

YOUR
COMMODORE

NOVEMBER 1988

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EMERGENCY WARD 64

**William Tell –
Sprites Galore**

**HARLEY
STREET** W1

Games Reviewed:
The Three Stooges
Echelon ◊ Barbarian
Great Giana Sisters
Salamander

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Telephone (0452) 24 84
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Editor:

Steve Coody

Deputy Editor:

Eric Dool

Technical Editor:

Paul Eves

Advertisement

Manager:

Paul Kavanagh

Advertisement Copy

Control:

Andrew Selwood

Artist:

Alan Bachelor

Designer:

Neil Swerman

Origination:

Elbow Typesetting

Printer:

Clare Web

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 U.S.A.

REGULARS

- **Data Statements** 6
 Interesting snippets for Commodore owners
- **Games Update** 10
 Our view of the current software scene



- **First Steps** 32
 Advice for bridging Commodore owners
- **Constructing A Computer** 37
 Time to add the finishing touches
- **Software For Sale** 53
 The easy way to enter our superb listings
- **Listings** 60
 This month's programs and our System Checker
- **Book Page** 68
 Useful info and puzzles to tax your brain

	21	22	23	24
Data Statements	•	•	•	•
Games Update	•	•		
First Steps	•	•	•	•
Constructing A Computer	•	•		
Software For Sale	•	•		
Listings	•	•		
Book Page	•	•	•	•

FEATURES

- **Emergency Ward 64** 18
Trilogic's Doctors are always on-call
- **Salvander** 25
The arcade classic and successor to Nemesis
- **The Great Glass Sisters** 38
Controversial stuff from Rainbow Arts
- **Unlock Hidden C128 Powers** 41
Using C128 function key routines in C64 mode
- **The Finalizer** 41
Mardocosa mayhem from Imagine
- **Barbarian** 44
The Amiga blockbuster on the C64
- **Exodus** 52
Explore a new world and blast it to bits
- **Warp Speed** 57
A cartridge for both the C64 and the C128
- **Disk Contents** 58
Chapters and verse about tracks and sectors

PROGRAMS

- **Secret Writing** 19
The sophisticated way to protect your programs
- **Painless Windows** 22
The C128 routine which Commodore omitted
- **William Tell** 30
An all-action game using multiple sprites
- **Talking Computers** 59
How to get Max Mindroom from speech routines

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6
4C
1
2
8

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1988

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DATA STATEMENTS

FAST Broadside

A simultaneous sweep of software pirates in the Glasgow, Wishaw, and East Kilbride areas north of the border has netted the Federation Against Software Theft its most successful series yet. Assisted by the E Division of Glasgow CID and a meeting crew of software house representatives, Bob Hay of FAST is now in possession of suspect software with a street value estimated at £100,000.

Of the co-ordinated raids, Bob said, "Fray in Scotland has been of concern for some time but with some very good information and assistance from Electronic Arts, the Strathclyde police carried through a very thorough investigation. Results so far are most encouraging."

Simon Jeffery, UK Sales Administration Manager for Electronic Arts and EA's representative on the raids added, "We are delighted to the pirates' activity both by ourselves and our local distributor/salesman relationship, and worked closely with FAST over a number of months to make this operation a success. Electronic Arts feels that if software houses can work with FAST in taking a firm stand against piracy, it can be countered."

If you buy software and you think that it isn't the real McCoy, you should first of all contact the software house who normally markets. If you don't know the software house then you can contact Bob Hay on 00-436 3488.

New labels

Top selling budget software house, Alternation, have created a new label, Again Again, which will be releasing full price games in time for Christmas. The first title, The Minutes, should be appearing later this month and involves the wacky exploits of Channel 4's cult television family of Frankenstein's, vampires and werewolves.

Pegasus, originator's of Barbarian, have launched Pegasus as a new games label. Once more,

illustrator Roger Dean has been called in to design the new logo but future illustrations for the games will draw upon a broad spectrum of leading artists. Although Pegasus will run alongside Pegasus, the two labels are to maintain separate identities.

Touchline: Again Again Unit 3-4, Bellgrove Industrial Estate, Pennington, West Leeds WYS 3LN.

Pegasus First Floor, Part of Liverpool Building, Pier Head, Liverpool L3 1ET.

Free Disks

Compart are suppliers of disk boxes for 3.5 and 5.25 inch disks. Ariga owners, or owners of the new IBM drive for Commodore's eight bit machines, will be pleased to note that the 3.5 disk box has a special offer at the moment. With each box sold, Compart will supply two free disks which amounts to almost a 50% reduction in the £11.26 cost of the box (including VAT but including first class delivery and same day despatch).

The storage boxes are lockable and made from anti-static, impact resistant plastic. Each 3.5 box can hold up to 70 disks and comes with a set of dividers.

Touchline: Compart, Jubilee Drive, Leighton Buzzard, Luton LU1 3JX. TEL: 0598/67044.

Two Board Tales

While Domark are busy reworking Trivial Pursuit, Grandslam are working on a new boardgame conversion.

Grandslam's game is Espionage which takes the players into the world of secret agents travelling the globe to unearth four microfilms which form the plans for the ultimate super weapon.

As the search goes on, the spies will occasionally meet and battle to the death and the first one home with all four films is the winner.

Domark appear to have decided to agonise as much as they can from their Trivial Pursuit license. In the offing is a new concept for the background behind the question and answer game which is more suited to computer players.

The game is called Genesis II — A New Beginning and involves the players in a race to reach the planet of Genesis II. Each player has to win a place on their laser powered spacecraft by answering a Trivial Pursuit question correctly. On the journey through space, the craft has to land at six planets or stars and collect a luxury household item from each before finally arriving at Genesis II.

A senior member of Domark's is the computer version of the 1975 James Bond movie Licence and let Dr. Rainier has it that the original Domark authored game was not considered good enough but that had a speedboat game on the starting blocks which lifted the bill. The result is a shared game which will feature both companies logos.

Touchline: Domark House, 22 Harcourt Rd, Whitechapel, London E1 7YJ. TEL: 01-447 5822.

Janky Jargon

As the newweek we get inundated with press releases for all manner of machines and services, many of which invite us for a tea and sticky bun session at some plush venue. The latest 'ave-a-lunch' features two choice examples that makes transpotters reach for their tech-ops.

The first, from Peterborough Software and aimed at personnel managers, opens with 'Dear Human Resource Professionals' (pass the bucket, I think I'm going to be...). Honestly, if our personnel manager heard anyone talking like in such a way they'd get an instantaneous pugil-

istic party in the vicinity of the auditory canal!

The second even more lush example refers to the launch of the Microsoft Center HST Modem. In plain terms, this is the kind of gibberish used by systems operators on bulletin boards. According to the release this little wonder exhibits, 'effective' speeds up to 17,000 bps, employing 'indivisible' modulation, asynchronous full duplex transmission, data compression, and MNP error-control.' Just what we've all been waiting for.

Stop Press

Two problems beyond our control have altered the contents of the magazine as displayed on our cover.

We apologise for the non-appearance of the Three Stooges review destined for this issue but the Post Office strike effected receipt of the text. Normal service will be resumed by the time the December issue hits the street and the Three Stooges will be there.

The second apology relates to the

Sierra Sisters review. Although some copies of the game have been circulated, Nintendo have slapped an injunction on Rainbow Arts for infringement of copyright. US Gold, who hold the British distribution rights, have had to withdraw the game from sale until the situation is resolved.

US Gold deeply regret having to make this move and hope that Nintendo and Rainbow Arts can reach a mutual agreement which will allow the game back into circulation.

Plus 4 Fantasy

York Electronic Research are set to launch a new software package for the Plus 4. Using their program it is possible to create a series of printer typelines which will give documents that extra touch of class.

A release date and price have not yet been fixed but you can be sure that we'll be putting it through its paces in a future review as soon as the YER production line gets going.

Touchline:

York Electronic Research, The Fishergate Centre, 4 Fishergate, Ford 981 648. Tel: (0894) 618727

Fortran for the C64

Although the Fortran programming language has been around for thirty years, it is still one of today's most widely used languages. In the US, Abacus have developed a stripped down version for the C64 which supports over 45 statements and functions so that users can get the feel of the language and examine the benefits through hands-on experience.

Fortran 64 includes a built-in editor, compiler and linker so that fast standalone programs can be produced, running even when Fortran 64 is not in residence.

At the moment, there are no plans to release the program in the UK, but maybe in time a pioneering company such as Financial Systems Software will see fit to import a few copies.

Touchline:

Abacus, 1370 17th Street SE, Grand Rapids, MI 49508.

Special Reserve

Half price software is on offer as the public relations company, Inter-Medians, diversifies into the mail-order business.

The venture takes the form of a club called Special Reserve and the £4 per year membership entitles each member to three issues of the Special Reserve Buyer's Guide in addition to

the updates on new releases that are sent with every order.

The club boasts a catalogue in which discounts can be greater than 50% before postage and packing is added.

Touchline:

Inter-Medians, 7 South Block, The Maltings, Riverside Way, Southbridge-wood, Warr. Tel: (0759) 726185

Dragon Simulator

We knew they could do it if they tried. Code Masters latest release is called Super Dragon Slayer. 'Was, no simulator,' we all cry.

Perhaps this departure into pastime new is in response to the expansion of the programming team.

Tim Miller is the latest signing for Code Masters and the gang of four (David and Richard Darling, Mark Bullock and Mike Clark) is now a

quintet. Tim has written State-Cry for Gemini and ATV Simulator for gems who?

The new signing the launch of several in-ho projects which should be ready for release in the not-too-distant future.

Touchline:

Code Masters, Lower Farns House, Stoneysheep, Southern, Warrs CP23 0NL. Tel: (0828) 844732



Tim Miller flanked by Richard and David Darling.

COMMUNICATIONS CORNER

CompuNet, the on-line commercial database for C64, Amiga and ST users, has followed Protext, Microsoft and MicroLink and revised its tariff structure.

The price of a Gold subscription (a Gold sub is favoured by those who use the service on a regular basis) is now £14.90 a quarter, an increase of £4.50. However, Gold subscribers will get an additional 1000 pages/days which brings the total to 2000.

An additional £10 per quarter entitles a user to upload programs to the system regardless of length. This has now been restricted to 45,000 pages/days per quarter.

The estimated off-peak connect charge is now £10, a rise of 22p. Finally, the standard connect charge has risen from 50p to 80p per hour.

The price increases will hit the regular user who uploads programs onto the system — and at 75 baud! The concession of an additional 1,000 pages/days is fine for those who use the chat on-line facility, or have text based areas, but those who upload programs on a regular basis will be hurt the most.

Considering that CompuNet's survival relies on its users' goodwill to supply a regular stream of text-based material and programs, it's somewhat surprising that the company did not come up with a better concession than the extra 1,000 pages/days.

Shades of Gold

Shades, the popular multi-user adventure game is now available on Telecom Gold.

Shades first appeared as a value added service (VAS) on Microsoft a couple of years ago. Since then, Telemag, which operates Microsoft, has made Shades available to all Protext users, and recently it has become the premier feature on Telemag's 0698 service PlusTel.

Shades can be played on Telecom Gold by entering SHADES at the chevron prompt. During peak hours Shades will be free, as the cost is absorbed in the peak-rate charge. During off-peak hours the cost is 4.5p per minute on top of the off-peak charge.

Your Commodore notes that playing Shades on system 7J (MicroLink) is cheaper than playing the game on any other system because MicroLink does not charge for data transfer to or from Telecom Gold, as is the case with other systems.

MicroLink users, who use the GW command which displays a list of databases that are available via gateway, will notice that Shades is not included (even though it is available). When asked about this omission Derek Mearns, MD for Database Publications which operates MicroLink, said: "We haven't decided what to do about Shades yet."

Executoids take note

Two developments have occurred in the comms world that will be of interest to business users.

First, MicroLink subscribers who read the excellent Newsbytes columns now have the option of reading EXEC after entering the newsbytes area. EXEC stands for executive briefing and unlike the other columns that contain comprehensive reports, EXEC is geared towards the business user and offers concise information as well as a contact.

Secondly, Protext users will soon be able to read Inter-Business which is aimed towards those who are running

small businesses and the self employed.

According to Telemag's PR manager, David Rosenbaum, InterBusiness will be a totally separate product from Microsoft.

Telesoftware Amiga!

Previously, all downloadable telesoftware provided by Microsoft has been stored as pages on the Protext database, this has changed and Microsoft is now providing all its telesoftware via a gateway.

This means that instead of starting a program as encoded pages on Protext, a link is provided to Microsoft's own Amiga 2000 on which all the programs are stored.

At the time of writing, technical details of how the system works were not available but it's clear that the decision to store telesoftware on their own system is a wise one. Programs for the Amiga, PC and ST tend to be large, and take up numerous frames. These frames cost Microsoft money for rent, storing the programs on their own computer will no doubt save money.

An interesting aspect is that all the software is to be free of charge. This is because it's not possible to implement a frame charge via a gateway. Just what will happen to third-party, chargeable telesoftware (as provided by Teas Commodore for example) is not yet clear.

A chatline at last

Commodore users who subscribe to Microsoft now have their very own Chatline called CBM RABBIT.

Most machines supported by Microsoft have their own chatline on which users can talk (rabbit) specifically about their own type of computer.

Currently, CBM RABBIT is rather under-used, and Andy Walker who runs the Satley CBM area on Microsoft may decide to place the regular letters section within CBM RABBIT.

Wanna bet?

CompuNet and betting have been used together for years. The major betting houses were amongst the first corporate group to make use of computers for computing odds, displaying the SP on a race each day. Now Telecom Gold users who like to play the ge-goes can subscribe to a new service called Turfnet.

Turfnet is a teletext service which provides its subscribers with the very latest information on a race. Unlike conventional racing sheets, Turfnet is updated every morning and takes into account whether conditions. Detailed information on the days racing is provided together with tips on the best horses.

Aimed at the serious punter (the service costs £20 per month), a free trial offer is available to anyone who sends a request to 74-SIDR004.

Protext users need not feel left out either. For quite some time a number of information providers (IPs) have been supplying punters with teletext services.

For the casual punter daily tips on Viewtel 202 are provided, while BARD supply a daily tip for 50p. The more serious punter can analyse the data for a specific race on the BARD database for 30p per race. The services mentioned do not require any extra subscription, however, the serious punter can subscribe to BARD's more professional service which is also on Protext.

Now you can afford perfect data storage



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Any minute now the deluge
of Christmas offerings will
burst onto the scene...
but not yet!



Fort Apache

Games Update

With luck, this month should mark the end of the summer lull caused by software houses merely concentrating on the games they are preparing for launch in the run up to Christmas. This annual dearth is particularly marked this year with the opening of the Olympic Games in Seoul adding to the mountain of games awaiting autumn release.

Traditionally, this makes early autumn a good time for compilations and budget games, particularly for the re-release of classics.

Budget games

There's a new force in cut-price software as US Gold back a new budget range called Kick. All Kick games cost \$2.99, with the initial batch of releases coming from US Gold's

back catalogue which includes Ace of Aces, 10th Frame and this month's dose of Gauntlet and Microcross.

Gauntlet is the arcade classic and features 312 levels of monsters, magic and treasure as you guide a wizard, warrior, elf or Valkyrie into the depths of the dungeon. This was the Christmas number one two years ago and is still one of my favourite games.

Microcross is a recent movie hit but



Microcross



The Cat

well-known, coin-up simulation in which you must complete an obstacle course within a time limit. In your way there are barrels to trip you, giant barrels to squash you, pistons to plummet into and slithering tins which put the brakes on and lose you valuable seconds. On the good side, you will find springboards to give you a lift and a skateboard to carry you to the finish.

I think *Tao Cui* was one of the best space exploration and combat games of its time and now it's back in part of Mastertronic's Ratchet range. In the game you control a skimmer vehicle in a desperate mission to power-down the defence systems of *Tao Cui III* which were turned on again by a freak meteor storm. This is far from easy as you have to battle with the Hunter attack-craft while collecting reactor rods from the reactor sub-stations so that they can be used to power-down the system controlled by the main reactor.

These sub-stations are spread throughout the cities of *Tao Cui* which are connected by a network of jump pads and controlled by still more lasers.

Mastertronic's *Volleyball* seems the most promising of the specially-written budget games, an area once again dominated by Mastertronic. It's a two-player, futuristic sports game fought out on a vector-graphic pitch full of hollows, peaks and waves. The aim is to control your spinning player and knock the ball into a basket, or computer, opponent's goal area. It's very pretty to look at but inevitably difficult to play.

None of it is the wild-west sequel in which you must shoot bad guys who are travelling on a train, capture Fort



Kuros Ace

Apache to rescue a princess and then ride a backing bronco before escaping across some treacherous terrain.

