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It operates at 4 million instructions per second.

It's the world's fastest microcomputer.

It has been voted the 1987 microcomputer of the year.*

**Archimedes**

Model shown here is the Archimedes 310 with colour monitor and includes Mouse.

- In addition to BBC Basic V, high level languages such as ‘C’ and ‘Pascal’ can be used for specialist applications fully exploiting the computer's outstanding power, graphics and speed.

- The huge potential of Archimedes doesn't stop there. The 310M with its built-in PC emulator can run Lotus 1-2-3®, DBASE III® MS-WORD® and other popular business programs available under MS-DOS®.

- With prices starting at £749 exc. VAT for the 305 with mono monitor and rising to £1035 exc. VAT for the 310M with colour monitor, the Archimedes 300 series represents unparalleled value for a computer system of such capability.

---

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**Atari in top gear at Motor Fair**

ATARI UK caused a big stir at the MotorFair in Olympia by setting up a computer games stand.

Centrepiece of the stand, which embarrassed show organisers admitted was the best visited in the whole exhibition, was a line of racing cars inside which youngsters could play Pole Position.

An Atari spokesman said, "We believe that many of the 300,000 people who go to the show are fathers with children under 10. We saw this as a perfect opportunity to introduce our games system to these youngsters, many of whom might never have seen them before.

"The organisers said we had one of the most exciting exhibits. It became virtually an entertainment area for the youngsters.

"We believe the introduction of the new games machine this Christmas has opened up a new market place to us. The youngsters of that market place certainly responded enthusiastically at this show," said the spokesman.

---

**£1.3 million deal brings big Email expansion**

A MASSIVE expansion of MicroLink, Britain's fastest-growing electronic mail service, is now being planned following the completion of a £1.3 million contract with Telecom Gold.

MicroLink - which has a section specifically for Atari users - was launched in April 1985 as a means of encouraging people to start exploring the exciting new world of electronic communications.

It became an instant success - and not only in Britain. Computer users in Europe, the Middle East and Australasia call the MicroLink service, which is housed on a Prime 750 computer in Telecom Gold's top security London headoffice.

As part of the new deal, the service is being transferred to a machine that is four times more powerful - the Prime 9595.

"The phenomenal development of MicroLink has meant that we have now outgrown the computer that has served us so well in the last two and half years", said MicroLink chairman Derek Meakin.

"The new machine will give us much greater flexibility. It will allow us to provide a much faster service, introduce a variable charging structure to meet the different needs of our users, and make possible the installation of many new and exciting facilities".

---

**Software developers rapped**

ATARI 8 bit micro users are being given a raw deal by some software developers according to Essex-based retailer Clive Pulman.

His firm, Trybridge, has sold computer software for more than four years and Pulman says he has had particular difficulty getting a regular supply of new titles for Atari 8 bit machines.

"The amount of new programs coming available is pathetic", said Pulman. "The machines have so much potential it is a pity that software houses are not picking up on them the way they should".

Pulman says that although Americans have about 2,000 Atari 8 bit programs to choose from, Britain is limited to "a few hundred - of which many are re-issues of old titles that don't fully utilise the machines' capabilities".

One major software house was quick to deny the situation is as grim as Pulman describes it. US Gold marketing and product manager Richard Tidsall told *Atari User*: "Currently we have 85 games available on licence from America, which isn't bad for just one publisher.

"American buyers may have a greater choice, but what is suitable for them may not be suitable for us".

But there is good news for users - Atari UK is back in the software market itself with Twilight Zone and has another 20 rom cartridge games due for release.

---

**Parallel interface for Ataris**

A LEADING supplier is aiming to make Atari 8 bit users fall in love with its new internal add-on. The Computer House Universal Parallel Interface Device, or Cupid, will cost £39.95 and could open up the 8 bit machine to the world.

A series of handlers will be produced by Computer House (01-731 1276) to enable the interface to work with modems, printers and Midi, using a standard 25-way D socket. With a rom support system, the interface will be fully programmable.

Cupid is just one of a number of products on the cards as Computer House steps up its support for the 8 bit range.

A Help menu will be on offer which allows the user to put all the instructions about a program in a form which can be pulled up by a single keystroke.

CH boss John May said the company was importing a growing selection of software from the US.

A 130XE high resolution designer is on the cards which will work very well with CH's Snapshot.

Also to be released is Word Magic, which John May describes as a word processor with built-in graphics. It will cost £17.99.
SOFTWARE EXPRESS Ltd.

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KNIGHT ORC.................................. DISK £14.95
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MOUNTAIN KING............................. CASS
MINEY MINEY MINE........................................ CART
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**Be a back seat driver**

BACK seat driving takes on a new dimension in Speed Run, one of a series of Christmas releases from Red Rat.

Unlike most racing games, the player’s point of view is behind an animated driver who turns corners and changes gear on command.

Red Rat (061-835 1085) says it is the most ambitious motor driving game ever written for an 8 bit machine.

The object is to complete the various stages of a motor rally in a Ford Sierra RS Cosworth with its five-speed gearbox.

The company also has two double packs ready for release.

In the first, Planet Attack is paired with Mad Jax.

The former is a multi-speed, 3D scrolling shoot em up in which the player must guide a craft on a mission to destroy a series of outposts guarded by vicious aliens.

Mad Jax gives a bird’s eye view of an armoured tank which must negotiate a desert road and a city, taking on all opponents along the way.

The second double pack features platform adventures Burglar Bill and Pot-hole Panic.

All Red Rat pre-Christmas releases are being sold at £7.95 on cassette and £9.95 on disc.

---

**Colour-coded discs**

A range of 5.25in coloured discs for Atari computers has been announced by Centec.

The discs, which come in five colours, have been produced as a result of customer demand for an easier way to identify their data discs from program or backup discs.

John Taylor, managing director of Centec (0689 35353), told Atari User: “Single colour discs have been causing problems for our customers. Now that they have a choice of colours it is possible for them to store data on red discs, backup discs on green and program discs on blue.

“With the addition of yellow and black it gives the customer greater flexibility in storage identification”.

---

**DTP PACKAGE**

A £20 desktop publishing package for Atari 8 bit machines is scheduled for release in the new year.

US software house XLent - now half-owned by Software Express (021-328 35565) - has put together on disc Typesetter and Rubber Stamp.

Typesetter helps with page layout, while Rubber Stamp is essentially a font designer.

---

**THE GALLUP CHART**

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<td>DECATHLON</td>
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<td>Firebird</td>
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<td>FEUD</td>
<td>1.99</td>
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<td>Mastertronic</td>
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<tr>
<td>180</td>
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<td>DIZZY DICE</td>
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<td>Players</td>
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<td>GAUNTLET</td>
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<td>US Gold</td>
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<td>MONKEY MAGIC</td>
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<td>Alternative</td>
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<td>ON CUE</td>
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<td>Mastertronic</td>
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<td>LEADERBOARD</td>
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<td>STORM</td>
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<td>Micro Value</td>
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<td>FOOTBALL MANAGER</td>
<td>1.99</td>
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<td>Addictive</td>
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<td>Domark</td>
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<td>3.99</td>
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<tr>
<td>Micro Value</td>
<td></td>
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Compiled by Gallup/Microscope

Decathlon retains the first position for another month, but there are eight new and re-entries in the chart. The highest entry is the new Monkey Magic from Alternative. Watch out for Micro Value’s two compilations which also enter the chart in time for Christmas.
Lost in your listings?

Colour your cursor with this superb utility from David Steele

The cursor is just like booting a game: Press Play, hold down Start and switch on. When you hear the beep, press Return, and after about 15 seconds the coloured cursor will appear. Remember to stop the cassette.

The cursor colour is initially set to orange/red, but you can alter this in either program by changing the 240 - line 1050 of Program I, line 1040 of Program II or any number from 1 to 255. Some of the colours available are given in the panel below. If you want to change the cursor colour once the program is loaded it is controlled by poking 705 with an even number from 0 to 254. For even better effects, try altering the text colours by poking 709 and 710.

If you wish to use the player-missile graphics in your program, switch off the coloured cursor and when you have finished with them enter POKE 54279,4:POKE 53277,3 before switching them back on.

The program itself occupies the lower half of this area of memory. The upper half is used as player 1 in double-line resolution mode. For machine code enthusiasts, Program III is the assembler source listing of the disc version. Program IV shows the changes necessary for cassette booting.

The program is protected against the Reset button and the Break key meaning that once installed the only way to totally disable it is to turn off the power off. If at any time you lose the colour of the cursor press Reset to bring it back.

The cursor can be affected by poking directly into the code that controls it. Some useful ones are given in the panel above.

---

**Listing 1: Program to create AUTORUN.SYS disc file.**

1 REM COLOURED CURSOR
2 REM BY GLOBAL COMPUTER SERVICES
3 REM (C)ATAR USER
4 REM DISC AUTOSET
5 GRAPHICS 10 OFFSET 9,11
6 "Setting up AUTORUN.SYS"
7 OPEN #1,8,8,8:"AUTORUN.SYS"
8 RESTORE 1000
9 READ 2:3,2:6 THEN 90
10 PUT #1,0,5070,50
11 CLOSE #1
12 POSITION 15,13 : ALL DONE :END
13 REM
14 DATA 255,255,0,6,127,6,125,125,255,125,255,255,0
15 DATA 12,141,22,6,165,15,141
16 DATA 25,5,169,21,153,12,169
17 DATA 6,153,15,76,24,6,32
18 DATA 8,0,159,4,141,7,212
19 DATA 169,3,141,29,208,169,248
20 DATA 141,95,2,173,36,2,141
21 DATA 126,6,175,37,2,141,127
22 DATA 6,159,2,160,6,168,68
23 DATA 76,92,226,216,169,8,168
24 DATA 153,126,6,208,16,258,173
25 DATA 248,2,208,30,169,4,141
26 DATA 67,5,169,4,208,191,2
27 DATA 240,6,166,87,208,34,240

---

**POKE COLOUR**

<table>
<thead>
<tr>
<th>POKE</th>
<th>COLOUR</th>
</tr>
</thead>
<tbody>
<tr>
<td>710,1</td>
<td>Black</td>
</tr>
<tr>
<td>710,54</td>
<td>Pink</td>
</tr>
<tr>
<td>710,64</td>
<td>Purple</td>
</tr>
<tr>
<td>710,94</td>
<td>White</td>
</tr>
<tr>
<td>710,164</td>
<td>Green</td>
</tr>
<tr>
<td>710,242</td>
<td>Red/Brown</td>
</tr>
</tbody>
</table>

Pokes to give different colour to the cursor
### Machine Code Breakdown

- **Program Breakdown**
  - **20-50**: Set up screen and open file
  - **60-70**: Copy program data to file
  - **80-90**: Close file, report done

### Utility

#### Pokes that affect the cursor

<table>
<thead>
<tr>
<th>POKE</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>752,1</td>
<td>Cursor off</td>
</tr>
<tr>
<td>752,0</td>
<td>Cursor on</td>
</tr>
<tr>
<td>53277,0</td>
<td>Remove colour</td>
</tr>
<tr>
<td>53277,3</td>
<td>Restore colour</td>
</tr>
</tbody>
</table>

### Listing III: Program to create AUTOBOOT cassette file

```basic
10 REM COLOURED CURSOR
11 REM BY GLOBAL COMPUTER SERVICES
12 REM 8510 USER
13 REM CASSETTE AUTOBOOT
20 GRAPHICS 8: POSITION 9,11
30 PRINT "Setting up CASESET boot"
40 OPEN #1, ,128: "C;"
50 RESTORE #0
60 KE<, DLE=2: KE> 2: THEN 80
70 PUT #1, 125: DLO 68
80 CLOSE #1
90 POSITION 15, 13: " ALL DONE!": END
```

### Listing III: MAC65 Source code

```basic
1.0; LISTING: SOURCE LISTING
20.0;
30.0: Coloured cursor for KLXE
40.0: DISK VERSION
50.0:
60.0: By David Steele
70.0: (c) ATARI USER
80.0:
90.0:
0100: This program will create a
0110: AUTOBOOT.SYS file on a Dos
0120: format disc.
0130:
0140:
0150:
0160: OPT NO LIST
0170:
0180: BEGIN
0190:
0200: ; This is a MAC65 source file
0210:
0220: DOSIN=83C
0230: ROWCRS=554
0240: COLORS=555
0250: WINDEX=557
0260: SWFLEG=578
```

#### Get it Right! II

- **10 CPT (9)** 100 CUS (9)
- **11 CTT (9)** 100 TTG (5)
- **12 CKI (9)** 100 CYW (3) 110 ENJ (3)
- **13 CKI (9)** 100 CYW (3) 110 ENJ (3)
- **20 ROX (6)** 100 F2R (K) 110 GUV (1)
- **20 ROX (6)** 100 F2R (K) 110 GUV (1)
- **30 4×K (2)** 100 R2S (P) 110 4GV (6)
- **30 4×K (2)** 100 R2S (P) 110 4GV (6)
- **40 5×5 (4)** 100 R3S (O) 110 5GC (2)
- **40 5×5 (4)** 100 R3S (O) 110 5GC (2)
- **50 TKW (7)** 100 FJO (3) 110 FGC (6)
- **50 TKW (7)** 100 FJO (3) 110 FGC (6)
- **60 FMK (2)** 100 HX (E) 110 THK (4)
- **60 FMK (2)** 100 HX (E) 110 THK (4)
- **70 4×4 (5)** 100 HMV (6) 100 4XP (6)
- **70 4×4 (5)** 100 HMV (6) 100 4XP (6)
- **80 LSV (4)** 100 GSF (7) 100 3 XP (6)
- **80 LSV (4)** 100 GSF (7) 100 3 XP (6)
- **90 SHD (8)** 100 FJ (9) 200 3 DP (4)
- **90 SHD (8)** 100 FJ (9) 200 3 DP (4)
- **2270**: 2280 VBBLD = 8024
- **2290**: SDMCTL = 8022
- **2300**: BDISR = 8028
- **2310**: PCORT = 8021
- **2320**: KUNADR = 8026
- **2330**: CRSIN = 8020
- **2340**: CRPST = 8081
- **2350**: GRACTL = 8010
- **2360**: PNMASE = 8047
- **2370**: SETBY = 845C
- **2380**:
- **2390**:
- **2400**:
- **2410**:
- **2420**:
- **2430**: PLAYER = 8660
- **2440**: *= 8660
- **2450**:
- **2460**:
- **2470**: Program runs here when loaded
- **2480**: START
- **2490**:
- **2510**: Intercept DIS init vector to 5200; re-enable cursor after reset

**Turn to Page 10**
Listing IV: Modifications to Listing III to create a cassette AUTOBOOT file.

010 ;LIST#4: PROGRAMS.LST
020 ;
030 ; Coloured cursor for XL/XE
040 ; CASSETTE VERSION
050 ;
052 ; THESE PROGRAM LINES REPLACE THE
054 ; CORRESPONDING LINES IN PROGRAM 2
055 ;
057 ; 0320 PACTL = 0320
059 ;
060 ; 0410 ;
061 ; 0420 ;
062 ; 0430 PLAYER = 08680
063 ; 0440 ;
064 ; 0450 = 08680
065 ; 0460 ;
066 ; 0470 LOAD
067 ; 0480 ;
068 ; 0490 ;Reader data for cassette boot
070 ; 0500 ;
0510 ; .BYTE 0 ; unused
0520 ; .BYTE 1 ; # records
0530 ; .WORD LOAD ; load addr
0540 ; .WORD INIT ; init addr
0550 ;
0560 ; Boot continuation
0570 ;
0580 LDA #3C ; stop motor
0590 STA PACTL ; boot OK
0600 RTS
0620 ;
0630 ;
0640 ;
0650 ;
0660 ;
0670 ;
0680 ; O.S. inits here after boot & on every Reset
0690 ;
0700 ;
0710 ;

1110 LDA #5E ; enable players
1120 STA SMCCTL ; in single res
1130 ;
1140 ;(any GR. alters SMCCTL so it
1150 ; is constantly restored here)
1160 ;
1170 LDA #4
1180 CMP DOTSCLR ;4/24
1190 BNE WINDOW ; text window ?
1200 ;
1210 LDX INDEX ; full screen but
1220 BNE VBI.OUT ; not GR.0 ?
1230 ;
1240 ; BEQ DRAW ; always branch
1250 ;
1260 WINDOW
1270 LDA #24
1280 ;
1290 ; LDX SWPFLG ; cursor in main
1300 ; BNE VBI.OUT ; GR. screen ?
1310 ;
1320 ; Cursor is in:
1330 ; main GR.0 screen (4< 4)
1340 ; text window (4<24)
1350 ;
1360 DRAW
1370 CLC
1380 ADC ROWR\$RS
1390 ASL A
1400 TAY
1410 TAY ; vertical pos
1420 ;
1430 LDX #3
1440 LDA #B3 ; cursor data
1450 ;
1460 DRAW.LOOP
1470 STA PLAYER+3,Y
1480 DEY
1490 DEY
1500 BPL DRAW.LOOP
1510 ;
1520 LDA COLR\$RS
1530 ASL A
1540 ASL A ; (CLC)
1550 ADC #46
1560 STA HPOS\$I ; horizontal pos
1570 ;
1580 VBI.OUT
1590 JMP C
1590 JMP @ ; exist to other
1600 ; VBlank stuff
1610 ;
1620 .IF $>PLAYER
1630 "ERROR 'Code hit Player'
1640 "ENDIF
1650 ;
1660 ;
1670 ;
1680 ;
1690 = RUNADR
1700 ;
1710 ;
1720 ; END

9
From Page 9
DEDICATED? So are we!

Don't get confused. PAGE 6 is a totally independent magazine for Atari users that will compliment and expand your Atari world.

