

ER-12LF

Product Brief

Schedule:

Demo kit	2007/12/25
Mass production	2008/2/22

Product Brief V1

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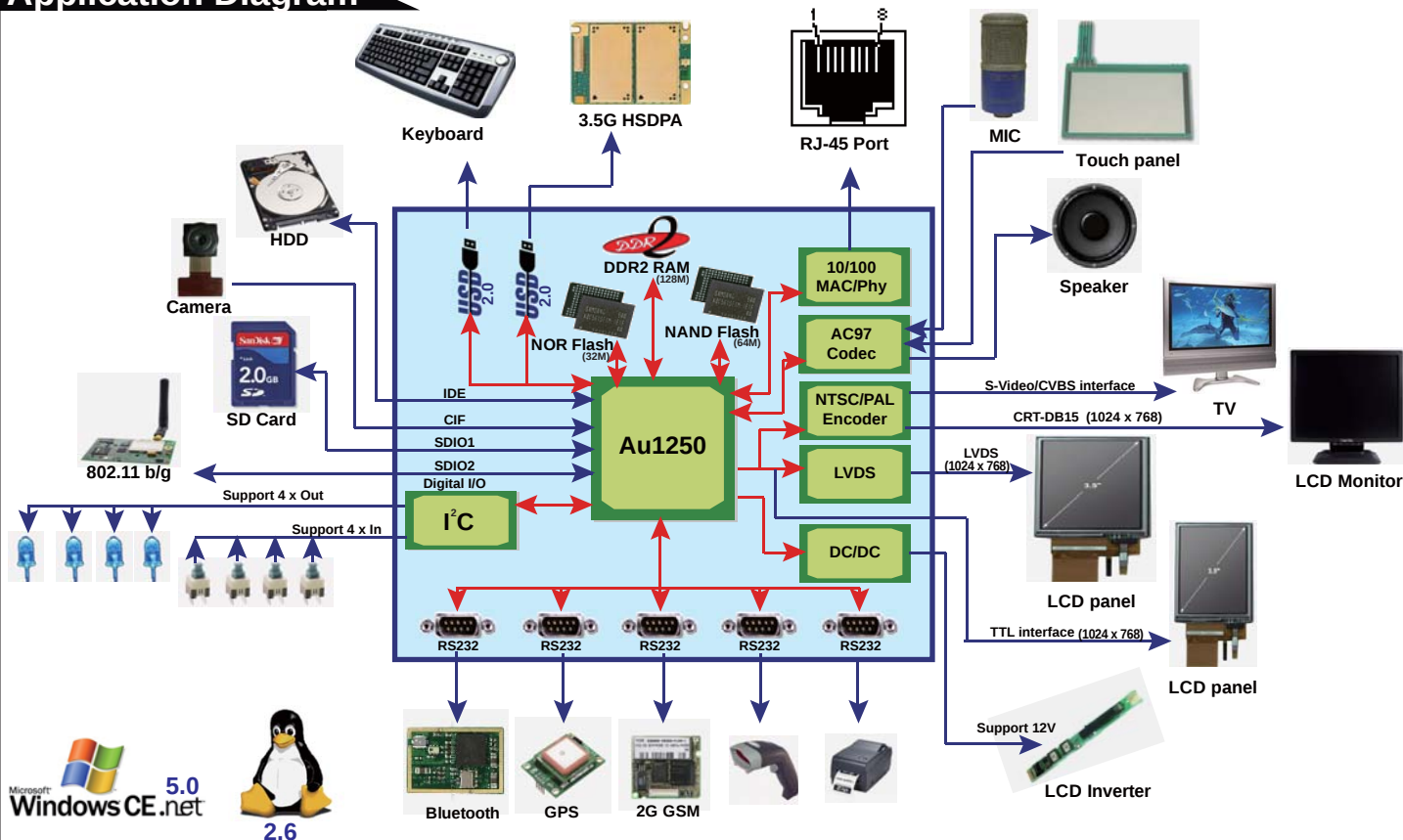
ER-12LF

Specification

System	
Operation System	Microsoft WIN CE.NET 5.0
CPU Type	RMI AU1250 500MHz/ 400MHz
GPU Type	Support Mpeg (1,2,4, H 263, DivX, WMV9) Resolution 800 x 600 (up to 1024 x 768) Support 18bit TTL TFT LCD
LAN Chip Type	SMSC9115 10/100M base T
TV Chip	Focus 453 support TV-out or VGA port
Flash ROM	32M byte NOR for O.S., 64MB NAND for storage
SDRAM	128M byte DDR2
Watchdog	Internal watchdog timer
Dimension	145mm (W) x 102mm (L)
I/O Ports	
LCD Interface	2 x 15 pin connector for 18bit TTL LCD 1 x 40 pin FPC connector for APEX 5.7" or 7" LCD 2 x 10 pin connector for LVDS
TV-Out	1 x 8 pin connector for TV-out or CRT
Audio	1 x 2 pin MIC-in, 1 x 2-pins internal speaker, 1 x phone jack for Line-out
LAN	1 x RJ45 connector
Serial port	6 x COMs, COM0 for debug, COM1~COM5 for RS232
Inverter	1 x 5 pin connector for 12V inverter
Touch Panel	1 x 4 pin FPC connector for 4-wire touch panel
IDE	1 x 44 pin IDE connector
SD/MMC	1 x SD/MMC slot, 1 x 10 pin FPC connector
USB	2 x 5 pin support USB2.0 OTG/ HOST connector
Digital I/O	2 x 5 pin for 4I/4O and I C bus
System Status	2 x 4 pin for Power, HDD LED, ON/Reset SW
CMOS Camera	1 x 20 pin FPC P=0.5 connector
Environment	
Power Requirement	DC in (12~36V) only (3 Pin headed)
Operation Temp.	0 C ~ 60 C (32 F ~ 140 F)
Storage Temp.	-40 C ~ 85 C (-40 F ~ 185 F)
Operation Humidity	20 ~ 90%
Storage Humidity	20 ~ 95%
Safety & EMC	
EMC	FCC
Safety	CE

