V2426 Series

x86 ready-to-run embedded computers with Intel Atom N270, VGA, DVI-I, audio, 2 LANs, 4 serial ports, 6 DIs, 2 DOs, 3 USB 2.0 ports, CompactFlash, 2 peripheral expansion slots

- Intel Atom N270 1.6 GHz processor
- DDR2 SODIMM socket supporting DDR2 533 up to 2 GB (max.)
- Dual independent displays (VGA + DVI-I)
- 2 10/100 Mbps Ethernet ports with M12 connectors
- 4 RS-232/422/485 serial ports (non-standard baudrates supported)
- 3 USB 2.0 ports for high speed peripherals
- 6 DIs, 2 DOs
- CompactFlash socket for storage expansion
- 1 SATA-II connector for hard disk drive expansion
- M12 power connector
- EN50155 certified
- Ready-to-run Embedded Linux, or Windows Embedded Standard 2009 platform
- -40 to 70°C wide temperature models available

Overview

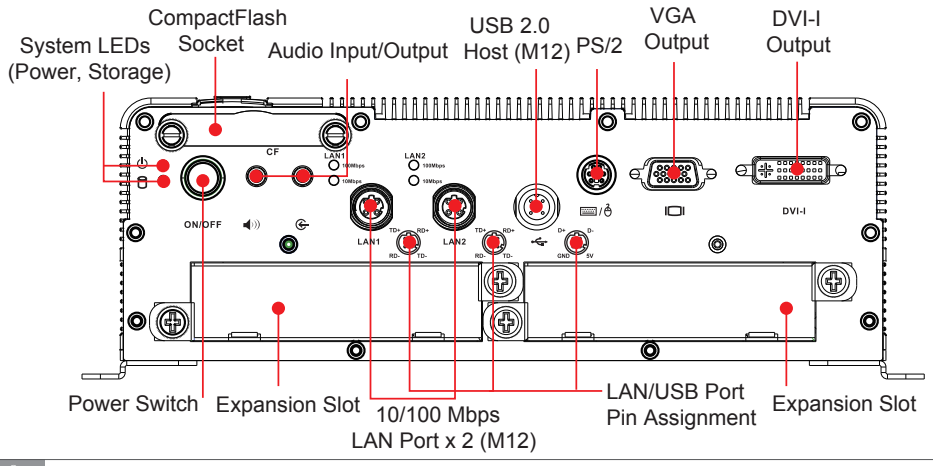
The V2426 Series embedded computers are based on the Intel Atom N270 x86 processor, and feature 4 RS-232/422/485 serial ports, dual LAN ports, and 3 USB 2.0 hosts. In addition, the V2426 computers provide VGA and DVI-I outputs , and are EN 50155 certified, making them particularly well-suited for railway and industrial applications.

The dual 10/100 Mbps Ethernet ports with M12 connectors offer a reliable solution for network redundancy, promising continuous operation for data communication and management. As an added convenience, the V2426 computers have 6 DIs and 2 DOs for connecting digital input/output devices. In addition, the CompactFlash socket, SATA connector, and USB sockets provide the V2426 computers with the reliability needed for industrial applications that require data buffering and storage expansion. Moreover, the V2426 computers come with 2 peripheral expansion slots for inserting different communication modules, such as a 2-port CAN module, an HSDPA, GPS, WLAN module, an 8+8 port digital input/output module, a 2-port serial module, a mini PCI expansion module, and a mini-PCI Express module, giving greater flexibility for setting up different industrial applications at field sites.