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OVER the last year there has been an increase in the amount of budget software available for the Atari micros.

The popularity of these programs seems to have overshadowed the full capabilities of the micro, so it was with interest that I viewed Blazing Paddles.

This graphics package offers you more than 250 colours, a range of pre-drawn shapes stored on disc, three variations of text, four different input drawing devices and an icon-driven menu of commands.

You load the program with Basic switched off and the first thing to appear is the Drawing Device menu. This is where you choose your drawing tool – joystick, paddles, touch tablet or trackball.

I found the joystick easiest to use, as the scrolling and medium pace takes you around the screen comfortably, if a little jerkily.

The Touch Tablet requires a Koala Pad – I tried to use my Atari Touch Tablet but as I moved the stylus up, the crosshair cursor moved down. As a result I stuck with the joystick option.

Moving on to the drawing mode, the menu icons are placed across the screen at the top and bottom. This effectively leaves you with only half a screen for your drawing.

Blazing Paddles has the usual range of drawing commands – Clear screen, Text, Lines, Ovals, Solid box, Outline box, Dots, Spray can, Fill and Zoom. Attached to these are the pre-drawn shapes and window features.

The majority of commands are selected by placing the screen crosshair cursor on top of an icon and pressing the fire button. Some of the commands speak for themselves, but others will benefit from a brief explanation.

Window is a visual cut and paste routine. By dragging a dotted outline around a portion of the drawing you want to cut you can send it to a buffer.

This allows you to move a chosen segment around the screen by simply picking the spot and hitting the fire button.

Text can be selected in three sizes and each is double the height of the last, with the smallest similar to the standard Atari character set.

There are two additional styles – italic and bold. But only one style at a time can reside in memory.

Also on disc are three files containing various pre-drawn shapes. When first loaded the program defaults to a set of six shapes which includes buildings and vehicles.

These can be moved using the cursor, flipped from side to side and rotated in 60 degree increments before placing with the fire button. There is also a file of more than 30 musical symbols ready for pasting.

The Colour Selection menu displays 16 colours with up to 16 variations of shade in each. You choose a colour by selecting a playfield register – 0, 1, 2 or 3 – then you must decide on a main colour and finally on a shade. This procedure is a little time-consuming.

If you take advantage of the six pre-set pattern boxes found at the base of the colour palette screen you can also mix two colours for the patterns. These are a mixture of horizontal and vertical lines in a checkerboard design.

The Spray command produces a stippled effect using a defined colour – although there doesn’t seem any method of modifying the nozzle pattern.

A more useful method of drawing is provided by the seven different painting brushes, and a mixture of these can give a very nice effect to your picture.

The Fill option is linked to the colour spectrum and allows you to flood an area with a colour or pattern.

Zoom works by splitting the screen in two. The top half is a normal representation of the picture while the bottom shows an expanded view. You can then carry out...
Devilish fun

Program: Little Devil
Price: £9.95 (disc), £7.95 (cassette).
Supplier: Red Rat Software, 11-15 Fennel Street, Manchester M1 3DU.
Tel: 061-835 1055

THE Little Devil in question is trapped in the very bowels of Hades.

Now I had always thought that such a place would be the natural sort of habitat for devils of all sizes, but for some reason Old Nick's protege wants out.

To escape his eternal torment in this fiery furnace he must release the scores of lost and lonely souls suffering down below. Having done that he must rescue Linarta, the daughter of Earl Mordred.

If successful, he moves in to further realms, taking him nearer to the Castle Despair where the fair Linarta awaits rescue.

The diminutive demon materialises at the bottom corner of the screen and by jumping and dodging must collect the souls stuck in Limbo.

Out to prevent him are a collection of ghastly ghouls, ghosts and gremlins, which defend their domain with diabolic devotion.

He has the additional problem, of lack of time - strange considering he is stuck in eternity.

An indication of the time elapsed is shown on the souls of the unfortunates, counting down from seven to zero and he will be had pushed to clear a screen within one lifespan.

Lucifer's demons jealously guard the lost souls. Some home in on him, while others wander around at random or follow set paths. Also floating around is an energy pill which gives your Bouncing Beelzebub an extra life if you touch it. You are able to gain extra lives a number of times on each screen.

The power pill can occasionally disable the gremlins and ghosts, allowing them to be destroyed for a short period of time – in much the same way as in Pac Man.

The graphics are pleasantly drawn, movement is smooth and game play reasonably paced. The sound effects are adequate, which is more that I can say about the tune.

I quite enjoyed what I saw of Little Devil, although I only had a pre-release copy and only the first level was available for inspection. Even on that rather limited basis I am sure this game will appeal to platform addicts, although bearing the music in mind, perhaps with the proviso that they are tone deaf.

Niels Reynolds
King-sized

KNIGHT Orc is Level 9's latest release under the Rainbird label and is a major step forward in adventure sophistication.

The game is large - so much so that it is split into three separate parts. Because it is so big, there is no room left for graphics - for Atari 8 bit owners this version is text only.

In most adventure the role of the hero or heroine is normally taken over by the player. Not so in Knight Orc. True, you do play the main part, but in this case the star is an ill-smelling, cowardly Orc by the name of Grindelguts.

Orcs have been persecuted by adventurers for generations - is it possible that now you have a chance to get your own back?

The game starts in splendid style with you being challenged to a fight by a human knight. Only trouble is someone has tied you to your horse so you can't run away, much as you'd like to.

Apparently your erstwhile Orc chums did this to you while you were intoxicated, volunteering you as their champion while you snoozed on.

Because you're yellow-streaked, somewhat repellant streak of Orcinancy, you'll be spending much of your time running away from potential duffings-up. It seems at times as if the entire population has got a personal grudge against you.

And that's possibly one of the drawbacks with the game. Although a generous helping of personalities is to be desired in an adventure, there are so many characters in Knight Orc (over 70, I believe) that at times you become a little bewildered by all the to-ing and fro-ing, fighting and fleeing.

The huge cast list includes such notables as Rapunzel, the Green Knight, the Annihilator, Brunhilde, Green Sleeves, Jabberwock, Kris the Ant Warrior, Mrs Wallop, Synonym the Wizard and Professor Nutter. Not to be taken too seriously, you see.

Another unusual feature is that no mapping is required. You need simply state where you want to go (major locations are mentioned in the text), and the program will take you step by step along the appropriate route. Go, run and find are the main commands for movement - you can also use them to locate objects which you have previously seen or mislaid.

Characters can be talked to, commanded, followed and even ambushed - the powerful parser allows you to carry out such interesting actions as "Wait for the innkeeper and attack him".

Simultaneous action is possible. For example, you can instruct a character to go off and find something. At the same time as that person is carrying out your instructions, you can continue with your own business.

Magic is also at work in Knight Orc. There are 21 spells to find and learn, and they can be used in unexpected ways. In addition, all is not as it first seems in this game.

Although the plot casts you in the role of an oppressed Orc whose prime objective in Part I is to stay alive long enough to collect enough lengths of rope to cross a bridge into Part II, once there, the notion may slowly dawn on you that something very strange is going on.

There's a neat twist to this adventure, but you'll have to discover it for yourself.

As well as a large cast list, Knight Orc has a vast number of locations. Many are fairly predictable (a wide range of similar arboreal spots in Part I, for example).

In this respect, the game could have done with a bit of tightening up. Given the quantity of characters and locations, the nature of your initial task, and the arbitrary nature of the characters' appearances, Knight Orc has a somewhat unstructured and sprawling feel to it at the beginning. However, perseverance pays off - Parts II and III are better in this respect.

As well as detailed and stimulating text, a powerful parser and a massive vocabulary, the game also has the usual save and re-store features including ram save and restore.

Knight Orc has its flaws, the too-large cast list and the too frequent random appearances of the characters being chief among them.

But having said that, the adventure has a lot to offer and is certainly one of the most sophisticated around.

On strict value for money terms, you get a great deal of high quality material, entertainment and play for your cash.

Knight Orc can be a little frustrating and unsatisfying in its early stages but the game is so big and complex that if you persevere, you'll be well pleased with this addition to your adventure collection.

Bob Chappell

COMING SOON...

To further augment your adventure library you should be on the look out for two new titles from Rainbird. They are offering the more adventurous of you Time and Magik, and Jinxter.

Time and Magik is from the Level 9 team of Mike and Pete Austin. Indeed Level 9's heroine, Ingrid Bottomlow, will be making her adventuring debut any day now in her first role as the Gnome Ranger.

Plundered Hearts, and Nord and Bert Couldn't Make Head Nor Tail Of It, the two new Infocom titles, are also on the edge of release. Ruoloc is looking into them.

Bob Chappell

Presentation ................. 8
Atmosphere ................. 7
Puzzlement ................. 8
Value for money .............. 8
Overall ...................... 8
No jump for joy

Program: Leapster
Price: £9.95 (disc) £7.95 (cassette)
Supplier: Red Rat Software, 11-15 Fennell Street, Manchester M4 3DU
Tel: 061-836 1055

I had high hopes for Leapster as it loaded. The introductory screen was rather attractive and a nicely harmonised little tune was playing at a fair lick. I pressed fire to start as instructed. I was greeted by a street scene, a little naive in its rendition perhaps, but inoffensive enough. The jaunty tune had slowed to a turgid drone, and this was to get progressively more annoying as the game wore on. Jimmy the Leapster was standing in the middle of the road on his way to school. Someone's mum hadn't taught him the Highway Code that's for sure.

He is apparently on his way to school to free his headmaster.

Anyway there he is, under your control, looking like some demented leprechaun, bowling down the street heading towards on-rushing motor cars.

Looking at the houses you see various objects shown fleetingly at one of the four windows in which they may appear.

Jimmy must jump on to the cars, riding them until next to a window with something in it, and then leap at it to grab the object and be awarded points.

He needs to collect objects to progress to the next level.

As you have probably guessed, the level after the High Street is the Nuclear Missile Site - most kids stroll through one on their way to school don't they?

After the missile site there is the Haunted Cemetery and then the school itself.

The pace is on the slow side and once the leaping on to car bonnet stunt is mastered there is little to offer a challenge.

I am afraid that I found the story line a little disjointed, but maybe Red Rat will alter this in the production copy. The company has tried to make a dull game more interesting by including supposedly exciting locations but I'm sorry to say that it doesn't work, and I was left with the feeling that here was a game merely bashed out in time for Christmas.

Red Rat is capable of producing better than this.

Niels Reynolds

Don't nod off...

Program: Nightmares
Price: £9.95 (disc) £7.95 (cassette)
Supplier: Red Rat Software, 11-15 Fennell Street, Manchester M4 3DU
Tel: 061-836 1055

Yawn, it was two in the morning and I was feeling pretty drowsy. The disc drive whirred quietly and my eyes blurred. I'm not entirely sure what happened next, but it was pretty weird.

I looked at my TV screen and there I was, posing like some errant fairy godmother, with a lovely pair of golden wings flapping behind me.

Then things started happening. Blue Airflits started buzzing round me like wasps around a jam pot, sapping my energy as they touched.

Fortunately my magic wand was loaded and I opened fire to try to persuade them to buzz off - but they kept on coming.

Things were to improve however, as I slowly became accustomed to my surroundings. Somewhere deep in my subconscious I had the feeling that I must collect five little pink fairies and then go into the next level of this strange experience.

Unaccustomed as I am to going round picking up fairies, I nonetheless steeled myself and set off on my quest - although quite what the ultimate aim of it was I still didn't know.

Suddenly out of the ground emerged two Grunts. They were ugly beasts, looking like giant eggs on legs.

These monsters spat globs of energy suckling venom at me and, to make matters worse, they were totally unaffected by my puny magic wand bolts.

Luckily I had noticed that every now and then the wand would shoot out a bomb which really cracked them up, so some defence was at least possible.

This particular task was made more difficult by the fact that the Grunts would usually survive a direct hit. This was partly compensated by their falling to bombs dropping a short way ahead of them.

Having picked up the fairies and despatched sufficient Airflits and Grunts, I bolted for the doorway to the next level. Here I was confronted by enormous red dragons and long-nosed flying sea horses which needed repeated shooting in order to kill them.

The Grunts or the dragons would get me more often than not, but I kept coming back for another go.

I woke up with a start. In front of me lay a pre-release copy of Nightmares, a new title from Red Rat.

It was four in the morning and I was feeling pretty drowsy. The disc drive whirred quietly and my eyes blurred...

Paul Mills
JOYSTICKS can cause endless problems — they don’t move quickly enough and they also wear out rapidly. Star-Trak is a small hand-held pad which puts all possible stick-position and firebutton combinations to individual keys to overcome these problems. So, for example, you can select “up-left” or “up-left-plus-fire” with a single touch.

It’s not the first keypad to hit the market, and some of the others have left a lot to be desired, so I was initially sceptical about testing this one. However, after playing with it for an hour or two, I found myself getting hooked, and wondering why no-one has marketed anything quite like this before.

The first thing you notice is that the pad is easy and comfortable to use. It is usually suitable for left or right-handed players, and the buttons have a crisp, positive feel to them.

I expected that it would take an hour or two to get used to the key layout, but in fact I was blasting away at full speed after only about 15 minutes — which was when I noticed how much it reduces wear and tear on the wrist and trigger finger.

