TC-6110 Series

EN 50155-compliant x86 train computer with dual LAN ports, dual power inputs, USB, VGA, serial port, CompactFlash, and 4 expansion slots

- Durable, fanless design for rolling stock applications
- Modular design for easy storage and peripheral expansion
- Comes with Moxa SafeGuard™, for HDD in wide temperature and high vibration environments
- Compact rackmount 3U housing, wide 24 to 110 VDC isolated power supply
- Supports SNMP-based system configuration, control, and monitoring
- Essential compliance with EN 50155*
- Conformal coating models available

*Moxa defines "essential compliance" to include those EN 50155 requirements that make products more suitable for rolling stock railway applications.

EN 50155

Windows Embedded Standard 7

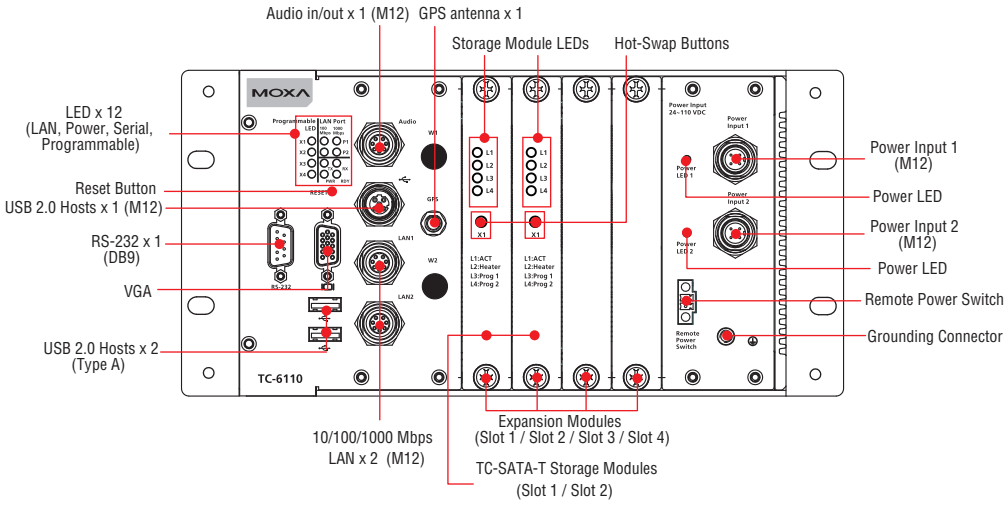
Introduction

TC-6110 train computers are designed specifically for car-borne train automation like network video recorders, passenger information systems, condition monitoring, and train-to-ground communications. The computers come with two Gigabit LAN ports, one RS-232 serial port, three USB 2.0 ports, and two TC-SATA-T storage modules, giving customers a versatile solution for on-board train computing.

Designed for high reliability in the demanding conditions experienced in on-board train environments, TC-6110 computers come with M12 connectors on both the Gigabit LAN ports and dual power inputs, and an additional M12 USB port. The TC-6000 Series expansion modules further allow for highly flexible, convenient integration into a variety of systems. Users can easily add storage modules for additional capacity, Gigabit switch modules to expand network connectivity and/or bandwidth, serial and CAN bus modules for additional serial/CAN device connectivity, or mini PCIe modules for additional peripheral communications.

For the strongest component protection in harsh environments, TC-6110 Series computers are available with conformal coating.

Appearance



Hardware Specifications

Computer
CPU: Intel Atom D525, dual core 64 bit threaded 1.8 GHz, 1 MB for L2 cache
OS (pre-installed): Windows Embedded Standard 7 or Linux
System Chipset: ICH8-M
System Memory: 4 GB capacity, 2 GB pre-installed: 2 slots of 2 GB DDR3-1066 204 pin SO-DIMM SDRAM
USB: 3 USB 2.0 compliant hosts; 2 with type A connectors supporting system bootup, 1 with M12 connector

Storage
Built-in: 8 GB onboard industrial CompactFlash card for operating system storage
HDD Support: 2 removable TC-SATA-T storage trays, for 2.5" SSD or HDD storage drive (with Intelligent Heating Solution)

