

# SMART TRAIN & VEHICLE\_DISPLAY

ST&V\_Display is an on board TFT LCD monitor displaying information related to the journey, entertainment contents and commercial advertisements.

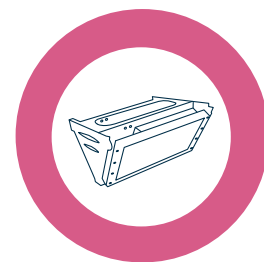
Passengers enjoy position based or situation based information, i.e. current position of the train on the line timetable and on the map, connections departing from the next station, emergency messages, news and weather forecast.

Commercial and multimedia contents can be shown upon customer request. The UI is fully customisable, and contents are managed by a web based central system which controls, monitors and diagnoses every single display installed in the vehicle.

Functions are fully compliant to TSI PRM normative.

High performances are guaranteed by state of the art CPU technology with hardware decoding for multimedia content playback.

Advanced and additional user friendly features like touchscreen allow it to be dedicated to passengers as well as vehicle staff. The monitor can be customized upon customer request for ceiling or wall mounting, in single side, double side or ultra wide configuration and with plastic or metallic enclosure.



Video

## ST&V\_DISPLAY

### FEATURES:

- > Wide choice of display sizes (4:3) (16:9) (32:9)
- > High contrast and brightness (fixed or variable)
- > 10/100 Mbps Ethernet communication interface
- > 24VDC/110VDC input voltage with overload current and reverse polarity protection and optional SmartUPS for safe shutdown
- > Plastic, metallic or open frame mechanical solution based on customer requirements
- > EN50155, EN50121-3-2, EN45545-2 International Railway application requirements certified
- > Compliant with ST306158 Italian Railway (FS-Trenitalia) application requirements
- > Optional touch screen for passenger or train staff interaction

# SMART TRAIN & VEHICLE\_NETWORKING



ST&V\_Networking is a Full 10G Redundant Railway Ethernet Switch allowing the design of a switched LAN over trains.

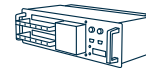
ST&V put together the railway standard characteristics and the network features typical of the enterprise environment. Its structure based on a redundant stack of ruggedized switches offers advantages in the realization of an IP network, meeting the most demanding needs in bandwidth, reliability and security for train services and operations.

ST&V\_Networking provides the key features of a Layer2/Layer3 switch, such as VLAN and Quality of Service support, inter-VLAN routing, traffic shaping and multicast support.

It's manageable, providing detailed diagnostics based on SNMP protocol. DHCP server and client roles offer the ability to develop a self contained network solution. RSTP/MSTP allow the deployment of more network topologies.

A train network backbone based on ST&V\_Networking configures automatically itself also in variable topology without the need of human intervention.

Connectors of this device solution is railway certified, supporting up to Category 7A link to establish highly reliable backbone or in-vehicle hosts communication. High density design allows the connection of up to 48 end devices with Gb link.



## Networking & V2I Communication

### ST&V\_NETWORKING

#### FEATURES:

- > Managed Gigabit Ethernet switch with 48 10/100/1000Mbps ports + 4 1/10Gbps ports
- > Advanced Layer2/Layer 3 features with security and control policies
- > Automatic configuration setup for static or dynamic train topology
- > Link redundancy and bandwidth multiplication via Link Aggregation (LACP)
- > Stacking capability for highly reliable and scalable solution
- > DHCP Server Options handling for IP address automatic assignment
- > Panel connectivity supporting links up to Category 7A
- > 24VDC/110VDC input voltage with overload current, reverse polarity protection and redundant power
- > EN50155, EN50121-3-2, EN45545-2 International Railway application requirements certified
- > Compliant with ST306158 Italian Railway (FS-Trenitalia) application requirements
- > Available with M12 (X-coded) or TERA connectors

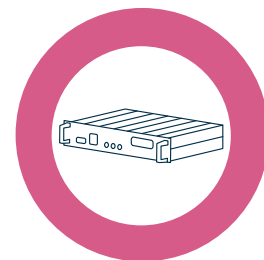
# SMART TRAIN & VEHICLE\_DIRECTOR



ST&V\_Director is an on-board passenger information, localization and communication unit for trains, subways, trams and buses.

The advanced GPS receiver and multi-channel mobile modules like LTE/LTE-A and Wi-Fi allow ST&V\_Director to act as a complete data and content concentrator for the train Passenger Information System. It performs both position and situation aware automatic public announcements using the available analog or digital/VoIP PA system and it distributes contents on video and multimedia peripherals (internal LCD monitors, internal and external LED panels and servers for passenger on-demand services).

ST&V\_Director, working as a train-to-ground mobile gateway, is able to download multimedia and tracking information from a Ground System and to receive commands and play audio/video contents from Operating Rooms. It also sends P.I.S. module diagnostics to the Ground System and provides direct access to hosts on the vehicle LAN with configurable forwarding, thus allowing a fully flexible solution for fleet management. Functions are compliant to TSI PRM normative. Its computational power addresses a broad number of applications and services related to train journey information, multimedia contents distribution, on board video surveillance live view and diagnostic management. The device is equipped with a SmartUPS for safe shutdown in case of main input power failure.