ER-12LF

Application Diagram



ER-12LF

MIPS base Motherboard/ RMI CPU(AMD)/
Win CE5.0/Linux 2.6

Product Description

Features

The ER-12LF is a derivative of the Au1250 processor and is optimized for Portable Navigation Devices (PNDs) and dedicated media applications. The ER-12LF enjoys similar functions of the Au1250, except for reduced clock rate, video resolution, and AES encryption/decryption support. The ER-12LF processor operates at frequencies up to 500MHz and supports video decode up to Wide-CIF resolution (480x288). This targeted functionality enables the Au1250 to address the needs of cost-sensitive applications such as HMI interface or customer display, where video playback is important, but full D1 video resolution.

High Speed MIPS CPU Core

- 400 and 500Hz
- 32-bit architecture
- 16KB instruct + 16KB data caches
- High-speed multiply-accumulate (MAC) and divide unit
- 1/2 Watt Typical Power at 600MHz (Au1250, Full D1 video)

Video Codec ported by RMI = Low Engagement Cost

• Since RMI ports all video codec that are supported by the on chip Media Acceleration Engine, there is no need to engage expensive 3rd party codec software development vendors. No NRE, so OEMs/ODM immediately realize a lower solution cost.

Storage Memory

- Support for both NOR and NAND Flash devices, Boot from NOR Flash
- Including Large Block NOR Flash for O.S, Supports 32M or 64M byte.
- Including Large Block NAND Flash for storage used, supports 64M byte.

Video Codec ported by RMI = Low Engagement Cost

• Since RMI ports all video codec that are supported by the on chip Media Acceleration Engine, there is no need to engage expensive 3rd party codec software development vendors. No NRE, so OEMs/ODM immediately realize a lower solution cost.

LCD Controller

- Up to 1024x768 resolution screens
- 24-bits alpha-RGB color resolution support
- Alpha override and per-pixel alpha blending
- Four-color hardware cursor
- Configurable on-chip memory area for palette RAM, gamma correction, or 1KB frame buffer

TV Video Scan Converter (choose one in three)

- Support S-video out put
- Support CVBS out put
- Support DB15 CRT output

Camera Interface Module

- 8-10 bit parallel data bus
- Planar modes support CMOS/CCD sensors
- CCIR 656 data input
- A Raw Data Mode supports moving CIM input data unchanged to memory

Power

- Power input:
— 3 pin connector w/ 9~36V input
or
— Power supply 4 pin connector, 5V/1A and 12V/0.5A (power supply)
- Power Saving Modes:
— Idle (TBD)

Media Acceleration Engine (MAE)

- Support for MPEG1, 2, 4, and WMV9 scaled up to 1024x768
- MPEG2 main profile/main level (720x480, 10Mbps, 30fps)
- MPEG4 advanced simple profile/level 5 (720x480, 4Mbps, 30fps)
- WMV9 main profile/medium level (720x480, 2.5Mbps, 30fps)
- Support for external 10/100 Ethernet controller

LCD Controller

- Up to 1024x768 resolution screens
- 32-bits per pixel a RGB color resolution support
- Alpha override and per-pixel alpha blending
- Four-color hardware cursor
- Configurable on-chip memory area for palette RAM, gamma correction, or 1KB frame buffer

DDRII Memory

- High-bandwidth DDR2 SDRAM memory controller (supports up to DDR2-400 and DDR2-533)
- 16/32-bit data, 14-bit address
- Up to 256MB (Basic DDR2-533 128M byte)

AC97 codec and Touch panel

- Support standard AC97 codec.
- Support one phone jack to Line-in and line-out.
- External one connector for Line-in
- External one connector for Line-out (for speaker used, Support MAX 1.5W)
- Support one 4-wire touch panel

RTC

- One Li-on 3V recharge battery
- Internal RTC

LVDS

- Support digital TTL scaled to 18 bits LVDS.

Integrated Peripherals

- IDE interface with support for PIO mode and multiword simple DMA data transfers
- Support one 10/100 Ethernet
- Support two Secure Digital/SDIO/MMC, One is standard connector, One is external FPC connector.
- Support two USB 2.0 Host and Device with HS, FS, and LS support (for both) — Configurable Host, device, OTG (On-the-Go) support
- Support five UART; with 5V (pin 10)
- Digital I/O, four Digital in, four digital out and I²C bus.