Knight Tyne is the second in the series of games featuring Magic Knight. Having survived the end of *Spellbound*, you now find yourself advised the USR Powers in the 25th Century. If you're to get out of this mess, you'll have to conquer the Tyne Guardians to get a Tyne machine while keeping out of the way of the Space Pirates and the Parasites Police. The Windmaster system, animated characters combined with window curtain adventure-style comments, mixes well to create a true arcade adventure.

Super Cup Football is from the Hewson/Mastertronic Ratchet label and is a top-down coin, soccer

simulation that is similar in many ways to the World Cup table-top arcade machine.

Full price games

Kuros Ace is a compilation of martial arts games that pack a few punches as well as some chops and kicks. Compiled by Gemini Graphics, the pack includes *Way of the Fighting Fist* (the Grand Masters and daddy of them all), *The Way of the Tiger*, *Sensory Triforce*, *Bravo Locomore* (like a platform game), *Kung-Fu Master*, *Avenger Guardian* - kung-fu style and the juke game, *Delic Mats*. If you don't feel like you could take an all-comers after playing that lot, you never will!

Sumerian Sparks is the latest US Commodore compilation which features hits from the past. This is a pack



Knight Tyne



Super Cup Football



Street Fighter

includes World Class Leaderboard, Solomon's Key, Devastator, Captain America, Tronzo and the solo-up conversion, Rypar.

Street Fighter is a game for people who want to fight around the world and actually features two versions of the game in one box. They couldn't decide which was the better: the public whom they received the US and UK versions and decided to let the public decide. I've played the patriots and in for a disappointment as the US version is worse better.



Street Sports Soccer

Street Sports Soccer is Epic's US Gold version of how football is actually played, so you can forget Wembley and head instead for the park or the alley for a three-on-side game with the local kids. The goals are made out of piles of boxes or cans and you can play for a set amount of time or up to a number of goals. The most important part of the game is to win the toss so you get first pick for sides.

The original Pink Panther is back in a Zenith game. He's broke, so he gets a job at a mansion house but really goes to work at night by helping himself to the family jewels. It's not going to be easy because the owner sleep-walks and you have to meet him

away from objects that will wake him up and you'll be caught red-handed.

Fast Out Road Racing takes car racing from the safety of the track to a series of terrains that will test you, your car and especially its tyres. The race are a mixture of driving skill and mechanical expertise in which you have to patch up your car as you go along, so you have to ensure that you have the parts you'll need before you set off.

The Empire Strikes Back is Demark's second instalment in the Star Wars trilogy in which the player man as Luke Skywalker. This time he's flying a ship against the Empire's probes, walkers and, finally, its tie-fighters. If you enjoyed Star Wars then you'll like this as it's more of the same and, for the real Star Wars

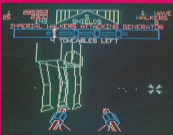
addicts, Demark is adding the final touches to the Return of the Jedi which ought to be out soon.

US Gold earned a great controversy with its obnoxious advertising campaign for Psycho Pigs UNL as it's nice to see the game behind the person at last. You play a Psycho Pig surrounded by a surreal of equally psycho pigs and must wipe them out by picking up and hurling bombs at them. This sets off a timer which explodes the bomb when it reaches zero. That's all there is to it. It's one of those reflexively addictive games that you play over and over without quite knowing why and it would make a great budget game — unfortunately, it isn't.

Tony Hetherington



Fast Out Racing



The Empire Strikes Back

Learn to conceal messages and how to protect your
Basic programs with a top secret password

Secret Writing

The Spartans did it, the Romans also, World War II armies did it and the Russians and Americans are still doing it. Throughout history people have exchanged secret messages in the hope that others could not pry into their affairs. The only way they could achieve this was by use of a secret code or cipher to disguise the actual text.

Even inside the workings of a computer there are code languages and text, such as machine code, Binary Coded Decimal or even the ASCII code. Most programmers are already familiar with these and there is nothing secret about them.

The study of secret writing is given the name 'cryptology' and the process by which an ordinary message is concealed is called 'encryption'. Depending on the type of encryption used, this process will transform the message into a secret code or cipher. The difference between the two is that a code uses whole words or parts of the text during encryption, whereas a cipher operates on each individual letter.

Decryption is the name given to the process which transforms the message back to its original state. As codes are a bit more complicated than ciphers, this article and its accompanying programs will be based only on secret ciphers. The processes used with a cipher are given different names to conceal a message the process is called encipherment, and the revealing of the message is called decipherment.

To get the ball rolling, lets take a look at a simple cipher and how it works. Julius Caesar used a very simple cipher whereby he would move the alphabet

a number of places forward, starting from the letter A. For example, if we show the normal alphabet and one underneath which had been moved four places forward, you will see the difference (Diagram 1). In this context, when concealing a message, the letter A would be replaced by an E, letter B would be replaced by F and so on through the alphabet. If we were to encipher the words YOUR COMMODORE, the resulting text would become ESYV GSNQCSHSVI which looks very different from its original lettering. You can, of course, move the alphabet as many places as you like but with only 26 letters in the alphabet it would be wise to stick with a number between 1 and 25. The golden rule is to use the same number in both enciphering and deciphering the text.

Because there can only be 25 possible configurations of the cipher, it is not very useful for protecting programs but it can easily be used to send secret messages to your friends. If you wish to experiment more with the Caesar Cipher then you can type in the listing at the back of the magazine. This program will do all the hard work of enciphering and deciphering for you, when you run it, you will be prompted for the code required. First press key 0 to encipher and then enter the keynumber, which is the number of places you want the alphabet to be moved forward from the letter A. Next enter your message and a display of the normal and ciphered alphabets will appear with the keynumber and the message in normal for deciphering and enciphered states.

To decipher a message, press key



Diagram 1

Normal	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
Cipher	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D

(-4 places)

If on the main menu, enter any keynumber, then the enciphered message. From this point it is possible to go through each of the 25 cipher configurations until the correct deciphered message appears. If you follow the on-screen prompts, everything should run smoothly.

Keywords and grids

The Caesar Cipher is very easy to crack, one of the reasons for this is that the text is directly enciphered without further scrambling of the letters. The next example aims to combat this by using a keyword in the encipherment/decipherment process. This cipher is called a Columnar Transposition and also introduces the use of a grid in which we place each letter of the message.

If we choose a keyword such as CODES and a simple message: THIS IS A SECRET MESSAGE OKAY. This contains 24 letters, so the first step of encipherment would look like Diagram 2(a). As you can see, the message is placed in the grid starting at the top left corner. The actual grid size is constructed by placing each letter of the message into the columns under the Keyword until all the letters have been used. In this example an empty space is left which has to be filled. I have chosen the letter X for filling and this can be seen in the bottom right corner of the grid.

The next step is to put the letters of the keyword into alphabetical order. During this process, so each letter in the keyword is moved, the whole of the columns below it in the grid is also moved, after which the text in the grid ends up looking like Diagram 2(b).

In the final step, the letters are read back from the grid. Starting at the top



left corner, we read down each column so that our final enciphered message ends up as: TERSO ISTAA SIMOY HAESK ICEEN.

To decipher a message we basically reverse each step of encipherment.

If you managed to follow all of that, you will be pleased to know that the listing entitled 'Columnar Cipher' will do all the hard work for you. This program works in much the same way

as the Caesar Cipher listing. Press either key E or key D to encipher or decipher respectively, then enter a keyword (at least two letters) and, finally, type in the message to be enciphered. Please note that the keyword entered must be the same in both enciphering and deciphering, and that all letters displayed, including any additional Xs, must be entered when deciphering.

KEYWORD

C	O	D	E	S
T	H	I	S	I
S	A	S	E	C
R	E	T	M	E
S	S	A	G	E
D	K	A	T	X

Diagram 2(a)

KEYWORD

C	D	E	S		
T	I	S	H	I	
S	S	E	A	C	
R	E	T	M	E	E
S	A	G	S	E	
D	A	T	R	X	

Diagram 2(b)

ROWS

	1	2	3	4	5
1	C	O	D	E	S
2	T	H	I	S	I
3	D	F	G	H	I
4	J	K	L	N	O
5	S	T	U	V	Y

Diagram 2(c)

```
MESSAGE-  I L O V E Y O U S U S A N
ROWS-     3 4 1 5 2 5 1 1 5 1 5 3 4
COLUMNS- 3 3 1 3 3 3 2 3 1 3 1 4 4
```

Diagram 3(b)

```
ROWS-     3 1 2 1 5 8 4 3 1 8 8 5 4
COLUMNS- 4 2 5 1 1 2 5 2 2 2 1 1 4
RESULT-   H U B C S V Q P F E V S S N
```

Diagram 3(c)

Many more ciphers

The final cipher is based around an old fascinating method which is much more sophisticated and tougher to crack than the previous examples. First of all, take any keyword (preferably large), and mix this with the alphabet in a 2x3 grid which has its rows and columns numbered from 1 to 3. If we use a keyword such as COMPU~~T~~ER, the resulting mix with the alphabet would look like Diagram 3(a). As you can see, the keyword is placed into the grid starting at the top left corner, or the co-ordinates [1,1] (row 1, column 1). You may also notice that there is no letter Z, this is because there are 36 letters in the alphabet and only 25 possible places in the grid. The standard way around this would be to place two letters in the same grid position but it's easier to leave out the Z and this should not be detrimental.

In the next step we encipher a message by locating each letter's co-ordinates in the grid and writing them down. Letter J, for instance, has the coordinates of 4,1 and if we apply this to a piece of text such as I LOVE YOU SUSAN then the coordinates of Diagram 3(b) would be produced.

The next step is to mix up the row and column digits. This is achieved by reading along the row co-ordinates and writing the digits by alternating between row and column, the same is then done with the column co-ordinates. If we do this to the first four row digits of Diagram 3(b) then the resulting co-ordinates would become 1(4) 1(5) 2(3) and 1(2,4). The series would continue with 3(3) 1(2,3) through to 4(4). Fully transposed, we end up with the coordinates as in Diagram 3(c).

The final stage of encipherment involves the conversion of the co-

ordinates of Diagram 3(c) back into letters. This is done by locating the letter corresponding to each row co-ordinate on the initial grid in Diagram 3(a). After doing this, our enciphered text becomes HUBCSVQPFVSSN.

For those of you that wish to experiment with this cipher, the listing entitled 'Fraction cipher' has been included.

On the main menu press either key E or key D to encipher or decipher. As in the last cipher you will be required to enter a keyword and then the message. Use only letters A to Y and no spaces. The program will display the grid with the mixed keyword and your message.

Although this article only considers three methods of coding, there are many other ciphers going under titles such as substitution, block transposition, polyalphabetic and fractionating ciphers and to explain all these would require a whole book. If this article has enticed you into the world of secret writing, then I suggest a trip to your local library, where you should be able to find further references.

Protecting a program

The basic idea behind any cipher is, of course, to stop anybody else from reading what you have written, but they can also be used for other applications. 'Password Protector' will save out a Basic program whereby your own password must be entered before the program will run.

Password Protector is written in machine code and sits in RAM from \$C000 to \$C700.

Before using the program, there are a few rules to obey. The Basic program you want to protect must be in memory and it must be at the normal Basic start position of 3049 (\$B81). Additionally, you must have at least

660 bytes of memory free to make room for the machine code deciphering section which is placed before your protected Basic program.

You can start Password Protector at any time with SYS 4912 where you will be presented with three choices. If you have a Basic program in memory that you wish to protect, press key 1 and you will then be prompted for the destination device for the protected version. Press either key D for disk or key T for tape. Next, enter a filename of up to a maximum of 14 characters. The last two characters of the filename will always be 'X' to help distinguish the protected file from others. You will then be required to enter a password of up to 13 characters but only letters A to Y can be used. After this, your protected Basic program will be saved out and you will be returned to the main menu.

Option 2 gives disk users a chance to read the disk directory, this can be used without corrupting any program in memory. The final option will return you to Basic.

Please note that you must remember to use the exact password when you reload the protected version or else the computer will crash, it might help if you use a note book to keep a record of any passwords used with their corresponding files and keep it somewhere safe.

Example Messages

When you have typed in the Basic listings for each of the ciphers, you might like to try the following enciphered messages. Before you use these examples though, make sure that you press key D to decipher, this goes for all of the examples. On the Caesar Cipher try this example keynumber 18, message:

```
RSQCYMYWDDYDROGNYBNTYF
COMBODMYNOC.
```

On the Columnar Cipher try this keyword COMMODORE, message IMREKXOSVILUECONCX

On the Fraction Cipher try this keyword GOOD INFORMATION, message JWPFGMQXCFGNRE MKESQWTR.

I hope that this article has uncovered some of the possibilities for using secret ciphers on your Commodore 64 and that you will experiment further. If so, I suggest you go out and get cracking!

Contributions

So you own a Commodore? So you've written some programs? So why haven't you sent them to us?

Your Commodore is always on the look out for new programs, hints and tips, articles and even regular series. In fact if you have something that you think could be of use to other Commodore owners we want to hear about it.

So if you have got something which you think we may be interested in, how do you go about submitting it to us?

Below you will find a list of guidelines that will help us to deal with any item that you send in to us. We don't expect everybody to be the next William Shakespeare but if you do follow these simple rules then it will make our job a lot easier.

1) If possible all material sent to the magazine should be typed or printed out on a computer printer.

2) All text should be double spaced (i.e. there should be a blank line between each line of text). You should also leave a margin of about 10 characters around the text.

3) On the very first page you should put the following:

Name of the article
Machine that it is for
Any extras required - disk, printer etc.
Your name
Your address
Your telephone number

4) The top of every page should have the following information on it:
Abbreviation of the article title
Your name
The page number

For example, suppose you had submitted an article on C64 interrupts. You should put something like the following at the head of the page:

Interrupts/J.Smith/1

5) Please make sure that you do not make any additional marks on your text especially underlining.

6) Try and write in clear concise English. It does not have to be a work of literature but it must be comprehensible.

7) On the bottom of each page you should put the word MORE if there are more pages to the article or ENDS if it is the last page.

8) If possible, enclose a listing of all programs.

9) Under no circumstances are a staple to hold the pages together. Use a paperclip instead.

10) Programs should be included on either disk or tape. Make sure that you SAVE two copies of every program so that we have a better chance of loading them if problems occur.

11) Programs under 10 lines can be included in the text. If your program is longer than this you must enclose a disk or cassette.

12) If your article needs any artwork, then supply clear examples of what is needed. We don't expect you to be an artist but we do need to see what is required.

13) Photographs, if necessary, must be either black and white prints or colour slides. We can take shots ourselves so don't worry about this too much.

14) Submissions of any length are welcome. If you have a line line routine that you think may be of use to someone else we welcome it just as much as a full blown six part series.

15) Payment varies quite a lot and depends on quite a number of factors, such as complexity of program, presentation of program, number of magazine pages it takes up etc. Payment is generally between £10.00 and £80.00.

16) All payments are made in the month that the magazine containing your article has appeared in print.

17) If we do find your submission suitable for inclusion in the magazine we will write to you giving the terms of publication, the rate of payment, and an agreement form. Payment return of this form will allow us to use your program as soon as possible.

18) If you want the program returning to you, should we find it unsuitable for publication, then you should enclose a stamped self addressed envelope.

19) The last and most important point to make is 'get writing', we are waiting for your articles.

The day Roger Jackson sent his first mailshot.



I was impressed by the fact that Star have now produced a great looking little budget printer with a 34 pin/head.

I was impressed by its excellent quality – the freedom forms available and its high-density letter quality helped me produce a really professional mailshot.

I was impressed by the extremely swift draft elite speed of D03psaid (Q) elite at 57cps and the standard 7x buffer.

I was impressed by the special push-tractor feature that allows the LC34-10 the lowest possible tear-off and its ability to 'park' continuous paper and load single-sheets automatically – so there's no need to remove the continuous.

I was impressed by the touch-button front control panel that makes using the printer an absolute dream.

But most of all, I was particularly impressed with myself.

Because my Star LC34-10 was so inexpensive and no other printer comes close for sheer quality and value-for-money.



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Star Micros (U.K.) Ltd.
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Please tell me how the Star LC34-10 can handle my printing needs.

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Company

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Postcode Telephone

Or just call behind us on 01-494 1825. (24 Yr. 10)

Emergency Ward 64!

*What can you do with a dead disk drive, decreased
datasette or a clapped out Commodore?*

by Kerry Fowler

Do you believe that your Commodore will go on forever without breaking down? What will you do when it fails? One recourse is to send it away for costly repairs but many of the faults can be repaired at home if you have suitable software.

The latest, and most comprehensive, range of home care kits from the Trilogix Doctor series. Other companies produce quite respectable kits but Trilogix's trio have taken the best ideas, refined them, added a few new twists and produced the packages at respectable prices.

