

HX-20 RS-232C data transfer

General information

When the RS-232C is used to transmit data serially on the HX-20, TXD rises to +8 volts for a short time and then falls to -8 volts and stabilises. This may result in incorrect reception by the receiving side, depending on the bit rate and other conditions.

As a result, one incorrect bit may be received at the beginning of a data transmission when a program list is serially output by the BASIC command LIST "COMO:". When programs are transferred from one HX-20 to another (one using LIST "COMO:" and the other using LOAD "COMO:"), this incorrect bit can prevent the expected results from being obtained.

There are several ways to circumvent this problem:

- 1) Use a bit rate which is slow enough for the incorrect bit to be ignored.
- 2) Apply current to the line ahead of time to avoid signal instability during voltage rise.
- 3) Synchronise the receiving and sending sides.

The sequence for applying current ahead of time is as follows:

Sending side	Receiving side
1) OPEN "I", #1, "COMO:(28N2B)" (line power ON)	
2) WIDTH "COMO:", 255	
	3) LOAD "COMO:(28N2B)" (start program reception)
4) LIST "COMO:(28N2B)" (start program transmission)	
5) CLOSE #1	

A procedure which can be used to synchronise the sending and receiving sides is shown in Example 1. The sending side sends the character "A" (synchronisation character) and then the receiving side responds with "A" when the synchronisation character is received. The sending side begins transmission after it receives the synchronisation character from the receiving side.

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HX-20: sending BASIC programs from one HX-20 to another

The procedure below describes a simple method for transmitting files between two HX-20s. To avoid data loss, make sure that the ports on both computers are open before sending. Also make sure that you use the WIDTH command to allow for BASIC lines longer than 80 characters.

1) Turn on both computers and connect the two RS-232C ports with a 716 cable.

2) On the sending HX-20, type:

```
OPEN "I",#2,"COMO:(28N2B)" [RETURN]
WIDTH "COMO:",255 [RETURN]
```

3) On the receiving HX-20, type:

```
LOAD "COMO:(28N2B)" [RETURN]
```

4) Send the data by typing on the sending HX-20:

```
LIST "COMO:(28N2B)" [RETURN]
```

Verify that the file was sent by finding it on the receiving HX-20.

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HX-20: sending BASIC programs from the QX-10 to the HX-20

Use the procedure below to send a BASIC program from the QX-10 to the HX-20. Before a program can be transferred, it must be stored in ASCII format, using the SAVE command with the A option. For example, to store a BASIC program named "INTEREST.BAS", you would give the command:

```
SAVE "INTEREST.BAS",A [RETURN]
```

The A stores the program as an ASCII file. You can use the TYPE command to display the file, if you want to make sure it is in ASCII format. (An ASCII file lists clearly on the screen; nonASCII files display as garbled text.)

Then follow this procedure to send an MBASIC program from the QX-10 to the HX-20:

1) Use the SETUP program to set the QX-10 serial options to 300 baud, 8 bit word and no parity.

2) Type the following on the HX-20:

```
LOAD "COMO:(28N1B)" [RETURN]
```

3) Set up the QX-10 to send by typing:

```
STAT PUN:=UP1: [RETURN]
```

4) Send the program from the QX-10 by typing:

```
PIP PUN:=filename.ext [RETURN]
```

HX-20 simultaneous I/O operations

The table below shows operations which can be performed simultaneously on the HX-20. Those combinations which are possible are shown on the same line. For example, during input from the microcassette drive (line 1 in the table), both the main and the slave CPUs are occupied. Therefore, operations such as output to the speaker are not possible, although input from the keyboard is accepted.

In line 11 of the table, the slave CPU does not operate during high speed serial communication, because this mode is used for the exchange of data with the main CPU; that is, the link between the main CPU and the slave CPU is severed during high speed serial communication. (However, if a command is issued to the slave CPU to sound the speaker, for example, for 10 seconds, high speed serial communication can be started whilst the speaker is sounding.) With the standard I/O routines provided, sounding the speaker after the RS-232C has been opened for input using BASIC COMO: statements will cause the input to be interrupted. However, RS-232C input automatically resumes after the specified operation has been completed.

Simultaneous I/O operations

Item number	Main CPU interrupt	Main CPU	Slave CPU
1	keyboard input	battery voltage	microcassette input
2	interrupt	interrupt	microcassette output
3	interrupt	interrupt	external cassette input
4	interrupt	interrupt	external cassette output
5	interrupt	interrupt	LCD display (input)
6	interrupt	interrupt	LCD display (input)
7	interrupt	interrupt	LCD display (input)
8	interrupt	interrupt	RS-232C output
9	interrupt	interrupt	RS-232C output
10	interrupt	interrupt	RS-232C output
11	interrupt	interrupt	high speed serial operation

HX-20: version one barcode software

General information

The demonstration program listed at the back of the manual accompanying the version one barcode ROM provides an example of the operation of the ROM, but it does not make clear how the subroutines in the ROM can be employed by the user in a custom applications program.

