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DO NOT CHANGE ANY MODULE UNLESS THE SET IS SWITCHED OFF

The mains supply part of the switch mode power supply's transformer is live.

Use an isolating transformer.

The receiver complies with the safety requirements.

SAFETY PRECAUTIONS:

The service of this TV set must be carried out by qualified persons only. Components marked with the warning symbol on the circuit diagram are critical for safety and must only be replaced with an identical component.

- Power resistor and fused resistors must be mounted in an identical manner to the original component.
- When servicing this TV, check that the EHT does not exceed 26kV.

TV set switched off:

Make short-circuit between HV-CRT clip and CRT ground layer.

Short C809 before changing IC800 or other components in primary side of the SMPS part.

Measurements:

Voltage readings and oscilloscope traces are measured under the following conditions:

Antenna signal's level is 60dB at the color bar pattern from the TV pattern generator. (100% white, 75% color saturation)

Brightness, contrast, and color are adjusted for normal picture performance.

Mains supply, 220VAC, 50Hz.

PERI-TV SOCKET

- The figure of PERI-TV socket-

SCART 1 PINING

1 Audio right output	0.5Vrms / 1K
2 Audio right input	0.5Vrms / 10K
3 Audio left output	0.5Vrms / 1K
4 Ground AF	
5 Ground Blue	
6 Audio left input	0.5Vrms / 10K
7 Blue input	0.7Vpp / 75ohm
8 AV switching input	0-12VDC / 10K
9 Ground Green	
10 -	
11 Green input	0.7Vpp / 75ohm
12 -	
13 Ground Red	
14 Ground Blanking	
15 Red input	0.7Vpp / 75ohm
16 Blanking input	0-0.4VDC, 1-3VDC / 75 Ohm
17 Ground CVBS output	
18 Ground CVBS input	

19 CVBS output	1Vpp / 75ohm
20 CVBS input	1Vpp / 75ohm
21 Ground	

1. INTRODUCTION

11AK46 is a 90° chassis capable of driving 14" tubes at the appropriate currents. The chassis is capable of operating in PAL, SECAM and NTSC standards. The sound system is capable of giving 3,5 watt RMS output into a load of 8 ohms. One page, 7 page SIMPLETEXT, TOPTEXT, FASTTEXT and US Closed Caption is also provided. The chassis is equipped with a 42 pin Scart connector.

2. SMALL SIGNAL PART WITH STV2248:

STV2248 video processor is essential for realizing all small signal functions for a color TV receiver.

2.1 Vision IF amplifier

The vision IF amplifier can demodulate signals with positive and negative modulation. The PLL demodulator is completely alignment-free. Although the VCO (Toko-coil) of the PLL circuit is external, yet the frequency is fixed to the required value by the original manufacturer thus the Toko-coil does not need to be adjusted manually. The setting of the various frequencies (38.9 or 45.75 MHz) can be made via changing the coil itself.

2.2 QSS Sound circuit (QSS versions)

The sound IF amplifier is similar to the vision IF amplifier and has an external AGC de-coupling capacitor. The single reference QSS mixer is realised by a multiplier. In this multiplier the SIF signal is converted to the inter-carrier frequency by mixing it with the regenerated picture carrier from the VCO. The mixer output signal is supplied to the output via a high-pass filter for attenuation of the residual video signals. With this system a high performance hi-fi stereo sound processing can be achieved. The AM sound demodulator is realised by a multiplier. The modulated sound IF signal is multiplied in phase with the limited SIF signal. The demodulator output signal is supplied to the output via a low-pass filter for attenuation of the carrier harmonics. The AM signal is supplied to the output via the volume control.

2.3 AM DEMODULATOR

The AM demodulated signal results from multiplying the input signal by itself, it is available on AM/FM output.

2.4 FM demodulator and audio amplifier :

The FM demodulator is realized as narrow-band PLL with external loop filter, which provides the necessary selectivity without using an external band-pass filter. To obtain a good selectivity a linear phase detector and constant input signal amplitude are required. For this reason the inter-carrier signal is internally supplied to the demodulator via a gain controlled amplifier and AGC circuit. The nominal frequency of the demodulator is tuned to the required frequency (4.5/5.5/6.0/6.5 MHz) by means of a calibration circuit that uses the clock frequency of the μ -controller/Teletext decoder as a reference. The setting to the wanted frequency is realized by means of the software. It can be read whether the PLL frequency is inside or outside the window and whether the PLL is in lock or not. With this information it is possible to make an automatic search system for the incoming sound frequency. This is realized by means

of a software loop that alternate the demodulator to various frequencies, then select the frequency on which a lock condition has been found. De-emphasis output signal amplitude is independent of the TV standard and has the same value for a frequency deviation of ± 25 kHz at the 4.5 MHz standard and for a deviation of ± 50 kHz for the other standards. When the IF circuit is switched to positive modulation the internal signal on de-emphasis pin is automatically muted. The audio control circuit contains an audio switch and volume control. In the mono inter-carrier sound versions the Automatic Volume Leveling (AVL) function can be activated. The pin to which the external capacitor has to be connected depends on the IC version. For the 90° types the capacitor is connected to the EW output pin (pin 20). When the AVL is active it automatically stabilizes the audio output signal to a certain level.