Datasette Doctor

Ever since the plethora of fast loading tape systems arrived on the scene, they have proved to be both a boon and a bane. The benefit is the higher loading speeds, which in many cases equal the 1241 disk drive's disadvantage is that head alignment becomes more crucial.

The tape head is the part of the datasette which reads magnetic impulses on a tape and converts them into electrical impulses which the computer reads as the zeros and ones of a binary coded program. These magnetic fields on the tape were originally created when the program was recorded onto the cassette.

The head consists of an almost complete ring of metal whose small gap is filled with an insulating material. The metal forming the ring is a magnetically inert alloy which can exhibit magnetic properties under certain conditions. These conditions are created by a current passing through a coil of wire which is wrapped around the area of the ring.

When the current passes one way through the coil the north and south poles of the 'instant' magnet are found on each side of the insulation. When the current flows in the opposite direction these poles are reversed and when no current flows the ring is magnetically inert.

When a program is recorded onto the tape, the zeros and ones of the binary code is converted by the computer into a series of electrical impulses which are passed through the coils of the recording head. As this is happening the magnetic field across the head 'gap' is constantly being directly affected by the electronic signal.

A cassette tape is coated with magnetised particles which act like small bar magnets. As the tape passes across the recording head, these particles are energised by the head gap's changing field. The tape therefore becomes a continuous record of the changing magnetic fields which the original electronic signal produced.

In playback (read) mode, the tape passes across the head gap. The magnetic field caused by the tape as it passes across the gap causes a small electrical current to be induced in the coil which exactly matches the original signal. When this is amplified and fed back to the computer the signal is re-converted into the original binary zeros and ones, completely recreating the program in the computer's RAM memory.

The gap is a vertical slit which must lie at precisely 90 degrees to the direction of the tape travel. If the gap is only slightly out of alignment, the magnetic fields will not be exactly the same as those created by the recording head unless the recorder was similarly



misaligned (this is why programs recorded by yourself may load easily when commercial tapes won't load at all). The head alignment is also referred to as the azimuth alignment.

Contrary to what may be believed, turbo loading tapes do not make the tape run faster. What happens instead is that the ROM program which normally converts the zeros and ones into electrical impulses is replaced by a RAM program which shortens the signal for a one or a zero and thereby compresses the recorded data into a shorter length of tape.

Take the rather exaggerated example of a signal, which lasts for one second, being recorded on a tape which moves at one inch per second. This means that the signal would occupy a one inch length of tape. The head gap, for this example, is a tenth of an inch so the azimuth alignment of the tape could be substantial adjusted without affecting the read signal.

Imagine that a turbo compressor this signal into an impulse lasting one tenth of a second, the head would have to be precisely aligned or the signal processing and following the recorded 'bit' would significantly affect the

magnetic field across the head gap.

With an actual recording, the lines and measurements are much smaller and the head alignment becomes far more crucial. This is why taping can cause such serious loading problems.

A secondary effect of the constant changes of field is that the heads can gradually collect a residual magnetic force which turns it into a very weak permanent magnet. Although it is unlikely that this residual magnetism will substantially affect a recording, constant passing and re-passing of a tape across a magnetized head will weaken a recording by partially erasing the signal and by confining the induced impulses from the tape.

A third effect of the record/playback process is the collection of particles which are stripped off the tape as it passes over the head. Even though the head is smoothed to a highly polished finish, the abrasive effect of the tape-coating and the general deposits of grease from the air can give a propensity to anchor small particles onto the head. As more and more oxide coating is deposited, the head itself becomes more abrasive and strips off more and more of the tape coating. This deposit confuses the magnetic fields in the head gap, damages the recorded signal and spoils the tape to head contact.

Trilog's Datacrite Doctor pack is designed to eliminate all three causes of loading problems. The pack contains two cassettes, a screwdriver, head-cleaning fluid and an adjustment scale and pointer. The two cassettes serve very different purposes, one is a recorded alignment program, the other is a head cleaner/demagnetizer.

The cleaner/demagnetizer should be used first to ensure that there are no contaminating circumstances which might make head alignment difficult to achieve. After cleaning, the first program can be loaded from the alignment cassette. On a very badly aligned drive, a certain amount of fiddling may be necessary to get the program loaded.

The head alignment screw access hole is located just beneath the cassette 'door', above the corner of the rewind key. The screwdriver from the kit is placed through the centre of the adjustment pointer arrow and then inserted into the screw head through the access hole. The alignment scale is then positioned so that the arrow is pointing to the central bar on the alignment arc and securely fixed with



blotak or sticky tape.

For a badly loading cassette recorder, a suitable position can be found by turning the screwdriver to the left or right, by degrees, within the bounds of the scale's arc. This could take some time as each position is set and a new load attempted.

Once the alignment program is successfully loaded, the instruction manual covers the alignment procedure adequately and the process is very simple to understand. Correct alignment is clearly indicated by the on-screen display.

Once the drive load alignment is set, the alignment can then be fine-tuned for turbo loaders by using the fastload alignment program which should load from the tape without any problems.

This is normally where some kit alignment packages call it a day, but not so with the Trilog system. The final program on the tape allows the recording abilities of the cassette to be tested. This test, which may be repeated for three different loading speeds, will show up faulty electronics or worn tape mechanisms, poor tape quality, or mains and TV interference. As the instructions point out, the worn mechanism or faulty electronics cannot be corrected easily, but tapes should be discarded and interference can usually be avoided by moving the Datacrite away from the source of interference.

Drive Doctor

Disk drives are notorious for misal-

ignment problems and the cost of repair can be daunting. Home therapy for a misadjusted drive takes a great deal of courage and care but it's not outside the reach of the majority of disk users with Drive Doctor.

The Doctor's main advantage over the opposition is that the test program is stored on cassette and can therefore be loaded even when the disk drive is totally disabled by alignment problems (yes, did I remember to get Datacrite Doctor, didn't you?). Included in the kit is a perfectly aligned disk which is supplied purely as an aid to correcting wayward drive heads and contains no alignment program material whatsoever.

The kit can perform five tests on the drive but the instructions do not stress heavily enough the danger of having the internal frame supply unit exposed while the major tests are being carried out.

Starting with disk speed, the program allows you to make one of the simplest, yet crucial, adjustments that can cure loading faults. The speed adjuster is not easily accessed because it is located on the underside of the internal chassis. This means that the drive case has to be opened and the whole chassis removed.

The instructions are quite clear on how to achieve this and the variable resistor can be pinpointed in minutes (depending on how tightly the chassis is screwed in).

The trick is to set the adjustment so that the screen displays the number zero constantly. If the number varies

mildly it's bad news and a visit to the repair shop may be necessary.

Head jamming is usually caused by a lack of lubrication on the head transport system, unless you've been particularly heavy handed on previous excursions into the drive's innards. The Trilogix test causes the head to travel back and forth along its track, if it sticks - lubricate.

The head needs to know where to find the tracks on every disk so a reference point is given by the back stop. This is the root cause of the horrendous hushing noise that emanates from the drive when the NEW command is used to initialise a disk.

As soon as NEW is executed, the head mechanism pulls back to the outside edge of the disk where the back stop is located. After a few thumps, stop is located. After a few thumps, the drive knows that the motor will normally carry the head to the correct track position, but what if the back stop is worn or has moved?

This is where the Drive Doctor comes into play. The stop test pulls the head back to the stop, attempts to read a track which should display asterisks across the screen. If this doesn't occur, the head can be positioned for an adjustment which can try the patience of a saint!

The puppie solution to a noisy back stop is to fit a 'soft' quiet stop which replaces the hard stop with a springy wire somewhat similar to the multi-functional least paperclip. The problem with this fix is that the head bounces off the wire and can have problems finding the correct track position. Even if this doesn't affect the drive's performance, you can guarantee that the wire will soon bend away from its true position.

After the stop is positioned a secondary test can be applied. The hysteresis test places the head on a particular track. The head is then pulled back to the stop and allowed to return to the original track. If this is successful, the drive stop is okay and you can be fairly sure that the head is not jamming.

The final test is the bigger - head alignment. This is tricky and can completely foul up a healthy drive, so take a tip from me and try all of the other tests first. Resist the temptation to try this test just for the hell of it or you may regret ever buying the Drive Doctor. This is for drives with a terminal illness, not for drives that are a bit off colour. By all means run

the test program but, if the repair looks reasonable don't try to get a perfect readout. Only one in a million drives can reach perfection - and it isn't yours!

As alignment tests go, this is close bias to use. The screen display is easily understood by the non-technically minded but the adjustment isn't easy. It involves slackening off the heavily lasquered screws which hold the drive motor in position and then twisting the motor housing to achieve good results on both inner and outer tracks. The adjustment can often upset the stop position so a lot of test and test



again methodology is involved. Only for amateurs with guts, so... do you feel lucky?

64 Doctor

This purports to be a 'professional diagnostic cartridge for your 64' but some of the facilities leave me with a few questions. The program is contained on a cartridge ROM and the 64 also includes various specially wired plugs so that the output ports can be tested.

The suite of tests start off with a test which displays a C64 keyboard on

the screen. Press a key and the screen registers success by registering out the corresponding screen display key. If any of the keys fail to respond the absolutely excellent manual will point you in the right direction for fault finding.

Next, the joystick parts can be tested in a similar way and devices such as paddles or analogue joysticks can also be used to test the A/D converters.

The final screen displays the I/O ports and associated chips. Any faults detected are indicated on the screen. This test also checks the banking capabilities of the VIC chip.

Although this package is better than nothing, it doesn't do a lot for its keep. The other two Doctor packs give exhaustive tests, this one merely checks the in and outs. A better name for it would be the C64 I/O Doctor.

Although I am unimpressed with the cartridge, I am very impressed with the manual which, though brief, does give some good pointers to fault finding on the C64 generally. Already I have managed to revive a dead 64 which apparently had an ailing VIC chip but, thanks to the manual, I found that the 'fault' was a secondary effect caused by the demise of another component.

This is the most expensive package of the Trilogix trilogy and really only for the technician who can desolder chips and replace them without over-heating the contacts. £18.99 is rather a lot to pay to find out that your 64 is not working which I'm afraid is all that many people will be able to determine with this package.

Triumphant Trilogix

Congratulations to Trilogix for holding their line and watching the opposition fall to the pits that await the producers of diagnostic and repair programs. What they have ended up with is a set of programs which will certainly appeal to a wide range of people. Each pack is well thought through and leaves it up to the individual to judge if they have the knowledge or ability to employ it to the full.

Fourfiles:

Supplies Trilogix, Unit 1, 251 New Works Road, Stockport SK11 8QP. Tel: (0274) 881111. Machines: C64 Probe, Database Doctor £18.99, Drive Doctor £14.99, 64 Doctor £18.99.

Painless Windows

Program your own pull-down menus and let this routine tend your WINDOW boxes



This collection of utilities provides the programmer with tools to extend the application of Commodore's own WINDOW Basic command. These enable up to 16 restorable windows to be defined with clearly marked edges, without any wrapping of text across window bound-

aries while retaining the facility for the screen to be restored to the state prior to the window being displayed.

The utilities are simply called via the 'SYS' command within Basic or a 'JSR' within a machine code program. The source code occupies the position normally used by the RS232

buffers and uses the four available zero page addresses between \$FA and \$FE for indirect indexed addressing. The zero page addresses of \$FF and \$A7 are also used, \$FF for bank selection in the store and restore routines and \$A7 as a counter for the last window to be stored.

Programmer's checklist

1. Check window size before calling the border routine.
2. Initialise \$A7 to zero as part of program initialisation routines.
3. Retain startup text screen location.
4. Ensure no channels are opened to device '2' the RS232 otherwise the routines will be destroyed.
5. Do not attempt to restore a screen until one has actually been saved in memory as this may cause the program to crash when an attempt is made to restore the window parameters.

Here's a quick guide to the main inclusions required for a Basic program:

```
10 POKE 167,0: REM PART OF INITIALISATION
20 ----- rest of program -----
1000 SYS3075: REM SAVE SCREEN TO MEMORY
1510 WINDOW10,10,25,20,1:REM DEFINE WINDOW
1620 SYS3632: REM DRAW WINDOW BORDER
1030 ----- rest of program -----
2000 SYS3076: REM RESTORE SCREEN
```

```
08C00 JMP 80C08
08C01 JMP 80C38
08C06 JMP 80C22
08C09 LDX $F4
08C0B INC
08C0C LDA 80C13,X
08C0F STA $FA
08C11 LDA 80C4C,X
08C14 STA $FB
08C18 LDX $E3
08C1B DEX
08C1F LDA 80C00
08C1C STA $FC
08C1E LDA 80C4C
08C21 STA $FD
08C23 LDX $E8
```

```
08C25 DEX
08C26 TXA
08C27 CLC
08C28 ADC $FA
08C2A STA $FA
08C2C 80C 80C3D
08C2E INC $FB
08C30 LDX $E6
08C32 DEX
08C35 TXA
08C38 CLC
08C3B ADC $FC
08C3F STA $FC
08C39 80C 80C3D
08C3B INC $FD
08C3D LDA $E7
```

```
08C3F CLC
08C40 SBC $E6
08C42 CLC
08C43 ADC $00
08C45 TAY
08C46 LDA $6E
08C48 STA ($PCL)
08C4A LDA $7D
08C4C STA ($PAL)
08C4E DEY
08C4F LDA $40
08C51 STA ($PAL)
08C53 STA ($PCL)
08C55 DEY
08C56 BNE 80C51
08C58 LDA $6D
```

The store and restore routines include read and write routines for the current window border parameters held in zero page locations from \$E4 to \$EC. The values are copied to 9 of the 24 bytes of screen RAM that are beyond the 1000 bytes of displayed RAM. These locations are not normally used but provide useful storage for the window border values, especially as the store and restore routines 'save' blocks of 256 bytes.

The store routine first checks location \$7 to ensure that the maximum number of 'saved' screens is not exceeded. If this value would be exceeded then the routine returns without any further action. If the number has not yet been reached then the routine increments the count, copies the window parameters and 'saves' the screen plus 24 bytes (1024 bytes in all) to the RAM normally used

by the 80-column screen.

The restore routine checks the value contained in location \$A7 to ensure that the value does not fall below the value of zero. This ensures that the screen (and window parameters) are not restored from a source outside the 10K RAM of the 80-column screen. If the check fails, the routine gives control back to the program, otherwise the 1024 bytes are restored to the screen RAM and the count decremented. After this has been achieved the window parameters are restored to the correct locations within the zero page and the window redisplayed with a call to the ROM routine at \$CA32 and the line pointers reset with a call to \$C15C. Finally, control is given back to the calling program with RTS.

The last routine held within the block of code is also the longest and

responsible for plotting a border around the outside of the currently defined window. The routine does not check what size window is defined, leaving this to the programmer. It is therefore very important for the programmer to be aware of the size of the current window defined because, when this window consists of the whole screen, the routine to draw the border will overwrite the first bytes of the Basic program, unless the start of Basic has been moved.

The window border routine makes use of the table within ROM that contains the low and high bytes of the screen line start positions. A relocated screen will require the writing up of a new table within the routine because the ROM is not updated by the system after screen relocation. The line start tables are located at \$C033 and \$C94C.

