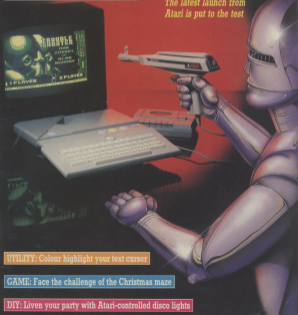


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The machine code secrets behind last month's superb utility.

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Archimedes shown here in the Archimedes 1000 series (model number A3000). Other models are available.

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Atari in top gear at Motor Fair

ATARI UK passed a big air at the Motor Fair in Olympia by setting up a computer games stand.

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

An Atari spokesman said: "We believe that many of the 200,000 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 told us that one of the most exciting exhibits in the centre is actually 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 1986 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 700 computer in Telecom Gold's top security London head-

As part of the new deal, the service is being transferred to a machine that is four times more powerful - the Prime 9000.

"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".

Parallel interface for Ataris

A LEADING supplier is going 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 £26.99 and could open up the 8 bit machine to the world.

A series of handlers will be produced by Computer House (01-731 1238) to enable the interface to work with modems, printers and M&M, using a standard 25-way D socket. With a ram 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 1200K high resolution designer is on the cards which will work very well with C&F's Snapshot.

Also to be released is Word Magic, which John May describes as a word processor with built-in graphics. It will cost £12.99.



Pictured after signing the £1.3 million deal are Telecom Gold general manager Clem Jones (seated left) and head of MicroLink Derek Meakin. Looking on, from left, are MicroLink sales and marketing manager Mike Hayes, Telecom Gold sales and marketing head Philip Madden, MicroLink joint managing director Michael Meakin, MicroLink marketing director Peter Burnfield, Telecom Gold northern sales manager David Bromley and MicroLink systems manager Tim Clarkson.

Software developers rapped

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

His firm, Trybridge, has sold computer software for more than four years and Fulman 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 Fulman. "The machines have so much

potential it is a pity that software houses are not picking up on them the way they should".

Fulman 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-releases of old titles that don't fully utilise the machines' capabilities".

One major software house was quick to deny the situation. It is as grim as Fulman describes it, US Gold mar-

keting and product manager Richard Tidwell told Atari User: "Currently we have 85 games available on license 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.

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Be a back seat

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

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

Red Hat (061-826 1065) 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 *Man! Joe*,

driver

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.

Man! Joe gives a bird's eye view of an armoured car which must negotiate a desert road and a city taking on all opponents along the way.

The second double pack features platform adventures *Dragon Ball* and *Planet Hero*.

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

Colour-coded discs

A batch of 6,200 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 back-up discs.

John Taylor, managing director of Centec (0883 35362), 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, back-up 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 Kent - now half-owned by Software Express (021-328 3685) - has put together an *On Disc Typesetter* and *Printer Stamp*.

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

THE
GALLUP
CHART

TOP 20
SOFTWARE

| THIS MONTH | LAST MONTH | TITLE (Software House) | PRICE |
|------------|------------|--------------------------------------|-------|
| 1 | ▲ | DECATHLON Firebird | 1.99 |
| 2 | ▲ | FOUR Mastertronic | 1.99 |
| 3 | ▼ | 100 Mastertronic | 2.99 |
| 4 | ▲ | DAZZY DICE Players | 1.99 |
| 5 | ▲ | GAUNTLET US Gold | 9.95 |
| 6 | • | MONKEY MAGIC Alternative | 1.99 |
| 7 | ▼ | MILK RACE Mastertronic | 2.99 |
| 8 | ▼ | ON CUE Mastertronic | 2.99 |
| 9 | • | HOVER BOYVER Mastertronic | 1.99 |
| 10 | ▲ | LEADERBOARD US Gold | 9.95 |
| 11 | ▼ | STORM Bally | 1.99 |
| 12 | ▼ | SILENT SERVICE Microprose/US Gold | 9.95 |
| 13 | • | DRUD Firebird | 9.95 |
| 14 | • | RED MAX Code Masters | 1.99 |
| 15 | ▼ | BOULDER DASH II First Star-Prime | 2.99 |
| 16 | • | INVASION Mastertronic | 1.99 |
| 17 | • | FOUR GREAT GAMES Micro Value | 3.99 |
| 18 | • | FOOTBALL MANAGER Additive | 1.99 |
| 19 | ▼ | LIVING DAYLIGHTS Demarc | 9.95 |
| 20 | • | FOUR GREAT GAMES 2 Micro Value | 3.99 |

Compiled by Gallup/Microimage

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.

NOW many times have you been editing a program on screen, then looked away for a minute, looked back and couldn't find the cursor? Well here's a program that leads the normal cursor with a coloured player missile.

It will help you find it in a screen full of text or you could even use the cursor to indicate an INPUT from the keyboard by changing its colour after each entry.

The new cursor shows up particularly well in reverse video strings, where it is often easily lost during editing. It's visible on any Graphics 0 screen in Basic, Dos or Assembler, and will also appear in the text window. It will remain even if you press Break or System Reset.

There are two versions of the program: Program I creates an AUTOREV.SYS file on any Dos disc, while Program II creates an AUTOEDIT cassette. Type in the program you need and use the Get It Right III shortcut to correct any typing errors.

If you use disc save your program as a master, then Run it. It will proceed to create a .SYS file to check which will load into memory on power-up.

Type users should save a copy of the program as a master, put a cassette in the recorder, rewind it and press Record and Play together. Run the program and, when you hear two beeps, press Return to save your autoload version to tape. When the program ends, switch the computer off and reinsert the cassette.

Getting the coloured cursor is now just like booting a game: Press Play, hold down Start and switch on. When you hear the beep, press Return, and after about 10 seconds the coloured cursor will appear. Remember to stop the cassette.

The cursor colour is initially set to orange, but you can alter this in either program by changing the 240 - line 1060 of Program I, line 1040 of Program II - to any number from 1 to 255. Some of the colours available are given in the panel below if you want to

Lost in your listings?

Colour your cursor with this superb utility from David Steele

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 player-missile graphics in your program, switch off the coloured cursor and when you have finished with them enter POKÉ 54070,4:POKE 53273,3 before switching them back on.

The coloured cursor boots from disc or cassette into page 0 and 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 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 panel above.

