



EM-1220-LX Quick Installation Guide

First Edition, August 2007

1. Overview

Thank you for purchasing the Moxa EM-1220 embedded module. The product's features include 2 software-selectable RS-232/422/485 serial ports, two 10/100 Mbps Ethernet ports, and SD signals for external SD socket connections. The EM-1220 uses the Moxa ARM9 32-bit 192 MHz communication processor. These features make the EM-1220 ideal for use as the core module of an industrial embedded system. In addition, Moxa provides an EM-1220 Development Kit, which is designed for system and software program development at the system evaluation stage. The kit includes the EM-1220 embedded computer, and the EM-1220-DK carrier board, which is used to evaluate the EM-1220. The EM-1220's pre-installed, ready-to-run μ Clinix Kernel 2.6 makes it easy for users to develop programs for any application.

2. Package Checklist

Before installing the EM-1220 Development Kit, verify that the package contains the following items:

- 1 EM-1220 Embedded Module
- 1 EM-1220-DK (the carrier board of the EM-1240 Development Kit)
- Quick Installation Guide
- Document & Software CD
- Cross-over Ethernet cable
- Console port cable :
CBL-4PINDB9F-100: 4-pin header to DB9 (female) cable, 100 cm
- Universal Power Adaptor
- Product Warranty Statement

Please notify your sales representative if any of the above items are missing or damaged.

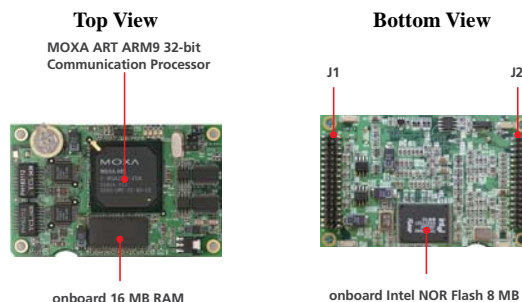
3. Product Features

- MOXA ART ARM9 32-bit 192 MHz processor
- On-board 16 MB RAM, 8 MB flash disk
- 2 software-selectable RS-232/422/485 serial ports
- Dual 10/100 Mbps Ethernet for network redundancy
- Ready-to-run μ Clinix Kernel 2.6 platform
- SD signals supported for external SD socket connection
- Built-in RTC, buzzer

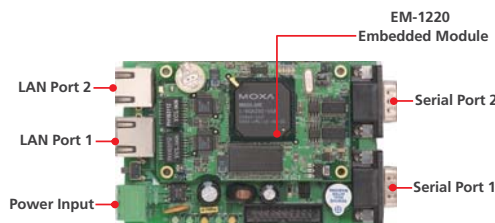
- 8 GPIOs reserved for system integration
- Credit card size design for easy integration virtually anywhere
- Full-function development kit for quick evaluation and application development
- -40 to 75°C wide temperature model available

4. Hardware Introduction

EM-1220 Embedded Module

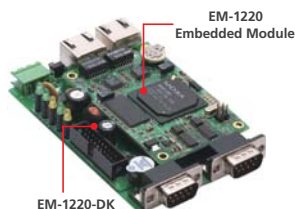


EM-1220-DK



5. Combining the EM-1220 with the EM-1220-DK

Insert the EM-1220 embedded module vertically onto the Development Kit board. Note that the pin marked "J2" on the embedded module must be matched with the pin marked "J2" on the Development Kit; the pin marked "J1" on the embedded module must be matched with the pin marked "J1" on the development kit. Use caution when combining the boards, since improper handling could damage the boards' pins.



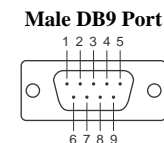
6. EM-1220-DK Introduction

LED Indicators

LED	Color	LED Function
Ready	Green	Power is on and system functions normally.
P1, P2 (Tx)	Green	Serial port 1, 2 is transmitting data.
	Off	Serial port 1, 2 is not transmitting data.
P1, P2 (Rx)	Yellow	Serial port 1, 2 is receiving data.
	Off	Serial port 1, 2 is not receiving data.

Serial Ports

The EM-1220 embedded module offers 2 software-selectable serial ports. The software that comes with the product can be used to configure these ports. Detailed information is provided in the Software User's Manual.



Pin	RS-232	RS-422	4-wire RS-485	2-wire RS-485
1	DCD	TxDA(-)	TxDA(-)	---
2	RxD	TxDB(+)	TxDB(+)	---
3	TxD	RxDB(+)	RxDB(+)	DataB(+)
4	DTR	RxDA(-)	RxDA(-)	DataA(-)
5	GND	GND	GND	GND
6	DSR	---	---	---
7	RTS	---	---	---
8	CTS	---	---	---

Console Ports

The serial console port on the EM-1220-DK is a 4-pin pin-header RS-232 port. It is designed for serial console terminals, which are useful for identifying the EM-1220-LX boot up message.



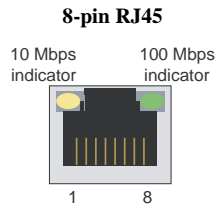
Pin	Signal
1	TxD
2	RxD
3	NC*
4	GND

*NC=Not Connected



LAN Ports

The EM-1220 embedded module has 2 LAN ports that support 10/100 Mbps. The communication redundancy provided by the 2 LAN ports is useful for avoiding network failure.



