



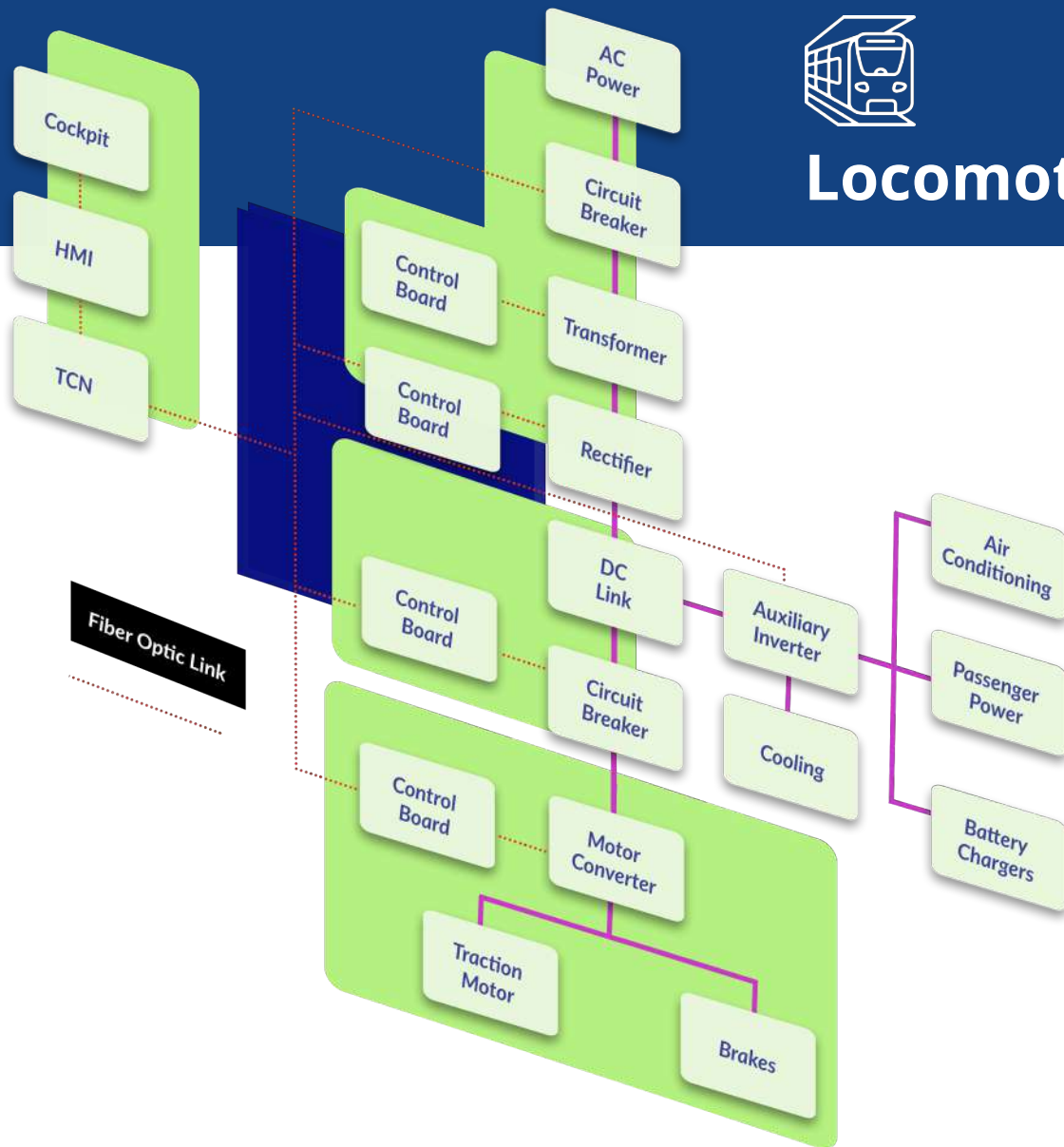
Electric & Diesel Trains Solutions


FirecommsTM
enlightened innovation

Firecomms fiber optic solutions deliver on the harsh demands of the electric and diesel train industry, ensuring the integrity of control, signaling and passenger data not be compromised by the harsh environment in which these applications operate. Firecomms has developed light sources and communications ICs with the deep understanding of the stresses and strains placed on equipment in electric and diesel trains.