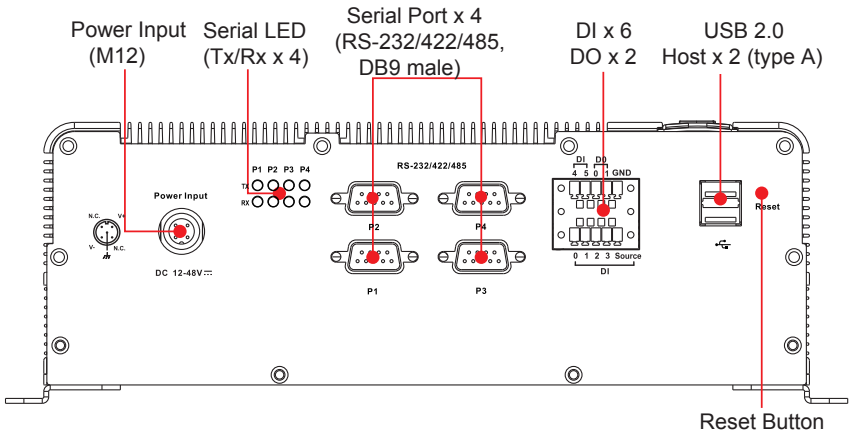
Pre-installed with Linux or Windows Embedded Standard 2009, the V2426 Series provides programmers with a friendly environment for developing sophisticated, bug-free application software at a low cost. Wide temperature models of the V2426 Series that operate reliably in a -40 to 70°C operating temperature range are also available, offering an optimal solution for applications subjected to harsh environments.

Appearance

Front View

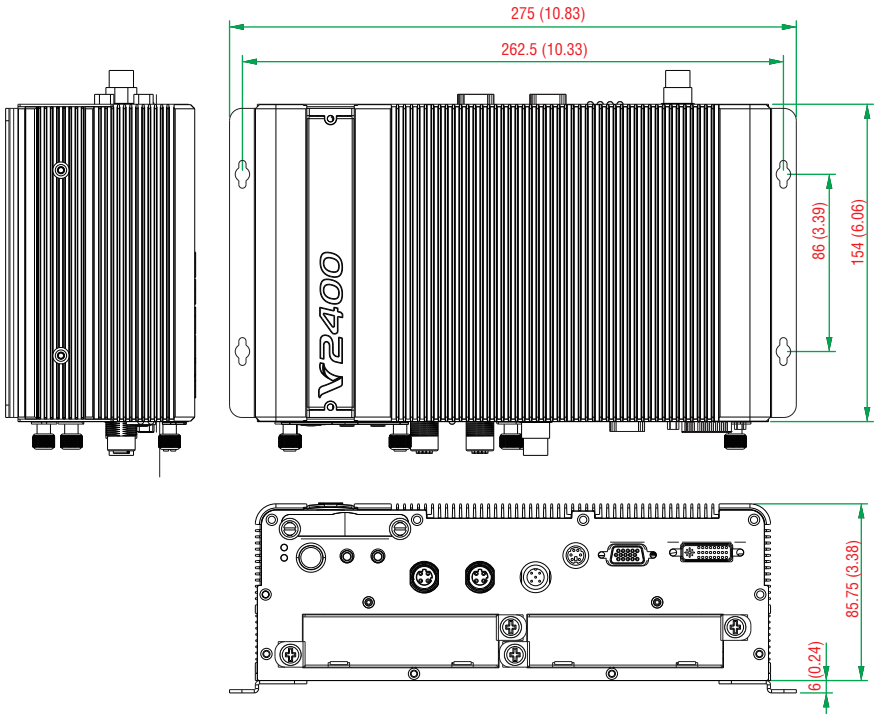


Rear View



Dimensions

Unit: mm (inch)



Hardware Specifications

Computer

CPU: Intel Atom N270 1.6 GHz processor
OS (pre-installed): Linux or Windows Embedded Standard 2009
System Chipset: Intel 945GSE + ICH7-M
BIOS: 8 Mbit Flash BIOS, PLCC type, ACPI function supported
FSB: 533 MHz
System Memory: 1 x 200-pin DDR2 SODIMM socket support DDR2 533 up to 2 GB, built-in 1 GB
Expansion Bus: PCI interface reserved
USB: USB 2.0 compliant hosts, type A connector x 2, supports system boot up, M12 connector x 1

Storage

Built-in: 2 GB onboard industrial DOM to store OS
Storage Expansion: CompactFlash socket for CF card expansion, supporting CF Type-I/II
HDD Support: 1 SATA-II connector for HDD expansion

Other Peripherals

KB/MS: 1 PS/2 interface supporting standard PS/2 keyboard and mouse through Y-type cable
Audio: Line-in, line-out interface

Display

Graphics Controller: Intel Gen 3.5 Integrated Graphics Engine, 250 MHz core render clock and 200 MHz core display clock at 1.05-V core voltage
VGA Interface: DB15 female connector, up to 2048 x 1536 resolution
DVI Interface: DVI-I connector (chrontel CH7307 SDVO to DVI transmitter), up to 1600 x 1200 resolution

