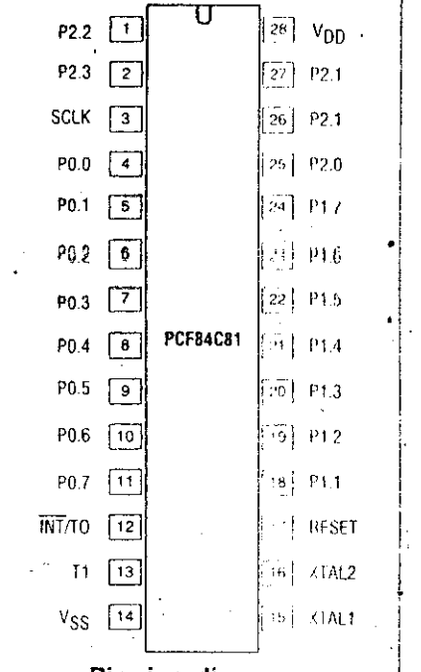
- **PCF84C00 - 256 x 8 RAM, external program memory**
- **PCF84C21 - 64 x 8 RAM, 2 K x 8 ROM**
- **PCF84C41 - 128 x 8 RAM, 4 K x 8 ROM**
- **PCF84C81 - 256 x 8 RAM, 8 K x 8 ROM**

These efficient controllers also perform well as arithmetic processors. They have facilities for both binary and 8CD arithmetic plus bit-handling capabilities. The instruction set is similar to that of the MAB8048.

These microcontrollers are members of the PCF84CXXX family.

For detailed information, consult the PCF84CXXX data sheet.

PINNING



Pinning diagram

FEATURES

- 8-bit CPU, ROM, RAM, I/0 in a single 28-lead DIL or SO package
- 2 K, 4 K or 8 K x ROM; also a ROM-less version
- 64, 128 or 256 x 8 RAM
- 20 quasi-bidirectional I/0 port lines
- Two test inputs, one of which is also the external interrupt input
- Single-level vectored interrupts: external, timer/event counter and serial I/0
- I²C hardware interface for serial data transfer on two lines (serial I/0 data via an existing port line and clock via a dedicated line)
- 8-bit programmable timer/event counter
- Clock frequency range: 100 kHz to 10 MHz;
  C versions: 1 MHz to 12 MHz
- Over 80 instructions (similar to those of the MAB8048) all of 1 or 2 cycles
- Single supply voltage (2,5 to 5,5 V)
- STOP and IDLE modes
- Power-on reset circuit
- Operating temperature range: -40 to +85°C
- High current on Port 1: I_{OL} = 10 mA at V_{OL} = 1,2 V (all versions except the PCF84C00).

For following sections see PCF84XXX family data sheet

Program memory	Program counter
Data memory	Central processing unit
Program counter stack	Conditional branch logic
IDLE and STOP modes	Test input T1
I/0 facilities	
Serial I/0	Power-on reset
Interrupts	Instruction set
Oscillator	
Timer/event counter	
Program status word	

PACKAGE OUTLINES

PCF84C21/41/81P :28-lead DIL; plastic (SOT117).
PCF84C21/41/81T :28-lead mini-pack; plastic (SO28; SOT 136A).
PCF84C00B :28-lead 'piggy back' package (supports up to 28-pin EPROM).
PCF84C00T :56-lead mini-pack; plastic (VSO56; SOT 190).

PIN DESIGNATION

Pin	Symbol	Type	Function
3	SCLK	I/0	Clock: bidirectional clock for serial I/O.
4-11	P0.0-P0.7	I/0	Port 0: 8-bit quasi-bidirectional I/0 port.
12	INT/T0	I	Interrupt/Test 0: external interrupt input (negative edge triggered) / test input pin: when used as a test input, this pin is directly tested by conditional branch instructions JT0 and JNT0.
13	T1	I	Test 1: test input pin, directly tested by conditional branch instructions JT1 and JNT1. T1 may also be selected as an input to the 8 bit timer/event counter via the STRT CNT instruction.
14	V_{SS}	I	Ground: circuit earth potential.
15	XTAL 1	I	Oscillator input: input from a crystal which determines the internal oscilator frequency or an external clock generator.
16	XTAL 2	I/0	Oscillator output: output of the inverting amplifier.
17	RESET	I/0	Reset input: used to initialize the microcontroller (active HIGH) also output of power-on-reset circuit.
18-25	P1.0-P1.7	I/0	Port 1: 8-bit quasi-bidirectional I/0 port.
26, 27, 1, 2	P2.0-P2.3	I/0	Port 2: 4 bit quasi-bidirectional I/0 port. P2.3 is the serial data input/output in serial I/0 mode.
28	V_{DD}	I	Power supply: 2,5 V to 5,5 V.

TELETEXT CIRCUIT

Teletext stage consist of SAA5243, SAA5231 and GM76C88AL15 (8K8SRAM)
Note: SAA5345 should be used instead of SAA5243 and 8K8 SRAM). Video signal goes to PIN 27 of IC (SAA5231). Analog signal translated to digital signal by SAA5231. PINS 18 and 20 IC730 oscillator input-output and operates with a xtal (EM727) 6MHz. IC728 (SAA5243P) is teletext decoder. PIN 19 of teletext decoder is SCL (Serial Clock) and PIN 20 is SDA (Serialdata) control. Text data in video signal that comes to IC728 (SAA5243) are separated in IC728 and R, G, B signal are produced by IC728. RGB signal go out from IC728 via pins 13, 14, 15. PIN 17 of IC is for fast blanking. PIN 8 is used by adjusting vertical deflection current. Therefore a vision can be obtained without flicker.

PCF84C81 (IC727) = This IC is a uP and converts SDA and SCL datas for 5243 to a form so that SAA5243 can evaluate.

8K8 SRAM (IC729) = This IC is a static ram and its memory 4 page at the same time for fastext system. When a new page is selected, memory IC changes its memory according to new page.

SAA5231 (IC730)

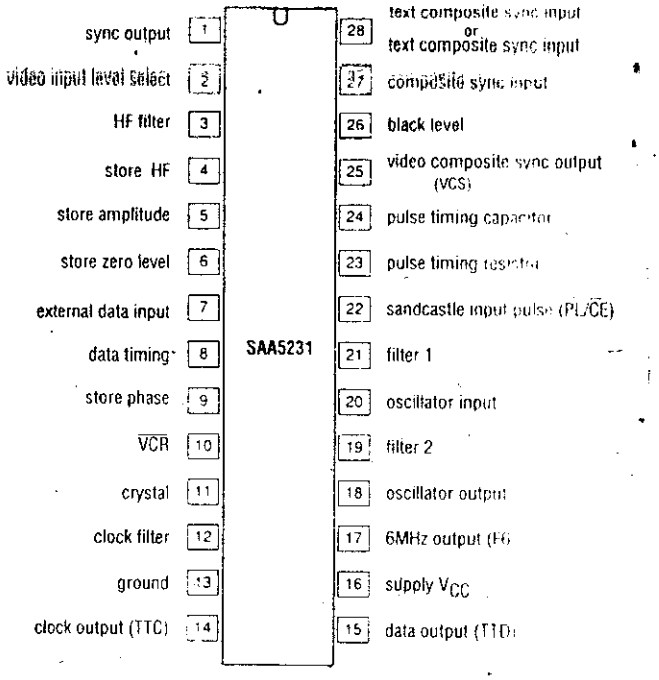
Teletext video processor

GENERAL DESCRIPTION

The SAA5231 is a bipolar integrated circuit intended as a successor to the SAA5030. It extracts Teletext Data from the video signal, regenerates Teletext Clock and synchronizes the text display to the television syncs. The integrated circuit is intended to work in conjunction with CCT (Computer Controlled Teletext), EUROM or other compatible devices.

FEATURES

- Adaptive data slicer
- Data clock regenerator
- Adaptive sync separator, horizontal phase detector and 6 MHz VCO forming display phase locked loop (PLL)

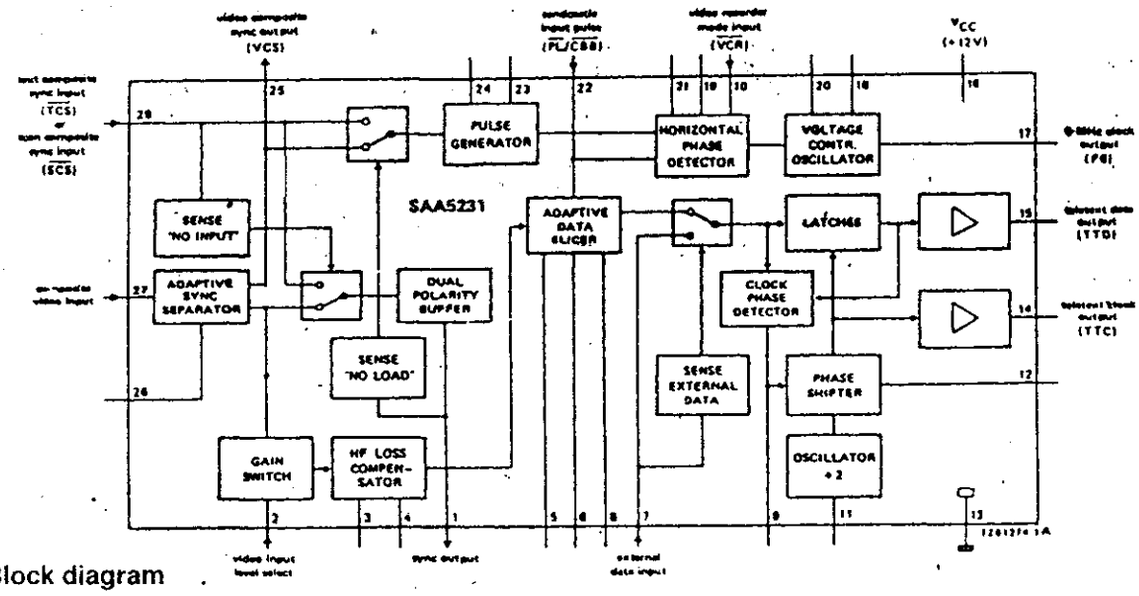


QUICK REFERENCE DATA

Supply voltage (pin 16)	V_{CC}	typ.	12 V
Supply current (pin 16)	I_{CC}	typ.	70 mA
Video input amplitude (pin 27) (peak-to-peak value)			
pin 2 LOW	$V_{27\text{-}13(p\text{-}p)}$	typ.	1 V
pin 2 HIGH	$V_{27\text{-}13(pp)}$	typ.	2,5V
Storage temperature range	T_{stg}		-20 to ± 125 °C
Operating ambient temperature range	T_{amb}		0 to + 70 °C

PACKAGE OUTLINE

28-lead dual in-line; plastic (SOT117).



Block diagram

SAA5243 (IC728)

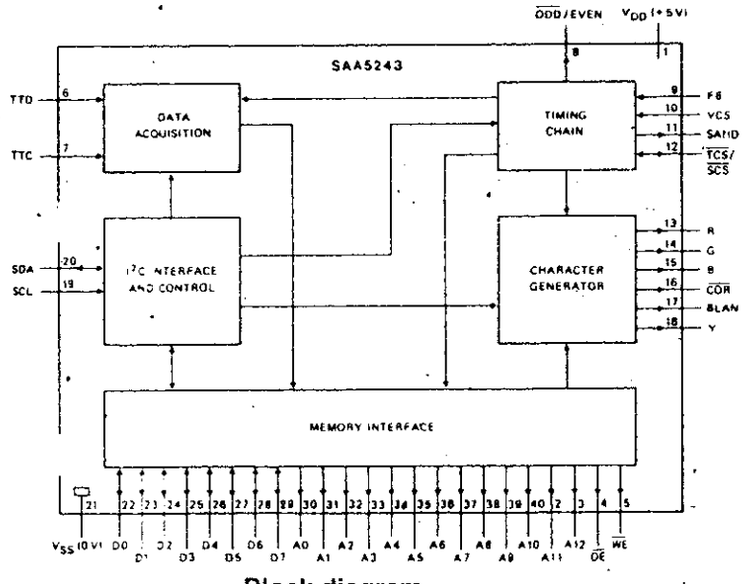
Enhanced Computer Controlled Teletext Circuit (ECCT)

GENERAL DESCRIPTION

The SAA5243 is a MOS N-channel integrated circuit which performs all the digital logic functions of a 625-line World System Teletext decoder. It operates in conjunction with the teletext video processor SAA5231, standard static RAMs and is controlled via the 2-wire I²C bus. The device can be used to provide videotex display conforming to a serial

FEATURES

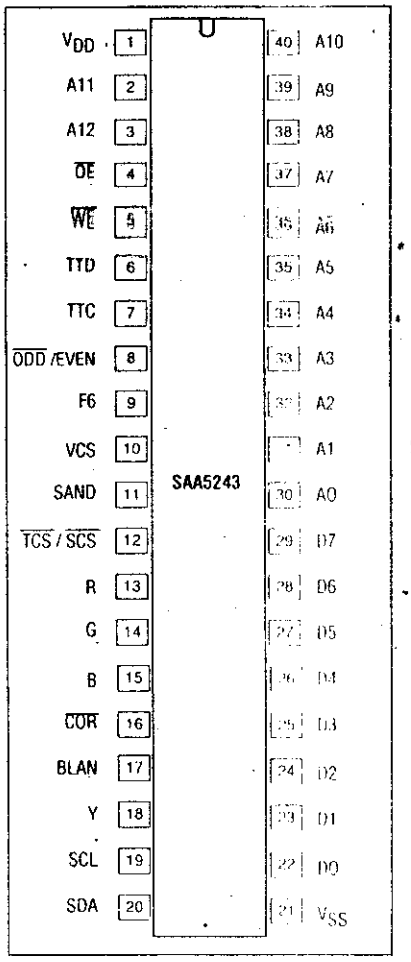
- Microcomputer controlled for flexibility
- High quality flicker-free display using a 12x10 character matrix
- Field flyback (lines 2 to 22), or full channel (all lines) data acquisition
- Up to four simultaneous page requests enabling acqisition during one magazine cycle
- Direct interface up to 8 K bytes static RAM
- Automatic language section of up to seven different languages
- 25th display row for software generated status messages
- Cursor control for videotex-telesofware
- 7-bits parity or 8-bit data acquisition
- Extension packet reception option
- Standard I²C bus slave transceiver (slave address 0010001)
- Single 5 volt power supply
- Mask programmable character sets
- Slave sync mode operation
- Odd/even field output for de-interlaced displays



Block diagram

PINNING

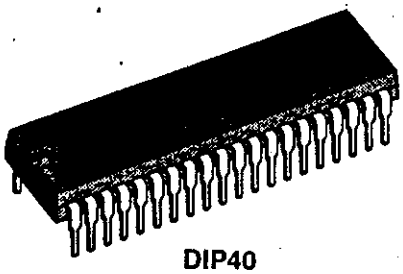
1	V_{DD}	**Power supply:** + 5 V power supply pin.
2,3,40	A11, A12, A10	**Chapter Address:** three outputs that select which 1 Kbyte chapter of external RAM is being accessed for any read or write cycle.
4	$\overline{OE}$	**Output Enable:** active low output signal used to control the reading of the external RAM. It occurs continuously at a 1 MHz rate.
5	$\overline{WE}$	**Write Enable:** active low output signal used to control the writing of data to the external RAM. It occurs for a valid write cycle only and is interleaved with the read cycles.
6	TTD	**Teletext Data:** input from the SAA5231 Video Input Processor (VIP2). It is clamped to V_{SS} for 4 to 8 µs of each television line to maintain the correct c.d.c. level following the external a.c. coupling.
7	TTC	**Teletext Clock:** 6,9375 MHz clock input from the SAA5231. It is internally a.c. coupled to an active clamp input buffer.
8	$\overline{ODD}$/EVEN	**Odd/Even:** for interlaced mode, the output changes once per field at 2 µs before the end of line 311 (624). The output is high for even fields and low for odd fields.
9	F6	**Character display clock:** 6 MHz clock input from the SAA5231. It is internally a.c. coupled to an active clamp input buffer.
10	VCS	**Video Composite Sync:** input from the SAA5231 derived from the incoming video signal. Sync pulses are active high.
11	SAND	**Sandcastle:** 3-level sandcastle output to the SAA5231 containing the phase locking and colour burst blanking information.
12	$\overline{TCS}/\overline{SCS}$	**Text Composite Sync/Scan Composite Sync:** as an output an active low composite sync waveform (TCS) with interlaced or noninterlaced format which is fed to the SAA5231 to drive the display timebases. Alternatively this pin can act as an input for an active low composite sync waveform (SCS) so 'slave' the display timing circuits.
13, 14, 15	R, G, B	**Red, Green, Blue:** these 3 open drain out puts are the character video signals to the television display circuits. They are active high and contain character and background information.
16	$\overline{COR}$	**Contrast Reduction:** open drain, active low output which allows selective contrast reduction of the television picture to enhance a mixed mode display.
17	BLAN	**Blanking:** open drain, active high output which controls the blanking of the television picture for a normal text display and for a mixed display.
18	Y	**Character foreground:** open drain, active high video output signal containing all the foreground information displayed on the television screen (e.g. for driving a display printer).
19	SCL	**Serial Clock:** input signal which is the I²C bus clock from the microcontroller.
20	SDA	**Serial Data:** is the I²C bus data line. It is an input/output function with an open drain output.
21	V_{SS}	**Ground:** 0 volts.
22-29	D0-D7	**8 RAM data lines:** 3-state input/output pins which carry the data bytes to and from the external RAM.
30-39	A0-A9	**RAM address:** 10 output signals that determine which byte location within a 1 Kbyte chapter of external RAM is accessed for any read or write cycle.



STV5345
STV5345/H - STV5345/T
(IC728)
TELETEXT DECODER WITH 8 INTEGRATED PAGES

PRELIMINARY DATA

- Complete teletext decoder including on-chip 8 pages memory, reducing EMC radiations
- Upward software and hardware compatible with previous SGS-THOMSON's decoder SDA5243
- Direct interface to an external static ram of 8 Kbytes for up to 16 pages application
- Automatic selection of up to six national languages
- Four simultaneous page requests
- Display of the 25th status row
- Microprocessor control via an I²C bus (slave address 0010001 R/W)
- Data acquisition available from lines 2 to 22 or from a complete field
- High quality display using a character matrix of 12 x 10 dots
- Single + 5V supply voltage
- On-chip mask programmable rom character generators
- Hcmos process



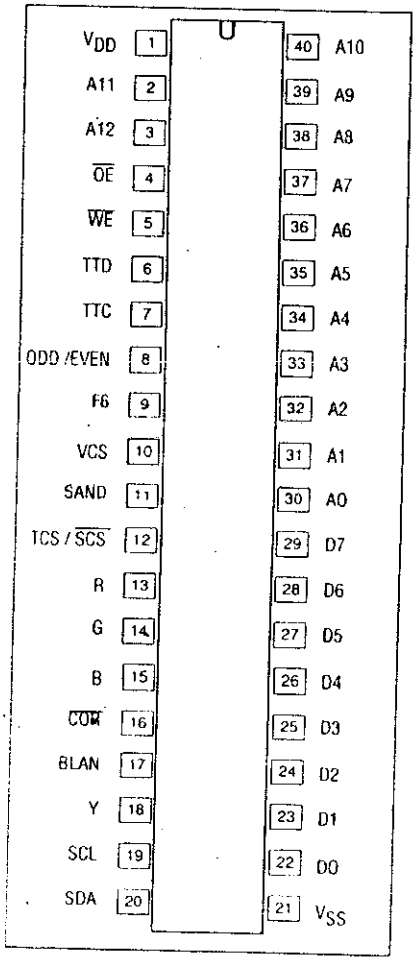
DIP40
(Plastic Package)

ORDER CODE: STV5345 West European
STV5345/H East European
STV5345/T Turkish & European

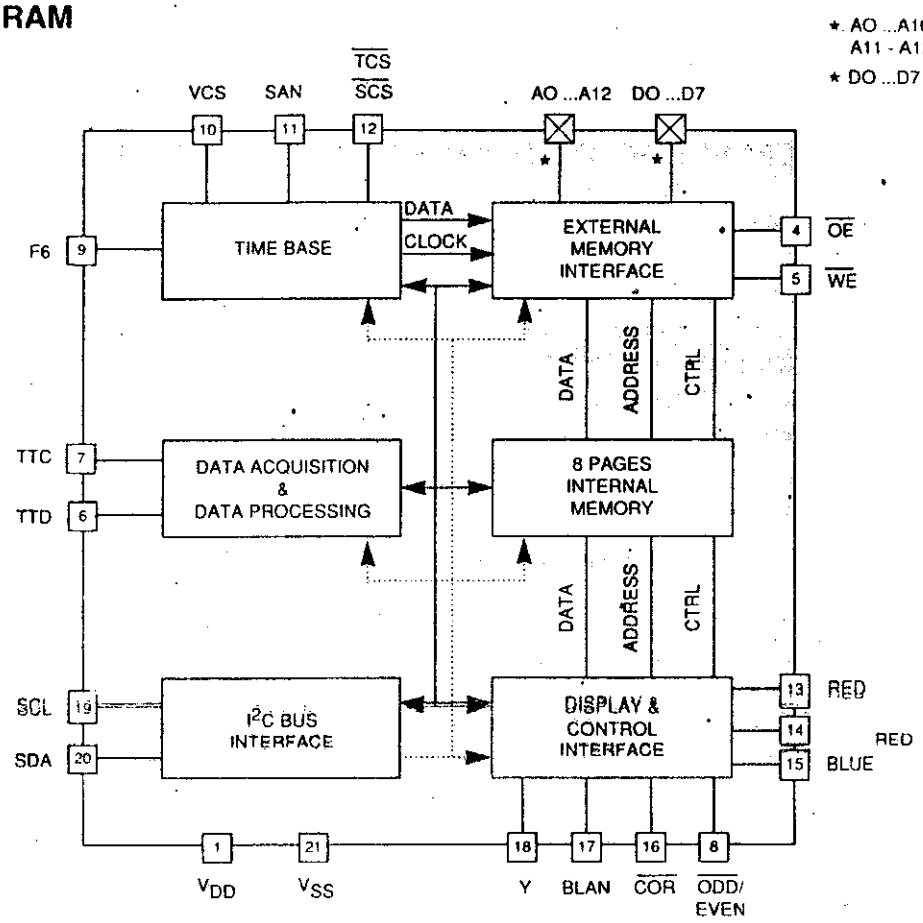
DESCRIPTION

The STV5345 is a HCMOS integrated circuit which performs all the processing of logical data within a 625 lines system teletext decoder. It is designed to operate in conjunction with one-chip: the SAA5231 integrated chip which extracts Teletext information embedded in a composite video signal. Up to 8 pages of display data can be stored in internal memory. Using 8 Kbytes of external memory leads to a 16 pages application. A complete system also comprises a microprocessor controlling the STV5345 via a 2-wires serial bus. An on-chip ROM memory contains the character sets. The STV5345 performs automatic selection of one of up to six natural languages. Data bytes may be decoded in either 7 Bit plus parity or in full 8-Bit formats. The chip set also supports facilities for reception and display of higher-level protocol data.

PIN CONNECTIONS



BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{DD}	Power Supply Range	-0.3, +6.0	V

INPUT VOLTAGE RANGE:

V_I	VCS, SDA, SCL, DO-D7	-0.3, V_{DD} + 0.5	V
V_I	TTD, F6, $\overline{TCS}/\overline{SCS}$, TTC	-0.3, +10	V

OUTPUT VOLTAGE RANGE:

V_O	SAND, A0-A12,$\overline{OE}$,$\overline{WE}$, DO-D7, SDA, $\overline{ODD}$/EVEN, R,G,B	-0.3, V_{DD}	V
V_O	BLAN, $\overline{COR}$, Y, $\overline{TCS}/\overline{SCS}$	-0.3, V_{DD}	V
T_{stg}	Storage Temperature Range	-20, +125	°C
T_A	Operating Ambient Temperature Range	-20, +70	°C

ELECTRICAL CHARACTERISTICS

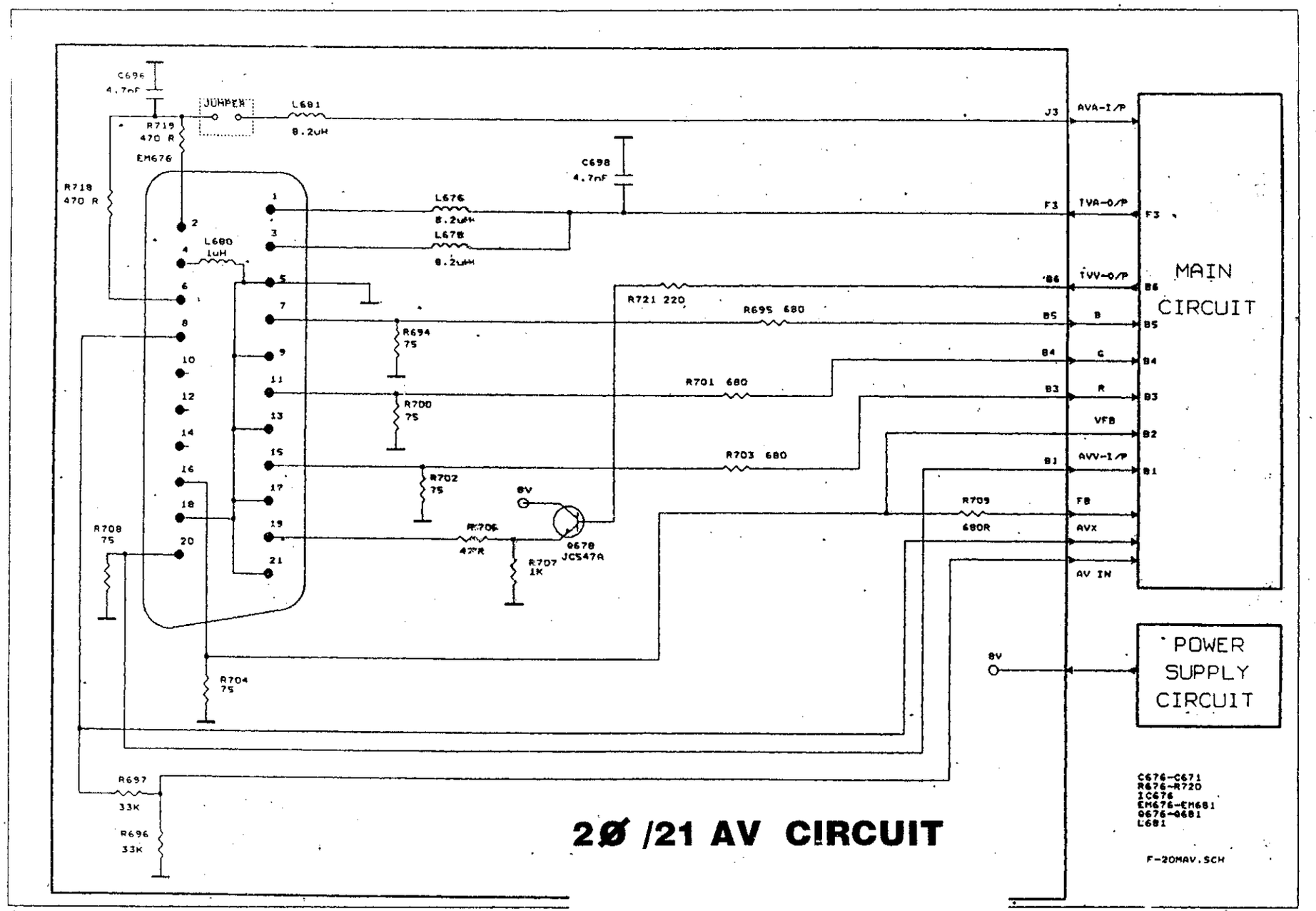
V_{DD} = 5V, V_{SS} = 0V, T_A = -20 to +70°C

Symbol	Parameter	Min	Typ	Max	Unit
V_{DD}	Supply Voltage (Pin 1)	4.5	5	5.5	V
I_{DD}	Supply Current (operating mode)		TBD		mA

PIN DESCRIPTION

Pin	Symbol	Function	Descripton
1	V_{DD}	+5V	Positive supply voltage
2,3,40*	A11, A12, A10	Chapter address	Address selection outputs for 1 of 8 external static RAM chapters each of 1 Kbytes.
4*	$\overline{OE}$	Output enable	Active-low external static RAM output enable control signal.
5*	$\overline{WE}$	Write enable	Active-low external static RAM write enable control signal. It supports write-cycles interleaved with read-cycles.
6	TTD	Teletext data input	An A.C. coupled teletext data input supplied by the SAA5231 chip is latched to V_{SS} between 4 and 8µs after each TV line.
7	TTC	Teletext clock input	A 6.9375MHz clock signal, supplied by the SAA5231 chip, is internally A.C. coupled, clamped and buffered.
8	$\overline{ODD}$/EVEN	Interlaced mode state output	High for even numbered and low for odd-numbered frames. The value is valid 2µs before the end of lines 311 and 624.
9	F6	Character display clock signal	The 6MHz clock signal, supplied by the SAA5231 chip is internally A.C. coupled, clamped and buffered.
10	VCS	Video composite synchronization input signal	Active high VCS input.
11	SAND	Sandcastle	Three level output pulse to the SAA5231 device. Phase lock, blanking signal, and color burst components are contained in this signal.
12	$\overline{TCS}/\overline{SCS}$	Input / output composite synchronization signal	Scan composite input signal ($\overline{SCS}$) for the display - synchronization or Text composite sync. ($\overline{TCS}$) output signal to the SAA5231. Both signals are active low.
13.14.15	R G B	Red, green, blue	Character and background colors active- high open-drain outputs.
16	$\overline{COR}$	Contrast reduction	Open-drain active-low output supporting optimal display of characters in "mixed mode" operation.
17	BLAN	Blanking signal output	Open-drain active high output for TV-image blanking in normal and mixed-mode operation.
18	Y	Foreground output	Open-drain active-high output with fore ground information. Can be used for printer command.
19	SCL	Serial clock	Microprocessor clock input via serial bus.
20	SDA	Serial data input / output	Open-drain microprocessor serial data input/output via serial bus.
21	V_{SS}	0 Volt	Ground.
22-29*	D0-D7	Parallel data input / output	Eight tri-state input/output for data read/write from/to an external static RAM.
30-39*	A0-A9	Address signals	Ten addresses output pins for accessing to individual Bytes of a 1 Kbyte chapter stored in an external Static RAM.

