



Product size and connectors may vary depending on configuration

## TrainWise® Infotainment Display

The TrainWise® Infotainment Display (DS17) features the latest design in the rail transit industry for on-board passenger information, advertising, and infotainment services.

Available in a variety of form factors and resolutions, and with custom enclosure options to suit a wide variety of installation requirements.

The DS17 is designed for easy installation and integration with the train's Ethernet network and onboard subsystems. It operates over a wide range of voltages for direct connection to the vehicle's power system.

## Technical compliance

Railway standards	Compliant with IEEE and IEC rail design standards (including IEEE 16 and IEC60571/ EN50155) IEC 61375-3-4 Electronic railway equipment – Train communication network (TCN) – Part 3-4: Ethernet Consist Network (ECN)
Fire, smoke and toxicity	Compliant to 49 CFR Part 238.103 guidelines and NFPA-130

## Display

Display	TFT LCD with LED Backlight
Display characteristics	Custom options available for specific project requirements: <ul style="list-style-type: none"> <li>• Display resolution</li> <li>• Standard or ultra-widescreen (“stretch”) aspect ratio</li> <li>• Sunlight-readable</li> <li>• Contrast ratio</li> </ul>
Brightness adjustment	Automatically via ambient light sensor
Viewing angle	>170° (H/V)

## Processor and storage

Processor	i.MX6 with ARM Cortex A9 processor
Operating system	Linux, QNX
OS memory	1 GB DRAM, 1 GB NAND flash
Data logging capacity	4 GB Solid State Flash Memory (Larger memory configurations available)
Real-time clock	Battery backup for up to 8 years

## Communications

Ethernet ports	2	IEEE 1473 (Type E) Ethernet, 100 Mbps, M12 D-Coded
USB ports	1	x Type C USB 2.0 On-The-Go (OTG)
Protocol support	✓	Protocols included in IEC 61375-3-4 Electronic railway equipment – Train communication network (TCN) – Part 3-4: Ethernet Consist Network for Standard End Devices
Secure web server	✓	Secure web server providing remote access for PTU, operations, and maintenance

## Electrical interfaces

Power supply	1	Operating voltage range: 16VDC – 90VDC
Power consumption		Specific to each display type
Status output	1	Form A, 0.5 Amp, normally open, solid state output
Configuration inputs	6	Self-powered inputs, jumpered into vehicle interface connector to define unit location or other identification

## Mechanical characteristics

Enclosure	Open-frame to allow rear mounting inside rail cars. Other enclosure types available as required; e.g. double-sided, window-mounted
Weight	Specific to each display type
Connectors	Ethernet: 2 x M12 D-coded Gigabit Ethernet (provision for daisy-chaining) USB: 1 x USB Type C Vehicle Interface: MIL-DTL-5015/SAE-AS50151 circular connector or alternate as required
Ingress protection	Front: IP51 - Back / Top / Sides: IP50

## Environmental conditions

Operating temperature	-40°F to +158°F (-40°C to +70°C)
Storage temperature	-40°F to +185°F (-40°C to +85°C)
Shock and vibration	IEC 61373; Category 1, Class A
Dielectric withstand	1.15kVAC circuit to circuit and circuit to chassis

## Electromagnetic compatibility

Surge immunity	IEC 62236-3-2, Table 7
Conducted emissions	IEC 62236-3-2, Table 3, 4, & 5
Conducted immunity	IEC 62236-3-2, Table 7 & 8
Radiated emissions	IEC 62236-3-2, Table 6
Radiated immunity	IEC 62236-3-2, Table 9 (with RF susceptibility verified to 6 GHz)
Electrical fast transient	IEC 62236-3-2, Table 7 & 8
Electrostatic discharge	IEC 62236-3-2, Table 9



Product size and connectors may vary depending on configuration

## TrainWise® Public Address Amplifier

The TrainWise® Public Address (PA) Amplifier (PC07) is an Ethernet connected audio amplifier that has four separate, independently controlled output channels to drive multiple speaker arrays.

