

Cybird Specification

Rev 0.1

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1. Overview

The Cybird product is the Cyberbank's definition of a smart-phone running the Microsoft WinCE 3.0 Operation System. Cybird shall be a pocketable product very capable in maintaining the users personal information as well as providing mobile phone with wireless communication.

2. Basic Description

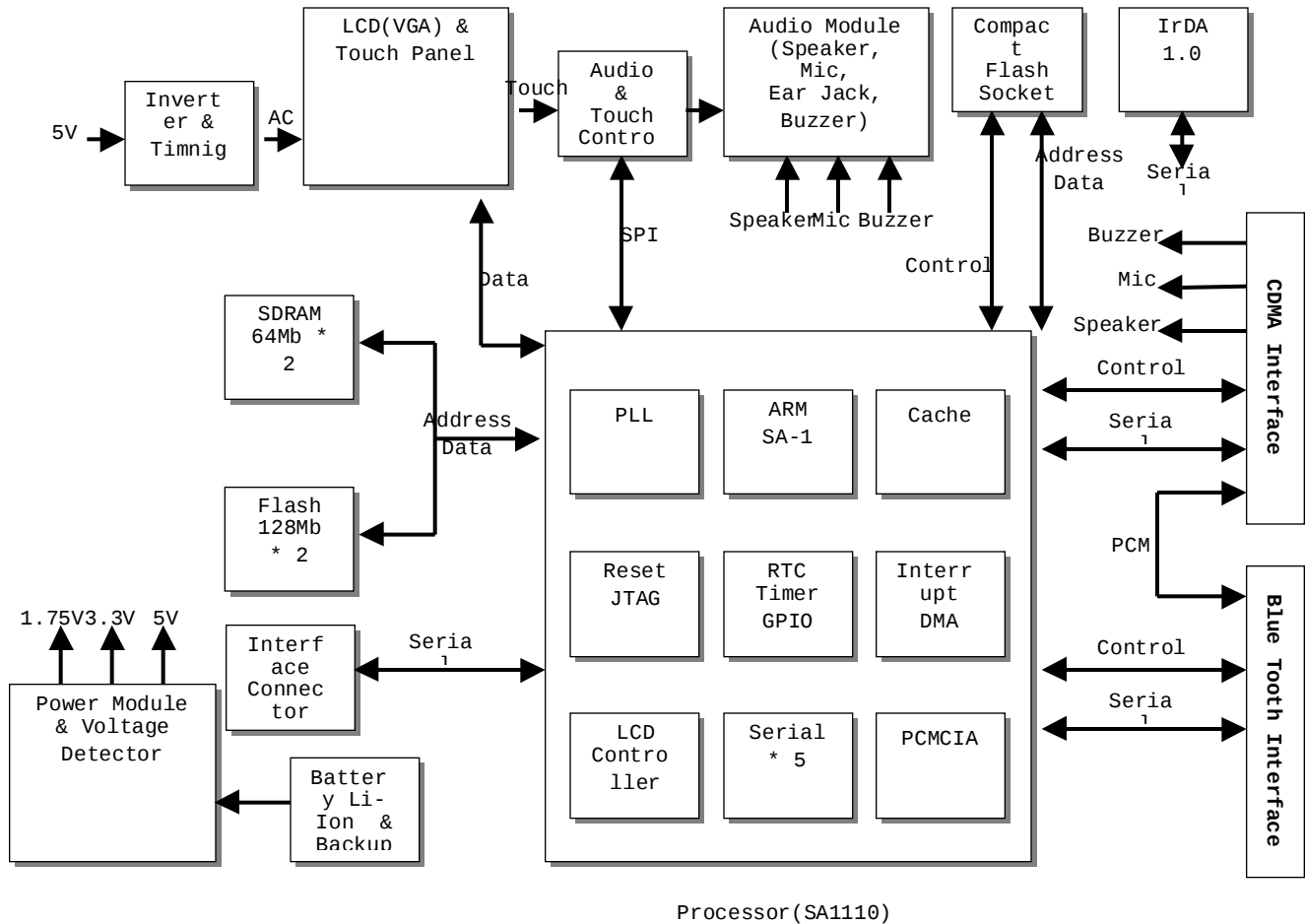
The Cybird product contains the following features:

- Mobile Phone (CDAM Module (800Mhz))
- Intel SA1110 based design
- Full VGA(640X480) TFT LCD
- CCFL Backlight
- Touch panel
- One Compact FLASH Type II slot
- Microphone for voice input
- Speaker for audible output
- Li-Ion Rechargeable Battery
- Charger & Cradle

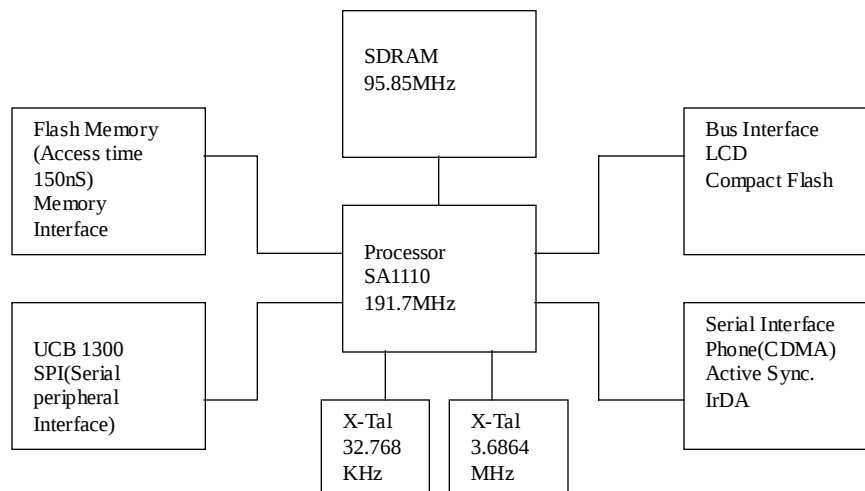
2.1 Block Diagram

Figure is a block diagram view of the Cybird PDA part showing the major functional components and their relationships.

