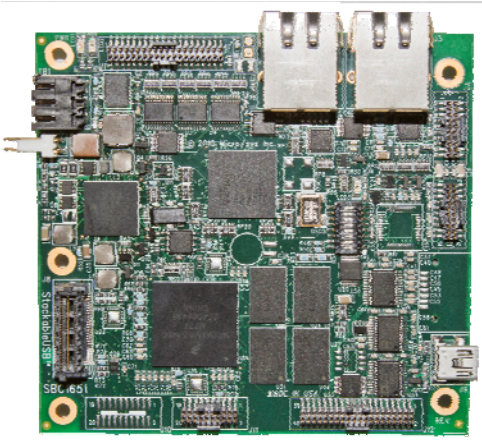
i.MX515 ARM Cortex-A8 StackableUSB™ Computer SBC1651



Features

- ✓ ARM Cortex-A8 processor, 800MHz
- ✓ 512MB SDRAM, 2GB Flash
- ✓ Four (4) USB ports
- ✓ Dual 10/100BASE-T Ethernet
- ✓ Controller Area Network (CAN) port
- ✓ Seven (7) serial ports
- ✓ Two (2) SD/MMC card slots
- ✓ 24 bits of digital I/O
- ✓ -40° to +85°C operation

StackableUSB

RoHS COMPLIANT

The SBC1651 is ideal for high-performance, low-power embedded applications. Freescale's i.MX515 ARM Cortex-A8 CPU operates at 800MHz delivering the performance needed to run multimedia-rich applications in embedded environments. Offering several embedded I/O features, the SBC1651 also consumes minimal power, satisfying the demanding environmental conditions in which OEMs must operate.

A high degree of integration allows a variety of I/O functions to be included on the SBC1651. On-board peripherals include dual Ethernet, USB On-The-Go, a real-time clock, watchdog timer, audio support, TV out, 24-bit LVDS flat panel display output, 4-wire touchscreen interface, two PWM outputs, a SATA HDD port, two SD/MMC card slots, 1-Wire interface, seven serial ports, and 24 lines of discrete I/O. For additional expansion, the StackableUSB interface allows for rugged, reliable board-to-board communication via USB, I^2C, and SPI.

All these features make the SBC1651 ideal for handheld, mobile devices or remote applications requiring rich connectivity and low power.

Software Support

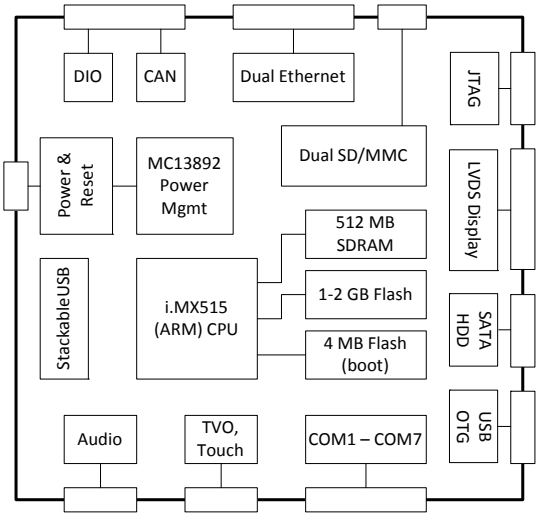
Linux
Windows CE
VxWorks
Android
C, compilers

Compatible Hardware

StackableUSB Client Devices
PC Hosts
LVDS FP-Kits
PSxxx, Power Supplies
Secure Digital Devices
RS232/RS485 Devices
CAN Devices
Ethernet Networks

Mounting/Packaging

Standoffs, STDOFFUSB
ENC104



Technical Details:

At the heart of the SBC1651 is the Freescale i.MX515 multimedia applications processor, a System on Chip (SOC) offering high-performance processing optimized for the lowest power consumption. The core of i.MX515 is an 800MHz ARM Cortex-A8 CPU. The CPU is augmented by a floating-point coprocessor, ARM's NEON SIMD media accelerator, and OpenGL ES 2.0 and OpenVG 1.1 hardware accelerators for fast, power-efficient graphics operations.

The i.MX515 SOC integrates many peripherals, including an interrupt controller, watchdog timer, SDRAM and flash memory controllers, three High-Speed USB ports, one Full-Speed On-The-Go USB port, a 10/100 Ethernet MAC, three 16C550 UARTs, 1-Wire interface, 24-bit flat panel display output, 4-wire touchscreen interface, an audio port, and PWM and TV outputs.

In addition to the peripherals built into the i.MX515, the SBC1651 packs on a second 10/100 Ethernet port, four more 16C550 UARTs, a Controller Area Network (CAN) controller, and 24 bits of 82C55A-compatible programmable parallel I/O.

The SBC1651 offers three boot options: A dedicated 4MB SPI NOR flash memory, a partition of the NAND flash, and a bootable SD/MMC card slot.

The SBC1651 memory subsystem provides 512MB of DDR2 SDRAM for application data. The 4MB SPI NOR flash memory holds the bootloader and operating system. Up to 2GB NAND flash is also available for operating system and non-volatile user storage.

If a larger program or data storage space is required, or if portability is needed, there are two options for expansion. Plug in an SD card to the second SD/MMC card slot, or use the SATA HDD connector to attach an external hard drive.

Seven (7) 16C550-compatible RS232 serial ports allow communication with low-speed devices. COM7 is software-configurable for half-duplex RS485 communication.

The SBC1651 can be powered from an external 5 VDC source or a battery. If external power is supplied while a battery is

plugged in, the battery will be recharged. Advanced power management is enabled by the new Freescale MC13892.

The SBC1651 becomes a powerful front-end processor for control applications with the standard StackableUSB expansion. This popular I/O channel accommodates multiple I/O boards on the top side and/or the bottom side of the board without use of a hub.

