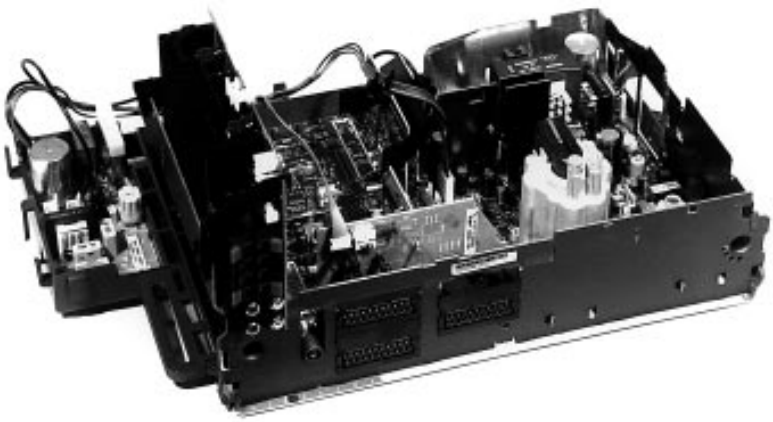
THOMSON MULTI MEDIA

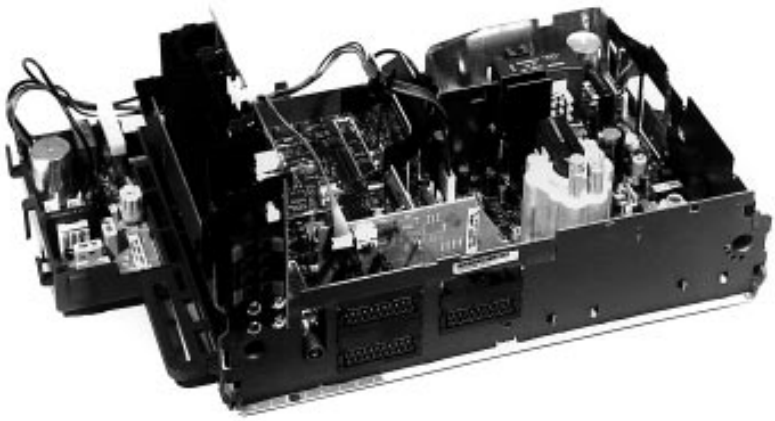
Brandt FERGUSON SABA TELEFUNKEN THOMSON

ICC19 CHASSIS TELEVISION SETS: PRINCIPLES AND MAINTENANCE



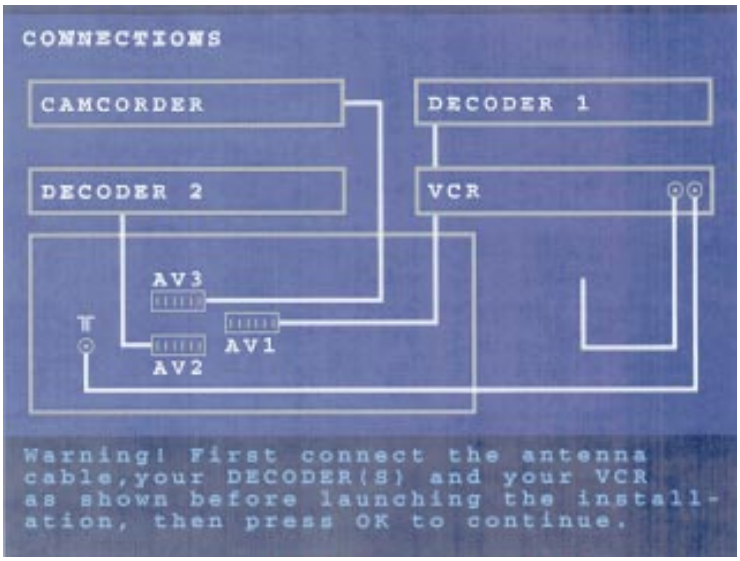
50-Hz CHASSIS

100-HzCHASSIS

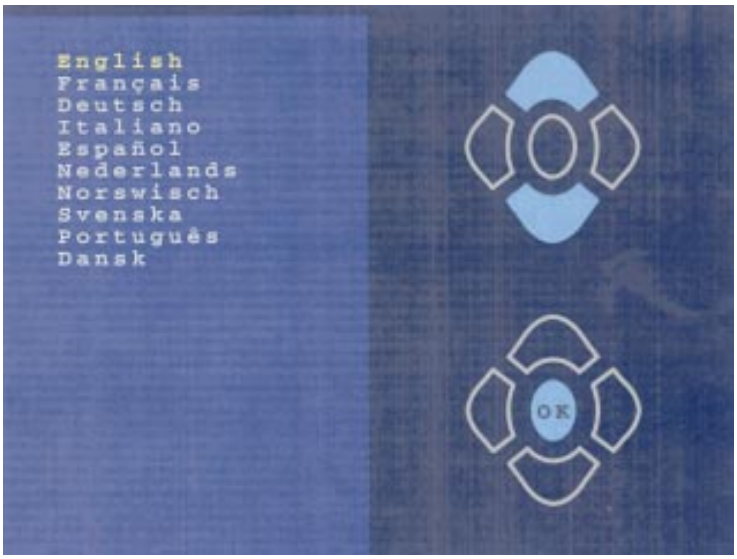


Code : 3504.93.50 - 07/97 - **ICC19 CHASSIS TELEVISION SETS: PRINCIPLES AND MAINTENANCE.**

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MENUS

◁ ***NAVI***LIGHT ▷



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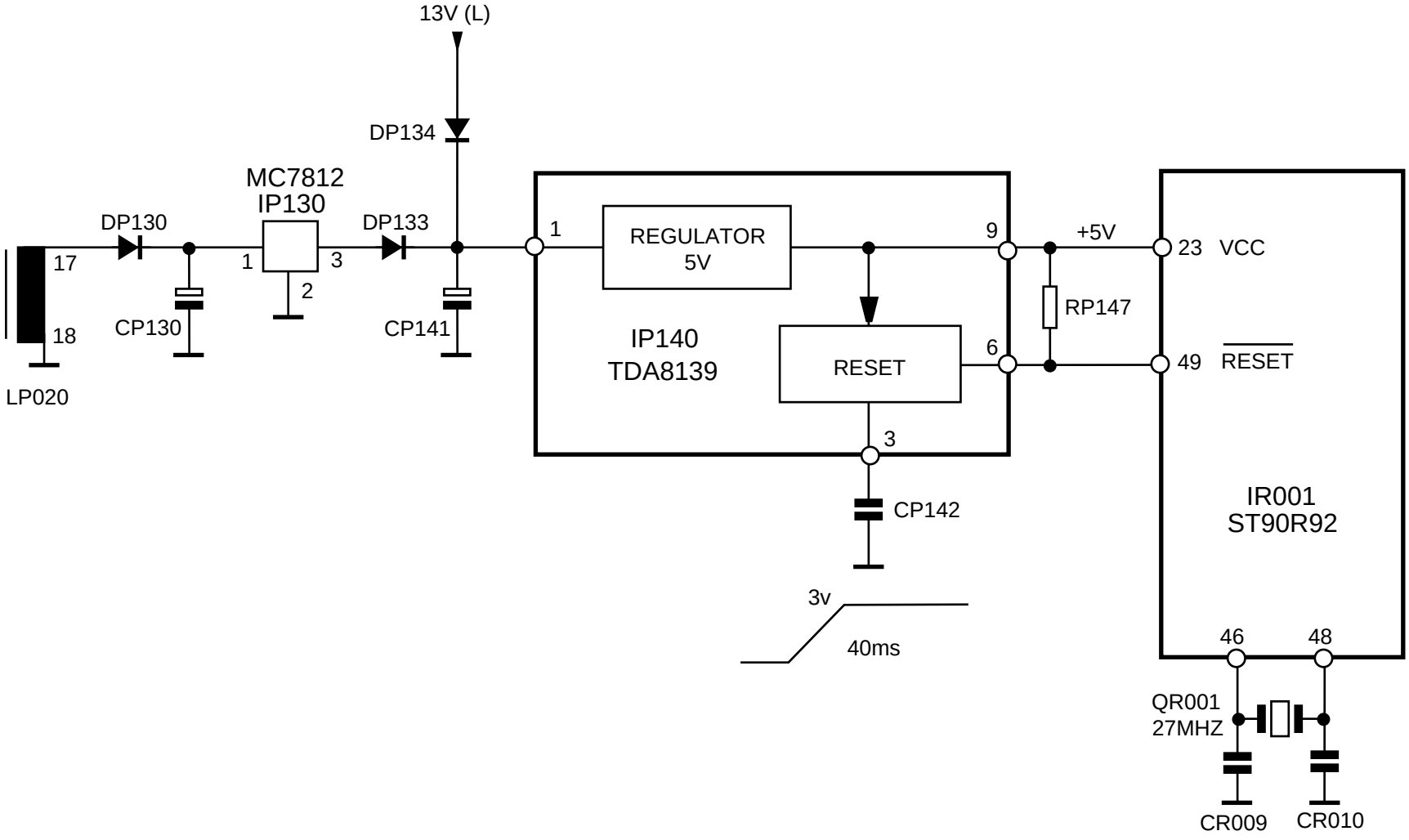
GENERAL INFORMATION

5

MANAGEMENT

CONTENTS

- IR001 POWER SUPPLY AND OPERATIONAL SIGNALS
- DATA MANAGEMENT
- CONTROLS
- RMICROCONTROLLER/EPROM COMMUNICATION
- BUSES
- BUS EXPANDER
- OTHER CONTROLS
- SWITCH-ON PROCEDURE
- FRONT PANEL LED CONTROL
- OFF/ON TIMING DIAGRAM
- ERROR CODES


13V (L)
DP134
MC7812
IP130
DP130
DP133
17
18
LP020
CP130
CP141
1
2
3
1
REGULATOR
5V
9
+5V
23
VCC
IP140
TDA8139
RESET
6
49
RESET
RP147
3
CP142
3v
40ms
IR001
ST90R92
46
48
QR001
27MHZ
CR009
CR010

IR001 POWER SUPPLY AND OPERATIONAL SIGNALS

POWER SUPPLY

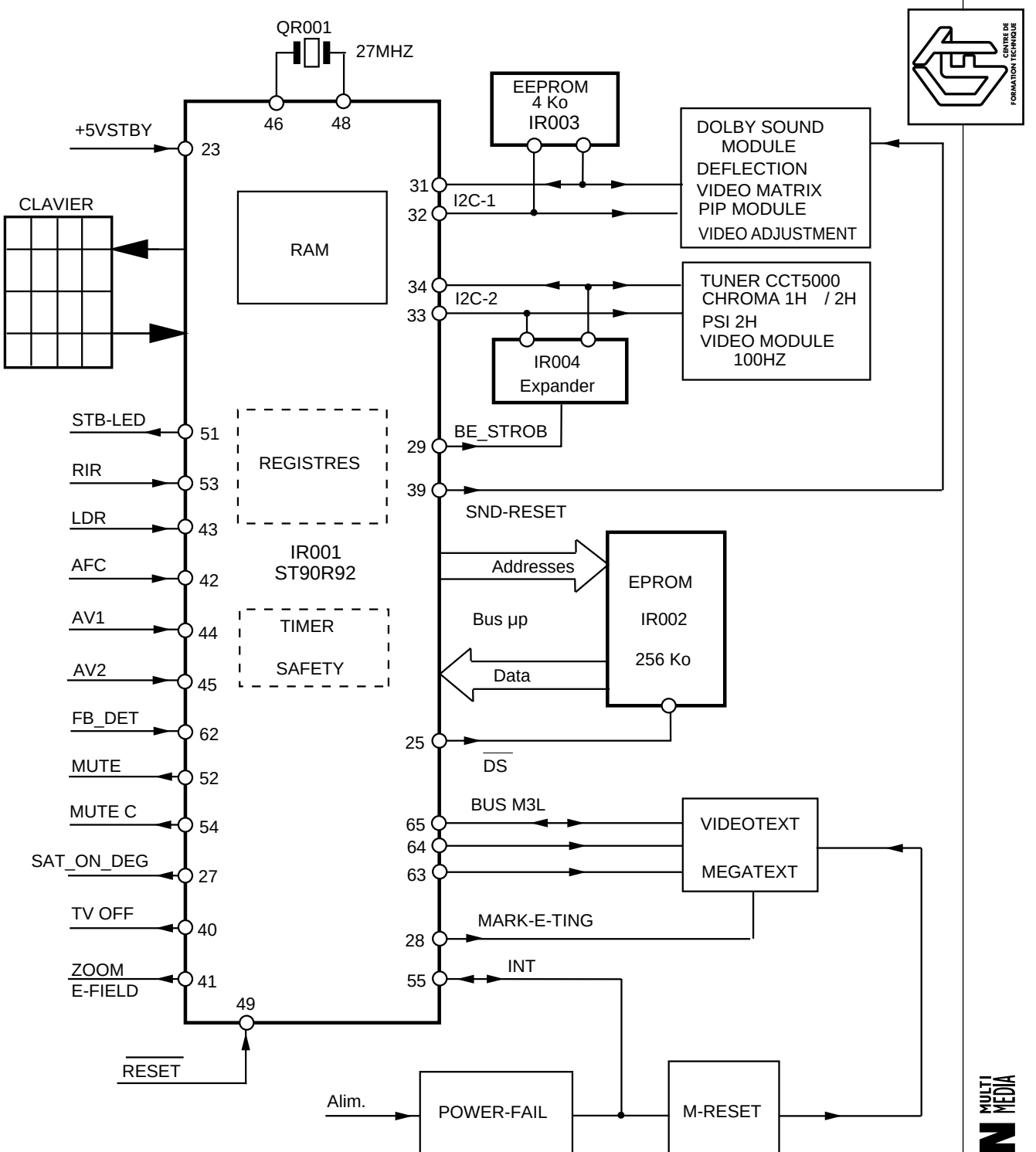
The power supply to the microcontroller at Pin 23 is active when the IP130 regulator (which produces a 10VSTBY) and the IP140 regulator (which produces a 5VSTBY from the 10VSTBY) are on Standby. When they are On, the 13 V (LINE) supply takes over from the 10VSTBY.

CLOCK.

A 27-MHz QR001 quartz stabilises the system clock of the IR001 microcontroller (Pins 46 and 48).

RESET.

CP142, Pin 3 of the IP140 is the Reset capacitor. When the voltage at Pin 9 of the IP140 has reached 5 V, and after a delay of a few milliseconds given by CP142, Pin 6 of the IP140 goes from 0 to 5 V. Pin 49 of IR001 receives this Reset signal.


QR001
27MHZ
46
48
+5VSTBY
23
EEPROM
4 Ko
IR003
DOLBY SOUND
MODULE
DEFLECTION
VIDEO MATRIX
PIP MODULE
VIDEO ADJUSTMENT
31
32
I2C-1
CLAVIER
RAM
34
33
I2C-2
TUNER CCT5000
CHROMA 1H / 2H
PSI 2H
VIDEO MODULE
100HZ
IR004
Expander
STB-LED
51
RIR
53
LDR
43
AFC
42
AV1
44
AV2
45
FB_DET
62
MUTE
52
MUTE C
54
SAT_ON_DEG
27
TV OFF
40
ZOOM
E-FIELD
41
49
REGISTRES
IR001
ST90R92
TIMER
SAFETY
RESET
29
BE_STROB
39
SND-RESET
Addresses
Bus µp
Data
EPROM
IR002
256 Ko
25
DS
BUS M3L
65
64
63
VIDEOTEXT
MEGATEXT
MARK-E-TING
28
INT
55
Alim.
POWER-FAIL
M-RESET

DATA MANAGEMENT

ICC19 chassis are 50-Hz or 100-Hz compatible. They are controlled by an 8-bit microcontroller, the ST90R92.

It communicates via an address and data bus with its external program memory, an EPROM, IR002, with a basic capacity of 256 KB that can be extended to 1024 KB.

Two I2C buses dialog with the various programmable circuits installed on the chassis.

In conjunction with IR003 (EEPROM), the I2C1 bus saves the parameters and settings required by the television set.

It manages the ON/OFF command, the line and frame time base circuits, audio and video switching, and settings including the USYST voltage.

In conjunction with the tuner frequency synthesis, the I2C2 bus controls video processing and the 100-Hz digital converter.

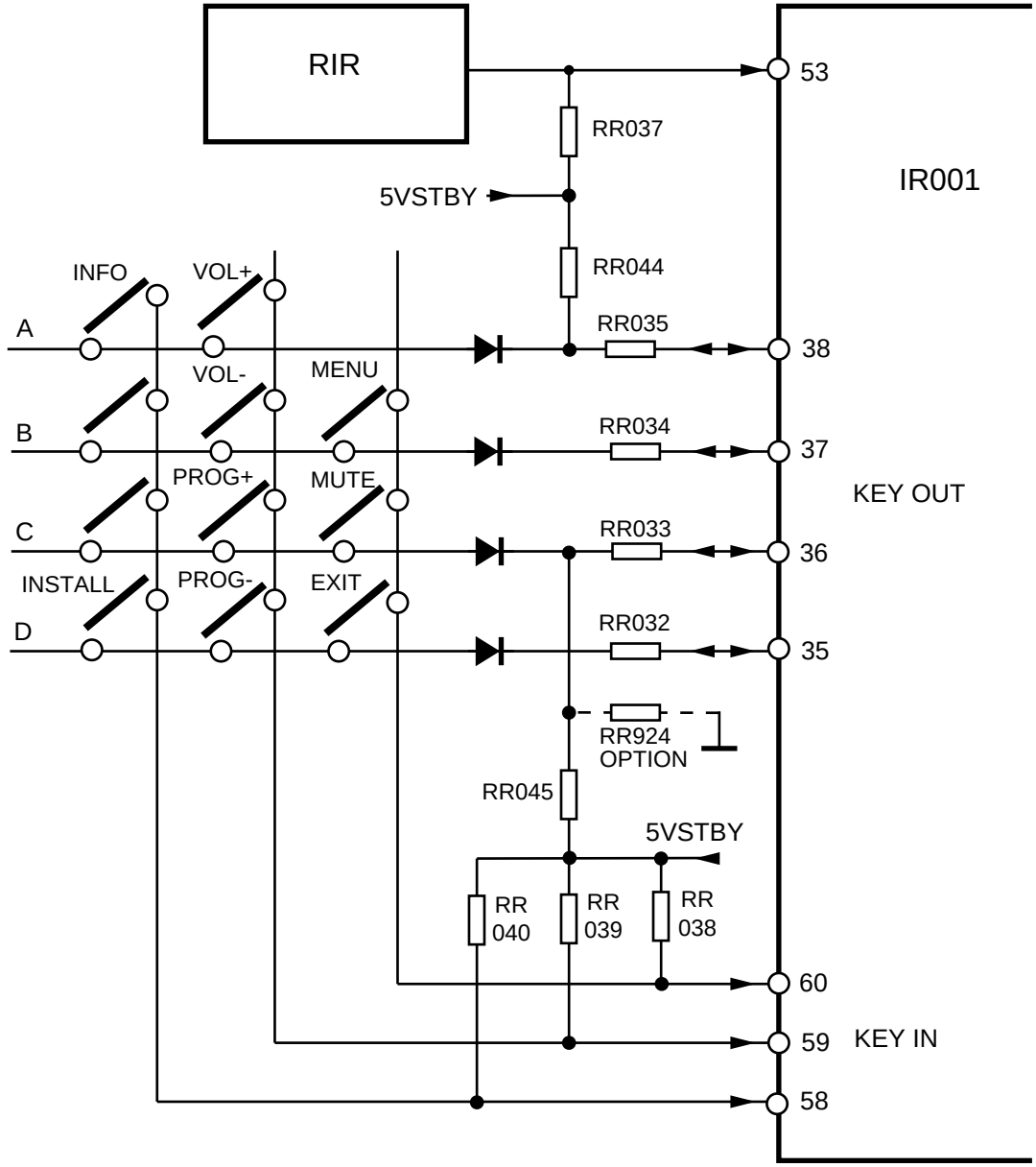
It also controls an 8-bit IR004 universal register (EXPANDER), which increases the number of control ports.

The M3L bus is intended for the TELETEXT module (MEGATEXT version).

The microcontroller analyses and distributes the commands from peripheral devices, the infrared receiver, the keypad, and the red LED via several input and output lines.

The INT line is the HALT input of the microcontroller, and the MAIN RESET output of the TELETEX module.

NOTES :


RIR
53
RR037
IR001
5VSTBY
RR044
INFO
VOL+
A
RR035
38
VOL-
MENU
B
RR034
37
PROG+
MUTE
KEY OUT
C
RR033
36
INSTALL
PROG-
EXIT
D
RR032
35
RR924
OPTION
RR045
5VSTBY
RR
040
RR
039
RR
038
60
59
KEY IN
58

CONTROLS

KEYPAD

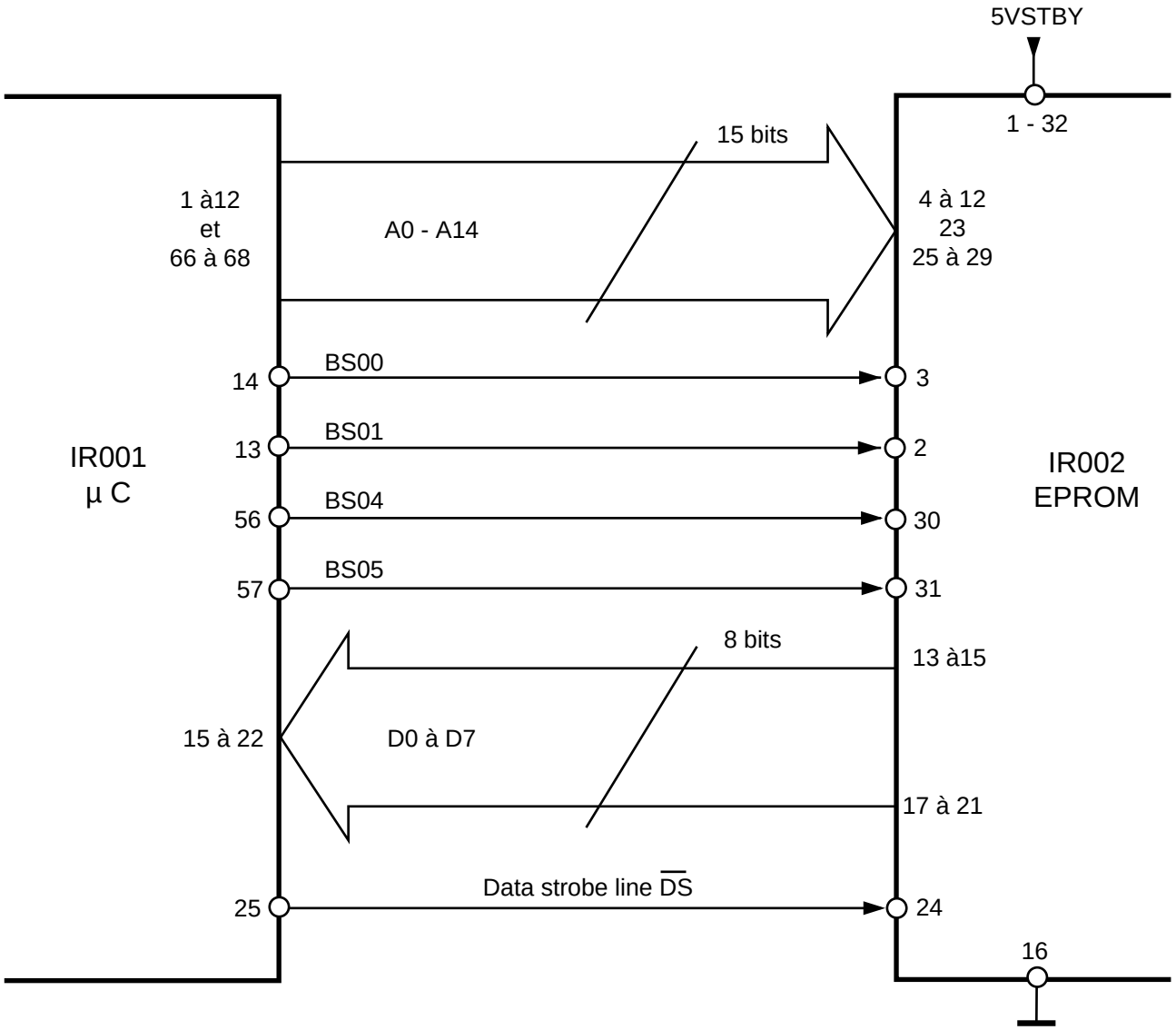
The keypad is compatible with previous ICC10/11 chassis. It can support four to 10 control keys. It is laid out in a matrix of rows and columns.
Pins 58 through 60 are the function inputs. They are at 5 V when idle. Pins 35 through 38, which are labelled A, B, C, and D, are the sweep outputs. Signals with a period of 20 ms are present on these outputs when idle.
During the initialisation phase, Line C (Pin 36) is connected to the input and analysed. In this way, an option prediction, determined by Resistor RR924, can be read.
The four diodes protect the IR001 circuit inputs.

REMOTE CONTROL UNIT

LRemote control function codes (12 bits) arrive at Pin 53 of IR001. They consist of the following:
• Four address bits,
• One call bit,
• Seven function bits, defined by the key pressed.

These codes are repetitive at 80-ms intervals.

NOTES :



THOMSON MULTI MEDIA

CENTRE DE FORMATION TECHNIQUE

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REMOTE CONTROL UNIT

ADDRESSING

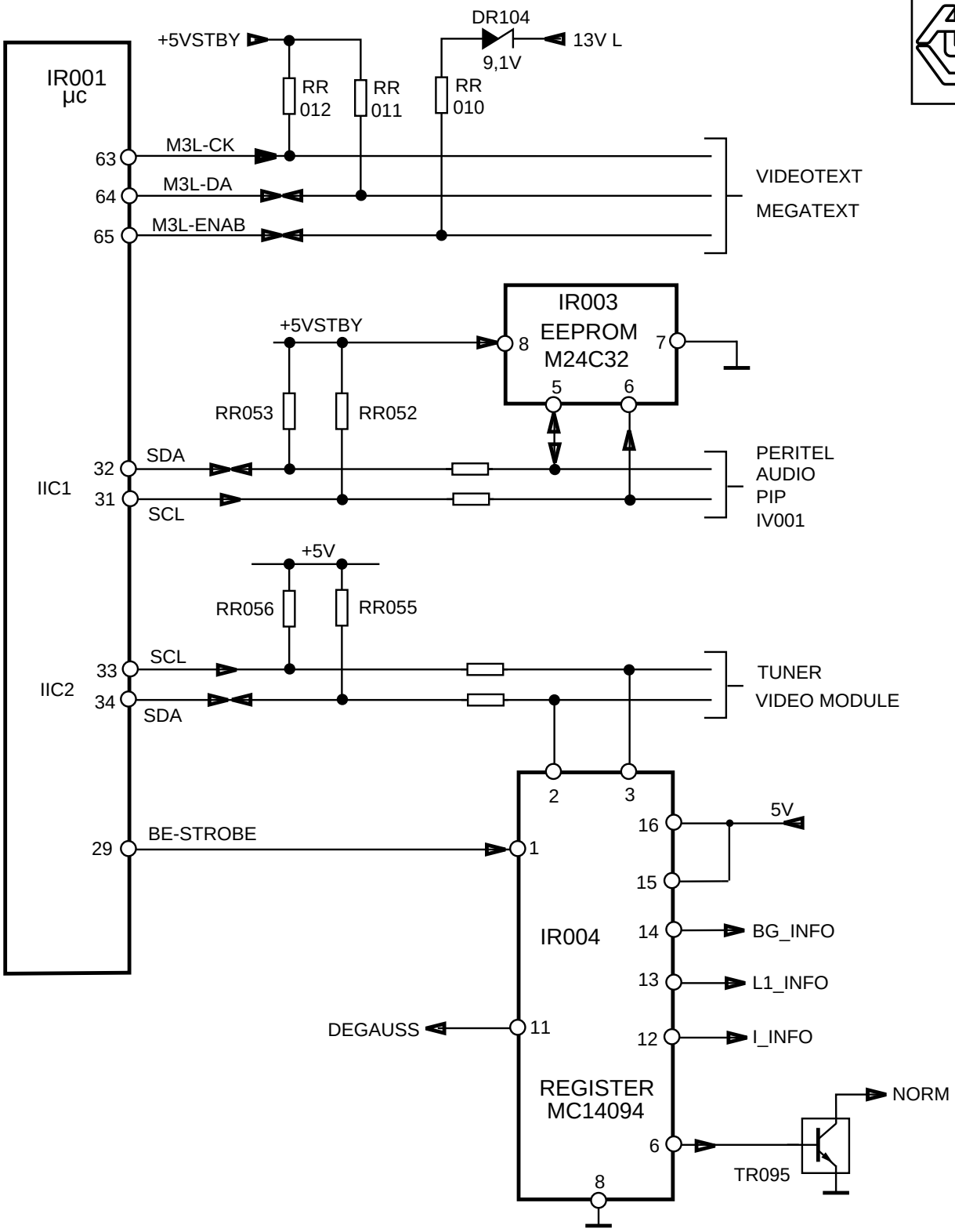
The IR002, memory for the software and default values, is an EPROM with capacity up to 512 KB or 4 Mbits.
The 8-bit ST90R92 microcontroller has an address bus (A0-A14) limited to 15 bits. This provides addressing of only 32 KB. Page-swapping is therefore necessary.

Four output port lines (BS00 through BS05) swap the read-only memory for a selection of 16 pages compatible with the use of an 8-Mbit memory capacity, i.e. 1024 KB.

DATA

Data comprising eight bits, labelled D0 through D7, are sent via the data bus. To prevent any conflict of addresses with the microcontroller internal RAM, an enable line, called data-strobe, is activated in the low state when the microcontroller communicates with its ROM. The rest of the time, the IR002 is in tri-state to free the data bus.

NOTES :


IR001
µc
+5VSTBY
DR104
9,1V
13V L
RR 012
RR 011
RR 010
63
M3L-CK
64
M3L-DA
65
M3L-ENAB
VIDEOTEXT
MEGATEXT
IR003
EEPROM
M24C32
+5VSTBY
8
7
5
6
RR053
RR052
32
SDA
IIC1
31
SCL
PERITEL
AUDIO
PIP
IV001
+5V
RR056
RR055
33
SCL
IIC2
34
SDA
TUNER
VIDEO MODULE
2
3
5V
16
29
BE-STROBE
1
15
IR004
14
BG_INFO
13
L1_INFO
DEGAUSS
11
12
I_INFO
REGISTER
MC14094
NORM
6
TR095
8

BUSES

The IIC1 bus is charged by pull-up resistors connected to the +5VSTBY. It is active in Standby and On Modes.
It dialogs with the IR003 NVM (M24C32) to store the user parameters. It distributes its commands to the SCART switching circuits, the Audio Module, and the sweep and video processor (IV001).

The IIC2 bus, referenced by pull-up resistors connected to the +5V, is active in On Mode only.
It communicates directly with the PLL built into the tuner. It controls the Video Module as well as the IR004 expander circuit.

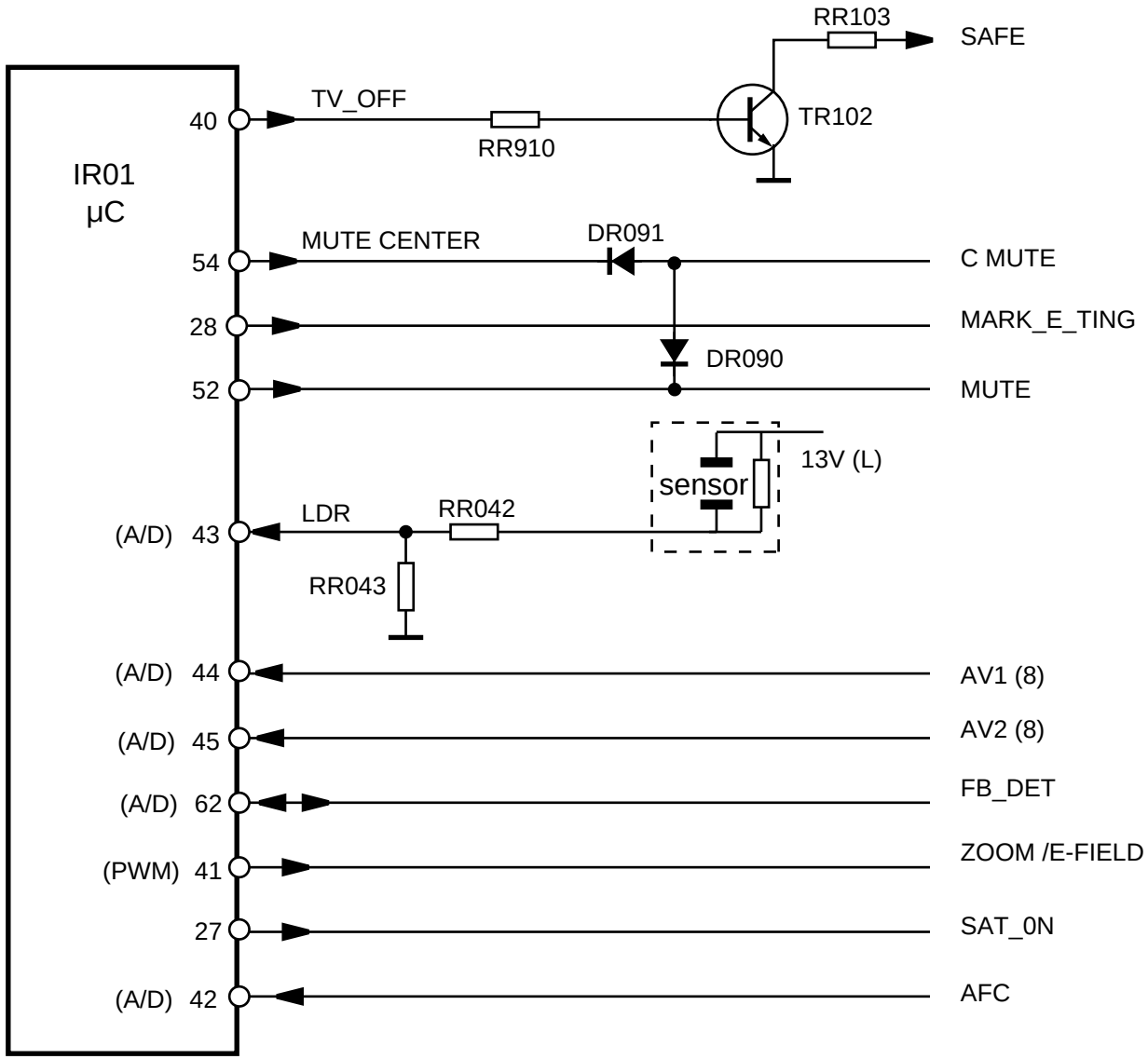
The M3L bus is used in controlling the Teletext or Megatext Module.

BUS EXPANDER

Integrated Circuit IR004 (MC14094) is an 8-bit serial/parallel register that extends the interface capacity of the microcontroller.
It is equipped with a de-serialiser register and an output register. Its BE-STROBE (Pin 1) has the function of transferring a service byte to its outputs.

- Pin 6: NORM is used via Transistor TR095 by Integrated Circuit FI II050.
- Pin 11: DEGAUSS. According to chassis option, this output delivers a relay command pulse to degauss the tube.
- Pin 12: I-INFO adjusts the video level to the I standard.
- Pin 13: L1-INFO is used for switching to Band 1 L'.
- Pin 14: BG-INFO is used to operate filters to reject the neighbouring channel (31.9 MHz) and to reject FM sound intercarriers (5.5 MHz or 6.5 MHz).

NOTES :


IR01
µC
40
TV_OFF
RR910
RR103
SAFE
TR102
54
MUTE CENTER
DR091
C MUTE
28
MARK_E_TING
DR090
52
MUTE
13V (L)
sensor
(A/D) 43
LDR
RR042
RR043
(A/D) 44
AV1 (8)
(A/D) 45
AV2 (8)
(A/D) 62
FB_DET
(PWM) 41
ZOOM /E-FIELD
27
SAT_0N
(A/D) 42
AFC

OTHER CONTROLS

The function of Pin 27 is to switch the power supply separately from the satellite tuner.

Pin 40 is used to switch off the television set using a control independent of the buses. This is very useful in the event of the buses being blocked. The breathing line is pulled down via Transistor TR102. In addition, this line is analysed by software to indicate whether the TV is a 100-Hz or 50-Hz model. This is indicated by RR910 (RR910 = 10K, 4 V at 40 = 100 Hz; RR910 = 0, 0.6 V at 40 = 50 Hz).

Pin 41 has two functions:
- To control the ZOOM Module if the television set is so equipped.
- On the 28" SF and 32" 16/9 modules, it delivers a PWM (pulse width modulation) signal to compensate for the earth's magnetic field.

Pin 42 informs and analogue-to-digital converter for the AFC (automatic frequency control). It operates in Automatic Programming and Manual Search Modes.

Pin 43 informs an analogue-to-digital converter. This is used to regulate the contrast according to the ambient lighting.

Pins 44 and 45 receive slow switching from SCART sockets AV1 and AV2. They are used to recognise the formats of received images: 4/3 and 16/9.

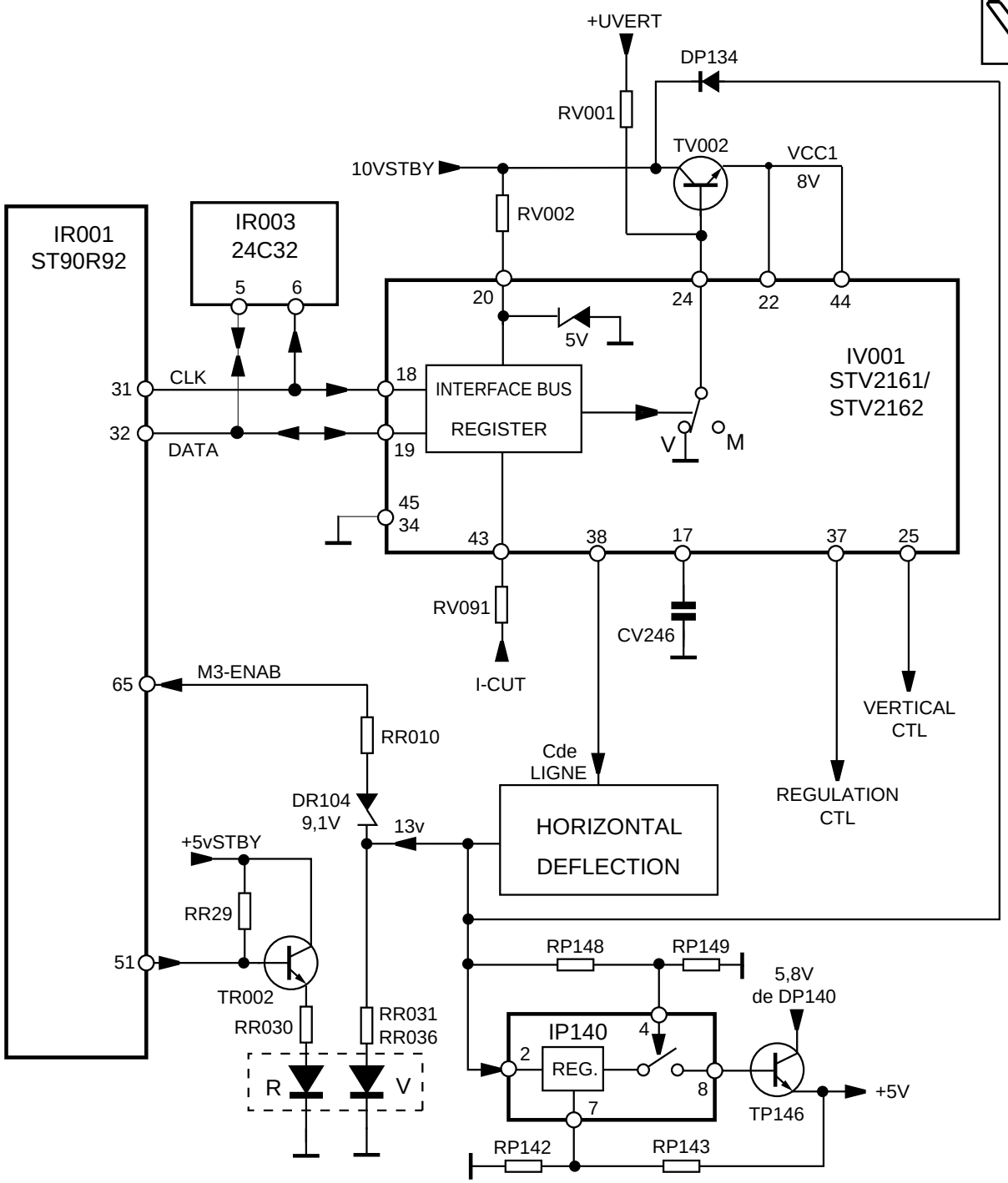
Pin 52 mutes the audio amplifiers. It is active at low level, and is present each time the TV is switched on or off.

Pin 54 is reserved for the DOLBY SURROUND PROLOGIC function only, to perform a software cut-off of the TV internal speakers, to free the central channel. It does not act on the auxiliary external output sockets.

Pin 62 indicates the presence of fast switching from SCART socket AV1.

At Pin 28, the input when the microcontroller is initialised by its pull-up wiring specifies the size of the read-only memory, IR002, by selecting the number of pages to swap. It is completed by the wiring of Pins 63 and 61 to the 5VSBY.

NOTES


+UVERT
DP134
RV001
TV002
VCC1
8V
10VSTBY
RV002
IR001
ST90R92
IR003
24C32
5
6
20
24
22
44
5V
IV001
STV2161/
STV2162
31
CLK
18
INTERFACE BUS
REGISTER
32
DATA
19
V
M
45
34
43
38
17
37
25
RV091
CV246
I-CUT
65
M3-ENAB
RR010
VERTICAL
CTL
Cde
LIGNE
DR104
9,1V
13v
HORIZONTAL
DEFLECTION
REGULATION
CTL
+5vSTBY
RR29
51
RP148
RP149
5,8V
de DP140
TR002
RR030
RR031
RR036
IP140
4
2
REG.
8
7
TP146
+5V
R
V
RP142
RP143

SWITCH-ON PROCEDURE

The 10VSTBY from the power supply is used. This is limited to 5 V by a Zener diode inside the IV001, and powers its IIC1 bus interface.

After its power supply, clock, and reset, the IR001 microcontroller manages the following commands:

- RAM reading,
- I/O configuration of ports,
- Reading EEPROM, IR003. To be programmed, if necessary, using the default values contained in the IR002 program memory, if it is deprogrammed or blank.

When an ON command is issued, the IR001 microcontroller initialises IV001 via its IIC1 bus with values stored in the EEPROM (loading of essential parameters: on, geometry, etc.). Pin 24 on the IV001 is freed, and leads to the presence of VCC1 = 8 V via TV002. This voltage powers Pins 22 and 44 of the IV001.

The line time base, secondary regulation, and frame time base are gradually powered up by the slow-starting capacitor, CV246 (Pin 17 of IV001).

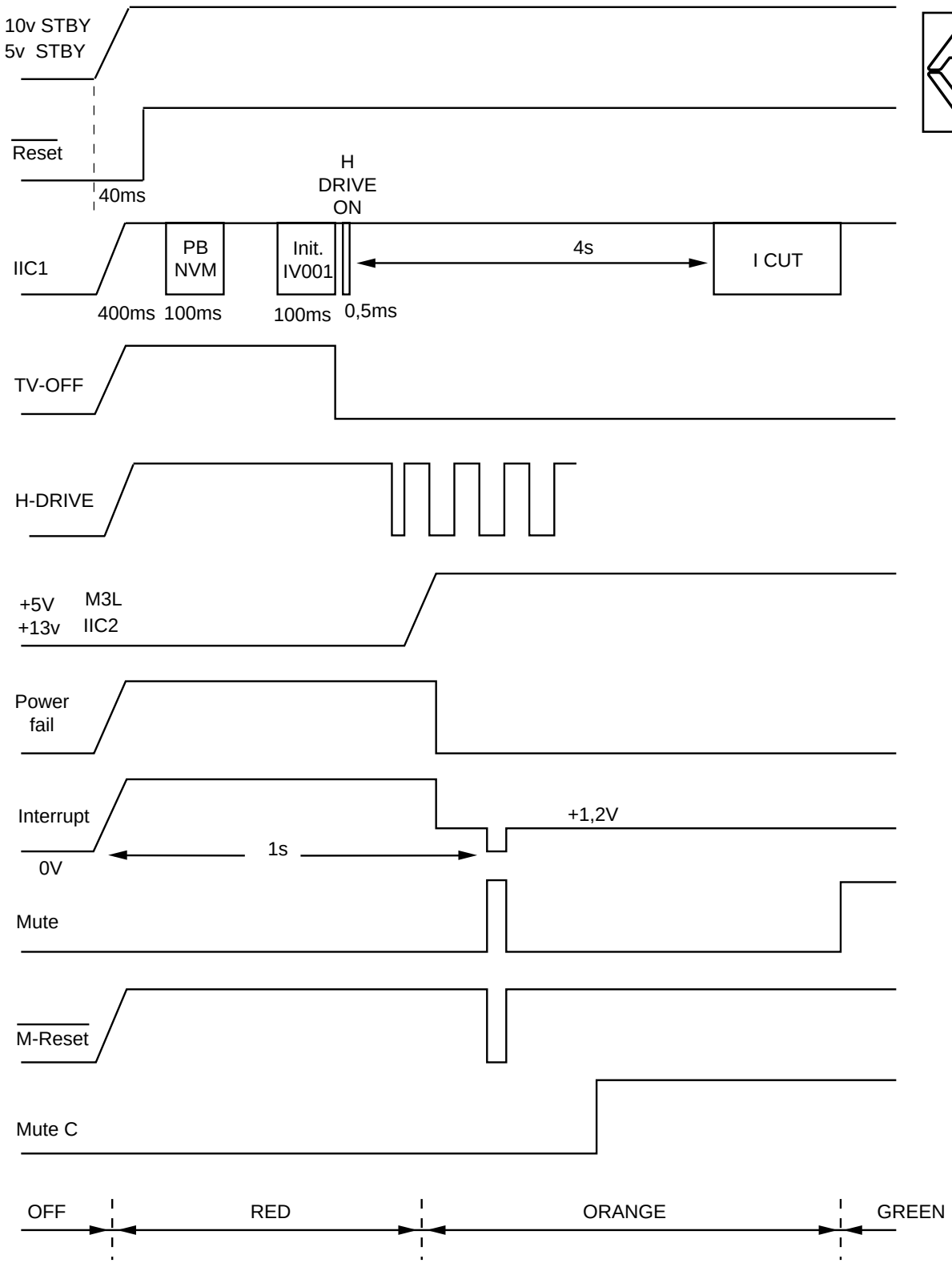
The rising of the line 13 V transmitted by DR104 confirms that the On function is fully established (5V at Pine 65 of IR001). This 13VL also makes it possible to obtain a +5V via the IP140 regulator.

The ICUT signal (Pin 43 of IV001) indicates when the tube is warmed up, and frees the analogue controls. The image and sound appear. Orders routed in from the outside, e.g. from the keypad or the remote control unit, are then processed.

FRONT PANEL LED CONTROL

In Standby Mode, Pin 51 of microcontroller IR001 is in high impedance. Switching transistor TR002 powers the red LED from the 5 V STBY.
In On Mode, the 13 V from the line time base powers the green LED. This is the initialisation phase, and results in the indicator lamp glowing orange.
When the warm tube signal, sent by the I2C1 bus to IR001, is detected, Pin 51 of IR001 goes to 0. This blocks TR002 and cuts off the power supply to the red LED.

OFF to ON CHRONOGRAM

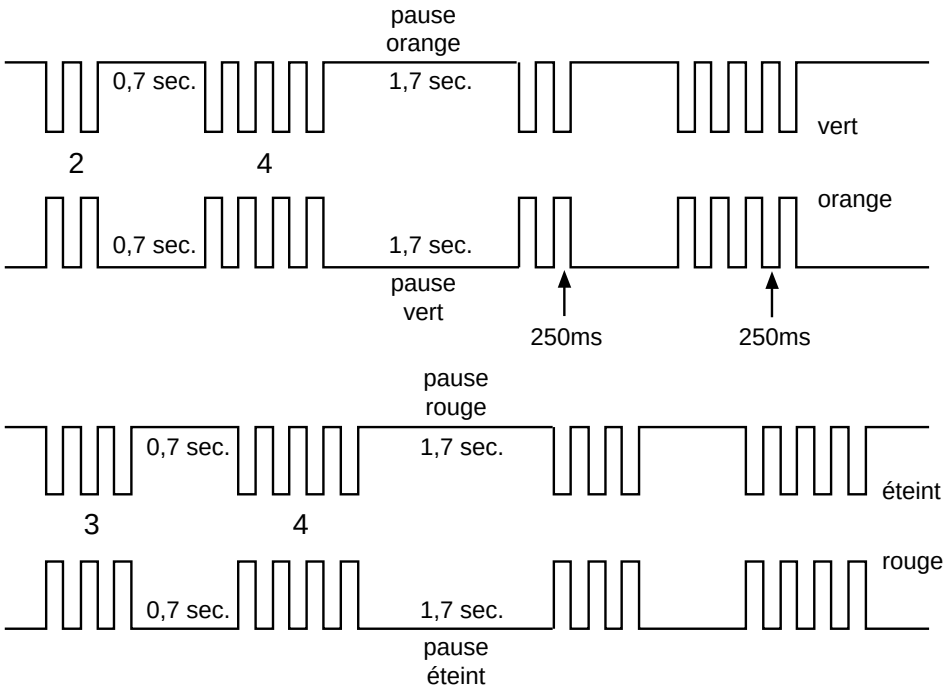


ERROR CODES

These error codes are displayed by the red LED. They are displayed only if the management microcontroller is operating.
A maximum of 81 codes (11 through 99) can be signalled. These codes consist of two digits separated by a 0.7-second pause. The error codes are repeated again and again, with a pause of 1.7 s between error codes.

SIGNAL RATE AT 2 OF BR001

There are four possible waveforms, according to whether the TV remains in Standby Mode or is switched On, and whether LED pause status is Off, Red, Orange, or Green.



LIST OF ERROR CODES

CODE	ERROR	CODE	ERROR
11	ACR MSP3410	26	NO WARM TUBE SIGNAL AFTER 15 s
12	ACR MSP3400	27	STV216X DETECTED A CASE OF PROTECTION 3 TIMES
13	ACR DSP56004	28	MEGATEXT INTERFACE NOT RESPONDING
14	ACR STV2161/2162	29	MEGATEXT DRAM IS DEFECTIVE
15	ACR STV2151ou TDA9143	31	NO RAM AVAILABLE FOR THE REQUESTED FUNCTION
16	ACR DMU0	32	TIMER OCCUPIED
17	AUDIO MODULE NOT DETECTED	33	ACR STV2165
18	ACR TEA6415C	34	ACR NVM M24C32
19	ACR TUNER	35	13V ABSENT
21	IIC1 DATA EARTHED	36	NVM ADDRESS NOT FOUND
22	IIC2 DATA EARTHED	37	INCORRECT NMI LEVEL (HALT)
23	IIC1 CLOCK EARTHED	38	M3L BUS IS BLOCKED
24	IIC2 CLOCK EARTHED	39	MEGATEXT NOT LISTE-NING
25	SWITCHED 5 V ABSENT		

POWER SUPPLY

CONTENTS

INTRODUCTION

PRINCIPLE

CHARACTERISTICS

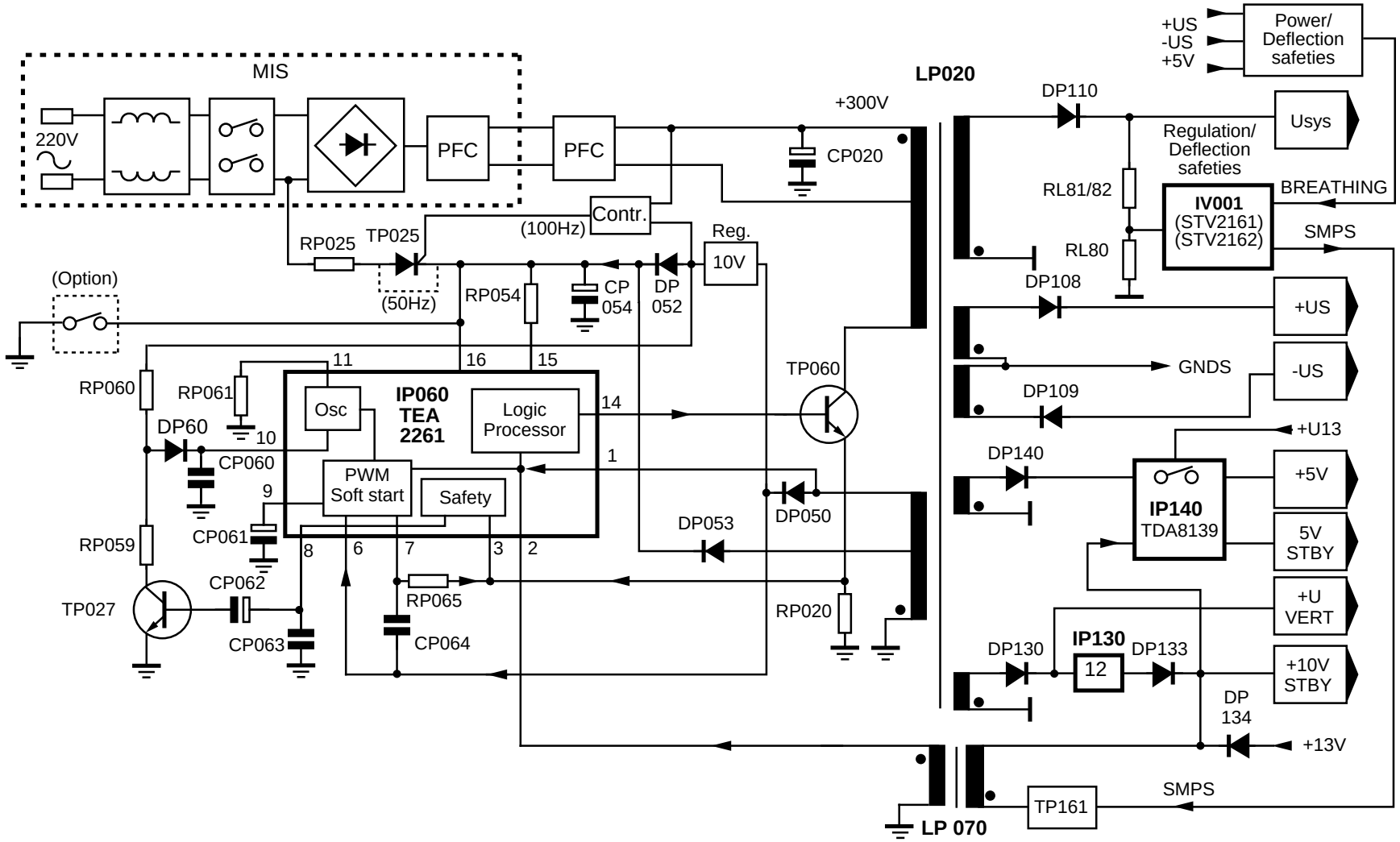
LP020 POWER SUPPLY

INTEGRATED CIRCUIT TEA2261

SECONDARY REGULATION

POWER SUPPLY INTERLOCKS

MAINS POWER CUT DETECTION



THOMSON MULTI MEDIA

CENTRE DE FORMATION TECHNIQUE

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INTRODUCTION

The ICC19 power supply comes in two main versions: one operating at 16 kHz, and the other operating at 32 kHz. The main difference lies in the choice of components.

PRINCIPLE

IThe power supply is a fixed-frequency flyback-type switching power supply unit. Two specific regulating loops come into action according to the status of the TVC.

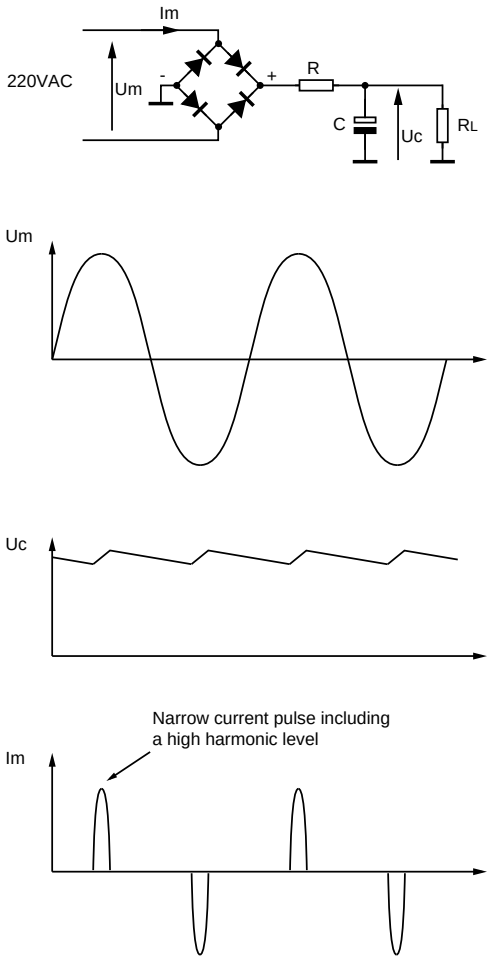
In Standby Mode, the frequency is determined by an oscillator located on the primary.
This is also where regulation occurs. To do this, a signal indicating the overall consumption of the secondaries, picked up on a primary winding, is used.
In Steady-State Mode, the line frequency synchronises the signal.
Regulation then takes place at the secondary, and is based on stabilising the voltage USYS applied to the line time base.