**Pins only activated when 8KBytes of external memory are addressed, otherwise pins $\overline{OE}$ and $\overline{WE}$ remain high, and others remain low.*

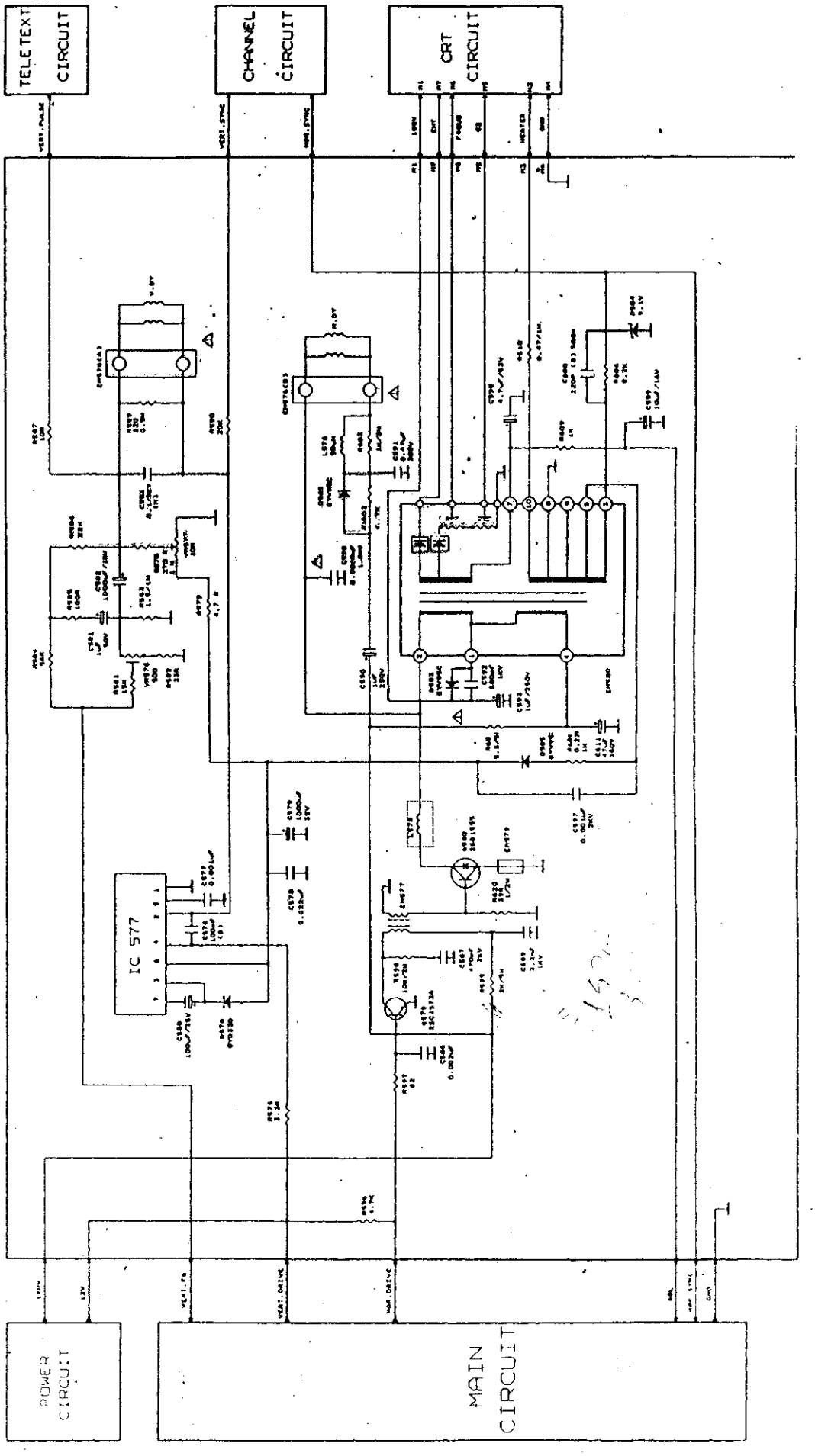


2Ø /21 AV CIRCUIT

A/V SCART

1- Audio output 1. right channel 0.5 VRMS / < 1kohm
2- Audio input 1. right channel 0.5 VRMS (connected to no. 6)
3. Audio output 2. left channel 0.5 VRMS (connected to no.1)
4- GND (audio)
5- GND
6- Audio input 2. left channel 0.5 VRMS / >10kohm
7- RGB input, blue (B)
8- Switch signal video (status)
9- GND
10- Reserved for clock signal (not connected)
11- RGM input, green (G)
12- Reserved for remote control (not connected)
13- GND
14- GND switch signal RGB
15- RGB input, red (R)
16- Switch signal RGB
17- GND (video)
18- GND
19- Video output 1 Vpp/75ohm
20- Video input 1 Vpp/75ohm
21- Shield

DRIVE CIRCUIT



DRIVE CIRCUIT

Vertical Output Stage

The vertical pulses that come from pin 43 of IC181 are amplified by IC577 and given deflection coils via EM576 (A)

TA8403 (LA7830)
(IC577)

TENTATIVE
VERTICAL DEFLECTION OUTPUT CIRCUIT FOR COLOR TELEVISION

FEATURES
- High output current
- Low power consumption provided by pump-up circuit
- Small number of external components required

MAXIMUM RATINGS (TA=25°C)

ITEM	SYMBOL	RATING	UNIT
Power Supply Voltage	V_{CC}	30	V
Vertical Output Supply Voltage	V_{vt}	60	V
Power Dissipation	P_D	15	W
Operating Temperature	T_{opr}	-20 to 85	°C
Storage Temperature	T_{stg}	-55 to 150	°C

RECOMMENDED OPERATING CONDITIONS (TA=25°C)

ITEM	SYMBOL	MEASURING CONDITIONS	MINIMUM	TYPICAL	MAXIMUM	UNIT
Power Supply Voltage	V_{CC}		—	24	27	V
Deflection Output Current	12p-p	Peak to peak	—	—	1.8	Ap-p

ELECTRICAL CHARACTERISTICS (TA=25°C)

ITEM	SYMBOL	MEASURING CONDITIONS	MINIMUM	TYPICAL	MAXIMUM	UNIT
Output Transistor Saturation Voltage	V_v (sat)1.	V_{CC} = 24V	0.3	0.5	1.0	V
	V_v (sat)2.	V_{CC} = 24V	1.0	1.8	3.6	V
Pump-up Output Tr. Saturation Voltage	V_p (sat)1.	V_{CC} = 24V	1.0	2.0	3.0	V
	V_p (sat)2.	V_{CC} = 24V	0.3	0.8	1.6	V
Quiescent Current	IB	V_{CC} = 24V	10.0	15.0	30.0	mA
Center Voltage	Vcenter	V_{CC} = 24V	10.0	12.0	14.0	V

1. GND
2. Vertical Output
3. Vertical Output Power Supply
4. Input
5. Phase Compensation
6. Supply Voltage
7. Pump-up Output

EQUIVALENT BLOCK DIAGRAM AND PIN CONFIGURATION

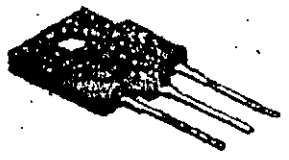
BUH515D (2SD1555)
(Q580)

CRT HORIZONTAL DEFLECTION HIGH VOLTAGE NPN FASTSWITCHING TRANSISTOR

- High breakdown voltage capability
- Fully insulated package for easy mounting
- Low saturation voltage
- High switching speed
- Complete characterization of power losses and switching times as a function of negative base current for optimum drive

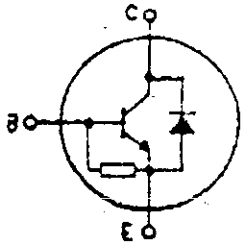
APPLICATIONS:

- Horizontal deflection stage in standard and high resolution dis-plays for TV's and monitors



ISOWATT218

INTERNAL SCEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CS0}	Collector-Base Voltage (I_E = 0)	1500	V
V_{CE0}	Collector-Emitter Voltage (I_B = 0)	700	V
V_{E90}	Emitter-Base Voltage (I_C = 0)	5	V
I_C	Collector Current	8	A
I_{CM}	Collector Peak Current (t_p < 5 ms)	15	A
I_B	Base Current	5	A
I_{BM}	Base Peak Current (t_p < 5 ms)	8	A
P_{tot}	Total Dissipation at Tc = 25°C	80	W
T_{ztg}	Storage Temperature	-65 to 150	°C
T_1	Max. Operating Junction Temperature	150	°C

THERMAL DATA

$R_{thj\text{-}case}$	Thermal Resistance Junction-case	Max	2.08	°C/W

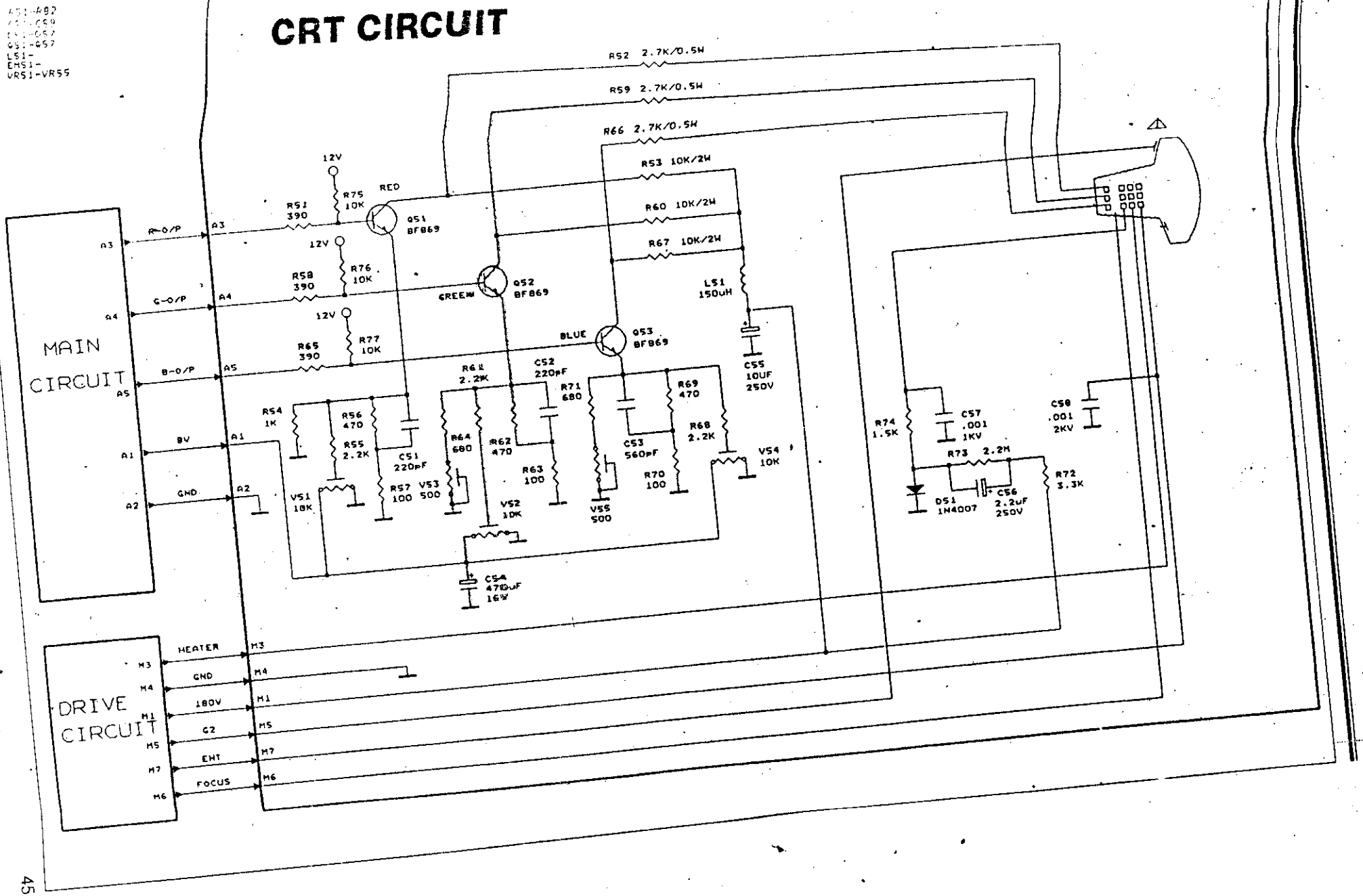
ELECTRICAL CHARACTERISTICS (Tcase = 25°C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CES}	Collector Cut-off Current (V_{BE} = 0)	V_{CE} = 1500 V V_{CE} = 1500 V T_j = 125°C			1 2	mA mA
I_{EBO}	Emitter Cut-off Current (I_C = 0)	V_{EB} = 5 V			100	µA
$V_{CEO(sus)}$	Collector-Emitter Sustaining Voltage	I_C = 100 mA	700			V
V_{EBO}	Emitter-base voltage (I_C = 0)	I_E = 10 mA	10			V
$V_{CE(sat)}$ *	Collector-Emitter Saturation Voltage	I_C = 5 A I_B = 1.25 A			1.5	V
$V_{BE(sat)}$ *	Base-Emitter Saturation Voltage	I_C = 5 A I_B = 1.25 A			1.3	V
h_{FE} *	DC Current Gain	I_C = 5 A V_{CE} = 5 V I_C = 5 A V_{CE} = 5 V T_j = 100 °C	6 4			
ts t_f	RESISTIVE LOAD Storage Time Fall Time	Vcc = 400 V I_C = 5 A I_{B1} = 1.25 A I_{B2} = 2.5 A		2.7 190	3.9 280	µs ns
ts t_f	INDUCTIVE LOAD Storage Time Fall Time	I_C = 5 A f = 15625 Hz I_{B1} = 1.25 A I_{B2} = 2.5 A $V_{ceflyback} = 1050 \sin \left\{ \frac{\pi}{10} 10^6 \right\} t$ V		2.3 3.50		µs ns
ts tf	INDUCTIVE LOAD Storage time Fall Time	I_C = 5 A F = 31250 Hz I_{B1} = 1.25 A I_{B2} = 2.5A $V_{ceflyback} = 1200 \sin \left\{ \frac{\pi}{5} 10^6 \right\} t$ V		2.3 200		µs ns

* *Pulsed: Pulse duration = 300 µs, duty cycle 1.5%*

CRT CIRCUIT

CRT CIRCUIT


MAIN CIRCUIT
R-O/P
G-O/P
B-O/P
BV
GND
DRIVE CIRCUIT
HEATER
GND
180V
G2
EHT
FOCUS
12V
R51 390
R58 390
R65 390
R75 10K
R76 10K
R77 10K
Q51 BF869
Q52 BF869
Q53 BF869
RED
GREEN
BLUE
R52 2.7K/0.5W
R59 2.7K/0.5W
R66 2.7K/0.5W
R53 10K/2W
R60 10K/2W
R67 10K/2W
L51 150uH
C55 10UF 250V
R54 1K
R56 470
R55 2.2K
C51 220pF
R57 100
VR3 500
VR1 10K
R64 680
R62 470
C52 220pF
R61 2.2K
R63 100
VR2 10K
C54 470uF 16V
R71 680
C53 560pF
R70 100
VR5 500
R69 470
R68 2.2K
VR4 10K
R74 1.5K
C57 .001 1KV
C58 .001 2KV
R73 2.2M
C56 2.2uF 250V
R72 3.3K
DS1 1N4007

BF 869 . BF 871
(Q51, Q52, Q53)

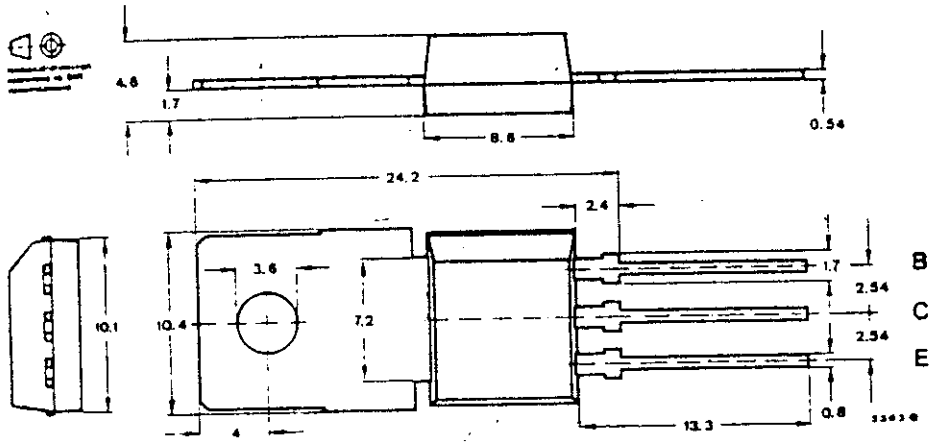
Silicon NPN Epitaxial Planar RF Transistors

Applications: Video-B-class power stages in TV-receivers

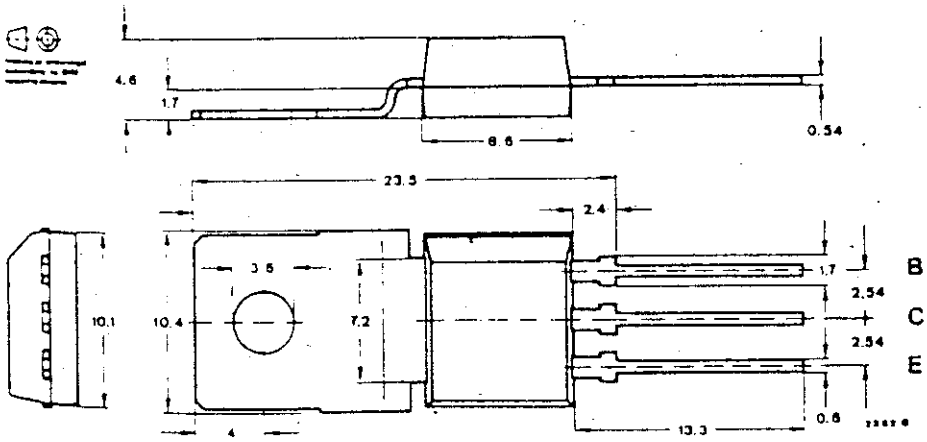
FEATURES:

- High reverse voltage
- BF 869 complementary to BF 870
- BF 871 complementary to BF 872

Dimensions in mm



BF 369 . BF 871



Collector connected with metallic surface

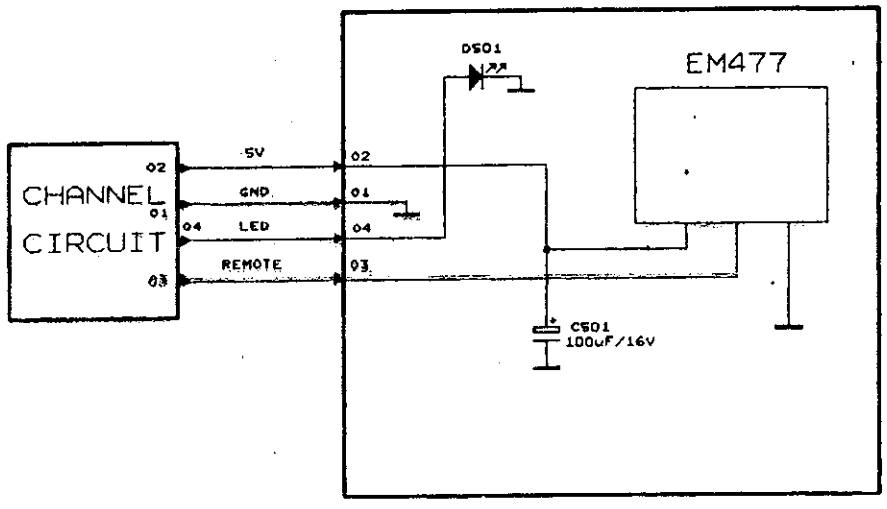
Case
34 A 3 DIN 41 869
JEDEC TO 202
Weight max. 1.8 g

Absolute maximum ratings		**BF 869**	**BF 871**	
Collector-base voltage	V_{CBO}	250	300	V
Collector-emitter voltage	V_{CEO}	250		V
$R_{BE} \leq 2.7$ kΩ	V_{CER}		300	V
Emitter-base voltage	V_{EBO}	5		V
Collector current	I_C	50		mA
Collector peak current	I_{CM}	100		mA
Total power dissipation $T_{case} \leq 25$ °C	P_{tot}	5		W
Junction temperature	T_j	150		°C
Storage temperature range	T_{stg}	-65...+150		°C

Thermal resistances		**Min.**	**Typ.**	**Max.**	
Junction ambient	R_{thJA}			85	K/W
Junction case	R_{thJC}			25	K/W

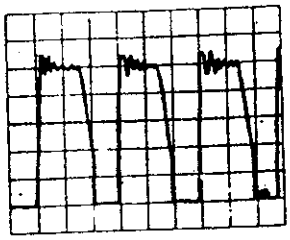
Characteristics $T_{amb} = 25$°C, unless otherwise specified					
Collector cut-off current					
V_{CB}=200V	**BF 869**	I_{CBO}		100	nA
V_{CB}=250V, R_{BE}=2.7 kΩ	**BF 871**	I_{CER}		50	nA
V_{CE}=200V, R_{BE}=2.7 kΩ, T_j= 150°C		I_{CER}		10	µA
Emitter cut-off current					
V_{EB} = 5V		I_{EBO}		10	µA
Collector-emitter breakdown voltage					
I_C=1 mA	**BF 869**	$V_{(BR)CEO}$	250		V
I_C = 1 µA, R_{BE} = 2.7 kΩ	**BF 871**	$V_{(BR)CER}$	300		V
DC forward current transfer ratio					
V_{CE} = 20 V, I_C = 25 mA		h_{FE}	50		
Gain bandwidth product					
V_{CB} = 10 V, I_C = 10 mA		f_T	60		MHz
Feedback capacitance					
V_{CB} = 30 V, I_C = 0, f =1 MHz		$C_{üre}$		1.8	pF
Collector saturation RF voltage					
I_C = 25 mA, T_j = 150 °C		$V_{CEsatHF}$	20		V

REMOTE SENSOR CIRCUIT



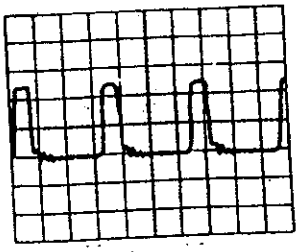
OSCILLOSCOPE SIGNALS

1) 5 usn/div 100 volt/div



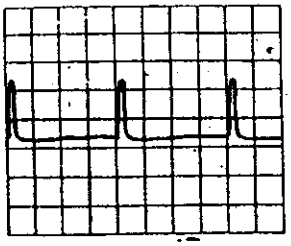
Collector of Q101

2) 20 usn/div 2volt/div



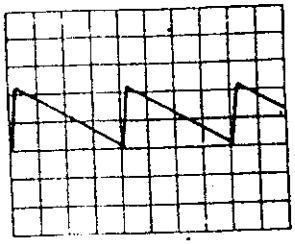
IC-476 pin 26

3) 5m sn/div 2volt/div



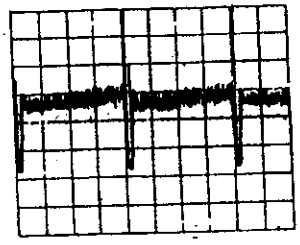
IC-476 pin 27

4) 5 msn/div 0,5 volt/div



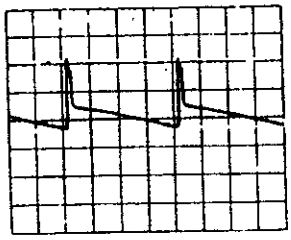
IC-181 pin 41

5) 5 msn/div 1 volt/div



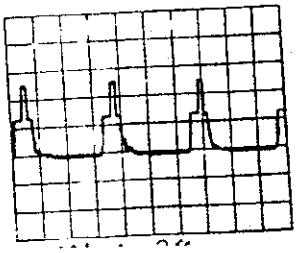
IC-577 pin 4

6) 5 msn/div 20 volt/div



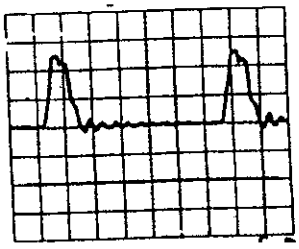
IC-577 pin 2

7) 20 usn/div 2 volt/div



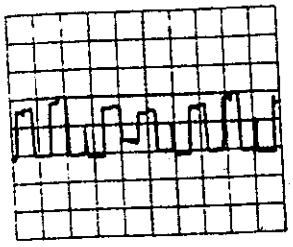
IC-181 pin 38

8) 10 usn/div 50 volt/div



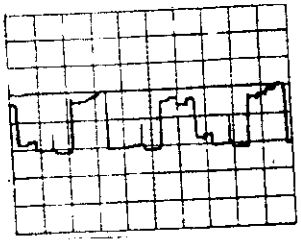
Cathode of D 584

9) 20 usn/div 2 volt/div



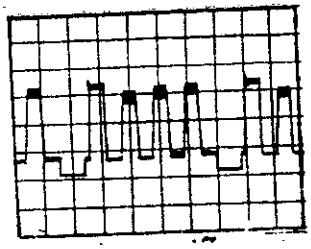
IC-181 pin 20

10) 20 usn/div 2 volt/div



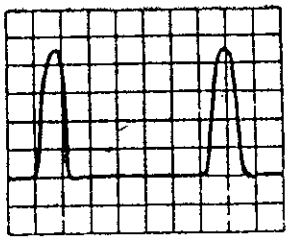
IC-181 pin 19

11) 10 usn/div 2 volt/div



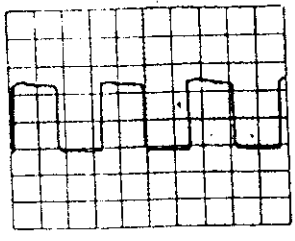
IC-181 pin 18

12) 10 usn/div 200 volt/div



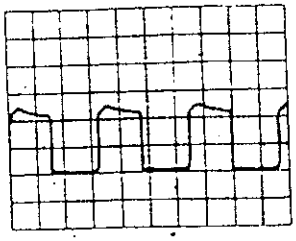
Collector of Q 580

13) 20 usn/div 0.5 volt/div



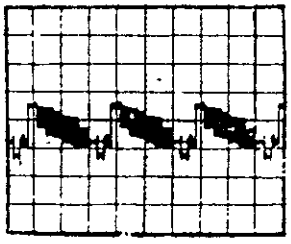
IC-181 pin 37

14) 20 usn/div 50 volt/div



Collector of Q 581

15) 20 usn/div 1 volt/div



IC-181 pin 13

PIN VOLTAGES OF IC'S

Pin.	TDA8361	ST63T85	TDA4661	TDA1905	TA8403	TDA4605	LM317
1	2.9V	3.9V (Varicap)	5.1V	10.2V	0V	0.4V	10.7V
2	5.8V	0.25V	0V	19.7V	14.6V	1.18V	11.9V
3	5.8V	4.8V	0V	18.27V	25.2V	2.9V	16.9V
4	6.9V	2.3V	0V	1.8V	0.9V	0V	
5	0.5V	2.2V	0.4V	0V	0.8V	3V	
6	3.8V	5V	3.3V	3.8V	25V	13.1V	
7	3V	5V	1V	3.8V	1.35V	1.9V	
8	1.8V	5V	0V	3.7V		0.4V	
9	0V	2.8V(AFT)	5.1V	0V			
10	8V	5V	0V	0V			
11	0V	5V	2.8V	0V			
12	2.8V	5V	2.8V	0V			
13	4V	5V	0V	0V			
14	2.9V	5V	1.2V	0V			
15	3.4V	5V	0V	0V			
16	0V	0V	1.2V	0V			
17	2.5V	5V					
18	1.8V	0V					
19	1.8V	4.5V					
20	2.4V	4.3V					
21	0.2V	0V					
22	3.2V	0V					
23	3.3V	0V					
24	3.3V	0V					
25	2.5V	0V					
26	1.8V	0.6V					
27	5.2V	0.1V					
28	3.8V	5V					
29	3.9V	5V					
30	1.5V	0V					
31	1.4V	1.9V					
32	0.03V	2.6V					
33	4.7V	4.8V					
34	2.5V	0V					
35	2V	5V					
36	7.9V	0.5V					
37	0.4V	0V					
38	0.4V	5V					
39	3.3V	5V					
40	3.7V	5V					
41	2.3V	4.7V					
42	2.8V	5V					
43	0.9V						
44	4.3V						
45	4V						
46	4V						
47	6.5V						
48	3.6V						
49	0.9V						
50	3.4V						
51	4.3V						
52	6.5V						

* All voltages are in Volt
* Reading are taken with a digital multimeter.
* Reading are taken with a colour-bar signal input.

