



## Central Processing Unit with Graphical Display Controller (CPG)

EN 50155  
EN 45545  
IEC 61131

### MODULE FUNCTIONS

Trainnet® CPG can be used as a processor to manage train computers and sub-systems connected to them. It integrates a graphical display controller that supports both analogue and digital displays. It can also be used to manage the display of video surveillance recordings. The Trainnet® CPG module is also capable of storing digital media content such as audio announcements in a compressed format for on-board use.

The Trainnet® CPG can be used to develop, store and run applications for the control and diagnostics of on-board systems, making it suitable to develop Train Control and Management Systems (TCMS) or VCU. It can also implement Gateway functionalities by providing the necessary interfaces and routing capabilities.

### KEY FEATURES

The Digital Signal Processor of the Trainnet® CPG is dedicated for video and audio processing. The Digital Visual Interface (DVI-I) combines both analogue and digital signals and can be directly connected to DVI displays with resolutions up to 1024 x 768

pixels. Touch screens can be connected either through an isolated RS 485 interface or a DVI-cable when using Trainnet® Human Machine Interface (HMI). The audio interface line output can be used to drive audio announcement systems. The interface is isolated on the digital side in order to provide the best audio quality.

Three programmable isolated asynchronous or bit-synchronous SCC channels are available (RS 485) for the connection to compatible devices in the train.

Two 10/100 Mbit/s Full Duplex Ethernet interfaces can be used to connect to any Ethernet Communication Network, typically connecting the CPG with switches or other electronic racks. The Ethernet interfaces can also be directly connected to any Ethernet enabled devices (e.g. network cameras). A bridge between two channels is also supported. The number of Ethernet interfaces can be increased with one of the Trainnet® Ethernet Switches.

The CODESYS® PLC kernel embedded in the CPU acts as the CPU's operating Software.

Train management applications can be developed with the CODESYS® PLC Software in order to create the desired control and diagnostic functions of the train. The open platform runs on the Linux Operating Software and supports further Software development in C language, either as an CODESYS® extension or on top of the module's Linux kernel. The PowerPC processor provides enough processing power for demanding applications with 400 MHz core speed and 64 megabytes of 64-bit wide 100 MHz SDRAM.

A PST interface (usually serial link or Ethernet) enables the use of the Trainnet® Portable System tester (PST) as well as other tools for event log operations, maintenance, debugging, downloading and application development purposes.

The Trainnet® CPG real-time clock is powered by a back-up capacitor and will run for a minimum of 30 days from the time power is no longer applied.

### TECHNICAL SPECIFICATIONS

#### Dimensions (W x H x D)

8 TE x 3 U x 160 mm

#### Weight: 300 g

**Input Power:** 5 V DC  $\pm$  5 % (1.5 A max., 1 A typ)

#### Temperature Range (operational)

-40 °C...+70 °C

#### MTBF (40 °C ambient temperature)

770 000 h (CPG1824A)

#### Video Interface

DVI-I; Single TMDS digital output and analogue RGB  
Resolution up to 1024 x 768

#### Audio Interface

Isolated stereo audio line output  
0 – 700 mVRMS to 10 k $\Omega$  load

#### Touch Screen Interface

Integrated RS 485 on DVI interface

#### Serial Interfaces

2 isolated RS 485 on front  
(3 if not using the Touch Screen Interface)  
1 RS 232 on front  
(for maintenance, configuration or ESN dongle)  
1 RS 485 on back for I/O bus connectivity

#### Ethernet Interfaces

2 x 10/100 Mbit, M12 connectors

#### Boot Flash Memory: 8 MB

#### File System Flash Memory

512 MB (On request up to 2 GB)

#### Processor RAM

64 MB

#### Graphics Controller RAM

32 MB

#### Digital Signal Processor RAM

16 MB

#### VME Bus (IEC 821) Interface

A24/D16 Master or Slave