The home reckoner-A scenario on the home use of computers

by CLAUDE A. R. KAGAN and LAWRENCE G. SCHEAR

Western Electric Company
Princeton, New Jersey

PART 1-THE HOME RECKONER "H.R." SETAN EXTENSION OF THE HOME ENTERTAINMENT CENTER

Certain similarities between the "H.R." set and General Purpose computers currently marketed, would indicate that the community of people engaged in the various phases of that business might be interested in a technically oriented description of the appliance in question, and its potential role in the home.

Currently available models of the "H.R." set make extensive use of integrated circuit modules, as well as a few transistors in those parts where high voltages and currents prevail. The "H.R." set is carefully designed to permit rapid and simple interconnection with the very broad range of models, types, and standards of units currently found in home entertainment centers.

It is hoped that, as time passes, incorporation of certain elements which are now duplicated in the several units shown in Figure 1 in the "H.R." set itself will cause significant price reduction of the entire system complex, and permit more convenient and broader application of some of the features to be discussed in this article.

Figure 1 shows in block diagram form the components of such a fully equipped, and admittedly, "De Luxe" system. It should be observed that the cost of the "H.R." set is commensurate with the investment value of the rest of the system illustrated.

Essentially the "H.R." set serves as a programmed input-output controller for a variety of signal sources and destinations. Furthermore the "H.R." set is capable of processing the signals in their transfer from the number of available input channels to their desired destinations.

In its present form the "H.R." set is modular in construction permitting the rate of growth and extension appropriate to the owner's desires and budget. (Membership in a proposed "Quarterly Module Club" will provide the members with the opportunity to expand their system conveniently, systematically, and economically.)

The basic "H.R." set is furnished in a variety of cabinets to match contemporary tastes in furniture. Custom installation is possible by discarding the attractive but inexpensive housing of the "H.R."

The standard configuration of the basic "H.R." set incorporates, in addition to the necessary power supply, interconnecting jacks, plugs, and connectors, a minimal logical capability which includes a specially wired command module designed to perform the scanning algorithm of a string language, and to execute its twelve most popular primitive functions.

In addition, all models are equipped with a minimum fast access memory pack with a capacity of 8000 words. This pack is divided into Memory Units, where the number of bits allocated to each MU is a function of the particular alphabet used, or the desired application of the moment. Command extension modules and additional memory packs may be added by the user at his convenience, and as required by the sophistication of the control scripts he wishes to use. (It is expected that lending libraries may possibly include the loan of specialized command modules when required to properly make use of the scripts being borrowed.)

Since the most frequent output is via the T.V. set, the basic "H.R." is equipped with a module capable of generating highly legible and pleasing characters in both upper and lower case, as well as arabic and roman numerals and a variety of frequently encountered punctuation marks and special symbols.

Anticipated offerings to members of the "Quarterly Module Club" will be of modules for additional fonts of characters, and to enable the display of these in a broad range of color and hue. The user may also, if he wishes, design and install fonts of his own choosing.

A suggested minimal configuration is shown in Figure 2. With the system shown it is possible to extend very greatly the scope of utility and enjoyment of the elements of the home entertainment center indicated.

Let us examine the elements shown and their function in the system illustrated.

As previously mentioned the T.V. set serves as the prime means of displaying messages originating from the "H.R." set (in addition to its basic function as a receiver of television signals), and also provides through use of the TVHR pointer a means of feedback to the "H.R." set of the user's wishes.

The 16 button keyboard is an inexpensive means of controlling or inputting information to the "H.R." set as well as serving as a channel selector for the T.V. set.
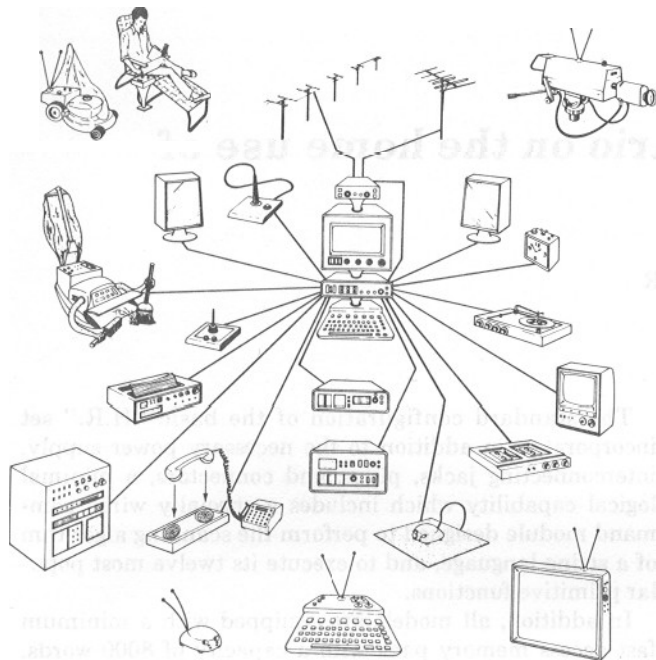
The pair of stereo arranged loud speakers needs no justification.