Ethernet Interface

LAN: 2 auto-sensing 10/100 Mbps ports (M12)
Magnetic Isolation Protection: 1.5 KV

Serial Interface
Serial Standards: 4 RS-232/422/485 ports*, software selectable (DB9 male)
*COM1's pin 9 signal can be set by jumper as N/C (default), +5 V, or +12 V
ESD Protection: 8 KV for all signals

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

Digital Input
Input Channels: 6, source type
Input Voltage: 0 to 30 VDC
Digital Input Levels for Dry Contacts:
• Logic level 0: Close to GND
• Logic level 1: Open
Digital Input Levels for Wet Contacts:
• Logic level 0: +3 V max.
• Logic level 1: +10 V to +30 V (Source to DI)
Isolation: 3 KV optical isolation

Digital Output
Output Channels: 2, sink type
Output Current: Max. 20 mA per channel
On-state Voltage: 24 VDC nominal
Connector Type: 10-pin screw terminal block (6 DI points, 2 DO points, DI Source, GND)
Isolation: 3 KV optical isolation

LEDs
System: Power, Storage
LAN: 10M/Link x 2, 100M/Link x 2
Serial: TX x 4, RX x 4

Switches and Buttons
Power Switch: on/off (front panel)
Reset Button: For warm reboot (rear panel)

Physical Characteristics
Housing: Aluminum
Weight: 4 kg
Dimensions:
Without ears: 154 x 250 x 86 mm (6.06 x 9.84 x 3.39 in)
With ears:154 x 275 x 92 mm (6.06 x 10.83 x 3.62 in)
Mounting: DIN-Rail, wall, VESA

Environmental Limits
Operating Temperature:
Standard models: -25 to 60°C (-13 to 140°F)
Wide temp. models: -40 to 70°C (-40 to 158°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)
Anti-vibration: EN50155 standard
Anti-shock: EN50155 standard

Power Requirements
Input Voltage: 12 to 48 VDC (M12 connector)
Power Consumption: 48 W
4 A @ 12 VDC
2 A @ 24 VDC
1 A @ 48 VDC

Standards and Certifications
Safety: UL 60950-1, CSA C22.2 No. 60950-1-03, EN 60950-1
EMC: EN 55022 Class A, EN 61000-3-2 Class D, EN 61000-3-3, EN 55024, FCC Part 15 Subpart B Class A
Rail Traffic:EN 50155, EN 50121-3-2, EN 50121-4, IEC 61373
Green Product: RoHS, CRoHS, WEEE

Reliability
Automatic Reboot Trigger: Built-in WDT (watchdog timer) supporting 1-255 level time interval system reset, software programmable
MTBF (mean time between failures): 192,308 hrs

Warranty
Warranty Period: 3 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.

Software Specifications

Linux
OS: Linux 2.6.26, Debian Lenny 5.0
File System: EXT2
Internet Protocol Suite: TCP, UDP, IPv4, SNMPv1/v2c/v3, ICMP, ARP, HTTP, CHAP, PAP, SSH 1.0/2.0, SSL, DHCP, NTP, NFS, Telnet, FTP, TFTP, PPP, PPPoE
Internet Security: OpenVPN, iptables firewall
Web Server (Apache): Allows you to create and manage web sites; supports PHP and XML
Terminal Server (SSH): Provides secure encrypted communications between two un-trusted hosts over an insecure network
Dial-up Networking: PPP Daemon for Linux that allows Unix machines to connect to the Internet through dialup lines, using the PPP protocol, as a PPP server or client. Works with 'chat', 'dip', and 'diald', among (many) others. Supports IP, TCP, UDP, and (for Linux) IPX (Novell).
File Server: Enables remote clients to access files and other resources over the network
Watchdog: Features a hardware function to trigger system reset in a user specified time interval (Moxa API provided)
Application Development Software:
• Moxa API Library (Watchdog timer, Moxa serial I/O control)
• GNU C/C++ compiler
• GNU C library
• Perl