## Server & PIS controller ST&V\_DIRECTOR

### FEATURES:

- > Cutting-edge CPU for high performance
- > Accurate tracking capability with high sensitivity GPS receiver
- > Wireless communication based on LTE/LTE-A and Wi-Fi technology
- > Continuous Train-to-Ground link for two-way information exchange
- > Redundant wired Ethernet connectivity
- > Serial interfaces and additional MVB EMD interface available for local communication
- > Provider of geolocalized audio & video information
- > User-friendly graphical interface MMI for Train Staff operation
- > Automatic software update for application and multimedia contents handling
- > Rack or boxed mechanical solution and fanless design
- > 24VDC/110VDC input voltage with overload current and reverse polarity protection and optional
- > SmartUPS for safe shutdown in case of main input power failure
- > EN50155, EN50121-3-2, EN45545-2 International Railway application requirements certified
- > Compliant with ST306158 Italian Railway (FS-Trenitalia) application requirements
- > Compliant with TSI PRM normative



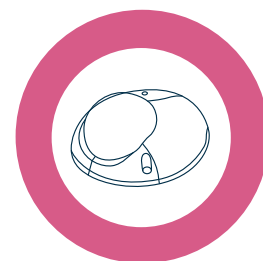
# SMART TRAIN & VEHICLE\_NVR SERVER



ST&V\_NVR Server is a fully customizable railway server.

Its computational power addresses a broad number of applications and services related to train on-board video surveillance live view and diagnostic management, following all the railway standards which apply to all the electronic equipment. The server can be equipped with an optional SmartUPS for safe shutdown in case of main input power failure.

It can be configured with a wide range of software functions and capabilities, implementing a fully compliant GDPR CCTV system with local and remote management for real-time and recorded video sequences. The CCTV system is integrated with the other PIS subsystems, thus obtaining a situation-aware tagging of the images.



CCTV

## ST&V\_NVR SERVER

### FEATURES:

- > State-of-the-art Intel Core processors up to i7 family
- > Up to 16GB of RAM
- > Fanless and highly efficient thermal design to reach operating temperature up to +70 °C
- > SSD or HDD resistant to vibration and wide temperature range of rolling stock environment. Optionally could be provided with removable SSD.
- > Redundant 10/100/1000 Mbps ethernet connection
- > 24VDC/110VDC input voltage with overload current and reverse polarity protection and optional SmartUPS for safe shutdown in case of main input power failure
- > Fully configurable software solution
- > Rack-mountable mechanical housing, resistant to harsh environmental conditions
- > EN50155, EN50121-3-2 International Railway application requirements certified
- > Compliant with ST306158 Italian Railway (FS-Trenitalia) application requirements



# SMART TRAIN & VEHICLE\_PA

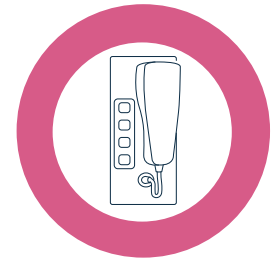
ST&V\_PA is a double technology analog and digital audio Public Address unit for delivering standard PA messages and high-priority warnings to the passengers and to broadcast music and entertainment audio.

Analog UIC568-compliant and digital audio handling, together with multiple loudspeakers line driving and high audio quality allow the device to create a PA system in compliance with TSI LOC&PAS and PRM normatives, in terms of security and service reliability.

The communication is realized with a double Ethernet connection, ensuring redundancy and fault tolerance towards IP backbone network.

The audio processing and amplification use state-of-the-art devices like high efficiency amplifiers and programmable digital audio processor.

Train Staff Handset for manual announcements can be automatically interfaced through the IP network or it can be integrated in ST&V\_PA system for a compact all-in-one solution.



## Audio ST&V\_PA

### FEATURES:

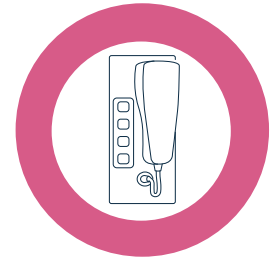
- > High efficiency Audio Amplifier for passenger audio public address announcements
- > Complete integration with ST&V\_HS and ST&V\_PA1
- > Optional integrated local Handset
- > Double Ethernet Interface to train backbone for redundancy purposes
- > Remote software update and dynamic / reprogrammable audio parameterization
- > Serial RS485 interface to manage optional non-IP based P.I.S. items (LED panels, etc.)
- > 24VDC/110VDC input voltage with overload current and reverse polarity protection
- > Rack-mountable mechanical housing, resistant to harsh environmental conditions
- > SIP/VoIP support
- > Compliant with UIC568 Fiche Railway Standard
- > EN50155, EN50121-3-2, EN45545-2 International Railway application requirements certified
- > Compliant with ST306158 Italian Railway (FS-Trenitalia) application requirements

# SMART TRAIN & VEHICLE\_HS

ST&V\_HS, is an on-board Handset designed for Public Address and Intercom functions on rolling stock.

