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.
### 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**: 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
- **Ethernet Interface**: Up to 2048 x 1536 resolution at 75 Hz, DB9 female connector

#### GPS Module
- **Receiver Types**: 50 channels, GPS L1 C/A code, SBAS (WAAS), EGNOS, MSAS, GAGAN

#### Flow Control
- **Serial Signals**: RTS/CTS
- **Baudrate**: Up to 115.2 kbps

#### 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
- **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
- **Warranty**: 3 years

### Standards and Certifications
- **Safety**: UL 60950-1, CSA C22.2 No. 60950-1-07, EN 60950-1
- **EMC**: EN 55032:2010 Class A
- **Standards and Certifications**:
  - Interoperability: EN 60950-1
  - Safety: EN 61326-1:2006
  - Immunity: EN 61000-6-3:2007
  - Interference: EN 300 440-1:V1.6.1 (2010-08), EN 300 440-2:V1.4.1 (2010-08)
  - *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

### 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): 360,616 hrs
- **Warranty**: 3 years

### Notes
- All units of measurement are metric unless otherwise specified.
- All tests are conducted at standard test conditions with a 50% duty cycle unless otherwise specified.
- Values are the worst-case result from 21 C to 25 C (70 F to 77 F).
- **System Temperature**: 100 F (38 C) max.
- **CPU Temperature**: 110 F (43 C) max.
- **CPU Fan Temperature**: 120 F (49 C) max.
- Motor rotation must be supported by the embedded computer unit itself, not its official accessories. In particular, the wide temperature specification does not apply to accessories such as power adapters and cables.

See www.moxa.com/warranty for more information.
**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 1/2/2.0, 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 Storage:
• Windows Data Access Components
• Windows Backup and Restore

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

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