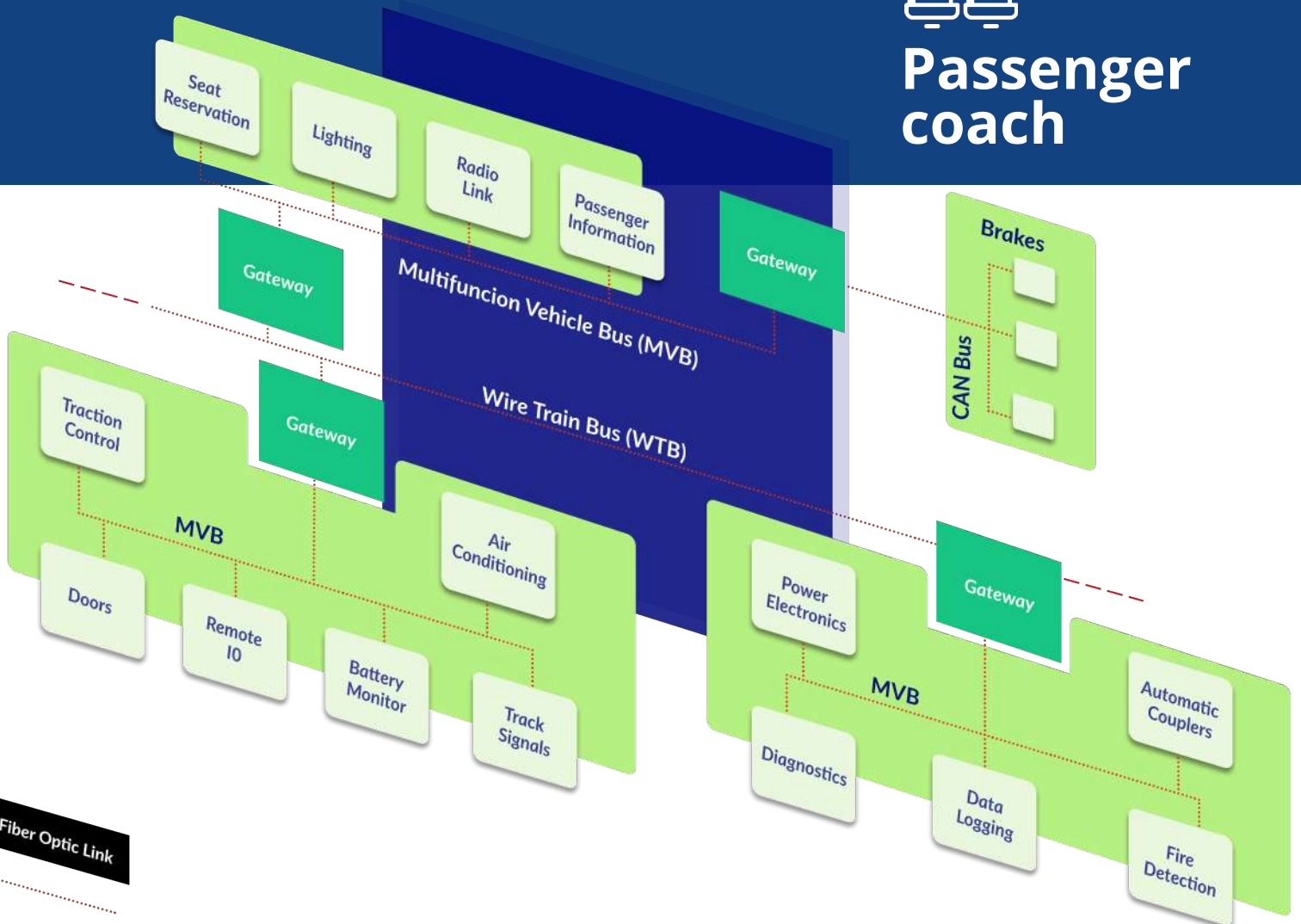
Locomotive



Our light sources use Resonant Cavity LED (RCLED) technology to ensure the strongest optical output at the lowest currents while preserving stability after decades of operation. Our robust receiver topologies guarantee error-free transmissions every time.