Inverter

- Support 12V output.
- Support inverter enable and control brightness

Operating System Support

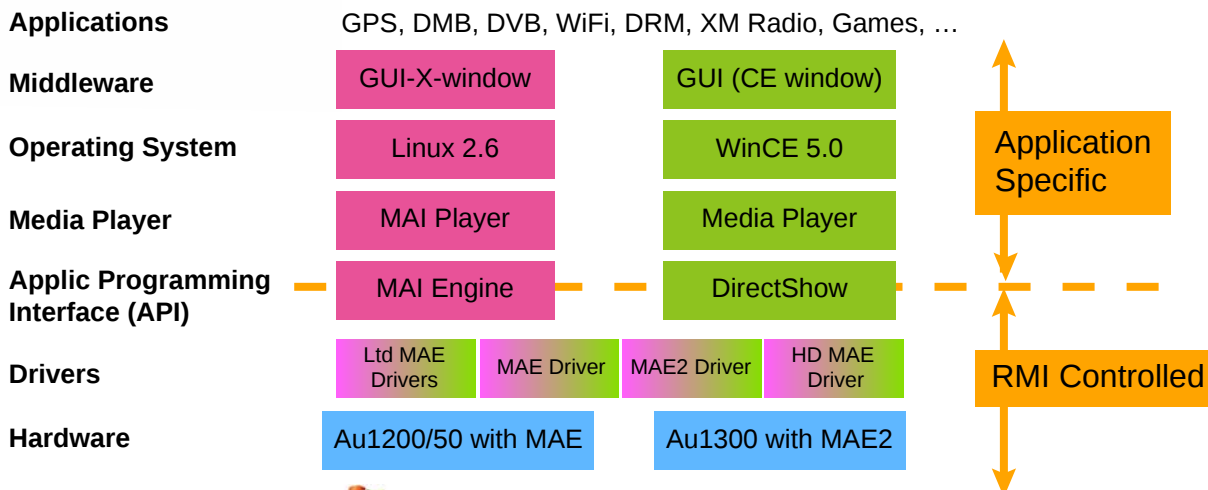
- Microsoft Windows® CE 5.0
- Linux 2.6xx

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Win CE5.0/Linux 2.6

Software Support

Software Compatibility Protects Application Investment



Software Support - Win CE5.0

Core Functionality

Yamon Bootloader	OK	MTP	OK
Booter (Yamon replacement)	OK	AES	OK
PCMCIA	Not ready	USB2.0 Host	Not ready
IDE Driver	Not ready	USB2.0 Device	Not ready
UART	OK	USB OTG	Not ready
PSC AC97 Audio	Not ready	2 SDIO	Not ready
PSC I2S Audio	Not ready	Power Management	Not ready
PSC SMBus	OK		
PSC SPI	OK		
GPIO	OK		
2 SD/MMC	Not ready		
LCD Driver	OK		
MAE Driver	Not ready		
10/100 Ethernet	Not ready		
Board Interrupt Controller	OK		
AC 97 Coded	Not ready		
LCD VGA CRT	Not ready		
Camera Interface Module	Not ready		

Audio Codecs

AAC (MPEG 2&4)	Not ready
PCM (WAV, AIFF)	Not ready
Dolby Digital AC-3	Not ready (3rd)
MP3	Not ready (3rd)
(MPEG 1, 2, &2.5)	Not ready
MPEG 1 & 2, Layers 1 &2	Not ready
OGG Vorbis	Not ready
WMA	Not ready (3rd)

Video Codecs

MPEG-1	Not ready
MPEG-2	Not ready
MPEG-4	Not ready
WMV9	Not ready
DivX V3.11, V4, V5	Not ready (3rd)

Demultiplex

MPEG-2 DEMUX (program)	Not ready
MPEG-2 DEMUX (transport)	Not ready
MPEG-4 DEMUX - ISO	Not ready
DIVX DEMUX - AVI	Not ready (3rd)
WMV DEMUX	Not ready (3rd)
(ASF included in CE PB)	

Win CE5.0 Driver will be ready at 31/01/2008

Software Support - Linux 2.6

Core Functionality

Yamon Bootloader	OK	MTP	OK
Booter (Yamon replacement)	OK	AES	OK
PCMCIA	OK	USB2.0 Host	OK
IDE Driver	OK	USB2.0 Device	OK
UART	OK	USB OTG	OK
PSC AC97 Audio	OK	SDIO	OK
PSC I2S Audio	OK	Power Management	OK
PSC SMBus	OK	X-window	No
PSC SPI	OK	(X-window is for customerized only)	
GPIO	OK		
2 SD/MMC	OK		
LCD Driver	OK		
MAE Driver	OK		
10/100 Ethernet	OK		
Board Interrupt Controller	OK		
AC 97 Coded	OK		
LCD VGA CRT	OK		
Camera Interface Module	OK(support capture)		