* Sound min.
  Contrast
  Brightness } Normal
  Color

CHASSIS
REPLACEMENT
PARTS LIST

POS:	COMPONENT:	DESCRIPTION:
BK01	BATTERY	NiCd 3/V 100R 3.6 V 110 mAh
C101	CAP. M. POLYPROPYLENE	0.10 µf 10% 275 VAC
C102	CAP. M. POLYPROPYLENE	0.10 µf 10% 275 VAC
C103	CAP. CERAMIC	1000 pf 10% 1 KV BN
C104	CAP. CERAMIC	1000 pf 10% 1 KV BN
C105	CAP. AL.ELECT.	100 µf 20% 400 V SR'
C106	CAP. POLYESTER	0.033 µf 5% 630 V GP
C107	CAP. CERAMIC	1000 pf 10% 2 KV BN
C108	CAP. CERAMIC	100 pf 10% 50 V SL
C109	CAP. ELECT.	1 µf 20% 50 V GP
C110	CAP. POLYESTER	0.0033 µf 10% 50 V
C111	CAP. POLYESTER	0.0068 µf 20% 50 V
C112	CAP. ELECT.	47 µf 20% 16 V GP
C113	CAP. M. POLYESTER	0.22 µf 5% 50 V GP
C114	CAP. CERAMIC	100 pf 20% 1 KV BN
C115	CAP. CERAMIC SAFETY	2200 pf 10% 4 KV MX
C116	CAP. CERAMIC	470 pf 10% 1 KV BN
C117	CAP. ELECT.	1000 µf 20% 25V GP
C118	CAP. CERAMIC	470 pf 10% 1 KV BN
C119	CAP. ELECT.	47 µf 20% 160 V GP
C120	CAP. ELECT.	1000 µf 20% 16 V GP
C121	CAP. ELECT.	220 µf 20% 16 V GP
C123	CAP. CERAMIC	100 nf +80-20% 25 V FZ
C124	CAP. ELECT.	47 µf 20% 16 V GP
C125	CAP. ELECT.	2.2 µf 20% 50 V GP
C126	CAP. CERAMIC	10 nf+80-20% 50 V (FZ)
C128	CAP. ELECT.	220 µf 20% 16 V GP
C129	CAP. CERAMIC	470 pf 10% 1 KV BN
C130	CAP. ELECT.	2200 µf 20% 25 V GP
C131	CAP. ELECT.	220 µf 20% 16 V GP
C132	CAP. M. POLYESTER	0.1 µf 5% 50 V GP
C133	CAP. M. POLYESTER	0.1 µf 5% 50 V GP
C134	CAP.ELECT.	4.7 µf 20% 50 V
C135	CAP. CERAMIC	470 pf 10% 1 KV BN
C151	CAP. CERAMIC	1 nf +80-20% 50 V F
C152	CAP. CERAMIC	1 nf +80-20% 50 V F
C153	CAP. CERAMIC	1 nf +80-20% 50 V F
C154	CAP. CERAMIC	1 nf +80-20% 50 V F
C161	CAP. ELECT.	470 µf 20% 16 V GP
C162	CAP. CERAMIC	100 nf +80-20% 25 V FZ
C163	CAP. CERAMIC	10 nf +80-20% 50 V (FZ)
C164	CAP. ELECT.	10 µf 20% 16 V GP
C165	CAP. ELECT.	33 µf 20% 16 V GP
C166	CAP. ELECT.	10 µf 20% 16 V GP
C167	CAP. M. POLYESTER	330 nf 5% V GP
C169	CAP. ELECT.	10 µf 20% 16 V GP
C181	CAP. CERAMIC	4700 pf 10% 50 V B
C182	CAP. CERAMIC	10 pf 5% 50 V CH
C183	CAP. ELECT.	10 µf 20% 16 V GP
C184	CAP. CERAMIC	100 nf+80-20% 25 V FZ
C185	CAP. ELECT.	220 µf 20% 16 V GP
C186	CAP. CERAMIC	100 nf+80-20% 25 V FZ
C187	CAP. CERAMIC	100 nf+80-20% 25 V FZ
C188	CAP. POLYESTER	0.047 µf 5% 50 V
C189	CAP. ELECT.	10 µf 20% 16 V GP
C190	CAP. M. POLYESTER	0.1 µf 5% 50 V GP
C191	CAP. ELECT.	10 µf 20% 16 V GP
C192	CAP. CERAMIC	100 nf +80-20% 25 V FZ

POS:	COMPONENT:	DESCRIPTION:
C193	CAP. CERAMIC	100 nf +80-20% 25 V FZ
C194	CAP. CERAMIC	100 nf +80-20% 25 V FZ
C195	CAP. ELECT.	10 µf 20% 16 V GP
C196	CAP. ELECT.	10 µf 20% 16 V GP
C197	CAP. CERAMIC	100 nf+80-20% 25 V FZ
C198	CAP. POLYESTER	0.0047µf 10% 50 V
C200	CAP. CERAMIC	18 pf 5% 50 V CH
C201	CAP. CERAMIC	10 nf +80-20% 50 V (FZ)
C202	CAP. ELECT.	10 µf 20% 16 V GP
C203	CAP. POLYESTER	0.0022µf 10% 50 V
C204	CAP. POLYESTER	0.0047 µf 10% 50 V
C205	CAP. ELECT.	1 µf 20% 50 V GP
C206	CAP. CERAMIC	22 nf +80-20% 50 V (FZ)
C207	CAP. M. POLYESTER	0.1 µf 5% 63 V GP
C208	CAP. POLYESTER	0.022 µf 5% 50 V GP
C209	CAP. CERAMIC	22 nf +80-20% 50 V (FZ)
C210	CAP. ELECT	2.2 µf 20% 50 V GP
C211	CAP. POLYESTER	0.022 µf 5% 50 V GP
C212	CAP. M. POLYESTER	0.1 µf 5% 50 V GP
C213	CAP. ELECT.	10 µf 20% 16 V GP
C124	CAP. ELECT.	2.2 µf 20% 50 V GP
C125	CAP. CERAMIC	100 nf +80-20% 25 V FZ
C216	CAP. ELECT.	10 µf 20% 16 V GP
C241	CAP. CERAMIC	100 nf +80-20% 25 V FZ
C242	CAP. ELECT.	100 µf 20% 16 V GP
C243	CAP. M. POLYESTER	0.1 µf 5% 50 V GP
C244	CAP. M. POLYESTER	0.1 µf 5% 50 V GP
C245	CAP. CERAMIC	1 nf +80-20% 50 V F
C246	CAP. CERAMIC	1 nf +80-20% 50 V F
C251	CAP. ELECT.	100 µf 20% 16 V GP
C252	CAP. CERAMIC	100 nf +80-20% 25 V FZ
C253	CAP. M. POLYESTER	0.1 µf 5% 50 V GP
C254	CAP. M. POLYESTER	0.22 µf 5% 50 V GP
C26	CAP. CERAMIC	15 pf 5% 50 V CH
C27	CAP. CERAMIC	5 pf 5% 50 V CH
C28	CAP. CERAMIC	5 pf 5% 50 V CH
C29	CAP. CERAMIC	12 pf 5% 50 V CH
C30	CAP. CERAMIC	1 nf +80-20% 50 V F
C31	CAP. CERAMIC	100 pf 10% 50 V SL
C326	CAP. CERAMIC	33 pf 10% 50 V B
C327	CAP. CERAMIC	33 pf 10% 50 V B
C328	CAP. CERAMIC	47 pf 10% 50 V SL
C329	CAP. ELECT	1 µf 20% 50 V GP
C351	CAP. CERAMIC	1 nf +80-20% 50 V F
C352	CAP. CERAMIC	1 nf S +80-20% 50 V F
C353	CAP. CERAMIC	10 nf +80-20% 50 V (FZ)
C355	CAP. CERAMIC	100 nf +80-20% 25 V FZ
C356	CAP. ELECT.	4.7 µf 20% 16 V
C357	CAP. ELECT.	4.7 µf 20% 16 V
C358	CAP. CERAMIC	220 nf 10% 50 V
C359	CAP. CERAMIC	220 nf 10% 50 V
C360	CAP. CERAMIC	220 nf 10% 50 V
C361	CAP. CERAMIC	10 nf +80-20% 50 V (FZ)
C362	CAP. ELECT.	10 µf 20% 16 V GP
C363	CAP. CERAMIC	220 nf 10% 50 V
C364	CAP. CERAMIC	220 nf 10% 50 V
C401	CAP. M. POLYESTER	0.1 µf 5% 50 V GP
C401C	CAP. M. POLYESTER	0.1 µf 5% 63 V GP

POS:	COMPONENT:	DESCRIPTION:
C402	CAP. ELECT.	1000 µf 20% 25V GP
C402C	CAP. CERAMIC	22 pf 10% 50 V CH
C403	CAP. ELECT	1000 µf 20% 25 V GP
C403C	CAP. ELECT.	4.7 µf 20% 50 V
C404	CAP. CERAMIC	100 nf +80-20% 25 V FZ
C405	CAP. ELECT.	47 µf 20% 16 V GP
C407	CAP. CERAMIC	2.2 nf +80-20% 50 V (FZ)
C408	CAP. ELECT.	2.2 µf 20% 50 V GP
C409	CAP. ELECT.	10 µf 20% 16 V GP
C410	CAP. M. POLYESTER	0.1 µf 5% 50 V GP
C476	CAP. CERAMIC	22 nf +80-20% 50 V (FZ)
C477	CAP. M. POLYESTER	330 nf 5% 50 V GP
C478	CAP. ELECT.	2.2 µf 20% 50 V GP
C479	CAP. ELECT.	2.2 µf 20% 50 V GP
C480	CAP. ELECT.	2.2 µf 20% 50 V GP
C481	CAP. ELECT.	2.2 µf 20% 50 V GP
C483	CAP. CERAMIC	22 pf 10% 50 V CH
C484	CAP. CERAMIC	22 pf 10% 50 V CH
C485	CAP. CERAMIC	22 pf 10% 50 V CH
C486	CAP. CERAMIC	22 pf 10% 50 V CH
C487	CAP. POLYESTER	0.015 µf 10% 50 V
C488	CAP. M. POLYESTER	0.1 µf 5% 50 V GP
C489	CAP. CERAMIC	47 pf 10% 50 V CH
C490	CAP. CERAMIC	47 pf 10% 50 V CH
C491	CAP. CERAMIC	33 pf 10% 50 V CH
C492	CAP. CERAMIC	33 pf 10% 50 V CH
C493	CAP. ELECT.	1 µf 20% 50 V GP
C494	CAP. ELECT.	220 µf 20% 16 V GP
C495	CAP. CERAMIC	22 nf +80-20% 50 V (FZ)
C496	CAP. POLYESTER	0.022 µf 5% 50 V GP
C497	CAP. ELECT.	470 µf 20% 16 V GP
C51	CAP. CERAMIC	220 pf 5% 50 V B
C52	CAP. CERAMIC	220 pf 5% 50 V B
C53	CAP. CERAMIC	560 pf 10% 50 V B
C54	CAP. ELECT.	470 µf 20% 16 V GP
C55	CAP. ELECT.	10 µf 20% 250 V
C56	CAP. ELECT.	2.2 µf 20% 250 V
C57	CAP. CERAMIC	1000 pf 10% 2 KV BN
C576	CAP. CERAMIC	100 pf 10% 500 V B
C577	CAP. CERAMIC	1 nf +80-20% 50 V F
C578	CAP. CERAMIC	22 nf +80-20% 50V (FZ)
C579	CAP. ELECT.	1000 µf 20% 35 V GP
C58	CAP. CERAMIC	4700 pf +50-20% 2 KV BN
C580	CAP. ELECT.	100 µf 20% 35 V GP
C581	CAP. ELECT.	1 µf 20% 50 V GP
C582	CAP. ELECT.	1000 µf 20% 16 V GP
C583	CAP. M. POLYESTER	0.1 µf 5% 50 V GP
C587	CAP. CERAMIC	470 pf 10% 2 KV BN
C590	CAP. ELECT.	1 µf 20% 250 V GP
C592	CAP. CERAMIC	680 pf 10% 1 KV BN
C593	CAP. ELECT.	1 µf 20% 250 V GP
C596	CAP. POLYPROPYLENE	0.0072 µf 2.5% 1600V
C597	CAP. CERAMIC	1000 pf 10% 2 KV BN
C598	CAP. ELECT.	4.7 µf 20% 50 V
C599	CAP. ELECT.	1 µf 20% 50 V GP
C600	CAP. CERAMIC	220 pf 10% 500 V B
C611	CAP. ELECT.	47 µf 20% 160 V GP
C670	CAP. ELECT.	22 µf 20% 16 V GP

POS:	COMPONENT:	DESCRIPTION:
C671	CAP. CERAMIC	.1 nf 10% 50 V SL
C676	CAP. CERAMIC	.100 nf +80-20% 25 V FZ
C687	CAP. CERAMIC	.22 pf 10% 50 V SL
C690	CAP. CERAMIC	.22 pf 10% 50 V SL
C692	CAP. CERAMIC	.22 pf 10% 50 V CH
C695	CAP. CERAMIC	.22 pf 10% 50 V CH
C696	CAP. CERAMIC	.22 pf 10% 50 V CH
C698	CAP. CERAMIC	.22 pf 10% 50 V CH
C728	CAP. CERAMIC	.15 pf 5% 50 V CH
C729	CAP. CERAMIC	.1 nf +80-20% 50 V F
C730	CAP. CERAMIC	.470 pf %10 50 V (SL)
C731	CAP. CERAMIC	.20 nf +80-20% 50 V (FZ)
C732	CAP. CERAMIC	.470 pf %10 50 V (SL)
C734	CAP. CERAMIC	.15 pf 5% 50 V CH
C735	CAP. CERAMIC	.27 pf 10% 50 V CH
C736	CAP. CERAMIC	.10 nf +80-20% 50 V (FZ)
C737	CAP, POLYESTER	.0.047 µf 5% 50 V
C738	CAP. CERAMIC	.100 nf +80-20% 25 V FZ
C739	CAP. CERAMIC	.18 pf 5% 50 V CH
C740	CAP. POLYESTER	.0.047 µf 5% 50 V
C741	CAP. ELECT.	.10 µf 20% 16 V GP
C742	CAP. CERAMIC	.220 pf 10% 50 V SL
C743	CAP. POLYESTER	.0.068 µf 5% 50 V
C744	CAP. ELECT.	.22 µf 20% 50 V GP
C747	CAP. ELECT.	.100 µf 20% 16 V GP
C748	CAP. CERAMIC	.22 nf +80-20% 50 V (FZ)
C749	CAP. CERAMIC	.10 nf +80-20% 50 V (FZ)
C750	CAP. CERAMIC	.10 nf +80-20% 50 V (FZ)
C751	CAP. ELECT.	.100 µf 20% 16 V GP
C752	CAP. CERAMIC	.22 nf +80-20% 50 V (FZ)
C760	CAP. ELECT.	.10 µf 20% 16 V GP
C761	CAP. ELECT.	.10 µf 20% 16 V GP
C762	CAP. ELECT.	.10 µf 20% 16 V GP
CDX	CAP. CERAMIC	.2200 pf 10% 2 KV BN
D101	DIODE	.1N4007
D102	DIODE	.1N4007
D103	DIODE	.1N4007
D104	DIODE	.1N4007
D105	DIODE	.BYD 33D
D106	DIODE	.BYV 95C
D107	DIODE, ZENER	.6.2 V
D108	DIODE	.BYD 33D
D109	DIODE	.BYD 33D
D111	DIODE	.BYV 95C
D112	DIODE	.BYV 95C
D113	DIODE	.BYV 95C
D114	DIODE, TEMP. COMP. ZENER	.UPC574J
D115	DIODE	.BYD 33D
D161	DIODE	.1N4148
D162	DIODE	.1N4148
D163	DIODE	.1N4148
D164	DIODE	.1N4148
D165	DIODE	.1N4148
D166	DIODE	.1N4148
D167	DIODE	.1N4148
D169	DIODE	.1N4148
D170	DIODE	.1N4148

POS:	COMPONENT:	DESCRIPTION:
D171	DIODE	1N4148
D181	DIODE	1N4148
D187	DIODE	1N4148
D241	DIODE, ZENER	5.1 V 0.5 W 5%
D351	DIODE	BB809
D352	DIODE	1N4148
D353	DIODE	BA282 / BA582 / BA482
D354	DIODE	BA282 / BA582 / BA482
D355	DIODE	1N4148
D356	DIODE	1N4148
D357	DIODE	1N4148
D476	DIODE	1N4148
D477	DIODE	1N4148
D478	DIODE	1N4148
D479	DIODE	1N4148
D480	DIODE	1N4148
D481	DIODE	1N4148
D482	DIODE	1N4148
D483C	DIODE, ZENER	7.5 V 0.5 W 5%
D484	DIODE	1N4148
D485	DIODE	1N4148
D486	DIODE	1N4148
D487	DIODE	1N4148
D488	DIODE	1N4148
D489	DIODE	1N4148
D490	DIODE	1N4148
D491	DIODE, ZENER	3.9 V 0.5 W 5%
D500	DIODE	1N4148
D51	DIODE, RECTIFIER	1N4007
D578	DIODE	BYD 33D
D582	DIODE	BYV 95C
D583	DIODE	BYV 95C
D584	DIODE, ZENER	9.1V 0.5 W 5%
D585	DIODE	BYV 95C
D727	DIODE	1N4148
D729	DIODE	1N4148
D730	DIODE	1N4148
D731	DIODE	1N4148
D732	DIODE	1N4148
D733	DIODE	1N4148
D734	DIODE	1N4148
D735	DIODE	1N4148
E102	HARNESS ASS'Y 2P 1 CNN	BROWN/BLUE (MAINS) 70 CM H4
E102	CONNECTOR 2P	5285-02A (MAINS)
E108	CONNECTOR 2P	5287-02A (DEGAUSS.)
E108	HARNESS ASS'Y 2P 1 CNN	BLACK/WHITE (DEGAUSS.) 35 CM h2
EM101	CORD POWER	KP-419 LTCE-2F (0.75) SQM/3M
EM101*	CORD POWER	LTBS 0.75 SQM 3M W PLUG (BSI)
EM103	FUSE, SLOW	3.15 A / 250 V
EM104	FILTER, LINE	ELF-18D615
EM107	POSISTOR	PTH451A102BG180M290
EM111	TRANSFORMER	SMPS 110V (FOR 14" CTV)
EM113	COIL	FILTER 3.5X10X1.3 H
EM151	TUNER	TECU5983VA06A
EM151	TUNER	SAMSUNG TUNER
EM182	CRYSTAL, QUARTZ	4.433619 MHz
EM401C	CRYSTAL	32.768 KHZ

POS:	COMPONENT:	DESCRIPTION:
EM476	CRYSTAL	8.00 MHz
EM575	CONNECTOR 2P	5283-02A (HORZ.)
EM575	HARNESS ASS'Y 2P 1 CNN	RED/WHITE (HOR.) 40 CM h3
EM576	CONNECTOR 2P	5279-02A (VERT.)
EM576	HARNESS ASS'Y 2P 1 CNN	BROWN/BLACK (VER.) 40 CM h1
EM577	TRANSFORMER	HORIZONTAL DRIVE
EM579	COIL	FILTER 3.5x10x1.3 H
EM580	TRANSFORMER	FLYBACK
EM726	CRYSTAL	13.875 MHz
EM727	RESONATOR, CERAMIC	6 MHz
FI181	FILTER, CERAMIC TRAP	5.5 MHz TPS 5.5 MB
FI182	FILTER, CERAMIC TRAP	6.5 MHz TPS 6.5 MB
FI182	FILTER, CERAMIC TRAP	6 MHz TPS 6 MB
FI183	FILTER, SAW	J1951 M
FI183	FILTER, SAW	SAF 38.9 MS51P K2950
FI183	FILTER, SAW	K3953
FI326	FILTER, CERAMIC	5.5 MHz SFE 5.5 MB
FI326	FILTER, CERAMIC	6 MHz SFE 6 MB
FI327	FILTER, CERAMIC	6.5 MHz SFE 6.5 MB
FI351	FILTER, SAW	L9453
IC101	IC	LM317
IC102	IC	L7808 8V 1A
IC103	IC	L7805 5V 1A
IC104	IC	TDA 4605
IC181	IC	TDA 8362
IC181	IC	TDA 8361
IC241	IC	TDA 4661
IC251	IC	TDA 8395
IC351	IC	TDA 9830
IC401	IC	TDA 1905
IC401C	IC	M 8716BB1
IC476	IC	ST 6385
IC577	IC	TDA 8403K
IC728	IC	SAA5345 P/T
IC730	IC	SAA5231
L101	COIL, CHOKE	150 UH
L151	COIL, AXIAL FIXED	1 UH J
L152	COIL, AXIAL FIXED	10 UH
L181	COIL, AXIAL FIXED	6.8 UH J
L182	COIL, AXIAL FIXED	10 UH
L326	COIL, AXIAL FIXED	8.2 UH J
L351	COIL, AXIAL FIXED	1 UH J
L476	COIL, AXIAL FIXED	47 UH J
L51	COIL, AXIAL FIXED	150 UH J
L576	COIL	50 UH LINEARITY
L676	COIL, AXIAL FIXED	8.2 UH J
L678	COIL, AXIAL FIXED	8.2 UH J
L680	COIL, AXIAL FIXED	8.2 UH J
L681	COIL, AXIAL FIXED	8.2 UH J
L726	COIL, AXIAL FIXED	15 UH
Q101	TRANSISTOR	H3N90
Q102	TRANSISTOR	JC 547 A
Q151	TRANSISTOR	BF 370
Q161	TRANSISTOR	JC 558
Q162	TRANSISTOR	JC 558
Q163	TRANSISTOR	JC 558
Q181	TRANSISTOR	JC 547 A
Q257	TRANSISTOR	JC 547 A

POS:	COMPONENT:	DESCRIPTION:
Q351	TRANSISTOR	JC 547 A
Q352	TRANSISTOR	JC 547 A
Q353	TRANSISTOR	JC 547 A
Q354	TRANSISTOR	JC 547 A
Q355	TRANSISTOR	JC 547 A
Q356	TRANSISTOR	JC 547 A
Q357	TRANSISTOR	JC 547 A
Q360	TRANSISTOR	JC 547 A
Q361	TRANSISTOR	JC 547 A
Q362	TRANSISTOR	JC 547 A
Q363	TRANSISTOR	JC 547 A
Q364	TRANSISTOR	JC 547 A
Q401C	TRANSISTOR	JC 558
Q476	TRANSISTOR	PH2369
Q480	TRANSISTOR	JC 558
Q481	TRANSISTOR	JC 547 A
Q482	TRANSISTOR	JC 547 A
Q483	TRANSISTOR	JC 547 A
Q484	TRANSISTOR	JC 547 A
Q 485	TRANSISTOR	JC 547 A
Q488	TRANSISTOR	JC 558
Q498	TRANSISTOR	JC 547 A
Q499	TRANSISTOR	JC 547 A
Q51	TRANSISTOR	BF 869
Q52	TRANSISTOR	BF 869
Q53	TRANSISTOR	BF 869
Q579	TRANSISTOR	2SC1573A
Q580	TRANSISTOR	BUH315D
Q581	TRANSISTOR	JC 547 A
Q678	TRANSISTOR	JC 547 A
Q726	TRANSISTOR	JC 547 A
Q727	TRANSISTOR	JC 547 A
Q728	TRANSISTOR	JC 547 A
Q729	TRANSISTOR	JC 547 A
Q730	TRANSISTOR	JC 547 A
R101	RES. CEMENT	5.6 R %10 5 W
R102	RES. M. O. FILM	68 K 5% 2 W
R103	RES. M. O. FILM	68 K 5% 2 W
R104	RES. CAR. FILM	220 R 5% 1/4 W
R106	RES. CAR. FILM	8.2 K 5% 1/4 W
R107	RES. CAR. FILM	47 R 5% 1/4 W
R108	RES. CAR. FILM	220 K 5% 1/4 W
R109	RES. CAR. FILM	330 K 5% 1/4 W
R110	RES. CAR. FILM	3.3 K 5% 1/4 W
R111	RES. CAR. FILM	47 R 5% 1/4 W
R112	RES. CAR. FILM	5.1 R 5% 1/4 W
R114	RES. CAR. FILM	10 K 5% 1/4 W
R115	RES. COAT. INSULATED	8.2 M 5% 1 W
R127	RES. M. O. FILM	47 K 5% 1 W
R128	RES. M. FILM FUSING	1 R 5% 1 W
R131	RES. M. FILM FUSING	1 R 5% 1 W
R132	RES. M. O. FILM	12 K 5% 1 W
R133	RES. M. O. FILM	33 R 5% 1 W
R134	RES. CAR. FILM	3.3 K 5% 1/4 W
R135	RES. CAR. FILM	390 R 5% 1/4 W
R136	RES. CAR. FILM	4.7 K 5% 1/4 W
R137	RES. CAR. FILM	47 R 5% 1/4 W
R151	RES. CAR. FILM	150 R 5% 1/4 W