The next thing that hits you is the pad’s responsiveness. You know how tricky it can be to get Bounty Bob into precisely the right position before he jumps? Well it’s a dodgle with this controller — you can move him a couple of millimetres at a time, simply by touching the key briefly. Far more accurate and sensitive than a joystick.

The pad also eliminates a major bane of the arcade-game-player’s life: Unreliable diagonal movement. Conventional sticks are prone to this problem, because they contain only four switches: Up, down, left and right.

To get diagonal movement, two adjacent switches must be levered down simultaneously, and if you get the stick position slightly wrong, only one of the two gets pressed. The result is horizontal or vertical rather than diagonal movement — very frustrating on games which give you limited space to manoeuvre.

With the Star-Trak pad this can’t happen, since there is only one key to press for diagonal movement. An electronic decoder generates the correct signal, so you can’t get it wrong.

Another useful feature is a central extra fire button which has three functions controlled by a slide switch. With this switch set to normal, a single touch on the central button produces a single shot which will always deliver, no matter how briefly you press the button.

Set the switch to Auto, and you get conventional auto-fire which blasts away without your touching any key.

But there’s also a centre position which gives you Burst action — press the button and you get auto fire, release it and firing stops.

Where this controller really scores, though, is on the latest generation of sports simulations — Karate and Olympics clones — which rapidly hammer joysticks to death and require complex position and/or fire button combinations.

It has now been extensively consumer tested — by me, my wife, two children and the cat — and, with one furry exception, all participants managed to beat their previous high scores on several arcade games, so we’re very happy with it.

The controller isn’t perfect for every program, though. Conventional joysticks give a more authentic feel on flight and driving simulations, and one or two games involve rotating the joystick rapidly around its eight positions, which is very tricky to do with Star-Trak.

It’s worth hanging on to your old joystick for games like these, but for many others, especially the latest generation, the new pad appears to have a definite edge. There are also two other things worth mentioning.

First, it comes complete with a three-metre lead which plugs into the pad rather than being wired permanently in place. You can use this lead with conventional joysticks, or paddles, or anything else that plugs into a joystick port — including Len Golding’s gadgets. Nice bonus, that.

Second, the pad is made entirely in this country, and it is evident from the design and construction — yes, I took the back off — that it is built to last.

The switches are all genuine keyboard “click” types — not a rubber membrane in sight — and the rest of the mechanism is solid-state, so there’s very little to go wrong. In fact, the manufacturers guarantee it for 12 months, which is a good measure of their confidence.

All this makes the price tag of £18.85 look quite reasonable — if it outlasts two joysticks, you’ve made a profit! And I can see these controllers turning up in a great many Christmas stockings this year.

**Product:** Star-Trak  
**Price:** £18.85  
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ATU12
SNOWBALL

Here is a fascinating puzzle game where you take the part of Snowy, a small white snowball trapped inside an ice maze. You want to get outside to play in the snow, but to do this you must solve the secrets of the maze as you look for the solitary secret exit.

To move Snowy you can either use a joystick plugged into port one, or the keyboard. The keys to use are Y for up, B for down, G left and H right. If you get stuck at anytime during the game press the spacebar to melt Snowy and start again.

As you roll around the maze you will notice that Santa has dropped some of his presents and you can pick them up. Each will allow you to traverse a different segment of the maze and may help or hinder you—but this is for you to figure out.

While you're empty-handed you leave a trail of snow behind you and this freezes creating an invisible barrier. Once you've picked up a present the trail becomes coloured.

Santa has also left these clues:

- Do you need all my presents?
- Think where you want to go.
- Some ice is melting.
- What colours are my presents?
- Merry Christmas!

When you type in the program be sure to use Get It Right III to ensure that you have entered it correctly.

And don't forget to save a copy before you run it as the program uses DILIs which may crash the computer if you make an error.

By MATTHEW BERNSTEIN and CASPIAN PRINCE

Turn to Page 21
Mini Office II

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AT12
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ALAN GOLDSBRO expands his
Atari’s DTP capabilities with
The Print Shop Companion

DESKTOP Publishing is all the rage
now, but for many users it was the 8
bit Atari and Print Shop which gave
them an insight into this field. Print
Shop from Broderbund was made
available late 1985 and ever since
then it’s been the only usable Atari 8
bit program within the desktop
publishing format.

Not to be outdone by its 16 bit cousins
where this type of program is very
popular, Broderbund has released The
Print Shop Companion as the perfect
partner for The Print Shop.

Like the Print Shop, the Companion
is easy to use, proof and a whole
lot of fun. It expands the capabilities
of Print Shop and adds a series of
Editors, new Fonts, Borders and Icons.
Even though you can use the
Companion as a standalone program,
to get the most from it you’ll need to
have The Print Shop.

To achieve true compatibility, the
original Print Shop disc has to be
modified by the Companion – this
means updating selective files so it
can recognise borders and fonts from
the Companion, and the Companion
copies the set up information from the
Print Shop disc to the Companion disc.

Once this has been achieved the
original blue background colour of
the Print Shop should turn to black.
The Print Shop Companion is as
easy to use as the original Print Shop
and follows the same menu driven
system. Working from the menu, the
first option is the Graphic Editor.
This has all the commands of the
original editor – with one exception:
The wraparound cursor.

The extra commands available
make up for this though – four mirror
modes, text, and numbers, insert/
delete row/column, flip horizontal or
vertical, negative (black) or positive
(normal) line commands, rays, boxes
and ovals. There is even a locking
mode for drawing, plus 17 fill patterns,
a flood fill and a very welcome undo
key.

The best feature has to be the Superimpose key. Icons can be placed side
by side or top to bottom on the one
screen, then saved to disc as a
complete icon – marvellous!

The best way to visualise this is
when working with the date
format. There are 20 number
graphics, 0 – 9 in both left and right positions
and the four date endings – st, nd, rd
and th. All can be superimposed and
making a date such as 20th has never
been so easy.

There are 50 new border selections
to choose from on the Print Shop
Companion disc and if you ever get
tired of them you can always create
your own with the Border editor.

The editing area consists of three
eight-bit boxes, representing the four
corners, top and bottom, and the sides
respectively. There are x and y coordi-
nations to help you in placing the
pixels in the grid. As you draw, the
border is displayed as a whole unit
which gives you an overall view of
how the completed unit will look.

You can copy any of the edit boxes
to another one, but unfortunately this
does not let you retrieve graphic icons
and place them in the edit boxes.

There are a number of commands
available such as Get, Save, Print,
Clear and Lock – these are standard
features right the way through the
Companion disc. Of the other com-
mands, flip horizontal, vertical, or
delete are as you would expect, and
the bottom and right sections of the
border can be flipped to make a mirror
image of the top and left sides of the
border respectively.

The Companion’s Font Editor lets
you add your own personalised fonts,
either by editing any of the 20 fonts
from Print Shop and Companion or by
designing your own. The creation of
fonts is a complicated and time con-
suming process which can really test
your dedication to computing!

If you wish to edit a font, say to add
a £ sign – because its an American

December 1987 Atari User 23
program there’s only the $ — or perhaps a series of graphical characters instead of text, that lead up an existing font and edit away.

To create an entirely new font takes considerable patience and an understanding of how text is created in the first place — the best way is to use the built-in reference fonts.

This comes in three sizes: Small, medium or large. The larger the font, the greater the memory used — a small font takes up about 27 per cent while a large font can use up to 90 per cent of file memory.

Designing or creating fonts is difficult, but there are plenty of commands available to assist you. Should you begin to master the font editor there is even a command to flip the font backwards.

The Tile magic feature provides an array of 11 moving patterns very similar to the kaleidoscopes in the original Print Shop. Unlike the kaleidoscopes though, these can be saved to disc or passed directly to the Graphic Editor+ where you can add your own touches. The tiles can be used to enhance backgrounds by “flooding” them together before superimposing text on your card and poster layouts.

In similarity, Creature Magic allows you to create original graphics by mixing and matching body parts. There are 1000 possible combinations which can be saved to disc and, like the tile magic, passed instantly to the Graphic Editor+ for personalised touches.

Print Shop Companion has an excellent calendar facility, creating either weekly or monthly calendars with Print Shop graphics and choice of fonts. The calendar has a date range from 1753 to 9999. Graphics can be positioned across the top of the page in two sizes. Text choices are from standard or outlined and 3D and can be placed in each day to highlight important events, up to a 120 characters for each day in the weekly versions and 112 characters for the monthly one.

Finally, not only can your designs be printed out but they can also be saved to disc and edited as and when required.

There are a couple of mini-features to Print Shop Companion which don’t really fit a specific category. For example there are 20 bonus graphics from Broderbund software characters, and you have the opportunity to leave Print Shop Companion and load up the Print Shop disc without rebooting.

Using Print Shop is tremendous fun and with the addition of Print Shop Companion, Broderbund has made an excellent package for the Atari 8-bit market. I feel the Tile magic and Creature magic are mainly for the kids — certainly they won’t get used much by me — but on the other hand the calendar is brilliant, the Graphic Editor+ a wonderful improvement on the original and the border and font editors extremely welcome.

If you’ve already got Print Shop then buying the companion will be money well spent. If you are without, then there’s a whole lot of exciting projects out there just waiting for you to try. Your printer will never forgive you for missing it!

Product: The Print Shop Companion
Supplier: Broderbund
Units 2/3 Holbard Way, Holbard, Birmingham, B6 7AX
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Price: £29.95

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LAST month we looked at USR in its simplest form: \( X = \text{USR}(\text{ADDRESS}) \). But you have probably come across listings which contain far more complex statements such as: \( X = \text{USR}(160, A, B, C) \). Let's look at how extra numbers and variables like these can be used in your own programs.

No matter how many things there are in the brackets, the first one is always the address of your machine code routine. It can be a real number, a variable name or an expression - such as \( \text{ADDR}(X) \) or \( 256 \times \text{PEEK}(106) \) - so long as its value is equal to the exact start address of your routine. All the other values in the brackets are called parameters of arguments.

As far as USR is concerned, they are just ordinary numbers, not addresses or machine code instructions or anything else complicated. You can have up to 127 different parameters and each one can be a real number, a variable name or an expression, so long as its value does not exceed 65535.

The USR function automatically stores these parameters in a form that can easily be retrieved by your machine code routine. So you can use Basic to do calculations which machine code finds difficult - complex arithmetic, for example - then transmit the result to your machine code routine for action.

This simplifies the machine code programming enormously, so it's a worthwhile technique to master. Here's how it works.

The 6502 processor uses a special memory area known as the Stack - think of it as a long, vertical tube, closed at the bottom end. Data can be pushed into it or pulled out of it byte at a time, but you have access only to the top of the stack. If you want to retrieve, say, the third byte down, you would first have to remove the top two bytes.

Now the first thing USR does is to note its current position in the Basic program, so that it can return later, and pushes this two-byte address onto the stack, low byte first.

Next it takes the parameters in turn, reading from right to left, and converts each into a two-byte integer. The parameter divided by 256 gives the high byte, and the whole-number part of whatever remains is the low byte.

It pushes each of these two-byte values on to the stack, low byte first.

```
10 FOR X=0 TO 6:READ D:POKE 1536+X,X:GOTO 10
20 DATA 1,2,3,4,5,6
30 C=BYTE desired screen colour, 0 to 255
40 X=USR(1536,C)
```

The screen change to any colour you want.

Program II shows the new routine, and Program III the Basic translation.

The routine is called using \( X = \text{USR}(1536,C) \), where \( C \) is a number from 0 to 255 which will control the screen colour. On execution of this statement, the stack will start off looking like this:

```
Top of Stack
1 C Hi high byte of 'colour' parameter (must \( = \) 0)
2 C Lo low byte of 'colour' parameter (0 to 255)
3 R Hi high byte of return address
4 R Lo low byte of return address
```

It is vital to remember that every parameter pushes two bytes on to the stack, even if it's only a one-byte number (less than 255), and that the number of parameters is pushed on to the top of the stack even if that number is zero.

The machine code in program I starts with three PLA instructions. Each of these removes one byte from the stack.

```
0170 LDA 60 @START/256
0175 EOR 00
0179 STA BTM
017D STA BTM+1
0181 LDA 60
0185 STA 60
0189 LDA 60
018D STA 60
0191 LDA 60
0195 STA 60
0199 LDA 60
019D STA 60
019F LDA 60
01A3 STA 60
01A7 STA 60
01AB STA 60
01AD STA 60
01AF STA 60
01B1 STA 60
01B5 STA 60
01B9 STA 60
01BD STA 60
01BF STA 60
01C3 STA 60
01C7 STA 60
01CD STA 60
01CE STA 60
```

Program I: Modified screen colour change routine

Program III: Modified flashing cursor routine

Turn to Page 27
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the top of the stack and puts it into the 6502 Accumulator. Line 20 removes the number of parameters byte, which is of no interest to us so we don't do anything with it.

Line 30 takes out the high byte of our parameter, which in this particular case must be 0, since you can't store more than 255 in a colour register. So, again, it is discarded.

The final PLA retrieves the parameter's low byte, which is the true value of C, and line 50 stores it into colour register 2. The RTS instruction at line 60 pulls the two remaining bytes off the stack, converts them into a two-byte address, and terminates the USR routine by jumping to that address in ram.

All being well, this will restore control to your Basic program at the statement immediately following the USR call.

Everything above the return address must be removed from the stack before the final RTS is executed, otherwise the computer will wander off into never-never land and your program will crash.

That's why every USR routine must contain at least one PLA instruction - to remove the number of parameters byte - even if there are no parameters.

Programs IV and VI are a bit more interesting: They are based on last month's flashing cursor routine. By using parameters you can gain control over the flash rate, and switch the routine on or off at will.

The variable SWITCH turns the routine off if it's zero or on if it's non-zero, while RATE controls the flash frequency. Neither parameter may exceed 255, so at the start of this routine the stack will look like this:

```
2 Number of parameters
SWITCH Hi High byte of SWITCH (must=0)
SWITCH Lo Low byte of SWITCH
RATE Hi High byte of RATE (must=0)
RATE Lo Low byte of RATE
R Hi High byte of return address
R Lo Low byte of return address
```

Notice in Program III how the parameters are pulled off the stack in turn, and used by the machine code routine.

Programs V and VI contain a simple routine for wiping a specified area of ram - useful when you're setting up player/missile graphics or page flipping. The example given clears four pages (1024 bytes) of ram starting at address 20000, but you can change store it on disc or cassette in assembled form - this is the object code file. There's a bug in the Atari's Assembler Editor cartridge which makes it difficult to assemble a program directly to cassette, so assemble it to ram first, then use SAVE #C: to make the cassette file.