CHARACTERISTICS

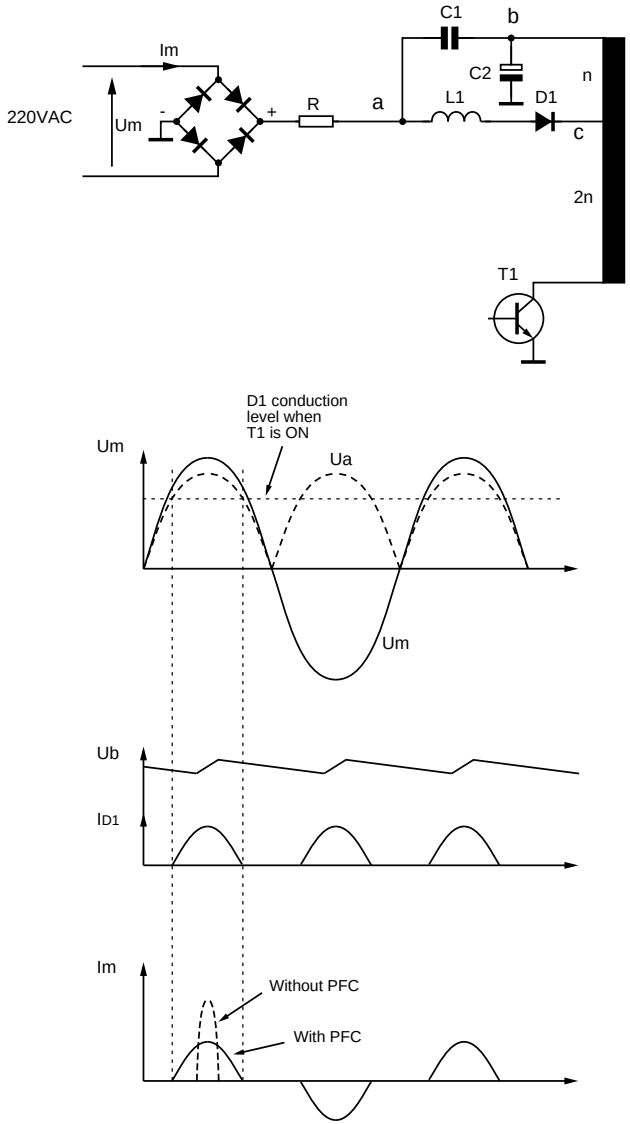
TMains voltage: 190 to 264 volts.
Secondary voltages:

U SYS	127 to 136 V for 50-Hz chassis. 130 to 142 V for 100-Hz chassis.
+ US	approx. +18 V for stereo chassis approx. +14 V for Dolby chassis.
- US	approx. -18 V for stereo chassis approx. -14 V for Dolby chassis.
UVERT	26 V on 50-Hz chassis 23 V on 100-Hz chassis.
U 7V	6 to 7 V5 according to chassis.

NOTES :



WITHOUT PFC CIRCUIT



WITH PFC CIRCUIT

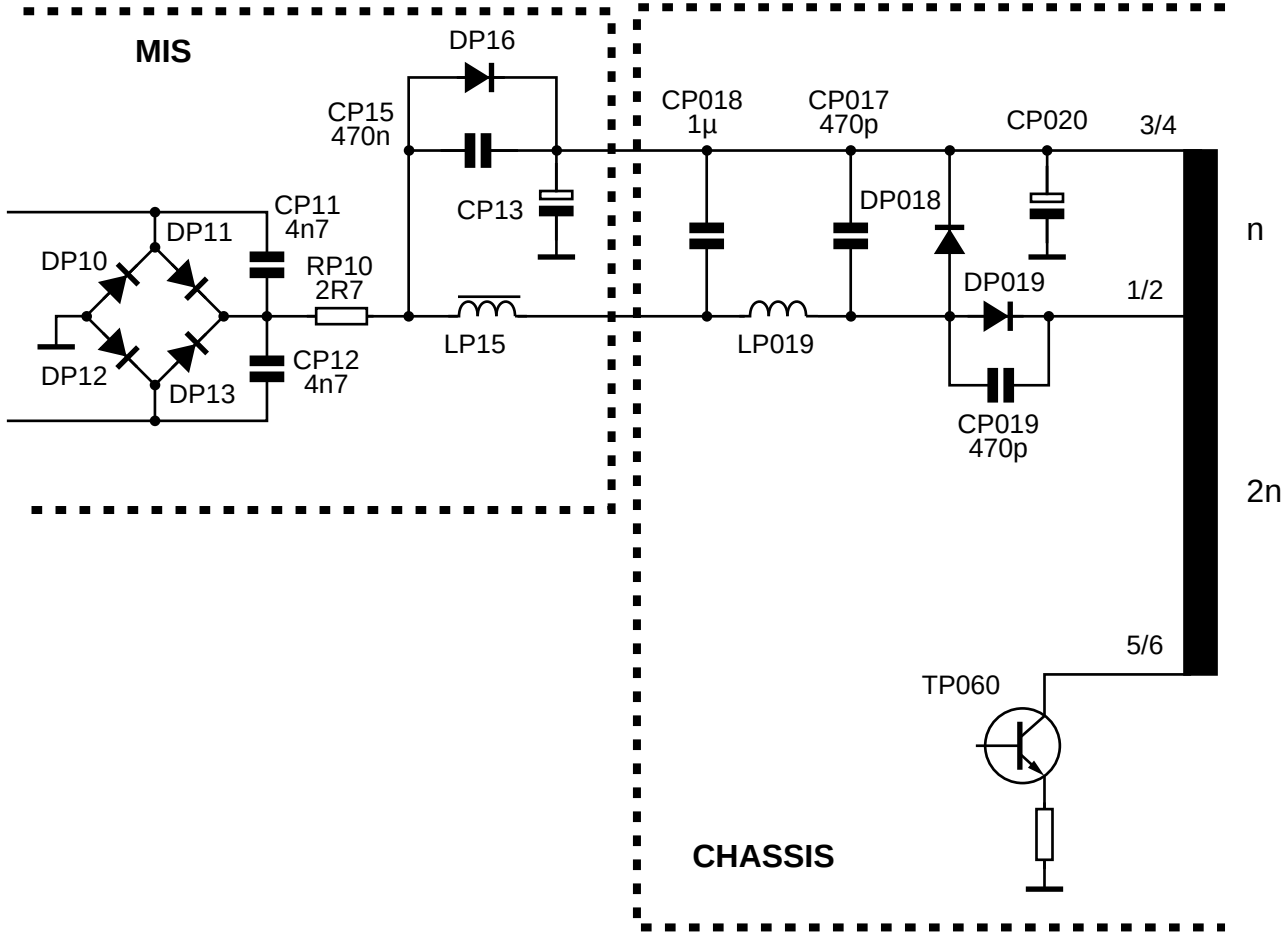
LP020 POWER SUPPLY

The new European standard, EN60555-2, limits pollution of the mains voltage by harmonics. For this purpose, the main primary winding is connected to the bridge rectifier via a power factor correction circuit.

PRINCIPLE

Harmonics are generated by the filter capacitor charging current. The narrower the charge pulse, the higher the amplitude of the harmonics (this occurs with a weak voltage residual and therefore a high capacitor value).
The layout used for this chassis therefore operates on the principle of widening these charging current pulses to reduce the amplitude of harmonics. To do this, a condenser C1 is inserted between the diode bridge and filter condenser C2 (C1 < < C2). It decouples the dc voltage between Condenser C2, charged to 300 V, and the diode bridge, providing full-wave rectification of the mains voltage.
An intermediate tap on the primary winding divides the winding so that when Transistor T1 conducts, the voltage at Point C is about 2/3 the value of the voltage at Point B. This, as soon as the rectified mains voltage exceeds this value (Point A), Diode D1 conducts, and the current is tapped directly off the diode bridge.
Because of this, a lower load is applied to Capacitor C2 (resulting in a lower charging current), and the mains voltage takes effect over a longer period. The current pulse taken from the mains therefore generates a lower level of harmonics.

NOTES :

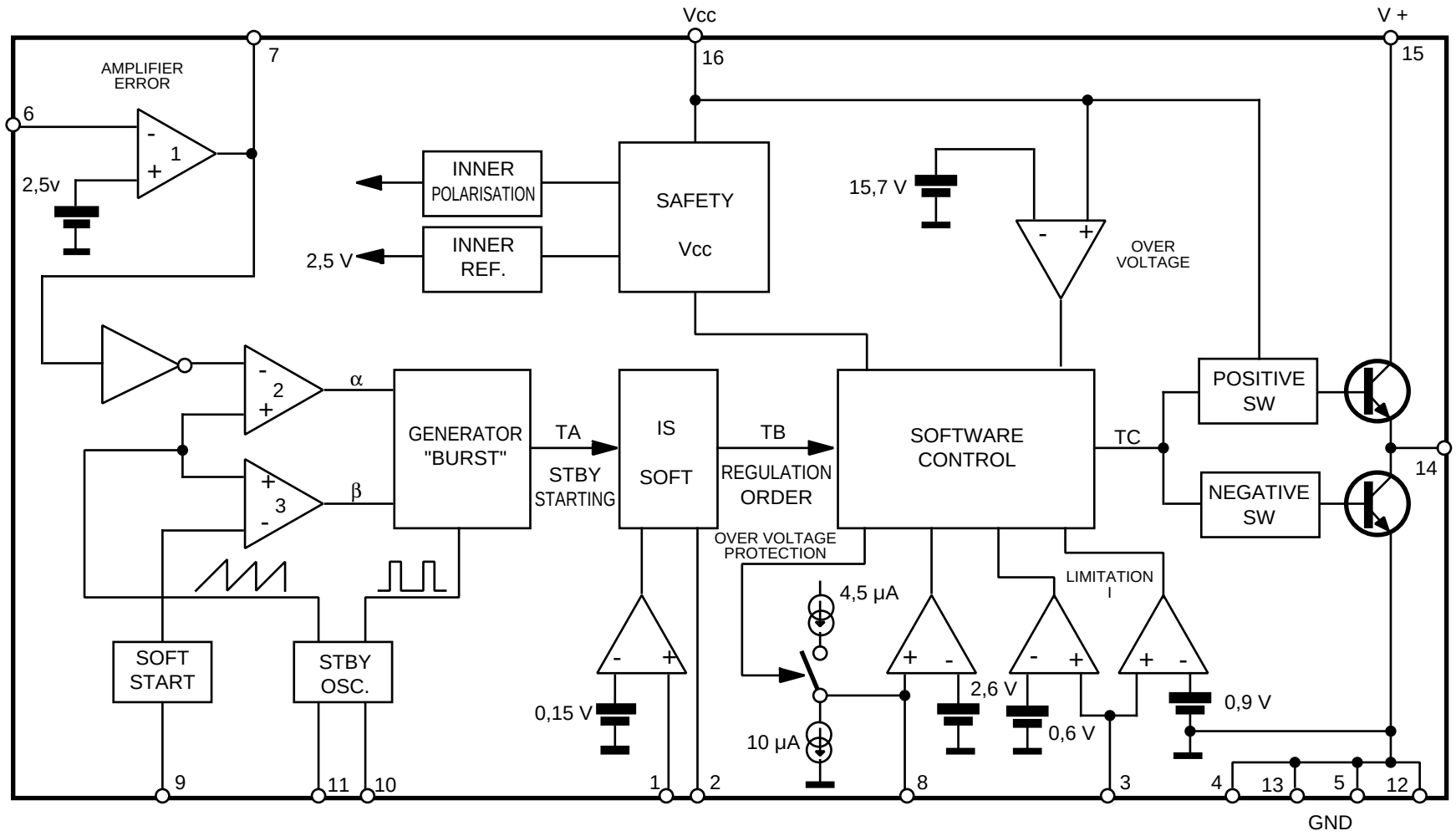

MIS
DP16
CP15
470n
CP018
1µ
CP017
470p
CP020
3/4
CP13
DP018
CP11
4n7
DP11
DP10
RP10
2R7
DP019
1/2
n
LP15
LP019
DP12
DP13
CP12
4n7
CP019
470p
2n
5/6
TP060
CHASSIS

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APPLICATION

A filter, CP15, CP018, and LP15, eliminates the mains pollution generated by the line frequency switching of Diode DP019 (D1).
Diode DP16 protects CP15 (C1) against voltage spikes on the mains.
Diode DP018 limits the collector overvoltage of TP060 (T1) when diode DP019 is blocked.

NOTES :



THOMSON MULTI MEDIA

CENTRE DE FORMATION TECHNIQUE

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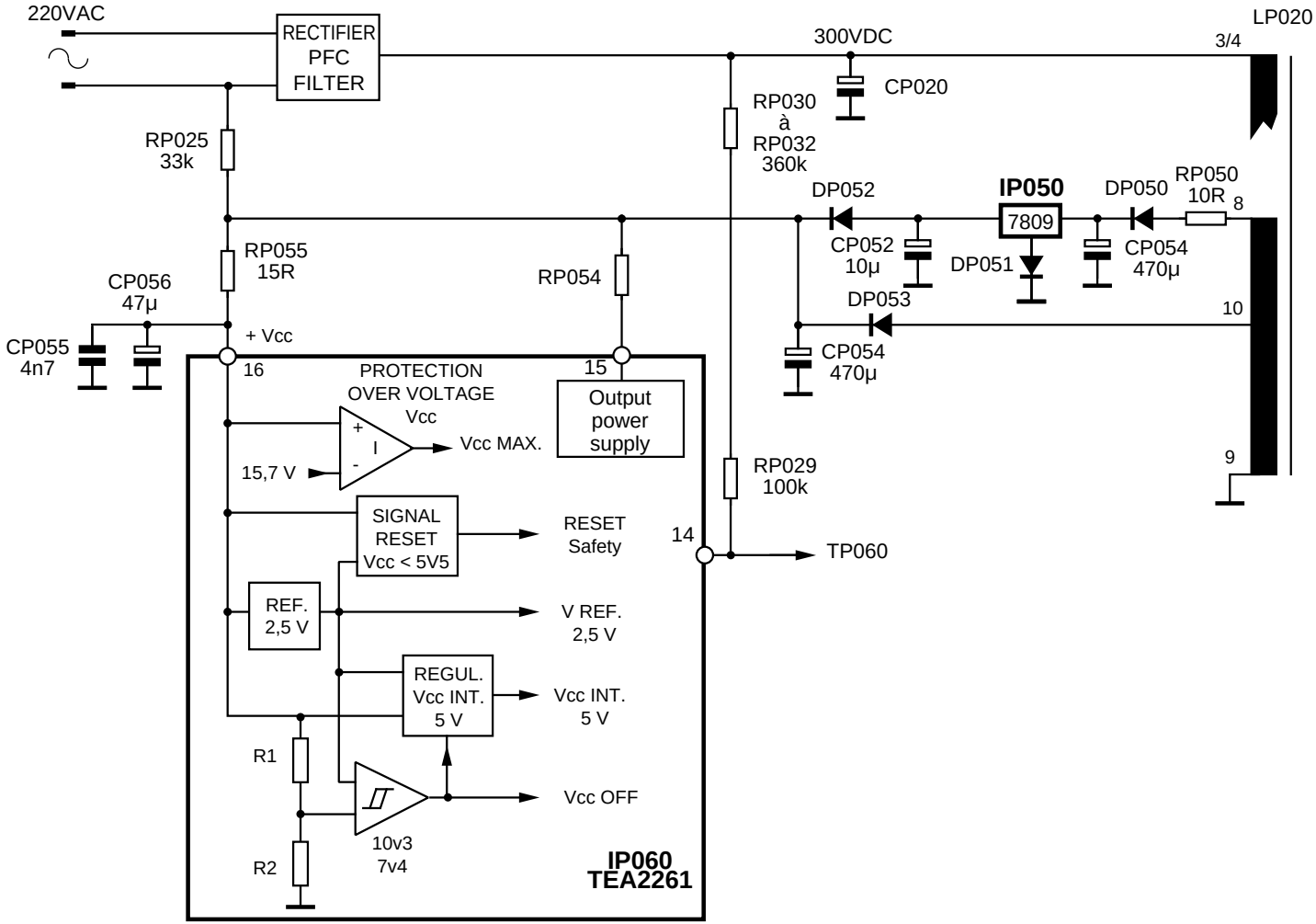
INTEGRATED CIRCUIT TEA2261

TEA2261 incorporates the various stages required for control and regulation of a switching power supply unit. It includes the following:

Internal voltage reference and regulation circuit
Error oscillator
Error amplifier
Pulse width modulator (PWM)
Gradual start circuit
Transformer degaussing control
Current limiting threshold detection
Logic management of limits and interlocks
Output stage for direct drive of a bipolar power transistor.

Because of the automatic switching of SALVES Mode in the event of low consumption, this circuit handles a wide range of regulation tasks, from a few watts to values in the region of 200 W.

NOTES :


220VAC
RECTIFIER
PFC
FILTER
300VDC
LP020
3/4
CP020
RP030
à
RP032
360k
RP025
33k
DP052
IP050
7809
DP050
RP050
10R
8
CP052
10µ
DP051
CP054
470µ
RP055
15R
RP054
CP056
47µ
DP053
10
CP055
4n7
+ Vcc
CP054
470µ
16
15
PROTECTION
OVER VOLTAGE
Vcc
Output
power
supply
+
I
-
Vcc MAX.
15,7 V
RP029
100k
9
SIGNAL
RESET
Vcc < 5V5
RESET
Safety
14
TP060
REF.
2,5 V
V REF.
2,5 V
REGUL.
Vcc INT.
5 V
Vcc INT.
5 V
R1
Vcc OFF
10v3
7v4
R2
IP060
TEA2261

GENERATION OF INTERNAL REFERENCES AND POWER SUPPLIES

The power supply at Pin 16 comes from:

On start-up, half-wave rectification of the mains by the mesh RP025, CP054, and a diode of the bridge rectifier.

In Standby Mode, winding 9, 8 of LP020 (fly-back mode). 12 V obtained by rectification (DP050, CP054) is applied to regulator IP050 (7809 applied to Diode DP051), which supplies 9 V via DP052.

In Steady-State, winding 9, 10 of LP020 (fly-back mode). Rectification by DP053 supplies a voltage of about 11 V.

Note that in this case Diode DP052 is blocked, and disconnects circuit IP02.

Resistor RP054 delivers the power supply to the final stage (Pin 15), and sets its maximum current.

The circuit supplies several voltages and service signals according to changes in the direct current voltage at Pin 16.

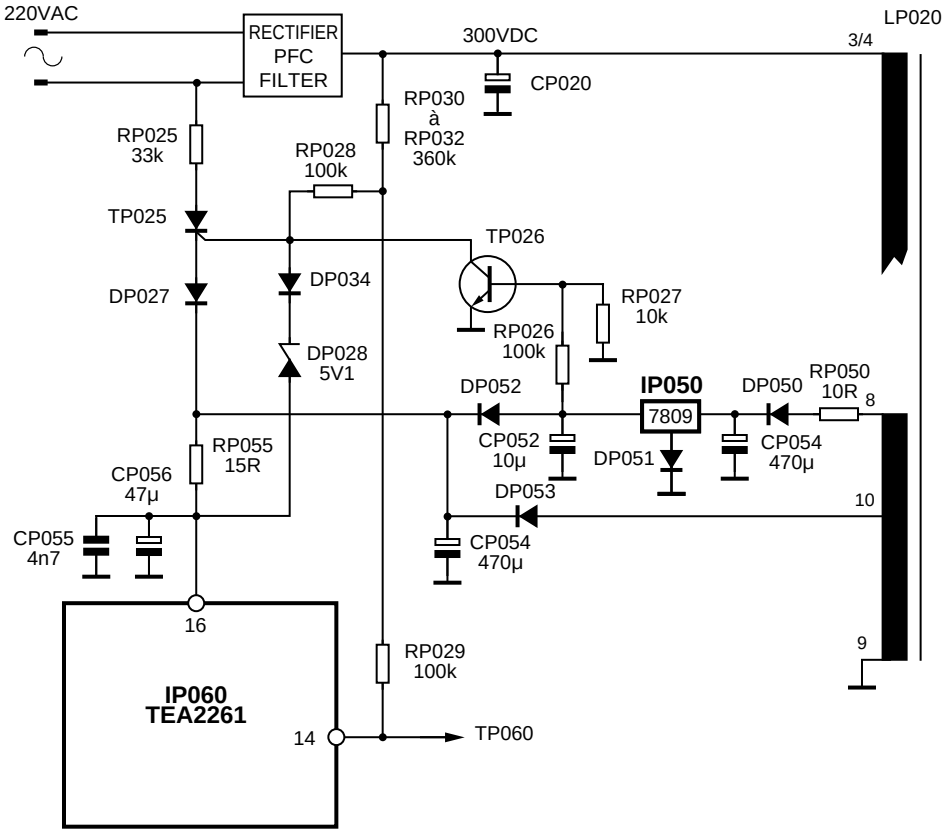
As soon as +Vdc reaches approximately 4V5, an internal reference of +2V5 is generated.

For +Vdc £ 5V5, a RESET pulse is produced.

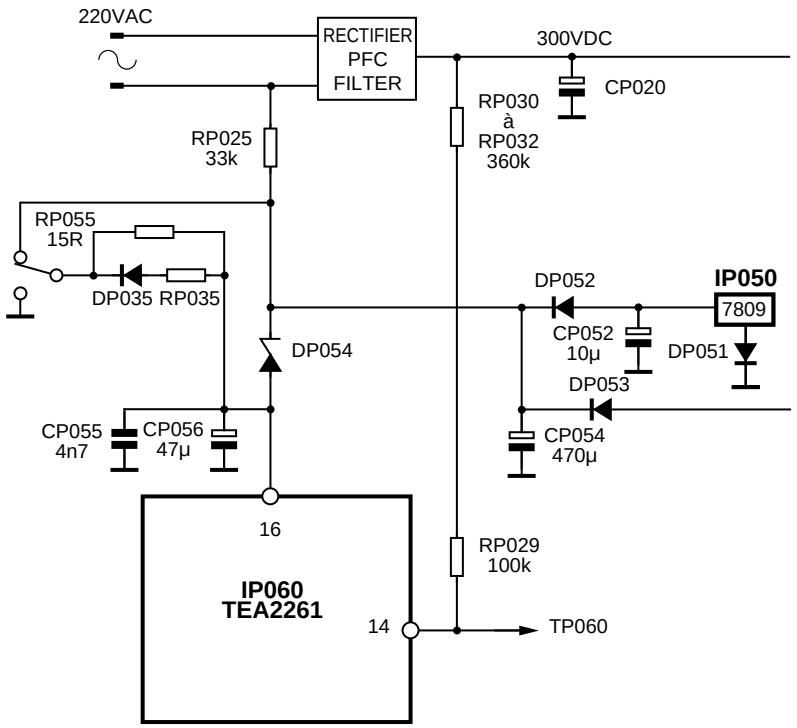
When +Vdc reaches 10V3 (Vdc start), enabling of an internal power supply Vdc int = 5 V. This stabilised voltage allows the circuit to perform well in a wide voltage range on Pin 16.
This threshold also triggers the passage to high state of Vdc off, thus enabling the interlock and limit management logic, and authorising pulse output from Pin 14 (as long as +Vdc remains higher than +Vdc stop, i.e. 7V4 typ.).

For Vdc of 15V7 typ., passage to high state of Vdc max, and interlocking of the circuit by the interlock and limit management logic.

NOTES :



POWER STANBY SWITCHING



LOW POWER SWITCHING

OPTIONS

SWITCHING OF START-UP POWER SUPPLY

On 100-Hz chassis, a thyristor (TP025) is added in series with Resistor RP025.

When mains power is applied, a current from the 300 V via the RP028, RP030 through 32 resistor network energises the thyristor. The thyristor then channels the CP054 charging current.
When the power supply starts up, a voltage of 9V6 appears at the output of Regulator IP050 and saturates Transistor TP026. With its gate then earthed, the thyristor de-energises the next time the mains alternation is inverted.

This layout reduces the consumption by 0.7 W.

LOW-POWER SWITCH

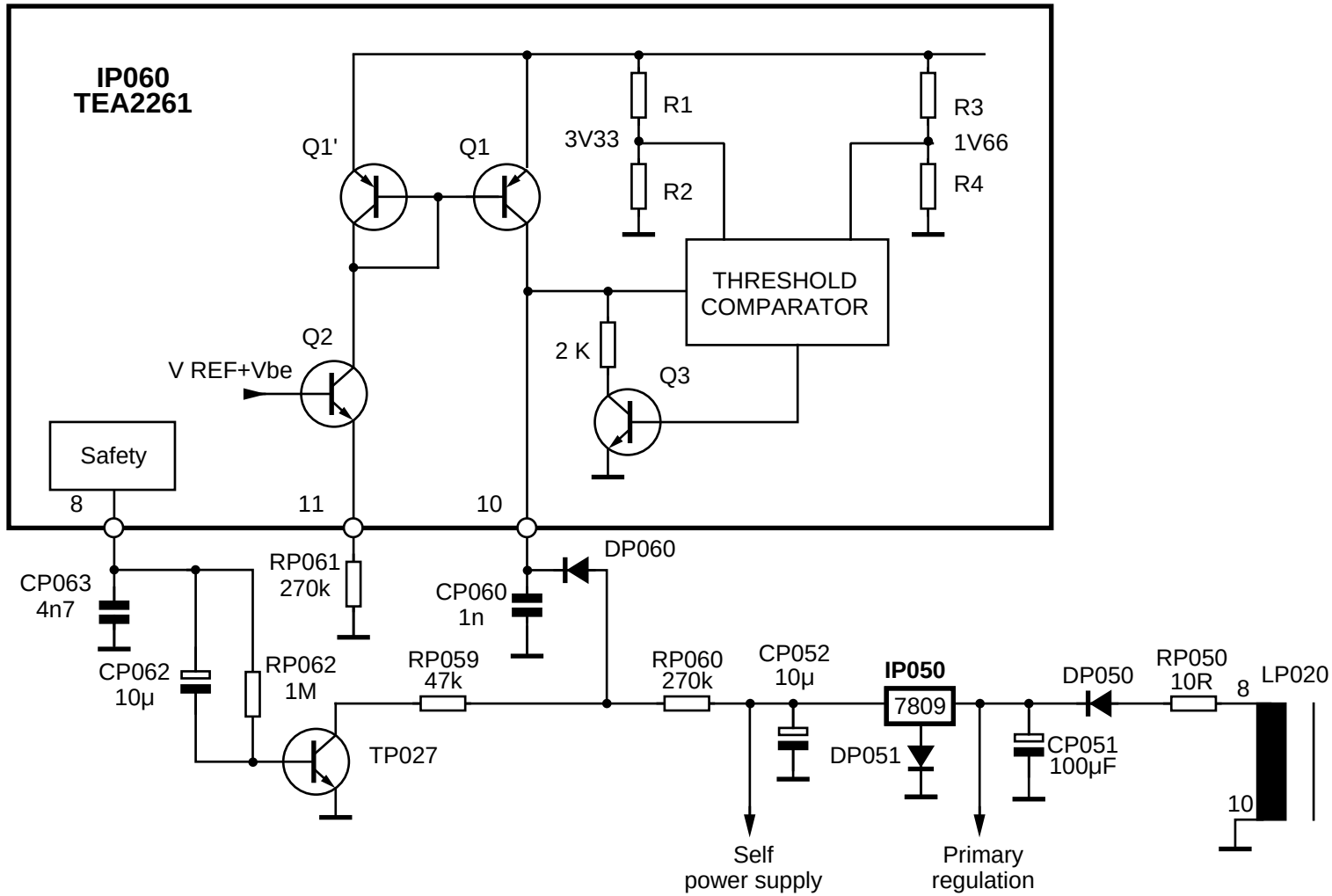
A low-power switch can be connected in series with Resistor RP025 to replace the classic mains switch.

In operation, this switch connects RP025 via Resistor RP55 to Pin 16 of IP60.

In Off position, this switch switches Pin 16 of IP060 to earth via Resistor RP035 and Diode DP035.

Zener Diode DP054 limits the voltage to the terminals of CP54 when Off.

NOTES :


IP060
TEA2261
Q1'
Q1
3V33
R1
R2
R3
1V66
R4
THRESHOLD
COMPARATOR
Q2
V REF+Vbe
2 K
Q3
Safety
8
11
10
CP063
4n7
RP061
270k
CP060
1n
DP060
CP062
10µ
RP062
1M
RP059
47k
RP060
270k
CP052
10µ
IP050
7809
DP050
RP050
10R
8
LP020
TP027
DP051
CP051
100µF
10
Self
power supply
Primary
regulation

OSCILLATOR

An oscillator determines the switching frequency of the switching device in Standby Mode.

It includes the following:

- Current (Q1, Q1', Q2) generator; value of current set by Resistor RP061 (Pin 11).

This current charges Capacitor CP060 (Pin 10).

Threshold detector which analyses the voltage across CP060:

- 1st threshold (2/3 Vdc int. = 3V33 typ.): switching of transistor Q3 and discharge of CP060 by internal 2 kW resistor.
- 2nd threshold (1/3 Vdc int. = 1V66 typ.): blocking of transistor Q3 and charging of CP060 by the current generator.

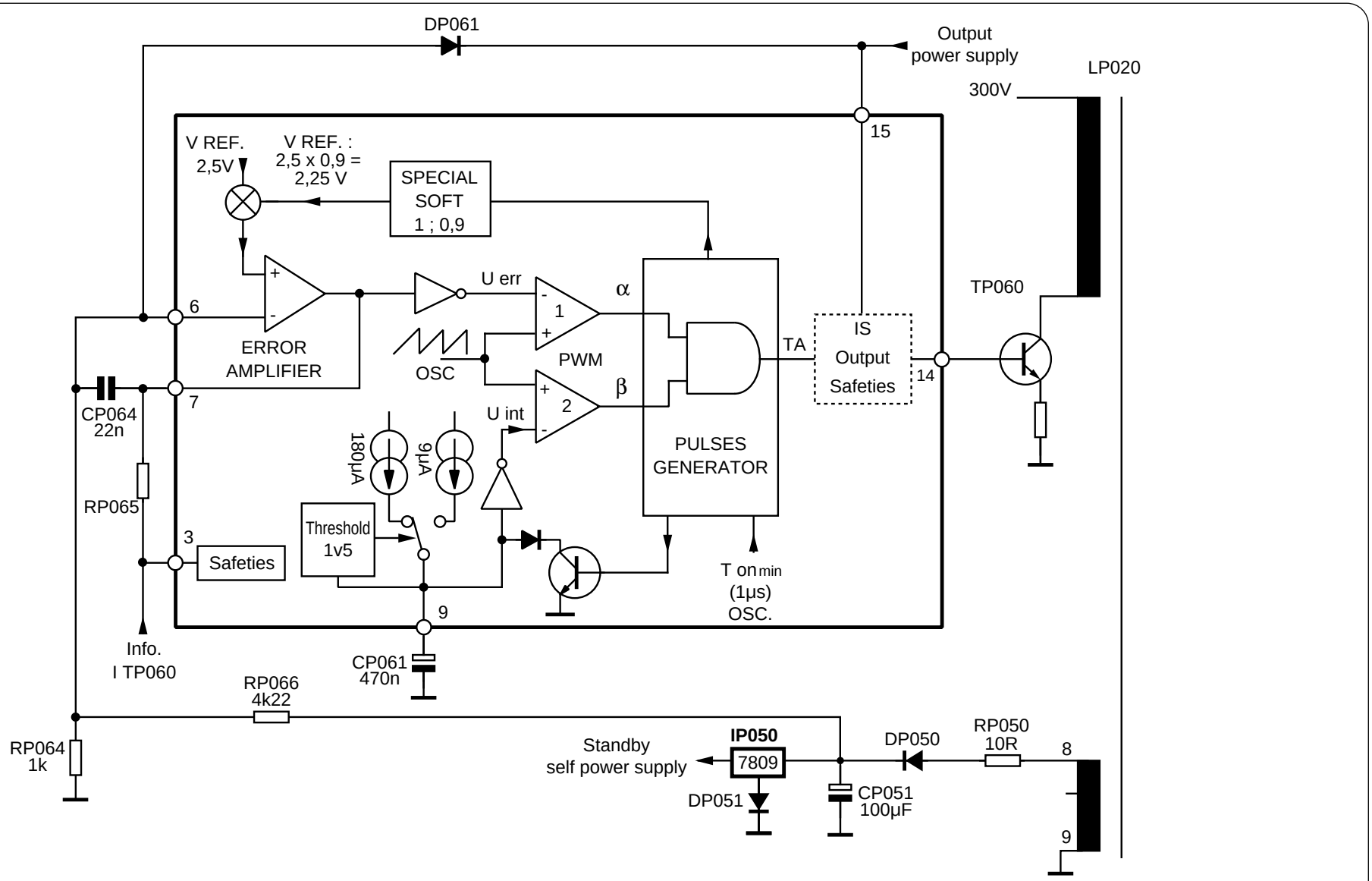
The overall result is a sawtooth.

Function of components RP059, RP060, and DP060.

In the start-up phase, because the secondary voltages are low, the time required to restore the energy is liable to exceed the nominal period of the oscillator. The oscillator therefore starts up with a low frequency (approx. 5 kHz) due to components RP061 and CP060 only (Diode DP060 is blocked). With the increase in voltage at the IP050 output, Diode DP060 begins to conduct, and the current determined by RP060 gradually contributes to an acceleration of the charging of CP060, thus bringing the oscillator frequency up to 19 or 20 kHz.

Resistor RP059 is connected to earth via the conduction of transistor TP027, and contributes to reducing the charging current of Capacitor CP060 and therefore the frequency of the oscillator in the event of the primary interlock being triggered (refer to paragraph on interlocks).

NOTES :


DP061
Output
power supply
LP020
300V
15
V REF.
2,5V
V REF. :
2,5 x 0,9 =
2,25 V
SPECIAL
SOFT
1 ; 0,9
U err
α
TP060
6
ERROR
AMPLIFIER
OSC
PWM
TA
IS
Output
Safeties
14
CP064
22n
7
U int
β
180µA
9µA
PULSES
GENERATOR
RP065
Threshold
1v5
3
Safeties
T on min
(1µs)
OSC.
9
Info.
I TP060
CP061
470n
RP066
4k22
RP064
1k
Standby
self power supply
IP050
7809
DP050
RP050
10R
8
DP051
CP051
100µF
9

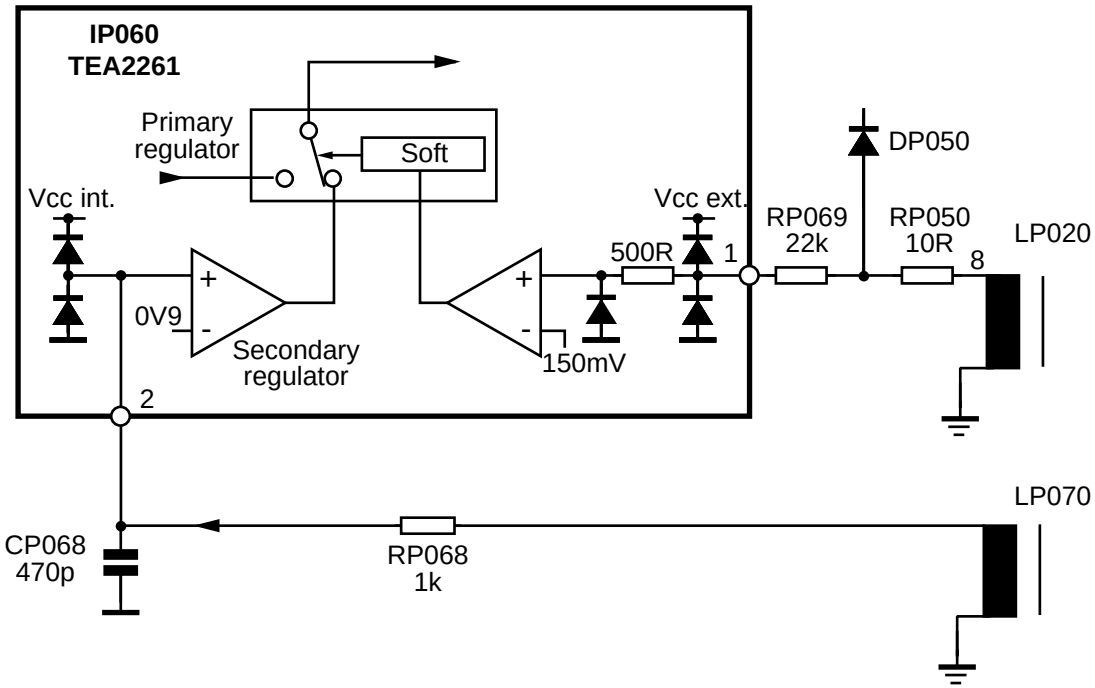
PRIMARY REGULATION LOOP

This includes an error amplifier that compares a fraction of the image of the secondaries (Winding 8, 9, RP050, DP050, CP051, RP066, RP064) to an internal reference.
Resistor RP065 sensitises the primary circuit in Standby Mode.
In Steady State, because the secondary regulations brings the voltage at Pin 6 to approximately 4V7, the primary regulation is in a constant overvoltage configuration, and automatically shuts itself off.

A first PWM then compares the error voltage to the sawtooth signal from the oscillator, to produce a command strobe pulse (signal a).
A second PWM defines the maximum authorised duty cycle (60%) by comparing the same sawtooth signal to an internal voltage (signal b).
A logical AND operator between these two signals produces the narrowest strobe pulse.

When switching on, and at the beginning of each burst, a soft start is ensured by controlling the internal voltage and therefore the width of signal b: from T1 to T2, Capacitor CP061 (Pin 9) is charged by an internal generator producing a current of 180 µA. There is no signal at the IC output.
At T2, the voltage at the terminals of CP061 reaches 1V5. The charging current goes to 9 µA. Strobe pulses appear at Pin 14, corresponding to signal b which is widening (Tb < Ta).
A few milliseconds after T2, the soft start circuit stops limiting strobe pulse width, and the primary regulation loop becomes established (Ta < Tb).
When the voltage reaches 2V7 typical, it sets the maximum duty cycle (b = 60%).
The load on CP061 (maximum value 3V1) is returned to 800 mV at the end of start-up and at the end of each burst.

NOTES :


IP060
TEA2261
Primary
regulator
Soft
Vcc int.
Vcc ext.
DP050
RP069
22k
RP050
10R
LP020
500R
1
8
+
-
0V9
Secondary
regulator
150mV
2
LP070
CP068
470p
RP068
1k

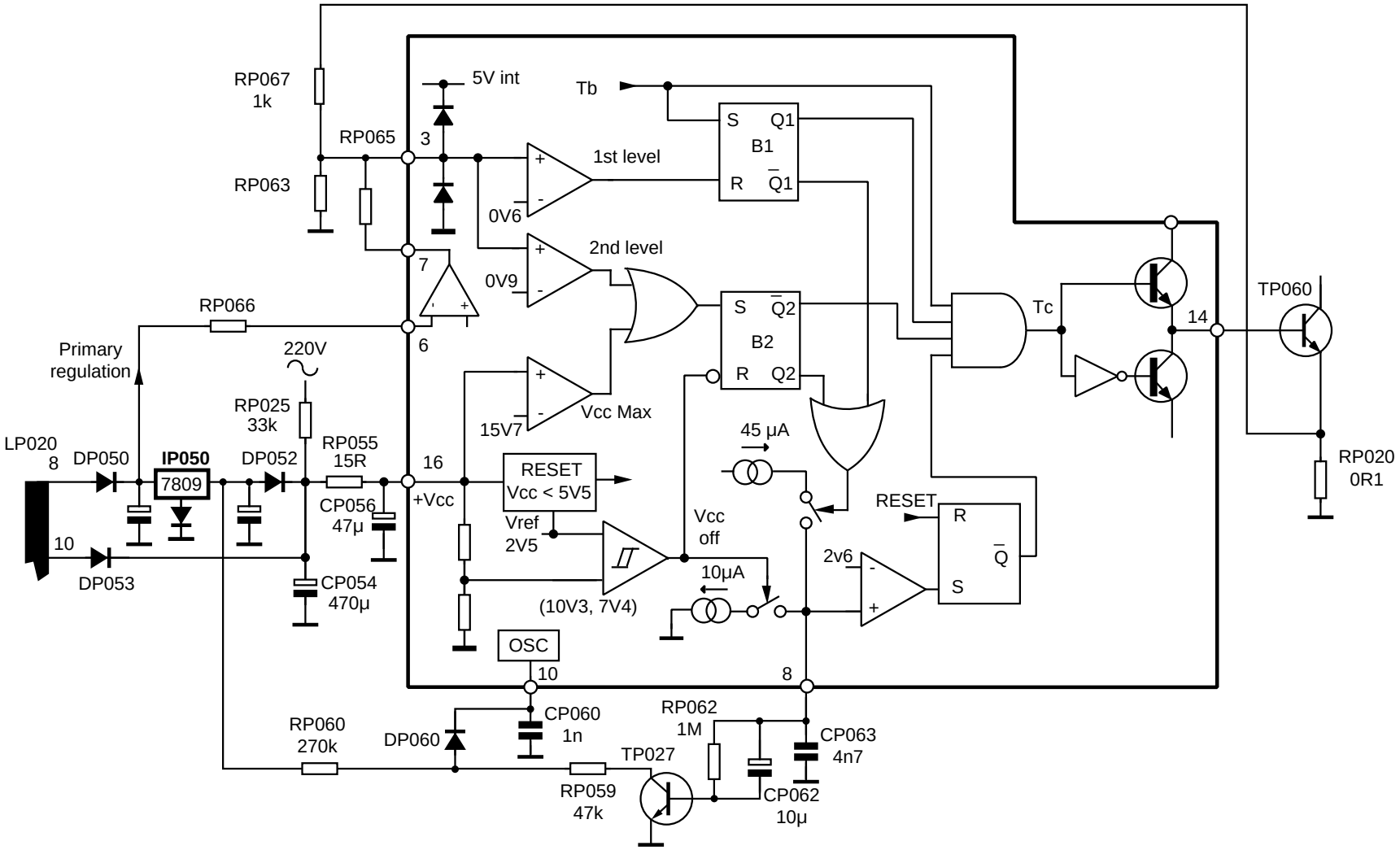
LOGICAL IS STAGE.

During the transition between Standby and Steady State, the two regulation loops coexist. Because the signals are not synchronous, there is a risk of a Transistor TP060 command during the energy restoration phase, and of the interlock being triggered by a current peak.

To avoid this problem, a signal taken from Winding 8, 9 and applied to Pin 1 warns the circuit of this critical phase. All commands are then blocked. The first negative front (corresponding to the end of energy restoration = transformer degaussing) enables any new primary or secondary commands.

NOTES :

41


RP067
1k
5V int
Tb
RP065
3
RP063
1st level
S Q1
B1
R Q1
0V6
2nd level
7
0V9
RP066
S Q2
B2
R Q2
Tc
TP060
14
Primary
regulation
220V
6
RP025
33k
15V7
Vcc Max
45 µA
LP020
8
DP050
IP050
7809
DP052
RP055
15R
16
RESET
Vcc < 5V5
RESET
R
Q
S
CP056
47µ
+Vcc
Vref
2V5
Vcc
off
2v6
10µA
10
DP053
CP054
470µ
(10V3, 7V4)
OSC
10
8
RP020
0R1
CP060
1n
RP062
1M
CP063
4n7
RP060
270k
DP060
TP027
RP059
47k
CP062
10µ

AINTERLOCK ACTIVATION AND MANAGEMENT

The TEA2261 has a strobed current interlock at Pin 3 and an interlock related to the power supply voltage at Pin 16.

An image of the current is collected at the terminals of emitter resistor RP020, and applied to Pin 3 of TEA2261. The following two thresholds apply:

1ST THRESHOLD INTERLOCK
When the voltage at Pin 3 reaches the first threshold, 0.6 V, TP060 is blocked until the next Tb pulse (bit-by-bit limitation). During this time, CP063 is charged by a current of 45 - 10 = 35 µA.
When this phenomenon is repetitive, the charge on CP063 reached 2V6 and triggers an RS-bistable circuit which permanently disables control of TP060. A main reset is then necessary to re-start the circuit (Vdc 5V5).

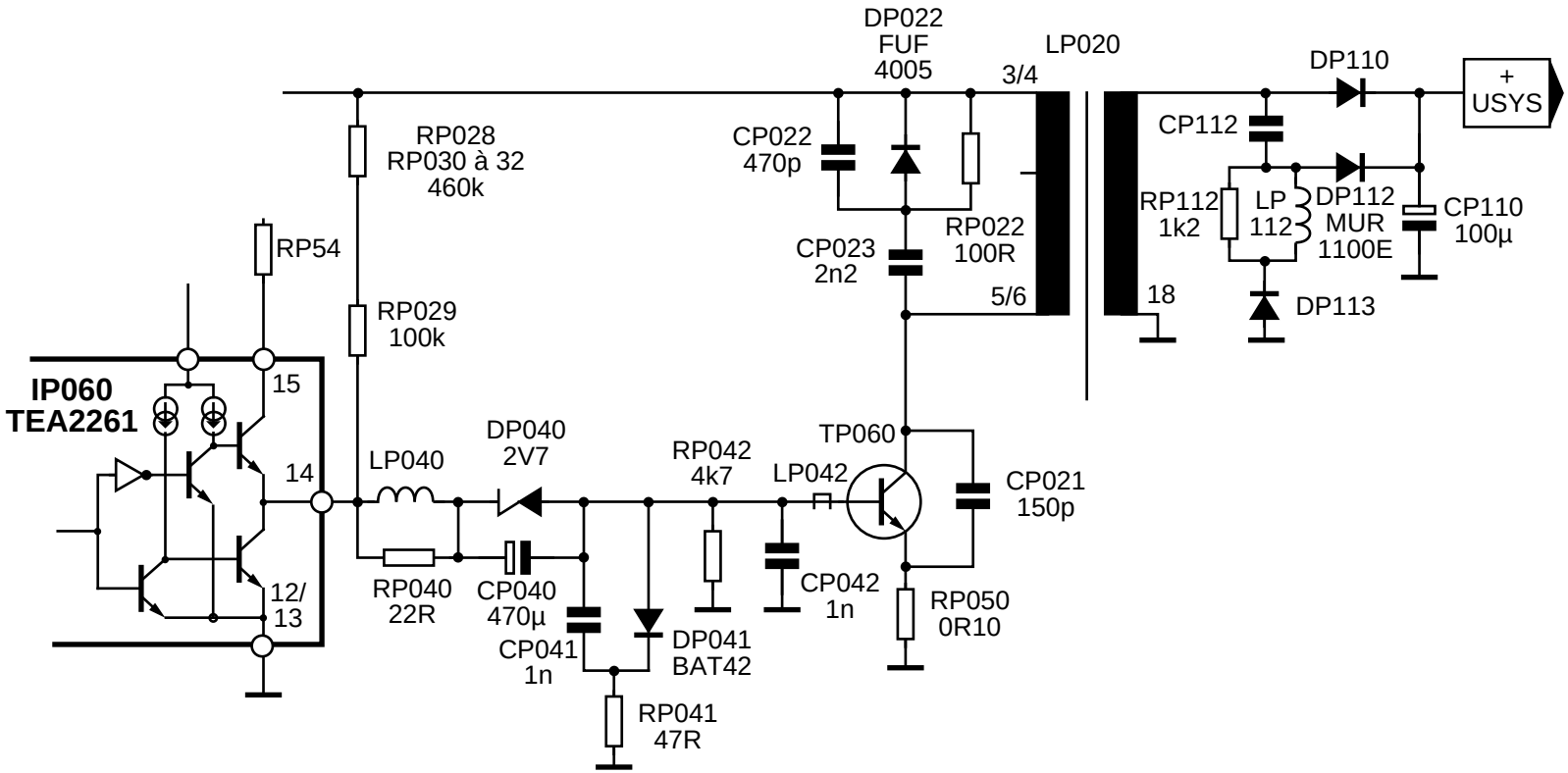
2ND THRESHOLD INTERLOCK
In the event of a major overload (short circuit on USYS), a second threshold is reached (0V9). Control of TP060 is permanently disabled. A main reset is then necessary to re-start the circuit (V Pin 16 5V5).

VOLTAGE INTERLOCK
A voltage above 15V7 on Pin 16 blocks TP060. A main reset is then necessary to re-start the circuit (V Pin 16 5V5).

SPECIFIC FEATURES OF ICC19 CHASSIS

Because the primary interlock is calibrated for U SYS at steady state, the sensitivity of this stage has been increased in Standby Mode to detect faults on the other secondaries.
For this purpose, a resistor, RP065, is added between the error amplifier output of the primary loop (Pin 7 of IP060) and the interlock input (Pin 3).
When capacitor CP063 reaches 0.6 V, Transistor TP027 conducts and reduces the charging current of Capacitor CP060 (RP059), which reduces the frequency of the Standby oscillator.

NOTES :


DP022
FUF
4005
LP020
3/4
DP110
+
USYS
RP028
RP030 à 32
460k
CP022
470p
CP112
RP112
1k2
LP
112
DP112
MUR
1100E
CP110
100µ
RP54
CP023
2n2
RP022
100R
5/6
18
DP113
RP029
100k
IP060
TEA2261
15
14
12/
13
LP040
DP040
2V7
RP042
4k7
LP042
TP060
CP021
150p
RP040
22R
CP040
470µ
CP042
1n
RP050
0R10
CP041
1n
DP041
BAT42
RP041
47R

TP060 ENVIRONMENT

OUTPUT STAGE

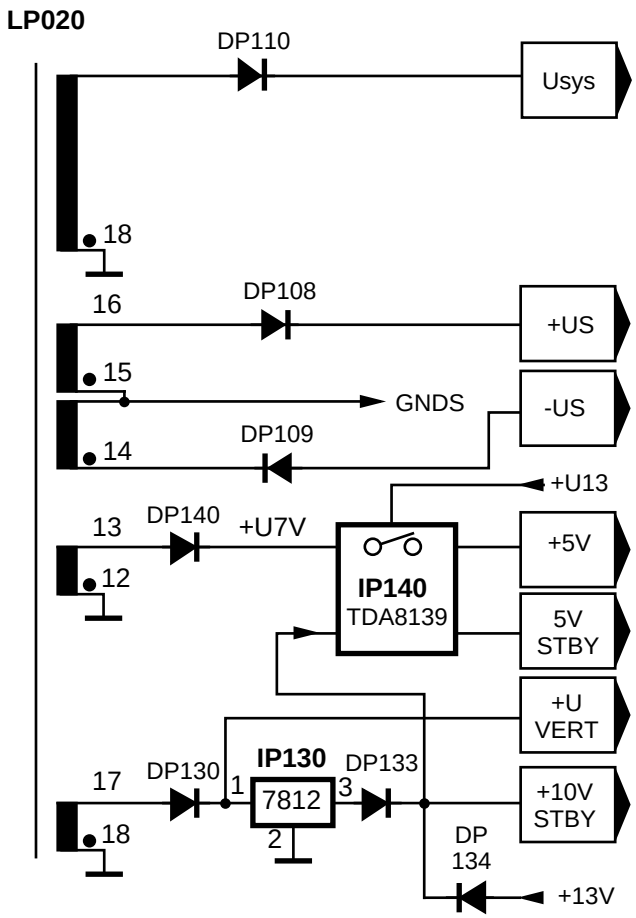
The output stage of the TEA2261 consists of a push-pull.
It supplies the basic current for control of TP060, and then channels the reverse locking current caused by the discharging of CP040.
In the conduction phase, Resistor RP054 limits the polarisation current.

TP060 SWITCHING CIRCUITS

Resistors RP029 through RP032 pre-charge CP040 as soon as power is switched on, to ensure an adequate reverse locking current during the start-up phase and at the beginning of each burst. Self-induction coil LP040 sets the dl/dt of the control current reversal.

The circuit DP022, CP023, RP022 slows the rise in collector voltage of TP060 when it is blocked, to ensure minimum dissipation through switching, and to limit the overvoltage peak. To do this, it is assisted by the secondary assembly DP113, LP112, RP112, CP112, and DP112.

NOTES :



Voltage	Black screen sound mute	White screen maxi. sound	Standby 190V	Standby 230V
50Hz stéréo				
+USYS	131,3V	131,2V	85,3V	86,7V
+UVERT	26,1V	26,5V	15,1V	15,0V
+US	18,4V	16,8V	10,5V	10,6V
-US	-18,1V	-15,1V	-10,3V	-10,3V
+U7V	7,7V	7,87V	6,7V	6,9V
50Hz dolby				
+USYS	137,3V	137,2V	91,6V	91,3V
+UVERT	26,0V	26,3V	14,9V	14,8V
+US	14,1V	12,7V	7,7V	7,7V
-US	-14,0V	-12,8V	-7,6V	-7,6V
+U7V	7,52V	7,68V	8,5V	8,5V
100Hz stéréo				
+USYS	134,2V	133,9V	108,2V	109,6V
+UVERT	22,7V	22,8V	13,9V	14,0V
+US	18,6V	15,2V	11,1V	11,3V
-US	-18,4V	-15,2V	-11,0V	-11,1V
+U7V	5,95V	5,8V	6,8V	6,8V
100Hz dolby				
+USYS	134,2V	133,9V	104,4V	105,9V
+UVERT	23,5V	23,4V	13,9V	14,0V
+US	13,5V	11,1V	8,9V	9,0V
-US	-13,6V	-11,5V	-9,0V	-9,1V
+U7V	6,05V	5,78V	7,2V	7,2V

SECONDARY VOLTAGES

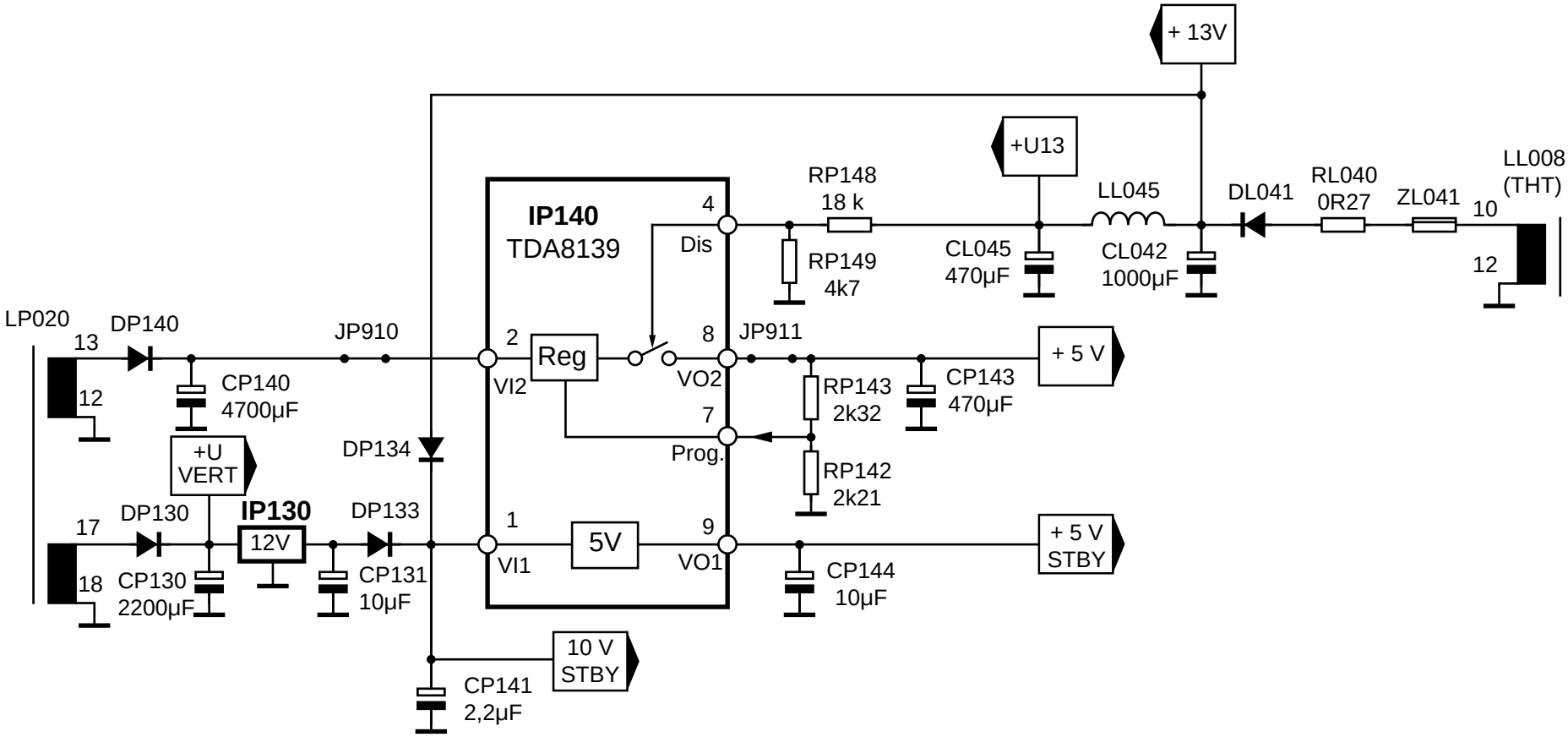
The secondary windings produce five direct voltages:

+USYS which can be between 127 and 140 volts, according to chassis, and according to the winding connector selected (19 through 22 via jumpers JP914 through 917).
+US and -US, symmetric power supplies with specific earth distributed to the audio stage via a cable (from BP120).
+UVERT, vertical stage power supply voltage. Also applied to the regulator circuit, IP30, and causes the polarisation of the base of TV002 (IV001 power supply).
+U7V, voltage supplying the switched 5 V.

