digital

SA-1100

DIGITAL Semiconductor SA-1100 Microprocessor Evaluation Platform Product Brief

DIGITAL Semiconductor offers a SA-1100 hardware developer's kit and evaluation platform that manufacturers can use as a hardware reference design and as a tool for developing and testing software. Designers can easily extract portions of the board and accompanying SA-1100 schematics to expedite product design.

Applications

- Software development
- Operating system porting
- Hardware design verification

Benefits

- The tools help OEMs and third-party software application providers easily and quickly deliver leadership products based upon the SA-1100 microprocessor.
- The hardware developer's kit expedites the development of successful customer products by providing detailed, royalty-free application examples.
- The tools reduce developer time and effort to:
  - Generate and benchmark code
  - Simulate processors and memory
  - Download code to target hardware
  - Debug efficiently and rapidly
- The evaluation board enables software testing prior to hardware system availability.

Description

The evaluation platform provides a wide variety of design and development features, including the SA-1100 processor, onboard memory (SRAM, DRAM, Flash, and ROM), LCD panels, touch screen, keyboard, audio accessories (telephone jack, microphone, and speaker), PCMCIA connector, serial I/O interfaces (USB port, IrDa infrared support, SDLC port, and two UART ports), and logic analyzer connectors.

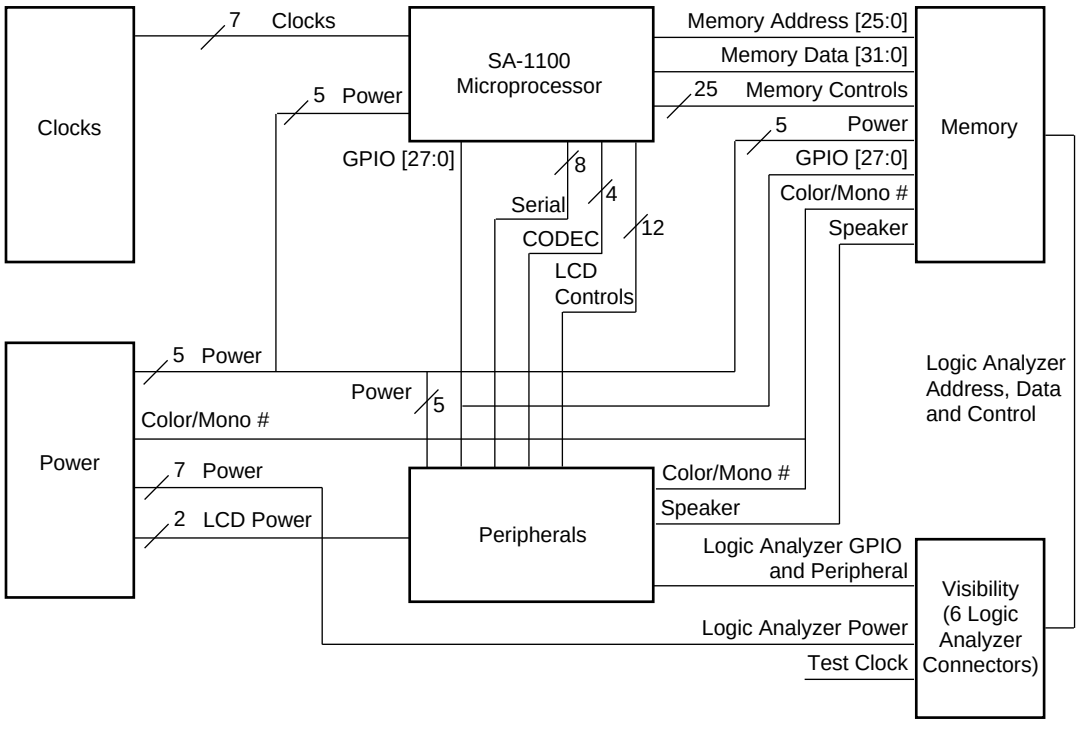
The SA-1100 evaluation platform is a design verification platform for the SA-1100 microprocessor. It is intended to meet the following requirements:

- Provide a power-up vehicle for the SA-1100 microprocessor
- Provide an evaluation board for the SA-1100 microprocessor
- Provide a software development environment

Features

- High-performance, low-power integrated processor configured to run at speeds ranging from 133 MHz to 200 MHz
- Provides the following memory configurations:
  - 512KB of SRAM
  - 16MB of self-refresh capable EDO RAM
  - Switch to enable SRAM or DRAM
  - 256KB of 32-bit wide or 128KB of 16-bit wide (switch selectable) 3.3-V only Flash
  - 256KB of 32-bit wide or 128KB of 16-bit wide (switch selectable) 3.3-V only ROM
  - Socket allowing installation of an operating system Boot ROM SIMM (3.3 V, 5 V, or 12 V)
  - Footprints for one pair of 1M x 16 higher performance Flash chips
- External register is implemented and performs the following functions:
  - Controls application of 12 V to the PCMCIA card (Flash)
  - Controls application of 5 V to the PCMCIA card
  - Monitors the voltage sense pins
- Clock usage
  - 32.768-kHz crystal
  - 3.6864-MHz crystal
  - Oscillators
  - Coax connectors (to pulse generators)
- LCD panels
  - Kyocera KCS3224ASTT-X1 8-bpp color, STN, with a resolution of 320 x 240 single panel
  - Sharp LQ64D341 18-bpp color (16 used), TFT, with a resolution of 320 x 240 single panel
- PCMCIA supporting one or two socket PCMCIA implementations
- Audio accessories
  - Telephone jack
  - Microphone
  - Speaker
- Fujitsu FKB1406 keyboard
- Serial I/O interfaces
  - Universal serial bus (USB) device port
  - IrDa infrared support
  - Synchronous data link controller (SDLC)
  - Two universal asynchronous receiver-transmitter (UART) ports
- Debug and evaluation logic
  - Test points for test equipment
  - Connectors for logic analyzer
  - LEDs connected to SA-1100 **gpio** pins