Disc systems don't have this problem: you can use ASM,+#D:filename to create the object file in a single operation. Now go back into Basic, run

```
10 FOR X=0 TO 46:READ B:POKE 15365+X,B:NEXT X
20 DATA 104,104,104,143,67,6,104,104,1
31,48,159,21,141,48,179,141,41
40 DATA 173,67,6,200,6,169,2,141,263
50 DATA 9,173,243,273,2,141,243,2
60 DATA 173,67,6,21,141,262,2,96
80 SWITCH=1:REM Set flash routine ON
08 USR (0)=0
10 RATE=5:REM Set flash frequency (0 to 255)
70 X=USR(1536,SWITCH,RATE)
```

```
Program IV: Basic loader for Program III

the parameters to suit yourself.

In this example the parameter values exceed 255, so both bytes of the integer are relevant. If you can work out how the stack operates in this routine you've mastered the technique of parameter passing.

Having come this far, you will now want to write routines of your own, and this involves translating machine language source code into Basic DATA statements.

Doing this by hand is tedious and error-prone so, as promised last month, Program VII is designed to do all the hard work for you.

First write your source code and check that it assembles correctly. Next

```
10 :CALL by X=USR(1536,A,M)
20 START=55B
30 *$6D28
40 PLA
50 STA STA+1
60 STA STA
70 PLA
80 STA STA
90 PLA
100 STA SIZE+1
110 PLA
120 STA SIZE
130 LDA #0
140 TAY
150 LDS SIZE+1
160 DEY
170 INC
180 DEY
190 STA (STA),Y
200 BNE LOOP
210 INC STA+1
220 EXX
230 BNE LOOP
240 REMAIN
250 LDB SIZE
260 BNE LOOP
270 EXX
280 RTS
300 SIZE ***+2
```

```
Program V: Erase N bytes of ram, starting at address A
```

```
18 FOR X TO 40:READ B:POKE 20000+X,B:NEXT X
20 DATA 104,104,104,104,104,135,206,104,135,203,10
31,48,159,21,141,48,179,141,41
40 DATA 173,67,6,200,6,169,2,141,263
50 DATA 9,173,243,273,2,141,243,2
60 DATA 173,67,6,21,141,262,2,96
80 START=10000:REM Start of area to be wiped
100 BYTES=1024:REM Number of bytes to be
110 CLEAR
70 X=USR(1536,START,BYTES)
```

```
Program VI: Basic loader for Program V
```

Program VII and follow the instructions as they appear on the screen. Your source code will be turned into DATA statements, complete with line numbers, which you then store in LISTed form so that they can be merged into any Basic program.

Now you have mastered USR, a whole new programming world is waiting. You can use system timers, write vertical blank interrupt routines, experiment with fine scrolling, customise parts of the operating system, talk directly to CIO, produce fast player/missile graphics and much, much more.

In fact you've taken the first step on the road to becoming a fully fledged machine code programmer.

```
31599 REM PROGRAM 16: Converts object
4 code files into DATA statements.
32000 DIM A(1),B(1),C(1),D(1),E(1)
32010 P ON (0):R=0(1):I=0(2)
32020 IF AS=C THEN BS=C:CS=C:case
32030 tee:'9=object file'5GOTO 52870
32040 5250 IF AS=C THEN BS=C:CS=C:case
32050 5260 IF AS=C THEN BS=C:CS=C:case
32060 5270 BST TO 5280
32070 5280 INPUT BS:BS:LEN(BS)+1)=BS
32070 5290 IF 'Insert 'CS', containing "
32080 52A0 "press START"!
```

```
Program VII: Convert code into DATA
```

Turn to Page 28 ➤
From Page 27

32800 GSOSUB 32479
32890 OPEN #1,4,8,256
32900 GET #1,4,GET #1,X
32910 GET #1,4,GET #1,Y
32920 START=2+X*256+Y*256
32925 IF #1,4,GET #4,Y
32930 IF #1,4,GET #1,Y
32940 START=PEEK(186)-32: POKE 106,STAR
T:G,1,B=8
32950 : CHRS(125):"""START ADDRESS:"" +=1
32960 : TRAP 32198:ADD
32970 : GET #1,A:POKE START+A,A
32980 : X=X+1:GOTO 32170
32990 : CLOSE #1
33000 TRAP 32200:POKE 752,12:U=""""NUMB
BER OF BYTES = """";FINISH=START+X-1
33100 : POSITION 2,14:""""Press START to con-
vert code into"
33200 : DATA statements for use by Ba
sic"
33230 GSOSUB 32479
33240 TRAP 32240:CHR$(125)
33250 : "At what line number do you wa
nt this:"" DATA statements to start.
33260 INPUT LINE:START=LINE:CHR$(12
5)
33270 BYTE=0
33280 : ? ; "LINE: DATA ";
33290 : PEEK(START+BYTE)","/
33300 BYTE+BYTE+1
33310 IF START+BYTE>FINISH THEN GSOSUB
33320 32490:GOTO 32350
33330 IF BYTE/16:IN#BYTE,BR THEN GOSUS
UB 32490:LINE=LINE+10: ? ;GOTO 32280
33340 IF BYTE/20:IN#BYTE/20 THEN 7;c
HRS(126):LINE=LINE+10:GOTO 32280
33350 GSOSUB 32290
33360 : "Data encoding finished at lin
e ";LINE
33370 IF A=$D THEN BS=D:DATAFILE.TM
33380 : ? ; "1. Insert new "";S;" if ne-
necessary"
33390 : ? ; "2. Press RETURN to cre-
ate the DATA file"
33400 : ? ; "Data statements recorded i
n this way"
33410 : "may then be merged with any o
ther"
33420 : "program, using the command:"
33430 : "ENTER";CHR$(34);CHR$(34)
33440 POKE 1520,POSITION 2,20
33450 : LIST "CHR$(34);CHR$(34);CHR$(34),""
33460 : "LIST":LINE=POSITION 2,10
33470 TRAP 32460
33480 END
33490 CHR$(125):""""ERROR:"" PEERK(193)
33500 GOTO 32370
33510 IF PEERK(3279)=6 THEN 32470
33520 RETURN
33530 CHR$(125):""""CONT:"""" POSITION 2,
D:POKE 48213:STOP
33550 POKE 842,32:CHR$(125):RETURN

Get it right! II

31999 ESN (L) 32250 NMF (S)
32000 NNP (N) 32260 NAV (W)
32010 NNP (N) 32270 NLP (A)
32020 655 (V) 32280 NHP (A)
32030 4W (W) 32290 NCV (B)
32040 UCS (S) 32300 WDF (S)
32050 XUV (L) 32310 HK2 (S)
32060 RBD (S) 32320 CDS (M)
32070 RLG (A) 32330 352 (E)
32080 NUF (C) 32340 354 (C)
32090 SMK (L) 32350 VDR (L)
32100 4WR (T) 32360 2PB (G)
32110 XXR (B) 32370 4SL (E)
32120 3ON (N) 32380 YTV (W)
32130 5ON (G) 32390 DNA (S)
32140 AY (S) 32400 YSN (N)
32150 MWK (M) 32410 DY (V)
32160 5TF (M) 32420 R16 (L)
32170 MCG (S) 32430 7ST (G)
32180 SEC (U) 32440 UTO (G)
32190 VTX (S) 32450 HFT (S)
32200 5SL (B) 32460 WFR (G)
32210 RSH (S) 32470 3HT (C)
32220 EUL (C) 32480 YHS (S)
32230 WFT (C) 32490 8PB (S)
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TO complete the game you must first go to the herb garden and try to collect as many herbs as you can before the gardener comes after you. Then leave as fast as you can because your brother soon follows.
Now go to the cauldron and mix the spells that are complete so you can use them against your brother. — William Gladwin, Doncaster, South Yorks.

**Jet Boot Jack**

WHILE playing this superb game from the English Software Company, if you are going across the slides and up the lifts push your joystick up then they will move faster. Also play on the practice game as no monsters will appear to get in your way and annoy you. — Christopher Hussey, High Wycombe, Bucks.

**Astromeda**

THERE is an undocumented feature of the game. If you stop your craft on top of the flashing area then your fuel will increase. — Kevin Campbell, West Lothian.

**Atari Tennis**

WHEN you are serving from the top of the screen in the one-player game, always serve using a forehand as the opponent will have no chance of returning it. — Dinesh Bhudia, Harlesden, London.

**Alternate Reality**

THERE are two healers and they work on alternate hours so, if a healer is out when you arrive, wait until the next hour and try again. It isn’t worth fighting the brown mould as it only usually leaves you with a disease.

There is nothing special about the clubs that you join, except that their prices are sky high. The small green dragons and wraiths can be tricked, so you don’t need to fight them.

After using the heater his prices will increase, so exit and walk back in again. — Granville Danby, Leeds.

**Pole Position**

WHEN you start, keep the pause button pressed and this way your finishing time will be around 45 seconds. — Nicholas Atkins, Birstall, Leicester.

**Scrolls of Abaddon**

PLUG a joystick into port two, type PFW and after the game has started you can then move the creatures. To change men press fire — David Baxter, Franny, Runcorn.

**Los Angeles Swat**

ONCE you have fought your way to the crossroads you must fight off about four squads of men. When the boss and the hostage appear, let them move on to the road. When they are coming from the right, just before the boss gets into your line of fire, shoot and if you time it right and are very accurate, with luck you will kill him and miss the hostage. — Nigel Bowley, Hockley, Essex.

**Krazy Kopter**

HOVER above the platform on the right hand side of the screen. This will protect you from being shot by the boat below. If you are very accurate with your bombs you can get extra points by hitting the missile when it appears. — Nigel Bowley, Hockley, Essex.

**Mercenary 2 — The Second City**

HERE is a tip for getting into the programmer’s special cheat rooms. When you start, board the Dominion Dart and fly to a height of over 350 metres then level out. Press 9 and then keep pressed until you reach a speed of around 1781 kph.

Fire a bullet and as you fly close to it pick it up by pressing T. Then fly back to location 08-08 and pick up the object that you started the game inside.

At this point fly to any elevator — the one at location 08-01 is probably the easiest one to get to.

Go underground and walk to the triangular door. You don’t get the usual “locked” reply, and you can walk straight in.

You now have the key to every door and you can get into any hanger, out of prison and amass millions of credits easily. It will also be easy to find the Novadrive and the intergalactic starship and escape.

Final quick tip: In one of the complexes out in the wasteland is a room that is bright white inside. If you walk around the room and along the walls, after a while you will find the bar chart from the exchequer. — Paul Mylet, Woking, Surrey.
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IN nice time for Christmas, here’s something new from Atari – the XE Games System. With its low price, it will be at the top of lots of present lists, so let’s take a look at how it performs.

This month we’ll assess the new hardware, next month we’ll delve deeper and reveal how it compares with the rest of the 8 bit range. The first thing that hit me was the machine’s new external design. Atari has put a lot of thought into this and it has paid off. The XE is very pleasing to the eye.

Although there has been little change in the technical specification, both the overall design of the main board and the layout have changed. Atari is selling the XE games console in several forms (see panel on facing page). The three systems range from one that is only suitable for games up to one that can be used for any micro application and will even suit serious programmers.

We’ll take a look at the individual components so you can best choose which system is for you:

**The Game console**

This is the heart of the system, and a rectangular case houses what I class as the best 8 bit technology on the market. There is a serial port on the rear, two joystick ports, and sockets for cartridge, keyboard and mains. The DIN audio/video output socket found on earlier machines is replaced by two phono sockets.

The parallel bus that featured on all XL micros has gone, and so has the expansion bus that appeared on the 130XE. The cartridge socket, power switch, Option, Start and Select switches are located on the top of the casing making them easy to access.

The switches are coloured in pastel shades and add to the micro’s overall looks.

There’s an extra bonus built into the console in the form of the old Atari Missile Command game, a classic in its time. The console also has a built-in diagnostic test routine that will check the ram, rom, audio channels, screen display and keyboard switches.

The console comes with 65,536 bytes of ram available to the user and an operating system of around 28k. Contained within the OS is Basic, the game and a self test routine – not bad for a so-called games machine.

**Keyboard**

A standard qwerty keyboard is supplied, with the control graphics printed on the front of the keys as with the 130XE – this is designed to
save you time constantly referring to manuals.

The keyboard has a lovely feel to it and I found typing at speed very easy. Included is a Help key, usually found with Start and Option on the 8-bit Ataris.

It is detachable, so you can type in whatever position you find comfortable. This adds a very professional feel to the system.

If you POKE 752,1 you will be able to get an international character set if you use the control key in conjunction with key entries.

### Joystick

The joystick supplied is a standard Atari design that dates back to VCS days. While not being the best unit available it does its job and is fairly sturdy.

When the system is powered up you are presented with the instantly recognisable blue screen with the message READY – Atari Basic is built into the console. This means that all the listings from Atari User will work fine. The loading and saving procedures for tape are the same as for the X/XE micro.

The system was fully compatible with all the software packages I tried on it – and these ranged from Mini Office II to International Karate. All the electronic add-ons tried also worked on the system, including an 850 Interface box, Epson FX-80 and Atari 1029 printers.

The system will also support a disc drive – my old 810 and my new 1050 drives worked perfectly when loading games or Dos. Atari is bringing out a new disc drive, the XF-551 and hopefully its design will match the new console to give a very nice looking system.

The console is controlled by a 6502 CPU and has the GTIA custom graphics chip and the POKEY custom sound chip, both being custom chips dedicated to the Atari.

When these are combined you have at your fingertips some of the best 8 bit electronics to come off the drawing board in the last decade. The computer still has the 6522 PIA chip, and so interfacing techniques are the same.

### Conclusions

The new design is superb, very sleek and smooth. Picture quality via the TV output has been improved, giving a display that has lost the tendency to drift out of sync. Including disc software well over 2000 pieces of software will work on the new systems.

- **XE Computer Games Console:** Includes 65XE, built-in Missile Command and joystick. £79.95.
- **XE Computer Games System:** Includes 65XE, keyboard, light gun, built-in Missile Command and joystick, flight simulator II and Bug Hunt games. £119.95.
- **Starter Pack:** Includes computing tutorial, 130XE, X12 cassette, centipede, Star Raiders, Missile Command and Atari Tennis cartridges. £139.95.

---

**Heart of the new machine**

His appetite whetted by our evaluation, next month technical editor André Willey will take a detailed look at the fascinating technology behind the launch of the new machine.

He will also assess how it compares with the rest of the 8 bit range and come to his own conclusions as to its future in the market.

---

