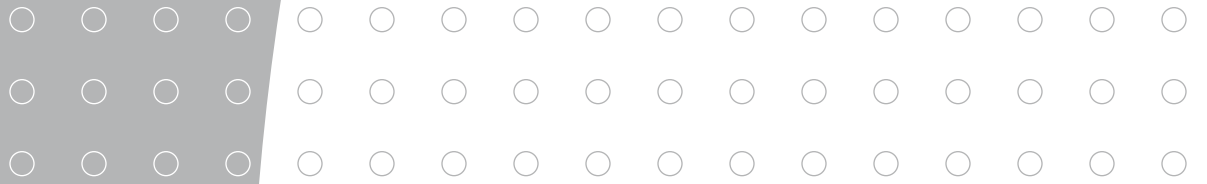




TELEGRA

Smart Traffic Management®



THE ROADSIDE FIELD CONTROLLER



The Roadside Field Controller

THE ROADSIDE FIELD CONTROLLER

Specially designed for roadside applications, Telegra's Roadside Field Controller (RFC) is the communications hub of a Telegra traffic control system. Whether installed beside a highway or inside a tunnel or sign, the RFC directly controls and communicates with a variety of intelligent transportation system (ITS) products and subordinated traffic management devices. The Telegra RFC provides:

Data Management Manages and processes data transmitted between the main traffic control center and sensors in the road via NTCIP protocol

Data Processing Processes and assembles real-time data, such as weather conditions or traffic flow. Detects data through sensors in the road and other intelligent traffic devices and transmits it to the control center

Message Activation Activates the message displays on LED variable message signs and other intelligent traffic devices

Data Storage Stores traffic data using large non-volatile memory buffer (SD Flash memory card). Data can be retrieved locally by replacing the memory card, via service port download or remotely via Internet communication with control center

Versatile Design A modular design enables Telegra to customize the configuration of hardware components and accommodate a wide range of control and monitoring functions, satisfying the most demanding ITS applications

Versatile Connectivity The RFC is fully Ethernet-supported, with options to communicate to the control center via fiber-optic networks or directly to roadside equipment via copper or fiber-optic connectivity

TOTAL INTEGRATION FOR ADVANCED TRAFFIC MANAGEMENT SYSTEMS.



Integration Supports a large number of interfaces and protocols to offer full in-field integration with other systems and is able to control a wide range of Telegra's third-party equipment. The RFC also connects field-based equipment with Telegra's **topXview™** Intelligent Traffic Manager™ software in the main traffic control center, allowing a single operator to centrally control the traffic management system. **topXview™** Intelligent Traffic Manager™ offers simple, one-stop control of complex roadway monitoring and management

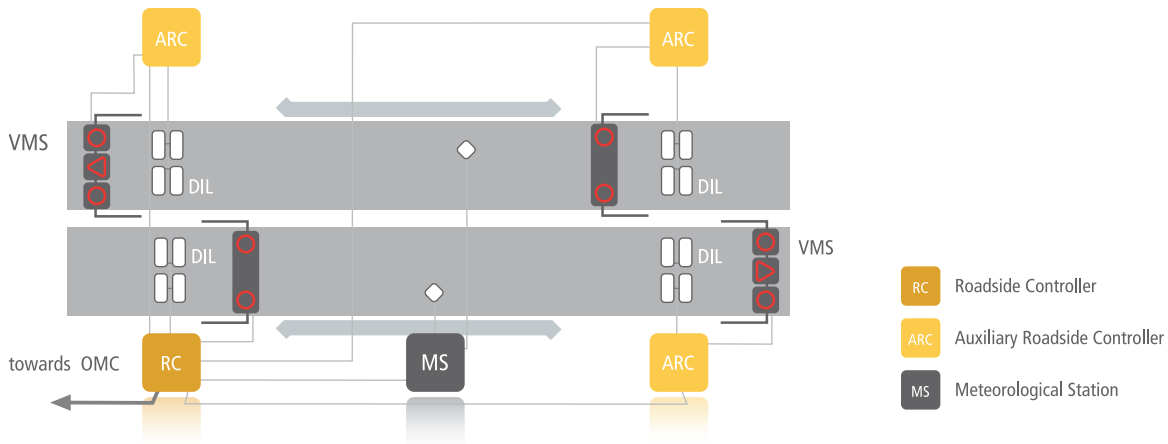
System Protection In case of communication breakdown with the traffic control center, customized software assumes control of traffic equipment on the corresponding road section using input from roadside devices

