

EM-1220 Series

RISC-based ready-to-run embedded core module with 2 serial ports, dual LANs, SD, μ Clinux



- > MOXA ART ARM9 32-bit 192 MHz processor
- > 16 MB RAM, 8 MB flash disk on-board
- > 2 software-selectable RS-232/422/485 serial ports
- > Dual 10/100 Mbps Ethernet for network redundancy
- > Ready-to-run μ Clinux 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 at any field site
- > Full-function development kit for quick evaluation and application development
- > -40 to 75°C wide temperature model available

The certification logos shown here apply to some or all of the products in this section. Please see the **Specifications** section or Moxa's website for details.



16

RISC-based Computers > EM-1220 Series

Overview

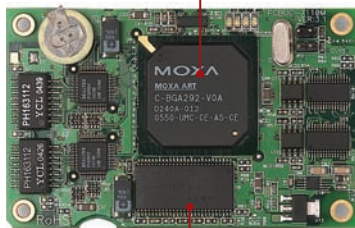
The EM-1220 embedded module features 2 RS-232/422/485 serial ports, dual Ethernet ports, and an SD socket for external storage expansion. The module has a compact design that can be easily integrated with industrial applications, such as gas stations, vending machines, and ticketing machines, and offers a powerful serial communication capability for better system integration. Programmers

will find that the pre-installed, ready-to-run μ Clinux platform and the full-function development kit make it easy to develop software and build a reliable communication base for industrial automation applications. In addition, the "wide temperature" EM-1220-T model is also available to provide a reliable solution for any harsh environment.

Appearance

Embedded Module—Top View

MOXA ART ARM9 32-bit
Communication Processor



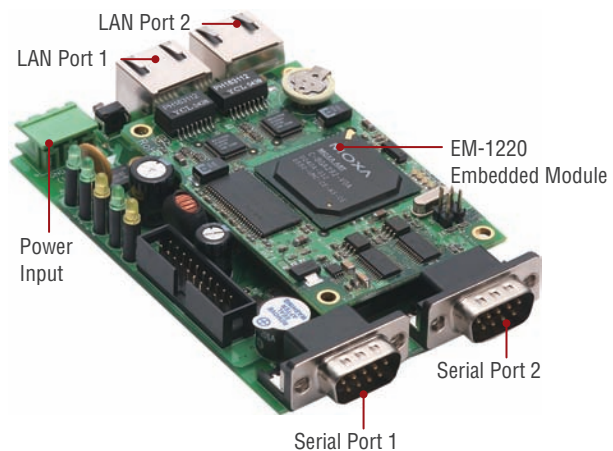
onboard 16 MB RAM

Embedded Module—Bottom View



onboard Intel NOR
Flash 8 MB

Development Kit



Hardware Specifications

Computer

CPU: MOXA ART ARM9 32-bit 192 MHz processor
OS (pre-installed): Embedded µClinux (kernel 2.6.19)
DRAM: 16 MB onboard (32 MB for ODM)
Flash: 8 MB onboard (16 MB for ODM)
Storage Expansion: SD signals for external Secure Digital (SD) socket connection

LAN Interface

Ethernet: 10/100 Mbps x 2
Magnetic Isolation Protection: 1.5 KV built-in

Serial Interface

Number of Ports: 2
Serial Standards: RS-232/422/485, software-selectable
ESD Protection: 15 KV for all signals
Console Port: RS-232 (TxD, RxD, GND), 4-pin pin header output

Serial Communication Parameters

Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, XON/XOFF, ADDC™ (automatic data direction control) for RS-485
Baudrate: 50 bps to 921.6 Kbps (non-standard baudrates supported; see user's manual for details)

Serial Signals

RS-232: TxD, RxD, DTR, DSR, RTS, CTS, DCD, GND
RS-422: TxD+, TxD-, RxD+, RxD-, GND
RS-485-4w: TxD+, TxD-, RxD+, RxD-, GND
RS-485-2w: Data+, Data-, GND

LEDs

System: Ready x 1
LAN: 10M/Link x 2, 100M/Link x 2
Serial: TxD, RxD (2 of each)

Physical Characteristics

Weight:
 EM-1220 Module: 40 g
 EM-1220 Development Kit: 120 g
Dimensions:
 EM-1220 Module: 80 x 50 mm (3.15 x 1.97 in)
 EM-1220 Development Kit: 117 x 70 mm (4.61 x 2.76 in)
Module Interface: Two 2 x 17 pin-headers (2.5 x 2.5 mm pitch)

Environmental Limits

Operating Temperature:
 Standard model: -10 to 60°C (14 to 140°F)
 Wide temp. model: -40 to 75°C (-40 to 167°F)
Operating Humidity: 5 to 95% RH
Storage Temperature:
 Standard model: -20 to 80°C (-4 to 176°F)
 Wide temp. model: -40 to 85°C (-40 to 185°F)

Power Requirements

Input Voltage: 3.3 VDC through the pin header

Regulatory Approvals

EMC: CE (EN55022 Class A, EN61000-3-2 Class A, EN61000-3-3, EN55024), FCC (Part 15 Subpart B, CISPR 22 Class A)

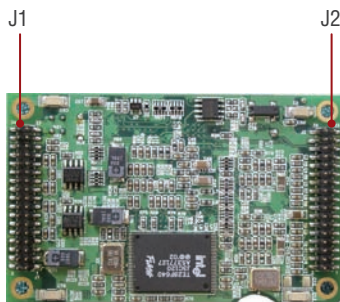
Reliability

Alert Tools: Built-in buzzer and RTC (real-time clock)
Automatic Reboot Trigger: Built-in WDT (watchdog timer)

