

# EF-22LF

## Product Brief

Product Brief V1

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## Specification

### System

Operation System	Microsoft WIN CE.NET 5.0
CPU Type	Freescale IMX21 266MHz
GPU Type	Support 2D Resolution 640 x 480 Support 18bit VGA Support Mpeg4 & H263 encode/decode acceleration w/pre & post-processing
LAN Chip Type	Cirrus Logic CS8900-CQ3 (10 base-T)
Flash ROM	32M byte for O.S. / 32MB NAND flash for storage
SDRAM	64M byte
Audio Coedc	Wolfon WM8731 codec
Watchdog	Hardware watchdog
Dimension	140mm (W) x 80mm (L)

### I/O Ports

LCD Interface	1 x 30 pin connector for 18bit TTL LCD, with 5 pin connector for inverter 1 x 33 pin FPC connector for PVI 5.7" LCD
Audio	1 x 3 pin connector
LAN	1 x RJ45 connector
Serial port	2 x COMs, COM1 for RS232, COM2 for RS422/485
Touch panel	1 x 4 pin FPC connector for 4-wire touch panel
SD/MMC	1 x SD/MMC slot
USB	1 x USB Port with USB1.1
Key pad	2 x 8 pin connector with 38 keys for key pad
System status	1 x 10 pin for system LED

