EM-1240 Series

**RISC-based ready-to-run embedded core module with 4 serial ports, dual LANs, SD, μClinux**

- MOXA ART ARM9 32-bit 192 MHz processor
- 16 MB RAM, 8 MB flash on-board
- 4 software-selectable RS-232/422/485 serial ports
- Dual 10/100 Mbps Ethernet for network redundancy
- RS-232 serial console port supporting PPP
- Ready-to-run μClinux Kernel 2.6 platform
- SD signals supported for external SD socket connection
- Built-in RTC, buzzer
- 10 GPIOs reserved for system integration
- Full-function development kit for quick evaluation and application development
- -40 to 75°C wide temperature model available

### Overview

The EM-1240 embedded module features 4 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 related 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 μClinux 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-1240-T model is also available to provide a reliable solution for any harsh environment.

### Appearance

**Embedded Module—Top View**

**Embedded Module—Bottom View**

**Development Kit Appearance**
Embedded Computing Solutions

**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
- Flash: 8 MB onboard

**Storage**
- Storage Expansion: SD signals for external Secure Digital (SD) socket connection

**Ethernet Interface**
- LAN: 2 auto-sensing 10/100 Mbps ports (RJ45)
- Magnetic Isolation Protection: 1.5 KV built-in

**Serial Interface**
- Serial Standards: 4 RS-232/422/485 ports, software-selectable
- ESD Protection: 15 KV for all signals
- Console Port: RS-232 (all signals), RJ45 connector, supports PPP

**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 (supports non-standard baudrates; 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
- LAN: 10M/Link x 2, 100M/Link x 2
- Serial: TxD x 4, RxD x 4

**Physical Characteristics**
- Weight:
  - EM-1240 Module: 50 g
  - EM-1240 Development Kit: 200 g
- Dimensions:
  - EM-1240 Module: 90 x 80 mm (3.54 x 3.15 in)
  - EM-1240 Development Kit: 177 x 115 mm (6.97 x 4.53 in)
- Module Interface: Two 2 x 28 pin-headers (1.27 x 1.27 mm pitch)

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

**Power Requirements**
- Input Voltage: 3.3 VDC
- Power Consumption: 2.5 W (740 mA @ 3.3 VDC)

**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

Note: The Hardware Specifications apply to the embedded computer unit itself, but not to accessories. In particular, the wide temperature specification does not apply to accessories such as the power adaptor and cables.
### Pin Assignment

<table>
<thead>
<tr>
<th>PIN</th>
<th>RS-232</th>
<th>RS-422/485-4w</th>
<th>RS-485-2w</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DCD</td>
<td>TxD-(A)</td>
<td>–</td>
</tr>
<tr>
<td>2</td>
<td>RxO</td>
<td>TxD+(B)</td>
<td>–</td>
</tr>
<tr>
<td>3</td>
<td>TxD</td>
<td>RxO+(B)</td>
<td>Data+(B)</td>
</tr>
<tr>
<td>4</td>
<td>DTR</td>
<td>RxO-(A)</td>
<td>Data-(A)</td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
<td>GND</td>
<td>GND</td>
</tr>
<tr>
<td>6</td>
<td>DSR</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>7</td>
<td>RTS</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>8</td>
<td>CTS</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

### Software Specifications

**μClinux**

**Kernel Version:** 2.6.19

**Protocol Stack:** ARP, ICMP, IPv4, TCP, UDP, FTP, Telnet, SNMP V1, HTTP, CHAP, PAP, DHCP, NTP, NFS V2, SMTP, Telnet, PPP, PPPoE

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

**System Utilities:** msh, busybox, tinylogin, telnet, ftp

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

### H/W Block Diagram

- **Ethernet**
- **LAN 1**
- **LAN 2**
- **PHY**
- **PHY**
- **MOXA ART CPU**
  - 32-bit ARM9
  - 192 MHz
- **16 MB SDRAM**
- **8 MB Flash**
- **SD/GPIO Function**
  - Power Circuit
  - MAC
  - MAC
  - RTC
  - Watchdog
  - UART UART UART UART
  - Console Port
  - Serial Port 1
  - Serial Port 2
  - Serial Port 3
  - Serial Port 4
- **RS-232/422/485**
- **RS-232**

### Available Modules

**EM-1240-LX:** RISC-based embedded core module with 4 serial ports, dual LANs, SD, μClinux OS, -10 to 60°C operating temperature

**EM-1240-T-LX:** RISC-based embedded core module with 4 serial ports, dual LANs, SD, μClinux, -40 to 75°C operating temperature

### Development Kits (must be purchased separately)

**EM-1240 Development Kit:** Includes the EM-1240-DK snap-on testing board with built-in RJ45 LAN ports and DB9 male serial ports

### Ordering Information

**Package Checklist (module)**

- EM-1240-LX or EM-1240-T-LX embedded module

**Package Checklist (Development Kit)**

- EM-1240 embedded module
- EM-1240-DK, the carrier board for the EM-1240 module
- Universal power adaptor set
- Ethernet cable: RJ45 to RJ45 cross-over cable, 100 cm
- DB9 female to terminal block adaptor
- Terminal block (300V, 15A)
- Universal power adaptor set
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

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