2.5 Video switching

The video processor (STV2248C) has three CVBS inputs and two RGB inputs. The first CVBS input is used for external CVBS from SCART 1, the second is used for either CVBS or Y/C from BAV/FAV, and the third one is used for internal video. The selection between both external video inputs signals is realized by means of software and hardware switches.

2.6 Synchronization circuit

The video processor (STV224X) performs the horizontal and vertical processing. The external horizontal deflection circuit is controlled via the Horizontal output pulse (HOUT). The vertical scanning is performed through an external ramp generator and a vertical power amplifier IC controlled by the Vertical output pulse (VOUT).

The main components of the deflection circuit are:

- PLL1: the first phase locked loop that locks the internal line frequency reference on the CVBS input signal. It is composed of an integrated VCO (12 MHz) that requires the chroma Reference frequency (4.43MHz or 3.58MHz crystal oscillator reference signal), a divider by 768, a line decoder, and a phase comparator.
- PLL2: The second phase locked loop that controls the phase of the horizontal output (Compensation of horizontal deflection transistor storage time variation). Also the horizontal position adjustment is also performed in PLL2.
- A vertical pulse extractor.
- A vertical countdown system to generate all vertical windows (vertical synchronization window, frame blanking pulses, 50/60Hz identification window...).
- Automatic identification of 50/60Hz scanning.
- PLL1 time constant control.
- Noise detector, video identification circuits, and horizontal coincidence detector.
- Vertical output stage including de-interlace function, vertical position control.
- Vertical amplitude control voltage output (combined with chroma reference output and Xtal 1 indication).

2.7 Chroma and luminance processing:

The chroma decoder is able to demodulate PAL, NTSC and SECAM signals.

The decoder dedicated to PAL and NTSC sub-carrier is based on a synchronous demodulator, and an Xtal PLL locked on the phase reference signal (burst).

The SECAM demodulation is based on a PLL with automatic calibration loop.

The color standard identification is based on the burst recognition.

Automatic and forced modes can be selected through the I2C bus.

NTSC tint, and auto flesh are controlled through I2C bus.

Xtal PLL can handle up to 3 crystals to work in PAL M, PAL N and NTSC M for South America.

ACC an ACC overload control the chroma sub-carrier amplitude within 26dB range. Both

ACC s are based on digital systems and do not need external capacitor.

All chroma filters are fully integrated and tuned via a PLL locked on Xtal VCO signal.

A second PLL is used for accurate fine-tuning of the SECAM bell filter. This tuning is achieved during the frame blanking. An external capacitor memorizes the bell filter tuning voltage.

A base-band chroma delay-line rebuilds the missing color line in SECAM and removes transmission phase errors in PAL.

The base-band chroma delay line is clocked with 6MHz signal provided by the horizontal scanning VCO.

The luminance processor is composed of a chroma trap filter, a luminance delay line, a peaking function with noise coring feature, a black stretch circuit.

Trap filter and luminance delay lines are achieved with the use of bi-quad integrated filters, auto-aligned via a master filter phase locked loop.

2.8 RGB output circuit:

The video processor performs the R, G, B processing.

There are three sources:

1. Y,U,V inputs (coming from luma part (Y output), and chroma decoder outputs (R-Y, B-Y outputs)).
2. External R,G,B inputs from SCART (converted internally in Y,U,V), with also the possibility to input YUV signals from a DVD player, (YUV specification is $Y=0.7\text{ V PP}$, $U= 0.7\text{ V PP}$, $V = 0.7\text{V PP}$ for 100% color bar).
3. Internal R,G,B inputs (for OSD and Teletext display)

The main functions of the video part are:

- Y,U,V inputs with integrated clamp loop, allowing a DC link with YUV outputs,
- External RGB inputs (RGB to YUV conversion), or direct YUV inputs,
- Y,U,V switches,
- Contrast, saturation, brightness controls,
- YUV to RGB matrix,
- OSD RGB input stages (with contrast control),
- RGB switches,
- APR function,
- DC adjustment of red and green channels,
- Drive adjustments (R, G, B gain),
- Digital automatic cut-off loop control,
- Manual cut-off capability with I2C adjustments,
- Half tone, oversize blanking, external insertion detection, blue screen,
- Blanking control and RGB output stages.

2.9 μ -Controller

The ST92195 is the micro-controller, which is required for a color TV receiver. ST92195D1 is the version with one page Teletext and ST92195D7 is the one with 7 page Teletext. The IC has the supply voltages of 5 V and they are mounted in PSDIP package with 56 pins.

μ -Controller has the following features

- Display of the program number, channel number, TV Standard, analogue values, sleep timer, parental control and mute is done by OSD
- Single LED for standby and on mode indication
- System configuration with service mode
- 3 level logic output for SECAM and Tuner band switching

3. TUNER

PLL tuner is used as a tuner.