There are four subroutines in the ROM intended for use by programmers, which are as follows:

Entry point		Purpose of subroutine
Hex	Decimal	
614C	24908	tells the barcode system where the work area is
6100	24832	tells the system which type of code is to be read
6104	24836	reads the line of barcode
6108	24840	tells the system whether check digits are to be used

If BASIC is being used, these should be set up using the DEFUSR statement; for example:

```
10 DEF USR0=24908:DEF USR1=24832:DEF USR2=24836:DEF USR3=24840
```

The barcode system always uses the six bytes of memory at locations 0A40 to 0A45 hex (2624 to 2629 decimal). It also requires a 364 byte work area and it is normal to use locations 0A46 to 0BB1 (2630 to 2993) for this purpose. This is carried out from BASIC as follows:

```
20 MEMSET 2994  
30 D=USR0(2630)
```

D is a dummy variable and 2630 indicates the start address of the work area. MEMSET is set to just above the end of the work area.

The three lines of BASIC used so far will be needed at the start of every package which is going to use the version one barcode ROM. However, the commands below may be used at any time during the course of a program to switch between different code types or select check digits.

Selecting different barcode types

The USR1 function defined above is used for selecting the type of barcode to be read. The argument supplied to USR1 is the address of the internal ROM routine for decoding the barcode and varies, depending on which code type is to be used, as described below:

Barcode type	Argument for USR1	
	Hex	Decimal
CODE 39	6823	26659
INTERLEAVED 2 OF 5	69EE	27118
MODIFIED PLESSEY (MSI)	6C1D	27677
CODABAR	6E22	28194
EAN 8/13 or UPC A/E	7050	28752

For example, to set up reading some CODE 39 barcode from BASIC:

```
40 D=USR1(26659)
```

Once again D is a dummy variable.

Use of check digits

Some types of barcode support check digits to guard against bad reads. The argument passed to USR3 determines whether check digits are to be used.

Code type	Argument passed		
	0	256	512
CODE 39	no	yes	-
INTERLEAVED 2 OF 5	no	IBM MOD 9/10	-
MODIFIED PLESSEY (MSI)	no	IBM MOD 10	IBM MOD 10/11
CODABAR	no	yes	-
EAN 8/13 and UPC A/E	-	-	-

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For example, to use check digits with CODE 39 barcode:

```
50 D=USR3(256)
```

Once again, D is a dummy variable. The EAN and UPC standard barcodes employ check digits as part of their design and USR3 has no effect if these codes are being used. MODIFIED PLESSEY has the option of two check digit schemes; the MOD 10/11 being more comprehensive.

Reading the barcode

To read a code, the USR2 function is used; for example:

```
60 B$=SPACE$(20)
70 R=USR2(VARPTR(B$))
```

B\$ is the string variable into which the code is to be read and must first be filled with a number of spaces equal to or greater than the maximum number of characters which the barcode is expected to contain. R is a return status variable and its contents are as follows:

1 to 253	good read; value returned is the number of characters read
255 or -255	keyboard interrupt occurred; read terminated
254 or -254	unwanted interrupt (eg RS-232C, paper feed)
-253 to 0	decoding error

Use of the barcode ROM with the Epson expansion unit

If the HX-20 Epson expansion unit is used with the barcode ROM, the DIP switches in the expansion unit must be changed to reduce the memory available from 32 to 24k. This is necessary in order that the HX-20 recognises the ROM as being installed.

HX-20 with Epson printers

Serial interface compatibility with the HX-20

If an HX-20 is connected to an FX or an RX printer using an 8148 serial board there is a problem with printing. This is caused by the switching noise of the HX-20 RS-232C port when the OPEN or CLOSE statements are executed. If a serial board has not yet been fitted, make sure that either an 8143 or an 8145 is used if the printer is to be used with an HX-20. If an 8148 has already been fitted, the following patch will solve the problem. This will not affect printing if it is run with a printer using either of the other interfaces.

```
10 MEMSET &HOA50
20 FOR I = 0 TO 5
30 READ A
40 POKE &HOA40 + I, A
50 NEXT I
60 DATA &H0086, &H0001, &H00BD, &H00FF, &H0073, &H0039
70 EXEC &HOA40
80 OPEN "0", #1, "COM0:"
90 WIDTH "COM0:", 255
100 PRINT #1, "AAAAAAAAAA"
110 PRINT #1, "BBBBBBBBBB"
120 CLOSE
130 END
```

Explanation

Line numbers	Purpose
10	set aside an area of memory for machine code routine
20-60	read data into bottom of memory
70	execute machine code routine
80	open RS-232C port as a file for output to test routine
90	suppress carriage return/line feed
100-110	test print
120	close RS-232C port

Loading HX-20 binary format RAM files

The RAM files used by BASIC can be saved to and loaded from tape quickly by using the SAVEM and LOADM commands. However, any attempt to load the RAM file back in will produce a BD (bad data) error. This may be overcome by using the program listed below:

```
10 CLS
20 DEFFIL 25,0
30 A$ = "This is record 0"
40 PUT% 0,A$
50 GET% 0,B$
60 PRINT B$
70 RFS = PEEK(&H5A2)*256+PEEK(&H5A3)
80 RFL = PEEK(&H4FE)*256+PEEK(&H4FF)
90 WIND:SAVEM "RAMFILE",RFS,RFS+RFL-1,RFS
100 A$ = "This will be erased"
110 PUT% 0,A$
120 GET% 0,B$
130 PRINT B$
140 TVH = PEEK(&H500):TVL = PEEK(&H501)
150 POKE &H500,PEEK(&H4B2):POKE &H501,PEEK(&H4B3)
160 WIND:LOADM "RAMFILE"
170 POKE &H500,TVH:POKE &H501,TVL
180 GET% 0,B$
190 PRINT B$
```

Note: this program will produce odd effects and will probably crash if the length of the RAM file is decreased before loading it from cassette.