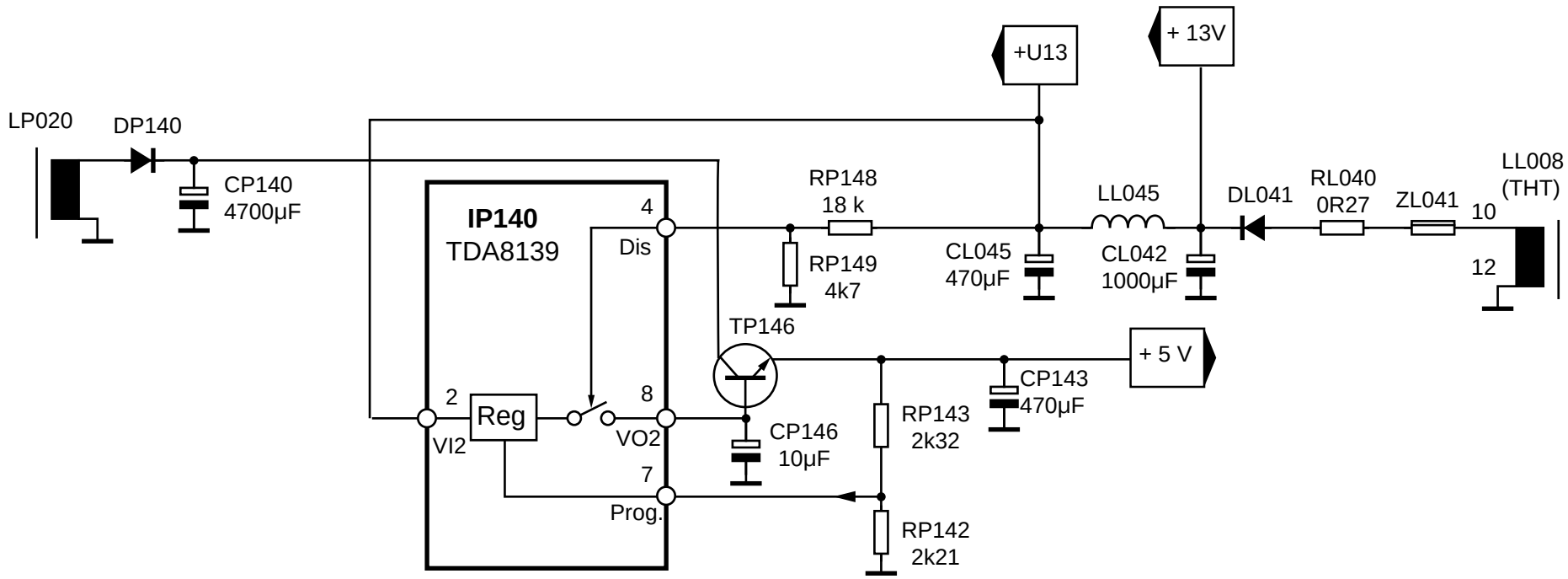
In Standby Mode, the 10VSTBY is produced by Regulator IP130 and Diode DP133. In Steady State, the 13 V from the EHT takes over via Diode DP134.

The switched 5 V is obtained at Pin 8 of IP140 (switched by voltage +U13, Pin 4) on 50-Hz stereo chassis, while a transistor, TP146, handles this regulation task for 50-Hz Dolby and 100-Hz chassis (see illustrations below).

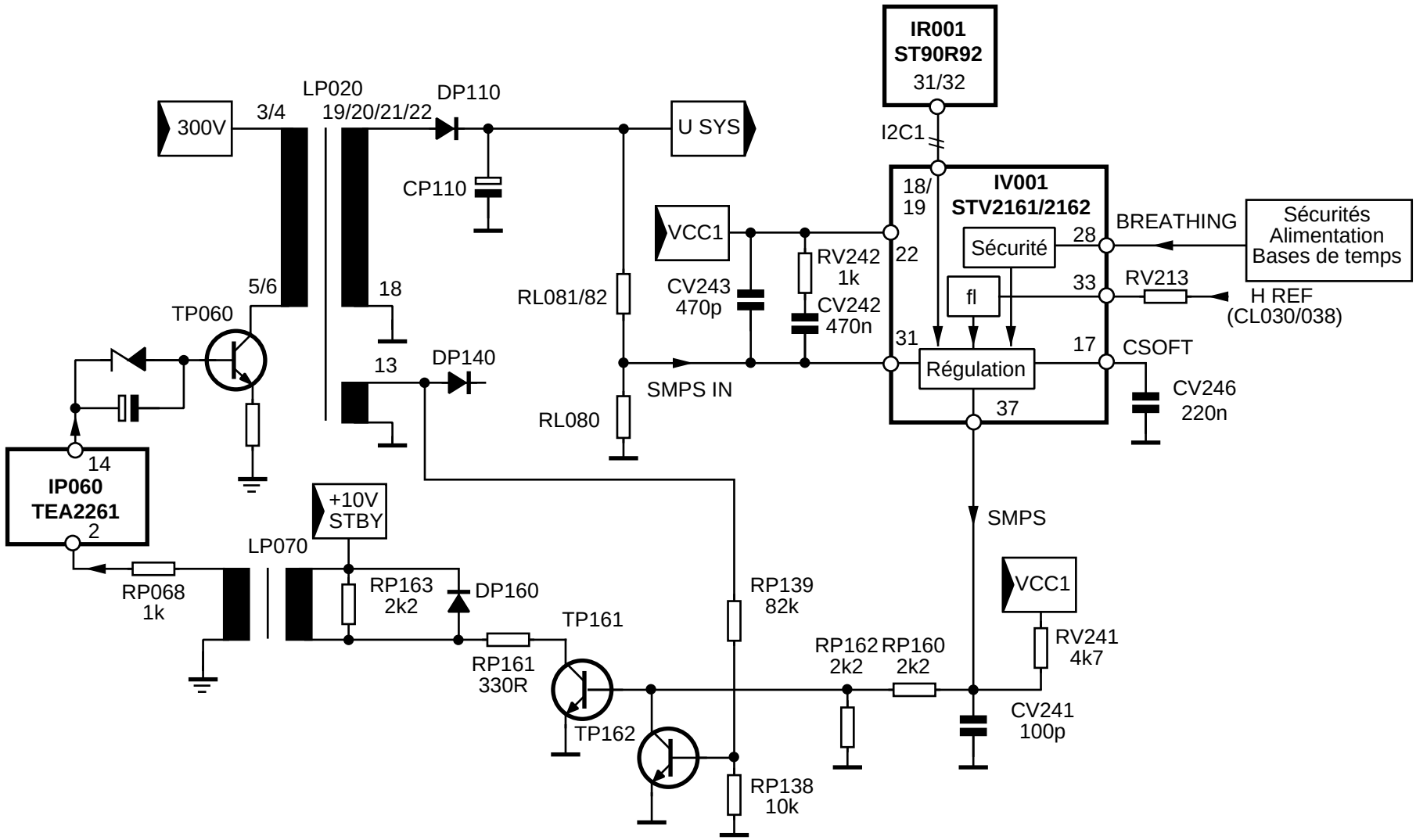
NOTES :



VOLTAGES ELABORATION + 5 VSTBY AND + 5 V (50 Hz Stéréo VERSION)



VOLTAGE ELABORATION + 5 V (50 Hz Dolby / 100 Hz VERSION)


IR001
ST90R92
31/32
I2C1
IV001
STV2161/2162
18/
19
22
28
33
31
17
37
Sécurité
fl
Régulation
BREATHING
Sécurités
Alimentation
Bases de temps
RV213
H REF
(CL030/038)
CSOFT
CV246
220n
300V
3/4
LP020
19/20/21/22
DP110
U SYS
CP110
VCC1
CV243
470p
RV242
1k
CV242
470n
RL081/82
SMPS IN
RL080
5/6
18
13
TP060
DP140
14
IP060
TEA2261
2
+10V
STBY
LP070
SMPS
RP068
1k
RP163
2k2
DP160
TP161
RP161
330R
RP139
82k
RP162
2k2
RP160
2k2
VCC1
RV241
4k7
CV241
100p
TP162
RP138
10k

SECONDARY REGULATION

This mode is adopted as soon as Steady-State Mode begins. It regulates voltage USYS.

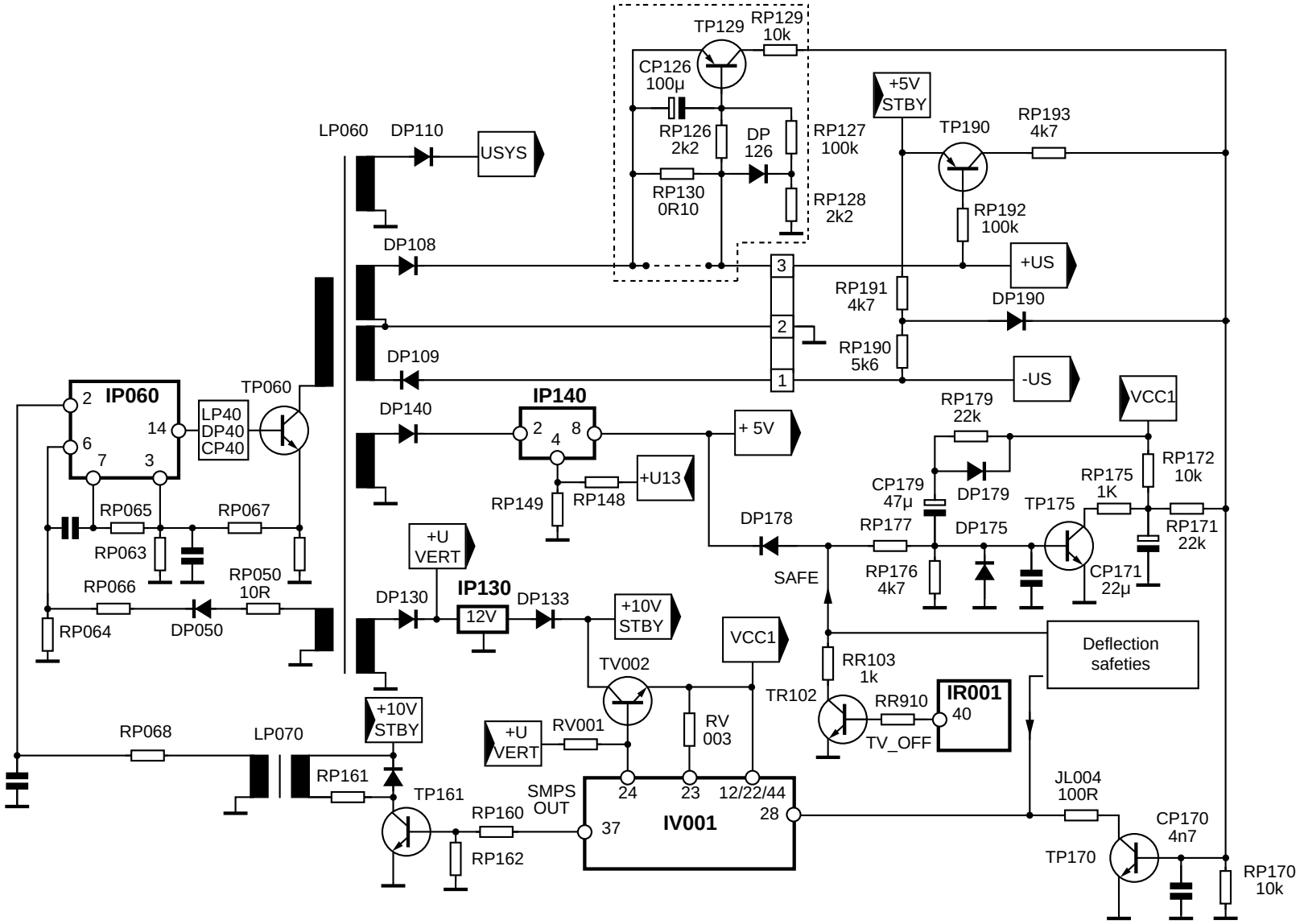
A fraction of USYS, tapped off by divider bridge RL082, RL081, and RL080, is applied to Pin 31 of IV001 (SMPS IN).
This information is compared to an internal reference whose value can be adjusted according to operating mode (USYS adjusted in 64 steps within a 16-V range).
A strobe signal at line frequency with a variable duty cycle is available on Pin 37 (SMPS OUT).
This signal is applied to galvanic isolating transformer LP070 via Transistor TP161.
A soft start circuit is associated with the production of the command strobe signal. (CV246, Pin 17; when power is applied to circuit IV001, it is charged to 5V5 in 900 ms.

The network RV242, CV242, CV243 limits the pass band of the entire regulating loop to 300 Hz.

On 100-Hz chassis, Transistor TP162 controls transformer degaussing.

In the event of irregularities on the secondaries or in the time bases, the interlock circuit forces the BREATHING line to low state (Pin 28 of IV001). The regulating and time base commands are then stopped. If the error persists after two more start-up attempts by IV001, the TV goes into Standby Mode.

NOTES :


TP129
RP129
10k
CP126
100µ
RP126
2k2
DP
126
RP130
0R10
RP127
100k
RP128
2k2
+5V
STBY
TP190
RP193
4k7
RP192
100k
LP060
DP110
USYS
DP108
DP109
+US
RP191
4k7
DP190
RP190
5k6
-US
VCC1
IP060
TP060
LP40
DP40
CP40
RP065
RP067
RP063
RP066
RP050
10R
RP064
DP050
DP140
IP140
+ 5V
+U13
RP149
RP148
RP179
22k
DP179
CP179
47µ
RP175
1K
TP175
RP172
10k
RP171
22k
DP178
RP177
DP175
RP176
4k7
CP171
22µ
SAFE
+U
VERT
IP130
12V
DP130
DP133
+10V
STBY
VCC1
Deflection
safeties
TV002
RR103
1k
TR102
RR910
IR001
40
TV_OFF
RP068
LP070
+10V
STBY
+U
VERT
RV001
RV
003
RP161
TP161
SMPS
OUT
RP160
RP162
IV001
JL004
100R
CP170
4n7
TP170
RP170
10k

POWER SUPPLY INTERLOCKS

Overloads and short circuits are detected by analysing the primary current in the emitter resistor of TP060 (input at Pin 3 of circuit IP060).

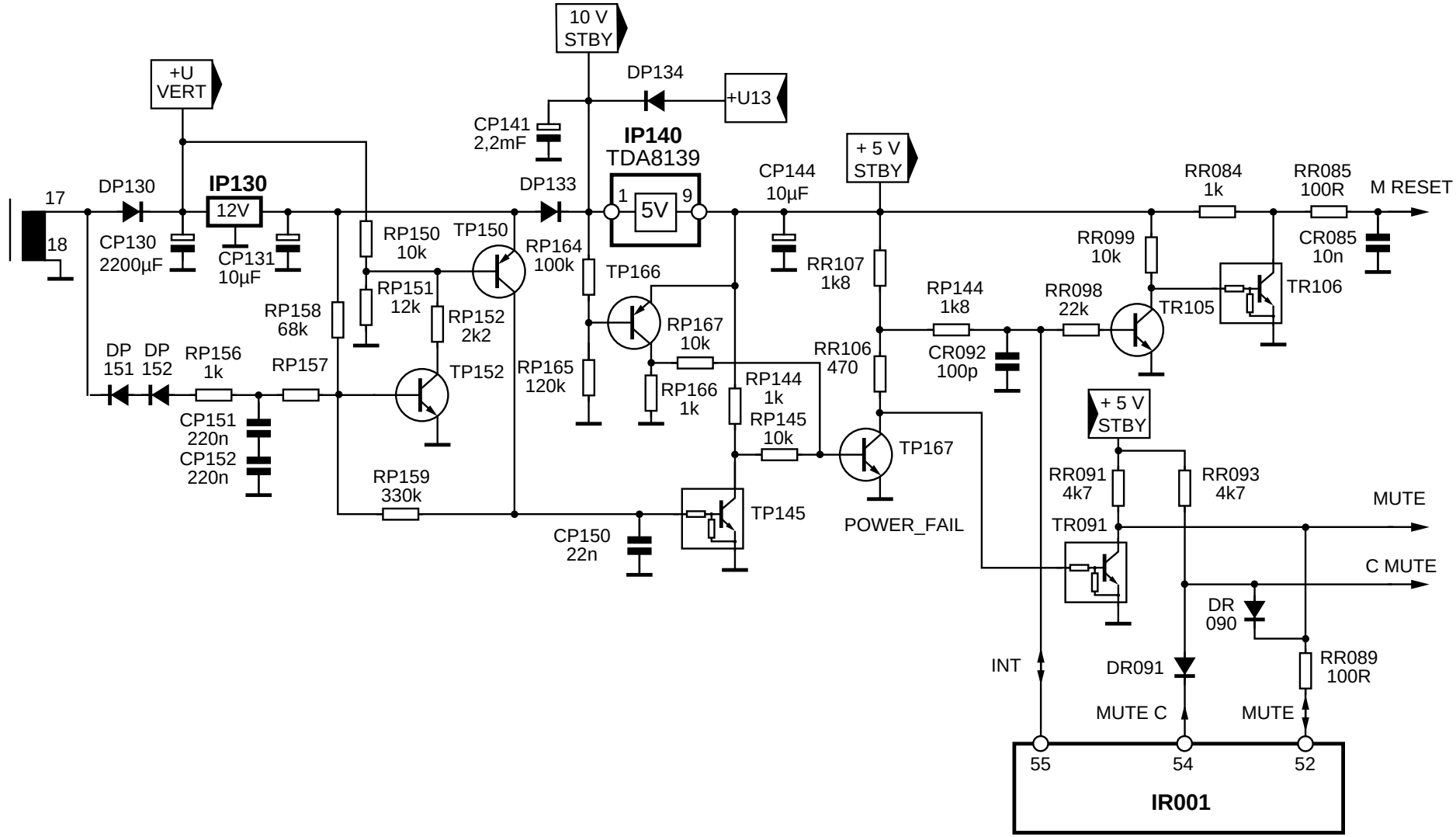
The sensitivity of this stage was increased in Standby Mode to detect errors in the low-voltage secondaries (RP065, TP027, and RP059). For this reason, when an incident occurs in Steady State on a secondary other than U SYS, it is necessary to go to Standby Mode to trigger the interlock.

- An overload or short circuit on voltages +U VERT or +10 V STBY leads to power supply VCC1 of the regulation and sweep circuit (IV001) disappearing.
- An overload or short circuit on +US causes TP190 and TP170 to conduct. This forces the breathing interlock input of the regulation and sweep circuit (IV001) to be triggered by a low level.
- An overload or short circuit on -US causes DP190 and TP170 to conduct, and triggers the IV001 interlock.

In the event that external speakers with too low an impedance value are connected (Dolby versions), or when incidents occur on the +5 V, simply shut off the sweep to remove the overload:

- Excessive current in Resistor RP130 causes TP129 and TP170 to conduct, and triggers the IV001 interlock (audio mute).
- A short circuit on the +5 V blocks TP175 through the action of DP178, and causes TP170 to conduct (see sweep interlocks), causing the IV001 interlock to trigger and the +13 V to disappear.

NOTES :


10 V
STBY
+U
VERT
DP134
+U13
CP141
2,2mF
IP140
TDA8139
1
5V
9
+ 5 V
STBY
CP144
10µF
RR084
1k
RR085
100R
M RESET
17
18
DP130
IP130
12V
CP130
2200µF
CP131
10µF
DP133
RP150
10k
TP150
RP164
100k
TP166
RR107
1k8
RR099
10k
CR085
10n
TR106
RP151
12k
RP152
2k2
RP158
68k
RP167
10k
RP144
1k8
RR098
22k
TR105
DP
151
DP
152
RP156
1k
RP157
TP152
RP165
120k
RP166
1k
RR106
470
CR092
100p
RP144
1k
RP145
10k
TP167
+ 5 V
STBY
RR091
4k7
RR093
4k7
MUTE
CP151
220n
CP152
220n
RP159
330k
TP145
TR091
C MUTE
CP150
22n
POWER_FAIL
DR
090
INT
DR091
RR089
100R
MUTE C
MUTE
55
54
52
IR001

DETECTION OF MAINS POWER FAILURE

In the event of mains power failure, the microcontroller must be informed promptly so that the data in the NVM (IR003) can be saved, and to avoid a plop in the speakers (sound mute).
To do this, POWER FAIL has a rising edge in the event of mains power failure in ON Mode, and a falling edge in the event of mains power failure in Standby Mode.
The signal is received by the management circuit via the INTERRUPTION input at Pin 55. Transistor TR091 produces a low mute level when the phenomenon occurs in ON Mode.

The negative voltage rectified in Forward Mode by Diodes DP151/152 is an image of the mains voltage. It blocks TP152 in ON Mode. TP150 and TP145 are blocked. TP167 is saturated, and the POWER FAIL line has a low level.
When the mains falls below 160 Vac, TP152, TP150, and TP145 conduct, TP167 generates a rising edge on the POWER FAIL line by blocking off.

In Standby Mode, because voltage +UVERT goes from 23-26 V to 14 V, the RP150/151 network saturates TP150, TP145 conducts and blocks TP167, and the POWER FAIL line has a high level.
When mains power breaks down, the decrease in 10VSTBY saturates TP166 and TP167, and the POWER FAIL line has a falling edge.

NOTES :

TIME BASES

CONTENTS

INTRODUCTION

PRODUCTION OF H-DRIVE COMMAND IN STV2161

SPECIFIC FEATURES OF STV2162

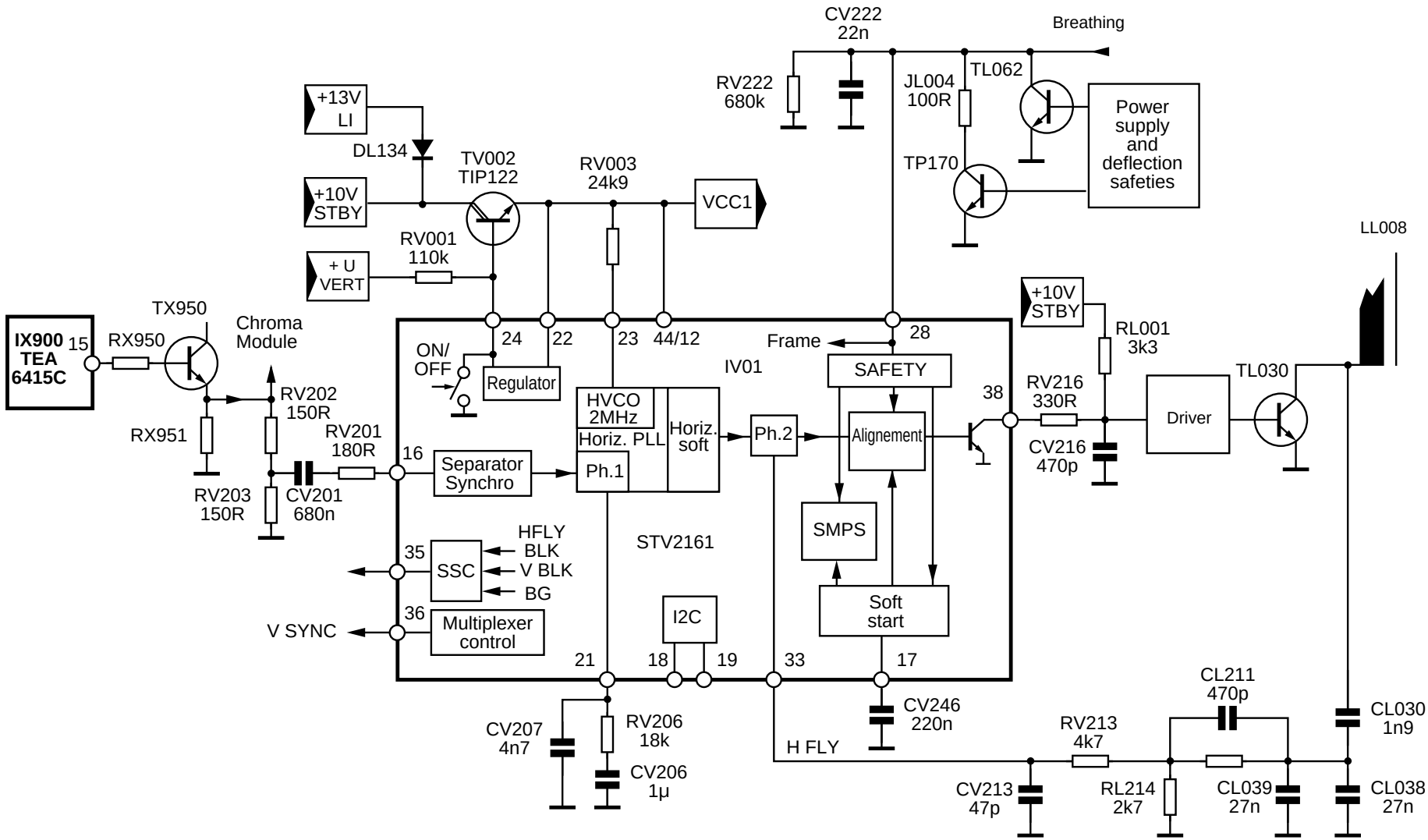
DRIVER STAGE

EHT AND LINE POWER

EW STAGE

FRAME SWEEP

TIME BASE INTERLOCKS


CV222
22n
Breathing
RV222
680k
JL004
100R
TL062
+13V
LI
DL134
TV002
TIP122
RV003
24k9
TP170
Power
supply
and
deflection
safeties
+10V
STBY
VCC1
LL008
RV001
110k
+ U
VERT
TX950
IX900
TEA
6415C
15
RX950
Chroma
Module
24
22
23
44/12
28
Frame
ON/
OFF
Regulator
IV01
SAFETY
+10V
STBY
RL001
3k3
RV216
330R
38
TL030
Driver
RV202
150R
RX951
RV201
180R
16
Separator
Synchro
HVCO
2MHz
Horiz. PLL
Ph.1
Horiz.
soft
Ph.2
Alignement
CV216
470p
RV203
150R
CV201
680n
HFLY
BLK
V BLK
BG
35
SSC
STV2161
SMPS
36
V SYNC
Multiplexer
control
I2C
Soft
start
21
18
19
33
17
CV246
220n
CL211
470p
CL030
1n9
CV207
4n7
RV206
18k
CV206
1µ
H FLY
RV213
4k7
CV213
47p
RL214
2k7
CL039
27n
CL038
27n

58

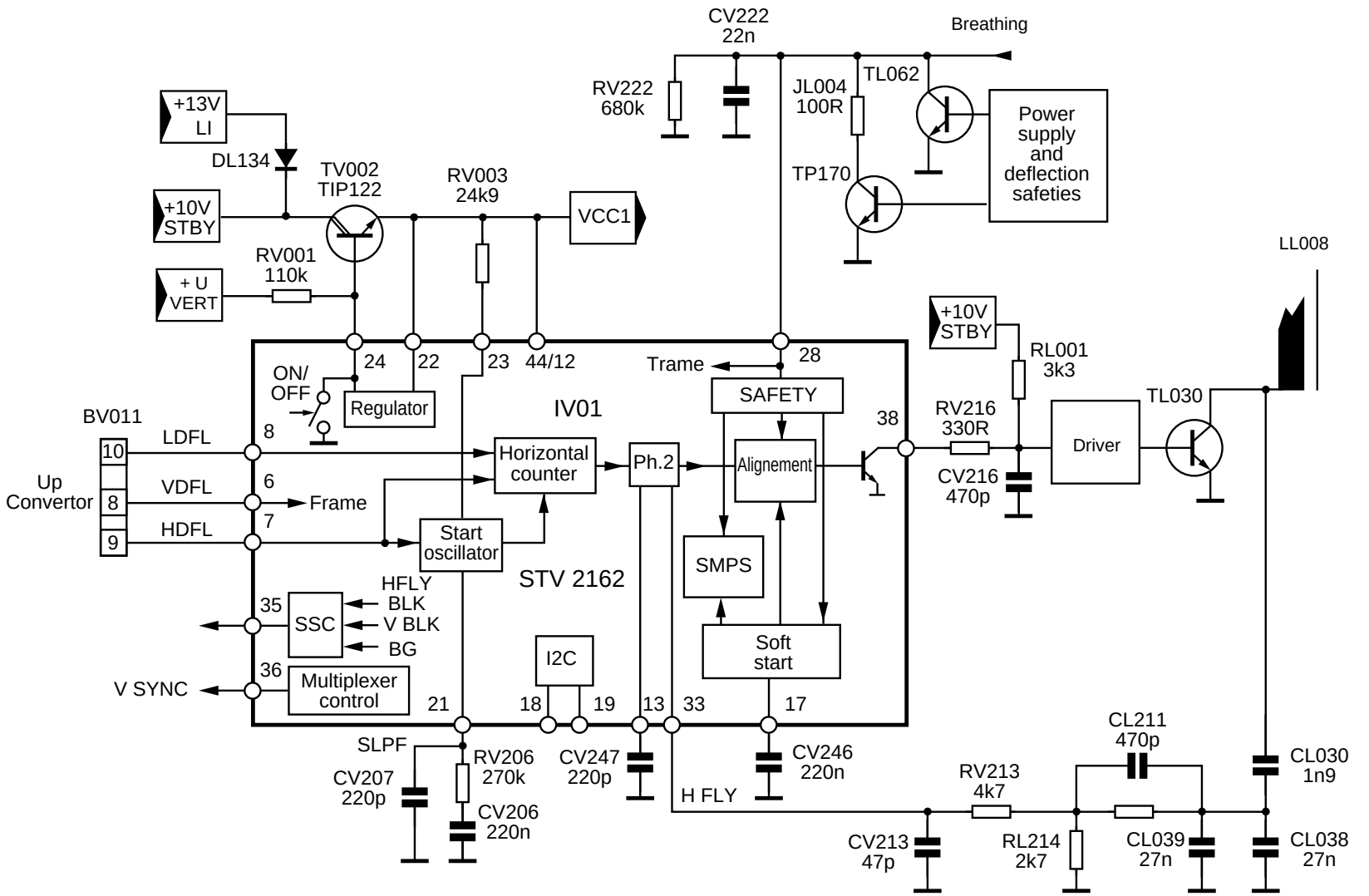
INTRODUCTION

Time base commands are produced by the IV001 video processor:
STV2161 for the 50-Hz chassis.
STV2162 for the 1006Hz chassis.
Apart from the difference in frequency, the difference between these two circuits is in the internal oscillator, which is used constantly in the STV2161, but only for start-up in the STV2162 (an external 27-MHz signal then takes over).
In Standby Mode, only the I2C interface of IV001 is powered. This allows the microcontroller to manage start-up by freeing the transistor regulating control TV002 (Pin 24), which then supplies the main power supply voltage to the VCC1 circuit.

PRODUCTION OF H-DRIVE COMMAND IN STV2161

A VCO (sawtooth signal generator) operates at 2 MHz. It calls on a reference current supplied by Resistor RV003 (Pin 23). Its free frequency can be adjusted in 125-Hz steps in the 15,500-15,750 Hz range according to operating mode.
The video signal is applied to the synchronisation separation stage by Pin 16 (SYNC-IN).
The resulting signal is brought to the first phase detector which generates an error voltage on filter RV206, CV206, CV207 (Pin 21).
A HORIZONTAL-LOGIC stage then divides the frequency from the automatically controlled VCO to apply it to the second phase detector. The second phase detector also receives the HFLY line return (Pin 33). This is where the horizontal phase adjustment takes effect; this also takes place via Operating Mode.
A signal shaping stage increases the H-DRIVE signal on the open-collector output (Pin 38). On start-up, this signal appears with a duration of 5 µs typ. (low level), and then widens to 38 µs as the charging of CV246 progresses (related to the soft start, Pin 17).

NOTES :


CV222
22n
Breathing
RV222
680k
JL004
100R
TL062
Power
supply
and
deflection
safeties
TP170
+13V
LI
DL134
TV002
TIP122
RV003
24k9
+10V
STBY
VCC1
RV001
110k
+ U
VERT
LL008
+10V
STBY
RL001
3k3
ON/
OFF
24
22
23
44/12
Trame
28
Regulator
IV01
SAFETY
TL030
BV011
LDFL
8
38
RV216
330R
Horizontal
counter
Ph.2
Alignement
Driver
Up
Convertor
10
VDFL
6
CV216
470p
8
Frame
HDFL
7
9
Start
oscillator
SMPS
STV 2162
HFLY
35
SSC
BLK
V BLK
BG
I2C
Soft
start
36
V SYNC
Multiplexer
control
21
18
19
13
33
17
SLPF
RV206
270k
CV247
220p
CV246
220n
CL211
470p
CL030
1n9
CV207
220p
CV206
220n
H FLY
RV213
4k7
CV213
47p
RL214
2k7
CL039
27n
CL038
27n

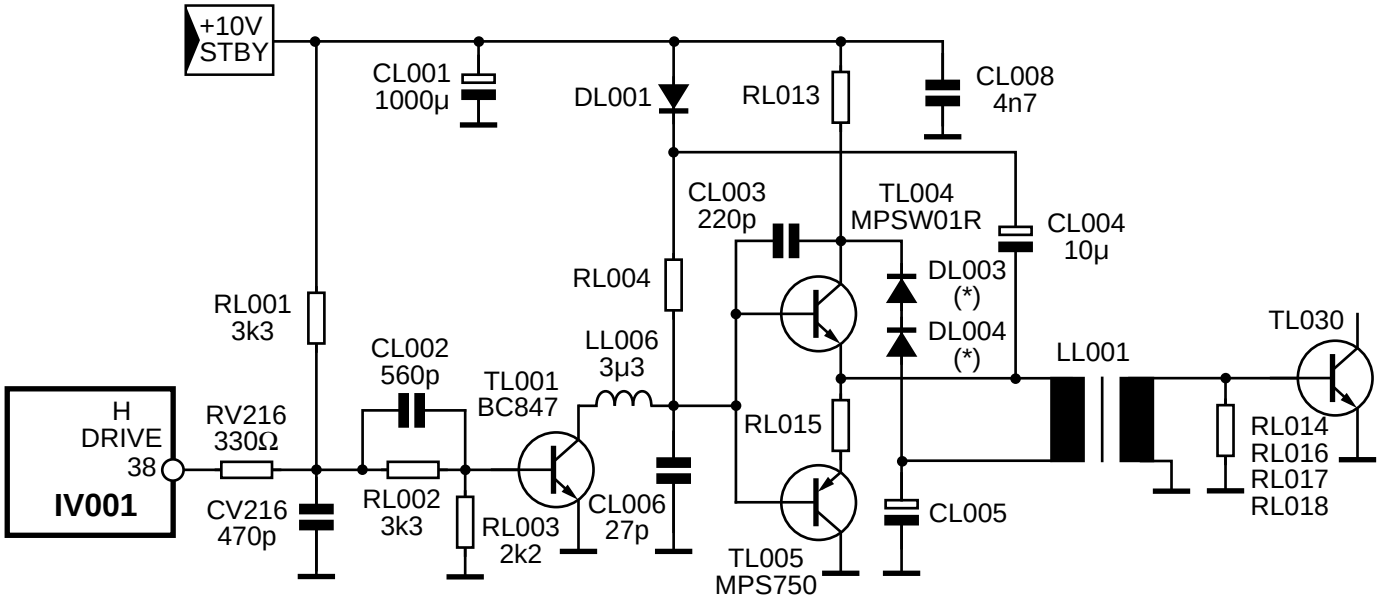
SPECIFIC FEATURES OF STV2162

For the STV2162, the separation of synchronisation pulses has already been performed by circuit TDA9143 of the video module (50/100 Hz). This module supplies line and frame synchronisation signals, after conversion, with a clock:
VDFL Pin 6 of IV001, 64-µs square signal for a period of 10 ms.
HDFL Pin 7 of IV001, positive 2.2-µs pulse for a period of 32 µs.
LDFL Pin 8 of IV001, 27-MHz clock with amplitude 2Vpp.

The STV2162 incorporates an oscillator whose frequency depends on a reference current (RV003, Pin 23) and regulation handled by Operating Mode (free frequency).
This oscillator starts up the line time base, and is then synchronised by the HDFL pulses.
After division, a counter then supplies a frequency of 31250 Hz, which is applied to the second phase detector. This operates in exactly the same way as in the STV2161.

The HDRIVE command is available on Pin 38. This gives a 2.9-µs active low level on start-up (soft start via CV246), and then 19 µs at steady state.

NOTES :



(*) only for chassis 50Hz

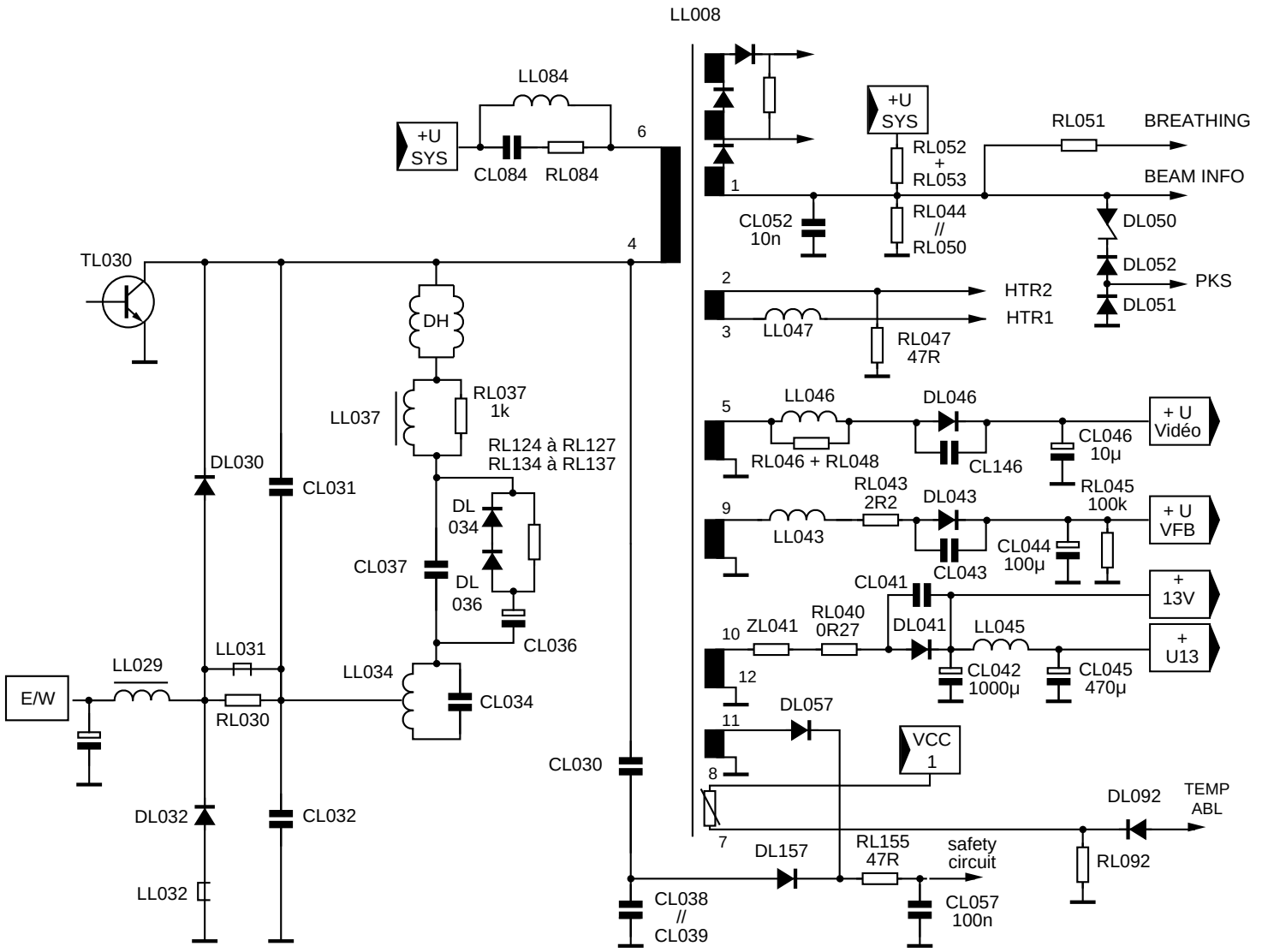
DRIVER STAGE

At the IV001 circuit output, the H DRIVE command goes through a low-pass filter that reduces interference caused by steep edges (RV216/CV216).

The line transistor command is issued via a driver transformer operating in Forward Mode. A positive or negative current constantly passes through its primary.
To do this, the base of the LL001 primary relies on a positive voltage of about 8 V (Capacitor CL005 charging) related to the duty cycle of the H DRIVE command.
Driver Transistor TL001 is switched by this signal, and controls push-pull TL004/TL005.

The differences between the 100-Hz chassis and the 50-Hz chassis are the value of Resistor RL013 (10R for the 50-Hz version, and 4R7 for the 100-Hz version), and the driver transformer, which has a lower leakage inductance for the 100-Hz model (basic reverse current of TL030 goes to -4 A (-2 A for the 50-Hz model)).
In the event of a collector/emitter short circuit in TL004, Diodes DL003 and DL004 can be used to short-circuit the driver transformer primary also, which triggers the BREATHING input by sweep stop. From then on, TL005 constantly conducts, and causes the rapid destruction of RL013.

NOTES :

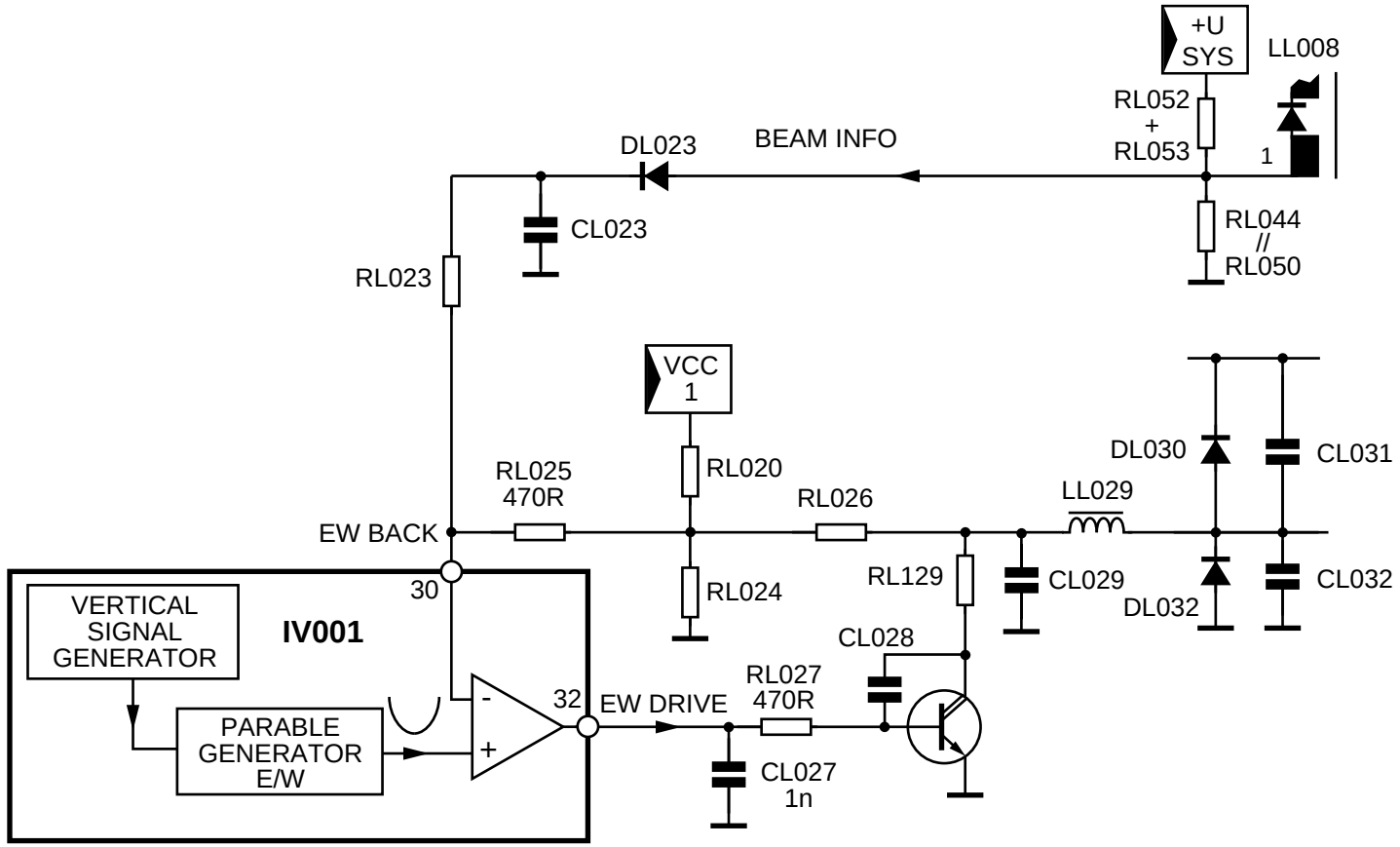

LL008
LL084
+U SYS
CL084
RL084
6
4
1
TL030
DH
LL037
RL037 1k
RL124 à RL127
RL134 à RL137
DL030
CL031
DL 034
CL037
DL 036
CL036
LL031
LL029
E/W
RL030
LL034
CL034
DL032
CL032
LL032
CL030
CL038 // CL039
+U SYS
RL051
BREATHING
RL052 + RL053
BEAM INFO
CL052 10n
RL044 // RL050
DL050
DL052
PKS
DL051
2
3
LL047
RL047 47R
HTR2
HTR1
5
LL046
DL046
RL046 + RL048
CL146
CL046 10µ
+ U Vidéo
RL045 100k
9
LL043
RL043 2R2
DL043
CL043
CL044 100µ
+ U VFB
CL041
+ 13V
10
ZL041
RL040 0R27
DL041
LL045
12
CL042 1000µ
CL045 470µ
+ U13
DL057
11
VCC 1
8
7
DL092
TEMP ABL
RL092
DL157
RL155 47R
safety circuit
CL057 100n

EHT AND LINE POWER

The primary of LL008, which is powered by voltage +USYS, is associated with line power transistor TL030 and diode modulator DL030, DL032, CL031, CL032.
These switching elements also channel the current from the horizontal deflector connected in series with the capacitor of S, CL037, and linearity self-induction coil LL037.
A damper circuit connected in parallel with the capacitor of S suppresses the oscillations that are generated whenever the beam current varies at high speed.
For flat-screen tubes, resonating circuit LL034, CL034, which is tuned to double the line frequency, provides dynamic correction of S.

The following are picked up on the secondaries of LL008:
- Pins 2 and 3: a 27-Vpp pulse to heat up the filament, for 50-Hz tubes, or a 45-Vpp pulse for 100-Hz tubes.
- Pin 5: 500-Vpp negative trigger pulse which supplies a voltage +U VIDEO (200 V) after rectification in Forward Mode (DL046).
- Pin 9: 400-Vpp negative trigger pulse which supplies a voltage +UVFB (52 V) after rectification in Forward Mode (DL043).
- Pin 10: 120-Vpp negative trigger pulse which supplies 13 V after rectification in Forward Mode (DL041).
- Pin 11: 35-Vpp positive trigger pulse which supplies an EHT control voltage of 29 V after rectification in Flyback Mode (50-Hz chassis only). For 100-Hz chassis, this signal is obtained from capacitance bridge CL030, CL038, CL039 via DL157.
- Pin 1: The image of the instantaneous beam current, BEAM INFO and BREATHING (12 V for If = 0).

NOTES :


+U
SYS
LL008
RL052
+
RL053
1
DL023
BEAM INFO
CL023
RL044
//
RL050
RL023
VCC
1
RL025
470R
RL020
RL026
LL029
DL030
CL031
EW BACK
30
RL024
RL129
CL029
DL032
CL032
VERTICAL
SIGNAL
GENERATOR
IV001
CL028
RL027
470R
32
EW DRIVE
PARABLE
GENERATOR
E/W
-
+
CL027
1n

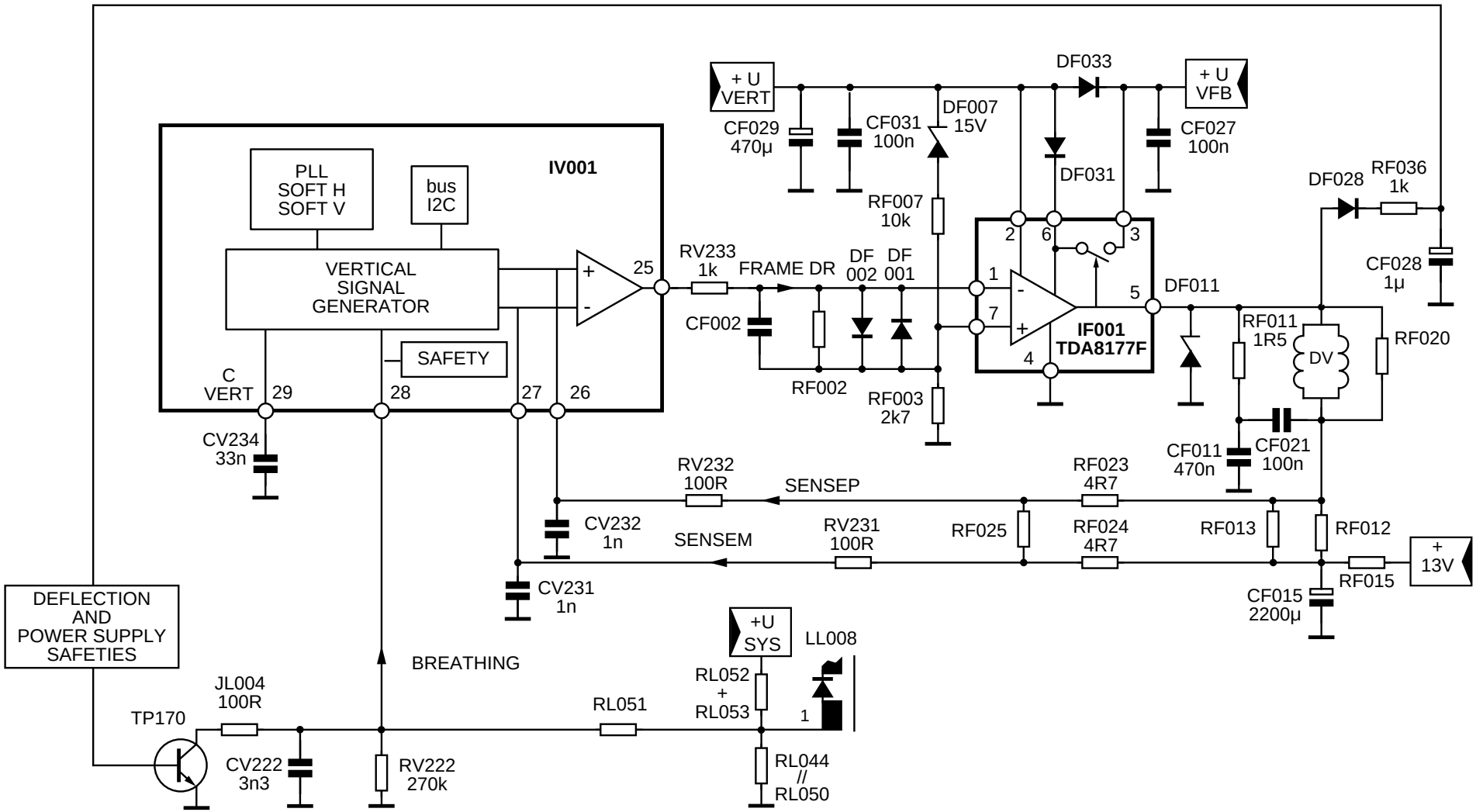
EW STAGE

Circuit IV001 incorporates the E/W parabolic signal generator which is synchronised by the vertical ramp generator.
Adjustments are therefore made via Operating Mode, and are routed via Bus I2C.

An amplifier also incorporated in IV001 delivers an EW DRIVE command in the form of a current on Pin 32. This is applied to the Darlington transistor. It takes energy from the modulator via self-induction coil LL029.

The general negative feedback and the operating point are supplied by network RL026, RL025, RL020, RL024, and VCC1. They correspond to the EW BACK signal on Pin 30. On the 50-Hz chassis, there is also a dynamic pulse width correction, performed by network DL023, CL023 and the BEAM INFO signal.

NOTES :


IV001
PLL
SOFT H
SOFT V
bus
I2C
VERTICAL
SIGNAL
GENERATOR
SAFETY
C
VERT
29
28
27
26
25
+ U
VERT
CF029
470µ
CF031
100n
DF007
15V
DF033
+ U
VFB
CF027
100n
DF031
DF028
RF036
1k
CF028
1µ
RF007
10k
RV233
1k
FRAME DR
DF
002
DF
001
CF002
RF002
RF003
2k7
IF001
TDA8177F
DF011
RF011
1R5
DV
RF020
CF011
470n
CF021
100n
RV232
100R
SENSEP
RF023
4R7
CV232
1n
SENSEM
RV231
100R
RF025
RF024
4R7
RF013
RF012
+
13V
RF015
CF015
2200µ
CV231
1n
DEFLECTION
AND
POWER SUPPLY
SAFETIES
+U
SYS
LL008
BREATHING
JL004
100R
TP170
RL051
RL052
+
RL053
RL044
//
RL050
CV222
3n3
RV222
270k

FRAME SWEEP

Two circuits are involved in the frame sweep.
IV001 (STV2161 or STV2162) produces a frame sawtooth signal.
IF001 (TDA8177F) amplifies this signal, and delivers the current to the frame deflector.

Video scanning processor IV001 includes a vertical ramp generator that uses Capacitor CV234 (Pin 29).
The amplitude of this ramp is adjusted according to the BREATHING signal applied to Pin 28 (dynamic height correction):

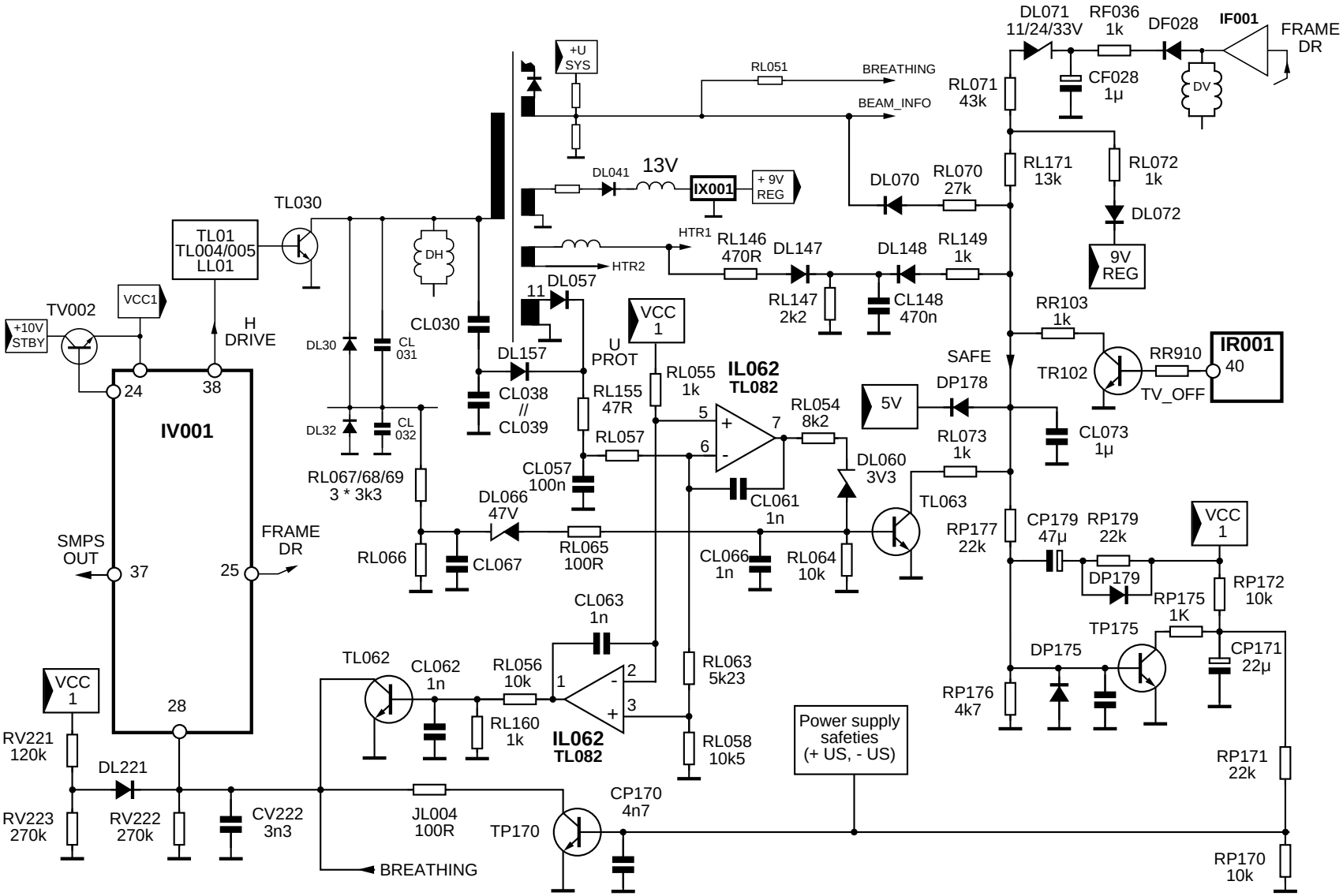
V Pin 28 = 8 V (VCC1) no correction
V Pin 28 = 1V5 maximum correction (5%)

This input is multiplexed with the interlock circuit so that, for a voltage below 1 V, the sweep and power supply commands disappear (TP 170 saturated).
Linearity and amplitude correction are also provided by IV001. They can be adjusted via Bus I2C in Operating Mode.
An integrated op-amp delivers the FRAME DR signal on Pin 25. It receives the ac negative feedback (SENSEP, Pin 26) and dc negative feedback (SENSEM, Pin 27) signals. Its operating point is set by an internal dc framing voltage which is adjustable in Operating Mode.

