APPLICATION NOTE

TV Reference design GTV4000 update

AN99063

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Abstract

The reference design GTV4000 TV receiver is described in report AN98079, the modifications made in the total receiver after the release of report AN98079 are given in this report.

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TV Reference design GTV4000 update

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Author(s):

Chris Bergmans
Anne v.d. Meulen

Philips Semiconductors - Systems Laboratory Eindhoven,
The Netherlands

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Summary

The reference design GTV4000 TV receiver is described in report AN98079, the modifications made in the total receiver after the release of report AN98079 are given in this report.
New integrated circuits are used for the sound output amplifier, combfilter and vertical deflection.
The latest version of the IPQ module is used with improved performance and possibilities.
Also the changes needed for real flat 16:9 picture tube and a 4:3 picture tube are given.

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1. Introduction

The GTV4000 TV receiver is described in report AN98079, the modifications made in the total receiver after the release of report AN98079 are given in this report.

2. Modifications in GTV4000.

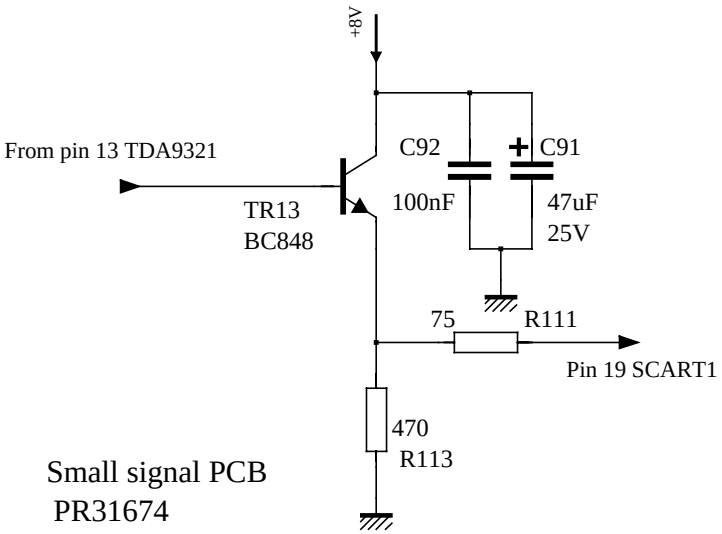
The GTV4000 receiver PCB number PR31672 is updated two times, PR31673 and PR31674. The changes from PR31672 to PR31674 are given. In the SMPS and deflection board some hand made modifications are made; no new PCB design is made.

3. Soundtrap switching.

In AN98079 the video amplitude at pin12 of the TDA9321 (page 26) is 1Vpp, this must be 2Vpp; for that reason the switches of the sound traps are changed. The signal from the sound traps is now directly connected to the output emitter followers TR11 and TR27 and an extra transistor TR8 is used to switch between the two sound traps. The signal is fed to pin 12 (group delay in) via C54.

The output voltage of the group delay circuit pin 13 has now also an amplitude of 2Vpp. This voltage is fed to an emitter follower TR28 and on the emitter the voltage is divided to 1Vpp with resistors R289 and R290 and fed to pin 14 CVBS internal in.

The signal from 13 is fed to the SCART connector CVBS out pin19, the signal has now already an amplitude of 2Vpp and there fore the amplifier with TR12 and TR13 can be replaced by a simple emitter follower; in the board R102, R110 and C93 can be replaced by 0 Ohm resistors.
R109, R112 and TR12 can be removed.
R113 is changed to 470 Ohm.

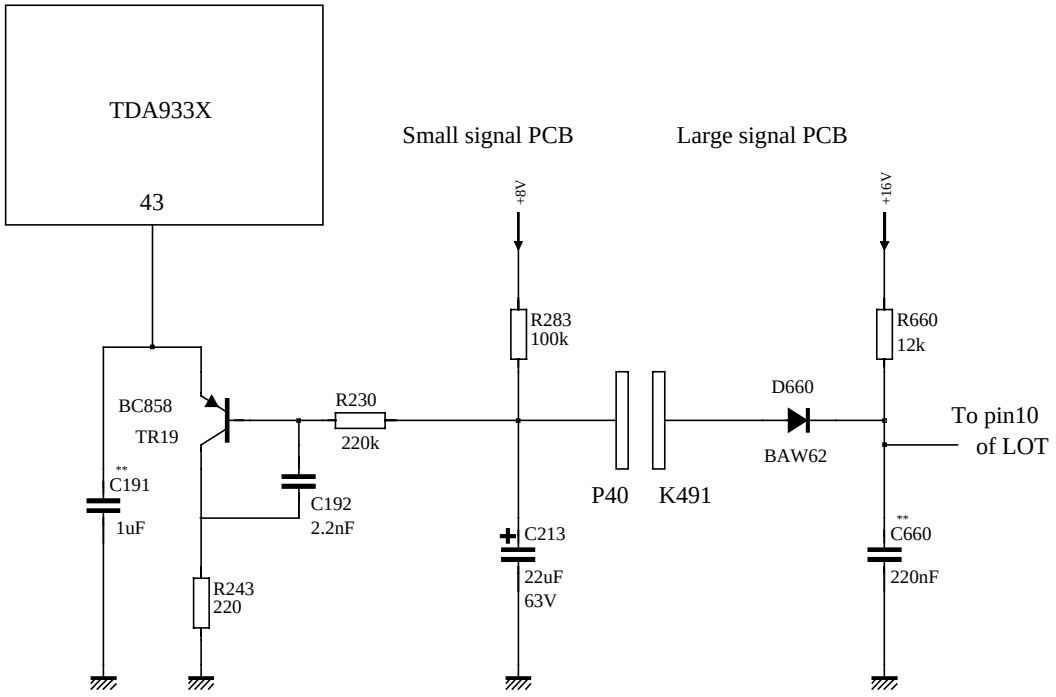


The value of L6 is reduced from 10uH to 4.7uH to get a flat frequency response of the video signal after the sound traps.

4. Beamcurrent limiter circuit.

In the beamcurrent limiter circuit an oscillation could occur; the value of capacitor C191 (3.3nF) on pin43 of the TDA933X has to be increased to 1uF (page 27).

Furthermore R283 (100k) and C213 (22uF) are added to improve the loop stability.



5. Black current loop.

The black current loop showed sometimes an instability, a fast brightness modulation could be visible on the screen. Therefore the circuit on the black current feedback pin 44 is changed page 27). R214 is changed from 100 ohm to 10k, a diode D11 and a capacitor C226 of 470pF are added. With these components a lowpass filter is incorporated in the feedback loop to remove the interference from the feedback signal.

6. Vertical deflection.

The TDA8351 or TDA8354 vertical deflection IC is replaced by the new vertical deflection IC TDA8359 (page 28).

The circuit is suitable to drive tubes with different deflection currents.
In the circuit R182 is not present and R181 has to be adapted to the required current for the tube:
16:9 picture tube deflection current is 1.4App, R181=1.8 Ohm
Real flat 16:9 picture tube deflection current 1.75App, R181=1.5 Ohm
4:3 Picture tube deflection current 2.2App, R181=1.2 Ohm.
In case a 4:3 tube is used an extra filter has to be used to avoid oscillations in the circuit, R292 and C216 are added.

7. New combfilter TDA9181.

The combfilter SAA4961 is replaced by a new combfilter TDA9181T (page 26); the functioning of this IC is the same. The performance of the new filter is better than the old one, specially the noise in the signal is less. The number of peripheral components is less; 4 capacitors and 2 resistors can be saved. The TDA9181T is available in SMD and in a DIL16 encapsulation. In this receiver the SMD package is used.

8. Audio amplifiers.

The audio output amplifiers 2 times TDA2616Q are replaced by one TDA8580 which contains 4 output amplifiers (page 28).
The advantage of this IC is that only one large capacitor is needed, C152, C162 and C196 all 1000uF can be left out.