The program works as follows:

Line number	Purpose
10-60	initialise RAM files record size and demo of setting a record
70	obtains starting address of RAM file
80	obtains length of RAM file
90	saves the complete file in binary format
100-130	demo of setting a record to a value that will be overwritten once the RAM file is reloaded
140	obtains the original value of the highest address in memory that LOADM can use
150	sets the highest address that LOADM can use to the highest address that BASIC can use
160	loads the complete RAM file
170	restores the highest address that LOADM can use back to its original value
180-190	proof that it works by getting the record written in line 40

Using the Epson HX-20 expansion unit

Installation

Refer to the 'Expansion Unit Mounting Procedure' booklet supplied with the unit for physical attachment to the HX-20. After mounting the unit you MUST cold start the machine by pressing CTRL @ the first time you use the machine. A cold start must also be carried out when the expansion unit is removed or the configuration changed.

RAM and ROM options

There are three basic configurations for the expansion unit as follows:

1) 16k RAM + 18k ROM; with the expansion unit configured this way, the internal optional expansion ROM is disabled and cannot be used. This is particularly relevant to those users who wish to use the packages which contain the COMMS or RAX ROMS.

2) 8k RAM + 24k ROM; the internal optional expansion ROM is usable.

3) 32k ROM; the internal optional expansion ROM is usable.

In addition to being able to select the RAM/ROM combination for the expansion unit, you can also select the type of ROM which is used within the expansion unit. The types of ROM available for use are as follows:

1) MBM 27C64 CMOS EPROM
SMM 2365 masked ROM

2) NM613128
MBM 27C128

Note: CMOS EPROMS should be used, otherwise battery life will be reduced from the normal 50 hours.

Setting the options

The options described above are selected as follows:

1) RAM/ROM mixture:

Option	Switches		Configuration
	1	2	
1	ON	OFF	16k RAM + 16k ROM
2	OFF	ON	8k RAM + 24k ROM (when using RAX or COMMS)
3	OFF	OFF	32k ROM

2) ROM type:

ROM type	Switches		Jumpers	
	3	4	1	2
27C64	OFF	ON	B	B
27128	ON	OFF	A	A

Bank switching

When ROM is installed in both the main HX-20 and the expansion unit, it must be possible to switch between the banks of ROMs. This should only be carried out from machine code; the locations are as follows:

\$30 or \$31 selects bank 1; the expansion unit ROMs

\$32 or \$33 select bank 0; the HX-20 main ROMs

HX-20 applications software summary

This is an up to date list of HX-20 software currently available. In no way is the description of each program complete. For further details, please ring the firm which produced the software package.

Category	Package	Purchase	Telephone number	Description
ACCOUNTING	CASHBOOK	Southern	0803 212957	normal facilities of cashbook including extraction of VAT
	CASH REGISTER	Phipps Associates	01-393 0283	turns HX-20 into pos terminal, front end device for Phipps Assoc. microshop package
	NOMINAL LEDGER	Phipps Associates	01-393 0283	analysis of accounting data over 100+ headings
ACCOUNTS	ACCOUNTS	Kuma	0735 74335	complete accounting system
BARCODES	BARCODE ROM	Epson UK	01-902 8892	decodes input from Epson barcode pen
BARSTOCK	BARSTOCKS	Valldata	0225 705957	incorporates data capture and full stock analysis
	DATA CRAFT/ BARSTOCK	Ebor	0904 791595	evaluates wet stock and compares takings
	DESKMASTER 16 BAR STOCK CONTROL	Kuma	0735 74335	mobile stock taking program for multiple number of bars
BUILDING AND QUANTITY SURVEYING	PRICEQ	Forward	0332 49150	uses TAKEQ info and prices the quantities
	TAKEQ	Forward	0332 49150	used in conjunction with traditional measurement procedures
BUSINESS AIDS	CARD INDEX	Epson UK	01-902 8892	stores and retrieves data, 200 character cards
	DESKMASTER 1 OFFICE AID	Kuma	0735 74335	full functions of desktop calculator
	DESKMASTER 6 DECISION MAKER	Kuma	0735 74335	makes decisions through proven scientific theory
	DESKMASTER 8 MAIL LISTER	Kuma	0735 74335	creates mailing list