The HI-FI Stereo phonograph is used to play into the system the wide range of available musical and other offerings as well as the expected equally wide variety of material designed to fulfill the desires and needs of the "H.R." set owners.

One of the albums, popular with young and old, is "PARTY GAMES," which, when played into the "H.R." set will condition the system with the ability of playing literally dozens of games, single player as well as team. This album includes such old time favorites as TIC-TACTOE, ONE-ARM-BANDIT, Pin the tail on the BUNNY (Moving)- using the TVHR pointer, BATTLESHIPS, and educational games such as GABBLE, FINANCIER, POST-OFFICE, and furthermore the user can receive coaching in games as CANASTA, BRIDGE, and CHESS.

It is obvious that, although relatively slight, the investment in an appliance such as the "H.R." set should pro
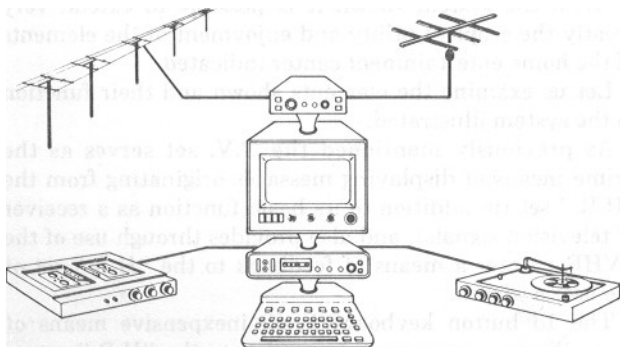
vide a modicum of use other than pure FUN. To this end a variety of educational albums will be offered, initially to charter members of the "SCRIPT of the Month Club" and later through the usual retail consumer outlets.

Description of the broad range of amusement and educational albums may be found in Figure 3.

It is expected that as the number of "H.R." sets increases throughout the homes of T.V. viewers we will find wide demand for a future module for the "H.R." set. This module will permit the reception and storage in the memory packs of the "H.R." set of a variety of information to be broadcast either as a sub-carrier or in "QUICKIE" or subliminal burst mode by the T.V. stations. Such information may include weekly program listings, details of news items too lengthy or of such limited interest as not to warrant more than a fraction of a second

of broadcast time, as well as a host of other useful information, including contests, sales promotion and miscellaneous educational items.

In fact it has been suggested that one of the UHF channels in each community be reserved and devoted to the broadcast in a recycling mode of nothing but INFOR-MATION, educational aids, and other scripts solely for use in "H.R." sets. The user need only select the UHF channel that serves this need in his community, depress the INDEX button, and within a minute or so, when the index is being broadcast, a display of available scripts or "H.R." loads in the current broadcast cycle will be displayed on the screen of his T.V. set. Selection is achieved simply by pointing to the desired item with the TVHR POINTER and again within a minute or so the desired one from a choice of 1800 or so items will reside in the memory pack of his "H.R." set ready for use.

Purveyors of proprietary "H.R." control and other information may also be called upon to sell their offerings through use of the hard-wired telephone switched network. Typical telephone line holding times of the order of ten seconds should fulfill most domestic users' needs, thereby obviating the need for a third telephone line merely to provide home information system needs. Computer Utility Companies will find this feature of the "H.R." set particularly convenient in their attempts to provide ever improving service to the general public.

