

# **ARM8060**

# **User's Manual**

 **Beijing ART Technology Development Co., Ltd.**

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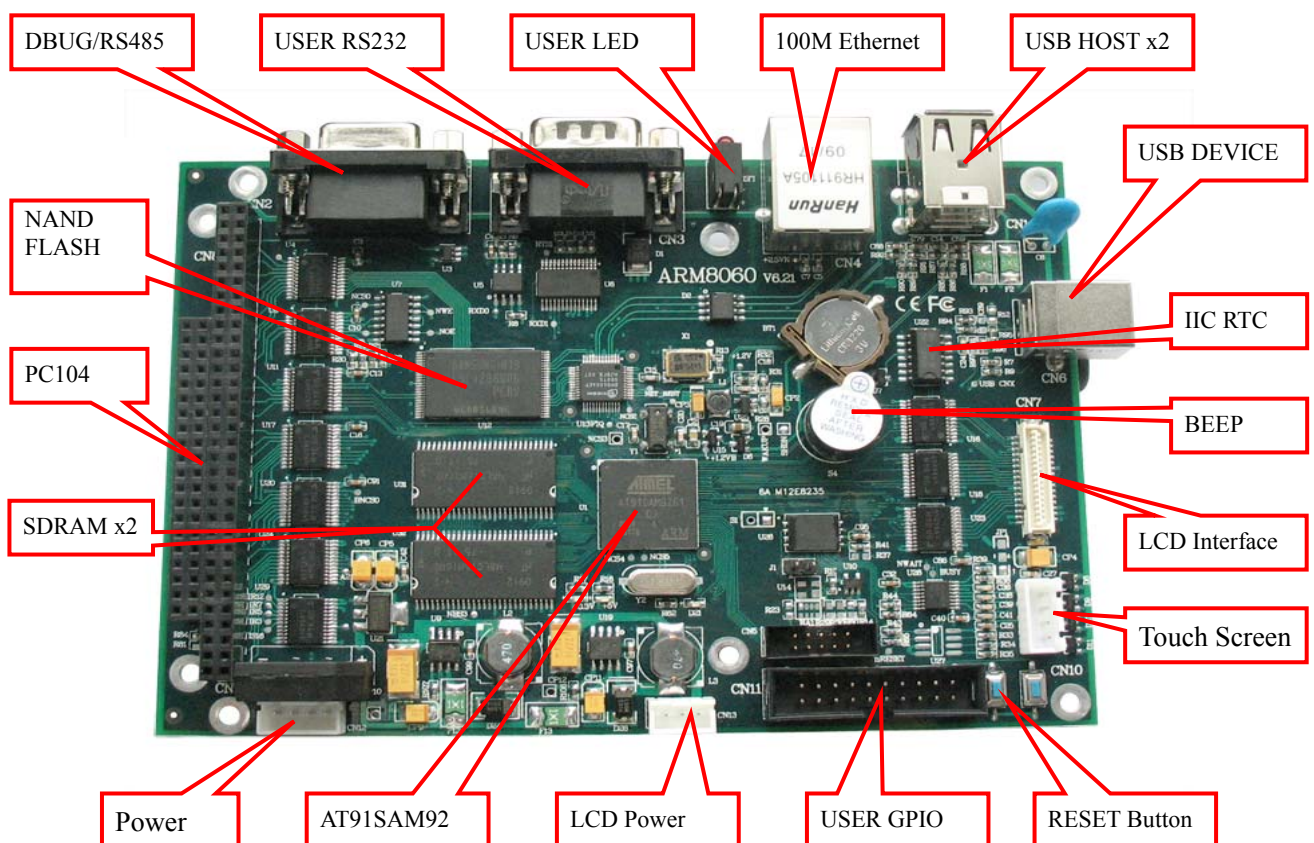
# Chapter 1 Overview

ARM8060 is a kind of industrial mainboard which conform to PC104 Bus criterion designed by Beijing ART Technology Development Co., Ltd. CPU used Atmel ARM926EJ-S AT91SAM9261, ARM8060 could process multi-Computing tasks by running Embedded Linux operation system or WinCE operation system.

ARM8060 uses embedded CPU with Ultra-low Power Consumption without fan control system, super-wide operating temperature  $-10^{\circ}\text{C} \sim +60^{\circ}\text{C}$ , excellent performance on low temperature operating. Solving the problem of failure caused by the fan thoroughly on high working temperature. ARM8060 mainbaord possesses excellent features of high stability, low cost, low power consumption, which has an extensive application in industrial control Man-computer interface, web terminal, POS machine.

