

RGB signal selection/processing/output stages

Within the RGB signal selection there are three modes to choose from:

- RGB (internal)
- Fast RGB insertion (R_TXT G_TXT B_TXT on pins 23, 24 and 25 respectively)
- OSD-mode

Teletext

Two different microprocessors are used: one with and one without teletext.

- In case of TXT, this teletext function is integrated together with the control part in one and the same μ C. This μ C is drawn in the diagrams with the outer pin numbering.
- In case of no TXT another μ C is used with fewer pins.

This μ C is used in the diagrams with the internal pin numbering.

In the description below, the pin numbers mentioned are the numbers mentioned outside the housing of IC 7600 (IC7600 with TXT and IC7601 without TXT), so for the μ C with integrated TXT functionally. In case of the μ C with integrated teletext function, the CVBS-TXT signal is fed to pin 23 the TXT and OSD- information are combined at pins' 32-33-34.

Before the RGB signal selection the RGB signals are clamped to similar DC level during burst key period.

Selection is controlled by the RGB insertion input voltage at pin 26.

Voltage at pin 26	selected RGB signals
< 3V	RGB (internal)
$0.9V < V < 3V$	(R_TXT G_TXT B_TXT (fast insertion on pin 23, 24 and 25)
> 4V	OSD can be inserted at the RGBout pins

The contrast, brightness and white-point RGB adjustment on the selected RGB signals are controlled by 1°C bus commands. After the adjustment, the three RGB black levels are added to the RGB signals. These three signals are blanked when the RGB blank signal is active. The RGB blanking level tracks with the DC measurement pulse level. The RGB output stages supply the buffered RGB signals the pin 21, 20 and 19 respectively.

Black Stretcher

The black stretcher circuit, which is only operational during line scan, extends the grey signal level towards the actual black level (that is actual black level measured during burst-key). The amount of extension is dependent upon the difference between actual black level and the darkest part of the incoming video signal. The darkest part of the video signal is registered in the capacitor at pin 39 by means of an internal discharge current approximately 130uA. The black stretcher is made inactive if the voltage at pin 39 is set to ground. This is done by turning on transistor 7220 video the command blackstrow from the microprocessor (when powerchip button on the remote control unit is activated).

Beam Current Limiter

The beam current limiter circuit functions as an average white limiter as well as peak white limiter. The average

white limiter needs external circuitry comprising of 7265, and associated components to function. The peak white limiter is an internal detection circuit. The function of the beam current limiter (average white/peak white limiter) reduces the contrast and brightness of RGB signals.

For beam current limiting, the difference in beam current (I_{BCL}) and an internal charge current (I_{CHARGE}) is stored in capacitor 2460 at pin 22. If $I_{BCL} > I_{CHARGE}$ the voltage (V_{BCL}) at pin 22 decreases. For beam current limiter:

- contrast reduction begins when V_{BCL} 3.5V
- brightness reduction begins when V_{BCL} 2.5V

V_{BCL} is normally 4V when beam current limiter is not active. The contrast and/or brightness reduction of the RGBout is proportional to the voltage decrease at pin 22.

9.6.4 Horizontal synchronisation IC 7225-5D and the line output stage (diagram A2)

Start up of the horizontal oscillator via the +8V gives a start-up current into pin 37, if the voltage on pin 37 exceeds 5V6 the horizontal oscillator starts running at approx. 25kHz. Only when the supply pin of IC 7225 (pin 12 at IC 7225-5A in diagram A3) becomes 8V the line frequency changes to 15625 Hz.

Horizontal synchronisation separator separates horizontal pulses out of CVBS and so synchronises the free-running horizontal sawtooth generator.

Horizontal oscillator sawtooth is converted into square wave voltage with variable duty cycle. This square wave on pin 40 is fed to the line output stage. The time constant of the synchronisation circuit is automatically internally determined by IC 7225-5D.

Pin 41 is both SANDCASTLE output and HORIZONTAL FLYBACK input.

- The SANDCASTLE has an output current a few mA, the amplitudes of sandcastle pulse, burst 5V3, line blanking 3V, frame blanking 2V.
- When the input acts as a HORIZONTAL FLYBACK pulse, the input has a current of 100-300 mA. This horizontal flyback pulse compares phase of flyback pulse with phase of the horizontal oscillator, If the phase is not correct the duty cycle of horizontal oscillator will be adjusted.
- Flash protection: The BCI info is applied to pin 42 of IC7225-5D. If due to a flash in the picture tube the voltage on pin 42 is 6V, the horizontal drive is switched off immediately. If the voltage is again V the horizontal drive is switched on again via the slow start procedure.
- EHT over voltage protection. The BCI info is also applied to pin 50-IC7225-5D. First the BCI is compensated vertical picture amplitude variations due to beam current variations. The control range is between 1.2V and 2.8V. However if the voltage on pin 50 exceeds 3.9V the EHT overvoltage protection is activated and the horizontal drive is switched off.

9.6.4.1 The line output circuitry

In principal the line output stage Pin 40 IC 7225-5D drives the line output stage, TS 7445 and transformer 5445 via drivers TS 7440-7441. The line output stage supplies the deflection current and the following supply voltages (see also the power supply block diagram in chapter 5):

Output voltage (Diagram A2)

LOT (5445 Line output transformer) output voltage

- EHT, +160, Vg2, focus and ff for the picture tube.
- 160V for the CRT drive cct.
- +5.5V for the control cct & tuner supply.
- +9V for the tuner supply.
- +13V for the control & vertical drive output cct.
- -13V for the vertical drive output cct.