Circuit TDA8177F receives the previous command on its Pin 1. It is polarised by bridge RF007/RF003 and Zener DF007.
Voltages +UVERT (Pins 2 and 6) and +UVFB (Pin 3) power this circuit.
The output at Pin 5 supplies current to the deflector. Resistors RF012, RF013, and RF023 through RF025 develop an image of the current at their terminals for the negative feedback (SENSEP).

This stage is monitored by the interlock circuit. To do this, the signal picked up from the deflector is rectified by the cell DF028, RF036, and CF028. A fall in the voltage obtained triggers conduction of TP170 and produces a level below 1 V on the BREATHING pin of IV001 (Pin 28). The result of this is to stop sweeps and secondary regulation (see section on interlocks).

NOTES :



THOMSON MULTI MEDIA

CENTRE DE FORMATION TECHNIQUE

70

TIME BASE INTERLOCKS

The interlock circuit detects short circuits in the line voltages or sweeps, disconnection of the deflectors, or racing of the beam current or EHT voltage.

The frame deflector signal supplies a voltage that polarises Zener Diode DL071 and saturates Transistor TP175 via the SAFE line. Transistor TP170 is therefore blocked.
The following irregularities force a low level on the SAFE line, thus freeing the charge from CP171 and saturating TP170.

- **Frame** error by DL071,
- Error on **9 volts REG** (from +U13) by DL072 or **5 volts** (from the power supply, IP140) by DP178,
- **Filament** error on 100-Hz tubes by DL147/148,
- Racing of **beam current** by DL070 (I > 3 mA),
- Increased line return value on **diode modulator** by Zener Diode DL066 and TL063,
- **Line deflector disconnection**. This is detected through a decrease in voltage UPROT (11 on LL008, DL157 (50-Hz chassis), CL030/38/39, DL157 (100-Hz chassis)) and a high level at 7 on IL062 (saturation of TL063).

Using TR102, the microcontroller can force the interlock via the SAFE line. Two time constants delay the action of TP170 (CP179/RP179 and CP171/RP172).

The **EHT voltage** image is also controlled by the UPROT signal. In the event of an increase in EHT voltage (35 to 40 V according to chassis), Output 1 of IL062 goes to high state and saturates Transistor TL062.

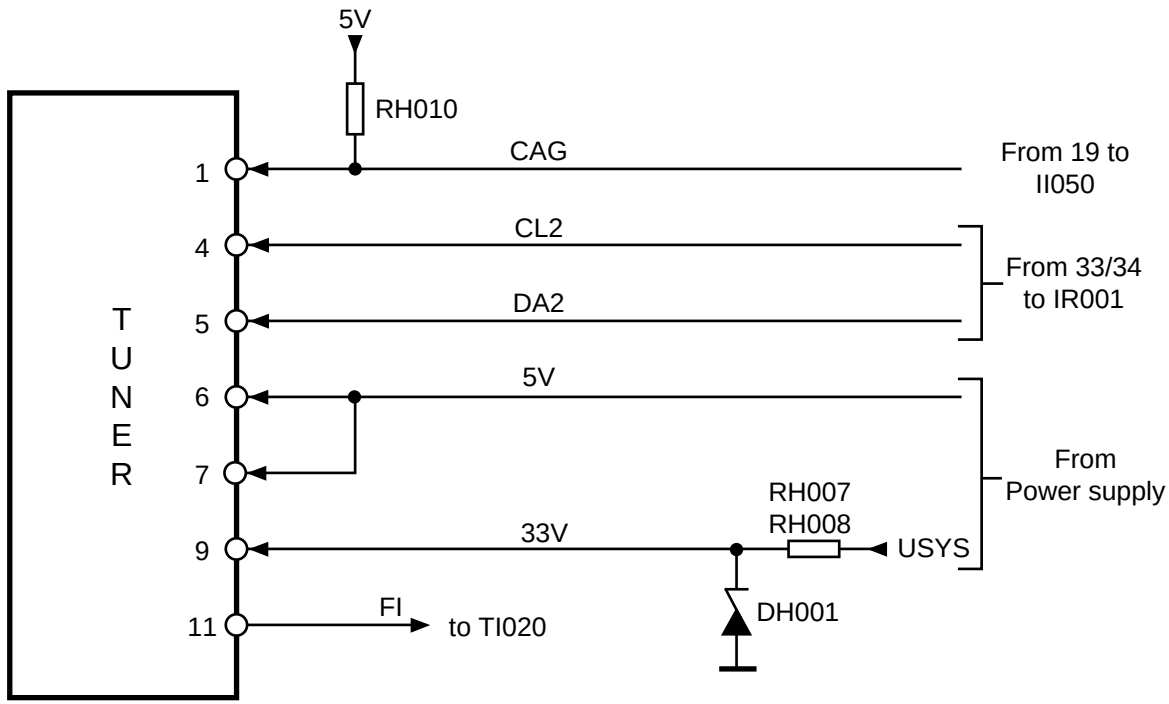
With the BREATHING input forced to the low level, IV001 shuts off its power supply and blocks the secondary regulation and sweep commands.
If the error persists after two re-start attempts (three interlock triggerings), the television reconfigures itself in Standby Mode and displays an error code.

NOTES :

HIGH FREQUENCY
INTERMEDIATE FREQUENCY

CONTENTS

- CTT5000T TUNER
- INTERMEDIATE FREQUENCY



THOMSON MULTI MEDIA

CENTRE DE FORMATION TECHNIQUE

CTT5000T TUNER

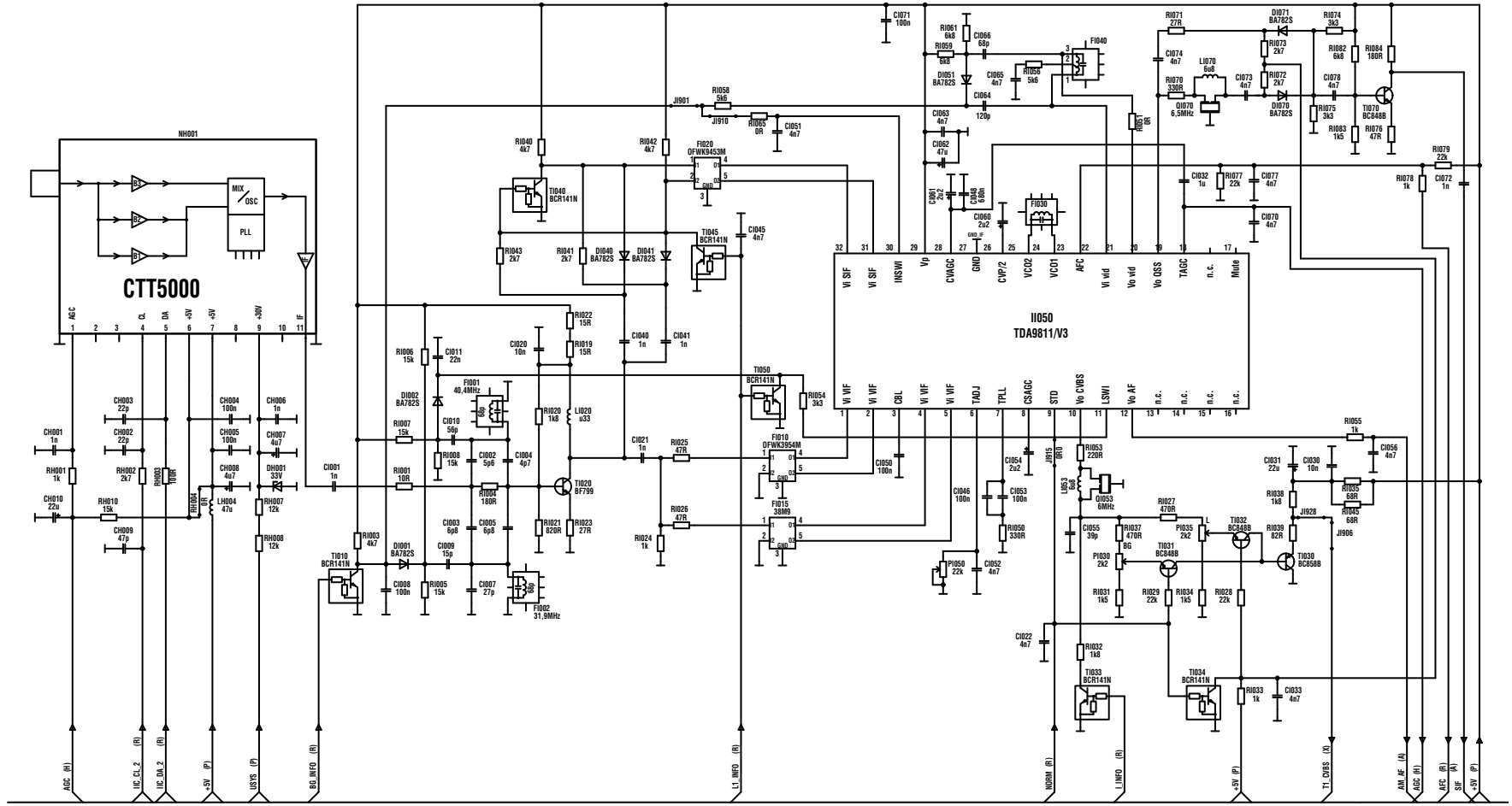
The CTT5000T tuner is equipped with a frequency synthesiser. It covers the following frequency bands:

- Band 1: 48.25 MHz to 112.25 MHz
- Band 3: 119.25 MHz to 399.25 MHz
- Bands 4 and 5: 407.25 MHz to 863.25 MHz

The following table gives information about the pins of this tuner.

PIN	COMMENT
1	HF AGC input
4	CL2 IIC2 BUS
5	DA2
6/7	5 V
9	33 V
11	IF output

NOTES :


CTT5000
NH001
MIX
OSC
PLL
AGC
CL
DA
+5V
+5V
+30V
IF
II050
TDA9811/V3
Vi SIF
Vi SIF
INSWI
Vp
CVAGC
GND
CVP/2
VCO2
VCO1
AFC
Vi vid
Vo vid
Vo OSS
TAGC
n.c.
Mute
Vi VIF
Vi VIF
CBL
Vi VIF
Vi VIF
TADJ
TPLL
CSAGC
STD
Vo CVBS
LSWI
Vo AF
n.c.
n.c.
n.c.
n.c.
AGC (R)
I²C CL 2 (R)
I²C DA 2 (R)
+5V (P)
USYS (P)
BG INFO (R)
L1 INFO (R)
NORM (R)
I INFO (R)
+5V (P)
T1 CVBS (X)
AM AF (A)
AGC (R)
AFC (R)
SIF (A)
+5V (P)

INTERMEDIATE FREQUENCY

Created using three surface wave filters and an integrated circuit:

- FI010, two-sided Nyquist filter for picture selectivity in L' Band 3, L, D, K, and I (38.9 MHz) and L' Band 1 (33.9 MHz).
- FI015, for picture selectivity in B and G.
- FI020, switchable filter, for sound selectivity in L' Band 3, L, D, K, I, B, and G (32.4 MHz), and L' Band 1 (40.4 MHz).
- II050, TDA9811.

After leaving the tuner, the IF signal passes through two traps (40.4 MHz, out of operation in Band 1 L', and 31.9 MHz, in operation in B/G), is amplified by TI020, and informs Circuit II050 via the selectivities. The picture IF is injected at 1/2 and at 3/4 of II050. The sound IF is injected at 31/32 of II050. Transistors TI040 and TI045 and Diodes DI040 and DI041 select the audio selectivity (DI040 passes in Band 1 L').

Integrated Circuit II050 performs the following functions:
- Picture IF amplification and demodulation (FI030 is used),
- FM sound and NICAM amplification,
- IF and HF AGC.

The demodulated video signal is available on Output 21 of II050. It passes through the FM audio intercarrier trap (FI040, 5.5 and 6.5 MHz) and is reinjected at 22 on II050. After amplification, this video signal is output at 10 of II050. It passes through the FM audio intercarrier trap (QI053, 6 MHz), and is sent to the switching stage via PI035, TI032, TI030, or PI030, TI031, TI030.

PI035 adjusts the video level for L, L'.
PI030 adjusts the video level for B, G, D, K, and I.
TI033 and RI032 attenuate the video level for I.

The demodulated audio signal (from AM) is available on Output 12 of II050.

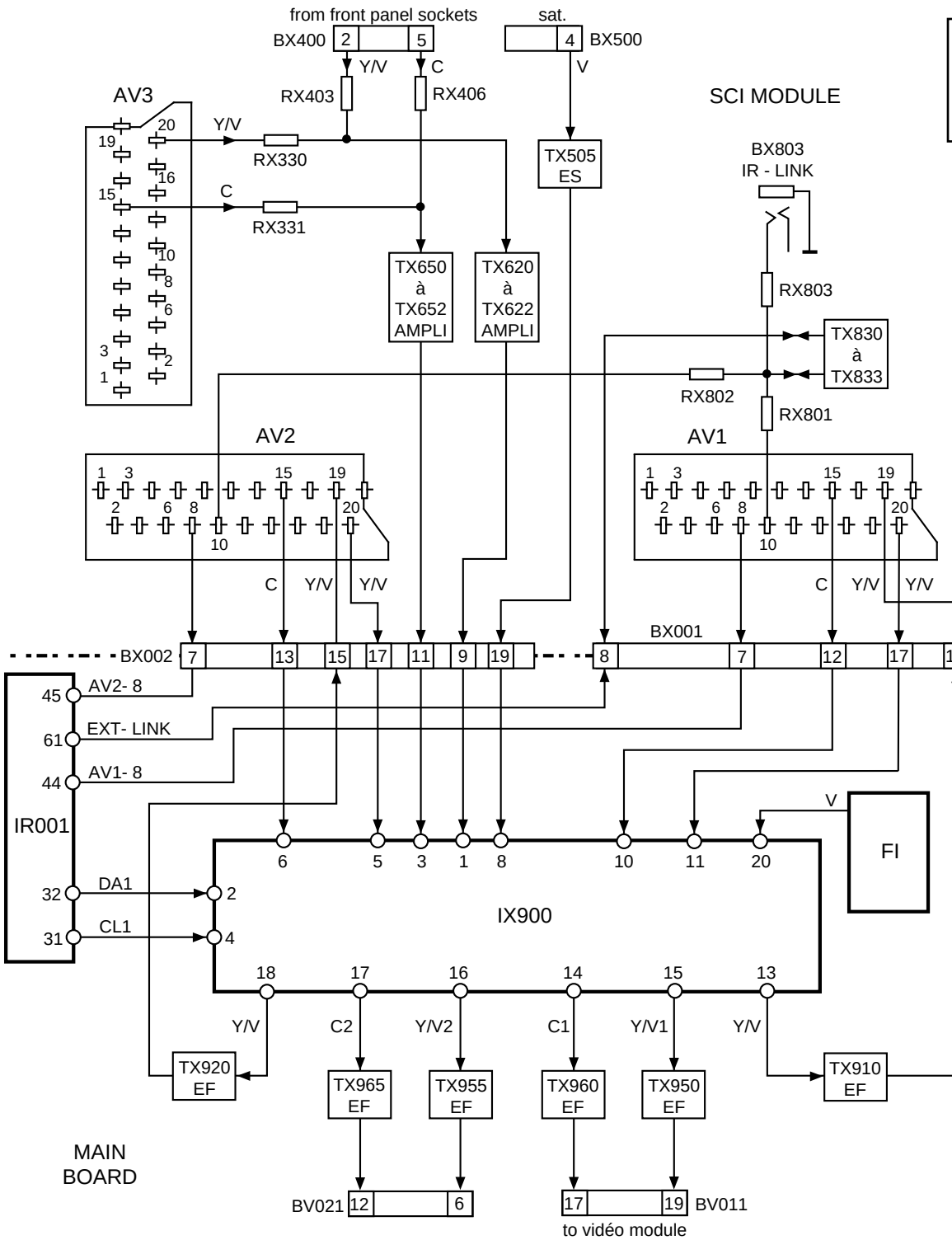
The NICAM and FM audio intercarriers are available on Output 20 of II050. They are amplified by TI070 via Switching Diodes DI070 (NICAM 5.85 MHz) and DI071 (FM), and are sent to the demodulation stage (MSP3410).

The HF AGC voltage is available on Output 19 of II050. PI050 adjusts it.

SWITCHING

CONTENTS

- VIDEO SWITCHING
- AUDIO SWITCHING
- RGB SWITCHING


from front panel sockets
BX400
2
5
Y/V
C
RX403
RX406
sat.
4
BX500
V
AV3
SCI MODULE
Y/V
RX330
TX505
ES
BX803
IR - LINK
C
RX331
TX650
à
TX652
AMPLI
TX620
à
TX622
AMPLI
RX803
TX830
à
TX833
RX802
RX801
AV2
AV1
C
Y/V
Y/V
BX001
BX002
7
13
15
17
11
9
19
8
7
12
17
15
45
AV2- 8
61
EXT- LINK
44
AV1- 8
IR001
V
FI
6
5
3
1
8
10
11
20
32
DA1
31
CL1
IX900
18
17
16
14
15
13
Y/V
C2
Y/V2
C1
Y/V1
Y/V
TX920
EF
TX965
EF
TX955
EF
TX960
EF
TX950
EF
TX910
EF
MAIN
BOARD
BV021
12
6
17
19
BV011
to vidéo module

VIDEO SWITCHING

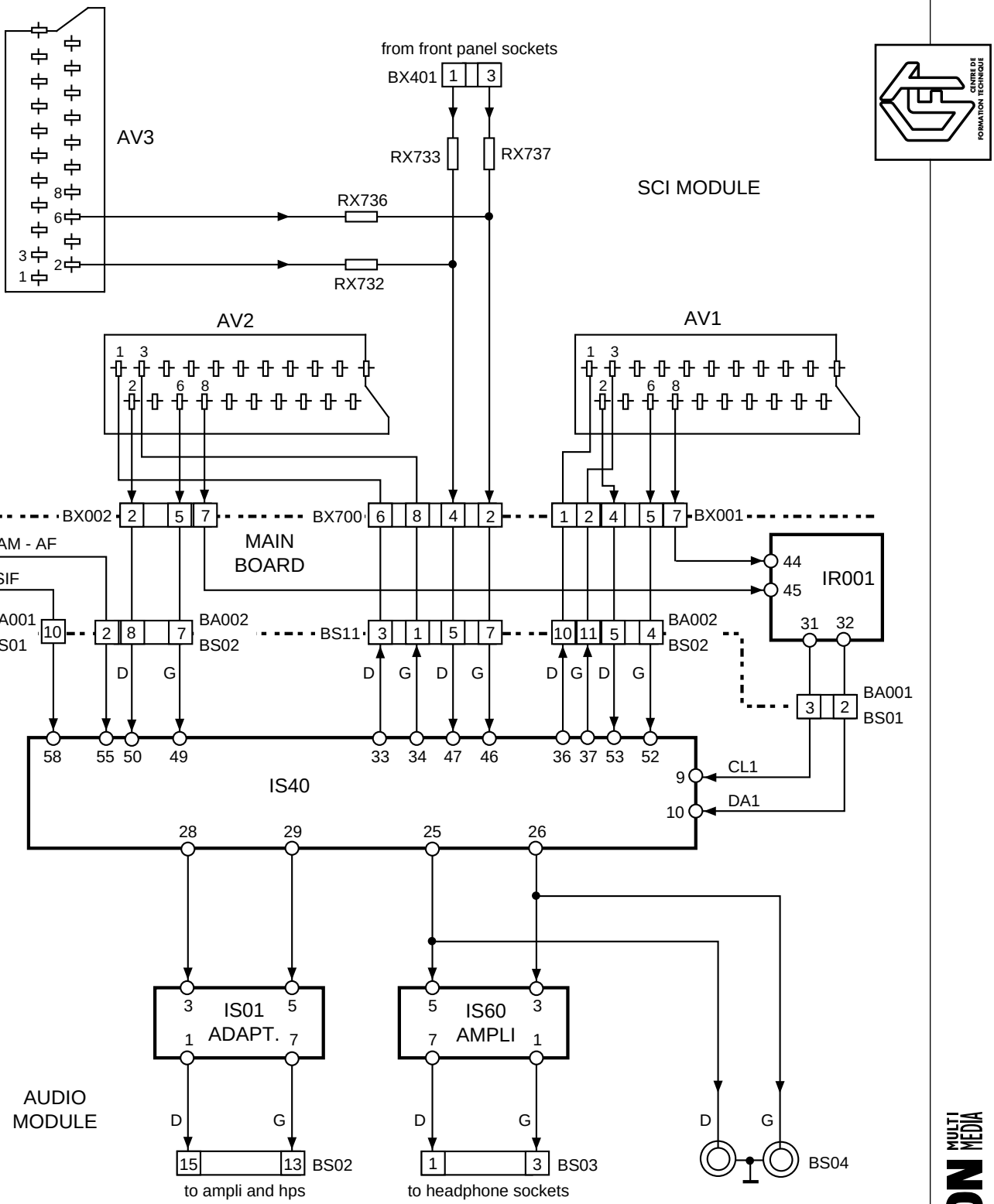
Integrated Circuit IX900 performs the switching of eight input sources (VIDEO or Y/C) to six outputs. Microcontroller IR001 controls this switching via Bus IIC1.

The values of the voltages from Pins 8 of the SCART connectors, arriving at Pins 44 and 45 of Microcontroller IR001, indicate whether the source is 4/3 or 16/9:

- 1.7 V < V < 3 V = 16/9 source
- 3.6 V < V < 5 V = 4/3 source

The table opposite summarises the video switching.

FUNCTION	INPUT	OUTPUT
TV	20 of IX900	13 of IX900 15 of IX900 16 of IX900 18 of IX900
AV1	11 of IX900 20 of IX900	15 of IX900 16 of IX900 18 of IX900 13 of IX900
AV2	5 of IX900	13 of IX900 15 of IX900 16 of IX900
AV3	1 of IX900 20 of IX900	15 of IX900 16 of IX900 13 of IX900 18 of IX900


from front panel sockets
BX401
AV3
RX733
RX737
SCI MODULE
RX736
RX732
AV2
AV1
BX002
BX700
BX001
MAIN
BOARD
AM - AF
SIF
IR001
BA001
BS01
BA002
BS02
BS11
IS40
CL1
DA1
IS01
ADAPT.
IS60
AMPLI
AUDIO
MODULE
BS03
BS04
to ampli and hps
to headphone sockets

AUDIO SWITCHING

This switching takes place in the audio processor, IS40 (MSP3410).
This audio processor is controlled by Microprocessor IR001 via Bus IIC1.

The following table summarises the audio switching:

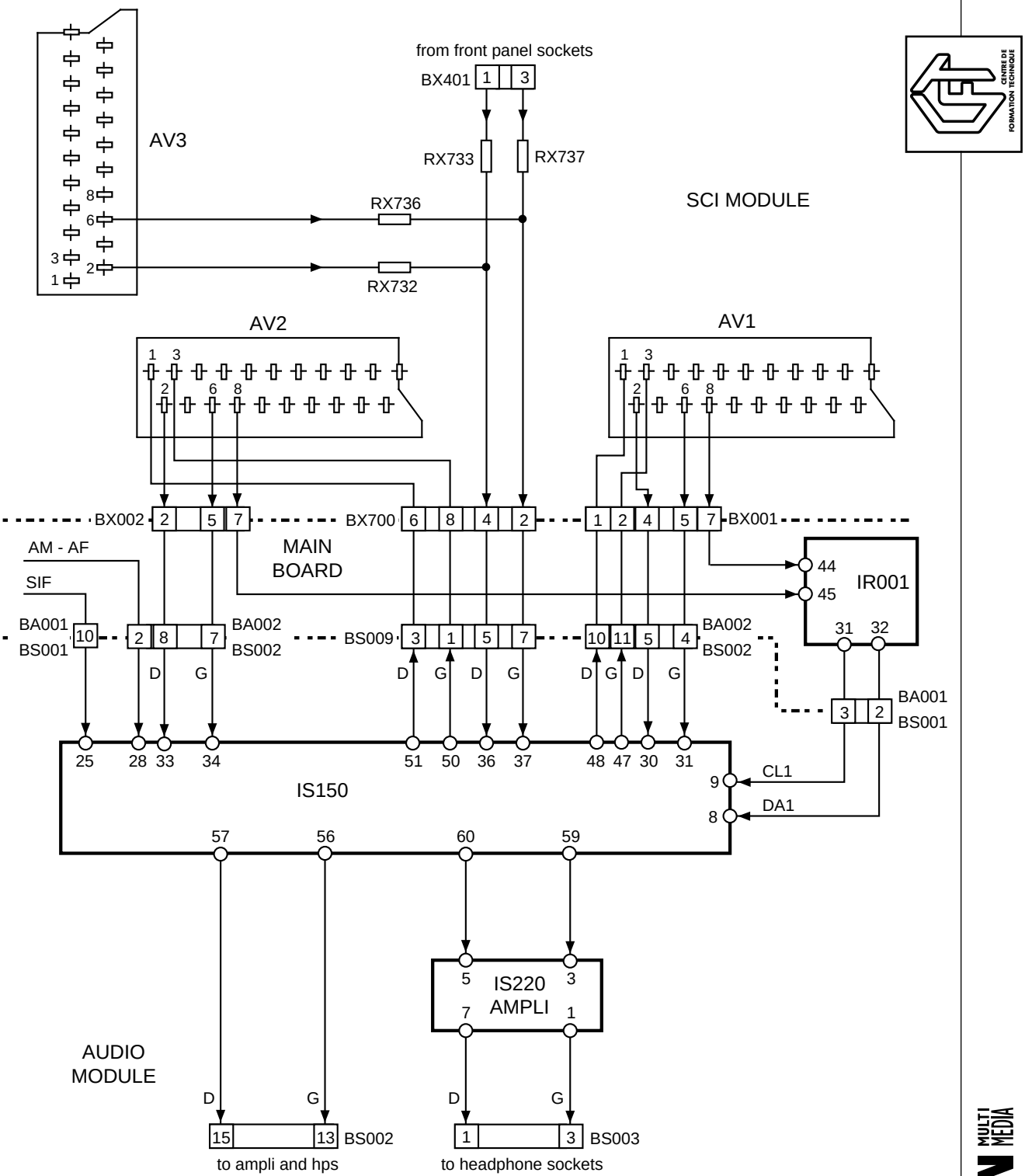
FUNCTION	INPUT	OUTPUT
TV	55 of IS40 or 55 / 58 of IS40 or 58 of IS40	25 / 26 of IS40 28 / 29 of IS40 33 / 34 of IS40 36 / 37 of IS40
AV1	52 / 53 of IS40 55 / 58 of IS40	25 / 26 of IS40 28 / 29 of IS40 33 / 34 of IS40 36 / 37 of IS40
AV2	49 / 50 of IS40	25 / 26 of IS40 28 / 29 of IS40 36 / 37 of IS40
AV3	46 / 47 of IS40 55 / 58 of IS40	25 / 26 of IS40 28 / 29 of IS40 36 / 37 of IS40 33 / 34 of IS40

NOTES :

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from front panel sockets
BX401
AV3
RX733
RX737
RX736
RX732
SCI MODULE
AV2
AV1
BX002
BX700
BX001
MAIN
BOARD
AM - AF
SIF
IR001
BA001
BS001
BA002
BS002
BS009
IS150
CL1
DA1
IS220
AMPLI
AUDIO
MODULE
BS002
BS003
to ampli and hps
to headphone sockets

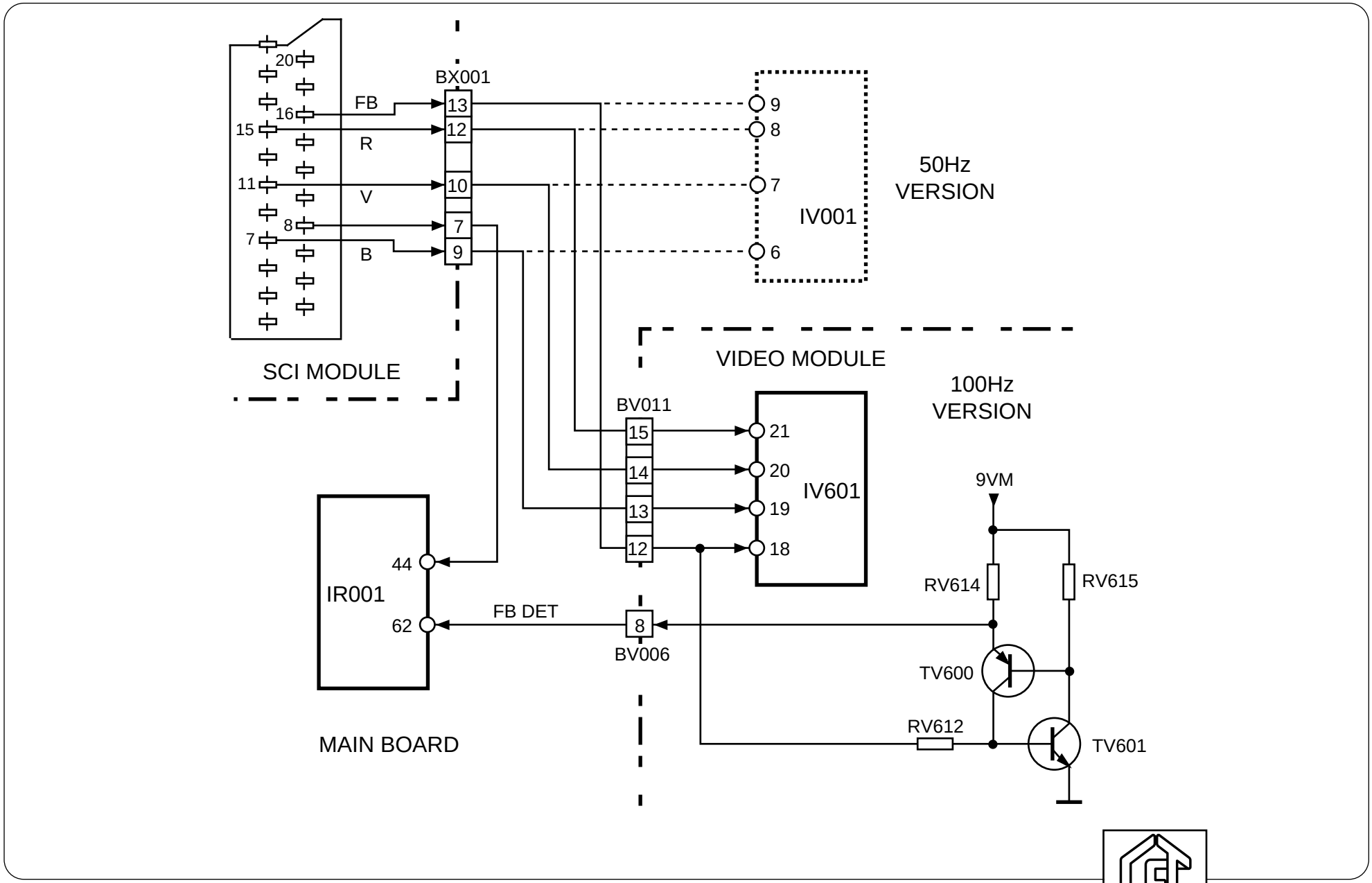
AUDIO SWITCHING (DOLBY PROLOGIC)

This switching takes place in the audio processor, IS150 (MSP3410).
This audio processor is controlled by Microprocessor IR001 via Bus IIC1.

The following table summarises the audio switching:

FUNCTION	INPUT	OUTPUT
TV	28 of IS150 or 28 / 25 of IS150 or 25 of IS150	59 / 60 of IS150 56 / 57 of IS150 50 / 51 of IS150 47 / 48 of IS150
AV1	30 / 31 of IS150 28 / 25 of IS150	59 / 60 of IS150 56 / 57 of IS150 50 / 51 of IS150 47 / 48 of IS150
AV2	33 / 34 of IS150	59 / 60 of IS150 56 / 57 of IS150 47 / 48 of IS150
AV3	36 / 37 of IS150 28 / 25 of IS150	59 / 60 of IS150 56 / 57 of IS150 47 / 48 of IS150 50/51 of IS150

NOTES :


20
16
15
11
8
7
FB
R
V
B
BX001
13
12
10
7
9
9
8
7
6
IV001
50Hz
VERSION
SCI MODULE
VIDEO MODULE
100Hz
VERSION
BV011
15
14
13
12
21
20
19
18
IV601
9VM
RV614
RV615
44
62
IR001
FB DET
8
BV006
TV600
RV612
TV601
MAIN BOARD

RGB SWITCHING

RGB and FB signals from SCART connector AV1 are sent to:

- The video processor, IV001, for a 50-Hz television set.
- The demodulator, IV601, for a 100-Hz television set.

DETECTING A FAST SWITCH, FB (100-Hz MODEL)

The microcontroller must be informed of the presence of a fast switch to perform all switching of TV interfaces (RGB switching, mode display and inlay). The fast switch can, however, be in pulse form. This is what happens for inlays. The fast switch occurs only when characters need to be displayed on screen. The microcontroller cannot constantly test for presence of a fast switch; it does so periodically, at the rate allowed by its software. This is why the appearance of a fast switch must be stored in memory. This is the function of TV600 or TV601, whose layout is equivalent to a pseudo-thyristor.

APPLICATION:

- Pin 16 = 0 -> TV600/TV601 blocked -> input Pin 62 of Microcontroller IR001 = 4.5 V. The microcontroller interprets this as absence of fast switching.
- Pin 16 = 1.5 V -> TV600/TV601 saturated -> Pin 62 of microcontroller = 0.8 V. The microcontroller identifies the presence of a fast switch.

If the fast switch disappears, Pin 16 = 0. Pin 62 of the microcontroller remains at 0.8 V, because the thyristor effect keeps TV600 and TV601 saturated. This is a memory effect that allows the sequence to be completed.

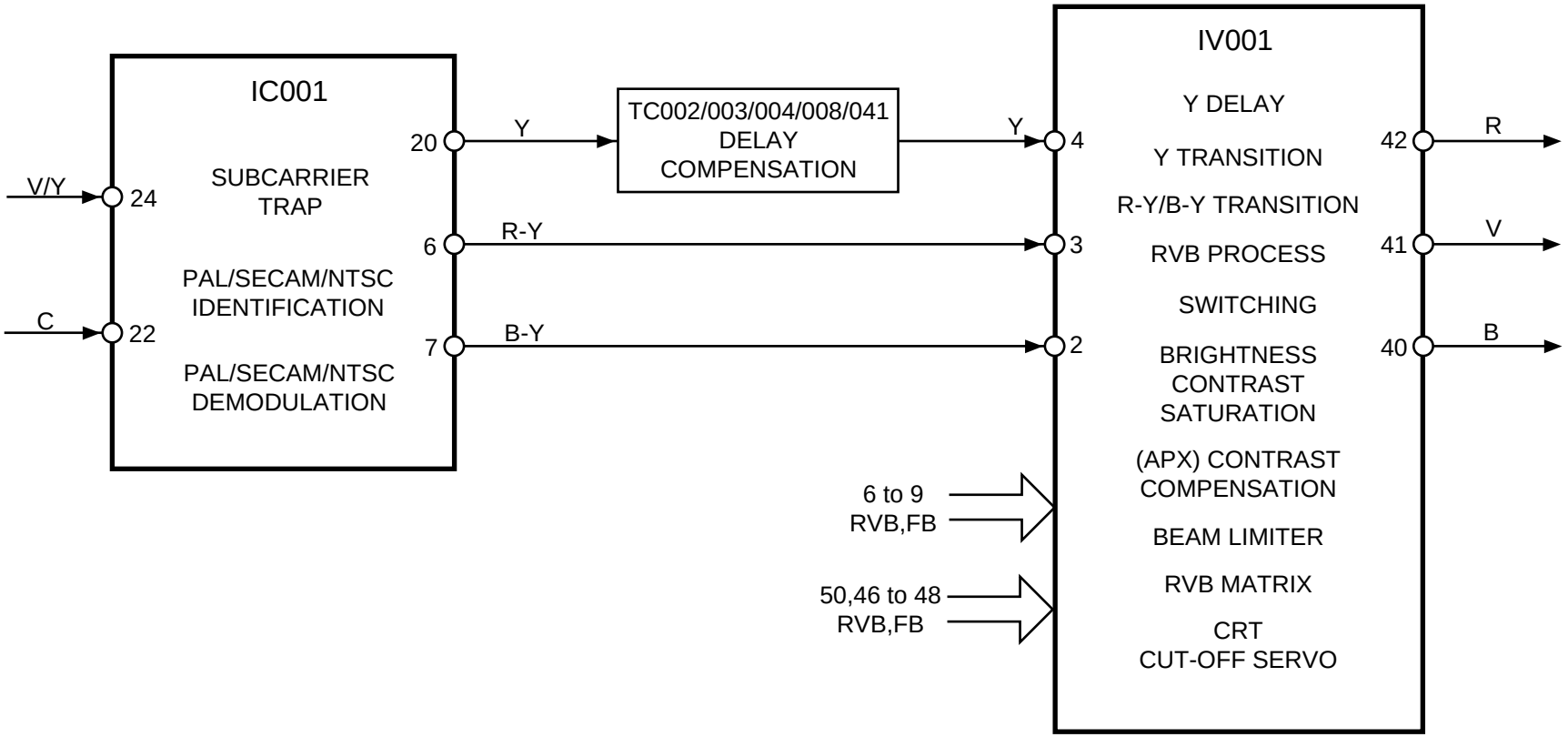
As has already been mentioned, the microcontroller performs cyclical resetting of Pin 62, which inhibits the thyristor effect. A few seconds after the fast switch disappears from Pin 16, Pin 62 of the microcontroller goes to 0, the thyristor effect disappears, 5 V at Pin 62. The microcontroller can detect a new fast switch at Pin 16.

NOTES :

50Hz
VIDEO PROCESSING

CONTENTS

- GENERAL INFORMATION
- IC001, STV2151
- GROUP DELAY COMPENSATION
- IV001, STV2161


IC001
V/Y
24
SUBCARRIER
TRAP
C
22
PAL/SECAM/NTSC
IDENTIFICATION
PAL/SECAM/NTSC
DEMODULATION
20
Y
6
R-Y
7
B-Y
TC002/003/004/008/041
DELAY
COMPENSATION
IV001
Y
4
Y DELAY
Y TRANSITION
R-Y/B-Y TRANSITION
3
RVB PROCESS
SWITCHING
2
BRIGHTNESS
CONTRAST
SATURATION
(APX) CONTRAST
COMPENSATION
BEAM LIMITER
RVB MATRIX
CRT
CUT-OFF SERVO
6 to 9
RVB,FB
50,46 to 48
RVB,FB
42
R
41
V
40
B

GENERAL INFORMATION

Two integrated circuits, controlled via Bus I2C, are used for video processing.

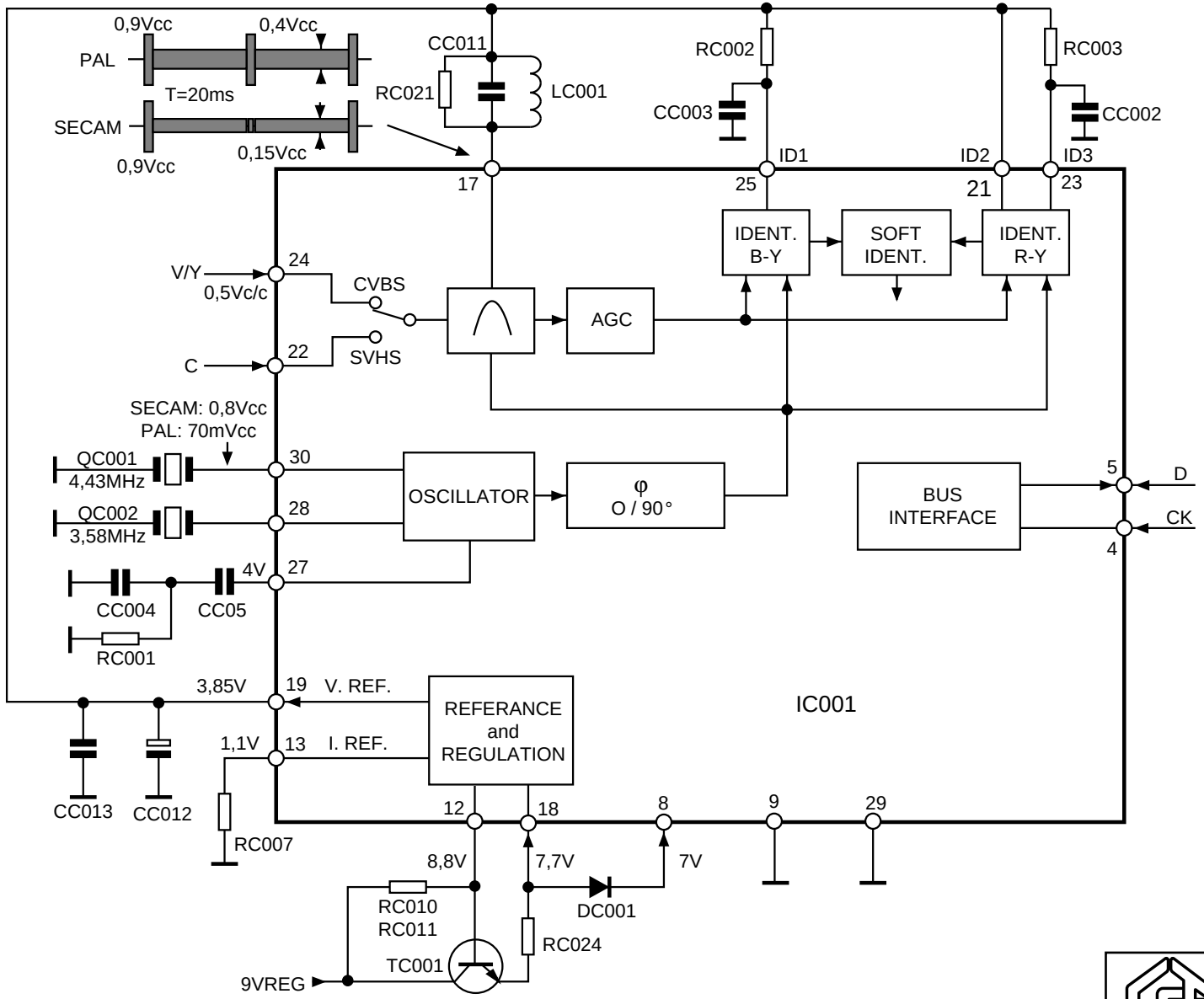
IC001, STV2151. This performs:

- Rejection of colour subcarriers,
- Identification of colour: PAL/SECAM/NTSC,
- Demodulation of colour: PAL/SECAM/NTSC.

IV001, STV2161. This performs:

- Luminance delay,
- Improvement of R-Y and B-Y transitions,
- Dematrixing of Teletext/OSD/SCART RGBs into Y, R-Y, and B-Y,
- Switching of Y, R-Y, and B-Y,
- Light, contrast, and saturation commands,
- Automatic contrast compensation (APX),
- Beam lock,
- RGB matrixing,
- Automatic control of tube cutoffs.

NOTES :


0,9Vcc
0,4Vcc
PAL
T=20ms
SECAM
0,9Vcc
0,15Vcc
CC011
RC021
LC001
RC002
CC003
RC003
CC002
ID1
ID2
ID3
17
25
21
23
IDENT. B-Y
SOFT IDENT.
IDENT. R-Y
V/Y
0,5Vc/c
24
CVBS
AGC
C
22
SVHS
SECAM: 0,8Vcc
PAL: 70mVcc
QC001
4,43MHz
30
OSCILLATOR
φ
O / 90°
BUS INTERFACE
5
D
CK
4
QC002
3,58MHz
28
4V
27
CC004
CC05
RC001
3,85V
19
V. REF.
REFERANCE and REGULATION
IC001
1,1V
13
I. REF.
CC013
CC012
RC007
12
18
8
9
29
8,8V
7,7V
7V
RC010
RC011
DC001
RC024
TC001
9VREG

IC001, STV2151

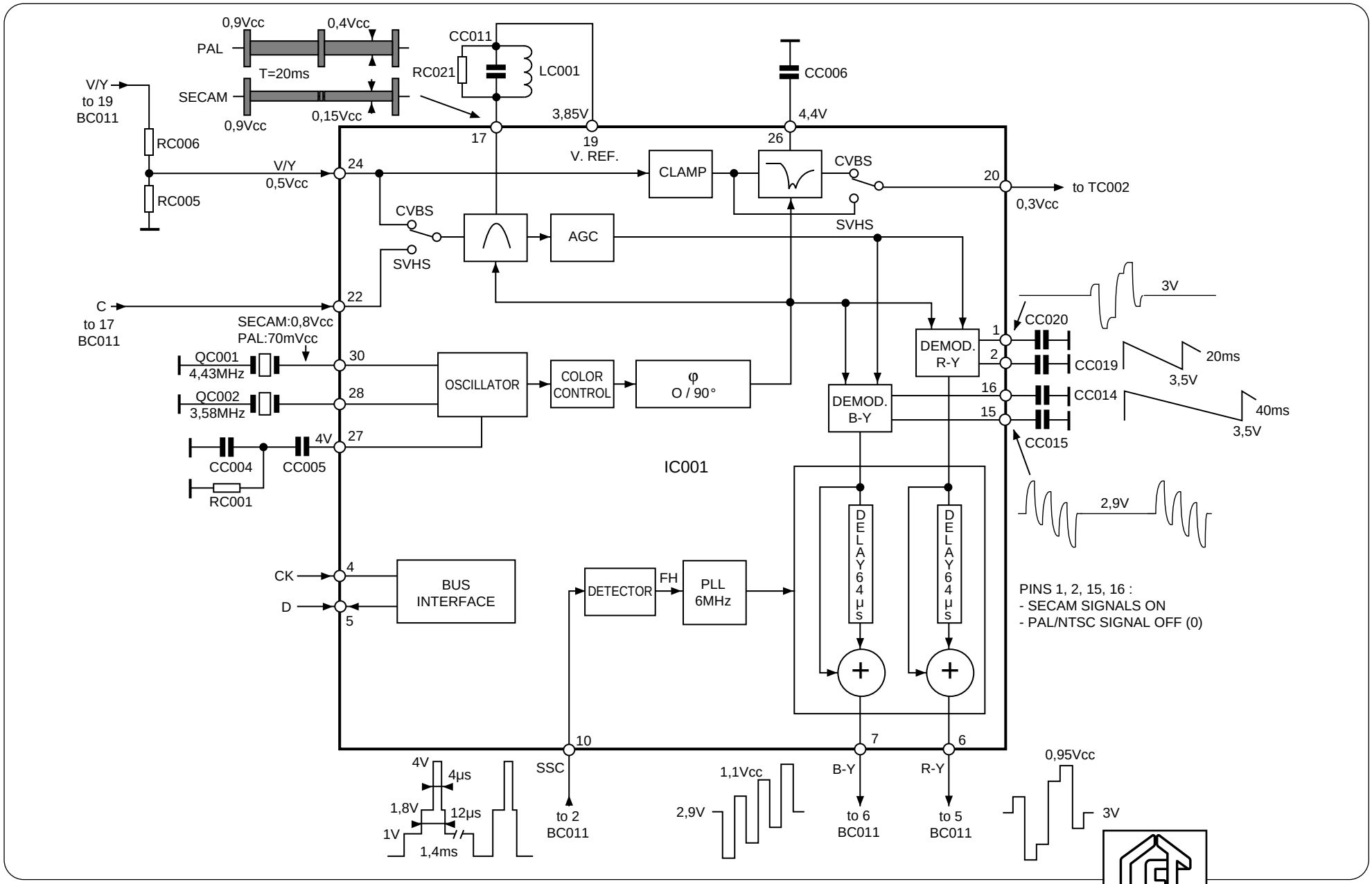
POWER SUPPLY

9VREG is the IC001 power source. Through a regulator built into IC001 and power Transistor TC001, it powers the IC001 (Pin 18) with a typical voltage of 7.7 V. Resistor RC007 sets the reference current required for this regulation.
Diode DC001 brings this voltage down to a typical value of 7 V, which powers the internal logic circuits of the IC001.
A reference voltage value of 3.85 V typical (VCC/2) is obtained from the regulation stage.

IDENTIFICATION

During a colour standard search phase, IC001 is configured in PAL, SECAM, and then NTSC successively, until the standard is identified (four frames each).
The SECAM colour standard is identified by the frequency demodulation of the subcarrier bursts.
The PAL/NTSC colour standards are identified by the amplitude demodulation of the bursts.
The dc voltages obtained are memorised in Capacitors CC002 and CC003 (Pins 23 and 25), and supply the identification criteria.

25 IC01 ID1 (B)	23 IC01 ID3 (+R)	STANDARD
3.8V	3.8V	NO BURSTS
4.85V	2.75V	PAL
5.15V	2.85V	SECAM
5.25V	3.75V	NTSC


0,9Vcc
0,4Vcc
PAL
T=20ms
SECAM
0,9Vcc
0,15Vcc
CC011
RC021
LC001
CC006
V/Y
to 19
BC011
RC006
RC005
V/Y
0,5Vcc
3,85V
4,4V
17
19
V. REF.
26
CLAMP
CVBS
SVHS
20
to TC002
0,3Vcc
CVBS
SVHS
AGC
C
to 17
BC011
22
SECAM:0,8Vcc
PAL:70mVcc
QC001
4,43MHz
QC002
3,58MHz
30
28
OSCILLATOR
COLOR
CONTROL
φ
O / 90°
4V
27
CC004
CC005
RC001
IC001
DEMOD.
R-Y
DEMOD.
B-Y
1
2
16
15
3V
CC020
CC019
20ms
3,5V
CC014
40ms
3,5V
CC015
2,9V
CK
D
4
5
BUS
INTERFACE
DETECTOR
FH
PLL
6MHz
DELAY 64 µs
DELAY 64 µs
PINS 1, 2, 15, 16 :
- SECAM SIGNALS ON
- PAL/NTSC SIGNAL OFF (0)
10
7
6
4V
4µs
1,8V
12µs
1V
1,4ms
SSC
to 2
BC011
1,1Vcc
2,9V
B-Y
to 6
BC011
R-Y
to 5
BC011
0,95Vcc
3V

94

DEMODULATION

The video or luminance signal from the SCART switching part arrives at 24 of IC001. The separate colour from the SCART switching part arrives at 22 of IC001.

In IC001, the separate colour or video signals are sent to the input colour filter (bell or band pass). The tuning of this filter is automatically adjusted by a PLL loop. In PAL and NTSC, the PLL reference signal comes from the 4.43 MHz or 3.58 MHz oscillator, and the filter is tuned at every frame flyback. In SECAM, the PLL reference signal comes from the B-Y = 4.25 MHz demodulator. A capacitor internal to IC001 is switched to reach 4.286 MHz. This filter is tuned at every frame flyback.

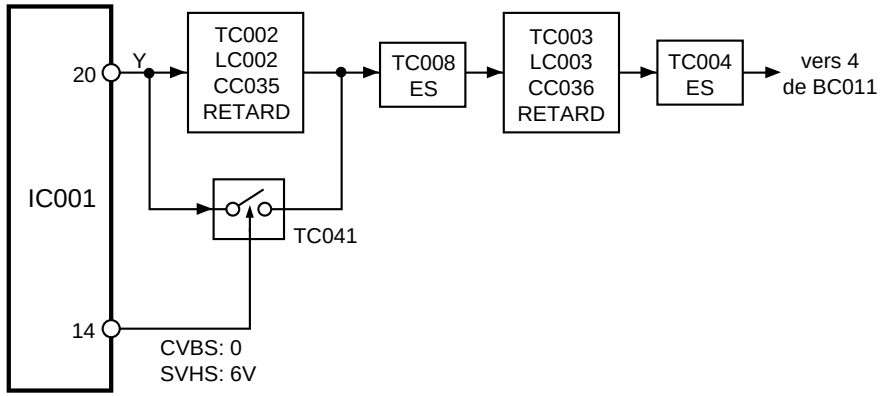
The signals are then directed to the R-Y and B-Y demodulators via an AGC. In PAL and NTSC, there are two synchronous demodulators controlled by the 4.43-MHz or 3.58-MHz oscillator. In SECAM, there are two FM demodulators. The central demodulation frequencies (4.25 and 4.406 MHz) are produced from PLL using the 4.43 MHz oscillator as reference. Locking of the PLL of the B-Y demodulator occurs every two frame flybacks, in alternation with the tuning of the bell filter. Locking of the PLL of the R-Y demodulator occurs every frame flyback. The error voltages of these PLLs are present in CC014 for the B-Y, and in CC019 for the R-Y.
Capacitors CC015 and CC020 deaccentuate the SECAM B-Y and R-Y.

The R-Y and B-Y obtained travel through the delayed channel and the adder before becoming available on Outputs 6 and 7 of IC001. The delay lines (CCD) are controlled from a 6-MHz PLL. The line synchronisation, obtained from Super Sand Castle, is used as reference for this PLL.

The IC001 also has the subcarrier traps required to pick up the luminance on Pin 20. These traps are also tuned by a PLL controlled by the 4.43-MHz or 3.58-MHz oscillator.

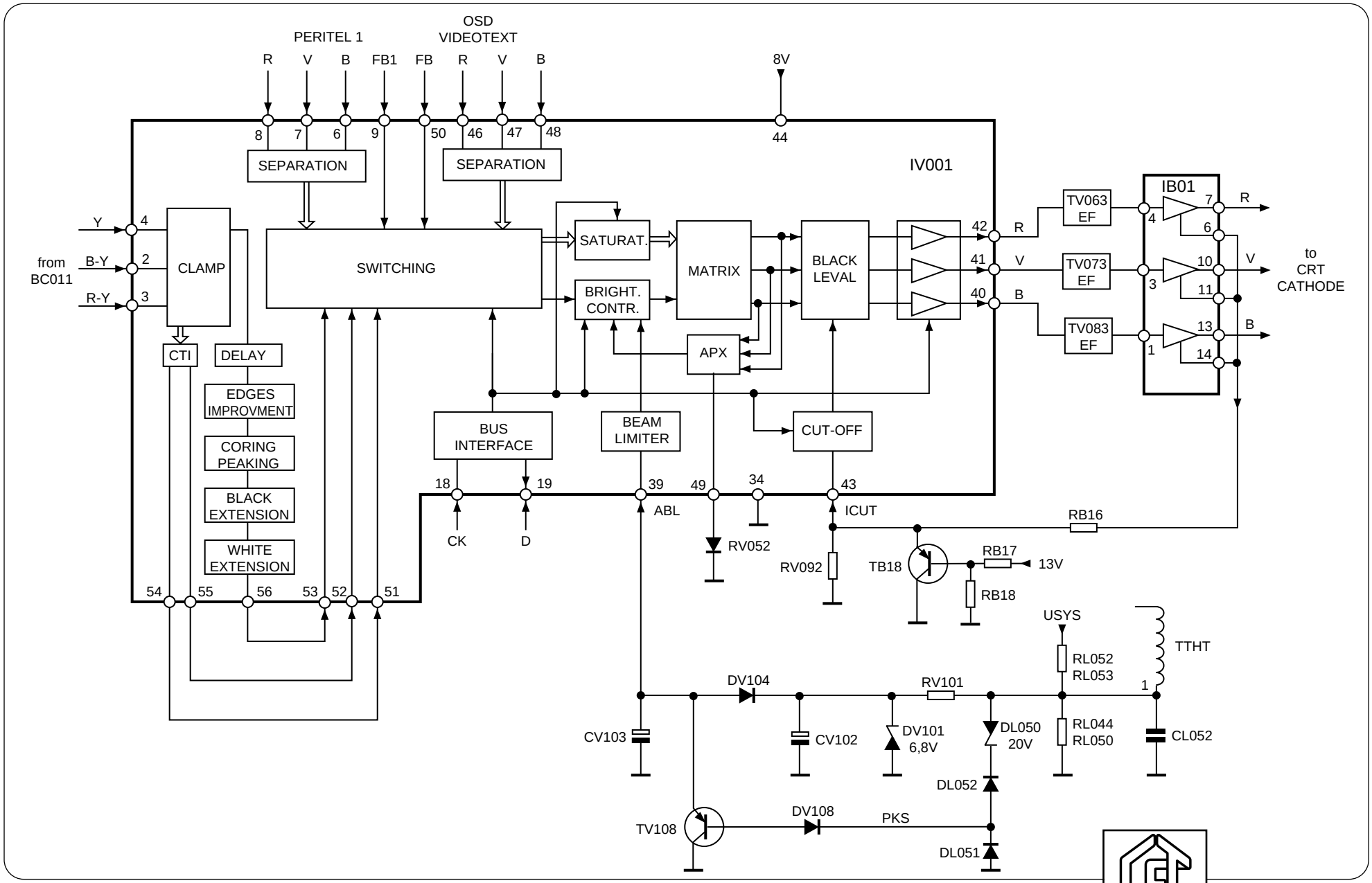
GROUP DELAY COMPENSATION

This circuit compensates for the delay in the video signal high frequencies (CVBS) by delaying the low frequencies using the subcarrier trap built into the IC001. This circuit is out of operation in SVHS.