POS:	COMPONENT:	DESCRIPTION:
R152	RES. CAR. FILM	1.2 K 5% 1/4 W
R153	RES. CAR. FILM	1.2 K 5% 1/4 W
R154	RES. CAR. FILM	5.6 K 5% 1/4 W
R155	RES. CAR. FILM	10 R 5% 1/4 W
R156	RES. CAR. FILM	68 R 5% 1/4 W
R163	RES. CAR. FILM	10 K 5% 1/4 W
R164	RES. CAR. FILM	22 K 5% 1/4 W
R165	RES. CAR. FILM	1 K 5% 1/4 W
R166	RES. CAR. FILM	22 K 5% 1/4 W
R167	RES. CAR. FILM	4.7 K 5% 1/4 W
R168	RES. CAR. FILM	22 K 5% 1/4 W
R169	RES. CAR. FILM	4.7 K 5% 1/4 W
R170	RES. CAR. FILM	10 K 5% 1/4 W
R171	RES. CAR. FILM	22 K 5% 1/4 W
R172	RES. CAR. FILM	4.7 K 5% 1/4 W
R173	RES. CAR. FILM	2.7 K 5% 1/4 W
R175	RES. CAR. FILM	1 M 5% 1/4 W
R181	RES. CAR. FILM	330 R 5% 1/4 W
R182	RES. CAR. FILM	5.6 K 5% 1/4 W
R183	RES. CAR. FILM	1 K 5% 1/4 W
R184	RES. CAR. FILM	100 R 5% 1/4 W
R185	RES. CAR. FILM	180 R 5% 1/4 W
R186	RES. CAR. FILM	1 K 5% 1/4 W
R187	RES. CAR. FILM	1.5 K 5% 1/4 W
R189	RES. CAR. FILM	4.7 K 5% 1/4 W
R190	RES. CAR. FILM	8.2 K 5% 1/4 W
R191	RES. CAR. FILM	680 K 5% 1/4 W
R192	RES. CAR. FILM	12 K 5% 1/4 W
R193	RES. CAR. FILM	100 R 5% 1/4 W
R194	RES. CAR. FILM	100 R 5% 1/4 W
R195	RES. CAR. FILM	100 R 5% 1/4 W
R196	RES. CAR. FILM	100 K 5% 1/4 W
R197	RES. CAR. FILM	47 K 5% 1/4 W
R199	RES. CAR. FILM	10 R 5% 1/4 W
R200	RES. CAR. FILM	27 K 5% 1/4 W
R201	RES. CAR. FILM	470 K 5% 1/4 W
R202	RES. CAR. FILM	12 K 5% 1/4 W
R204	RES. CAR. FILM	330 K 5% 1/4 W
R205	RES. CAR. FILM	5.6 K 5% 1/4 W
R209	RES. CAR. FILM	1 M 5% 1/4 W
R210	RES. CAR. FILM	56 K 5% 1/4 W
R211	RES. CAR. FILM	2 M 5% 1/4 W
R212	RES. CAR. FILM	3.3 K 5% 1/4 W
R213	RES. CAR. FILM	10 K 5% 1/4 W
R214	RES. CAR. FILM	18 K 5% 1/4 W
R215	RES. CAR. FILM	47 K 5% 1/6 W
R241	RES. CAR. FILM	220 R 5% 1/4 W
R242	RES. CAR. FILM	1 K 5% 1/4 W
R250	RES. CAR. FILM	4.7 K 5% 1/4 W
R251	RES. CAR. FILM	10 R 5% 1/4 W
R252	RES. CAR. FILM	22 K 5% 1/4 W
R253	RES. CAR. FILM	1.5 K 5% 1/4 W
R254	RES. CAR. FILM	1.5 K 5% 1/4 W
R255	RES. CAR. FILM	1.5 K 5% 1/4 W
R256	RES. CAR. FILM	1.5 K 5% 1/4 W
R26	RES. CAR. FILM	15 R 5% 1/4 W
R260	RES. NONFLAMABLE C. FILM	2.7 K 5% 1/2 W
R27	RES. CAR. FILM	150 R 5% 1/4 W

POS:	COMPONENT:	DESCRIPTION:
R310	RES. CAR. FILM	10 K 5% 1/4 W
R326	RES. CAR. FILM	1 K 5% 1/4 W
R327	RES. CAR. FILM	270 R 5% 1/4 W
R328	RES. CAR. FILM	330 R 5% 1/4 W
R350	RES. CAR. FILM	270 R 5% 1/6 W
R351	RES. CAR. FILM	100 R 5% 1/4 W
R352	RES. CAR. FILM	18 K 5% 1/4 W
R353	RES. CAR. FILM	4.7 K 5% 1/4 W
R354	RES. CAR. FILM	4.7 K 5% 1/4 W
R355	RES. CAR. FILM	22 K 5% 1/4 W
R356	RES. CAR. FILM	27 K 5% 1/4 W
R357	RES. CAR. FILM	47 K 5% 1/4 W
R358	RES. CAR. FILM	4.7 K 5% 1/4 W
R359	RES. CAR. FILM	12 K 5% 1/4 W
R360	RES. CAR. FILM	4.7 K 5% 1/4 W
R361	RES. CAR. FILM	22 K 5% 1/4 W
R362	RES. CAR. FILM	33 K 5% 1/4 W
R363	RES. CAR. FILM	100 K 5% 1/4 W
R364	RES. CAR. FILM	4.7 K 5% 1/4 W
R365	RES. CAR. FILM	22 K 5% 1/4 W
R366	RES. CAR. FILM	820 R 5% 1/4 W
R367	RES. CAR. FILM	6.8 K 5% 1/4 W
R368	RES. CAR. FILM	2.2 K 5% 1/4 W
R369	RES. CAR. FILM	47 R 5% 1/4 W
R370	RES. CAR. FILM	820 R 5% 1/4 W
R371	RES. CAR. FILM	68 K 5% 1/4 W
R372	RES. CAR. FILM	180 K 5% 1/4 W
R373	RES. CAR. FILM	100 R 5% 1/4 W
R374	RES. CAR. FILM	10 K 5% 1/4 W
R375	RES. CAR. FILM	47 K 5% 1/4 W
R376	RES. CAR. FILM	22 K 5% 1/4 W
R378	RES. CAR. FILM	910 R 5% 1/4 W
R379	RES. CAR. FILM	100 K 5% 1/4 W
R380	RES. CAR. FILM	15 K 5% 1/4 W
R381	RES. CAR. FILM	15 K 5% 1/4 W
R382	RES. CAR. FILM	1 K 5% 1/4 W
R383	RES. CAR. FILM	1 K 5% 1/4 W
R384	RES. CAR. FILM	1 K 5% 1/4 W
R385	RES. CAR. FILM	1 K 5% 1/4 W
R386	RES. CAR. FILM	9.1 K 5% 1/4 W
R387	RES. CAR. FILM	2.7 K 5% 1/4 W
R388	RES. CAR. FILM	1 K 5% 1/4 W
R389	RES. CAR. FILM	5.6 K 5% 1/4 W
R390	RES. CAR. FILM	6.8 K 5% 1/4 W
R391	RES. CAR. FILM	8.2 K 5% 1/4 W
R401	RES. M. O. FILM	2.2 R 5% 1/2 W
R401C	RES. CAR. FILM	2.2 K 5% 1/4 W
R402	RES. M. FILM FUSING	0.47 R 5% 1 W
R402C	RES. CAR. FILM	560 R 5% 1/4 W
R403C	RES. CAR. FILM	100 R 5% 1/4 W
R404	RES. CAR. FILM	18 K 5% 1/6 W
R404C	RES. CAR. FILM	100 R 5% 1/4 W
R405	RES. CAR. FILM	10 K 5% 1/6 W
R406	RES. CAR. FILM	330 R 5% 1/6 W
R407	RES. CAR. FILM	100 K 5% 1/6 W
R476	RES. CAR. FILM	22 K 5% 1/4 W
R477	RES. CAR. FILM	3.3 K 5% 1/4 W
R478	RES. CAR. FILM	15 R 5% 1/4 W

POS:	COMPONENT:	DESCRIPTION:
R479	RES. CAR. FILM	12 K 5% 1/4 W
R480	RES. CAR. FILM	47 K 5% 1/4 W
R481	RES. CAR. FILM	1.8 K 5% 1/4 W
R482	RES. CAR. FILM	3.9 K 5% 1/6 W
R483	RES. CAR. FILM	68 K 5% 1/4 W
R484	RES. CAR. FILM	47 K 5% 1/4 W
R485	RES. CAR. FILM	1.8 K 5% 1/4 W
R486	RES. CAR. FILM	15 K 5% 1/6 W
R487	RES. CAR. FILM	33 K 5% 1/4 W
R488	RES. CAR. FILM	47 K 5% 1/4 W
R489	RES. CAR. FILM	1.8 K 5% 1/4 W
R490	RES. CAR. FILM	10 K 5% 1/6 W
R491	RES. CAR. FILM	33 K 5% 1/6 W
R492	RES. CAR. FILM	100 K 5% 1/4 W
R493	RES. CAR. FILM	1.8 K 5% 1/4 W
R494	RES. CAR. FILM	10 K 5% 1/6 W
R495	RES. CAR. FILM	56 K 5% 1/6 W
R496	RES. CAR. FILM	18 K 5% 1/6 W
R498	RES. CAR. FILM	47 K 5% 1/6 W
R499	RES. CAR. FILM	22 K 5% 1/4 W
503	RES. CAR. FILM	1 K 5% 1/4 W
R504	RES. CAR. FILM	100 R 5% 1/4 W
R505	RES. CAR. FILM	1 K 5% 1/4 W
R506	RES. CAR. FILM	100 R 5% 1/4 W
R507	RES. CAR. FILM	1.2 K 5% 1/4 W
R508	RES. CAR. FILM	1.5 K 5% 1/4 W
R509	RES. CAR. FILM	1.5 K 5% 1/4 W
R51	RES. CAR. FILM	390 R 5% 1/4 W
R510	RES. CAR. FILM	1.5 K 5% 1/4 W
R511	RES. CAR. FILM	1.5 K 5% 1/4 W
R512	RES. CAR. FILM	10 K 5% 1/4 W
R513	RES. CAR. FILM	10 K 5% 1/4 W
R514	RES. CAR. FILM	10 K 5% 1/4 W
R515	RES. CAR. FILM	47 K 5% 1/4 W
R516	RES. CAR. FILM	100 R 5% 1/4 W
R517	RES. CAR. FILM	1 K 5% 1/4 W
R518	RES. CAR. FILM	470 R 5% 1/4 W
R519	RES. CAR. FILM	1.8 K 5% 1/4 W
R52	RES. NONFLAMABLE C. FILM	2.7 K 5% 1/2 W
520	RES. CAR. FILM	1.5 K 5% 1/4 W
R521	RES. CAR. FILM	5.6 K 5% 1/4 W
R522	RES. CAR. FILM	47 K 5% 1/4 W
R523	RES. CAR. FILM	1.8 K 5% 1/4 W
R524	RES. CAR. FILM	4.7 K 5% 1/4 W
R525	RES. CAR. FILM	15 K 5% 1/4 W
R526	RES. CAR. FILM	100 K 5% 1/4 W
R527	RES. CAR. FILM	150 K 5% 1/4 W
R528	RES. CAR. FILM	100 R 5% 1/4 W
R529	RES. CAR. FILM	3.3 K 5% 1/4 W
R53	RES. M. O. FILM	10 K 5% 2 W
R530	RES. CAR. FILM	100 R 5% 1/4 W
R531	RES. CAR. FILM	3.3 K 5% 1/4 W
R532	RES. CAR. FILM	220 K 5% 1/4 W
R533	RES. CAR. FILM	100 K 5% 1/4 W
R534	RES. CAR. FILM	47 K 5% 1/4 W
R535	RES. CAR. FILM	56 K 5% 1/4 W
R54	RES. CAR. FILM	820 R 5% 1/4 W
R549	RES. CAR. FILM	2.2 K 5% 1/4 W

POS:	COMPONENT:	DESCRIPTION:
R55	RES. CAR. FILM	2.2 K 5% 1/4 W
R56	RES. CAR. FILM	470 R 5% 1/4 W
R57	RES, CAR. FILM	100 R 5% 1/4 W
R576	RES. CAR. FILM	3.3 K 5% 1/4 W
R578	RES. NONFLAMABLE C. FILM	270 R 5% 1 W
R579	RES. CAR. FILM	4.7 R 5% 1/4 W
R58	RES. CAR. FILM	390 R 5% 1/4 W
R581	RES. CAR. FILM	15 K 5% 1/4 W
R582	RES. CAR. FILM	33 R 5% 1/4 W
R583	RES. M. O. FILM	1.5 R 5% 1 W
R584	RES. CAR. FILM	56 K 5% 1/4 W
R585	RES. CAR. FILM	100 R 5% 1/4 W
R586	RES. CAR. FILM	22 K 5% 1/4 W
R587	RES. CAR. FILM	10 K 5% 1/4 W
R589	RES. NONFLAMABLE C. FILM	220 R 5% 1/2 W
R59	RES. NONFLAMABLE C. FILM	2.7 K 5% 1/2 W
R590	RES. CAR. FILM	20 K 5% 1/4 W
R596	RES. CAR. FILM	4.7 K 5% 1/4 W
R597	RES. CAR. FILM	47 R 5% 1/4 W
R598	RES. M. O. FILM	10 K 5% 2 W
R599	RES. CEMENT	2 K %10 5 W
R60	RES. M. O. FILM	10 K 5% 2 W
R601	RES. CEMENT	5.6 R %10 5 W
R602	RES. CAR. FILM	4.7 K 5% 1/4 W
R603	RES. M. O. FILM	1 K 5% 3 W
R604	RES. CAR. FILM	22 K 5% 1/4 W
R606	RES. CAR. FILM	8.2 K 5% 1/4 W
R608	RES. M. FILM FUSING	1 R 5% 1 W
R609	RES. CAR. FILM	1 K 5% 1/4 W
R61	RES. CAR. FILM	2.2 K 5% 1/4 W
R610	RES. M. FILM FUSING	0.22 R 5% 1/2 W
R62	RES. CAR. FILM	470 R 5% 1/4 W
R63	RES. CAR. FILM	100 R 5% 1/4 W
R64	RES. CAR. FILM	680 R 5% 1/4 W
R65	RES. CAR. FILM	390 R 5% 1/4 W
R66	RES. NONFLAMABLE C. FILM	2.7 K 5% 1/2 W
R67	RES. M. O. FILM	10 K 5% 2 W
R68	RES. CAR. FILM	2.2 K 5% 1/4 W
R69	RES. CAR. FILM	470 R 5% 1/4 W
R694	RES. CAR. FILM	75 R 5% 1/4 W
R695	RES. CAR. FILM	680 R 5% 1/4 W
R696	RES. CAR. FILM	33 K 5% 1/4 W
R697	RES. CAR. FILM	33 K 5% 1/4 W
R70	RES. CAR. FILM	100 R 5% 1/4 W
R700	RES. CAR. FILM	75 R 5% 1/4 W
R701	RES. CAR. FILM	680 R 5% 1/4 W
R702	RES. CAR. FILM	75 R 5% 1/4 W
R703	RES. CAR. FILM	680 R 5% 1/4 W
R704	RES. CAR. FILM	75 R 5% 1/4 W
R706	RES. CAR. FILM	680 R 5% 1/4 W
R707	RES. CAR. FILM	1 K 5% 1/4 W
R708	RES. CAR. FILM	75 R 5% 1/4 W
R709	RES. CAR. FILM	680 R 5% 1/4 W
R71	RES. CAR. FILM	680 R 5% 1/4 W
R717	RES. CAR. FILM	15 K 5% 1/4 W
R718	RES. CAR. FILM	470 R 5% 1/4 W
R719	RES. CAR. FILM	470 R 5% 1/4 W
R72	RES. CAR. FILM	3.3 K 5% 1/4 W

POS:	COMPONENT:	DESCRIPTION:
R721	RES. CAR. FILM	220 R 5% 1/4 W
R73	RES. CAR. FILM	2.2 M 5% 1/4 W
R734	RES. CAR. FILM	470 R 5% 1/4 W
R735	RES. CAR. FILM	1 K 5% 1/4 W
R736	RES. CAR. FILM	3.3 K 5% 1/4 W
R737	RES. CAR. FILM	1.8 K 5% 1/4 W
R738	RES. CAR. FILM	3.3 K 5% 1/4 W
R739	RES. CAR. FILM	1.8 K 5% 1/4 W
R74	RES. CAR. FILM	1.5 K 5% 1/4 W
R740	RES. CAR. FILM	3.3 K 5% 1/4 W
R741	RES. CAR. FILM	1.8 K 5% 1/4 W
R743	RES. CAR. FILM	1.2 K 5% 1/4 W
R744	RES. CAR. FILM	10 K 5% 1/4 W
R745	RES. CAR. FILM	3.3 K 5% 1/4 W
R746	RES. CAR. FILM	330 R 5% 1/4 W
R747	RES. CAR. FILM	470 R 5% 1/4 W
R748	RES. CAR. FILM	68 K 5% 1/4 W
R749	RES. CAR. FILM	6.8 K 5% 1/4 W
R75	RES. CAR. FILM	10 K 5% 1/4 W
R750	RES. CAR. FILM	6.8 K 5% 1/4 W
R751	RES. CAR. FILM	10 K 5% 1/4 W
R753	RES. CAR. FILM	22 K 5% 1/4 W
R756	RES. CAR. FILM	100 R 5% 1/4 W
R757	RES. CAR. FILM	100 R 5% 1/4 W
R76	RES. CAR. FILM	10 K 5% 1/4 W
R761	RES. CAR. FILM	100 R 5% 1/4 W
R762	RES. CAR. FILM	2.2 K 5% 1/4 W
R763	RES. CAR. FILM	56 K 5% 1/4 W
R765	RES. CAR. FILM	220 R 5% 1/4 W
R77	RES. CAR. FILM	10 K 5% 1/4 W
R776	RES. CAR. FILM	8.2 K 5% 1/4 W
R777	RES. CAR. FILM	33 K 5% 1/4 W
R778	RES. CAR. FILM	33 K 5% 1/4 W
R779	RES. CAR. FILM	4.7 K 5% 1/4 W
R780	RES. CAR. FILM	1.5 K 5% 1/4 W
R781	RES. CAR. FILM	470 R 5% 1/4 W
RDX	RES. M. O. FILM	39 R 5% 1/2 W
SW101	SWITCH, POWER	
T181	COIL, TUNNING CIRCUIT	39.5 MHZ (AFC)
T26	COIL, TOKO	31.9 MHZ
T27	COIL, TOKO	40 MHZ
VC726	CAP. CER. TRIMMER	30 pf
VR101	TRIMPOT, CARBON	5 K 6MM 20 %0.5W VERT.
VR181	TRIMPOT, CARBON	10 K 20% 0.5W VERT.
VR182	TRIMPOT, CARBON	10 K 20% 0.5W VERT.
VR351	TRIMPOT, CARBON	47 K 20% 0.5W VERT. PT6V
VR51	TRIMPOT, CARBON	10 K 20% 0.5W HORZ.
VR52	TRIMPOT, CARBON	10 K 20% 0.5W HORZ.
VR53	TRIMPOT, CARBON	500 R 6 MM 20% 0.5W HORZ.
VR54	TRIMPOT, CARBON	10 K 20% 0.5W HORZ.
VR55	TRIMPOT, CARBON	500R 6 MM 20% 0.5W HORZ.
VR576	TRIMPOT, CARBON	500 R 6 MM 20% 0.5W VERT.
VR577	TRIMPOT, CARBON	10 K 20% 0.5W VERT.
WC426	WIRE CONNECTOR	5 PIN WIRE CON. W 2 CNN
WC51	WIRE CONNECTOR	5 PIN WIRE CON. W 2 CNN
WC51	CONNECTOR	5P
WC576	WIRE CONNECTOR	4 PIN WIRE (3P) CON. W 2 CNN
WC726	WIRE CONNECTOR	6 PIN WIRE CON. W 2 CNN
WC731	CONNECTOR	2P
WC737	WIRE CONNECTOR	2 PIN WIRE CON. W 2 CNN

20''/21'' MAIN CIRCUIT

F-20MMON.SCH
TV PROCESSOR

R151-R155,R161-R176,R181-R208
R241-R262,R251-R254
C151-C154,C168-C169,C181-C216
C241-C247,C251-C256
L151- ,L161- ,L181-L185
LF91- ;
MTL ;D161-D163,D181-D187
D241- ; MTL
Q151- ;Q161-Q163,Q181-Q182
FI181-FI183
EM181-EM182
IC901- ,IC241- ,IC251
VR181-VR182

PTZ
R26-R27
C26-C30
T26-T27

GERMAN STEREO
R901-R906
C901-C910
L901
EN901
IC901

SOUND SYSTEM
R326-R341
C326-C340
L326
T326
FI326-FI334
IC326-IC327
X326
VR326

THE SERVICE INFORMATION FOR SAFETY

1. REPLACMENT OF COMPONENTS MARKED ⚠ MUST BE USED WITH THE SAME TYPE SPECIFIED BY MANUFACTURES.
2. TO MAKE INSULATION RESISTANCE MEASUREMENT BETWEEN POWER SUPPLY AND EXPOSED (ACCESIBLE) METAL PARTS BEFORE RETURNING EQUIPMENT TO THE CUSTOMER TO DETERMINE APPROPRIATE RESISTANCE VALUE SPECIFIED BY MANUFACTURES: 1M OHM/500V DC

CHANNEL CIRCUIT
POWER SUPPLY CIRCUIT
CRT CIRCUIT
DRIVE CIRCUIT
AV CIRCUIT
TELETEXT CIRCUIT
CHANNEL CIRCUIT

BDS1, BDS0, VT, IDENT., VOL., 8V, 12V, 16V, GND, B O/P, G O/P, R O/P, ABL, TVV-O/P, AVV-I/P, B, G, R, FB, FB, R, G, B, FE, BRI., CONT., COL., AFT

IC181

1 BANDGAP SUPPLY 52
2 IF DECOUPLING SOUND DEMODULATOR 51
3 IF AUDIO O/P 50
4 IDENT TUNER TAKE-OVER ADJUSTMENT 49
5 SIF IN DECOUPLING AGC CAP. 48
6 AUDIO I/P TUNER AGC 47
7 VIDEO OUT IF I/P 2 46
8 DECOUPLING IF I/P 1 45
9 GND 1 AFC1 O/P 44
10 VDD VER. O/P 43
11 GND 2 V.GENERATOR 42
12 DECOUPLING FILTER TUNING V FB I/P 41
13 TV CVBS I/P PHASE 1 LOCK FILTER 40
14 PEAKING CONTROL I/P PHASE 2 LOCK FILTER 39
15 EXT CVBS I/P SAND 38
16 AV SW H. O/P 37
17 BRI. START H. OSC 36
18 B O/P 4.43 XTAL 35
19 G O/P 3.58 XTAL 34
20 R O/P BURST PHASE DETECTOR 33
21 FB 4.43MHZ O/P 32
22 R I/P B-Y O/P 31
23 G I/P R-Y O/P 30
24 B I/P R-Y I/P 29
25 CONT. B-Y I/P 28
26 COL. TINT 27