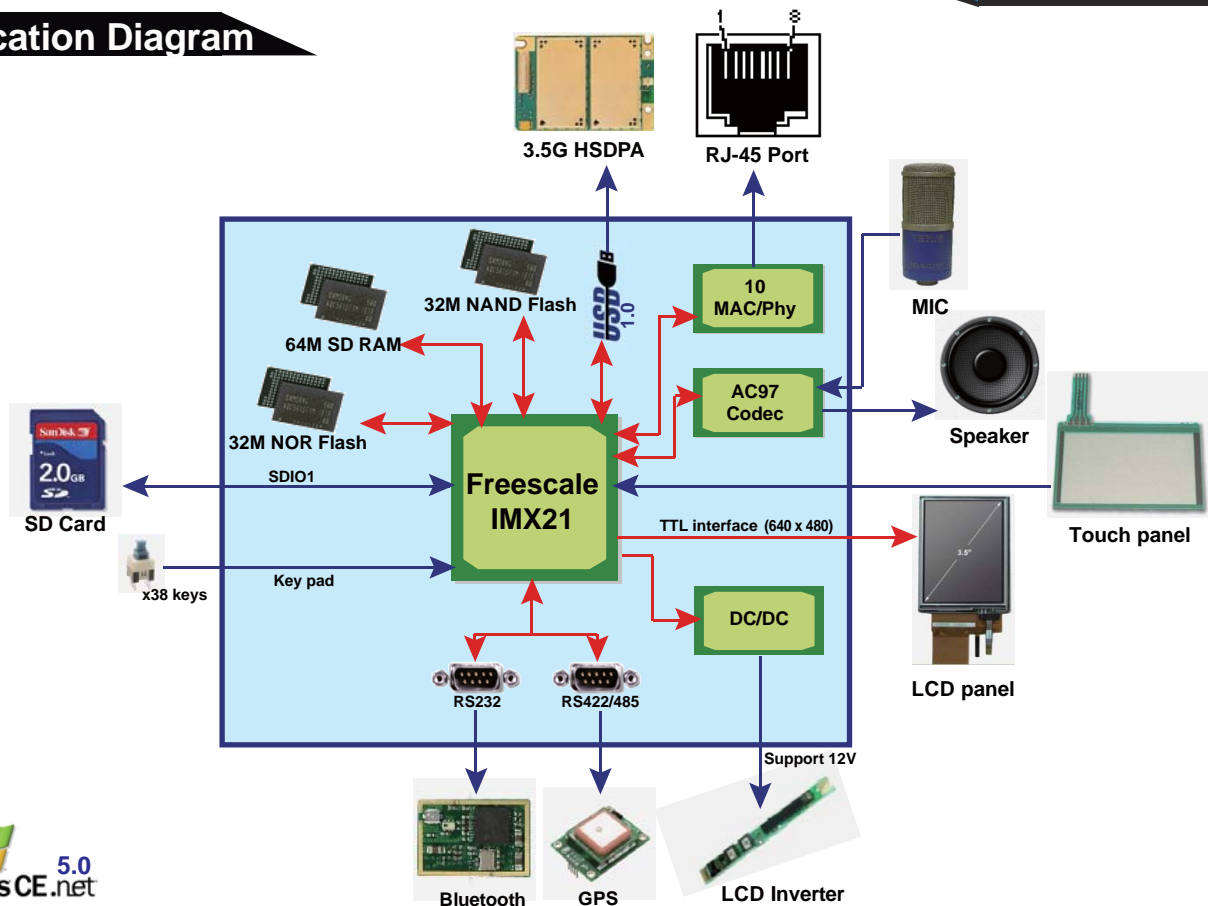
### Environment

Power Requirement	DC in (10~30V) 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

## Application Diagram



# EF-22LF

## ARM base Motherboard/ Freescale IMX21 CPU/ Win CE5.0/ SD/MMC

### Product Description

#### Features

The EF-22LF features the advanced and power-efficient ARM926EJ-S core operating at speeds 266 MHz and Smart Speed products that offer high performance processing optimized for lowest power consumption. On-chip modules such as a video accelerator module, LCD controller (640 x 480), USB 1.0, and synchronous serial interfaces offer designers a rich suite of peripherals that can enhance many products seeking to provide a rich multimedia experience.

This targeted functionality enables the EF-22LF to address the needs of cost-sensitive applications such as HMI interface or small size Photo customer display, information appliances, smart phones, Web browsers, audio players, handheld computers based on the popular WinCE5.0 platform.

#### High Speed ARM9 CPU Core

- 266MHz
- 32-bit architecture
- 16kB Instruction cache, 16kB Data cache
- Jazelle Java Acceleration
- 16 Channel DMA
- 16/32bit SDRAM controller

#### Storage Memory

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

#### RTC

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

#### Inverter

- Support 12 output
- Support inverter enable and control bright-

#### Power

- Power input:  
—DC input 10~30V
- Power output:  
—Support one inverter 12V power supply.
- Power Saving Modes:  
— Idle

#### Multi Media

- MPEG 4 & H.263 encode/decode acceleration w/ pre- & post- processing
- High speed CMOS sensor I/F + I2C
- External Bus Master I/F (BMI)

#### LCD Controller

- Up to 640 x 480 resolution screens
- 18-bits per pixel a RGB color resolution support
- Smart panel support (SLCDC)

#### SD Memory

- High-bandwidth SD RAM memory controller (supports up to 133MHz)
- 16/32-bit data

#### Touch panel

- Support one 4-wire touch panel

#### AC97 codec and Touch panel

- Support standard AC97 codec.
- Support one MIC connector and one line-out connector.
- External one connector for MIC

#### Integrated Peripherals

- Support one 10M base-T Ethernet
- Support one Secure Digital/SDIO/MMC standard connector.
- Support one USB 1.1 Host and Device.
- Support two UART, one is RS232 connector, one is RS422/485

#### Operating System Support

- Microsoft Windows® CE 5.0

### Software Support

#### Software Compatibility Protects Application Investment

##### Applications

GPS, DMB, DVB, WiFi, DRM, XM Radio, Games, ...

##### Middleware

GUI (CE window)

##### Operating System

WinCE 5.0

##### Media Player

Media Player

##### Applic Programming Interface (API)

DirectShow

##### Drivers

CPU Drivers

LCD Driver

UART Driver

SD/MMC Driver

##### Hardware

Freescale IMX21 ARM9 CPU

Application Specific

IMX21 Controlled

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Win CE5.0/ SD/MMC

## Software Support con't

### Software Support - Win CE5.0



#### Core Functionality

Bootloader	OK	Board Interrupt Controller	OK
Booter	OK	AC 97 Codec	OK
UART RS232	OK	USB1.1 Host	OK
UART RS422/485	OK	USB 2 Device	OK
AC97 Audio	OK	RTC	OK
PSC SMBus	OK	1 SDIO	OK
PSC SPI	OK	Power Management	OK
GPIO	OK	Touch Panel	OK
1 SD/MMC	OK	Keypad	OK
LCD Driver	OK		
Key pad	OK		
10M Ethernet	OK		