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Category	Package	Purchase	Telephone number	Description
BUSINESS AIDS	DESKMASTER 17	Kuma	0735 74335	used for project analysis and reporting
	PSTIMER	Practical Software	01-340 0237	records and analyses timekeeping
	TAPSUM	Time and People	01-405 2565	calculation package
COMMUNICATIONS	COMMUNICATIONS ROM	Epson UK	01-902 8892	sends and receives ASCII encoded text blocks
	DESKMASTER 20: HX VIEWDATA INTELLIGENT TERMINAL/EDITOR	Kuma	0735 74335	
COMMUNICATIONS: ELECTRONIC MAIL	COMTEXT	Transam	01-404 4554	links to most micro, minis and mainframes
		Talbot Computers	0202 519282	includes fast text editing, search and formatted printed text
	DESKMASTER 4 FRIENDLY TERMINAL	Kuma	0735 74335	transforms HX-20 into intelligent terminal
COMMUNICATIONS: REMOTE PRINTING	DESKMASTER 5 EDITING TERMINAL	Kuma	0735 74335	transforms HX-20 into intelligent terminal
	DIALTEXT	Talbot Computers	0202 519282	uses HX-20 as coordinator in an automatic remote printing system for reports
CURRENCY	CASH EXCHANGE CURRENCY CONVERSION	Kuma	0735 75335	explores trends in currency rates
		Kuma	0735 74335	selects currency to be bought and calculates conversion rates
	CURRENCY CONVERSION	PDS	0204 493816	selects currency to be bought and calculates conversion rates
DATA CAPTURE /ANALYSIS	DATA CAPTURE	Valldata	0225 705957	user definable data recording system
	DESKDATA	Bits and PCs	0532 458877	includes variable number of lines per record
	DESKMASTER 9 RAM DATABASE	Kuma	0735 74335	suitable for all applications
	MST PORTABLE FILING	MST Consultants	0626 832617	allows user to choose card headings
	ROCFILE V42 DATABASE	Rocon Ltd	0235 24206	this is live data program

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Category	Package	Purchase	Telephone number	Description	
ENTERTAIN- MENT/LEISURE	ADVENTURE	Transam	01-404 4554	DAS HAUS is a version of ADVENTURE	
	AIRLINE	Kuma	0735 74335	make enough capital to take over British Airways	
	ASTRONOMY 1	Kuma	0735 74335	geocentric planetary ephemeris for HX-20 with expansion unit	
	ASTRONOMY 2	Kuma	0735 74335	heliocentric planetary ephemeris for HX-20 with expansion unit	
	BIG BANG	Time and People	01-405 2565	involves skill in extinguishing sticks of dynamite	
	DIARY	Epson UK	01-902 8892	easy to use 3 month rolling diary	
	ENTERTAIN- MENT PACK 1	Kuma	0735 74335	includes moonlander, biorhythm, blackjack 39 steps, etc	
	EPSON GAMES 1	Epson UK	01-902 8892	contains bomber, lightcycle, blackjack	
	EPSON GAMES 2	Epson UK	01-902 8892	contains cavern, hangman and sketchit	
	GAMES	Pocket Computers	0932 57808	contains little brick out, animals, hangman, 3D graph	
	GAMES COMPENDIUM	Kuma	0735 74335	contains bandit, hangman and dice	
	GAMES PACK 1	Transam	01-404 4554	contains maze and 3D noughts and crosses	
	GAMES PACK 2	Transam	01-404 4554	contains frogs, spots, tower, doctor	
	GAMES PACK 3	Transam	01-404 4554	contains anagram and hangman, connect 4	
	FINANCIAL PLANNING/ BUDGETING	HOME BUDGET	Kuma	0735 74335	keeps track of domestic costs and overheads
		HORSERACE FORECASTING	Kuma	0735 74335	provides odds and recommends a runner
STAMPOUT		Kuma	0735 74335	avoid hazards in an expanding pattern	
COMPUTAX		Kuma	0735 74335	calculates personal tax liability	
DESKMASTER 3 SPREADSHEET		Kuma	0735 74335	uses 15 X 15 matrix	
DESKMASTER 3.5 SPREADSHEET		Kuma	0735 74335	offers extended facilities to above spreadsheet	
DESKMASTER 14- EXPENSES		Kuma	0735 74335	enables build up and service of personal data files	

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Category	Package	Purchase	Telephone number	Description
FINANCIAL PLANNING/ BUDGETING	ECALC SPREADSHEET SYSTEM	Epson UK	01-902 8892	simple to use, powerful spreadsheet
	EPCALC	Healey Management Services	0268 416155	financial modelling package
	HOME BUDGET	Kuma	0735 74335	keeps track of domestic costs and overheads
GOLF HANDICAPPING	PSINVESTOR	Practical Software	01-340 0237	tool for tracking and analysing an investment portfolio
	GOLF HANDICAPPING	Ebor	0904 791595	accommodates up to 200 members records
INSURANCE	GOLF HANDICAPPING	P & M Data Services Limited	0942 497123	handles 250 members records expanding to 950 handicap records
	COMPUTAX	Kuma	0735 74335	calculates personal tax liability
	INSURANCE MANAGER	LSD Software Limited	01-731 5100	suite of modules showing arithmetic relating to real life situations
INVOICING	PQS	BPA Computer Systems	0763 73056	personal quotation system
	ORDERMASTER	Micro Business Centre	0902 29907	produces order acknowledgements and invoices
LANGUAGES	FORTH	HCCS Ltd	0632 821924	available on an internal ROM
	TINY PASCAL COMPILER	Kuma	0735 74335	standard compiler for HX-20
MAILING LIST	APWRITER (MAILMERGE)	AP Systems Limited	01-399 1257	can create, edit and file both text and names and addresses
	DESKMASTER 8 LABELLER	Kuma	0735 74335	general purpose label maker
	DESKMASTER 10 MAIL LISTER	Kuma	0735 74335	can maintain name and address file
	MLIST	Epson UK	01-902 8892	can design label size, up to 200 characters per label
MAINTENANCE PLANNING: MAINTENANCE OPTIMISATION	MINI-MAINOPT	CM Mainopt Limited	0793 850222	evaluates financial impact of management decisions
MISCELLANEOUS APPLICATIONS/ SYS	BITWEIGH PORTABLE WEIGHING SYSTEM	BIT Computer Services Limited	0606 888782	portable production measurement and reporting tool