IC401

IC251

IC241

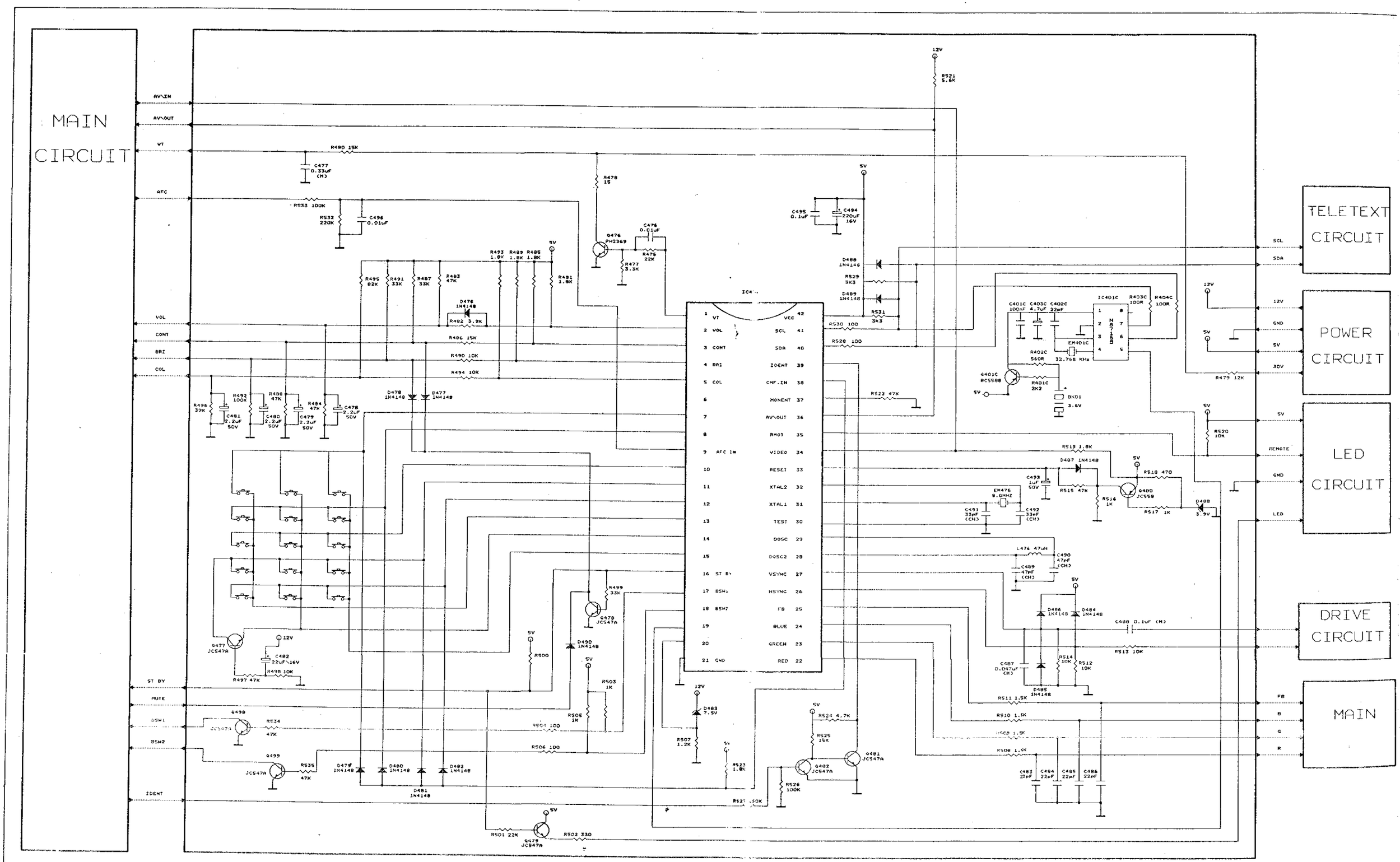
EM401, EM181, EM182, FI181

CHANNEL CIRCUIT
AV CIRCUIT
DRIVE CIRCUIT

MUTE, F3 TVA-O/P, J3 AVA-I/P, VER.DRIVE, VER. FB, HOR. SYNC, HOR. DRIVE

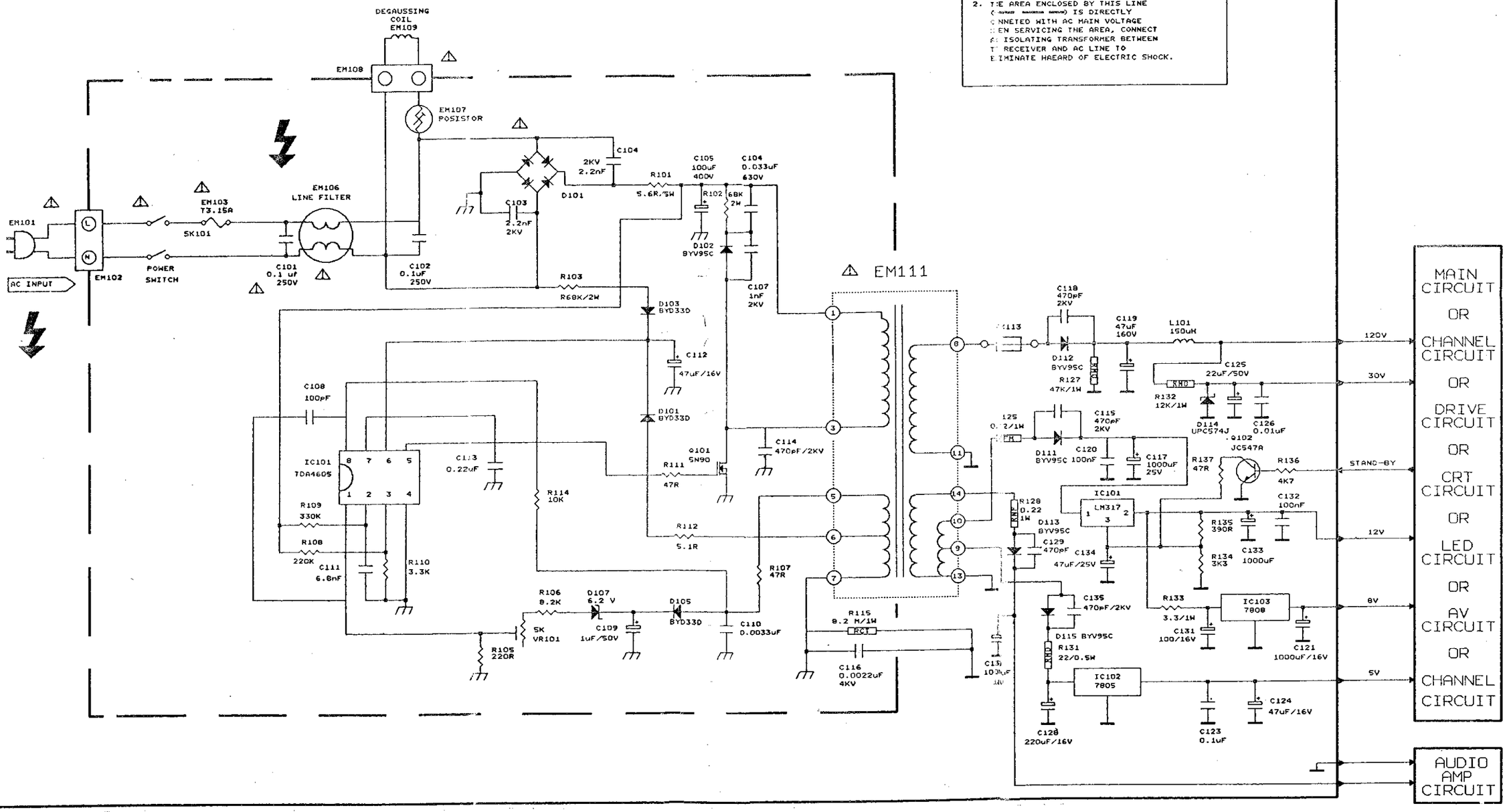
MAIN CIRCUIT

SIS CIRCUIT DIAGRAM



THE SERVICE INFORMATION FOR SAFETY

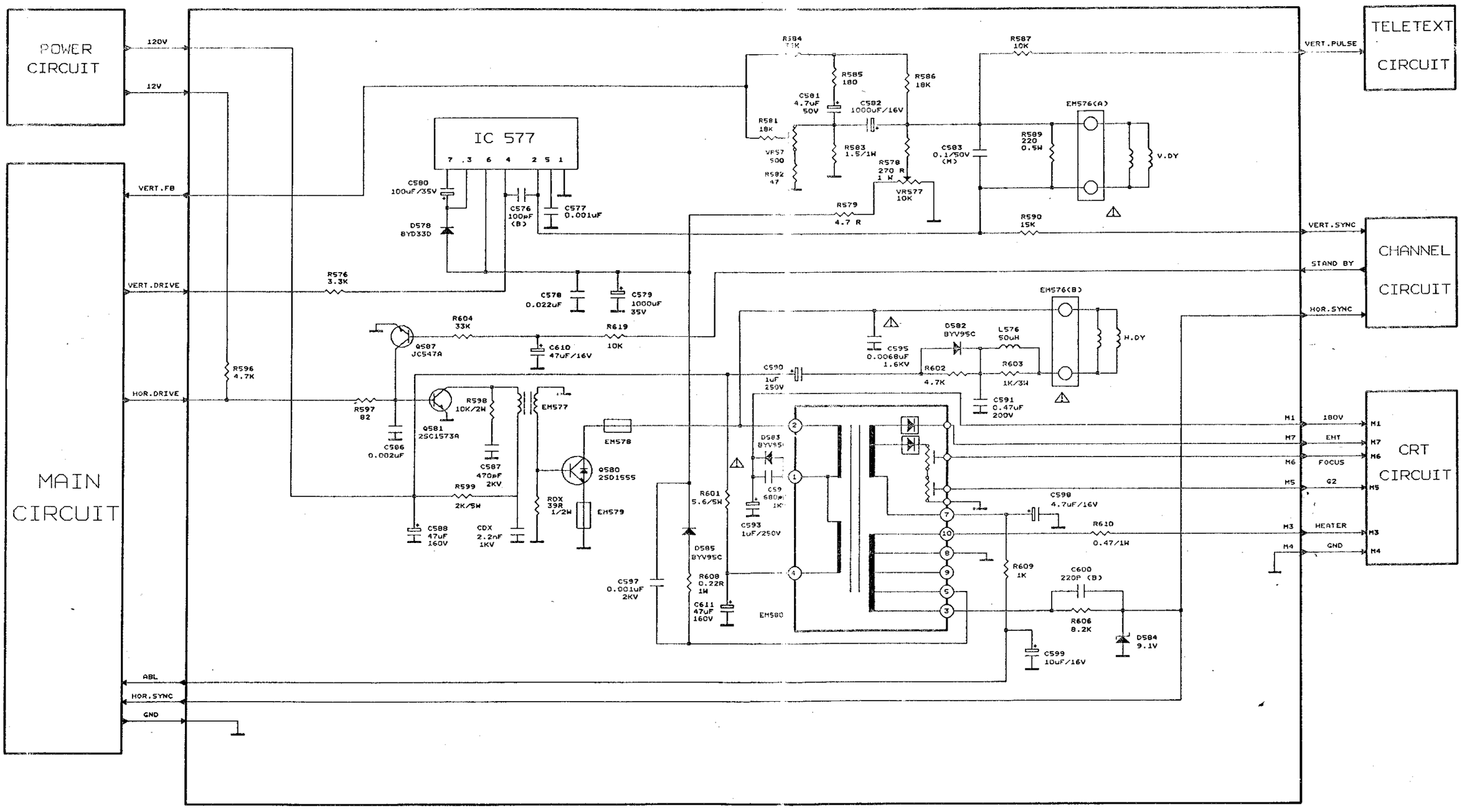
1. REPLACEMENT OF COMPONENTS MARKED ⚠ MUST BE USED WITH THE SAME TYPE SPECIFIED BY MANUFACTURES.
2. THE AREA ENCLOSED BY THIS LINE (- - - - -) IS DIRECTLY CONNETED WITH AC MAIN VOLTAGE WHEN SERVICING THE AREA, CONNECT AN ISOLATING TRANSFORMER BETWEEN THE RECEIVER AND AC LINE TO ELIMINATE HAEARD OF ELECTRIC SHOCK.



POWER CIRCUIT

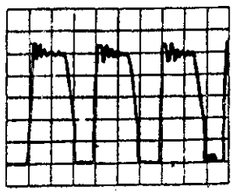
R575~R619
C573~C610
D577~D583
EM576~EM580
VR576~VR578
Q576~Q581
IC576
L576~L577

20''/21'' DRIVE CIRCUIT



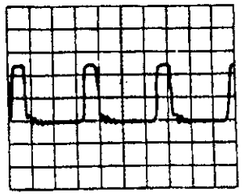
DRIVE CIRCUIT

1) 5 usn/div 100 volt/div



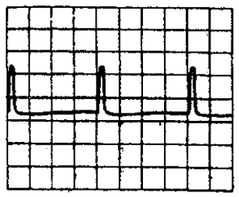
Collector of Q101

2) 20 usn/div 2volt/div



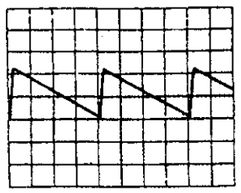
IC-476 pin 26

3) 5m sn/div 2volt/div



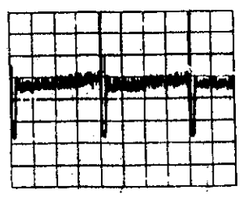
IC-476 pin 27

4) 5 msn/div 0,5 volt/div



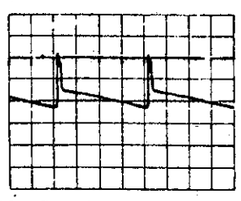
IC-181 pin 41

5) 5 msn/div 1 volt/div



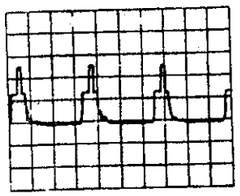
IC-577 pin 4

6) 5 msn/div 20 volt/div



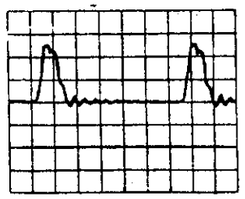
IC-577 pin 2

7) 20 usn/div 2 volt/div



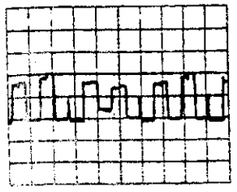
IC-181 pin 38

8) 10 usn/div 50 volt/div



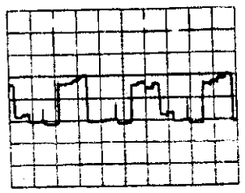
Cathode of D 584

9) 20 usn/div 2 volt/div



IC-181 pin 20

10) 20 usn/div 2 volt/div



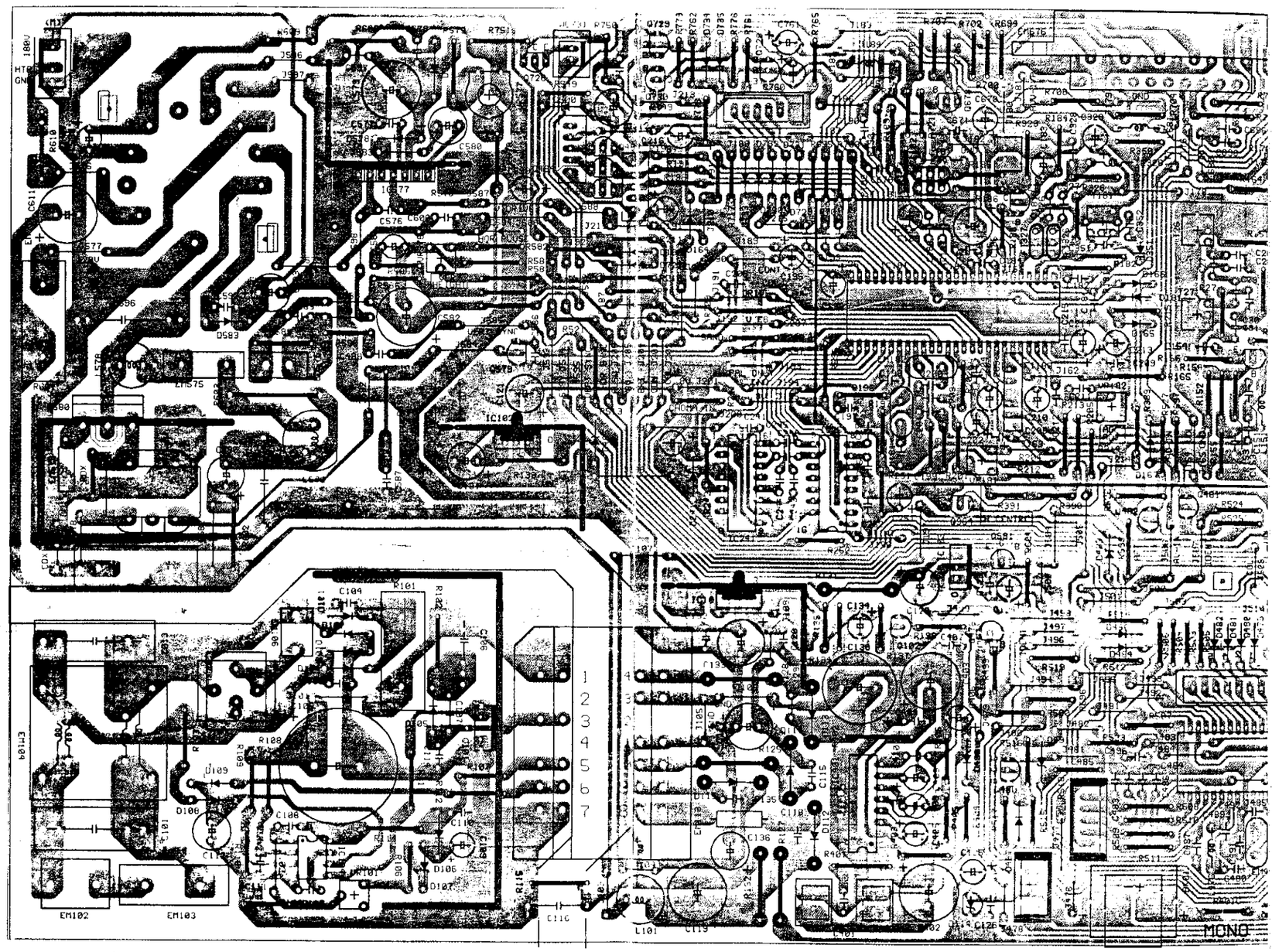
IC-181 pin 19

11) 10 usn/div 2 volt/div

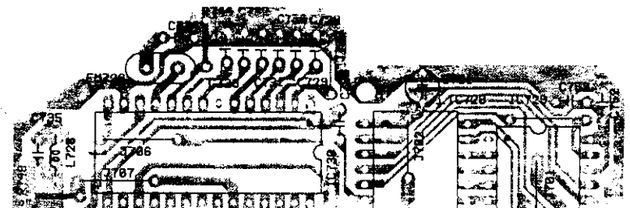
IC-181 pin 1

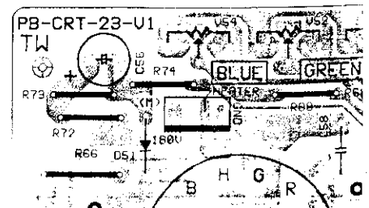
12) 10 usn/div 200 volt/div

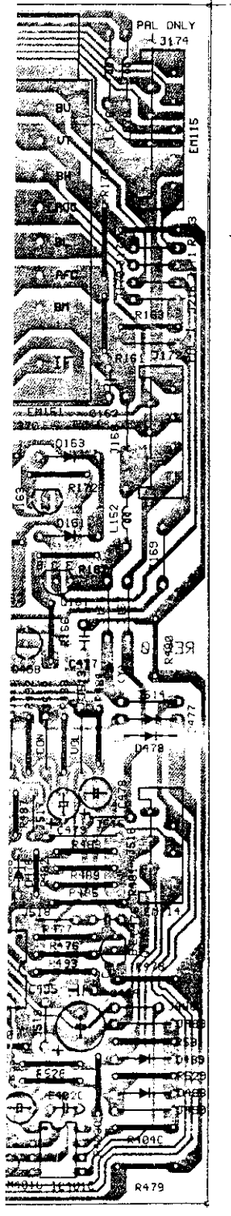
IC-181 pin 2

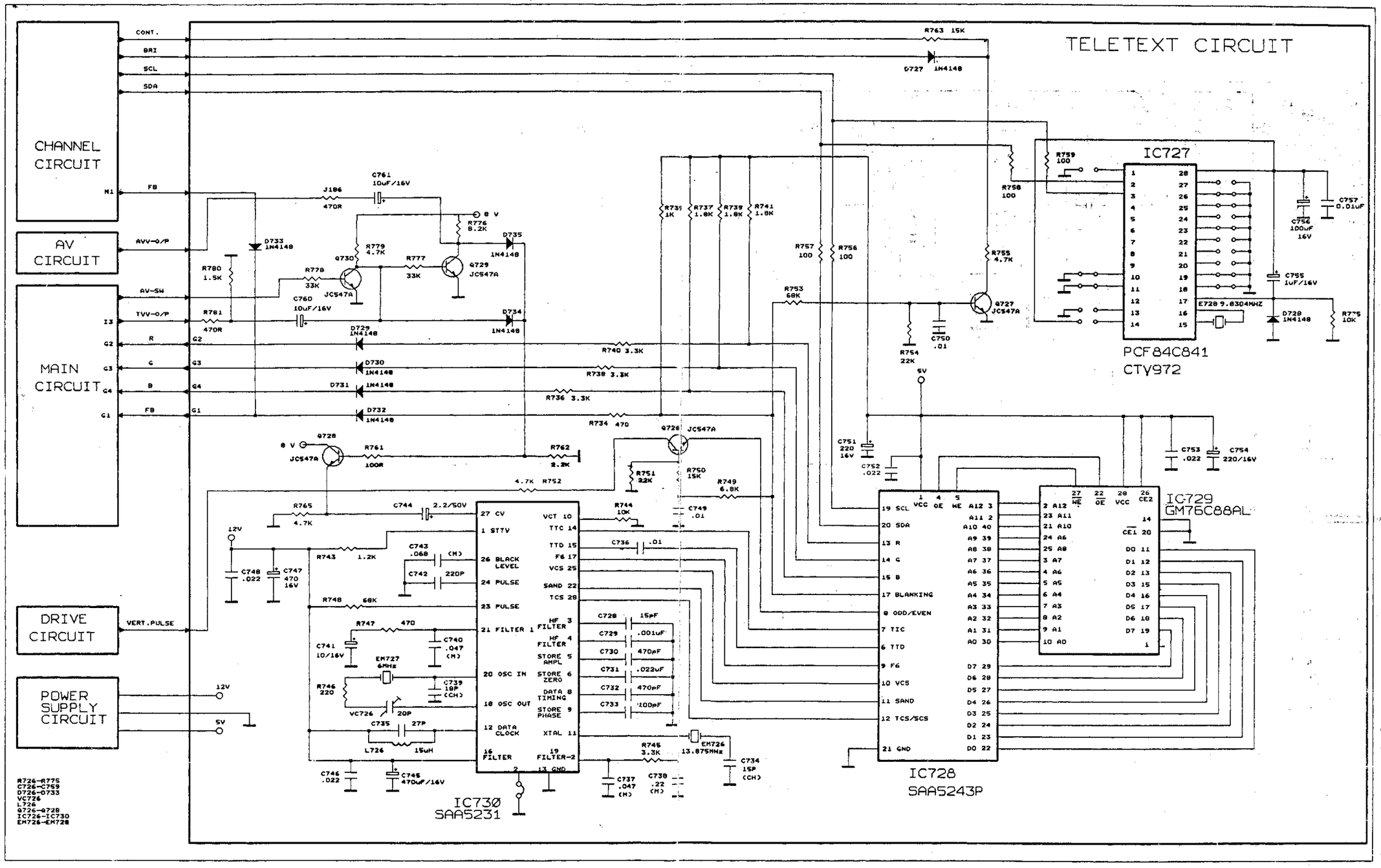


MAIN PCB

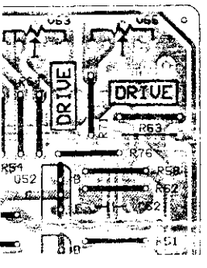


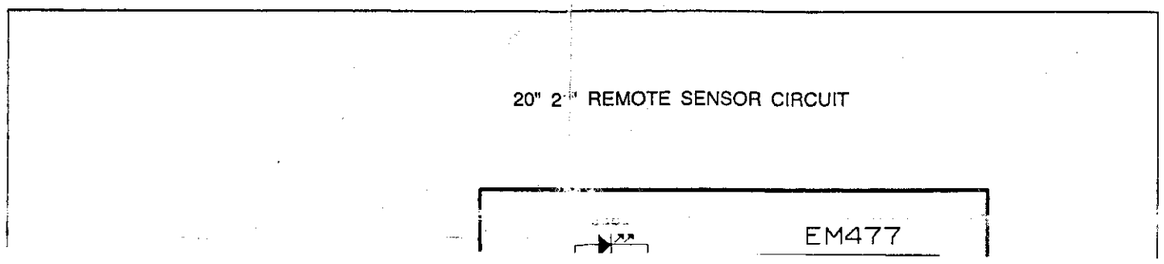




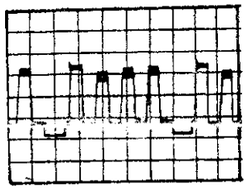


TELETEXT CIRCUIT



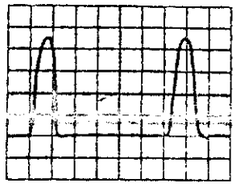


11) 10 usn/div 2 volt/div



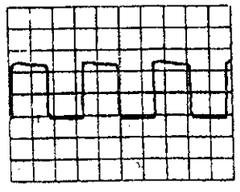
IC-181 pin 18

12) 10 usn/div 200 volt/div



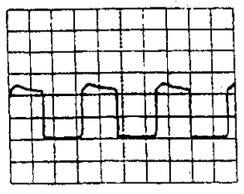
Collector of Q 580

13) 20 usn/div 0.5 volt/div



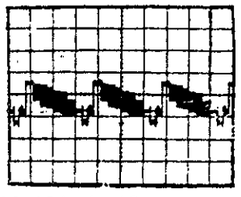
IC-181 pin 37

14) 20 usn/div 50 volt/div



Collector of Q 581

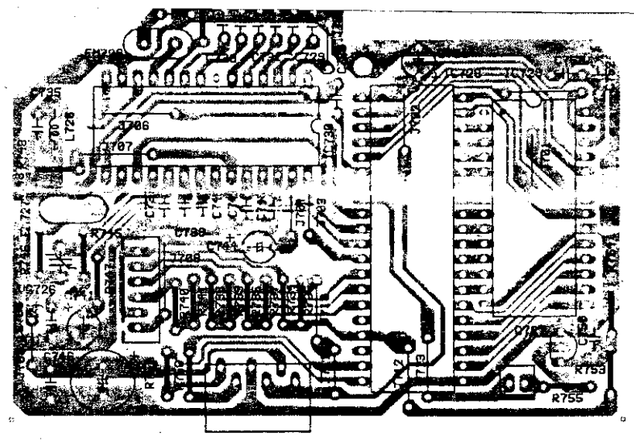
15) 20 usn/div 1 volt/div



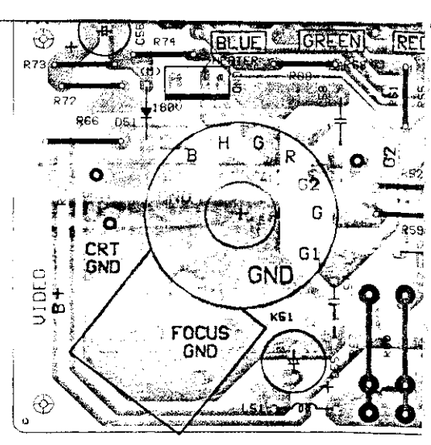
IC-181 pin 13

OSSILOSCOPE SHAPES

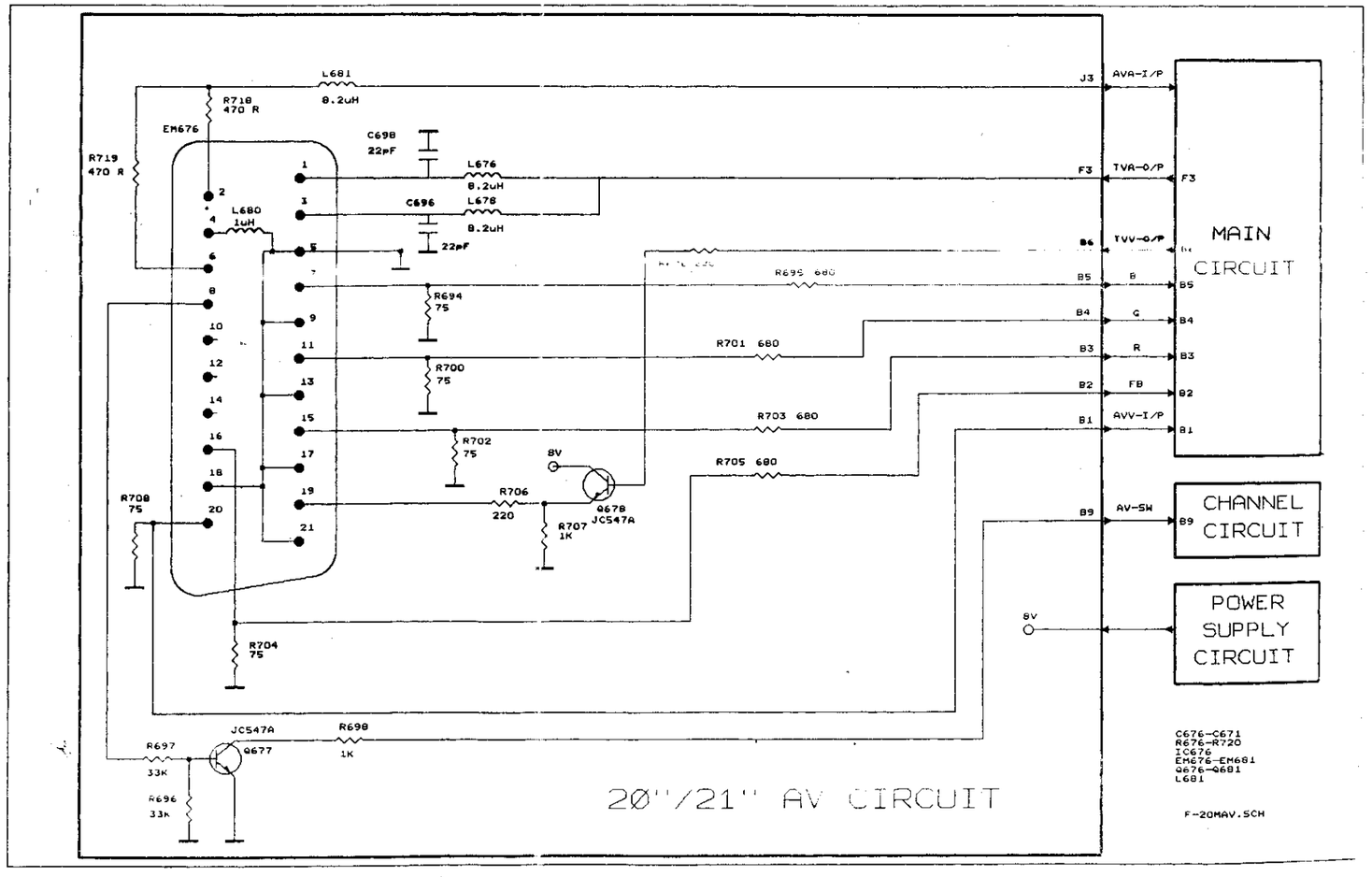
TUBE	C 595	R 610	TUBE SOCKET	LOSS COIL
14" EKRANAS	6.8 nF	0.22R (0.5W)	NARROW NECK	--------
20" EKRANAS	7.8 nF	0.47R (1W)	NARROW NECK	56 uH
20" SAMSUNG	9.1 nF	0.47R (1W)	NARROW NECK	56 uH
21"EKRANAS	8.2 nF	0.47R (1W)	NARROW NECK	150 uH
21"VIDEOCOLOR	7.8 nF	0.22R (0.5W)	NARROW NECK	150 uH

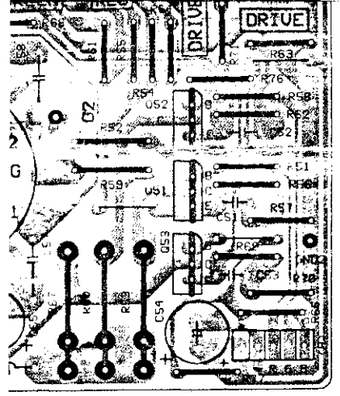


TELETEXT PCB

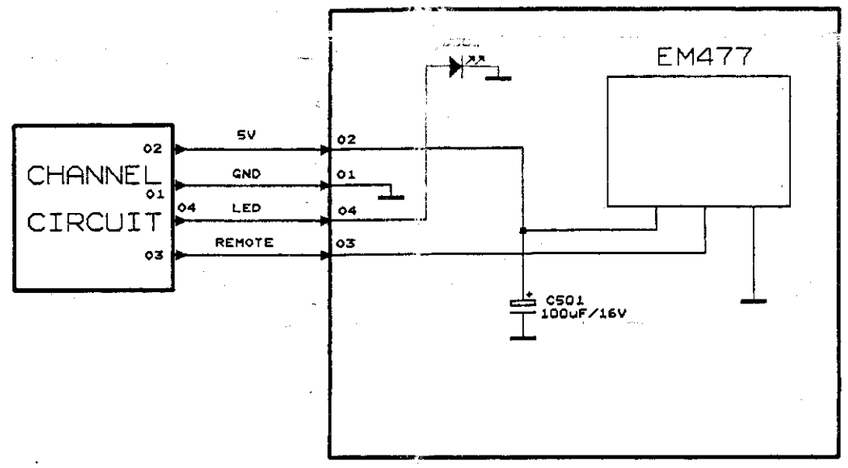


CRT PCB





20" 21" REMOTE SENSOR CIRCUIT



LED CIRCUIT

R51-R82
Q51-Q59
D51-D57
Q51-Q57
L51-
EM51-
VR51-VR55

20" 21" CRT CIRCUIT

28" DRIVE CIRCUIT

MAIN CIRCUIT

HOR.SYNC
ABL
VER. FB
VER.DRIVE
HOR.DRIVE

IC576
1 2 3 4 5 6 7 8 9

R576 4.7K
C576 0.01
C578 470P
C577 0.001
R577 4.7K
C579 47 50V
R585 150 0.5W
D576 FR105
C580 100nF (M)
C581 1000/35V

R501 56K
R579 15K
R582 18K
R580 100
C582 2.2/50V
C583 2200 25V
R578 220/0.5W
C584 0.1(M)
D.Y. VERTICAL
EM580(A)
D580 7.5V
VR576 500
R584 1R/1W
R586 220R
VR579 5K
R587 560/0.5W

VERT. PULSE
TELETEXT CIRCUIT

C608 220nF 500V
R612 2.7K

VR578
R589 470K
R588 12K
R593 10K
C588 22 50V
200K
PICTURE WIDTH
R599 180K
R601 2.2K
R603 220
C585 100nF (M)
C587 0.47 (M)
R591 33K
R592 100K
C586 220nF (M)
Q577 JC558
VR577 20K
R590 47K
R594 2.2K
R595 1.8K
Q576 JC547A
R596 1K
C589 1000 16V
R598 6.8K
R597 100K
Q578 JC558
C590 0.001
Q579 BD435
R600 2.2K
R602 4.7K
R604 3.3/1W
L576 CHOKE COIL
C591 6.2 50V
BIPOLAR
C592 0.27 200V
L577 LINEARITY COIL
R605 1K/3W
D.Y. HOR.
EM580(B)