It maintains high fidelity and clarity by dynamically adjusting for ambient noise and matching the output impedance of the audio speaker lines.

The PC07 is an important part of a modern, Ethernet based digital audio Passenger Information System.

The PA Amplifier is part of the complete TrainWise® Passenger Information System suite that includes servers, automated signage, and crew and passenger intercoms. Used together, these products provide an IEC 61375-3-4-compliant system that enhances rider comfort and optimizes communication between drivers, passengers, operations centers, and maintenance crews.

## Technical compliance

Railway standards	Compliant with IEEE and IEC rail design standards (including IEEE 16 and IEC60571/ EN50155) IEC 61375-3-4 Electronic railway equipment – Train communication network (TCN) – Part 3-4: Ethernet Consist Network (ECN) IEEE 1722 Audio Video Bridging and Time-Sensitive Networking protocols
Fire, smoke and toxicity	Compliant to 49 CFR Part 238.103 guidelines and NFPA-130

## Options

Assistive listening device support	Can be paired with a separate induction loop amplifier to drive on-board T-coil loops for passengers using assistive listening devices.
Trainline interface customization	Can be customized to support any legacy analog PA and IC trainline configuration.

## Electrical interfaces

Power supply	1	Operating voltage range: 16VDC – 90VDC
Power consumption		50 Watt (Max), 85 Watt peak
Configuration inputs	6	Self-powered inputs for jumpers or dry contacts; can be used to define unit location/ID
ECN Ethernet ports	1	M12 D-coded: connection to Ethernet Car Network (ECN)
Ethernet ring ports	2	M12 A-coded: allows PEI to be a member of a Quester Tangent Passenger Information System Communications Ethernet Network.
Serial ports	2	RS485 data channels
Trainline interface	✓	Audio trainline input/output signals Audio output frequency response: 100Hz – 10kHz, +1, -2dB

## Other interfaces

Speaker channels	4	Independently controllable audio output channels Frequency response: 100Hz – 10kHz, +1, -2dB Power output / channel: 10 Watts continuous, 50 Watts peak Total harmonic distortion: <1% @ 1Khz, full output
Audio input (external microphone)	1	For use with external microphones (e.g. Ambient Noise Sensing microphones)
Status LEDs	✓	Power, Health status, Fault

## Mechanical characteristics

Dimensions	13.7 in x 10 in x 5.2 in (34.8 cm x 25.4 cm x 13.2 cm)
Weight	9 lb / 4.1 kg (approximate)
Connectors	Ethernet: 2 x M12 D-coded; 2 x M12 A-coded Vehicle Interface: MIL-DTL-5015/SAE-AS50151 circular connector or alternate as required
Ingress protection	IP30

## Environmental conditions

Operating temperature	-40°F to +158°F (-40°C to +70°C)
Storage temperature	-40°F to +185°F (-40°C to +85°C)
Shock and vibration	IEC 61373; Category 1, Class A
Dielectric withstand	1.15kVAC circuit to circuit and circuit to chassis

## Electromagnetic compatibility

Surge immunity	IEC 62236-3-2, Table 7
Conducted emissions	IEC 62236-3-2, Table 3, 4, & 5
Conducted immunity	IEC 62236-3-2, Table 7 & 8
Radiated emissions	IEC 62236-3-2, Table 6
Radiated immunity	IEC 62236-3-2, Table 9 (with RF susceptibility verified to 6 GHz)
Electrical fast transient	IEC 62236-3-2, Table 7 & 8
Electrostatic discharge	IEC 62236-3-2, Table 9

## Communication

ECN protocol support	Protocols included in IEC 61375-3-4 Electronic railway equipment – Train communication network (TCN) – Part 3-4: Ethernet Consist Network (ECN) Other data exchange protocols supported on request
Ethernet ring protocol support	Compliant with IEEE Audio / Video Bridging and Time Sensitive networking protocols



Product size and connectors may vary depending on configuration

## TrainWise® Crew Intercom (CI)

The TrainWise® Crew Intercom (PC11) gives the train operator complete control of all communications through a single, integrated unit.