9. Lay-out changes.

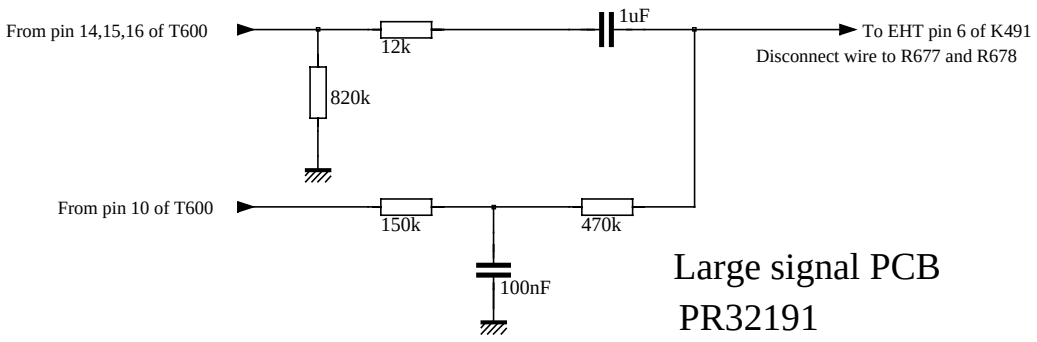
Due to the modifications the lay-out is changed.
The major changes are made:
1. The antenna signal splitter is changed to type number PS1311; this splitter is mounted on the main PCB; the old one was mounted to the heatsink.
2. The position of connectors P31 and P37 are interchanged; now the sound board will correctly fit in the connectors.
3. Comb filter changed from SAA4961 to TDA9181.
4. Vertical deflection changed to TDA8359J
5. Audio amplifiers changed to TDA8580.

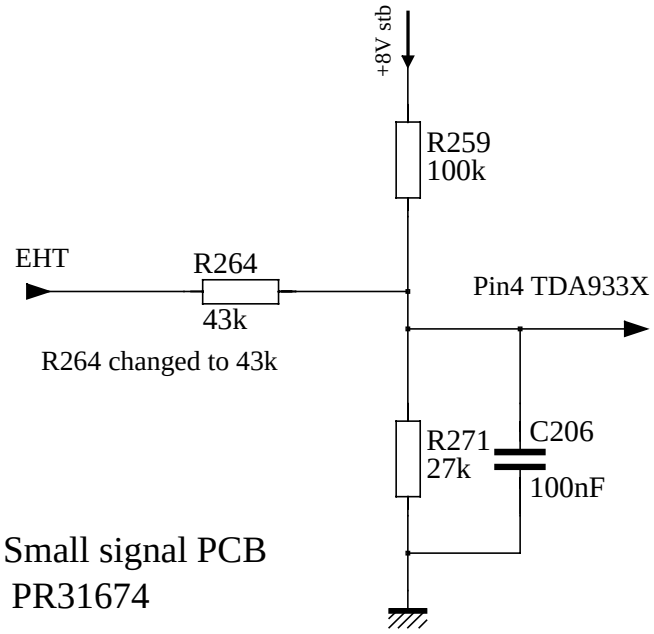
10. EHT comp.

See figures. below.

The AC information for the EHT compensation is obtained from the EHT bleeder in the line output transformer. It is available on pin14, 15 and 16 of T600.

The DC information for the EHT compensation is obtained from the lower part of the EHT winding of the line output transformer pin 10.
The information is added in the correct proportions and fed to the EHT input pin4 of the TDA933X





11. TR1, J11.

The signal CVBS(TXT)out is fed to the SCART 2 via emitter follower TR1 (page 26), the emitter resistor is split up into R6 and R307. The emitter signal 2Vpp for SCART is divided by 2 and the 1Vpp signal is fed to J11. With J11 (page 25) a choice can be made between the source which is fed to the PIP module CVBS(TXT) or CVBS(PIP).

12. Connectors P31 and P37.

In PCB PR31672 the connectors P31 and P37 (page 28) for the sound boards were at the wrong PCB location. The mechanical location is interchanged and now the sound board fits into the connectors.

13. FB connected to ground when no TXT module is present.

When no Teletext board is used the fast blanking pin of connector P18 pin 6 has to be connected to ground, otherwise the picture will be blanked (page 25).

14. R278 removed.

R278 has been removed; it divided the RC5 signal from the infrared receiver to half the required value (page 27).

15. 10pF parallel to L4.

In the present PCB still a capacitor of 10pF has to be connected in parallel to L4; the IF demodulation circuit (page 25).

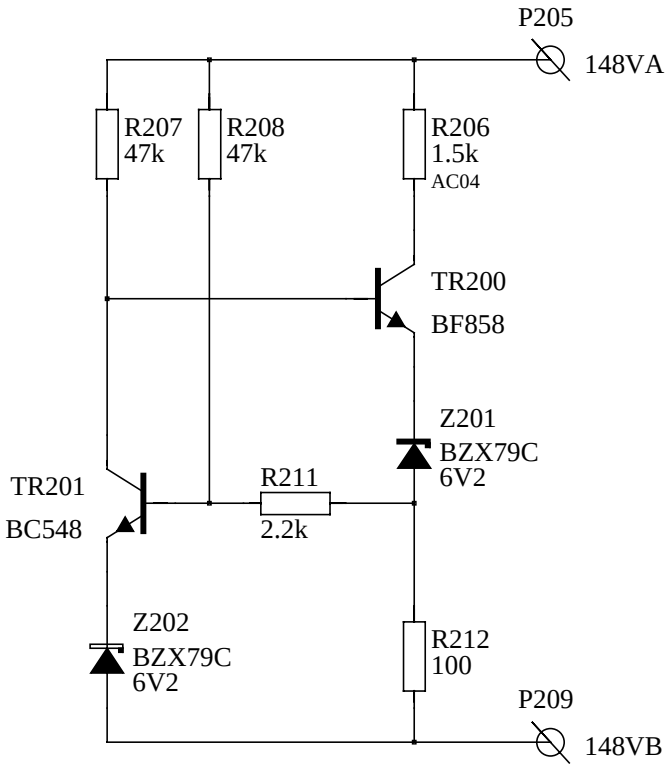
16. Automatic polarity convertor in VGA mode.

The automatic polarity convertor IC5 for the VGA sync pulses can be removed because the TDA933XH version N2 can handle positive and negative sync polarity (page 27).

IC5 and all components around IC5 can be removed, The jumpers J12 and J 13 have to be closed to connect the sync pulses directly to the TDA933XH via sync switch IC7.

17. R610 on the large signal board is replaced by a small PCB PR31821.

This PCB contains the circuit as shown below.



The circuit is connected in series with the line driver circuit. It acts in normal operation as a maximum current limiter. When one of the protection circuits of the TDA933x (HOP) is activated the line drive is switched off and the driver transistor is continuously conducting. In this condition the current in the driver transistor is reduced to a lower value to avoid excessive heating of the line driver transistor, TR200 and resistor R206.

18. 100Hz cross

A well known problem in 100Hz TV sets is the so called 100Hz cross.
The 100Hz cross consists of a vertical bar (some 5cm wide) in the middle of the screen and a small horizontal bar (some 1cm high), also in the middle of the screen. Together they form the cross. They may be equally strong or different in visibility.
Also it can happen that one or both is missing.
The cause is usually the horizontal and vertical deflection entering sensitive parts on the 50Hz side. Also actions of IC's on the 100Hz side during H- and/or V-blanking can cause disturbances on e.g. supply lines.

The following points reduced the visibility of the horizontal bar:

During the vertical flyback, the tuning voltage for the tuner (derived from +45Vfb) was disturbed, causing some mistuning and therefore a disturbance on the tuner output. Extra decoupling is required, C73 is increased to 470uF (page 25).

During vertical flyback, the +5V supply for the tuner was disturbed. Also here an extra decoupling is required C75 increased to 470uF (page 25).

For the reduction of the vertical bar the next points are required on the large signal board:

Connect on the large signal board the grounds of connectors K491 and K891 directly with a thick wire.

Also a direct thick wire is connected between ground of C603 and ground pin 5 of the LOT T600.

These modifications reduced the ground bounce on the small signal board.

19. TDA9178 picture improvement.

There are two sharpness controls, one in the IPQ module and one in the TDA9178. In the TDA9178 module the setting is fixed and the sharpness control of the IPQ is in the menu.
When the PIP picture is displayed the border of the PIP is disturbed when the CTI function is switched-on, therefore CTI has to be switched-off when PIP is on.

20. IPQ module.

In the set the following IPQ modules can be used:

MK8: BESIC and PROZONIC + field memories or field memory with noise reduction.
MK9.6 BESIC and MELZONIC + field memories or field memory with noise reduction.
MK11 BESIC and FALCONIC + field memories.
Both MK8 and MK9.6 can be used with only BESIC + FM(+NR), SFM mode (AABB mode).

