

# NASA TECH BRIEF

## NASA Pasadena Office



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### Tone-Activated, Remote, Alert Communication System

#### The problem:

To provide a police officer with an easy-to-operate alert signal communicator which uses the patrol car radio to relay the signal.

#### The solution:

A pocket sized transmitter, frequency modulated by crystal-derived tones, with an integral loop antenna. The tone modulated FM is transmitted to a narrow band receiver/detector and tape player mounted in the patrol car, and either one of two pre-recorded alert messages is transmitted over the patrol car transmitter to the central dispatcher. Because the allotted time for the recorded message and the patrol unit location information is relatively small, the communications channel can be time-shared by several patrol units. In addition, the signals and the detector have a very narrow bandwidth (1 Hz), providing an additional advantage over the voice channel.

#### How it's done:

Initially, the design requirement was for a reliable one-way communications link from a police officer away from his car to the dispatcher.

The specific design implemented includes a red alert signal, transmitted when the red alert push-button on the transmitter is activated. The signal consists of a 100 Hz tone which modulates the FM transmitter. The transmitter in turn radiates the signal, via the closed-loop antenna and through the RF transparent wall of the transmitter case, to the patrol car mounted receiver/tape player and control unit. The receiver output is applied to a

narrow-band detector consisting of a bandpass filter, and driver and vibrating reed relay stages.

The narrow-band characteristics of the reed relays used as filters, and the low-pass filters following the relays, result in a significant performance improvement over the voice channel. This performance advantage makes up for losses due to the inefficient small antenna and propagation losses through the building walls (should the policemen be inside a structure).

The 100 Hz signal is passed through binary logic gates in order to (1) select the tape track on which the red alert message is recorded, and (2) turn on the tape player. The recorded message triggers the voice detector circuit to turn on the patrol car radio transmitter, and the red alert message, pre-recorded on tape together with the identity of the patrol unit, is broadcast to the dispatcher.

The second signal available in the original design is the yellow alert message, consisting of a 400 Hz tone, which performs the same functions as the red alert message tone, but on a second tape track.

Power for the remote unit is provided by a 9 V battery contained in the case.

#### Note:

Requests for further information may be directed to:

Technology Utilization Officer  
NASA Pasadena Office  
4800 Oak Grove Drive  
Pasadena, California 91103  
Reference: B71-10307

(continued overleaf)

**Patent status:**

No patent action is contemplated by NASA.

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