```basic
10 POKE 752,1:REM TURN OFF CURSOR
20 VP=PEEK(564):YP=POKE(563):REM READ X AND Y COORDINATES OF GUN
30 PRINT CHR$(125)+PRINT "X":X,Y,Y Y
40 PRINT VALUES RETURNED
50 IF STICK(0)=15 THEN SOUND 1,55,5,11
60 IF MAKE 1 NOISE IF TRIGGER PRESSED
80 IF STICK(0)=14 THEN SOUND 1,8,8,3
90 EM SWITCH OFF NOISE IF NOT PRESSS
100 GOTO 20:REM REPEAT THE PROCESS
```
It's the Atari disco show!

LEN GOLDING shows how to brighten up the festive season

OUR offering for the party season is a programmable mains disco light controller. It can generate strobes, chasers, random flashes, pre-set sequences and many other instant atmosphere effects which cannot be matched by units available in the shops.

You can even set up your own son-et-lumière displays, switching from one lighting pattern to the next by a single touch on the keyboard.

Each channel can handle up to six 60 watt coloured reflector bulbs, so it's powerful enough for most clubs and school rooms, as well as for any home. And the design uses a special triggering system which eliminates radio interference, so you can use it alongside your VHF tuner — unlike some commercial units.

Figure I shows the circuit. It's rather more complex than might at first seem necessary, but this is because of the need to protect your micro from stray mains voltages, and to minimise RF interference.

If you're into electronics you will probably see how most of it works without much difficulty. IC1 is used to buffer and amplify the tiny currents from the joystick port, making them powerful enough to drive four light-emitting diodes in a quad opto-isolator.

Your micro can see only this section of the circuit — so far as it is concerned, all the high-voltage switching takes place in another universe.

To preserve the isolation, we've powered the rest of the circuit from a small mains transformer (T1). This must be a centre-tapped type, with 6-0-6 volt outputs, capable of delivering at least 50mA.

The outputs from the opto-isolator are fed to the inputs of a four-bit latch (IC3). If pins 4 and 13 of this IC are high, the input pattern is transferred to the four outputs, otherwise changes at the inputs have no effect. TR1 monitors the mains AC voltage, which swings from positive to negative voltage and back again 50 times a second, passing through zero volts on each swing. When the downward cycle reaches about 0.6V, the collector of TR1 goes high.

This triggers a monostable from IC2a and IC2b. Its output goes high for a few microseconds, unlatching IC3 and allowing the input pattern to flow through to the outputs. When the monostable output returns to its low state, IC3 becomes latched, so the outputs remain in their current pattern until the next zero-volt transition.

The combined action of TR1, IC2 and IC3 ensures that the disco lamps cannot switch on or off unless there is practically no voltage across them. This eliminates power surges and consequent RF interference. It also avoids the need for bulky and expensive suppression chokes and capacitors.

IC4 buffers the output signals from

WARNING!

Once the mains supply is connected to the board, triac heat sinks and several other on-board components will become live and must not be touched!

high, current can flow — when it is low, current is blocked.

Now on to the construction side of the article. The printed circuit board is available as always from RH Design, who can also supply a ready-built and tested module, for you to connect up to the mains and mount in a suitable case.

Those of you who prefer to etch your own PCBs can use the pattern shown in Figure II. All holes are 1mm, except the mounting holes for the
triacs and the PCB itself (3mm), the fuse clips (1.5mm) and the terminal blocks (1.2mm).

Figure III shows the component layout. Start by fitting the resistors and wire links – they can go either way round. Then fit the three diodes, observing correct polarity as marked by the band at one end. Solder the IC sockets, followed by the voltage regulator, again taking care that this goes the right way round.

Although Figure III shows a fuse on-board, you may prefer to run leads from the pads to a chassis-mounting fuseholder, so that you can change the fuse without dismantling the case. Maplin's type RX96E is suitable.

If you do this, it’s easiest to use 1 sq mm solid-conductor mains cable – the kind sometimes used for domestic lighting circuits. You will need to take very great care soldering the wires to the tracks, as any stray blobs of solder could be disastrous. In either case, the fuse should be not more than 6.3 amp rating.

All other connections to and from the board are taken through PCB terminal blocks, which are much easier to solder and safer to use. Solder them in place, then fit C1, C2, C3 and C4, making sure that C1 is the right way round – the negative side is marked with a broad band containing chevrons and the number 0. Next fit TR1 and the 9-pin D connector which will accept the joystick extension cable.

Finally, fit the triacs. Snip off the centre lead from each, and bend the remaining ones at right-angles to fit the PCB holes. If your PCB is not roller-tinned, scrape away the etch-resist coating under each triac fixing hole, so that the bolt can make good contact with the copper track.
contact with the track.

If you’re planning to run only three or four lamps on each channel, you can dispense with the heat sinks. Otherwise, smear a little heat-sink compound on the back of each triac, fit it to its heat sink and bolt the whole assembly tightly into place on the PCB.

Use 6BA or 3mm bolts, inserted from the reverse side otherwise there is a risk that the fixing nut will bridge across two tracks. Do not solder the leads until you are satisfied that each triac is fitted correctly, and that the heat sink vanes cannot touch each other.

Now it’s time to test the board, and for this you will need some kind of meter set to measure around 5V. Start by inserting IC1 and connecting the joystick lead, then plug into port 1 and run Program 1. Check each of IC1’s outputs – pins 6, 3, 8 and 11 – they should all be high (about +5V).

Now type 1 and hit Return. Pin 6 should fall low (0V), while the other three outputs remain high. The same should occur for pins 3, 8 and 11 when you type 2,4 and 8 respectively. If these tests work correctly, it means that the first section is fully operational. Now you need to power-up the rest of the circuit.

The safest way of doing this is to connect a 9V battery to the terminal block, with its positive lead going to one of the points marked 6V, and its negative lead to 0V.

Alternatively, wire your transformer to the mains via an external terminal block, and fit the secondaries to the PCB. The specified transformer has three secondary wires. Fit the two same-coloured ones to the 6V points – it doesn’t matter which way round they go – and the different one to 0V.

Check that 5V appears at each IC.

Figure IV: Bulb layout
socket – pins 14 and 7 of IC2, 5 and 12 of IC3 and 14 and 7 of IC4. If not, you have probably inserted the voltage regulator incorrectly, or left out one of the wire links.

Insert the opto-isolator and repeat the 1, 2, 4, 8 testing sequence using Program 1, but this time check the inputs at the socket of IC4 (pins 2, 3, 7 and 6). They should go low in sequence.

Disconnect the power supply, insert IC3 and IC4, and reconnect the low-voltage supply. Temporarily link pins 4 and 14 at the socket of IC2: This will unlatch IC3, so that section 3 can be tested.

Go through the 1, 2, 4, 8 sequence again, this time checking that the triac gates go high in the order 1, 2, 3,

WARNING!
Remember that potentially lethal mains voltages are involved, so great care is needed in construction and testing!

4. If all is well, insert IC2 and attach a 60W or 100W mains lamp to each of the triac outputs, as shown in Figure III.

That's all that can be done without connecting the mains, but if everything is satisfactory so far there should be no further problems.

It's best to mount the board in some sort of case or enclosure – a cardboard box will do – to reduce the risk of touching live components while you're testing. And remember to unplug the unit from the mains before touching the board.

If everything has been wired correctly, the mains lamps should light in sequence when you type 1, 2, 4 and 8. You may like to wire a panel neon in parallel with each output, to act as a monitoring device. These can be wired to the eight-terminal block along with the lamp leads.

You will almost certainly want to design your own display, so there's little point in giving constructional details here. The prototype batten was made from square-section plastic drainpipe, which is very cheap and available from many builders' merchants or DIY stores.

You might prefer to make up a number of smaller batten, say with four lamps each, so that they can be distributed around a large room. Whatever method you choose, all the lamps for each channel should be

Program I: Basic test program
5 REM Program 1: TEST DISCO LIGHT UNIT
10 POKE 54818,55:POKE 54816,255:POKE 5
4818,6B:POKE 54816,8
20 INPUT N
30 POKE 54816,N
40 GOTO 20

Program II: Basic strobe program
5 REM Program 2: SINGLE CHANNEL STROBE
10 POKE 54818,56:POKE 54816,255:POKE 5
4818,6B:POKE 54816,8
20 POKE 54816,1:REM SWITCH CHANNEL TO
30 N
40 FOR W=1 TO 8:NEXT W:REM "OFF" TIME
50 POKE 54816,0:REM SWITCH ALL CHANNEL
60 OFF
70 FOR W=1 TO 8:NEXT W:REM "ON" TIME
80 POKE 54816,1:REM SWITCH ALL CHANNEL
90 ON
100 GOTO 20

Program III: Basic chaser program
5 REM Program 3: FOUR-CHANNEL CHASER
10 POKE 54818,56:POKE 54816,255:POKE 5
4818,6B:POKE 54816,8
20 RESTORE 1
30 FOR CHAN=1 TO 4
40 READ D:POKE 54816,D
50 NEXT
60 GOTO 100
100 NEXT:REM SET SPEED
110 DATA 1,2,4,8

Program IV: Basic random flash with equal intervals program
5 REM Program 4 - FLASHES LIGHTS IN RA
20 N=INTER(RND(10)+1):REM Select Rando
30 M=1000:REM Select random delay
40 POKE 54816,N
50 GOTO 100

Program V: Basic flash with random interval program
5 REM Program 5 - FLASHER LIGHTS IN RA
20 N=INTER(RND(2)+1):REM Select Rando
30 M=10000:REM Select random delay
40 POKE 54816,N
50 GOTO 1

Program VI: Basic program to control flash from keyboard
5 REM Program 6 - Keyboard controlled sequencer. Press 'a' to advance, 's' to go back or ESC to start again
20 READ D,F="*:END"
30 FOR W=1 TO 8:NEXT W:REM SET SPEED
40 POKE 1536+X,X+X+X:IF X=255 THEN
50 'TO MUCH DATA':END
60 GOTO 10
60 NEXT W
70 POKE 54818,56:POKE 54816,255:POKE 5
80 INPUT X
90 GOTO 10
100 GOTO 10
110 GOTO 10
120 GOTO 10
130 GOTO 10
140 GOTO 10
150 GOTO 10
160 GOTO 10
170 GOTO 10
180 GOTO 10
190 GOTO 10
200 GOTO 10
210 GOTO 10
220 DATA 1,5,1,3,1,7,2,14,15,8,1

Turn to Page 38 ▶
wired in parallel, as shown in Figure IV.

The lighting effects available are very easily programmed, and we have listed a few ideas to get you started. Table I shows the numbers which must be POKEed into address 54016 to switch on any given combination of channels.

Program II is a simple strobe, acting on one channel and Program III is a four-channel chaser. Program IV flashes lights randomly at a constant rate, while Program V flashes them randomly at random rate. Program VI shows how you can generate a preprogrammed pattern sequence.

The unit can handle 500 watts per channel so long as the load is switched on and off every couple of seconds, and no more than two channels are on at the same time. If the on period is likely to be longer than this, or all channels will be on simultaneously - however briefly - it's best to keep the total power drain to about 300 watts per channel.

<table>
<thead>
<tr>
<th>Pin number</th>
<th>PORT 1</th>
<th>PORT 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Control Number</th>
<th>PORT 1</th>
<th>PORT 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>32</td>
<td>64</td>
</tr>
<tr>
<td>128</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table II: Switch control numbers

---

**PARTS REQUIRED FOR 4-CHANNEL DISCO LIGHTS CONTROLLER**

<table>
<thead>
<tr>
<th>R1-R4</th>
<th>820 ohm (4 off)</th>
<th>Maplin Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>R5</td>
<td>100k 1 Watt</td>
<td>C100K</td>
</tr>
<tr>
<td>R6</td>
<td>10k</td>
<td>M100K</td>
</tr>
<tr>
<td>R7</td>
<td>100k</td>
<td>M100K</td>
</tr>
<tr>
<td>R8-R11</td>
<td>4k7 (4 off)</td>
<td>M4K7</td>
</tr>
<tr>
<td>R12-R15</td>
<td>620 ohm (4 off)</td>
<td>M620R</td>
</tr>
<tr>
<td>C1</td>
<td>470 mfd 25v</td>
<td>FF165</td>
</tr>
<tr>
<td>C2</td>
<td>0.1mfd miniature disc</td>
<td>YR75S</td>
</tr>
<tr>
<td>C3</td>
<td>1000 pF (1nf) ceramic</td>
<td>WX68Y</td>
</tr>
<tr>
<td>C4</td>
<td>0.01 mfd miniature disc</td>
<td>YR73Q</td>
</tr>
<tr>
<td>IC1, IC4</td>
<td>74AC00 (2 off)</td>
<td>UH67X</td>
</tr>
<tr>
<td>IC2</td>
<td>74HC02</td>
<td>UB01B</td>
</tr>
<tr>
<td>IC3</td>
<td>74LS76</td>
<td>YF32K</td>
</tr>
<tr>
<td>D1-D3</td>
<td>1N4004 (3 off)</td>
<td>QL76H</td>
</tr>
<tr>
<td>TR1</td>
<td>BC117</td>
<td>QB34M</td>
</tr>
<tr>
<td>SCR1-SCR4</td>
<td>C20ED Triacs (4 off)</td>
<td>WQ24B</td>
</tr>
<tr>
<td>T1</td>
<td>6-0-6v transformer</td>
<td>WBOOA</td>
</tr>
</tbody>
</table>

8-way PCB block (2 off)
 Fuse clips (2 off) *
 6.3A anti-surge fuse
 Vaned heat sink (4 off) *
 1 pack 6BA x ¼" RH bolts
 1 pack 6BA nuts
 Silicon grease *

All the above components are available from:
Maplin Electronic Supplies, P.O. Box 3, Rayleigh, Essex SS6 8LR. Tel: 0702 552911

The printed circuit board (order code DBP16) at £4.88 and joystick extension lead (order code AT111) at £2.99 are available from:
R.H. Design, 137 Stonefall Avenue, Harrogate, North Yorkshire, HG2 7NS. Tel: 0423 508359

* These components may not be needed – see text.
Keystick

BRUCE WOODLAND provides a utility for a programmable interrupt driven joystick

WHEN you write programs it is often necessary to provide both cursor key and joystick options to widen their user appeal. If the micro could be fooled into interpreting a joystick input as a predesignated keypress the user would have the best of both worlds and you'd have less programming to do.

This utility allows you to ignore joysticks as you write your program, but still make use of them in the final product. To do this, first type in the listing, remembering to use Get it Right II! and save a copy to disc or tape.

When the routine is run it will set up an interrupt driven machine code program residing in page 6. This new routine will constantly scan joystick port 1 and interpret all joystick movements as key inputs.

It accomplishes this by sampling input from the port, translating it into the required internal key code and writing this information to the keyboard register at regular intervals.

This sampling rate is normally matched to the keyboard auto-repeat, but if the fire button is pressed the time delay between the sampling is shortened. The routine has two modes of operation and you can toggle between them by pressing Option.

When the program is in memory and running you are presented with a menu of keyboard inputs against joystick movements. At this point you are asked if you wish to accept the values as they are, or to enter new values.

The program will offer you all eight joystick movements and you enter the corresponding keyboard functions. The fire button is always linked to the spacebar.

At this time you are in the first of the two modes and this ties the Control key to all inputs from the joystick, allowing you on-screen editing features from the joystick.

To indicate that you are in the editing mode a flashing cursor is present and if the fire button is pressed the cursor will whizz around the screen. The second mode is without the link to Control and you simply get standard keyboard entry.

The machine code routine is not directly relocatable since a definite address must be inserted as a vector and the keyboard addressed by direct indexing methods. This means the routine is disabled by pressing Reset, but it can be re-implemented by:

CALL USR (1536)

If you find this utility useful you may wish to modify it as a non-resectable AUTORUN.SYS file. The routine could then be stored above Dos and below LOMEM leaving page 6 free for other uses.

