ESS Technology, Inc.

ES3890
Visba3 Video CD Processor
Product Brief

DESCRIPTION

The Visba®3 ES3890 single-chip Video CD (VCD) processor is the latest innovation of ESS's family of VCD chips for VCD players. The Visba3 ES3890 is based on the ESS Programmable Multimedia Processor (PMP) architecture consisting of a 32-bit video controller and a 64-bit video processor and it integrates the TV-encoder, thus eliminating the need for a VCD companion chip.

The ES3890 integrates an audio ADC for microphone inputs, two video DACs for Composite and S-video outputs, and digital echo circuitry. With Visba3, VCD player design and board layout become simpler, the VCD system cost is much reduced, and it offers a very flexible design configuration for 512 kB or 2 MB system RAM.

The ES3890 performs all of the functions such as video filtering, NTSC/PAL conversion, audio and video error concealment, and picture zoom in/out up to 4x magnification. It supports On-Screen-Display (OSD) with 4 colors in 8 degrees of transparency, Karaoke, and VCD 2.0 Playback Control (PBC).

Features in the Visba3 ES3890 solution include: a 7-band audio graphic equalizer display with five pre-configured settings and environment effects, Karaoke voice recording for sing-along, and Karaoke scoring.

The ES3890 also offers the ESS SmartBright™ movie brightness feature, the ESS SmartColor™ color balancing feature, as well as the Kodak® Picture CD and Fujicolor® CD JPEG photo viewing features.

The ESS SmartBright™ feature allows the brightness level of VCD movies being played back to be adjusted in real time while the ESS SmartColor feature allows the skin color of JPEG photos being viewed to be enhanced. Other features found with the ES3890 include support for CD+G Karaoke, CD-Text, and Windows™ Media Audio (WMA) decoding and playback.

The ES3890 is available in an industry-standard 128-pin Plastic Quad Flat Pack (PQFP) device package.

FEATURES

- ESS proprietary dual CPU PMP core.
- Integrated TV-encoder.
- VCD 1.1 and 2.0 compatible.
- Composite or S-video output.
- CCIR601 non-square operation.
- NTSC/PAL formats.
- Video error concealment.
- SmartBright feature for adjusting brightness of movies during playback.
- Video scaling and X- and Y-axis interpolation.
- Motion pan and zoom to 4X magnification.
- Video CD 2.0 Playback Control.
- JPEG photos decoding and playback.
- Kodak Picture CD and Fujicolor CD JPEG image viewing.
- SmartColor feature for adjusting skin color of JPEG photos during viewing.
- Trick mode functions.
- Dual microphones inputs.
- 7-band audio graphic equalizer.
- Programmable master clock for external audio DAC.
- Digital echo up to 168 ms delay.
- Karaoke voice recording.
- Karaoke scoring.
- CD+G Karaoke.
- Karaoke and subtitle functions.
- MP3 audio playback.
- CD-DA with CD-Text.
- Vocal reverb simulates a theater acoustic environment.
- Windows Media Audio decoding.
- Flexible design for 512 kB or 2 MB memory.
- Direct servo control.
- Remote control interface for power standby on/off.
- 4-bit On-Screen Display controller with 3-bit blending supports 4 colors in 8 degrees of transparency.
- Power management.
- Optional lead-free leads using 98%-Sn/2%-Cu or 98%-Sn/2%-Bi with ES3890FF.

ES3890 PINOUT DIAGRAM

The device pinout for the ES3890 is shown in Figure 1.