Listing 1: Program to create AUTOEDIT.II to edit files.

```

10 REM COLOURED CURSOR
11 REM BY DAVID STEELE © 1987
12 REM CONTROL CODE
13 REM POKÉ 705 TO CHANGE
14 REM POKÉ 709 TO CHANGE
15 REM POKÉ 710 TO CHANGE
16 REM POKÉ 54070,4:POKE 53273,3
17 REM POKÉ 54070,4:POKE 53273,3
18 REM POKÉ 54070,4:POKE 53273,3
19 REM POKÉ 54070,4:POKE 53273,3
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99 REM POKÉ 54070,4:POKE 53273,3
100 REM POKÉ 54070,4:POKE 53273,3

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| 1624 | 1625 | 1626 | 1627 | 1628 | 1629 | 1630 | 1631 | 1632 | 1633 | 1634 | 1635 |
| 1636 | 1637 | 1638 | 1639 | 1640 | 1641 | 1642 | 1643 | 1644 | 1645 | 1646 | 1647 |
| 1648 | 1649 | 1650 | 1651 | 1652 | 1653 | 1654 | 1655 | 1656 | 1657 | 1658 | 1659 |
| 1660 | 1661 | 1662 | 1663 | 1664 | 1665 | 1666 | 1667 | 1668 | 1669 | 1670 | 1671 |
| 1672 | 1673 | 1674 | 1675 | 1676 | 1677 | 1678 | 1679 | 1680 | 1681 | 1682 | 1683 |
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| 1840 | 1841 | 1842 | 1843 | 1844 | 1845 | 1846 | 1847 | 1848 | 1849 | 1850 | 1851 |
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| 1864 | 1865 | 1866 | 1867 | 1868 | 1869 | 1870 | 1871 | 1872 | 1873 | 1874 | 1875 |
| 1876 | 1877 | 1878 | 1879 | 1880 | 1881 | 1882 | 1883 | 1884 | 1885 | 1886 | 1887 |
| 1888 | 1889 | 1890 | 1891 | 1892 | 1893 | 1894 | 1895 | 1896 | 1897 | 1898 | 1899 |
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| 1912 | 1913 | 1914 | 1915 | 1916 | 1917 | 1918 | 1919 | 1920 | 1921 | 1922 | 1923 |
| 1924 | 1925 | 1926 | 1927 | 1928 | 1929 | 1930 | 1931 | 1932 | 1933 | 1934 | 1935 |
| 1936 | 1937 | 1938 | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 |
| 1948 | 1949 | 1950 | 1951 | 1952 | 1953 | 1954 | 1955 | 1956 | 1957 | 1958 | 1959 |
| 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 | 1971 |
| 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 |
| 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 |
| 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
| 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
| 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 |
| 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 |
| 2044 | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 | 2052 | 2053 | 2054 | 2055 |
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| 2116 | 2117 | 2118 | 2119 | 2120 | 2121 | 2122 | 2123 | 2124 | 2125 | 2126 | 2127 |
| 2128 | 2129 | 2130 | 2131 | 2132 | 2133 | 2134 | 2135 | 2136 | 2137 | 2138 | 2139 |
| 2140 | 214 | | | | | | | | | | |

Graphics galore

Program: *Blazing Paddles*
Price: £29.95
Supplier: Baudville/ABC
Marketing, 33 Cambridge
Street, Abingdon, Oxfordshire
OX14 3AE
Tel: 0562 27960

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 overwhelmed 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 on-screen 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. It is little jerky.

The Touch Tablet requires a *Keelo 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 stick 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 80 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 18 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 preset pattern boxes found at the base of the colour palette screen you

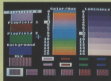
can also mix two colours for the patterns. These are a mixture of horizontal and vertical lines in a checker-board design.

The Spray command produces a stippled effect using a defined colour - although there doesn't seem any method of modifying the raster 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



King-sized

Program: Knight Orc
Price: £74.95 (includes post
and p&h)

Supplier: Rainbird Software,
First Floor, 20 New Oxford
Street, London WC1A 1PS.
Tel: 01 240 8639

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 adventures the role of the hero or heroine is normally taken over by the player. Not so in Knight Orc. Yes, you do play the main part, but in this case the star is an ill-fam'dling, cowardly Orc by the name of Grindiguts.

Orcs have been persecuted by adventurers for generations – is it possible that you now 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 ancestor Orc chums did this to you while you were incarcerated, volunteering you as their champion while you slept on.

Because you're a yellow streaked, somewhat repellent streak of Orcness, 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 30, 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 Art Warrior, Mrs Wallig, 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 missed.

Characters can be talked to, conversed with, followed and even embraced – the powerful parser allows you to carry out such interesting actions as "Walk for the innkeeper and attack him".

Simple, obvious, but it 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 logic.

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 1) is to stay alive long enough to collect enough lengths of rope to cross a bridge into Part 2, once there, the action 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 exterior spots in Part 1), 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 2 and 3 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 restore features including name 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 adventures of you Time and Magic, and Jinnex.

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

Plundered Hearts, and Nord and Bert Caudin's Make Head Nor Tail Of It, the two new Introsive titles, are also on the edge of release. Rainbird is looking into them.

| | |
|-----------------|---|
| Presentation | 5 |
| Atmosphere | 7 |
| Plot/Story | 6 |
| Value for money | 6 |
| Overall | 6 |

No jump for joy

Program: *Leapster*
Price: £9.99 (suggested) £7.99 (actual)
Supplier: *Real Fun Software*
17-19 Fenner Street, Manchester M4 3DU
Tel: 061-633 7055

I HAD high hopes for *Leapster* as it leaped. This 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 ineffective enough.

The jaunty tune had stopped to a lurchy 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 the way to school. *Season's mums* 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 dejected leprechaun, bowling down the street heading towards on-rushing motor cars.

Looking at the houses you see various objects shown floating 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 - must 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 since the leaping on to car bonnet starts is mastered there is little to offer a challenge.

I am afraid that I found the story line a little disjointed, but maybe *Real Fun* 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.

Real Fun is capable of producing better than this.

Missile Remarks

| | |
|-----------------|---|
| Sound | 8 |
| Graphics | 7 |
| Playability | 8 |
| Value for money | 8 |
| Overall | 8 |

Don't nod off...

Program: *Nightmare*
Price: £9.99 (suggested) £7.99 (actual)
Supplier: *Real Fun Software*
17-19 Fenner Street, Manchester M4 3DU
Tel: 061-633 7055

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

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

Then things started happening. Blue Aerlins 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 in order to get into the next level of this strange experience.

Unconcerned as I am to going round picking up fairies, I nonetheless steered 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 revvered spot globes of energy sucking venom ate 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 gutted up the fairies and despatched sufficient Aerlins and Grunts, I baited 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 *Nightmare*, a new title from *Real Fun*.

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

Paul Mills

| | |
|-----------------|---|
| Sound | 8 |
| Graphics | 8 |
| Playability | 8 |
| Value for money | 7 |
| Overall | 8 |

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 fire-button combinations on 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 equally 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 10 minutes — which was when I realised 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 *Demolition* into precisely the right position before he jumps? Well it's a doddle with this controller — you can raise 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 — *Exotic* and *Olympics* clones — which rapidly laminate 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 funny 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 Goldberg's gadgets. Nice bonus, that.

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

The switches are all genuine key-board "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 £18.95 look quite reasonable — if it weren't for 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: £18.95
Supplier: RM Design, 127 Staveley Avenue, Harrogate, North Yorkshire NG2 5JL
Tel: 0637 88020



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GEORGE O'DONNELL takes a look at an alternative joystick

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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 V for up, B for down, G left and H right. If you get stuck at anytime during the game press the spacebar to rest 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! to ensure that you have entered it correctly.

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

Turn to Page 27

By **MATTHEW BERNSTEIN**
and **CASPIAN PRINCE**



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Your HINTS & TIPS

Feud



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 castle and into the spells that are complete so you can use them against your brother. — **William Gledhill, 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 Huxsey, High Wycombe, Bucks.**

Astromeda



THERE is a unimplemented feature of the game. If you stop your craft on top of the landing 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. — **Drush Bhada, Harloweson, London.**

Alternate Reality

THERE are two healers and they work on alternate floors so, if a healer is out when you arrive, wait until the next floor 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 slides that you join, except that their prices are six high. The small green dragons and wreaths can be tricked, so you don't need to fight them.

After using the healer his prices will increase, so exit and walk back in again. — **Granville Dandy, Leeds.**

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, Hemley, Essex.**

Mercenary 2 — The Second City

HERE is a tip for getting into the programmer's special secret rooms. When you start, board the Dominion Dam and fly to a height of over 356 metres then level out. Press B and then keep > pressed until you reach a speed of around 1181 kph.

Fire a bullet and as you fly close to it pick it up by pressing T. Then fly back to location 00-00 and pick up the object that you started the game inside.

At this point fly to any elevator — the one at location 00-01 is probably the easiest one to get to.

Go underground and walk to the tri-

Pole Position



WHEN you start, keep the pause button pressed and this way your finishing time will be around 40 seconds. — **Nicholas Atkins, Brentall, Leicester.**

Scrolls of Abaddon

PLUG a joystick into port two, type POW and after the game has started you can then move the creatures. To change men press fire. — **David Master, France, Roulers.**

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, Hemley, Essex.**

angular 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 hangar, out of prison and across millions of credits easily. It will also be easy to find the Novastive and the intergalactic spaceship and escape.

Final quick tip: one of the complexes, but 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 bat shaft from the mosquitoes. — **Paul Myler, Welton, Surrey.**

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Something old, something new . . .



**NEIL FAWCETT takes a
look at Atari's latest baby**

It's 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 main 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 mouse. The DIN audio/video output socket found on earlier machines is replaced by two phone sockets.

The parallel bus that featured on all XL models 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 console's overall look.

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 rom available to the user and an operating system of around 20k. Contained within the OS is Basic, the game and a self test routine — not bad for a so-called games machine.

Keyboard

A standard query 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 Atari.

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 754,204 you will be able to get an international character set if you use the control key in conjunction with key entries.

KC12 Tape recorder

Atari tape units have, with the exception of the very first 410 recorder, been badly designed. The KC12 is a vast improvement in a variety of ways.

The power supply is now taken from the serial lead, and most of the unit is of metal construction and so should last longer than the plastic keys and inserts on the older disks.

The unit complements the system nicely, and will also match the 130XE. When I plugged the tape deck into the back of my old drive I had trouble loading tapes but when plugged directly into the console it performed perfectly.

Light gun

The gun looks as though it has come straight out of a sci-fi movie and so should appeal to kids of all ages. On a disc in the review package was a shoot-'em-up game that uses the gun to click at bugs on the screen and it worked fine at a fairly long range.

At the moment there is doesn't seem to be any commercial software to take advantage of the gun. However, it is easy to write your own because it works like a light pen.

To get you started here is a short program to demonstrate the techniques used in reading the information sent from the gun to the console:

```
10 POKE 752,1:REM TURN OFF LIGHTS
20 AT=INKEY:GOTO 14:POKE 750:REM READ A
30 IF 1:GOTO 30:GOTO 30:GOTO 30
40 POKE 1:GOTO 125:POKE 751,1:1
50 REM READ VALUE RETURNED
60 IF 1:GOTO 60:1=1:REM COUNT VALUE
70 REM READ VALUE IF THROUGH PROCESS
80 IF 1:GOTO 80:1=1:REM COUNT VALUE
90 GOTO 90:REM REPEAT THE PROCESS
```

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 KLXX series.

The system was fully compatible with all the commercial software packages I tried on it - and these ranged from Mini Office II to International Karate. All the electronic add-ons I tried also worked on the system, including an RS0 interface box, Epson FX80 and Atari 1620 printer.

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

The console is controlled by a 6602 CPU and has the GTIA custom graphics chip and the POKEY custom sound chip, both being custom chips dedicated to the Atari range.

When these are combined you have at your fingertips some of the best 8 bit electronics to come off the drawing boards in the last decade. The computer still has the 6502 PIC chip, and so interlocking techniques are the same.

Programmers have available to them a palette of 256 colours and with a minimum of effort all can be displayed at once. There are 11 graphics and five text modes on offer.

The graphics capabilities are superb and spectacular visual effects can be created using the GII - Display List Interrupt.

The POKEY sound chip allows you to control four channels independently, with a frequency control ranging from .06Hz to 800Hz - so any sound effects created are quite stunning.

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 eyes.

Including disc software well over 2000 pieces of software will work on the new systems.

❖ KI Computer Games Console:

Atari/Atre 85XE, built-in Atari/Atre Command and joystick, £79.95.

❖ KI Computer Games System:

Atari/Atre 85XE, keyboard, light pen, built-in Atari/Atre Command and joystick, light simulator II and Bug Hunt games, £119.95.

❖ Starter Pack:

Atari/Atre competing tutorial, 130XE, KC12 cassette, controller, Star Raiders, Atari/Atre Command and Atari Tennis cartridges, £129.95.

Heart of the new machine



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

We 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.

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 matrix 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 seat-of-furniture displays, switching from one lighting pattern to the next by a single touch on the keyboard.

Each channel can handle up to six 80 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 1 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 line currents from the joystick port, making them powerful enough to drive four light-emitting diodes in a read-out-isolator.

Your return 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 0-2-0 volt outputs, capable of delivering at least 100mA.

The outputs from the opto-isolator are fed to the inputs of a four-bit latch (IC2). 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 made from IC3 and IC2a. Its output goes high for a few microseconds, unclamping 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, test 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 RN 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 add your own PCBs can use the patterns shown in Figure 2. All holes are brass, except the mounting holes for the

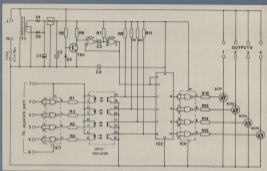


Figure 1: The circuit

tracks and the PCB itself (2mm), the fuse clips (1.5mm) and the terminal blocks (1.5mm).

Figure 11 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 11 shows a fuse in-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. Magnin's type F0088 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

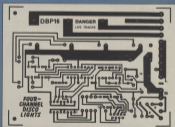


Figure 11: The PCB foot-candle view

marked with a broad band containing chevrons and the number 9. Next fit T1 and the 3-pin D connector which will accept the joystick extension cable.

Finally, fit the brass. Strip off the centre lead from each, and bend the

remaining mass at right-angles to fit the PCB holes. If your PCB is not roller-brazed, scrape away the attachment coating under each trace fitting hole, so that the bolt can make good

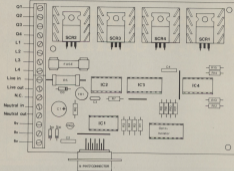


Figure 3: Component layout

4 From Page 23

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 M4 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 part 1 and run Program 1. Check each of IC1's outputs - pins 6, 8, 9 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 8, 9 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 5V battery to the terminal block, with its positive lead going to one of the points marked 5V, and its negative lead to 0V.

Alternatively, wire your transformer

near 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 0V points - it doesn't matter which way round they go - and the different one to 5V.

Check that 5v appears at each IC

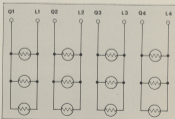


Figure 4: Sulf layout

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 IC3 (pins 2, 3, 7 and 8). They should go low in sequence.

Disconnect the power supply, insert IC3 and IC4, and reconnect the low-voltage supply. Temporarily link pins 8 and 14 at the socket of IC2. This will unlash IC2, so that section 2 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 10.

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 meter in parallel with each output, in aid of 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 battery 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 batteries, 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 1: Basic test program