Channel coverage of UV1316:

BAND	OFF-AIR CHANNELS		CABLE CHANNELS	
	CHANNELS	FREQUENCY RANGE (MHz)	CHANNELS	FREQUENCY RANGE (MHz)
Low Band	E2 to C	48.25 to 82.25 (1)	S01 to S08	69.25 to 154.25
Mid Band	E5 to E12	175.25 to 224.25	S09 to S38	161.25 to 439.25
High Band	E21 to E69	471.25 to 855.25 (2)	S39 to S41	447.25 to 463.25

(1). Enough margin is available to tune down to 45.25 MHz.

(2). Enough margin is available to tune up to 863.25 MHz.

Noise	Typical	Max.	Gain	Min.	Typical	Max.
Low band : 5dB		9dB	All channels	: 38dB	44dB	52dB
Mid band : 5dB		9dB	Gain Taper (of-air channels):			8dB
High band : 6dB		9dB				

Channel Coverage UV1336:

BAND	CHANNELS	FREQUENCY RANGE (MHz)
Low Band	2 to D	55.25 to 139.25
Mid Band	E to PP	145.25 to 391.25
High Band	QQ to 69	397.25 to 801.25

Noise is typically 6dB for all channels. **Gain** is minimum 38dB and maximum 50dB for all channels.

5. SOUND OUTPUT STAGE TDA7496

TDA7496 is used as the AF output stereo amplifier . It is supplied by +20 VDC coming from a separate winding in the SMPS transformer. An output power of 3.5W (THD=0.5%) can be delivered into an 8ohm load.

6. VERTICAL OUTPUT STAGE WITH TDA8174A

The TDA8174A is a power amplifier circuit for use in 90° and 110° colour deflection systems for 25 to 200 Hz field frequencies, and for 4: 3 and 16: 9 picture tubes.

7. VIDEO OUTPUT DISCRETE AMPLIFIERS

There are three monolithic video output amplifiers. Each amplifier consist of two transistors which are TR_2SC2482 and BF421.

8. POWER SUPPLY (SMPS)

The DC voltages required at various parts of the chassis are provided by an SMPS transformer controlled by the IC MC44608 which is designed for driving, controlling and protecting switching transistor of SMPS. The transformer produces 115V for FBT input, $\pm 14V$ for audio output IC, S+3.3, S+5V and 8V for ST92195.

10. SERIAL ACCESS CMOS 8K EEPROM 24C08

The 24C08 is a 8Kbit electrically erasable programmable memory (EEPROM), organized as 4 blocks of 256*08 bits. The memory is compatible with the I²C standard, two wire serial interface which uses a bi-directional data bus and serial clock.

12. SAW FILTERS

Saw filter type:

Model:

-66M:

PAL SECAM B/G/D/K/I MONO

J1981 :

PAL-I MONO

K2958M:

PAL-SECAM B/G-D/K (38) MONO

L9653M:

SECAM L/L' AM MONO (AUDIO IF)

G3967M:

PAL-SECAM B/G STEREO (VIDEO IF)

G9353M:

PAL-SECAM B/G STEREO (AUDIO IF)

K3958M:

PAL-SECAM B/G/D/K/I/L' STEREO (VIDEO IF)

K9356M:

PAL-SECAM B/G/D/K/I STEREO (AUDIO IF)

K9656M:	PAL-SECAM B/G/D/K/I/L/L' STEREO (AUDIO IF)
K3958M:	PAL I NICAM (VIDEO IF)
K9356M:	PAL I NICAM (AUDIO IF)
M1962M:	PAL M/N NTSC M MONO
M3953M:	PAL M/N NTSC M STEREO (VIDEO IF)
M9370M:	PAL M/N NTSC M STEREO (AUDIO IF)

IC DESCRIPTIONS AND INTERNAL BLOCK DIAGRAM

- ST92195
- STV224X
- TUNER (UV1316, UV1336)
- TDA7496L
- TDA8174A
- STV5114
- MC44608
- 24C08
- SAW FILTERS

G1975M, K2966M, K2962M, L9653M, G3962M, G9353M, K3958M, K9356M, K9656M, K6263K, K9652M, M1962M, M3953M, M9370M

ST92195

The ST92195 is a member of the ST9+ family of micro-controllers, completely developed and produced by SGS-THOMSON Microelectronics using a proprietary n-well HCMOS process. The nucleus of the ST92195 is the advanced Core, which includes the Central Processing Unit (CPU), the ALU, the Register File and the interrupt controller. The Core has independent memory and register buses to add to the efficiency of the code. A set of on-chip peripherals form a complete system for TV set and VCR applications:

- Voltage Synthesis
- VPS/WSS Slicer
- Teletext Slicer
- Teletext Display RAM
- OSD

Additional peripherals include a watchdog timer, a serial peripheral interface (SPI), a 16-bit timer and an A/D converter.