1) System Block Diagram



2.2 Clock Block Diagram

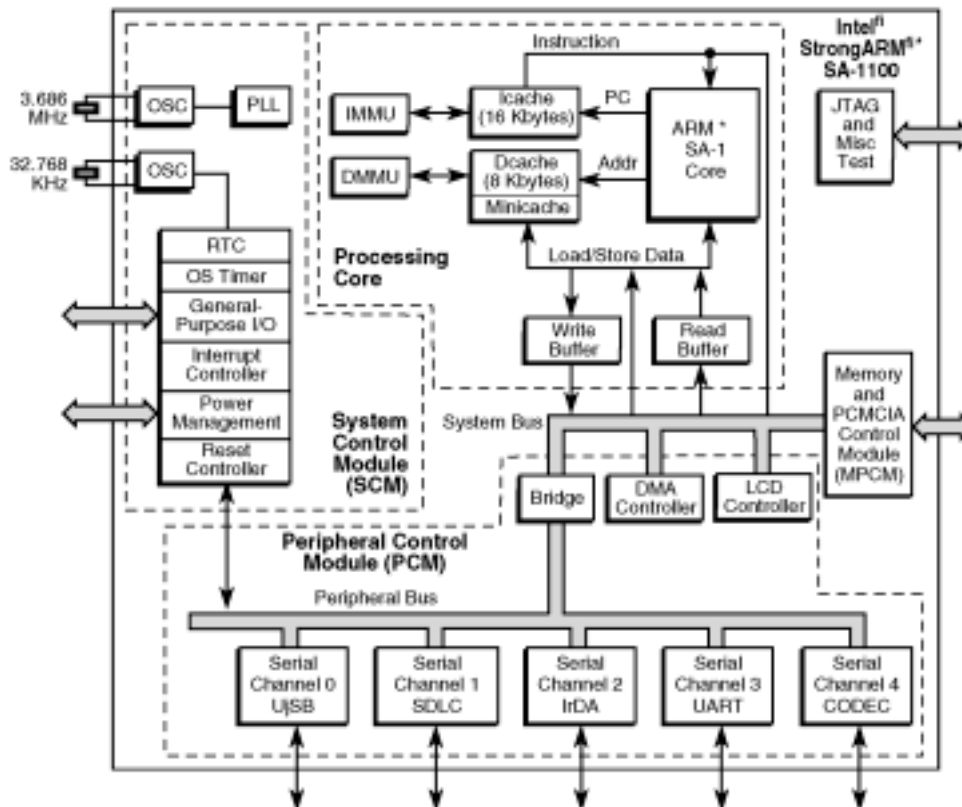


3. Design Specification

This chapter provides a more detailed description of the Cybird PDA part.

3.1 Processor

The Processor used on the Cybird PDA part is a Strong ARM-SA1110 processor operating at a clock speed of 191.7 MHz and driven by an external clock of 3.6864MHz and 32.768KHz. The processor is provided in a BGA package for small board size.



3.1.1 Intel Strong ARM SA1110 206 MHz(Core 1.5 V, I/O 3.3V)

- 1) High Performance : 235 Dhrystone 2.1 MIPS @ 206 MHz
- 2) Low power (normal mode) : <400 mW @ 1.75 V/206 MHz
- 3) Integrated clock generation
 - Internal phase-locked loop (PLL)
 - 3.686 MHz oscillator
 - 32.768 kHz oscillator
- 4) Power-management features
 - Normal (full-on) mode
 - Idle (power-down) mode
 - Sleep (power-down) mode
- 5) Big and little endian operating modes
- 6) 3.3 V I/O interface

- 7) 256-pin mini-BGA package (mBGA)
- 8) 32-way set-associative caches
 - 16 Kbyte instruction cache
 - 8 Kbyte write-back data cache
- 9) 32-entry memory-management units
 - Maps 4 Kbyte, 8 Kbyte, or 1 Mbyte
- 10) Write buffer : 8-entry, between 1 and 16 bytes each
- 11) Read buffer : 4-entry, 1, 4, or 8 words
- 12) Memory bus
 - Interfaces to ROM
 - Synchronous mask ROM (SMROM)
 - Flash
 - SRAM
 - SRAM-like variable latency I/O
 - DRAM,
 - synchronous DRAM (SDRAM)
 - Supports two PCMCIA sockets
- 13) LCD controller
 - 1-, 2-, or 4-bit gray-scale levels
 - 8-, 12-, or 16-bit color levels
- 14) Serial communications module supporting SDLC
- 15) 230-Kbps UART
- 16) Touch-screen, audio, telecom port
- 17) Infrared data (IrDA) serial port : 115 Kbps
- 18) Six-channel DMA controller
- 19) Integrated two-slot PCMCIA controller
- 20) Twenty-eight general-purpose I/O ports
- 21) Real-time clock with interrupt capability
- 22) On-chip oscillators for clock sources
- 23) Interrupt controller
- 24) Four general-purpose interruptible timers
- 25) Synchronous serial port (UCB1100, UCB1200, SPI, TI, Wire)

3.2 Memory System

The Cybird PDA part provides 32Mbytes of Flash ROM and 16Mbytes of SDRAM.

