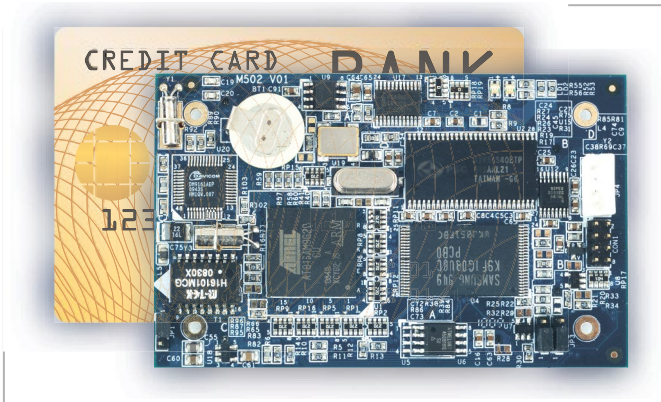
M-9G45A

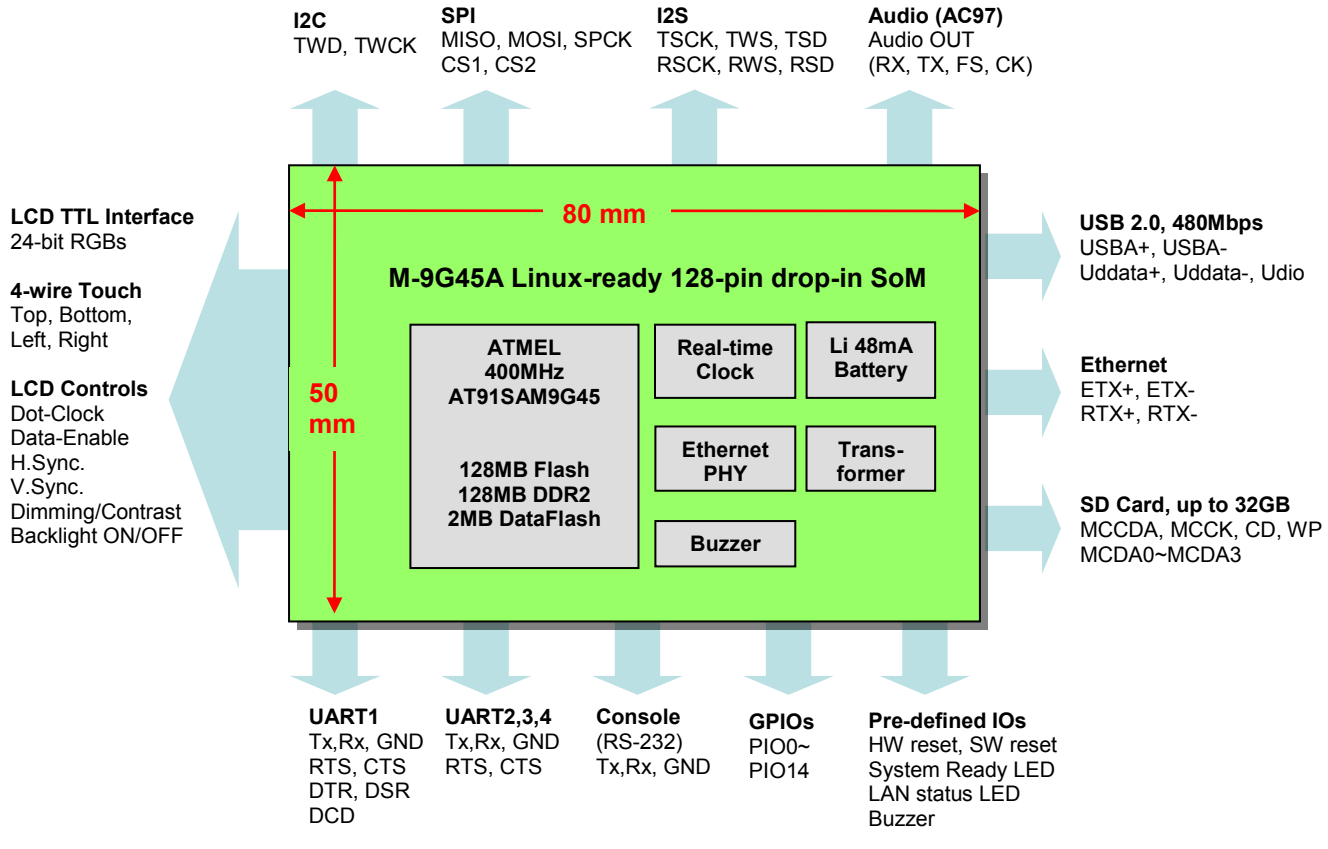
Linux-ready, 400MHz ARM9 SoM (System-on-Module) with 24-bit TTL LCD interface, 1x Ethernet, 4x UART, 1x 480Mbps high-speed USB host, RTC and Battery