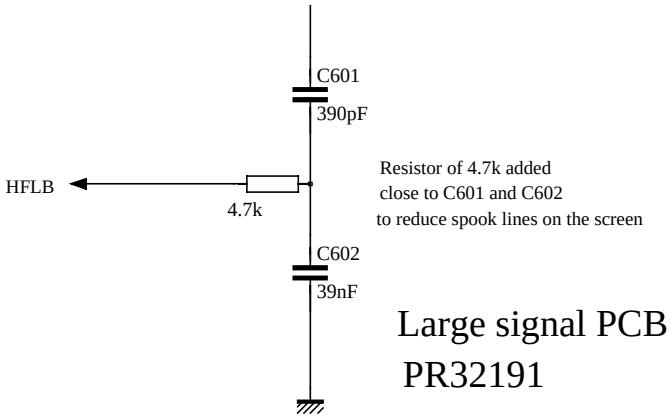
BESIC SAA4977
Field memory SAA4955
Field memory with noise reduction SAA4956.
PROZONIC SAA4990: Line and field progressive scan line flicker reduction and noise reduction.
MELZONIC SAA4991: As prozonic + motion estimation and compensation in field progressive scan mode.
FALCONIC SAA4992: As melzonic but with increased range for motion estimation and compensation, also in line progressive scan mode. Also improved noise reduction (as in SAA4956) and vertical peaking.

For MK9.6 the report AN98041 can be used, the circuit diagrams are updated.
For MK11 at this moment no report is available.

21. Improvement points.

With the introduction of the new IPQ modules MK9.6 and MK11 as well as the introduction of the new comb filter TDA9181 the S/N ratio of the picture has become much better.

In the Low VHF band at weak signals a vertical disturbance was visible:
We could cure it on the deflection board. The horizontal flyback pulse for the TDA933X is taken from a capacitive divider, formed by C601/C602 see next figure.
This pulse contains high frequent ringing. By placing a 4k7 resistor between this tie-point and connector K491 (close to the capacitor), the problem was solved.



After a white vertical line ringing was visible on the screen.
By removing speed-up capacitors C2, C3 and C4 on the CRT board the problem was solved.

22. RGB emitter followers.

In the RGB outputs of the TDA933x three emitter followers (TR29, 30 and 31) are placed to minimize the capacitive load on these pins.
With these emitter followers the full video bandwidth is available to drive the video output amplifiers.

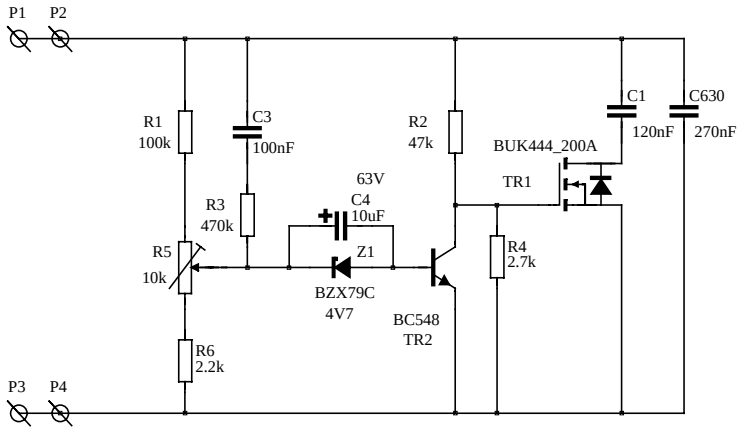
23. 4:3 tube

When a 4:3 tube is used the focus electrode of the picture tube must be connected to the focus potentiometer without dynamic correction.
The focus cable from the picture tube PCB must be connected to the black focus potentiometer on the EHT transformer.

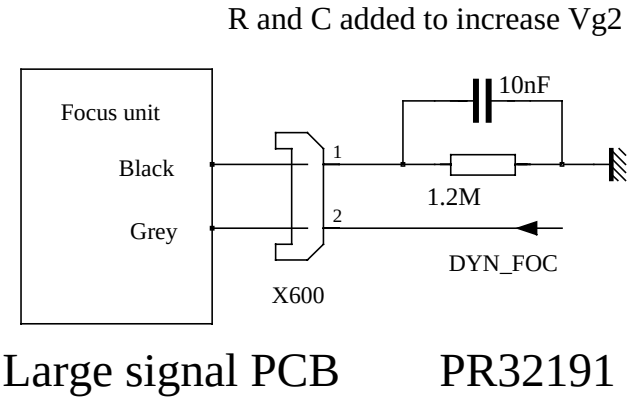
24. Real flat picture tube.

When a real flat picture tube is used, inner pincushion correction is required.
With the deflection circuit used in the receiver it is not possible to make inner pincushion correction, therefore the circuit has to be changed.
The S-correction capacitor C630 on the large signal board is replaced by an extra circuit that makes the required inner pincushion correction for this tube, see next figure. The values are for a 32” 16:9 Real Flat tube, 76ERF031X044.

The original circuit is patented, for this application solution patent is pending.
For a more detailed description see ref 4.

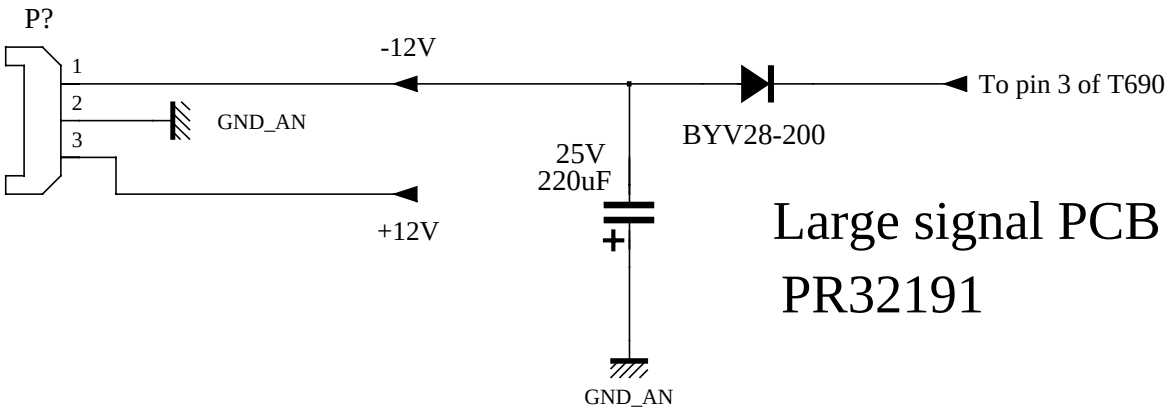


For the real flat picture tube the focus voltage has to be increased.
This can be realised by connecting a resistor of 1.2Mohm in series with the focus unit, the voltage across the resistor is added to the focus voltage and this ensures a sufficient focus voltage range for this tube.



Large signal PCB PR32191

The real flat tube has an PCB on the deflection coil that needs supply voltages +12V and -12V.
The +12V is available in the set, the -12V is made by an extra diode and elco connected to pin3 of T690 see Figure below.



25. N1 to N2 changes of TDA9321H and TDA933XH.

TDA9321H

In general there are modifications made to improve the performance of the IC.
New: One extra bit is added: FCO = Forced Colour On
Subaddress 01, byte D3.

FCO=0 normal operation of colour decoders.
FCO=1 active, unkills colour at forced standard modes.

TDA933XH

Black current loop switchable: Off, 1 point or 2 point loop.
AKB=1; black current loop off.
AKB=0; black current loop on.

New: OPC input bit at subaddress 04, bit D7.
OPC=1; 1 point control.
OPC=0; 2 point control.

New: Horizontal bow correction at subaddress 1F, bits A3...A0.
Horizontal parallelogram control at subaddress 0D, bits A5...A0 changed into 4 bit control.
E-W corner/parabola control (subadrress10, bits A5...A0) changed into E-W upper corner/parabola control.

New: E-W lower corner/parabola control at subaddress 1E, bits A5...A0.
FAST bit, located at subaddress 03, bit D5 has been removed.

New: Picture tube discharge time TFBC input bit is located at subaddress 02. bit D6.
TFBC = 0; 18.6mS discharge time.
TFBC = 1; 25mS discharge time.

New: Black level offset R control at subadrress 1B, bits A3...A0.
New: Black level offset G control at subadrress 1C, bits A3...A0.

New: HPOL status bit located at subaddress 02, bit D2.
HPOL=0; Hd input is positive.
HPOL=1; Hd input is negative.