This controller connects through an onboard Ethernet network to other Quester Tangent CIs, Public Announcement Amplifiers, and Passenger Emergency Intercom stations, and provides an interface to the local train radio.

Soft buttons and indicators on a connected Quester Tangent touchscreen control CI functions and indicate communication mode and Passenger Emergency Intercom call location and status

Digitized audio transmission and volume control automatically adjusts to background noise to optimize sound quality

The Crew Intercom is part of the complete TrainWise® Passenger Information System suite that includes PA amplifiers, automated signage, and crew and passenger intercoms. Used together, these products provide an IEC 61375-4-compliant system that enhances rider comfort and optimizes communication between drivers, passengers, operations centers, and maintenance crews.

## Technical compliance

Railway standards	Compliant with IEEE and IEC rail design standards (including IEEE 16 and IEC60571/ EN50155) IEC 61375-3-4 Electronic railway equipment – Train communication network (TCN) – Part 3-4: Ethernet Consist Network (ECN) IEEE 1722 Audio Video Bridging and Time-Sensitive Networking protocols
Fire, smoke and toxicity	Compliant to 49 CFR Part 238.103 guidelines and NFPA-130

## Options

Custom control panel	QT can provide custom control panels, including buttons and indicators, for installation on the cab console that interface with the CI to control the mode, volume, etc.
Train radio interface	CI can interface with train radio for train to wayside communication, including PA announcements from control center.
Cab microphone and speaker	QT can provide the cab operator microphone and speaker for interface with the crew intercom.

## Electrical interfaces

Power supply	1	Operating voltage range: 16VDC – 90VDC
Power consumption		5 Watt nominal, 20 Watt peak
Configuration inputs	5	Self-powered, inputs for jumpers or dry contacts. Can be used to define unit location/ID or monitor external switches/buttons such as PTT or hook switch
ECN Ethernet ports	1	M12 D-coded: connection to Ethernet Car Network (ECN)
Ethernet ring ports	2	M12 A-coded: allows PEI to be a member of a Quester Tangent Passenger Information System Communications Ethernet Network.

## Other interfaces

Radio audio input	1	Line audio input for train radio
Microphone audio input	1	Adjustable gain to support input levels from microphone to line level
Speaker audio output	2	Line outputs for Cab Speaker and Radio Speaker: <ul style="list-style-type: none"><li>- Frequency response: 100 Hz-10 kHz, +1, -2 dB</li><li>- Speaker power output/channel: 8 Watts RMS</li><li>- Total harmonic distortion: &lt;1% @ 8 W</li><li>- Load impedance: 4 – 16 Ohms</li></ul>

## Mechanical characteristics

Dimensions	8 in x 6.25 in x 4.5 in (20.3 cm x 15.9 cm x 11.4 cm)
Weight	3 lb / 1.4 kg (approximate)
Connectors	Ethernet: 1 x M12 D-coded; 2 x M12 A-coded Vehicle Interface: MIL-DTL-5015/SAE-AS50151 circular connector or alternate as required
Ingress protection	IP30

## Environmental conditions

Operating temperature	-40°F to +158°F (-40°C to +70°C)
Storage temperature	-40°F to +185°F (-40°C to +85°C)
Shock and vibration	IEC 61373; Category 1, Class A
Dielectric withstand	1.15kVAC circuit to circuit and circuit to chassis



## Electromagnetic compatibility

Surge immunity	IEC 62236-3-2, Table 7
Conducted emissions	IEC 62236-3-2, Table 3, 4, & 5
Conducted immunity	IEC 62236-3-2, Table 7 & 8
Radiated emissions	IEC 62236-3-2, Table 6
Radiated immunity	IEC 62236-3-2, Table 9 (with RF susceptibility verified to 6 GHz)
Electrical fast transient	IEC 62236-3-2, Table 7 & 8
Electrostatic discharge	IEC 62236-3-2, Table 9

## Communication

ECN protocol support	Protocols included in IEC 61375-3-4 Electronic railway equipment – Train communication network (TCN) – Part 3-4: Ethernet Consist Network (ECN) Other data exchange protocols supported on request
Ethernet ring protocol support	Compliant with IEEE Audio / Video Bridging and Time Sensitive networking protocols

## TrainWise® Destination Sign



Product size and connectors may vary depending on configuration

The TrainWise® Destination Signs (SG03) provide clear, reliable and flexible on-board digital signage for destination information.