PIN CUSHION

M3 160V
M5 EHT
M6 FOCUS
M4 G2
M2 GND
M1 HEATER
CRT CIRCUIT

Q580 15734
R608 10K 3W
C593 2.2nF
C594 470nF 2KV
EMS76
C609 2.2nF 1KV
R609 1.8K/5W
R610 1/2W
619 47/1W
EMS77
Q581 BUH51500
EMS78
D577 BY228
D578 BYV95B
C596 0.012 1.6KV
C597 0.022 400V
R607 47
R606 4.7K
C601 470P/1KV
D579 BYV95C
C602 1uF/250V
C605 1/50V
R617 1K
C606 1uF 50V
R613 0.47R/1W
R611 3.9K/10W
R614 0.47R 1W
D581 BYV95C
C603 1000P 1KV
EM579

POWER SUPPLY CIRCUIT
140V
12V

PS76-R618
C576-C609
D576-D583
EMS76-EM580
VR576-VR578
Q576-Q581
IC576
LS76-L577

EM676
L680 1mH
R708 75
R704 75
JC547A
R697 33K
R696 33K
Q677

NICAM 1

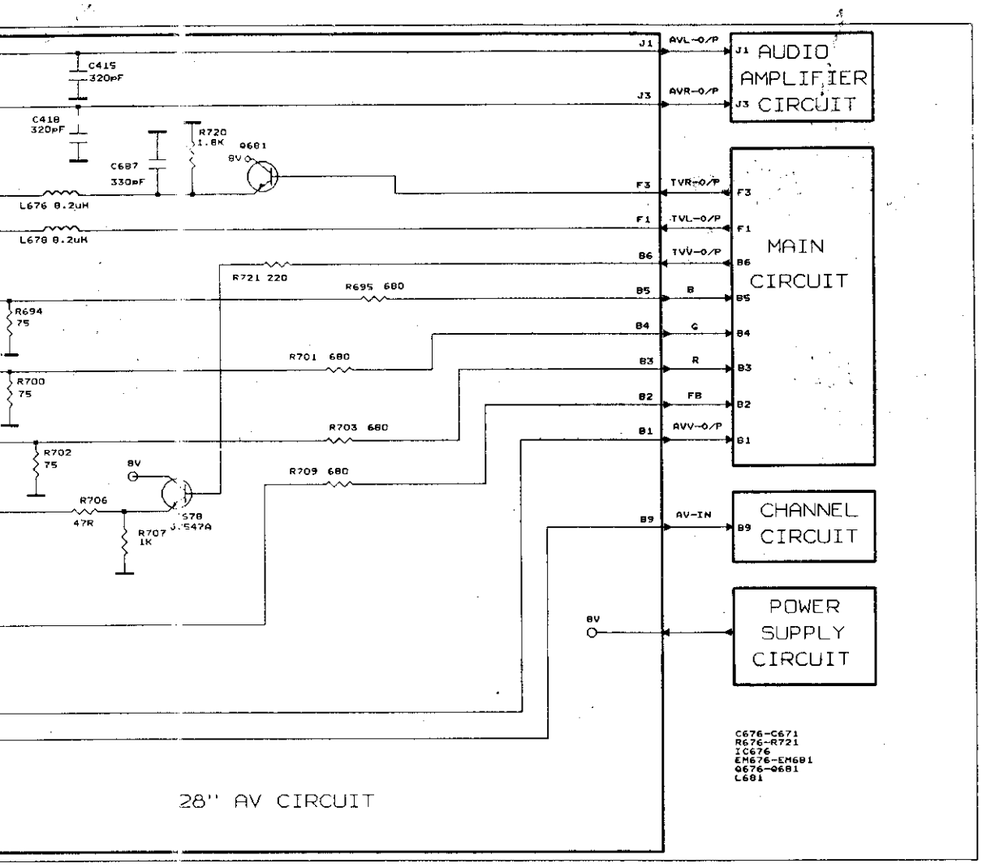
MAIN BOARD

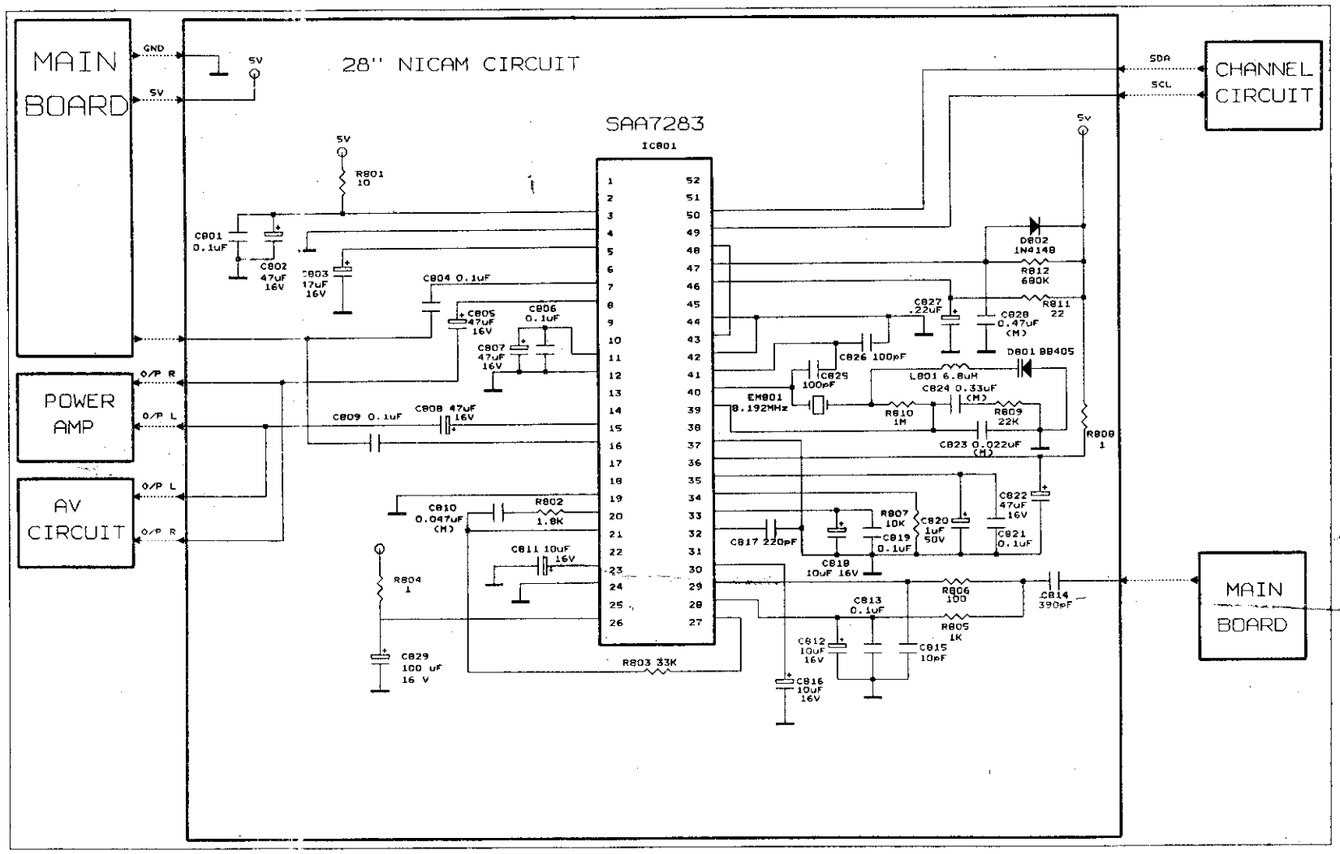
28" POWER CIRCUIT

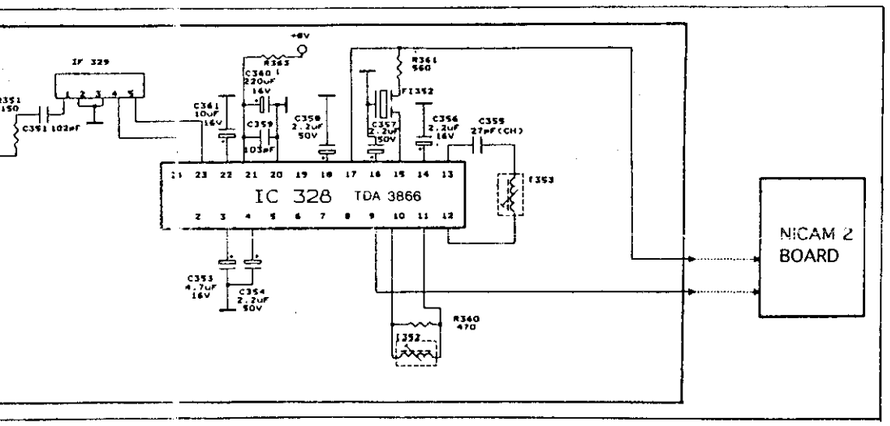
THE SERVICE INFORMATION FOR SAFE Y ⚠

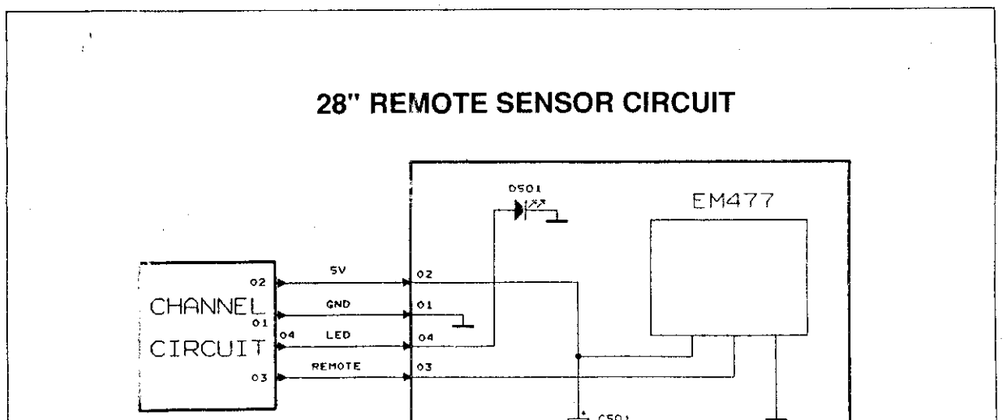
1. REPLACMENT OF COMPONENTS MARKED MUST BE USED WITH THE SAME TYPE SPECIFIED BY MANUFACTURES.
2. THE AREA ENCLOSED BY THIS LIN CONNETED WITH AC MAIN VOLTAGE

R101-R116,R120-R128
C101-C116,C120-C132,C135-C140
D101-D105,D120-D126
EM101-EM108,EM120
VR101, NIL
IC101,IC122-IC123
Q101,Q120-Q123
NIL,L120-L122
SW101


C415 320pF
C418 320pF
C687 330pF
R720 1.8K
Q681
8V
L676 0.2uH
L678 0.2uH
R721 220
R695 680
R694 75
R701 680
R700 75
R703 680
R702 75
R709 680
R706 47R
R707 1K
S78 J-547A
8V
J1 AVL-O/P
J3 AVR-O/P
F3 TVR-O/P
F1 TVL-O/P
B6 TVV-O/P
B5 B
B4 G
B3 R
B2 FB
B1 AVV-O/P
B9 AV-IN
J1 AUDIO AMPLIFIER CIRCUIT J3
F3
F1
B6
B5
B4
B3
B2
B1
MAIN CIRCUIT
B9
CHANNEL CIRCUIT
8V
POWER SUPPLY CIRCUIT
C676-C671
R676-R721
IC676
EM676-EM681
Q676-Q681
L681
28" AV CIRCUIT


MAIN BOARD
GND
5V
28" NICAM CIRCUIT
SAA7283
IC801
R801 10
C801 0.1uF
C802 47uF 16V
C803 47uF 16V
C804 0.1uF
C805 47uF 16V
C806 0.1uF
C807 47uF 16V
C808 47uF 16V
C809 0.1uF
C810 0.047uF (M)
R802 1.0K
C811 10uF 16V
R804 1
C829 100 uF 16 V
R803 33K
D802 1N4148
R812 680K
R811 22
C827 .22uF
C828 0.47uF (M)
C826 100pF
D801 BB405
C825 100pF
L801 6.8uH
C824 0.33uF (M)
EM801 8.192MHz
R810 1M
R809 22K
C823 0.022uF (M)
R808 1
C822 47uF 16V
C817 220pF
R807 10K
C820 1uF 50V
C819 0.1uF
C818 10uF 16V
C821 0.1uF
R806 100
C814 390pF
C813 0.1uF
R805 1K
C812 10uF 16V
C815 10nF
C816 10uF 16V
SDA
SCL
CHANNEL CIRCUIT
MAIN BOARD
POWER AMP
AV CIRCUIT
O/P R
O/P L
O/P L
O/P R


IF 329
+8V
R363
C360 220uF 16V
R361 560
FI352
C361 10uF 16V
C359 103nF
C358 2.2uF 50V
C357 2.2uF 50V
C356 2.2uF 16V
C355 27pF(CH)
IC 328 TDA 3866
FI353
C353 4.7uF 16V
C354 2.2uF 50V
R360 470
J352
NICAM 2 BOARD


28" REMOTE SENSOR CIRCUIT
D501
EM477
CHANNEL CIRCUIT
5V
GND
LED
REMOTE
C501

CONNETED WITH AC MAIN VOLTAGE
WHEN SERVICING THE AREA, CONNEC:
AN ISOLATING TRANSFORMER BETWEEN
TV RECEIVER AND AC LINE TO
ELIMINATE HAREARD OF ELECTRIC SHOCK.

AC INPUT

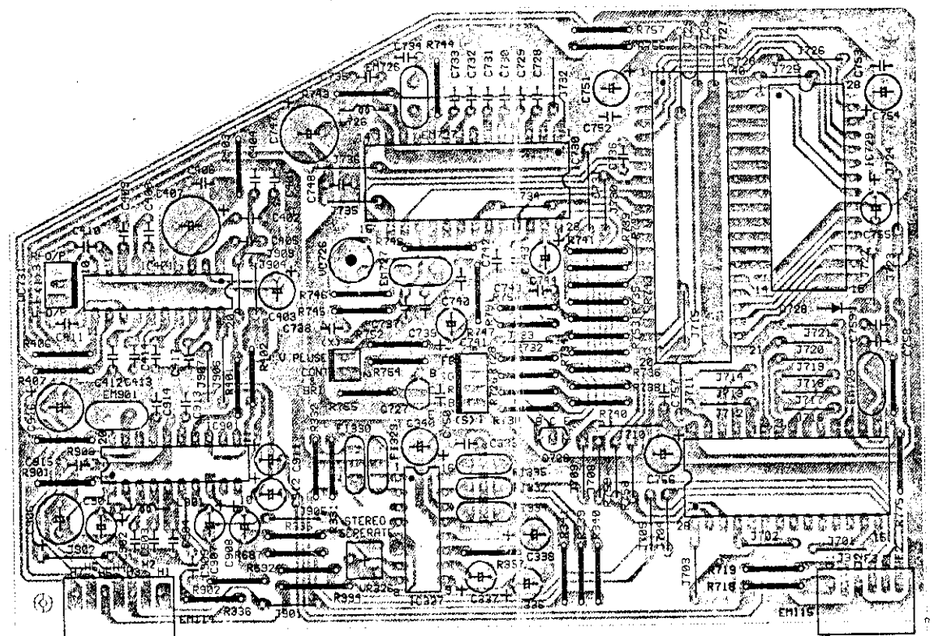
EM101 EM102 SW101 POWER SWITCH EM103 T3.15A K101 C101 0.1uF 250V EM104 LINE FILTER C102 0.1uF 250V EM106 DEGAUSSING COIL POSISTOR EM105 D101 RS206L C104 0.0022uF 2KV C105 100uF 400V C106 0.033uF 630V R101 5.6/5W R102 68K/2W C10 0.002uF 2KV R103 68K/2W D102 BYV 95C C107 102pF 2KV D103 BYV330 C112 47uF 16V EM108

IC101 TDA4605 C108 100pF C113 0.22uF (M) R108 330K R109 220K C111 0.0068uF (M) R110 3.3K R111 47 Q101 H5N90 C115 100pF 2KV D104 BYV330 R112 5 R114 10K R107 47 D107 R106 6.8K D105 BYV330 VR101 5K C109 1uF 50V C110 3.3nF

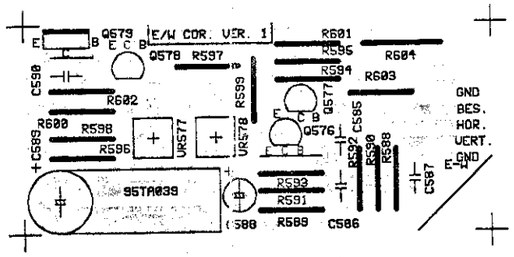
R115 4.7M/0.5W R116 4.7M/0.5W C116 0.001uF 4KV R126 22K R127 22K

EM120 L120 150uH D125 BYV95C C127 47uF 160V L121 150uH C128 22uF/50V C129 20nF R124 12K/1W C130 47uF/160V D124 JC574J D120 BYV95C C120 470pF 2KV C121 2200uF/25V C122 470pF 2KV R121 0.47/1W D121 BYV95C C123 1000uF 16V IC123 7805 C131 0.1uF C140 220uF 16V C139 0.022uF C132 1000uF 16V R120 0.47/1W R122 0.47 1W C124 470pF 2KV D122 BYV95C C125 1000uF 25V L122 150uH C136 100nF R129 2.2K Q121 BD435 C135 1000uF 16V Q122 BF422 Q123 JC547 R125 15R D126 12V IC122 7808 C138 0.1uF C137 470uF 16V

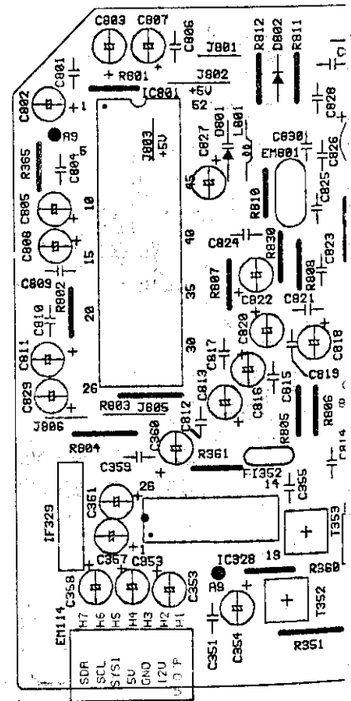
20V → AUDIO AMPLIFIER CIRCUIT
30V → MAIN CIRCUIT OR CHANNEL CIRCUIT OR DRIVE CIRCUIT OR CRT CIRCUIT OR LED CIRCUIT OR AV CIRCUIT OR TELETEXT CIRCUIT
120~140V
5V
12V
8V
STBY → CHANNEL CIRCUIT