System Block Diagram



SA-1100 Microprocessor

The SA-1100 microprocessor is a high-performance, low-power integrated processor configured to run at speeds ranging from 133 MHz to 200 MHz. The SA-1100 packaging is a 208-pin TQFP and is attached to the board via a ZIF socket.

Memory System

512KB of SRAM is implemented. The EDO DRAM is 60 ns, with an approximate data bandwidth of 100 MB/s. The 16MB of DRAM is implemented in 4 banks of 4MB each. Each of the banks is implemented with two 1M x 16 memory chips. The SA-1100 evaluation board also uses both SRAM and DRAM on the same board, and the selection is determined via use of a switch. The ROM is actually Flash with the **WE#** signal tied high.

PCMCIA

The PCMCIA implementation on the SA-1100 evaluation board is intended to provide the maximum possible flexibility while supporting one or two socket PCMCIA implementations. The PCMCIA portion of the logic was designed to support the voltage switching required for 3.3-V and 5-V cards as well as hot insertion (with power on) of the card. A low-power CPLD is implemented to support the majority of the Boolean logic required to support a dual-socket implementation, and also to provide an additional level of protection by controlling the drive enables to and from the PCMCIA cards. Also provided is a dual PCMCIA socket, a card cage, and the power controllers for the card and socket interface.

External Register

An external register controls the application of 12 V and 5 V to the PCMCIA card, and also, monitors the voltage sense pins.

Clocks

The SA-1100 uses the 32.768-kHz crystal, 3.6874-MHz crystal, oscillators, and coax connectors (to pulse generators). In addition, the SA-1100 evaluation board can accept clock sources from test equipment (for example, clock generators) through the connectors J17 and J21.

LCD Panels

The SA-1100 evaluation board is designed to operate with two different LCD panels: Kyocera KCS3224ASTT-X1 and Sharp LQ64D341. Most of the SA-1100 evaluation boards are shipped with the Kyocera panel, which is a passive color display. The Sharp panel connector is on the board so that functional tests can be performed with the SA-1100 driving TFT panels. Because of cost reasons, this panel will not be shipped with the SA-1100 evaluation board.

Audio Accessories

The SA-1100 evaluation board includes a telephone jack and a direct access arrangement (DAA) approved for North America and Japan, a microphone, and a speaker. For debugging purposes, a 7-segment LED is provided, along with two discrete LEDs that indicate board and software status. Two footprints are on the board to allow either a Philips UCB1200 or Cirrus CS4271 to interface to the speaker, telecommunication functions, touch screen, and the microphone. (PCB footprints exist for both Philips and Cirrus devices, but only one may be soldered to the SA-1100 platform at any given time.)

Touch Screen

The SA-1100 evaluation board touch-screen panel is used for data input. It is connected to either the UCB1200 or the CS4271.

Keyboard Interface

The SPI protocol on the SA-1100 interfaces to a USAR Systems UR5HCSPI-06-FB keyboard controller on the SA-1100 evaluation board. The controller then interprets input from the Fujitsu FKB1406 keyboard.

Serial I/O Interfaces

The following types of serial I/O interfaces are available:

- A universal serial bus (USB) “device” port (cannot be a “master” or a “hub”) is supplied along with the necessary circuitry.
- IrDa infrared support. The TFDS6000D is a dual-speed IrDa transceiver (115 kb/s or 4 Mb/s).
- Synchronous data link controller (SDLC) port configuring AppleTalk, GeoPort, or differential RS-422 type interface.
- Two universal asynchronous receiver-transmitter (UART) ports support computer-to-computer connections only (no modem).

Evaluation Logic

Logic analyzer connectors are available for observing all SA-1100 signals. To observe the SA-1100 signals, the simplest method of operation is to use the Tektronix TLA 711 Logic Analyzer with the P6434 mass termination probes.

Power

The system power requirements are as follows:

- External power transformer (wall unit): +5 V, +3.3 V, +12 V
- Onboard voltage regulators

Characteristics	
Electrical	
Power supply	+5.0 V (4 A maximum current) +12 V (.5 A maximum current) +3.3 V (4 A maximum current)
Physical	
Platform dimensions	Height: 20.3 cm (8.0 in) Width: 33.0 cm (13.0 in) Length: 45.7 cm (18.0 in)

For More Information

To learn more about the availability of the SA-1100, contact your local semiconductor distributor. To learn more about DIGITAL Semiconductor's product portfolio, visit the DIGITAL Semiconductor World Wide Web Internet site:

http://www.digital.com/semiconductor

or you can contact the DIGITAL Semiconductor Information Line:

United States and Canada
1–800–332–2717
Outside North America
1–510–490–4753
Electronic mail address
semiconductor@digital.com

For technical support, contact the DIGITAL Semiconductor Customer Technology Center:

Phone (U.S. and international)
1–978–568–7474
Fax
1–978–568–6698
Electronic mail address
ctc@hlo.mts.dec.com