

TELESOFTWARE—VALUE ADDED TELETEXT

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INTRODUCTION

The average person regards a radio receiver as a consumer device which he can buy at a relatively low cost from any multiple store, and which will supply him (at no extra cost) with entertainment, information and education. This radio is usually equipped with only a small number of controls (e.g. on/off, tuning, bandchange, volume) and it is very rare to find someone who is unable to operate it satisfactorily.

The radio receiver is a commonplace item in the households of the western world, and the microcomputer, also, will become commonplace since it too offers entertainment, information and education. But it also has the tremendous added dimension of 'interaction' (from the transitive verb 'interact' - to act upon each other), so that the value of this entertainment, information and education is enhanced by the microcomputer and the user both providing reciprocal actions, one to the other.

For the microcomputer to become as accepted in the average household as the radio it must, like the radio, be simple to set up and use, and must be available (by purchase or rental) from the high street store.

This analogy can be taken further. The earliest radios were constructed by their owners who then proudly demonstrated the results to their friends and neighbours. Any sound, even a faint crackling one, was an improvement on what had been before - no sound at all. Even today there are people who design and construct their own radios, and, of course, there are the 'hams' who are concerned not so much with broadcast radio as with 'networks' of like-minded individuals.

At the present time the domestic microcomputer scene can be likened to those early days of radio. Microcomputers are bought or built by enthusiastic amateurs, and demonstrated by their proud owners (and only they seem to know the secret place on the case which has to be kicked to make the machine perform!) Like the radio 'hams' there is a band of microcomputer users who are much involved in the interconnection of their microcomputers by networks, but these worthy individuals, and indeed all 'hobby' computerists are very much a minority and will stay so, since the average person has no wish to become involved in any such exercise. Indeed, the average person is still very wary of 'computers' and anything that appears remotely like 'Big Brother' is likely to frighten him off!

How then can microcomputers be introduced into households so that the ordinary citizen will accept them and use them to provide information, education and entertainment, while retaining simplicity of operation and low cost?

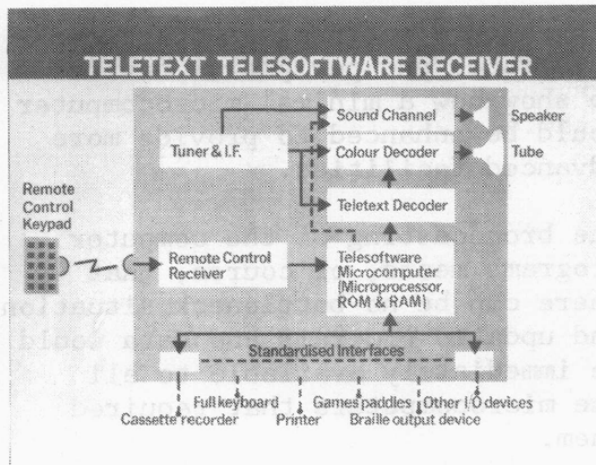
The television receiver is an obvious device to examine for clues to the answer to this question. It is ubiquitous, and because of this has the low cost that only mass sales in the domestic market can provide. Also because of this ubiquitousness it is a very familiar (sometimes too familiar!) object around the house - nobody, from the youngest to the oldest, is afraid of the television set (at least in the obvious sense!) This is very important if it is to form the basis of a domestic microcomputer, since such a computer, being allied to the television, would already be a considerable way along the 'acceptance curve' for the average citizen, who is, and rightly perhaps, reluctant to become involved with products which appear to him, on the surface at least, to be beyond his conceptual grasp.

Of course, the various adjuncts to the television (such as video recorders and TV games) which are already available and used in considerable quantity are of great benefit here, since they point the way to the television receiver being the central module in the 'home information centre' of the future.

Fortunately, a rapidly growing number of households (in the United Kingdom at least) are equipped with Teletext TV receivers, which contain some of the modules required for a domestic microcomputer (fig. 1). The keypad, usually having 12 - 16 buttons, can be used as an input device to the microcomputer, and will allow the input of numeric data, menu item selection and simple control functions.

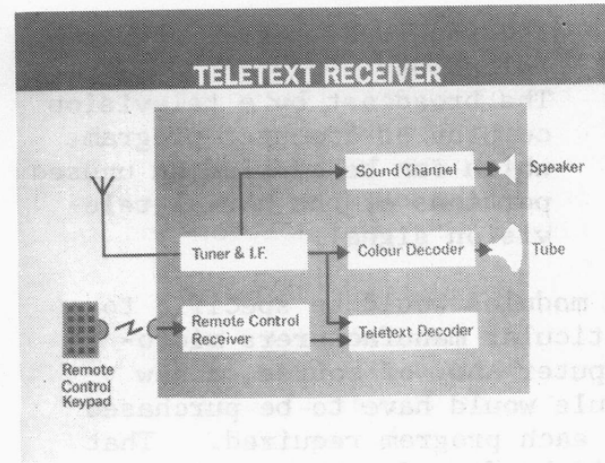
The teletext decoder and the colour television itself form essentially a computer-type display, with the ability, for example, to present up to about 950 textual characters at a time, in a variety of colours, or a mixture of characters and low-resolution colour graphics. (Future teletext decoders in the UK will have considerably enhanced graphics capability, in line with the policy of both the broadcasters and the set manufacturers to continually enhance the features of teletext while retaining complete upward compatibility with the existing standards and receivers.)

