NASA TECH BRIEF

Marshall Space Flight Center

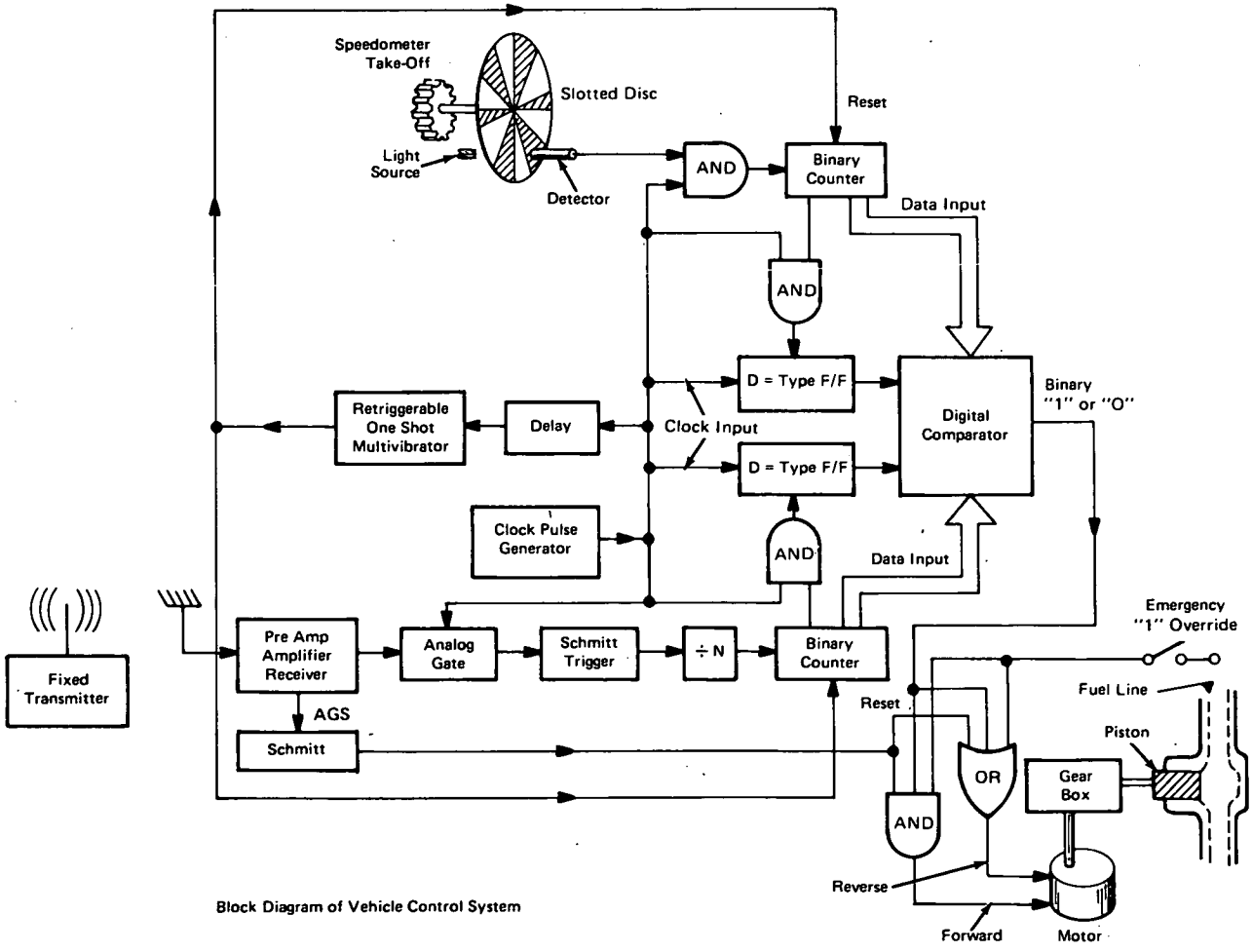
Automatic Speed Control of Highway Traffic

The problem:

Speeding is the major cause of highway deaths. Despite this fact, it is almost impossible for law enforcement and safety officials to vigorously enforce speed limits. Because the use of radar and electronic timing systems is limited by the number of operators available, most police departments, with their limited resources, are unable to monitor much more than a representative sample of the traffic in their area of responsibility.

The solution:

A vehicle control system has been designed which monitors all the vehicles in its range, and automatically



Block Diagram of Vehicle Control System

(continued overleaf)

slows down speeding vehicles by activating a governor in the vehicle.

How it's done:

The proposed system (see figure) consists of several subsystems. Solid state radio transmitters are permanently placed at regular intervals along the road. The device could be placed on existing fixtures such as telephone poles and would have a limited range (30 to 300 meters for example) to allow relatively inexpensive low-power operation. Each transmitter would send a particular frequency corresponding to the local speed limit. The transmitters could be designed to follow a time varying speed limit schedule needed in school zones or during rush hours.

In the vehicle, an electronic clock (pulse generator) activates a "gate" to take periodic samples of the transmitted speed command signal. This wavetrain is shaped by a Schmitt trigger, and the resulting pulse train used as the input to a binary divider. After division, a final binary counter accumulates the sampled divided pulse group to give a binary count proportional to the transmitted frequency.

A pulse train proportional to the actual vehicle speed is generated by a transducer consisting of a slotted disc and optical detector. The vehicle speedometer cable drives the disc.

The "vehicle speed" pulse train feeds a second binary counter, after gating controlled by the internal electronic clock, to generate a binary number proportional to the vehicle speed. The two binary counter outputs (numbers) are digitally compared after each sampling cycle to determine if the vehicle speed exceeds the transmitted, speed command.

The comparator output is a simple on/off signal which is used to control a fuel flow valve. An off signal decreases fuel flow until the vehicle speed drops below the transmitted speed command.

The system determines only a maximum speed; speeds below the maximum are controlled by the vehicle operator. Furthermore, loss of the transmitted signal or activation of an emergency over-ride will open the fuel line and return control to the operator. The emergency over-ride system incorporates a warning device (a flasher or a horn) to indicate an emergency condition or a violation of speed laws.

This automatic governor uses readily available building blocks and can be installed and implemented at a much lower cost than would have been possible for even simpler systems only a few years ago. Because of this and because of the serious extent of highway fatalities, it merits careful consideration by automobile manufacturers and safety and transportation officials at all levels.

Notes:

1. Similar devices may be useful in other transportation systems such as railroads and subways.
2. Requests for further information may be directed to:
   Technology Utilization Officer
   Marshall Space Flight Center
   Code A&PS-TU
   Marshall Space Flight Center, Alabama 35812
   Reference: B73-10100

Patent status:

Inquiries concerning the commercial use of this invention should be addressed to:

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