Passenger coach



Power, Control, Communicate

Power for electric trains, which comprise the main locomotive responsible for power and propulsion systems, and passenger coaches, is typically provided from the main grid or the on-board diesel engines. The propulsion systems are based on highly efficient power converters to deliver power suitable for various motors, brakes and other on-board electrical systems. Due to the extremely high voltages and electrical noise generated in these areas of the train, fiber optic links are widely used to ensure reliable, safe operation of the power generation unit.

To withstand the stresses of operation in these challenging environments, Firecomms offers a range of robust inter-connect solutions for use on Plastic Optical Fibers (POF) or Plastic/Polymer Clad Silica (PCS) fibers for extended distances.

Firecomms DC-1 MBd and DC-5 MBd transmitters and receivers overcome the significant electromagnetic interference

(EMI) challenges within the locomotive area to guarantee error-free control of rectifiers, VARs, and high-power transformers. Equally, to ensure galvanically-isolated equipment control, Firecomms DC-10 MBd components transmit clean, noise-free switching signals to fire high power IGBT/IGCT semiconductors used in auxiliary inverters or motor converters for traction and brake control systems.

Whether in the locomotive or within passenger coaches, data is typically transported over the Multi functional Vehicle Bus (MVB). Governed by the



IEC-61735 standard, this bus operates at 1.5 Mbps and transmits all passenger information, and control and diagnostics systems over various protocols such as RS485 or CAN.

Fiber optic communications is used in applications where protection is needed from EMI or high potential circuits.

In these applications, Firecomms DC-10 MBd transceivers are ideal for implementations where POF or large core glass fibers are utilized for extended distances.

In the transition to IP-based communication standards, equipment and network designers are increasingly implementing Ethernet based connectivity solutions. For this purpose Firecomms offers industrial-grade Fast and Gigabit Ethernet fiber optic transceivers in popular LC and OptoLock® form factors.



Flexible Solutions from Firecomms

To ensure compatibility and versatility, Firecomms offers the widest choice of fiber optic solutions with our range of transmitter, receiver and transceiver products in three different connector configurations: OptoLock® LC and RedLink®

- ***Industrial Transceivers (1 Mbps-1 Gbps)***
- ***Analog Transmitters & Receivers***
- ***Industrial RedLink® Transmitters & Receivers (DC-1/5/10/50 MBd)***

OptoLock®



LC Transceivers



RedLink®



Fiber Optic Communications for High Speed and Urban Transport Applications

Firecomms is a global leader in the provision of fiber optic solutions and optical transceivers, skillfully combining state-of-the-art compound and silicon semiconductor technology with inventive small-scale integration.

Together with a far reaching network of representatives and distribution channels, Firecomms serves its global clients across a range of power and energy, industrial, transportation, medical and consumer markets.

Firecomms leverages its deep knowledge across our multi-disciplinary teams in developing the broadest range of fiber optic transmitters and receivers specifically suited to our target markets. With an emphasis on world class performance in reliability, Firecomms utilizes internally developed market leading Resonant Cavity LED (RCLED) photonics with ultra low power CMOS drivers in our transmitters. Together with robust receiver IC architectures, Firecomms products enable ultra low power fiber optic links, from DC up to Gigabit data rates, to ensure extended lifetimes in the harshest of environments.

Firecomms products with Plastic Optical or Plastic Clad Fiber (POF/PCS) links offer many advantages in high speed, electric and diesel locomotive applications :

- **EMI/RFI immunity** ideal for industrial, harsh, noisy environments
- **Galvanic isolation** between transmitter and receiver, ideal for harsh, noisy industrial environments
- **Visible spectrum** operation enables eye-safe, fast troubleshooting
- **Low power** consumption, transmitters capable of operation at 3-4 mA
- **Resilient** to bending and vibrations
- **Durable**, flexible and lightweight
- **High reliability** for extended machine uptime
- **Industrial temperature** in range of -40 to +85° C
- **Reduced maintenance cycle time** provides up to a 20-year life-cycle on transceivers and cables
- **Simplified field installation** for easy termination of large core optical fibers in custom distances