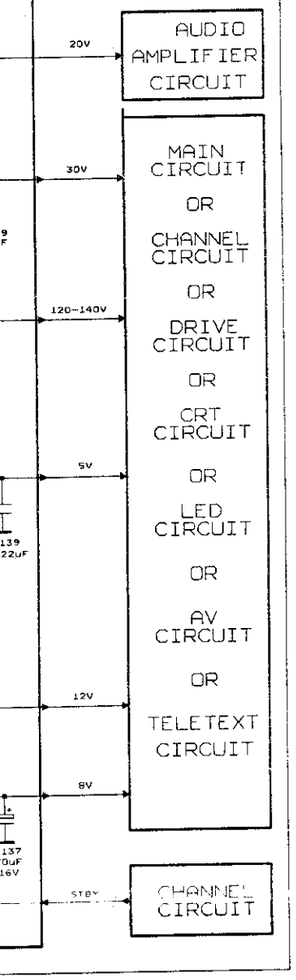


E/W CORRECTION PCB

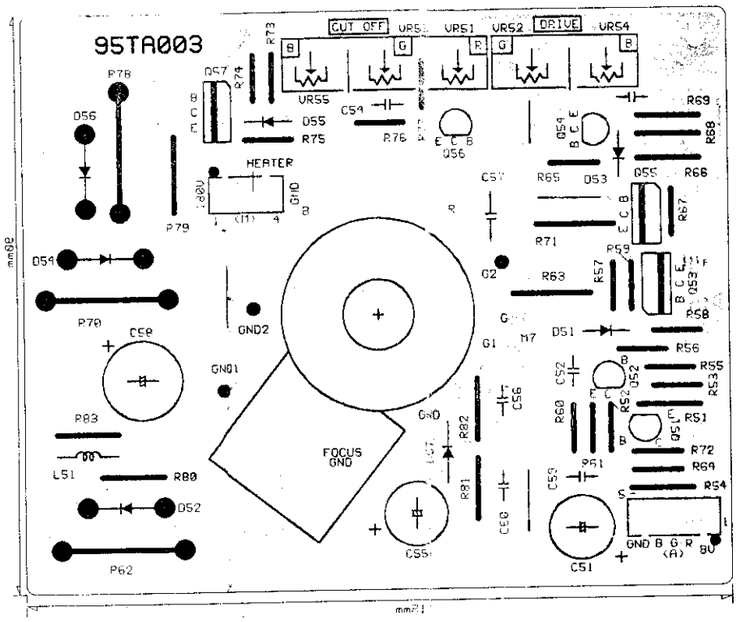


NICAM/TXT PCB

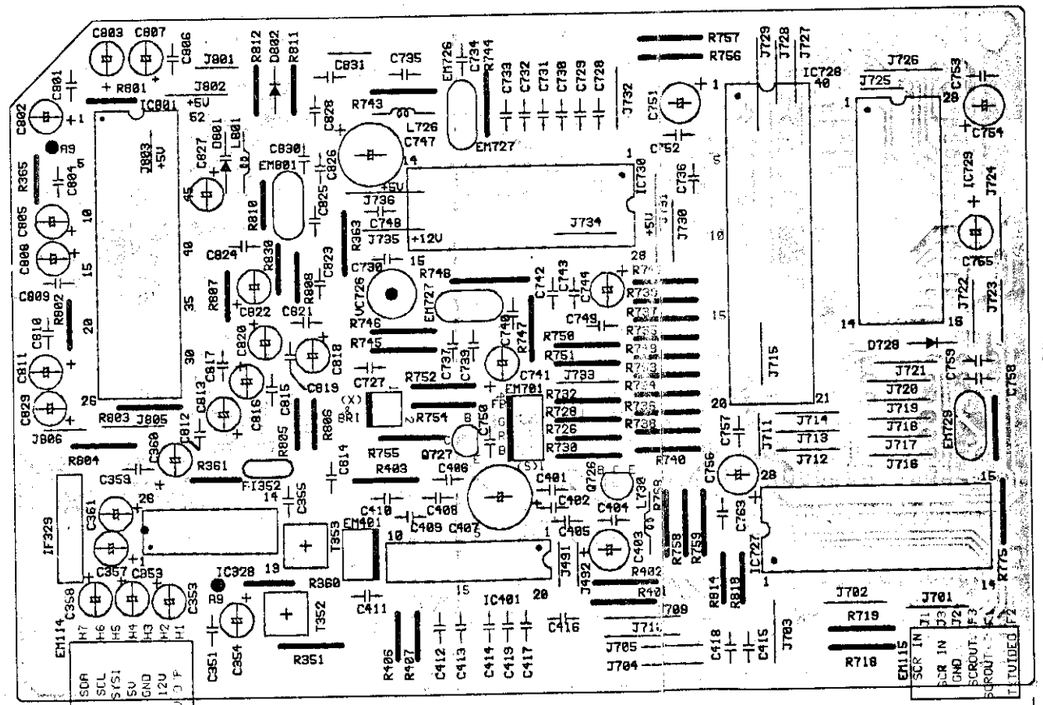




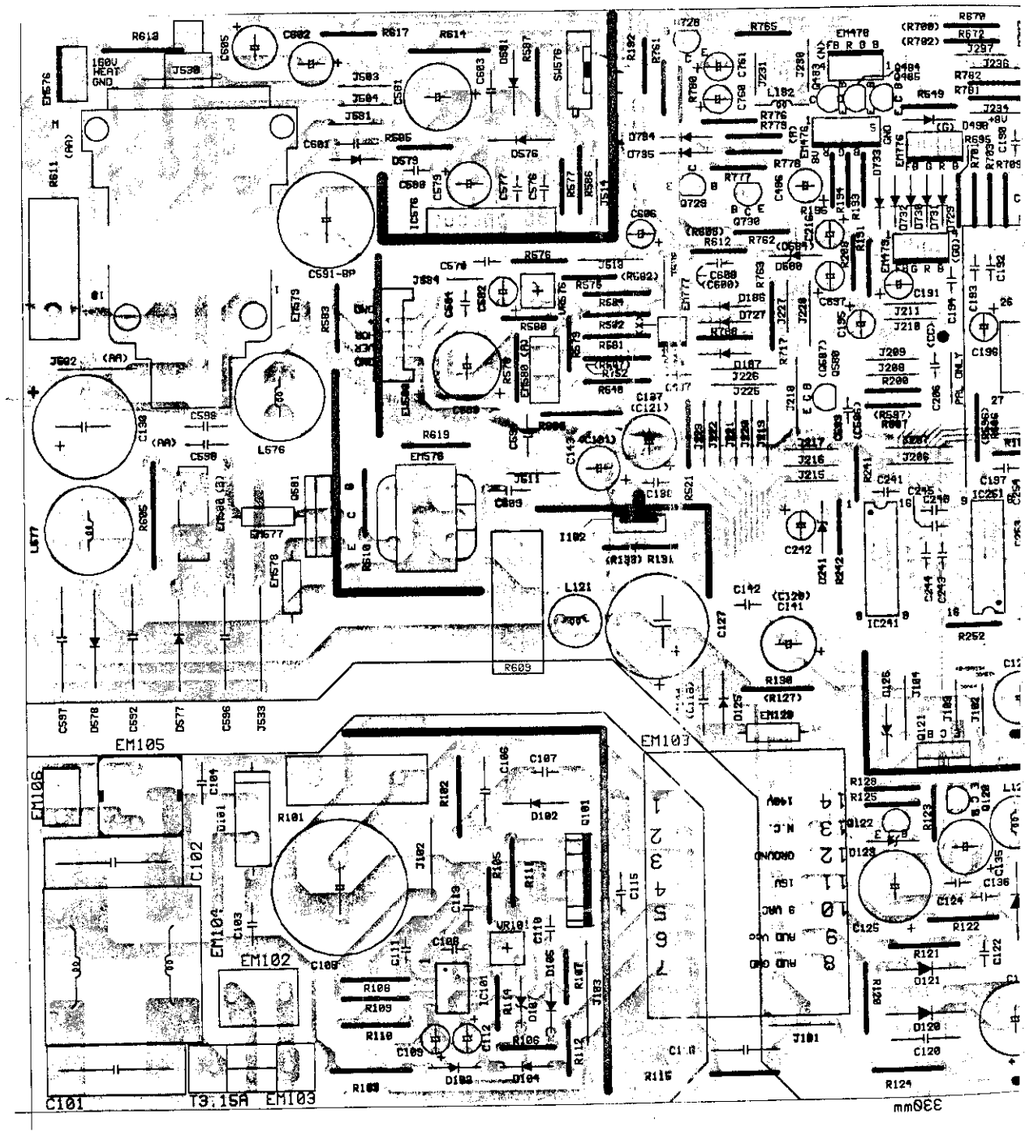
CRT PCB

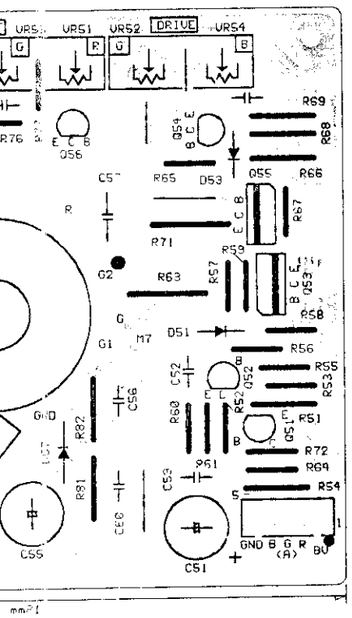


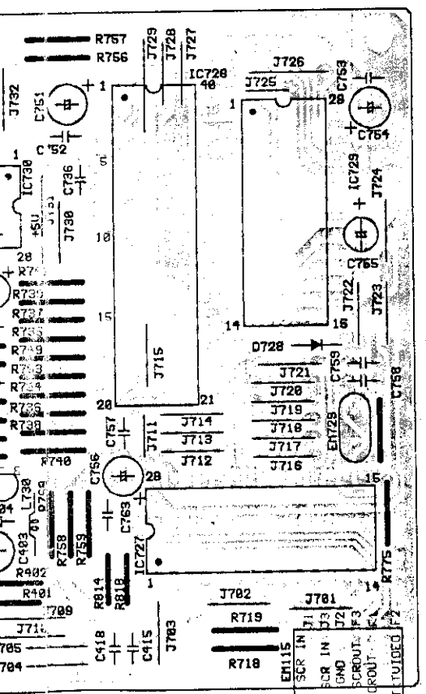
NICAM/TXT PCB



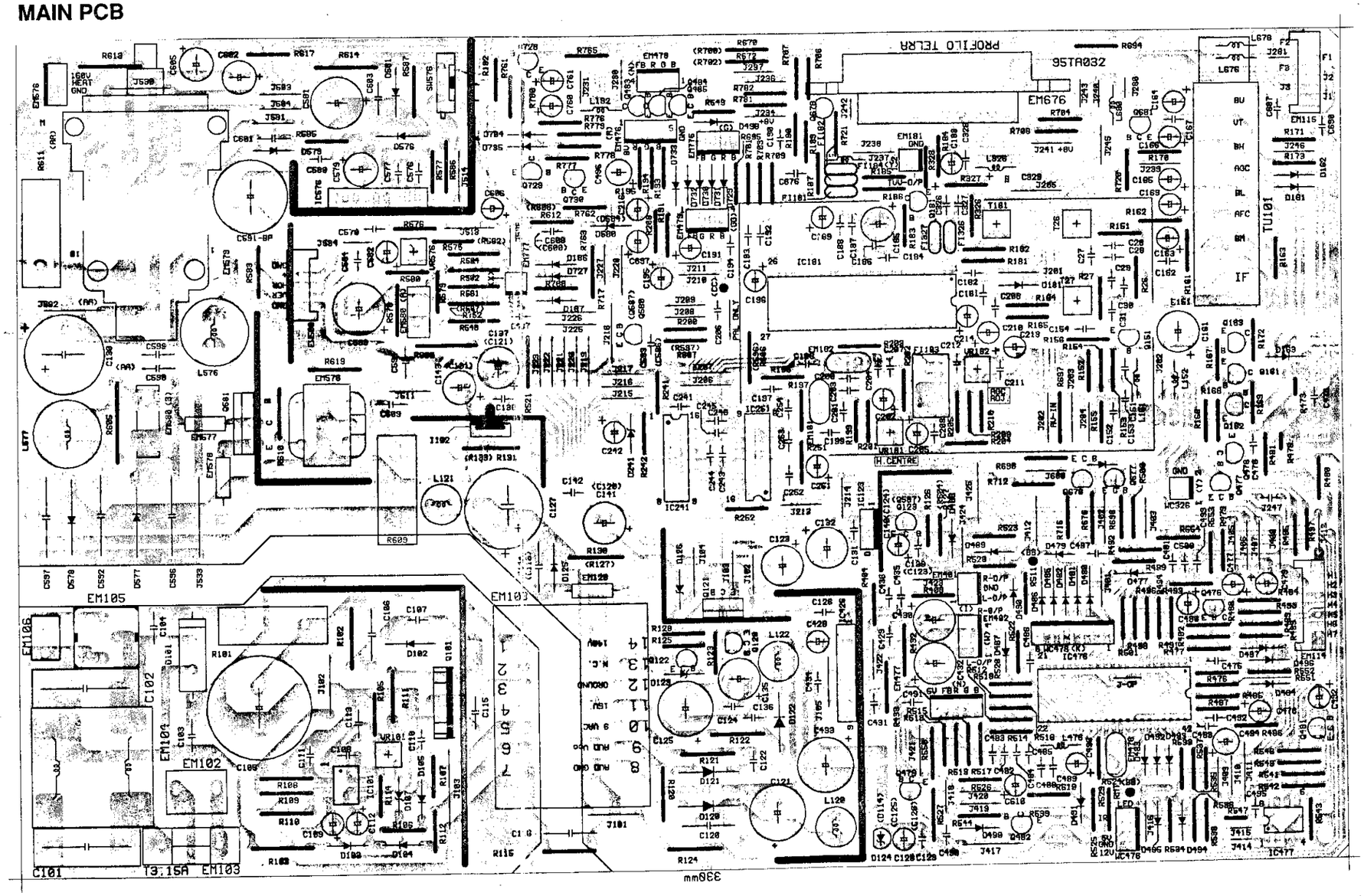
MAIN PCB




VR51
VR52
DRIVE
VR54
R69
R68
Q54
Q56
R65
D53
Q55
R66
R67
R71
R59
R63
R57
Q53
R58
D51
R56
R55
R53
Q52
Q51
R60
R61
R72
R69
R54
R82
R81
C56
C55
C51
GND B G R BU
(A)


R757
R756
IC726
J726
J725
C753
C764
C752
C736
J738
C755
J724
J723
J722
J715
D728
J721
J720
J719
J718
J717
J716
J714
J713
J712
J711
C759
C758
EM729
C757
C756
C763
IC727
R790
R814
R818
J702
J701
R719
R718
J703
C418
C415
EM115
SCR IN
SCR IN
GND
SCROUT
SCROUT
J1
J3
J2
F3
F4
F2

MAIN PCB


PROFILO TELAR
95TA032
EM676
TU101
BU
VT
BH
AGC
BL
AFC
BM
IF
EM105
EM106
EM104
EM102
EM103
C101
T3.15A
330mm

28" SM-1 STERE

TV PROCESSOR

R151-R156,R161-R174,R181-R208
R241-R242,R251-R254
C151-C154,C168-C169,C181-C216
C241-C247,C251-C256
L151- ,L161- ,L181-L185
W251-
N1 ,D161-D163,D181-D187
D241- ,MIL
Q151- ,Q161-Q163,Q181-Q182
FI181-FI183
EM181-EM182
IC181- ,IC241- ,IC251
VR181-VR182

FTZ

R26-R27
C26-C30
T26-T27

GERMAN STEREO

R901-R906
C901-C910
L901
EM901
IC901

SOUND SYSTEM

R326-R341
C326-C340
L326
T326
FI326-FI334
IC326-IC327
D326
VR326

28" MAIN CIRCUIT

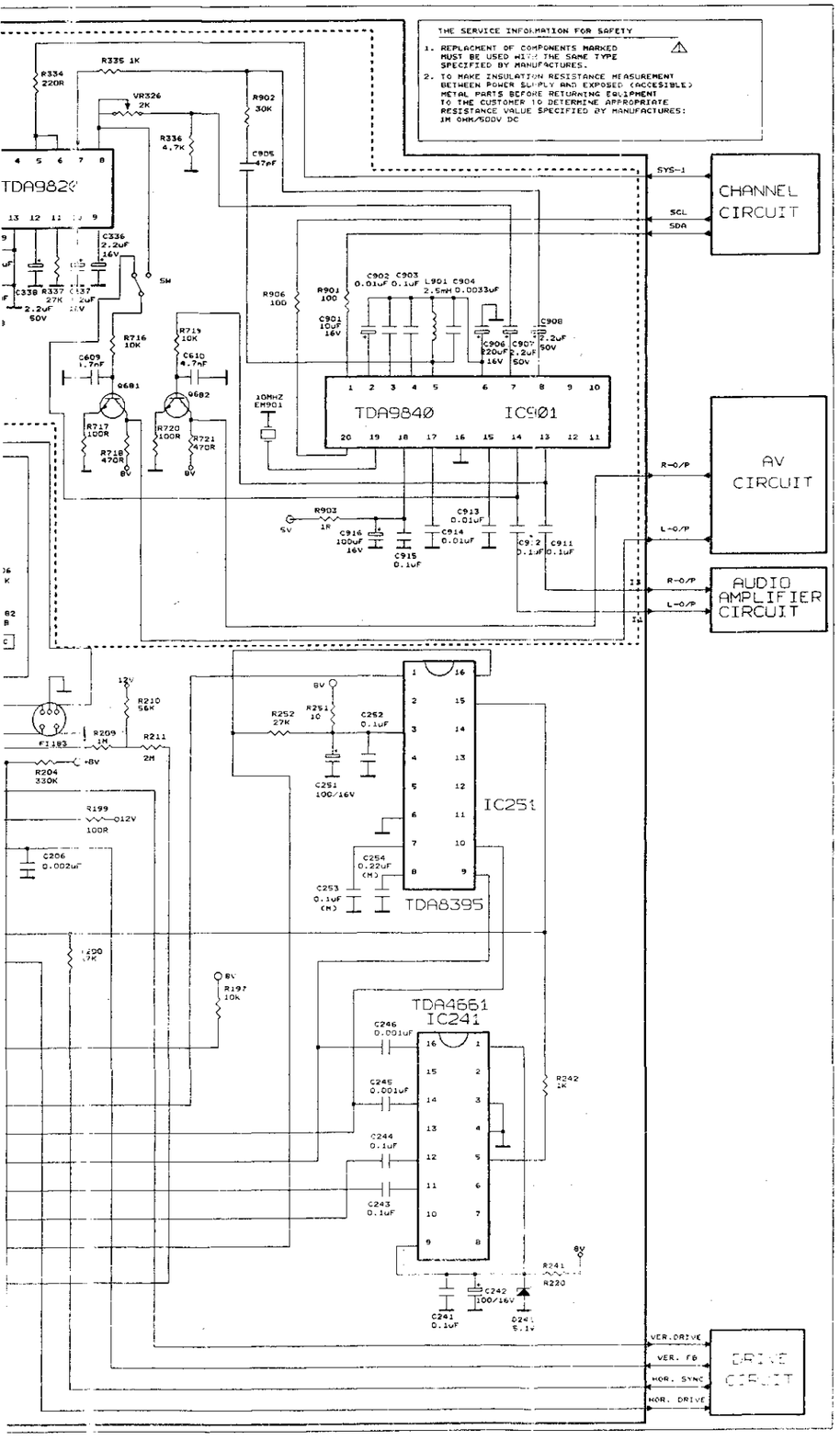
THE SERVICE INFORMATION FOR SAFETY

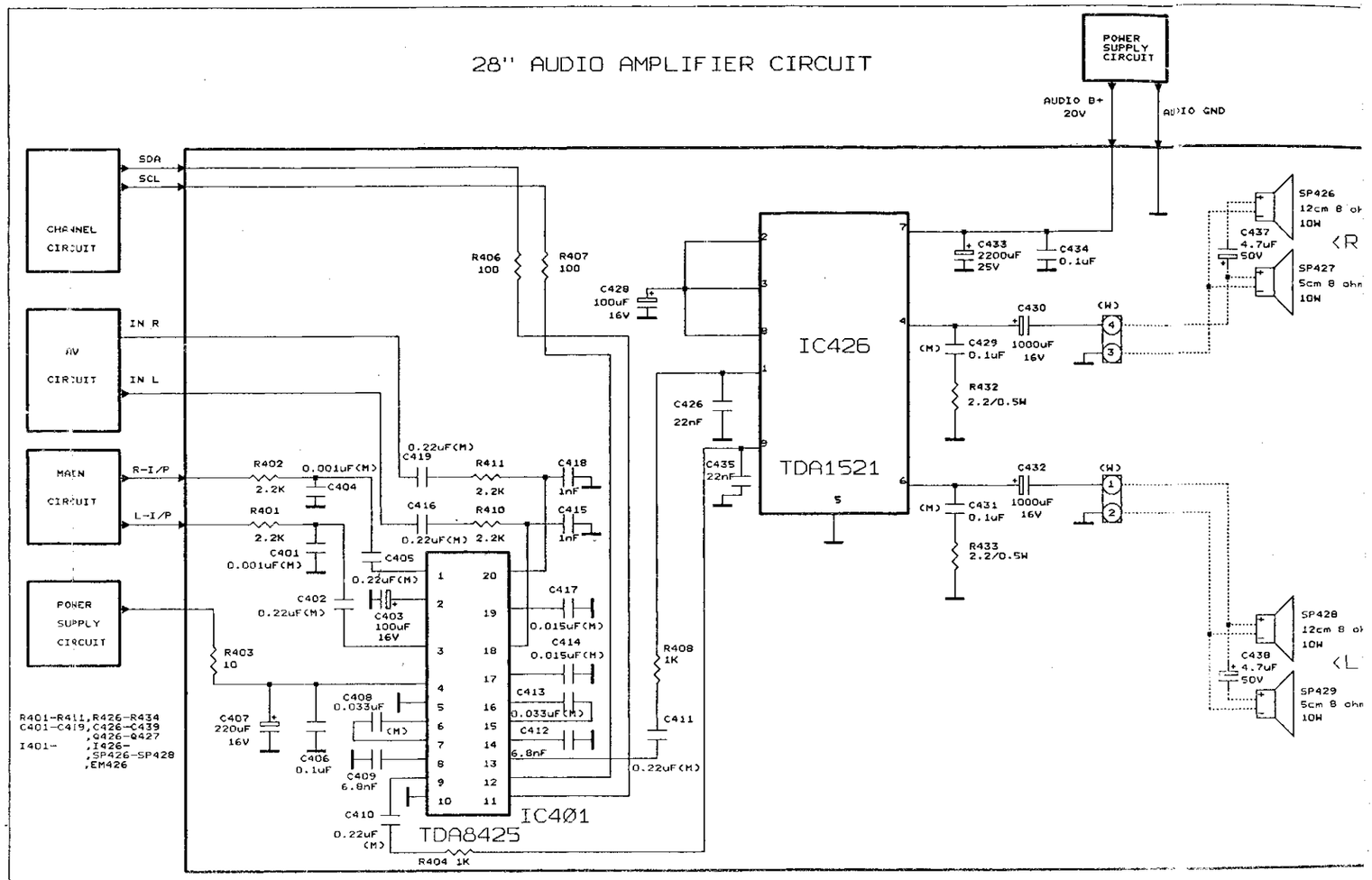
1. REPLACEMENT OF COMPONENTS MARKED ⚠ MUST BE USED WITH THE SAME TYPE SPECIFIED BY MANUFACTURES.
2. TO MAKE INSULATION RESISTANCE MEASUREMENT BETWEEN POWER SUPPLY AND EXPOSED (ACCESSIBLE) METAL PARTS BEFORE RETURNING EQUIPMENT TO THE CUSTOMER TO DETERMINE APPROPRIATE RESISTANCE VALUE SPECIFIED BY MANUFACTURES: 1M OHM/500V DC

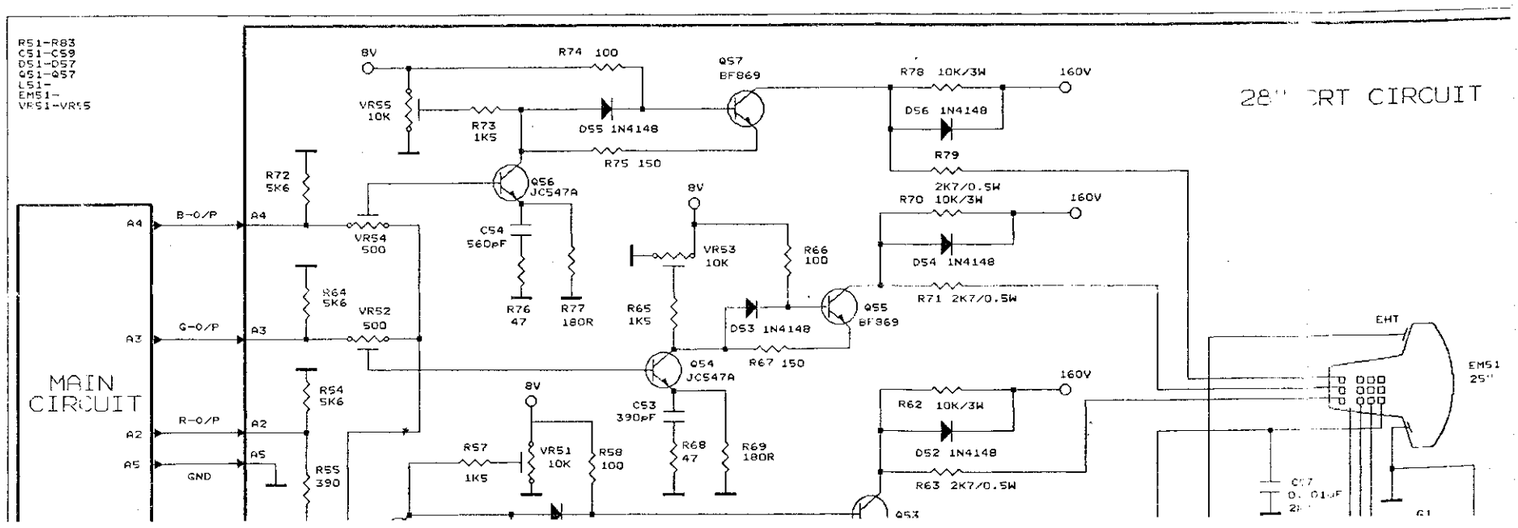
CHANNEL CIRCUIT
POWER SUPPLY CIRCUIT
CRT CIRCUIT
DRIVE CIRCUIT
AV CIRCUIT
TELETEXT CIRCUIT
CHANNEL CIRCUIT
CHANNEL CIRCUIT
AV CIRCUIT
AUDIO AMPLIFIER CIRCUIT
DRIVE CIRCUIT

IC327 TDA982(
TDA9840 IC901
TDA8395 IC251
TDA4661 IC241
TDA8362 IC181

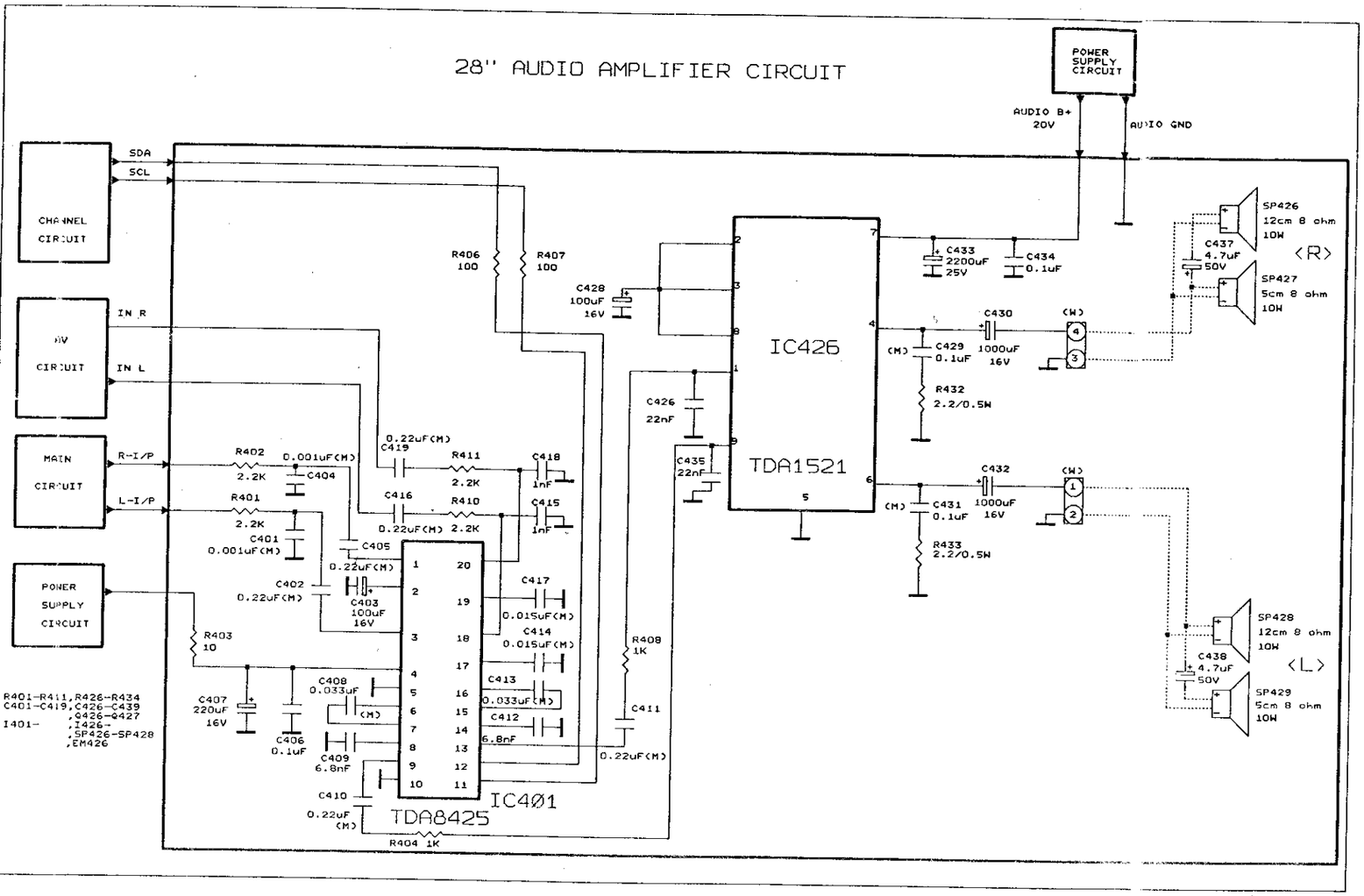
28" SM-1 STEREO CIRCUIT DIAGRAM

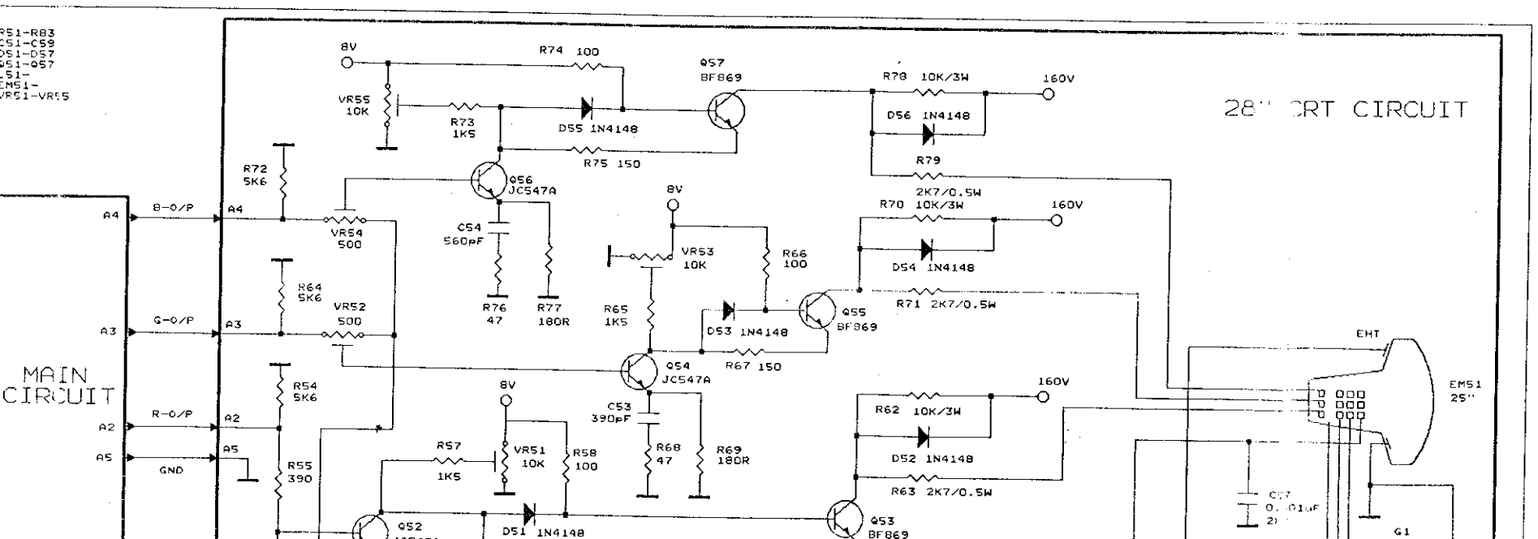




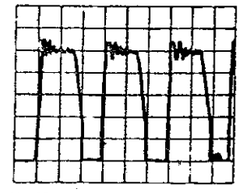


CIRCUIT DIAGRAM



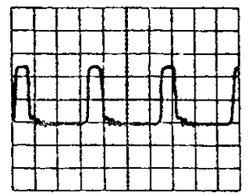


1) 5 usn/div 100 volt/div



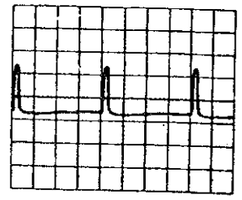
Collector of Q101

2) 20 usn/div 2volt/div



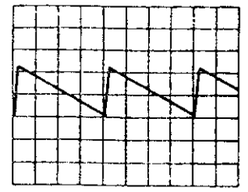
IC-476 pin 26

3) 5m sn/div 2volt/div



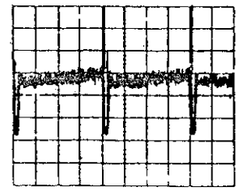
IC-476 pin 27

4) 5 msn/div 0,5 volt/div



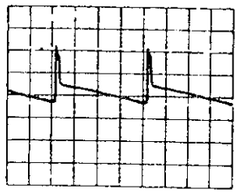
IC-181 pin 41

5) 5 msn/div 1 volt/div



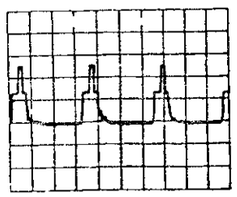
IC-576 pin 5

6) 5 msn/div 20 volt/div



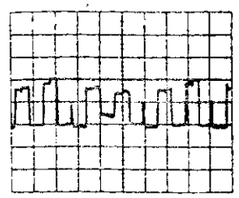
IC-576 pin 3

7) 20 usn/div 2 volt/div



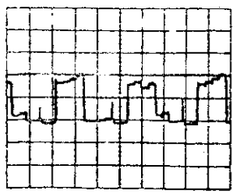
IC-181 pin 38

8) 20 usn/div 2 volt/div



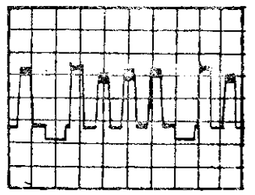
IC-181 pin 20

9) 20 usn/div 2 volt/div



IC-181 pin 19

10) 10 usn/div 2 volt/div



IC-181 pin 18

TELETEXT CIRCUIT

CHANNEL CIRCUIT

TUV-O/P
FB
R
G
B
FE
BRI.
CONT.
COL.
AFT

R195 1KΩ
C192 0.1uF
C193 0.1uF
C194 0.1uF
C195 10/16V
12V
R192 10K
1N4148 D183
R191 680
C191 10/16V
C196 10/16V

TDA8362 IC181

20 R O/P
21 FB
22 R I/P
23 G I/P
24 B I/P
25 CONT.
26 COL.
3.58 XTAL 34
BRUST PHASE DETECTOR 33
4.43MHZ O/P 32
B-Y O/P 31
R-Y O/P 30
R-Y I/P 29
B-Y I/P 28
HINT 27

C197 0.0047uF (M)
R196 100K
C198 0.1uF

0.001uF
C245 0.001uF
C244 0.1uF
C243 0.1uF
R242 1K
8V
R241
R220
C241 0.1uF
C242 100/16V
D24 5.1V

VER.DRIVE
VER. FB
HOR. SYNC
HOR. DRIVE
DEFLE CIRCUIT

28" MAIN CIRCUIT

* IF YOUR TV SET IS NICAM STEREO INSTEAD OF GERMAN STEREO,
THIS AREA MUST BE CHANGED WITH NICAM 1 AND NICAM 2 SCHEMATICS

TELETEXT CIRCUIT

CHANNEL CIRCUIT

CONT.
BRI
SCL
SDA
FB

AV CIRCUIT

AVV-O/P
AV-SW
TVV-O/P

MAIN CIRCUIT

I3
G2
R
G3
G
G4
B
G1
FB

DRIVE CIRCUIT

VERT.PULSE

POWER

12V

R763 15K
D727 1N4148

C761 10uF/16V
R782 470R
8 V
R776 8.2K
D735 1N4148
R779 4.7K
Q730
R778 33K
JC547A
R777 33K
Q729 JC547A
R780 1.5K
R781 470R
C760 10uF/16V
D733 1N4148
D734 1N4148
D729 1N4148
D730 1N4148
D731 1N4148
D732 1N4148

R735 1K
R737 1.8K
R739 1.8K
R741 1.8K
R740 3.3K
R738 3.3K
R736 3.3K
R734 47Ω

R757 100
R756 100
R755 4.7K
R753 22K
R754 10K
Q727 JC547A
C750 .01

R759 100
R758 100
IC727
C757 0.01uF
C756 100uF 16V
C755 1uF/16V
E728 9.8304MHZ
D728 1N4148
R775 10K

PCF84C841
CTV972

5V
C751 100uF 16V
C752 .022pF
C753 .022

Q728 JC547A
8 V
R761 100R
R762 2.2K
Q726 JC547A
R751 22K
R750 10K
R749 6.8K
4.7K R752
R744 10K
C749 .01
C736 .01

R765 4.7K
C744 2.2/50V
12V
R743 1.2K
C743 .068 (M)
C742 220P
R748 15K
R747 470
C741 10/16V
EM727 6MHz
C740 .047 (M)
C739
R746