The modularity, relative small size, and low power consumption of the "H.R." set opens up new vistas to the automobile owner. Sports car enthusiasts will find the combination of the "H.R." set and appropriate interconnections to the automobile's odometer, direction finder, and other navigation aids invaluable in the generation and display of maps and other rally aids.

International travellers will also find the "H.R." set invaluable, in combination with a small T.V. set and their automotive cartridge player set as a conversational mode real-time aid to the understanding of foreign road signs, and even in direct communication with the natives.

Recognizing the fact that neither the schools nor the universities will be able to provide suitable instruction in time to meet the rapid acceptance and acquisition by the nation's technically minded and highly receptive citizenry of this new addition to their homes, a special effort is being made in the interim, by the AOHRSM (Assoc. of Home Reckoner Set Manuf.) to design reasonably standardized but attractive and effective learning aids to enable all "H.R." set owners and users to enjoy to the utmost his latest addition to the home entertainment center.
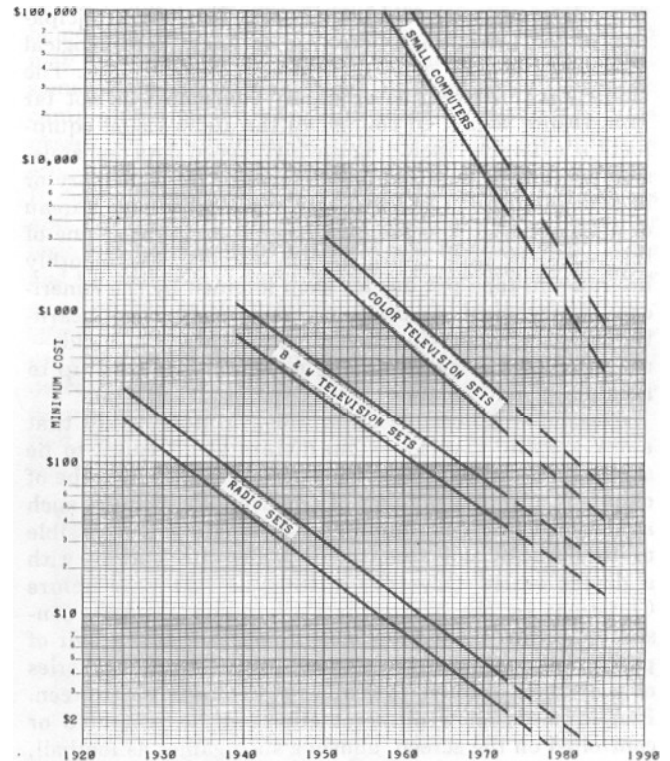
PART II

Technological forecasting, the Nostradamus of today, shows us the most probable future based on an estimate of the impact of changes. It is a study of trends and probabilities, of psychology and social science. Usually such forecasting is oriented toward product lines, manufacturing techniques, or our changing materials technology. Rarely, outside of the realm of science fiction, does it attempt to relate to the daily life of the so-called average family. Occasionally, however, a serious attempt is made to predict in reasonable detail the effect of one or more facets of changing technology on everyday life in the not-too-distant future.

The Home Reckoner* Set may be thought of as a computer with many peripherals or as a very smart terminal, using today's terminology, in that it may work perfectly well in a stand-alone mode or can be augmented by external storage and/or processing unit. It may be tied

* The use of the term "reckoner" was originated by Jules Verne in his story entitled, "One Day in the Life of an American Journalist in the Year 2889," first published in English in the October, 1889, issue of the "New York Forum" magazine. In this story, Jules Verne makes a distinction between a computer, which he visualizes as a mathematician's tool, and a reckoner, envisioned as an information processing tool.

COST – TIME FORECASTING CURVES

Figure 4

to a central computer, not only for the rapid transfer of data from one memory to another, but also for increased processing power. This large central computer could be located at a service bureau, with different rates depending upon use or time. The Home Reckoner Set as envisioned would be completely modular, being able to operate effectively with whatever peripherals happen to be connected at that time, assuming that they are adequate for the job. Moderate-speed serial interfacing would probably be the least expensive, and would facilitate interconnection of devices from a variety of manufacturers. Each Home Reckoner Set would probably be different, depending on the owner's existing electronic equipment and on whatever peripherals happened to be on sale at his local appliance discount store. Since the concept of the Home Reckoner Set makes as much use of consumer electronics as possible, emphasis is on low cost, and today this favors the moderate-speed serial mode of data transmission among the Various units.