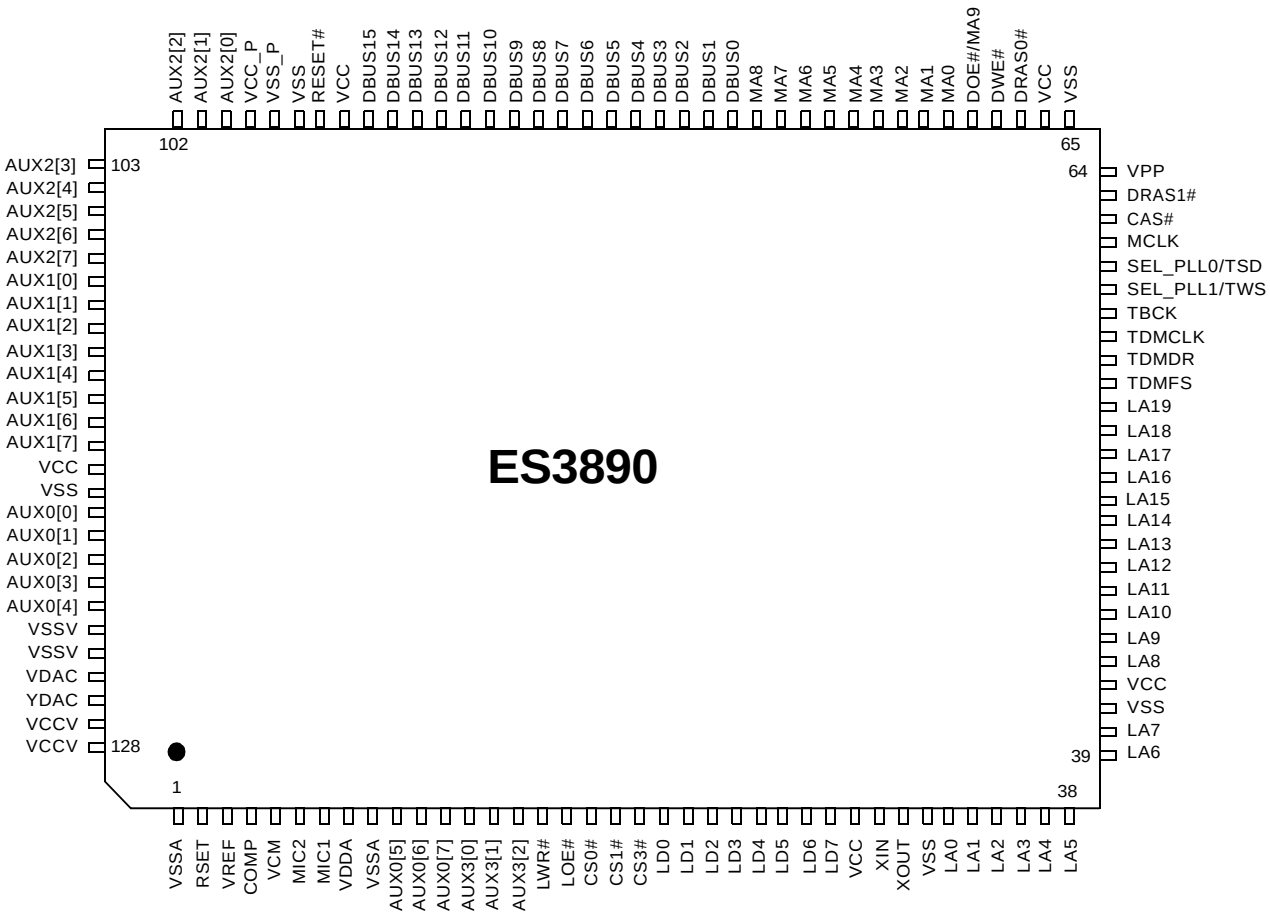

Figure 1 ES3890 Device Pinout

ES3890 PIN DESCRIPTION

Table 1 lists the pin descriptions for the ES3890.

Table 1 ES3890 Pin Description

Names	Pin Numbers	I/O	Definitions
VSSA	1, 9	G	Ground for analog circuits.
RSET	2	O	Reset. Internal current source generator. Connect this pin to a 510Ω resistor to ground.
VREF	3	O	Output reference voltage. Connect to a 0.01–µF high-frequency bypass capacitor to VSSA.
COMP	4	O	Compensation capacitance for low-pass filter on VDAC. Connect to a 0.01–µF high-frequency bypass capacitor to VSSA.
VCM	5	O	ADC analog voltage reference. Connect to a 0.01–µF filter capacitor to VSSA.
MIC1, MIC2	6, 7	I	Microphone inputs.
VDDA	8	P	5.0V power supply for analog circuits.
AUX0[7:5]	10-12	I/O	General-purpose programmable I/O.
AUX3[2:0]	13-15	I/O	General-purpose programmable I/O.
LWR#	16	O	RISC interface Write Enable (active-low).
LOE#	17	O	RISC SRAM Output Enable (active-low).
CS0#	18	O	Chip select 0 for SRAM (active-low).
CS1#	19	O	Chip select 1 for SRAM (active-low).
CS3#	20	O	Chip select 3 for SRAM (active-low).
LD[7:0]	21-28	I/O	Data bus.
VCC	29, 42, 66, 95, 116	P	Core power supply (2.5V).
XIN	30	I	Crystal connection or input source of 27MHz.
XOUT	31	O	Crystal connection or output drive of an input clock source.
VSS	32, 41, 65, 97, 117	G	Ground for core.
LA[19:0]	33-40, 43-54	O	Address bus.
TDMFS	55	I	Frame signal from CDROM.
TDMDR	56	I	Data signal from CDROM.
TDMCLK	57	I	Clock signal from CDROM.
TBCK	58	O	Transmit clock when sending audio IIS data to external DAC.
SEL_PLL1	59	I	PLL mode select 1. Pulldown to ground to bypass PLL. Pullup to VCC for optimal performance.
TWS		O	Audio strobe signal of IIS signals to external DAC.
SEL_PLL0	60	I	PLL mode select 0. Pulldown to GND to bypass PLL. Pullup to VCC for optimal performance.
TSD		O	Audio data of IIS signals to external DAC.
MCLK	61	I/O	Media clock input to drive external audio devices or media clock output when driven by external source into the ES3890.