27 CV
1 SITV
26 BLACK LEVEL
24 PULSE
23 PULSE
21 FILTER 1
20 OSC IN
VCT 10
TTC 14
TTD 15
F6 17
VCS 25
SAND 22
TCS 28
HF 3 FILTER
HF 4 FILTER
STORE 5 AMPL
STORE 6 ZERO

C728 15pF
C729 .001uF
C730 470pF
C731 .022uF

19 SCL
20 SDA
13 R
14 G
15 B
17 BLANKING
8 ODD/EVEN
7 TIC
6 TTD
9 F6

IC729
GM76C88AL

2 A12
23 A11
21 A10
24 A6
25 A8
3 A7
4 A6
5 A5
6 A4
7 A3
8 A2
9 A1
10 A0
D7 29

D0 11
D1 12
D2 13
D3 15
D4 16
D5 17
D6 18
D7 19

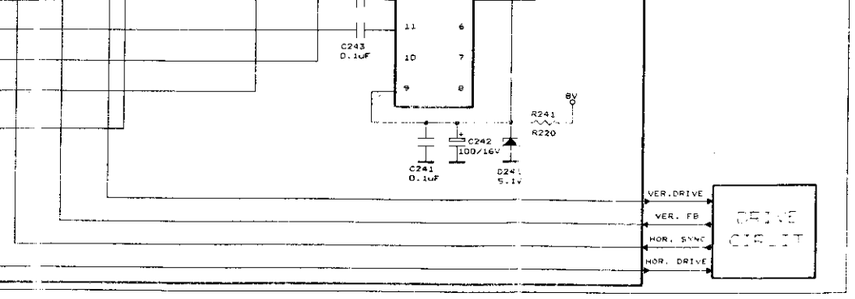
SW476-SW486
R476-R554
C476-C500
0476-0499
EM476-EM477
Q476-Q482
L476

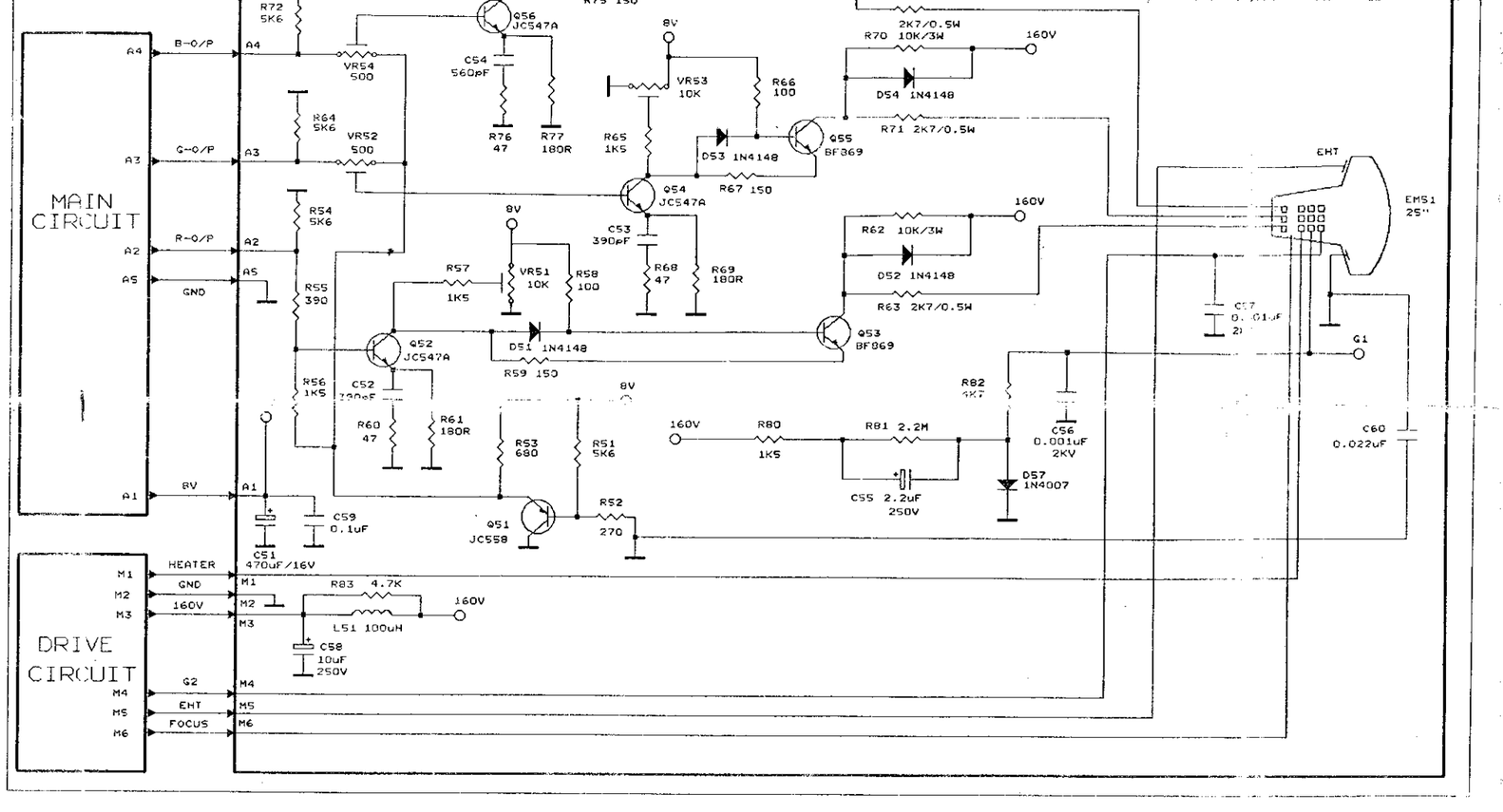
28" CHANNEL

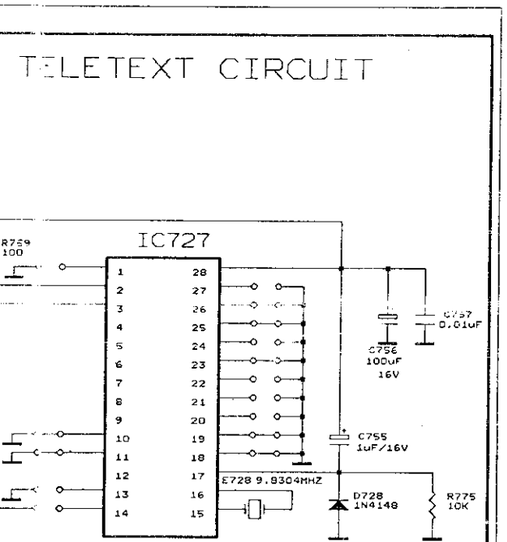
MAIN CIRCUIT

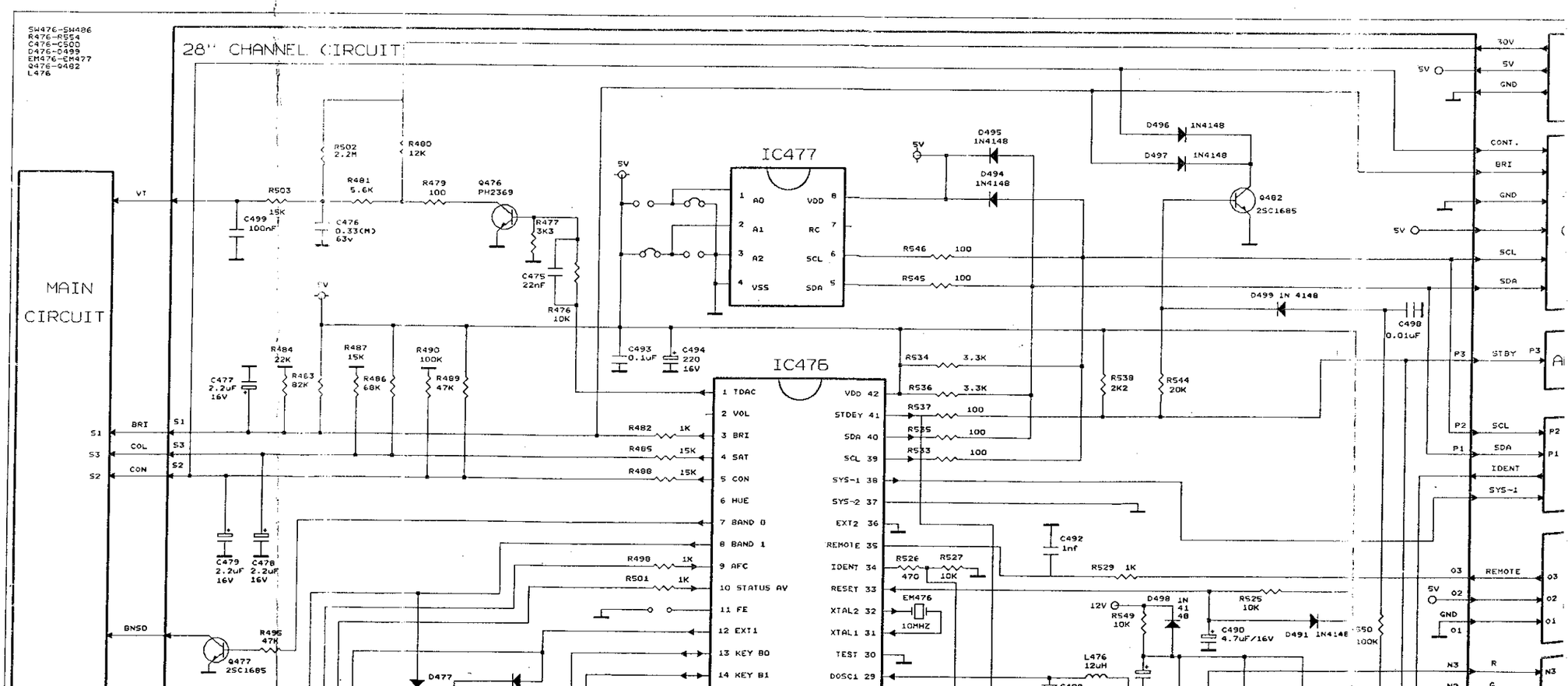
VT
C499 100nF
C477 2.2uF 16V
BRI
COL
CON
S1
S3
S2
C479
C478

ERED,
CHEMATICS

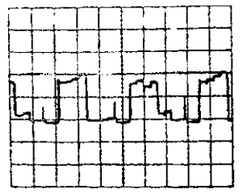






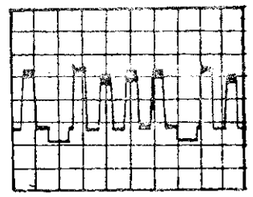


9) 20 usn/div 2 volt/div



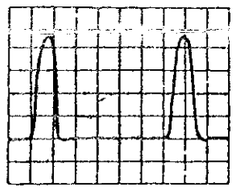
IC-181 pin 19

10) 10 usn/div 2 volt/div



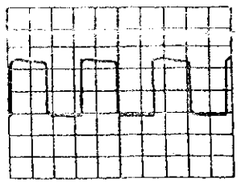
IC-181 pin 18

11) 10 usn/div 200 volt/div



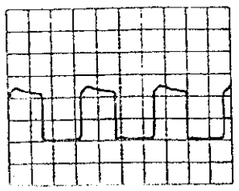
Collector of Q 580

12) 20 usn/div 0.5 volt/div



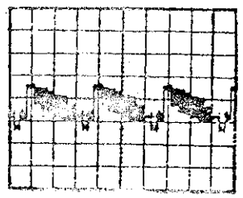
IC-181 pin 37

13) 20 usn/div 50 volt/div



Collector of Q 581

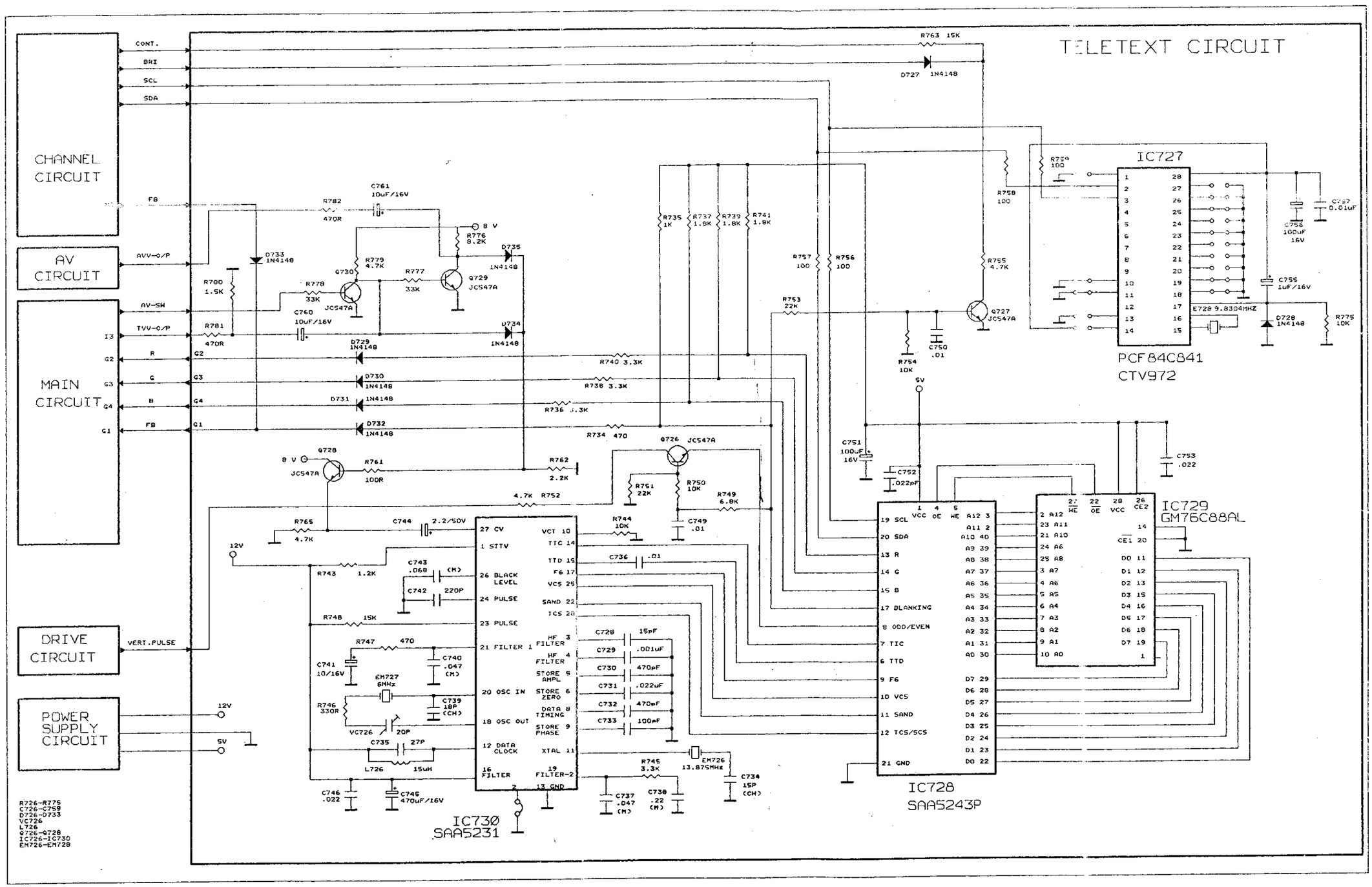
14) 20 usn/div 1 volt/div

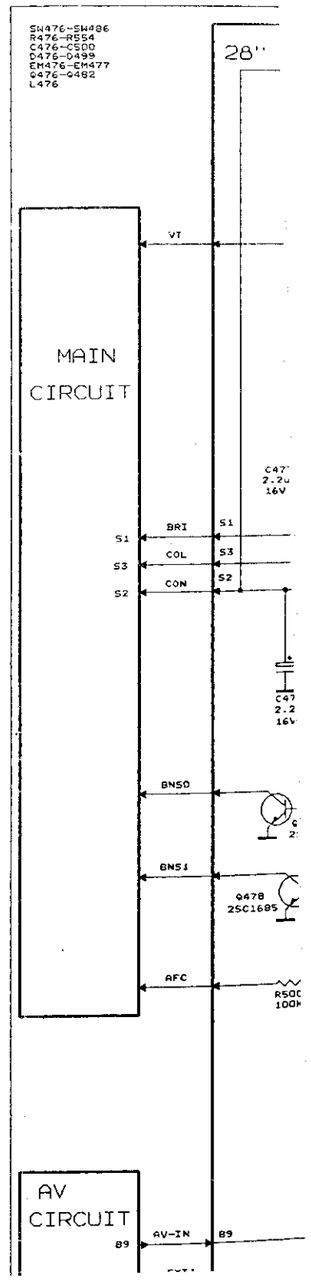


IC-181 pin 13

OSSILOSCOPE SHAPES

IF YOUR TV SET IS NICAM STEREO INSTEAD OF GERMAN STEREO,
THIS AREA MUST BE CHANGED WITH NICAM 1 AND NICAM 2 SCHEMATICS





D OF GERMAN STEREO,
1 AND NICAM 2 SCHEMATICS

TELETEXT CIRCUIT

R763 15K
D727 1N4148
R759 100
R758 100
R755 4.7K
Q727 JC547A
C750 .01
R754 10K
IC727
PCF84C841
CTV972
C756 100uF 16V
C757 0.01uF
C755 1uF/16V
E728 9.8304MHZ
D728 1N4148
R275 10K
5V
C753 .022
752 22pF
IC729
GM76C88AL
IC728
SAA5243P
ANKING
/EVEN
/SCS

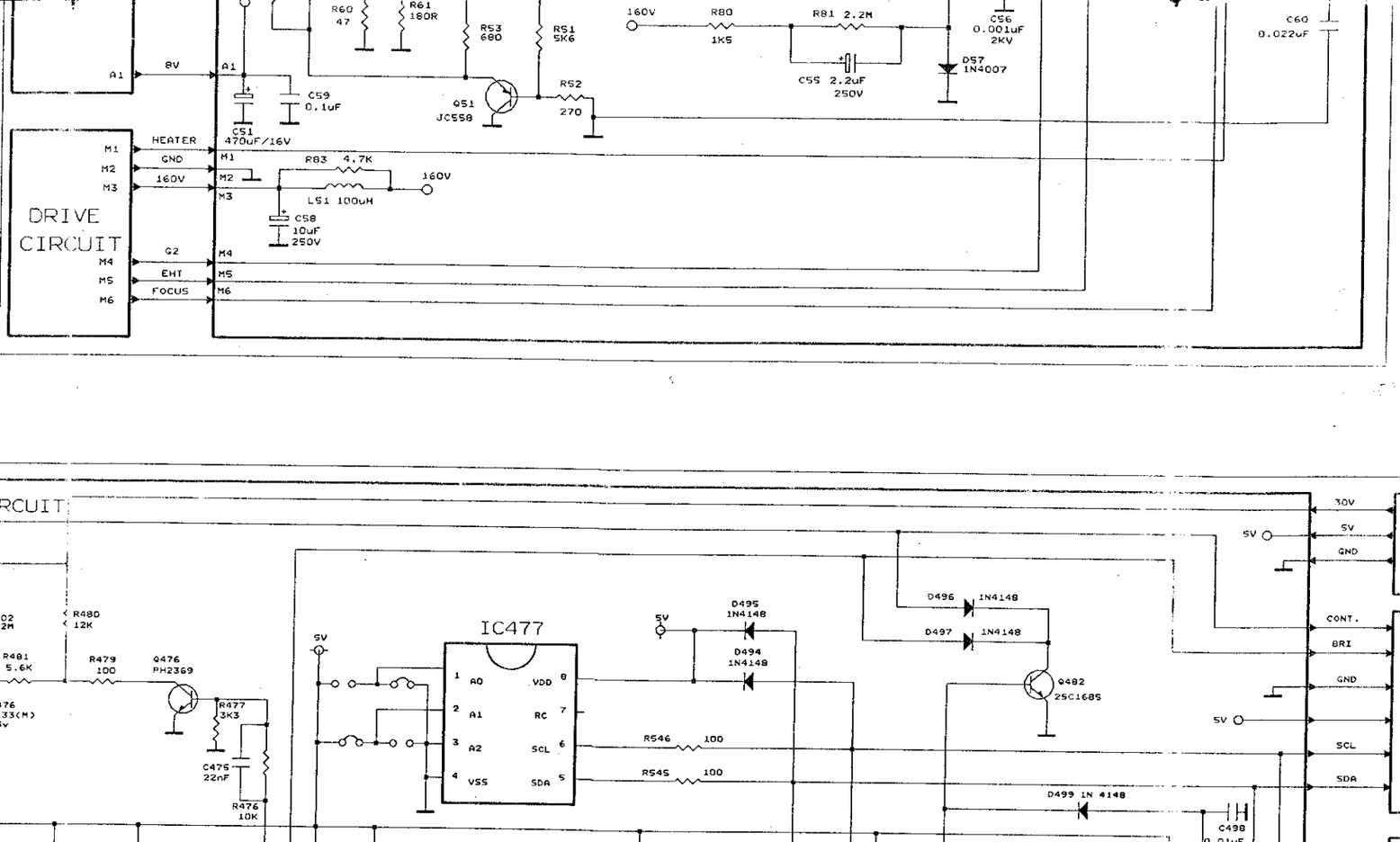
DRIVE CIRCUIT

A1
8V
C59 0.1uF
C51 470uF/16V
R60 47
R61 180R
R53 680
R51 5K6
Q51 JC550
R52 270
160V
R80 1K5
R81 2.2M
C55 2.2uF 250V
C56 0.001uF 2KV
D57 1N4007
M1 HEATER
M2 GND
M3 160V
R83 4.7K
L51 100uH
C58 10uF 250V
M4 G2
M5 EHT
M6 FOCUS

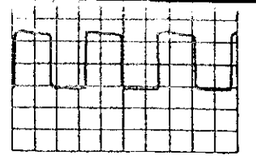
SW476-SW486
R476-R554
C476-C500
D476-D499
EM476-EM477
Q476-Q482
L476

28" CHANNEL CIRCUIT

MAIN CIRCUIT
VT
R502 2.2M
R480 12K
R503 15K
C499 100nF
R481 5.6K
C476 0.33(M) 63V
R479 100
Q476 PH2369
R477 3K3
C475 22nF
R476 10K
C493 0.1uF
C494 220 16V
IC477
D495 1N4148
D494 1N4148
D496 1N4148
D497 1N4148
Q482 2SC1685
R546 100
R545 100
D499 IN 4148
R484 22K
R463 92K
R487 15K
R486 68K
R490 100K
R489 47K
C477 2.2uF 16V
IC475
R534 3.3K
R536 3.3K
R537 100
R535 100
R533 100
R538 2K2
R544 20K
BRI S1
COL S3
CON S2
R482 1K
R485 15K
R488 15K
C479 2.2uF 16V
C478 2.2uF 16V
C492 1nF
R529 1K
R526 470
R527 10K
R498 1K
R501 1K
EM476 10MHZ
12V
R549 10K
D498 1N 41 48
R525 10K
C490 4.7uF/16V
D491 1N4148
L476 12uH
C489 18P (CH)
C496 100uF 16V
C488 18P(CH)
Q483 JC547A
Q484 JC547A
BNS0
R496 47K
Q477 2SC1685
D477
D479 1N4148
BNS1
Q478 2SC1685
R497 47K
R518 75R
R516 1.5K
R514 1.5K
R512 1.5K
AFC
R500 100K
R499 220K
C481 1uF/16V
D482 1N4148
D486 DIODE
R511 1K
C497 100nF
SW484 STORE
SW477 FINE TUNE UP
SW482 LINEAR UP
SW487 SYSTEM SELECT
SW478 FINE TUNE DOWN
SW483 LINEAR DOWN
SW476 SEARCH
SW479 PRO. UP
SW480
AV CIRCUIT
AV-IN
EXT1
5V
D489 1N4148
R528 1M
C491 0.01uF
Q479 2SC1685
D490 1N4148
R520 18K
R604 22K
R550 4.7K
Q581 JC547A
16V
D487 1N4148
C486 0.047uF (M)
R522 10K
C487 0.1uF(M)
R523 10K
C482 22P
C483 22P
C484 22P
R548
0K

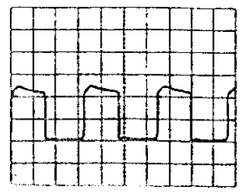


Collector of Q 580



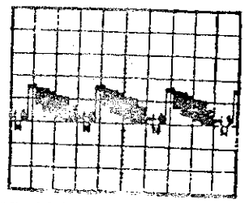
IC-181 pin 37

13) 20 usn/div 50 volt/div



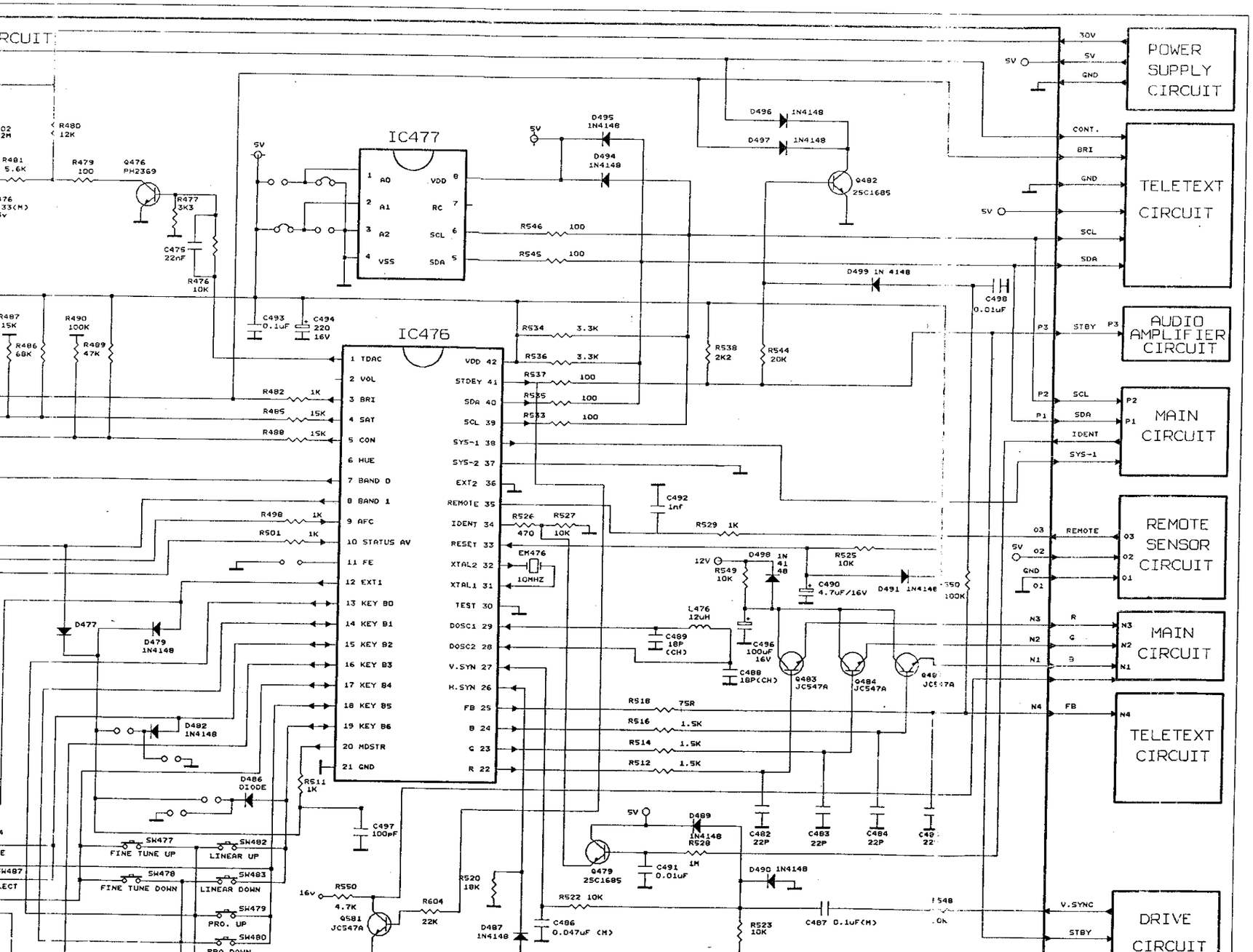
Collector of Q 581

14) 20 usn/div 1 volt/div



IC-181 pin 13

OSSILOSCOPE SHAPES



065 031 007 840