```

1 REM PROGRAM 1: TEST SEQUENCE (START 002)
10 POKE 54816,50:POKE 54816,250:POKE 5
  1070,40:POKE 54816,8
20 INPUT #
30 POKE 54816,8
40 GOTO 20
  
```



```

1 500 010
10 000 010
20 010 010
30 000 010
40 000 010
  
```

Program 2: Basic strobe program

```

1 REM PROGRAM 2: STROBE CHANNEL 1 (START
  002)
10 POKE 54816,50:POKE 54816,250:POKE 5
  1070,40:POKE 54816,8
20 POKE 54816,1000:WAIT CHANNEL 1 0
  8
30 FOR V=0 TO 99999:GOTO 100:V=V+1
40 POKE 54816,8:FOR WAITER=0 TO 99999
  0:V=V
50 FOR W=0 TO 99999:GOTO 100:W=W+1
60 POKE 54816,8:FOR SWITCH=0 TO 99999
  0:V=V
70 GOTO 20
  
```



```

1 100 110
10 100 110
20 110 110
30 000 110
40 110 110
50 000 110
60 000 110
  
```

Program 3: Basic chase program

```

1 REM PROGRAM 3: FOUR CHANNEL CHASE
  (START 002)
10 POKE 54816,50:POKE 54816,250:POKE 5
  1070,40:POKE 54816,8
20 REMOTE=0
30 FOR CHANNEL=1 TO 4
40 FOR CHANNEL=CHANNEL+1 TO 4
50 FOR W=0 TO 99999:GOTO 100:W=W+1
60 POKE 54816,8
70 GOTO 20
  
```



```

1 100 110
10 000 110
20 011 110
30 021 110
40 000 110
50 001 110
60 000 110
  
```

Program 4: Basic random flash with equal intervals program

```

1 REM PROGRAM 4 - FLASHED LIGHTS ON 80
  MICRO CHANNELS, WITH PAUSE BETWEEN
  1 BETWEEN CHANNELS
10 POKE 54816,10:POKE 54816,255:POKE 5
  400,80:POKE 54816,8
20 INPUT#00000000:CONTROL:THE RATE OF
  CHANGE (1) IS ABOVE 1 SECOND
30 INPUT#00000000:11111
40 POKE 54816,8
50 FOR V=0 TO 99999:GOTO 100:V=V+1
  
```



```

1 000 110
10 000 110
20 001 110
30 001 110
40 000 110
50 000 110
  
```

Program 5: Basic flash with random interval program

```

1 REM PROGRAM 5 - FLASHED LIGHTS ON 80
  MICRO CHANNELS, WITH RANDOM INTERVALS
  BETWEEN CHANNELS
10 POKE 54816,50:POKE 54816,250:POKE 5
  1070,40:POKE 54816,8
40 INPUT#00000000:CONTROL:ENTER RANGE
  0 PATTERNS
20 INPUT#00000000:0001:0001:SELECT THE
  NEW VALUE
40 POKE 54816,8
50 FOR V=0 TO 99999:GOTO 100:V=V+1
  
```



```

1 100 110
10 100 110
20 100 110
30 100 110
40 100 110
50 100 110
  
```

Program 10: Basic program to control flash from keyboard

```

10 REM PROGRAM 10 - Keyboard controlled
  sequencer. Press "0" to advance, "1"
  to go back or "ESC" to start again
20 INPUT#000:LOAD THE DATA FROM PAGE 4
30 GOTO 11111:WAIT 1000:G0
40 POKE 54816,10:CONTROL:IF 0-99:GOTO 1
  100:WAIT 0.1:G0
40 GOTO 10
40 REMOTE=1
50 POKE 54816,50:POKE 54816,255:POKE 5
  400,80:POKE 54816,8
60 INPUT#011
70 REM
80 INPUT#00000000:11111
90 POSITION 8,1:PRINT:CONTROL:NUMBER
  "0"
100 POSITION 8,1:PRINT:NUMBER:NUMBER
  "0"
110 IF 0-999 THEN POSITION 8,1:PRINT:ESC
  1:GOTO 100
120 IF 0-999 THEN POSITION 8,1:PRINT:ESC
  1:GOTO 100
130 IF 0-999 THEN POSITION 8,1:PRINT:ESC
  1:GOTO 100
140 IF 0-999 THEN POSITION 8,1:PRINT:ESC
  1:GOTO 100
150 IF 0-999 THEN POSITION 8,1:PRINT:ESC
  1:GOTO 100
160 IF 0-999 THEN POSITION 8,1:PRINT:ESC
  1:GOTO 100
170 IF 0-999 THEN POSITION 8,1:PRINT:ESC
  1:GOTO 100
180 IF 0-999 THEN POSITION 8,1:PRINT:ESC
  1:GOTO 100
190 IF 0-999 THEN POSITION 8,1:PRINT:ESC
  1:GOTO 100
  
```