ARM8060 provides abundant interfaces, integrating the two serial ports, two USB main interfaces, one USB device interface, one LCD and Touch Screen interface, which makes peripheral design more simple, more reliable, the software and hardware cost lower.

VGA interface, which resolution could reach equal to 640 x480 and could connect to the CRT display with the keyboard and mouse, which could make up of a industrial computer with low power consumption. Industrial grade serial port and 100M Base-T Ethernet Controller can easily connect to kinds of industrial control module. The PC104 extended socket is compatible with former control extended board, which can implement on the new system without any change.



# Hardware Features

- ✚ Size: 146×102×20 mm
- ✚ CPU: Atmel AT91SAM9261  
Operating Frequency Range: 550Hz~200MHz
- ✚ SDRAM: Industrial grade 64MB SDRAM
- ✚ Solid State Memory  
NorFlash: 4MB  
NandFlash: 256MB
- ✚ Display System  
Interface for LCD: Supports TFT Liquid Crystal Screen, the highest resolution is 640x480  
Interface for Touch Screen: Supports 4-line Resistance Touch Screen
- ✚ Audio System  
Interface for AC97: Phone x 1, Line In x 1, MIC x 1
- ✚ Communication Interface:  
RS232 Serial port: 1x 5-line serial port, baud rate-- 921.6Kbps  
Debugging Serial port: 1x 3-line serial port, baud rate—115200 Kbps  
Interface for RS485: 1xIndustrial Grade standard RS485
- ✚ USB HOST: 2x USB2.0, baud rate-- 12Mbps
- ✚ USB Device: 1x USB2.0, baud rate-- 12Mbps
- ✚ Ethernet: Ethernet Controller, Industrial Grade chip, 10M/100Mbps Self-adaptive, 1 x RJ-45  
Ethernet port
- ✚ Power Interface: 12-36V<sub>DC</sub>
- ✚ PC104 Bus: Extended PC104 Bus
- ✚ Other Device:  
1 x DC buzzer  
3 x LED  
Independent Watchdog Timer  
General- Purpose I/O
- ✚ Technics Characteristic  
6 layer PCB Design, high stability, anti-interference
- ✚ Operation Temperature  
Industrial Grade Operation Temperature: -10°C ~+60°C  
Storage temperature: -20 °C ~ +70 °C

# Software Resource

ARM8060 embedded mainboard provides all function components driver, the specification of the software resource are as follows:

## 1.1 WINCE

- **Kernel Version**

- WindowsCE.net 5.0

- **Driver Features**

- 10M/100M Ethernet Card DM9000A Driver
- NAND FLASH Driver(Identified as a disk on WinCE5.0 operating system)
- RTC Driver
- RS232/RS485 Driver
- USB HOST Driver supports USB mouse, keyboard, USB flash device etc.
- USB Device Driver
- WLAN Card Driver(choice)
- TFT Liquid Crystal Screen Driver
- Touch Screen Driver
- Backlight Control Driver
- PC104 Bus Driver
- Buzzer Driver
- LED Driver

- **Component Features**

- Support ActiveSync, Microsoft Excel Viewer, Microsoft Word View, Word Pad application
- Support. NET Compact Framework 2.0, COM, MFC, SQL Server CE 2.0, MSXML 3.0
- Support RAS/PPP, TAPI 2.0, TCP/IP, Ping, IE6, FTP Server, Telnet Server and other network protocols
- Support BMP, GIF, JPG, PNG and other image codecs
- Support Registry Save Function