New: VPOL status bit located at subaddress 02, bit D1.
VPOL=0; Vd input is positive.
VPOL=1; Vd input is negative.

New: HDTV input bit located at subaddress 03, bit D7.
HDTV=0; horizontal frequency is 15.6kHz (1fH mode) or 31.3kHz (2fh mode)
HDTV=1; horizontal frequency is 16.8kHz (1fH mode) or 33.7kHz (2fh mode)

New: HDCL input bit located at subaddress 1D, bit D4.
HDCL=0; normal timing.
HDCL=1; HDTV timing.

New: Start of line blanking (horizontal timing) adjustable with bus bits LBL3...LBL0. The bits are located at subaddress 1D, bits D3...D0.

New:

MAT	MUS	Matrix position
0	0	PAL
0	1	high definition ATSC
1	0	NTSC Japan
1	1	NTSC USA

26. Software modifications in GTV4000.

Peaking control in Besic.

Initialization: pk_tau, pk_delta and pk_neggain have to be set to 00.

IIC address	R/W	Subaddress	DATA
68H	W	39H	00

pk_corthr has to be set to 00

68H	W	3AH	00

The peaking function can be controlled with pk_beta and pk_alpha.
With pk_alpha = 00, the frequency response of the TV receiver can be made flat by changing pk_beta.

IIC address	R/W	Subaddress	DATA
68H	W	38H	YY

YY = 00 08 10 18 20 28 30 38 (step size 8H, bits 3 up to 5)

Software settings for the old and new comb filter:

When comb filter TDA9181 is used the frequency response of the receiver is flat with DATA setting 28.

To adjust the peaking on the screen the value pk_alpha must be changed between 28 and 2F.

IIC address	R/W	Subaddress	DATA
68H	W	38H	XX (step size 1, bits 0 up to 2)

XX = 28 is minimum peaking.
XX = 2F is maximum peaking

When comb filter SAA4961 is used the frequency response of the receiver is flat with DATA setting 38.

To adjust the peaking on the screen the value pk_alpha must be changed between 38 and 3F.

IIC address	R/W	Subaddress	DATA
68H	W	38H	XX (step size 1, bits 0 up to 2)

XX = 38 is minimum peaking.
XX = 3F is maximum peaking

The software version 1.0 is also suitable for the FALCONIC.
Motion estimation/compensation for line progressive scan and vertical peaking are also available in version 1.0.
There is a problem with the system switching to system M.
The demo software does not support the sound part and teletext part of the receiver yet.

27. Service menu.

To reach the service menu the **service** button on the local key board has to be pressed for more than 250mS. On the screen there will appear one line of text or two lines of text depending on the item selected.

When there is one line of text, first an abbreviation of 3 or 4 characters will be present followed by a value and than the range in which the value can be set.

When there are two lines of text, the first line displays an abbreviation of 3 or 4 characters followed by an indication (high, low, inside, outside etc.).

On the second line an abbreviation of 3 or 4 characters will be present followed by a value and than the range in which the value can be set. In this case it always influences the results on the first line.

Only the menu items which have relation to the display picture on the screen will be displayed. For instance when a 50Hz (100Hz) PAL picture is displayed on the screen the settings for 60Hz (120Hz), SECAM, NTSC, VGA etc. will not be displayed and can not be changed.

An item can be selected with the **up** and **down** keys and the value or setting can be changed with the **left** and **right** keys. To leave the service menu “TV” mode has to be pressed.

When the service menu is active, with the following RC keys we can go to a particular part of the service settings.

key:

0. Main IF-PLL adjustment, Main AGC take over, Main Y delays and Main Y gain.

1: Sub IF-PLL adjustment, Sub AGC take over, Sub Y delay and Sub Y gain. Sub = devices on PIP board.

2. PIP adjustments.

3. TDA9178 adjustments.

4. TDA933X (HOP) adjustments.

5. 50Hz adjustments.

6. 60Hz adjustments.

7. VGA settings.

8. OSD position, Teletext position and Option bytes.

9. Initialisation to default values. **Do not use this function. All programmed settings will be lost.**

Red. TDA933xH White point R.

Green. TDA933xH White point G.

Blue. TDA933xH White point B.

TV. Exit service mode (Not in Menu Carrousel).

see also Ref5.

28. Abbreviations used in the service menu.

Special conditions are present for the following items:

5IV1, 5OV1, 5VW1, 5VZ1, 6IV1, 6OV1, 6VW1 and 6VZ1. Used if SFM mode not active or, 4:3 to 16:9 format and horizontal compress formats when SFM mode is active.
5IV2, 5OV2, 5VW2, 5VZ2, 6IV2, 6OV2, 6VW2 and 6VZ2. Used with 4:3 to 14:9 format when SFM mode not active.
5IV3, 5OV3, 5VW3, 5VZ3, 6IV3, 6OV3, 6VW3 and 6VZ3. Used with expand format when SFM mode not active.
5IV4, 5OV4, 5VW4, 6IV4, 6OV4 and 6VW4. Used with expand +lift when SFM mode not active.

Abbreviation:

5ELC. 50Hz E-W Lower Corner parabola
5EUC. 50Hz E-W Upper Corner parabola.
5EWE. 50Hz E-W EHT Compensation.
5EWP. 50Hz E-W Parabola width.
5EWT. 50Hz E-W Trapezium.
5EWW. 50Hz E-W Width.
5HBW. Horizontal bow control.
5HP. 50Hz Parallelogram.
5HS. 50Hz Horizontal shift.
5IH1. 50Hz IPQ Horizontal write delay.
5IV1 50Hz IPQ Vertical write delay1.
5IV2. 50Hz IPQ Vertical write delay 2.
5IV3. 50Hz IPQ Vertical write delay 3.
5IV4. 50Hz IPQ Vertical write delay 4.
5OV1. 50Hz OSD position 1.
5OV2. 50Hz OSD position 2.
5OV3. 50Hz OSD position 3.
5OV4. 50Hz OSD position 4.
5SC. 50Hz Vertical S correction.
5VA. 50Hz Vertical amplitude.
5VC. 50Hz Vertical scroll.
5VS. 50Hz Vertical shift.
5VSL. 50Hz Vertical slope.
5VW1. 50Hz Vertical wait 1.
5VW2. 50Hz Vertical wait 2.
5VW3. 50Hz Vertical wait 3.

5VW4. 50Hz Vertical wait 4.
5VZ1. 50Hz Vertical zoom 1.
5VZ2. 50Hz Vertical zoom 2.
5VZ3. 50Hz Vertical zoom 3.

6ELC. 60Hz E-W Lower Corner parabola
6EUC. 60Hz E-W Upper Corner parabola.
6EWE. 60Hz E-W EHT Compensation.
6EWP. 60Hz E-W Parabola width.
6EWT. 60Hz E-W Trapezium.
6EWW. 60Hz E-W Width.
6HBW. Horizontal bow control.
6HP. 60Hz Parallelogram.
6HS. 60Hz Horizontal shift.
6IH1. 60Hz IPQ Horizontal write delay.
6IV1 60Hz IPQ Vertical write delay1.
6IV2. 60Hz IPQ Vertical write delay 2.
6IV3. 60Hz IPQ Vertical write delay 3.
6IV4. 60Hz IPQ Vertical write delay 4.
6OV1. 60Hz OSD position 1.
6OV2. 60Hz OSD position 2.
6OV3. 60Hz OSD position 3.
6OV4. 60Hz OSD position 4.
6SC. 60Hz Vertical S correction.
6VA. 60Hz Vertical amplitude.
6VC. 60Hz Vertical scroll.
6VS. 60Hz Vertical shift.
6VSL. 60Hz Vertical slope.
6VW1. 60Hz Vertical wait 1.
6VW2. 60Hz Vertical wait 2.
6VW3. 60Hz Vertical wait 3.
6VW4. 60Hz Vertical wait 4.
6VZ1. 60Hz Vertical zoom 1.
6VZ2. 60Hz Vertical zoom 2.
6VZ3. 60Hz Vertical zoom 3.

HAKB. HOP (TDA933xH) Black current loop.
HCDL. HOP (TDA933xH) Cathode drive level.
HPWL. HOP (TDA933xH) Peak white limiting.
HSCL. HOP (TDA933xH) Soft clipping level peak white limiter.
HWPB. HOP (TDA933xH) White point B.
HWPG. HOP (TDA933xH) White point G.
HWPR. HOP (TDA933xH) White point R.