08C5A	STA	(SPALY	08CA5	JSR	\$D004	08CF9	INX	
08C5C	LDA	\$70	08CA8	LDY	\$00	08CFA	CPX	\$09
08C5E	STA	(SPCLY	08CAA	LDY	\$00	08CFC	RNE	\$0CF4
08C60	LDX	\$E5	08CAC	LDX	\$FF	08CFF	JSR	\$0D31
08C62	DEX		08CAE	LDA	\$FB	08D01	DRC	\$A7
08C63	INX		08CB0	JSR	\$FF74	08D03	RTS	
08C64	LDA	\$C033	08CB3	JSR	\$CDDA	08D04	STA	\$FC
08C67	STA	\$FA	08CB6	INX		08D06	STX	\$FD
08C69	LDA	\$C04C	08CB7	RNE	\$CAC	08D08	STY	\$FE
08C6C	STA	\$FB	08CB9	INC	\$FC	08D0A	CLC	
08C6E	LDA	\$A2	08CB8	LDA	\$FC	08D0B	ADC	\$FE
08C70	LDY	\$E6	08CB0	CMF	\$FE	08D0D	STA	\$FE
08C72	DEY		08CBF	BCC	\$CAC	08D0F	LDA	\$00
08C73	STA	(SPALY	08CC1	RTS		08D11	STA	\$FB
08C75	LDY	\$E7	08CC2	LDX	\$A7	08D13	LDX	\$12
08C77	INX		08CC4	CPX	\$00	08D15	LDA	\$FD
08C78	STA	(SPALY	08CC6	RNE	\$ACC9	08D17	JSR	\$CDDC
08C7A	CPX	\$04	08CC8	RTS		08D1A	INX	
08C7C	RNE	\$0C0	08CC9	LDA	\$0D21	08D1B	LDA	\$00
08C7E	RTS		08CC3	TAX	\$00	08D1D	JSR	\$CDDC
08C7F	NOP		08CCD	LDA	\$04	08D20	RTS	
08C80	INC	\$A7	08CCF	LDY	\$00	08D22	BIT	\$0
08C82	LDX	\$A7	08CD1	STY	\$FF	08D23	BIT	\$4
08C84	CPX	\$10	08CD3	LDY	\$04	08D24	BIT	\$8
08C86	RNE	\$0C3B	08CD5	JSR	\$D004	08D24	BIT	\$C
08C88	DRC	\$A7	08CD8	LDY	\$00	08D25	BIT	\$0
08C8A	RTS		08CDA	LDA	\$FB	08D26	BIT	\$4
08C8B	LDX	\$00	08CD3	STA	\$D2B	08D27	BIT	\$8
08C8D	LDA	\$FA,X	08CDF	JSR	\$CDD4	08D28	BIT	\$C
08C8F	STA	\$0794	08CE2	LDX	\$FF	08D29	BIT	\$0
08C92	INX		08CE4	JSR	\$FF77	08D2A	BIT	\$4
08C95	CPX	\$09	08CE7	INX		08D2B	BIT	\$8
08C95	RNE	\$0C3D	08CE8	RNE	\$CDDF	08D2C	BIT	\$C
08C97	LDX	\$A7	08CEA	INC	\$FC	08D2D	BIT	\$0
08C99	LDA	\$0D21	08CEC	LDA	\$FC	08D2E	BIT	\$4
08C9C	TAX		08CEE	CMF	\$FE	08D2F	BIT	\$8
08C9D	LDA	\$04	08CF0	BCC	\$CDDF	08D30	BIT	\$C
08C9F	LDY	\$00	08CF2	LDX	\$00	08D31	JSR	\$CA32
08CA1	STY	\$FF	08CF4	LDA	\$0F4,X	08D34	JSR	\$C15C
08CA3	LDX	\$04	08CF7	STA	\$FA,X	08D37	RTS	



Salamander

Beyond infinity lies the evil galaxy dominated by the forces of the deplorable Salamander.

A hero is required who can persuade his compatriots to vent him on a journey into hell and beyond. Surpriser, surprise: you're that hero.

Your ultimate objective is to destroy a giant base that controls the Salamander's forces but believe that you will have to pilot your tiny craft through massive mazes that are packed with organic monsters.

In this game, the sequel to *Kronen's Nemesis*, you have only three ships with which to complete one of the toughest missions that you will ever have to face, in one of the best coin-up conversions you will ever play.

To succeed you navigate for consecutive levels, each offering a different challenge and range of foes and obstacles including Nuclear Spiders, raging skeletons, swarms of devils and a powerful enemy at the end of each level that must be defeated to allow entry to the next level.

Although you begin the game with a single-shot laser as your only weapon, you can dramatically increase your firepower by collecting bonus pods and weapons which appear each time you destroy an entire wave of aliens or one of the special aliens that only seem to appear in the most dangerous places. By collecting these pods you can increase the frequency of the shots you can fire, spend up the ship to make it more maneuverable, and launch missiles that fire and run along the screen's roof and floor picking off anything lurking there, or add up to three multiple shots to your ship.

Missiles are incredibly useful devices that follow you about and if they were attached to your ship by a rope. They move your moves at least they can and fire when you do. A ship with three endplates, missiles and rapid firing lasers should be able to stop

most things but be warned: this game has traps for the unwary and ever careful.

Your main foe in the first level are claws that grow out of the walls to grab you and occasionally had a foot as you just for good measure. Once they've done this to you a few times you'll be ready for these, having learned to fire at the segment of the body that's a different color. That's the secret of Salamander. If you see a color (that doesn't match the rest of the monster, and isn't because that's the monster's weak point).

Unfortunately, just as you get the hang of this, the walls suddenly grow out to crush you, giant spikes appear in your way and missiles whizz in your direction. One of the most difficult traps to navigate is a section of wall that must be blasted away, only to find that it regenerates. You have to move fast to get through it while remembering to avoid the blasts from exploding, balloon monsters.

At the end of each level there's always the giant mega-monster that must be slain if you are to reach the next level until your final confrontation with the Salamander's brain.

Ferry his from a mine will not you and all your lives unless you manage to wipe out one of the waves at the start of a level. This provides a shield that surrounds and flashes around your ship, giving you limited protection. Navigating the wall at the end of the first level will usually destroy the shield, leaving you vulnerable for the end-of-level conflict.

A rapid shoot-em-up and one of the best coin-up conversions to date.

Finalizer:

File: *Salamander*, Supplier: *Imagive Software*, 3 Central Street, Manchester, M2 5NE, Tel: 061-557 6512, Machines: £34 Price: £8.95.

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REMEMBER: all features are both in and available at the touch of a key. All features work with both TAPE and DISK. (Except multipart transfer & disk file utility).

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The Great Giana Sisters



When I was but knee high to a hedge-hopper, I can remember all the nasty things my parents used to say as they cajoled, threatened, beat me up and pleaded with me in an attempt to get me to go to bed. 'The boggy man will get you if you don't go straight to sleep,' and Father Christmas won't come if you're not good.

Those threats only pertained to sleep itself though. The only nightmare to dreams that I can remember come from my grandmothers who insisted that I would suffer from the most horrible nightmares if I ate cheese just before my nightly encounter with the boggy man.

If there is any truth in these stories, then the Giana sisters must have been skavenging down their parents' supper pots as fast as their little fists could stuff it into their mouths! What started off as a dream has soon turned into a nightmare. Captured within a mysterious world, their only means of escape is to discover the whereabouts of a fantastic jewel. Finding it means that they will safely wake up at the other end of their journey, father recalls in them never escaping from their worst violent.

The game is a variant on the old platform theme that seems to be making a bit of a comeback lately. Giana (her sister only comes into play in the two player version) must make her way across thirty-two sections as she attempts her quest.

The old restrictions of typical platform games have largely been removed. No longer do you have to make pixel perfect leaps or time very more down to the last split-second. Instead, you can travel across a section however you want with the one proviso that you cannot go back on yourself - the areas only work one way.

Each section has to be completed within a set time limit. Failure results in the loss of a life, as does the more obvious calamities such as collision with a monster or falling off into a no-go area. Completing a section is not too difficult. What causes the problems is the pressure put on you to get out of your way to collect various objects.

Fewest amongst these are the diamonds that lie scattered about. Most of these are fairly accessible but there are usually one or two strategically placed to lure the careless jumper to their doom. There are also special tricks which can be used butted from below to release either another diamond or a bonus object.

The fascination with diamonds stems from the fact that you gain an extra life for every 100 you collect. The bad news is that this counter needs to see every time you die.

The bonus symbols consist of lightning and double lightning bolts allowing Giana to fire dream-bubbles, gain extra lives, enjoy temporary fire resistance or have the ability to either put assorted monsters to sleep or make

them vanish entirely.

Perhaps the most interesting feature is the initial stage of the game is the fire wheel. This transforms the sweet, innocent Giana into a vicious punk rocker with the ability to leap up and head-but her way through solid rock as a useful way to collect extra diamonds. As with the diamonds, any of these bonus features disappear when you lose a life.

The levels steadily increase in difficulty so that there is always a challenge to face. Monsters can be jumped on, instead of merely having to jump over them all the time, although this can be a problem where there are several of them or you have a row of bricks over your head.

Look forward to encountering invisible items, dragons and hidden magic plus one extra feature without which, no platform game would be complete - the collapsing bridge.

One annoying feature is the lack of a save facility as a password system allowing you to skip levels previously completed. Whereas many other games offer a game, this, too, is something that is missing from the CD4 version. The graphics have been kept fairly simple and the screen has a very welcome, unobtruded feel to it.

The Great Giana Sisters is an excellent platformer game and one which, as the blisters on my joystick hand will testify, extremely addictive.

CBR

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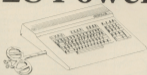
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Unlock Hidden 128 Powers



Learn how to use the full
128 keys in 64 mode
By Dave Garbide

Like a lot of 128s mine spends a fair amount of its time in 64 mode, and I've always been slightly annoyed that the keypad available in the other two modes of the computer is not implemented in 64 mode. Especially so there is actually no reason why the additional keys should not be available, except that to do so would have involved Commodore producing a patch for the 64 Kernel. This article shows how with a bit of prodding in the right place the full 128 keypad can be made to work in the 64 mode.

The standard 64 keypad is arranged in an 8 by 8 matrix. This matrix is read through the I/O ports of CIA 1; the relevant control registers are register 0 and register 1, which are mapped to \$DC00 and \$DC01 respectively. Briefly each bit in register 1 corresponds to the state of a key connected to each line. Now because we are dealing with an 8 bit machine, it should be clear that there can only be 8 lines of 8 keys; hence the 8 by 8 matrix, with simple arithmetic showing that only 64 keys can be read using this system. Note that the standard 64 keypad has 66 keys, but two, SHIFT-LOCK and RESTORE, are hardwired and separate from the main keypad.

In order to provide the additional keys, Commodore have built in an extra three control lines. Now, presumably in the interest of preserving compatibility, these lines are connected to the 40 column video chip and controlled through register 47 which is mapped onto the address

\$D02F and is active in 64 mode. Therefore by the use of appropriate software it is possible to read and process the full keypad.

Program 1 provides a wedge that will read extra keys and provide a value indicating which key has been pressed in the variable 'KEY'. The correspondence between key and value returned is given in Table 1. Program 2 provides an example of how the keys could be processed. The example places the ASCII value of the key pressed into the keyboard buffer in much the same way as standard key presses are processed. Non standard keys like 'ESC' are ignored. However a different set of processing could treat the additional keys as 24-extra-function keys (more if 'shift' type operations are included).

As well as the source code for the two programs I've included two BASIC loaders which provide selectable code for program 1 and Programs 1 and 2 combined for people without assemblies. To use, simply type in the programs, save and then run. The loader will then convert the BASIC data into a machine code file, prompt for a file name and output device, and finally save out the machine code version of the program.

When the program is reloaded and run, the relocater will prompt for a start address, the address should be in normal RAM (i.e. not under BASIC) or the Kernel, or between \$B800 and \$D400) and should be specified in hexadecimal starting at a page boundary (i.e. \$4000, \$4100, \$4200 etc). The program will relocate to that

address and then prompt for a decision as to whether to run the program. A negative reply will result in the SYS address of the program start being supplied in decimal ready for later activation.

Table 1

Value in KEY	Key pressed
0	HELP
1	8
2	9
3	TAB
4	2
5	4
6	7
7	1
8	ESC
9	"
10	.
11	LINE FEED
12	ENTER
13	6
14	9
15	3
16	ALT
17	0
18	.
19	cursor up
20	cursor down
21	cursor left
22	cursor right
23	NO-SCROLL
255	no key pressed

NB. CAPS LOCK and the 40/80 DISPLAY keys are hardwired and not detected through the keyboard matrix.

See listing on page 67

First Steps

How to make sense of errors and input operations



Although many computer error messages relate to communications with peripherals, the majority are linked to links that can arise in basic programs. These may be broken down into three main areas.

The first area is mathematical errors which are relatively easy to correct. Then there are errors relating to inputs and character strings which are normally the fault of the program user but ultimately the responsibility of the programmer. Finally, there are operational errors which is always the programmer's fault and can be very difficult to correct.

The final category will form the subject of a whole article in a later issue of *Your Commodore*. In this article we'll concentrate on the input errors.

String too long

The maximum length of a string is 255 characters. Input from the screen through the INPUT statement is limited to less than 80 characters but use of the GET statement or string concatenation should be carefully planned during programming.

Weak areas are open-ended statements such as:

```
10 GET A$ IF A$="" THEN 10
20 IF A$=CHR$(1) THEN 40
30 B$=B$+A$ GOTO 10
```

The computer will carry on build-

ing the B\$ string as long as the user is willing to type away at the keyboard. It is possible that the 255 character limit would soon be exceeded so a trap is needed:

```
25 IF LEN(B$)>255 THEN
PRINT"INPUT TOO LONG.
PLEASE TRY AGAIN";B$"
```

If the input is deliberately long a different approach can be employed by using a routine like this:

```
10 X=0
20 GET A$ IF A$="" THEN 20
30 IF A$=CHR$(1) THEN 60
40 IF B$(X)=255 THEN X=X+1
50 B$(X)=B$(X)+A$ GOTO 20
60 FOR A=0 TO X:PRINT B$(A):
NEXT
```

Type mismatch

This occurs when an alphabetic character is typed in instead of a number. It can also occur within a program when a statement such as A\$=A or A=A\$ is used. The correct syntax would be A\$=STR\$(A) or A=VAL(A\$). In the second case, the value would only be those of any numbers at the beginning of the string. If A\$ starts with a letter it will not be suitable, even a floating point number such as 2.1E+30 would only be returned as 2.1 by this construct.

Extra ignored

This means that an input statement has received too many items. For example:

```
10 INPUT"LENGTH, BREADTH",
L,B
```

The extra information would be ignored if the input was 12,18,12. Only two items were expected but three were received.

This is a particular nuisance when string inputs are required:

```
10 INPUT"THE SECRET OF
LIFE",S$
```

A possible response could be:

KEEP BREATHING, STUPID

The camera would confuse the computer into believing that STUPID was a separate input and this error would be flagged as extra ignored.

With strings it is usually best to use the GET A\$ method because it's easier to error trap and accommodate commas, colons and semicolons.

Redo from start

Usually this arises when string data was typed in but numeric data was requested; a response such as "seven" instead of "7".

This error is fairly friendly because it does not crash the program but waits patiently for the user to try to do the correct key-in procedure.

It can also occur when the HOME key is struck instead of DEL, sending the cursor to the top of the screen. This is read as a valid entry along with the copious keypresses which generally follow as the user replaces the cursor to the correct place.

As long as the user realises what the message means everything should be resolved by simply re-inputting the correct information.

Bad subscript

If any array element oversteps the preset limit the computer cannot cope and reverts to this message.

All variables automatically have the facility to have eleven elements such as A(0) to A(10). If A(11) is accessed the eleven is known as a bad subscript. If A(11) is sorted, then a DIM statement will have to be placed at the beginning of the program.

The next set of errors contains the most commonly occurring messages of doom and form the operational error set. They can also be the hardest to track down so the next First Steps will be devoted to these important and irritating mistakes.



William Tell

*Can you fight off the
Austrian soldiers?
Only time will tell*



It is not often that a game meets our stringent standards but it was like a bolt from the blue when David Light made contact with William Tell, we couldn't resist.

The program is entirely written in machine code and uses multiple sprite techniques to produce a game of fast reactions and joystick-gripping excitement.

William Tell's son has been captured by the Austrians and imprisoned in the deepest dungeons of the castle. Armed with a limited supply of crossbow bolts, you have to help Tell to rescue the apple of his eye.

The first stage of the game involves the collection of two keys which unlock the doors to the dungeons. Both keys are to be found hanging up outside the guardrooms located at either end of the battlements. The battlements are patrolled by armed guards who can either be shot with your crossbow or jumped over if your timing's good. Occasionally you must replenish your supply of crossbow bolts by jumping up and collecting them. Timing your jump is vital because arrows and cannonballs are whizzing overhead. Once you've got the keys, fight your way back to the battler and then you are delivered to the courtyard.

The second stage means fighting your way across the courtyard to one of the dungeon entrances which are at either side of the courtyard. It's up

to you which entrance you choose but you must be in possession of both keys because the doors are double-locked. In addition to more coordination, you also have guards armed with longbows shooting arrows at you. The only way of avoiding these missiles is to jump over them but it's important that you replenish your supply of crossbow bolts during the first stage on the battlements because there are no more supplies until you enter the dungeons. If you have less than ten bolts remaining, the indicator starts flashing as a warning and you may have to return to the battlements to re-arm.

The final stage of the game takes place in the dungeons themselves. Here you have to collect 25 apples while being pursued relentlessly by intelligent guards who are also armed with longbows. You can shoot the archers and deflect their arrows with your own crossbow bolts but don't try to jump over the guards or their arrows. There are ample stocks of crossbow bolts distributed around the dungeons to replenish your supply.

Other hazards lurk deep within the dungeons, spinning blades appear that will chop you up if you walk or jump onto them. After frantically jumping over the blades and avoiding the guards, you may find an area in the dungeons where it seems you are safe from the pursuing guards but you could be in for a nasty surprise if you lunge in one spot for too long! When

you have collected all the apples you will be directed towards the exit where your son is waiting for you to shoot the final apple off his head.

