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Review of the Trekmate Security System

In terms of security systems, recreation vehicles are somewhat unusual in that they combine the needs and problems of both automobiles and houses. Because of their ease of entry, motorhomes are subject to break-ins. Large glass areas, lightweight locks, and duplication of keys for outer compartments contribute significantly to the problem. If a hard-wired alarm system is to be retrofitted to a motorhome, there may be areas where installation is difficult, if not impossible.

Thomas Behm, owner of Trekmate Security (formerly TravelSAFE), has solved this problem in part by designing an RV alarm system that incorporates wireless sensors. Before founding Trekmate Security, Behm enjoyed a career in electronics engineering design and sales. He spent the last few years of his career working with a California firm providing sophisticated home alarm systems. When Behm purchased his first motorhome he realized that there was a need for an alarm system created expressly for the RV market. So, he designed and developed the Trekmate system and formed his own business.

This article will review one of the company's systems, discussing its installation and operation.

Product description. The Trekmate is offered in a choice of two packages, the basic system, and the deluxe system. Essentially, the basic system provides interior protection, while the deluxe system provides perimeter protection as well. The basic system has the following features:

1. Remote arm/disarm and emergency capability.
2. Audible arm/disarm signals
3. Status light for arm/disarm modes.

Designed specifically to protect recreation vehicles, this system includes such noteworthy features as wireless sensors that detect motion, glass breakage, or the opening of doors, as well as a variety of remote-control functions.

4. Instant alarm response.
5. Siren for alarm activation.
6. Wireless interior motion sensor.
7. Driver area glass breakage sensor.

Additional wireless sensors are available to detect the opening of doors, rooftop storage pods, and outer storage compartments; glass breakage in other areas of the coach or tow vehicle; and the presence of smoke.

The deluxe system incorporates the following:

1. Remote arm/disarm, emergency, and light control capability.
2. Audible and visual arm/disarm signals.
3. Status light for arm/disarm and prior attempt warning.
4. Instant alarm response.

5. Siren and flashing lights for alarm activation.

6. Hard-wired or wireless sensors for doors, roof storage pods, outer compartments, glass breakage, tow car, interior motion, or smoke alarm.

7. Two remote-control functions—one 12 volt positive and one ground. These can be programmed to function as on/off continuous, on/off momentary, or on as long as the control button is held. This feature can be programmed to function when the system is armed, disarmed, or in either case.

8. Semi-remote features include a 12-volt relay activated when the system is disarmed; a system armed ground; and a momentary ground when armed or disarmed.

9. A diagnostic mode that indicates if and where the system has been violated.

10. Manual controls that include a switch for valet mode (alarm disabled for coach service) and diagnostics mode (intrusion zone memory, real-time zone monitor, and radio frequency testing of key-fob (the keychain-size device used to remotely operate the alarm system) and wireless sensor transmitters). Optional - alarm on with engine running and pager on/off switches.

11. Optional remote pager that can be activated by the alarm or on demand by someone in the coach to signal the person carrying the pager.

Any number of additional wireless sensors can be used.

Installation. We installed the deluxe system, with options, in our 40-foot converted bus. Although some of the installation procedures described will not be applicable to smaller coaches, either the basic or deluxe system can be adapted readily to any size or style recreational vehicle.

For the most part, the installation was straightforward. However, to utilize the full potential of the deluxe system with remote-control options, the installer should possess some electronics skills and be familiar with the coach wiring. According to Behm, RV dealers install either system in four to six hours at a cost of approximately \$200. An installation similar to the one described in this article may well cost twice that much. The wiring chart included with this article is one that we devised ourselves, as none was provided with the product. Other than the absence of a wiring diagram or chart, the instructions were complete and understandable.