Superior visibility is achieved through super-bright dot matrix LEDs with full color display. Flexible content display options include adjustable scroll rate, adjustable brightness, and choice of character or font style.

The LED Destination Signs are designed for easy installation with a variety of mounting options and a wide operating voltage range for direct connection to the vehicle low voltage system

## Technical compliance

Railway standards	Compliant with IEEE and IEC rail design standards (including IEEE 16 and IEC60571/ EN50155) IEC 61375-3-4 Electronic railway equipment – Train communication network (TCN) – Part 3-4: Ethernet Consist Network (ECN)
Signage standards	Compliant with ICC ASC A117.1 Standard for Accessible and Usable Buildings and Facilities: 703.7 Variable Message Signs
Fire, smoke and toxicity	Compliant to 49 CFR Part 238.103 guidelines and NFPA-130

## Options

LED array size and pitch	Custom LED array sizes and alternate LED pitch configurations are available.
Serial interface	RS485 interface available for communication with central sign controller.

## Display

LED type	SMD Tricolor RGB
LED array	Large: 20 x 200 (4000 pixels) Medium: 12 x 112 (1344 pixels) Small: 12 x 32 (384 pixels)
Pixel pitch	7 mm
Brightness	1850 nit (Max)
Viewing angle	70 degrees

## Electrical interfaces

Power supply	1	Operating voltage range: 16VDC – 90VDC
Power consumption		Large: 132 Watts (Max) Medium/Small: 50 Watts (Max)
Light sensor	1	Front mounted ambient light sensor
LEDs	6	SMD tricolor RGB

## Communication

Ethernet ports	2	IEEE 1473 (Type E) Ethernet, 100 Mbps, M12 D-Coded
Protocol support	✓	Protocols included in IEC 61375-3-4 Electronic railway equipment – Train communication network (TCN) – Part 3-4: Ethernet Consist Network for Standard End Devices

## Mechanical characteristics

Dimensions	Large: 57.2 in x 7.6 in x 2.7 in (145 cm x 19 cm x 7 cm) Medium: 31.5 in x 6.7 in x 2.7 in (80 cm x 17 cm x 7 cm) Small: 10.9 in x 6.7 in x 2.8 in (27.7 cm x 17 cm x 7.1 cm)
Weight	Large: 18 lb / 8.2 kg (approximate) Medium: 10 lb / 4.5 kg (approximate) Small: 5 lb / 2.3 kg (approximate)
Connectors	Ethernet: 1 x M12 D-coded Vehicle Interface: MIL-DTL-5015/SAE-AS50151 circular connector or alternate as required
Ingress protection	Front: IP51 - Back / Top / Sides: IP50

## Environmental conditions

Operating temperature	-40°F to +158°F (-40°C to +70°C)
Storage temperature	-40°F to +185°F (-40°C to +85°C)
Shock and vibration	IEC 61373; Category 1, Class A
Dielectric withstand	1.15kVAC circuit to circuit and circuit to chassis

# Electromagnetic compatibility

Surge immunity	IEC 62236-3-2, Table 7
Conducted emissions	IEC 62236-3-2, Table 3, 4, & 5
Conducted immunity	IEC 62236-3-2, Table 7 & 8
Radiated emissions	IEC 62236-3-2, Table 6
Radiated immunity	IEC 62236-3-2, Table 9 (with RF susceptibility verified to 6 GHz)
Electrical fast transient	IEC 62236-3-2, Table 7 & 8
Electrostatic discharge	IEC 62236-3-2, Table 9



Product size and connectors may vary depending on configuration

## TrainWise® Passenger Intercom (PI)

The TrainWise® Passenger Intercom (PC06) quickly connects passengers to the train operator via a simple, easy-to-use interface.