INIT. Initialisation to default values. **Do <u>not</u> use this function. All programmed settings will be lost.**
MAG. Main AGC take over point.
MIF. Main IF-PLL adjustment for non SECAM-L'.

MIF1. Main IF-PLL adjustment for SECAM-L'.
MYFN. Main Y delay front end NTSC.
MYFP. Main Y delay front end PAL.
MYFS. Main Y delay front end SECAM.
MYG. Main Y gain.

OH. OSD Horizontal position.

OP1. Option byte 1.

OP_PAL_BG	Bit 0	1=PAL-BG allowed	0=PAL-BG not allowed
OP_PAL_DK	Bit 1	1=PAL-DK allowed	0=PAL-DK not allowed
OP_PAL_I	Bit 2	1=PAL-I allowed	0=PAL-I not allowed
OP_PAL_M	Bit 3	1=PAL-M allowed	0=PAL-M not allowed
OP_PAL_N	Bit 4	1=PAL-N allowed	0=PAL-N not allowed
OP_NTSC_M	Bit 5	1=NTSC-M allowed	0=NTSC-M not allowed
OP_NTSC_443	Bit 6	1=NTSC-443 allowed	0=NTSC-443 not allowed
OP_SECAM_BG	Bit 7	1=SECAM-BG allowed	0=SECAM-BG not allowed

OP2. Option byte 2.

OP_SECAM_DK	Bit 0	1=SECAM-DK allowed	0=SECAM-DK not allowed
OP_FRANCE	Bit 1	1=SECAM-L/L' allowed	0=SECAM-L/L' not allowed
OP_TN_THREE_BANDS	Bit 2	1=VHF-L, VHF-H, UHF	0=UHF
OP_COMBFILTER	Bit 3	1=Use comb filter	0=Do not use comb filter
OP_DL_PHASE	Bit 4	1=0.5H delay in second field	0=0.5H delay in first field
RESERVED	Bit 5		
RESERVED	Bit 6		
RESERVED	Bit 7		

OP3. Option byte 3.

OP_CURSOR_KEYS	Bit 0	1=Separate cursor keys	0=P+/- and Vol+/-cursor key
OP_PROZONIC	Bit 1	1=PROZONIC present	
OP_MELZONIC	Bit 2	1=MELZONIC present	
OP_VOLBAR	Bit 3	1=Volume bar outside menu	0=no volume bar outside
OP_EXTERN_LS	Bit 4	1=External speakers	0=No external speakers
RESERVED	Bit 5		
OP_PRESETS	Bit 6	1=Five audio/video presets	0=One audio/video present
OP_LOCK	Bit 7	1=Parental lock	0=No parental lock

note bit 1,2=00 SFM mode
and bit 1,2=11 FALCONIC present.

OP4. Option byte 4.

RESERVED	Bit 0	
OP_AV!_RGB	Bit 1	1=Allow RGB from AV1 when in FE mode

OP_2FH	Bit 2	1=TDA9178 in 1Fh mode	0=TDA9178 in 2Fh mode
OP_315V	Bit 3	1=0.315V range TDA9178	0=1V range TDA9178
OP_CTI_OFF_SECAM	Bit 4	1=CTI off if SECAM selected/detected	
OP_CTI_OFF_PIP	Bit 5	1=CTI off if PIP is active	
OP_315V_HOP	Bit 6	1=0.315V range HOP	0=1V range HOP
OP_FILTER	Bit 7	1=SAA4961	0=TDA9181

OP5. Option byte 5.

OP_CLOCK	Bit 0	1=Software RTC	0=No RTC hence no switch timer
OP_24_HRS_CLOCK	Bit 1	1=24 hrs clock	0=12 hrs clock (AM/PM)
RESERVED	Bit 2		
RESERVED	Bit 3		
OP_NTSC_MATRIX	Bit 4	1=USA matrix	0=Japanese matrix
RESERVED	Bit 5		
OP_TRAP	Bit 6	1=non M/N	0=M/N trap setting during search
OP_TUNER	Bit 7	1=UV1316 present	0=UV1336 present

PFBD. PIP Fast blanking delay.
PHAM. PIP Horizontal acquisition position main.
PHAS PIP Horizontal acquisition position Sub.
PHB. PIP Horizontal background position.
PUP. PIP U pedestal.
PVAM. PIP Vertical acquisition position main.
PVAS. PIP Vertical acquisition position sub.
PVB. PIP Vertical background position.
PVP. PIP V pedestal.

SAG. Sub AGC take over point.
SIF. Sub IF-PLL adjustment for non SECAM-L'.
SIF1. Sub IF-PLL adjustment for SECAM-L'.
SYFN. Sub Y delay front end NTSC.
SYFP. Sub Y delay front end PAL.
SYFS. Sub Y delay front end SECAM.
SYG. Sub Y gain.

TABS. TDA9178 Adaptive black stretch level.
TBSG. TDA9178 Blue stretch gain.
TBSS. TDA9178 Blue stretch size.
TDSA. TDA9178 Dynamic skin tone angle.
TDSS. TDA9178 Dynamic skin tone size.
TDSW. TDA9178 Dynamic skin tone width.
TGEG. TDA9178 Green enhancement gain.
TGES. TDA9178 Green enhancement size.
TGEW. TDA9178 Green enhancement width.

THPH. Teletext Horizontal position.
THPL. Teletext Horizontal position.
TLW. TDA9178 Line width.
TNLG. TDA9178 Non-linearity gain.
TS. TDA9178 Steepness.
TVG. TDA9178 Variable gamma.
TVP. Teletext Vertical position.
TYD. TDA9178 Y delay.

VELC. VGA E-W Lower Corner parabola
VEPE. Vertical peaking
VEUC. VGA E-W Upper Corner parabola.
VEWE. VGA E-W EHT Compensation.
VEWP. VGA E-W Parabola width.
VEWT. VGA E-W Trapezium.
VEWW. VGA E-W Width.
VHBW. Horizontal bow control.
VHP. VGA Parallelogram.
VHS. VGA Horizontal shift.
VOV. VGA Vertical position if ident.
VOVN. VGA Vertical position if no ident.
VSC. VGA Vertical S correction.
VVA. VGA Vertical amplitude.
VVC. VGA Vertical scroll
VVS. VGA Vertical shift.
VVW. VGA Vertical wait.
VVZ. VGA Vertical zoom.
YAV. Y delay AV mode.

29. List of abbreviations

1Fh. Line frequency is 15625Hz for 50Hz systems and 15734Hz for 60Hz systems.
1Fv. 50Hz or 60Hz field frequency.
2Fh. Line frequency is 31250Hz for 50Hz (100Hz) systems and 32468 for 60Hz (120Hz) systems,
2Fv. 100Hz or 120Hz field frequency.
AC. Alternating Current.
A/D. Analog to Digital converter.
AFC. Automatic Frequency control.
AGC. Automatic Gain Control.
AM. Amplitude Modulation.
AV. Audio Video.
AVL. Automatic Volume Levelling.
BCL. Beam Current Limiter.
BL. BLanking signal.
CDS. Colour Dependant Sharpness.
CRS. Customer Requirement Specification.
CTI. Colour Transient Improvement.

CVBS. Composite Video Banking Sync.
D/A. Digital to Analog converter.
DC Direct Current.
DHcomp. Dynamic Horizontal phase compensation.
DNR. Dynamic Noise Reduction.
EEProm. Electrically Erasable Programmable Read Only Memory.
EHT. Extra High Tension.
EMC. Electro Magnetic Compatibility.
ESD. Electro Static Discharge.
EW. East West correction.
FB. Fast Blanking.
FBpip. Fast Blanking from the PIP module.
FBL. Fast BLanking.
FM. Frequency Modulation.
FRS. Functional Requirements Specification.
HA. Horizontal sync pulse Acquisition side.
HD. Horizontal sync pulse Deflection side.
HFB. Horizontal FlyBack.
HIP. High performance Input Processor.
HOP. High performance Output Processor.
HSI. Hardware Software Interface.
IC. Integrated Circuit.
I^2C bus. Inter IC bus.
IF. Intermediate Frequency.
IPQ MKxx. Improved Picture Quality. (MKxx = version number)
IR. Infra Red.
L. Left sound signal.
LED. Light Emitting Diode.
LFR. Line Flicker Reduction.
LPSU. Low Power Start Up.
N.C. Not Connected.
NTSC. National Television System Committee.
NV. Non Volatile memory, EEProm.
OSD. On Screen Display.
PAL. Phase Alternating Line.
PC. Personal Computer.
PCB. Printed Circuit Board.
PIP. Picture In Picture.
PLL. Phase Locked Loop.
QSS. Quasi Split Sound.
R. Right sound signal.
RC5. Remote Control code 5.
RGB. Red Green Blue.
SAW. Surface Acoustic Wave filter.
SCL. Serial CLock of I^2C bus.
SDA. Serial DAta of I^2C bus.
SECAM. SEquencial Couleur Avec Memoire (Sequential Colour With Memory).
SIF. Sound Intermediate Frequency.
SFM. Single Field Memory mode.