Other Peripherals
Audio: 1 line in / line out interface with M12 connector
Independent Sensors: Accelerometer (G-sensor), thermometer (T-sensor)

Display
Graphics Controller: Integrated Intel GMA 3150 (Pineview) Graphics Engine
VGA Interface: Up to 2048 x 1536 resolution at 75 Hz, Female DB15 connector

Ethernet Interface
LAN: 2 auto-sensing 10/100/1000 Mbps ports (M12)

GPS Module
Receiver Types: 50 channels, GPS L1 C/A code, SBAS (WAAS), EGNOS, MSAS, GAGAN
Acquisition:
• Cold start: 29 s
• Warm start: 29 s
• Aided start: 1 s
• Hot start: 1 s
Sensitivity:
• Tracking & Navigation: -160 dBm
• Reacquisition: -160 dBm
• Cold start: -147 dBm
Accuracy:
• Autonomous: 2.5 m
• SBAS: 2.0 m
Protocols: NMEA, UBX binary, max. update rate: 5 Hz (ROM version)
Time Pulse: 0.25 Hz to 1 kHz
Velocity Accuracy: 0.1 m/s
Heading Accuracy: 0.5°
A-GPS: AssistNow Online/Offline, SUPL (Open Mobile Alliance) compliant
Operational Limits:
• Dynamics ≤ 4 g
• Altitude 50,000 m
• Velocity 500 m/s
Connector Type: QMA

WLAN Module (Available on request)
Standards: IEEE 802.11 a/b/g/n for wireless LAN
Security: WEP, TKIP, and AES hardware encryption
Antenna Type: 2 QMA connectors (female type)
Mode: Client (default), Access Point (available on request)

Serial Interface
Serial Standards: 1 RS-232 port (DB9 male)
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS
Baudrate: Up to 115.2 kbps

Serial Signals
RS-232: TxD, RxD, DTR, DSR, RTS, CTS, DCD, GND

LEDs
System: Independent "Power" and "System Ready" signals
LAN: 100M/Link x 2, 1000M/Link x 2
Serial: TX x 1, RX x 1
Other: Programmable x 4

Physical Characteristics
Housing: Aluminum and SECC sheet metal (1 mm)
Weight: 5 kg
Dimensions:
• Without ears: 210 x 222 x 133 mm (8.27 x 8.74 x 5.24 in)
• With ears: 210 x 269 x 133 mm (8.27 x 10.60 x 5.24 in)
Mounting: Rack

Environmental Limits
Operating Temperature:
• Standard models: -25 to 55°C (-13 to 140°F), (EN 50155 Class T1)
• Wide temp. models: -40 to 70°C (-40 to 158°F), (EN 50155 Class Tx)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)
Anti-vibration: Meets EN 50155 standard
Anti-shock: Meets EN 50155 standard

Power
Reset Button: For warm reboot (front panel)
Input Voltage: 24 to 110 VDC, M12 connector
Power Consumption: 32 W (without heater), 62 W (with heater), no SSD/HDD attached
Note: 24 VDC and 110 VDC compliant with EN 50155