Windows XP Embedded
OS: Windows Embedded Standard 2009 SP1
File System: NTFS
Internet Protocol Suite: DHCP, DNS, FTP, HTTP, SNTP, NTP, Telnet, SMTP, SNMPv2, TCP, UDP, IPv4, ICMP, IGMP, IPsec, TAPI, ICS, PPP, CHAP, EAP, PPPoE, PPTP, NetBIOS
Web Server (IIS): Allows users to create and manage websites
Silverlight 2.0: A free runtime that powers rich application experiences and delivers high quality, interactive video across multiple platforms and browsers, using the .NET framework
Remote Registry Service: Enables remote users to modify registry settings on this computer
Remote Desktop: The Terminal Server Remote Desktop component provides remote access for the desktop of a computer running Terminal Services
Watchdog: Features a hardware function to trigger system reset in a user specified time interval (Moxa API provided)
Enhanced Writer Filter: Redirect disk write operations to volatile (RAM) or non-volatile (disk) storage
File Based Write Filter: The File Based Write Filter (FBWF) component redirects all write requests directed at protected volumes to the overlay cache, which records and displays the changes while preserving the protected status of the target volume.

Application Development Software:
- Moxa API Library
- Microsoft .Net Framework 3.5
- Active Directory Service Interface (ADSI) Core
- Active Template Library (ATL), ASP.NET 2.0
- Common Control Libraries
- Common File Dialogs
- Direct3D, DirectPlay, DirectShow, and Direct show filters
- Mapi32 Libraries
- Message Queuing (MSMQ) Core
- Microsoft Visual C++ Run Time Libraries
- Power Management dynamic-link library
- RPC
- Windows API, Script Engines, and WMI

Ordering Information

Available Models

V2426-XPE: x86 ready-to-run embedded computer with Intel Atom N270, VGA, DVI-I, Audio, 2 LANs, 4 serial ports, 6 DIs, 2 DOs, 3 USB 2.0 ports, CF, 2 peripheral expansion slots, Windows Embedded Standard 2009, -25 to 60°C operating temperature (EN 50155 Class T1)
V2426-LX: x86 ready-to-run embedded computer with Intel Atom N270, VGA, DVI-I, Audio, 2 LANs, 4 serial ports, 6 DIs, 2 DOs, 3 USB 2.0 ports, CF, 2 peripheral expansion slots, Linux 2.6, -25 to 60°C operating temperature (EN 50155 Class T1)
V2426-T-XPE: x86 ready-to-run embedded computer with Intel Atom N270, VGA, DVI-I, Audio, 2 LANs, 4 serial ports, 6 DIs, 2 DOs, 3 USB 2.0 ports, CF, 2 peripheral expansion slots, Windows Embedded Standard 2009, -40 to 70°C operating temperature (EN 50155 Class TX)
V2426-T-LX: x86 ready-to-run embedded computer with Intel Atom N270, VGA, DVI-I, Audio, 2 LANs, 4 serial ports, 6 DIs, 2 DOs, 3 USB 2.0 ports, CF, 2 peripheral expansion slots, Linux 2.6 -40 to 70°C operating temperature (EN 50155 Class TX)

Expansion Modules (can be purchased separately)

EPM-3112: 2 isolated CAN ports, DB9 connector
EPM-3337: HSDPA, GPS, WLAN (11a/b/g/n)
EPM-3438: 8+8 DI/DO with 3 KV digital isolation protection, 2 KHz counter
EPM-3032: 2 isolated RS-232/422/485 ports with DB9 connectors
EPM-DK01: 1-slot mini PCI and mini PCIe expansion module
EPM-3552: 1 VGA or DVI-I display connector

Optional Accessories (can be purchased separately)

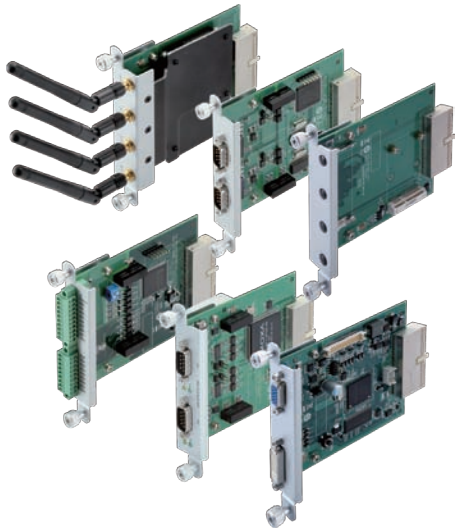
PWR-24250-DT-S1: Power adaptor
PWC-C7US-2B-183: Power cord with 2-pin connector, USA plug
PWC-C7EU-2B-183: Power cord with 2-pin connector, Euro plug
PWC-C7UK-2B-183: Power cord with 2-pin connector, British plug
PWC-C7AU-2B-183: Power cord with 2-pin connector, Australia plug
PWC-C7CN-2B-183: Power cord with 2-pin connector, China plug
FK-75125-01: Hard disk installation package
DK-DC50131-01: DIN-Rail mounting kit