The first part of this paper was written in 1967 by Mr. Claude A. R. Kagan of Western Electric. It was based on a series of graphs tracing through the years the minimum retail price of three items-radios since 1925, television sets since 1945, and "small" general-purpose computers since 1957. These graphs have since been updated.

As can be seen from the curve showing the trend of computer prices in Figure 4, the $2000 computer should become available to the consumer in 1977 or 1978. How-

ever, the Intel MCS-8 micro-computer is available now with 3K of memory for about $1000. This is in anticipation of the predicting curve. As we know, technological forecasting usually gives us trends, not exact dates. The Home Reckoner Set, as originally envisioned, is not far from reality today. Of course, all the audio-visual equipment is available, including the high-speed data transmission equipment required to enhance the local memory or local capabilities. The possibility of a local service bureau or a Cassette-Of-The-Month Club has as its basis one of the record or tape clubs, or, for instance, the monthly information tape put out for shop foremen by the American Management Association. We already have Learn-By-Cassette tapes covering a wide variety of fields - everything from speed-reading to automobile tune-up to accounting mathematics.

Character generator chips are available today that allow graphic display of characters of all types to be shown on a standard television receiver, and this type of chip is in use in a number of teledisplay terminals, such as the Digi-Log Telecomputer 109. It is already possible to use the television receiver for games and learning with a device called Odyssey, introduced last year before Christmas by the Magnavox Corporation. Odyssey consists of a video modulator, character generator, a pair of positioning mechanisms, a detecting device, and a series of patterned, colored overlays for the television screen. Plug-in cards allow different effects to be generated or controlled on the screen, allowing such games as football, tennis, and name-the-states to be played. Odyssey came with 12 games for $100, with additional games being available for from $3 to a high of $25, that being a light "rifle" capable of across-the-room control of the picture on the screen.

Input and output for the Home Reckoner Set may use the asynchronous serial mode, easily achieved with the Western Digital Systems, Inc. Tr1402A transmitter/receiver chip. The speed, up to 9600 baud, depends on an external clock pulse, and may be driven from either the computer clock or a multiple of the line frequency. The Philips cassette was chosen as the local storage medium because of its size, attractive package, tape protection, and its capability to record medium-speed frequency-shift-keying tones with inexpensive equipment, improvable with a Dolby noise reduction system.

However, program libraries may also be enlarged with pressed vinyl stereo records, available at the local super-market, which may have data on one channel and music, commentary, or instruction on the other, or data on both. Being ultra-conservative, implying monaural, medium-fidelity records, about one million ISO 8 bit characters may be stored on each disc. High-fidelity quadrasonic recording may more than quadruple this density. An average record collection today may consist of about 50 albums, enough to store about 50 million characters of data. By comparison, an average IBM 360 Operating System may use about 2.5 million characters, with about 60 million available on a standard Disk Pack.

A few years ago, Neiman-Marcus advertised a computer for use in the home kitchen to keep running inventory of the family larder, to make up shopping lists, and to prepare interesting and varied menus. A number of engineers today have computers in their homes, where they are used for everything from income tax computation to student homework problems to architectural designing. Many more people have remote access to a computer via the telephone network. The home computer is still a very rare exception. It has not yet become a status symbol. As with other electronic devices, when it does achieve this position of desirability, as we are sure that it will, the supply of inexpensive, easily interfacable computers will increase, because it will become profitable for manufacturers to make them available. Already the stored-program version of the Standard Logic Inc. C.A.S.H.-8 is available for $600 and a complete Intel MCS-8, including 1 K of RAM for about $1000. Figure 5 shows the Intel CPU and Figure 6 shows the complete computer-only one card!

