



Traffic Priority Management System

The wireless EMTRAC Priority Management System uses secure Frequency Hopping Spread Spectrum (FHSS) data communications and Global Positioning System (GPS) technology to detect equipped bus, light rail, and emergency vehicles passing through predefined intersection approach zones to place priority or preemption requests to intersection signal-control equipment. The EMTRAC system is capable of communicating wirelessly and through existing Local Area Networks (LANs) in traffic cabinets to enable remote monitoring, data collection, and configuration.

The EMTRAC system consists of three main components—the intersection equipment, vehicle equipment, and the software used to configure and monitor the system.

EMTRAC Vehicle Equipment

Vehicles equipped with the EMTRAC system carry a compact, yet rugged, Vehicle Computer Unit (VCU), which is connected to an omnidirectional antenna that receives GPS location data and transmits Signal Priority requests to intersections through secure 900 MHz UHF radio. The GPS functionality is able to track vehicle location with precision accuracy, and the radio range allows reliable intersection response—even in adverse conditions.

Features and Benefits:

- 900 MHz, frequency-hopping spread spectrum radio with secure, 256-bit AES encryption
- Typical transmission range of 3,000 feet, enabling approach zones of the same length
- Operates off nominal 8 to 40-volt DC power source
- Capable of communication through Ethernet, RS-232, or wireless connection
- Sends four main directional codes, and four auxiliary codes
- Capable of storing up to 1,000 intersection approach zones
- Ability to accept multiple inputs to prompt priority requests, including bus-door or pull cord activity, schedule adherence, passenger count, and emergency light-bar.
- Time-out feature configurable to cease transmission after designated amount of inactivity
- Programmable with Windows XP (or later) operating system



Specifications:

GPS Engine

Parameter	Specification		
Receiver Type:	1.1 frequency, C/A Code, 16 Channels		
Max Navigation Update Rate:	4 Hz		
Accuracy ^{4,5} :	Position	2.5 m CEP ²	5.0 m SEP ³
	Position DGPS/SBAS ¹	2.0 m CEP	3.0 m SEP
Sensitivity ⁶ :	Tracking	-158 dBm	
	Acquisition & Reacquisition	-148 dBm	
	Cold Starts	-142 dBm	
Operational Limits:	Velocity	1,689 ft/sec (515 m/s)	

Dimensions

VCU:	2.35" (H) x 4.75" (W) x 8.5" (D)
Antenna:	1.15" (H) x 4.55" (Diameter)

15-foot cable provided with antenna (with additional cable available).

UHF Radio

Performance	Standard Range	High-Speed Short Range
Transmit Power Options:	1mW - 1 Watt	1mW - 1 Watt
Urban Range:	Up to 3,600 ft (1100 m)	Up to 1,500 ft (450 m)
Interface Data Range:	1,200 - 230,400 bps	1,200 - 230,400 bps
Throughput Data Rate:	9,600 bps	115,200 bps
Receiver Sensitivity:	-110 dBm	-100 dBm

All specifications are subject to change without notice.

Radio, Networking, and Security	
Frequency:	902 - 928 MHz
Spread Spectrum:	Frequency-Hopping Spread Spectrum
Modulation:	FSK (Frequency Shift Keying)
Data Comm.:	Ethernet 100Base-T or Serial (RS-232)
Encryption:	256-bit AES
Certifications:	FCC (Part 15.247), Industry Canada (IC)

EMTRAC Intersection Equipment

Intersections equipped with the EMTRAC system have a UHF antenna mounted either on a signal pole or on the traffic cabinet and a Priority Detector (shown below), which consists of a 900 MHz spread-spectrum transceiver and a single-board computer integrated in a dual-card assembly that plugs into the traffic cabinet's detector rack or a shelf-mount cabinet.

Features and Benefits (Priority Detector):

- Includes serial RS-232 or Ethernet communications, enabling remote monitoring of system activity and configuration of EMTRAC intersection equipment through the existing traffic network
- Maintains a database of system activity, which is used to generate detailed event logs and setup reports
- Four main outputs (N, E, S, W) and four auxiliary outputs are provided, with each output signal optically isolated for 2,500 volts
- Includes four optically-isolated inputs
- Operates on 120 VAC with its own power supply, and fits NEMA, 170, or shelf cabinet styles
- Includes indicator lights for power on, signal received, active output by priority, and direction of signal or channel
- Includes toggle switches to send output in either Priority 1 or Priority 2 mode, allowing manual testing of detector function and intersection response
- Allows full configuration of system settings for desired response and output

Specifications:

- Dimensions:** 4.5" (H) x 2.3" (W) x 6.95" (D)
- Compatibility:** NEMA or 170 Model Controllers
- Versions:** Rack-Mount, Shelf-Mount
- Comm. Ports:** Two 100Base-T Ethernet, Serial (RS-232)
- Outputs:** 8 (4 standard directional, 4 auxiliary)
- Inputs:** 4 NEMA Logic Levels
- Power:** 120 VAC, 50/60 Hz
- Frequency:** 902 - 928 MHz FHSS
- Modes:** Active / Standby
- Parameters:** Programmable settings include:
Time for call to remain on after loss of vehicle request (in seconds),
Output redirection,
Intersection ID, Limit to one output, Direction enable,
Minimum duration of priority call



EMTRAC Systems Manager Software

The Systems Manager software is used to set up the vehicles, intersections, and intersection-approach zones for the EMTRAC system. The software maintains a database of this information and graphically displays the streets and approach zones for each intersection in a map format. Systems Manager is also capable of configuring required operating information into each piece of equipment and obtaining stored operation history from each device.

Features and Benefits:

- Generates savable logs and reports that display system activity as well as intersection and vehicle setup information.
- Displays equipped-vehicle motion in real-time, and enables users to save and replay the saved motion on the provided map (when connected to the Vehicle Computer Unit)
- Uses real-time GPS vehicle-position data in order to set up intersection approach zones while driving through the area of interest (when connected to the Vehicle Computer Unit)
- The following reports and logs are currently available:

Vehicle Log - Lists signal-request activity by vehicle

Intersection Report - Lists intersection and zone setup information

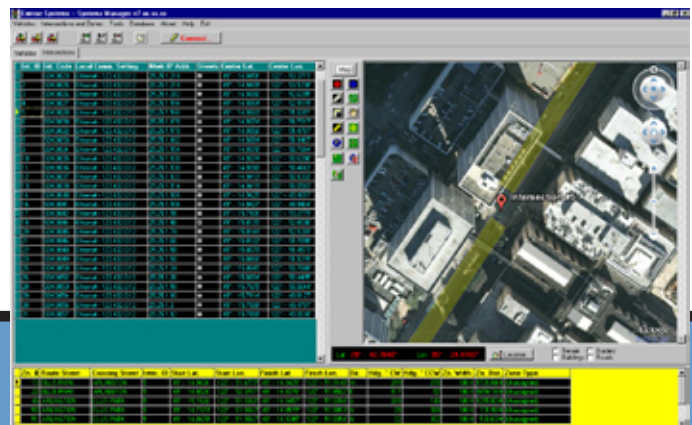
Priority Detector Log - Lists signal request activity by intersection

Vehicle Configuration: Lists vehicle setup details

Zone Data in VCU: Lists zone configuration currently in Vehicle Computer Unit

Specifications:

- Operating System:** Windows XP, Windows Vista, or later
- CPU:** Pentium 4 (or later)
- Minimum RAM:** 512 MB (Windows XP), 1 GB (Windows Vista)
- Hard Drive Space:** 50 MB minimum available
- Comm. Support:** Ethernet 100Base-T, Serial (RS-232)



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