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PERITEL 1
OSD
VIDEOTEXT
R
V
B
FB1
FB
R
V
B
8V
8
7
6
9
50
46
47
48
44
SEPARATION
SEPARATION
IV001
from
BC011
Y
B-Y
R-Y
4
2
3
CLAMP
SWITCHING
SATURAT.
BRIGHT.
CONTR.
MATRIX
BLACK
LEVAL
APX
42
41
40
R
V
B
TV063
EF
TV073
EF
TV083
EF
IB01
4
3
1
7
6
10
11
13
14
R
V
B
to
CRT
CATHODE
CTI
DELAY
EDGES
IMPROVMENT
CORING
PEAKING
BLACK
EXTENSION
WHITE
EXTENSION
BUS
INTERFACE
BEAM
LIMITER
CUT-OFF
18
19
39
49
34
43
CK
D
ABL
ICUT
RB16
RV052
RV092
TB18
RB17
13V
RB18
54
55
56
53
52
51
USYS
TTHT
RL052
RL053
1
DV104
RV101
CV103
CV102
DV101
6,8V
DL050
20V
RL044
RL050
CL052
DL052
TV108
DV108
PKS
DL051

IV001, STV2161

LUMINANCE PROCESSING

The luminance signal is injected at 2 of IV001, and passes through the following stages:

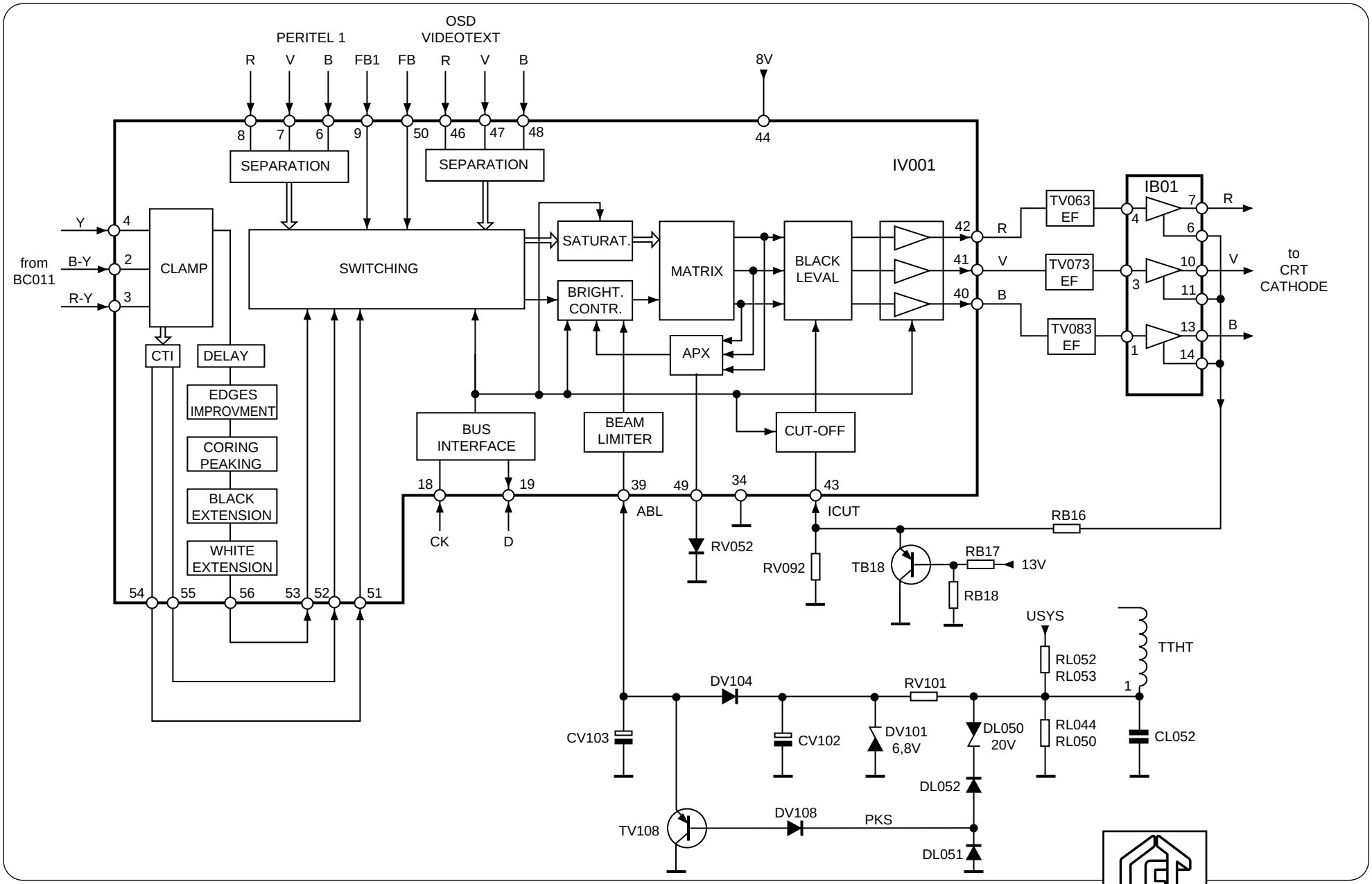
- Programmable delay line, with amount of delay set by the MANAGEMENT microcontroller via Bus IIC.
- EDGE REPLACEMENT circuit that improves the signal edges without creating overshoots.
- CORING and PEAKING circuit that improves signal transitions without increasing noise.
- BLACK STRETCH circuit that increases contrast in a picture with only a few small dark areas.
- WHITE STRETCH circuit that increases the average light value in a picture with a few bright areas.

After this processing, the luminance signal is available on Output 56 of IV001.

CHROMINANCE PROCESSING

Colour difference signals B-Y and R-Y are injected at 2 and 3 of IV001, and pass through the COLOR TRANSIENT IMPROVEMENT circuit before becoming available on Outputs 55 and 54 of IV001.

NOTES :


OSD
PERITEL 1
VIDEOTEXT
R V B FB1 FB R V B
8V
8 7 6 9 50 46 47 48
44
SEPARATION
SEPARATION
IV001
IB01
Y
B-Y
R-Y
from
BC011
4
2
3
CLAMP
SWITCHING
SATURAT.
BRIGHT.
CONTR.
MATRIX
BLACK
LEVAL
42
41
40
R
V
B
TV063
EF
TV073
EF
TV083
EF
4
3
1
7
6
10
11
13
14
R
V
B
to
CRT
CATHODE
CTI
DELAY
EDGES
IMPROVMENT
CORING
PEAKING
BLACK
EXTENSION
WHITE
EXTENSION
APX
BUS
INTERFACE
BEAM
LIMITER
CUT-OFF
54 55 56 53 52 51
18 19 39 49 34 43
CK
D
ABL
ICUT
RV052
RV092
TB18
RB16
RB17
13V
RB18
USYS
RL052
RL053
TTHT
1
DV104
RV101
CV103
CV102
DV101
6,8V
DL050
20V
RL044
RL050
CL052
DL052
TV108
DV108
PKS
DL051

RGB PROCESSING

The Y, R-Y, and B-Y signals arrive at Pins 51 through 53 of IV001. They are aligned, and then sent to a switch.
The RGBs and FB1 from SCART 1 arrive at Pins 6 through 9 of IV001. They are dematrixed into Y, R-Y, and B-Y, and then inform the switch.
The RGBs and FB from the OSD or Teletext arrive at Pins 50 and 46 through 48 of IV001. They are dematrixed into Y, R-Y, and B-Y, and then inform the switch.
The switch selects one of these sources via rapid switches FB1 and FB, and via Bus I2C.

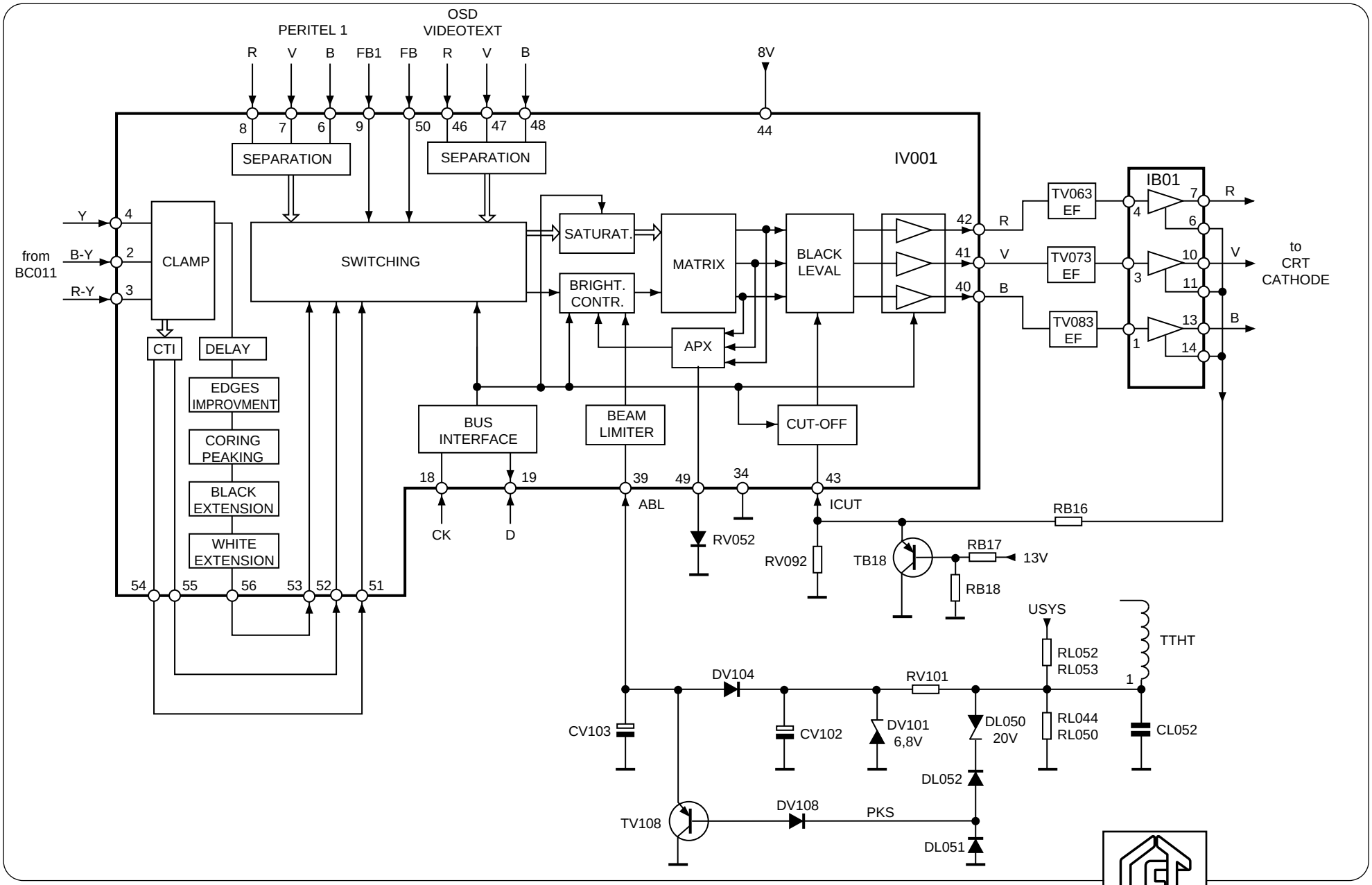
The selected signals are adjusted for light, contrast, and saturation, and are then RGB matrixed. The beam lock signal (ABL) arrives at the light and contrast adjustment stage. This signal comes from Point 1 of the line transformer, and indicates the tube rate. The AUTO-PIX circuit is an AGC that compensates for the differences in level between the various sources.

After automatic control of the cutoffs, the signals are amplified and made available on Outputs 40 through 42 of IV001. The gain of these amplifiers can be adjusted via Operating Mode (R DRV, G DRV, and B DRV).
The RGBs are then sent to the tube via the transistors (TV063/073/083) and the amplifier (IB01).

BEAM LOCK

The beam lock (ABL) voltage arrives at 39 of IV001. It is limited to 6.8 V by DV101, and to -20 V by DL050.
Light and contrast are not affected if the voltage is above 6 V. If the voltage falls below 6 V, contrast is limited. If the voltage falls below 4 V, light is limited.
Transistor TV108 uses the PeaK Sense signal to reduce contrast and light instantaneously in the event of a sudden increase in beam current.

NOTES :



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AUTOMATIC CUTOFF CONTROL

Automatic cutoff control is performed for Lines 21 through 24 and 334 through 337. To compensate for the tube leakage current, the RGB outputs are erased during Lines 21 and 334. The leakage current measurement determines a compensation current within IV001 that creates a voltage of 1.5 V at the terminals of RV092 (Pin 43 of IV001). This compensation current is memorised for an entire frame, and is taken into account for the automatic control of the tube cutoffs. This compensation current is added to the RGB gun cutoff measurement currents.

During Lines 22 and 335, the blue channel is in operation. The blue gun measurement current plus the compensation current produce a voltage at the terminals of RV092. This voltage is compared to an internal 3-V reference, and then determines the black level of the blue signal.

During Lines 23 and 336, the green channel is in operation. Its automatic control is identical to that of the blue channel.

During Lines 24 and 337, the red channel is in operation. Its automatic control is identical to that of the blue channel.

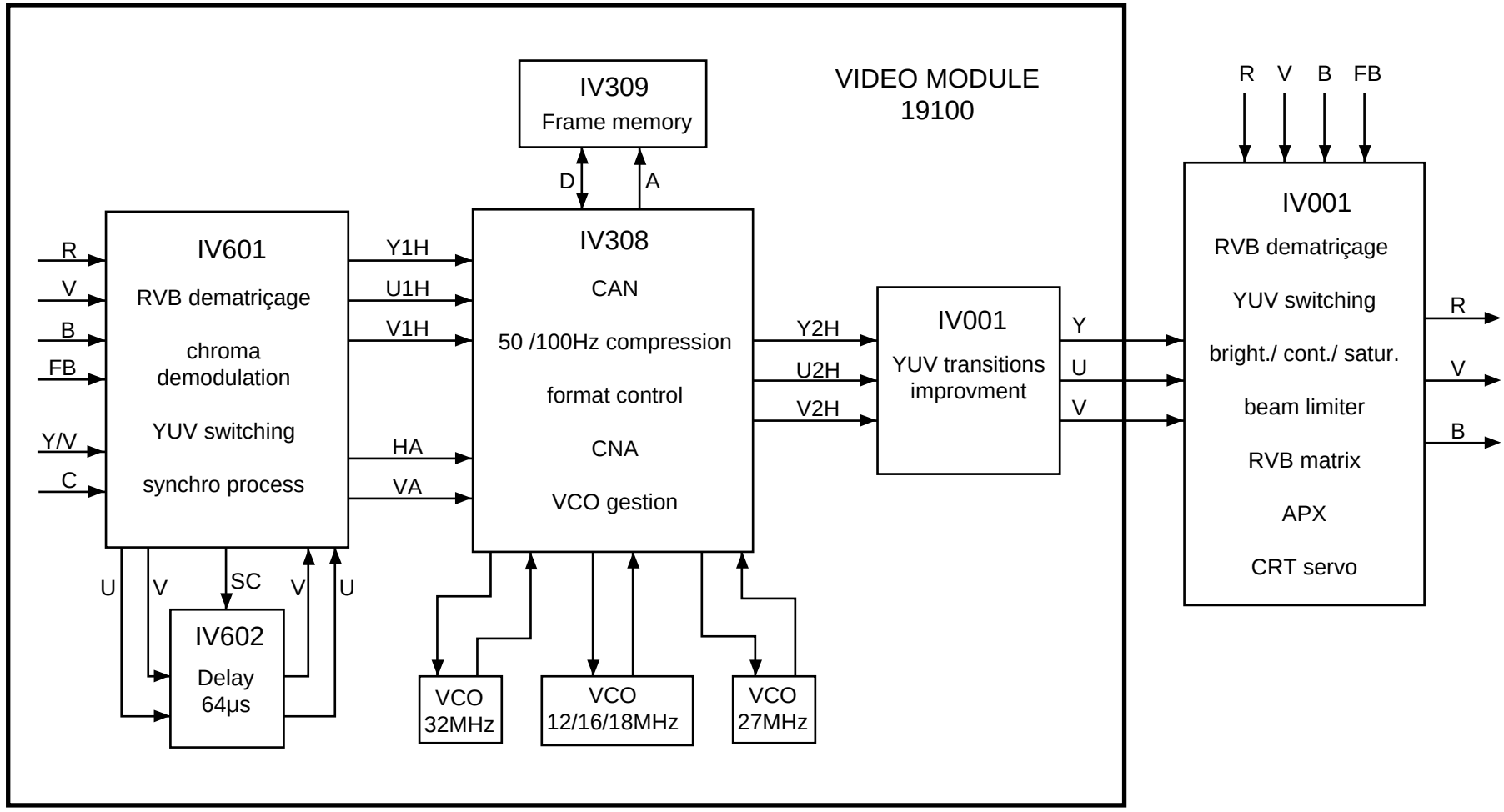
Transistor TB18 and its associated components limit the cutoff measurement voltage to approximately 4.2 V.

NOTES :

100-Hz VIDEO PROCESSING

CONTENTS

- GENERAL INFORMATION
- IV601, TDA9143
- SIGNAL PROCESSING BEFORE DIGITISING
- 100-Hz DIGITAL PROCESSING
- STRUCTURE OF PLL CLOCKS
- FORMAT CHANGES
- SMOOTHING AND CORRECTION OF SIGNALS Y2H, U2H, AND V2H
- RGB PROCESSING
- BEAM LOCK
- AUTOMATIC CUTOFF CONTROL


VIDEO MODULE
19100
IV309
Frame memory
D
A
IV601
RVB dematriçage
chroma
demodulation
YUV switching
synchro process
R
V
B
FB
Y/V
C
Y1H
U1H
V1H
HA
VA
IV308
CAN
50 /100Hz compression
format control
CNA
VCO gestion
Y2H
U2H
V2H
IV001
YUV transitions
improvment
Y
U
V
R
V
B
FB
IV001
RVB dematriçage
YUV switching
bright./ cont./ satur.
beam limiter
RVB matrix
APX
CRT servo
R
V
B
U
V
SC
V
U
IV602
Delay
64µs
VCO
32MHz
VCO
12/16/18MHz
VCO
27MHz

GENERAL INFORMATION

Video processing is performed by the following integrated circuits:

Circuit IV601, TDA9143 performs the following functions:

- Dematrixing of SCART RGBs into YUV (U = B-Y, and V = R-Y),
- PAL/SECAM/NTSC colour demodulation,
- Switching of the two YUV sources,
- HA and VA synchronisation processing.

Circuit IV602, TDA4665 is necessary for colour demodulation (64-µs delay and mixing).

Circuit IV308, DMU0 performs the following functions:

- Analogue-to-digital conversion,
- 50/100 Hz compression,
- Format checking,
- Digital-to-analogue conversion,
- VCO management.

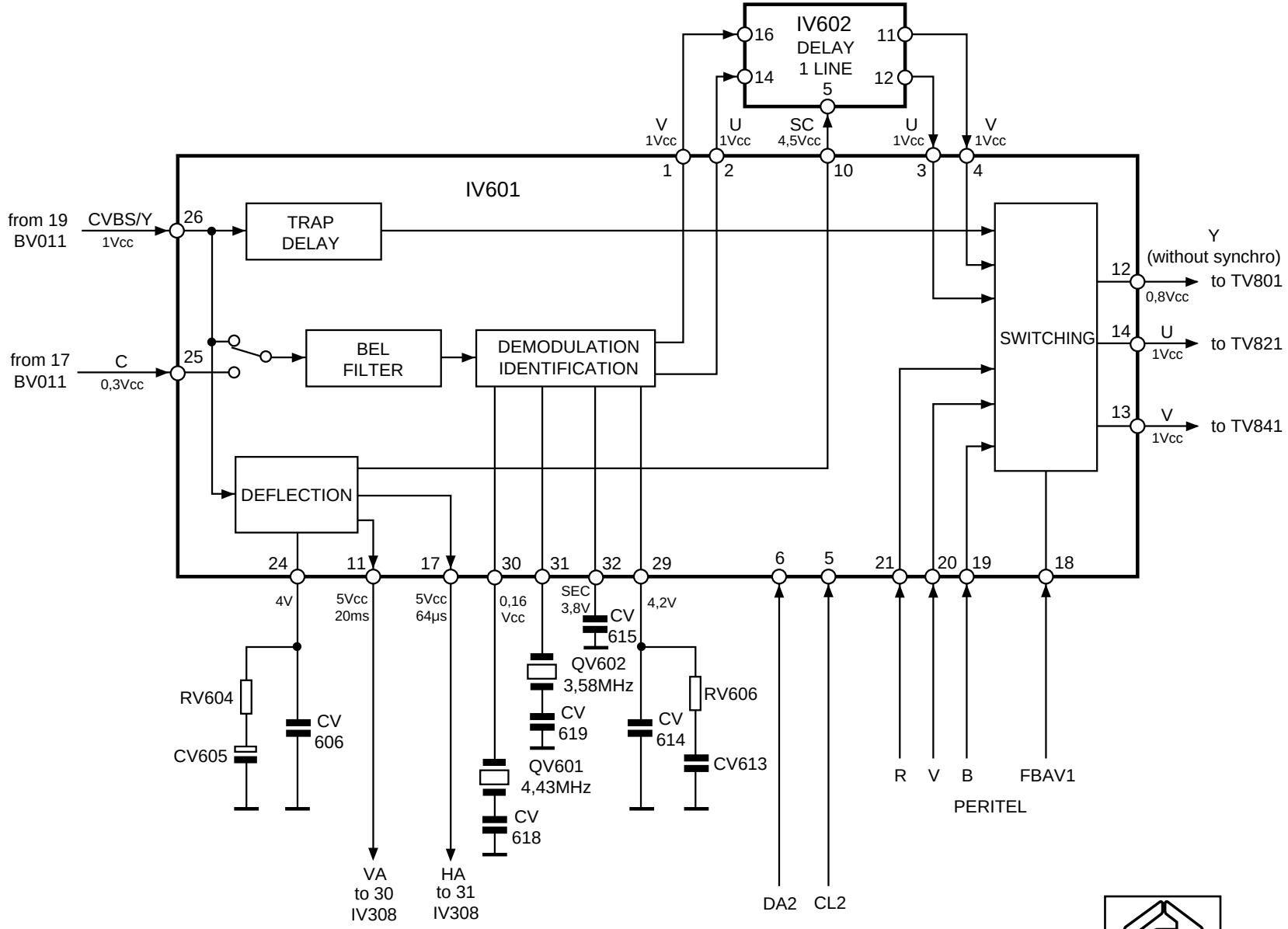
Circuit IV309, TMS4C29720T is the frame memory. It has a capacity of 245760 12 bits.

Circuit IV001, STV2165 (video module) improves the YUV transitions.

Circuit IV001, STV2162 (main board) performs the following functions:

- Dematrixing of Teletext and Menu RGBs into YUVs.
- Switching of YUV sources,
- Light, contrast, and saturation adjustments,
- Automatic contrast compensation, APX,
- Beam lock,
- RGB matrixing,
- Automatic control of tube.

NOTES :


IV602
DELAY
1 LINE
16
14
11
12
5
V
1Vcc
U
1Vcc
SC
4,5Vcc
U
1Vcc
V
1Vcc
1
2
10
3
4
IV601
from 19
BV011
CVBS/Y
1Vcc
26
TRAP
DELAY
from 17
BV011
C
0,3Vcc
25
BEL
FILTER
DEMODULATION
IDENTIFICATION
SWITCHING
Y
(without synchro)
to TV801
12
0,8Vcc
14
U
1Vcc
to TV821
13
V
1Vcc
to TV841
DEFLECTION
24
11
17
30
31
32
29
6
5
21
20
19
18
4V
5Vcc
20ms
5Vcc
64µs
0,16
Vcc
SEC
3,8V
4,2V
CV
615
QV602
3,58MHz
CV
619
RV604
CV
606
CV605
QV601
4,43MHz
CV
618
CV
614
RV606
CV613
VA
to 30
IV308
HA
to 31
IV308
DA2
CL2
R
V
B
FBAV1
PERITEL

IV601, TDA9143

This is a specialised processor that handles video processing from a CVBS or Y/C signal. It is fully controlled via a IIC bus, and has its own internal filters. It requires no adjustment.

RECOGNITION OF STANDARD

The circuit performs automatic digital recognition of standards from bursts. Two oscillator crystals (4.43 MHz and 3.58 MHz) are used for this purpose.

Y CHANNEL PROCESSING

According to the standard recognised, the circuit switches the appropriate traps, or allows the signal to pass through in the event of SVHS recognition. A 60-ns delay line internal to the circuit performs delay compensation.

CHROMINANCE CHANNEL PROCESSING

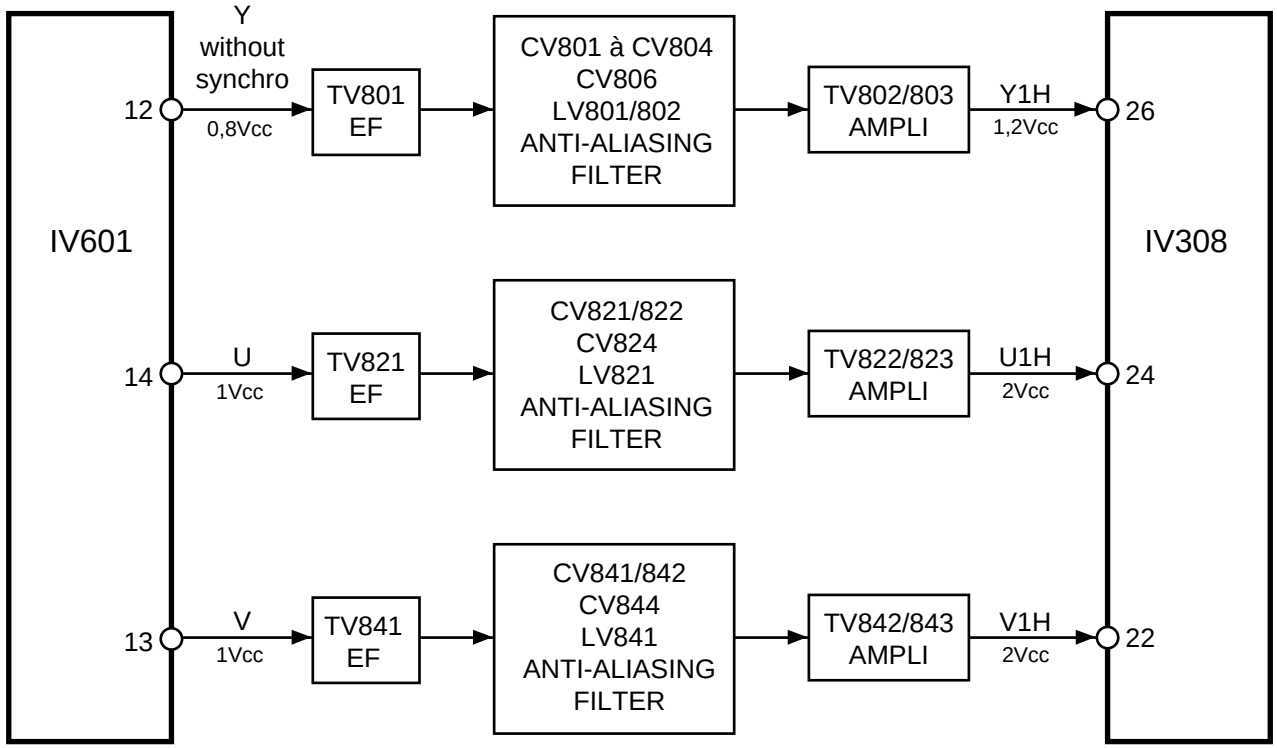
The internal band pass (for PAL/NTSC) or bell (for SECAM) filters operate according to the standard recognised. The resonance frequency of the bell, 4.28 MHz, is controlled via a circuit using the 4.43-MHz oscillator during the frame flyback.
PAL/NTSC demodulation requires an oscillator that works with one of the external oscillator crystals. The SECAM decoder is a self-calibrated PLL demodulator (Pin 29) whose VCO is adjusted during frame flyback.
Demodulation is completed via a 64-µs CCD delay line, IV602 (TDA4665). This circuit is controlled by the SC signal from Output 10 of IV601.

MATRIXING AND SWITCHING OF EXTERNAL RGB SIGNALS

RGBs from a SCART source are matrixed so that they can be digitally processed in the same way as CVBS or Y/C signals. External command FBAV1 enables the acceptance of these SCART RGBs.

SYNCHRONISATION PROCESSING

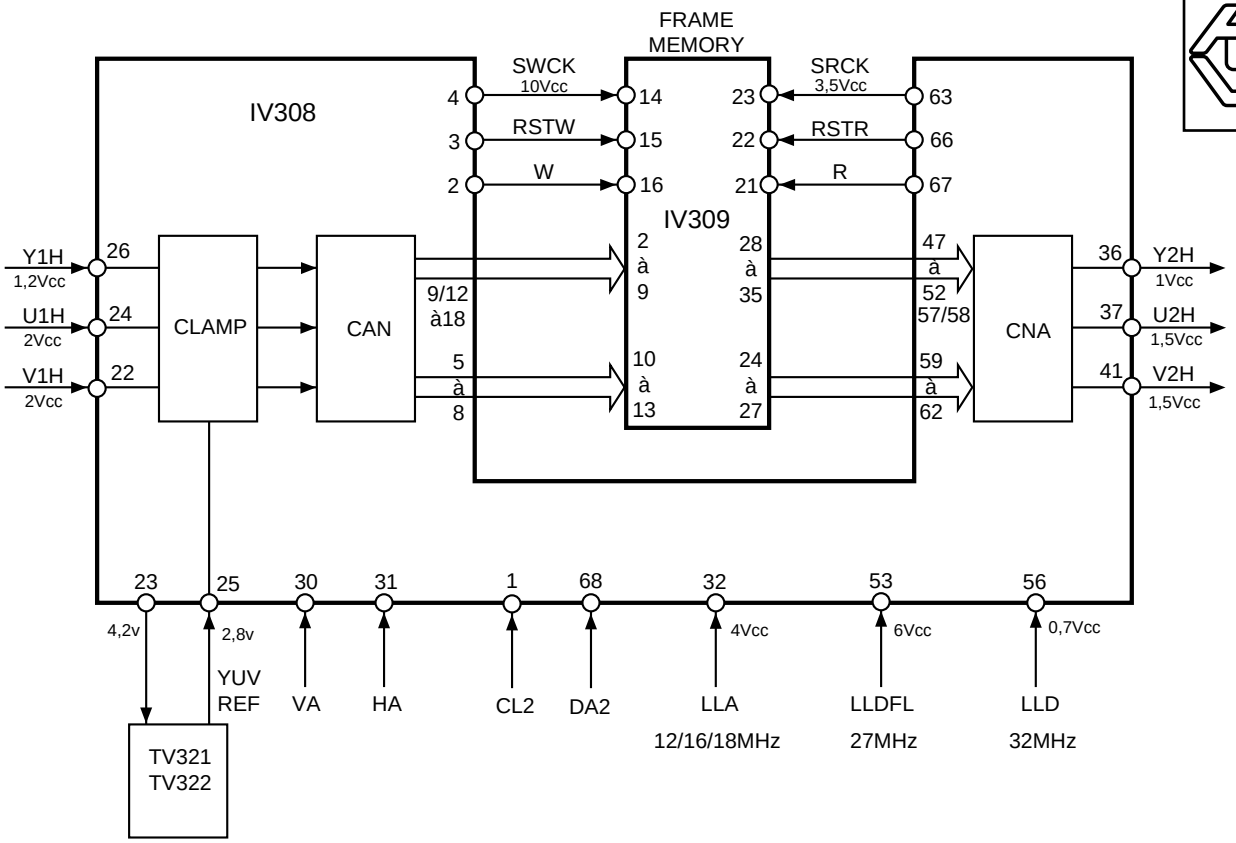
A second PLL control loop (Pin 24) delivers the line synchronisation (HA) and frame synchronisation (VA) signals via a time base and based on synchronisation separation and frame sorting.
The VCO operates at 6.875 MHz = 440 x 15625 Hz.
This loop is connected via Bus IIC. Its time constant can therefore be software-modified according to the noise level in the incident signal. When the signal is too noisy or non-existent, the system operates in an open loop and produces a stable frequency.

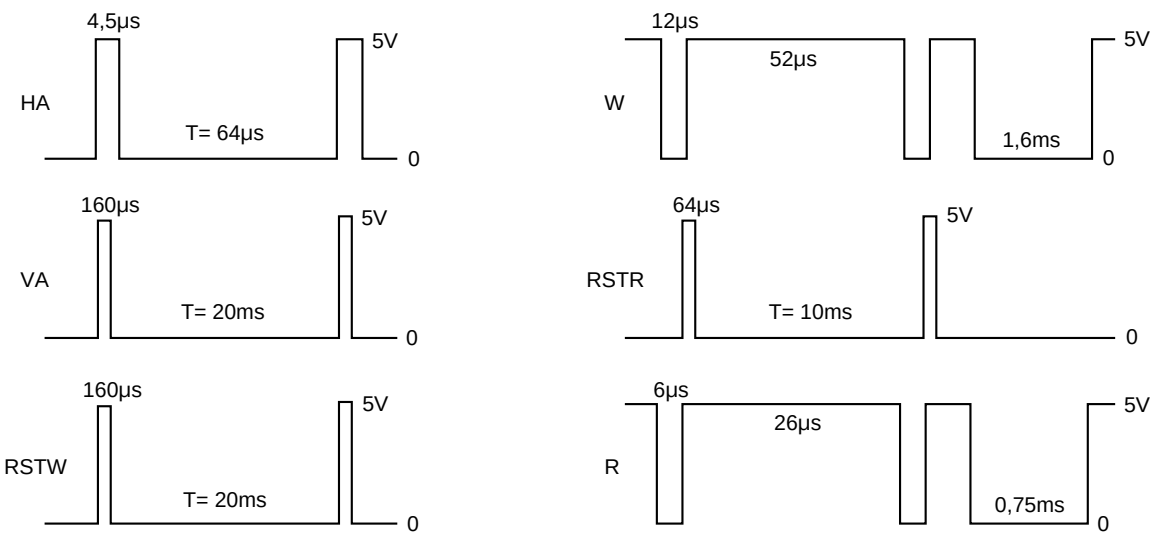

IV601
12
Y
without
synchro
0,8Vcc
TV801
EF
CV801 à CV804
CV806
LV801/802
ANTI-ALIASING
FILTER
TV802/803
AMPLI
Y1H
1,2Vcc
26
IV308
14
U
1Vcc
TV821
EF
CV821/822
CV824
LV821
ANTI-ALIASING
FILTER
TV822/823
AMPLI
U1H
2Vcc
24
13
V
1Vcc
TV841
EF
CV841/842
CV844
LV841
ANTI-ALIASING
FILTER
TV842/843
AMPLI
V1H
2Vcc
22

SIGNAL PROCESSING BEFORE DIGITISING

The Y, U, and V signals from IV601 go through the low-pass anti-overlap filters (limiting their pass band), and are amplified and injected into IV308.
After being processed in this way, these signals are digitised in IV308 in 4-1-1 version (Y = 8 bits, U = 2 bits, and V = 2 bits). The sampling frequency for Y is 16 MHz.

NOTES :


FRAME
MEMORY
IV308
IV309
SWCK
10Vcc
RSTW
W
SRCK
3,5Vcc
RSTR
R
Y1H
1,2Vcc
U1H
2Vcc
V1H
2Vcc
CLAMP
CAN
9/12
à18
CNA
Y2H
1Vcc
U2H
1,5Vcc
V2H
1,5Vcc
4,2v
2,8v
YUV
REF
VA
HA
CL2
DA2
LLA
12/16/18MHz
LLDFL
27MHz
LLD
32MHz
4Vcc
6Vcc
0,7Vcc
TV321
TV322


4,5µs
5V
HA
T= 64µs
0
12µs
52µs
W
1,6ms
160µs
VA
T= 20ms
64µs
RSTR
T= 10ms
160µs
RSTW
T= 20ms
6µs
26µs
R
0,75ms

100-Hz DIGITAL PROCESSING

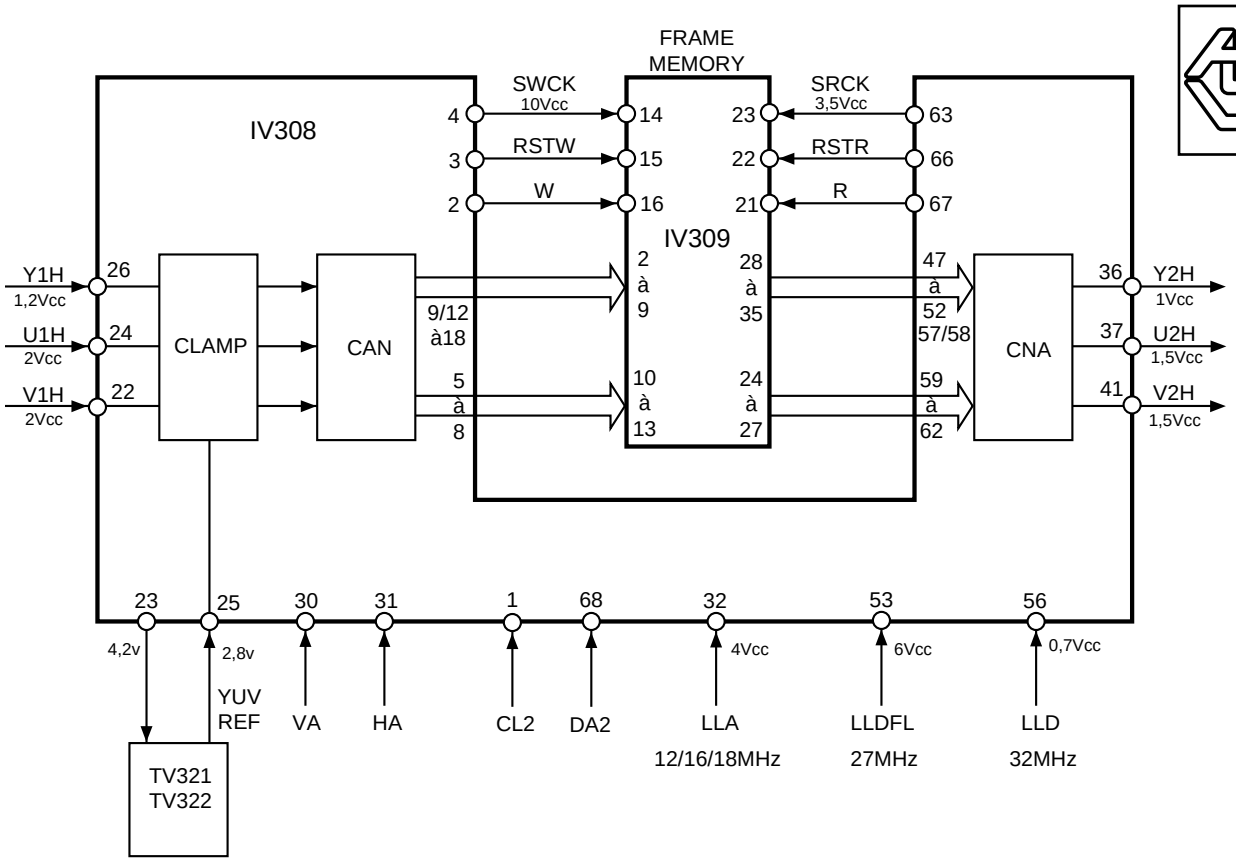
Integrated Circuits IV308 and IV309 are used. The various stages of processing are as follows:

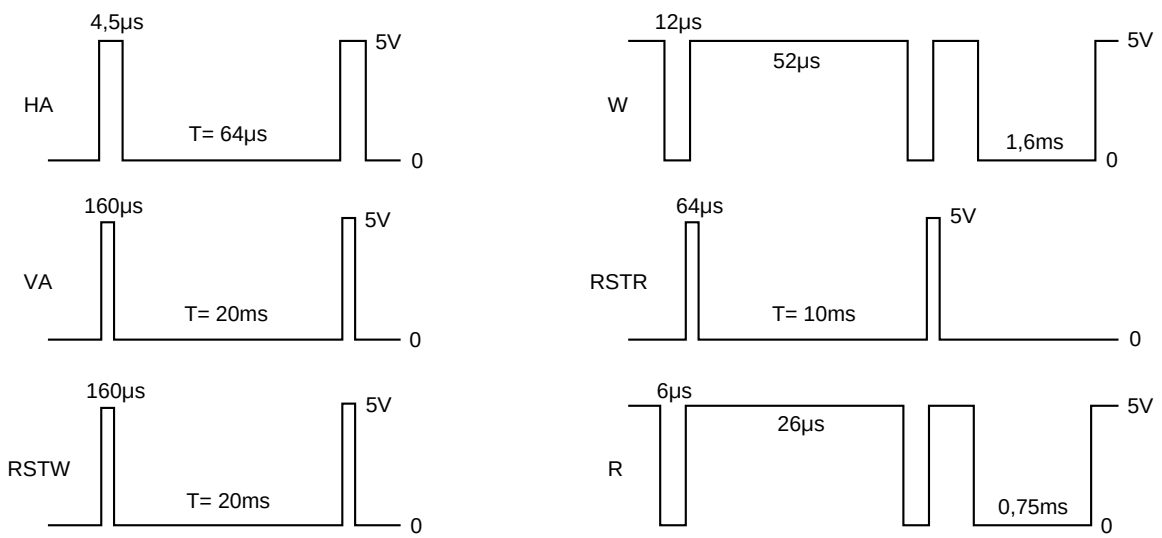
- Alignment of the Y, U, and V signals (IV308). The signals are input at 26, 24, and 22 of IV308. The alignment voltage is obtained from the reference voltage at 25 of IV308. This reference voltage comes from Output 23 of IV308 via current amplifier TV321/322.

- Analogue-to-digital conversion (IV308), Y = 8 bits, U = 2 bits, V = 2 bits. The sampling frequency can be 12, 16, or 18 MHz, according to picture and screen format. Digital samples are available on Outputs 5 through 9 and 12 through 18 of IV308.

- Writing to frame memory (IV309). Signals SWCK, RSTW, and W control this writing.
  - SWCK is the writing clock. Its frequency is identical to the sampling frequency.
  - RSTW resets the writing line counter. This is the VA signal.
  - W enables writing. Because of this signal, the line and frame flybacks are not stored in memory.

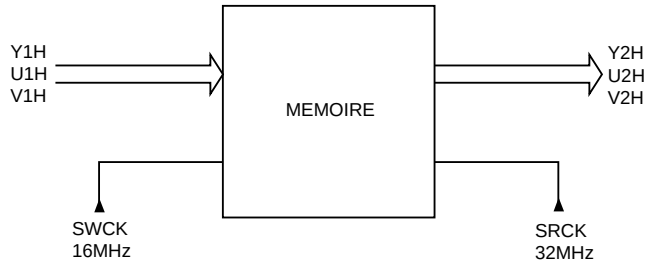
NOTES :

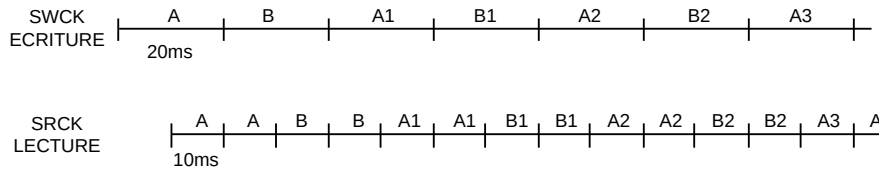

FRAME
MEMORY
IV308
IV309
SWCK
10Vcc
SRCK
3,5Vcc
RSTW
RSTR
W
R
Y1H
1,2Vcc
U1H
2Vcc
V1H
2Vcc
CLAMP
CAN
CNA
Y2H
1Vcc
U2H
1,5Vcc
V2H
1,5Vcc
4,2v
2,8v
YUV
REF
VA
HA
CL2
DA2
LLA
12/16/18MHz
LLDFL
27MHz
LLD
32MHz
4Vcc
6Vcc
0,7Vcc
TV321
TV322


4,5µs
5V
HA
T= 64µs
0
12µs
52µs
W
1,6ms
160µs
VA
T= 20ms
64µs
RSTR
T= 10ms
160µs
RSTW
T= 20ms
6µs
26µs
R
0,75ms

- Reading of frame memory (IV309). Signals SRCK, RSTR, and R control this reading.

  - SRCK is the reading clock. Its frequency is 27 or 32 MHz. Because this is higher than the writing clock frequency, the picture is compressed.





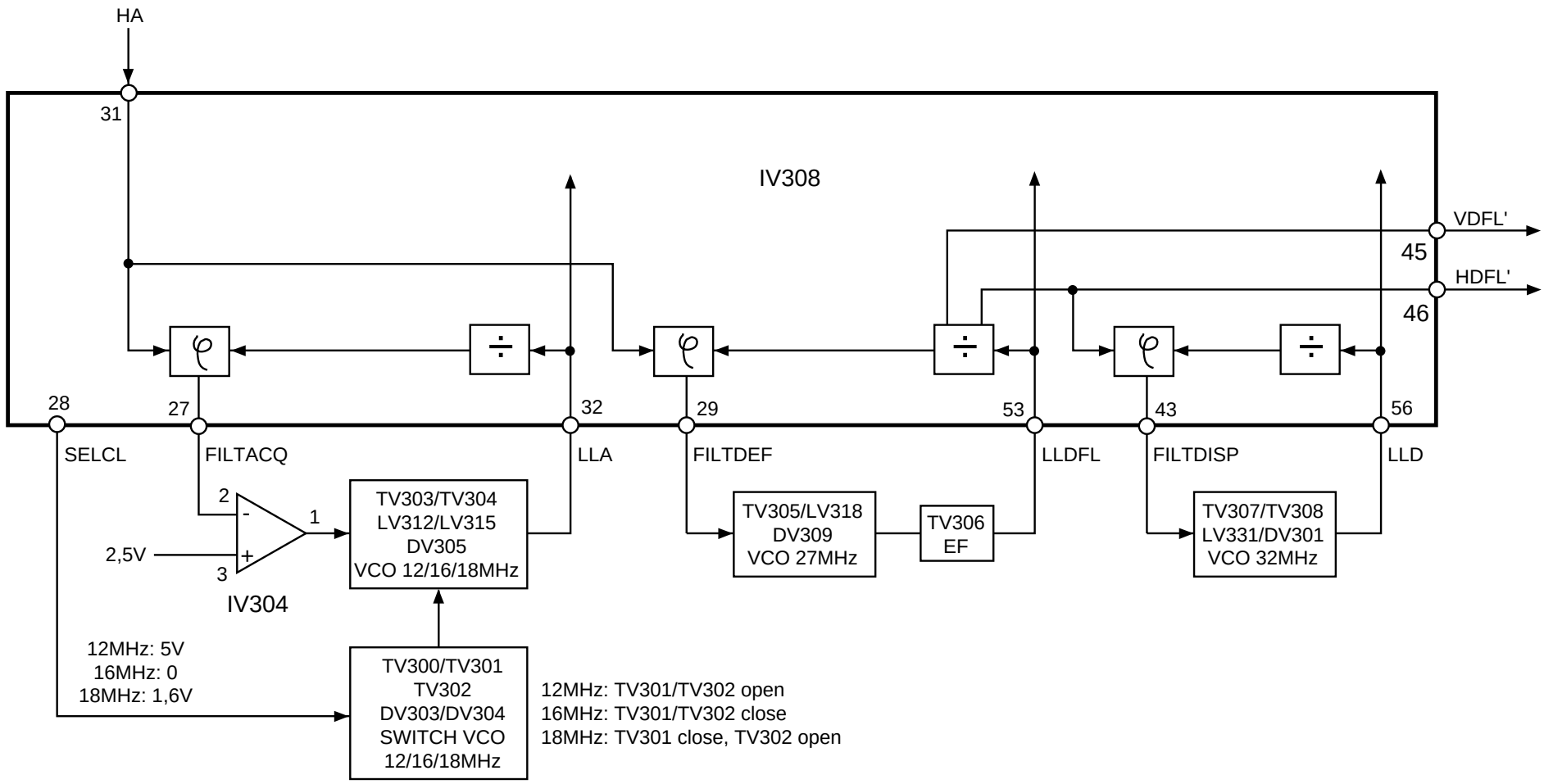
- RSTR resets the reading line counter.
- R enables memory reading.

- Digital-to-analogue conversion (IV308). Y2H, U2H, and V2H are available on Outputs 36, 37, and 41 of IV308.

NOTES :

THOMSON MULTI MEDIA

CENTRE DE FORMATION TECHNIQUE


HA
31
IV308
VDFL'
45
HDFL'
46
28
27
32
29
53
43
56
SELCL
FILTACQ
LLA
FILTDEF
LLDFL
FILTDISP
LLD
2
1
3
-
+
2,5V
IV304
TV303/TV304
LV312/LV315
DV305
VCO 12/16/18MHz
TV305/LV318
DV309
VCO 27MHz
TV306
EF
TV307/TV308
LV331/DV301
VCO 32MHz
12MHz: 5V
16MHz: 0
18MHz: 1,6V
TV300/TV301
TV302
DV303/DV304
SWITCH VCO
12/16/18MHz
12MHz: TV301/TV302 open
16MHz: TV301/TV302 close
18MHz: TV301 close, TV302 open

STRUCTURE OF PLL CLOCKS

Integrated Circuit IV308 creates three clocks: an acquisition clock for sampling and writing to memory, a restoration or display clock for reading from memory, and a deflection clock, set at 27 MHz, to deliver small line and frame signals for STV2162. Each of these clocks must be strictly in phase with the inputting of video signals, and must do so in accordance with the various formats.
IV308 has programmable frequency dividers and phase detectors. The loop filters and VCOs are external elements.

The acquisition clock, LLA, comes from a loop with a dividing ratio of 768, 1024, or 1152, which means that frequencies of 12, 16, or 18 MHz can be supplied in phase with the HA line synchronisation signal (15625 Hz). These three frequencies determine the different picture formats. Switching of these three frequencies is performed via Output 28 of IV308 and Transistors TV300 through TV302. Output 28 or IV308 has the following:

- 0 to enable the 16 MHz frequency,
- 5 V to enable the 12 MHz frequency,
- 1.6 V (HZ) to enable the 18 MHz frequency. This 1.6 V is determined by resistive divider RV326/RV327.

Deflection clock LLDFL is supplied from a loop with dividing ratio 1768, with the HA line synchronisation signal as reference. This clock can also be switched for restoration. The loop also makes it possible to supply line synchronisation signal HDFL' at 31250 Hz, and frame synchronisation signal VDFL' at 100 Hz.

The 32 MHz restoration or display clock, LLD, is based on a loop with dividing ratio 1024. Its reference is the HDFL' signal at 31250 Hz.

NOTES :

PROGRAM 4/3 SCREEN 4/3		
NORMAL	W= 16	R= 32
ZOOM 1	W= 18	R= 32
ZOOM 2	W= 18	R= 27

PROGRAM 4/3 SCREEN 16/9		
NORMAL	W= 12	R= 32
ZOOM 1	W= 16	R= 32
ZOOM 2	W= 18	R= 27

PROGRAM 16/9 SCREEN 4/3		
NORMAL	W= 16	R= 32
ZOOM 1	W= 18	R= 32
ZOOM 2	W= 18	R= 27

PROGRAM 16/9 SCREEN 16/9		
NORMAL	W= 16	R= 32

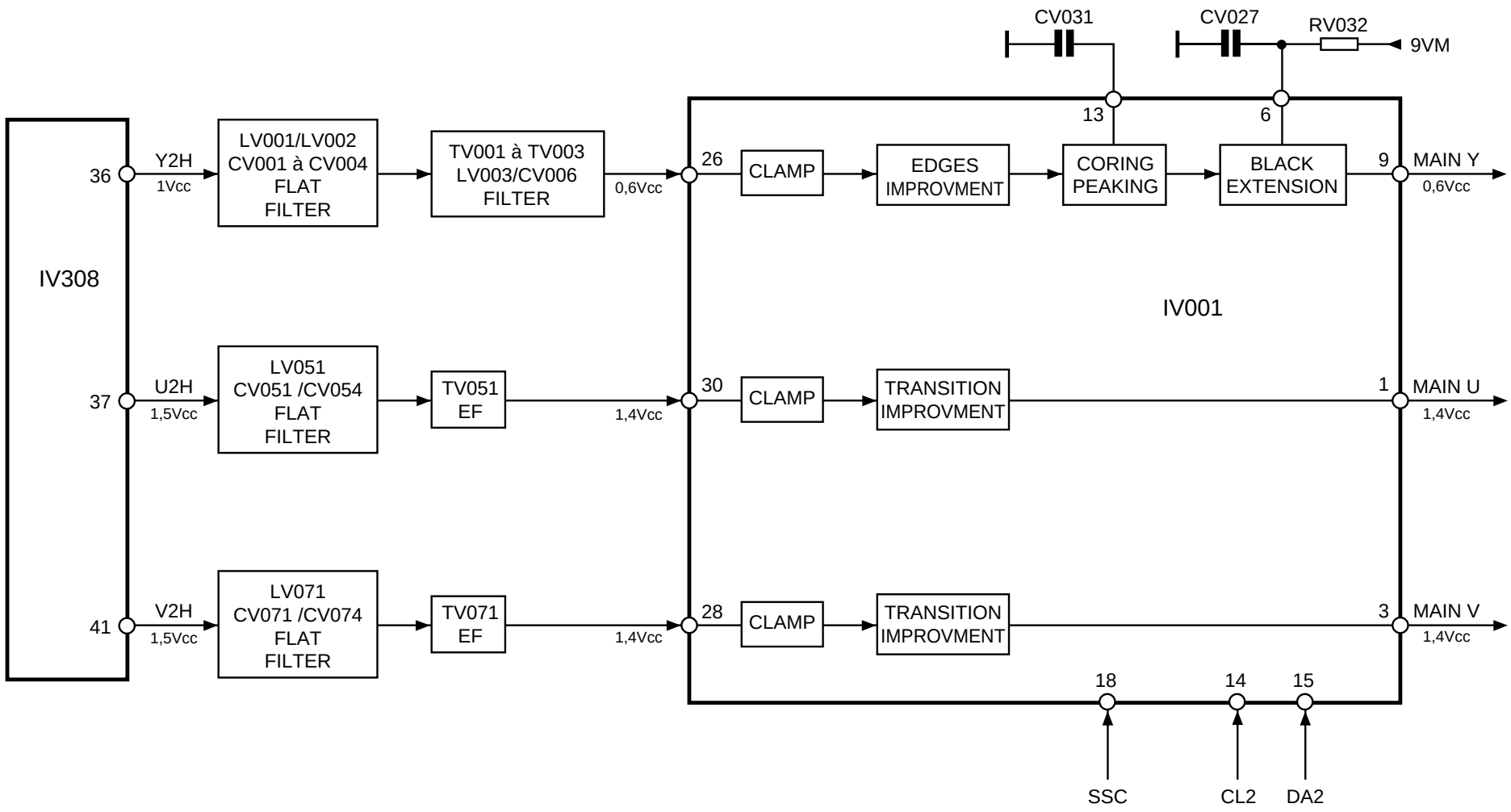
FORMAT CHANGES

Format changes are related to the concepts of temporal compression or expansion, and can be applied via the memory writing and reading speeds, W and R. This change is visible only through its effect on picture width.
The frame sweep must be acted on accordingly for the picture height.

The following tables list the various formats according to clock frequency.