Package Checklist

- V2426 embedded computer
- Terminal block to power jack converter
- PS2 to KB/MS Y-type cable
- Documentation and software CD or DVD
- Quick installation guide (printed)
- Warranty card

V2400 Series Expansion Modules

Expansion peripheral modules (EPM) for the V2400 series



- PCI slots for interface expansion
- EPM-3032: 2 isolated RS-232/422/485 ports with DB9 connectors
- EPM-3112: 2 isolated CAN ports with DB9 connectors
- EPM-3337: HSDPA, GPS, WLAN (11a/b/g/n)
- EPM-3438: 8+8 DI/DO with 3 KV digital isolation protection, 2 KHz counter
- EPM-3552: VGA or DVI-I display module
- EPM-DK01: Mini PCI and Mini PCIe expansion module

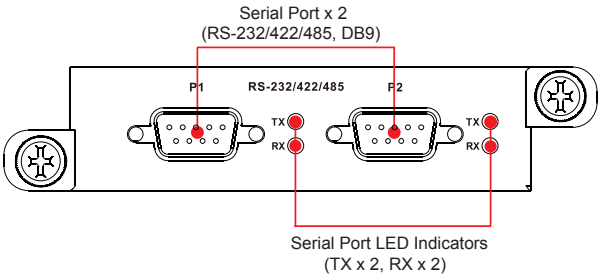
EN50155

Introduction

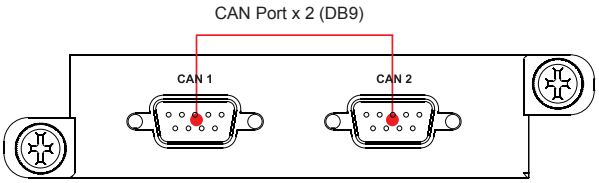
Moxa's V2400 series expansion modules, which come with serial ports, CAN ports, wireless and GPS cards, digital input/output channel card, mini PCI and PCI-e modules, and VGA or DVI-I display connectors, can be used with Moxa's V2422 and V2426 embedded computers, and give end-users the best flexibility for setting up and expanding a variety of industrial applications.