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Category	Package	Purchase	Telephone number	Description
MISCELLANEOUS APPLICATIONS/SYS	VIEWSCAN TEXT SYSTEM	Wormald Int. Sensory Aids Ltd	0602 820600	portable information handling system
NAVIGATION	NAVIGATIONAL ALMANAC	Kuma	0735 74335	provides information for celestial navigation
	THE NAVIGATOR	Microtek Limited	0473 50152	complete navigation package for small craft
NUMERICAL CONTROL SYSTEMS	CNC	Objex Ltd	0235 24301	portable programming system for CNC machine tools
	NC AND CNC MACHINE TAPE PROG.	Healey Management Services	0268 416155	works at high speed, expanded version copes with 17k program tapes
PAYROLL	PAYE	Pocket Computers	0932 57808	provides filing and calculation system for maintenance of the PAYE tax scheme
	PAYROLL	Kuma	0735 74335	converts user from manual payroll to computerised payroll
	PAYROLL	Southern	0803 212957	deals with up to 50 members of staff including all common tax codes
PHARMACEUTICAL LABELLING	CHEMLABEL	Kuma	0735 74335	label printout, can select from 400 drugs already in system, 700 may be stored
	CHEMLABEL	PDS	0204 493816	label printout, can select from 400 drugs already in system, 700 may be stored
	ORALABEL	Orange Computers	0565 53417	holds up to 1000 drug descriptions and approximately 120 dosages. Written in machine code for extra speed
	PHARMACEUTICAL LABELLING PACKAGE	Independent Retail Computer Systems	042 1282452	almost entirely written in assembler holds 800 drug records
	PHARMACEUTICAL LABELLING PACKAGE	P and M Data Services Limited	0942 497123	holds 410 drug descriptions on the 16k machine and 1200 with the expansion unit

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Category	Package	Purchase	Telephone number	Description
PHARMACEUTICAL LABELLING	PHARMASSIST	BPA Computer Systems	0763 73056	drug file of 1000 descriptions stored
POINT OF SALE	MICROSHOP	Phipps Associates	01-393 0283	designed for retailer, used together with QX-10
PRODUCTION/PROCESS OPTIMISATION	MINI-MAINOPT	CM Mainopt Limited	0793 850222	evaluates financial impact of management decisions
RETAIL	MICROSHOP	Phipps Associates	01-393 0283	designed for retailer, used together with QX-10
	RECEIPT	AP Systems Limited	01-399 1257	for small businesses with under 500 transactions per day produces totals at end of day
	RESTAURANT	AP Systems Limited	01-399 1257	gives itemised receipts for customers in a restaurant with under 500 transactions
SALES ORDER PROCESSING	ORDER/STOCK CONTROL SYSTEM	Measurement Control and Displays	0483 574659	complete processing of orders received through to customer delivery
	SALES ORDER ENTRY	Kuma	0735 74335	stores up to 400 sales/orders
	SALES ORDER ENTRY SYSTEM	Epson UK	01-902 8892	system for remote capture of the order
STOCK CONTROL	DESKMASTER 11 MOBILE STOCK REC	Kuma	0735 74335	can store up to 100 items (425 on 32k)
	DESKMASTER 15 - STOCK CONTROL	Kuma	0735 74335	can store up to 101 records on a 16k machine, or 525 on 32k machine
	STOCK CONTROL	Healey Management Services	0268 416155	can deal with 400 items on the 16k machine and 900 with the expansion unit
	STOCK CONTROL	MST Consultants	0626 832617	can handle 800 items and produces stock lists
	STOCK/SPARES	CM Mainopt Limited	0793 850222	evaluates optimum number of spares to be held
SURVEYING	SURVEY SUITE	Longdin and Browning (Surveys) Limited	055 42357401	carries out all normal survey processing, plotting and computation

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Category	Package	Purchase	Telephone number	Description
SURVEYING: BUILDING/ QUANTITY SURVEYING	QUANTAK PRICE Q	Forward	0332 49150	uses info generated and on tape in TAKEQ program and provides for pricing
	QUANTAK TAKE Q	Forward	0332 49150	used together with traditional measurement procedures providing direct input of 'taking off'
TEXT EDITOR	INTEXT	Talbot Computers	0202 519282	includes fast text editing and search facilities
	CORRESPONDENT 20	Epson UK	01-902 8892	can create up to 7 pages, 60 lines by 60 characters on each side of the tape
UTILITIES	CHARACTER GENERATION	Transam	01-404 4554	can generate the 32 user definable graphic characters
	COMTEXT	Talbot Computers	0202 519282	includes fast text editing, search and formatted printed text
	CROSS ASSEMBLY/ DOWN LOAD LINE	Ffoss Ltd	0753 820277	enhances the p system 6800 cross assembler for developing HX-20 software
	DESKMASTER 7 ASSEMBLER/ EDITOR	Kuma	0735 74335	can write and assemble a program in 6301 code on the HX-20
	DISASSEMBLER	Transam	01-404 4554	can disassemble 6801 mnemonics. A 6801 assembler is now under development
	DISASSEMBLER - PROLOG	Kuma	0735 74335	can follow branches in code as they occur
	GRAPH PLOTTER	CM Mainopt Limited	0793 850222	2 basic subroutines which generate graphical representations of tabular information
	HX-20 DEVELOPMENT SYSTEM	Transam	01-404 4554	cross-assembler running on CP/M computers. The assembled code may then be downloaded into the HX-20