Whether you complete the game, lose all your lives or the countdown timer reaches zero, you will be given the opportunity to enter your initials in the Hall of Fame as long as your score is greater than those already there. Use the joystick to scroll the alphabet left or right and press fire to select any three letters.

The program has 25 different screens (21 of which are scrolling) and three separate levels. Once the game has loaded, an animated title page which uses 24 sprites is displayed. When the animation is complete, the Hall of fame screen appears.

Getting it all in

Type in and save the program in the order they are printed, following the instructions given. To start the game, press the fire button on the title or Hall of Fame screens. The title screen will be re-displayed at the end of each game once the Hall of Fame has displayed the top ten scores. Pressing RUN/STOP and RESTORE will abort the current game and return the title screen. The Hall of Fame scores will not be lost.

Are you bold enough to face this challenge? Can you save the boy? Who can? Tell!

Constructing a



To complete the FCL Compiler we present the all-important SYSLIB library file

The SYSLIB library file is given here as a Basic loader program. Unlike ASSEMBLE, you need not change the start of Basic because SYSLIB loads into memory at \$C000, well out of reach of Basic.

Once assembled, your program is ready to be run on the computer; simply type LOAD "PROGRAM-NAME", and then RUN. At runtime, your program expects the library file SYSLIB to be present on the disk. SYSLIB provides most of the facilities required by your program such as error handling and file I/O. The SYSLIB program was written using the FCL assembler and I should point out that all of the problems mentioned back at the beginning of the series occur within this code.

A program can call SYSLIB by loading a service request function number into the accumulator and then calling the library via an indirect jump at memory address \$001E (\$4E). Many of the functions assume that parameters are to be found in one or more of the system variables in zero page and most results are returned in this way. SYSLIB also sets up several buffer areas for file and keyboard I/O, runtime stack and numeric conversion.

It is possible for an end user to "patch" into SYSLIB by altering the indirect jump vector mentioned earlier. In this way, extra functions may be added. The user patch would set the value of the accumulator and, if it was one of the new function numbers, would execute the appropriate subroutine, otherwise the normal SYSLIB routines would be called.

The library is first initialized at runtime by a call from the compiled program to the initialized routine at \$C000 (the library lines between \$C000 and \$CFFF although there is some spare memory here). This sets up the memory pointers and buffer areas for runtime operations. The actual screen page addresses of the system variables and pointers are listed in Fig 1.

The addresses of these variables have been carefully chosen so that they don't interfere too much with the resident Basic system. This ensures that a safe return to Basic may be made following execution of a runtime FCL program.

SYSLIB library calls

Fig 2 lists the calls to the SYSLIB program.

To make a call to SYSLIB, place

the parameters required into the correct system variables, load the accumulator with the function number and execute a JSR \$001E instruction. After execution, any parameters are returned in the stated variables.

As you can see SYSLIB does quite a bit! As I have already mentioned SYSLIB also provides an error messaging facility. When an error occurs, the program will normally halt. When a warning is printed, execution continues although the operating conditions may change and results may not be as expected. All errors and warnings are listed in Fig 3.

Compiler complete

So there you have it. A complete compiler system, albeit a rather simple one. Given time and a lot of patience, many of you may be able to come up with bigger and better (and faster!) compiler systems.

In Fig 4, you will find a couple of example programs to try. They are pretty simple routines but may give you the feel of the language and show you the sort of things you can do.

If you do go on to write a compiler, good luck!

Fig 1 System variables

System name	Purpose	Address
AC1	Numeric accumulator 1	\$05
AC2	Numeric accumulator 2	\$05
SD1	String descriptor 1	\$26
SD2	String descriptor 2	\$2F
UP1	Utility pointer 1	\$FB
UP2	Utility pointer 2	\$FD
APT	Array pointer	\$48
TT1	Temporary variable	\$47
CALLVEC	SYSLIB call vector	\$5E
MEMTOP	Top-of-strings pointer	\$49

The buffer areas are as follows:

OUTBUF	Output buffer (write)	\$9800
INBUF	Input buffer (read)	\$9C00
STACK	Runtime stack	\$9D00

OUTBUF and INBUF are each 256 bytes in length while STACK is 768 bytes long. The pointer for STACK is held within the area of the stack runtime and should not be changed even if you can find it!

Fig 4 Example program

Program 1. Simple typewriter.

This program uses the charin and charout simulators to construct a simple typewriter program which may be terminated by pressing the RUN/STOP key.

```
begin
  ch
  loop
    charout charin(0)
  andloop when stop(0)
end
```

Program 2. Multiplication tables program.

Back to school with this short program to display a multiplication table of your choice.

```
var int count,mult
begin
  count=1
  write "Enter table:"
  read mult
  loop
    write count, count*mult
    count++
  andloop when count=12
end
```

Fig 2 SYSLIB library function calls

Function number (A)	Action		
00		and place it in AC1.	from these functions are returned in accumulator AC2 where TRUE is a value of 1 and FALSE is a value of 0.
01	PHOENIX. This call will reset SYSLIB and is used by the initialization routines. The string pointers will be reset to the end of the program and the stack will be cleared.	01 Copy the contents of AC2 into pointer UP1.	02 Compare the two strings and return TRUE if they are exactly equal.
02	Place the contents of accumulator AC3 onto the system runtime stack. Contents of AC3 are preserved.	02 Copy the contents of AC2 into pointer UP2.	03 Compare the two strings and return TRUE if they are NOT equal.
03	Remove the topmost runtime stack member	03 Copy the contents of string descriptor SD3 onto the top of the runtime stack.	04 Compare the two string and returns TRUE if SD1 = SD2.
04	Place the contents of accumulator AC3 onto the system runtime stack. Contents of AC3 are preserved.	04 Remove the topmost runtime stack member and place it in SD1.	05 Compare the two string and returns TRUE if SD1 = SD3.
05	Remove the topmost runtime stack member	Functions 07 to 12 assume that the two string descriptors, SD1 and SD2 contain pointers to two strings. Results	

- 11 Compare the strings and return TRUE if SD1 < SD2.
- 12 Compare the strings and return TRUE if SD1 > SD2.
- 13 Concatenate (join) string SD2 to string SD1 returning the combined descriptor for the new string in SD2.

Functions 14 and 15 assume that the I/O channel has been opened previously by function 37 (open).

- 14 Select the channel number in AC1 for input.
- 15 Select the channel number in AC1 for write.
- 16 Convert the number in AC2 to an ASCII-numeric literal and output to the current (output) channel.
- 17 Write the string currently described by SD2 to the current (output) channel.
- 18 Write a carriage return (ASCII 13) to the current output channel.
- 19 Applies to screen output. Move the cursor to the next screen tab position; take set at positions 8,16,24 and 32.

Functions 20 to 23 calculate and check array addressing requests.

- 20 TT1 should contain the start address of the array. The first two bytes at this address contain the maximum number of elements. This function checks that the program is trying to address a valid element by comparing these bytes to the contents of the array pointer APT. An error will result if the element being addressed is invalid.
- 21 Calculate the address of the element in an integer array. Element number is in APT.

Functions 22 to 28 perform operations on arrays. You must use functions 20 followed by 21 or 22 to calculate the address of the array element to be used by these functions.

- 22 Calculate the address of the element in a string array. Element number is in APT.
- 23 Load AC1 with the value of the integer array element at the address calculated by function 21.
- 24 Save AC1 to the integer array element whose address was calculated by function 21.
- 25 Load SD2 with the descriptor from the string array element whose address was calculated by function 22.
- 26 Save SD2 to string array element whose address was calculated by function 22.
- 27 Increment the integer array element.
- 28 Decrement the integer array element.
- 29 Remove the topmost stack element and place it in the array pointer APT.
- 30 Copy the contents of AC1 to APT.
- 31 Read a literal numeric string from the current input channel and convert it into a value in AC2.
- 32 Read a string literal from the current input channel and place descriptor in SD1.
- 33 BSET. Move the contents of UPT to the memory address contained in AC1.
- 34 WSET. Similar to 33.
- 35 Check if AC1 contains a FALSE value of zero.
- 36 CHAROUT. Output the ASCII character whose code is in AC2.
- 37 POPEN. Opens an I/O channel. Either of functions 39 or 40 must be called first.
- 38 FCLOSE. Close channel AC2.

Functions 39 and 40 set up parameters for function 37, the open statement, and expect the filename string in SD1 and the channel number in UPT.

- 39 INPUT. Define a channel for input.
- 40 OUTPUT. Define a channel for output.
- 41 CLS. Clear the screen and home the cursor.
- 42 WAIT. Use the value in AC1 to cause a delay calculated by 60*AC2.
- 43 HALT. Forces a terminate sequence. Similar to function call 78.
- 44 SYSCALL. Call a machine code routine at address in AC2.

Functions 45 to 58 perform operations between AC1 and AC2, returning the result in AC1. The exception is function 48 which uses only AC2. Functions 49 to 54 compare AC1 and AC2 and return a TRUE (1) value in AC1 if the condition is satisfied.

- 45 OR. Perform AC1 OR AC2 - AC2.
- 46 NOR. Perform AC1 NOR AC2 - AC2.
- 47 AND. Perform AC1 AND AC2 - AC2.
- 48 NOT. Perform NOT (AC2) - AC2.
- 49 Test for AC1 = AC2.
- 50 Test for AC1 < AC2.
- 51 Test for AC1 <= AC2.
- 52 Test for AC1 > AC2.
- 53 Test for AC1 >= AC2.
- 54 Test for AC1 <> AC2.
- 55 Plus (+). Perform AC1 + AC2 - AC2.
- 56 Subtract (-). Perform AC1 - AC2 - AC2.
- 57 Multiply (*). Perform AC1 * AC2 - AC2.
- 58 Divide (/). Perform AC1 / AC2 - AC2.
- Autoincrement (++). NOT IMPLEMENTED.
- Autodecrement (--). NOT IMPLEMENTED.
- BYTE. Get the contents of the memory location (AC1) into AC2 (single byte only).
- 62 WORD. Similar to 61 but gets a word.
- 63 LEN. The length of the string whose descriptor

	is in SID2 is returned in AC2.		(STOP or CONTROL has been pressed.		the values of the A,R,T and flags registers to be passed to the routine.
64	CHAR. The ASCII character code in AC2 is converted to a string in SID2.	68	CHARIN. The current input device is pulled for a character which is returned in AC2.		Upon return, string (SID2) contains the return values of these registers.
65	STR. The literal of the value in AC2 is converted to a string in SID2.	76	LEFT. Places in SID2 the substring of the leftmost (LPT) character of string (SID1).	74	ROSTAT. Returns the value of the I/O status byte in AC2.
66	ASCII. The ASCII code of the first character of the string in SID2 is placed in AC2.	71	RIGHT. Places in SID2 the substring of the rightmost (RPT) character of string (SID2).	75	DSTAT. Returns the disk status string in SID2.
67	STOP. A TRUE value is returned in AC2 if the RUN/STOP key has been pressed.	72	MID. Places in SID2 the substring of (SID2) of length (LPT) starting at (LPT).	76	DIRR. Returns the disk status string in SID2.
68	KEY. A TRUE value is returned in AC2 if a key other than SHIFT, COMMAND/ORE, RUN	73	STMPN. Calls a machine code routine at address in AC2. The string (SID2) contains	77	Clear all I/O channels, but do not close them.
				78	Terminate. Calling this function terminates the current program. There is no return from this function!

Fig 2 **SYSTEM error messages**

SYSTEM warnings

Numeric overflow

A calculation has exceeded the integer limit of 65535 and may not contain a valid value.

Numeric underflow

A calculation has gone 'negative'. I.e. has effectively gone less than zero. In fact the value will be 2's complement.

WARNING Disk not present. Subsequent I/O attempts will cause errors

May be printed during the init phase. Indicates that a disk drive is not present.

SYSTEM errors — non I/O

Bad array subscript

An array has been illegally addressed.

Illegal quantity

Some value (possibly during a read) has exceeded the valid limits.

String too long

Strings must not exceed 255 characters.

Data type mismatch

May occur during a read. Indicates that incorrect data has been assigned

to a particular variable.

System I/O error

General I/O error. More detailed messages follow later.

Reserved I/O channel

Certain channel numbers are reserved by the system. This message is printed when you try to use one of them (See the PCL Programmer's Manual for a list of invalid channels).

Device not found

Disk drive is not present.

Null FID

A filename was null.

Out of memory

There is no more room for strings.

Division by zero

You cannot divide by zero!

Stack overflow

Unlikely, but occurs if the runtime stack fills up. This may indicate an error in COMPILE.

SYSTEM I/O errors

These I/O errors are more specific and are actually used to report Kernel I/O errors (See Commodore 64 Programmer's Reference Guide for details of Kernel routines).

EOF read

An I/O operation was terminated by the RUNSTOP key being pressed.

Too many open files

The system cannot maintain more than about 8 concurrently open files.

File already open

You have used the same channel as a previous (still open) I/O.

File not open

A channel you have used has not been opened.

File not found

The system cannot find the file you have requested for INPUT.

Device not present

The device asked for was not available.

File is not an INPUT file

You have tried to read from an OUTPUT file.

File is not an OUTPUT file

You have tried to write to an INPUT file.

File name is missing

You cannot open a disk file with no name.

Illegal device number

The device number specified is not legal. May indicate a problem with SYSTEM itself.

The Vindicator

Guns who has got to save the world against invaders from a distant star have crashed the Earth to bits. As the sole survivor, you and a few like-minded individuals have pledged to uphold the laws of justice, revenge and other clichés. One man has to face the final challenge and become the Vindicator. How do you restore how it is always one man. What's happened to the rest of the survivors? Perhaps they are not so keen on upholding the laws of justice, revenge and other clichés as they claim to be – but I digress.

A quote from the packaging blurb gives you some insight into the enormity of the task facing you. "Across a tortured landscape, against incredible odds, he must battle through to the enemy stronghold, down into a maze-like corridor filled with enraged guardians until he reaches the inner sanctum of the dark overlord to strike the final blow of retribution..." It's beginning to sound as if you draw the short straw.

The task comes in three sections. In part one, you have to blow up the Alien Vanguard and their base. This complex is set out as a first-level maze in which you must find the computer rooms. These, in turn, will give details to the whereabouts of the bomb parts necessary for the destruction of the base.

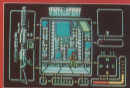
Before you can access the computers though, you must first kill off vast numbers of aliens that patrol the rooms off the corridors. Green ones are easy to kill – you can just duck out of the way of their bullets – but the red ones are much harder to dispatch and you will need bigger and better weapon cartridges if you are not to sustain considerable damage yourself.

Having killed the alien, you can then pick up his left paw, computer access card or an extra cartridge. Other items to be acquired include oxygen – a health restorer used to repair damage either from being shot or simply from inhaling the poisonous atmosphere.

Once you have found a computer terminal and accessed it with the correct card, you then have to solve an anagram to believe you are given the information you desire. The solutions to these are not immediately obvious but a reference to some of the names connected with the design of the game may put you on the right track. Losing one of your lives also results in the loss of any cards you are carrying at the time.

Having blown up the base, you now have to fly a one-man-armed fighter plane across enemy terrain blowing up as many of the installations as possible. The problem is that there is nowhere to land so you must return to the start and then make the journey again, this time in your jeep. Hordes of tanks and helicopters are out to get you but that shouldn't prove too difficult for a budding superhero. Once you reach the other end, all that remains is for you to defeat the Marold Guardian before gaining access to the final part of the game.

The Catacombs lead you to the bowels of Hell itself. Apart from avoiding the hordes of evil minions, it is purely a case of keeping on going until you come to the final confrontation with Gog – the personification of evil and the ultimate objective of your quest.



Here is your chance to live up to the title of the game and become THE VINDICATOR.

The game looks good and plays very well. The controls are easy to get to grips with, unlike some other games of this type. The only real problem you are going to encounter is that of orientating yourself properly in the corridors. The easiest way round that is to make a note of the co-ordinates of all the key installations – these are constantly updated as you wander around the maze.

I'll have one major griumble, it is that you cannot store supplies of any-guns in a pocket (unlike even superheros' basic pockets) but have to leave it where it is until required. That apart though, *The Vindicator* is an excellent challenge and anyone enjoying this type of game will surely want it in his or her collection.



Troubleshooting

Price: The Vindicator. Supplier: Amlogic Software, 6 Central Street, Manchester M2 3JG. Tel: 061-812 6671. **Price:** £9.95 from £14.95 (deal).

*Not the Palace hit, but a conversion
which is already a 16-bit cult.*

When it first appeared on the Amiga and Atari ST, Pippin's *Barbarian* immediately gained cult status and I suppose it was only natural that it would be converted to eight bit formats. The conversion has now appeared on the Melbourne House label and I am sorry to say that they have made something of a botch of it.