- **Other Features**

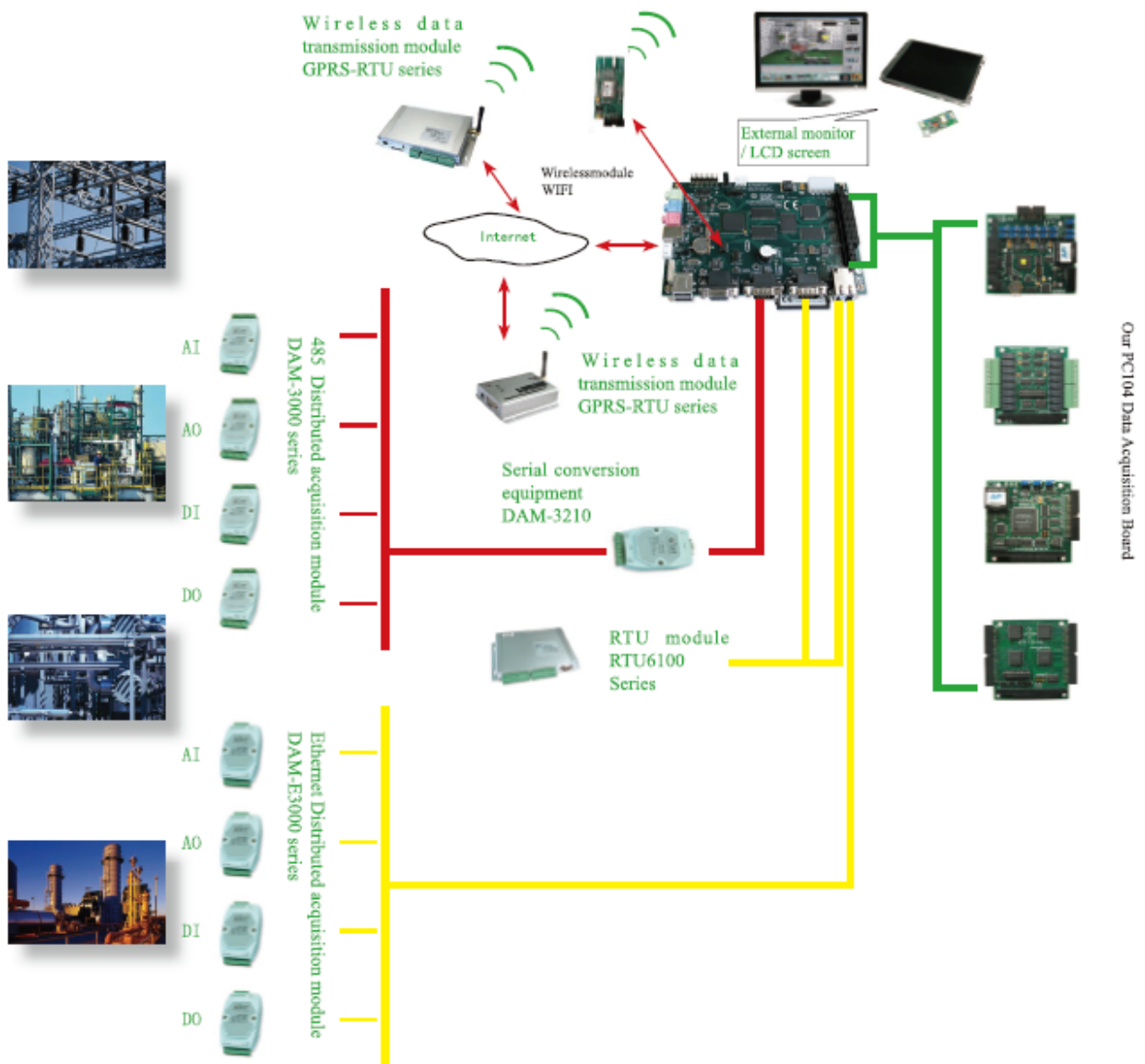
- When connect motherboard with LCD, the power consumption is more than 2W, the user can set 1~30min into the IDLE status to reduce power consumption, and the backlight automatic closing (click touch screen or mouse can wake-up)
- Support transition screen display
- Can set AT91SAM9261 working basic frequency

## 1.2 Linux

- Kernel Version
  - Linux2.6.27
- Support File Systems
  - Yaffs (file system can be read/wrote, recommend)
  - Cramfs (only read file system, recommend when does not update data online)
  - NFS (network file system)
  - Ext2
  - Ramdisk
- Driver Features
  - 10M/100M Ethernet Card DM9000A Driver
  - NAND FLASH Driver(Identified as a disk on WinCE5.0 operating system)
  - RTC Driver
  - RS232/RS485 Driver
  - USB HOST Driver supports USB mouse, keyboard, USB flash device etc.
  - WLAN Card Driver(choice)
  - TFT Liquid Crystal Screen Driver
  - Touch Screen Driver
  - Backlight Control Driver
  - PC104 Bus Driver
  - General- Purpose I/O Driver
  - Buzzer Driver
  - LED Driver
- Linux Applications and Service Programs
  - Busybox
  - Telnet, Ftp, TFTP
  - ifconfig, ping, route
- Embedded Graphics System
  - Qt/Embedded, MiniGUI

# 1.3 Typical Application

Embedded motherboard with the on-board serial ports, Ethernet port and other functions, together with good human-computer interface, can quickly build a field bus control system. With 10/100M Ethernet interface, the system can expediently access to the information management layer of the enterprise, realization of the local monitoring and remote monitoring in real-time; we can also use the Ethernet characteristics of high transmission rate, as a terminal management unit, connect the Ethernet acquisition module and RS485/232 acquisition module, multi-serial on-line equipment, loading PC104 data acquisition to achieve filed signal acquisition and real-time monitoring.