#### Video Codecs

MPEG-4	OK
H.263	OK

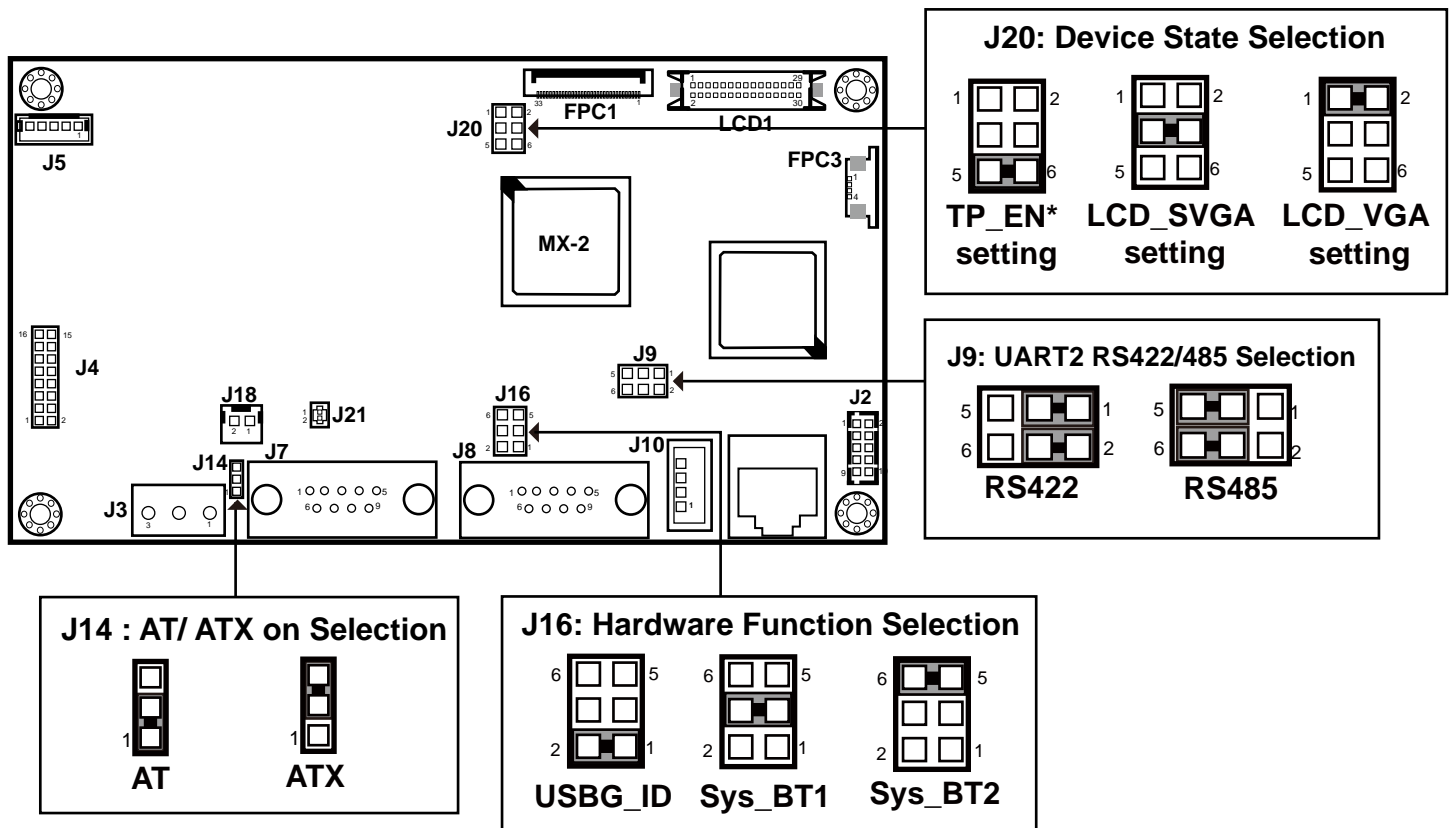
#### Audio Codecs

AAC (MPEG 4)	OK
PCM (WAV, AIFF)	OK
MP3	Not ready (3rd)
WMA	Not ready (3rd)