The storyline is convoluted to say the least, running to some twenty pages in the instruction booklet. What



Barbarian

follows is a (very) partial history. You are Hagar the Barbarian. When you were young, your father, Thoren, trained you in the use of various weapons. One day, you return home to see him being beaten to a pulp by a dragon which he had just herded away from the village (heavily gaining, but posthumous, hero status). You immediately vow your vengeance.

To whet away a few years, you go off practising all the usual barbarian-type habits such as drinking and wrenching a lot while killing the odd monster. During these travels, you discover that your father's enemy, the controller of the dragon, was in fact your Uncle Neeron, your father's twin brother. Your father had killed Neeron once but, because of the family ties, let his soul regenerate.

Neeron is now terrorising the world again and there is a price of a kingdom to anyone who can defeat him and his dragon Volcanus. This seems to interest you rather more than your previous vow of vengeance but the ghost of your father appears and reminds you of your duty. Confused? Don't worry, it's all incidental to the game.

Hagar is controlled via a series of icons although the instructions cunningly don't bother to tell you what they are for. At least not in English (they don't). They do in French, German and Italian although one of the French commands is also missing. This is obviously a plot by Melbourne/Melbourne House to get everyone learning a foreign language.

For non-linguists, the available commands (include left, right, up-down, jump, stop, run away, attack, defend, pick up, drop and use). A cursor is moved over the appropriate choice and the fire button is pressed to execute an action. Being used to the Amiga version using the mouse, I found the joystick response to be very slow and got killed several times through being unable to execute combination moves quickly enough.

The game involves traversing a number of screens by killing off monsters or by trying to leap over falling masonry, collapsing bridges and the like. Amongst the monsters to be encountered are: an orc, strange rhinos and woolly bears. You start off armed only with a sword but must find and pick up other weapons on route, such as a bow and arrow which is required to dispose of the dragon. Eventually, you will find the crystal that represents Neeron's soul and you must drop this in the volcano. You then have only a limited amount of time to make your escape before the volcano erupts.

The traps appear one at a time at first but soon they are found set in combination with monsters. One trap I didn't like involved a falling slab of spiked stonework which could be avoided by standing underneath it and jumping upwards!

Although comparisons between eight and sixteen bit versions are difficult, the graphics and sound effects on the C64 version are poor, especially the graphics which look very busy. Even the stunning Amiga title screens, which could have been reasonably reproduced, have been replaced with less-than-ideal.

It is the gameplay that has suffered most. The monsters have lost all their aggression and there is a general woodenness about the controls. Coupled with the very shoddy instruction booklet, this all makes for a very disappointing product.

The Amiga version was on the office machine all the time. Everybody wanting to have just one more go. On the C64, I found no addictive qualities whatsoever and couldn't wait to turn the machine off. GRH

Touchline:

Title: *Barbarian*. Supplier: Melbourne House, 2nd Floor, Tel. Fenchurch Rd., London EC3 1DF. Tel: 01-727 8070. Machine: C64. Price: £5.99 (non), £14.99 (disk).

YOUR

COMMODORE

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We would like to thank you in advance for your time, and remind you that only fully completed questionnaires received by 11th November 1988 will be eligible for the FREE draw.

1. How long do you keep your copies of YOUR COMMODORE for:

- Less than one month
 One month
 Three months
 Six months
 A year or more

2. If kept, how often do you refer back to issues of YOUR COMMODORE?

- Once a week or more
 About once a month
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 Never

3. How long do you spend reading your copy of YOUR COMMODORE?

- Over 2 hours
 1 1/2 - 2 hours
 1 - 1 1/2 hours
 1/2 - 1 hour
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- Less than 3 months
 3 - 6 months
 7 - 12 months
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- Read only some articles
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7. With regard to the advertisements in YOUR COMMODORE do you?

- Read or look through most or nearly all of the ads
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 Just read or look through the occasional ad
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8. Which of the following would you most like to see featured with the magazine (please tick one box only)?

- Cover mounted gifts
 Additional supplements
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9. Does anyone else read your copy of YOUR COMMODORE?

- No, only myself
 One or two other people
 Three or four other people
 More than four other people

10. If your copy of YOUR COMMODORE is read by other people, please give details of their age and sex:

	PERSON 1	PERSON 2	PERSON 3	PERSON 4
AGE: 5-14 YRS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15-24 YRS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25-34 YRS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35-44 YRS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
45-54 YRS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
55-64 YRS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OVER 64 YRS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SEX: Male	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Female	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

11. With respect to the articles in YOUR COMMODORE, how do you rate the following:

	POOR	AVERAGE	GOOD	EXCELLENT
News	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
General features	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tutorials/programming hints	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Business features	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Utility & hardware reviews	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Book reviews	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Business & educational reviews	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Competitions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Letters page	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Games listings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Services/utility listings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ample coverage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Readers offers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Software for sale	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mail	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

12. Thinking specifically about the advertising content, would you please rate the two main types of advertisements:

	Display	Classified
Very useful	<input type="checkbox"/>	<input type="checkbox"/>
Useful	<input type="checkbox"/>	<input type="checkbox"/>
Not very useful	<input type="checkbox"/>	<input type="checkbox"/>
Not at all useful	<input type="checkbox"/>	<input type="checkbox"/>

13. Would you like to see more or less coverage given to the following:

	MORE	LESS	SAME
News	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
General features	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Technical/programming facts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Business features	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Utility & hardware reviews	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Book reviews	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Business & Educational reviews	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Competition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Letters page	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Games listings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Series/utility listings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Amiga coverage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reader offers/Software for sale	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Music	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

14. Which other computer magazines do you read and how often?

	NEVER READ	READ OCCASIONALLY	READ REGULARLY
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Commodore User	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Zzap! 64	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Amiga User Int.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Amiga Computing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Your Amiga	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Amiga World	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Popular Computing Weekly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Personal Computer World	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Commodore Disk User	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

15. If read, how do they compare with YOUR COMMODORE?

	NOT AS GOOD AS Y.C.	AS GOOD AS Y.C.	BETTER THAN Y.C.
Commodore Computing Int.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Commodore User	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Zzap! 64	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Amiga User Int.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Amiga Computing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Your Amiga	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Amiga World	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Popular Computing Weekly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Personal Computer World	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Commodore Disk User	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

16. Please give any further comments or criticisms that you feel will help us improve YOUR COMMODORE.

.....

17. How much do you normally spend in a 12-month period on the following types of software? (please tick one box on any line)

	Nothing	£50	£51-100	£101-200	£201-300	£300+
Games	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Business	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Educational	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Graphics/Music	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Utilities/Language	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

18. What sort of listings do you type in?

	All	Some	None
Games	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Utilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Music	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Business (W.P., Spreadsheets, etc)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

19. How much of the time do you use your computer for the following purposes? (please tick one box on each line)

	All the time	More than half the time	Sometimes	5
Writing programmes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Typing in games listings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Typing in utility listings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Playing games	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Graphics or music	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Educational	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Business (wordprocessing, database, etc)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

20a. Have you used the YOUR COMMODORE software service?

Yes (please answer part c)
No (please answer part b)

20b. IF YOU HAVEN'T USED IT, why not?

Too expensive
Limited Choice
Delivery period too long
Other reason - (please state)

20c. IF YOU HAVE USED IT, have you been satisfied with the software and the service you have received?

Yes No

21. Put a tick next to the magazine you think offers the best coverage of the following areas (Y.C.=Your Commodore, CUI=Commodore Computing International, CU=Commodore User, Zzap! 64=Zzap! 64, CDU=Commodore Disk User).

21a News
Y.C.
CUI
Zzap! 64
CDU
21b General features
Y.C.
CUI
Zzap! 64
CDU

21c Editorial features and reviews of utilities and hardware
Y.C.
CUI
CUI
Zzap! 64
CDU

21d Games features
Y.C.
CUI
CUI
Zzap! 64
CDU

21e 'Serious' computing (wordprocessing, personal finance, art etc.)
Y.C.
CUI
CUI
Zzap! 64
CDU

21f. Do you own a printer that you use with your Commodore computer?
Yes No
If 'Yes' please answer the next part.

21g. What type of printer is it?
Commodore
Epson Compatible
Other

22. Do computers or a related activity provide you with an income?

Yes No

23. Do you attend computer exhibitions/shows?

Yes No

24. If your answer to the previous question is YES, please specify which ones.

.....
.....

25. (a) Which computer(s) do you own?

C 16
Plus 1
C64/64C
C128/128D
Amiga
Spectrum
Atari ST
Atari 504
Other Atari
Other (please specify)

(b) How long have you had a Commodore computer?

Less than 3 months
3 to 6 months
7-12 months
1-2 years
Over 2 years

25b. Do you own a disk drive that you use with your Commodore computer?

Yes No
If 'Yes' please answer the next part.

25c. What make/model is your disk drive?

1041
1001
1070
1071
Other made by Commodore
Other not made by Commodore

25d. Do you own a printer that you use with your Commodore computer?

Yes No
If 'Yes' please answer the next part.

25e. What type of printer is it?
Commodore
Epson Compatible
Other

28(a) Do you think you are likely to buy a new computer during the next year?

Yes No

(b) If 'Yes', which do you think you are likely to buy?

- IBM/PC
- Amiga
- IBM PC or clone
- Apple II
- Other (please specify) _____

29. Which of the following types of software do you own and use:

- Word processor
- Data base
- Spreadsheet
- Assembler
- Lotus package
- Music package
- Games

30. Do software reviews influence your buying?

Yes No

31. Do software charts influence your buying?

Yes No

32. Are you aware of the estimated publication day?

Yes No

33. If the answer to the previous question is YES, do you attempt to purchase the magazine on that day?

Yes No

34. How do you normally obtain your copy?

- Change purchase
- Newspaper shop collection
- Newspaper home delivery
- Subscription
- Passed on copy

35. If you are a subscriber, on which date did you receive this issue?

/ /

36. If you are a subscriber, how long have you subscribed to this magazine?

- 1-6 months
- 7-12 months
- 1-2 years
- 3-4 years

37. If you do not obtain your copy by subscription, is it due to one of the following:

- Subscription too expensive
- Not every issue required
- Not aware subscription service available

38. Are you aware that to subscribe to this magazine in the U.S. is the same cost as purchasing it in a shop?

Yes No

39. Would you like to receive further details on taking a subscription?

Yes No

40. If you do not subscribe, from which type of newspaper do you most often obtain your copy?

- High Street shop
- Bookshop
- Corner Shop
- Travel Point
- Other (please specify) _____

41. If you have subscribed to this magazine but now lapse, is it due to:

- Subscription too expensive
- Every issue no longer required
- Lapsed in receiving subscription copy
- Poor service from our subscription bureau

42. What is your marital status?

- Married
- Single
- Divorced

43. Age (please tick)

- Under 12 Yrs
- 15-18 Yrs
- 19-21 Yrs
- 22-24 Yrs
- 25-34 Yrs
- 35-44 Yrs
- 45-54 Yrs
- Over 54 Yrs

44. Sex

Male Female

45. Are you...?

- In full-time employment
- In part-time employment
- Not employed at present
- Retired
- Student - full-time
- Student - part-time

46. If in full-time employment, please state your occupation:

.....

47. If student, what subjects studied?

.....

48. Please tick the box which represents the annual total of your gross income:

- Under £8,500
- £8,501-£18,000
- £18,001-£19,000
- £19,001-£32,500
- £32,501-£52,000
- £52,001-£78,000
- Over £78,000

49. Which of the following do you have?

- Bank current account
- Bank deposit or savings account
- Life insurance policy
- Any stocks or shares
- Access card
- Barclaycard (Plus)
- American Express
- Diners Club
- Vain Treats

- Private medical ins.
- Personal Accountant
- Building Society account
- A mortgage
- Any R.F. agreements
- Telephone

50. Do you own your home, rent or live with parents?

- Own
- Rent
- Live with parents
- Other (please specify) _____

51. If you own your own home, what is the approximate value (your principal residence if you have more than one)?

- Under £20,000
- £20,000-£74,999
- £75,000-£99,999
- £100,000-£149,999
- £150,000-£200,000
- Over £200,000

52. How many rooms does your home (or principal residence) have?

- Bedrooms
- Reception rooms

53. If you have children, please indicate their age and sex (give details of the four youngest if you have more than four.)

AGE	SEX			
	FIRST	SECOND	THIRD	FOURTH
1-3 yrs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4-8 yrs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9-12 yrs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13-16 yrs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Over 16 yrs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SEX	Male <input type="checkbox"/>	Female <input type="checkbox"/>	Male <input type="checkbox"/>	Female <input type="checkbox"/>

54. How many of the following items do you buy, on average, over a month?

ITEM	PER MONTH					NEVER BUY
	LESS THAN 1	1 or 2	3 or 4	5 or 6	MORE	
A book	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A record	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A tape	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

55. Please indicate below when you last did any of the following:

ACTIVITY	WHEN		
	IN LAST WEEK	IN LAST MONTH	LONGER AGO
Are out at a Restaurant	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Entertained at home	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Went to the theatre/sports hall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Went to a music concert	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Went to the cinema	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Attended at sporting event	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Visited an art gallery/museum	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Went to a pub	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Had a short break in a hotel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Overseas holiday (in last 12 months)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

56. Which of the following do you drink?

BEVERAGE	FREQUENCY		
	MORE THAN ONCE A WEEK	ONCE A WEEK	LESS OFTEN
Beer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lager	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wine	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sherry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Port	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Brandy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gin	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rum	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Toddy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Whisky	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Liquors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DON'T DRINK	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

57. Where do you buy most of your drink from?

- An Off-licence
- A supermarket
- A Public House
- Other (please specify) _____

58. Do you have any of the following cards either yours or jointly with another person?

- Cash discount card
- Retailer card/stores card

59. Name the three television programmes you watch most regularly

-
-
-

60. Do you listen to commercial radio stations?

Yes No

40. How many cars are there in your household?

- None
- One
- Two
- Three or more

41. What cars do you own?

42. Is one or more of your cars a company vehicle?

- Yes No

43. Do you usually buy your cars new?

- Yes No

44. How often do you tend to change your car(s)?

- Over a year or more often
- About every two years
- About every three years
- Less often

45. Do you smoke?

- Cigarettes
- Cigs
- Pipe
- Don't smoke

46. Other than items purchased for your computing, have you bought any other types of goods by mail-order during the past 12 months?

- Yes No

48. If the answer to the previous question is YES, please state the type(s) of goods purchased.

49. Which of the following newspapers do you read?

- The Times
- The Daily Telegraph
- The Financial Times
- The Guardian
- The Independent
- The Daily Express
- The Daily Mail
- The Daily Mirror
- The Sun
- The Daily News
- Today
- None of the above

50. Which of the following Sunday newspapers do you read?

- The Sunday Times
- The Observer
- The Sunday Telegraph
- The Sunday Express
- The Mail on Sunday
- The Sunday Mirror
- The People
- The News of the World
- None on Sunday
- None of the above

51. Are you a member of a book club?

- Yes No

52. Are you a member of a record club?

- Yes No

53. Which, if any, of these sports and activities do you play or take part in nowadays?

- Crick
- Fishing
- Golf
- Rugby
- Soccer
- Sailing
- Tennis
- Swimming
- Squash
- Travis
- Weight training
- Wintering

54. Which of the items listed below have you been shopping in during the last six months?

- Books
- W.H. Smith
- John Menzies
- Deans
- Currys
- Leaky
- Rambles
- Barton
- Asst in Food
- Harrods
- Next
- Fraser
- None of you own
- Stores/H-F systems
- Tape plays/cassette
- Video recorder
- T.V.
- None of the above

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Grey/Black/Red Jacket	1/2/3/4/5/6		32.99		
Grey/Black/White Jacket	1/2/3/4/5/6		32.99		
Leather Moon Phase Watch	1/2/3/4/5/6		49.99		
Leather Moon Phase Watch	1/2/3/4/5/6		49.99		
					£1.00
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Talking Computers

How to program a mini Max Headroom into your favourite program

In all very well being able to hear your prose spoken by a disembodied voice through a voice synthesiser. How much better it would be to see who the voice belonged to.

Creating a simple face on the screen is easy; getting it to talk is a much more difficult. Even the creators of the television program, Max Headroom, had to rely on an actor made-up to look as though he was computer generated and enhanced by a few clever TV tricks. Armed only with some speech software, the odd sprite and a C64, I considered the possibility of creating a talking head!

It seemed like a good idea because a talking head in an adventure would allow the user to not only see the guide but it would also tell them what was going on; a game show host could read out the questions and answers; cartoon characters designed by you, working in your own programs could be seen and heard to speak just like Fred Flinstone or Yogi Berra. Imagine your own program being introduced by a talking head explaining how to use the program... it's nice to get carried away by the possibilities but what about the practical problems?