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

Pin Assignment



Jumper 1 (J1)

Pin No.	Signals	Pin No.	Signals
1	VCC (3.3V)	2	VCC (3.3V)
3	VCC (3.3V)	4	VCC (3.3V)
5	GND	6	GND
7	GND	8	GND
9	TxD0 (RS-232)	10	RxD0(RS-232)
11	RTS0	12	CTS0
13	DTR0	14	DSR0
15	RxD1 (RS-232)	16	DCD0
17	CTS1	18	TxD1 (RS-232)
19	DSR1	20	RTS1
21	DCD1	22	DTR1
23	Data-(A)0/ RxD-(A)0	24	Data-(A)1/ RxD-(A)1
25	Data+(B)0/ RxD+(B)0	26	Data+(B)1/ RxD+(A)1
27	Serial LED_Tx0	28	Serial LED_Rx0
29	Serial LED_Tx1	30	Serial LED_Rx1
31	TxD(-)0	32	TxD(-)1
33	TxD(+0)	34	TxD(+1)

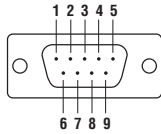
Jumper 2 (J2)

Pin No.	Signals	Pin No.	Signals
1	Console_RxD	2	Console_TxD
3	Eth1_TxD_out+	4	GND
5	Eth1_TxD_out-	6	Eth1_RxD_in+
7	Eth1_LED_100M	8	Eth1_RxD_in-
9	Eth0_TxD_out+	10	Eth1_LED_10M
11	Eth0_TxD_out-	12	Eth0_RxD_in+
13	Eth0_LED_100M	14	Eth0_RxD_in-
15	GPIO0	16	Eth0_LED_10M
17	GPIO2	18	GPIO1
19	GPIO4	20	GPIO3
21	GPIO6	22	GPIO5
23	GPIO8	24	GPIO7
25	Buzzer	26	GPIO9
27	LED_Ready	28	SW_Reset
29	SDA	30	SCL
31	GND	32	GND
33	GND	34	GND

16

RISC-based Computers > EM-1220 Series

DB9 male



PIN	RS-232	RS-422/485 -4W	RS-485-2W
1	DCD	TxD-(A)	-
2	RxD	TxD+(B)	-
3	TxD	RxD+(B)	Data+(B)
4	DTR	RxD-(A)	Data-(A)
5	GND	GND	GND
6	DSR	-	-
7	RTS	-	-
8	CTS	-	-

Software Specifications

µClinux

Kernel Version: 2.6.19

Protocol Stack: ARP, ICMP, IPV4, TCP, UDP, FTP, Telnet, SNMP V1/V2c, HTTP, CHAP, PAP, DHCP, NTP, NFS V2, SMTP, Telnet, PPP, PPPoE

File System: JFFS2, root file system (read only), and user directory (read/write)

Msh: Minix shell command

pppd: Dial in/out over serial port daemon, including PPPoE (Point-to-Point over Ethernet)

Snmpd: SNMP V1 Agent daemon

Busybox: Linux normal command utility

Tinylogin: login and user manager utility

Telnetd: Telnet server daemon

Telnet: Telnet client daemon

Inetd: TCP server manager program

ftpd: FTP server program

ftp: FTP client program

Boa: Web server daemon

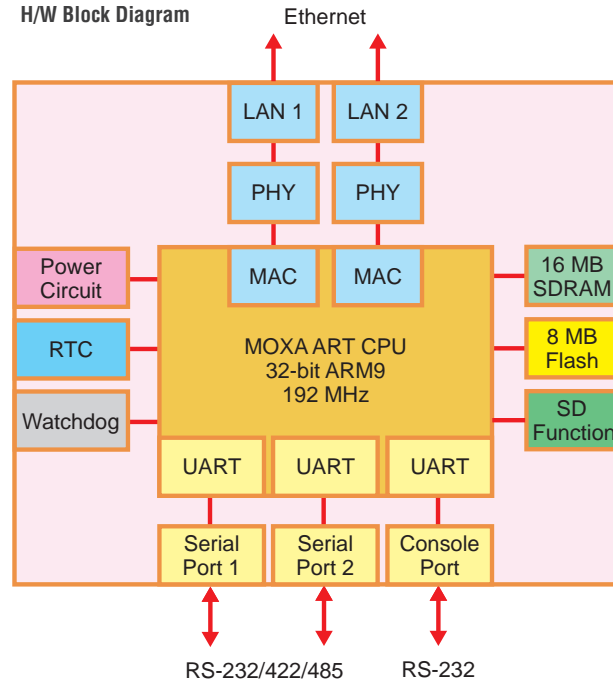
ntpd: Network Time Protocol client utility

Tool Chain:

Arm-elf-gcc: C/C++ PC Cross Compiler

µClibc: POSIX standard C library

H/W Block Diagram



Ordering Information

Available Models

EM-1220-LX: RISC-based embedded core module with 2 serial ports, dual LANs, SD, µClinux (standard operating temperature: -10 to 60°C)

EM-1220-T-LX: RISC-based embedded core module with 2 serial ports, dual LANs, SD, µClinux (wide operating temperature: -40 to 75°C)

EM-1220 Development Kit: Includes the EM-1220-DK snap-on testing board with built-in RJ45 LAN ports and DB9 male serial ports

Package Checklist (module)

- EM-1220-LX or EM-1220-T-LX embedded module
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

Package Checklist (Development Kit)

- EM-1220 embedded module
- EM-1220-DK, the carrier board for the EM-1220 module
- Universal power adaptor set
- Cross-over Ethernet cable
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card