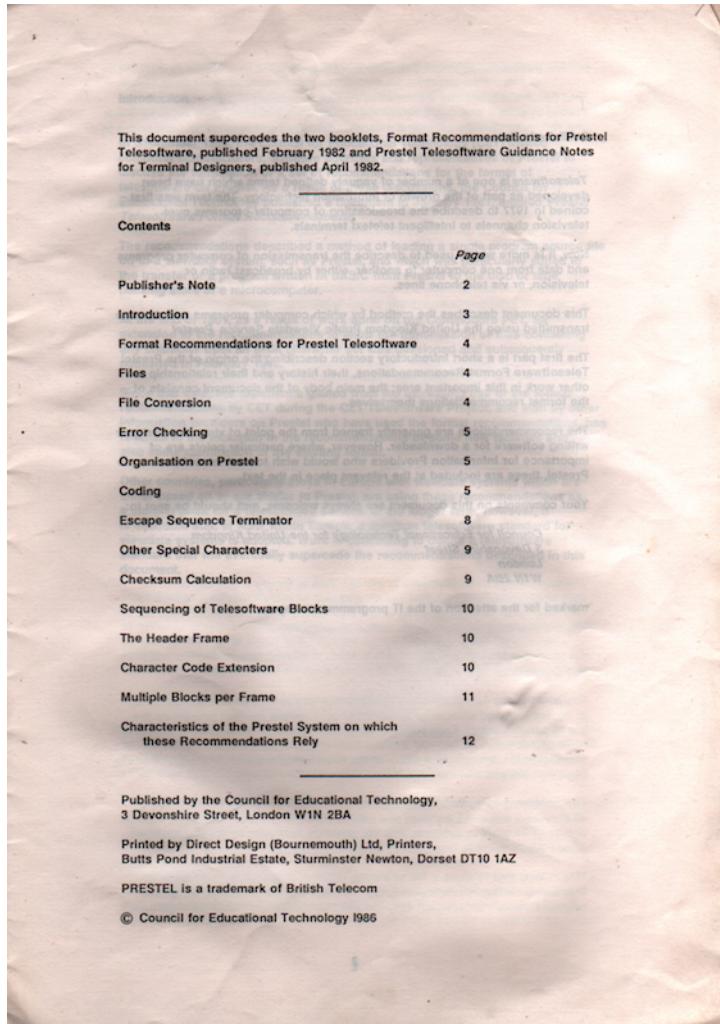


**Format
Recommendations
For Prestel
Telesoftware**

June 1986



Council for Educational Technology



Publisher's Note

Telesoftware is one of a number of vaguely defined terms which have been developed as part of the growth of information technology. The term was first coined in 1977 to describe the broadcasting of computer programs over television channels to intelligent teletext terminals.

Now, it is more widely used to describe the transmission of computer programs and data from one computer to another, either by broadcast radio or television, or via telephone lines.

This document describes the method by which computer programs and data are transmitted using the United Kingdom Public Viewdata Service *Prestel*.