Speaker, microphone, call button, and status indicators are combined in a single attractive yet rugged unit.

The PC06 provides digitized audio transmission, automatic volume control to adjust for background noise, and a noise-rejecting microphone array provide optimal sound quality.

The Passenger Intercom is part of the complete TrainWise® Passenger Information System suite that includes PA amplifiers, automated signage, and crew and passenger intercoms. Used together, these products provide an IEC 61375-4-compliant system that enhances rider comfort and optimizes communication between drivers, passengers, operations centers, and maintenance crews.

## Technical compliance

Railway standards	Compliant with IEEE and IEC rail design standards (including IEEE 16 and IEC60571/ EN50155) IEC 61375-3-4 Electronic railway equipment – Train communication network (TCN) – Part 3-4: Ethernet Consist Network (ECN) IEEE 1722 Audio Video Bridging and Time-Sensitive Networking protocols
Fire, smoke and toxicity	Compliant to 49 CFR Part 238.103 guidelines and NFPA-130

## Options

Form factor	The PEI dimensions can be modified to suit a variety of required form factors
Braille text	Braille text available as an option for vision-impaired passengers
Text display	LCD or LED text display with pre-programmed messages available as an option for hearing-impaired passengers

## Electrical interfaces

Power supply	1	Operating voltage range: 16VDC – 90VDC
Power consumption		5 Watt nominal, 20 Watt peak
Configuration inputs	17	Self-powered inputs for jumpers or dry contacts; can be used to define unit location/ID
PEI activation output	1	Relay output to signal PEI activation over trainline or other discrete line.
Door light control output	1	Relay output to illuminate door light when PEI is active
Ethernet ring ports	2	M12 A-coded: allows PEI to be a member of a Qeuster Tangent Passenger Information System Communications Ethernet Network.

## Other interfaces

Internal microphone array	✓	Dynamic range > 90 dB, 100 Hz to 16 kHz Total harmonic distortion (THD) < 0.3 % for inputs < 100 dB sound pressure level (SPL) Operates at levels up to 120 dB SPL without damage
Internal speaker	✓	Frequency response: 70 Hz – 14 kHz, ± 3 dB Total harmonic distortion: <1%
Status LED	✓	Active / Hold (integrated in call button)

## Mechanical characteristics

Dimensions	8 in x 6.5 in x 4.5 in (20.3 cm x 16.5 cm x 11.4 cm)
Weight	5 lb / 2.3 kg (approximate)
Connectors	Ethernet: 2 x M12 A-coded Vehicle Interface: MIL-DTL-5015/SAE-AS50151 circular connector or alternate as required
Call button	Vandal resistant pushbutton surrounded by protective ring to prevent inadvertent activation.
Status indicators	LED intercom status indicator light in call button
Ingress protection	IP30

## Environmental conditions

Operating temperature	-40°F to +158°F (-40°C to +70°C)
Storage temperature	-40°F to +185°F (-40°C to +85°C)
Shock and vibration	IEC 61373; Category 1, Class A
Dielectric withstand	1.15kVAC circuit to circuit and circuit to chassis

## Electromagnetic compatibility

Surge immunity	IEC 62236-3-2, Table 7
Conducted emissions	IEC 62236-3-2, Table 3, 4, & 5
Conducted immunity	IEC 62236-3-2, Table 7 & 8
Radiated emissions	IEC 62236-3-2, Table 6
Radiated immunity	IEC 62236-3-2, Table 9 (with RF susceptibility verified to 6 GHz)
Electrical fast transient	IEC 62236-3-2, Table 7 & 8
Electrostatic discharge	IEC 62236-3-2, Table 9

## Communication

ECN protocol support	Protocols included in IEC 61375-3-4 Electronic railway equipment – Train communication network (TCN) – Part 3-4: Ethernet Consist Network (ECN) Other data exchange protocols supported on request
Ethernet ring protocol support	Compliant with IEEE Audio / Video Bridging and Time Sensitive networking protocols

## TrainWise® Passenger Information Server (PIS)



Product size and connectors may vary depending on configuration

The TrainWise® Passenger Information Server (PC08) provides centralized control for the Quester Tangent Train Passenger Information System. All onboard audio and sign data are stored in its database.