3.2.1 SDRAM

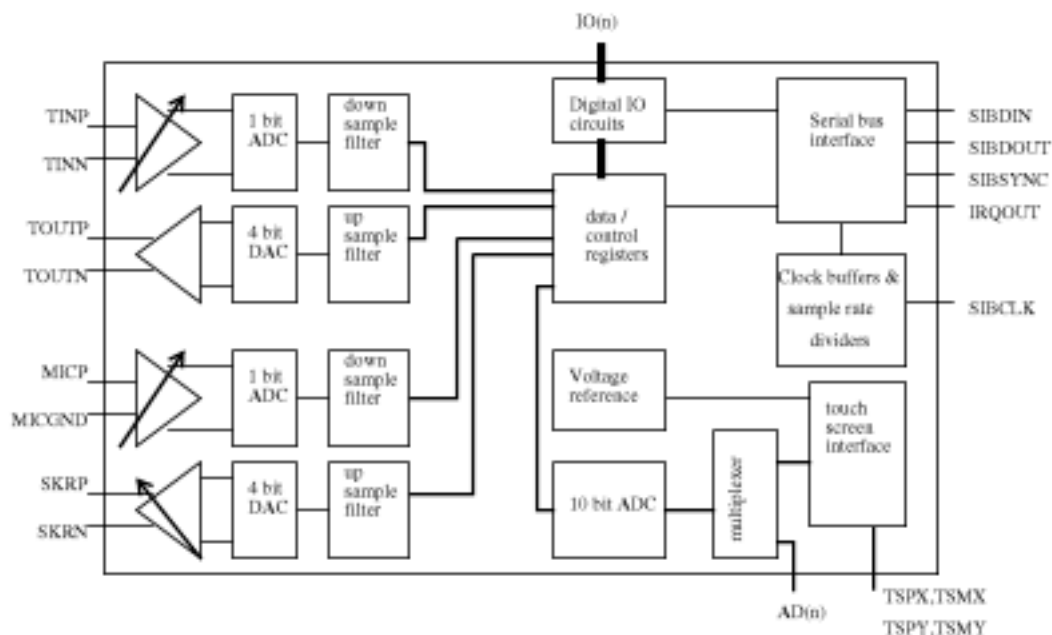
- 1) SDRAM Samsung 100MHZ Lowpower
- 2) Data width 32bit
- 3) Size : 64Mbitx2 (16Mbyte)
- 4) Interface Clock : 95.85MHz

3.2.2 Flash Memory

- 1) Intel 281F128J3A –150ns (TQFP Type)
- 2) Data width : 32bit
- 3) Flash Memory size : 128Mbit X 2 : 32MByte
- 4) High-Density Symmetrically-Blocked Architecture
128 128-Kbyte Erase Blocks
- 5) High Performance Interface Asynchronous Page-Mode Reads
150/25 ns Read Access Time (128 M)
- 6) 2.7 V–3.6 V V_{CC} Operation
- 7) 128-bit Protection Register
64-bit Unique Device Identifier
64-bit User Programmable OTP Cells
- 8) Enhanced Data Protection Features Absolute Protection with V_{PEN} = GND
Flexible Block Locking
Block Erase/Program Lockout during
- 9) Packaging
56-Lead TSOP Package
- 10) Automation Suspend Options
Block Erase Suspend to Read
Block Erase Suspend to Program
Program Suspend to Read
- 11) 0.25 μ Intel ® StrataFlash™ Memory Technology

3.3 Peripheral Controller

Advanced modem/audio analog front-end



- 1) 48 pin LQFP (SOT313) small body SMD package and low external component count results in minimal PCB space requirement
- 2) 12-bit sigma delta audio codec with programmable sample rate, input and output voltage levels, capable of connecting directly to speaker and microphone, including digitally controlled mute, loopback and clip detection functions
- 3) 12-bit sigma delta audio codec with programmable sample rate, input and output voltage levels, capable of connecting directly to speaker and microphone, including digitally controlled mute, loopback and clip detection functions
- 4) Complete 4 wire resistive touch screen interface circuit supporting position, pressure and plate resistance measurements
- 5) 10-bit successive approximation ADC with internal track and hold circuit and analog multiplexer for touch screen read-out and monitoring of four external high voltage (7.5V) analog voltages
- 6) High speed, 4 wire serial interface data bus (SIB) for communication to the system controller
- 7) 3.3V supply voltage and built in power saving modes make the UCB1300 optimal for portable and battery powered applications
- 8) Maximum operating current 25 mA
- 9) 10 general purpose IO pins

3.4 LCD Module

The color TFT LCD is a VGA display of 640X480 pixel.