\* 3rd = need 3rd party licence

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

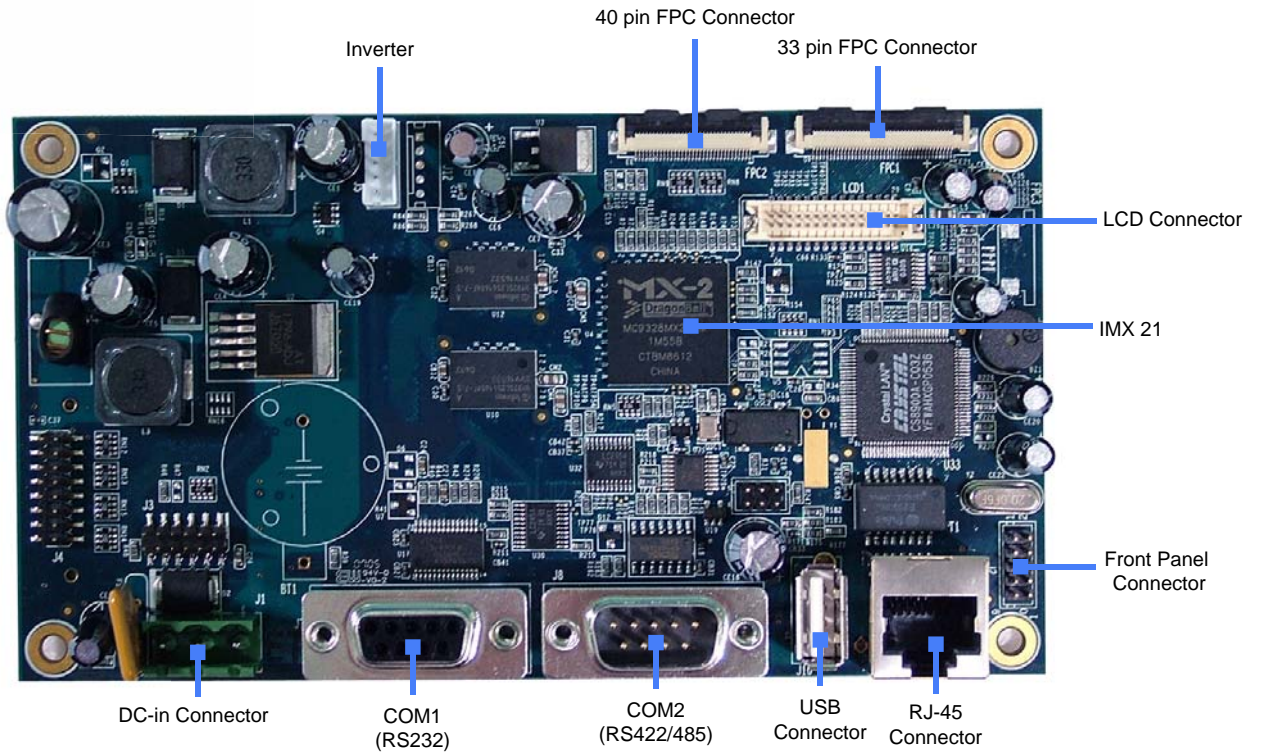
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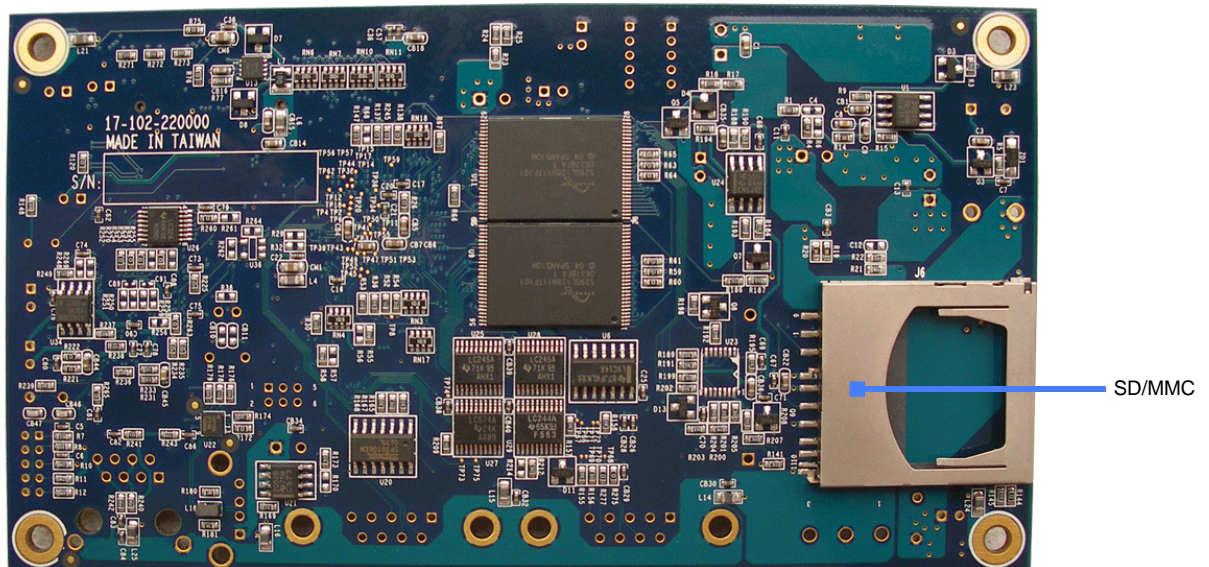
# EF-22LF