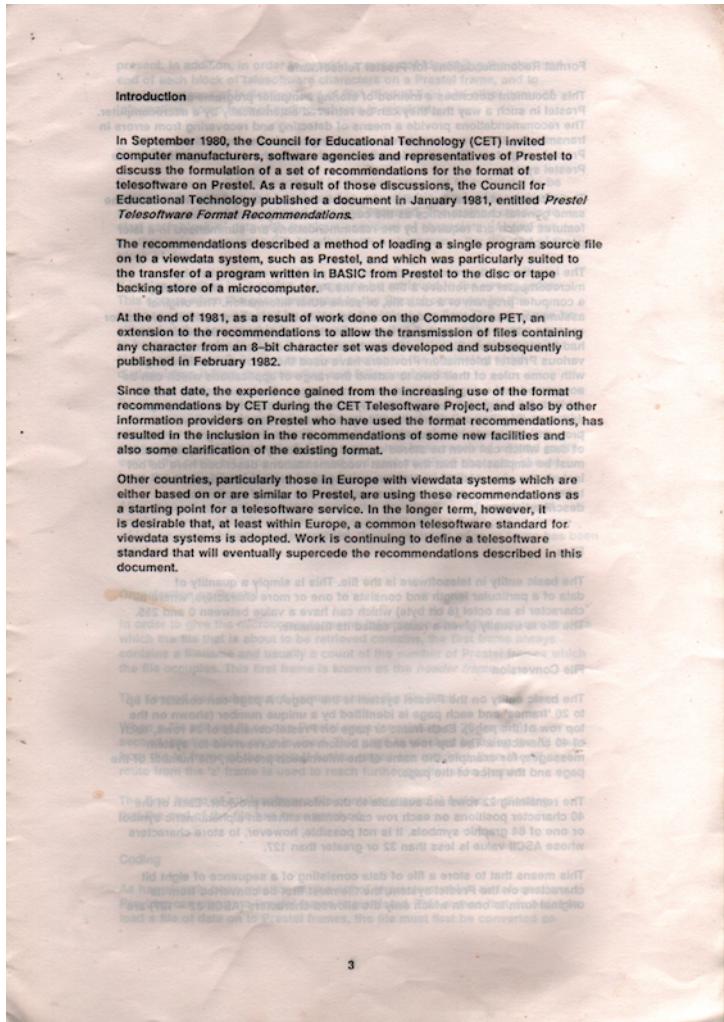
The first part is a short introductory section describing the origin of the Prestel Telesoftware Format Recommendations, their history and their relationship to other work in this important area; the main body of the document consists of the format recommendations themselves.

The recommendations are generally framed from the point of view of a designer writing software for a downloader. However, where particular points are of importance for Information Providers who would wish to load telesoftware on to Prestel, these are included at the relevant place in the text.

Your comments on this document are always welcome, and should be sent to:

Council for Educational Technology for the United Kingdom
3 Devonshire Street
London
W1N 2BA

marked for the attention of the IT programme manager.



Format Recommendations for Prestel Telesoftware

This document describes a method of storing computer programs and data on Prestel in such a way that they can be retrieved automatically by a microcomputer. The recommendations provide a means of detecting and recovering from errors in transmission that are encountered when using telephone connections to the Prestel computers. They also describe how the data should be organised on the Prestel system.

The recommendations are designed to work on viewdata systems which have the same general characteristics as the current Prestel system. Particular features which are required by the recommendations are summarised in a later paragraph.

The intention of the recommendations is to provide a means whereby a microcomputer can retrieve a file from the Prestel computer. This file may be a computer program or a data file, or some other information. The original assumption was that the program or data would be stored immediately on disc or cassette, either as it was being retrieved or immediately after the whole file had been retrieved. Since the first publication of these recommendations, various Prestel Information Providers have used the recommendations together with some rules of their own to extend the range of applications which can be accommodated using the format recommendations. Such extensions include retrieving a program, placing it directly into the memory of the microcomputer and executing the program immediately; it is also possible to retrieve a program which, when executed, will retrieve either another program or a file of data which can then be stored or used immediately by the first program. It must be emphasised that the format recommendations described here do not include the above facilities. However, using the format recommendations together with some additional rules can allow the sort of applications described above.