Appearance

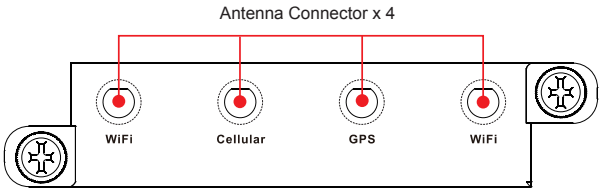
EPM-3032



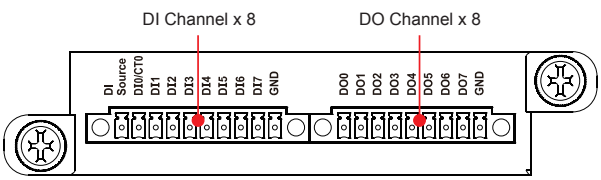
EPM-3112



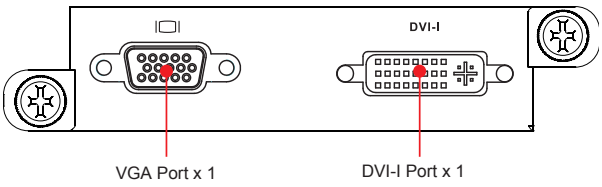
EPM-3337



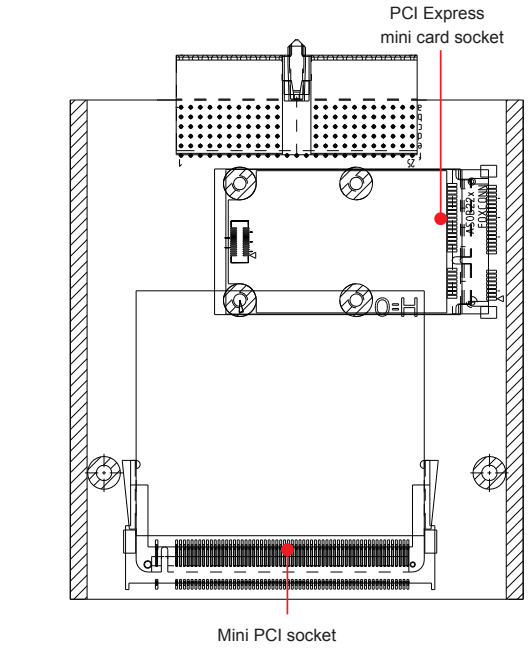
EPM-3438

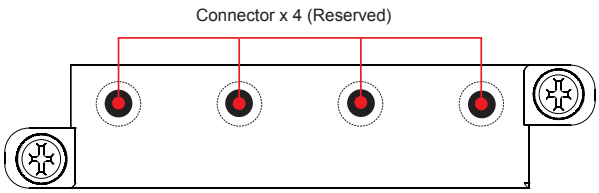


EPM-3552



EPM-DK01





EPM-3032 Specifications

Serial Interface

Serial Standards: 2 RS-232/422/485 ports, software-selectable (DB9 male)
Isolation: 2 KV digital isolation

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

Physical Characteristics

Weight: 137 g
Dimensions: 104 x 121 x 34 mm (4.09 x 4.76 x 1.34 in)

Environmental Limits

Operating Temperature: -40 to 70°C (-40 to 158°F), EN 50155 Class TX

EPM-3112 Specifications

CANbus Communication

Interface: 2 optically isolated CAN2.0A/2.0B compliant ports
CAN Controller: Phillips SJA1000T
Signals: CAN-H, CAN-L
Isolation: 2 KV digital isolation
Speed: 1 Mbps
Connector Type: DB9 male

Physical Characteristics

Weight: 127 g
Dimensions: 104 x 121 x 34 mm (4.09 x 4.76 x 1.34 in)

Environmental Limits

Operating Temperature: -25 to 55°C (-13 to 131°F), EN 50155 Class T1

EPM-3337 Specifications

Cellular Interface

Frequency Bands:
• UMTS/HSDPA: Triple band, 850/1900/1900 MHz
• GSM/GPRS/EDGE: Quad band, 850/900/1800/2100 MHz
• GSM Dass: Small MS
Output Power:
• Class 4 (2 W) for GSM850/900
• Class 3 (0.25 W) for UMTS/HSDPA
• Class E2 (0.5 W) for EDGE850/900
• Class E2 (0.4 W) for EDGE1800/1900
• Class 1 (1 W) for GSM1800/1900

HSDPA Interface

3GPP Release 5:
• 3.6 Mbps, UL 384 Kbps
• UE CAT. [1-6], 11, 12 supported
• Compressed mode (CM) supported according to 3GPP TS25.212

GPS Interface

Tracking: Tracks up to 13 satellites, L1 1575.42 MHz
Accuracy Position: 2.5 m CEP; 5.0 m SEP
Protocols: NMEA-0183 V2.3, E911 AGPS Control plane, GPS dedicated AT commands, Date WGS-84
Tracking sensitivity: -158 dBm (with active antenna)
Start-up Time:
• Hot start: <3s
• Cold start: 30s
• Warm start: 30s
GPS active antenna supply: 3.3 V