What, then, is still required to turn a teletext receiver into a simple, but nonetheless powerful, domestic microcomputer? Firstly, of course, a microprocessor chip is required, and it may even already exist, hidden away as an unassuming component within the teletext decoder! Secondly, extra memory is required for this microprocessor, to hold its programs and data. Thirdly, a means of loading programs and data into the microcomputer, and last, but by no means least, the programs and data themselves.



(Fig. 1)

Let us now examine each of these items in turn. The microprocessor chip and the associated memory required for a useful microcomputer can be provided at a cost estimated to be comparable with the cost of adding the teletext facility to the basic television receiver. The cost of this teletext add-on is proving to be reasonable (even in the harsh economic climate of England!) and will become even more so as production volumes increase. There is no reason to suppose that the microprocessor and memory additions, which use a similar technology to the teletext decoder, will not follow a similar route.



(Fig. 2)

Several schemes are potential contenders for the means of loading programs into this microcomputer, such as:-

- (a) Read-only-memory (ROM) modules, like those used for some programmable calculators and TV games.
- (b) Audio cassettes, like those currently used to distribute programs for hobby computers.
- (c) A dial-up network based on the public switched telephone system, where customers phone a program supply service (a private company or a public utility), which then transmits a copy of

the required program down the telephone.

- (d) The broadcast by a television company of computer programs which can be carried on unused portions of the normal television signal.

ROM modules would be specific to a particular manufacturer's microcomputer and, of course, a new module would have to be purchased for each program required. That would be fine for the supplier, but not so nice for the customer. Audio cassettes have somewhat similar characteristics with the added complication of requiring a tape player to be connected into the microcomputer. A program dial-up service is in pilot operation in the UK, using pages in the Prestel viewdata service, but the (relatively) high cost of the basic service plus the program supply service makes it more suitable for business rather than domestic use. Another complication with the dial-up service when applied to the domestic market is the bottleneck situation which could occur at peak times, e.g. accessing programs (and the data) to analyse sports results on Saturday evenings.

Broadcasting the computer programs allows the function of the program loading device of the home microcomputer to be provided by existing parts of the television receiver: the tuner, IF strip and teletext decoder. The hardware of the home microcomputer then takes on the appearance as shown on the block diagram of fig. 2. The only essential additions which have been made to the teletext receiver of fig. 1 are the microprocessor and its memory, although shown in the

diagram are optional standardised interfaces and peripheral devices to show how a minimal microcomputer could be enhanced to provide more advanced facilities.

The broadcasting of the computer programs means, of course, that there can be no bottleneck situation, and updated programs and data would be immediately available to all the microcomputers that required them.

The final and most essential item required for the home microcomputer is a steady supply of programs to enable a wide variety of tasks to be performed. Using the premise that was mentioned earlier about the average citizen not wishing to become involved in the actual 'computing' or programming of his microcomputer, merely wishing to treat it as yet another household gadget, there is no need for the standard home computer to even be capable of being programmed by its owner. Any one of the relatively small number of people who wish to get involved with the internal operations of the device will use a 'conventional' hobby computer, but by far the larger market will be the supply of non-owner-programmable devices for the average citizen. These (supplied) programs fall generally into four groups:-

- (1) Self-assessment programs, such as mortgage and tax calculations, and welfare rights examinations. A major characteristic of this group is that they are of a question-and-answer nature, with numeric and logical calculations to be performed

by the program upon (numeric, logical and textual) provided by the user. Although uses such as mortgage and tax calculations would generally only require numeric (e.g. monetary values and time scales) and logical (e.g. options) data from the user, other uses, such as welfare rights, would require that textual data was also supplied by the user.

- (2) Educational programs. This is a vast subject, and some typical groupings are:-
- (i) Language and literacy training.
 - (ii) Mathematics and numeracy.
 - (iii) Scientific and technical areas, and
 - (iv) 'Non-numerical' topics, such as history and general knowledge, and
 - (v) 'Skills' such as first-aid, cookery, and appliance maintenance.

The use of the domestic micro-computer for educational purposes will, we believe, become very widespread, and this topic is addressed in the latter part of this paper.

- (3) TV games. These tend to fall into two categories:-
- (i) Verbal and reasoning games, such as word games and chess, and
 - (ii) 'Dexterity' games, such as car racing and space battles.

The simpler reasoning games are ideally suited to a minimal

microcomputer since a numeric keypad is often adequate and memory requirements are modest. 'Dexterity' games, however, present a different set of requirements. The most obvious is the need for paddles, joysticks, or whatever other input mechanism suits a particular game. This type of game introduces the need for a timing mechanism in the microcomputer, either for merely controlling the rate at which the action proceeds on the screen, or for more overt reasons, such as giving a player a limited time to perform a particular action.

- (4) Database manipulation. Here, fairly small databases, such as stock market information, are available and can be analysed in various ways by a program under the control of the user.

Since these programs will be specifically designed for use by members of the general public with probably no firsthand knowledge of computers whatsoever, it is vital that they are completely reliable. It is also essential that the program loading mechanism should detect recording or transmission errors on the incoming programs so that the possibility of the microcomputer executing an incorrectly loaded program is very small.

The most important aspect of these programs, and the most difficult to achieve, is that they should be thoroughly tested and be very 'robust'. The ultimate requirement must be that the microcomputer never produces meaningless, obscure

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