# Chapter 2 Product Features

## 2.1 DIP switch

S6: When the DIP switch No. 1 (3.3V) points to "ON", it will provide 3.3V for LCD, when the DIP switch No. 2 (5V) points to "ON", it will provide 5V for LCD.

Note: DIP switch 3.3V and 5V can not be set "ON" at the same time.

LCD screen connection as follows:

- TFT 10.4-inch: select 3.3V
- TFT 6.4 inch, 3.5-inch LCD screen: select 5V

## 2.2 Peripheral Interface

Power Sources: System power supply and liquid crystal screen inverter power supply output.

Power Interface CN12 is defined as follows

Pin	Pin Definition
1、 2	12V~36V
3、 4	GND

Serial port: CN2and CN3.

CN2: DBUG and RS485 multiplex serial port

Pin	Pin Definition	Function
2	DTXD	Debug data sending
3	DRXD	Debug data receiving
5	GND	GND
7	TXD0	RS485 sends data
8	RXD0	RS485 receives data
1、 4、 6、 9	NC	NC



CN3: RS232 serial port

Pin	Pin Definition	Function
2	RXD1	Receive data
3	TXD1	Send data
5	GND	GND
7	RTS1	Send require
8	CTS1	Send clear
1、4、6、9	NC	NC

Interface for USB: two USB main interface, one USB device interface.

ARM8060 industrial control mainboard has one USB Device and two USB Host interface, USB Device interface synchronizes with PC, and USB Host interface supports USB keyboard, mouse, U-disk and other devices.

USB Host (CN1) interface

Pin	Signal Name	Function
1	VBUS	5V power
2	HDMA	USB host A port data D-
3	HDP A	USB host A port data D+
4	GND	ground
5	VBUS	5V power
6	HDMB	USB host B port data D-
7	HDPB	USB host B port data D+
8	GND	Ground

USB Device (CN6) interface

Pin	Signal Name	Function
1	VBUS	signal detection
2	DDM	USB device port data D-
3	DDP	USB device port data D+
4	GND	ground

Interface for Liquid Crystal Screen: supports 31 chips TFT LCD module.

The following table shows ARM8060LCD Interface Pin Description (CN7)

Pin	Signal Name	Function
1、5、12、19、26	GND	ground
2	LCDDOTCLK	LCD dot matrix data clock
3	LCDHSYNC	LCD level sync signal
4	LCDVSYNC	LCD vertical sync signal
6	VB0	
7~11	LCDD19~ LCDD 23	LCD data bus
13~18	LCDD 10~ LCDD 15	LCD data bus
20	VR0	
21~25	LCDD 3~ LCDD 7	LCD data bus

27	LCDDEN	LCD data enable
28~29	3.3 V /5V	Select LCD power supply voltage through DIP switch
30	R/L	Select through DIP switch
31	U/D	Select through DIP switch

Interface for LCD Power Supply (CN13)

Pin	Signal Name	Function
1	12V	Output
2	GND	Ground
3	LCDCC	Backlight control signal

Interface for Touch Screen (CN10):



CN10

Pin	Signal Name
1	TSYM
2	TSXM
3	TSYP
4	TSXP

Ethernet (CN4): Interface for 100M Ethernet.

Pin	Signal Name	Function
1	TX+	Send data pack
2	TX-	Send data pack
3	RX+	Receive data pack
4、5	2.5V	
6	RX-	Receive data pack
7、8	GND	
9~12	LED	
13、14	Case	

Interface for PC104 Bus: Using the External Bus of ARM CPU and programmable logic device could extend PC104 Bus, which supports standard PC104 Bus expansion board, the signal definition is as follows:

Pin	Signal Name	Function
A 2~A9	SD7~SD0	Data signal
A11	AEN	Chip selection signal

A12~A30	SA19~SA0	Address signal
B2	RESET	Reset signal
B13	IOW	Write command
B14	IOR	Read command
B21	IRQ7	Interrupt signal
B23	IRQ5	
B25	IRQ3	
B28	BALE	Allow address latch
C3~C5	LA22~LA20	Latch address signal
C11~C18	SD8~SD15	Data signal
D5	IRQ12	Interrupt signal
D16	5V	
A31,A32, B1,B31,B32, C0,D0, D18, D19	GND	

Interface for General- Purpose I/O: 8 Input/Output (CN11).