MICROCONTROLLER PIN DESCRIPTION

INT7 / P2.0	1	56	P2.1 / INT5 / AIN1
RESET	2	55	P2.2 / INT0 / AIN2
P0.7	3	54	P2.3 / INT6 / VSO1
P0.6	4	53	P2.4 / NMI
P0.5	5	52	P2.5 / AIN3 / INT4 / VSO2
P0.4	6	51	OSCIN
P0.3	7	50	OSCOU
AIN4 / P0.2	8	49	P4.7 / PWM7 / EXTRG / STOUT0
P0.1	9	48	P4.6 / PWM6
P0.0	10	47	P4.5 / PWM5 / SDA2
CS0 / RESET0 / P3.7	11	46	P4.4 / PWM4 / SCL2
P3.6	12	45	P4.3 / PWM3 / TSLU / HT
P3.5	13	44	P4.2 / PWM2
P3.4	14	43	P4.1 / PWM1
B	15	42	P4.0 / PWM0
G	16	41	VSNC
R	17	40	HSNC / CSNC
FB	18	39	AVDD1
SDA1 / SDI / SDO / P5.1	19	38	PXFM
SCL1 / SCK / INT2 / P5.0	20	37	JTRSTO
V	21	36	GND
JTDO	22	35	AGND
WSCF	23	34	CVBS1
V / WSCR	24	33	CVBS2
AVDD3	25	32	JTMS
TEST0	26	31	AVDD2
MCFM	27	30	CVBSO
JTCK	28	29	TXCF

STV224X Video processor:

The STV2246/2247/2248 are fully bus controlled ICs for TV including PIF, SIF, luma, Chroma and deflection processing. Used with a vertical frame booster (TDA1771 or TDA8174 for 90° chassis, STV9306 for 110° chassis), they allow the design of multi-standard (BGDKIMNLL, PAL/SECAM/NTSC) sets with very few external components and no manual adjustments.

PIN CONNECTIONS STV224X/8X (SDIP56)

<u>SIFIN1</u>	1	56	FMCAP
<u>SIFIN2</u>	2	55	AUDIOOUT
<u>AGCBIFCAP</u>	3	54	GND D
<u>V_{ref} IF</u>	4	53	V _{cc}
<u>AGCPIFCAP</u>	5	52	SDA
<u>PIFIN1</u>	6	51	SCL
<u>PIFIN2</u>	7	50	SLPF
<u>TUNERAGCOUT</u>	8	49	LBF/SSC
<u>IFPLL</u>	9	48	HOUT
<u>GND IF</u>	10	47	VERT
<u>AM/FMOUT/BC</u>	11	46	SCL/SAF
<u>V_{cc} IF</u>	12	45	V _{cc1}
<u>INTCVBSOUT</u>	13	44	CVBSOUT2
<u>EXTAUDIOIN</u>	14	43	GND1
<u>PIFLC1</u>	15	42	X1/VAMP/CHROUT
<u>PIFLC2</u>	16	41	CLPF
<u>V_{cc}</u>	17	40	XTAL1
<u>CVBSIN1</u>	18	39	XTAL2
<u>GND2</u>	19	38	XTAL3/STUN
<u>CVBSIN2</u>	20	37	FBOSD
<u>BS</u>	21	36	ROSD
<u>Y/ CVBSIN3</u>	22	35	GO8D
<u>CHR</u>	23	34	BO8D
<u>APR</u>	24	33	I _{EXTM}
<u>BEXT/EXT</u>	25	32	ROUT
<u>GEXT/YEXT</u>	26	31	QOUT
<u>REXT/VEXT</u>	27	30	BOUT
<u>PPFEXT</u>	28	29	BLP

UV1316, UV1336

General description of UV1316:

The UV1316 tuner belongs to the UV 1300 family of tuners, which are designed to meet a wide range of applications. It is a combined VHF, UHF tuner suitable for CCIR systems B/G, H, L, L', I and I'.

Features of UV1316:

- Member of the UV1300 family small sized UHF/VHF tuners
- Systems CCIR: B/G, H, L, L', I and I'; OIRT: D/K
- Digitally controlled (PLL) tuning via I²C-bus
- Off-air channels, S-cable channels and Hyper-band
- World standardized mechanical dimensions and world standard pinning
- Complies to "CENELEC EN55020" and "EN55013"

PINNING

PIN VALUE

1. Gain control voltage (AGC)	:4.0V, Max:4.5V
2. Tuning voltage	
3. I ² C-bus address select	:Max:5.5V
4. I ² C-bus serial clock	:Min:-0.3V, Max:5.5V
5. I ² C-bus serial data	:Min:-0.3V, Max:5.5V
6. Not connected	
7. PLL supply voltage	:5.0V, Min:4.75V, Max:5.5V
8. ADC input	
9. Tuner supply voltage	:33V, Min:30V, Max:35V
10. Symmetrical IF output 1	
11. Symmetrical IF output 2	

General description of UV1336:

UV1336 series is developed for reception of channels broadcast in accordance with the M, N standard.