ARM base Motherboard/ Freescale IMX21 CPU/  
Win CE5.0/ SD/MMC

## Front View



## Rear View

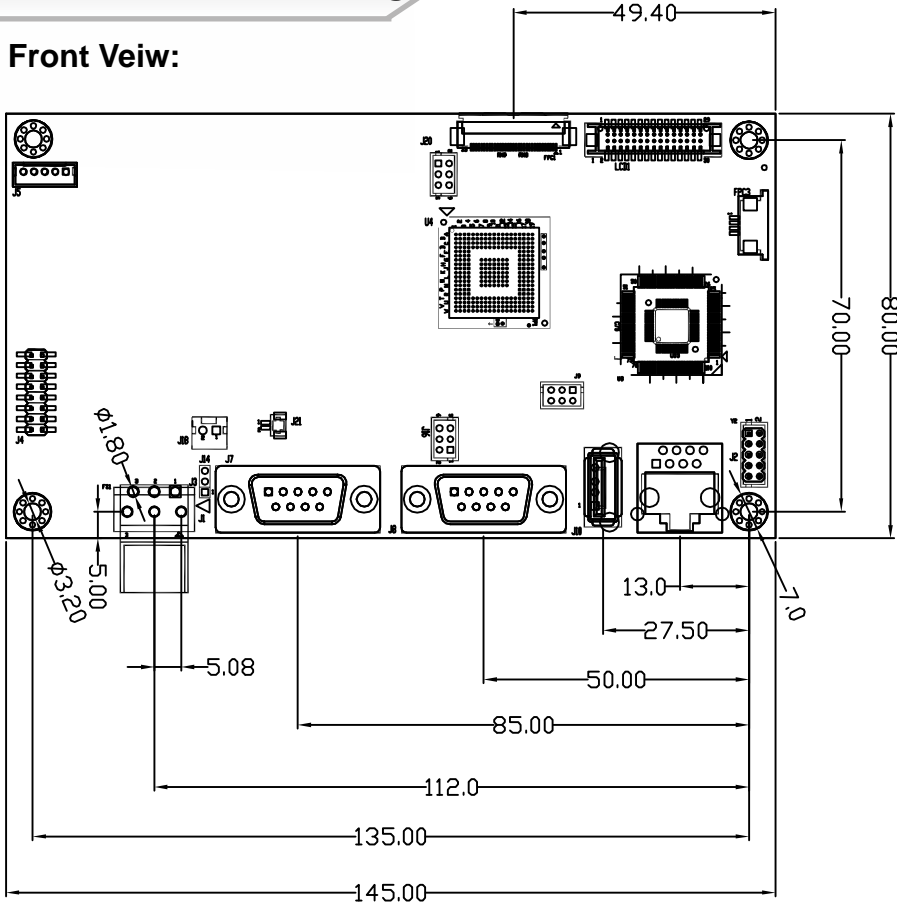


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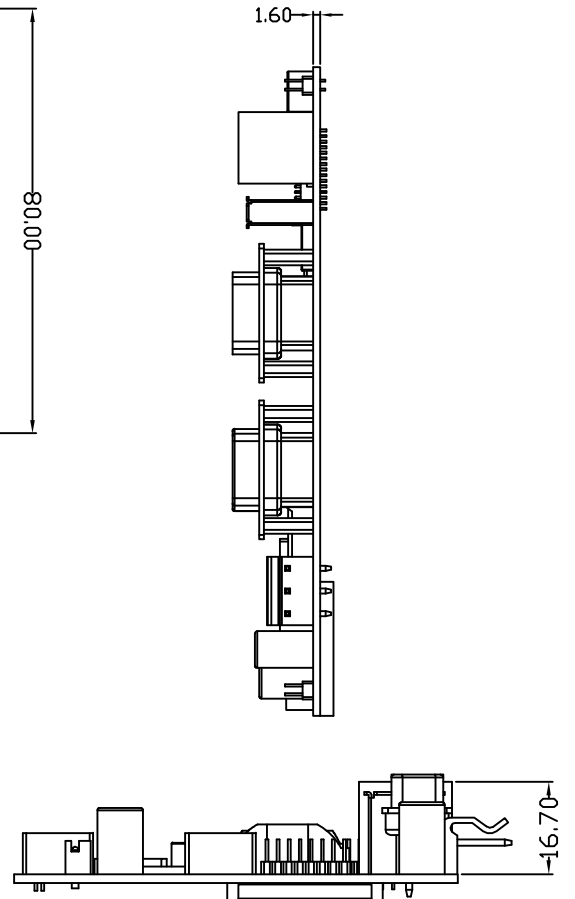
ARM base Motherboard/ Freescale IMX21 CPU/  
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## Mechanical Drawing

