ARM Cortex-A8 StackableUSB™ Pico-ITX Computer SBC5651

Features

- ✓ ARM Cortex-A8 processor, 800MHz
- ✓ 512MB SDRAM, 4GB Flash, 4MB SPI NOR Flash
- ✓ Power Options:
  - Power-through-USB
  - Single cell Li-Ion battery
  - StackableUSB
  - Terminal block
- ✓ LCD touchscreen support
- ✓ Four USB ports, three serial ports
- ✓ One SD/MMC card slot
- ✓ 10/100 Ethernet
- ✓ Pico-ITX form factor

The SBC5651 is for use in small, low-power handheld and portable devices typical to medical, gaming, ticketing, and test and measurement applications. With the Freescale i.MX515 ARM Cortex-A8 multimedia processor at its core, the SBC5651 can consume as little as 1W with user-programmable speeds up to 800MHz. The SBC5651 can be powered through the USB OTG connector, a standard terminal block, StackableUSB, or single cell Lithium Ion battery.

The SBC5651 on-board I/O feature set includes LCD touchscreen support (LVDS and TFT), LED back light control, keypad interface, SD card slot, 4G NAND flash, audio, Ethernet, USB On-The-Go, a real-time clock, watchdog timer, two PWM outputs, one SD/MMC card slot, 1-Wire interface, and three serial ports. 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 SBC5651 ideal for handheld, mobile devices or remote applications requiring rich connectivity and low power.

Software Support

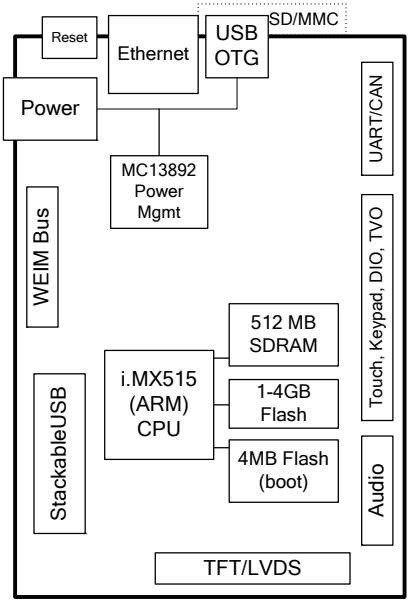
Linux
Windows CE
VxWorks
Android
C, compilers

Compatible Hardware

StackableUSB Client Devices
PC Hosts
TFT FP-Kits
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 SBC5651 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 (3) High-Speed USB ports, one (1) Full-Speed On-The-Go USB port, one (1) 10/100 Ethernet MAC, three (3) 16C550 UARTs, 1-Wire interface, resistive 24-bit flat panel display output, 4-wire resistive touchscreen interface, an 8-row x 6-column keypad controller, an audio port, and PWM and TV outputs.

In addition to the peripherals built into the i.MX515, the SBC5651 adds a Controller Area Network (CAN) controller and 16 bits of 82C55A-compatible programmable parallel I/O.

The SBC5651 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 SBC5651 memory subsystem provides up to 512MB of DDR2 SDRAM for application data. The 4MB SPI NOR flash memory holds the bootloader and operating system. 1-4GB NAND flash is available for operating system and non-volatile user storage.

Three (3) 16C550-compatible RS232/RS485 serial ports allow communication with low-speed devices.

The SBC5651 can be powered from an external 5 VDC source, a single cell Li-Ion battery, through an on-board mini-AB USB

power connector, or through StackableUSB. 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. Through user-programmable clock rates, the SBC5651 can attain sub 1W power requirements.

The SBC5651 becomes a powerful front-end processor for control applications with the standard StackableUSB expansion. This popular I/O channel accommodates multiple stacked I/O boards without use of a hub.

For true 32-bit application development, the SBC5651 supports 32-bit operating systems such as Linux, Windows CE, VxWorks, and Android. All have full tool suites available, including compilers and debuggers.