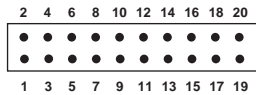
Pin	Signal
1	ETx+
2	ETx-
3	ERx+
4	---
5	---
6	ERx-
7	---
8	---

SD Socket

The EM-1220 Development Kit has an internal SD socket for storage expansion. The SD socket allows users to plug in a Secure Digital (SD) memory card that is compliant with the SD 1.0 standard to provide up to 1 GB of additional memory space. When removing the SD card from the socket, press in the SD card first to cause it to pop out. Detailed information is provided in the Software User's Manual.

GPIO

The EM-1220 Development Kit has 10 GPIOs. Digital input channels and digital output channels can be configured by software. Note that the GPIO function will not work if you enable the SD signals. Use the GPIO pin header to connect to devices. The GPIO pinouts are shown in the following figure.



Pin No.	Pin Definitions
1	GPIO 0
2	GPIO 1
3	GPIO 2
4	GPIO 3
5	GPIO 4
6	GPIO 5
7	GPIO 6
8	GPIO 7
9	GPIO 8
10	GPIO 9
11-16	NC
17-18	GND
19-20	+5V

Connecting the Power

You may connect a 12 to 48 VDC power source to the terminal block on the EM-1220 Development Kit.

Reset Button

Press the **Reset** button on the EM-1220-DK continuously for at least 5 seconds to load the factory default configuration. After the factory default configuration has been loaded, the system will reboot automatically. We recommend that you only use this function if the software is not working properly and you want to load factory default settings. To reset an embedded Linux system, always use the software reboot command (`/reboot`) to protect the integrity of data being transmitted or processed. The Reset button is not designed to hard reboot the EM-1220 Development Kit.

7. Software Installation Procedure

STEP 1: Insert the EM-1220 CD-ROM into your Windows or Linux PC. Use Acrobat Reader to view the EM-1220 User's Manual.

STEP 2: Install the EM-1220 tool chain, which is on the CD-ROM. The tool chain consists of the following components:

1. UC Finder: Broadcast search for the EM-1220 IP address on your LAN. The EM-1220 supports the Linux platform.

2. Cross Compiler: Arm-elf-gcc is a C/C++ PC Cross Compiler, which is a gcc compiler that runs on an x86 PC, but creates an execution file for Arm-based platforms (such as the EM-1240). For more information visit <http://www.uclinux.org>.

3. uClibc: uClibc is an abbreviation for "microcontroller C library." uClibc was created to support μ Linux, a Linux port for MMU-less microcontrollers, such as the ARM9 installed in the EM-1220. For more information, visit <http://www.uclibc.org>.

STEP 3: Edit the source code on a Linux PC.

STEP 4: Use the Cross Compiler to compile the source code, and then use FTP to download the program to the EM-1220.

STEP 5: Run your program.

8. EM-1220 Hardware Specifications

Model	EM-1220 Embedded Module
CPU	MOXA ART ARM9 32-bit 192 MHz processor
RAM	16 MB
Flash	8 MB
LAN	Auto-sensing 10/100 Mbps x 2 Built-in 1.5 KV magnetic isolation
Serial Ports	2 serial ports that support RS-232/422/485 signals

RS-232	TxD, RxD, DTR, DSR, RTS, CTS, DCD, GND
RS-422	TxD+, TxD-, RxD+, RxD-, GND
4-wire RS-485	TxD+, TxD-, RxD+, RxD-, GND
2-wire RS-485	Data+, Data-, GND
Serial Protection	15 KV ESD for all signals
Data bits	5, 6, 7, 8
Stop bit(s)	1, 1.5, 2
Parity	None, even, odd, space, mark
Flow Control	RTS/CTS, XON/XOFF, RS-485 ADDC
Speed	50 bps to 921.6 Kbps, supports Any Baudrate
Serial Console	RS-232 x 1 (TxD, RxD, GND)
Storage Expansion	SD signals for external Secure Digital (SD) socket connection
GPIO	GPIO x 10 (to enable GPIO, the SD must be disabled)
Real-time Clock	Yes
Watchdog Timer	Yes
Buzzer Signals	Buzzer signals reserved for external buzzer connection
LED Signals	System: Ready x 1 LAN: 10M/Link x 2, 100M/Link x 2 Serial: TxD x 2, RxD x 2
Reset Signal	Reserve signal for external "Reset to Default" button connection
Power Input	Accept external 3.3 VDC through pin header
Dimensions (W x L)	80 x 50 mm
Operating Temperature	-10 to 60°C (14 to 141°F), 5 to 95% RH -40 to 75°C (-40 to 167°F) is optional for EM-1220-T model
Storage Temperature	-20 to 80°C (-4 to 176°F), 5 to 95% RH -40 to 85°C (-40 to 185°F) is optional for EM-1220-T model
Module Interface	Two 2 x 17 pin-headers, pitch: 2.0 x 2.0 mm

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