The central processing unit (CPU) - the "brains" of the system - was installed under the dash using the supplied color-coded harness. In installing the device, take care to avoid any area subject to heat and/or moisture - near the heater or air

WIRING CHART	
13 PIN CONNECTOR	
Red/White	Pager on/off switch
Red/Black	Pager on/off switch
Black	Ground
Orange	+Siren - ground
Blue	- trigger, left storage (Zone 2)
Yellow	- trigger, door/hood (Zone 3)
Yellow/Black	+ trigger (Zone 5)
Gray	LED status light - black - ground
Gray/White	12V+, ignition on/alarm off
KEY	
Purple/Black	- purple - Mode Switch - black - ground
Purple	12V+ ignition on
Brown/Black	- ,right storage (Zone 4_
6-PIN CONNECTOR	
6. Black/White	Ground pulse lock
5. White/black	Ground plus unlock
4. White/brown	Ground (#1 remote)
3. KEY	
2. Not used	
1. Tan	System armed ground, output
3 PIN CONNECTOR	
1. Brown	Docking light lead (#2 remote)
2. Orange/Black	Parking light relay
3. Red	12V+
2 CONDUCTOR LEAD	
Green	Parking light
Black	Switch
PAGE ALERT	
Green	Trigger
Red	12V+
Black	Ground

conditioner, for example. Since our coach has a 24 -volt running light system, a 12/24-volt relay was added. This relay is available at any Radio Shack store (part #275-226). We installed the wired glass break sensor in the dash area using the double-sided tape that was provided.

After placing the radio frequency receiver in various locations in an attempt to find the position that provided maximum range, we finally installed it on the underside of the front overhead cabinet. This location allows a range of approximately 40 feet. Although Trekmate literature indicates a range of 30 feet or more, even the 40-foot

range was not adequate to allow remote activation of the docking lights when approaching the coach from the rear. The range in our particular installation may possibly be limited by the fact that our coach has a stainless steel and aluminum body, rather than fiberglass. Also, we were informed that if a manufacturer abides by FCC standard, it generally is not possible to obtain a range of greater than 50 feet or so.

The radio frequency receiver is hard-wired to the CPU via a standard four-conductor phone cable and jack assembly. Its location is limited only by the availability of a wire run. It can

be oriented in any direction and could, if desired, be located in the midsection of the coach.

Our installation included the following wireless sensors:

1. Two glass break detectors - one at the rear and one in the midsection of the coach.

Coaches 40 feet in length are best served by a total of three glass break detectors. Vehicles less than 30 feet long can be protected by two detectors - one in the front and one in the rear. Coaches between 30 and 40 feet may or may not require the third detector, depending upon the floor plan.

2. A photosensitive smoke detector mounted in the kitchen area.

3. Two opening sensors with magnetic switches were installed on the window screens in the bedroom. This makes it possible for the coach occupants to leave the windows open for ventilation while they are sleeping and yet gives warning should an intrusion be attempted.

4. Glass break detector for the tow car.

The wireless interface with the CPU offers great versatility. Aside from the items we installed, a coach owner could also connect safety devices such as propane and carbon monoxide detectors in to the alarm system using such wireless transmitters. Any number of wireless sensors can be used. Another advantage of these wireless sensors is that they make it possible to transfer the security system to another vehicle. We hard-wired our outer storage areas, because each of them had already been wired for lighting by the bus manufacturer. The CPU is versatile enough to accept a negative or a 12-volt or 24-volt positive trigger. An interface consisting of a transistor and an IC voltage regulator were required to adapt the bus manufacturer's wiring to the 12-volt positive trigger of the CPU.

In the event that there is no existing wiring in the storage

bays, a wireless sensor with either a pin or magnetic switch can be used. The use of these wireless sensors eliminates the difficulty of making long or inconvenient wire runs.

In most installations, the hood and door will be hard-wired to either the positive or negative trigger. In the event that the door is located in the midsection of the coach, a wireless sensor can be used.

Next, the LED (light emitting diode) status light, the mode switch, the pager on/off switch, and an on/off switch to the ignition lead were installed. The latter switch was installed to allow the alarm to be armed with the engine running, since there are occasions when it is convenient or necessary to be out of the coach while the motor is running. Connection of the ignition lead is essential to eliminate any chance of a false alarm while driving. Installation of these switches is straightforward, and their location will vary slightly from coach to coach.

Perhaps the most exclusive feature of this alarm system is the capability to use the key fob alarm system commands as remote-control switches. As delivered, button number 2 on the key fob is intended to turn outside lights (usually docking lights) on and off. If no docking lights are present, any other outdoor lights may be controlled. The versatility of the CPU was demonstrated in our particular installation. All of the wiring for the docking lights is at the rear of the coach, and only switches to activate latching relays are in the dashboard area. This presented no problem, because the CPU can be programmed easily so that the output, as a result of pushing button number 2 on the key fob, is either 12-volt on/off, 12-volt pulse, or 12-volt intermittent (as long as the button is held). These outputs may all be programmed to react when the alarm is armed, disarmed, or in either case. We chose to pro-

gram our system for 12-volt pulse output when the system is either armed or disarmed. If the disarmed only mode is chosen, the controlled lights will turn off automatically when the system is armed.