Features of UV1336:

- Global standard pinning
- Integrated Mixer-Oscillator & PLL function
- Conforms to CISPR 13, FCC and DOC (Canada) regulations
- Low power consumption
- Both Phono connector and 'F' connector are available

PINNING

PIN VALUE

1. Gain control voltage	:4.0V, Max:4.5V
2. Tuning voltage	
3. Address select	Max:5.5V
4. Serial clock	:Min:-0.3V, Max:5.5V
5. Serial data	:Min:-0.3V, Max:5.5V
6. Not connected	
7. Supply voltage	:5.0V, Min:4.75V, Max:5.5V
8. ADC input (optional)	
9. Tuning supply voltage	:33V, Min:30V, Max:35V
10. Ground	
11. IF output	

TDA7496

DESCRIPTION

The TDA7496 is a stereo 5+5W class AB power amplifier assembled in the @ Multiwatt 15 pack-age, specially designed for high quality sound, TV applications. Features of the TDA7496 include linear volume control, Stand-by and mute functions.

-5+5W OUTPUT POWER

-RL =? W@THD= 10% VCC = 22V

-ST-BY AND MUTE FUNCTIONS

-LOW TURN-ON TURN-OFF POP NOISE

-LINEAR VOLUME CONTROL DC COUPLED

-WITH POWEROP. AMP.

-NO BOUCHEROT CELL

-NO ST-BY RC INPUT NETWORK

-SINGLE SUPPLY RANGING UP TO 35V

-SHORT CIRCUIT PROTECTION

-THERMAL OVERLOAD PROTECTION

-INTERNALLY FIXED GAIN

-SOFT CLIPPING

-VARIABLE OUTPUT AFTER VOLUME CON-TROL

-CIRCUIT

-MULTIWATT 15 PACKAGE

PINNING

1	INR.
2	VAROUT_R
3	VOLUME
4	VAROUT_L
5	INL
6	NC

7	SWR
8	S_GNR
9	STBY
10	MUTE
11	PW_GND
12	OUTL
13	VS
14	OUTR
15	PW1_GND

TDA8174AW

Independent vertical amplitude adjustment. buffer stage. Power amplifier flyback generator thermal protection . Internal reference voltage decou-pling

General Description:

TDA8174A and TDA8174AW are a monolithic integrated circuits. It is a full performance and very efficient vertical deflection circuit intended for direct drive of a TV picture tube in Color and B & W television as well as in Monitor and Data displays.

PINNING

1.	POWER OUTPUT
2.	OUTPUT STAGE Vs
3.	TRIGGER INPUT
4.	HEIGHT ADJUSTMENT
5.	VOLTAGE REF DECOUPLING
6.	GROUND
7.	RAMP GENERATOR
8.	BUFFER OUTPUT
9.	INVERTING INPUT
10.	Vs
11.	FLYBACK GENERATOR

STV5114

25MHz BANDWIDTH

CROSSTALK : 55dB

SHORT CIRCUIT TO GROUND OR VCC PRO-TECTED

ANTI SATURATION GAIN CHANGING

VIDEO SWITCHING

DESCRIPTION

This integrated circuit provides RGB switching allowing connections between per TV plug, internal RGB generator and video processor in a TV set. The input signal black level is tied to the same reference voltage on each input in order to have no differential voltage when switching two RGB generators.

An AC output signal higher than 2 V_{pp} makes gain going slowly down to 0dB to protect the TV set video amplifier from saturation. Fast blanking output is a logical OR between FB1 (Pin 8) and FB2 (Pin 10).

PINNING

PIN VALUE

1.	R1IN
2.	GND
3.	R2IN
4.	G1IN
5.	G2IN
6.	B1IN
7.	B2IN
8.	FB1IN
9.	FBOUT
10.	FB2+FBBIN
11.	BOUT
12.	FBGIN
13.	GOUT
14.	VCC
15.	FBRIN
16.	ROUT

MC44608

General description:

The MC44608 is a high performance voltage-mode controller designed for off-line converters. This high voltage circuit that integrates the start-up current source and the oscillator capacitor, requires few external components while offering a high flexibility and reliability.

The device also features a very high efficiency stand-by management consisting of an effective Pulsed Mode operation. This technique enables the reduction of the stand-by power consumption to approximately 1W while delivering 300mW in a 150W SMPS.

- Integrated start-up current source
- Loss less off-line start-up
- Direct off-line operation
- Fast start-up

General Features

- Flexibility
- Duty cycle control

- On chip oscillator switching frequency 40, or 75kHz
- Secondary control with few external components

Protections

- Maximum duty cycle limitation
- Cycle by cycle current limitation
- Demagnetization (Zero current detection) protection
- “Over V_{CC} protection” against open loop
- Programmable low inertia over voltage protection against open loop
- Internal thermal protection

GreenLine Controller

- Pulsed mode techniques for a very high efficiency low power mode
- Lossless startup
- Low dV/dT for low EMI radiations

PINNING

1. Demagnetization
2. I Sense
3. Control Input
4. Ground
5. Driver
6. Supply voltage
7. No connection
8. Line Voltage

PIN VALUE

Zero cross detection voltage: 50mV typ.
 Over current protection voltage 1V typ.
 Min: 7.5V Max.: 18V
 I_{out} 2A_{p-p} during scan 1.2A_{p-p} during flyback
 Output resistor 8.5 Ohm sink 15 Ohm source typ.
 Max:16V (Operating range 6.6V-13V)
 Min:50V Max:500V

24C08

General description:

The 24C16 is a 8Kbit electrically erasable programmable memory (EEPROM), organized as 4 blocks of 256 * 08 bits. The memory operates with a power supply value as low as 2.5V.