- ✓ ATMEL 400MHz AT91SAM9G45 CPU w/ MMU
- ✓ Linux kernel 2.6.38 with file system
- ✓ 128MB DDR2 DRAM, 128MB NAND Flash
- ✓ Free GNU C/C++ tool chain is included
- ✓ Compact size, 50 x 80mm only
- ✓ Ultra low power consumption, less than 2.5W

- ✓ 24-bit TTL LCD interface with dimming control, supports TFT panel up to 1280x860 pixels
- ✓ Supports 4-wire touchscreen
- ✓ 1x 10/100Mbps Ethernet interface, with PHY and transformer on board
- ✓ 4 x 921.6Kbps UARTs w/ hardware flow control
- ✓ 1x 480Mbps high-speed USB 2.0 host
- ✓ 1x Real-time clock with on-board backup battery, also supports external backup battery
- ✓ 1x SD (secure digital) interface
- ✓ 1x I2C interface
- ✓ 1x I2S interface, 1x transmitter and 1x receiver
- ✓ 1x SPI interface with two chip selects
- ✓ 15 x GPIOs, CMOS/3.3V compatible
- ✓ 1x audio out interface
- ✓ Supports AC97 interface (signals are shared with GPIOs)

M-9G45A Functional Block Diagram



Hardware Specifications

CPU/Memory
CPU: ATMEL 400MHz AT91SAM9G45 w/MMU
DDR2: 128MB
NAND Flash: 128MB
DataFlash®: 2MB, for system backup

Network Interface
Type: Ethernet, 10/100Mbps
Signals: ETX+, ETX-, ERX+, ERX-
PHY: DAVICOM DM9161, on-board
Protection: 1.5KV magnetic isolation

UART
UART1: TX, RX, RTS, CTS, DCD, DTR, DSR, GND
UART2: TX, RX, RTS, CTS, GND
UART3: TX, RX, RTS, CTS, GND
UART4: TX, RX, RTS, CTS, GND
Signal level: CMOS/3.3V compatible

Common UART Parameters
Baud rate: up to 921.6Kbps
Parity: None, Even, Odd, Mark, Space
Data bits: 5, 6, 7, 8
Stop bit: 1, 1.5, 2
Flow control: RTS/CTS, XON/XOFF, None

USB 2.0 High Speed Interface
Speed: supports 480Mbps high-speed mode
Host: one, USB 2.0 compliant
Host signals: USBA+, USBA-
Device (client): one, USB 2.0 compliant
Device (client) signals: Uddata+, Uddata-, Udio

I2C (Inter-IC Bus)
Signals: TWD, TWCK
Supported devices: EEPROM, Real Time Clock

I2S (Inter-IC Sound)
Transmitter signals: TSCK, TWS, TSD
Receiver signals: RSCK, RWS, RSD

SPI (Serial Peripheral Interface)
Data signals: MISO, MOSI, SPCK
Chip selects: CS1, CS2

SD (Secure Digital Card Interface)
Data signals: MCCDA, MCCK, MCDA0~MCDA3
Aux. signals: CD(Card Detection), WP(Write Protect)
Compatibility: SD memory card specification 1.0
Storage capacity: 32GB max.

Watchdog Timer
CPU built-in watchdog timer, used by Linux kernel
Additional watchdog timer is available for user applications

GPIO (General-Purpose IOs)
No. of pins: 15x, PIO0~PIO14
Signal level: CMOS/3.3V compatible

AC97 Interface
Signals: RX, TX, FS, CK
Note: signals are shared with GPIO PIO11~14

Pre-defined IO Pins
Reset Button: (CN1, pin#11), input
System Reset: (CN1, pin#13), input/output
Buzzer: (CN1, pin#22), output
System ready LED: (CN1, pin#1), output
LAN activity LED: (CN1, pin#3), output

Real Time Clock
Chip: ST M41T81
Backup Battery: Lithium, 48mAh, on-board
External Battery Input: on CN1 pin#5

Debug Ports
Type: RS-232 serial console
Signals: Tx, Rx, GND

LCD Interface (TTL)
Resolution: upto 1280x860 TFT
RGB Signals (24-bit): red x8, green x8, blue x8
Control Signals: Dot Clock, Data Enable, H.sync, V.sync, Dimming (contrast), Backlight

Touchscreen Interface
Type: support 4-wire touchscreen
Signals: Top, Bottom, Left, Right

Power Consumption
Input range: 3.0 to 3.6VDC (3.3V nominal)
Consumption: 2Watts typ.