With the approval of Trekmate Security, we constructed a diode network that allows key fob button number 2 output to activate the right, left, and rear pairs of docking lights in unison while allowing the original dash switches to maintain control of each pair independent of the other two. These diodes are available from Radio Shack (part #276-1141) for approximately 75 cents each. With only slight further modification to the coach wiring, it was possible to have key fob button number 2 also turn on the headlights, thereby providing around-the-coach illumination under emergency circumstances. Less sophisticated systems would not provide a 12-volt pulse; instead all of their remote circuits would be completed by switching to ground. In this case, if a 12-volt pulse were needed, an extra transistor and/or relay would be required.

The remote features controlled by key fob button number 1 are similar, except that the circuit outlet is completed to ground rather than providing 12 volts. It is also user programmable. As supplied by Trekmate Security, holding key fob number 1 for three seconds will activate the "finder" function to assist the owner in locating the vehicle. The siren chirps six times and the lights flash six times. This remote output can be programmed to activate other items. An example would be to open or close electrically powered windshield drapes.

Still other remote capabilities exist. We wired the existing porch light and courtesy lights to turn on when the system is disarmed. They remain on for approximately 60 seconds whenever the entry door is opened.

It is also possible to have remote control of electric bay door locks, i.e. automatically locked when the system is armed and automatically unlocked when the system is disarmed. We personally like the lock-when-armed feature but question whether we would want the bays unlocked whenever the system is disarmed. Entry door locks can also be controlled. These are choices an owner can make.

This system also contains a "system armed ground output" (when the alarm is armed, a ground is completed). This allows certain accessory devices to be turned on whenever the alarm is armed. You attach one wire from the accessory device to 12 volts and the other wire to the alarm system armed ground. Thus, whenever the alarm is armed, the selected accessory device is also activated. It is possible to control more than one accessory item in this manner. This feature would be useful if one chose hard-wired glass break detectors, which require independent 12-volt power to operate, rather than wireless detectors.

The Trekmate also includes a provision for a system armed starter interrupt. If this optional feature is installed, the engine cannot be started when the system is armed. An optional starter interrupt relay is inserted in the wire between the ignition switch and the starter solenoid. A 12-volt output lead from the CPU is then attached to the coil of this relay, while the other coil lead attaches to ground. The 12-volt output lead is active only when the system is disarmed. Once the alarm is armed, no 12-volt power is available to this lead. Even if a thief had a duplicate of your ignition key and was willing to drive with the siren blaring and the lights flashing, he or she would not be able to start the engine. According to Behm, most coach owners do not opt for the starter interrupt circuit. This is probably because they know that most thieves are in-

terested in the contents of the coach rather than the motorhome itself. In addition, many owners do not want the manufacturer's starter circuit modified.

The "diagnostics mode" allows self-diagnosis for testing and troubleshooting the alarm system. Three areas of testing exist. The first is intrusion zone memory; the second is present time zone monitoring; and the third allows for evaluation of wireless components. The most significant advantage of the diagnostics mode is to allow a service representative from Trekmate Security to assist in troubleshooting any problems so that they can be corrected either by the owner or by a local technician who may not be totally familiar with the product. Help is just a phone call away.

We may have reported more information about the installation of the Trekmate system than some of you care to know. However, it would be a shame for consumers to purchase this product and not benefit from some of its features because an installer either did not know or did not tell them that these options were available.

Operation. We had an unsolicited assistant who demonstrated that no consumer education is necessary to operate the system's "panic" button. We were quietly enjoying our dinner one night when the siren began to wail and the lights to flash. We frantically searched for the key fob to turn off the alarm and found it under the cat's paw! We had left it on a table, and Smokey must have decided that this would be a good time to test our reflexes.

In this instance, and in others, the key fob performed flawlessly in arming and disarming the system. Having the porch light wired to turn on for 60 seconds after the system was disarmed was terrific. This enabled us to see so as to find the key and keyhole when entering the coach. A side benefit to the

way we wired the porch light is that it also turns on for 60 seconds whenever the entry door is opened. This is very convenient when exiting the coach at night. You can see to lock the door and can move away from the coach while the light is on.