Features:

- Minimum 1 million ERASE/WRITE cycles with over 10 years data retention
- Single supply voltage:4.5 to 5.5V
- Two wire serial interface, fully I²C-bus compatible
- Byte and Multi-byte write (up to 8 bytes)
- Page write (up to 16 bytes)
- Byte, random and sequential read modes
- Self timed programming cycle

PINNING

1. Write protect enable
2. Not connected
3. Chip enable input
4. Ground
5. Serial data address input/output
6. Serial clock

PIN VALUE

:0V
 :0V
 :0V
 :0V
 :Input LOW voltage: Min:-0.3V, Max:0.3*V_{cc}
 :Input HIGH voltage: Min:0.7*V_{cc}, Max:V_{cc}+1
 :Input LOW voltage: Min:-0.3V, Max:0.3*V_{cc}
 :Input HIGH voltage: Min:0.7*V_{cc}, Max:V_{cc}+1

- | | | |
|------------------------------|----------------------|--------------------------------------------------|
| 7. Multibyte/Page write mode | :Input LOW voltage: | Min:-0.3V, Max:0.5V |
| | :Input HIGH voltage: | Min:V _{cc} -0.5, Max:V _{cc} +1 |
| 8. Supply voltage | :Min:2.5V, Max:5.5V | |

Saw filter's list:

		VIDEO	AUDIO
MONO	PAL BG	G1975M	
	PSBG DK	K2966M	
	PAL II'	J1981	
	PSBGDKK' II'	K2966M	
	PSBGDKK' LL'	K2962M	L9653

		VIDEO	AUDIO
STR	PAL BG	G3967M	G9353M
	PAL II'	K3958M	K9356
	PSBGDKK' II'	K3958M	K9356
	PSBGDKK' LL'	K3958M	K9656

PINNING

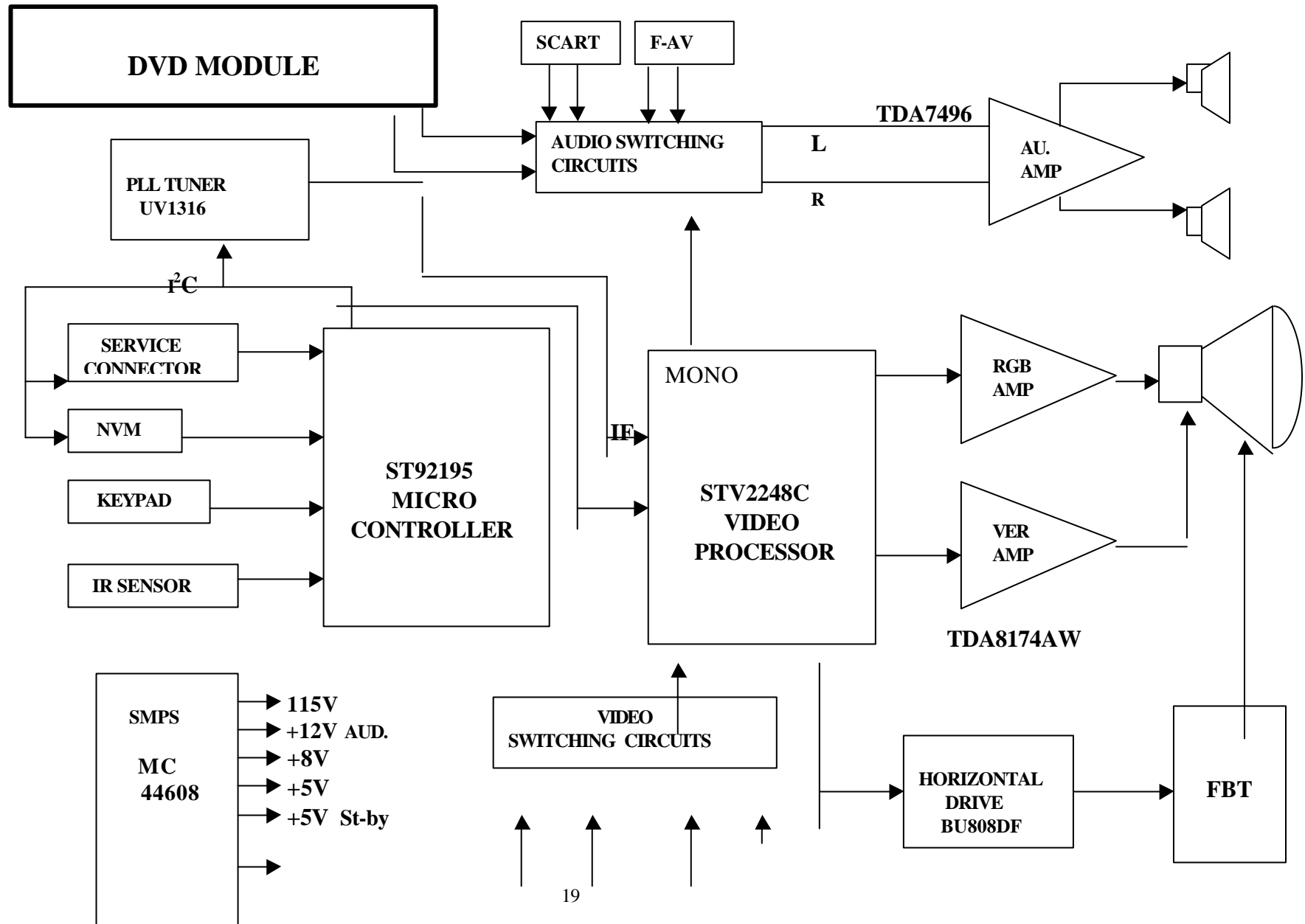
1. Input
2. Input-ground
3. Chip carrier-ground
4. Output
5. Output

