

## *Customer Success Story*

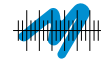


# *High reliability modems for Gotthard tunnel*



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Provided by:



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Industriële Datacommunicatie

*Gotthard tunnel is at the leading world level for safety control installation. Weiss-Electronic, which delivers its traffic management system, has chosen Westermo's LD-64 optical fibre modems to transmit data from the 272 traffic lights and 68 speed or emergency display screens.*

The Gotthard Tunnel in the Swiss Alps is considered to be one of the narrowest bottle-necks on the transit road between Northern and Southern Europe and one of the longest tunnels in the world (17 km).

In order to ensure higher security for traffic flow, Weiss-Electronic has implemented a new evolutionary road control installation that allocates vehicles to the appropriate lanes of the tunnel's gateway. This gateway can be closed when the passage of the tunnel is impossible due to an accident. The systematic metering of vehicles allows only a safe number of vehicles in the tunnel at the same time. Also, by means of a so-called 'drop control' the trucks can be singularised so that bunching is avoided in the 17 km long tunnel tube: this is especially important in case of fire in order to prevent the spreading of flames.

The necessary signal switching will be started automatically if there is a fire, if the allowed CO-concentration is exceeded or if stopped vehicles are detected. The entire data management network is based on redundancy rings. Thus, the system can still be controlled in the event of a defective cable or device failure.

All data coming from the lights or speed display panels is then transmitted to the control system through Westermo's LD-64, RS-485, fibre optics modem. There are 68 stations; each has two LD-64, one for the normal bus, and one for the emergency bus used for alarm signal transmission in case of an optical link failure. Each of those stations has four signalling lights and one speed limit or emergency display. The used protocol is TLS Inselbus, a special protocol from "Technische Lieferbedingungen für Streckenstationen" normed by the German road traffic institution, Bundesanstalt für Strassenwesen (BAST).



"The technical difficulty of such a project is the length of the tunnel. It is 17km long, and has just one tube for both directions. To conform to the security requirement, we have to adjust the traffic so that there are no more than 150 lorries per direction per hour; and not more than 1000 car units per direction per hour (one lorry equals three car units, one bus equals two car units, one car equals one car unit). In case of fire detection, the tunnel has to be closed in less than ten seconds. This means that each light and each display panel has to display the right emergency message at the right place", says Joerg GELZ, Project Manager at Weiss-Electronic.

"In that context, we have chosen Westermo's product because of its strong harsh environment compliance and reliability, and of course because of the price", adds Joerg Gelz. Switches in road infrastructure have to resist vibration, moistness and high levels of corrosion. Westermo's network solutions are proven throughout the world with implementation in the most stringent environments; be it for road traffic systems, aeronautics, process, electrical energy management, military ☺

## Application

The LD-64 is designed to provide a redundant fibre optic ring solution for equipment with RS-232/V.24 or RS-422/485 interfaces. The LD-64 is mostly used in applications where high reliability is required as this unit can still function even if a fibre or a fibre pair are broken. In the event of line failure the LD-64 is equipped with alarm outputs which can be connected to a local I/O device (a PLC) to provide a network alarm. The LD-64 handles transmission rates up to 375kbit/s. It is available in both multi and single mode fibre.

In the tunnel, there are 68 stations and 10 server units. Each of these units is composed of two redundant servers. One is active and one is passive. In case of trouble, the active becomes passive and the passive changes to active. The head server is also redundant. Stations are organised in 3km redundancy rings. The emergency system has three bus systems : one from the North portal through the middle, one from the South portal through the middle of the tunnel, and the longest from the North to South portal every third station in one direction and one direct way over 17 km from South to North to close the third ring.





## A product range to meet every demand

Westermo provides a full range of data communication solutions for such demanding applications as railways, aeronautics, defence, water treatment, substation automation, roads and tunnels. The staff at Westermo can provide the highest levels of service and technical support to help our customers to choose, configure and install the best solution for each specific application requirement. Our knowledge goes far beyond our own product range; we have a unique competence regarding your environment whether it is on a train, in an aeroplane, on the seabed or in a substation. To ensure a close relationship with the customer, Westermo has a local presence in more than 35 countries. The Westermo product line includes more than one thousand different types and versions of our modems, switches, routers, time servers and converters.

### Multidrop via balanced current loop

Westermo's  $\pm 10$  mA balanced current loop (W1) transmission technique makes it possible to transmit data up to 18 km (11.2 mi) at low data rates on a 4-wire cable. At shorter ranges transmission rates up to 38.4 kbit/s can be achieved.

The LD-01 is also available in a "by-pass" version. This model ensures that if a modem in the multidrop network should fail that modem will be by-passed, hence not effecting the communications between other units on the network.

#### LD-0x (Multidrop)

- ⌘ 1 x RS-232 (LD-01)
- ⌘ By-Pass function (LD-01)
- ⌘ 1 x RS-422/485 (LD-02)
- ⌘ 3 x RS-232 (LD-02)
- ⌘ Tri-galvanic isolation
- ⌘ Protocol independent
- ⌘ Up to 38.4 kbit/s