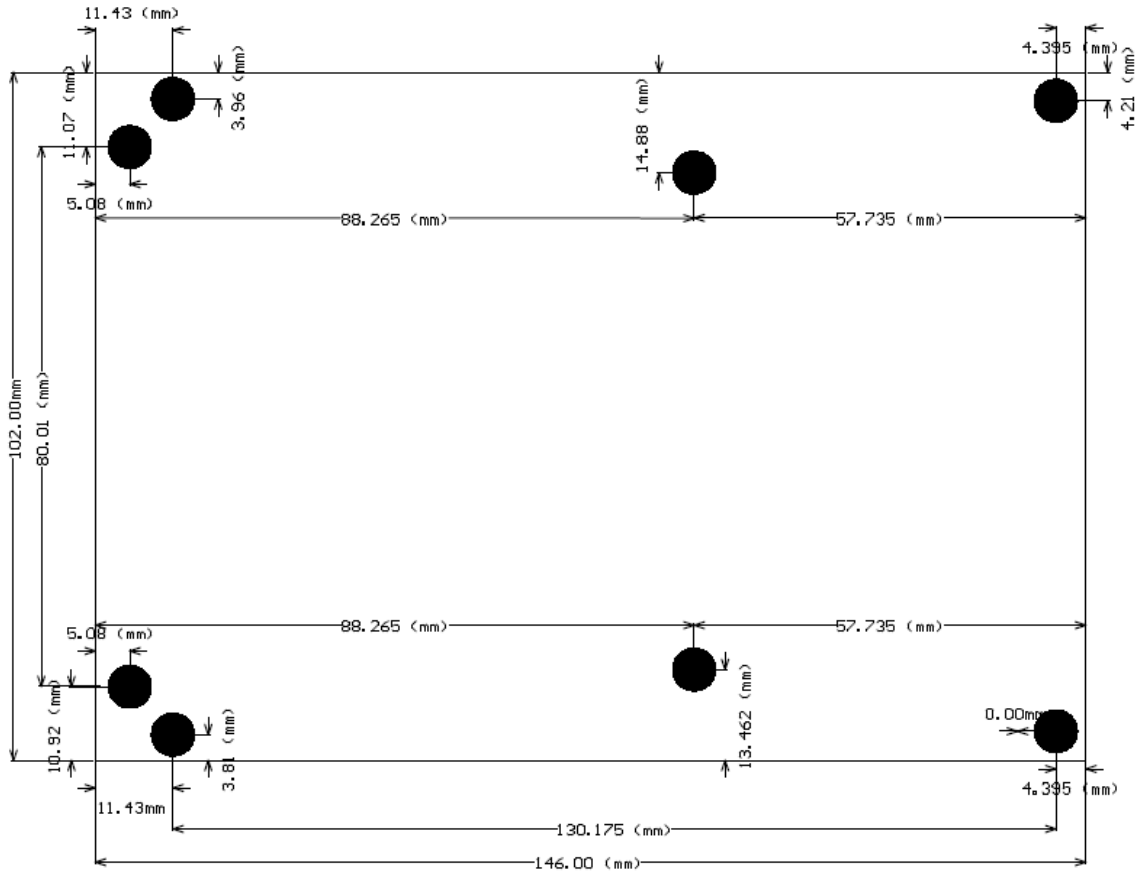
Pin	Signal Name
1~16	PIO0~PIO15
17	RESET
18	3.3V
19、 20	GND

# Chapter3 Electrical Specification

## Power Supply Static Electrical Parameters

- Operating Temperature: -10 ~ + 60°C
- Storage Temperature: -20 ~ +70°C
- Environmental humidity: 0% ~ 90%, non-condensing
- Electrical Specification: +24 V × 32mA <without LCD>  
+24 V × 320mA <with 6.4-inch LCD>
- System Specification: accord with CE, FCC performance

## Mechanical Character



# ***Chapter 4 Important Safety Instructions***

## **Electrical Safety Instructions**

- In order to forbid damage, before moving mainboard, please cut off the power of the mainboard.
- Whether add hardware devices to system or move out hardware devices from system, please must first connect hardware devices' signal line, and then connect the power cord.
- Make sure power supply has been adjusted to the standard voltage.

## **Operation Safety Instructions**

- Please read these safety instructions carefully.
- Please read and follow all instructions in the documentation before installing the mainboard and hardware devices.
- Before using ARM8060, please make sure all the plat cables and power cord have been connected rightly. Check for any damage, if it is damaged, please contact us or notify the local dealer or sales for a replacement or repair.
- In order to avoid electric short circuit, please take back all unwanted snails, clips and other components from the mainboard.
- Mainboard life time can be affected by dust, humidity and exquisite temperature change, so we should put it away from these places.
- Please contact technical support staff when you have any problem in technology.