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THE INTERNATIONAL
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CONSULTATIVE COMMITTEE

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SERIES V: DATA COMMUNICATION OVER THE
TELEPHONE NETWORK

Interfaces and voice-band modems

SIMULATED CARRIER CONTROL

Reedition of CCITT Recommendation V.13 published in
the Blue Book, Fascicle VIII.1 (1988)

NOTES

- 1 CCITT Recommendation V.13 was published in Fascicle VIII.1 of the *Blue Book*. This file is an extract from the *Blue Book*. While the presentation and layout of the text might be slightly different from the *Blue Book* version, the contents of the file are identical to the *Blue Book* version and copyright conditions remain unchanged (see below).
- 2 In this Recommendation, the expression “Administration” is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

Recommendation V.13

SIMULATED CARRIER CONTROL

(Melbourne, 1988)

The CCITT,

considering

- (a) that there is a wide variety of duplex data systems available;
- (b) that some data terminal equipment (DTE) operate 2-way alternate over these systems.

recommends

that the following procedure be employed for simulated circuit 105 to circuit 109 operation, when specifically called for in a CCITT Recommendation.

1 Scope

This Recommendation applies wherever a requirement for control of a remote circuit 109 by a local circuit 105 exists, and where switching OFF and ON of a modem carrier is impossible or impractical. Examples of such environments are:

- sub-channels of modems containing multiplex facilities;
- modems with long equalizer/echo canceller training sequences;
- high efficiency multiplexers containing no control channels;
- PCM channels used for 64 bit/s data transmission.

2 Location of the simulation function

Within this Recommendation the function is described as though it were located between the DTE and the remaining part of the data circuit-terminating equipment (DCE). Location with respect to the loop device as defined in Recommendation V.54 is for further study.

3 Operation

When circuit 105 is OFF the DCE will transmit a pattern of bits (idle pattern) produced by scrambling a binary 1 with the polynomial $1 + x^{-3} + x^{-7}$, in lieu of data bits for that port. No particular starting state is specified for the scrambler. When circuit 105 turns ON, the DCE will immediately transmit a pattern of 8 bits (ON pattern) produced by scrambling a binary 0 with the polynomial $1 + x^{-3} + x^{-7}$, after which data bits are sent (Note 1). Circuit 106 may be turned ON within 8 bit intervals after circuit 105 turns ON, and the first bit appearing on circuit 103 after circuit 106 turns ON should be sent as the first data bit (Note 2). When circuit 106 is turned ON before transmission of the ON pattern has been completed, data bits appearing on circuit 103 are stored in a data buffer for subsequent transmission.

At the remote DCE circuit 109 is turned OFF whenever a sufficient number of successive bits in the above idle pattern is detected (Note 3). Circuit 109 is turned ON after detecting a pattern of 8 bits produced by scrambling a binary 0 with the polynomial $1 + x^{-3} + x^{-7}$ (Note 4). Circuit 104 (received data) is held at binary 1 when circuit 109 is OFF (see also Notes 5, 6, 7).

Note 1 – The starting state of the scrambler used for scrambling a binary 0 with the polynomial $1 + x^{-3} + x^{-7}$ should be the same as the ending scrambler state after scrambling binary 1.

Note 2 – Additional circuit 106 turn ON delays may be provided as manufacturer's options.

Note 3 – The number of successive bits of the idle pattern required to be detected to turn circuit 109 OFF is recommended to be 48-64. Before circuit 109 turns OFF, the idle pattern may appear on circuit 104.

Note 4 – It is recommended that circuit 109 be turned ON only if the ON pattern is preceded by a sufficient number of consecutive scrambled ones. The protection against failure to recognize the ON pattern when transmission errors occur is subject to further study. The length of the ON pattern required to be detected to turn circuit 109 ON is provisionally fixed to 8.

Note 5 – Following an ON to OFF transition of circuit 105, circuit 105 should be ignored for at least 128 bit intervals so that at least 128 bits produced by scrambling a binary 1 are sent to the remote modem.

Note 6 – When circuit 105 is OFF, precaution should be taken that the output of the scrambler is not continuous 1, but rather is a 127 bit pseudo-random sequence.

Note 7 – Circuit 109 may be erroneously turned ON at the time of receiving the idle pattern, or circuit 109 may remain OFF at the time of receiving the ON pattern, when transmission errors occur. It may also turn OFF due to simulation by user data.

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