



Council for Educational Technology

PRESTEL TELESOFTWARE FORMAT
RECOMMENDATIONS

Preface

In September 1980 the Council for Educational Technology invited computer manufacturers, software agencies and representatives of PRESTEL to discuss the formulation of a set of recommendations for the format of telesoftware on PRESTEL. This document is the result of these discussions.

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1 SOURCE FILES

This section defines the nature of the unit of software (a FILE) which may be distributed via PRESTEL. The definition is deliberately general so as to include any type of sequential file and size. The declaration of a set of allowable character codes is necessary although the realisation of these characters is irrelevant. The FILE may, if the provider wishes, consist of a number of LINES, where a LINE is terminated by some suitable delimiter which does not need to be specified here.

- 1.1 A SOURCE FILE is a quantity of data intended for transmission.
- 1.2 A FILE consists of one or more LINES.
- 1.3 A LINE consists of one or more CHARACTERS.
- 1.4 A CHARACTER is any symbol whose ASCII value lies between 32 and 126 inclusive.

2 FILE CONVERSION

This section describes the changes which must be made to the SOURCE FILE before it is eligible to appear on PRESTEL. All spaces are replaced by $\frac{3}{4}$ and escape sequences are inserted to mark end-of-line, end-of-file and occurrences in the source FILE of the escape character and of $\frac{3}{4}$. Trailing spaces on a PRESTEL line are sometimes stripped and replaced by carriage-return-line-feed. This means that spaces which were legitimate characters of the source FILE may be lost in transmission.

The best way to ensure that the character stream submitted to PRESTEL is the same character stream received by the terminal is to remove all spaces from the source FILE, replace them with another character and reconvert upon retrieval.

The escape sequences allow formatting information to appear on PRESTEL without reducing the available character set and at the same time allow very high packing density compared with ordinary program listings.

- 2.1 An ESCAPE SEQUENCE consists of a pair of CHARACTERS the first of which is `ESC` (ASC 124) hereafter known as the ESCAPE CHARACTER.
- 2.2 Each occurrence in the SOURCE FILE of the CHARACTER space (ASC 32) is replaced by CHARACTER $\frac{3}{4}$ (ASC 125).
- 2.3 Each occurrence in the SOURCE FILE of the CHARACTER $\frac{3}{4}$ is replaced by ESCAPE SEQUENCE `ESC` $\frac{3}{4}$.
- 2.4 Each occurrence in the SOURCE FILE of the ESCAPE CHARACTER is replaced by the ESCAPE SEQUENCE `ESC` E.
- 2.5 The ESCAPE SEQUENCE `ESC` F is inserted after the last CHARACTER in the SOURCE FILE.
- 2.6 The ESCAPE SEQUENCE `ESC` L is inserted after each line in the SOURCE FILE .

3 BLOCK STRUCTURE & ERROR CHECKING

Data on PRESTEL may only exist in the form of frames so programs which are larger than one frame must be fragmented. This fragmentation allows a block structure which can be used for error detection.

Each block is parenthesised by start and stop markers and followed by a BLOCK CHECK of up to three decimal digits. These digits form a number which is the result of bitwise exclusive-OR operations on the characters of the preceding block.

- 3.1 Converted SOURCE FILES are partitioned into contiguous BLOCKS.
- 3.2 BLOCKS may contain a minimum of one and a maximum of 859 CHARACTERS.
- 3.3 Only one BLOCK may appear on a PRESTEL frame.
- 3.4 A BLOCK on a PRESTEL frame is preceded by the ESCAPE SEQUENCE `IIA` and followed by the ESCAPE SEQUENCE `IIZ` and a BLOCK CHECK.
- 3.5 A BLOCK CHECK is a sequence of up to three CHARACTERS being the decimal result $CH(n)$ of exclusive-OR operations on the ASCII values of all n CHARACTERS in the preceding BLOCK.

$CH(n) = CH(n-1).XOR. ASC(n)$
where $CH(0) = 0$ and $ASC(i)$ is the ASCII value of the i th CHARACTER.

4 ORGANISATION ON PRESTEL

This section describes the structure of the frames which make up a PRESTEL file and introduces a START FRAME which contains the size and name of the file which follows.

Since there are only 26 frames in a PRESTEL page, one of which is reserved here for the START FRAME, files of more than 25 blocks must continue on another page. Files of over 51 blocks must continue on a third page and so on. The zero route from the 'z' frame is designated for this purpose.

- 4.1 Converted SOURCE FILES appear on PRESTEL as sequences of frames beginning with a START FRAME.
- 4.2 A START FRAME must be the first frame of a PRESTEL page.
- 4.3 Each converted SOURCE FILE has a HEADER LINE consisting of the name of the SOURCE FILE (max 12 chars), the ESCAPE SEQUENCE `||L` followed by the number of BLOCKS in the file.
- 4.4 Line 23 of the START FRAME contains the ESCAPE SEQUENCE `||A`, the HEADER LINE and the ESCAPE SEQUENCE `||Z` followed by a LINE CHECK.
- 4.5 The LINE CHECK is a sequence of up to three CHARACTERS being the decimal result of exclusive-OR operations on the ASCII values of all the CHARACTERS in the preceding HEADER LINE.
- 4.6 The first BLOCK of a converted SOURCE FILE appears on the 'b' frame of the page which contains its HEADER LINE.
- 4.7 Subsequent BLOCKS appear on subsequent continuation frames.
- 4.8 If the number of BLOCKS exceeds 25 then the 'zero' route from the 'z' frame will address the page containing the remaining BLOCKS.

5 RETRIEVAL OF FILES

Parity checking is a simple and effective method of detecting single-bit transmission errors. The exclusive-OR block check is able to detect errors which the parity check fails to detect. A user terminal should not perpetually request retransmissions of any frame in response to parity or block check errors; there must be a finite number of requests before the retrieval is abandoned to ask advice of the user on how to proceed. This number has been left to the programmer to decide.

- 5.1 The terminal will check the parity of every PRESTEL character.
- 5.2 The terminal will operate a TIME-OUT facility whereby should an interval of two seconds elapse after the receipt of the last PRESTEL character the terminal will assume that a complete frame or message has been received.
- 5.3 Upon detecting the completion of the transmission of a telesoftware frame the terminal will compare its calculated BLOCK CHECK with that transmitted on the frame.
- 5.4 The terminal will request a finite number of retransmissions of any telesoftware frame found to have either a parity or BLOCK CHECK error.