NOTES :

117


CV031
CV027
RV032
9VM
13
6
IV308
36
Y2H
1Vcc
LV001/LV002
CV001 à CV004
FLAT
FILTER
TV001 à TV003
LV003/CV006
FILTER
0,6Vcc
26
CLAMP
EDGES
IMPROVMENT
CORING
PEAKING
BLACK
EXTENSION
9
MAIN Y
0,6Vcc
IV001
37
U2H
1,5Vcc
LV051
CV051 /CV054
FLAT
FILTER
TV051
EF
1,4Vcc
30
CLAMP
TRANSITION
IMPROVMENT
1
MAIN U
1,4Vcc
41
V2H
1,5Vcc
LV071
CV071 /CV074
FLAT
FILTER
TV071
EF
1,4Vcc
28
CLAMP
TRANSITION
IMPROVMENT
3
MAIN V
1,4Vcc
18
14
15
SSC
CL2
DA2

118

SMOOTHING AND CORRECTION OF SIGNALS Y2H, U2H, AND V2H

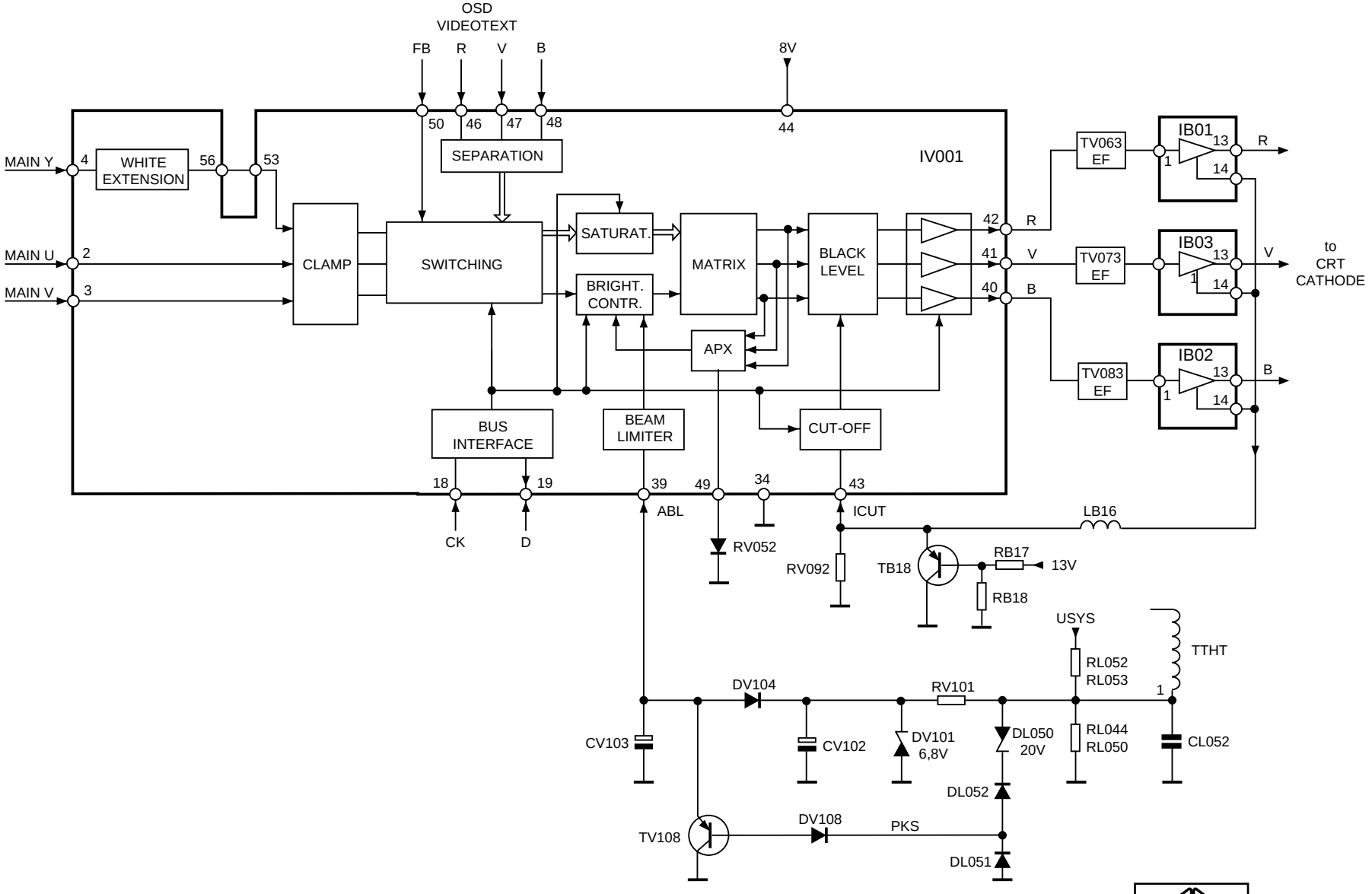
Signals Y2H, U2H, and V2H pass through the smoothing filters required after digital-to-analogue conversion, and are injected at 26, 30, and 28 respectively on the PSI (Picture Signal Improvement) board, IV001.

In IV001, Signal Y2H passes through the following stages:

- Alignment stage,
- EDGE REPLACEMENT circuit that improves the signal edges without creating overshoots.
- CORING and PEAKING circuit that improves signal transitions without increasing noise.
- BLACK STRETCH circuit that increases contrast in a picture with only a few small dark areas.

After this processing, the luminance signal is available on Output 9 of IV001, and is sent to Pin 5 of Connector BV011.

Colour difference signals U2H and V2H are injected at 30 and 28 of IV001, and pass through the COLOR TRANSIENT IMPROVEMENT circuit before becoming available on Outputs 1 and 3 of IV001, and sent to Outputs 7 and 6 of Connector BV011.


OSD
VIDEOTEXT
FB
R
V
B
8V
50
46
47
48
44
IV001
MAIN Y
4
WHITE EXTENSION
56
53
SEPARATION
MAIN U
2
MAIN V
3
CLAMP
SWITCHING
SATURAT.
BRIGHT. CONTR.
MATRIX
BLACK LEVEL
APX
42
41
40
R
V
B
TV063 EF
TV073 EF
TV083 EF
IB01
IB03
IB02
13
14
1
to CRT CATHODE
BUS INTERFACE
BEAM LIMITER
CUT-OFF
18
19
39
49
34
43
CK
D
ABL
ICUT
LB16
RV052
RV092
TB18
RB17
13V
RB18
USYS
RL052
RL053
TTHT
DV104
RV101
CV103
CV102
DV101
6,8V
DL050
20V
RL044
RL050
CL052
DL052
TV108
DV108
PKS
DL051

RGB PROCESSING

MAIN Y, MAIN U, and MAIN V arrive at Pins 2 through 4 of IV001. The MAIN Y component goes through the white stretch circuit, is output at 56 of IV001, and is reinjected at 53 of IV001. The three signals are then aligned and sent to a switch.
The RGBs and FBs from the OSD or Teletext arrive at Pins 50 and 46 through 48 of IV001. They are dematrixed into Y, R-Y, and B-Y, and then inform the switch.
The switch selects one of these sources via rapid switch FB or Bus I2C.

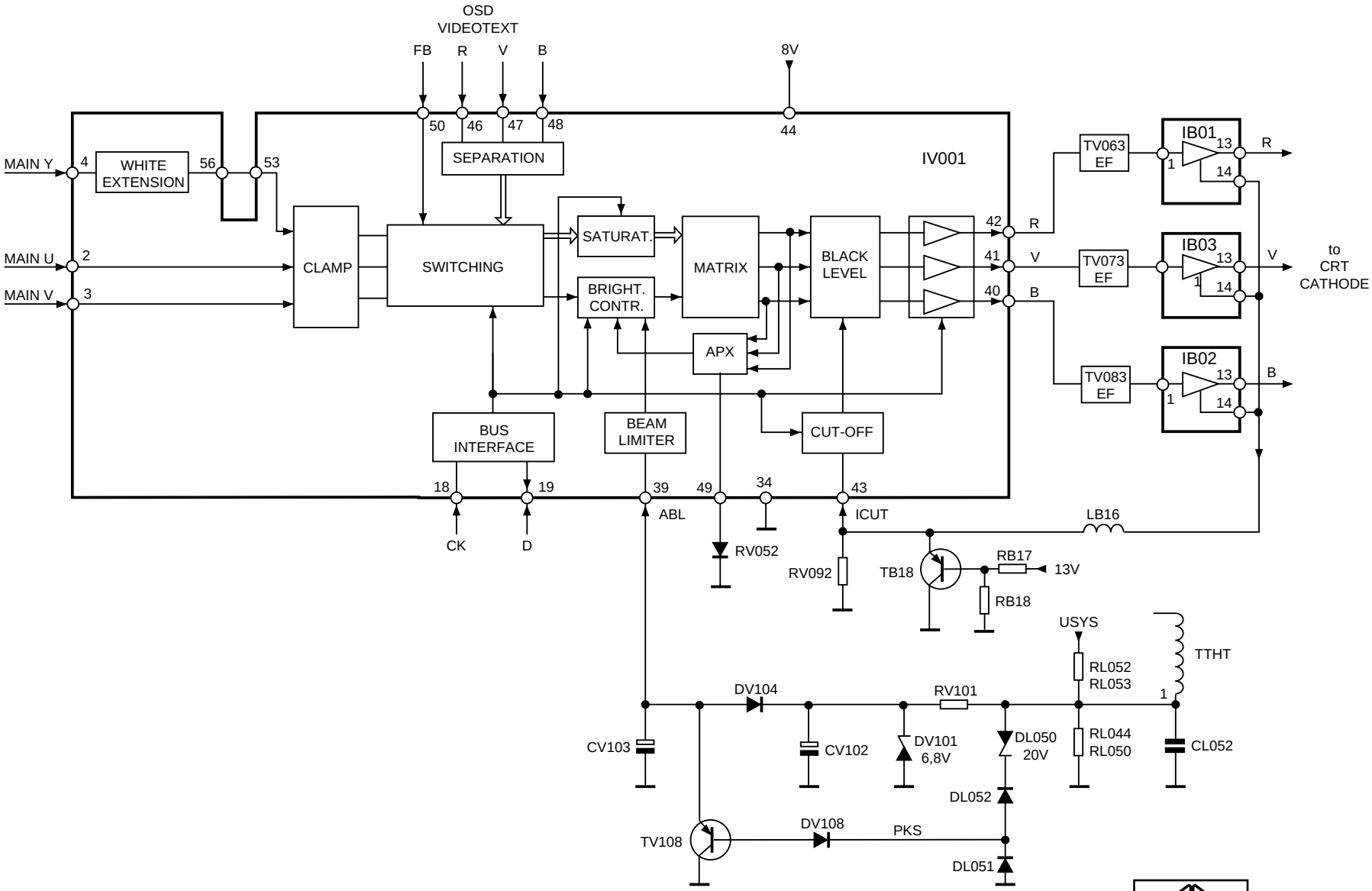
The selected signals are adjusted for light, contrast, and saturation, and are then RGB matrixed. The beam lock signal (ABL) arrives at the light and contrast adjustment stage. This signal comes from Point 1 of the line transformer, and indicates the tube rate. The AUTO-PIX circuit is an AGC that compensates for the differences in level between the various sources.

After automatic control of the cutoffs, the signals are amplified and made available on Outputs 40 through 42 of IV001. The gain of these amplifiers can be adjusted via Operating Mode (R DRV, G DRV, and B DRV).
The RGBs are then sent to the tube via the transistors (TV063/073/083) and the amplifiers (IB01, IB02, and IB03).

BEAM LOCK

The beam lock (ABL) voltage arrives at 39 of IV001. It is limited to 6.8 V by DV101, and to -20 V by DL050.
Light and contrast are not affected if the voltage is above 6 V. If the voltage falls below 6 V, contrast is limited. If the voltage falls below 4 V, light is limited.
Transistor TV108 uses the PeaK Sense signal to reduce contrast and light instantaneously in the event of a sudden increase in beam current.

NOTES :


OSD
VIDEOTEXT
FB
R
V
B
8V
50
46
47
48
44
IV001
MAIN Y
4
WHITE
EXTENSION
56
53
SEPARATION
MAIN U
2
MAIN V
3
CLAMP
SWITCHING
SATURAT.
BRIGHT.
CONTR.
MATRIX
BLACK
LEVEL
APX
42
41
40
R
V
B
TV063
EF
TV073
EF
TV083
EF
IB01
IB03
IB02
13
14
1
R
V
B
to
CRT
CATHODE
BUS
INTERFACE
BEAM
LIMITER
CUT-OFF
18
19
39
49
34
43
CK
D
ABL
ICUT
LB16
RV052
RV092
TB18
RB17
13V
RB18
USYS
TTHT
RL052
RL053
DV104
RV101
CV103
CV102
DV101
6,8V
DL050
20V
RL044
RL050
CL052
DL052
TV108
DV108
PKS
DL051

AUTOMATIC CUTOFF CONTROL

Automatic cutoff control is performed for Lines 21 through 24 and 334 through 337. To compensate for the tube leakage current, the RGB outputs are erased during Lines 21 and 334. The leakage current measurement determines a compensation current within IV001 that creates a voltage of 1.5 V at the terminals of RV092 (Pin 43 of IV001). This compensation current is memorised for an entire frame, and is taken into account for the automatic control of the tube cutoffs. This compensation current is added to the RGB gun cutoff measurement currents.

During Lines 22 and 335, the blue channel is in operation. The blue gun measurement current added to the compensation current produces a voltage at the terminals of RV092. This voltage is compared to an internal 3-V reference, and then determines the black level of the blue signal.

During Lines 23 and 336, the green channel is in operation. Its automatic control is identical to that of the blue channel.

During Lines 24 and 337, the red channel is in operation. Its automatic control is identical to that of the blue channel.

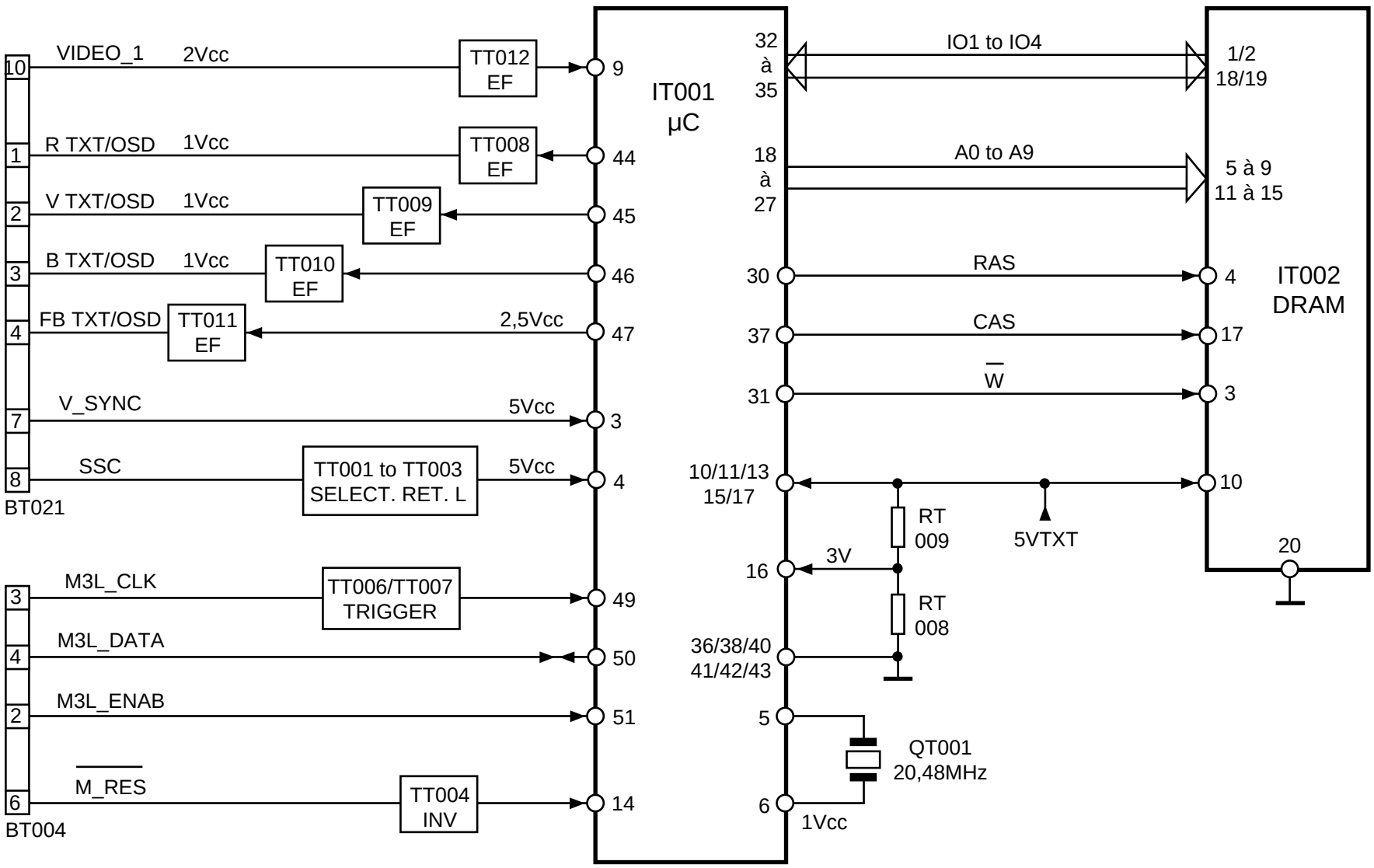
Transistor TB18 and its associated components limit the cutoff measurement voltage to approximately 4.2 V.

NOTES :

MEGATEXT
OSD

CONTENTS

• PROCESSING OF TELETEXT AND OSD


VIDEO_1
2Vcc
TT012 EF
R TXT/OSD
1Vcc
TT008 EF
V TXT/OSD
1Vcc
TT009 EF
B TXT/OSD
1Vcc
TT010 EF
FB TXT/OSD
TT011 EF
2,5Vcc
V_SYNC
5Vcc
SSC
TT001 to TT003 SELECT. RET. L
5Vcc
BT021
M3L_CLK
TT006/TT007 TRIGGER
M3L_DATA
M3L_ENAB
M_RES
TT004 INV
BT004
IT001 µC
IO1 to IO4
1/2 18/19
A0 to A9
5 à 9 11 à 15
RAS
CAS
W
IT002 DRAM
10/11/13 15/17
RT 009
5VTXT
3V
RT 008
36/38/40 41/42/43
QT001 20,48MHz
1Vcc

PROCESSING OF TELETEXT AND OSD

Teletext and OSD are completely managed by Microcontroller IT001, assisted by DRAM IT002.
IT001 is powered at 5 V and controlled by a 20.48-MHz clock. It communicates with IR001 via Bus M3L (at a rate of 850 kHz). It is configured as slave, and receives the MRESET initialisation command.

IT001 is a combination Teletext slicer, decoder, and VPS. The slicer separates Teletext data from the video signal. The IT001 processing unit checks, selects, and stores the requested data in the DRAM, IT002. A page of data occupies 1 KB of memory on average. IT002 is designed for 512 pages of Teletext.

The data (Teletext) acquisition PLL is locked from the video signal, Pin 9 of IT001. The display (Teletext and OSD) PLL is locked from the line and frame signals arriving on Pins 3 and 4 of IT001.

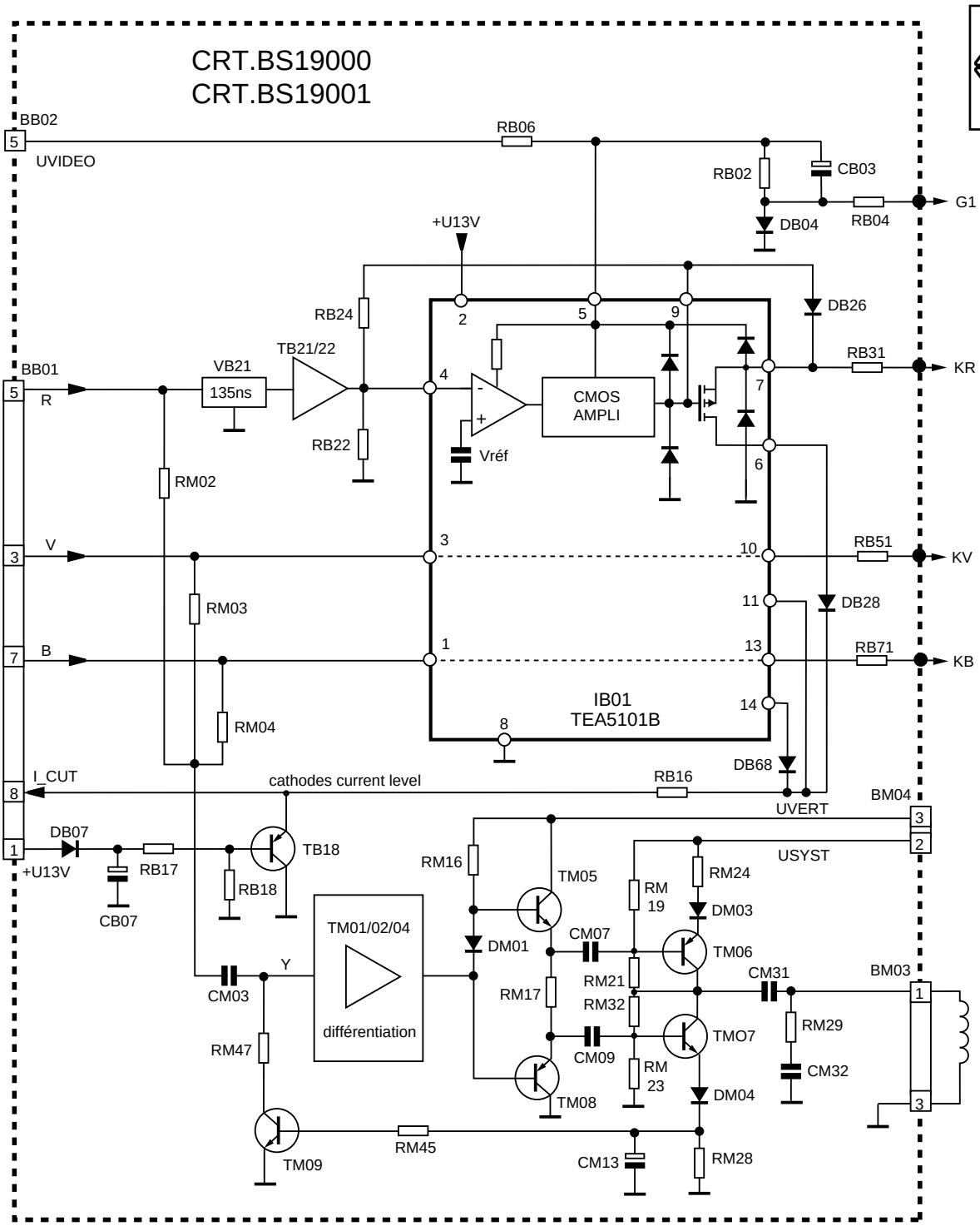
The display generator supplies 4-bit words for each pixel and each of the R, G, and B signals. The R, G, and B signals are then output through Pins 44 through 46 of IT001 via three digital-to-analogue converters. The level of these R, G, and B signals is proportional to the reference voltage at 16 of IT001. The fast switching signal, FB (Pin 47) accompanies the R, G, and B signals.

NOTES :

RVB AMPLIFIERS

CONTENTS

- GENERAL INFORMATION
- RGB AMPLIFIER
- SPOT BLANKING
- BSVM CORRECTION CIRCUIT


CRT.BS19000
CRT.BS19001
BB02
UVIDEO
RB06
RB02
CB03
G1
DB04
RB04
+U13V
DB26
RB24
TB21/22
VB21
135ns
BB01
R
RB31
KR
CMOS
AMPLI
Vréf
RB22
RM02
V
RB51
KV
RM03
DB28
B
RB71
KB
IB01
TEA5101B
RM04
I_CUT
cathodes current level
RB16
DB68
UVERT
BM04
USYST
DB07
+U13V
RB17
CB07
TB18
RB18
RM16
TM05
RM
19
RM24
DM03
DM01
CM07
TM06
TM01/02/04
différentiation
Y
CM03
RM17
RM21
RM32
CM31
BM03
RM29
CM32
TMO7
CM09
RM
23
DM04
TM08
RM47
TM09
RM45
CM13
RM28

GENERAL INFORMATION

Video amplification (50 Hz and certain 100-Hz models*) is performed by Integrated Circuit IB01, TEA5101B. This board is equipped with a Beam Scan Velocity Module (BSVM) correction circuit in some models. The BSVM correction circuit modulates the horizontal speed of the spot via an auxiliary correction coil, in order to enhance the edge.
For the other 100-Hz models, three TEA5101B integrated circuits are used, i.e. one per channel. This minimises crosstalk, even at high frequencies.

RGB AMPLIFIER

Integrated Circuit IB01 includes three differential amplifiers. Their gains are set by external negative feedback (RB 24/21, RB44/41, and RB64/61). The continuous output level is determined by resistors RB22, 42, and 62.
The 13 V at 2 of the circuit is used as a reference for the three amplifiers. Three PMOS transistors sample the measurement current from the cathodes (Pins 6, 11, and 14). Transistor TB18 limits the I-CUT signal required for automatic control of the tube to 4 V.

SPOT BLANKING

In operation,CB03 is charged to 150 V. The voltage of Grid G1 is 0.6 V because of DB04. When the TV is switched off, the 200 V disappears. Capacitor CB03 generates, and polarises G1 to -150 V, which prevents any secondary emission.

BSVM CORRECTION CIRCUIT

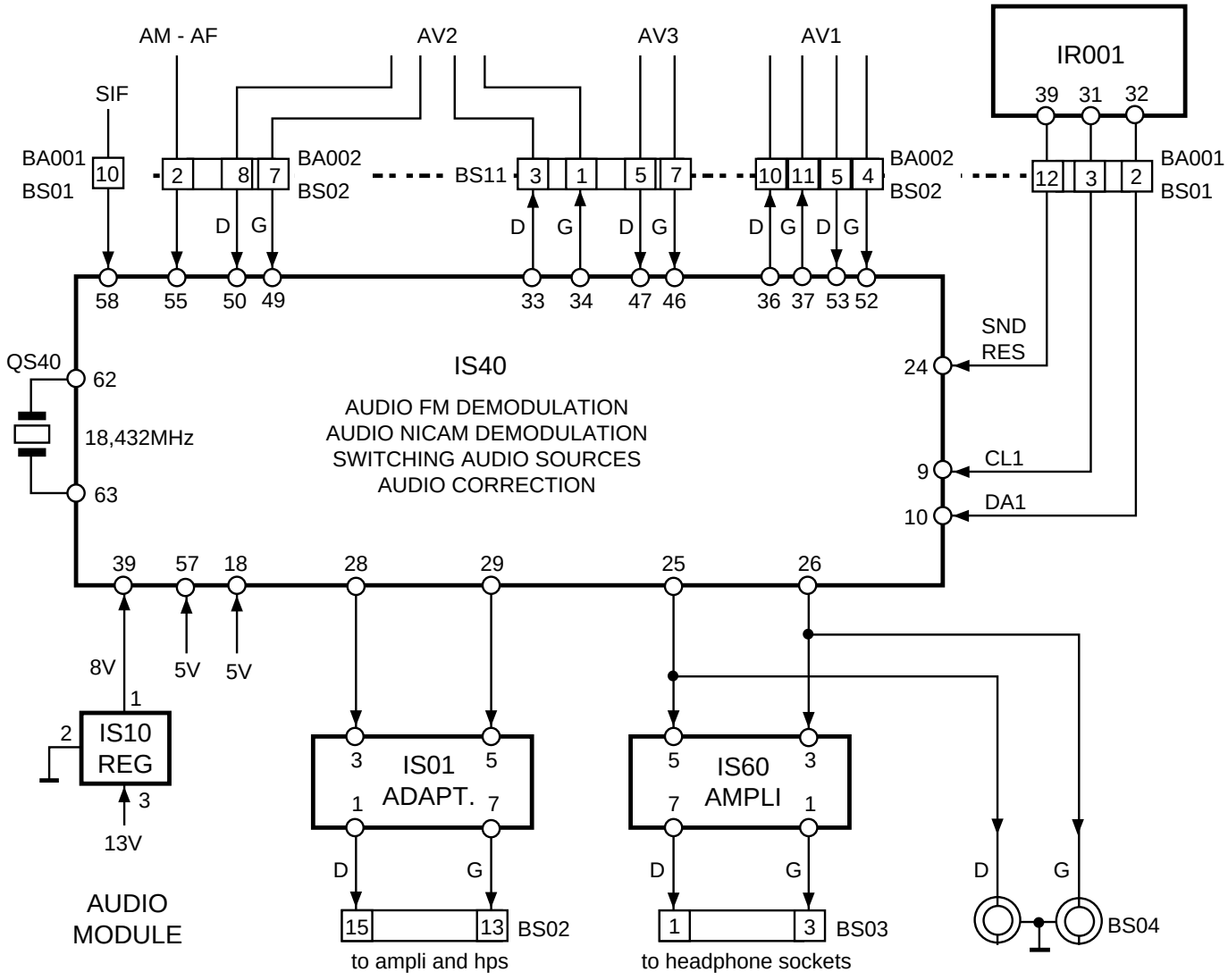
This correction consists in accelerating spot movement over the first half of a black/white transition, and then slowing this same movement over the second half of the transition. Because brightness is inversely proportional to spot speed, the beginning of the transition is darkened, and the end is brightened.

Signal Y is reconstituted by summing the RGBs in resistor network RM02 through RM04. The signal is then preamplified, and differentiated by Transistors TM01, TM02, and TM04. The correction current is supplied by an additional C-type amplifier (TM05/08 and TM06/07) to the 7-µH correction coil.
Transistor TM09 uses negative feedback to limit the current in the output amplifier to 30 mA.
Network RM29/CM32 damps any ringing that might arise.

AUDIO PROCESSING

CONTENTS

- AUDIO MODULE WITH MSP3410
- AUDIO POWER AMPLIFIER, IA001
- IA001 MUTE
- BOOMER POWER AMPLIFIER, IA002
- IA002 MUTE
- INTERLOCK


AM - AF
AV2
AV3
AV1
IR001
SIF
39 31 32
BA001
BS01
10
2 8 7
BA002
BS02
BS11
3 1 5 7
10 11 5 4
BA002
BS02
12 3 2
BA001
BS01
D G
D G D G D G D G
58 55 50 49 33 34 47 46 36 37 53 52
SND
RES
24
QS40
62
18,432MHz
63
IS40
AUDIO FM DEMODULATION
AUDIO NICAM DEMODULATION
SWITCHING AUDIO SOURCES
AUDIO CORRECTION
9
CL1
10
DA1
39 57 18 28 29 25 26
8V
5V
5V
1
2
IS10
REG
3
13V
3
1
IS01
ADAPT.
5
7
5
7
IS60
AMPLI
3
1
D G
D G
D G
15 13 BS02
1 3 BS03
BS04
AUDIO
MODULE
to ampli and hps
to headphone sockets

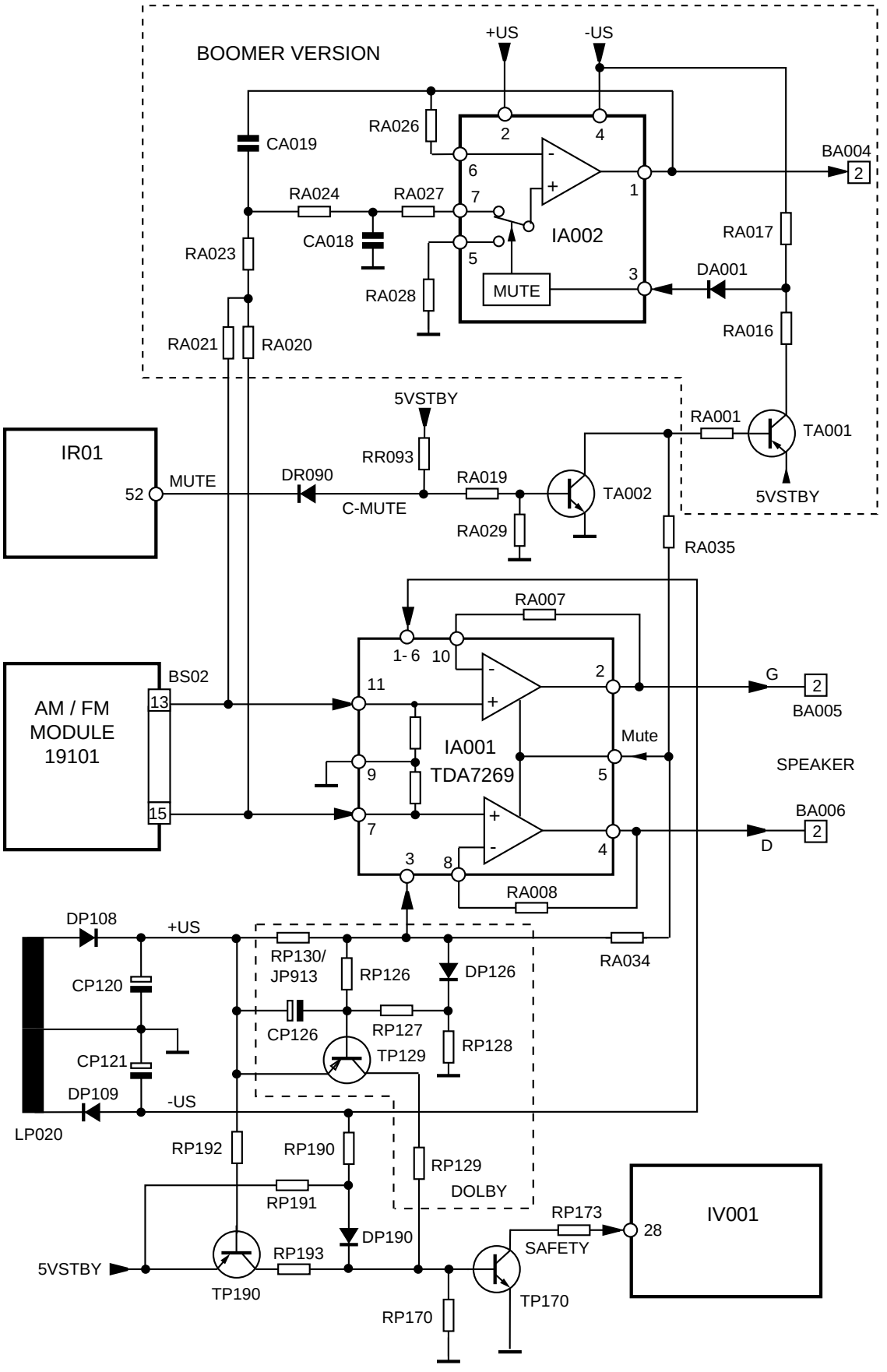
AUDIO MODULE WITH MSP3410

Integrated Circuit IS40 (MSP3410) is used for audio processing. It is controlled by an 18.432-MHz clock. Management microcontroller IR001 controls it via Bus IIC1, and executes its reset via Pin 39.

This integrated circuit performs the following functions:
- Demodulation of FM audio intercarriers,
- Demodulation of NICAM audio,
- Switching of the various analogue audio sources for the SCART outputs,
- Analogue-to-digital conversion of the various audio sources,
- Corrections on digital audio signals (tone, pseudo-stereo, expanded stereo, headphone volume, speaker volume, etc.).
- Digital-to-analogue conversion.

The audio signals for the headphone outputs are available on Pins 25 and 26 of IS40. They are amplified by Integrated Circuit IS60, and sent to Connector BS03.

The audio signals for the stereo speaker outputs are available on Pins 28 and 29 of IS40. They travel through impedance adapter IS01, and are sent to Pins 13 and 15 of Connector BS02.


BOOMER VERSION
+US
-US
RA026
CA019
BA004
2
RA024
RA027
CA018
RA023
RA028
IA002
MUTE
RA017
DA001
RA016
RA021
RA020
5VSTBY
RA001
TA001
IR01
52
MUTE
DR090
RR093
RA019
TA002
C-MUTE
RA029
RA035
RA007
1- 6
10
11
BS02
13
15
AM / FM
MODULE
19101
IA001
TDA7269
Mute
SPEAKER
G
BA005
BA006
D
9
5
7
3
8
4
RA008
DP108
CP120
CP121
DP109
LP020
RP130/
JP913
RP126
DP126
CP126
RP127
TP129
RP128
RA034
RP192
RP190
RP191
RP129
DOLBY
DP190
RP193
TP190
RP173
SAFETY
IV001
28
TP170
RP170

AUDIO POWER AMPLIFIER, IA001

The audio power amplifier consists of a single integrated circuit, IA001 (TDA7269). This is a B-type amplifier. It has a symmetrical +14 V/-14 V power supply.
The speaker output impedance is 8 W for a 2 x 10 W sinusoidal power output.

IA001 MUTE

Pin 5 of IA001can switch off the sound if it is at a potential of +US. In normal operation, the voltage at this pin is close to 5 V due to the saturation of Transistor TA002.

BOOMER POWER AMPLIFIER, IA002

This amplifier receives audio signals G and D mixed on Input 7 via a low-pass filter. The pass band of this amplifier is from 20 to 500 Hz.

IA002 MUTE

Pin 3 of IA002 can switch off the sound if it is at a potential of -US. In normal operation, the voltage at this pin is close to 8 V due to the saturation of TA001.

INTERLOCK

In the event of an overload on the +US power supply line, TP190 saturates and leads to the saturation of TP170. In the event of an overload on the -US line, the negative voltage (-5 V) on the anode of DP150 becomes positive, and leads to the conduction of TP170. In both cases, the voltage at 28 of IV001 goes to 0. The time base and regulation commands disappear. The TV shows an error code. The red LED flashes.

INTERLOCK WITH DOLBY OPTION

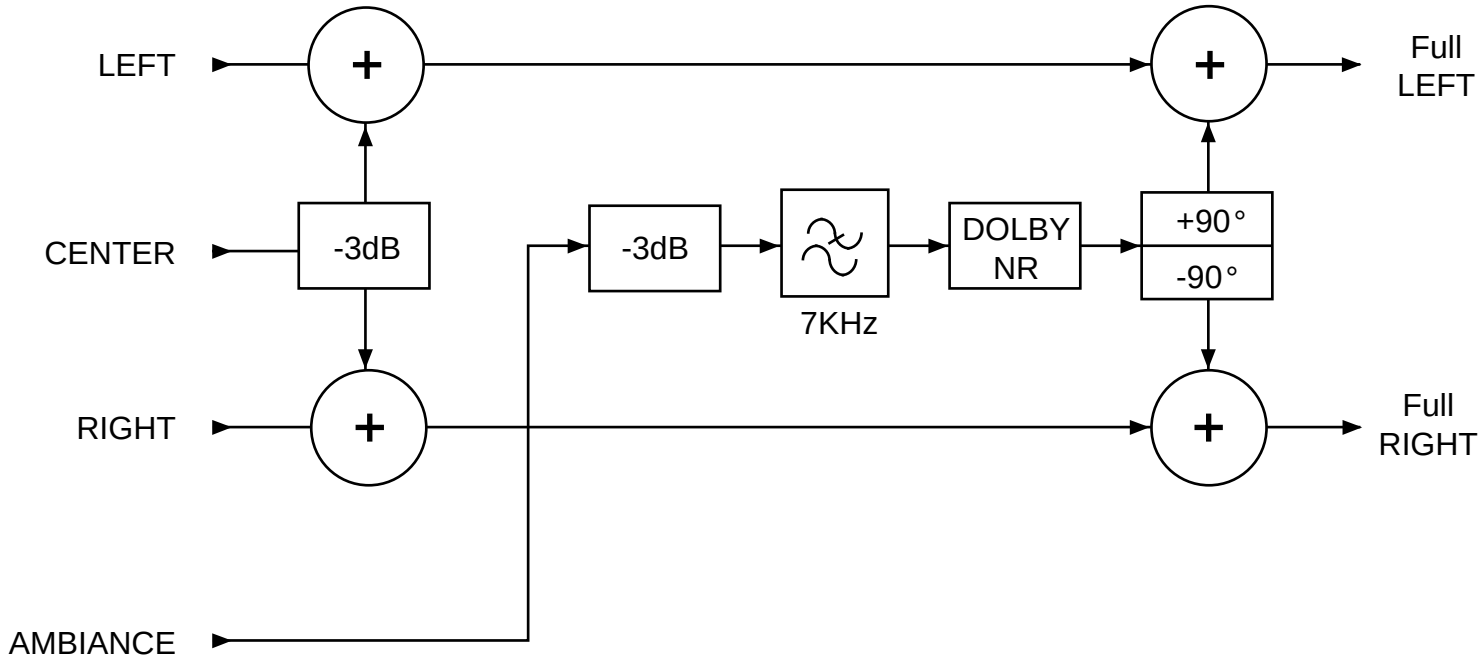
In the event of an overload on the +US power supply line, the voltage drop at the terminals of Resistor RP130 increases and leads to the conduction of Transistor TP129. Transistor TP170 is then saturated. The voltage at 28 of IV001 goes to 0. The time base and regulation commands disappear. The TV shows an error code. The red LED flashes.

MODULE AUDIO WITH DOLBY PROLOGIC

CONTENTS

• INTRODUCTION

• OPERATION



DOLBY SURROUND SCRAMBLE

INTRODUCTION

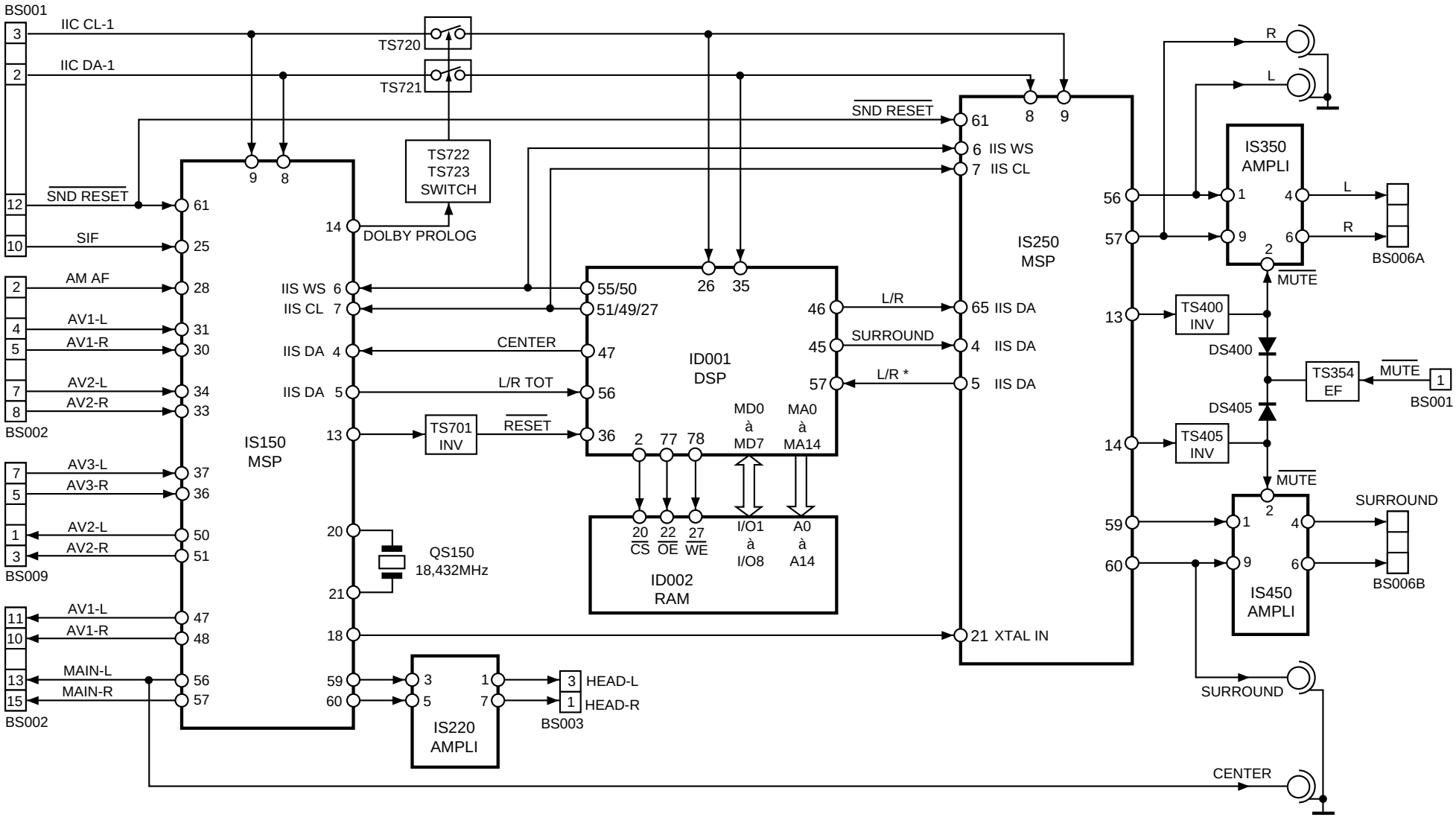
Dolby Surround and Dolby Surround Prologic encoding are consumer applications of the Dolby Stereo professional audio system used for the cinema.

This system consists of matrixing four channels on two tracks:

- The classic left and right channels,
- A central channel. After attenuation, this is added identically to the two channels.
- A background channel, attenuated, band-pass limited, corrected (modified Dolby B), phase shifted by +90° and -90°, is added to the two channels.

The two channels called "Total Left" and "Total Right" can be carried to the user via any stereophonic medium.

This system is fully compatible with classic stereophonic equipment.



THOMSON MULTI MEDIA

CENTRE DE FORMATION TECHNIQUE

OPERATION

Decoding takes place on the AM/DP module of the ICC19 chassis, using two MSP integrated circuits from ITT, and a DSP from Motorola. Operation is fully digital.

MSP3410

This IS150 circuit is used as in chassis that are not equipped for Dolby Prologic. It demodulates the FM or NICAM audio carriers received. It selects the various inputs: AV1, AV2, AV3, AM-AF, FM, NICAM, according to the configuration of the television set.
All incoming signals are digitised, while the analogue outputs from the IC come from a digital-to-analogue conversion.
This circuit sends the Total Right and Total Left signals, and receives the Centre signal, via Bus I2S.
The MSP3410 controls the headphone output, as well as the right and left outputs of the TV speakers, used as a Centre effect in Dolby Prologic Mode.

DSP 56004

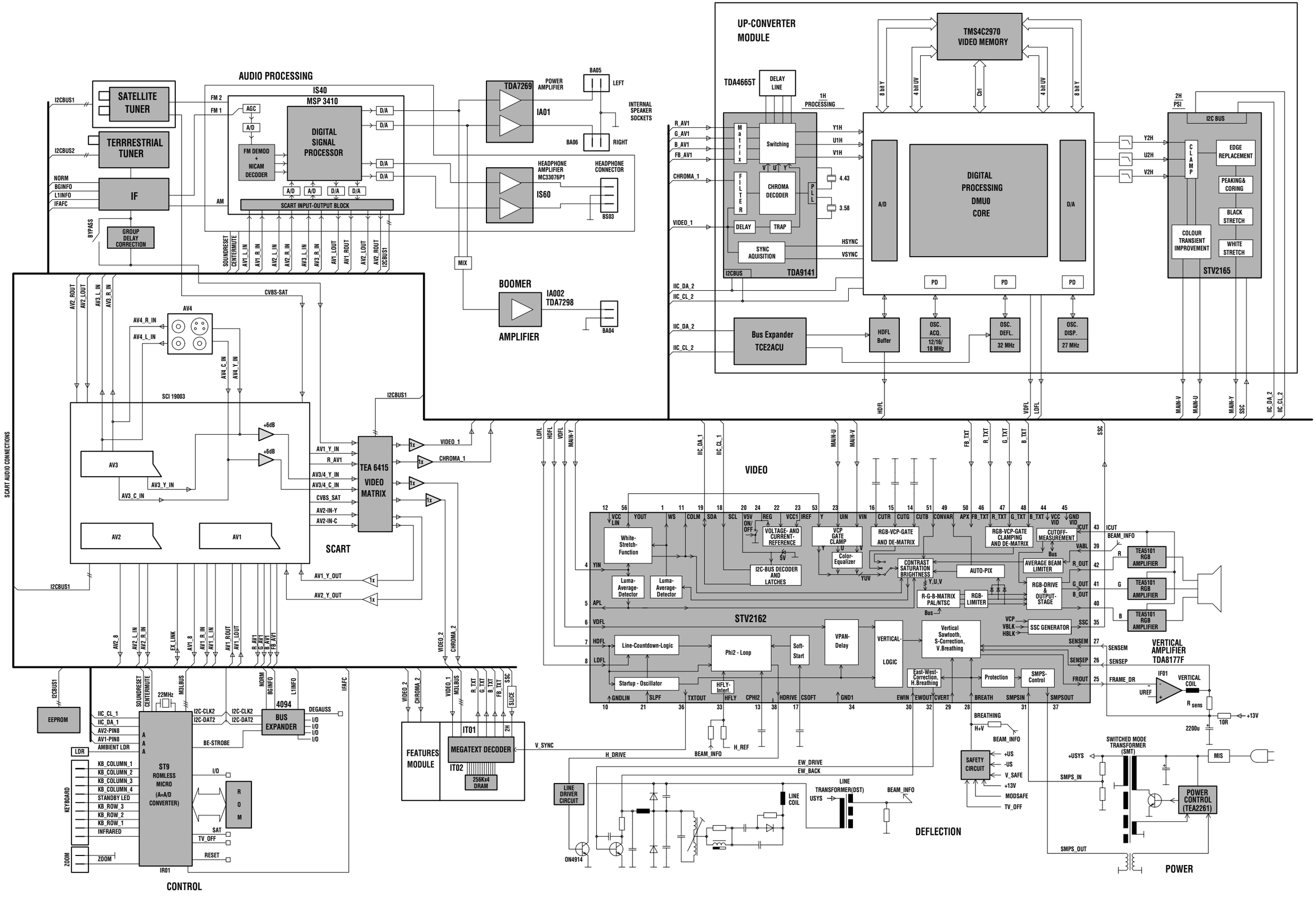
The Digital Sound Processor circuit works in a 24-bit internal format. The management microcontroller loads the software that is used, under licence from Dolby, via Bus I2C during the initialisation phase.
Using this program, the DSP generates four different channels, corresponding to the channels of the Prologic system.
The centre signal returns to the first MSP. The background signal and the external right and left channels are sent to the second MSP. These connections are made via Bus I2S.
During installation, the DSP uses a program controlled by the microcontroller to generate a sequence of noises for system configuration. The levels of the various channels can thus be adjusted according to the user's set-up. These adjustments are essential to obtain good results from the decoding of Dolby Prologic.
The DSP is associated with 256-kbit RAM ID002, through which an adjustable delay can be generated (Surround channel).

MSP3400

This circuit is different from the MSP3410 in the following two ways:
- This circuit does not perform NICAM processing,
- A second I2S bus input is wired in place of the SBUS input on the MSP3410.

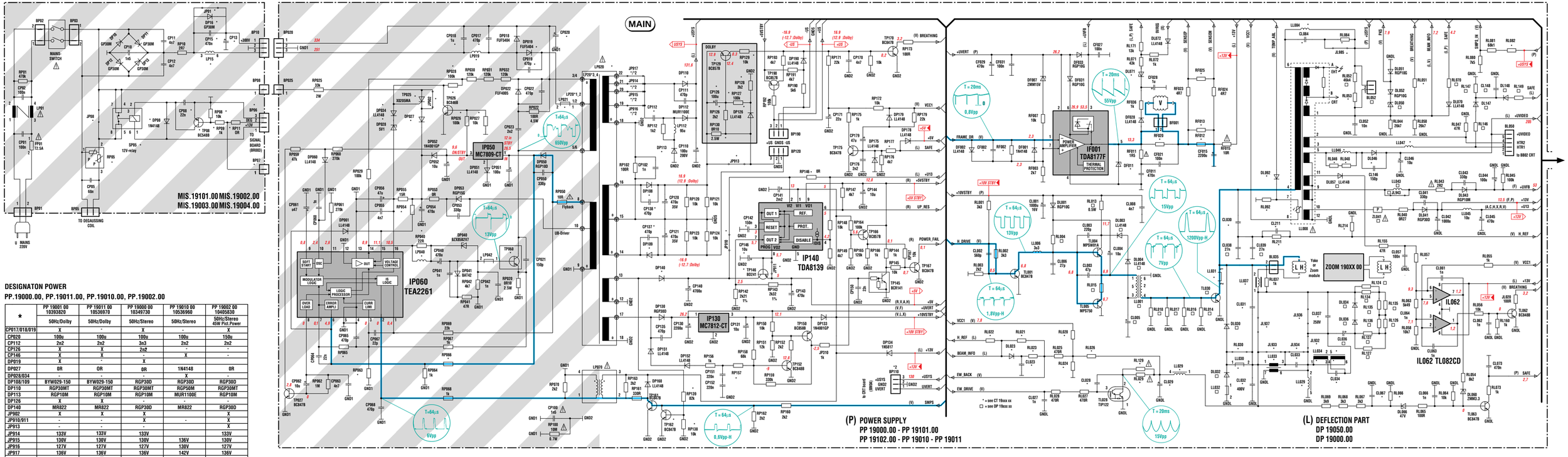
The FM demodulation stages are not used, and only the digital inputs are used.
The 18.432-MHz clock is the same as for the first MSP, to avoid clock synchronisation problems between the two ICs.
The signal from the background channel enters the IC through the first I2S input port. The signal from the right and left channels enters through the second I2S port.
After processing that includes digital-to-analogue conversions, these signal are available at the output. The right and left channels are output via the main outputs of the IC, and the background channel is output via the outputs initially intended for the headphones.
R/L* feedback is planned for MSP versions that perform the equaliser function.

BLOCK DIAGRAM - SCHEMA SYNOPTIQUE - BLOCKSCHALTBILD - SCHEMA A BLOCCI - ESQUEMA DE BLOQUES



ICC19 100 Hz
First issue 09 / 97

COMPLETE PCB DIAGRAM - SCHEMA PLATINE PRINCIPALE EQUIPEE - SCHALTUNG LEITERPLATTE KPL - SCHEMA PIASTRA COMPLETA - ESQUEMA PLATINA EQUIPADA



DESIGNATON POWER

PP.19000.00, PP.19011.00, PP.19010.00, PP.19002.00

★	PP 19001 00 10393820	PP 19011 00 10536970	PP 19000 00 10349730	PP 19010 00 10536960	PP 19002 00 10405830
	50Hz/Dolby	50Hz/Dolby	50Hz/Stereo	50Hz/Stereo	50Hz/Stereo 65W Pict.Power
CP017/018/019	X	-	X	-	X
CP020	100u	100u	100u	100u	150u
CP112	2n2	2n2	3n3	2n2	2n2
CP126	X	X	2n2	-	-
CP146	X	X	-	X	-
DP019	X	-	X	-	-
DP027	0R	0R	0R	1N4148	0R
DP028/034	-	-	-	X	-
DP108/109	BYW029-150	BYW029-150	RGP30D	RGP30D	RGP30D
DP110	RGP30MT	RGP30MT	RGP30MT	RGP50M	RGP30MT
DP113	RGP10M	RGP10M	RGP10M	MUR1100E	RGP10M
DP126	X	X	-	-	-
DP140	MR822	MR822	RGP30D	MR822	RGP30D
JP902	X	X	X	-	X
JP910/911	-	-	X	-	X
JP913	-	-	-	-	X
JP914	133V	133V	133V	-	133V
JP915	130V	130V	130V	136V	130V
JP916	127V	127V	127V	130V	127V
JP917	136V	136V	136V	142V	136V
LD919	180u	X	180u	195u	180u
LP020	10385280	10536280	10378130	10459670	10378130
LP020	10385280	10536280	10378130	10459670	10378130
LP021	X	-	X	X	X
LP040	4u7	4u7	4u7	2u2	4u7
RP026/028	-	-	-	X	-
RP827	-	-	-	X	-
RP840	1/4W	1/4W	1/4W	1/2W	1/4W
RP054	5R6	5R6	5R6	6R8	5R6
RP063	10k	10k	10k	47k	10k
RP065	10k	12k1	10k	12k1	10k
RP066	3k48	3k57	3k48	3k57	3k48
RP126/128	X	X	-	-	-
RP127/129	X	X	-	-	-
RP130	X	X	-	-	-
RP138/139	-	-	-	X	-
RP146	X	X	-	X	-
RP157	150k	150k	150k	130k	150k
RP177	22k	22k	22k	130k	22k
TP025/026	-	-	X	X	-
TP060	BUV48CFI	BUV48CFI	BUV48CFI	BUL810TH	BUV48CFI
TP129	X	X	-	X	-
TP146	X	X	-	X	-
TP162	-	-	-	X	-

X Inserted
– Not inserted

★	different comp.	BP06	BP07	CP08	CP13	CP15	DP08	DP16	JP01	JP08	LP15	RP05	RP08	RP09	SP05	TP08
MIS.19101	100Hz/+relay	X	X	X	150u	X	X	X	—	—	1.5mH	18R	X	X	X	X
MIS.19002	50Hz	—	—	—	100u	X	—	X	1mH	—	3mH	25R	—	—	—	—
MIS.19003	50Hz/+relay	X	X	X	100u	X	X	X	—	—	3mH	18R	X	X	X	X
MIS.19004	50Hz/45W Pict.Pow.	—	—	—	—	X	—	X	—	X	3mH	25R	—	—	—	—
MIS.19012	50Hz	—	—	—	100u	—	—	—	X	—	2SR	—	—	—	—	—
MIS.19111	100Hz/+relay	X	X	X	150u	—	X	—	X	—	—	18R	X	X	X	X

X Inserted
– Not inserted

Part of board connected to mains supply.
Partie du chassis reliée au secteur.
Primärseite des Netzteils.
Parte dello châssis collegata alla rete.
Parte del chassis conectada a la red.

Use isolating mains transformer
Utilise un transformateur isolateur du secteur
Einen Trenntrafo verwenden
Utilizar un transformador aislador de red
Utilizzare un transformatore per isolarvi dalla rete

Note :
Power Supply primary circuit measurements.
- Use only (GND1) connection point.

Attention :
Mesure dans le bloc alimentation
- Utiliser la masse du bloc alimentation (GND1).

Achtung :
Bei Messungen im Primärnetzteil
- Primärnetzteilmasse verwenden (GND1).

Attentionze :
misure nell'alimentatore primario
- usare massa alimentazione primario (GND1).

Cuidado :
Medida en el bloque de alimentacion
- Utilizar la masa del bloque de alimentacion (GND1).