K9656M, L9653M

PINNING

1. Input
2. Switching Input
3. Chip carrier-ground
4. Output
5. Output

GENERAL BLOCK DIAGRAM of 11AK46



**DVD POWER
SUPPLY**

DVD SCART1 FAV/BAV SVHS



SIRA NO	REGISTER	PARAMETER
1	OSD	OSD Horizontal Position
2	IF1	IF Coarse Adjust
3	IF2	IF Fine Adjust
4	IF3	IF Coarse Adjust for L-Prime
5	IF4	IF Fine Adjust for L-Prime
6	AGC	Automatic Gain Control
7	VLIN	Vertical Linearity
8	VS1A	Vertical Size for 50 Hz / 4:3
9	VS1B	Vertical Size for 50 Hz / 16:9
10	VP1	Vertical Position for 50 Hz
11	HP1	Horizontal Position for 50 Hz
12	VS2A	Vertical Size for 60 Hz / 4:3
13	VS2B	Vertical Size for 60 Hz / 16:9
14	VP2	Vertical Position for 60 Hz
15	HP2	Horizontal Position for 60 Hz
16	RGBH	RGB Horizontal Shift Offset
17	WR	White Point Adjust for RED
18	WG	White Point Adjust for GREEN
19	WB	White Point Adjust for BLUE
20	BR	Bias for RED
21	BG	Bias for GREEN
22	APR	APR Threshold
23	FMP1	FM Prescaler when AVL is OFF
24	NIP1	NICAM Prescaler when AVL is OFF
25	SCP1	SCART Prescaler when AVL is OFF
26	FMP2	FM Prescaler when AVL is ON
27	NIP2	NICAM Prescaler when AVL is ON
28	SCP2	SCART Prescaler when AVL is ON
29	F1H	High Byte of crossover frequency for VHF1-VHF3
30	F1L	Low Byte of crossover frequency for VHF1-VHF3
31	F2H	High Byte of crossover frequency for VHF3-UHF
32	F2L	Low Byte of crossover frequency for VHF3-UHF
33	BS1	Band Switch Byte for VHF1 Meaningful for only
34	BS2	Band Switch Byte for VHF3 Meaningful for only
35	BS3	Band Switch Byte for UHF Meaningful for only
36	CB	Control Byte Meaningful for only PLL Tuner
37	OP1	Option 1 (see the Option List)
38	OP2	Option 2 (see the Option List)
39	OP3	Option 3 (see the Option List)
40	OP4	Option 4 (see the Option List)
41	OP5	Option 5 (see the Option List)
42	TX1	Teletext Option 1 (see the Option List)

OP1 – Peripheral Options	
BIT-7	NOT USED
BIT-6	1, Display “AV-3” as “F-AV”
	0, Display “AV-3” as “B-AV”
BIT-5	1, Turn back TV mode after the last AV (with AV key)
	0, Turn back first AV mode after the last AV
BIT-4	1, SVHS is available in AV key stream
	0, SVHS is NOT available in AV key stream
BIT-3	1, RGB is available in AV key stream
	0, RGB is NOT available in AV key stream
BIT-2	1, AV-3 is available in AV key stream
	0, AV-3 is NOT available in AV key stream
BIT-1	1, DVD is available in AV key stream
	0, DVD is NOT available in AV key stream
BIT-0	1, AV-1 is available in AV key stream
	0, AV-1 is NOT available in AV key stream
OP2 – Reception Standard Options	
BIT-7	1, 3-button keyboard (V-, P+, V+)
	0, 4/5 button keyboard (V-, V+, P-, P+, Menu)
BIT-6	1, L/L' is available
	0, L/L' is not available
BIT-5	1, I is available
	0, I is not available
BIT-4	1, DK is available
	0, DK is not available
BIT-3	1, BG is available
	0, BG is not available
BIT-2	RESERVED (Keep as "0")
BIT-1	RESERVED (Keep as "0")
BIT-0	1, WFI available
	0, WFI NOT available
OP3 – Video Options	
BIT-7	Xtal Configuration
BIT-6	00, 1 Xtal PAL 4.43
	01, 2 Xtal PAL/NTSC 4.43/3.58
	10, 1 Xtal PAL/SEC/NTSC 4.43
	11, 2 Xtal PAL/SEC/NTSC 4.43/3.58
BIT-5	1, Enable Blue back when no signal in AV modes
	0, No Blue back in AV modes
BIT-4	1, White Insertion is ON
	0, White Insertion is OFF
BIT-3	1, Blue Background when no signal
	0, Disable Blue Background
BIT-2	1, Semi-transparent background for menu
	0, Solid Menu background for menu

