



PinnaClear™ Input Processor

First input processor with Silicon Image's patent-pending InstaPort™ instantaneous port switching technology

The PinnaClear SiI9251 input processor gives manufacturers the flexibility to add new features to their HDTV platforms quickly and cost-effectively. In addition to managing all the input interfaces into the DTV, input processors offer innovations in legacy analog video inputs with high-quality 12-bit state-of-the-art ADCs and AVI interfaces, new MHL™ interfaces for HD mobile devices and InstaPort technology for faster port switching.

The highly integrated PinnaClear™ SiI9251 video input processor is the first multi-port input processor for the high-end and mid-range HDTV market. The SiI9251 features four HDMI 1.3 inputs that deliver Deep Color with 12 bits of video at 1080p resolution and 60Hz. The SiI9251 also includes four analog high-definition component video inputs that support YCbCr and RGB formats and a 5-input composite and 4-input S-Video switch capable of selecting three composite outputs or two Y/C outputs.

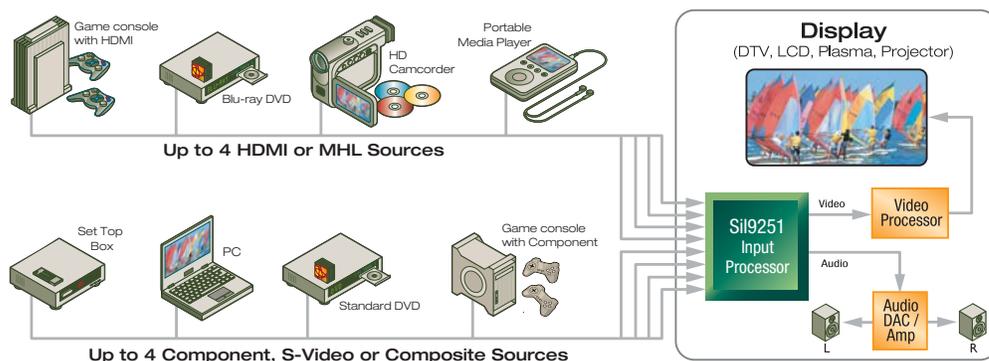
The four HDMI input ports on the SiI9251 support MHL, a low pin-count, low power interface designed for mobile CE devices. MHL technology enabled mobile devices can be connected directly to an SiI9251-equipped DTV without a dock or dongle, with auto discovery of HDMI or MHL source devices in the hardware.

The SiI9251 supports multiple audio formats and all common audio sample rates up to 192kHz. Audio is available for output on an S/PDIF port or an I²S port.

The SiI9251 analog video interface consists of triple-channel 12-bit analog-to-digital converters (ADCs) for capturing RGB and YPbPr inputs. With conversion rates ranging from 12.5 MSPS to 170 MSPS, the Analog Video Interface (AVI) inputs capture 480i/576i to 720p/1080i/1080p TV formats and PC graphic formats up to 1600 x 1200 (UXGA). An additional 12-bit ADC is integrated for SCART compatibility to overlay RGB data over CVBS. This fully integrated AVI includes an internal voltage reference and an anti-alias filter with selectable cutoff frequencies. The SiI9251 processor also integrates a data slicer/decoder to capture VBI data services.

In support of the processor's HDMI functionality, the the SiI9251 input processor comes pre-programmed with HDCP keys to simplify manufacturing and provide the highest level of HDCP key security. The chip includes a 256-byte Extended Display Identification Data (EDID) RAM block and support for Consumer Electronics Control (CEC) over a single wire bus. SiI9251 supports extremely low standby power with power islands enabling CEC and EDID operations when the device is in shut-down mode consuming less than 35mW.

SiI9251 System Diagram



SiI9251

Applications

- LCD, plasma and projection DTVs

Key Features

- Patent-pending InstaPort technology
- Four HDMI 1.3 input ports support MHL
- Four component or RGB inputs
- 12-bit ADC for Deep Color analog video
- Four S-Video and five CVBS inputs
- Full SCART support
- 2-channel digital audio up to 192KHz
- Integrated CEC
- Four integrated EDIDs with NVRAM for each HDMI port

HDMI™
HIGH-DEFINITION MULTIMEDIA INTERFACE

instaport™

Sil9251 Features

Sil9251 Starter Kit (CP9251HDMI/ADC)

Contents include:

Hardware

- Sil9251 input processor daughter board
- Sil9134 transmitter daughter board
- Motherboard
- HDMI to HDMI cable

Software

- Simon receiver software tool

Documentation

- User's guide
- Schematics
- Bill of materials (BOM)



Industry-Standard Compliance

- HDMI 1.3
- DVI 1.0
- HDCP 1.1
- ITU-656
- EIA/CEA-861D

HDMI/MHL Inputs

- InstaPort technology on HDMI ports
- Four HDMI / MHL inputs
- Resolution support up to 1080p @ 60Hz or 720p/1080i @ 120Hz with 36-bit color via HDMI or 1080p @ 30Hz or 720/ 1080i @ 60Hz with 24-bit color via MHL
- Integrated RGB-to-YCbCr color space conversion with 12-bit accuracy
- x.v.Color support
- 4:2:2 to 4:4:4 converter with 14-bit accuracy
- Integrated CEC Consumer Electronics Control
- Integrated EDID for each HDMI Port

Analog Video Inputs

- Video format detection in hardware
- 4x12-bit ADC @ 170 MSPS conversion rate
- 1.4 Vp-p analog input range
- Supports RGB and component (YPbPr) video signals up to 1080p
- D1/D2/D3/D4/D5 D-Connector support
SCART FB inputs delay matched and multiplexed to one FB output
- Macrovision (Level 1) detection and handling

System Operation

- Register-programmable via slave I²C interface
- Auto video mode simplifies design
- Auto audio mode allows more robust system
- Flexible interrupt registers with interrupt pin

Digital Audio Output

- Industry-standard S/PDIF and I²C output
- Supports high-end audio including SACD and DVD-Audio: 2-channel at 32-192kHz
- Programmable I2S output supports numerous low-cost audio DACs
- Supports IEC60958 2-channel PCM
- Supports IEC61937 compressed audio

Content Protection

- Integrated HDCP cipher engine
- Built-in HDCP BIST
- Pre-programmed HDCP keys
- Built-in HDCP self-test

Power Management

- Low standby power mode with auxiliary power mode for CEC and EDID support

Package

- 208-pin LQFP

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InstaPort technology dramatically reduces the wait time when switching between HDMI sources by performing background HDCP authentication with all

source devices connected to the DTV. Since the authentication process is done on all ports simultaneously, when a new input is selected by the viewer it can begin streaming content immediately without waiting for HDCP authentication. As consumers continue to connect an increasing number of devices to their DTVs—from DVD players and game consoles to PCs and set top boxes—switching between them with limited delay becomes an increasingly desired feature.

Simply Stored. Connected. Beautiful.

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