Safety Part
When repairing, use original part only
Piece de securite
N'utilisez que les pieces d'origine
Sicherheitsbauteil
Bei Ersatz nur Originalteil verwenden
Componenti di sicurezza
durante la ripazione usare componenti originali
Pieza de seguridad
Utilice solo piezas originales

□	Deflection - Basic Partlists	
	50Hz ZOOM DP 19050 00 10 34 99 70	50Hz DP 19000 00 10 34 99 60
BL052	X	-
CL005	220u/25V	220u/25V
CL036	–	2u2/250V
CL038	27n	27n
CL039	27n	27n
CL148	–	–
DL003/04	X	X
DL030	DTV32F-1500	DTV32F-1500
DL032	BYW76	BYW76
DL034/036	–	RGP10G
DL050	BZX85C30	BZX85C30
DL057	X	X
DL147/148	–	–
JL043	X	X
LL001	10 51 81 10	10 51 81 10
LL030	–	–
LL032	Jumper	Jumper
LL043	–	–
RF015	10R	10R
RL004	1k8	1k8
RL013	10R	10R
RL014	68R	68R
RL015	2R2	2R2
RL016/17	68R	68R
RL01	-	-
RL070	33k	33k
RL071	43k	43k
RL124/127	–	7k5
RL134/137	–	7k5
RL146	–	–
RL147	–	–
RL149	–	–
TL030	BUV48CFITH16	BUV48CFITH16
ZL041	MP125	MP125

★	Deflection - Picture Tube related Partlists CT 19005 31 10 51 08 90 50Hz 25°SF-29°SF 4/3	CT 19003 32 10 35 15 20 50Hz 25-28°MP 4/3	CT 19031 37 10 44 62 60 50Hz ZOOM 28°SF-32° 16/9
CF002	1n5	1n5	1n5
CL023	10n	10n	10n
CL028	1n	47n	47n
CL029	3n3/63V	4u7/160V	4u7/160V
CL030	1n8/2KV	1n8/2KV	1n8/2KV
CL031	14n4/1K5V	12n8/1K6V	12n8/1K6V
CL032	33n/400V	24n/400V	24n/400V
CL033	–	1u5/160V	1u5/160V
CL034	–	–	–
CL037	510n/250V	560n/250V	–
CL067	–	100n/100V	100n/100V
CL084	4n7/250V	4n7/250V	4n7/250V
CL211	–	–	–
DF011	10 35 18 80	10 35 18 80	10 35 18 80
DL023	BAV103	BAV103	BAV103
DL046	RGP10M	RGP10M	RGP10M
DL071	BZX55C33	BZX55C33	BZX55B11
DL092	–	–	–
JL932	X	X	X
JL933	X	X	X
JL934	X	X	X
JL936	–	–	X
JL937	–	–	–
JL985	–	–	–
LL008	10 51 77 20	10 51 77 40	10 51 77 50
LL029	10 37 74 20	10 09 50 60	10 09 50 60
LL030	–	–	–
LL031	LFBEAD 90R	LFBEAD 90R	LFBEAD 90R
LL033	–	–	–
LL034	–	–	–
LL037	24u	24u	24u
LL046	–	–	–
LL047	25u	25u	25u
LL084	24u	24u	24u

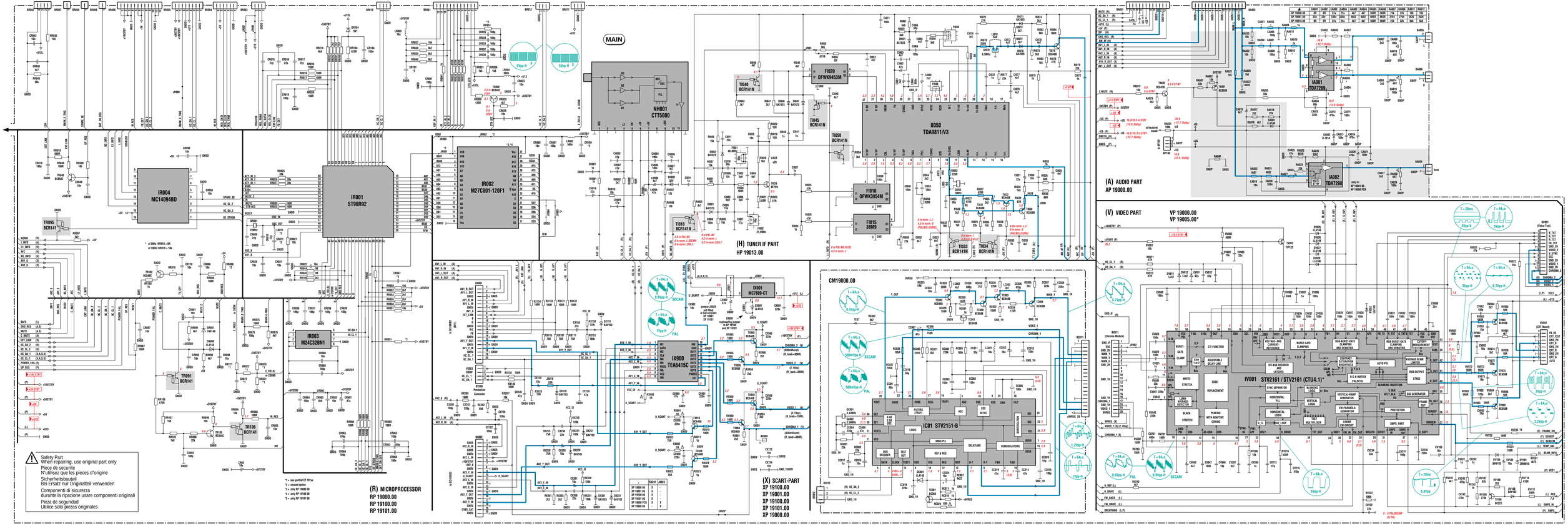
★	Deflection - Picture Tube related Partlists CT 19005 31 10 51 08 90 50Hz 25°SF-29°SF 4/3	CT 19003 32 10 35 15 20 50Hz 25-28°MP 4/3	CT 19031 37 10 44 62 60 50Hz ZOOM 28°SF-32° 16/9
RF002	–	–	–
RF012	1R5	1R5	1R5
RF013	1R5	1R5	1R5
RF020	220R	220R	–
RF025	91R	221R	240R
RL020	3k09	3k09	3k09
RL021	–	–	–
RL023	100k	120k	120k
RL024	1k82	1k82	1k82
RL026	37k4	37k4	37k4
RL029	2R2	2R2	2R2
RL046/48	0R	0R	0R
RL051	750k	750k	750k
RL053	5k1	30k	8k2
RL057	40k2	39k2	40k2
RL066	1k8	–	–
RL082	56k2	56k2	61k9
RL084	12R	12R	12R
RL092	–	–	–
RL129	–	–	–
RL211	12k	12k	12k
RL214	2k7	2k7	2k7
ZOOM MODULE	–	–	10 39 10 40

Note : the last two numbers of the CT xxxx part list name indicates the system voltage.
e.g. CT 19005 31 Usys 131V →

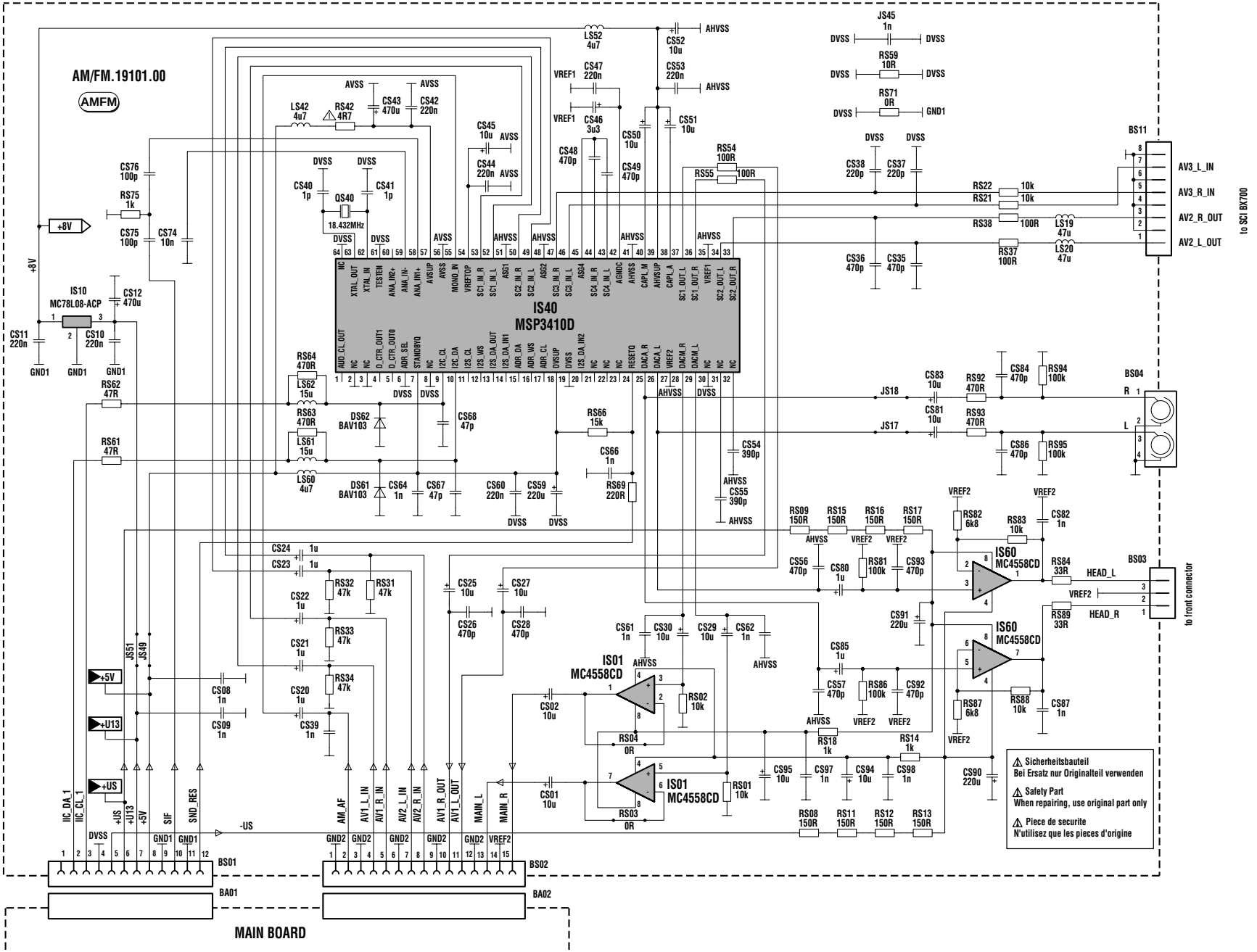
Nota : Los dos últimos números de la denominación CT xxxx, indica la tensión Usys
e.g. CT 19005 31 Usys 131V

X Inserted
– Not inserted

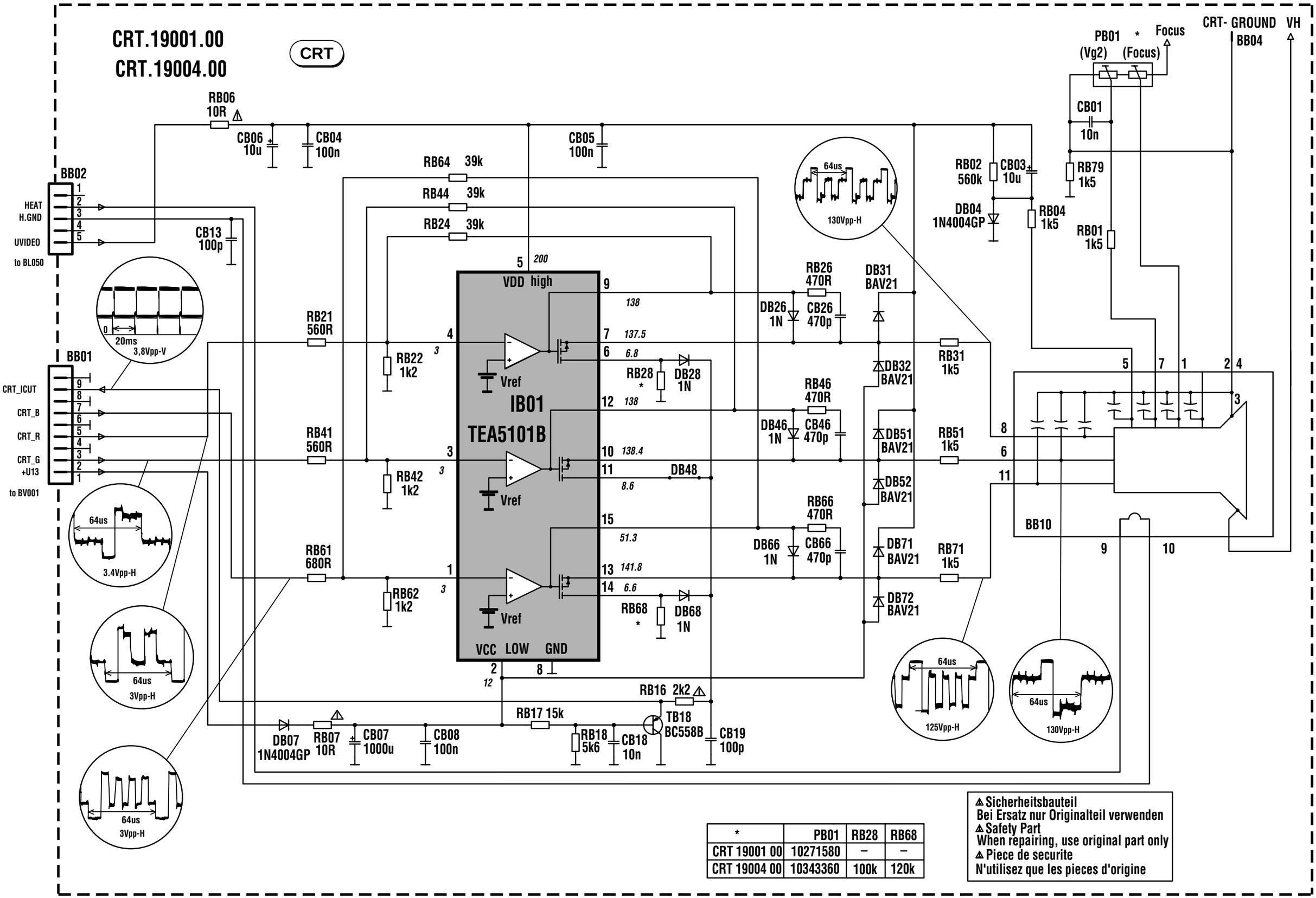
COMPLETE PCB DIAGRAM - SCHEMA PLATINE PRINCIPALE EQUIPEE - SCHALTUNG LEITERPLATTE KPL - SCHEMA PIASTRA COMPLETA - ESQUEMA PLATINA EQUIPADA



AUDIO SIGNAL MODULE - MODULE AUDIO - TON SIGNAL BAUSTEIN - MODULO AUDIO



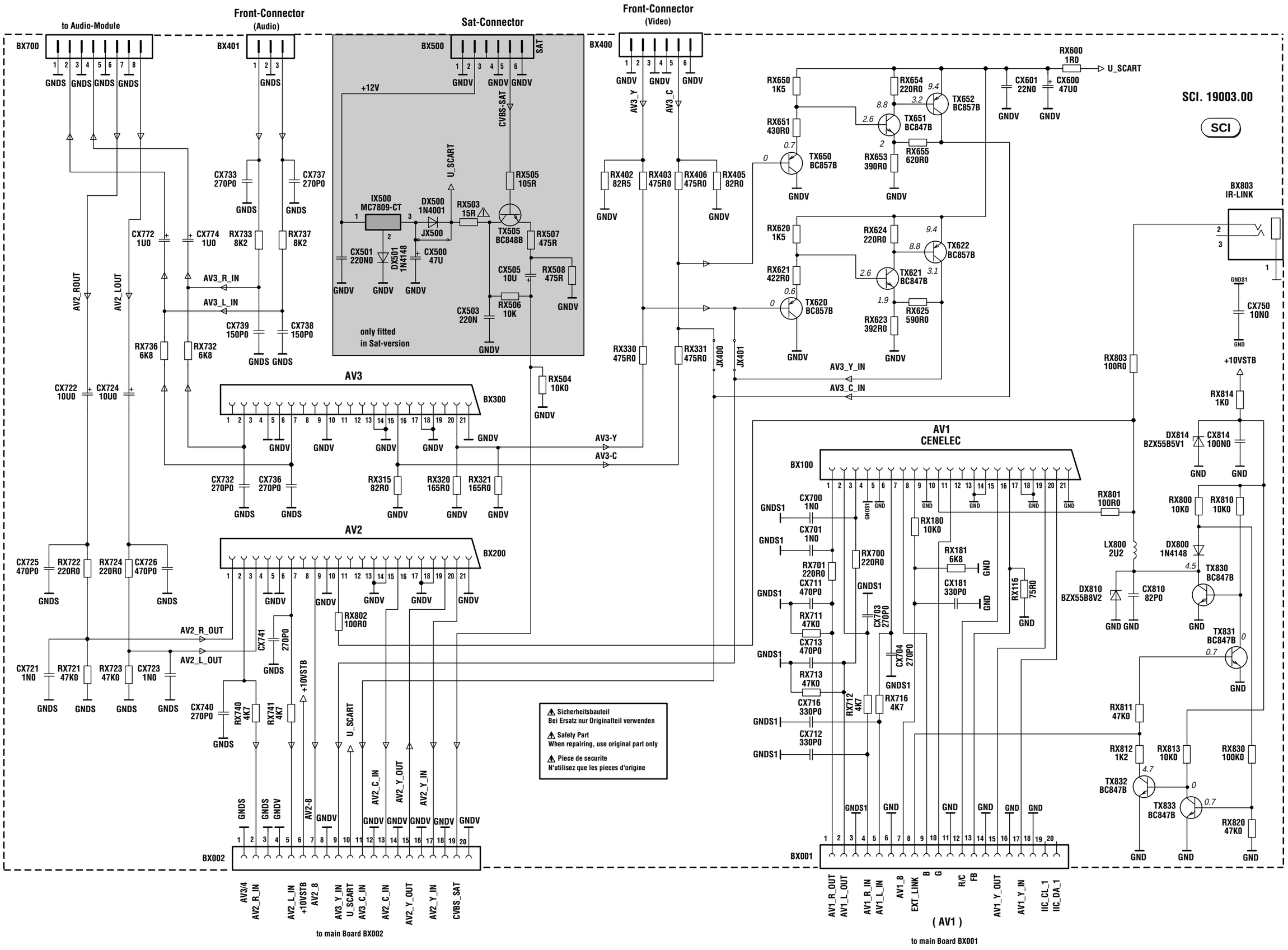
VIDEO AMPLIFIER BOARD - PLATINE AMPLIFICATEURS VIDEO - VIDEOVERSTÄRKERPLATTE
PIASTRA AMPLIFICATORE VIDEO - PLATINA AMPLIFICADOR VIDEO



*	PB01	RB28	RB68
CRT 19001 00	10271580	–	–
CRT 19004 00	10343360	100k	120k

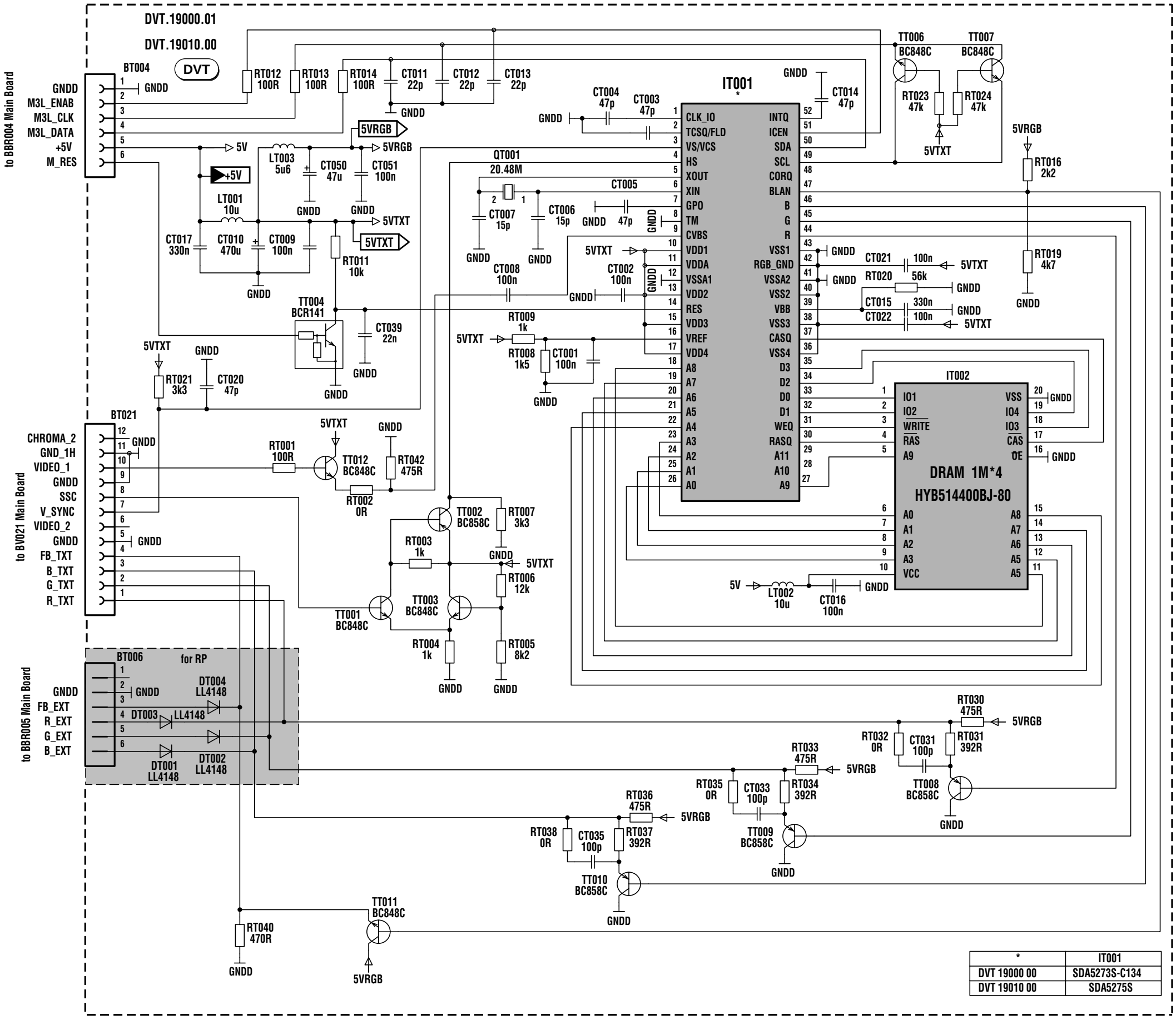
⚠ Sicherheitsbauteil
Bei Ersatz nur Originalteil verwenden
⚠ Safety Part
When repairing, use original part only
⚠ Piece de securite
N'utilisez que les pieces d'origine

SCART INTERFACE MODULE - MODULE INTERFACE PERITELEVISION - SCART INTERFACE - MODULO PRESA PERITEL - MODULO EUROTOMA



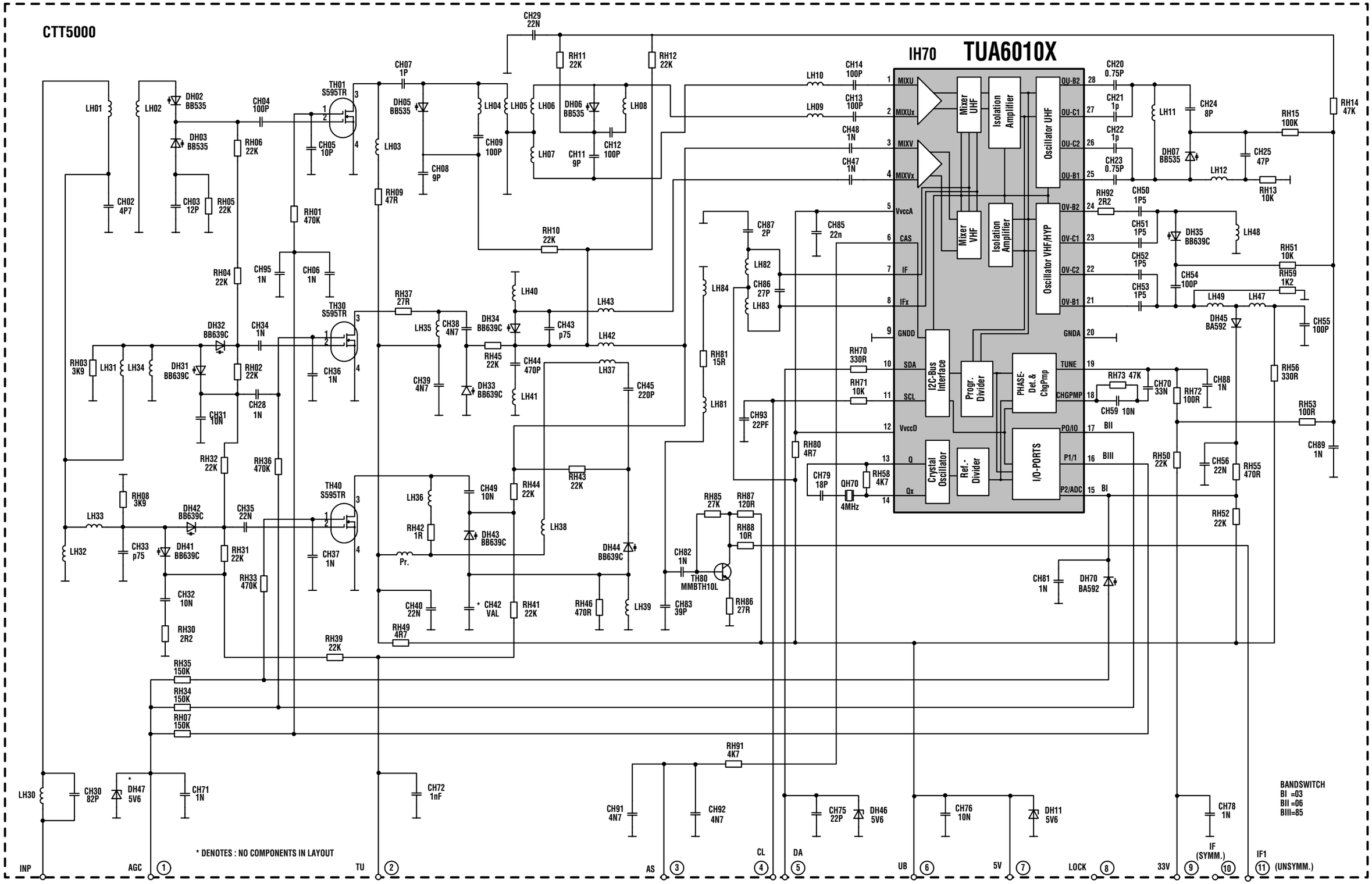
ICC19 50 Hz
First issue 09 / 97

TELETEXT MODULE - MODULE TELETEXTE - VIDEOTEXT MODUL - MODULO TELEVIDEO - MÓDULO TELETEXTO

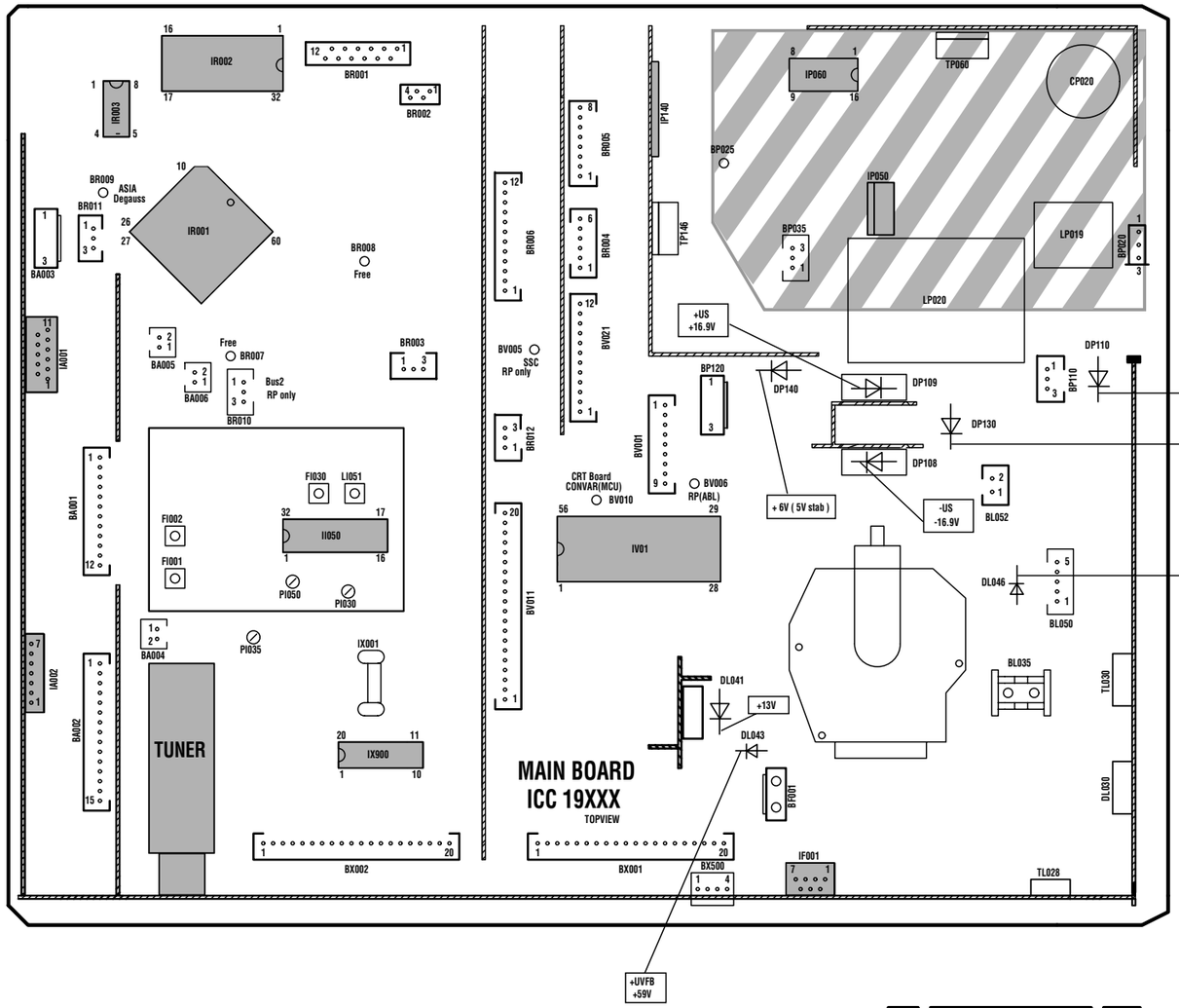


*	IT001
DVT 19000 00	SDA5273S-C134
DVT 19010 00	SDA5275S

VHF / UHF TUNER CTT5000 (For information only)



LOCATION OF CONTROLS - EMPLACEMENT DES REGLAGES - SERVICE LAGEPLAN - POSIZIONE REGULATORI DI SERVIZIO - SITUACIÓN DE LOS AJUSTES



Do not disconnect modules when they are energized !
Repairs on power supply section are to be carried out only with isolating transformer.

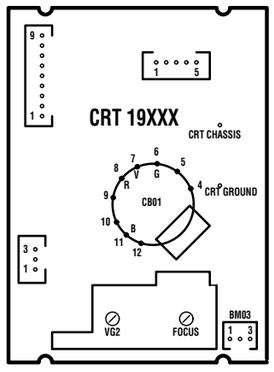
Ne pas retirer les modules lorsqu'ils sont sous tension.
N'effectuer les travaux de maintenance sur la partie reliée au secteur (Switch mode) qu'au travers d'un transformateur d'isolement.

Module nicht bei eingeschaltetem Gerät entfernen !
Servcearbeiten am Netzteil nur unter Verwendung eines Regeltrenntrafos durchführen.

Non scollegarei moduli quando sono alimentati !
intraprendere riparazioni sulla sezione alimentatore solo con transformatore isolante.

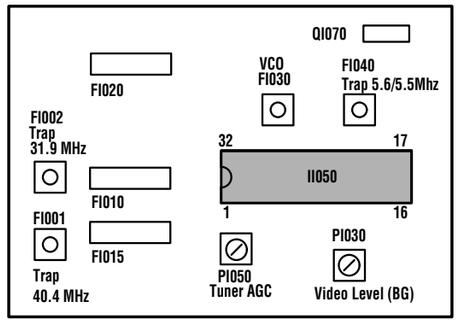
No desconectar los módulos cuando están activados !
Las reparaciones en la sección de alimentación de energia deben ser ejecutadas solamente con un transformador de separacíon.

Part of Board connected to mains supply.
Partie du châssis reliée au secteur.
Primärseitedes Netzteils
Parte del panello collegato alla rete di alimentazione
Parte del chasis conectada a la red



ADJUSTMENTS - REGLAGES - EINSTELLUNGEN - REGOLAZIONE - AJUSTES

U Sys	SERVICE MODE	Standard TV - Settings : OMA Position TV to AV1 : Black test pattern	V= DP 110	TUBE NAME / DESCRIPTION / Usys jumper / Usys A66ECY 13X 15 / 4/3 28" MP / JP914 / 132V +/- 0.5V A59EGD048X300 / 4/3 25" SF / JP915 / 131V +/- 0.5V A68EGD038X300 / 4/3 29" SF / JP915 / 131V +/- 0.5V W66EGV023X115 / 16/9 28"SF / JP917 / 137V +/- 0.5V W76EGX023X115 / 16/9 32"SF / JP917 / 137V +/- 0.5V
IF Alignment VCO Standard BG	FI030	Switch set to standard BG IF Signal 38.9 MHz (BG) 30 mV G 75Ω TUNER 11 NH01	V= RI078 AFC (uP) 42 IR01	Adjust FI30 / PI54 for 2,5VDC +/-0.1V
VIDEO-LEVEL Alignment	PI030 PI035	Standard Signal (BG / L) 15kHz test pattern 3 mV G 75Ω TV set Antenna	Oscillo. SCART Video output	Adjust PI030 : standard BG Adjust PI035 : standard L for V = 0,7 Vpp (Black/white level)
V G2 METHOD 1 Measurment method	G2 poten-tiometer	Standard TV - Settings : OMA Position TV to AV1 : Black test pattern	highest output CRT 1900X (50Hz) : R signal : IB01 Pin 15 G signal : IB01 Pin 12 B signal : IB01 Pin 15	V 1 - Adjust VG2 : V= 160V +/- 5 V 2 - Adjust Focus 3 - Adjust VG2 : V= 160V +/- 3V
METHOD 2 Cut-off counter method SERVICE MODE	SERVICE MODE	Standard TV - Settings : OMA Position No test pattern (generated by internal text processor).		Adjust R-Cut off and G-Cut-off to 80H temporary. Select G2 Alignment in Service Mode Adjust the lowest value to: Select "Restore" in Service Mode and press "OK" to restore the cut-off values. Tube Type / Value A66ECY 50H A79ECU - A89AEJ - A59EGD 60H A68EGD 50H W56EGV - W66EGV 50H W76EGX 60H
FOCUS	FOCUS	Test pattern (standard values)		Sharp picture



ICC19 50 Hz
First issue 09 / 97

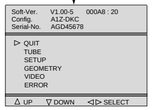
SERVICE MODE (GB) | MODE SERVICE (F) | SERVICE - MODE (D) | SERVICE - MODE (I) | MODO SERVICIO (E)

I - ENTER/EXIT SERVICE MODE - ENTREE/SORTIE DU MODE SERVICE - EIN-AUSTIEG SERVICE MODE - ACCESSO/USCITA ALLA/DALLA FUNZIONE - ENTRADA/SALIDA MODO SERVICIO

1 ACCESSING SERVICE MODE

TV Control Panel Access

- Turn "Off" the TV using the **ON/OFF** button.
- Press the **PR-** and **VOL-** buttons ,hold them down and switch "On" the TV with the **ON/OFF** button.
- After the normal switch on time the main service menu appears on the screen.

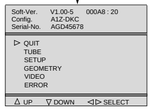


Note :
In service mode :
- *The child lock function is re-initialized*
- *The look function (PIN Number) is ignored.*
- *Clear any wake-up/sleep timers*
- *Pin 8 of the scart plug has to be ignored.*
- *AV- Link WSS detection , EPG and Teletext have to be disabled.*
- *Automatic stand-by functions, in case of no antenna signal have to be disabled.*
- *Contrast, colour, brightness : factory settings.*
- *Sharpness : middle (nominal)*
- *Contrast expander to low.*
- *Install Mode disabled.*
- *Default format and zoom..*

1 ACCES AU MODE SERVICE

Accès avec le clavier du téléviseur

- Arrêter le TV avec la touche **M/A.**
- Tout en appuyant sur les touches **PR -** et **VOL - ,** mettre le TV en service à l'aide de la touche **M/A.**
- Maintenir enfoncées les touches **PR -** et **VOL -.**
  Le menu suivant apparaît.



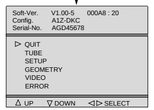
Note :

En mode service:
- *Le verrouillage parental est effacé (réinitialisé).*
- *La fonction de verrouillage (Pin number) est ignorée.*
- *La programmation des heures «reveille/matin» est annulée.*
- *Possibilité de passer en mode service avec commutation lente active.*
- *AV- Link , la détection WSS, l'EPG et le Vidéotexte ne sont pas validés.*
- *La fonction de stand-by automatique en cas d'absence de signal d'antenne n'est pas validée.*
- *Les valeurs de réglages usine sont affectées au contraste, à la couleur et à la lumière.*
- *Le contour est appelé à sa valeur moyenne.*
- *L'expansion contraste est au niveau bas.*
- *Le mode d'installation et l'ambiance «Light sensor» ne sont pas validés.*
- *Zoom et format ignorées.*

1 EINSTIEG IN DEN SERVICE MODE

Zugriff über die Tastatur des Fernsehgeräts

- Fernsegerät über die EIN/AUS - Taste ausschalten.
- Gleichzeitig die Tasten PR- und VOL- drücken und den Fernseher über die EIN/AUS-Taste einschalten.
- Die Tasten PR- und VOL - gedrückt halten.



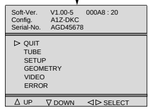
Anmerkung :

Im SERVICE MODE :
- *wird die Sperrfunktion (PIN-Nummer) ignoriert und die Kindersicherung gelöscht (reinitialisiert).*
- *werden alle Ein- und Ausschaltzeitgeber gelöscht.*
- *wird die SCART - Scaltspannung ignoriert.*
- *werden AV- Link WSS, EPG und Teletext gesperrt*
- *wird die Automatische Abschaltung bei fehlendem Antennensignal gesperrt.*
- *werden Kontrast, Farbe und Helligkeit auf standardwerte gesetzt.*
- *wird die bildschärfe auf Mittelstellung (nominal) gesetzt.*
- *wird der Kontrast-Expander auf "gering.." gesetzt.*
- *wird der Installations Modus gesperrt.*
- *wird das Standardformat bzw. der Standard-Zoom-modus gewählt.*

1 ACCESSO AL SERVICE MODO

tramite i comandi del televisore

- Spegnere il TV mediante il pulsante ON/OFF.
- Premere i tasti **PR- e VOL-** accendendo il TV con il pulsante ON/OFF.
- Premere i pulsanti **PR - e VOL -.**



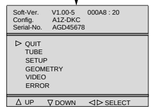
Nota :

Nel service mode:
- *la funzione Blocco (Numero Pin) viene ignorata e la funzione Blocco Bambini è reinizializzata.*
- *Cancellare la programmazione sveglia*
- *Il piedino 8 della scart deve essere ignorato.*
- *I riconoscimenti AV-Link WSS, EPG e televideo devono essere disabilitati.*
- *Funzione automatica di standby, nel caso di mancanza del segnale d'antenna deve essere disabilitata.*
- *Contrasto, colore, luminosità : regolazioni di fabrica.*
- *Nitidezza: media (nominale)*
- *Espansore contrasto troppo basso.*
- *IModo Install disabilitato.*
- *Formato default e zoom.*

1 ACCESO AL MODO SERVICIO

Acceso panel control TV

- Apague la TV con el botón MARCHA:PARADA.
- Pulse los botones **PR -** y **VOL -** y sin soltarlos,pulsar la tecla MARCHA:PARADA.
- Libere los botones **PR -** y **VOL -** .



Nota :

En modo servicio:
- *Se ignora la función de bloqueo y se inicializa la función "cerradura ninos".*
- *Anula todos las horas programadas*
- *La patilla 8 del SCART es ignorada*
- *La detección WSS AV Link, EPG, y Telexto son desactivados.*
- *El apagado automático en caso de ausencia de señal de antena es desactivado.*
- *El contraste,color y brillo son puestos a los valores de fábrica.*
- *la nitidez es puesta al punto medio.*
- *La expansión de contrast al nivel bajo*
- *Modo Instalación es desactivado.*
- *Zoom y formato ignorados.*

2 TEMPORARY EXIT FROM SERVICE MODE

- Press Exit on the Remote control.
- Everyday use menu can be accessed via Menu button.

- Field Service Menu can be re-entrered via Blue button.

2 SORTIE TEMPORAIRE DU MODE SERVICE

- Utiliser la touche Exit de la télécommande.
- Le menu utilisateur peut être accessible via la touche «Menu».

- Pour entrer à nouveau dans le mode service utiliser la touche bleue.

2 VORÜBERGEHENDES VERLASSEN DES SERVICE MODUS

- Auf der Fernbedienung EXIT drücken.
- Mit der Taste Menü gelangen Sie zum Menü Übersicht

- Mit der blauen Taste gelangen sie wieder zum Service-Menü.

2 USCITA TEMPORANEA DAL SERVICE MODE

- Premere Exit sul telecomando.
- Al menu di uso quotidiano si accede attraverso il pulsante Menu.

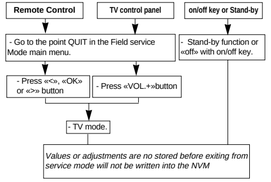
- É possibile rientrate nel Menu Field Service attraverso il pulsante Blue.

2 SALIDA TEMPORAL DEL MODO SERVICIO

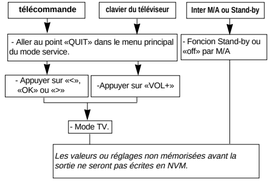
- Pulse Salir en el mando a distancia
- Con el botón Menu puede acceder al menú de uso cotidiano.

- Puede entrar al Menú Servicio con el botón azul.

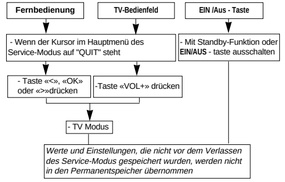
3 EXITING FROM SERVICE MODE



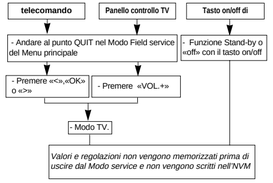
3 SORTIE DEFINITIVE DU MODE SERVICE



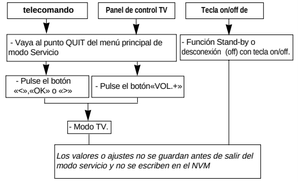
3 ENDGÜLTIGES VERLASSEN DES SERVICE MODE



3 USCIRE DAL SERVICE MODE

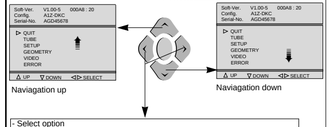


3 SALIDA DEL MODO SERVICIO

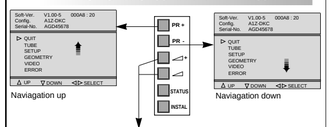


II - NAVIGATION INSIDE THE SERVICE MODE - DEPLACEMENT DANS LE MODE SERVICE SUCHE IN SERVICE MODE - OPZIONI NEL SERVICE MODE - BUSQUEDA EN MODO SERVICIO

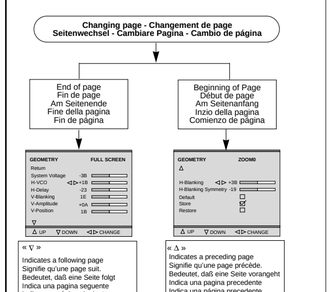
1 REMOTE CONTROL - TELECOMMANDE - FERNBEDIENUNG TELECOMANDO - MANDO A DISTANCIA



2 TV CONTROL PANEL - CLAVIER TV - TASTATUR DES FERNSEHGERÄTS - COMANDI DEL TELEVISORE -

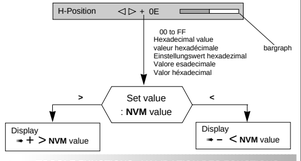


Changing page - Changement de page Seitenwechsel - Cambiare Pagina - Cambio de página



- The menu turns the page when the cursor reaches the arrow.
- Amener le curseur sur la ligne repérée par « ▽ »ou « △ » pour passer à la page qui précède ou qui suit.
- Cursor nach « ▽ »,« △ » zum Seitenwechsel
- Il cursor su « ▽ », « △ » cambia pagina.
- Cursor en « ▽ » ,« △ » cambia las páginas

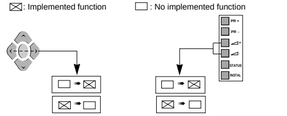
3 DISPLAYING THE VALUE OF THE SETTING - AFFICHAGE DES VALEURS - ANZEIGE DES EINSTELLUNGSWERTS VISUALIZZAZIONE DEL VALORE DELLA REGOLAZIONE - VISUALIZACION DEL VALOR DE AJUSTE



4 TOGGLE FUNCTIONS - VALIDATION DES FONCTIONS EIN-UND AUSSCHALT FUNKTIONEN - FUNZIONI DI COMMUTAZIONE - FUNCION CONMUTACION

To enable a function check (tick) ☒ the box.
Pour valider une fonction cocher ☒ la case correspondante
Zum Implementieren einer Funktion das Kontrollkästchen ☒ aktivieren (ankreuzen)
Per implementare una funzione di verifica, (vistare) ☒ la casella
Para poner en fucionamiento una función verificar (señale) ☒ la casilla

☒: Implemented function ☐ : No implemented function



5 STORING VALUES IN MEMORY - MEMORISATION DES VALEURS - SPEICHERN DER WERTE - MEMORIZZAEZ I VALORI - VALORES ALMACENADOS EN LA MEMORIA

After setting, the values are stored in NVM.
Après réglages les valeurs sont mémorisées en NVM.
Nach dem Einstellen werden die Werte im NVM gespeichert.
Dopo la regolazione i valori vengono memorizzati in NVM.
Después del ajuste, los valores son almacenados en NVM

The box ☐ becomes ☒
During alignment, values are temporarily stored in RAM.
En cours d'alignement les valeurs sont mémorisées temporairement en RAM
Während des Abgleichs werden die Werte vorübergehend im RAM gespeichert
Durante l'allineamento i valori vengono memorizzati provvisoriamente sulla RAM
Durante el alineamento, los valores son almacenados temporalmente en RAM

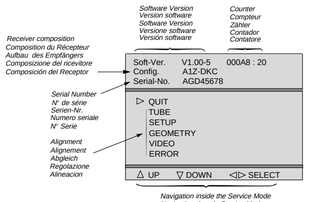
Store ➡ Copies RAM values into NVM
Copie la valeur RAM en NVM
Kopieren des Werts von RAM nach NVM
Copiare i valori RAM in NVM
Copiar valores RAM en NVM

Restore ➡ Copies all values from NVM into RAM.
Copie toutes les valeurs des données NVM en RAM
Kopiert alle NVM-datenwerte in den RAM
Copiare tutti i valori da NVM sulla RAM
Copia todos los valores de NVM a RAM

ROM Default ➡ All the default values of a page in use are stored in RAM.
L'ensemble des valeurs par défaut d'une page courante est chargé en RAM.
Sämtliche Standardwerte der aktuellen Seite werden im RAM geladen
Tutti i valori di default di una pagina in uso vengono memorizzati sulla RAM
Todos los valores por defecto de la página en curso están almacenados en RAM.

III - LITE-MENU FOR FIELD SERVICE MODE - MENUS DU MODE SERVICE

1 MAIN MENU - MENU PRINCIPAL



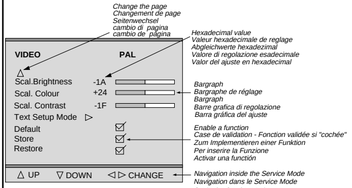
TV CONFIGURATION - CONFIGURATION DU TV - GERÄTEKONFIGURATION - CONFIGURAZIONE DEL TV - CONFIGURACIÓN Y TV

Config.	A1Z-DKC

Character 1 : Tube type : «A»= 4/3 , «W» =16/9
Character 2 : Chassis type : «5» = 50Hz, «1»= 100 Hz
Character 3 : Zoom available : «Z»=yes, «-»=not
Character 4 : Ambiant Sensor : «S»= detected, «-»= not
Character 5 : Dolby : «D»=detected, «-»= not
Character 6 : AV Link detected : «K»=IR link detected, «-»= not
Character 7 : Password mode: «C»= Password stored, «-»= not

TIME COUNTER - COMPTEUR DE TEMPS - ZÄHLER - CONTATORE - CONTADOR
The counter indicates the TV's number of service hours.It counts from to 0 to 65535 hours.
The display is hexadecimal.
Le compteur de temps indique le nombre d'heures de service du TV. Il compte de 0 à 65535 heures. L'affichage est en hexadécimal.
Der Zähler zeigt an, wieviele Stunden der Fernseher in Betrieb ist. Die Anzeige ist hexadezimal.
Il contatore indica il numero di ore di servizio del TV. Puo' contatore da 0 a 65535. La visualizzazione è esadecimale.
El contador indica el número de horas de servicio de la TV. Cuenta de 0 a 65535 horas. El visualizador es hexadecimal.

2 SUBMENU - SOUS-MENU



ALIGNMENT PROCEDURE - PROCESSUS DE REGLAGES - ABGLEICH - VISUALIZZAZIONE DEL VALORE DELLA REGOLAZIONE - PROCEDIMIENTO DE ALINEACION

TUBE
Return
Tube type A66ECY...
Store ◁ ▷
Restore
△ UP ▽ DOWN ◁ ▷ SELECT

SETUP
Return
OSD Position -20
PIN Erase ◁ ▷
Clear Prog.
Standard Pan-Euro ...
WSS
△ UP ▽ DOWN ◁ ▷ CHANGE
page 1

SETUP
△
Text Lang. 1
Ext.HIFI/Dolby Ext.
IR Download ▷
Default
Store
Restore
△ UP ▽ DOWN ◁ ▷ CHANGE
page 2

GEOMETRY FULL SCREEN
Return
System Voltage -3B
H-VCO ◁ ▷ +1B
H-Delay -23
V-Blanking 1E
V-Amplitude +0A
V-Position 1B
△ UP ▽ DOWN ◁ ▷ CHANGE
page 1
Test Bar pattern used : 4/3 with geometric circle.

GEOMETRY ZOOM1
△
V-Linearity -3B
H-Position ◁ ▷ +0E
H-Amplitude -19
EW-Amplitude +1C
EW-Trapezium 2B
EW-Shape 1D
△ UP ▽ DOWN ◁ ▷ CHANGE
page 2
Adjust separate for 4/3 and 16/9 format. See annexed

VIDEO PAL
Return
Normalise User Settings
G2 Alignment mode ▷
R-Cut off +1B
G-Cut off -1F
R-Drive +3A
G-Drive -3B
B-Drive
Peak-White
△ UP ▽ DOWN ◁ ▷ CHANGE
page 1
Color standard or RGB is autodetected and displayed opposite the displayed opposite the menu title.

VIDEO PAL
△
Scal.Brightness -1A
Scal. Colour +24
Scal. Contrast -1F
Text Setup Mode ▷
Default
Store
Restore
△ UP ▽ DOWN ◁ ▷ CHANGE
page 2

ERROR CODE
Return
Erase Error Codes ◁ ▷
CODE
11 013AF
24 008A0
78 0042A
11 0023F
51 000E3
△ UP ▽ DOWN ◁ ▷ CHANGE

TUBE

Return
Closes the submenu and the main Field Service Mode menu appears.

Retourne au menu principal.

Verlassen des Untermenüs

Chiude il sottomenu e fa apparire il menu principale Field Service Mode.

Cierra el submenú. El menú Field Service Mode aparece.

Press </>: remote control; Vol. +/- : TV keyb.

Tube type

Define the right tube after changing the NVM. 6 characters
New type tube values (with default video and geometry) are immediatly active
Variable geometry and video parameters are put into NVM when the Store feature is selected. See below tube list.

Definit le tube exact après changement de NVM.
Les nouvelles valeurs de tubes (avec video et géometrie) sont actives de suite.
Les paramètres de vidéo et de géométrie sont chargés en NVM lorsque STORE est sélectionné. Voir liste ci-dessous.

Den Bildröhrentyp auswählen.
Die Geometrie-und Videodefault Werte werden sofort in das NVM geladen.
Bildrohrauflistung : siehe unten.

Definire il tubo appropriato dopo aver cambiato il NVM; 6 caratteri I valori per il nuovo tipo di tubo (con video e forma di default) sono immediatamente attivi. I parametri per video e forma variabili vengono immessi i nel NVM quando viene selezionata la funzione Store.
Si veda la lista dei tubi riportata sotto.

Definir el tubo correcto después de haber cambiado el NVM.6 caracteres.Los nuevos valores de tipo de tubo (con la video y la geometría por defecto) se activan inmediatamente. Los parámetros variables de geometría y video se graban en el NVM al seleccionar la función Store. Vea más arriba la lista de tubos.

Default tube type :

50Hz A66ECY 13X 15 : A66ECY
4/3 28"MP, AK mask COTY M gun

➟ After setting ➟ Store (+)

TUBE NAME	LIST	DESCRIPTION	tube type
A66ECY 13X 15	A66ECY	4/3 28" MP, AK mask COTY M gun	00, 50Hz
A59EGD048X300	A59EGD	4/3 25" SF , invar , vector gun , BSVM	03, 50Hz
A68EGD038X300	A68EGD	4/3 29" SF , invar , vector gun , BSVM	04, 50Hz
W66EGV023X115	W66EGV	16/9 28"SF, invar , vector gun , BSVM	06, 50Hz
W76EGX023X115	W76EGX	16/9 32"SF, invar , vector gun , BSVM	07, 50Hz

SETUP

Return
Closes the submenu and the main Field Service Mode menu appears.
Retourne au menu principal.

Verlassen des Untermenüs
Chiude il sottomenu e fa apparire il menu principale Field Service Mode.
Cierra el submenú. El menú Field Service Mode aparece.
Press </>: remote control; Vol. +/- : TV keyb.

OSD Position
Adjusts the position of all Megatext OSD.
Horizontale zentrierung des OSD.

PIN Erase Erases all PINs.
☑ PIN active-Pin aktiv
☐ No PIN active-Kein PIN
Selection : Long press: ~ 5s
Press </>/OK: remote control;Vol. +/- :TV keyb.
Löschen des PIN Code durch längeres (≈ 5s) drücken der Taste >oder<.
Automatically stored

Clear Prog.
Clears all programms stored in the memory.
Analogues values SOUND PICTURE :
factory values.
Return the TV to "out of factory mode.
Selection : Long press:2,5s
Efface tous les programmes mémorisés.
valeurs SON et IMAGES: valeurs usines.
Pour sortir des valeurs usine :
Selection : Long pres:2,5s
Setzt das Gerät in die Werksgrundeinstellungen.
Es erscheint nach dem erneuten.
Einschalten das Installationsmenü.
Clear Prog.
Cancella tutti i programmi in memoria.Valori analogici SUONO IMMAGINE:valori di fabbrica.
Riportare la TV al modo Selezione: pressione prolungata: 2,5 sec.
Programa de borrado.
Borra todos los programas almacenados en la memoria.Valores análogos de
SOUND PICTURE: valores de fábrica.Regreso a la TV para "salir del modo fábrica".Selección: Presión larga igual a 2,5 s.
☑ active-aktiv ☐ No active-inaktiv

Standard "Pan-Euro" or "I".
BG PAL SECAM L SECAM (France),
DKK' SECAM,NTSC M,I PAL (UK/IRELAND)

WSS Detection "auto-surround" and "format" via Teletext line 23.
Selection of WSS Processing is valid for all programs.
Sélection du process WSS valid pour tous programmes
WSS (nur bei 16:9 oder Dolby)
Auswertung der Zeile 23 zur automatishen Format-umschaltung und Dolby-umschaltung
Rivelazione "auto-surround" e "format" via televideo alla riga 23.La selezione di WSS Processing vale per tutti programmi.
La selezione di WSS Processing vale per tutti programms.
Detección "auto-surround" y "format" a través de la línea 23 de Teletext.La selección del procesamiento WSS es válida para todos los programas.La selección del procesamiento WSS es válida para todos los programas.
☑ detect.enable- aktiv ☐ disable-inaktiv

SETUP

Text. Lang. Teletext language :

0	1	2	3
English	Polish	English(US)	English
German	German	German	German
Swedish	Swedish	Swedish	Swedish
Italian	Italian	Italian	Italian
French	French	French	French
Portug.	Serbocroat	Portug.	Portug.
Czech/Slov.	Czech/Slov.	Czech/Slov.	Turkish.
-	Rumanian	English(UK).	-

EXT.HIFI / Dolby Ext.
Dolby Internal Not available on Normal Sound TV's Nur bei Dolby TV.
☑ Dolby with External Loudspeaker. Dolby mit ext.Lautsprechern
☐ Dolby with Internal Loudspeakers. Dolby mit int. Lautsprechern
External HIFI Not available on Dolby TV's Bei nicht Dolby TV
☑ External HIFI control
Einstellung der Lautstärke int.Lautsprecher
☐ Normal sound control
Einstellung der Lautstärke der Cinchbuchsen (HIFI Anlage)

IR Download
Download screen for receiving mapping via IR data.
Ecran de chargement pour réception "mapping" via IR data
Herunterladen des Programmschemas per IR.
Trasferimento IR
Trasferire schermo per ricezione mappatura via dati IR
Descarga de IR
Pantalla de descarga para recibir el mapeado a través de los datos IR.

IR Download
Programme 00
Return / Abort ◁
IR Download active

"programme 00" : function is active or finished.
Return / Abort : To exit/Abort the menu
press "left" arrow key or Volume - key of keyboard.
All other IR commands have no response.
Toutes les autres commandes IR sont sans réponse;
Es gibt auf IR Kommandos keine Reaktion.
Tutti gli altri comandi IR sono senza risposta
Los otros comandos IR no envían respuesta.
➟ After setting ➟ Store (+)

GEOMETRY

Return
Closes the submenu and the main Field Service Mode menu appears.
Retourne au menu principal.