```

10 011 010
20 001 010
30 010 010
40 000 010
50 000 010
60 000 010
70 000 010
80 000 010
90 000 010
  
```

| Number in SAE16 | PORT 1 | | | |
|-----------------|--------|--------|--------|--------|
| | Chan.1 | Chan.2 | Chan.3 | Chan.4 |
| 0 | OFF | OFF | OFF | OFF |
| 1 | ON | OFF | OFF | OFF |
| 2 | OFF | ON | OFF | OFF |
| 3 | ON | ON | OFF | OFF |
| 4 | OFF | OFF | ON | OFF |
| 5 | ON | OFF | ON | OFF |
| 6 | OFF | ON | ON | OFF |
| 7 | ON | ON | ON | OFF |
| 8 | OFF | OFF | OFF | ON |
| 9 | ON | OFF | OFF | ON |
| 10 | OFF | ON | OFF | ON |
| 11 | ON | ON | OFF | ON |
| 12 | OFF | OFF | ON | ON |
| 13 | ON | OFF | ON | ON |
| 14 | OFF | ON | ON | ON |
| 15 | ON | ON | ON | ON |

Table 1: Output switching

4 From Page 27

wired in parallel, as shown in Figure 19.

The lighting effects available are very easily programmed, and we have listed a few ideas to get you started. Table 1 shows the numbers which must be POKED into address SAE16 to switch on any given combination of channels.

Program II is a simple strobe, setting 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 pre-programmed 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 so 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 200 watts per channel.

| Pin number | PORT 1 | | | | PORT 2 | | | |
|----------------|--------|---|---|---|--------|----|----|-----|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Control Number | 1 | 2 | 4 | 8 | 16 | 32 | 64 | 128 |

Table 2: Switch control numbers

PARTS REQUIRED FOR 4-CHANNEL DISCO LIGHTS CONTROLLER

| | Magline Code |
|-----------|----------------------------|
| R1-R4 | 820 ohm (4 off) |
| R5 | 100K 1 Watt |
| R6 | 700 |
| R7 | 100K |
| R8-R11 | 4K7 (4 off) |
| R12-R16 | 520 ohm (4 off) |
| C1 | 470 micro 25v |
| C2 | 0.1 mfd miniature disc |
| C3 | 1800 pf (1 off) ceramic |
| C4 | 0.01 mfd miniature disc |
| IC1, IC4 | 74AC00 (2 off) |
| IC2 | 74AC02 |
| IC3 | 74LS76 |
| DS-D3 | 74AC04 (3 off) |
| TR1 | 8C117 |
| SCR1-SCR4 | C2080 Triacs (4 off) |
| T1 | 6-0-6v transformer |
| | Opto opto-isolator |
| | 78L05AWC +5v regulator |
| | 14-pin DIL sockets (3 off) |
| | 18-pin DIL sockets (2 off) |
| | Right-angle 8-pin D socket |

| | Magline Code |
|--------|----------------------------|
| | 4-way PCB block (2 off) |
| | Fuse clips (2 off) * |
| | 0.2A anti-surge fuse |
| | Varied heat sink (4 off) * |
| 1 pack | 88A, 2 1/2" PH bolts |
| 1 pack | 88A nuts |
| | Silicon grease * |
| | SCR25F |
| | SP16U |
| | HQ20A |

All the above components are available from:

Magline Electronic Supplies, P.O. Box 3, Rayleigh, Essex S85 5LR, Tel: 0202 862911

The printed circuit board (order code D6P10) at £4.80 and joystick extension lead (order code AT111) at £2.00 are available from:

R.H. Design, 137 Stonehill Avenue, Harrogate, North Yorkshire, HG2 7NS. Tel: 0423 588259

* 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 pre-designated keyboard 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 will 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 speaker.

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 whirl 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:

DELH00107M1

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

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Turn to Page 60

Green witches and lurking bugs

by
Rouloc

PRDW! Never thought I was going to make it in time for this month's issue. There I was in Teravia (a small village — turn left just past Orter Mengolia and it's first on the right) surrounded by a thousand slaving orcs. I'd have preferred to have thousand 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 *Psittacop* at the place in the instantiation where I should I should have said *Strookpart* 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.

Well, it's an ill wind and all that. On the way back, I stopped off for a quick oil change on the broomstick and jumped into my old friend *Billig* from *Ann ST Liser* — he had just popped into the same garage for a refuel job on his wand.

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

If you have the brass tyran ring, take it into the terminal soon 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 horse 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 *Bainbird* — its next Magnetic Scrolls adventure called *Jinxer* 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 *Guild of Thieves*, *Jinxer* is a modern and humorous tale set in Apollonia.

The green witches are gaining power in Apollonia, 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 mailing has been going over 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 self-inflicted dangers in foreign climes.

My thanks this month go to *Adam*

From to Page 42



4 From Page 41

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 dull!

Faul Clark in Postino was grateful for our map of Worm in Paradise in the August 1987 issue of *Alan's Quest*, but is still having trouble with the Basic listing because using the Ethen transport system he keeps getting a Dm error.

I thought the program was correct and 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 incorrect, but Ty Hays of Newston 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 faculty recitation of transportation spells – and I have to wear all my shoes specially made by the Seven League Boot and Shoe Company.

Speaking of small folk, Lord B has written an adventure about one of my old heroes – a young bossy gnome by the name of Ingrid Bottomlow. The adventure is called *George 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 *Monks' Quest*, Bob Stacy of Cardiff with *The Lurking Horror*, Peter Gaudin of Lincoln with *Arrow Of Death Part 8*, Mike Proctor at Silverdale with *The Paron*, 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 get lost next month – I plan to buy a new transportation spell. If I do manage to get here without a hitch, maybe I'll let you have a list of how all the points in *The Paron* are awarded. Here's that for a treat! Until then, exciting adventuring!

Hints & tips

LEATHER GODDESSES OF PHOBOS

- Having a tough time in the cage with the gorilla?

Throw the chocolate into the cage before being strapped down. Once in the cage, eat the chocolate and you'll be strong enough to pull the bars and get out.

- Sulfur's *chicken solution* hurting you?

The answer is "sister".

- Can't get into the lights?

Put the baby in the basket, put the basket on the stool, hide and wait for the baby to be taken into the orphanage.

- Cade's message a mystery?

Replace each letter by its third previous one in the alphabet, for example replace E by B and B by Y. Then read the whole message backwards.

THE PARON

- Five points left?
- Don't forget to ask the Devil "What is the wizard's hat?"

MORNING'S QUEST

- Can't get jyggy a problem?

Make a blowpipe using the bamboo, chair and Genie and kill the jyggy with it.

Now you've defeated the jyggy, you've got something to feed to the real-wing plant – grasshopper wuff!

THE LURKING HORROR

- Horrible monster keeps flying off with the Jungs?

Drive the creature away by throwing the stone at it inside the dome, go down to the sky-scaper roof and do it again.

ARROW OF DEATH Part 8

- Want to go somewhere from the bridge?

Hold on to the support rope and cut it – then you'll really be swinging! Make sure you've got a soft landing – fluffy leaves!



ATARI USER Classifieds

Has upgrading your computer given you hardware you no longer need? Or have changing interests left you with unwanted software? Then **THIS** is the place to advertise your surplus items. *Atari User* readers are always on the lookout for a bargain and this is the first place they look!

An added bonus!

Your advert will also be automatically displayed on MicroLink, the electronic mail service operated in association with Telecom Gold. This means it will be seen by thousands of computer enthusiasts who can send an instant response.

- Forty cassettes and twenty discs, all originals for sale 10 pence, compatible 60/90c. lots. Tel: 0793 776710.
- Atari 800XL, over 60 disc recorder plus 15 games 68c. Tel: 01 880 4317 Mr Hallyday Tom.
- Atari 8000L, disc drive, 1229 printer, data recorder, lots of software £280. Tel: 0708 46407.
- Atari 132E printer plus decoder rom 120 duplicating technologies, 1040 duplicator based 4.8 £100. Stockists disc reader £70 other original software best price. Tel: 0604 860356.
- Cassettes budget and full priced only £1 or £2. Tel: 051 124 4228.
- Atari 1300X, 8800L, 1050 plus Doublet, 1229, joystick, recorder, discs, cassettes, carts, books, mags etc £425 o.n.s. Tel: 0908 178320 after 5pm.
- For sale 1300X, 1050 disc drive, 880 Doublet £185. Tel: Robin Holland 0208 804765.
- Disc drive with Doublet £80 o.n.s. 1229 printer 120 o.n.s. either one speech sampler. Tel: 021 347 2678 evenings.
- To call Quarter Summer

- Games. Titles less than only 65.50 each. Also Quickshot, Valtreas, joystick £7 each, extension leads 6+ cost 14.75 each. Tel: 0793 260348.
- 8008L for sale £20. Tel: Dufford 50270 ask for Hugh.
- For sale or trade Silicon Dreams, Jovaris Daximus, Ultimate, Ultimate, Maroonary Conquidors, Ocean Explorer, original discs Mr J Murray, 88 Stockbridge Cross 45/80m, Ayrshire, Scotland. £425 795.
- Atari 800XL, 1050 disc drive, 1010 cassette over forty games on disc, cassettes, cartridge, 10 blank discs, 48 doc's, joystick, leads, hundreds of mags £250. Netras for sale as well. Tel: 01 728 2876.
- Atari 1300X, KC11 cassettes, joystick, keypad, software, magazines, books £250. Tel: 0690 30489.
- Wanted 1050 disc drive. Tel: 0627 55583 evenings.
- 8000L, 1280 disc drive, 1229 printer, joystick plus software and books/magazines as new in original packaging £250 o.n.s. Tel: 01452 806105 weekends only.

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- This service is **EXCLUSIVELY** for the use of private readers. No trade ads will be allowed.
- To avoid encouraging software piracy, all ads will be carefully vetted before they are accepted.
- Ads can only be accepted on this form (or a photocopy of it).
- There is no maximum to the number of words you include in your ad. If there is insufficient room on the form, continue on a separate sheet of paper.
- The cost is 20p per word, with a minimum of 10 words.
- We **GUARANTEE** your ad will appear in the January issue (on sale December 23) providing it is received by November 27.

- Atari 8008L, 1050 disc drive, 1010 tape rec, disc, tapes £200. Tel: Don 8000 606497.
- Atari touch table and software £15. Write: Philip Caribaris, 21 Durling Road, Bridgewater, Somerset, TA8 7AC.
- For sale Atari 8000L, 1280 disc drive, cassette recorder with 150 files including Ultimate II, Trivial Pursuit, Telemaster II, Kurosaki, Kurosaki micro lang, Habitat complete quarterbox and many more £250 o.n.s. Write or Call Mr J M Morris, 18 Mollacross, Farnwater, Cornwall, Great. Tel: Cornwall 86420.
- Dragons tail, toolkit, integrated floppy, 323 disc £75. Tel: 0684 620505.
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SK7 5NR.

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 for the film: if you crash your cycle in to 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 the fact 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 | Direction of computer |
| R | Locate value of computer |
| K, Y | Position of player |
| DL, DY | Direction of player |
| Z | Locate value of player |
| S | Stack(0) value |