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Category	Package	Purchase	Telephone number	Description	
UTILITIES	LO-RAX	Ffoss	0753 820277	for the software developer who needs totally reliable random access management of the microcassette	
	RAXUTILS	Ffoss	0753 820277	for applications which use the RAX random access microcassette system	
	THE HOUSEKEEPER	AP Systems Limited	01-399 1257	nine utility programs to aid the user	
	USER DEFINABLE GRAPHICS APWRITER	Kuma	0735 74335	quick and easy way to set up special characters	
	WORD PROCESSING	DESKMASTER 2 V1.10	AP Systems Limited	01-399 1257	can create, edit and file both text, names and addresses
		DESKMASTER 2/D	Kuma	0735 74335	includes character string search, cursor position markers, etc
		FFOSSWRITER	Kuma	0735 74335	to be used with the HX-20 and TF-20 disk drive
		FFOSSWRITER	Ffoss	0753 820277	full featured word processor for the HX-20 with true random access to tape
		FFOSSWRITER	Kuma	0735 74335	features include menu driven commands, quick reference card, dedicated function keys, etc
		INTEXT	Talbot Computers	0202 519282	includes fast text editing and search facilities
WORK STUDY	SM UNITEX	SM Software (UK) Ltd	0453 46065	full screen editing, audio return, remote transmission and text blocks	
	COMTIME	Healey Management Services	0268 416155	allows engineer to carry out his study, input RA and CA, element frequency and all the necessary editing	

HX-20: version two barcode software

General information

Many companies are now using, or considering the use of, barcode reading systems to replace manual input via a keyboard. The main advantages of a barcode reading system are ease of use, accuracy of data and speed of operation.

The Epson HX-20 Barcode Reading Package is a small set of assembly code routines which may be integrated into an application program written in either BASIC or assembly language.

The BCR Package supports a comprehensive set of facilities which make it suitable for most barcode reading applications:

1) decoding of all popular barcode types:

- code 39
- interleaved 2 out of 5
- EAN 8 and EAN 13
- UPC A and UPC E
- modified plessey
- monarch codabar;

2) bidirectional reading with false start detection and debounce logic;

3) wide tolerance in speed of operation and wide to narrow print ratio;

4) automatic support for check digit verification;

5) support for alternative keyboard input if a label cannot be read.

Included in the BCR Package is a BASIC demonstration/configuration program. This assists in the tailoring of the BCR Package for the particular barcode label which your system uses.

For the majority of labels a minimal configuration may be performed, whilst those with unusual barcode label print formats may have to resort to the many additional features described in section 5 of the manual.

The BCR Package requires an Epson H00BR wand and will run on either a 16k or an expanded 32k Epson HX-20.

Technical Support Document number 75a

HX-20: barcode printing hardware and software

General information

There are currently four firms which produce barcode printing software and hardware. Each firm uses a different system as explained below and this is consequently reflected in the prices of each printing program.

The first company is:

Actel Computers Ltd
The Computer Centre
Bugbrooke Road
Gayton
Northampton
NN7 3EU

Tel: 0604 858011

This is purely software and consists of a BASIC program which reads code 39, plessey and codabar barcodes.

The second company is:

Altek Instruments
1 Green Lane
Walton on Thames
Surrey

Tel: 09322 44110

The basic off the shelf program costs £25 and prints code 39 only using the bit image mode printer control codes on an Epson printer. It is purely a software program. Custom barcode software is available on request.

The third company is:

Ecupan Ltd
PO Box 40
Hertford
SG13 7HE

Tel: 0992 552426

This company has constructed a sophisticated barcode printing kit, which is capable of producing all the common types of barcode. Currently they are charging £2741 for the flexiprinter unit, £495 for the format program and £520 for an HX-20 containing a special EPROM and special BASIC program. Alternatively, the EPROM and the BASIC program can be purchased separately for £165. There is also a data collection program which costs £400.

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The fourth company is:

SB Electronic Systems Ltd
Arden House
Arden Grove
Harpenden
Hertfordshire
AL5 4SL

Tel: 05827 69991

This firm produces solely Telepen barcode, which is their registered trademark. They produce both a parallel and a serial interface board, which are mounted inside an Epson printer in the same position as an RS-232C board would normally be mounted. The boards cost £198. Special printer control codes exist for printing different modes of Telepen barcode.

Technical Support Document number 76a

HX-20 communications

General information

This is a list of companies which provide communication services for the HX-20. The list is split into various categories.