Not only is the external LED status light a convenient indication of alarm status, but it also allowed us to enter the coach with confidence that no intrusion had occurred while we were away. An additional status light can be mounted inside the coach.

The wireless opening sensors on the bedroom screens functioned as intended. We tested the wireless glass break sensor in the tow car up to a range of 200-plus feet, and it functioned well. One must remember, however, that the tow vehicle is not protected when it is moved beyond the range of the wireless receiver mounted in the coach.

We are pleased to note that the wireless photosensitive smoke detector did not issue a false alarm when we were cooking. The fact that this smoke detector activates the alarm system in the event of fire when the system is armed, greatly improves the fire protection when the coach is not occupied.

The hard-wired sensors functioned normally. The hard-wired glass break sensor in the windshield area had to be adjusted to keep it from being tripped by a barking dog (ours). This adjustment readily prevented further false alarms; however, we lacked the testing equipment to assure that a broken windshield glass would be detected. Traveling with two dogs and a cat creates some idiosyncrasies, but the system handled our "family" well.

Our favorite part of the system is the remote-control feature. The dogs bark at any suspicious noise but they cannot make a value judgement. Now that we have the Trekmate system, when the dogs alert us we

can turn on the lights at the front, rear, and both sides of the coach simultaneously to see whether they are barking at a possible intruder or just a nosy raccoon. This is especially valuable when you are parked in an isolated area.

Our coach does not have electric windshield drapes, but we can imagine how convenient it would be to be able to open and close them from anywhere inside the coach, or even from the outside. This might be desirable if, upon your return to the coach, the status light indicated a prior intrusion attempt. The coach owner could fully illuminate the exterior of the coach and open the drapes before entering the vehicle. It is also possible to turn on selected interior lights before entering the coach.

The optional pager is effective within a two-mile range of the coach. It activates whenever the system is armed or disarmed, or when the alarm is violated. It also can be used to notify the person carrying it- a feature we found particularly useful at mealtime! We did experience two false alarms related to the pager. When the first one occurred, one of us was in the coach, and we determined that there was no reason for the transmitter to be activated. In the second incidence, both of us were outside the coach, but when we returned, there was no evidence of intrusion, and the LED status light did not indicate a "prior attempt." These false alarms occurred while we were attending a trade show where the organizers and security personnel communicated by radio. Most likely, the pager receiver responded to one of their radio transmissions. We should point out that the Trekmate alarm system itself did not issue a false alarm.

The pager transmitter uses the FM radio antenna to signal the receiver. The transmitter is activated by the flashing of the parking lights. When you flash the ICC lights while passing

another vehicle on the highway, you can hear a harsh interference on the CB radio. Trekmate Security officials commented that this is why they recommend always turning off the pager transmitter when driving.

The diagnostics mode enhances the performance of the alarm system. Aside from the "troubleshooting" feature that provides telephone assistance from a Trekmate representative, the owner can also use this mode to derive helpful data. When our pager issued false alarms, it was through the diagnostics mode, that we determined that the system had not been violated and that the transmitter had not sent a signal, leaving us to assume that the pager had picked up an extraneous radio signal. On the occasion of finding the lights and sounds of a tripped alarm, the diagnostics mode informed us that the hard-wired glass break detector had been violated. Since the windshield was intact, we deduced that our enthusiastically barking dog had triggered the response. We were then able to adjust the sensor to avoid further false alarms.

Summary. The Trekmate is a very sophisticated, extremely versatile alarm system with high-quality components. As tested, the deluxe system with OEM options and tow car and fire protection retails for approximately \$1,702 plus installation. This may seem like a great deal of money, but this cost must be related to the value you place on your coach, its contents, and your personal safety. Prices for Trekmate systems without OEM options, tow car protection, and fire reporting range from \$695 to \$1,349.

The systems come with a two-year limited warranty against defects in material and workmanship. It should be noted that no alarm system is absolutely perfect. They serve as deterrents to intrusion but cannot guarantee protection in all circumstances. Owners must

still exercise caution and good judgment. In addition, all systems have some inconveniences. It does take some time to learn how to use the more sophisticated systems, but less sophisticated systems lack the versatility for multifunctional protection modes.

For further information contact Trekmate Security, 5085 Caesena Way, Oceanside, CA 92056; (609) 941-3444.