SMPS. Switched Mode Power Supply.
SVGA. Super VGA.
SVHS. Super VHS.
TXT. Tele teXT.
TV. TeleVision.
U. colour difference signal -(B-Y).
V. colour difference signal -(R-Y).
VA. Vertical sync pulse Acquisition side.
VCO. Voltage Controlled Oscillator.
Vcon. Conversion resistor.
VD. Vertical sync pulse Display side.
VGA. Video Graphics Array.
VIF. Vision Intermediate Frequency.
Vm. Measuring resistor.
WP. Write Protect.
Xtal. Crystal.
Y. Luminance signal.
Y/C. Luminance / Chroma signal.

30. References.

Ref1:

Report: AN98043.
Title: Improved Picture Quality Module MK8. Author: Heinrich Waterholter.

Ref2:

Report: AN98041.
Title: Improved Picture Quality Module MK9. Author: Heinrich Waterholter.

Ref3.

Report: AN98079.

Title: GTV4000 2Fh TV receiver with TDA9320H and TDA933XH. Authors: Chris Bergmans / Anne v.d. Meulen.

Ref4.

Report: ETV/AN99003.

Title: Higher order and inner linearity compensation by dynamic S-correction for the 32” Real Flat tube in TV applications. Author: F.R. Antheunes.

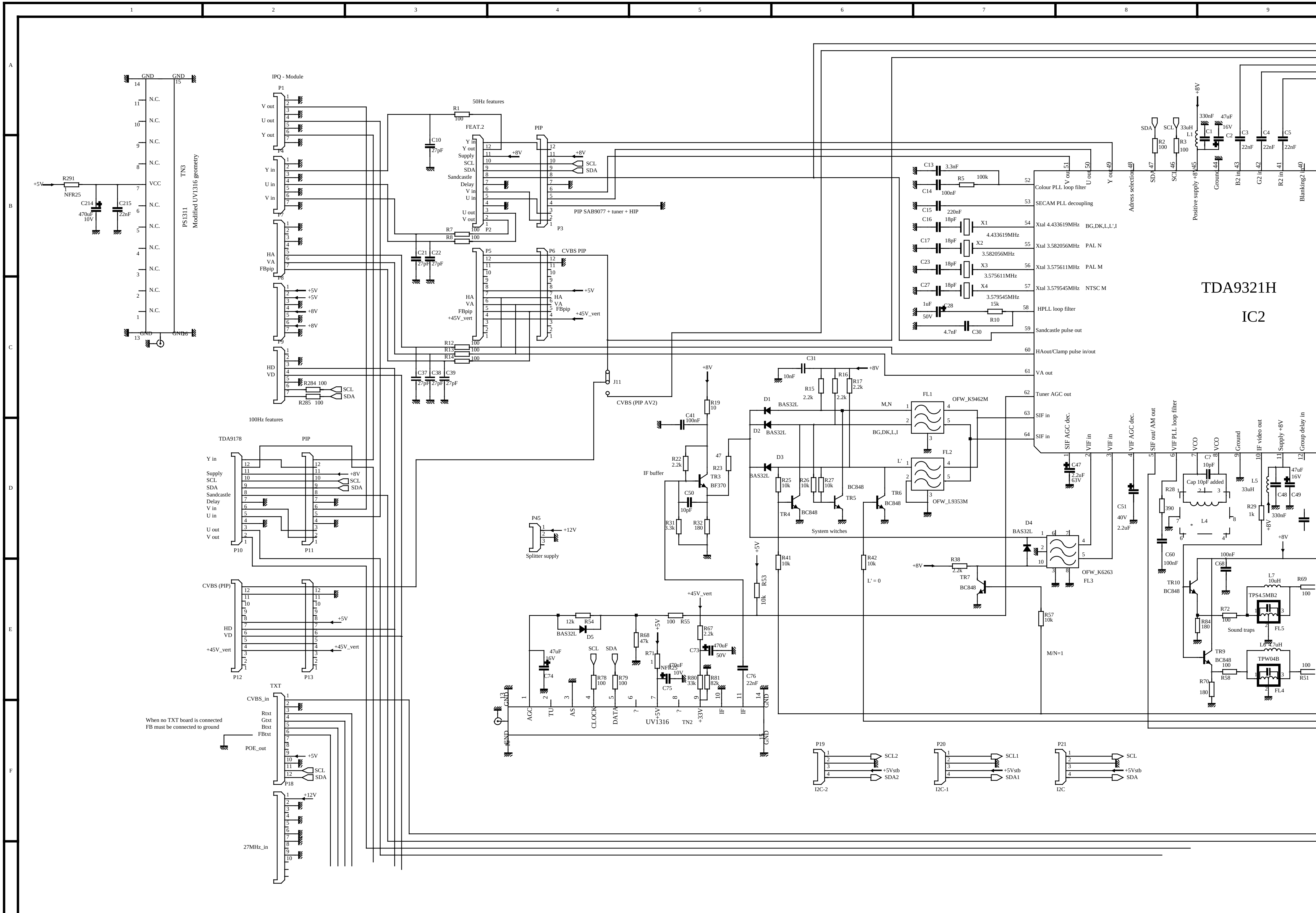
Ref5

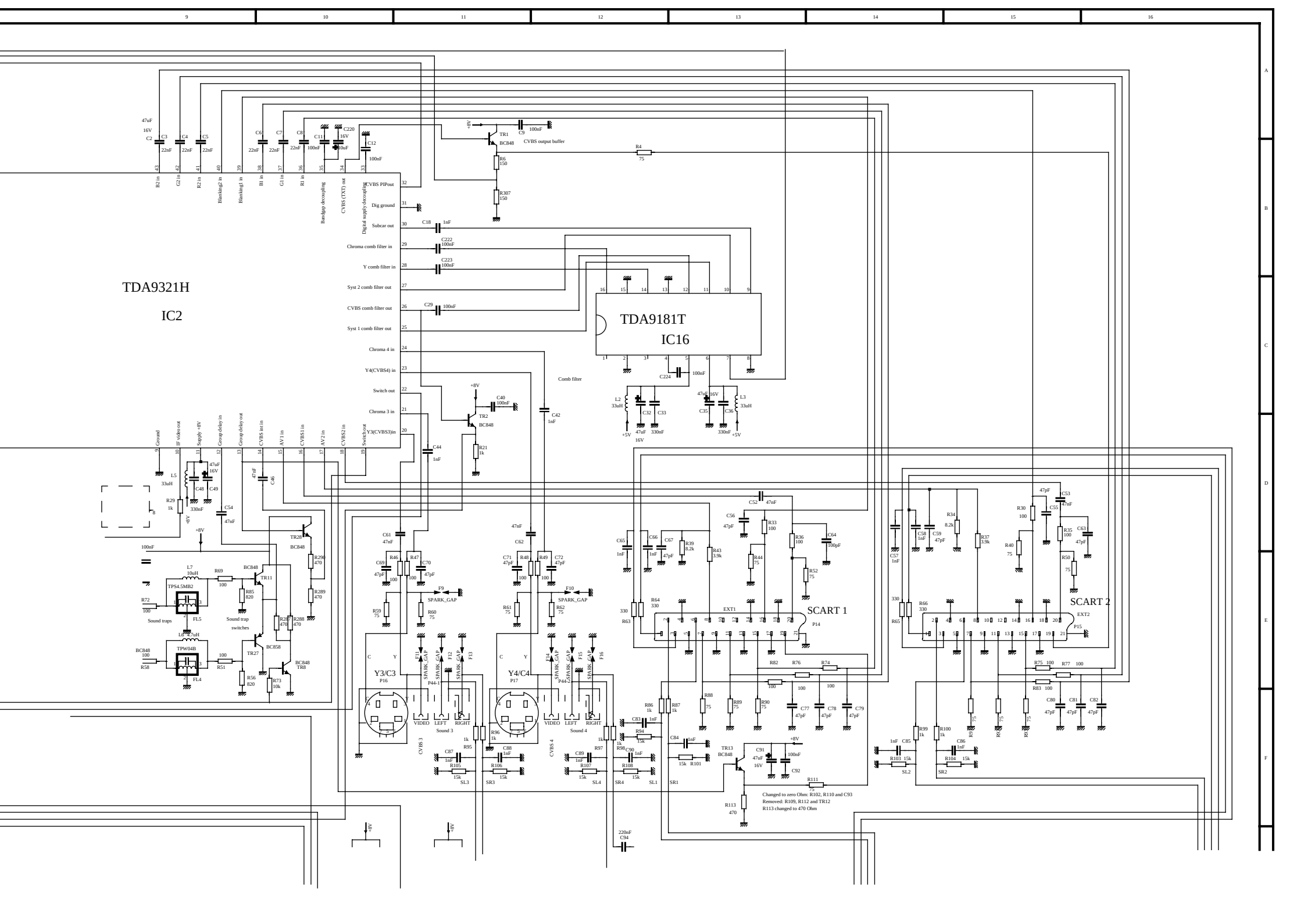
Report ETV/IR97050.10
FRS for HIP HOP demo receiver.Author: Theo van Daele. Version V1.0 updated FRS for FALCONIC 99-10-25.