Audio Codecs

AAC (MPEG 2&4)	OK
PCM (WAV, AIFF)	OK
Dolby Digital AC-3	No
MP3	OK (3rd)
(MPEG 1, 2, &2.5)	OK
MPEG 1 & 2, Layers 1 &2	OK
OGG Vorbis	No
WMA	OK (3rd)

Video Codecs

MPEG-1	OK
MPEG-2	OK
MPEG-4	OK
WMV9	OK
DivX V3.11, V4, V5	OK (3rd)

Demultiplex

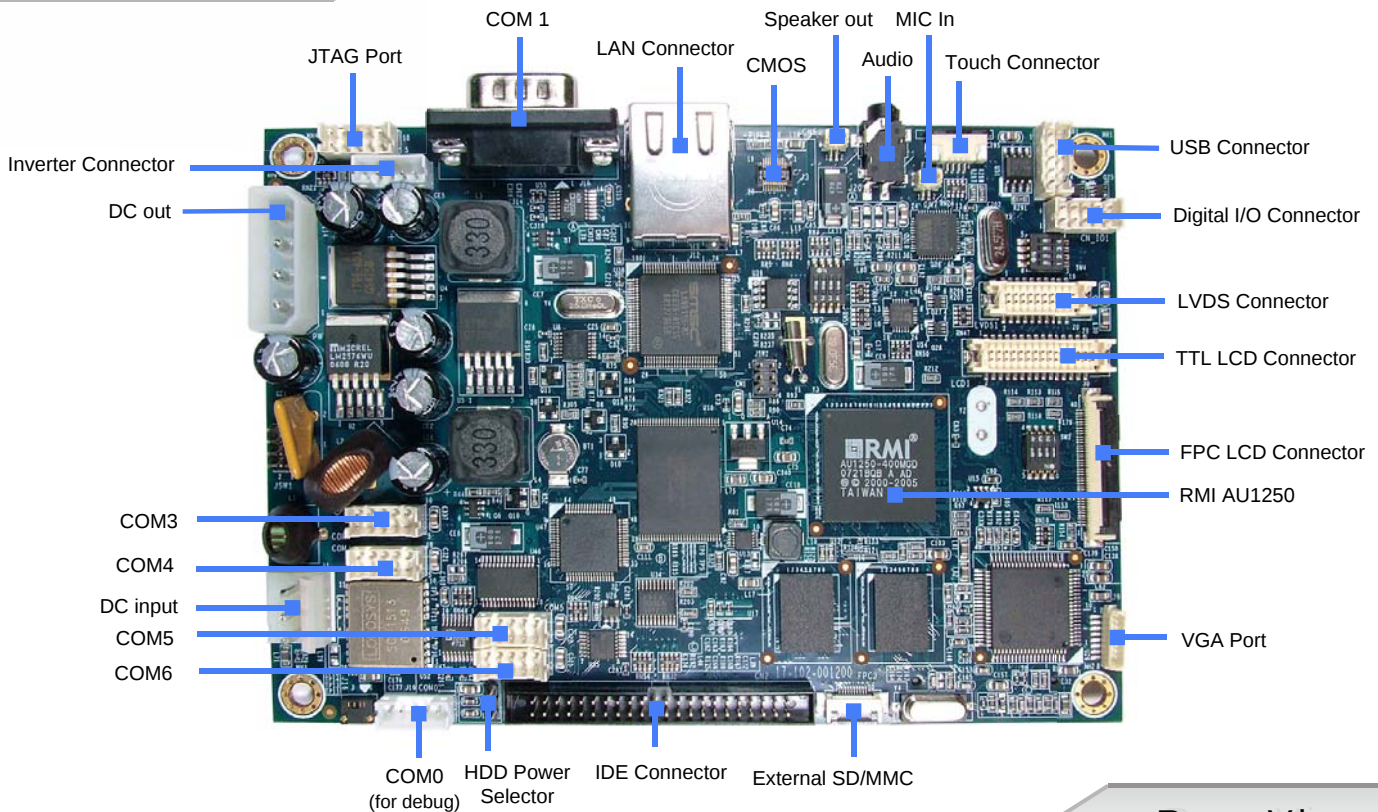
MPEG-2 DEMUX (program)	OK
MPEG-2 DEMUX (transport)	OK
MPEG-4 DEMUX - ISO	OK
DIVX DEMUX - AVI	OK
WMV DEMUX	OK
(ASF included in CE PB)	