Fifteen years ago, color television sets cost about $1000 and were the extreme status symbol. Today a color set is available for little more than a seventh of that. The audio cassette tape recorder, main mass storage device of the Home Reckoner Set, sells for as low as $14, including tape. Very few aspects of the Home Reckoner Set require standardization in order to make the concept work. One is the information interchange code, of which the ISO 8 bit code is probably the most logically suitable. The other is the language of the information processor-the command structure which the untrained user interacts with, not the machine language. This is the language in which the centrally available scripts are written, and may very probably be a string language. Libraries today lend books, records, tapes, pictures, and other works of art. It is only a small step to include tapes of computer programs or scripts. Of course, computer libraries already do this, but we are talking about a different medium and a different potential user population than they have.
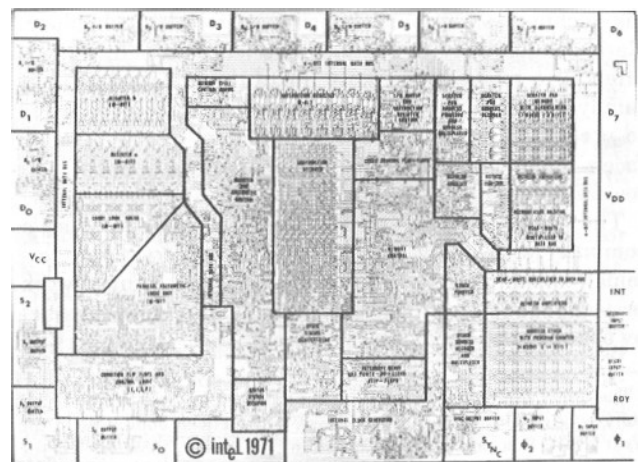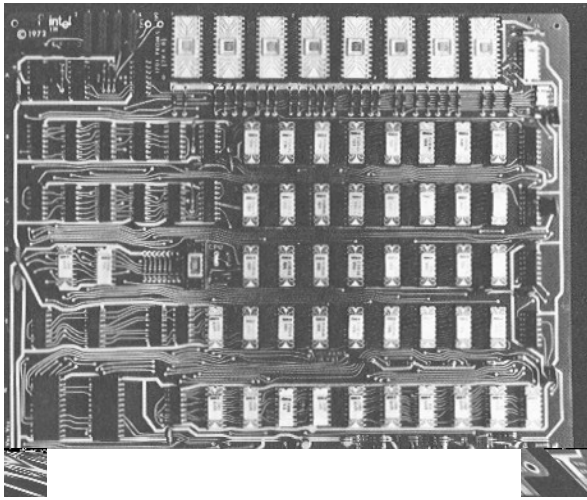

Figure 5

Figure

Inasmuch as the Home Reckoner Set allows the user to be an active participant rather than a passive viewer, there would probably spring up a number of users groups, which may or may not be affiliated with the various manufacturers, and at least 2 competing magazines in which new programs, new processors and new perpiherals would be advertised, experimented with, and expounded upon. Eventually, of course, there would be a convention held at least once each year, perhaps in the spring and in the fall, in opposite sides of the country. Lest you think that I am referring to the Spring Joint and Fall Joint Computer Conferences held in days of yore, let me state that similar conferences exist for science fiction fans, camera collectors, stamp and coin collectors, Airstream travel trailer owners, and for just about any other special interest group you'd care to name. The proliferation of

CATV and the "wired city" opens additional possibilities to the Home Reckoner Set concept. We then have in the home a potential wide-band communications port which may provide enhanced local communication. Could not some of the useful bandwidth be used for 2-way video communication on a demand-interrupt basis? As time passes, the possibilities increase. As you can see, it is now economically possible to have a useful computer at home. It may be used with a variety of peripherals for business and pleasure, for education and recreation. Computer logic and programming is now taught in high school. More and increasingly younger people are viewing the computer as a tool and as an enrichment to life, not as the manifestation of the Big Brother concept. As the demand increases, the cost of these small but capable machines will decrease further, necessitating a reconstructuring of the forecasting curve. Perhaps the small machines will warrant their own curve! The computer is not yet all-knowing. Only time will tell!

Examples of costs

asynchronous transmitter/ receiver chip Western Digital Systems, Inc. TR1402A-$15 keyboard-Controls Research Corp.-$49

black & white television set-$50 up color television set-$150 up Magnavox Odyssey game-$100 up Data Set/ modem-$200 up (high, due to low production)

IBM Selectric typewriter-$550

Panasonic converter-JK-102K-makes a data terminal from a Selectric typewriter-$250

Intel MCS-8 micro-computer-2K PROM, 1K RAM -$1000 up

Hi-Fi stereo set-about $29.95 plus obligation to buy 10 records or tapes during the next 2 years