The SL11-R from ScanLogic Corporation, is a low cost, high speed Universal Serial Bus (USB) RISC based Controller. It contains a 16 bit RISC processor with built in BIOS ROM that greatly reduces firmware development time. It interfaces to serial flash EEPROM, which contains the USB device configuration and "customer product specific functions". New functions can be programmed into the Serial EEPROM by uploading it from a USB Host PC. This unique architecture provides the ability to upgrade products, in the field, without changing the peripheral hardware. The processor can execute code either from internal ROM/RAM or external DRAM, SRAM and ROM. The SL11-R's Programmable Bi-Directional Data Port supports both DMA and I/O modes. The USB port supports up to 12 Mbits/sec. the maximum USB transfer rate. All USB protocol modes are supported; Isochronous (up to 1024 bytes), Bulk, Interrupt and Control. The SL11-R power source requires only 3.3v, and it can be powered through a USB host PC or a Hub . Resume, Suspend and Low power modes are supported.

The SL11-R's unique architecture combined with ScanLogic's comphrehnsive Development Kit, provides ScanLogic's customers the ability to have a working USB Peripheral within 5 weeks. The SL11-R offers an optimal USB solution for a variety of peripherals that traditionally interface to a host PC via EPP or a SCSI:

PC Peripherals
- Scanners
- Digital Cameras (video & still)
- Printers
- Facsimiles
- Multi-function Units

- External Storage Devices
- CD-ROM
- DVD player
- External Modems
- Digital audio

Communications
- Computer Telephony (CTI)
- Video Conferencing
- Cable modems
- DBS/DSS Satellite
- ISDN/T1

Other
- Embedded Systems
- Data Acquisition
- Note Pads
- Gamepads
- Digital joystick

The unique capabilities of SL11-R

- **48 MHz RISC Processor -** 16 bit processor with built in BIOS ROM. It provides comprehensive I/O support including USB functions, UART, DMA, Serial EEPROM programming, among other functions, thereby eliminating the need for time consuming firmware development

- **Internal SRAM -** 3K x 8 internal multi-purpose SRAM provides double buffering "Ping -Pong" operation scheme. Incoming/Outgoing Data is buffered and sent or received to/from the USB port

- **Data Port -** Up to 16 bits, Programmable Bi-Directional Fast Data Port. Both direction and operating modes (DMA or I/O) are selected by the user.

- **USB Port -** Built in USB Transceiver, up to 12Mbits/sec throughput rates in all modes; Bulk/ Isochronous/Interrupt/ Control modes - Isochronous mode supports packet sizes up to 1024 bytes . Conforms

- **Re-Programmable -** Executable code can be downloaded through USB host PC and can be pro-grammed into a serial EEPROM to easily modify or update product functionality.

- **Miniport Driver -** Development Kit includes generic mini-port driver for Windows 95 WDM - Memphis/Detroit for a variety of peripheral classes. Development time is significantly reduced.

- **Power Modes -** Includes Suspend, Resume and Low power modes for integration into devices re-quiring power from the USB host or USB Hub.

- **Digital Phase Lock Loop (DPLL) -** Digital PLL incorporated in the SL11-R requires only 12 MHz external clock or crystal.