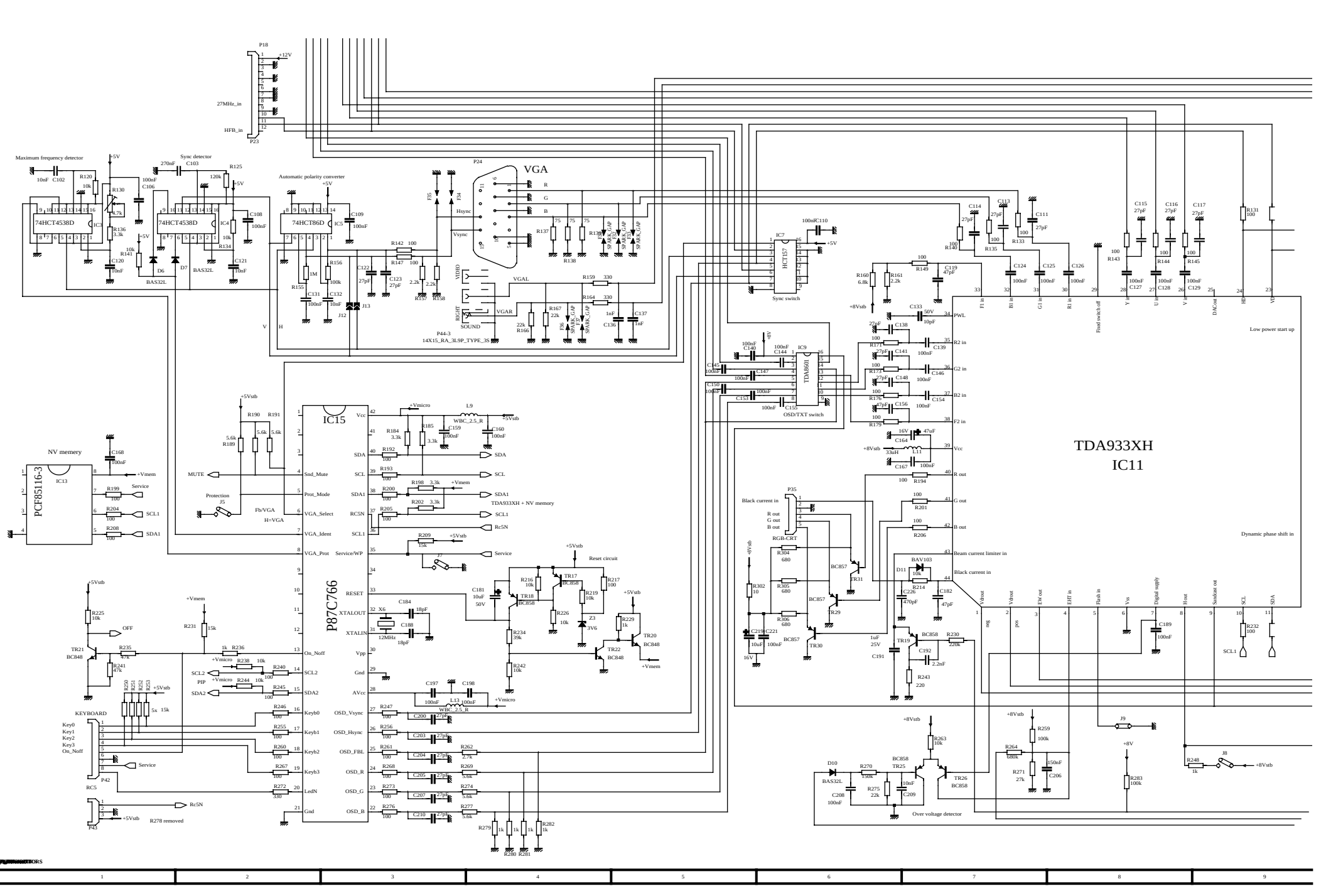
31. Circuit diagram.

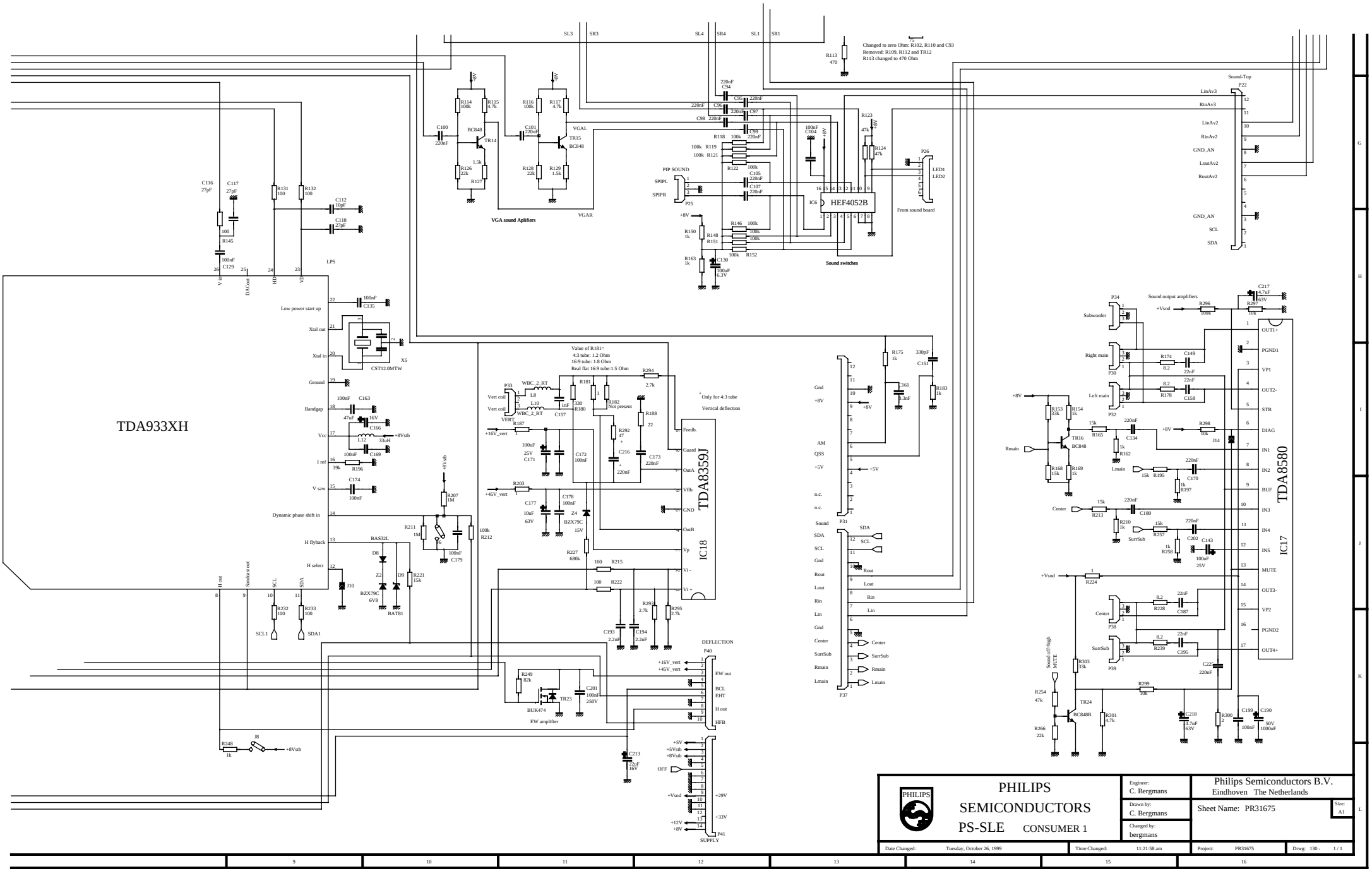
On page 25 to 28 the updated small signal circuit diagrams of PCB PR31674 are given, the circuit diagram is splitted up in 4 parts.