Verlassen des Untermenüs
Chiude il sottomenu e fa apparire il menu principale Field Service Mode.
Cierra el submenú. El menú Field Service Mode aparece.
Press </>: remote control; Vol. +/- : TV keyb.

System Voltage
Adjustment of the system voltage Usys.
Only possible via the test keyboard Vol +/-.
Einstellung nur über die Bordbedienung möglich (Lautstärke +/-)

TUBE NAME	DESCRIPTION	Usys
A66ECY 13X 15	4/3 28" MP	132V +/- 0.5V
A59EGD048X300	4/3 25" SF	131V +/- 0.5V
A68EGD038X300	4/3 29" SF	131V +/- 0.5V
W66EGV023X115	16/9 28"SF	137V +/- 0.5V
W76EGX023X115	16/9 32"SF	137V +/- 0.5V

H-VCO Horizontal - VCO oscillator.
Adjust H_VCO until the speed of the unsynchronised picture is the lowest.
Agir sur H-VCO pour obtenir une image la plus proche de la synchronisation
Den H-VCO auf Schwebung einstellen.
Regolare FH_VCO finché l'immagine non sincronizzata non avrà raggiunto la velocità minima.
Ajuste H_VCO hasta que la imagen no sincronizada alcance su velocidad más baja.
default value = 0FH
Press </>: remote control; Vol. +/- : TV keyb.

H-Delay Horizontal delay
Use "+" and "-" to adapt the image

V-Blanking
1-V-amp. pre-align: > 7% overscan
2- Reduce V-blanking: visible on top & bottom
3-Increase steps/step:blank. at the bottom and cut- off lines at the top disappear
4- Increase one more step
5- Fine adjust V-amp. and V-position
1-V-amp. ampl.vertic. suffisante (>7% overscan)
2- réduire V-blanking:visible en haut et bas.
3-Agir étape par étape jusqu'à disparition du blanking en bas d'image et des lignes de cut-off en haut d'écran
4- Augmenter d'une valeur.
5- Faire un réglage fin de V-amp. et V-position
1-Vi-Position und V-Amplitude optimal einstellen (V-amp. vorabgleich: >7% Überschreibung.)
2- V-Blank soweit verändern, daß am oberen und unterem Bildrand gerade eine Austastung sichtbar wird.
3-Den Wert von-Blank um 2 steps erhöhen (2 x die + Taste drücken).
1- Ampiezza verticale: grande a sufficienza (7% di sovrascanzione)
2- Riduzione della soppressione verticale: visibile in alto e in basso
3- Aumentare passo/passo: vuoto in basso per veder scomparire le linee di interdizione in alto
4- Aumentare ancora di un passo
5- Regolare con precisione l'ampiezza e la posizione verticali
1- Amplitud V: suficientemente grande (7% de sobreexploración)
2- Reducir el parpadeo V: visible en las partes superior e inferior.
3- Aumentar el paso a paso: el vacío en la parte inferior y las líneas de corte en la parte superior desaparecen.
4- Aumentar de otro paso.
5- Ajustar finamente la amplitud V y la posición V.

V-Amplitude
V-Position
➟ After setting ➟ Store (+)

GEOMETRY
V-Linearity
H-Position
H-Amplitude
EW - Amplitude
EW - Trapezium
EW -Shape

GEOMETRY ZOOM0
△
H-Blanking ◁ ▷ +3B
H-Blanking Symmetry -19
Default
Store
Restore
△ UP ▽ DOWN ◁ ▷ CHANGE
page 3

GEOMETRY
H-Blanking Adjustments : 50Hz 16/9 TV zoom 0.
H-Blanking Symmetry Adjustments : 50Hz 16/9 TV zoom 0.
➟ After setting ➟ Store (+)

VIDEO PAL

Return
Closes the submenu and the main Field Service Mode menu appears.
Retourne au menu principal.

Verlassen des Untermenüs
Chiude il sottomenu e fa apparire il menu principale Field Service Mode.
Cierra el submenú. El menú Field Service Mode aparece.
Press </>: remote control; Vol. +/- : TV keyb.

Normalise User Settings
Recalls the factory settings for colour, brightness, contrast and sharpness and sets contrast expand to "low".
☑ Factory settings recalled
☐ User settings kept.

G2 Alignment
Display a special menu:
Adjust R-Cut off
and G-Cut off to 80H temporary.
Adjust the lowest value with RGB cutoff counters SCREEN potentiometer to: see table
Es erscheint folgendes Menu. Die R-und G-Cut off Werte für diese Einstellung temporär auf 80H einstellen. den kleinsten angezeigten Wert mit dem Schrmgittereinsteller auf entsprechenden. wert in der Tabelle abgleichen.

Tube Type	Value	Tube Type	Value
A66EGW	60H	W76EGX	60H
A59EGD	50H	A80EDM	60H
A68EGD	50H	A90AFF	50H
W66EGV	50H	RP 4 / 3	-
W76EGV	60H	RP 16 / 9	60H

To return video submenu:
Press </>/OK: remote control;Vol. +/- :TV keyb.
Select"Restore" to restore the cut off values.

R-Cut off* **G-Cut off*** **R - Drive** **G - Drive** **B - Drive** Grey scale test pattern white =100%

Peak-White** Peak white test pattern white =100%

CRT Pin 6,8,11

Tube Type	[Init]	[Vpp]	Tube Type	[Init]	[Vpp]
A59EGD	470	110	A90AFF	-	-
A66ECY	350	110	W66EGV	550	110
A66EGW	425	110	W76EGV	430	110
A68EGD	400	110	W76EGX	430	110
A80EDM	-	-			

Blue cathode Blue cathode

VIDEO PAL

Scal. Brightness = 50% ; = 100% ; Grey scale test pattern white =100% ; black.

Scal*. Colour PAL (then SECAM +RGB) 75% Colour bar test pattern via RF.

Scal. Contrast factory settings.

Text Set-up Mode
Set Text Contr. to max. !
Adjust Text Gain to get a light output of just ≥40% of OMA peak withe.
Fine-adjust with Text Contr. to 40% of light output of OMA Peak White.

Return ◂ Text Cont. Da Text Gain Ad

CRT Pin 6,8,11

Note :
* adjust separate for PAL/NTSC/SECAM and RGB/AV getrennte Einstellung für PAL/SEACAM und RGB/AV
* * After PEAK white adjustment control cut off setting. Repeat the adjustments if necessary. nach der Einstellung von Peak white die Cut off Einstellungen wiederholen
➟ After setting ➟ Store (+)

ERROR CODE

Return
Closes the submenu and the main Field Service Mode menu appears.
Retourne au menu principal.

Verlassen des Untermenüs
Chiude il sottomenu e fa apparire il menu principale Field Service Mode.
Cierra el submenú. El menú Field Service Mode aparece.
Press </>: remote control; Vol. +/- :TV keyb.

Erase Error Codes Clears all error codes storedin the NVM.Long press action (2.5s) : Durch längeres Drücken der >oder< Taste werden die Error Codes gelöscht.
Press </>/OK: remote control;Vol. +/- :TV keyb.

CODE LED Error Codes

Store the last five different error codes when each occured (via runtime counter) .The more recent error is displayed on top.A repeat of the error code on the top of the list just updates the runtime. If 5 different error codes are signalled from the TV LED :11 to 44. The error code is signalled as two separate digits with a suitable pause in-between and will repeat until the TV is fixed or fixes itself.

e.g. Error-code : 23 will be displayed :
2 flashes, short pause
3 flashes, long pause .....
List of Errors Codes : see table

Mémorise les cinq derniers codes erreurs et affiche en haut d'écran les plus récents.
27 codes erreurs différents sont signalés par 2 digits selon une séquence spécifique
Exemple :
Code erreur : 23 affiché
2 flashes, courte pause
3 flashes, longue pause
.....
Voir ci-contre la liste des codes erreurs

Zeigt die letzen 5 Fehlercodes mit der Laufzeit an. Der zuletzt aufgetretene Fehler steht an erster Stelle.
Sollte ein Fehler wiederholt auftreten wird nur die Laufzeit aktualisiert.
Die Fehlercodes können im Menü Error Code angezeigt werden oder über die Kontroll LED angezeigt werden;

Beispiel für die Anzeige über die Kontroll LED :

Fehlercode 23
Zweimaliges Blinken der LED, kurze Pause
Dreimaliges Blinken der LED, lange Pause.
Auflistung der Fehlercodes : siehe Liste

Memorizzare gli ultimi cinque codici d'errore (differenti tra loro) dopoche ognuno di essi si sia presentato (attraverso il contatore della durata di esecuzione). L'errore più recente viene visualizzato in cima. La ripetizione del codice di errore in cima alla lista non farà altro che aggiornare la durata di esecuzione.Dal LED della TV vengono segnalati 27 codici d'errore differenti, numerati da 11a 44. Il codice d'errore è indicato da due cifre separate da un opportuno intervallo di tempo e verrà ripetuto fino a quando il televisore non sarà stato riparato o non si sarà corretto da solo. Ad es:
Il codice d'errore 23 visualizzerà:
2 segnali luminosi con pausa breve
3 segnali luminosi con pausa lunga
Per la lista dei Codici d'Errore, si veda la tabella

Almacene los últimos cinco códigos de error cuando cada uno ocurre (gracias al contador de tiempo de ejecución). El error más reciente se visualiza en la parte superior. Una repetición del código de error en la parte superior de la lista solamente actualiza el tiempo de ejecución El indicador TV LED indica 27 códigos de error diferentes: de 11 a 44. El código de error se señala en forma de dos dígitos separados con una pausa apropiada entre los dos y se repetirá hasta que repare el TV o él se repara a si mismo Por ejemplo,Se va visualizar el código de error 23:
2 parpadeos, una pausa corta;
3 parpadeos, una pausa larga.
Para la Lista de códigos de error, consulte la tabla.

ERROR CODES

GB

11	1st Audio_MSP doesn't answer
12	2nd Audio-MSP doesn't answer
13	Audio-DSP doesn't answer
14	Video IC ST V2161/2 doesn't answer
15	Chroma IC 2151/9143 doesn't answer
16	Upconverter DMU0 doesn't answer
17	Audio (or Dolby) module not detected
18	SCART IC TEA6415C doesn't answer
19	Tuner CTT5000 doesn't answer
21	I2C Bus1 data line held low
22	I2C Bus2 data line held low
23	I2C Bus1 clock line held low
24	I2C Bus2 clock line held low
25	Switched 5V not available
26	Tube doesn't gets warm in time
27	Deflection detects >3 times protection (problem detected on "breathing" line)
29	DRAM memory of Megatext defect
33	The PSI chip (STV2165) doesn't answer
34	The NVM (X24C32) chip doesnt answer
35	13V not available
37	Unexpected level on NMI (Interrupt) line found (possible cause : tube flashover)
38	M3LBus for Megatext is blocked
39	Megatext (SDA5273) doesn't answer
41	bus1 (data line) not recoverable
42	bus2 (data line) not recoverable
43	MCU (Motion Mastering Up-Converter) doesn't answer
44	Convergence IC (Rear Projector) doesn't answer

F

11	Processeur Audio MSP ne répond plus
12	Deuxième MSP ne répond plus (Dolby)
13	Audio-DSP ne répond plus (produit Dolby)
14	Video-IC STV2161/2 ne répond plus
15	Chroma-IC STV2151 ou TDA9143 ne répond plus
16	Convertisseur de frequence d'image digital DMU0 (Intelligent Mastering) ne répond plus
17	Module son (ou Dolby) n'est pas détecté
18	Commutateur SCART TEA6415C ne répond plus
19	Tuner CTT5000 ne répond plus
21	I2C-bus 1 data bloqué au niveau bas
22	I2C-bus 1 clock bloqué au niveau bas
23	I2C-bus 2 data bloqué au niveau bas
24	I2C-bus 2 clock bloqué au niveau bas
25	Le "5V commuté" n'est pas disponible
26	Tube ne chauffe pas a temps
27	Plus que 3-fois la déflection a détecté une "protection" (c'est-à-dire qu'il y a un problème détecté sur la ligne "breathing")
29	Mémoire (DRAM) du Megatext est en panne
33	STV 2165 (PSI 100Hz) ne répond plus
34	NVM (mémoire) X24C32 ne répond plus
35	+13V n'est pas disponible
37	Problème détecté sur la ligne "Interrupt" pendant le démarrage ou le fonctionnement duTV. Possibilité: "arcing"?
38	Bus M3L pour Megatext est bloqué
39	Megatext (SDA5273) ne répond plus
41	I2C-bus 1 data reste bloqué
42	I2C-bus 2 data reste bloqué
43	MCU (convertisseur de frequence d'image digital: Motion Mastering) ne répond plus
44	CI Convergence ne répond plus (rétroprojecteur)

D

11	Audio MSP Prozessor antwortet nicht.
12	Zweiter Audio MSP Prozessor antwortet nicht.(Dolby)
13	Audio DSP Prozessor antwortet nicht. (Dolby)
14	IC TV2161/62 antwortet nicht
15	IC STV2151 / TDA9143 antwortet nicht
16	DMU0 Upconverter (Videomodul) antwortet nicht
17	Audio- oder Dolby-modul nicht erkannt
18	TEA6415C antwortet nicht (SCART Schalter)
19	Tuner CTT5000 antwortet nicht
21	I2C Bus1 data line ist auf low
22	I2C Bus2 data line ist auf low
23	I2C Bus1 clock line ist auf low
24	I2C Bus2 clock line ist auf low
25	Geschaltete 5V nicht vorhanden
26	Röhre wird nicht rechtzeitig warm
27	Ablenkung meldet 3 mal Fehler. (Problem auf Breathing Leitung)
29	DRAM des Megatext defekt
33	STV 2165 (PSI 100Hz) antwortet nicht
34	NVM Chip antwortet nicht (X24C32)
35	+13V nicht vorhanden
37	Unerwarteten Zustand an NMI (Interrupt) line gefunden. (Mögliche Ursache = Röhren Überschlag")
38	M3L Bus des Megatext blockiert
39	Megatext (SDA 5273) antwortet nicht
41	Bus1 (data line) nicht möglich zu reaktivieren
42	Bus2 (data line) nicht möglich zu reaktivieren
43	MCU (Motion Mastering Up-Converter) antwortet nicht
44	Konvergenz IC antwortet nicht (Rear-Projektor)

I

11	Primo Audio MSP non risponde più
12	Secondo Audio MSP non risponde più
13	Audio DSP non risponde più
14	2161/2 non risponde più
15	2151/9143 non risponde più
16	il convertitore non risponde più
17	Modulo Audio non trovato
18	TEA6415C non risponde più
19	il sintonizzatore non risponde più
21	Linea I2C bus dati 1 mantenuta bassa
22	Linea I2C bus dati 2 mantenuta bassa
23	Linea I2C bus temporizzatore 1 mantenuta bassa
24	Linea I2C bus temporizzatore 2 mantenuta bassa
25	Commutazione 5V non disponibile
26	il tubo non si riscalda in tempo
27	La deflezione ha rilevato più
29	Difetto alla DRAM di Megatext
33	il chip PSI non risponde più
34	il chip NVM non risponde più
35	13V non disponibile
37	Livello imprevisto sulla linea NMI
38	Bus M3L per Megatext bloccato
39	Megatext non risponde più
41	Bus 1 (linea dati) non ripristinabile
42	Bus 2 (linea dati) non ripristinabile
43	MCU non risponde
44	Convergenza IC non risponde

E

11	Procesador de audio MSP no responde
12	Segundo MSP no responde (Dolby)
13	Audio DSP no responde
14	Cir. integrado de video STV2161 ó 2162 no responde
15	Cir. integrado croma ST2151 ó TDA9143 no responde
16	Convertidor de frecuencia de imagen digital DMU0 (Mastering Inteligente) no responde
17	Módulo de sonido (o Dolby) no se detecta
18	Conmutador Scart (TEA6415C) no responde
19	Tuner CTT5000 no responde
21	Data 1 del bus I2C permanece en bajo
22	Clock 1 del bus I2C permanece en bajo
23	Data 2 del bus I2C permanece en bajo
24	Clock 2 del bus I2C permanece en bajo
25	No se dispone de los "5v conmutados"
26	El tubo tarda en calentarse
27	La protección de la deflexión actúa mas de 3 veces (el problema se detecta en la línea de "breathing")
29	La memoria DRAM del Megatext está defectuosa
33	El chip STV2161 (PSI 100Hz) no responde
34	La memoria no volátil X24C32 no responde
35	No están disponibles los + 13 v.
37	Problema detectado en la línea "Interrupt" durante el arranque o el funcionamiento del TV.Posibilidad de chispazos en muy alta?
38	El bus M3L para el Megatext está bloqueado
39	Megatext (SDA5273) no responde
41	Data 1 del bus I2C permanece boqueado
42	Data 2 del bus I2C permanece boqueado
43	MCU (convertidor de frecuencia de imagen digital: Motion Mastering) no responde
44	Cir. integrado de covergencia no responde (retroproyectores)

GEOMETRY MODE ALIGNMENT - 50Hz VERSION

4/3 picture tube

Signal : 4/3 test pattern

4 / 3 standard mode (zoom 0)



50Hz Version : overscan V=107% , H=107%
1- Adjust Vertical position and Vertical amplitude
2- Adjust Vertical Blanking and linearity



3- Adjust Horizontal position and Horizontal amplitude



4-Adjust EW Amplitude ,EW Shape and Trapezium



16 / 9 standard mode zoom 0



Adjust the vertical height until it is 80% of the horizontal width.



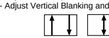
16/9 picture tube

Signal : 4/3 test pattern

16 / 9 standard mode (zoom 0)



50Hz Version : overscan V=107% , H=107%
1- Adjust Vertical position and Vertical amplitude
2- Adjust Vertical Blanking and linearity



3- Adjust Horizontal position and Horizontal amplitude



4-Adjust EW Amplitude ,EW Shape and Trapezium

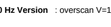


4/3 Centered (zoom 0)



50 Hz Version : overscan V=107% , Hi=80% of the screen

1- Adjust H-amplitude & H-position
2- Adjust H- Blanking and H-blanking symmetry



< 4/3 > wide (zoom 1)



50 Hz Version : overscan V=133% , H=107%

1- Adjust V-amplitude



⇧ 4/3 ⇧ PANNING (zoom 1)

50 Hz Version : overscan V=133% , H=107%

No adjustment necessary

Full Screen Zoom



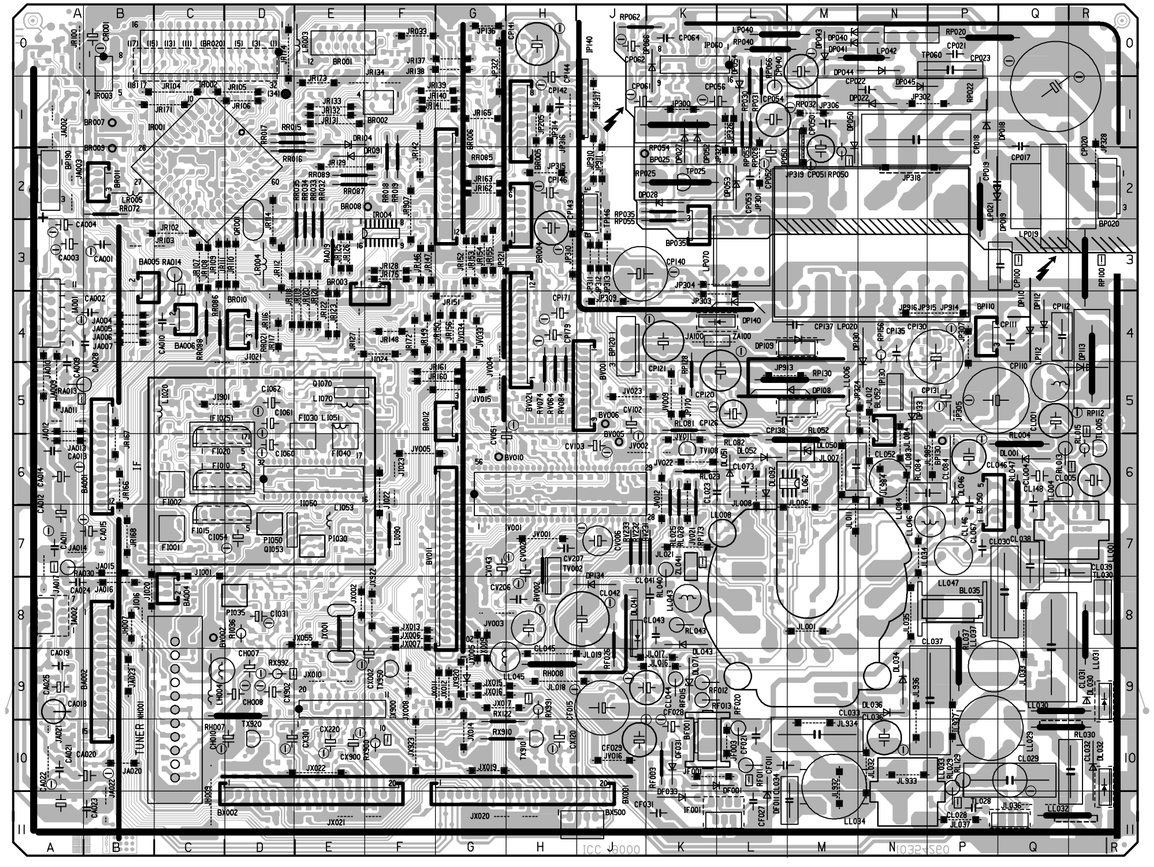
50 Hz Version : overscan V=114% , H=107%

1- Adjust V-amplitude

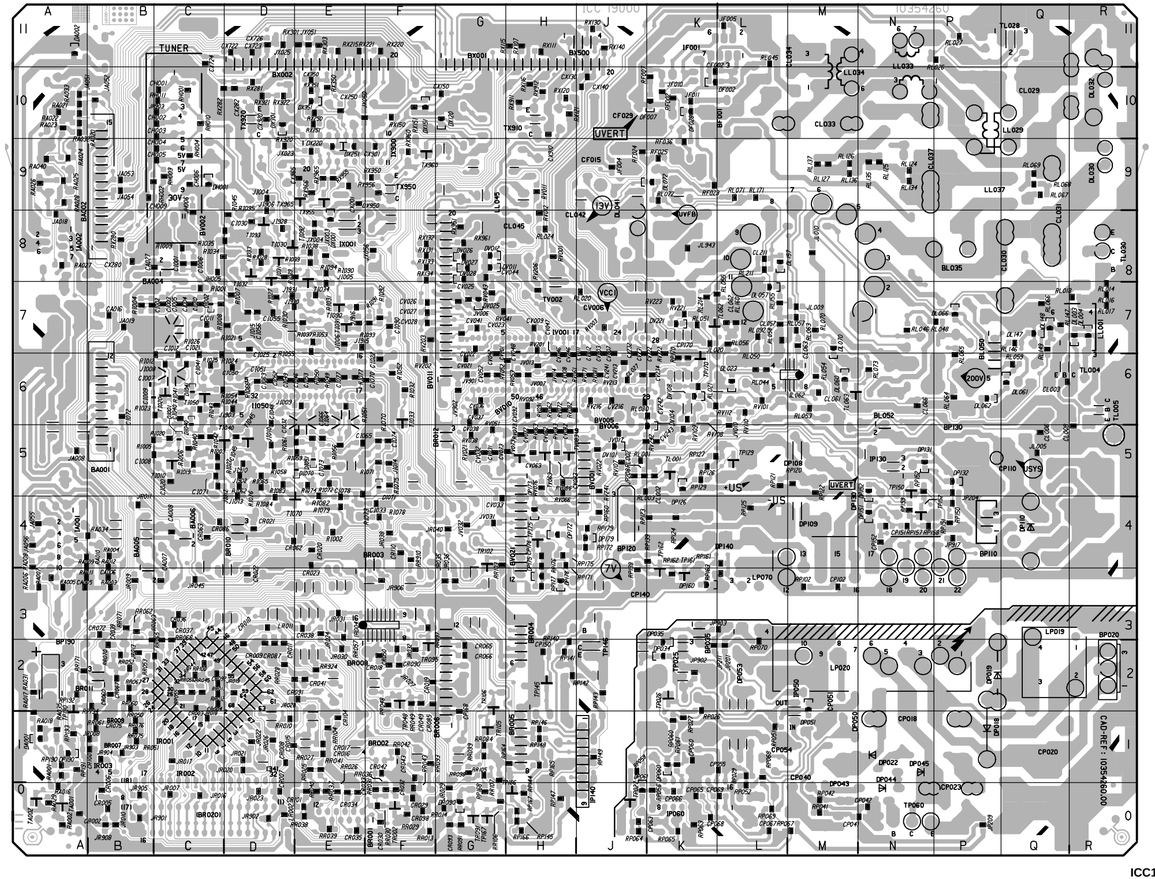
ICC19 50 Hz
First issue 09 / 97

MAIN BOARD - PLATINE PRINCIPALE - CHASSIS GRUNDPLATTE - PIASTRA PRINCIPALE - PLATINA PRINCIPAL

COMPONENT SIDE - COTE COMPOSANTS - BESTÜCKUNGSSEITE - LATO COMPONENTI - LADO COMPONENTES



SOLDER SIDE - CÔTE SOUDURES - LÖTSEITE - LATO SALDATURE - LADO SOLDADURAS



COMPONENTS LOCATION - LOCALISATION DES ELEMENTS - LAGE DER BAUTEILE - LOCALIZZAZIONE DEGLI ELEMENTI - LOCALIZACION DE LOS COMPONENTES

* SOLDER SIDE - COTE CUIVRE - LÖTSEITE - LATO SALDATURE - LADO DEL COBRE



BA001	B6
BA002	B9
BA004	C8
BA005	B3
BA006	C4
BF001	K10
BL035	P8
BL050	P6
BL052	N5
BP020	R2
BP025	J2
BP035	K3
BP110	P4
BP120	J4
BP130	P6
BP190	A2
BR001	E0
BR002	F1
BR003	F4
BR004	H2
BR005	H1
BR006	G2
BR007	B1
BR008	F2
BR009	B2
BR010	D4
BR011	B2
BR012	G5
BV001	J5
BV002	C8
BV005	J6
BV006	J5
BV010	G6
BV011	G7
BV021	H4
BX001	H11
BX002	E11
BX500	J11



CA001	B3
CA002	B4
CA003	A3
CA004	A3
CA005*	B3
CA006*	B3
CA007*	C 3
CA008*	C 4
CA009	A 5
CA010	C 4
CA011	A 7
CA012	A 7
CA013	A 6
CA014	A 6
CA015	B 7
CA016*	B7
CA018	A9
CA019	A9
CA020	B10
CA021	A10
CA022	A11
CA023	B11
CA024	A8
CA025	A9
CA027*	C8
CA028	B4
CF002*	K10
CF011	L10
CF015	J9
CF021	L10
CF027	L11
CF028	K10
CF029	J10
CF031	K11
CH001*	C10
CH002*	C10
CH003*	C10
CH004*	C9
CH005*	C9
CH006*	C9
CH007	D9
CH008	D9
CH009*	B9
CH010	D10
CI001*	C8
CI002*	B7
CI003*	C7
CI004*	C7
CI005*	C7
CI006*	C8
CI007*	B6
CI008*	C5
CI009*	C6
CI010*	C7
CI011*	C7
CI012*	C6
CI020*	C5
CI021*	C6
CI022*	F6
CI025*	D7
CI030*	D8
CI031	D8
CI032*	E5
CI033*	F4
CI040*	C6
CI041*	C6
CI045*	D5
CI046*	E6
CI048*	D6
CI049*	D6
CI050*	D6
CI051*	D6
CI052*	D6
CI053*	E6
CI054	D7
CI055*	D7
CI056*	D7
CI060	D6
CI061	D5
CI062	D5
CI063*	D6
CI064 *	E5
CI065*	E5
CI066*	E5
CI070*	F6
CI071*	C5
CI072*	B6
CI073*	E5
CI074*	F5
CI077*	E6
CI078*	E4
CI090*	F7
CL001	Q5
CL002*	K5
CL003*	Q6
CL004	Q6
CL005	R6
CL006*	Q5
CL008*	R5
CL023	L6
CL027*	J6
CL028	P11
CL029	Q10
CL029	Q10
CL030	Q8
CL031	Q8
CL032	R10
CL033	M10
CL034	M11
CL036	N10
CL037	P9
CL038	Q7
CL039	R7
CL041	K8
CL042	J8
CL043	K8
CL044	K9
CL045	H8
CL046	P6
CL052	M6
CL057*	L7
CL061*	M6
CL062*	L7
CL063*	M7
CL066*	N6
CL067	P7
CL073	L6
CL084	P6
CL146	P6
ICL148	Q6
CL211*	L8
CP017	Q1
CP018	N1
CP019	Q 2
CP020	Q 1
CP020	Q1
CP021	P0
CP022	N1
CP023	P0
CP040	M0
CP041*	N0
CP042*	N0
CP050	M1
CP051	M2
CP052	L2
CP053	L2
CP054	L1
CP055*	L1
CP056	L1
CP060*	K1
CP061	J1
CP062	J0
CP063*	J0
CP064	K0
CP065*	K0
CP066*	K0
CP067*	L0
CP068*	K0
CP069*	L0
CP100	P3
CP100	Q3
CP102*	M3
CP110	P5
CP111	Q4
CP112	Q4
CP120	L5
CP121	K4
CP126	L5
ICP130	P4
CP131	P5
CP135	N4
CP137	M4
CP138	L5
CP140	J3
CP141	H0
CP142	H1
CP143	H 3
CP144	H1
CP146	H2
CP150*	H2
CP151*	N4
CP152*	N4
CP168*	G1
CP170*	K6
CP171	H4
CP176*	H4
CP179	H4
CR001	B0
CR002*	A0
CR003*	C2
CR004*	C2
CR005*	B0
CR006*	B0
CR007*	D0
CR008*	D1
CR009*	D2
CR010*	D2
CR011*	D2
CR015*	D1
CR016*	E1
CR017*	E1
CR018*	F2
CR019*	F2
CR020*	E4
CR021*	D4
CR022*	D3
CR023*	E4
CR029*	F0
CR030*	F0
CR032*	F0
CR033*	E0
CR034*	E0
CR035*	E0
CR036*	C3
CR037*	C3
CR038*	E3
CR039*	B2
CR041*	E2
CR042*	F1
CR043*	F1
CR049*	F2
CR050*	F2
CR060*	B2
CR062*	D4
CR063*	C4
CR065*	G2
CR066*	G2
CR067*	B2
CR072*	B3
CR075*	B1
CR085*	F2
CR086*	C4
CR087*	D2
CR090*	F2
CR091*	E2
CR092*	C2
CR093*	G0
CR098*	F0
CR100*	B1
CR101*	E0
CR104*	E1
CR110*	F4
CV002	H7
CV003	J6
CV006	J7
CV007*	J6
CV008*	H 6
CV009*	H7
CV011*	J6
CV012*	J6
CV021*	G6
CV022*	G7
CV023*	G7
CV025*	G7
CV026*	F7
CV027*	F7
CV028*	F7
CV031*	G5
CV032*	G5
CV033*	G4
CV036*	G6
CV037*	G6
CV038*	G6
CV041*	G7
CV042*	G6
CV043	G7
CV044*	G8
CV046*	H6
CV047*	H6
CV048*	H7
CV051	H6
CV052*	G6
CV062*	H5
CV063*	H5
CV072*	H5
CV073*	H5
CV082*	H5
CV083*	H5
CV092*	H6
CV102	J5
CV103	J6
CV201*	H6
CV206	H8
CV207	H7
CV213*	J6
CV216*	J6
CV222*	K6
CV231*	J6
CV232*	J6
CV234*	K6
CV241*	J6
CV242*	K6
CV243*	K5
CV246*	H6
CX001*	E9
CX002	F9
CX120	H10
CX130*	J10
CX140*	J10
CX150*	G10
CX220	E10
CX250*	E10
CX280*	B8
CX282*	D10
CX301	D10
CX350*	E10
CX722*	D11
CX723*	D11
CX724*	C11
CX726*	D11
CX900	E10
CX901*	F9
CX902	D9
CX910*	H10
CX920*	D10
CX950*	F9
CX965*	E9



DA001*	A1
DA002*	A11
DF001	K10
DF002*	K10
DF007*	K10
DF011	L11
DF028*	K10
DF031	K10
DF033	K11
DH001*	C9
DI001*	C5
DI002*	C 7
DI040*	C6
DI041*	C6
DI051*	E5
DI070*	E5
DI071*	F5
DL001	Q6
DL003*	R7
DL004*	R7
DL023*	L6
DL030*	R9
DL032*	R9
DL032*	R10
DL032	R10
DL032	R11
DL034	N9
DL036	N9
DL041*	J8
DL041	J8
DL043	K8
DL046	P6
DL050	M6
DL051	L6
IDL052	L6
DL057*	L7
DL060*	M6
DL061*	Q6
DL062*	P6
DL066*	P7
DL070*	M7
DL071	K9
DL072*	K9
DL092	L6
DL147*	Q7
DL148*	Q7
DL157*	L8
DP018	P1
DP019	Q2
DP022	N1
DP027	K1
DP028	K2
DP034*	K 2
DP035	K2
DP040	N0
DP041	N0
DP043	M0
DP044	N0
DP045	N1
DP050	M1
DP051*	M2
DP052	K1
DP053	L2
DP054	L1
DP060*	K1
DP061*	J0
DP066	K0
DP108	L 5
DP108*	M5
DP108	M4
DP109*	M4
DP109	M4
DP110	Q4
DP112	Q 4
DP113	R5
DP126*	K5
DP130	N4
DP131*	N5
DP132*	P5
DP133	N5
DP134	J8
DP140*	L4
DP140	L4
DP151*	N4
DP152*	N5
DP160*	K3
DP172*	H4
DP173*	H4
DP175*	H3
DP178*	H3
DP179*	J4
DP190*	A1
DR090*	G0
DR091	E2
DP104	E1
DV011*	G8
DV012*	G8
DV025*	G7
DV026*	G8
DV027*	G8
DV028*	G8
DV101*	J5
DV104 *	K5
DV108*	K6
DV221*	K7
DX001*	E8
DX120	G10
DX151*	F10
DX220*	E9
DX251*	E9
DX301*	D10
DX351*	E10



FI001	C7
FI002	C6
FI010	C6
FI015	C7
FI020	C6
FI030	E6
FI040	E6



IA001	A7
IA001	A4
IA001	A8
IA002	A2
IF001	L11
II050	E6
IIL062*	M6
IP050	M1
IP060	K0
IP130	N5
IP140	J2
IP140	J1
IR001*	C2
IR001	C2
IR002*	C0
IR002	C0
IR003	B0
IR004*	F3
IR004	F3
IV001	H6
IX001*	E8
IX001	E8
IX900	E9



JA002	A1
JA003	A2
JA004	B4
JA005	B4
JA006	B4
JA007	B4
JA008	A5
JA009	A5
JA010	A5
JA011	A5
JA012	A5
JA013	A 6
JA014	B7
JA015	B7
JA016	B8
JA017	A7
JA018*	A 8
JA019	B7
IJA020	B10
JA021	A10
JA022	B11
JA023	B9
JA051*	A10
JA052*	B10
JA053*	B9
JA054*	B9
JA055*	A4
JA056*	A4
JA100	K4
JF001	K10
JF003	L10
JF004*	J9
JF005*	L11
JF010*	K10
JF011*	K10
JH005*	C8
JH006*	C8
JH007	B8
JH009	C11
JH903*	C 10
JI001	C7
JI004*	D9
JI005*	E7
JI006*	E7
JI008*	C6
JI009*	E6
JI010*	D5
JI012*	C5
JI013*	D5
JI014*	F5
JI015*	D7
JI016	B8
JI020	B8
JI021	D5
JI022	F6
JI023	F6
JI024	F 4
JI901	C5
JI902*	D5
JI903*	D6
JI906*	D8
JI910*	D5
JI915*	E7
JI916*	E7
JI928*	D8
JI930*	D7
JI931*	D8
JL001	M8
JL005*	Q 5
JL006	M7
JL007	M6
JL008	L6
JL009 *	M7
JL010*	M8
JL011	M7
JL012	N6
JL016	K9
JL017	K9
JL018	H9
JL019	H9
JL020 *	K 7
JL021	K7
JL032	N10
JL033	Q8
JL034	N7
JL035	N8
JL036	Q11
JL037	P11
JL083	N 6
JL084	N6
JL932	M10
JL933	N10
JL934	M10
JL936	N10
JL937	P10
JL943*	K8
JL984	N6
JL985	P6
JP136	G0
JP170	K5
JP201*	L2
JP204*	P5
JP205	H1
JP208*	J5
JP209*	P0
JP211*	K2
JP300	K1
JP301	L2
JP302	P1
JP303	L4
JP304	L3
JP305	P5
JP306	M1
JP307	P4
JP309	J4
JP310	H3
JP311	J3
JP312	J3
JP313	J3
JP314	H1
JP315	H2
JP316	H1
JP317	J1
JP318	N2
JP319	M1
JP321	H3
JP322	G0
JP324	N5
JP326	L1
JP327	L1
JP328	R2
JP902*	K2
JP903*	L3
JP910	J2
JP911	J2
JP913	L5
JP914	P4
JP915	P4
JP916	P4
JP917*	P4
JR007*	C0
JR008*	B1
JR009*	B3
JR017*	C1
JR018*	C1
JR019*	D 2
JR020*	D1
JR021*	D1
JR022*	D1
JR023*	D0
JR024*	E3
JR026*	D1
JR027*	F2
JR028*	E2
JR029*	G0
JR030*	E2
JR031*	E3
JR032*	F2
JR033	F0
JR035*	G3
JR036*	G3
JR038*	F4
JR040*	G4
JR045*	C3
JR100	A0
JR102	C3
JR103	B3
JR104	C1
JR105	D1
JR106	D1
JR107	C3
JR108	C3
JR109	C3
JR110	D3
JR111	D3
JR112	D3
JR114	D3
JR116	D4
JR117	D4
JR118	D4
JR119	E4
JR120	E4
JR121	E4
JR122	E4
JR123	E4
JR125	E3
JR126	E3
JR127	E4
JR128	F3
JR129	E2
JR131	E1
JR132	E1
JR133	E1
JR134	F1
JR137	G0
JR138	G0
JR139	G1
JR140	G1
JR141	G1
JR142	F2
JR146	F3
JR147	F3
JR148	F4
JR149	F4
JR150	G4
JR151	G4
JR152	G3
JR153	G3
JR154	G3
JR155	G3
JR156	G4
JR160	G5
JR161	G5
JR162	G2
JR163	G2
JR165	G1
JR166	B6
JR167	B6
JR168	B7
JR171	C1
JR172	F4
JR173	E1
JR174	D0
JR175	F3
JR901*	B0
JR902*	D0
JR903*	B1
JR904*	B1
JR905*	B0
JR906*	F3
JR907	F2
JR908*	B0
JV001	H7
JV002	K6
JV003	G8
JV004	G5
JV005	F6
JV006*	G7
JV007*	H6
IJV009	K5
JV010*	L5
JV011	K6
JV012	K6
JV013*	H6
JV014*	H6
JV015	G5
JV016	J10
JV017*	J5
JV021	K6
JV022	K6
JV023	J5
JV031*	G4
JV032*	G4
JV033	G4
JV034	G4
JV901*	G6
JV902*	G6
JX002	E8
JX003*	E8
JX004*	E8
JX005	G8
JX006	F8
JX007	F8
JX008	F9
JX009	G8
JX010	E9
JX011	G9
JX012	G9
JX013	F8
JX014	G10
JX015	G9
JX016	G9
JX017	G9
JX019	G10
JX020	H11
JX021	E11
JX022	E10
JX023*	E9
JX025*	D11
JX050*	E10
JX051*	E11
JX055	E8
JX056	F8
JX920	G9
JX922	F8
JX923	F10

LH004	C9
LI020	C5
LI051	E5
LI053	E7
LI070	E5
LI090	F7
LL001	R7
LL006	M5
LL008	M8
LL029	P10
LL030	Q9
LL031	R8
LL032	R11
LL033	N11
LL034	M10
LL037	P9
LL043	K8
LL045	H9
LL046	P7
LL047	P7
LL084	N6
LP019	Q2
LP020	N3
LP021	P2
LP040	L0
LP042	N0
LP070	L3
LP112	Q5
LR002*	D0
LR003	E0
LR004	D3
LR005	B2
LR011*	D3



PI030	E7
PI035	D8
PI050	D7



QI053	D7
QI070	E5
QR001	D3



RA001*	A 1
RA002*	A0
RA003*	B3
RA004*	B4
RA005*	A 3
RA006*	A3
RA007*	A 3
RA008*	A 4
RA009*	B4
RA010*	B4
RA011*	B3
RA012 *	B4
RA013	A5
RA014	C3
RA016*	A0
RA017*	A1
RA018*	A1
RA019	E3
RA020*	A10
RA021*	A10
RA022*	A10
RA023*	A 10
RA024*	A9
RA025*	A9
RA026*	A9
RA027*	A 8
RA028*	A9
RA029*	A0
RA030	A7
RA031*	A2
RA032*	A 10
RA033*	A10
RA034*	B4
RA035*	A1
RA040*	A 9
RF002*	K10
RF003	K10
RF007*	K10
RF011	L10
RF012	K9
RF013	K9
RF015	K9
RF020	L10
RF023*	K9
RF024*	J9
RF025*	K9
RF026	J8
RF036*	K9
RH001*	C10
RH002*	C9
RH003*	C9
RH004*	C9
RH007	D9
RH008	H9
RH010*	C10
RH011*	C10
RI001*	C7
RI002*	E4
RI003*	C5
RI004*	B7
RI005*	C5
RI006*	C5
RI007*	D7
RI008*	C7
RI009*	C8
RI012*	C6
RI019*	C5
RI020*	C5
RI021*	D7
RI022*	C5
RI023*	C6
RI024*	C6
RI025*	C6
RI026*	C7
RI027*	D7
RI028*	D8
RI029*	E8
RI030*	E7
RI031*	E7
RI032*	F6
RI033*	D8
RI034*	C8
RI035*	D8
RI036	D8
RI037*	E7
RI038*	E8
RI039*	E8
RI040*	C5
RI041*	C6
RI042*	C5
RI043*	C6
RI044*	C6
RI045*	D8
RI049*	E6
RI050*	E6
RI051*	E6
RI052*	F6
RI053*	E 7
RI054*	C6
RI055*	E7
RI056*	E5
RI058*	D5
RI059*	E5
RI061*	E5
RI062*	D5
RI065*	D5
RI066*	D6
RI070*	F5
RI071*	F5
RI072*	E5
RI073*	E5
RI074*	E5
RI075*	F5
RI076*	D5
RI077*	E6
RI078*	F 4
RI079*	E4
RI082*	E5
RI083*	D5
RI084*	D4
RI090*	E8
RI091*	E7
RI092*	F7
RI093*	F7
RI094*	E8
RL095*	D8
RL001*	J5
RL002*	J5
RL003 *	J5
RL004	Q6
RL004	Q6
RL013	Q6
RL014	R7
RL015	R6
RL016*	R7
RL017*	R7
RL018*	R7
RL020*	J7
RL021*	K6
RL023	K6
RL024*	H8
RL025	K6
RL026*	P11
RL027*	P11
RL028	K6
RL029	P11
RL030	Q 10
RL030	Q10
RL037	P9
RL040	K8
RL043	K8
RL044*	L6
RL045*	L11
RL046*	N7
RL047	Q 6
RL048*	P7
RL050*	L6
RL051*	K7
RL052	M 6
RL053*	M6
RL054*	M6
RL055*	L7
RL056*	L7
RL057*	M 7
RL058*	L7
RL059*	Q6
RL063*	M 7
RL064*	P6
RL065*	P6
RL066*	Q7
RL067*	Q9
RL068*	Q 9
RL069*	Q9
RL070*	M 7
RL071*	L9
RL072*	K 9
RL073*	N6
RL080*	J6
RL081	K5
RL082	L6
RL084	P6
RL092*	L7
RL124*	N9
RL125*	N9
RL126*	M9
RL127*	M 9
RL129	P10
RL134*	N9
RL135*	N9
RL136*	M 9
RL137*	M9
RL146*	Q7
RL147*	Q7
RL149*	Q7
RL155*	L7
RL160*	L7
RL171*	L9
RL211*	L8
RL214*	K7
RP020	P0
RP022	N1
RP025	K2
RP025	K2
RP026*	K2
RP027*	K1
RP028	L1
RP029*	L1
RP030	L1
RP031	L1
RP032	M1
RP035	K2
RP040	L0
RP041*	M0
RP042*	M0
RP050	M2
RP051*	L1
RP052*	L0
RP053	L1
RP054	K1
RP054	K1
RP055	K3
RP056*	K0
RP059*	J1
RP060*	K1
RP061*	K1
RP062	J0
RP063*	K0
RP064*	J0
RP065*	K0
RP066	L1
RP067*	M0
RP068*	L1
RP069*	L0
RP070*	L2
RP100	R3
RP102*	M3
RP112	R4
RP112	R5
RP120*	M5
RP121*	L5
RP122*	M5
RP123*	K4
RP124*	K4
RP125*	L4
RP126*	K5
RP127*	K5
RP128	K5
RP129*	K5
RP130	L5
RP138*	J3
RP139*	K4
RP140*	H2
RP141*	H2
RP142*	H2
RP143*	J2
RP144*	H0
RP145*	H0
RP146*	H1
RP147*	H0
RP148*	H1
RP149*	J1
RP150*	P4
RP151*	P4
RP152*	N5
RP156	N4
RP157*	N4
RP158*	P4
RP159*	N4
RP160*	J4
RP161*	L4
RP162*	K3
RP163*	L3
RP164*	H1
RP165*	H1
RP166*	H0
RP167*	H0
RP168*	G0
RP170*	K6
RP171*	H4
RP172*	J4
RP173	K6
RP175*	H4
RP176*	H4
RP177*	H3
RP179*	J4
RP190*	A1
RP191*	A1
RP192*	A2
RP193*	A1
RP194*	B2
RR010*	D1
RR011*	C2
RR012*	C2
RR013*	F0
RR014*	G0
RR015	D1
RR016	D2
RR017	D1
RR018	F2
RR019	F 2
RR021	D4
RR025*	E0
RR026 *	E0
RR027*	E1
RR028*	D2
RR029*	F0
RR030 *	F0
RR031*	F0
RR032	E3
RR033	E3
RR034	E3
RR035	E3
RR036*	F0
RR037*	E0
RR038*	E0
RR039*	E0
RR040*	E0
RR041*	E1
RR042 *	F1
RR043 *	F0
RR044 *	C2
RR045 *	C2
RR048*	F2
RR049*	F2
RR050*	B2
RR051*	B1
RR052*	B2
RR053*	C2
RR055*	C2
RR056*	C2
RR057*	E3
RR060*	B2
RR061*	B1
RR062*	B3
RR063*	B2
RR065*	C2
RR066*	C2
RR067*	B2
RR070*	B2
RR071*	B3
RR072	B2
RR075*	B1
RR076*	B1
RR084*	G1
RR085	G2
RR086	C4
RR087	E2
RR088	C4
RR089	E2
RR091*	G0
RR093*	F1
RR097*	F3
RR098*	G1
RR099*	G1
RR100*	C2
RR103*	G4
RR104*	E1
RR105*	G1
RR106*	G0
RR107*	G1
RR171*	B2
RR910*	F4
RR924*	E2
RV001*	H8
RV002	H7
RV003*	J7
RV011*	H9
RV012*	H8
RV021*	G5
RV022*	J5
RV038*	G5
RV041*	G7
RV043*	G7
RV051*	G5
RV052*	G6
RV053*	H6
RV061*	H6
RV062*	H6
RV063*	H5
RV064	H5
RV066*	H5
RV071*	J6
RV072*	H6
RV073*	H5
RV074	H5
RV076*	H5
RV081*	J6
RV082 *	H6
RV083*	H5
RV084	H5
RV086*	H5
RV091*	H6
RV092*	H6
RV101*	L6
RV107*	J5
RV108*	K6
RV109*	K5
RV110*	L6
RV112*	K6
RV201*	H7
RV202*	F6
RV203*	F7
RV206*	H7
RV213*	J6
RV216*	J 6
RV221*	K7
RV222*	K6
RV223*	K7
RV231	K7
RV232	J7
RV233	J7
RV241*	J5
RV242*	J5
RV107*	H11
RV111*	H11
RV115*	H11
RV116*	H10
RV120*	H10
RV121*	H10
RV122	G10
RV130*	J11
RV131*	F8
RV132*	F8
RV133*	F8
RV134*	F8
RV140*	J11
RV150*	F10
RV151*	F10
RV215*	E11
RV220*	F11
RV221*	E11
RV250*	E10
RV251*	E10
RV280*	B8
RV281*	D10
RV282*	D10
RV301*	E11
RV303*	E11
RV350*	E10
RV351*	E10
RX900	F10
RX910	G10
RX911*	H10
RX912*	H10
RX920*	D9
RX921*	D10
RX922*	D10
RX950*	F9
RX951*	G8
RX955*	E9
RX956*	E9
RX960*	F9
RX961*	G8
RX965*	E9
RX966*	E9
RX991	H9
RX992	D9



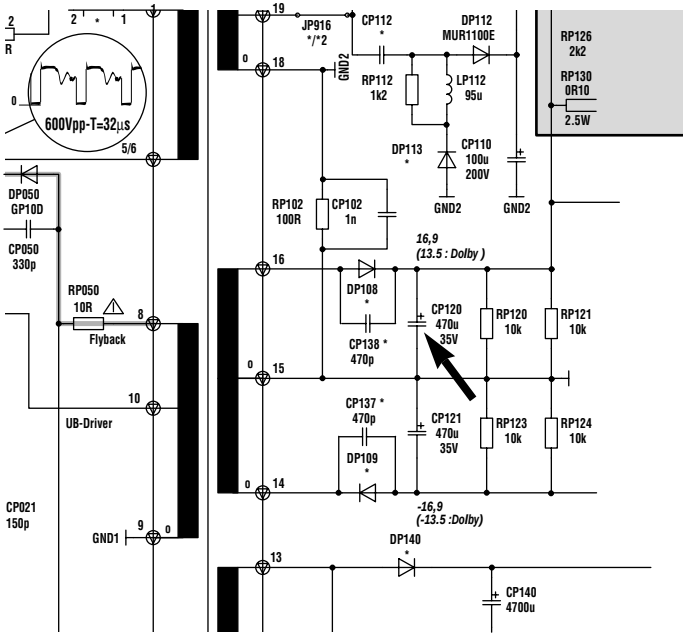
TI010*	C5
TI020*	C6
TI030*	D8
TI031*	D8
TI032*	D8
TI033*	F6
TI034*	E8
TI040*	D5
TI045*	D5
TI050*	C6
TI070*	E4
TI090*	E7
TI091*	E7
TI092*	D8
TI093*	D8
TL001*	K5
TL004*	Q6
TL005*	R6
TL028	Q11
TL030	R8
TL030	R9
TL062*	K7
TL063*	M6
TP025*	K2
TP026*	K2
TP027 *	J0
TP060	N0
TP129*	L5
TP145*	H2
TP146	J2
TP150*	N5
TP152*	N4
TP161*	K3
TP162*	K3
TP166*	H0
TP167*	G0
TP170*	K6
TP175*	H4
TP190*	A1
TR002*	F0
TR048*	F2
TR091*	G0
TR095*	F2
TR102*	G4
TR105*	G1
TR106*	G2
TV002	H7
TV063*	H5
TV073*	H5
TV083*	H5
TV108	K6
TX910	H10
TX920	D10
TX950	F9
TX955*	E9
TX960*	F9
TX965*	E9

TECHNICAL INFORMATION

TV EQUIPED OF ICC19 CHASSIS (50Hz and 100Hz)

Symptom :
When the television is in the Standby Mode, residual noise can be heard from the loudspeakers.

Solution :
Change CP120 from 470µF 35V to 330µF 25V capacitor (codice 10448410)



TECHNICAL INFORMATION

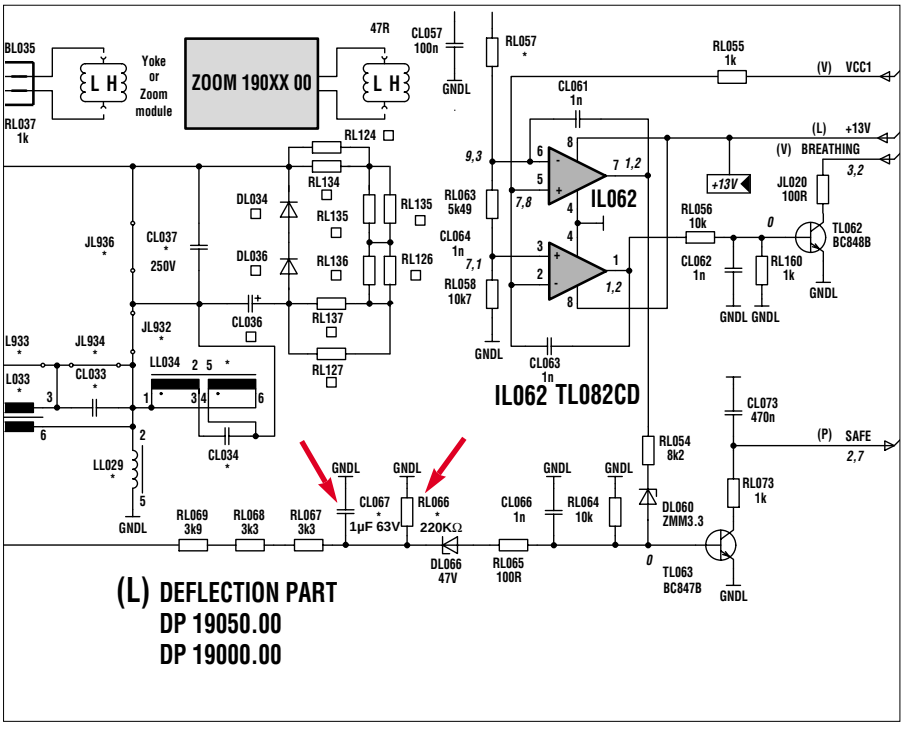
ICC19 16/9 50Hz CHASSIS ⟶

- **32WS88KE**
- **32WS83KP**
- **28WS73KD**
- **28WS78KE**

Symptom :
Power supply switches to safety mode during VCR operating.

Cause :
Loss of synchronisation signal for 1 or 2 frames (poor quality video recording).

Solution :
- Replace capacitor CL067 (100nF 100V) with a 1µF 63V (Part No. 43067772).
- Add a 220kΩ 5% 100mW melf resistor at position RL066 (Part No. 10328700)



TECHNICAL INFORMATION

TV EQUIPED OF ICC19 CHASSIS (50Hz and 100Hz)

Symptom :
In case of failure of IC TDA8177F in position IF001.

Solution :
CAUTION

Version TDA8177F (Part No. 10352880) is able to carry higher output currents than the TDA8177 (Part No. 15053440) used in TX92 chassis.

If the wrong IC is used, the replacement device will be distroyed at Switch On.

TECHNICAL INFORMATION

SUBJECT : ICC19 100Hz CHASSIS STEREO or DOLBY STEREO

Symptom (only applicable to Italy) :
Picture interference when receiving VHF Band 1 signals, either moire patterning or black vertical bars on the screen.

Cause :
Cross talk between power supply and tuner.

Solution :
Replace the switch mode transformer LP020 with either :
- 10553820 (stereo).
- 10553830 (dolby stereo).

ICC19 100 Hz - BASIC- / IM- / MM- Version

tube name	description	CT-Part		DST	Usys jumper	Usys	Version
A66EGW 48X322	4/3 28”MP INVAR BSVM	CT 19101 34 CT 19105 37	10362880 10351530	10460360 10468070	JP915 JP914	134V 137V	ICC19 IM ICC19 IM
A59EGD048X322	4/3 25”SF INVAR BSVM	CT 19105 37	10351530	10468070	JP914	137V	ICC19 IM
A68EGD038X322	4/3 29”SF INVAR BSVM	CT 19105 37 CT 19152 37	10351530 10520610	10468070 10510870	JP914 JP914	137V 137V	ICC19 IM ICC19 MM
W66EGV023X122	16/9 28”SF INVAR BSVM	CT 19111 34	10444810	10468160	JP915	134V	ICC19 IM
W76EGV023X122	16/9 32”SF INVAR BSVM	CT 19111 34	10444810	10468160	JP915	134V	ICC19 IM
W76EGX023X122	16/9 32”SF INVAR BSVM	CT 19151 34	10520600	10520330	JP915	134V	ICC19 MM
A66EHJ 48X 12	4/3 28”MP AK; no BSVM	CT 19103 34	10556010	10551170	JP915	134V	ICC19 BASIC
A68EGV038X322	4/3 29”SF SS INVAR BSVM	CT 19155 37	10562020	10551150	JP914	137V	ICC19 IM/MM
A80AJA 16X120	4/3 33”MP INVAR BSVM	CT 19156 37	10561990	10510870	JP914	137V	ICC19 IM
A90AFX 16X120	4/3 37”MP INVAR BSVM	CT 19156 37	10561990	10510870	JP914	137V	ICC19 IM

ICC19 50 Hz

tube name	description	CT-Part		DST	Usys jumper	Usys	Version
A59EGD048X300	4/3 25”SF	CT 19005 31	10510890	10517720	JP915	131V	
A68EGD038X300	4/3 29”SF	CT 19005 31	10510890	10517720	JP915	131V	
W66EGV023X115	16/9 28”SF	CT 19032 37	10391010	10517750	JP917	137V	
W76EGX023X115	16/9 32”SF	CT 19032 37	10391010	10517750	JP917	137V	
A66EHJ 13X 15	4/3 28”MP AK	CT 19003 32	10351520	10517740	JP914	132V	