HX-20 to QX-10

Company	Telephone number
Actel	0604 858011
AP Systems	01-399 1257
Berisford	0606 888782
Southern Computers	0803 212957
Talbot Offset	01-907 1992
Transam	01-404 4554

Intelligent terminals to mainframe

Company	Mainframes	Telephone number
IMI Computing	Honeywell, IBM, ICL	021 3564848
STC	DEC, Honeywell	0279 26777
Technology for business	Honeywell, IBM, ICL	01-837 1271

HX-20 for telex / Telecom gold / electronic mail

Company	Telephone number
BL Systems	01-486 6000
Norbain	0734 752201
Talbot Offset	0202 519282
Wilder and Company	04862 21554

Technical Support Document number 77a

HX-20 applications software: CARD INDEX

CARD INDEX forms part of the Epson personal office suite of programs. It enables you to devise and structure a personal card index system for use on the portable HX-20. Thus wherever you are you will be able to summon selected information on the screen and when required print it on either the internal or on an external printer.

The program gives you maximum flexibility in operating the index. You can create cards, edit and change them, store them for future use and update or remove them as required. At any time, the HX-20 will list all the cards or a particular card which you specify or select from the index according to criteria which you have defined.

The applications are legion so that anyone who needs to keep personal files for quick reference can benefit from operating CARD INDEX. Thus a salesman can keep a record of his customers and equipment purchased, a manager can keep a list of his employees and personal details and an engineer can keep a record of spare parts.

The package includes the RAX ROM which allows pseudo random access on cassette tapes.

The software provides prompts throughout the program and error messages if you make a mistake. The commands have been kept simple and as near to English as is possible.

Technical Support Document number 78a

HX-20 applications software: CORRESPONDENT 20

CORRESPONDENT 20 is a word processor program which provides a fast and flexible means of writing and storing pages of text in the HX-20. This is ideal for lengthy documents as well as short memos and letters.

Working on a page size of 60 characters across by 60 lines down, the HX-20 display screen acts as a window which is moved across the page when typing or editing text. Editing commands are provided both by HX-20 BASIC and by the more powerful CORRESPONDENT 20 set of screen edit functions, accessed by the programmable function keys.

A directory file at the beginning of the microcassette provides a very useful reference when storing or retrieving pages of text, providing filename and page dimension information.

CORRESPONDENT 20 text pages can be printed out either on the internal printer or on an external printer via the RS-232C interface.

Technical Support Document number 79a

HX-20 applications software: DIARY

DIARY forms part of the Epson personal office suite of programs. It enables you to record morning and afternoon appointments and by scrolling through the calendar, note at a glance whether appointments have been booked on a particular day. You can devise your own system of recording special events by using any character on the keyboard which appears alongside the required date on the diary.

DIARY on the HX-20 also records recurrent events so that once you have specified the frequency of any event, it will be registered on the relevant DIARY page automatically. Thus even if you forget an important event, you can rely on the HX-20 to remind you.

A 24 hour clock enables you to check the date and time and you can reset the clock if necessary.

The package includes the RAX ROM which allows pseudo random access on cassette tapes.

The software provides prompts throughout the program and error messages if you make a mistake. The commands have been kept simple and as near to English as is possible.

HX-20 applications software: DIY

Consider the benefits of being able to create and run your own data entry program without any knowledge of computer languages and computer programming. With the Epson DIY system, this becomes not only possible but practicable using your HX-20 portable computer. The system enables you to create your own program using the full keyboard facilities (that is, both alpha and numeric characters), giving you maximum flexibility in designing the formats for gathering and storing information. You can now tailor a data entry system to your own requirements and ensure that all those who enter data into the HX-20 will follow the instructions and formats which you have laid down.

The DIY system is in two parts:

- 1)DIYGEN which generates the program according to your instructions;
- 2)DIYRUN which runs the program according to the instructions given in DIYGEN.

Thus, for example, managers creating a program for capturing data in DIYGEN can set out the formats and instructions which must be used by their staff when entering data using DIYRUN. Armed with a powerful program in your portable computer, the applications are widespread; for example, the person responsible for stock records can take his HX-20 with him as he examines stock and record information on products, quantities, prices etc which will be stored in the HX-20 according to a prescribed procedure. A salesman can use the DIY system to take orders on a customer's premises. A shopkeeper can devise a program for keeping records of goods ordered and in stock and enter relevant data into the HX-20 as he moves around the shelves in his shop. An engineer can use the system for taking readings on testbeds. A manager can use the DIY system for keeping records about employees and their work performance.

The applications are legion, wherever there is a requirement to store and handle data.

Technical Support Document number 81a

HX-20 applications software: ECALC

ECALC is a 'spreadsheet calculator' program designed for the entry, storage, retrieval and analysis of data using a two dimensional work area organised into rows and columns.

Although ECALC is able to produce extremely complex financial models and forecasts, the inexperienced user will find it very easy to achieve simple and rapid transformations of data within the matrix. For example, the price of a range of products dependent on currency exchange rates may very quickly and accurately be recalculated in one step by simply changing the value of the conversion rate.

ECALC is a specially written version of the more popular calculator programs on the market today, incorporating all the most useful commands and allowing flexible and rapid manipulation of data in a form easily tailored to the user's own needs.