SL11-R Block Diagram

ScanLogic
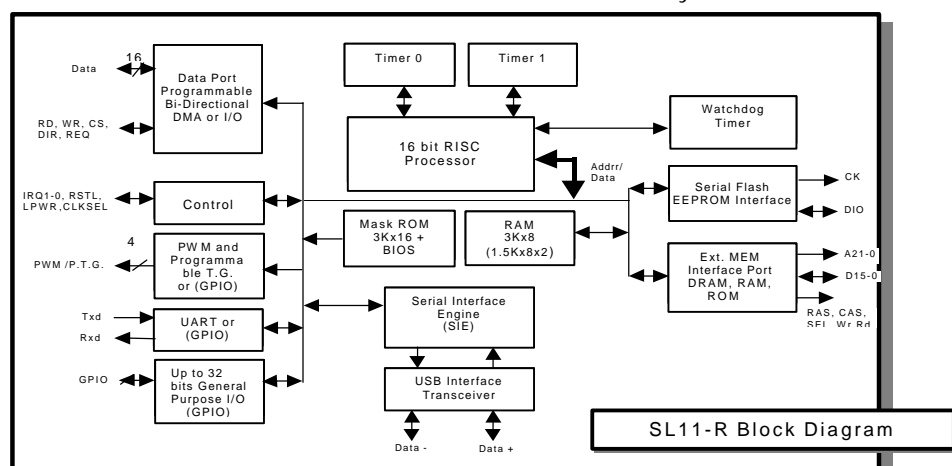
SL11-R-USB RISC Processor

Features:

- 48 MHz 16 bit RISC Processor

- Up to 16 bit Programmable Bi-directional Data I/O or DMA port

- Up to 32 bit General Purpose I/O (GPIO) channels.

- 3Kx16 internal Mask ROM with built-in BIOS in support of comprehensive I/O macros, including USB functions, serial EEPROM program, DRAM, UART, PWM, Timing Generator functions, and more. Executable code can run from external ROM, SRAM or external memory.

- 3Kx8 internal general purpose double buffer SRAM. Memory buffer can be configured as "Ping-Pong" buffer i.e., "A" buffer is filled while "B"buffer data simultaneously is moved to USB host, and then it switches automatically.

- Serial EEPROM interface port with BIOS support to allow on board flash EEPROM programming

- Up to 16 bit Extended Memory Interface Port for External DRAM, SRAM and ROM.

- SL11- R requires 12 MHz external crystal or clock. Other clocks such as 48 MHz are generated by built-in DPLL (Digital PLL).

- Executable code or data can be loaded either from USB port or via UART port. The code/data is moved to RAM buffer for either debugging purposes (utilizing break point register), or to be programmed, into a Serial Flash EEPROM as a new value added function.

- USB Port (12Mbits/sec) including built-in USB transceiver. All USB standard protocol modes are supported; Isochronous mode (up to 1024 packet size), Bulk, Interrupt and Control modes.

- Four end points. Each endpoint utilizes a bi-directional DMA port to move data to/from the USB port to/from internal Memory buffer. Independently, data can be sent/received by external device.

- Two built-in general purpose timers, a watch dog timer, four channels programmable PWM (Pulse Width Modulation) or Programmable Timing generator outputs.

- Suspend, Resume and Low Power modes.

- UART interface supports from 7,200 Baud to 115.2K Baud.

- Proprietry in-line compression (SL11R code) and System SW decompression is available for variety of applications.

- Package: 100 LPQFP, 0.5 micron.

- VDD : 3.3VDC.

Working USB product in only 5 Weeks!

Developers Kit

For all of its products, ScanLogic offers Development Kits (DVKs), training, and integration assistance from an experienced staff of engineers . **By using the DVKs, ScanLogic customers can have a working USB product within 5 weeks.** The following items are included in the Development Kits:

- Windows 98/2000 and WDM generic device mini-port driver object code

- Firmware source code examples

- Demo source code examples

- Application notes

- Reference design board

- "C" compiler, optional debugger and assembler

ScanLogic Corporation

ScanLogic Corporation was established in 1995 as a semiconductor company to develop, manufacture and license innovative, cost-effective chip based interface solutions for manufacturers of high performance peripherals including, Scanners, Digital Video and Still Cameras, MFU devices, Printers, Fax's, CTI devices, Cable Modems, External Storage Devices, and Embedded Systems. ScanLogic products combine Universal Serial Bus (USB) controllers, video compressors, signal processors, CCD / CMOS imager interfaces, memory controllers and software drivers to provide cost-effective, highly integrated single chip solutions for peripheral manufacturers.

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