

Microcomputer Braille Systems

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Abstract The paper describes a Braille and Ink-print Text-processing System (BITS) which can produce both print and contracted braille embossed on paper or on a paperless braille device. BITS can also accept input from the Prestel viewdata system. Another development is a program to accept contracted braille input and produce formatted print output.

There was a requirement for a typist, with no knowledge of braille, to produce documents in both ink print and contracted braille from a single typing operation. Typical documents are agendas and minutes of meetings, and letters from bank managers to their blind customers.

The system uses a 64K microcomputer with two floppy disc drives. The text is input and edited using a standard screen-orientated word-processing system. The print output is on a daisywheel printer.

The braille translation program, written in Fortran, converts the text to a good approximation to grade 2 English braille. The program includes automatic page numbering of the braille output and automatic word wrap. Although the system is designed for use by a typist with no knowledge of braille, facilities are provided for suppressing the use of contractions; the control characters do not appear in the printed output.

The output can be to either a Sagem or Triformation LED-120 braille embosser (Fig. 1). As soon as it becomes available the Resus 300 braille cell per second embosser will be used instead of the LED-120. Software for output to a Digicassette is also provided.

(insert photograph here)

Fig. 1 One configuration of BITS

An organisation for the deaf-blind who have one of these systems wished to input data from viewdata systems. Their specific application was the production of the daily news and weather forecast in braille.

The Teletext systems, such as Ceefax and Oracle, use the television signal to transmit the data which is then displayed on adapted television sets. Prestel is a different system which uses the telephone line to transmit the data. It is a two-way system so that the user can input information such as ordering goods. Prestel currently contains about 174,000 pages of information, but most of these are only of interest to the business community. However of great interest to the deaf-blind is the proposed introduction of a two-way message system between two or more users. Also it may be possible to have a block of pages for information of specific interest to the deaf-blind.

Because of the potential of Prestel, it was decided to use this system. The telephone jack plug is connected via a microprocessor to BITS where special software converts the textual data to a format suitable for input to the braille translation system. From the BITS keyboard the operator can instruct the microprocessor to dial the telephone number of the Prestel computer and then send a user identification number. Also from the keyboard the operator can select and examine pages before deciding which to produce in braille.

A different but related problem is that of a blind person, using a paperless braille device such as a Digicassette, who wants good quality typed output. The blind persons will want to use the braille code to which they are accustomed; in the United Kingdom this nearly always means grade 2 English braille.

This problem is being tackled in three stages:

- (i) development of an algorithm for converting contracted braille to print.
- (ii) implementation on the BITS microcomputer, and incorporation of word-processing features such as automatic word wrap, underline, superscript and variable line spacing.
- (iii) implementation of this program on a minimal configuration microprocessor which could be used as a part of a stand-alone system (ie Digicassette, microprocessor, printer).

The task of converting contracted English braille to print is more complex than might first appear. In English braille abbreviations may be used within words provided the original meaning of the words they represent are retained. When converting from contracted braille to print, there are problems such as deciding whether LL within a word is LL or LITTLE. It is necessary to restrict the use of some contractions to achieve perfect ink print output.

This program has been written and implemented on the microcomputer. However it has yet to be evaluated to determine the optimum set of word-processing facilities to be incorporated in the stand-alone system.

The developments described in this paper indicate some of the services which can be provided with existing technology. Although microcomputers are reducing in cost, the growth in use of these systems is being hampered by the high cost of the specialist hardware such as braille embossers. However large organisations like banks are starting to use them to correspond with customers in braille. This is a trend which is likely to accelerate as the cost comes down.