NASA TECH BRIEF

Kennedy Space Center

A Frequency Division Multiplex Technique for Transmitting Commands

A safe, reliable, random access multiplexer can be controlled and operated over two twisted-pair telephone lines at distances of 5.6 to 8.0 km (3.5 to 5.0 miles) with control signals of less than 10 volts

a parity check should be performed before using the command. Parity information can be used to read the command into a storage register to ensure that the command is correct. Command verification
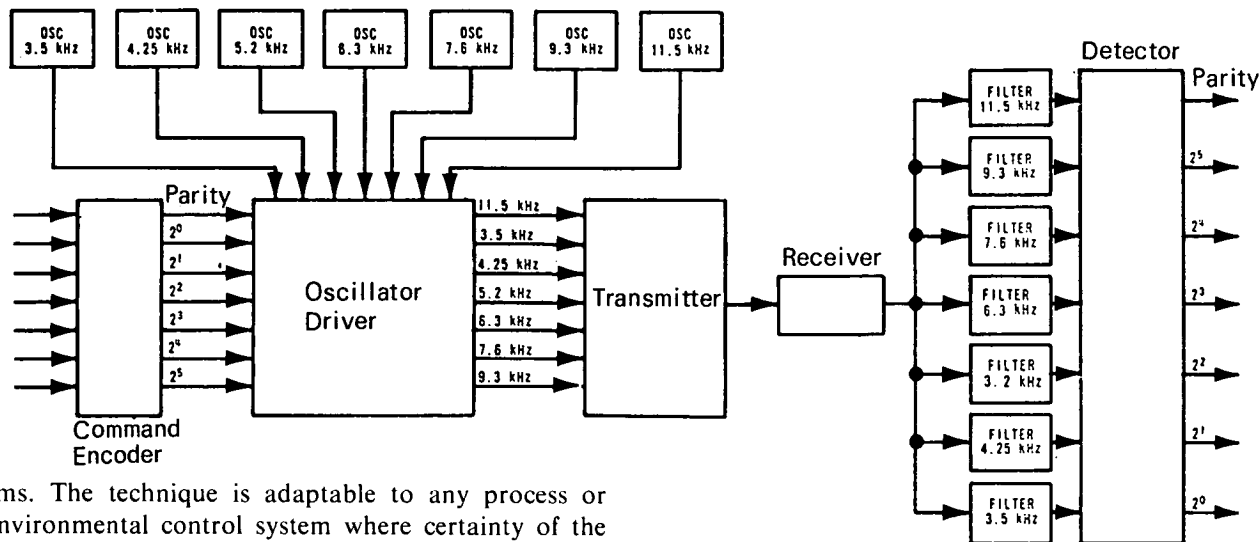
rms. The technique is adaptable to any process or environmental control system where certainty of the data source is a necessity. The method also performs well in low bandwidth transmission under high noise conditions.

A frequency division multiplex technique for command transmission is shown in the figure. In the master station, each command input either gates through or inhibits the transmission of an associated oscillator output through an oscillator driver. The output of the oscillator driver is a multiplex of the frequencies comprising the command and is transmitted to a receiver in the remote station. Each frequency is extracted by a filter, then converted to a dc level by a detector. At this point, the binary form of the command is available; however,

can be accomplished by decoding, generating a frequency multiplex, and transmitting this multiplex back to the master station. A bit-by-bit comparison can then determine if the two commands are identical.

The ratio between oscillator frequencies, in this case, was chosen to be 1.21 to 1, producing seven frequencies distributed such that no linear combination of any harmonics of any frequency pair would interfere with another frequency. This produces a system that is insensitive to both wave shape and symmetry. In addition, stringent linearity specifications are not required for any element in the system, and the bit rate is 1 bit in 10^7.

Note:

Requests for further information may be directed to:

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Reference: B71-10169

Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to:

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Sperry Rand Corp.
under contract to
Kennedy Space Center
(KSC-10521)