FS453 / FS454
PC to TV Video Scan Converter

Features

- Programmable 2D scaling
  - Variable horizontal up and down scale
  - Variable vertical up and down scale
  - Output format can be tuned to the exact dimensions of the TV
  - VGA input can be upscaled to fit PAL (720x576)
- Advanced 2D flicker filter
- Broadcast quality video encoder
- Supports multiple progressive input resolutions
  - Minimum 640x480
  - Maximum 1280 x 1024 (SXGA)
- HD modes
  - 480p
  - 720p
  - 1080i

- Multiple output formats
  - NTSC, NTSC-EIAJ, PAL-B/G/H/I
  - PAL-M, PAL-N, PAL-60
  - Composite, S-Video
  - RGB SCART with CVBS
  - HD YPrPb
  - SD YPrPb
  - VGA modes through XGA
- Glueless digital interface to display chips
- ITU-R BT.656 studio grade encoder
- 4 assignable 10-bit output D/A converters
- Macrovision 7 compliant (FS454)
  - Includes 480p support
- I^2C^* compatible port controls
- 80 pin PQFP package
- 3.3V, 1.8V operation

Description

The FS453 / FS454 is a video scan converter. It can accept computer graphics, in many different input resolutions and rates, and convert them to broadcast quality video compliant with industry standards as shown:

Format	Standard
NTSC (SD)	SMPTE-170M
PAL (SD)	ITU-R 624
480p (HD)	EIA-770.2-A
720p (HD)	SMPTE 296
1080i (HD)	SMPTE 274

The programmable up and down scaler allows the incoming resolution to be fitted to completely fill the output display screen. The programmable flicker filter is an advanced 2 dimensional filter that enhances text quality and eliminates artifacts. The degree of sharpness is also programmable.

The digital progressive RGB inputs are scaled to the ITU-R BT.601, 4:2:2 format. Vertical scaling and flicker filtering are done in the 4:2:2 format.

HD inputs bypass the scaler and flicker filter, and are formatted directly into HD compatible Component (YPrPb) outputs.

The FS453 / FS454 can be used both as a TV encoder and as a 75MHz DAC for VGA – XGA outputs.

The digital video encoder generates Y/C, CVBS, RGB and YPrPb output signals. These signals can be combined to support RGB + CVBS for SCART, YPrPb + CVBS or multiple CVBS and Y/C DAC outputs.

The FS454 incorporates Macrovision 7 anti-copy protection technology in the encoder, including 480p protection.

All parameters can be read and written via the I^2C compatible serial port. The flexibility of the FS453 / FS454 allows a glueless digital interface to most graphic display chips.

The FS453 / FS454 requires power from +1.8V digital and +3.3V analog supplies. For external components, it only needs a 27 MHz clock and passive parts. The FS453 / FS454 is an 80-lead Quad Flat Pack (PQFP) package.
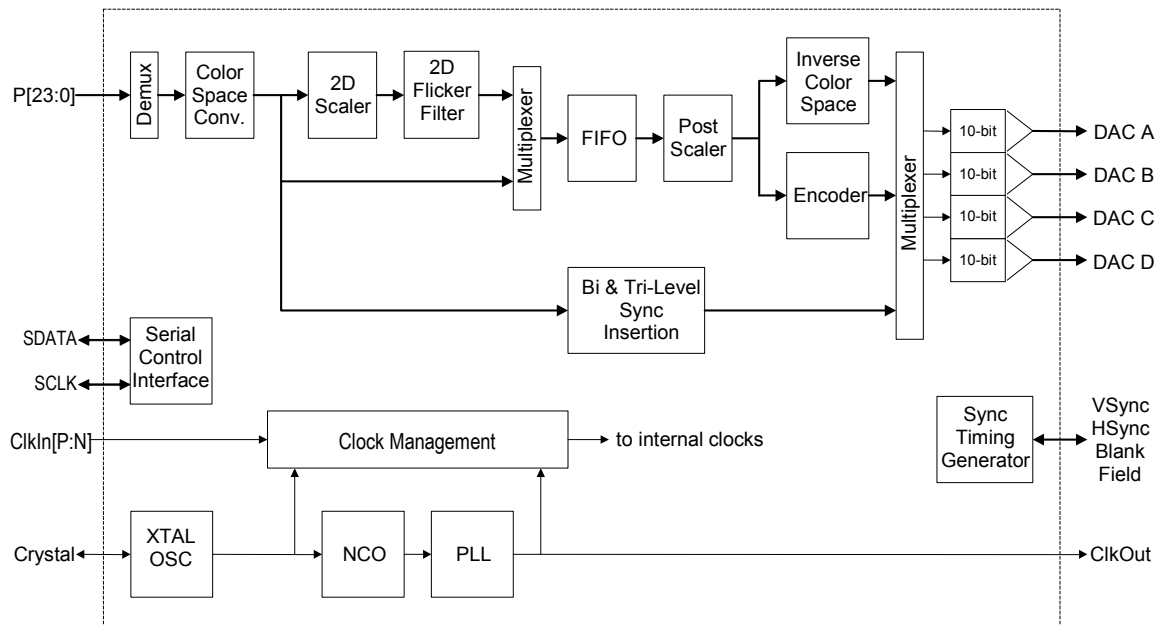
*Note: I^2C is a registered trademark of Philips Corporation. The FS453 / FS454 Serial I/O bus is similar but not identical to the Philips I^2C bus.

Applications

- PC Video Out
- Web Appliances
- Video Kiosks
- Gaming Consoles

Architectural Overview

The FS453 / FS454 PC-to-Video Scan Converter supports High Definition (HD) and Standard Definition (SD) outputs and is compatible with most graphic controller chips. It takes in digital RGB or YCrCb data and produces SD or HD analog outputs. In SD mode the FS453 / FS454 converts, scales, removes flicker, interlaces and encodes the data into NTSC or PAL formats. In HD mode the FS453 / FS454 performs the different color space conversions then inserts the required syncs for output. The FS453 / FS454 has the following major sections:

- Oscillators and PLLs
- Serial Control Port
- Input Synchronization
- Patented Horizontal and Vertical Scaling
- Programmable Color Space Converter
- Patented 2D Flicker Filter
- Studio Grade Encoder
- HDTV Sync Insertion
- Configurable Quad 10 bit DAC

FS453 / FS454 Functional Block Diagram

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