

# HOW SECURE IS YOUR PREEMPTION SYSTEM?

IN TODAY'S WORLD, CODED PREEMPTION IS NOT ENOUGH



**e lock**<sup>TM</sup>  
emitter authenticator

**YOUR  
PREEMPTION  
SYSTEM  
IS UNDER  
ATTACK!**

*e lock*  
IS  
YOUR  
ONLY  
DEFENSE!

# e lock™

emitter authenticator

For over 20 years, emergency vehicle preemption systems have been saving lives and property by helping first responders get to emergencies safer and quicker. Today the security of preemption systems is threatened.

Emitters for preemption systems used to be difficult to purchase. Now there are emitters being advertised on the internet, and being marketed to private detectives, private security guards, and funeral directors.

Coded preemption is not a secure solution. All coded preemption systems are vulnerable to "replay" attack. A coded emitter sends out repetitive optical signals that can be recorded electronically and "replayed" with a strobe light to gain access to a coded preemption system. Strictly coded systems also make wide area mutual aid with preemption difficult at best.

TOMAR's e lock™ emitter authenticator system slams the door on unauthorized users and returns control of your community's preemption system to you. Simple possession of an emitter will not grant access to an e lock™-equipped intersection with out e lock™ vehicle equipment plus the user programmed passwords.

The wireless signals utilized by e lock™ are encrypted and implement a US government standard, SHA-1, secure authentication system for vehicles requesting preemption. The authentication signals are hack-proof and are not subject to replay attack, as they change in an unpredictable way each time they are exchanged.

Mutual aid is enhanced with e lock™. Multi-jurisdiction metropolitan areas cooperate seamlessly by establishing mutually agreed upon area-wide passwords without divulging each member systems local password.

In times of extreme emergency, the e lock™ system can be sent a command to disable authentication and allow preemption by emitter only. After the emergency is over e lock™ can be commanded to resume secure authenticated operation.



Vehicle Module

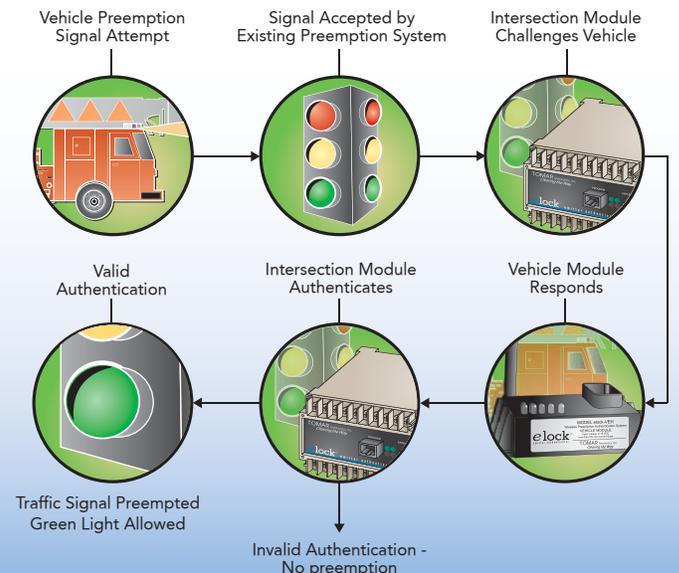
Intersection Module

## How It Works

The e lock™ system consists of two major components. The intersection module, mounted in the intersection traffic cabinet, and the vehicle module, mounted on the authorized vehicle.

When the existing preemption equipment in the intersection is activated by a signal from an emitter, the e lock™ intersection module momentarily intercepts the preemption signal to the traffic controller. The e lock™ intersection module sends an encrypted challenge to the vehicle requesting preemption. The vehicle returns a calculated response to the intersection. If the challenge and response match, the intersection module allows the preemption call to proceed to the traffic controller. If the response is missing or is incorrect the preemption signal is not passed on to the traffic controller. The whole authentication process typically takes less than 1 second to complete. Both successful and unsuccessful preemption attempts are logged in memory for review.

The passwords stored in the intersection modules and vehicle modules are user re-programmable and are not retrievable from either module.



## Features and Benefits

- Uses hack-proof, US Government developed, SHA-1 authentication standard to restore control of your community's preemption system to community leaders.
- Allows seamless mutual aid over any size area with no loss of security.
- Saves money by adding state-of-the-art vehicle coding and logging to older non-coded preemption systems without purchasing new preemption hardware.