- 1) 4" VGA TFT 256 Color (640x480)
- 2) Transmissive Type
- 3) Viewing Direction : 6 O'clock
- 4) 9 Bit Signal (R, G, B each 3Bit)
- 5) Dimension Outline : 94.04 (W) x 69.98 (H) x 1.83 (D) mm
- 6) Active Area : 80.64 (W) x 60.48 (H) mm
- 7) Viewing Area : 83.64 (W) x 63.48 (H) mm
- 8) Pixel Pitch : 0.126 (W) x 0.126 (H) mm

3.5 CCFL Back light : 1 Lamp (Dual Tube Lamp)

3.6 Inverter

- 1) Output Voltage : AC 900Vrms
- 2) Input Voltage : DC 5V
- 3) Power Consumption : 0.65 W
- 4) AC Frequency : 160 KHZ
- 5) Power Management
 - Full Operation
 - Doze Operation
 - Off

3.7 Input System

1) Analog Resistive Touch Panel : 10bit Resolution

4EA Wire contact

Keyboard (42 EA)

6 EA Icon

- Phone Icon
- WWW Icon
- E-Mail Icon
- Address Icon
- Schedule Icon
- SMS Icon

2) Application Key

Application buttons are connected directly to the SA1110 with the rows connected to the interrupt pins. Interrupt pin must be used to wake up the device.

Arrow Key: Up, Down, Right, Left

Action Key

Power Key : The power key is located on the right side of the unit. The power button when pressed for about 1 second when the unit is on will enable/disable the display backlight.

Phone Key

Record Key

3) Reset Key

The Cybird shall have a reset button. This button shall perform a CPU Software reset to the processor when pressed.

4) Hard Reset Function

The Cybird shall have a Hard Reset Function. This function will be activated by pressing the power on button at the same time as hitting the CPU Reset button. When this function is activated, the DRAM contents will be lost and the unit will be in the same state as when power is first applied.

3.8 External Port

1) Serial Port : Two Serial ports are provided on the Cybird PDA part. The RS 232 port that emulates the cradle is connected to the internal UART of the Strong ARM. The other serial is connected to the Phone part.

2) IrDA (Infrared Communication)

The Cybird shall have an IrDA interface built-in. The window for the IrDA shall be on the top side of the product. This shall the user to hold the unit and be able to point it at another device to transfer information.

The IrDA device is an IrDA 1.0-Compliant device from Vishay.
The Device can operate at up to 115.2 kbps.
Communication Distance : 1m
Angle -10 ~ +10 degree

- 3) Compact Flash Slot
 - Type II Support (5mm)
 - Supply Voltage : 3.3V
 - 1 Slot Support
 - Support to Memory and I/O Card
- 4) Audio Jack
 - Speaker
 - Microphone
- 5) Debugger Port
 - Serial (PDA)
 - Serial (Phone)
 - Power Jack
 - JTAG

3.9 Speaker & Microphone

The Cybird shall contain the functionality required to store and playback voice as well as voice communication for mobile phone. In order to accommodate a voice notes application and voice communication for mobile phone, the unit shall have a microphone and speaker.
The microphone audio is sampled by UCB 1300 and ST5093.

- 1) Receiver for voice communication for mobile phone
- 2) Speaker
 - The speaker alarm is driven off a spk pin of a UCB 1300.
 - 8 Ohm
 - 0.2Watts
- 3) Microphone

3.10 Battery

- 1) Main Battery
 - Lithium-Ion Battery (3.6V / 930mA x 2)
 - Support PCM (2.9V Shutdown)
 - Rechargeable Battery
- 2) Backup Battery
 - Lithium Battery (3.0V / 90mA)
 - Rechargeable Battery

3.11 Cradle

- 1) Cybird Main Battery Charging
- 2) Active Sync. (RS-232 Serial Interface)
- 3) DC Input Jack
- 4) Handset Battery Charging (Option)

3.12 Adapter

- 1) 12V / 1.3A Output
- 2) DC Output Cable
- 3) AC Input Cable
- 4) AC Free Voltage (AC 110 / 220V, 50 / 60 HZ)

3.13 Software

- 1) OS : Wince 3.0
- 2) Application program
 - Pocket Inbox
 - Pocket Word
 - Soft keyboard
 - Active Sync.
- 3) Web browser
 - Pocket Internet Explorer
- 4) Phone Application
- 5) PIMS
 - Calculator
 - Address book
 - Scheduler
 - Record & Play
- 6) Games