It supports double technology analog UIC568-compliant and digital/VoIP audio allowing to be used as a building block for a TSI PAS&LOC and PRM Public Address and Passenger Alarm System, also in compliance with EN16334.

It is equipped with high sensitivity microphone and loudspeaker, mechanical safety clamping and Push to Talk (PTT) push-button. Customized push-buttons, optional buzzer and on/off-hook function fulfil the requirements for any Train Crew operation. In the VoIP configuration it allows to address specific announcements in configurable train areas.



## Audio ST&V\_HS

### FEATURES:

- > Support for passenger audio Public Address announcement
- > Support for Interphone Communication between coach and locomotive and between coach and central control room
- > Complete integration with audio subsystem
- > Robust plastic handset with Push to Talk (PTT) push-button and on/off-hook function
- > High sensitivity microphone and high quality loudspeaker
- > Customized UI with push-buttons + leds and integrated buzzer
- > Mechanical design resistant to harsh environmental conditions, thanks to its small dimensions it is ideal for mounting on drivers' desk
- > SIP/VoIP support
- > Echo cancellation support for the best audio quality
- > Remote software update and dynamic / reprogrammable audio parameterization
- > Fully compliant with UIC Fiche 568 Railway Standard
- > EN50155, EN50121-3-2, EN45545-2 International Railway application requirements certified

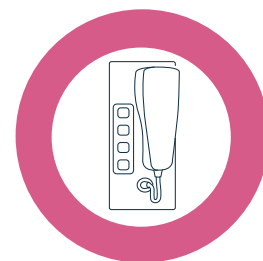
# SMART TRAIN & VEHICLE\_PA1

**MOOVA**  
ABSOLUTE MOBILITY

ST&V\_PA1, Passenger Alarm Intercom allows communication between passengers and train staff, driver and it supports emergency calls.

It provides double technology analog UIC568-compliant and digital/VoIP audio allowing to be used as a building block for a TSI PAS&LOC and PRM Passenger Alarm System, also in compliance with EN16334.

ST&V\_PA1 is equipped with a high quality built-in microphone and loudspeaker and it implements echo cancellation. It is possible to adapt the mechanical layout of the product to the train constructor needs. Moreover, the front cover, push-button, connectors and leds can be designed upon customer request. It is also available with push-button or in "call for aid" configuration.



## Audio ST&V\_PA1

### FEATURES:

- > Support for interphone communication between passengers and train crew
- > Complete integration with audio subsystem
- > High sensitivity microphone
- > Auxiliary optoisolated input for direct connection to an emergency handle
- > Optional rugged pushbutton
- > Three output leds for passenger visual feedback: Fault, Busy, Ready
- > Front cover, power and signal connectors customizable
- > Rugged and vandal-proof design
- > Remote software update and dynamic / reprogrammable audio parameterization
- > Echo cancellation support for the best audio quality
- > Fully compliant with UIC Fiche 568 Railway Standard
- > EN50155, EN50121-3-2, EN45545-2 International Railway application requirements certified

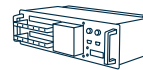


# SMART TRAIN & VEHICLE\_AC AND SMART TRAIN & VEHICLE\_AP

The advanced WiFi dual-radio IEEE802.11 a/b/g/n/ac/ax solution provides for the installation of a wireless network access controller, ST&V\_AC, together with multiple access points installed in passenger coaches, ST&V\_AP, and ensures an optimal

on-board Wi-Fi coverage with cutting-edge technology and enterprise-level capabilities both for passengers and train staff connectivity.





## Networking & V2I Communication

### ST&V\_AC AND ST&V\_AP

#### FEATURES:

- > High performance with maximum data rate of 1.3 Gbps in 5 GHz band and 600 Mbps in 2.4 GHz band with 4x4 MIMO support
- > 4 Gigabit Ethernet port on SmartTrain\_AC and 2 Gigabit ethernet port on ST&V\_AP for link aggregation and redundancy
- > Stability and high availability of the wireless connection, particularly in case of vehicle crowding, RF interference and presence of sticky clients
- > Backward compatibility towards old devices
- > Advanced enterprise-level features: VLAN management, multiple SSID handling, Quality of Service, Security
- > Radio channel management to reduce cellular systems, wireless network and electromagnetic interferences
- > Convenient mounting solution and RF coverage for coach environment
- > Automatic and seamless roaming
- > Unified policy management of ST&V\_AP for automatic network provisioning and simplified maintenance thanks the ST&V\_AC
- > Compliant with IEEE802.11 a/b/g/n/ac/ax
- > 24VDC/110VDC input voltage with overload current and reverse polarity protection
- > EN50155, EN50121-3-2, EN45545-2 International Railway application requirements certified
- > Compliant with ST306158 Italian Railway (FS-Trenitalia) application requirements