The key to your character being seen to talk is lipsync. Lipsync means that the speaker's lips move precisely at the same time as each syllable is spoken. If the timing of these two events is not perfect then the results will look very strange. A character in the distance can be seen simply to open and close its mouth but at closer quarters this technique looks rather bad. It can be disguised by large movements of the head as in the TV program 'Spitting Image' and with ventriloquist dolls, but those who remember the TV series, 'Thunderbirds', will recall how unconvincing the

puppet's speech was because of too limited lipsync and simplistic mouth movement.

Cartoon animators recognised this problem so even as they started adding speech to their characters and devised a number of lip movements for saying different letters. For example, the letters B and P are spoken with the lips closed and then immediately opened as they are pronounced. Similarly, the letter Q requires the lips to form a different shape and so on. The problem's not getting easier is it! Fortunately such lip movements can be reduced to just a few key 'frames' to produce a reasonably convincing result.

Blinking nuisance

To add to the realism, as the lips of your character move, you should also be able to see other facial movements. The eyelids blinking at the eyes moving from side to side add realism but also create more problems.

Sprites are the ideal solution for displaying both lip and eye movements. In creating the lip movements, it's possible to use just five mouth shapes to provide an acceptable result. This may not be adequate for lip-readers but it does give a convincing display. To narrow down the range of movements, I have taken groups of letters that use similar lip movements and grouped them together. The letters U, E, W use basically the same mouth shapes but P and F share their own particular mouth shape. When the character is speaking the movements will have to blend with each other in a fairly natural way.

To achieve a convincing blink, it's important to realise that a blink is

performed unconsciously and at random. The program can't rely on a set delay and must therefore look to some other form of control to give a realistic result. I could have chosen to use the random number generator in the computer but it seemed a waste of ideas to control the blink through the string of characters to be spoken. Taking advantage of the random occurrence of the letters within a sentence, I selected the letter 'O' to use the blink. So every time the program reads an 'O' the character will blink.

The Lipsync program that accompanies this article works by reading a string and, by scanning each character in turn, instructs a pre-defined sprite to be printed accordingly.

Controlling the delay is critical to lipsync but the speech synthesiser transfers a string to its own buffer and speaks as it reads each character from this buffer. The actual speech slows down the emptying of the buffer to its own slower speed as it calculates which sound goes with which character and this also makes it sound more realistic. If it didn't do this, the buffer would empty in a fraction of a second.

Because of this inherent sluggishness, the interrupt-driven speech software gives the computer to get on with another task, in this case reading the string for the Lipsync program. At this point I should mention that the speech buffer should always be filled just prior to the SYS call for the Lipsync routine.

The Talking Head listing is a sprite data made up with four individual sprites to produce a talking head for use with Lipsync. Run the Talking Head Demo to see it in operation.

Only the four face sprite pointers are used for the head leaving the other

Your orders are to report to the top secret flight facility known as Echelon and be trained to operate the Lockheed C-104 Tomahawk which is the most awesome combat and exploration craft in the 21st Century. So begins this 3D spaceflight simulator, from the authors of *Landerboard*.

This task shouldn't be any problem to someone who's mastered the controls of a 20th Century craft such as a Gunship helicopter or a civil or military aircraft because you have standard controls over the craft's pitch and roll, thrust and attitude. In fact the game comes with a Gunship-style keyboard overlay to help you find the right keys without diving continuously into the extensive 72 page instruction manual.

Squeezed inside the presentation box is a Lipstick, which sets Echelon apart from other combat flight simulators. No, it's not the latest shade from Max Factor but a voice-activated, headset microphone (lipstick) which you use to fire your weapon systems. It's important to realise that it's only voice-activated and does not employ voice recognition, it simply waits for some noise to activate it. In other words saying FIRE will launch a missile, as will LAUNCH, WOMBAT, or a whistle or cough. The headphones supplied with the Lipstick don't actually work but do create an interesting atmosphere.

With your headset on and your joystick primed you're ready for action. After a brief security check to make sure the Lipstick and joystick are in the correct joystick ports, the main game loads and you are launched into the massive vector graphics landscape. A grid that corresponds to your map references is superimposed on the ground to help you navigate around the various systems as you carry out one of three missions.

In scientific mode, your job is to explore the planet, collect and identify various objects and solve a series of mysteries to ascertain what exactly is going on in this sector and what, if anything, is the significance of the probe maps. I'm not giving anything else away about this mission as it's the main one in the game but it will suit those gamers who prefer a logical approach which engages their minds more than their hands.

Patrol mode adds some action for dinky fingered combat pilots while



Echelon

they're exploring the unknown and Military mode is all-out war for those who want to try out their missiles, lasers and photon cannons. These are selected by pressing the function keys and then fired using the Lipstick.

As a combat game, Echelon quickly reached a limit where heading missions at only one type of alien became tiresome and so I decided to concentrate on the scientific mission and began exploring the unknown. In this mode you can hover and land or even launch the RPV and remote vehicle from which you can watch the

Tomahawk itself to get a different angle on the action.

The game now comes into it's own as you find a massive playing area to explore which includes buildings, satellites and towers, some of which hold the keys that could unlock the mystery of the probe maps.

T.B.

Toolbox:

Title: Echelon. Supplier: Acorn (UK) Ltd, Units 2/3, Halford Way, Wofford, Birmingham, B6 7AN. Tel: 01 274 2388. Machine: C64. Price: £14.95.



Software for Sale

If you think that one of our programs looks very interesting, but you can't afford the time to type it in then our software service will help you out

It's three o'clock in the morning. You sit at the computer keyboard having just finished a marathon typing session entering one of the superb programs from Your Commodore. Your fingers reach for the keyboard and press the letters R, U and N. You press RETURN, sit back and nothing happens.

Everyone has probably faced this problem. When it does happen it's a matter of spending hours searching through the program for any typing mistakes. No matter how long you look or how many people help you, you can usually guarantee that at least one little bug slips through unnoticed.

The Your Commodore Software Service makes available all of the programs from each issue on both cassette and disk at a price of \$5.00 for disk and \$4.00 for cassette. None of the documentation for the programs is supplied with the software since it is all available in the relevant magazine. Should you not have the magazine then back issues are available from the following address:

INFONET LTD, 5 River Park Estate, Berkhamstead, Herts
HP4 1HL.
Tel: (04427) 7661

Please contact this address for prices and availability.

The Disk

Programs on the disk will also be supplied as totally working versions, i.e. when possible we will not use Basic Loaders thus making use of the programs much easier. Unfortunately at the moment we cannot duplicate C16 and Plus/4 cassettes. However programs for these machines will be available on the disk.

What programs are available?

At the top of each article you will find a strip containing the article type, C64 Program etc. So that you can see which programs are available on which format, you will also find a couple of symbols after this strip. The symbols have the following meaning:



This symbol means that the program is available on cassette.



These programs are available on disk.

Please Note

Since the programs supplied on cassette are total working versions of the programs, we do not put disk-only programs on tape. There is no sense in placing a program that expects to be loaded from disk, on to tape.

JUNE 88

DIRECTORY EDITOR — A superb utility that allows you to alter your disk directories as well as add comments (C64 disk only).

SEE RAM DISK — Turn unused memory on your C64 into a pseudo disk.

BASIC LISTER — List a Basic program stored on disk without having to load it into memory (disk only).

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DISK SECTOR EDITOR — Examine the contents of your Commodore 1541 disks (disk only).

ORDER CODE

DISK YDJUN88 \$6.00

TAPE YCJUN88 \$4.00

JULY 88

BASPRINT — Now C16 and Plus/4 owners can access their printer functions with a set of 60 map-to-use Basic commands (available on disk only).

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MAKING MUSIC — A simple C64 synthesiser to accompany our popular series.

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DISK YDJUL88 \$6.00

TAPE YCJUL88 \$4.00

AUGUST '88

MAKING MUSIC - Programs to accompany August's instalment of our super music series (C64).

SHORT INTERLUDE - Overcome the problems of handling more than one interrupt with this handy routine for machine code programmers (C64).

TAPE ORGANISER - A high-speed program filing system for cassette users. (C64).

SPLIT BAUD RATE TERMINAL - Drive an RS232 modem with this TTY software for C64 or C128.

SPRITE LIBRARY - Aeroplanes are the subject of this instalment (C64).

EDUCATING SYDNEY - Create an image of the SID chip in memory so that you can see what it's up to whenever you require (C64).

SIMPLE - Give your Plus/4 the facility to set loans and pull down menus. Available on disk only.

ORDER CODE
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SEPTEMBER 1988

MUSIC COMPOSER - Compose your own three part harmonies on your C64 with this superb package - disk only.

MUSICAL FX - An excellent effects generator that allows you to produce sound effects in your own C64 programs.

SAMPLER 64 - The quality may not be suitable for studio use but you can have great fun using this C64 sound sampler.

C18 Disk Monitor - A superb disk utility for C18 and Plus/4 owners (available on disk only)

ORDER CODE
DISK YSEPP88 £6.00
TAPE YCSEP88 £4.00

OCTOBER 1988

SPRITE LIBRARY - In this instalment our sprites take on the look of the alphabet (C64).

SAMPLER 64 - See September 1988 for details (Full program on both September and October disks and tapes.)

SET THE ALARM - Use the C64's in-built clock as an alarm.

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ORDER CODE
TAPE YOCSEP88 £4.00
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Cassettes or disks are available from March 1988. Please ring the editorial office (01-417 8626) for details of these.

ORDER FORM - PLEASE COMPLETE IN BLOCK CAPITALS

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NOVEMBER 88		DISK (£6.00)	YDN0V88	
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TOTAL				

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Letters

Your opinions are what count. So put pen to paper and let us know how you feel about the industry, and of course the magazine!

Iwould like to pass on some criticism of *Your Commodore* magazine. The broad coverage of your magazine serves the interests of many readers known to me. The odd printing error or so is no problem and is usually remedied on the Back Page.

Our complaint would only be the poor presentation of some programmes. A recent example is the C64 Utilities Unlimited series. The February program Turbo Miss Maker was very hard to read and I found several cases where "98" entered produced the same characters as "M". However, after borrowing the magazine of fellow readers most of the errors were resolved. The program runs but I'm sure it will be an error or two.

The March issue continued the series with three more potentially useful utilities. The second program however, proved impossible to read in certain sections. After borrowing magazines from friends again, buying a second copy from a different newsgroup (I tried to get away from my newsgroup's obviously bad batch) and then being loaned a copy from my original newsgroup the program will remain unfindable. I have even resorted to making blow-up copies of the unsearchable parts on a copier and will fail.

Given the high quality of other program formats used in *Your Commodore* e.g. Popper and Spelling Checker along with Joystick Road in the same issue, supporters of *Your Commodore* should be able to enjoy

the same high quality presentation in all program presentations.

On another topic, your review Write On (Nov '86) re: Script/Plan for Plus/4 and C16 owners was glowing in its praise. I subsequently obtained this program and am using it for this letter.

It is much more convenient than Easy Script on the C64, however I wonder if English versions have the same problems with two minor bugs in the program acknowledged by Commodore in Australia. One, Save with Replace!, does not work, a new file name has to be used. Two, it is necessary to exit Disk Mode and return again to execute a second disk command.

Thank you for a well-balanced magazine, for all Commodore owners including Plus/4 and C16, forgotten by lesser magazines.

G.K. Polson, Australia.

In the next few months you should be seeing a marked difference in the listings of Your Commodore. We will be starting to print many of our programmes using lower case. This will avoid confusion between certain letters and numbers, for example 9 and E.

The 'poor presentation' that you mention in your letter was due to a page not being placed behind the listings. Steps have already been taken to prevent this happening again.

We have already mentioned in the magazine that 'color' photographs of the *STREET* series (1-3) are available from this office. If anyone would like a copy then send a large stamped, self-addressed envelope to:

STREET PHOTOGRAPHS
Your Commodore

J Golden Square

London

W1R 1AA

As for your question about Script/Plan, we have not experienced this problem. Maybe some of our readers here?

Calling all knitters

I have been using and following Commodore for nearly two years, and reading *Your Commodore* for a year and really enjoy the coverage given to all aspects of computing. But I have one mean at the moment, and this is that there is a Sinclair and an Amstrad program for knitting, but there is nothing from Commodore programmers. My wife enjoys knitting and would like to see a program for knitting as I'm sure would the many wives of other male computer maniacs.

Is there any one that has an idea about such a program? Or perhaps one of the programmers from *Your Commodore* can put together a program for knitting.

I can even understand the fact that there is practically no programmes for the C128 (of which I own and am proud of) and it is the same with some utility programmes; there seems to be more for BBC computers and Amstrad, etc. than there is for Commodore? It is not as if the Commodore does not have the capabilities for such programmes, the blame lies with the programmers who keep putting out games and don't give us the chance to use and

appreciate and enjoy some different utility programmes.

Norman Stans, Chelmsford, Essex.

Writing and computing don't normally go hand in hand and I'm afraid that I don't know any training computer buffs who could produce such a program.

I'm sure that one of our readers somewhere will have, or could, produce such a program. So come on read it in, we may even publish it!

Cutting down the Workload

As a small businessman now getting to grips with computing, I would like to express my thanks to you for publishing a magazine that covers the whole field of Commodore computing.

Many of your articles/programs have helped me now to make computing profitable and labour saving, by showing me how to write my own detailed programs in Basic that get the desired results in half the time required by a certain well-known make of PC and clones.

Right I hope that in the not too distant future as the ICB becomes more established, we shall see some programmes to make greater use of its ability to read other formats and thereby saving hundreds of poor overworked users the never ending problems of incompatible disks.

Having over the years had a great deal of experience with many makes of so called business computers, I have come to appreciate that instructions to employees can in fact be written directly into a computer in Basic and be varied through, without further help from any human hand. The speed at which the computer works is of little importance if there is not the need for an operator to sit watching it. What is important is to be able to communicate with your computer in a way that is understandable. Your magazine articles and programmes about Basic help to show how simple it is to communicate and programmes about Basic help to powerful and reliable employees in its own right. It also shows that a businessman can still be the boss and need not be the slave to the computer and its software.

During the past four years I have been able to increase my clientele and profits and have more spare time and I

owe all this to two very important factors. Firstly my good fortune to finally purchase a Commodore computer and secondly to reading your Commodore every month.

Mike Gray, Leatherhead, Surrey.

Making Music?

I am a musician interested in the musical possibilities of computers and I have been struggling with my 64 for sometime, so I was pleased to see the inclusion of a new series on music in the August issue.

However, I was disappointed after reading the article by Peter Gerrard. The article is supposed to be an introduction but I found it irritating that a couple of errors were made that would either confuse or baffle a new-comer.

Firstly terminology: the term waveform was confused with the term wavelength, waveforms refer to the shape of the sound wave (i.e. triangular, sinusoidal, etc. Wavelength is the length of one complete cycle of the wave, i.e. from one peak of the wave to the next. Physicists will know that wavelength is measured in metres like the dial on your radio and is inversely proportional to the frequency.

Finally the few lines of the program between the text which is supposed to make a sound will not work, because a value of zero is in the SID registers (24272 & 24273) that control the frequency. The first line of the program clears the SID chips by poking zeros into all the registers. A paragraph explaining the frequency control registers should have been included in this introductory article, after all if this was your first attempt at a sound program on the 64 you could have been put off for life.

For readers who are still in need of a little help I can recommend Ian Waugh's book Music for Commodore 64 (Stanline Press).

Despite the fact I am complaining, I think your Commodore magazine is probably the best Commodore computing magazine around at the moment. There have been numerous world wide utility programmes for the system and so I am looking forward to more music articles in the future particularly interrupt driven music routines.

V.H.L. Berry, London.

We've had many letters praising Peter Gerrard's attempt at describing the geometry of programming the Commodore sound chip.

Thanky for pointing out the errors, anyway. Be assured that Peter has had his hands slapped.

As for interrupt music routines, there will be covered in a later part of Peter's series.

I wish to take this opportunity to congratulate you on your marvellous publication *Your Commodore*. I have purchased every edition and have found it extremely helpful. My previous computer was a 64 and I now own a 128. Therein lies the problem.

The really excellent utilities published, it seems to me, are for the most part aimed at 64 users. WIMP is an example of this. I hope that future issues will include 128 Utilities written to WIMP.

Also your articles mention references to future articles, eg. single pixel lines smooth scrolling "to be Continued". As I am obsessed with scrolling, I buy each issue in anticipation that this will be the one containing smooth scrolling, only to be disappointed. These future articles never seem to materialise. I hope some consideration might be given to continuity of a series.

Michael Youell, Australia.

Many thanks for your kind comments about the magazine.

I'm sorry that you feel that most of our programmes are for the C64 and not the C128. Don't forget that all C64 programmes should work on the C128.