```

1  P(1,40)R(1,40)D(1,40)Q(1,40)DP(1,40)
2  D(1,40)R(1,40)D(1,40)Q(1,40)DP(1,40)
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12 D(1,40)R(1,40)D(1,40)Q(1,40)DP(1,40)
13 P(1,40)R(1,40)D(1,40)Q(1,40)DP(1,40)
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20 D(1,40)R(1,40)D(1,40)Q(1,40)DP(1,40)

```

Get it right! II

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3 200 000
4 300 000
5 400 000
6 500 000

CHRISTMAS MESSAGE

from Gary Cheung

THIS free 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 Sets up graphics Mode X, 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 new 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.
- 35 Draws the tree lights using the colour in colour register 706.
- 40 Prints the Christmas message in the text window.
- 50 The tree lights are made to flash by changing the value of the colour register 706. This register also affects the message and the text flashes with the lights. Flipping 706 with 50 gives a star red and 15 gives a bright white.

```

10 GRAPHICS MODE X:COLORS 15,16
11 COLOR 706,15:PRINT "MERRY XMAS"
12 COLOR 15:PRINT "MERRY XMAS"
13 COLOR 15:PRINT "MERRY XMAS"
14 COLOR 15:PRINT "MERRY XMAS"
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99 COLOR 15:PRINT "MERRY XMAS"
100 COLOR 15:PRINT "MERRY XMAS"

```

Get it right! II

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Two discs crammed
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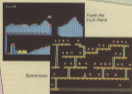
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Basic route to colourful triangles

I AM starting to learn Atari Basic and have written a program to draw and fill triangles in different colours. But I have some advice 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 81 you have a resolution of 64 by 100 pixels in 16 colours, and this will take up roughly 86 of memory before you start. But a Mode 7 display will only take up around 44.

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 8 text screen:

```
SETCOLOR 1,4,8 will
alter the intensity of
characters on screen.
SETCOLOR 2,8,8 will
alter the screen colour.
SETCOLOR 4,4,8 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 built-in word processor. Is it possible for me to fit one to my Atari 4000, in the same way? — A. Faulkner, Harrogate, North Devon.

The BBC Micro has space inside for several words. 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 built-in one.

Getting it right

IN the November 1987 issue of Atari User you published Get it Right 91. Are the checkpoints that you published for the old Get it Right still compatible with the new super high speed version? — Brenda Tanton, Sandbach, Cheshire.

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

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STARTING next month we will award £10 prizes for the most interesting letters sent to us.

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Get your pens out, start writing and you could be one of the winners. The address:

Mailbag Editor
Atari User
Europa House
60 Chester Road
Ridgeway
Stockport SK7 5NY

Looping into trouble

I WAS playing around with my Atari 4000 and wrote this simple program:

```
10 FOR I=0 TO 255
20 PRINT CHR$(I);
30 IF I=7
40 FOR J=0 TO 255:PRINT J
50 GOTO 1
```

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. Abert, Glenrothes, Fife.

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

| Atari code | Effect |
|------------|----------------|
| 27 | Escape |
| 32 | Blank space |
| 128 | Clear screen |
| 180 | EOI, or Return |
| 255 | Keyboard beep |

If you add 128 to the Ascii of a character it will appear in inverse video. For example, CHR\$(95) will give you A, but if you add 128 then give CHR\$(223) you will get an inverse capital A.

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

For example, a feature that the old program had that the old one didn't is a running cumulative checksum.

Tweened cartoon

AFTER typing in the excellent Tweening program from the November 1987 issue of Atari User I drew a cartoon character and lowered him between

two positions. I then printed out the individual screens of the animation using the CG Controller card screen dump utility.

Next I stuck the images together in load 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 guidance I could make a full length cartoon using it. - Philip Marston, Arridge, West Staff.

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 - MouseArt.

When I bought a product called the Atari compiler from them I had trouble installing library files on 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, Rowland, Essex.

Missing locations

I RECENTLY bought a tape version of International Karate. I enjoy agent situations 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 want to visit a friend who has a disc drive and I was surprised to find

ATARI USER

Mailbag

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
Europe House
88 Chester Road
Hazel Grove
Stockport SK7 5NR**

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

SEND me to composing and very willing to learn, I was attempting to follow the MD channels article by Andre Missig. But try as I may, I just keep getting stuck.

I don't know how to disable Basic and equal 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, Teworth, Staffs.

■ To create any machine code program you need an assembler language such as the Atari Assembler/Editor

cartridge or Mac/OS from Optimized System Software. These, and others, are available from several of the advertisers in Atari User.

Cardsharp cornered

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

Apart from the fact sound the computer always seems to win when random changes are chosen, I observed through the program and queried where the problem occurred and corrected it with the following changes:

```

000 07-011 0000 000 0
001 000 0000 000 000
002 000 000

```

This solves the problem of biased choings. - 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 48,1 will turn this noise off on all Atlaris, but when I tried it the beep was still there. Could you tell me how to get rid of this annoying sound? - L. J. Hawkins, 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.