* 3rd = need 3rd party licence

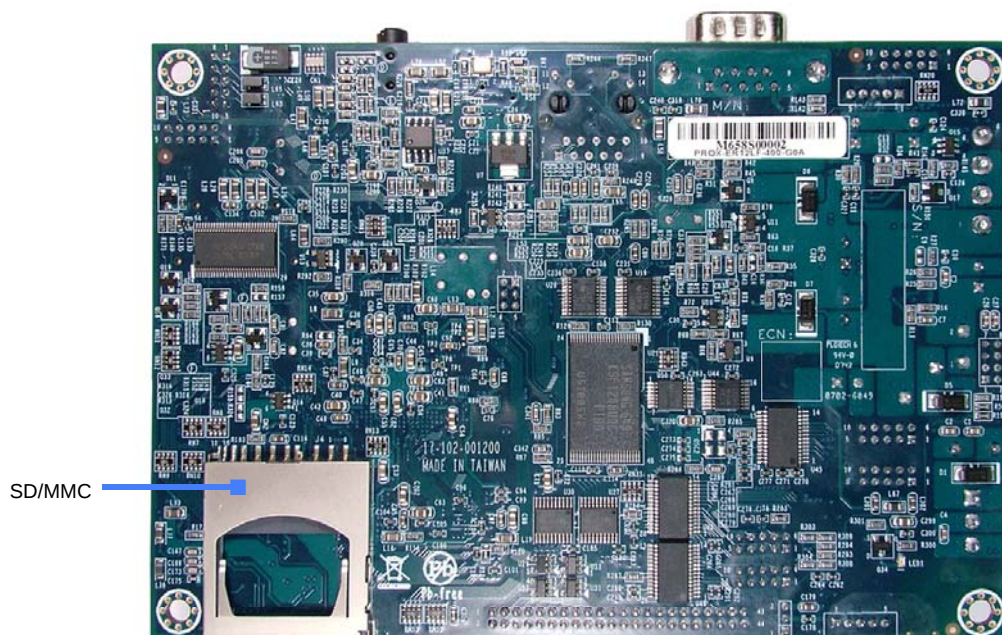
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MIPS base Motherboard/ RMI CPU(AMD)/
Win CE5.0/Linux 2.6

Front View



Rear View

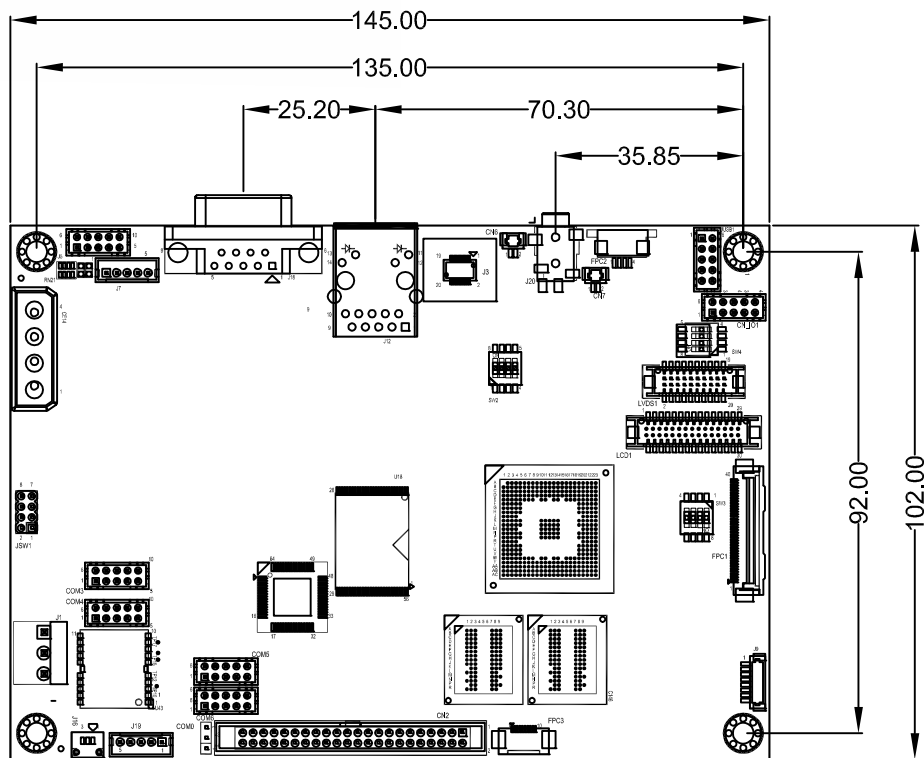


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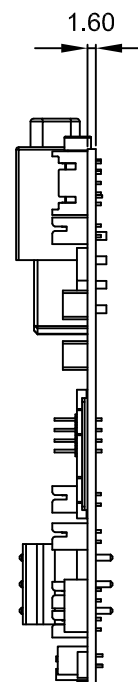
MIPS base Motherboard/ RMI CPU(AMD)/
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Mechanical Drawing

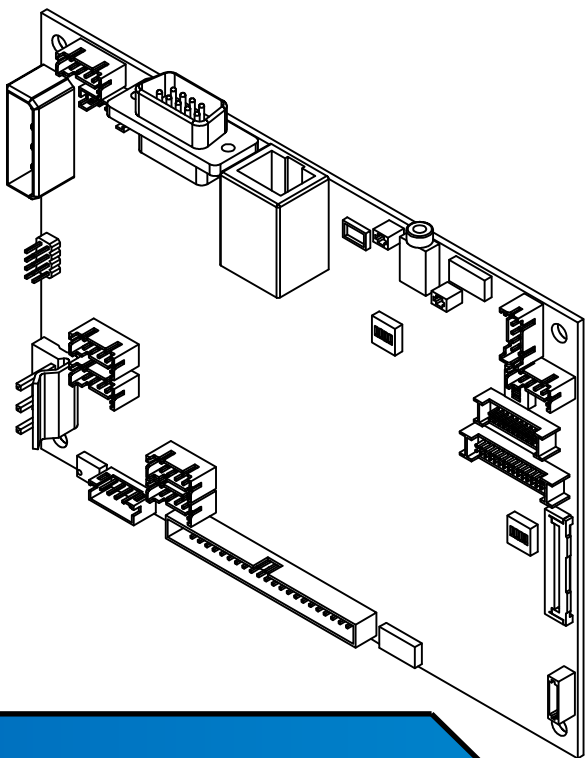
Front Veiw:



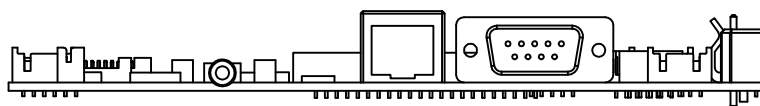
Side View:



Quarter View:



I/O Port:

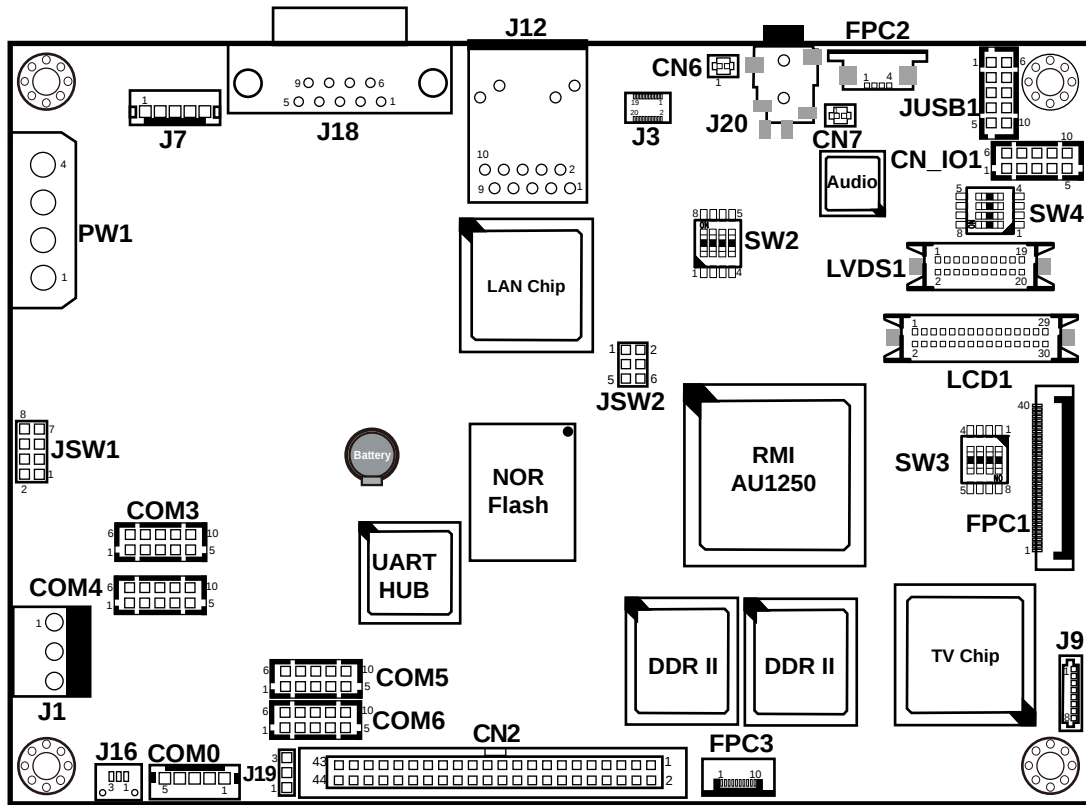


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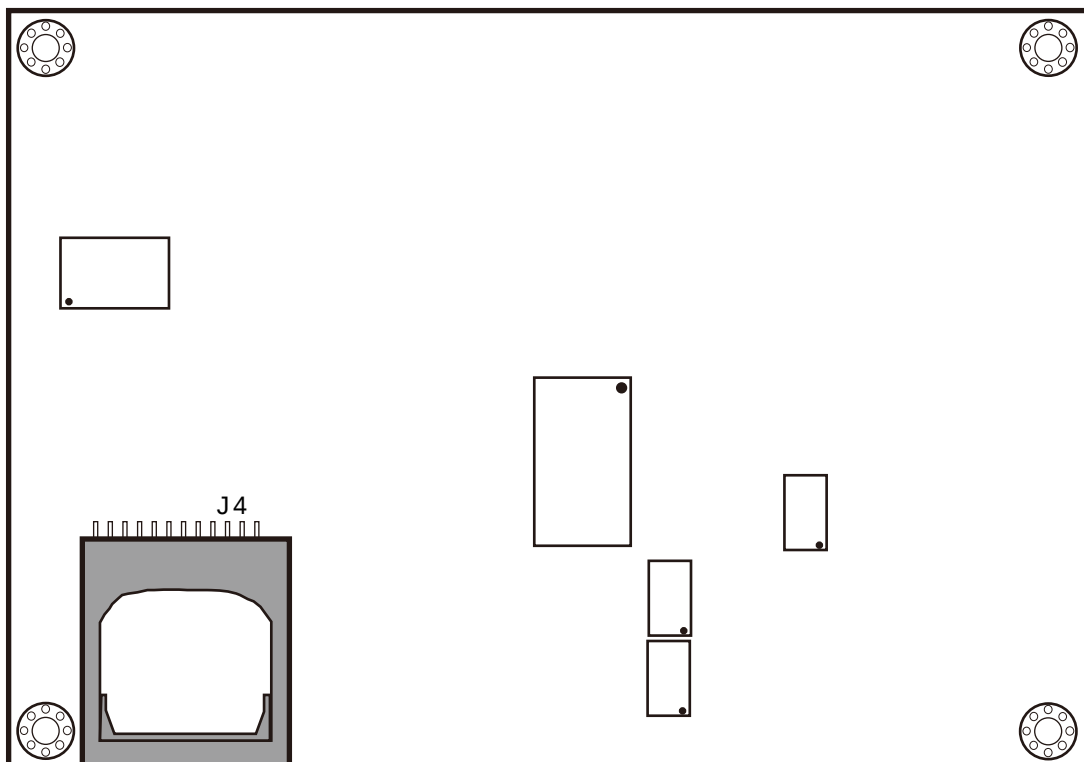
MIPS base Motherboard/ RMI CPU(AMD)/
Win CE5.0/Linux 2.6

Layout Diagram

Front View:



Rear View:



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Win CE5.0/Linux 2.6

Connector Pin Assignment 1

PW1: Stand-by Power Output (support power supply)

Pin	Name
1	12V_SB
2	GND
3	GND
4	5V_SB

J1: DC-IN (Support DC jack w/ cable)

Pin	Name	Description
1	Vin	DC 10~36V
2	GND	GND
3	GND_Earth	Reserved

(* Customers may choose to use power supply in or DC-jack in)

J7: Inverter

Pin	Name
1	12V_INV
2	NC
3	GND
4	Enable
5	Brightness

CN6: Speaker Out

Pin	Name
1	SPK+
2	SPK-

CN7: MIC In

Pin	Name
1	MIC+
2	MIC-

COM0: UART 0 (DTE) (Debug port)

Pin	Name
1	5V
2	COM0_RXD
3	COM0_TXD
4	GND
5	NC

J18: UART1 Port RS232 (DTE) DB-9 Male

Pin	Name	Pin	Name
1	NC	5	GND
2	RXD	6	NC
3	TXD	7	RTS
4	NC	8	CTS
9	NC		

COM3: UART2

Pin	Name	Pin	Name
1	DCD	6	DSR
2	RXD	7	RTS
3	TXD	8	CTS