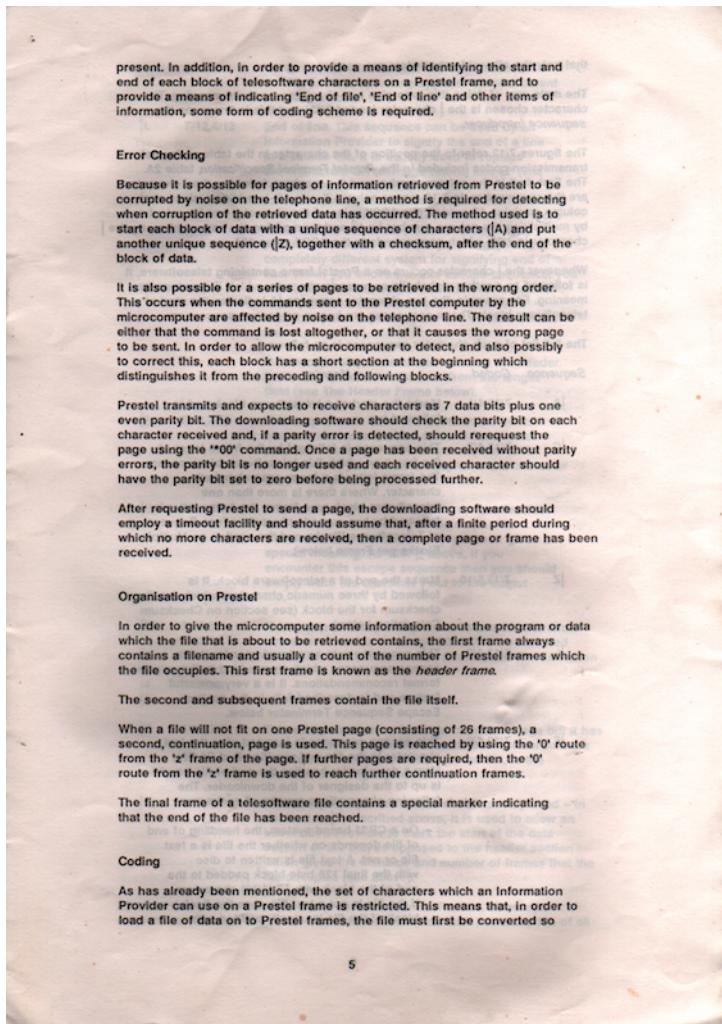
Files
The basic entity in telesoftware is the file. This is simply a quantity of data of a particular length and consists of one or more characters, where a character is an octet (8 bit byte) which can have a value between 0 and 255. The file is usually given a name, called its filename.