For true 32-bit application development, the SBC1651 supports 32-bit operating systems such as Linux, Windows CE, VxWorks, and Android. All have full tool suites available, including compilers and debuggers.

For pre-configured sets of options, Micro/sys can provide OEMs with a single part number for ordering. In addition, custom versions of the SBC1651 are available. Please call Micro/sys Technical Sales for details.

Specifications:

Mechanical:
- ❑ PC/104 mounting holes
- ❑ 3.55" (plus I/O region) x 3.775" x .6"
- ❑ Installed Secure Digital (SD) cards extend past edge of board opposite the StackableUSB connector
- ❑ Ethernet connector on top side has height of .535"

Power Requirements:
- ❑ +5v ±5% at 500mA typical, 850mA max
- ❑ Battery input voltage up to 4.8V

Power Connector	
Pin	Signal
1	+5V
2	Battery Input
3	GND

Environmental:
- ❑ Operating range 0° to +70°C, with 800MHz processor
- ❑ ET-version operating range -40° to +85°C, with 600MHz processor
- ❑ -40° to +85°C storage
- ❑ 5%-95% relative humidity, non-condensing

Processor Core Section:
- ❑ Freescale i.MX515 multimedia applications processor
- ❑ 800MHz or 600MHz clock rate
- ❑ ARM Cortex-A8 CPU core
- ❑ Hardware graphics accelerators (video, OpenGL ES 2.0 and OpenVG 1.1)
- ❑ JTAG (IEEE 1149.1) debug interface

On-board Memory:
- ❑ 512MB DDR2 Synchronous DRAM
- ❑ 4MB SPI NOR flash
- ❑ 1-2GB NAND flash (option)

Memory Expansion:
- ❑ Two (2) SD/MMC card slots
- ❑ SATA HDD connector (option)

Watchdog Timer:
- ❑ Program must refresh watchdog timer periodically, or system will be reset
- ❑ Enabled through software

COM1-COM7 Serial Ports:
- ❑ Seven (7) asynchronous serial ports
- ❑ 16C550-compatible
- ❑ RTS and CTS modem controls (all except COM3)
- ❑ RS232 on all channels
- ❑ COM7 RS485 half-duplex

10/100BASE-T Ethernet Ports:
- ❑ Two (2) 10/100BASE-T Ethernet ports
- ❑ Standard RJ45 connectors

USB:
- ❑ One (1) Full-Speed On-The-Go USB 2.0 port providing device and limited Host functions, Mini-AB connector
- ❑ Three (3) High-Speed USB 2.0 Host ports, StackableUSB connector
- ❑ Transfers at High-Speed 480Mbit/sec, Full-Speed 12Mbit/sec, or 1.5Mbit/sec

Controller Area Network:

- ❑ CAN version 2.0B, 1Mbit/sec
- ❑ Standard and extended data and remote frames
- ❑ Two (2) receive buffers and three (3) transmit buffers with prioritized message storage

Real Time Clock:

- ❑ RTC with rechargeable on-board battery

Digital I/O:

- ❑ 82C55-compatible digital I/O:
  - 24 TTL bi-directional signals
  - Direction programmable in three (3) groups of eight bits
  - 470-ohm current-limiting resistors on all lines
- ❑ 4-wire touchscreen interface
- ❑ I^2C (on StackableUSB connector)
- ❑ SPI (on StackableUSB connector)
- ❑ 1-Wire interface
- ❑ Two (2) PWM outputs

Audio/Video I/O:

- ❑ Microphone input, stereo line in/line out, headphone out
- ❑ FPDLink 24-bit LVDS flat panel display transmitter
- ❑ TV-out

External Connections:

- ❑ 40-pin header for COM1-COM7, RS485
- ❑ 40-pin header for digital I/O and CAN
- ❑ Four (4) 20-pin headers for LVDS display out, Audio, TV-out/touchscreen, and JTAG
- ❑ Two (2) 8-pin modular RJ45 jacks for Ethernet
- ❑ Two (2) SD/MMC card slots
- ❑ SATA HDD connector
- ❑ Mini-B USB connector
- ❑ 2-pin locking header for reset
- ❑ 3-pin removable terminal strip for power input

Development Kit:

- ❑ Single Board Computer
- ❑ Complete cable set
- ❑ Documentation, sample software

Ordering Information:

OEM Single Board Computers:

SBC1651	i.MX515 ARM Cortex-A8 CPU, 800MHz, 512MB SDRAM, 4MB NOR Flash, dual Ethernet
SBC1651-ET	i.MX515 ARM Cortex-A8 CPU, 600MHz, 512MB SDRAM, 4MB NOR Flash, dual Ethernet, -40°C to +85°C operating temperature
CS1651	Complete Cable Set
1651OPT5	Upgrade to 1GB flash
1651OPT6	Upgrade to 2GB flash
1651OPT22	CAN Bus Interface
1651OPT24	SATA Interface
1651OPT45	Audio Interface

Related Products:

BA2020	20-pin high density to 20-pin screw terminal
BA4040	40-pin high density to 40-pin screw terminal
CA4133	RJ45 Ethernet Cable
CA4136	Mini B to Type A USB Cable

Cables nominally 15", other lengths available
StackableUSB trademark Micro/sys, Inc.
VxWorks trademark Wind River
Android trademark Google, Inc.

Development Board Kits*

DK1651-Linux	SBC1651 Linux-installed development kit
DK1651-WinCE	SBC1651 WinCE-ready development kit
DK1651-ET-Linux	SBC1651-ET Linux-installed development kit
DK1651-ET-WinCE	SBC1651-ET WinCE-ready development kit

**See Development Kit Specifications*