The PC08 coordinates announcements with location information from multiple sources (GPS, speed sensors, wayside tags, external systems, etc.). Combined with configurable digital route maps, the PC08 reliably synchronizes messages for station approach, arrival, and departure. An external data radio allows content uploads and monitoring from the wayside operations center.

The PIS easily integrates with train control and monitoring systems to support new or modernization projects.

### Technical compliance

Railway standards	Compliant with IEEE and IEC rail design standards (including IEEE 16 and IEC60571/ EN50155) IEC 61375-3-4 Electronic railway equipment – Train communication network (TCN) – Part 3-4: Ethernet Consist Network (ECN)
Fire, smoke and toxicity	Compliant to 49 CFR Part 238.103 guidelines and NFPA-130

### Options

Expanded data storage	Additional storage for large audio/video files for infotainment, advertising, or automated announcement systems.
Serial interface	Optional RS485 serial interface for communication with on-board legacy signage
Configuration inputs	Self-powered inputs, jumpered into vehicle interface connector to define unit location or other identification



## Processor and storage

Processor	i.MX6 with ARM Cortex A9 multicore processor
Operating system	Linux, QNX
OS memory	1 GB DRAM, 1 GB NAND flash
Data logging capacity	4 GB Solid State Flash Memory (Larger memory configurations available)
Real-time clock	Battery backup for up to 8 years

## Communication

Ethernet ports	2	IEEE 1473 (Type E) Ethernet, 100 Mbps, M12 D-coded
USB ports	2	M8 USB 2.0: Supports connection to mass storage device (not supplied) Type C USB 2.0 On-The-Go (OTG)
Protocol support	✓	Protocols included in IEC 61375-3-4 Electronic railway equipment – Train communication network (TCN) – Part 3-4: Ethernet Consist Network for Standard End Devices
Secure web server	✓	Secure web server providing remote access for PTU, operations, and maintenance

## Electrical interfaces

Power supply	1	Operating voltage range: 16VDC – 90VDC
Power consumption		45 Watts (Max)
USB	2	1 x Type C USB 1 x M8 USB
Ethernet	2	M12 D-coded
Status output	1	Form A, 0.5 Amp, normally open, solid state output
Digital inputs	4	Type II (independent returns), wetting current, 2 kV protection
Status LEDs	✓	Power, Health Status, Network Status

## Mechanical characteristics

Dimensions	14" x 9.7" x 2.3" (35.6 cm x 24.6 cm x 5.8 cm)
Weight	8 lb / 3.6 kg (approximate)
Connectors	Ethernet: 2 x M12 D-coded USB: 1 x M8; 1 x Type C Vehicle Interface: MIL-DTL-5015/SAE-AS50151 circular connector or alternate as required
Ingress protection	IP30

## Environmental conditions

Operating temperature	-40°F to +158°F (-40°C to +70°C)
Storage temperature	-40°F to +185°F (-40°C to +85°C)
Shock and vibration	IEC 61373; Category 1, Class A
Dielectric withstand	1.15kVAC circuit to circuit and circuit to chassis

## Electromagnetic compatibility

Surge immunity	IEC 62236-3-2, Table 7
Conducted emissions	IEC 62236-3-2, Table 3, 4, & 5
Conducted immunity	IEC 62236-3-2, Table 7 & 8
Radiated emissions	IEC 62236-3-2, Table 6
Radiated immunity	IEC 62236-3-2, Table 9 (with RF susceptibility verified to 6 GHz)
Electrical fast transient	IEC 62236-3-2, Table 7 & 8
Electrostatic discharge	IEC 62236-3-2, Table 9