

# NASA TECH BRIEF

## *NASA Pasadena Office*



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### Systems of Coding and Their Implementation

The mechanics and utility of error-control information coding are surveyed in a NASA engineering planning document. Although some of the codes described were first devised to increase the reliability of data received from distant spacecraft, they are finding increased application in terrestrial communications.

A code may be defined as a set of symbols used to represent another set. Its purpose is to convert a message into a form better suited for transmission. "Better suited" may be variously interpreted, in terms of the critical factor in a given situation. For instance, a requirement to narrow transmission bandwidth leads to data compression codes, and security requirements produce military and industrial cryptography.

This document is concerned with a class of codes aimed at controlling noise-generated errors introduced into radio transmission of binary information. The document outlines the chronological development of certain codes. Certain formats, representative of various commonly used code types, are described in detail. Each description outlines the advantages and disadvantages of the scheme, and its method of operation. Error correction and detection possibilities are examined, and the conditions for which the greatest improvement in data quality may be expected are described.

The application of specific codes under various given conditions is discussed, and block diagrams of specific implementations of the most popular encoding and decoding schemes are presented. A comprehensive bibliography guides the reader to nearly 300 documents on information theory, codes, coding, and synchronization systems.

#### **Note:**

Requests for further information may be directed to:

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#### **Patent status:**

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