## Software

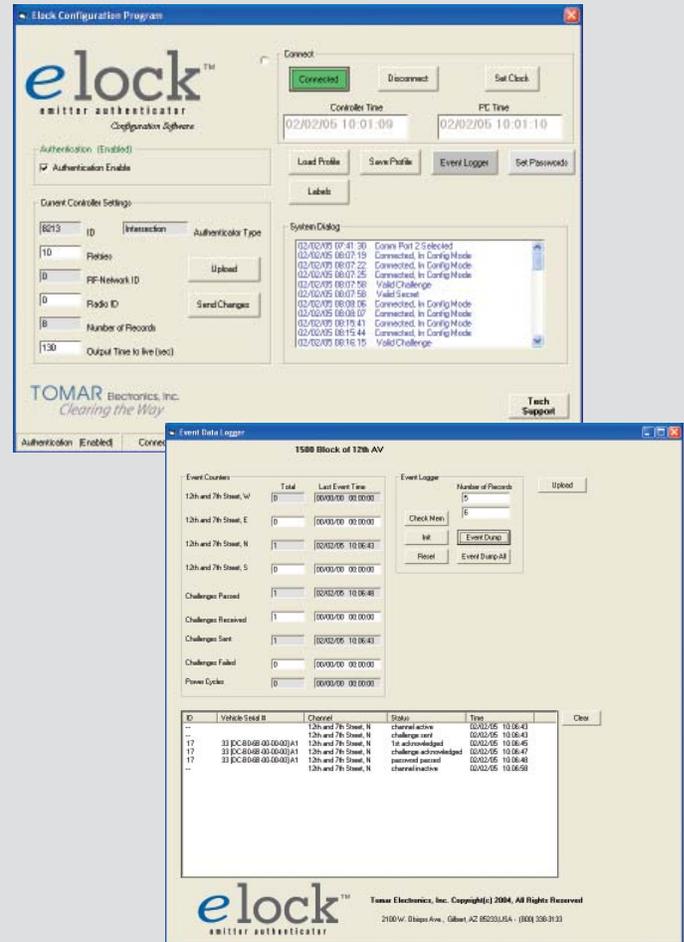
The eLock™ configuration software provides total control over the eLock™ authentication system allowing you to define all system parameters for the vehicle and intersection modules.

The event data logging system records the status of emergency lights, sirens and preemption emitters and provides time stamping of emergency vehicle activity.

The software can also disable a vehicle module if one is stolen or misused.

Log information includes:

- Vehicle ID number
- Time & date of event
- Vehicle approach direction
- Valid and invalid preemption attempts and times
- ALL vehicles attempting to preempt each intersection
- Unauthorized authentication attempts



## Specifications

	Intersection Module	Vehicle Module
<b>Power</b>	10 VDC ~ 24, Reverse Polarity Protected	8 VDC ~ 16, Reverse Polarity Protected
<b>Current</b>	35ma (typical)	100ma (typical)
<b>Size</b>	4.0 in x 2.8 in x 4.5 in (101.6 mm x 71.1 mm x 114.3 mm)	5.1 in x 4.3 in x 2.3 in (129.5 mm x 109.2 mm x 58.4 mm) (not including antenna)
<b>Weight</b>	10 oz (0.28 kg)	1 lb 3 oz (0.54 kg)
<b>Mounting</b>	DIN Type, 35mm	Molded mounting holes
<b>Frequency</b>	902-928 MHz (2.4 GHz available)	902-928 MHz (2.4 GHz available)
<b>Radio Type</b>	Frequency hopping, direct FM	Frequency hopping, direct FM
<b>Temperature Range</b>	-40° to +70° C	-40° to +70° C
<b>Antenna Connector</b>	Reverse-polarity SMA	Reverse-polarity SMA
<b>Event Log Capacity</b>	Approx. 1500 records	Approx. 1500 records
<b>Authentication Acquisition Time</b>	Approx. 750ms (typical)	Approx. 750ms (typical)
<b>Authentication Type</b>	SHA-1 over proprietary packet control	SHA-1 over proprietary packet control
<b>Range</b>	Approx. 3000 feet (typical)	Approx. 3000 feet (typical)
<b>Number of Approaches</b>	4	-NA-
<b>Inputs</b>	4, optically isolated inputs	4, optically isolated inputs - emitter, siren, emergency light, input detection, and time stamp logging
<b>Outputs</b>	4, open collector outputs, optically isolated	1, open collector output acknowledgement indicator (optional)
<b>LED Indicators</b>	4, data TX, data RX, connected, sanity	4, data TX, data RX, connected, sanity
<b>Serial Comm.</b>	Configuration, (optional cable). 9600,N,8,1	Configuration, (optional cable). 9600,N,8,1

**TAKE BACK  
CONTROL  
OF YOUR  
INTERSECTIONS**

**e**lock™  
emitter authenticator

[www.tomar.com](http://www.tomar.com)

**TOMAR** Electronics, Inc.  
*Clearing the Way*

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