Specifications:

Mechanical:
- ❑ Pico-ITX mounting holes
- ❑ 3.9" (plus I/O region) x 2.8" x .6"
- ❑ Installed Secure Digital (SD) card extends past edge of board
- ❑ Ethernet connector on top side has height of .535"

Power Requirements:

Option 1:
- ❑ +5v ±5% at 250mA typical, 350mA max at Pin1

Option 2:
- ❑ +4.8v single cell Li-Ion battery at Pin2

Option 3:
- ❑ Mini-AB USB OTG port

Option 4:
- ❑ +5v through StackableUSB connector

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)

On-board Memory:
- ❑ 256-512MB DDR2 Synchronous DRAM
- ❑ 4MB SPI NOR flash
- ❑ 1-4GB NAND flash (option)

Memory Expansion:
- ❑ One (1) SD/MMC card slot

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

COM1-COM3 Serial Ports:
- ❑ Three (3) asynchronous serial ports
- ❑ 16C550-compatible
- ❑ RTS and CTS modem controls (on COM1)
- ❑ RS232 on all channels
- ❑ Optional RS485/RS232 configurations

Ethernet Port:
- ❑ 10/100BASE-T Ethernet port
- ❑ Standard RJ45 connector

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:
- ❑ 4-wire touchscreen interface
- ❑ I^2C (on StackableUSB connector)
- ❑ SPI (on StackableUSB connector)
- ❑ 1-Wire interface
- ❑ Two (2) PWM outputs
- ❑ 8-row x 6-column keypad

Audio/Video I/O:
- ❑ Microphone input, stereo line in/line out, headphone out
- ❑ 24-bit TFT flat panel display output
- ❑ 24-bit LVDS flat panel display output option
- ❑ TV-out

External Connections:
- ❑ 50-pin header for TFT/LVDS LCD display out
- ❑ 50-pin header for touch, DIO, keypad, PWM, one-wire, and TVO
- ❑ 40-pin header for WEIM Bus
- ❑ 20-pin header for audio
- ❑ 20-pin header for CAN and Uart
- ❑ One (1) SD/MMC card slot
- ❑ One (1) USB Mini-AB USB connector
- ❑ 2-pin locking header for reset
- ❑ 2.1mm barrel power input
- ❑ One (1) RJ45 jack for Ethernet

Development Kit:
- ❑ Single Board Computer
- ❑ Industrial Enclosure
- ❑ Complete cable set and power supply
- ❑ Documentation, sample software

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

Ordering Information:

OEM Single Board Computers:

SBC5651	i.MX515 ARM Cortex-A8 CPU, 800MHz, 256MB SDRAM, 4MB NOR Flash, Ethernet, Pico-ITX form factor
SBC5651-ET	i.MX515 ARM Cortex-A8 CPU, 600MHz, 256MB SDRAM, 4MB NOR Flash, Ethernet, Pico-ITX form factor, -40°C to +85°C
CS5651	Complete Cable Set
5651OPT1(ET)	Upgrade to 512MB SDRAM
5651OPT5(ET)	Upgrade to 1GB flash
5651OPT6(ET)	Upgrade to 2GB flash
5651OPT7(ET)	Upgrade to 4GB flash
5651OPT8-x (ET)	Configurable RS485
5651OPT22(ET)	CAN Bus Interface
5651OPT28(ET)	LVDS Panel Support
5651OPT45 (-ET)	Audio Interface

Related Products:

BA4052	50-pin high density to 50-pin screw terminal
BA4040	40-pin high density to 40-pin screw terminal
BA2020	20-pin high density to 20-pin screw terminal
CA4133	RJ45 Ethernet Cable
CA4136	Mini B to Type A USB Cable

Development Board Kits*

DK5651-Linux	SBC5651 Linux-installed development kit
DK5651-WinCE	SBC5651 WinCE-ready development kit
DK5651-ET-Linux	SBC5651-ET Linux-installed development kit (emulating the ext temp clock speed for eval)
DK5651-ET-WinCE	SBC5651-ET WinCE-ready development kit (emulating the ext temp clock speed for eval)

**See Development Kit Specifications*