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
> Complies with all EN 50155 mandatory test items*
> Conformal coating models available

*This product is suitable for rolling stock railway applications, as defined by the EN 50155 standard. For a more detailed statement, click here: www.moxa.com/doc/specs/EN_50155_Compliance.pdf

EN 50155

Windows® Embedded Standard 7   RoHS   c UL us   CE   FC
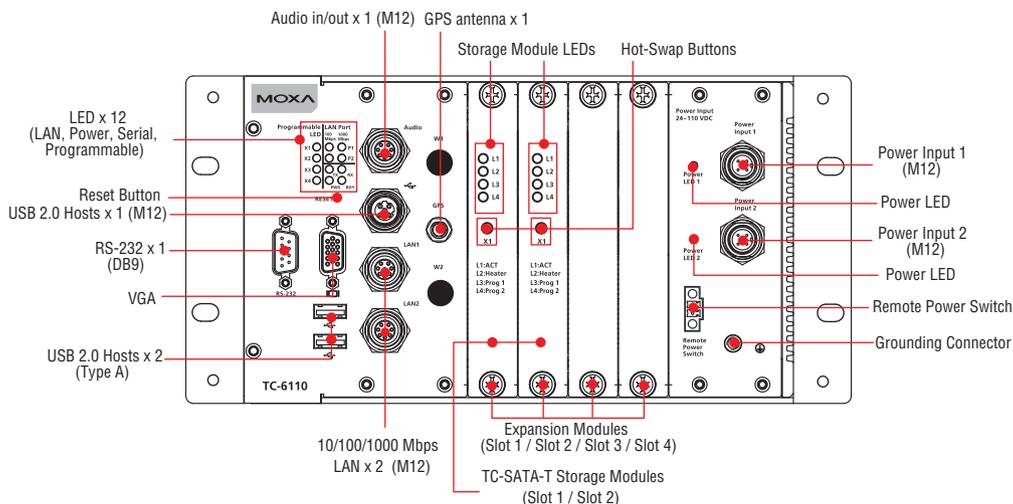
Introduction

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

Audio in/out x 1 (M12)   GPS antenna x 1
Storage Module LEDs   Hot-Swap Buttons
LED x 12 (LAN, Power, Serial, Programmable)
Reset Button
USB 2.0 Hosts x 1 (M12)
RS-232 x 1 (DB9)
VGA
USB 2.0 Hosts x 2 (Type A)
10/100/1000 Mbps LAN x 2 (M12)
TC-SATA-T Storage Modules (Slot 1 / Slot 2)
Expansion Modules (Slot 1 / Slot 2 / Slot 3 / Slot 4)
Power Input 1 (M12)
Power LED
Power Input 2 (M12)
Power LED
Remote Power Switch
Grounding Connector

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⋮ Hardware Specifications

Computer

CPU: Intel Atom D525, dual-core 64-bit threaded 1.8 GHz, 1 MB for L2 cache
OS: Windows Embedded Standard 7 or Linux
Note: The OS is pre-installed.
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: USB 2.0 hosts x 3 (Type A connectors x 2, supporting system boot up; D-coded, 5-pin, female M12 connectors x 1)

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-inch SSD or HDD storage drive (with Intelligent Heating Solution)

Other Peripherals

Audio: 1 line in / line out interface with A-coded, 8-pin, female 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, DB9 female connector

Ethernet Interface

LAN: Auto-sensing 10/100/1000 Mbps ports (A-coded, 8-pin, female M12) x 2

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 (11.11 lb)
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; A-coded, 5-pin, male 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 55032:2010 Class A, EN 55024:2010, FCC CFR Title 47 Part 15 Subpart B: 2011 Class A, CISPR 32:2008, 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*, EN 50121-1:2006 for EMC test, 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
*This product is suitable for rolling stock railway applications, as defined by the EN 50155 standard. For a more detailed statement, click here: www.moxa.com/doc/specs/EN_50155_Compliance.pdf
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

MTBF (mean time between failures)

Time: 360,616 hrs
**Standard:** Telcordia (Bellcore) Standard TR/SR

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 adapters and cables.

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Dimensions

Unit: mm (inch)

222 (8.74)

210 (8.27)

133 (5.24)

269 (10.60)
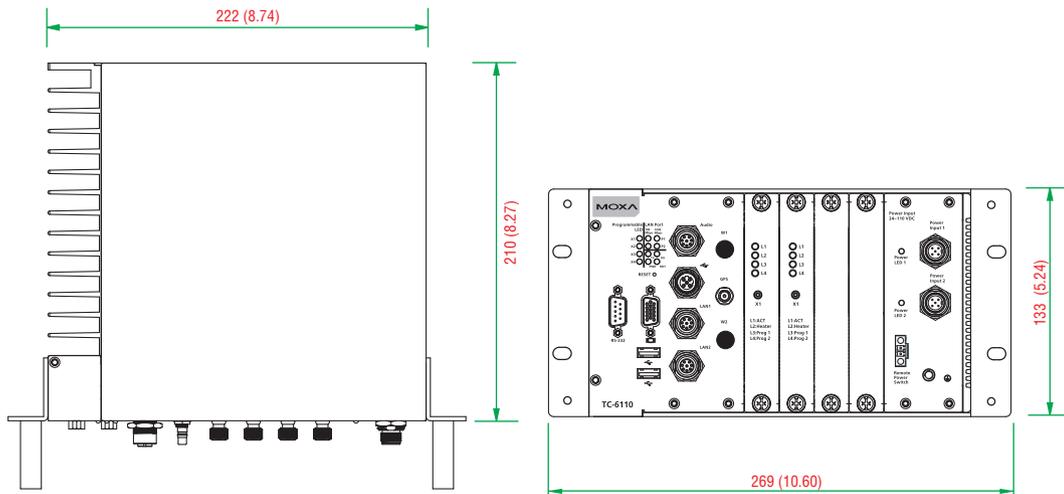
Software Specifications

Linux

OS: Linux Debian 7

Web Server (Apache): Allows you to create and manage websites; supports PHP and XML

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

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 Storrage:
• 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