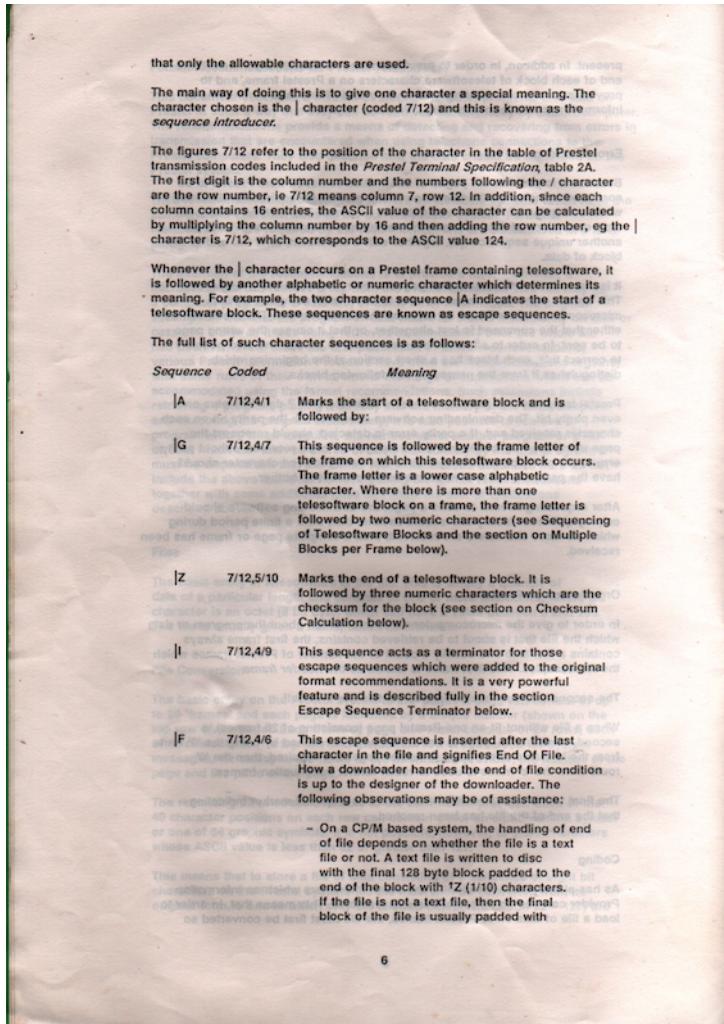
File Conversion

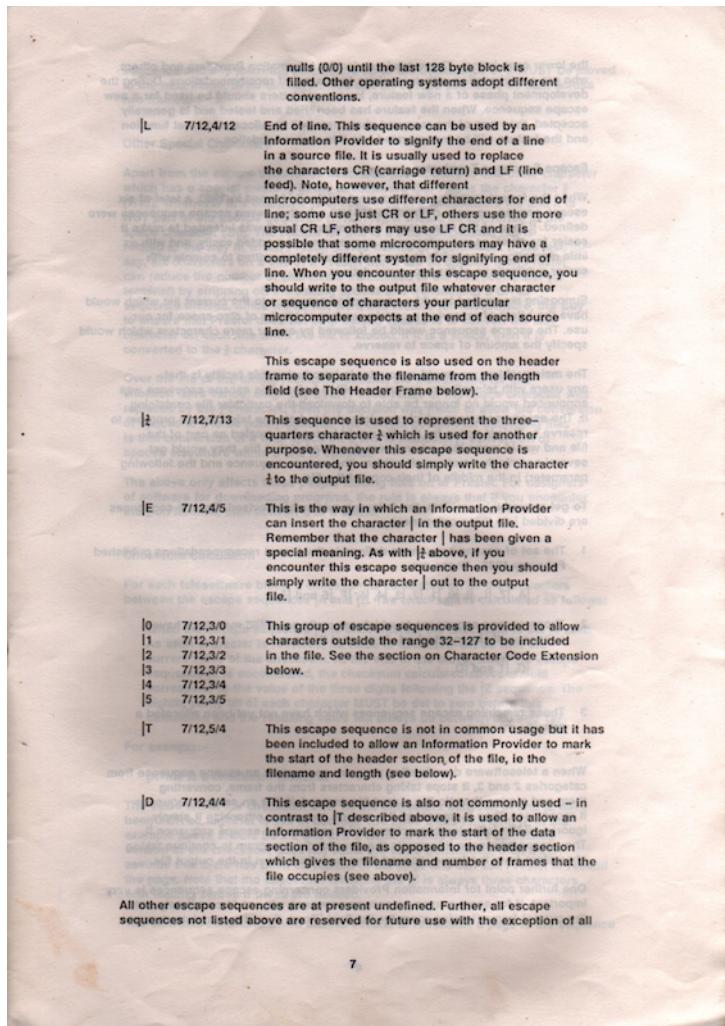
The basic entity on the Prestel system is the 'page'. A page can consist of up to 26 'frames' and each page is identified by a unique number (shown on the top row of the page). Each frame or page on Prestel consists of 24 rows, each of 40 characters. The top row and the bottom row are reserved for system messages, for example, the name of the information provider, the number of the page and the price of the page.

The remaining 22 rows are available to the information provider. Each of the 40 character positions on each row can contain either an alphanumeric symbol or one of 64 graphic symbols. It is not possible, however, to store characters whose ASCII value is less than 32 or greater than 127.

This means that to store a file of data consisting of a sequence of eight bit characters on the Prestel system, the file must first be converted from its original form to one in which only the allowed characters (ASCII 32 - 127) are







the lower case letters. These are intended for Information Providers and others who are experimenting with extensions to this set of recommendations. During the development phase of a new feature, lower case letters should be used for a new escape sequence. When the feature has been tried and tested and is generally accepted, then one of the reserved characters will be allocated to that function and the feature will be incorporated into this recommendation.

Escape Sequence Terminator

When the format recommendations were originally framed in 1980, a total of six escape sequences were defined. In 1981/82 a further seven escape sequences were defined. |J (one of the new escape sequences defined) was intended to make it easier for other, as yet unforeseen, sequences to be added easily, and with as little disruption as possible to users of downloaders written to comply with earlier publications of the recommendations.