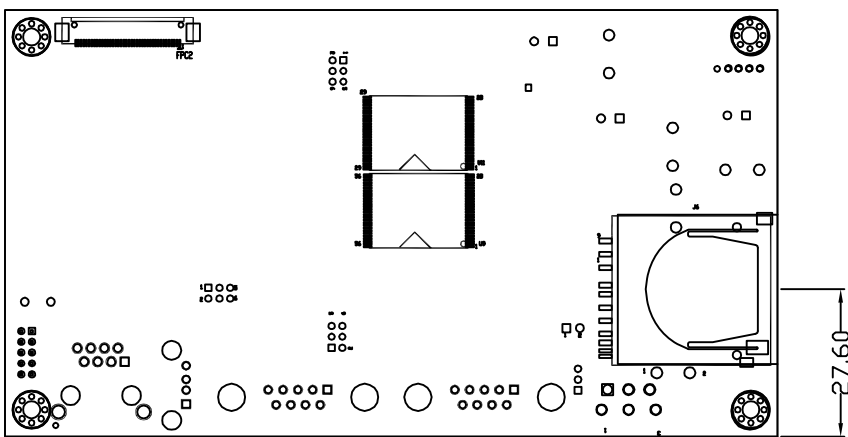
**Front View:**



**Side View:**



**Rear View:**

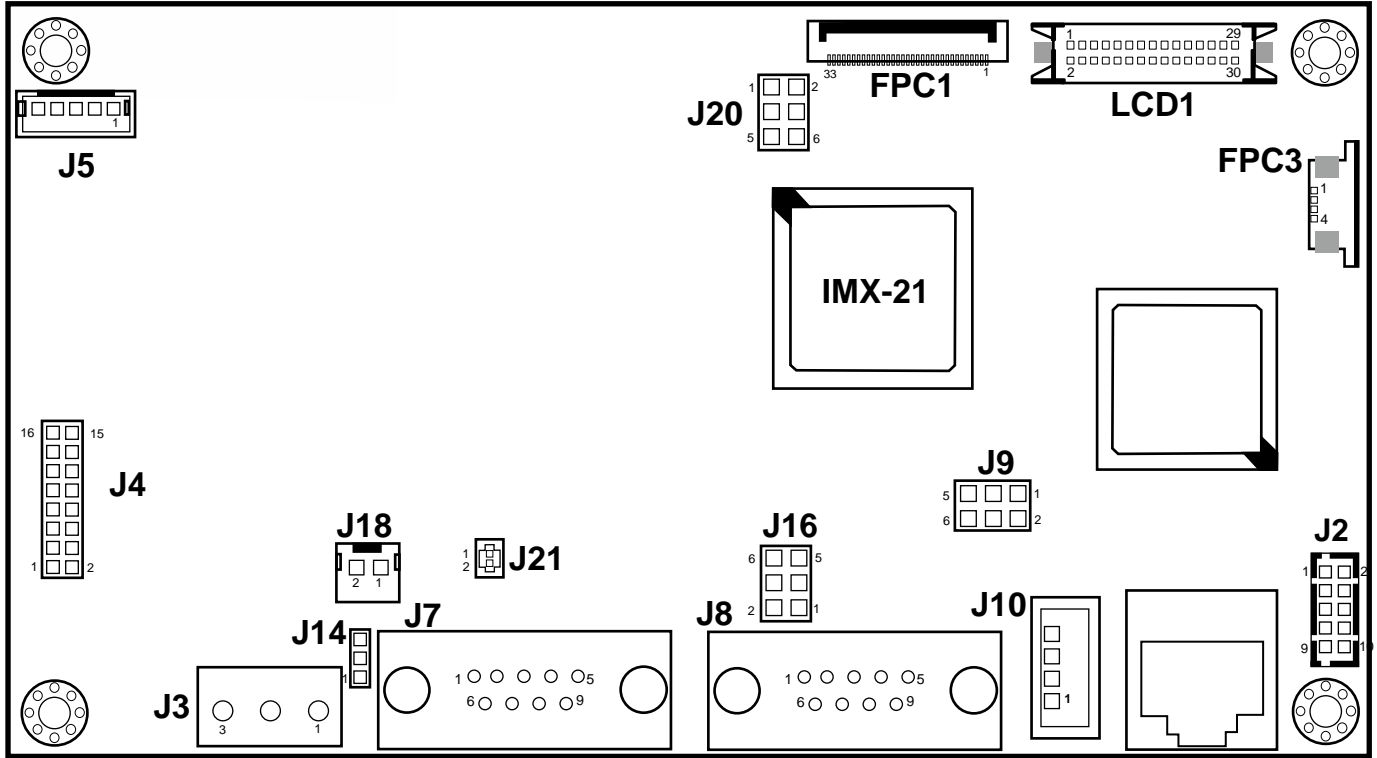