```
8 REM
1 REM "PROGRAMMABLE JOYSTICK"
2 REM "FOR CURSOR EDITING MODE"
3 REM "OR ANY 6 KEY GROUP"
4 REM "WRITTEN BY B. WOODLAND, 1987"
5 REM "ON TT" USER"
6 REM
8 REM
10 REM "MAIN PROGRAM"
20 GOSUB 100: REM "DOS SETUP"
30 GOSUB 300: REM "USER PARMS"
40 GOSUB 600: REM "ENABLE JOYSTICK"
50 REM
60 REM
80 REM "MAIN KEYBOARD SETUP"
110 DIM KCODE(10)
120 ? CHR$(125):? "PLEASE WAIT";
130 OPEN NI,4,0,"";CU=O;D=0;ADD=1516
140 READ DTA
150 IF DTA1 THEN 180
160 POKE ADD+4,DTA1+A+1
170 CU=CUS: DTA: GOTO 140
```

Turn to Page 40
Green witches and lurking bugs

by Rouloc

PHEW! Never thought I was going to make it in time for this month's issue. There I was in Tervania (a small village - turn left just past Outer Mongolia and it's first on the right) surrounded by a thousand slavering orcs. I'd have preferred to have thwacked a couple of hundred or so before I took my leave, but time was pressing.

Unfortunately, my transportation spell came out a bit wonky for some reason I still can't fathom. I said Pockstorp at the place in the incantation where I should have said Stockport and found myself in an aborigine's hut somewhere in the Australian outback.

Since then my spell has become a little depleted in power so I had to fly back across the world on a broomstick - old-fashioned and undignified but at least it worked.

Still, it's an ill wind and all that. On the way back, I stopped off for a quick oil change on the broomstick and bumped into my old friend Brillig from Atari ST User - he had just popped into the same garage for a rebore job on his wand.

We got chatting and he happened to mention that he'd found a bug in Infocom's The Lurking Horror and thought my readers might also be interested.

If you have the brass hyrax ring, take it into the terminal room where the hacker sits and drop it. Then say "Wear ring" and the program will respond by asking whether you mean the hacker's keyring or the hyrax ring.

If you then indicate that you want the keyring, the program tells you that you can't wear it. But examine your inventory and you'll find you've got it - green keys, yale keys and all the rest. Nice bug, even if it's not much use to you.

Hot news from Reinbird - its next Magnetic Scrolls adventure called Jinxter is well under way and should be available soon - it may even be out by the time you read this.

Featuring the same superb graphics and sophisticated parser as The Pawn and the Guild of Thieves, Jinxter is a modern and humorous tale set in Aquitania.

The green witches are gaining power in Aquitania, thanks to the dispersal of the pieces of a lucky charm bracelet. Your task is to retrieve all seven pieces and link them together to stop the witches taking over.

The interesting thing is that you can't get killed while your luck holds out. Instead, if you have a lethal encounter, you're dumped just past the hazard, thus allowing you to continue further into the adventure. Now that really sounds like good news for all accident prone adventurers.

The mailbag has been groaning ever louder of late and I'm afraid that I've a little catching up to do. Don't despair if you don't get a mention or have to wait a while before your name pops up in this column - I get so many letters it is simply not possible to find room to include all of them.

But rest assured that Rouloc reads every single one of your missives with great interest and admiration - and very grateful he is, too. The thought of getting back to read the latest batch of letters has more than once spurred me to greater efforts to escape from rat-infested dungeons in foreign climes.

My thanks this month go to Adam

Turn to Page 42
Marshall of Penrith in Cumbria for his tips on The Price of Magic and Alternate Reality. I especially liked one of his tips for the latter – he advises that whenever you get the chance, always try to trick giants as they are very thick and very foolish.

Paul Clark in Positano was grateful for our map of Worm In Paradise in the August 1987 issue of Atari User, but is still having trouble with the Basic listing because using the Eden transport system he keeps getting a Dim error.

I need to point out that the error must be caused by Paul’s typing, but is anyone else having the same problem?

I may have got his first name incomplete, but Ty Hays of Nuneaton was not impressed with the same map – but at least it gave him the incentive to get stuck back into the game.

He does mention one peculiarity of Worm which I haven’t yet had time to check out for myself. He says that if you go to the police station, type “give me” then “examine all”, the program will list out all the items in the game.

Ty also wonders what race I come from. Well, you’ve seen my handsome picture printed on the previous page fairly regularly so you should have no trouble in guessing that I am a dwarf of the magical variety.

My feet really are that big – I do a lot of walking on account of my regular faultyl recitation of transportation spells – and I have to have all my shoes specially made by the Seven League Boot and Shoe Company.

Speaking of small folk, Level 9 has written an adventure about one of my old flames – a young bossey gnome by the name of Ingrid Bottomlow. The adventure is called Gnome Ranger and it’s a corker – watch these pages for a review.

Finally, in the hints and tips, I am pleased to be able to help Andrew Blair of Glasgow with Mordon’s Quest, Bob Stacy of Cardiff with The Lurking Horror, Peter Goulston of Lincoln with Arrow Of Death Part II, Mike Proctor of Shrewsbury with The Pawn, and Dean Reynolds of Solihull with Leather Goddesses of Phobos. For these and many other readers, help is always at hand.

I’ll try not to let last month’s plan to buy a new transportation spell go without a hitch, maybe I’ll let you have a list of how all the points in The Pawn are awarded. How’s that for a treat? Until then, exciting adventuring!
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CAPS LOCKS INDICATOR
from Matthew Bernstein

HAVE you ever had problems with the
Atari's CAPS key? This five line pro-
gram provides a cure by giving a
visual indication of whether the com-
puter is in uppercase, lowercase or
control lock.

The utility places an extra line of text
at the top of the screen which will
indicate the state of the CAPS lock
mode and this is shown in an abbrevi-
atized form on screen:

CAPS upper case
LOWR lowercase
CTRL control lock

The routine is executed by
A=USR(1624) and will work in any
graphics mode. When you change
modes the line will be lost so you
must re-call it again with the USR
command.

The program contains its own check
routine so it will not start the machine
code routine if the totals do not match.

SCROLLING MESSAGE WINDOW
from Eric McGough

HERE is a simple Basic program which
you can adapt to suit your own needs.
It prints a scrolling message in a
window on a Graphics 0 screen. It is
just an example to fire your im-
agination and you could, for example,
adapt it to print a number which
would rise or fall depending on which
way the joystick is moved and is then
selected as an input when fire is
pressed.

PROGRAM BREAKDOWN
1 Selects Graphics Mode 0 and
dimensions 8X. The string is then
defined. The spaces on either side
of the message determine the gap
between the blocks of words as
they pass through the window. B
and C are then set to the portion of
the string you wish to display
which is a chunk of 10 characters
starting at the first in the string in
this case. The line ends with a
POKE which switches off the
cursor, otherwise it will flash when
the message is printed.
2 Beginning of the loop to display
window. The FOR..NEXT loop is
set to 600 to keep running until the
fire button is pressed and
going back to the loop causes a
slight blip. The window is then
positioned where you want it on
screen. Next, the required portion
of the message is printed. There is
also a short loop to scroll the
scroll.
3 Checks to see if the pointer (B,C)
have come to the end of the string. If
it has, it resets it to the beginning.
4 Checks to see if the fire button has
been pressed. If it has we would
then GOTO the desired action, in
this case the scrolling will stop.
5 Increments B and C so that the
message keeps moving to the left
and then returns to the beginning
of the loop. When it has reached
600 it starts again by going to line
2. The loop will keep going until
the fire button is pressed.

 babe 1: C=1
2 FOR A=1 TO 600: POSITION 15,1: AS(A)
3 IF B=29 THEN B=1: C=10
4 IF STRIG0(0)=B THEN END
5 B=B+1: C=C+1: NEXT A: GOTO 2

Get it right! II
JET BIKE
from Daniel Welch

This is a version of the Light Cycle sequence in the Tron film. The rules of the game are as follows: If you crash your cycle into your opponent's trail you will die and the same applies if you crash into the electrified walls that enclose the playfield.

The most remarkable thing about the game is that you have a computer opponent racing against you - and all this is achieved in five lines.

The program uses data statements to control the movement of the computer and uses Boolean statements to control movement of the player with the joystick. The advantage of using these statements are that they are fast and do not take up much space in the program.

**VARIABLES**

- **P, Q**: Position of computer
- **DP, DQ**: Directions of computer
- **X, Y**: Position of player
- **DX, DY**: Direction of player
- **Z**: Locate value of player
- **S**: Stick(0) value

```plaintext
1 P=1;Q=19;x=75;y=19;DP=-1;DY=0:GRAPHICS 2:COLOR 1: PLOT 0,0:DRAWTO 79,7,9,9:DRAWTO 79,5:DRAWTO 79,3:DRAWTO 79,1:DRAWTO 79,0,7,9:DRAWTO 79,5:DRAWTO 79,3:DRAWTO 79,1:DRAWTO 79,0,7,9:DRAWTO 79,5:DRAWTO 79,3:DRAWTO 79,1:DRAWTO 79,0,
2 READ DP,DQ:IF DP=0 AND DQ=0 THEN RETURN:GOTO 1:DATA 0,1,0,0,0,-1,-1,0,0,0,
3 SOUND 0,200,12,2:LOCATE P+DP,0+DP+1,X:
4 IF R=X THEN 2
5 S=STICK0+1:IF S<=15 THEN DX=S+5 OR S+5 OR S+7 OR S+9 OR S+10 OR S+11:2Y=S
6 S=15-S(X=16)
```

**CHRISTMAS MESSAGE**
from Gary Cheung

This five line is a simple program to demonstrate the graphics capabilities of Atari computers and it also sends a seasonal greeting. The program draws a Christmas tree with lights and flashes them on and off.

**PROGRAM BREAKDOWN**

10 **setups graphics Mode 7, sets up colours for the background and the tree. Makes the cursor invisible and sets the left margin.**

20 **The dummy PRINT statement enables the now left margin value to come into effect straight away when the message is printed in line 40. This combination enables the message in line 40 to be positioned without the POSITION command and thus reduces the length of the line.**

30 **Draws the Christmas tree.**

40 **Draws the tree lights using the colour in colour register 709.**

50 **Prints the Christmas message in the text window.**

60 **The tree lights are made to flash by changing the value of the colour register 709. This register also affects the message and the text flashes with the lights. Poking 709 with 86 gives a dull red and 15 gives a bright white.**

**Get it right! II**

- **10 F58 (M)**
- **20 P31 (Y)**
- **50 C39 (Y)**
- **48 5A8 (Y)**
- **5A 480 (9)**

December 1987 Atari User 45
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Basic route to colourful triangles

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I AM starting to learn Atari Basic and have written a program to draw and fill triangles in different colours. But I have come across a problem.

After drawing a red, orange, blue and green triangle in Graphics Mode 7 I found that when I tried to use different colours they didn't work. Can you explain why this is? – James Cox, Mowbray, Leicestershire, Age 11.

Depending on the graphics mode you choose to work in, you are restricted to the allowed number of colours – this is usually proportional to the resolution of the mode.

For example, in Graphics Mode 7 you have a screen resolution of 160 by 96 in four colours on a full screen.

But in Mode 11 you have a resolution of 60 by 192 pixels in 16 colours, and this will take up roughly 8k of memory before you start. But a Mode 7 display will only take up around 4k.

When deciding what colour you wish a pixel to be on screen you must first know the limitations of the mode you are working in.

It is also possible to alter the screen display by using the SETCOLOR command. This will change depending on what mode you are using and full details can be found in any Atari Basic manual.

Here are the effects created on a Graphics Mode 0 text screen:

```
SETCOLOR 1.A.B will alter the intensity of characters on screen.
SETCOLOR 2.A.B will alter the screen colour.
SETCOLOR 4.A.B will alter the border colour.
```

A is the colour you want, and can be a number from 0 to 15. B is the brightness or luminance of the colour and is an even number from 0 to 14.

So by playing around with the COLOR and SETCOLOR commands you can produce various patterns and shades.

Packing in a word processor

IN my first few computer lessons on a BBC Micro I noticed there is a build-in word processor. Is it possible for me to fit one to my Atari 800XL in the same way? – A. Faulkner, Barnstaple, North Devon.

The BBC Micro has space inside for several rams. These work in a similar way to cartridges on your Atari, but you can have more than one present at once. So a cartridge-based word processor such as AtariWriter is the equivalent of a build-in one.

Getting it right

IN the November 1987 issue of Atari User you published Get it Right II! Are the checksums that you published for the old Get it Right! still compatible with this new super high speed version? – Brenda Tennyson, Sandbach, Cheshire.

The new Get it Right creates a different checksum to the old program and so makes the two incompatible. We considered

keeping the numbers the same, but decided that the advantages that could be gained by a completely new program outweighed the advantages of compatibility.

For example, a feature that the new program has that the old one didn’t is a running cumulative checksum.

Looping into trouble

I WAS playing around with my Atari 400 and wrote this simple program:

```
10 FOR F=1 TO 255
20 PRINT CHR$(F);G
30 PRINT F
40 FOR N=1 TO 200:NEXT N
50 NEXT F
```

When I ran it the computer seemed to go haywire and refused to do what it was supposed to do. Is my computer broken? And if not, can you explain what exactly is happening? – G. Abbott, Glenrothes, Fife.

Firstly, your computer is not broken. The answer is very simple. As the program goes through its loop it prints CHR$(F) to screen and it is encountering Ascii control codes.

These codes will cause various different things to happen as shown in the table below. As you can see, the control codes are scattered throughout the loop that you defined and the best way for you to view them is individually.

<table>
<thead>
<tr>
<th>Ascii code</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>27</td>
<td>Escape</td>
</tr>
<tr>
<td>32</td>
<td>Blank space</td>
</tr>
<tr>
<td>125</td>
<td>Clear screen</td>
</tr>
<tr>
<td>155</td>
<td>EOL or Return</td>
</tr>
<tr>
<td>253</td>
<td>Keyboard beep</td>
</tr>
</tbody>
</table>

If you add 128 to the Ascii of a character it will appear in inverse video. For example, ?CHR$(128) will give you A, but if you add 128 then give ?CHR$(193) you will get an inverse capital A.

Tweened cartoon

AFTER typing in the excellent Tweening program from the November 1987 issue of Atari User I drew a cartoon character and tweened him between...
two positions, I then printed out the individual screens of the animation using the OS Controller card screen dump utility.

Next I stuck the dumps together in book form and if I flick the pages quickly I have a simple animated cartoon.

Thank you for a superb utility - I'm sure that with a little patience I could make a full length cartoon using it. - Philip Marston, Armitage, Wadd Soft.

ATARI Mailbag
USER

WE welcome letters from readers - about your experiences using the Atari micros, about tips you would like to pass on to other users ... and about what you would like to see in future issues.

The address to write to is:

Mailbag Editor
Atari User
Europa House
68 Chester Road
Hazel Grove
Stockport SK7 5NY

No trivial pursuit

IN my experience the majority of companies today consider customer relations to be a triviality. I am very pleased to say that there is a company that can be bothered to be polite and helpful - Noahsoft.

When I bought a product called the PL65 compiler from them I had trouble including library files that contain other library files on to my data disc. I contacted the company and they replied with the solution to my problem in a very efficient and helpful way. - Lee Fuller, Romford, Essex.

Missing locations

I RECENTLY bought a tape version of International Karate. I enjoy sport simulations and I was very keen to play the game.

The instructions say that you fly to eight different locations around the world and fight in each, but when I started to play I found, to my horror, that I only have two locations to fight in.

Later I went to visit a friend who has a disc drive and I was surprised to find that his version has the eight locations.

Why is it that tape owners always seem to lose out on games? - Mark Haddon, Hartford, Hertfordshire.

The problem with the tape version of International Karate concerns loading time. The game constantly loads new location screens, which is easy on a disc version, but if you were to load a new screen from tape the game would take far too long to complete.

Assembler required

BEING new to computing and very willing to learn, I was attempting to follow the I/O channels article by André Willey. But, try as I may, I just kept getting stuck.

I don't know how to disable Basic and input the machine code program which you published in the March 1987 issue of Atari User,

The article doesn't explain how to do this and so I was wondering if you could answer this for me? - M. Kiss, Tamworth, Staffs.

To enter any machine code program you need an assembler language such as the Atari Assembler/Editor cartridge or Mac/66 from Optimised System Software. These, and others, are available from several of the advertisers in Atari User.

Nice line in language

I RECENTLY bought Turbo Basic from Storisoft and was stunned by the quality of the product. The package contains the Basic with a compiler and although it doesn't contain all the commands that you get with other Basics, say for example Basic XL, it does leave the old Atari Basic language standing.

So if you feel like a new language for your Atari I would recommend you try it - A. Griffith, Wimborne, Dorset.

Cardsharp cornered

SOME people might have noticed something odd about the Knockout Whist program in the September 1987 issue of Atari User.

Apart from the first round the computer always seems to win when random trumps are chosen. I checked through the program and spotted where the problem occurred and corrected it with the following changes:

```asm
8810 RET=0:SF ch0=6 THEN TR= INT(RND(2)/4)+1:GOTO 8830
8820 6010 8830
```

This solves the problem of biased trumps. - Simon Sawyer, Winchester, Hants.

Sound of silence

I OWN an Atari 400 and was wondering how to turn off the noisy beeping sound I get whenever I save or load.

I use my computer mostly at night when everyone is in bed and the beeping keeps waking them up.

I was told that POKE 65,1 will turn this noise off on all Ataris, but when I tried it the beep was still there. Could you tell me how to get rid of this annoying sound? - L. J. Hall, Southend, Essex.

The beep that comes from an XL/XE computer is generated through the TV speaker. But on an Atari 400 there is a small speaker inside the micro.

This can easily be turned off by unplugging the wire from the board altogether or placing a switch between it and the speaker.

Printing out a document

I HAVE had Mini Office II for four months now and think it's a great package, but I do have one small problem with the spreadsheet.

When I save data from that module and then try to load it into the word processor to print it out in a document all I get is a mess of characters. Am I using the package wrongly? - Monica Harris, Maidstone, Kent.

You're using the package correctly, but I'm sorry to
say that the spreadsheet only integrates with the graphics package. You could print out the part of the spreadsheet you want and then print the document.

Card for the 65XE

AFTER reading the review for the OS Controller card in the November issue of Atari User I decided to buy one and have it fitted to my 130XE by Computerhouse, where I obtained very prompt and professional service.

I am about to buy a new 65XE games console to add to my collection of Atari computers and was wondering if the card will plug into it. — Keith Pattison, Middlesbrough, Cleveland.

• The card you bought is designed to work on your 130XE only, but Computerhouse is planning to bring one out that will fit inside the 66XE.

Doctor Boris diagnosis

I TYPED in the program Doctor Boris from the October 1987 issue of Atari User and checked it very carefully but I still get an Error 8 at line 1020.

If I take out this line the program runs, but not correctly. Is there an error in this line? — Michael Cain, Beeston, Nottingham.

• The listing that appeared in the magazine contained no errors. The message for Error 8 is:

   INPUT/READ type mismatch error: Attempting to enter a non-numeric value for a numeric variable.

   Check your data statements between lines 1040 and 1510. You will probably find that your mistake is somewhere there.

   It may well be that you have a letter instead of a number, a comma at the end of a line, full stop instead of a comma or an extra comma were there shouldn't be one.

Pokes for games

IS it possible for you print some pokes for Atari games like those I've seen for other computers? Or is there something unusual about games on the Atari that makes this impossible? — Sean Canning, London.

• With a lot of computers the games are loaded using a Basic loader routine. This can often be modified or pokes can be entered first and remain active as the program runs. But on the Atari, machine code games are loaded using a procedure called Boot.

   This is done by a combination of the Start, Option and Select keys being held down as the computer is switched on. This causes the games to be loaded directly into memory so there is no way you can enter a poke. Also most games software on the market today require you to switch Basic off, which makes it very difficult to give you any pokes on the Hints and Tips page.

Helpful review

I OWN a Panasonic KPX-1081 printer and was very interested in the review you published on this model in the October 1987 issue of Atari User.

After reading it I proceeded to experiment with my printer and discovered a lot of interesting features. Thank you for a superb review, keep them coming. — Mike Barstow, Birchwood, Cheshire.

Amateur radio

THERE must be thousands of amateur radio operators worldwide who, like me, are also Atari computer fans.

But could you tell me if there is a program or interface that will enable me to receive teleprinter signals on my radio and pass them to my 800XL so I can view them on the screen and finally print them out? — Sid Thompson, Leyland, Lancs.

• We don't know of any programs or add-ons that will do what you want, but the Radio Society of Great Britain may be able to tell you of a product to solve your problem. Their address is: Radio Society of Great Britain, Lambda House, Potters Bar, Herts.

Adding on to the 800XL

A LOT of computers these days seem to have the expansion capabilities necessary for adding a second processor, the most common of which is the Z-80. Is there such an add-on for my 800XL? — Steve Ward, Newcastle-Upon-Tyne.

• Quite a while ago Atari did mention that it was about to bring out a second processor for the 8 Bit computers. The package was called the Atari CP/M Module and was an external microprocessor upgrade that would allow CP/M software to be used on all 8-bit Atari computers.

This add-on plugs into the serial port and offers the following features:

• 80 microprocessor
• 4.0 MHz processing speed
• 64k ram
• CP/M 2.2 operating system
• 40/80 column video output (switchable)
• Serial input/output port
• Monitor output

Unfortunately, Atari never released this package in Britain, which is a pity because it would have been popular on a market that is always crying out for more.
Enter the magical world of Kerovnia!

This fascinating adventure features the most sophisticated parser around: You can type complex sentences and interact with the many characters, including some very intelligent animals.

This superb package includes a 44-page novel and a cryptic help section.

"The program took three man-years of programming time to produce and it shows. The Pawn is the stuff from which cults are made."

— Anthony Ginn, Atari User, May 1986

Guild of Thieves — it's a steal!

Guild of Thieves is the long-awaited follow-up to the award-winning adventure, The Pawn.

You're back in the fantasy world of Kerovnia, in the role of a novice thief who has applied to become a member of the Illustrious Guild. To prove your worthiness you must ransack an island of all its treasures.

There are 29 beautiful illustrations, a massive vocabulary, and a text parser which is claimed to be more sophisticated than the parser in the Infocom adventures.

"This is an absorbing, funny and tantalising adventure and guaranteed to be another sure-fire winner for Rainbird."

— Bob Chappell, Atari User, October 1987

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How much does it cost to go on Telex?

You could go the conventional way and buy a dedicated Telex machine. The cheapest will cost you £1,604 (the Whisper), the cheapest £2,892 (the Cheetah). You will also need a separate telephone line, costing £101 to install, plus £404 a year rental. That’s a total outlay over the first year of a minimum of £2,109. (All prices include VAT.)

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How do I turn my Atari into a Telex machine?

All you need is a modem and appropriate communications software. See the advertisements in this issue, a telephone, and a subscription to MicroLink.

Telex is just one of a growing number of services available to Atari users on MicroLink. With MicroLink you can also read the news as it happens, go teleshopping, create your own closed user group, send telemessages and electronic mail right round the world, download free telesoftware programs, directly into your micro... and much more.

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With MicroLink you don’t HAVE to be in your office to send or receive Telex messages. You can just as easily use your computer at home (or even a portable). So now you can check whether there are any Telex messages waiting for you – anywhere, anytime. How’s that for your business efficiency?
I've had a tremendously varied set of questions from you this month, starting with a problem from Timothy Harrison from Portsmouth who's having trouble with his memory.

I have been a regular reader of Atari User since 1985 and now have quite a library of your games on disc, together with a menu selection program which runs them. I have slightly modified each program so that when I have finished playing the game I can press an exit key to re-run the menu program where any of the games can be selected and run.

Generally this works efficiently, but if the previous game has used Player Missle Graphics or machine code routines - which many do - vertical lines of squares are left flickering across the screen. These can only be cleared by pressing the System Reset key. Sometimes the following game will not run at all, or the screen display is corrupted, and often the only way to cure this is to power off and restart from scratch.

Obviously data is being left behind in the memory by the preceding program and this is interfering with the next one. For example, if I run Cubes in Space after Chopper Rescue I usually find that once I have completed the first screen of Cubes nothing happens, or only the bottom of the screen moves to the left. Is there a routine - it will probably have to be written in machine code to be fast enough - to clear out any left behind data? It is awfully inconvenient to have to re-power every time.

Well Timothy, there are actually a number of problems to be considered to allow you to freely move between Basic game programs. Firstly, as you have noticed, PlayerMissle Graphics don't clear themselves properly when you have finished with them.

Secondly you might find that some Vertical Blank or Display List Interrupt routines are still running. Finally the program might have adjusted some of the OS or Basic work variables - such as the Display List pointer or the top of memory indicator.

To clear the PMG data is slightly more complex than just POKEing the enable register to off with the command POKE 559,34. This will stop the ANTIc graphics-they play from getting bytes of player data from memory, but will leave GTIA - the display generator - free-running with random data giving the flickering vertical stripe you have noticed.

You can tell GTIA to stop reading new data by using POKE 53277,0 and the screen becomes solid, which is at least some form of improvement. GTIA in fact contains a number of temporary registers which hold the incoming PMG data until it can be processed, and since these haven't been specifically zeroed we will still contain the last byte of data received from ANTIc - hence the solid stripe based on that data.

The four player registers are located at 53261-53264 ($D00D-$D010), and the single missile register is at 53265 ($D011). These must all be set to zero, and while we're doing that we might as well re-set the PMG position and size registers at 53248-53260 ($D000-$D007) and the PRIOR and VDELAY bytes at 53275 ($D019) and 53276 ($D01C).

Now that we've dealt with the PMGs let's turn off any user-defined interrupts which may be running. The DLI vector is at 512,513 ($200,$201) and the Immediate and Deferred mode Vertical Blank Interrupts (VBI's) are at 546,547 ($222,$223) and 548,549 ($224,$225) respectively.

The normal contents of these registers will depend on the age of your machine and the type of OS it contains. The easiest way to find out what number to POKE into them is to use PEEK to find the original value of each location before you run any programs at all, and change lines 1120 to 1140 accordingly. I've used the standard 130XE values, but make sure they are set correctly for your machine or it could be goodbye program time.

One point to note here is that you can't just POKE the new values straight in since the OS may want to use any of the vectors at any time, even after you've changed one byte but not the other. Thus you should make sure to turn off all interrupts with POKE 54286,0, then POKE the new values into place and only then turn the VBI system back on with POKE 54286,64.

Next you should re-set the RAMTOP high memory pointer in case the previous program has tried to reserve space at the top of memory by adjusting it. This can be achieved by using POKE 106,160 for a machine with more that 40K of memory. Again, you can find out the normal contents by turning the computer off and on again and then using the command PRINT PEEK(106).

Finally, just to be sure, you should do a GRAPHICS command to set the Display List back to its normal location. I'm not saying that these measures will cure every possible problem

Listing 1: Memory clearing routine

10 REM CLEAR MEMORY AFTER PROGRAM.
20 REM ADD THESE LINES AT END OF
30 REM OFFENDING PROGRAM.
40 REM MAY BE RE-NUMBERED.
50 REM ADD LINE 1120, 1130,
60 REM 1148 & 1156 ACCORDING TO
70 REM YOUR COMPUTER'S NORMAL
80 REM VALUES FOR THE LOCATIONS
90 REM 1000 REM CLEAN-UP RAM REGISTERS
100 REM POKE 559,34
110 FOR BYTE=53275 TO 53277
120 POKE BYTE,0 1040 NEXT BYTE
130 FOR BYTE=53248 TO 53265
140 POKE BYTE,0
150 NEXT BYTE
160 REM 20 BIT SYSTEM
170 REM SET BIT 0
180 REM RESET INTERRUPT VECTORS
190 REM POKE 54286,0
200 REM POKE 512,206:POKE 515,192
210 REM POKE 546,225:POKE 548,194
220 REM 1040 POKE 558,130:POKE 548,194
230 REM POKE 54286,64
240 REM POKE RAMTOP,DLIST
250 REM 106 POKE 160,168
260 REM 1202 GRAPHICS 0

Turn to Page 54
you might encounter - games programmers are a perverse bunch at the best of times. However, Listing I should cure most of the common faults, and at least give Basic and the OS a fighting chance to do their job correctly.

Merging Basic programs

Now let's move on to another problem. Mr. K.R. Henwood from Pembroke Dock, Dyfed writes:

I am writing a program in Basic for an 800XL and 1050 disc drive in which I want to interchange different blocks of DATA statements from within the main program - using the ENTER command. For example:

100 ON $ ON $ 500,600,700
110 REM REST OF THE PROGRAM
500 ENTER "DATA2.LST" RETURN
600 ENTER "DATA2.LST" RETURN
700 ENTER "DATA2.LST" RETURN

This works fine, but when the new segment has been loaded into the computer execution of the program stops and the READY prompt appears. Can the 800XL be re-programmed to continue execution of the main program automatically after the extra lines have been ENTERed from the disc? At the moment I have to restart the program every time with a direct GOTO command in order not to wipe out other data which is stored in arrays.

There is an answer to your problem, and one which may prove useful in solving many other programming difficulties too.

As you have correctly stated, the ENTER command was designed to work in direct mode rather than as a program statement. So it returns control to the editor rather than to the currently resident program. What is needed is a way to control the editor's operation from within a program.

Impossible? No, not really. You need to use a trick often known as 'Return-Key Mode', in which you are able to print whatever commands you like onto the screen and have the Basic interpreter execute them just as if you had pressed Return at the end of each line - hence the name.

100 I will write a small program to illustrate the technique, but you could expand it to do much greater things - including allow a program to modify itself directly. Here's how it works:

Lines 10 to 110 set up a string which contains the main portion of the filename. Assuming you use a single number to indicate each separate file then all you need to do is alter that byte within the string - in this case character number 7. Thus line 110 replaces the lowercase X in the string with the number contained in NUMB.

Next comes a GRAPHICS 0 command to avoid corruption from any old lines of text which may still be on the screen. The POKE 559,0 simply turns off the display while the clever stuff goes on - omit it if you want to watch the system in action.

Next lines 130 and 140 print the two instructions which we want to execute in immediate mode. The two blank PRINTs between each line are to allow for Basic's READY message which will be printed after each immediate mode task is finished.

Since we want to print a quotes symbol and this can't be done from within a string I have used it's ASCII value - CHR$(34) - instead. Thus line 130 will print

ENTER "DATA2.LST"

Once the two lines have been printed the cursor is placed just above the first command to be executed and Return-Key mode is enabled using POKE 842,13. Immediately after this the STOP command temporarily halts the program with the message STOPPED AT LINE 140.

Since Return-Key Mode has been set the screen editor won't wait for you to type a command and hit Return - it will instead go straight on to execute the first line it comes to, which will in this case ENTER the new lines for you. Then it will carry on and find the CONT command which will re-start your program.

The line immediately after CONT should always be POKE 842,12 to disable Return-Key Mode before you continue with the rest of your program. I've also added a GRAPHICS 0 to turn the screen back on.

This method can be used to do almost anything you want, but it's always best to experiment until you get it just right - some commands such as LIST and the graphics oriented instructions would not be suitable.

Before I disappear for another month there's just time to mention a letter I've received from Chris Simon from Mold in Clwyd who has just typed in Get It Right III from the November issue of Atari User. Not realising that we'd be printing the full source listing this month he went ahead and disassembled it for himself, and found various messages within the code, such as:

SELECTION MENU FOR D2
2) INIT DRIVE
3) CHANGE DRIVE #
4) SET NEW OFF

He wondered if this is an extra utility provided for more experienced users, and if so how it might work.

Well, sorry to disappoint you, Chris, but it's not an extra utility. If you look at the machine code program on Page 57 you will see that there is a 266 byte buffer defined near the end of the listing. As with most other assemblers, my own MAC/65 cartridge creates this space by simply skipping the relevant number of bytes, leaving any existing memory content intact.

In order to configure my 1050 to work correctly with my hard disc and SparteDos I have set up an AUTORUN file which re-programmes the system to my requirements at boot time, and it is a portion of this code that inadvertently slipped into the G!R II object file. These bytes could just as easily be zeros, of course, as all they do is pad the boot file out to the required length.

Next time we print the Basic version I'll modify it to skip that area completely and thus save you about 10 lines - although it won't affect the size of the machine code version. Anyway, well spotted Chris. I hope that the listing in this issue will be of interest to you.

Ah well, that's about it for another month. All that remains is for me to wish you all the very best for a great Christmas - and wait for the deluge of mail which will come in from all those new Atari XE games console owners early in the New Year.

Merry Christmas all.

Listing II: Return-Key Mode demonstration

Are you having problems getting your programs to work? Write to Software Solutions, Atari User, Europa House, 68 Charter Road, Hazel Grove, Stockport SK7 5NY. We will answer as many as we can within the pages of Atari User but, unfortunately we cannot give personal replies.
**Email is good business**

BOOKSELLERS Graeme Roberts and Tony Swann, who first got in touch through MicroLink's bulletin board, are finding electronic mail makes for good business.

Graeme made a 12,900 per cent profit on a battered copy of Sowerby's Exotic Mineralogy he sold to Tony, a director of natural history specialists Wheldon & Wesley.

"I bought the book for £1 from a local junk shop after seeing Wheldon & Wesley's advertisement on the MicroLink BB", said Graeme. "I thought it would probably be worth more than I paid, but had no idea I would get as much as £130!"

Tony Swann was equally delighted with the deal. "After a couple of hours hard work with a soft rubber I was able to remove the accumulated dust and grime of 175 years and turn it into a quite reasonable copy which I sold on the phone to a collector in America for £240 the same day", he said. "The three of us are very happy, and it's all thanks to MicroLink!"

The aged scientific tome was a change of theme for Graeme who specialises in out-of-print science fiction, fantasy and horror and is currently expanding into supplying dealers and collectors in the US. His main reason for joining MicroLink is its "enormous potential for speeding communications" with his clients.

Tony also considers MicroLink an extremely useful business tool. "It isn't just because of increasing sales and purchases", he says, "I travel a lot around Britain and Europe and find the Official Airlines Guide saves me much time at the travel agency. Telex and the British Rail timetables come in handy too."

"Overall I'm delighted with the system and it's certainly beginning to pay for itself".

**Cut the cost of fashion**

PEOPLE can now dress themselves from head to toe in the latest fashions with the help of MicroLink.

London company Twilline is using the system to advertise High Street chain store fashion wear at a fraction of normal retail prices.

The garments aren't seconds - they're warehouse stock which has to be cleared to make room for new lines.

Twilline's prices are as low as £4 for blouses usually priced £14.99 and £1.50 for shirts which normally retail at more than £13.

---

**YOUR chance to join MicroLink – Page 18**

**New board for chess**

MICROLINK subscriber Keith O'Connell has challenged the world to a giant electronic game of chess.

Playing on the MicroLink bulletin board he says he is willing to take on anyone of average standard.

"I don't mind how many games I play at once", he said. "Anyone who wants to take part can just mail me with their moves in response to my game on the bulletin board."

"All I ask is that my opponents play for themselves, and don't just use a computer chess program to decide their moves. I want to play people, not a computer - I can do that on my own at home".

**Micro muscles**

MICROLINK subscriber Theo van der Meer has launched a search for software authors with experience of writing for peripherals.

He wants them to help him develop a device which allows people with severe muscular problems to use computers.

Theo's company, Preston Communications, is UK distributor for a Dutch product that links a muscle or several muscles to a joystick, allowing people with all kinds of muscular diseases to control a micro.

The device, which takes over the five joystick functions, has just completed clinical trials in Holland and is now being tested here.

"Our problem is that all the programs to control the device are currently written for the Commodore and we need to have them re-written for other machines such as the BBC Micro, IBM PC and compatibles, Atari, Apollo, Apple and Macintosh", said Theo. "We will of course gladly pay for this work".

**Tower triumph**

TWO years after finding himself out of a job at the age of 56, Yorkshireman Philip Gibbs is boss of his own company and poised for success.

With the help of his computer and MicroLink he has launched Sheffield Skyhook to manufacture self-erecting towers for closed circuit TV systems.

Now his project is nearing completion he is also receiving financial support from British Steel, British Coal and the Department of Industry prior to going into full production.

Philip has been using MicroLink to improve his communications with the various agencies he deals with, and has also found the Kompass Online directory of UK companies invaluable as a source of potential customers.

"At the moment we are using MicroLink mainly for telex", said Philip. "But when we finally get going full swing we'll be making use of Email as well".

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December 1987 Atari User 55
LAST month’s Basic program is quite sufficient to generate all the checksums you will ever need, but we are now going to look at the machine code version.

This will allow experienced programmers to tailor it to their own needs, but you should note that you don’t need to understand the inner workings of either version in order to use Get It Right III to check your listings.

The program is written in pure machine code, with a simple Basic routine to make to boot tape or disc. So, unlike the original Get It Right!, there’s no easy way for you to see what’s going on when you use it.

Get It Right III is a fully relocating piece of machine code – which means that it can place itself anywhere in memory, adjusting automatically to take account of its new position. Even its work space is internal, so it won’t interfere with anything else you may have loaded, including page 6 space. If you want to write your own code to interface with ours then you will require a non-relocating version, and that’s what we’ve printed here.

You can specify a new origin address simply enough by changing the *-$0700 definition on line 140, but once you’ve assembled it for a given address it must always be loaded there.

Listing 1 is the assembly code for the cassette version, and contains all the necessary information to make a boot tape.

If you want to make a disc version, first type in the listing using an assembler/editor and then enter the extra lines given in Listing II. These will overwrite any cassette-specific

---

**ANDRÉ WILLEY**

**gives a detailed breakdown of our checksum program**

---

**PROGRAM BREAKDOWN**

<table>
<thead>
<tr>
<th>Address Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>180 – 210</td>
<td>Only applicable to the cassette version and contain the six boot header bytes.</td>
</tr>
<tr>
<td>230</td>
<td>The first line of code to be run – simply jumps to the setup code starting at line 3490.</td>
</tr>
<tr>
<td>250 – 320</td>
<td>The handler vector table for I/O use – refer to the recent series on I/O Channels for more information.</td>
</tr>
<tr>
<td>360 – 450</td>
<td>Define the ten internal work bytes used for data storage and condition flags.</td>
</tr>
<tr>
<td>470 – 690</td>
<td>Perform the CIO Open command. Firstly the buffer pointer and cumulative checksum digit are cleared, then the zero page IOCB is accessed to find the address of the filespec buffer. This should contain either “G:S” or “G:P”, and the OUTFEC flag is set accordingly – or if neither is found an error 139 is generated. As with all CIO commands, the routine is normally exited by setting the Y register to a value of one and performing an RTS instruction (lines 770 and 780).</td>
</tr>
<tr>
<td>710, 730 and 750</td>
<td>Perform the CIO Status, Special and Close functions – all of which simply return with the Y register set to one.</td>
</tr>
<tr>
<td>800 and 810</td>
<td>Used to return an error 137 if the line length is over 255 characters (the maximum buffer length). Using Basic this should never happen, but it’s always best to check for all possibilities.</td>
</tr>
<tr>
<td>830 and 840</td>
<td>Return an error 146 should the user mistakenly try to GET bytes from the G: handler.</td>
</tr>
<tr>
<td>860 – 930</td>
<td>Contain the Put-byte routine. This dumps the byte into a buffer area, increments the buffer pointer and returns. If the byte is 155 – the End-Of-Line marker – then the routine jumps to the CALC section of the program which is where the actual checksum is created.</td>
</tr>
<tr>
<td>950 – 1110</td>
<td>Output a single Acal character to the screen or printer, depending on the parameter value of OUTFEC. The address of the relevant Put-byte routine within the Operating System is retrieved from the appropriate CIO vector table and this is then pushed onto the stack. The byte to be printed is stored in the A register and the routine is called by executing an RTS.</td>
</tr>
<tr>
<td>1150 – 1940</td>
<td>This method works because a JSR instruction places the return address on to the stack in the same way we placed the Put-byte address. When an RTS is found the address to return to is always pulled back off the stack – and so in this case it jumps to our Put-byte routine.</td>
</tr>
<tr>
<td></td>
<td>This is a cheating way to generate an indirect JSR instruction, which is not included in the standard 6502 instruction set.</td>
</tr>
<tr>
<td></td>
<td>Use this character output routine to print out the checksum line. Firstly the line number is printed – stopping at the first space found – then lines 1430 to 1490 got and print the first digit, lines</td>
</tr>
</tbody>
</table>
lines with the appropriate disc instructions.

Once the disc version is assembled it can be used as an AUTORUN.SYS file, or just a straightforward binary-load if required.

The program breakdown shows how it all works. But remember, the listing printed in last month's *Atari User* is functionally identical to this assembler version, but obviously has some practical differences due to its ability to locate itself anywhere in memory.

This is achieved partly by increased use of relative branch instructions but mainly from the use of a relocation table near the end of the load space. This ensures that any position dependent instructions are modified as they are moved from the load area of $3000 to their new location just above the original LOMEM.

So now you have Get It Right III in two versions - a user version and one that you can modify to suit your own requirements. We'd be very interested to hear your comments on the new system, and of any modifications or additions which you dedicated programmers might come up with.

Listing 1: Get-It-Right cassette version