General
Board Dimension: 50mm x 80mm
Pins: total 128 pins, 2.0mm pitch
CN1: 28 pins; CN2: 50 pins; CN3: 50 pins
Mounting Holes: x2, 2.0mm (M2) in diameter
Operating Temperature: 0 to 70°C (32 to 158°F)

Software Specifications

General
OS: Linux, Kernel 2.6.38
Boot Loader: U-Boot

File Systems
UBI, JFFS2, ETX2/ETX3, VFAT/FAT, NFS, NTFS

Pre-installed Utilities
bash, busybox, gtk+, x11, gpe, alsa, madplayer, psplash, sysvinit, wget, ipkg, procps (for webmin), psmics, lighttpd, vsftpd, iptable, ppp, openssh, wireless_tools, util-linux-mount/umount, usbutils, phyton, jamvm, php, mysql, perl, qt4-embedded, sqlite3, snmp, Artila utility and more

Daemons Started by Default
- ssh (secured shell) with sftp
- syslog/klogd (system and kernel log)
- telnet server (disable root with/etc/security)
- ftp server (vsftp)
- Web server (lighttpd)
- amgrd (Artila broadcast search daemon)

Tool Chain for Linux
GCC: C/C++ PC cross compiler
GLIBC: POSIX Library
GUI: GTK+, X window(X11), GPE and QT4-Embedded

IPKG Package Management
Supports ipkg to manage the package installation, upgrade and removal.

Webmin System Administration
Supports webmin for web-based system administration

Standard Device Drivers
LCD, Real Time Clock, SD/MMC, UART, Ethernet, GPIO, Buzzer, EEPROM (ATMEL AT24C16 and compatibles), Audio out

Pre-load USB Device Drivers (customizable)
- Flash thumb disk
- IEEE-802.11b/g WiFi adapter
- 10/100Mbps Fast Ethernet adapter (RT8150)
- RS-232 adapter (prolific PL-2303)
- WebCAM
- Keyboard/Mouse
- 3G modem
- ISDN modem (CDC/ACM compatible)
- Bluetooth

Platform Features

Web + PHP5
lighttpd Web server supporting SSL V1/V2
CGI, FastCGI
PHP 5
Python 2.6

Database
- MySQL 5 server/client
- SQLite 3

SNMP
Supports SNMP V1/V2/V3

IPKG
- Supports ipkg for package management
- Supports Webmin

JAVA
Supports Jamvm 1.5 and Classpath

USB Peripherals

WiFi
Supports USB WiFI dongles
- rt73usb,rt2500usb
- rtl8178, zd1211

3G Modem
Supports USB 3G dongles
- Hwawei E169
- Hwqwei E169u
- Alcatel x200

Bluetooth
Supports USB BT dongles
- BCM2033
- BPA100/105

WebCAM
Supports USB WebCAM
- Generic type (uvcvideo)

Pin Assignments

CN1

RDY LED	1	2	TS.top
ACT LED	3	4	TS.bottom
V.BAT	5	6	TS.right
I2C.TWD	7	8	TS.left
I2C.TWCK	9	10	PIO0
RST#1	11	12	PIO1
RST#0	13	14	PIO2
PIO6	15	16	PIO3
PIO7	17	18	PIO4
PIO8	19	20	PIO5
PIO9	21	22	BUZR
PIO10	23	24	GND
TX 232	25	26	RX 232
VCC3	27	28	GND

CN1

CN2

LAN.ETX0-	1	2	LAN.ETX0+
LAN.ERX0-	3	4	LAN.ERX0+
A.GND	5	6	A.GND
Udio	7	8	LCD.G0
Uddata+	9	10	LCD.G1
Uddata -	11	12	LCD.G2
USB A -	13	14	LCD.G3
USB A+	15	16	LCD.G4
GND	17	18	LCD.G5
LCD.R0	19	20	LCD.G6
LCD.R1	21	22	LCD.G7
LCD.R2	23	24	GND
LCD.R3	25	26	LCD.B0
LCD.R4	27	28	LCD.B1
LCD.R5	29	30	LCD.B2
LCD.R6	31	32	LCD.B3
LCD.R7	33	34	LCD.B4
LCD.DE	35	36	LCD.B5
LCD.DIM	37	38	LCD.B6
LCD.HSync	39	40	LCD.B7
LCD.VSync	41	42	GND
LCD.BKLGT	43	44	LCD.DotCLK
GND	45	46	GND
GND	47	48	GND
VCC3	49	50	VCC3

CN2

CN3

VCC3	1	2	VCC3
GND	3	4	GND
GND	5	6	GND
COM2.TXD	7	8	COM1.CTS
COM2.RXD	9	10	COM1.RTS
COM2.RTS	11	12	COM1.RXD
COM2.CTS	13	14	COM1.TXD
COM3.TXD	15	16	COM1.DTR
COM3.RXD	17	18	COM1.DSR
COM3.RTS	19	20	COM1.DCD
COM3.CTS	21	22	GND
COM4.TXD	23	24	SD.MCDA0
COM4.RXD	25	26	SD.MCDA1
COM4.RTS	27	28	SD.MCDA2
COM4.CTS	29	30	SD.MCDA3
PIO11 AC97.RX	31	32	SD.MCCK
PIO12 AC97.TX	33	34	SD.MCCDA
PIO13 AC97.FS	35	36	SD.CD
PIO14 AC97.CK	37	38	SD.WP
I2S.TSCK	39	40	SPI.MISO
I2S.TWS	41	42	SPI.MOSI
I2S.TSD	43	44	SPI.SPCK
I2S.RSD	45	46	SPI.NPCS1
I2S.RSCK	47	48	SPI.NPCS2
I2S.RWS	49	50	Audio IO

CN3

Dimensions