On page 29 the total circuit diagram of the small signal part is given.


TDA9321H
IC2
IPQ - Module
50Hz features
FEAT.2
PIP
PIP SAB9077 + tuner + HIP
CVBS PIP
CVBS (PIP AV2)
100Hz features
TDA9178
PS1311
Modified UV1316 geometry
TN3
IF buffer
System witches
Splitter supply
Sound traps
UV1316
TN2
TXT
When no TXT board is connected
FB must be connected to ground
POE_out
27MHz_in
I2C-2
I2C-1
I2C
OFW_K9462M
OFW_L9353M
OFW_K6263
Colour PLL loop filter
SECAM PLL decoupling
Xtal 4.433619MHz
Xtal 3.582056MHz
Xtal 3.575611MHz
Xtal 3.579545MHz
HPLL loop filter
Sandcastle pulse out
HAout/Clamp pulse in/out
VA out
Tuner AGC out
SIF in
BG,DK,L,L',I
PAL N
PAL M
NTSC M
Cap 10pF added
M/N=1
L' = 0


TDA9321H
IC2
TDA9181T
IC16
SCART 1
SCART 2
Y3/C3
Y4/C4
Comb filter
CVBS output buffer
Sound traps
Sound trap switches
Changed to zero Ohm: R102, R110 and C93
Removed: R109, R112 and TR12
R113 changed to 470 Ohm


TDA933XH
IC11
P87C766
IC15
PCF85116-3
IC13
74HCT4538D
74HCT86D
HCT157
TDA9601
VGA
Sync switch
OSD/TXT switch
TDA933XH + NV memory
Low power start up
Dynamic phase shift in
Reset circuit
Over voltage detector
Maximum frequency detector
Sync detector
Automatic polarity converter
Protection
KEYBOARD
Black current in
Beam current limiter in
RGB-CRT
NV memery
SOUND
R278 removed


TDA933XH
TDA8359J
IC18
TDA8580
IC17
HEF4052B
VGA sound Aplifiers
Sound switches
From sound board
Sound output amplifiers
Low power start up
Xtal out
Xtal in
Ground
Bandgap
Vcc
I ref
V saw
Dynamic phase shift in
H flyback
H select
Only for 4:3 tube
Vertical deflection
EW amplifier
DEFLECTION
SUPPLY
PHILIPS
SEMICONDUCTORS
PS-SLE CONSUMER 1
Philips Semiconductors B.V.
Eindhoven The Netherlands
Engineer: C. Bergmans
Drawn by: C. Bergmans
Changed by: bergmans
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Size: A1
Date Changed: Tuesday, October 26, 1999
Time Changed: 11:21:58 am
Project: PR31675
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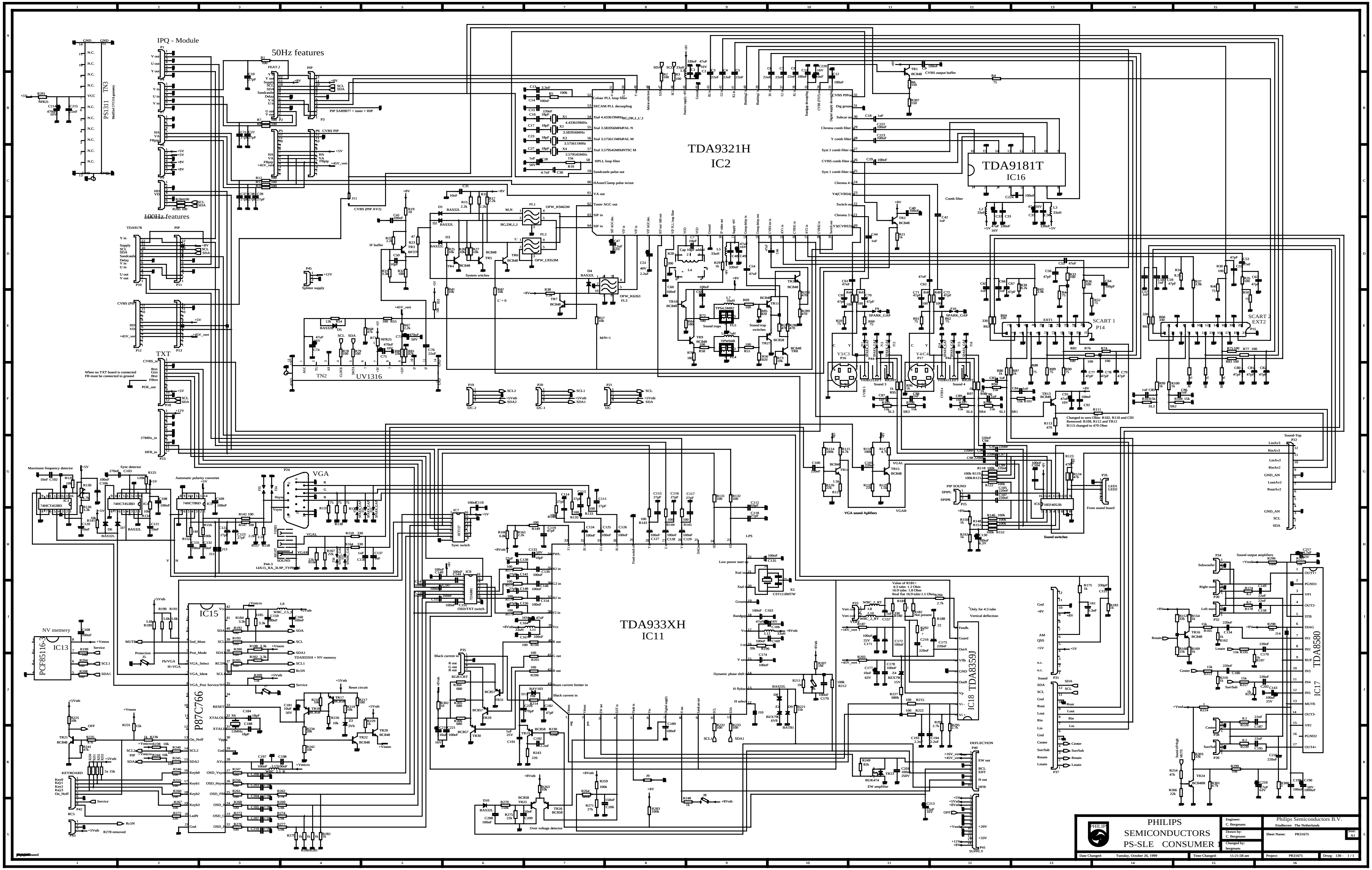

TDA9321H
IC2
TDA9181T
IC16
TDA933XH
IC11
P87C766
IC15
TDA8580
IC17
TDA8359J
IC18
PCF8516-3
IC13
NV memory
IPQ - Module
50Hz features
100Hz features
VGA
TXT
UV1316
TN2
SCART 1
SCART 2
KEYBOARD
DEFLECTION
SUPPLY
Sound switches
VGA sound Aplifiers
Sound output amplifiers
Over voltage detector
EW amplifier
Reset circuit
Maximum frequency detector
Sync detector
Automatic polarity converter
PHILIPS
SEMICONDUCTORS
PS-SLE CONSUMER
Philips Semiconductors B.V.
Eindhoven The Netherlands
Engineer:
C. Bergmans
Drawn by:
C. Bergmans
Changed by:
Sheet Name:
PR31675
Date Changed:
Tuesday, October 26, 1999
Time Changed:
11:21:58 am
Project:
PR31675