4	DTR	9	RING
5	GND	10	5V

COM4: UART3

Pin	Name	Pin	Name
1	DCD	6	DSR
2	RXD	7	RTS
3	TXD	8	CTS
4	DTR	9	RING
5	GND	10	5V

COM5: UART4

Pin	Name	Pin	Name
1	DCD	6	DSR
2	RXD	7	RTS
3	TXD	8	CTS
4	DTR	9	RING
5	GND	10	5V

COM6: UART5

Pin	Name	Pin	Name
1	DCD	6	DSR
2	RXD	7	RTS
3	TXD	8	CTS
4	DTR	9	RING
5	GND	10	5V

J19: IDE HDD Power Selection

Pin	Name
1	VCC_5V
2	V_HDD
3	3V3_SYS

J20: Line-Out Connector

Pin	Name
1	GND
2	LINE-OUT_R
3	LINE-OUT_L
4	AMP_R
5	AMP_L
6	MIC

FPC2: FPC Connector (4-wire Touch)

Pin	Pin Assignment
1	TSMX
2	TSMY
3	TSPX
4	TSPY

FPC3: EXT. SD/MMC

Pin	Name	Pin	Name
1	3.3V	6	AU_SD0_CD
2	SD0_DATA2	7	SD0_DATA1
3	SD0_DATA3	8	SD0_DATA0
4	SD0_CMD	9	AU_SD0_WP
5	SD0_CLK	10	GND

CN_IO1: Digital I/O

Pin	Name	Pin	Name
1	DOUT_1*	6	DIN_1
2	DOUT_2*	7	DIN_2
3	DOUT_3*	8	DIN_3
4	DOUT_4*	9	DIN_4
5	DIO_SMB_DAT	10	DIO_SMB_CLK

JUSB1: USB Front I/O

Pin	Name	Pin	Name
1	5V_USBG	6	5V_USBH
2	USBG_D-	7	USBH_D-
3	USBG_D+	8	USBH_D+
4	AU_USB_OTG_ID	9	GND
5	GND	10	GND

JSW1: Front I/O

Pin	Name	Pin	Name
1	HDD_LED	5	Gnd
2	3.3V	6	ON_SW
3	GND	7	GND
4	3.3V	8	RST_SW

SW2: H/W Function Setting (ON/OFF)