WLAN Interface

Supported Modes:
• IEEE 802.11a/b/g/n for client/bridge mode
• IEEE 802.11b/g/n for AP mode (Linux OS only)
Standards:
• IEEE 802.11a/b/g/n for Wireless LAN
• IEEE 802.11i for Wireless Security
Operating Channels (central frequency):
• US: 2.412 to 2.462 GHz (11 channels), 5.18 to 5.24 GHz (4 channels)
• EU: 2.412 to 2.472 GHz (13 channels), 5.18 to 5.24 GHz (4 channels)
• USA: 1 to 11 (2400 to 2483.5 MHz)
• Europe: 1 to 13 (2400 to 2483.5 MHz)
• Japan: 1 to 14 (2400 to 2497 MHz)
802.11g:
• USA: 1 to 11 (2400 to 2483.5 MHz)
• Europe: 1 to 13 (2400 to 2483.5 MHz)
• Japan: 1 to 13 (2400 to 2497 MHz)
802.11a:
• USA: 36 to 165 (5180 to 5825 MHZ)
• Europe: 36 140 (5180 to 5700 MHz)
• Japan: 7 to 11 (5035 to 5055MHz),183 to 189 (4915 to 4945 MHz)
Security: 64-bit and 128-bit WEP encryption, WPA /WPA2-Personal and Enterprise (IEEE 802.1X/RADIUS, TKIP and AES)
Transmission Rates:
• 802.11b: 1, 2, 5.5, 11 Mbps
• 802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps
• 802.11n: 6 to 300 Mbps (multiple rates supported)
TX Transmit Power:
• 802.11b: 1 to 11 Mbps: Typ. 18 dBm (± 1.5 dBm)
• 802.11g: 6 to 24 Mbps: Typ. 18 dBm (± 1.5 dBm); 36 to 48 Mbps: Typ. 17 dBm (± 1.5 dBm); 54 Mbps: Typ. 15 dBm (± 1.5 dBm)
• 802.11a: 6 to 24 Mbps: Typ. 17 dBm (± 1.5 dBm) 36 to 48 Mbps: Typ. 16 dBm (± 1.5 dBm); 54 Mbps: Typ. 14 dBm (± 1.5 dBm)
TX Transmit Power MIMO:
• 802.11a/n (20/40 MHz): MCS15 20 MHz: Typ. 13 dBm (± 1.5 dBm); MCS15 40 MHz: Typ. 12 dBm (± 1.5 dBm)
• 802.11g/n (20/40 MHz): MCS15 20 MHz: Typ. 14 dBm (± 1.5 dBm); MCS15 40 MHz: Typ. 13 dBm (± -1.5 dBm)
RX Sensitivity:
• 802.11b:
-92 dBm @ 1 Mbps, -90 dBm @ 2 Mbps, -88 dBm @ 5.5 Mbps, -84 dBm @ 11 Mbps
• 802.11g:
-87 dBm @ 6 Mbps, -86 dBm @ 9 Mbps, -85 dBm @ 12 Mbps, -82 dBm @ 18 Mbps, -80 dBm @ 24 Mbps, -76 dBm @ 36 Mbps, -72 dBm @ 48 Mbps, -70 dBm @ 54 Mbps
• 802.11a:
-87 dBm @ 6 Mbps, -86 dBm @ 9 Mbps, -85 dBm @ 12 Mbps, -82 dBm @ 18 Mbps,
-80 dBm @ 24 Mbps, -76 dBm @ 36 Mbps, -72 dBm @ 48 Mbps, -70 dBm @ 54 Mbps
RX Sensitivity MIMO:
• 802.11a/n:
-68 dBm @ MCS15 40 MHz, -70 dBm @ MCS7 40 MHz, -69 dBm @ MCS15 20 MHz, -71 dBm @ MCS7 20 MHz
• 802.11g/n:
-68 dBm @ MCS15 40 MHz, -70 dBm @ MCS7 40 MHz, -69 dBm @ MCS15 20 MHz,
-71 dBm @ MCS7 20 MHz
AP-only Protocols: ARP, BOOTP, DHCP, dynamic VLAN-Tags for 802.1X-Clients, STP/RSTP (IEEE 802.1D/w)
Default Antenna: 2 dBi dual-band omni-directional antenna, RP-SMA (male)
Connector for External Antennas: RP-SMA (female)

Physical Characteristics

Weight: 220 g
Dimensions: 104 x 121 x 34 mm (4.09 x 4.76 x 1.34 in)

Environmental Limits

Operating Temperature: -25 to 55°C (-13 to 131°F), EN 50155 Class T1

EPM-3438 Specifications

Digital Input

Input Channels: 8, source type
Input Voltage: 0 to 5 VDC at 15 Hz
Digital Input Levels:
• Logic level 0: Close to GND
• Logic level 1: Open
Connector Type: Terminal block
Counter Frequency: 2 KHz (DI0 only)