Supposing we wanted to add a new escape sequence to the current list which would have the effect of reserving a certain number of blocks of disc space for our use. The escape sequence would be followed by one or more characters which would specify the amount of space to reserve.

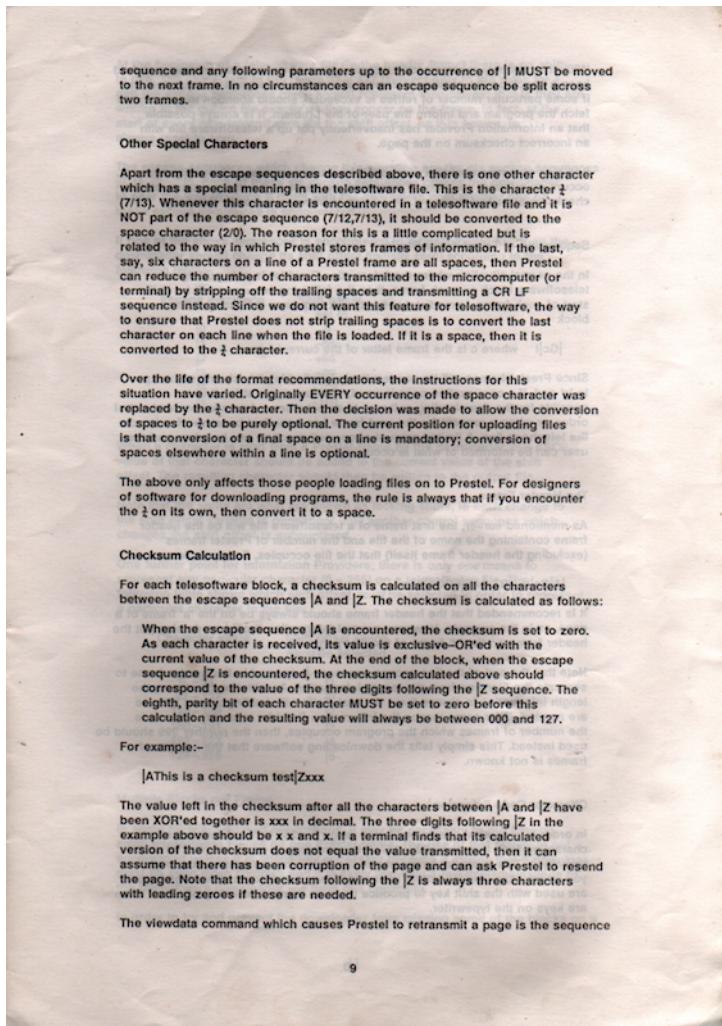
The main problem we would encounter in introducing this facility is that any users with telesoftware programs written before this escape sequence was announced would no longer be able to download the particular file containing it. The escape sequence which was intended to help the telesoftware program to reserve sufficient space for the file would instead be treated as part of the file and would mean that, when users downloaded that file, they would get several seemingly spurious characters (the escape sequence and the following parameter) in the middle of their copy of the file.