Table 1 ES3890 Pin Description (Continued)

Names	Pin Numbers	I/O	Definitions
CAS#	62	O	Column Address Strobe to DRAM (active-low).
DRAS1#	63	O	Row Address Strobe 1 to DRAM (active-low).
VPP	64	P	5V power supply.
DRAS0#	67	O	Row Address Strobe 0 to DRAM (active-low).
DWE#	68	O	Write Enable to DRAM (active-low).
DOE#	69	O	Data Out Enable to DRAM (active-low).
MA9		O	Multiplexed memory row and column address.
MA[8:0]	70-78	O	Multiplexed memory row and column address.
DBUS[15:0]	79-94	I/O	Input when DRAM is being read. Output when DRAM is being written.
REST#	96	I	External system reset forces ES3890 to do a reset (active-low).
VSS_P	98	G	Ground for system PLL.
VCC_P	99	P	2.5V power supply for system PLL.
AUX2[0]	100	I/O	General-purpose programmable I/O. May be used for VFD clock.
AUX2[1]	101	I/O	General-purpose programmable I/O. May be used for Subcode-Q data.
AUX2[2]	102	I/O	General-purpose programmable I/O. May be used for Subcode-Q clock.
AUX2[3]	103	I/O	General-purpose programmable I/O.
AUX2[4]	104	I/O	General-purpose programmable I/O. May be used for C2PO error correction flag from CDROM
AUX2[5]	105	I/O	General-purpose programmable I/O.
AUX2[6]	106	I/O	General-purpose programmable I/O. May be used for Subcode sync S0 or S1 detection.
AUX2[7]	107	I/O	General-purpose programmable I/O.
AUX1[5:0]	108-113	I/O	General-purpose programmable I/O.
AUX1[6]	114	I/O	General-purpose programmable I/O. May be used for VFD data output.
AUX1[7]	115	I/O	General-purpose programmable I/O. May be used for VFD data input.
AUX0[1:0]	118, 119	I/O	General-purpose programmable I/O.
AUX0[2]	120	I	General-purpose programmable input.
AUX0[4:3]	121, 122	I/O	General-purpose programmable I/O.
VSSV	123, 124	G	Ground for VDAC circuit.
VDAC	125	O	Video DAC V output. Connect to a 37.7Ω resistor to ground for proper operation.
YDAC	126	O	Video DAC Y output. Connect to a 37.7Ω resistor to ground for proper operation.
VCCV	127, 128	P	2.5V power supply for video DAC circuit.

FUNCTIONAL DESCRIPTION

Figure 2 below shows the internal block diagram of the ES3890.

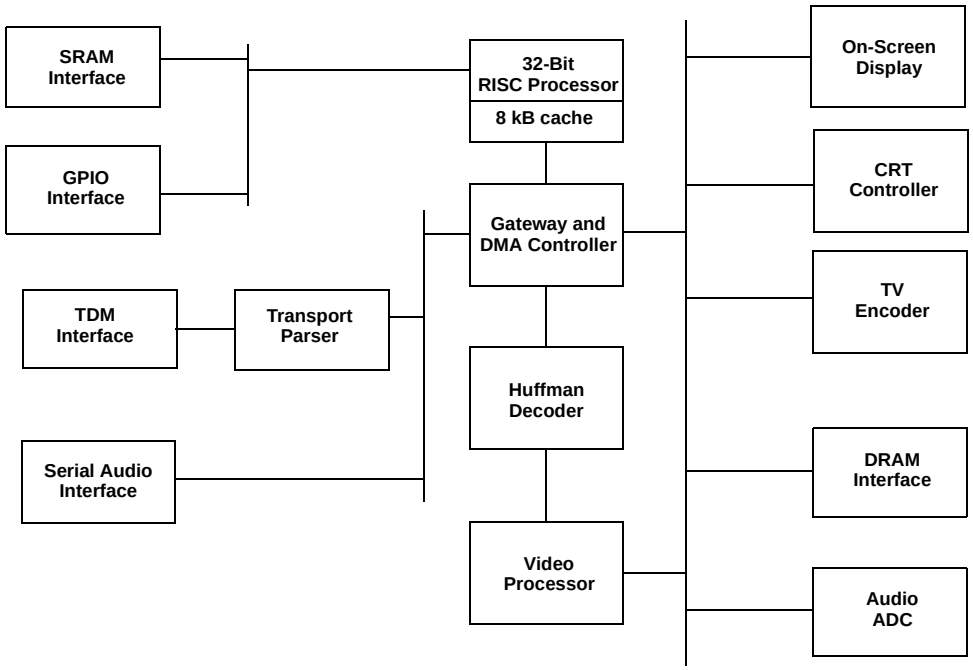

Figure 2 ES3890 Block Diagram