Digital Output

Output Channels: 8, sink type, 0 to 5 VDC
Output Current: Max. 20 mA per channel
Output Voltage:
• Logic 0: 0 to 0.55 V
• Logic 1: 4.2 to 5.0 V
Connector Type: Terminal block

Physical Characteristics

Weight: 120 g
Dimensions: 104 x 121 x 34 mm (4.09 x 4.76 x 1.34 in)

Environmental Limits

Operating Temperature: -40 to 70°C (-40 to 158°F), EN 50155 Class TX

EPM-3552 Specifications

Display
Graphics Controller: DsiplayLink DL-195
VGA Interface: 15-pin D-sub connector (female)
DVI Interface: 24-pin DVI-I connector (female)
Resolution: Up to 1920 x 1600 (2048 x 1152 for wide screen) resolution

Physical Characteristics
Weight: 130 g
Dimensions: 104 x 121 x 34 mm (4.09 x 4.76 x 1.34 in)

Environmental Limits
Operating Temperature: -25 to 55°C (-13 to 131°F), EN 50155 Class T1

EPM-DK01 Specifications

PCI Express Mini Slot
Interface: PCI-Express V1.0 (one lane)
USB 2.0 Bus SIM Card Holder: Reserved for Cellular applications

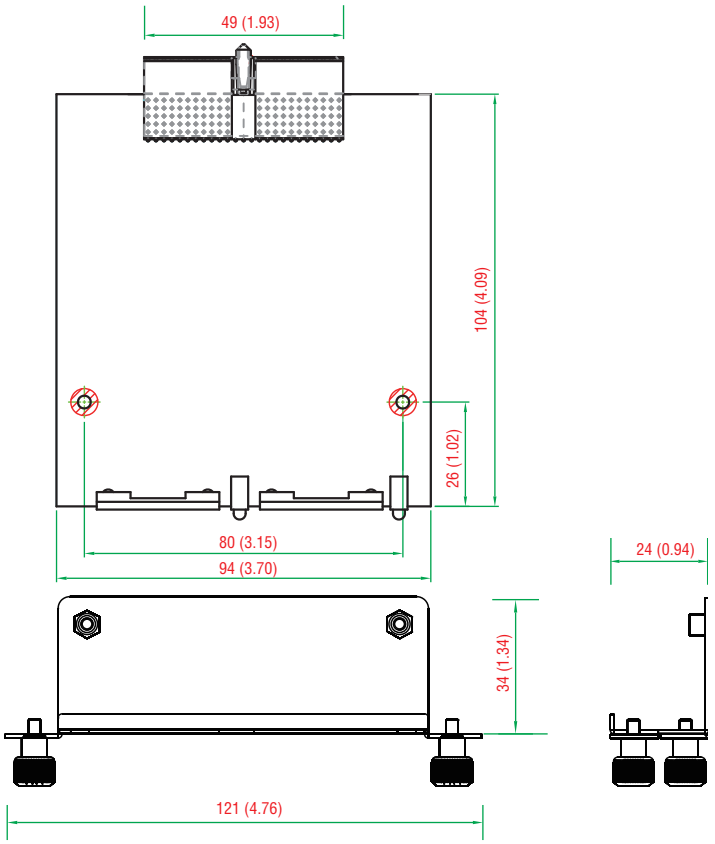
Mini PCI Slot
Interface: PCI
Bus Frequency: 32-bit, 33 MHz PCI

Physical Characteristics
Weight: 117 g

Environmental Limits
Operating Temperature: -40 to 70°C (-40 to 158°F), EN 50155 Class TX

Dimensions

Unit: mm (inch)



Ordering Information

Available Models
EPM-3032: 2 isolated RS-232/422/485 ports with DB9 connectors, -40 to 70°C operating temperature
EPM-3112: 2 isolated CAN ports with DB9 connectors, -25 to 55°C operating temperature
EPM-3337: HSDPA, GPS, WLAN (11a/b/g/n), -25 to 55°C operating temperature
EPM-3438: 8+8 DI/DO with 3 KV digital isolation protection, 2 KHz counter, -40 to 70°C operating temperature
EPM-3552: VGA or DVI-I display module, -25 to 55°C operating temperature
EPM-DK01: Mini PCI and Mini PCIe expansion module, -40 to 70°C operating temperature

Package Checklist
- EPM expansion module