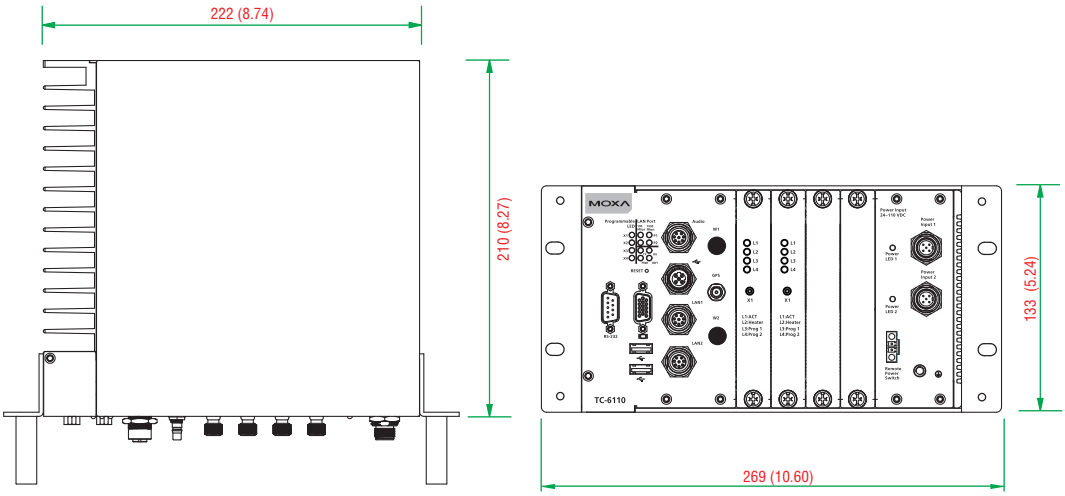
Standards and Certifications
Safety: UL 60950-1, CSA C22.2 No. 60950-1-07, EN 60950-1
EMC: EN 55022:2010 Class A, EN 55024:2010, FCC CFR Title 47 Part 15 Subpart B: 2011 Class A, CISPR 22:2008, ANSI C63.4:2009, ICES-003 Issue 5:2012 Class A
RF: EN 62311:Jan 2008, ETSI EN 301 489-1:V1.9.2 (2011-09), ETSI EN 301 489-3:V1.4.1 (2002-08), ETSI EN 301 893:V1.6.1 (2011-11), ETSI EN 300 328:V1.7.1 (2006-10), ETSI EN 300 440-1:V1.6.1 (2010-08), ETSI EN 300 440-2:V1.4.1 (2010-08)
Rail Traffic: EN 50155:2007 (essential compliance*), EN 50121-1:2006 for EMC test, EN 50121-3-2:2006, EN 50121-4:2006, EN 5011:2009+A1:2010, EN 61000-6-4:2007, CISPR 16-1-2:2003/A2:2006, CISPR 16-2-1:2003+A1:2005, CISPR 16-2-3:2006, EN 60068-2-1:2007, EN 60068-2-2:2007, EN 61373:1999
*Please contact Moxa or a Moxa distributor for details.
Environmental Tests: EN 60068-2-1:2007, EN 60068-2-2:2007, EN 61373:1999

Reliability
Automatic Reboot Trigger: Built-in WDT (watchdog timer) supporting system reset with software programmable time intervals of 1-255

Warranty
Warranty Period: 3 years
Details: See www.moxa.com/warranty
Note: These hardware specifications describe the embedded computer unit itself, but not its official accessories. In particular, the wide temperature specification does not apply to accessories such as power adaptors and cables.

Dimensions

Unit: mm (inch)



Software Specifications

Linux

OS: Linux Debian 7
File System: EXT 4
Internet Protocol Suite: TCP, UDP, IPv4, SNMPv1/v2c/v3, ICMP, ARP, HTTP, SSH 1.0/2.0, SSL, DHCP, NTP, NFS, Telent FTP, TFTP, PPP, PPPoE
Internet Security: OpenVPN, iptables firewall
Web Server (Apache): Allows you to create and manage websites; supports PHP and XML
Secure Shell for Remote Access: SSH allows remote logins to a secure encrypted console from any connected network Dial-up Networking: PPP Daemon for Linux that allows Unix machines to connect to the Internet through dialup lines, using the Point-to-Point Protocol (PPP). Works with 'chat', 'dip', and 'dialup'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: A watchdog timer that triggers a system reset upon software freezes, for both specific applications and system-wide failures.
Application Development Software:
• Moxa API Library
• GNU C/C++ cross-compiler
• GNU C library
• Perl
Software Package:
• SNMP
• SafeGaurd technology

