

FEATURE ARTICLES



RADIO ALARM SYSTEM CALLS "HELP" WITHOUT WIRES OR BATTERIES

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Designed for reliable, high-speed communications, a practical alarm system now exists for highway emergency, police, civil defense and fire-call applications that actually eliminates external wiring or batteries at field sites. In a novel twist to emergency reporting, distressed users energize a self-powered Radio Call Box when they signal for help.

Alarm system installation and maintenance costs are among the biggest problems faced by public safety officials. Motivated by this fact, Solid State Technology, Inc. (SSTI) of Saugus, Massachusetts, developed their wireless, batteryless call box and a receiver console to go along with it. Using frequency modulated tone coding, the system's transmitter can send signals at least 25 miles line-of-sight, and join with repeaters in the event of rough terrain to extend its effectiveness.

Simplicity: a paramount objective. With the matrix tone coding technique that adds to overall reliability, an entire system has the capability of monitoring up to 10,000 individual stations. Each station has its own identity and, in a multiple usage box, designates the nature of distress to the receiver. The real reason, however, that this coding technique was chosen stems from its resistance to atmospheric or man-made noise which could cause false alarms. As a bonus, the coding lends itself to signal transmission over conventional telephone lines, making it adaptable to most commercial equipment.

Solid State Technology's system operates in the public safety band and, according to the company, meets all public safety communications regulations. Operated simply by opening a door and pushing a button, the system offers a choice of distress calls such as "fire", "police", "service", and "ambulance". When you activate any of the call box buttons, the transmitter sends two watts of coded signal to a central headquarters where it's decoded into a message that defines the nature of a particular distress and its location. SSTI officials told *The Communications User* that the transmitter has enough power to emit a coded signal up to about 10 seconds, using a carrier on the order of 20 MHz. All this without wire or batteries.

You can install typical systems with ease, according to the system's developers. Call boxes may be mounted on existing poles or buildings, and it takes only one receiver console to connect with up to 9999 individual stations. Transmitting antennas are conventional for line-of-sight range, their exact type dependent upon box location with respect to geography and/or objects that may hamper effective transmission. Receiving antennas vary with installation but because the transmitters are fixed, these antennas can have high gain and

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high directional characteristics to assure strong reception and lessen interference and/or signal skip problems. As for the receiver, it extracts coded information from the carrier and passes it on to decoding circuits that interrogate the signal and project the results on a panel. At the same time, there's a print-out of these results along with the date and time that the signal was received.

Why it could be a boon. Outlining the advantages of the system for TCU Editors, spokesmen for the Saugus, Mass., firm note that overhead wires for the usual alarm systems are vulnerable to threats such as weather, automobile accidents—even kites and birds. Underground wires which are much costlier are not that much more efficient and are affected by ground conditions that create a need for sophisticated wrappings and corrosion prevention techniques. Batteries have to be recharged—a costly maintenance procedure—and often have to be replaced. In a fire-alarm system, for example, public safety codes dictate that you change batteries every six months, something that adds up to a lot of dollars in systems that have several hundred boxes, SSTI points out. Furthermore, they observe, present battery systems use a method of self-checking that supposedly checks the call box's circuit; but, in effect, only checks to see if the battery is still alive.

SSTI's solid-state system uses mil-spec components that are in certain cases rated reliable for up to 20 years. Its call boxes are totally maintenance free, says the company, and all you have to do to check them is to travel to each and operate it. They say that conventional self-check systems do not guarantee that call boxes will work the instant tests are complete.

When compared to the usual battery approach, Solid State Technology's alarm system claims reliability as the greatest plus although its low-cost installation and maintenance are also primary selling points. Reliability hinges on 100% solid-state construction.

Typical applications. Highway officials are among the first that will see SSTI's system. Until now, says the company, battery or underground cabled systems were necessary for the type of security that the highway people wanted, but the cost of such a network was prohibitive. Reliability was a problem, too, due to the number of two-way radios and car engines that could trigger many of



Figure 1. Highways appear to be a prime application for wireless and batteryless radio transmitters that are part of a public safety communications system developed by Solid State Technology, Inc. of Saugus, Mass. Distressed users produce the transmitter's power by simply pulling a door down to mechanically generate the coded signal energy that's released when you activate the box.



Figure 2. Dual receiving station at central headquarters—such as a police station—has a visual readout that indicates the number of the box sending the distress signal, and a visual indicator that describes the reported emergency's nature. It also provides a tone alert that calls the operator's attention to a received message.

the available systems. For the highway, SSTI suggests setting up a system in which a call box is available every quarter or half mile, depending on the specific need. One console would be adequate to take care of 50 road miles—a conservative estimate—in general terrain area, with repeaters available for rough surroundings.

As a fire-alarm system, the SSTI equipment could be used in suburbs that can't afford the dollars and man-hours required for the installation and maintenance of a wired or battery network. In business complexes where wiring and maintenance would be costly, a system of this nature could be installed quickly and efficiently. And, SSTI has an interesting idea for application of its approach to conservation and forestry where remoteness poses unique problems, and wiring is impossible. They suggest that call boxes strapped to random locations on trees might provide a protective network of transmitters that would be triggered by heat or smoke after they had been pre-loaded prior to installation.

Options and dollars. There are a host of features and options that go with SSTI's equipment. For example, the company also offers a battery system that has most of the advantages of the batteryless version, and includes a self-monitoring circuit feature that indicates at central headquarters when you have to recharge or replace each call box's battery. It also includes a tight control that notifies the receiver when a battery box has been either accidentally knocked over or vandalized.

Another useful option is a receiver inside the box which picks up a signal sent back to it when the central station receives the original distress call. This is in addition to an audible signal that the transmitter emits when you send the signal and an audible signal heard at the station when the signal arrives.

In case you're wondering what you will have to pay for the components that go into the wireless and batteryless SSTI system, it's \$1150 per radio call box and \$23,000 for the dual receiving station that includes a complete secondary back-up power supply. For a wireless, but battery-powered call box, you'd have to pay \$1050 each, while the receiving station that accommodates the battery boxes would cost \$24,000.