Pin	Name	Pin	Name
1	Sys_BT1	5	GND
2	Sys_BT2	6	GND
3	USBG_ID	7	GND
4	AT_ON	8	GND

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Win CE5.0/Linux 2.6

Connector Pin Assignment 2

J3: CIM Connector (Camera)

Pin	Name	Pin	Name
1	GND	11	CIM_FS
2	CIM_D9	12	CIM_LS
3	AU_SMB_CLK	13	CIM_D5
4	CIM_D7	14	CIM_D3
5	CIM_RST	15	CIM_D4
6	CIM_CLK	16	CIM_D6
7	AU_SMB_DAT	17	CIM_D2
8	3.3V	18	2.5V
9	CIM_26MHz	19	GND
10	CIM_D8	20	GND

J4: SD/MMC Slot

Pin	Name	Pin	Name
1	SD1_DATA3	7	SD1_DATA0
2	SD1_CMD	8	SD1_DATA1
3	GND	9	SD1_DATA2
4	3.3V	10	SD1_SW
5	SD1_CLK	11	GND
6	GND	12	SD1_WP

J9: TV-OUT/VGA Connector

Pin	Name	CVBS	S-Video	VGA
1	CRT_HSYNC			HSYNC
2	CRT_VSYNC			VSYNC
3	GND			GND
4	AGND	GND	GND	AGND
5	TV_S0		Y	G
6	TV_S1		C	R
7	TV_S2	CVBS		B
8	TV_S3			

SW3: Touch Function Setting (ON/OFF)

Pin	Name	Pin	Name
1	GND	5	XM
2	GND	6	YP
3	GND	7	XP
4	GND	8	YM

SW4: Touch Function Setting (ON/OFF)

Pin	Name	Pin	Name
1	YM	5	TSMX
2	XP	6	TSPY
3	YP	7	TSPX
4	XM	8	TSMY

LVDS1: 20-pin LCD Connector Pitch-1.25 (DF13-20DP-1.25(26))

Pin	Name	Pin	Name
1	GND	2	GND
3	TX_OUT2+	4	TX_OUT3+
5	TX_OUT2-	6	TX_OUT3-
7	GND	8	GND
9	TX_OUT1+	10	TX_CLK+
11	TX_OUT1-	12	TX_CLK-
13	GND	14	GND
15	TX_OUT0+	16	GND
17	TX_OUT0-	18	3V_LVDS
19	GND	20	3V_LVDS

FPC1: 40-Pin FPC Connector (APEX 5.7" & APEX 7")

Pin	Name	Pin	Name
1	LCD_U_D	2	DMS
3	LCD_HSYNC	4	5V_LED
5	5V_LED	6	5V_LED
7	3V_LED	8	LCD_VSYNC
9	DE_LCD	10	XM
11	YP	12	ADJ
13	LCD_B5	14	LCD_B4
15	LCD_B3	16	GND
17	LCD_B2	18	LCD_B1
19	LCD_B0	20	GND
21	LCD_G5	22	LCD_G4
23	LCD_G3	24	GND
25	LCD_G2	26	LCD_G1
27	LCD_G0	28	GND
29	LCD_R5	30	LCD_R4
31	LCD_R3	32	GND
33	LCD_R2	34	LCD_R1
35	LCD_R0	36	XP
37	YM	38	DCLK
39	GND	40	LCD_L_R

CN2: IDE Connector

Pin	Name	Pin	Name
1	IDE_RESET#	2	GND
3	IDE_DATA7	4	IDE_DATA8
5	IDE_DATA6	6	IDE_DATA9
7	IDE_DATA5	8	IDE_DATA10
9	IDE_DATA4	10	IDE_DATA11
11	IDE_DATA3	12	IDE_DATA12
13	IDE_DATA2	14	IDE_DATA13
15	IDE_DATA1	16	IDE_DATA14
17	IDE_DATA0	18	IDE_DATA15
19	GND	20	NC
21	IDE_MARQ	22	GND
23	IDE_DIOW#	24	GND
25	IDE_DIOR#	26	GND
27	IDE_IORDY	28	IDE_ALE
29	IDE_DMACK#	30	GND
31	IDE_INTRQ	32	NC
33	IDE_DA1	34	IDE_PDIAG#
35	IDE_DA0	36	IDE_DA2
37	IDE_CS0#	38	IDE_CS1#
39	IDE_DASP#	40	GND
41	V_HDD	42	V_HDD
43	GND	44	NC

LCD1: 30-Pin LCD Connector Pitch-1.25 (DF13-30DP-1.25(26))

Pin	Name	Pin	Name
1	HSYNC_LCD	2	CLK_LCD
3	VSYNC_LCD	4	DE_LCD
5	GND	6	GND
7	LCD_B4	8	LCD_B5
9	LCD_B2	10	LCD_B3
11	LCD_B0	12	LCD_B1
13	LCD_G4	14	GND
15	LCD_G2	16	LCD_G5
17	LCD_G0	18	LCD_G3
19	GND	20	LCD_G1
21	LCD_R4	22	LCD_R5
23	LCD_R2	24	LCD_R3
25	LCD_R0	26	LCD_R1
27	GND	28	GND
29	3V_LCD	30	3V_LCD