```
10:GET IT RIGHT V/2.0
20:
30:;WRITTEN BY ANDRE WELLEY, 1987
40:
50:;N.B. NON-RELOCATING CASS VERSION
60:
70: HATABLE = $013A
80: ZIOCB = $20
90: EOFCC = $4500
100: PREVC = $0450
110: EOL = $98
120: SPACE = 52
130:
140: *= $0700
150:
160: CASSETTE HEADER BLOCK
```

1500 to 1600 print the second and lines 1670 to 1710 the third.

Five bits of data are used for each digit, giving a number between 0 and 31 (see Figure I). This number is then used as an index into the table of valid letters and numbers (lines 3060 and 3070). Note that letters such as I, O and Z are missing to avoid any confusion with the numbers 1, 0 and 2.

Finally lines 1740 to 1940 print the cumulative digit, surrounded by brackets, and then a Carriage Return. The buffer is then cleared ready for the next line and CIO is exited via an RTS instruction.

The part that actually calculates the checksum itself. When a Carriage Return is detected the buffer is scanned, character by character, adding up the coded values for each byte. When the line is completed, or when a rem is encountered, the print-out routine starting at line 1150 is called. The process used is quite complicated and is best understood in flow chart form - as shown in Figure II.

3090 - 3420

Provide the initialise code required for correct system reset handling. This includes looking for a blank entry in the OS's handler address table (HATABLE) and inserting the address for our own G: driver, then setting MEMLO, LOMEM and APPMHI to tell the system where our code ends. After zeroing the temporary work space the INIT code returns control to the OS, which in turn re-starts Basic.

3440

Defines the 256 byte text buffer used for storing program lines until their checksum has been printed.

3470 - 3700

Executed from the boot loader to set the CASINI (or DOSINI) vector to point to our initialise routine. For disc users, they also set up an extra JSR within the INIT code to execute the original DOSINI vector in order to maintain DOS's own pointers.

This setup routine does two other things - it prints the "Loaded OK" message and it sets Basic's Load in Progress flag (location 202) to a value of one. This has the effect of making Basic do a cold-start which will reset its pointers with the new LOMEM values to leave space for our code.

Since this portion of machine code will only be needed at boot time it is placed outside the LOMEM protected area, which means that it will be erased after it has done its job.
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independent User Group
From Page 57

0330 ; WORK DATA AREA
0335 ;
0340 CHK1 .BYTE 0 ; CUMULATIVE BYTE
0345 CHK1 .BYTE 0 ; CHECKSUM BYTE 1
0350 CHK2 .BYTE 0 ; CHECKSUM BYTE 2
0355 BUFFER .BYTE 0 ; BUFFER POSITION
0360 DATA .BYTE 0 ; INPUT STRING
0365 STRING .BYTE 0 ; INPUT STRING
0370 SHFT .BYTE 0 ; # OF SHIFTS
0375 OUTVEC .BYTE 0 ; OUTPUT
0380 TEMP .BYTE 0
0385 TEMP2 .BYTE 0
0390 OPEN LDA #0
0395 STA CHK1
0400 STA BUFPR
0405 LDY #2 ; TEST P OR S:
0410 LDA (ZIOC8+4),Y
0415 CMP #:
0420 BNE OPR
0425 BNE OPR
0430 BNE OPR
0435 BNE OPR
0440 BNE OPR
0445 BNE OPR
0450 SET LDA #5 ; SET MODE = 5:
0455 STA OUTVEC
0460 RTS
0465 SET LDA #7 ; SET DEVICE NAK
0470 RTS
0475 SET LDA #6 ; SET MODE = 6:
0480 STA OUTVEC
0485 RTS
0490 RTS
0495 PUT LTY BUFPTR ; TRANSFER BYTE
0500 CMP #80 ; OF DATA TO
0505 BEG OVERRUN ; BUFFER AREA
0510 STA BUFFER,Y
0515 CMP #60 ; END-OF-LINE?
0520 BEQ DLSUM ; YES - CALCULATE
0525 INC BUFPTR ; NO - RETURN
0530 BNE EXIT
0535 RTS
0540 RTS
0545 CHOUT TAY ; OUTPUT BYTE
0550 LDX 0
0555 LDA OUTVEC
0560 CMP #P
0565 BEQ PRTR
0570 SCR LDA EDVFC+7 ; GET E: DRIVER
0575 PHA ; PUT BYTE ADDRESS
0580 LDA EDVFC+6 ; AND EXECUTE IT
0585 PHA
0590 TAA
0595 RTS
0600 PRTR LDA PRVLC+7 ; GET P: DRIVER
0605 PHA ; PUT BYTE ADDRESS
0610 LDA PRVLC+6 ; AND EXECUTE IT
0615 PHA
0620 TAA
0625 RTS

Figure 11: Flow chart showing the process used for adding a byte to the checksum

1110 RTS
1115 DCSUM JMP CALC
1120 LDA $255 ; PRINT LINE NO.
1125 POUT LDA #255 ; PRINT LINE NO.
1130 SP INY
1135 LDA BUFFER,Y
1140 CMP #60
1145 BEQ GSP
1150 CMP #SPACE
1155 BNE GSP
1160 BNE SP
1165 SP1 CPY #5
1170 LDA BUFFER,Y
1175 CMP #60
1180 BEQ GSP
1185 CMP #SPACE
1190 BNE SP
1195 BNE SP1
1200 SP1 CPY #5
1205 BNE SP2
1210 SP2 CPY #5
1215 RTS
1220 LDA $255 ; PRINT LINE NO.
1225 SP1 CPY #5
1230 BNE SP2
1235 LDA BUFFER,Y
1240 CMP #60
1245 BEQ GSP
1250 CMP #SPACE
1255 BNE SP2
1260 BNE SP1
1265 SP1 CPY #5
1270 LDA BUFFER,Y
1275 CMP #60
1280 BEQ GSP
1285 CMP #SPACE
1290 BNE SP1
1295 RTS
1300 POUT LDA #255 ; PRINT LINE NO.
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