Technical Support Document number 82a

HX-20 applications software: INTEXT

INTEXT is a stand alone 'mini word processor' with communications especially designed for use on the HX-20 computer. It capitalises on the unique features of the HX-20 to provide a text editor which can be used anywhere without complicated setting up procedures and without inconvenient add ons or bulky external equipment. Nevertheless, the documents produced by INTEXT are fully formatted for easy downloading into non portable office terminal equipment, rapid print out through external printers, easy transmission in ready to use format to typesetting and publishing establishments. Using the communications section of the program, access over the telephone system using a modem or acoustic coupler to almost any remote database can be achieved.

As INTEXT is written in machine code, high speed operation is standard and a file length of just over 12500 characters is available before there is any need to save to tape, print out on an internal or on an external printer, or output through the RS-232C interface. Text is retained in non volatile RAM memory whether the HX-20 power is on or off for as long as is deemed necessary.

Inevitably, any word processing package has a complex array of key functions and procedures to deal with the full range of basic editing routines and the facilities for loading, saving, printing and transmission to peripheral devices. Control of the program is simple once the control sequences have been mastered.

Technical Support Document number 83a

HX-20 applications software: MAILING LIST (MLIST)

MAILING LIST forms part of the Epson personal office suite of programs. It enables you to devise and structure a personal mailing list for use on the portable HX-20. Thus wherever you are you will be able to summon selected information on the screen and when required print it onto labels on either the internal printer or on an external printer.

The program gives you maximum flexibility in operating the mailing list. You can create items, edit and change them, store them for future use and update or remove them as required. At any time the HX-20 will list all the names or a particular item which you specify or select from the mailing list according to criteria which you have defined.

The applications are widespread and everyone who needs to keep an updated customer or dealer list as well as a personal list of addresses can benefit from operating MAILING LIST. MAILING LIST can be classified by region, nature of business, product type, credit rating etc. Thus you can keep detailed information on customers and select addresses for direct mail activity.

The package includes the RAX ROM which allows pseudo random access on cassette tapes.

The software provides prompts throughout the program and error messages if you make a mistake. The commands have been kept simple and as near to English as is possible.

Technical Support Document number 84a

HX-20 applications software: SALES ORDER ENTRY

Consider the benefits of salesmen being able to take orders, answer sales enquiries, quote prices and discounts and issue receipts at the touch of a button and on the customer's premises.

All this becomes not only possible but practicable using the Epson HX-20 portable computer and the Epson SALES ORDER ENTRY system.

With this system a salesman can load an updated stock file from the head office computer on to the HX-20 and visit a customer, confident in the knowledge that he will be able to present a recent stock position and take an order which checks against the stock file and either subtracts from the current stock or, if there is no current stock, registers an order for stock which can be delivered as soon as possible.

Prices, VAT charges, line and customer discounts are all calculated by the HX-20 so that within seconds the customer can be given precise information on the true cost of an order and if accepted can be confident that as the order is stored in the computer, it will be processed automatically. The HX-20 also prints out a receipt for the customer's records.

Once the salesman has visited his customers, he can transmit the orders from the HX-20 to the head office computer and the HX-20 automatically prints out the total value of the orders taken, so that the salesman has an immediate record of his activity on which he can calculate his commission.

The HX-20 thus becomes an important sales aid for the salesman and an invaluable asset for the head office accounts department, whose computer is regularly provided with updated information on orders received and the current level of stock.

The package includes the communications ROM which handles the link with the head office computer.

The software provides prompts on the screen at every step of the program and has been designed so that the commands are kept simple and as near to English as is possible.

Technical Support Document number 87a

HX-20: setting the external printer in CARD INDEX, DIYRUN and MAILING LIST

To set the external printer in CARD INDEX, DIYRUN and MAILING LIST, carry out the following procedure:

1)select BASIC from the menu;

2)type: OPEN "0",1,"COMO:(blpsc)":CLOSE 1
where (blpsc) are the parameters detailed on pages 3-46 and 3-47 of the HX-20 Basic Reference Manual;

3)type the following:
for CARD INDEX: POKE 12495,1:POKE 12496,1:POKE 12497,1
for DIYRUN: POKE 5993,1:POKE 5994,1:POKE 5995,1
for MAILING LIST: POKE 12845,1:POKE 12846,1:POKE 12847,1

To alter the parameters in DIYGEN, LIST the program in BASIC and alter line 5002.

Technical Support Document number 88a

HX-20: using C60 tapes with CARD INDEX and MAILING LIST

General explanation

Users of CARD INDEX and MAILING LIST with C60 cassettes who store more than 102 cards or items may have encountered a problem. This does not apply to users with C30 tapes or those with AB ROM machines with serial numbers above 25000. The patch to overcome this problem is as follows:

When initialising a C60 tape:

- 1)select the Initialise option on the menu;
- 2)wait for it to finish;
- 3)switch the HX-20 off and then on again;
- 4)select the Monitor option on the menu;
- 5)type: SB4C <RETURN>
 The machine shows: SB4C 01
 type: 2 <RETURN>
 The machine shows: SB4C 01 2
 type: .(full stop) <RETURN>
- 6)switch the HX-20 off and then on again.

This prevents the problem.

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