BIT-1	1, Black Stretch is ON
	0, Black Stretch is OFF
BIT-0	1, APR is ON
	0, APR is OFF
OP4 – TV Features	
BIT-7	1, Headphone is available (for STEREO models)
	0, Headphone is not available
BIT-6	1, Arabic/Persian ON
	0, Arabic/Persian OFF
BIT-5	1, Hebrew ON
	0, Hebrew OFF
BIT-4	1, Hotel Mode can be activated
	0, Hotel Mode can not be activated
BIT-3	1, No Signal Timer is enabled
	0, No Signal Timer is disabled
BIT-2	For PLL Tuner
	1, Frequency based search
	0, Channel table based search
	For VST Tuner
	1, VST Band drive is negative logic (with transistors on the chassis)
	0, VST Band drive is positive logic (without transistors on the chassis)
BIT-1	1, 3-band tuning (VHF1, VHF3, UHF)
	0, 1-band tuning (only UHF)
BIT-0	1, Extra 200 msec blanking for VST
	0, no-extra blanking
OP5 – Channel Tables	
BIT-7	1, Extra 150 msec blanking more for VST
	0, no-extra blanking
BIT-6	1, “Programme” item in AUTOSTORE menu is visible
	0, “Programme” item in AUTOSTORE menu is invisible
BIT-5	NOT USED
BIT-4	1, French OS Channel Table is available
	0, French OS Channel Table is not available
BIT-3	1, French Channel Table is available
	0, French Channel Table is not available
BIT-2	1, England Channel Table is available
	0, England Channel Table is not available
BIT-1	1, East Europe Channel Table is available
	0, East Europe Channel Table is not available
BIT-0	1, West Europe Channel Table is available
	0, West Europe Channel Table is not available
TX1 – Teletext Options	
BIT-7	NOT USED
BIT-6	RESERVED (must be 0)

BIT-5	5 4 3 Teletext Language Groups
BIT-4	000, Group 1 – West
BIT-3	(English, French, Swedish, Czech, German, Portuguese, Italian, Rumanian)
	001, Group 2 – West/East
	(Polish, French, Swedish, Czech, German, Serbian, Italian, Rumanian)
	010, Group 3 – West/Turkish
	(English, French, Swedish, Turkish, German, Portuguese, Italian, Rumanian)
	011, Group 4 – East/Cyrillic
	(English, Cyrillic, Swedish, Czech, German, Serbian, Lettish, Rumanian)
	100, Group 5 – Arabic
	(English, French, Swedish, Turkish, German, Hebrew, Italian, Arabic)
BIT-2	2 1 0 Device type selection
BIT-1	000, EPROM M6 A
BIT-0	001, ROM H5 P
	010, ROMLESS H5 P
	011, EPROM M6 R
	100, ROM M6 R
	101, OSDEPROM M6 R
	110, ROM M6 P
	111, Read Auto Gain Table for the device from EEPROM

AK46/TITANIUM – Languages Groups

GROUP 1 - WEST

- ENGLISH
- FRENCH
- SWEDISH
- CZECH
- GERMAN
- PORTUGUESE
- ITALIAN
- RUMANIAN

GROUP 2 – WEST / EAST

- POLISH
- FRENCH
- SWEDISH
- CZECH
- GERMAN
- SERBIAN
- ITALIAN
- RUMANIAN
- **GROUP 3 – WEST / TURKEY**
- ENGLISH
- FRENCH
- SWEDISH
- TURKISH
- GERMAN
- PORTUGUESE
- ITALIAN
- RUMANIAN

GROUP 4 – EAST / CYRILLIC

- ENGLISH
- CYRILLIC
- SWEDISH

- CZECH
- GERMAN
- SERBIAN
- LETTISH
- RUMANIAN

GROUP 5 - ARABIC

- ENGLISH
- FRENCH
- SWEDISH
- TURKISH
- GERMAN
- HEBREW
- ITALIAN
- ARABIC

Using Coloured Buttons

RED : No function.

GREEN : Is used to switch the aspect ratio between 4:3 and 16:9.

YELLOW : Is used to prepare the system for screen-adjustments.

BLUE : No function.