Windows Embedded Standard 7

Core OS:
• Windows 7 Embedded, 32 bit
• Sensor and Location Platform
• Remote Procedure Call
Applications and Services Development:
• .Net Framework 4.0
• Remote Desktop Protocol 7.1
• COM OLE Application Support
• COM+ Application Support
• MSMQ
Internet Services:
• Internet Explorer 8.0
• IIS 7.0
Diagnostics:
• Common Diagnostic Tools
• Problem Reports and Solutions
Fonts:
• Chinese (Trad. and Simp.), Middle East, South East Asian, and South Asian Fonts
• True Type Fonts
Graphics and Multimedia:
• MPEG DTV-DVD Audio Decoder (MPEG-2, AAC)
• MPEG Layer-3 Audio Codecs(MP3)
• MPEG4 Decoders
• Windows Media Video VC-1 (WMV) Codecs
• DirectX and Windows Device Experience
• Windows Media Player 12
Management:
• Group Policy Management
• Windows Management Instrument (WMI)
• Windows Update
Networking:
• Extensible Authentication Protocol (EAP)
• Internet Authentication Service
• Telnet Server
• Bluetooth
• Domain Services
• Network Access Protection
• Network and Sharing Center
• Quality of Service
• Remote Access Service (RAS)
• Telephony API Client
• Windows Firewall
• Wireless Networking

Security:
- Credential Roaming Service
- Credentials and Certificate Management
- Windows Authorization Manager (AZMAN)
- Windows Security Center
- Active Directory Rights Management
- Security Base
- Encrypted File System (EFS)

Embedded Features:
- Enhanced Write Filter(EWF)
- File-Based Write Filter (FBWF)
- Message Box Default Reply
- Registry Filter
- WSDAPI for .NET

File Systems and Data Storage:
- Windows Data Access Components
- Windows Backup and Restore

Embedded Self-Health Diagnostics: SNMP-based remote scripting layer for monitoring, reporting, and control

Ordering Information

Available Models

TC-6110-W7E: Modular 3U/42HP train computer, Intel Atom D525 1.8 GHz CPU, 4 expansion slots, 24 to 110 VDC isolated power, WLAN module (available on request), Win7 Embedded (32-bit) , -25 to 55°C operating temperature range, compliant with EN 50155 Class T1
TC-6110-T-W7E: Modular 3U/42HP train computer, Intel Atom D525 1.8 GHz CPU, 4 expansion slots, 24 to 110 VDC isolated power, WLAN module (available on request), Win7 Embedded (32-bit), -40 to 70°C operating temperature range, compliant with EN 50155 Class TX
TC-6110-CT-W7E: Modular 3U/42HP train computer, Intel Atom D525 1.8 GHz CPU, 4 expansion slots, 24 to 110 VDC isolated power, conformal coating, WLAN module (available on request), Win7 Embedded (32-bit) , -25 to 55°C operating temperature range, compliant with EN 50155 Class T1
TC-6110-CT-T-W7E: Modular 3U/42HP train computer, Intel Atom D525 1.8 GHz CPU, 4 expansion slots, 24 to 110 VDC isolated power, conformal coating, WLAN module (available on request), Win7 Embedded (32-bit), -40 to 70°C operating temperature range, compliant with EN 50155 Class TX
TC-6110-LX: Modular 3U/42HP train computer, Intel Atom D525 1.8 GHz CPU, 4 expansion slots, 24 to 110 VDC isolated power, WLAN module (available on request), Linux Debian 7, -25 to 55°C operating temperature range, compliant with EN 50155 Class T1
TC-6110-T-LX: Modular 3U/42HP train computer, Intel Atom D525 1.8 GHz CPU, 4 expansion slots, 24 to 110 VDC isolated power, WLAN module (available on request), Linux Debian 7, -40 to 70°C operating temperature range, compliant with EN 50155 Class TX
TC-6110-CT-LX: Modular 3U/42HP train computer, Intel Atom D525 1.8 GHz CPU, 4 expansion slots, 24 to 110 VDC isolated power, conformal coating, WLAN module (available on request), Linux Debian 7, -25 to 55°C operating temperature range, compliant with EN 50155 Class T1
TC-6110-CT-T-LX: Modular 3U/42HP train computer, Intel Atom D525 1.8 GHz CPU, 4 expansion slots, 24 to 110 VDC isolated power, conformal coating, WLAN module (available on request), Linux Debian 7, -40 to 70°C operating temperature range, compliant with EN 50155 Class TX

Package Checklist

- TC-6110 train computer
- Rackmount kit
- Power switch with cable extender
- M12 connector (M12A-5P-IP68)
- Power cable (CBL-Power Jack to M12)
- Quick installation guide (printed)
- Documentation and software CD or DVD
- Warranty card