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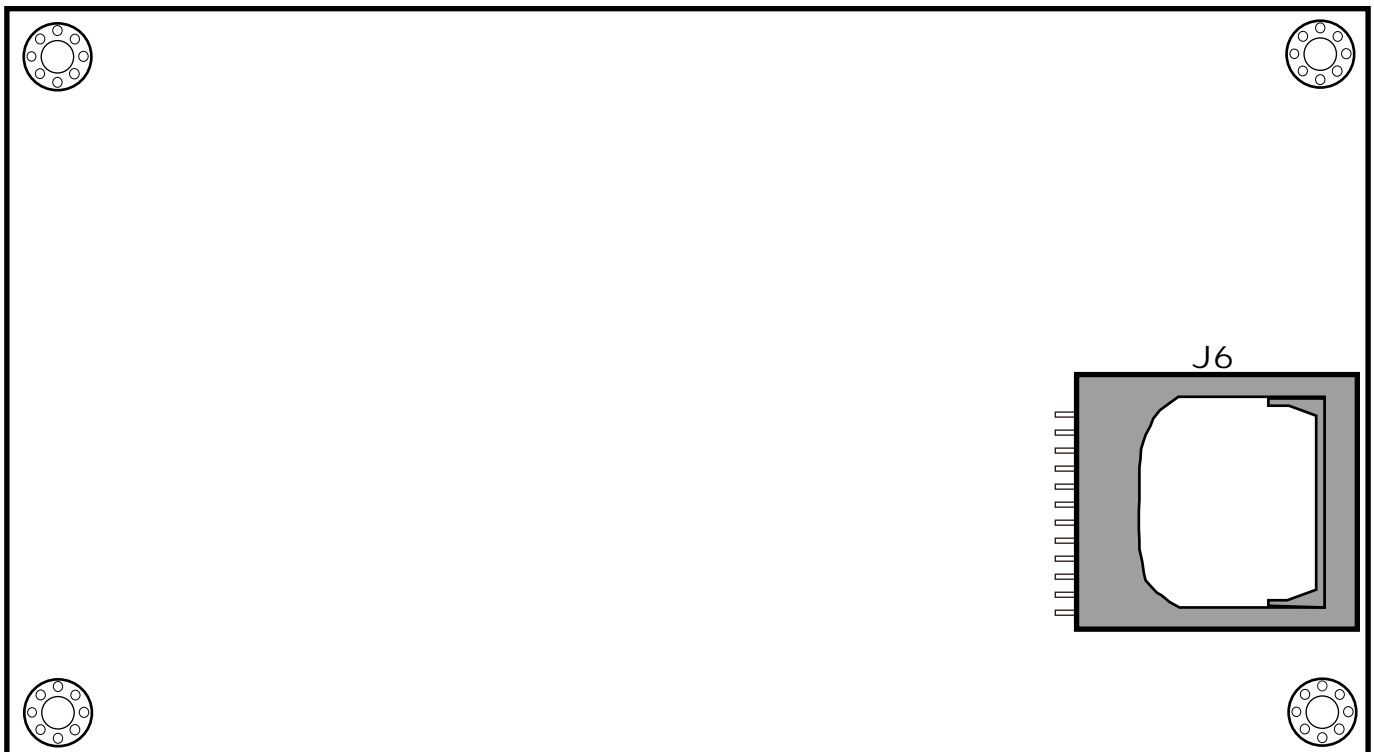
ARM base Motherboard/ Freescale IMX21CPU/  
Win CE5.0/ SD/MMC