ADVANCED FEATURES ENHANCE PERFORMANCE

Telegra's RFC provides traffic managers with the critical information they need as quickly as possible. Built-in versatility allows the RFC to adapt rapidly to a variety of situations and levels of roadside control. Among its advantages, the Telegra RFC:

- » Complies with main industry standards to support NTCIP, MODBUS, ProfiBUS, TLS 2002 and other fieldbus and communication protocols
- » Features a universal design that applies to highways or tunnels and supports any media and type of communication (Copper, optics, radio GSM, GPRS), dedicated modem or Ethernet WAN/LAN network
- » Offers autonomous local operation, using high processing power, to allow for control of road sections in the absence of a traffic control center or in case of a communications network failure. With a large non-volatile memory buffer, the RFC has the option to control electrical power equipment or connect directly to other subsystems using field bus protocols
- » Allows remote download of software upgrades or new control software applications via the Internet, eliminating the need for on-site servicing to upgrade firmware / software or to alter various configuration settings
- » Provides multilevel protection against over-current and over-voltage disturbances and high resilience electromagnetic interferences, resulting in increased reliability and minimizing the failure rate caused by external influences





ROBUST DESIGN DRIVES RELIABILITY

Telegra’s RFC has a robust design, both externally and internally, allowing for years of reliable highway and tunnel management. The RFC:

- » Supports a large variety of applications, including: controlling a variety of equipment; data collection and processing; integration of video surveillance and incident detection; autonomous local operation; and communication, control and data exchange with the traffic management center
- » Uses various communication devices and interfaces, enabling communication with the traffic control center and other equipment using a choice of data transfer media, including copper twisted-pair wire, fiber-optic cable or Ethernet

Controller Cabinet

- » Model 334 industry style cabinet designed to support Telegra’s Roadside Field Controller
- » Contains racks and cabinets with complete wiring necessary for connecting additional third-party components or interfaces, such as meteorological stations, weigh-in-motion systems and license plate recognition systems
- » Features durable housing that protects from the elements and is easily accessible for convenient maintenance. Mechanical and housing options include open road and tunnel versions.

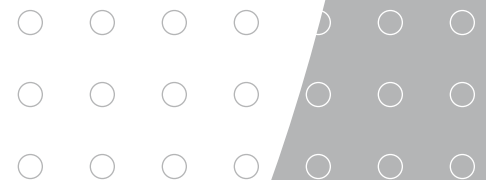
Both feature double, lockable doors on the front side of the cabinet, which is mounted on a secure foundation

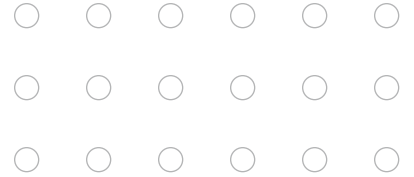
- » Includes all communications and power protection devices, and the RFC cabinet can also double for a power distribution point equipped with all required protection and safety devices

RFC Software

The Telegra RFC software enables operators to adjust configuration parameters, view the error log and monitor NTCIP protocol traffic. In the event of an emergency or communication breakdown, the RFC also functions in automatic mode, relying on an algorithm saved in its non-volatile memory. The algorithm:

- » Transfers to non-volatile memory using TLS telegrams that are extensions to standard TLS
- » Is simulated using pseudo-code to perform on the PC
- » Transfers a new algorithm to the RFC without stopping the current algorithm from running
- » Transmits securely by 32-bit CRC
- » Can be turned on or off remotely





CERTIFICATIONS

Telegra's RFC products meet and often exceed all international standards for the most stringent mechanical and environmental requirements. Our products are UL and CUL listed and they also comply with:

- » **General Requirements** Information technology equipment – safety in accordance with IEC 60950-1
- » Controller unit is EMC tested and compliant with applicable electromagnetic interference immunity levels
- » TLS2002 homologated and compliance tested
- » ISO 9001:2000
- » NTCIP Compliance – All Telegra U.S. products strictly adhere to the NTCIP standards