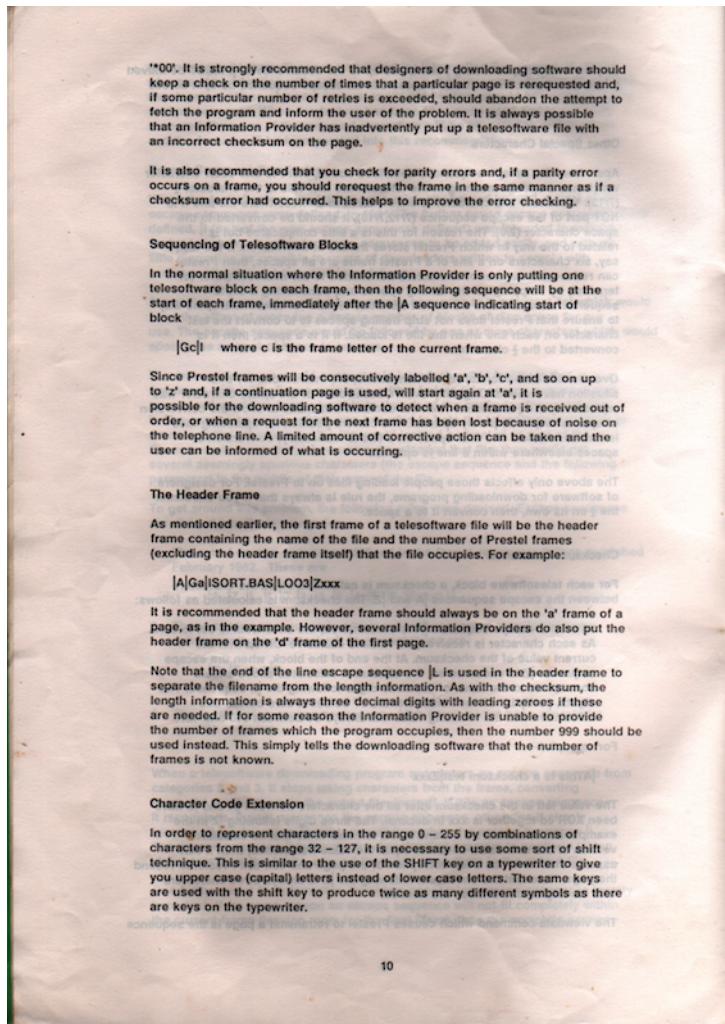
To get around this problem, the following rules were devised. Escape sequences are divided into three categories:-

- 1 The set of escape sequences defined in the format recommendations published February 1982. These are |A, |Z, |L, |I, |O, |1, |2, |3, |4, |5, |F, |E and |2
- 2 Those escape sequences to which generally accepted meanings have subsequently been attached. At present these are |G, |T and |D
- 3 Those remaining escape sequences which have not yet been allocated a specific meaning.

When a telesoftware downloading program encounters an escape sequence from categories 2 and 3, it stops taking characters from the frame, converting them and storing them in the output file. Instead, if it is an escape sequence it recognises, then it processes the escape sequence, otherwise it simply ignores all the following characters until it reaches the escape sequence |I. The escape sequence |I instructs the downloading program to continue taking characters from the frame, convert them and store them in the output file.

One further point for Information Providers concerning escape sequences is very important. If for some reason an escape sequence will not fit completely within the current frame (leaving room for the final |Zxxx), then the complete escape





At the beginning of a telesoftware file (ie the header frame) there is no shift in use. The characters in the range 32 - 127 (subject only to the rules for $\frac{1}{2}$ and the escape sequences given above) represent themselves; that is they are written to the output file exactly as they appear on the frame. In fact, at the start of every new telesoftware file the shift offset, as it is known, is always reset to zero.

The escape sequences which change this situation are the six escape sequences |0, |1, |2, ..., |5. Each of these six escape sequences causes the downloader to alter the way in which it deals with the characters until another one of these escape sequences is encountered.

If one of the above sequences is encountered in a telesoftware file, then the downloader should change its shift offset (initially zero) according to the following table:-

Escape sequence	Shift offset set to
0	0
1	-64
2	+64
3	+96
4	+128
5	+160

When a character is read from a Prestel frame by the downloader, the ASCII value of that character should be added to the current value of the shift offset. The resulting character should then be written to the output file.

Note that the shifts are what are known as locking shifts, ie each change to the shift offset variable is permanent until another control sequence which changes the shift offset is encountered.

One further point for Information Providers; there is only *one* means to represent any particular character (0 - 255) on a telesoftware file. The following table shows which shift offset *must* be selected in order to represent a particular character in the file:

Character value	Shift offset which must be selected
0 - 31	1
32 - 127	0
128 - 159	2
160 - 191	3
192 - 223	4
224 - 255	5

Multiple Blocks per Frame

In some fairly specialised applications, it may be necessary to put several small telesoftware blocks on one Prestel frame. The use of this facility is not encouraged unless it is absolutely necessary because it means that a downloader must be even more complex and it is likely that only a few implementations of the telesoftware downloader will have this capability.

In order to try and prevent the downloader from missing some of the blocks on a