## Layout Diagram

Front View:



Rear View:



# EF-22LF

ARM base Motherboard/ Freescale IMX21 CPU/  
Win CE5.0/ SD/MMC

## Connector Pin Assignment 1

### J3: DC-IN Connector

Pin	Name
1	Vin
2	GND
3	GND_Earth

### J5: Inverter

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

### J2: Front Panel Connector

Pin	Name
1	PWR_SW
2	GND
3	RST_SW
4	GND
5	ON_LED
6	GND
7	Link_LED-A
8	Link_LED-C
9	Active_LED-A
10	Active_LED-C

### J4: Keypad Connector

Pin	Name	Pin	Name
1	3V_SYS	9	KP_Row2
2	GND	10	KP_Col2
3	RST_SW	11	KP_Row3
4	ON_SW	12	KP_Col3
5	KP_Row0	13	KP_Row4
6	KP_Col0	14	KP_Col4
7	KP_Row1	15	KP_Row5
8	KP_Col1	16	KP_Col5

### J6: 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

### J7: UART1 Port RS232

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

### J8: UART2 Port RS422/485

Pin	Name	Pin	Name
1	TX_P	6	NC
2	TX_M	7	NC
3	RX_P	8	NC
4	RX_M	9	NC
5	GND		

### J10: USB Connector

Pin	Name
1	GND
2	USBG_DP
3	USB_DM
4	USB_5V

### J18: Speak-Out Connector

Pin	Name
1	SP+
2	SP-

### J21: MIC-Out Connector

Pin	Name
1	MIC+
2	MIC-

### FPC1: 33-Pin FPC Connector (PVI 5.7" LCD)

Pin	Name	Pin	Name
1	GND	2	CLK_LCD
3	HSYNC_LCD	4	VSYNC_LCD
5	GND	6	LCD_R0
7	LCD_R1	8	LCD_R2
9	LCD_R3	10	LCD_R4
11	LCD_R5	12	GND
13	LCD_G0	14	LCD_G1
15	LCD_G2	16	LCD_G3
17	LCD_G4	18	LCD_G5
19	GND	20	LCD_B0
21	LCD_B1	22	LCD_B2
23	LCD_B3	24	LCD_B4
25	LCD_B5	26	GND
27	DE_LCD	28	3V_LCD
29	3V_LCD	30	LCD_L_R
31	LCD_U_D	32	QVGA
33	GND		

### FPC2: 40-Pin FPC Connector (APEX 5.7")

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

### FPC3: 4-PIN FPC Connector

Pin	Name
1	X-
2	Y-
3	X+
4	Y+

### LCD1: LCD Connector

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