American Welding Association | ISO 9001:2000 Certification

Telegra is a member of AAAE, AASHTO, ATSSA, IBTTA, IEEE, IMSA, IRF, ITE, ITS America, NEMA, TEAM Florida, TEAM Texas and TRB

PRODUCT SPECIFICATIONS

Cabinet Dimensions	Project dependent or per customer request, 334 style		
Clock	Real-time with battery back-up		
Configuration Outlet	V24 or Ethernet		
Connection of Signal and Com. Lines	LSA connection terminal, over-voltage protected		
Controller Functionality	NTCIP-compliant controller; interfaces with any NTCIP-compliant traffic device		
Controller Physical Features	19" network rack; rugged lockable cabinet; double doors for outdoor use		
Electromagnetic Interference	Meets electromagnetic interference immunity criteria for the following: EN 50293:2000:04 EN 55022: terminal disturbance voltage, class: B EN 55022: radiated emissions, class: B EN 61000-3-2: limits for harmonic current emissions, class: A EN 61000-3-3: limitation and voltage fluctuations and flicker low voltage supply system EN 61000-4-2: immunity to electrostatic discharge, failure criteria: B EN 61000-4-3: immunity to radiated electromagnetic fields, failure criteria: A EN 61000-4-4: immunity to fast transients (burst), failure criteria: B EN 61000-4-5: immunity to surges, failure criteria: B EN 61000-4-6: immunity to conducted high frequency interference, failure criteria: A EN 61000-4-11: immunity to voltage drops, short interruptions and voltage variations		
Expansion Bus Type	Parallel		
Field Device Interface	Copper twisted pair; fiber optic; Ethernet		
Flash Memory	1 MB flash		
Front Panel Service Ports	RS-232 and RJ-45		
Inner Illumination	Light bulb with door contact		
Installed Units	More than 700 (all models)		
Main Processor Module	MC68331 32-bit microcontroller 4 MB static RAM-a w/local battery backup 1 MB FLASH memory for program 512 KB FLASH memory on board for storing configuration data Slot for docking of secure digital FLASH memory cards (up to 1 GB) Real time clock with battery backup Supply voltage monitoring circuit with hardware watchdog		
			Service serial RS-232 port on front board with RJ45 connector 4 serial ports of user choice, definable by means of exchangeable signal conversion adapters (RS232, RS485) CAN controller for connection of various CAN peripherals 10 MB Ethernet LAN controller, RJ45 connector on front board Parallel expansion bus for connection of parallel interface peripherals (LCD, keyboard etc.)
		Manufacturer Exp.	Over 20 years
		Microcontroller	32 bit
		Monitoring Circuit	Supply voltage monitoring with hardware watchdog
		Operating Temp.	-40° to +158° F
		Over-Voltage and Over-Current Protection	Fuse inserts B and C class over-voltage arresters Residual current circuit breakers
		Parallel I/O	Maximum of eight channel module
		Power Consumption	80 W, with heater turned on
		Power Requirements	120/240 VAC-50/60 Hz @ 80 Watts
		Power Supply	Stabilized DC; 120/240 VAC-50/60 Hz
		Random Access Mem.	4 MB static with local battery back-up
		Secure Digital Slot	1 GB flash memory slot
		Serial I/O	Up to eight ports; (four on main processing module and four on additional serial module): RS485 interface with galvanic opto-isolation RS422 interface with galvanic opto-isolation RS232 interface
		Serial Ports	Four ports are standard (configurable with additional ports)
		Software Specifications	Operation system "Thread X" / manufacturer "Express-Logic" One main control software module One or more TLS function groups User-interface layer Interface for PLC devices according to MODBUS/Profibus/other industry protocol
		User Interface	Foil keyboard; LCD 4x40 characters, back lit; optional touch-screen color LCD
		Vehicle Detection	Inductive loops detectors using detector cards; radar/microwave vehicle detectors; video camera detection equipment
		Voltage Driver	Four channel, opto-isolated
		Warranty	Two years on products and services