Nice line in language

I RECENTLY bought Turbo Basic from Microsoft and was struck 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 Basic's, 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. Griffin, Wimbome, Dorset.

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 down 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

see that the spreadsheet only integrates with the graphics package. You could print out the part of the spreadsheet you want and then print the documents.

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 128K by Computebase, where I obtained very prompt and professional advice.

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, Middleburgh, Cleveland.**

■ The card you bought is designed to work on your 1200K only, but Computebase is planning to bring one out that will fit inside the 65XE.

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 or 9 or 1000.

■ 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:

INPUTREAD type mismatch error: Attempting to enter a non-numeric value for a numeric variable.

Check your data statements between lines 1040 and 1045. You will probably find that your mistake is

Cruel to edge connections

FOR a while now I have been programming using C65's Micro8 cartridge to write routines that can be called from Basic.

In order to test them I have to remove my Micro cartridge and retest the system with Basic. At this removing and replacing isn't exactly ideal for the cartridge edge connector.

Do you or any of your readers know of an edge connector extension that could be fitted to save wear

and tear?

Or better still a device that could be fitted between the cartridge port and the cartridge that would allow me to push the cartridge out without having to remove it? — **A. Crawford, Laseley, North Grimsby.**

■ If you own a 1200K the supra hard disc interface would give you a vertical slot for your cartridge. This will reduce wear and tear on the part on the computer.

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 where 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 essential about games on the Atari that makes this impossible? — **Sean Cunningham, 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 game(s) 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 Hits and Tips page.

Helpful review

I OWN a Panasonic 65XE-128K 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 Santow, Birchwood, Cheshire.**

Amateur radio

1200K must be thousands of amateur radio operators worldwide who, like me, are also Atari computer fans.

Are you or will you be 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? — **Bob Thompson, Leyland, Lancs.**

■ We don't know of any programs or add-on 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, Peters St, 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 Z80. Do 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 micro-processor 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:

- 2.80 microprocessor
- 4.8 MHz processing speed
- 64k ram
- CP/M 3.2 operating system
- 60000 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 as 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 1988



Guild of Thieves – it's a steal!

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

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SOFTWARE Solutions

Your programming problems
solved by **ANDRÉ WILLEY**

I've had a tremendously varied set of questions from you this month, starting with a problem from Timothy Haxington from Portsmouth who's having trouble with his memory.

I have been a regular reader of *Asst! 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 return 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 Missile 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 in *Chopper Rescue* to do within its machine code to do fast enough — to clear out any left behind data? It is surely 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, *Player Missile 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 indicators.

To clear the PMO data is slightly more complex than just *POKEing* the enable register to off with the command *POKE 599,34*. This will stop the ANTIC graphics chip from getting bytes of player data from memory, but will leave GTM — the display generator — free-running with random data giving the flickering vertical stripe you have noticed.

You can tell GTM to stop reading new data by using *POKE 5377,0* and the stripe becomes solid, which is at least some form of improvement. GTM in fact contains a number of temporary registers which hold the incoming PMO data until it can be processed, and since these haven't been specifically cleared they 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 (53260-53261), and the single missile register is at 53265 (53271). These must all be set to zero, and while we're doing that we might as well reset the PMO position and size registers at 53248-53260 (53250-53260) and the *PMOEN* and *WELLAR* bytes at 53275 (53276) and 53276 (53277).

Now that we've dealt with the PMOs let's turn off any user-defined interrupts which may be running. The OLI register is at 512,513 (5200,5201) and the Immediate and Deferred mode Vertical Blank Interrupts (VBFIs) are at 540,547 (5232,5233) and 544,549 (5274,5275) 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 52000 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 105,160* for a machine with more than 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(105)*.

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

```

1000 POKE 53261,0:POKE 53262,0:POKE 53263,0:POKE 53264,0
1010 POKE 53265,0:POKE 53248,0:POKE 53249,0:POKE 53250,0
1020 POKE 53251,0:POKE 53252,0:POKE 53253,0:POKE 53254,0
1030 POKE 53255,0:POKE 53256,0:POKE 53257,0:POKE 53258,0
1040 POKE 53259,0:POKE 53260,0:POKE 53275,0:POKE 53276,0
1050 POKE 512,513:POKE 540,547:POKE 544,549
1060 POKE 512,513:POKE 540,547:POKE 544,549
1070 POKE 512,513:POKE 540,547:POKE 544,549
1080 POKE 512,513:POKE 540,547:POKE 544,549
1090 POKE 512,513:POKE 540,547:POKE 544,549
1100 POKE 512,513:POKE 540,547:POKE 544,549
1110 POKE 512,513:POKE 540,547:POKE 544,549
1120 POKE 512,513:POKE 540,547:POKE 544,549
1130 POKE 512,513:POKE 540,547:POKE 544,549
1140 POKE 512,513:POKE 540,547:POKE 544,549
1150 POKE 512,513:POKE 540,547:POKE 544,549
1160 POKE 512,513:POKE 540,547:POKE 544,549
1170 POKE 512,513:POKE 540,547:POKE 544,549
1180 POKE 512,513:POKE 540,547:POKE 544,549
1190 POKE 512,513:POKE 540,547:POKE 544,549
1200 GOTO 1110

```

Listing 1. Memory clearing routine

4 From Page 63

you might encounter — games programmers are a perverse bunch at the best of times. However, Listing 1 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. Harwood** from Pembroke Dock, Dyfed writes:

I am writing a program in Basic for an 80002 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 10 10000 500,400,700
110 10 1110 20 110 800000
120 1010 110110,11011 40100
130 10110 110110,11011 40100
140 10110 110110,11011 40100
```

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 80002 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 different GOTO command in order not to wipe out other data which is stored in storage. **Y**

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 have pressed Return at the end of each line — hence the name.

Listing 1 is a small program to illustrate the technique, but you could expand it to do much greater things — including allowing 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 program. 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 NUM5.

Next comes a GRAPHICS 0 command to avoid corruption from any old lines of text which may still be on the screen. The POKE 998,0 simply turns off the display while the clever stuff goes on — only 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 "DOWNTALK"
```

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 842,0. 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. Thus it will carry on and find the COM1 command which will re-start your program.

The line immediately after COM1 should always be POKE 842,0 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.

```
10 000 0000000
20 000 0000 4111 00 1,1,1 0 4
30 000 11 2001010 110 800000
40 00000000000000
50 000011,11-00010000
60 00000101010000 110,1
70 11 11 100000,000000,00000
80 11 11 00000
90 0000000 0,0
100 000 042,0
110 000
120 000 042,0
130 000000 0
140 000 000 000 000 000 00000
```

Listing 1: Return-Key Mode demonstration

Before I disappear for another month there's just time to mention a letter I've received from **Chris Stevan** from Mold in Clwyd who has just given in *Get It Right!* 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 GO
IN BWT GAME
IS CHANGE TRINE #
IS 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 204 byte buffer defined near the end of the listing. As with most other assemblies, my own MACROS cartridge creates this space by simply allocating the released number of bytes, leaving any existing memory contents intact.

In order to configure my 1050 to work correctly with my hard disc and SpartaDOS I have set up an AUTODISK 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 GBI II object file. These bytes could just as easily be zero, 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 20 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 26 games console owners early in the New Year.

Merry Christmas all.

Are you having problems getting your programs to work? Write to Software Solutions, Atari User, Europe House, 80 Chester Road, Heston 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 Swain, who first got in touch through MicroLink's bulletin board, are finding electronic real mates for good business.

Graeme made a 12,900 per cent profit on a battered copy of Gower's *Evolution: Mineralogy* he sold to Tony, a director of natural history specialists Whistler & Winstley.

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

£150".

Tony Swain 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 176 years and turn it into a quite reasonable copy which I sold on the phone to a collector in America for £248 the same day", he said. "The three of us are very happy, and it's all thanks to MicroLink".

The aged scientist's tone 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 British 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 Fresh-File is using the system to advertise High Street chain store fashions wear at a fraction of normal retail prices.

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

Fresh-File's prices are as low as £2 for blouses usually priced £14.99 and £1.99 for shirts which normally retail at more than £13.

YOUR chance to join MicroLink – Page 18

New board for chess

MICROLINK subscriber Keith O'Donnell 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-box 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".

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

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

Theo's company, Precision Communications, is UK distributor for a Dutch product that links a muscle

Micro muscles

or several muscles to a joystick, allowing people with all kinds of muscular stresses to control a mouse.

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, Apricot, Apple and Macintosh", said Theo. "We will of course gladly pay for this work".

TWO years after finding himself out of a job at the age of 44, 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-encoding towers for closed circuit TV systems.

Now his project is

neering 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 at UK companies invaluable as a source of potential customers.

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

Tower triumph

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 II to check your listings.

The program is written in pure machine code, with a simple Basic routine to make it load 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 II is a fully re-locating 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 8 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



ANDRÉ WILLEY gives a detailed breakdown of our checksum program

address simply enough by changing the *-80700 definition on line 140, but once you've assembled it for a given address it must always be loaded there.

Listing I is the assembly code for the cassette version, and contains all the

necessary information to make a foot tape.

If you wish 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

PROGRAM BREAKDOWN

| | |
|------------------|---|
| 180 - 218 | Only applicable to the cassette version and contain the six foot header bytes. |
| 230 | The first line of code to be run—simply jumps to the setup code starting at line 240. |
| 250 - 320 | The handler vector table for CIO use—refer to the recent series on IO Channels for more information. |
| 380 - 450 | Define the ten internal work bytes used for data storage and operation flags. |
| 470 - 690 | Perform the CIO Open command. Finally the buffer pointer and cumulative checksum digit are cleared, then the zero-page KCB is accessed to find the address of the flagpac buffer. This should contain either 'G' or 'P', and the OUTVEC flag is set accordingly—or if neither is found an error 130 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). |
| 710, 730 and 750 | Perform the CIO Status, Special and Close functions—all of which simply return with the Y register set to one. |
| 800 and 810 | 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. |
| 830 and 840 | Return an error 138 should the user |

860 - 930

mistakenly try to GET bytes from the CIO handler.

Contains the Put-byte routine. This dumps the byte into a buffer area, increments the buffer pointer and returns, if the byte is 150—the first OF-Line marker—then the routine jumps to the CALC section of the program which is where the actual checksum is created.

950 - 1110

Output a single ASCII character to the screen or printer, depending on the value of OUTVEC. 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.

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.

This is a cheating way to generate an indirect JSR instruction, which is not included in the standard 6502 instruction set.

1150 - 1340

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 1400 to 1490 get and print the first digit, lines

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 address of \$0000 to their new location just above the original LDMEM.

So now you have Get it Right II 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.

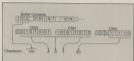


Figure 1: Calculating the checksum digits

Listing 1: Get-it-Right cassette version

```

10 GET IT RIGHT V2.0
20 :
30 WRITTEN BY MARK WELLS, 1987
40 :
50 D.O. NON-RELOCATING BASIC VERSION
60 :
70 04100 + 0001
80 11100 + 100
90 22100 + 0000
100 33100 + 0000
110 44 + 000
120 55100 + 10
130 :
140 ** 00000
150 :
160 04000000 0000 0000

```

```

170 :
180 0000 0010 0010 0
190 0010 0010 0000 0000 0000 0000 0000
200 0000 0000 0000
210 0000 0000
220 :
230 0000 0000 0000
240 :
250 0000 0000 0000 0000 0000 0000 0000
260 0000 0000 0000 0000 0000 0000 0000
270 0000 0000 0000 0000 0000 0000 0000
280 0000 0000 0000 0000 0000 0000 0000
290 0000 0000 0000 0000 0000 0000 0000
300 0000 0000 0000 0000 0000 0000 0000
310 0000 0000 0000 0000 0000 0000 0000
320 0000 0000 0000 0000 0000 0000 0000
330 0000 0000 0000 0000 0000 0000 0000
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840 0000 0000 0000 0000 0000 0000 0000
850 0000 0000 0000 0000 0000 0000 0000
860 0000 0000 0000 0000 0000 0000 0000
870 0000 0000 0000 0000 0000 0000 0000
880 0000 0000 0000 0000 0000 0000 0000
890 0000 0000 0000 0000 0000 0000 0000
900 0000 0000 0000 0000 0000 0000 0000
910 0000 0000 0000 0000 0000 0000 0000
920 0000 0000 0000 0000 0000 0000 0000
930 0000 0000 0000 0000 0000 0000 0000
940 0000 0000 0000 0000 0000 0000 0000
950 0000 0000 0000 0000 0000 0000 0000
960 0000 0000 0000 0000 0000 0000 0000
970 0000 0000 0000 0000 0000 0000 0000
980 0000 0000 0000 0000 0000 0000 0000
990 0000 0000 0000 0000 0000 0000 0000

```

Form for Page 001 B

1600 to 1650 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 5). 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 1760 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 C00 is exited via an RTS instruction.

1950 - 2000

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 6.

3000 and 3020

Contain the text strings for rem and data to allow for testing and setting flags accordingly.

3060 and 3070

Contain the list of valid characters which may be used for the checksum printouts.

3090 - 3420

Provide the initial code required for correct system reset handling. This includes looking for a blank entry in the DR's handler address table (HADR0) and inserting the address for our own G: driver, then setting MEMLO, LDMEM and APPMEM to tell the system where our code ends. After erasing the temporary work space the INIT code returns control to the DR, 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 for DOS6N0 vector to point to our initial routines. For disc users, they also set up an extra JSR within the INIT code to execute the original DOS6N0 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 (variable 200) to a value of one. This has the effect of making Basic do a cold-start which will reset its pointers with the new LDMEM values to leave space for our code.

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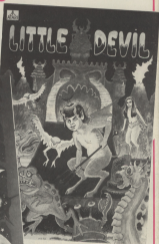
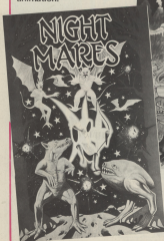
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