Obviously your most Commodore money have a C64 but large majority of the subscribers are for this machine. So come on you owners of other Commodore computers, and your programmes/articles in to us.

Sometimes authors of articles do promise us second, and even third parts, which unfortunately don't always materialise in our offer, sometimes due to pressure of work. Even so, we do always try to bring you as many articles on programming as we can. As for the this letter will provide Mr Crowther with producing some new music programmes for our readers to read over.

By Gordon Davis

Warp Speed is the latest contender in the cartridge wars which have spawned the Expert and the Final Cartridge. It's not to be confused with the Warp 25 fast load system inside the Action Replay Mk IV cartridge from Datal which revised the speed records in a recent comparative test by Commodore Disk User. I'd like to have put Warp Speed through an identical procedure, but I didn't have the precise test programs available.

I did however run some tests on a Commodore Basic program of my own. With no assistance from the cartridge, the program loaded on a 1541 drive in 15 seconds. The manual claims that Warp Speed can load such a file roughly 300 per cent faster. In 100 per cent faster. This was impressive as because the fast start on Warp Speed writes files to disk in 1771 format on a 1541 drive. Using the cartridge these can be reloaded, the manual says, up to 1800 per cent faster.

When tested, the fast start itself took just over seven seconds, while reloading took six seconds in this format. That's not 1800 per cent, more like 600, but to be fair, the claim is up to 1800 per cent faster. Frankly, this is rather sluggish. Warp Speed is doing the bare minimum of fast loading. Most rival cartridges use relatively sophisticated crunch/decrunch systems to reduce the number of bytes that they have to read and write. As a result, Action Replay's Warp 25 is able to do things at an incredible 35.6 bits per second. That's approximately 2000 per cent faster.

Warp Speed at its fastest is loading at about 80 bps (at against 0.8 bps for a native system) which makes it comparable with the Fiver Machine in its slowest mode. Since this latter was the slowest loader during the cartridge speed trials, Warp Speed's performance is not good.

Chain cut

Perhaps Warp Speed has other good points? Well if you're on the lookout for a cartridge that does roughly things don't look at this one. You can't grab anything, hence it or fiddle with it in any way.

Teachlet:

Supplier: Financial Systems Software Ltd, 18 High Street, Peckham, Wores W8 9JF, Tel: (0181) 331133. Machine: C64/128. Price: £24.95.



Commodore have kept this little box specially clean, so unlike other companies they won't be getting slapped with from the software houses.

All this makes Warp Speed a little worthy-but-dull. Nonetheless it does have useful features. Disk or floppy and multi-branch commands are included, plus a very respectable sector edit and an extensive range of utility commands.

There's also a built-in machine code monitor. Commodore says 'one of the most advanced monitors ever produced for the Commodore 64 and 128.' Could've fooled me! I must be missing some little thing or other, because to me it looks just like a monitor, neither better nor worse than a host of other monitors. Worse,

the manual describes it as a monitor assembler. An incredible achievement because what we have here is an assembler with one command! In fact what it does is to take a user-written and operand in immediate mode and convert them to machine code, that's all. Useless for entering more than about 8 bytes of code, and not even that if you need to branch. Hype, do they mean it?

All things considered, the most useful thing about Warp Speed is that it has a little switch which enables it to work in either C128 or C64 mode. Apart from that it's a rather dull, pedestrian product far surpassed by other cartridges on the market.

Disk Contents

How is information stored on a disk and where does GCR come in? By Eric Doyle

Commodore disk drives are called "intelligent" drives because they contain their own disk operating system (DOS) which maximizes on the amount of free space for programming within the computer's memory. All of the operations are translated and executed by the 6582 based circuitry inside the drive making it effectively a dedicated computer in itself. Contained on the board is a 16K ROM operating system and 2K of RAM for temporary storage of information for transmission to the computer (buffer) and for variables generated by the 6582.



Diagram 1: Disk arrangement on 5.25 disk

Information is stored on disk in short bursts of data (sectors) which are arranged around the disk in concentric rings known as tracks. There are 35 tracks across the disk surface but the number of sectors varies with the circumferential length of the track. Obviously the track around the centre of the disk is shorter than the first track around its rim. On most other disk

systems the number of sectors is the same on each track but the concept of the Commodore system is one of effective use of storage space. Where other systems leave large tracts of wasted space on the outer tracks, the 1341 spares packs in extra sectors and increases the disk capacity.

Table 1 — Tracks and Sectors

TRACK NUMBERS	SECTORS	TOTAL
1-17	21	357
18	19	39
	(Military)	
19-24	19	114
25-30	18	108
31-35	17	85
Total number of sectors = 683		
Number of usable sectors = 664		

Most people know that each sector stores around 256 bytes of information but the data is not stored in the usual binary or hexadecimal format. A system known as Group Coded Recording (GCR) is used which displays certain features that enable the storage system to be even more compact than would be possible otherwise. GCR is an unambiguous system which reduces the number of extra data bytes required by most other storage systems.

GCR is based on binary bits in groups of five (extended nybbles) arranged in such a way that no consecutive bytes will result in a series of eight ones or eight zeros. The reason for this will soon become clear but first the GCR system must be explained.

To convert from eight binary to five bit GCR, the binary byte is split

into two four bit nybbles. For example the number 158 is represented in binary by 1000 1110. Taking each nybble in turn, Table 2 shows that these convert to 1100 and 1110. Information is still stored on the disk in eight bit bytes so the GCR value becomes a full byte of 110011 and the top three bits of the next byte is formed by 110 and the first five bytes of the next GCR converted nybble.

Sector Dissection

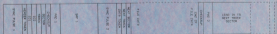
A sector consists of an eight part header section, a fixed length gap, a seven part data section followed by another gap which leads to the next sector as shown in Table 3.

The first section of the sector consists of a synchronization mark consisting of five bytes of value 255 which is immediately followed by a byte of value 8. The second section of the sector starts with an identical sync mark but this is followed by a value of seven. This means that when the head drives a 255 byte the operating system is alerted to the fact that some important information will follow. The next byte, the designation byte, indicates whether it is a data (7) or a header block (8).

On a header block the designation byte is followed by the two ID bytes specified in the formatting formula NOT DISCKNAME.ID. This is why it is important to vary the ID from one disk to another.

The next two values pinpoint the actual track and sector values and finally a checksum byte is included in

Diagram 2: Sector information storage



an error check. The checksum is derived by applying the XOR command to the track, sector and two ID values in turn.

When converted to GCR the block count does not equal a whole number as a pair of two converted bytes (28 bits GCR) is used to give a total header block of 15 full GCR bytes which converts to exactly 12 decimal bytes.

To allow time for the calculation and evaluation of the checksum, there is a short padding gap of eight bytes (10 bytes GCR).

After this gap comes the data leader sync signal followed by the data designation byte (7) indicating the start of the data block. The following 108 GCR bytes convert to what we know as the 256 normal binary bytes which form the data store, the first two bytes of which are a pointer to the next track and sector of program information.

The next byte is a checksum for the data block and is followed by a block equalling padding sector of 20 GCR bits. The intersector gap follows but its length depends on which track the sector is found and the speed of the drive.

The sector is 255 bytes long but when converted to true decimal this becomes 284 bytes. Of this only 254 bytes are of relevance to the computer so you can see that a sector is much more complicated than you may at first think. The complexity results in a very accurate and reliable basis for the operating system to which users.

As you can see the five bit GCR numbers are stored in the normal eight bit format so that the sequence 144, 5, 255, 7 would convert directly from GCR to decimal as 202, 148, 170, 165, 87, five bytes instead of four.

Why is such a complicated system necessary? The disk drive can cope with conversions very easily and the evidence of bytes of 11111111 or 00000000 means that these can be used for special purposes. To examine this in depth means a study of the format of a single sector.

Disk Organisation

As you've seen, the disk has a rigid structure of tracks and sectors which can be organised by the DOS. To do this the system claims a full track for its own exclusive use - track 18. This is not counted when the 'blocks free' value is calculated so an empty,

Table 2 - Standard System to GCR Conversion

DEC	HEX	BIN	GCR	DEC	HEX	BIN	GCR
0	001	000000	00000	9	009	01000	01001
1	001	000001	00011	9	009	01000	10001
2	002	000010	10000	10	00A	010010	10010
3	003	000011	10011	10	00A	010011	10011
4	004	0000100	00100	12	00C	011000	01101
5	005	0000101	01101	13	00D	011000	11001
6	006	0000110	10100	14	00E	011010	11100
7	007	0000111	10111	15	00F	011011	11101

To make this clearer we'll consider here the following four decimal bytes would be stored:

Table 3 - Decimal to Eight bit GCR Conversion

DECIMAL	BINARY bytes	GCR EXTENDED bytes	EIGHT BIT GCR
144	1001 0000	0100 01010	01000000 10
5	0000 0000	01010 01010	010100 1010
255	1111 1111	0000 10100	0000 100000
7	0000 0111	01010 101 11	01 00000011

Table 4 - Header format

Track 18 Sector 0

BYTE	CONTENTS	DEFINITION
0	Next track	Normally value 18
1	Next sector	Normally value 4
2	Format alert	For 1541 value is 65
3	Unused	Value zero
4-143	Block allocation map	See Table 5 for details
144-161	Start of disk name	Padded with 168 values if less than 16 bytes
162-163	Disk ID	Two byte ID also uses byte
164	Skipped space	Value 160
165-166	DOS version and format type	58 and 65 for 1541
167-168	Skipped space	Value 160
169-179	Not used	Value zero
180-191	Message	BLOCKS FREE characters on some versions, otherwise value zero
192-255	Not used	Value zero

Table 5 - Block Allocation Map (BAM)

BYTE	CONTENTS	DEFINITION
4	Number of free blocks	Blocks free on track 1
5	Bit map of sectors 0-7	
6	Bit map of sectors 8-15	
7	Bit map of sectors 16-23	
8-143	As for 4-7	Each track is torn in groups of four

e.g. BYTE	4	5	6	7
VALUE	0F	FC	E3	FF
BIT	12 blocks free	11110000	11000011	11111111
SECTOR		7-6	15-4	23-6

1 = block free 0 = block used

Table 6 - Directory Format

BYTE	CONTENTS	DEFINITION
0	Next directory block track	Always value 08
1	Next directory block sector	Value between 2 and 18
2	File type	128 = DEL 129 = SEQ 130 = PRG 131 = USER 132 = REL
3-4	Start track and sector	First file block pointer
5-20	First filename	Padded with value 150 if less than 16 characters
21-22	Side sector track	REL files only otherwise zero
23-27	Not used	Value zero
28-29	Track and sector of	Only used when 0 same in in use replacement file
30-31	Number of file blocks	Length of file in hi-lo format
32-33	Not used	Value zero
34-43	Second file	Similar to bytes 2-31
44-53	Third file	Similar to bytes 32-63
54-63	Fourth file	Similar to bytes 32-63
64-73	Fifth file	Similar to bytes 32-63
74-83	Sixth file	Similar to bytes 32-63
84-93	Seventh file	Similar to bytes 32-63
94-103	Eighth file	Similar to bytes 32-63

Table 7 - Sequential files

BYTE	CONTENTS	DEFINITION
0-1	Next track and sector	Pointer to next SEQ block
2-255	Data bytes	254 file bytes

Table 8 - Program files

BYTE	CONTENTS	DEFINITION
0-1	Next track and sector	Pointer to next PRG block
2-3	Computer load location	Only on first block otherwise data
4-255	Program data	252 bytes

Table 9 - Relative Files

Record block		DEFINITION
0-1	Next track and sector	Pointer to next record block
2-255	254 bytes of data	Empty records contain 255 in the first byte followed by zeros. Partially filled records are padded with zeros.

Side sector block

BYTE	CONTENTS	DEFINITION
0-1	Next track and sector	Next side sector
2	Side sector number	Value 0 to 5
3	Record length	Maximum 255
4-5	Track and sector (0)	First side sector pointer
6-7	Track and sector (1)	Second side sector pointer
8-9	Track and sector (2)	Third side sector pointer
10-11	Track and sector (3)	Fourth side sector pointer
12-13	Track and sector (4)	Fifth side sector pointer
14-15	Track and sector (5)	Six side sector pointer
16-255	Track and sector pointers	Pointers to record blocks

formatted disk only has 664 blocks free and not 688 as you might expect.

The DOS uses sector 0 as a space to store the disk header name and ID and an area to map out which sectors have been used and which are still available. In connection with every other used block on the disk, the first two bytes indicate the location of the next block in track and sector order. On the header block this is always 082 and 091 or track 10, sector 1 in decimal terms.

Track 18, 1 is the first block of the directory index and each entry occupies 32 bytes. On the first file entry is a block the first two bytes (0 and 1) point to the next track and sector in the chain (usually 10,4). On all other entries the first two bytes are both zero.

The third byte is where the directory really starts with a byte which denotes the type of file - PRG (program), SEQ (sequential), REL (relative), USER (user) or DEL (deleted).

The next two bytes are pointers to the first track and sector of the file proper, then sixteen bytes are reserved for a name and bytes 20 and 21 contain the number of blocks in the file in hexadecimal low byte, high byte order.

Relative files need a special sector or series of sectors (called side sectors) and their location is stored in bytes 21 and 22 (track and sector) and byte 23 stores the fixed record length.

The file blocks start with the usual track and sector pointer followed by data in SEQ and REL files but the PRG files reserve two bytes in the first sector for the load location in the computer's memory in hi-lo byte low format. All the following PRG sectors resemble SEQ and REL file formats with the two pointers being followed by 254 bytes of valid program data.

This continues through the chain of blocks until the last sector in the file is reached. Here the first byte is always zero and the next byte indicates where the byte after the last byte of the file can be found so that DOS knows when to hand control back to the computer.

Going back to the side sector, this is principally a list of where each record of the file is located in track, sector format. The first two bytes will form the link to the next side sector but the record length is also included so that the DOS can calculate which sector on which track and on which byte of that sector a particular record starts.



Listings

Get it right first time with our deluxe program systems
for the C64.

You may have noticed that our listings are free of those horrible little black blinks which send you searching around the keyboard for a suitable graphic symbol. You may also have noticed the fancy numbers by the side of each line of the listing. First no more, it's all part of our easy entry aid.

Instead of those nasty graphics and rows of countless spaces in PRINT statements and strings we use a special coding system. The code, or mnemonic, is always contained in square brackets and you'll soon learn to decipher their meanings.

For example, [SA] would mean type in a Shifted A, or an ace of spades in layman's terms, and [BA10] would mean a row of ten of these symbols.

[S+2] means hold down the shift key and press the plus key twice. It doesn't take a great leap of logic to realize that [C+2] means exactly the same thing, except that the Commodore key (bottom left of the keyboard) is held down instead of the shift key.

If more than two spacers appear in a statement then this will be printed as [SPC4] or, exceptionally, [SSPC4]. Translated into English this means press the spacebar four times or in the latter case hold the shift key down while you do it.

A string of special characters could appear as: [CTRL N, DOWN], [LEFT], [BLUE], [FAC3].

This would be achieved by holding

down the CTRL key as you pass N, press the cursor key down twice, the cursor left key five times, press the key marked [L+0] while holding down the CTRL key, press the F) key and, finally hold the Commodore key down while pressing the number two key (K2 would of course make the computer print in brown).

Always remember that you should only have a row of graphics characters on your screen with no square brackets and no commas, unless something like this appears: [SS][C+]

In this case the two characters should have a comma between them.

On rare occasions [REV T] will appear in a listing. This is a delete symbol and is created by entering the line up to this mnemonic. Then type a closing quotation mark (SHIFT + 2) and delete it. This puts the computer out of quotes mode. Hold down CTRL and press the number nine key (REWIN), type the relevant number of reversed Ts and then hold down CTRL and press zero (RVS/DUP). Now type another quotation mark and delete it again. Now finish the line and press RETURN.

A list of these special cases is given in the table but remember that only one of these mnemonics will appear outside of a PRINT string; the symbol for pi. This may appear when its value is needed in a calculation so this may look something like:

[C=C+2][PI]P[R]
Ignore the square brackets and just type in a shifted upward pointing arrow (or the pi symbol).

PROGRAM: BIRTHDAY CHECKER

```

10 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
20 GO TO 1-20 [REV T]
30 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
40 GO TO 1-20 [REV T]
50 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
60 GO TO 1-20 [REV T]
70 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
80 GO TO 1-20 [REV T]
90 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
100 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
110 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
120 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
130 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
140 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
150 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
160 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
170 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
180 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
190 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
200 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
210 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
220 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
230 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
240 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
250 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
260 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
270 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
280 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
290 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
300 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
310 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
320 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
330 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
340 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
350 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
360 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
370 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
380 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
390 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
400 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
410 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
420 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
430 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
440 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
450 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
460 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
470 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
480 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
490 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
500 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
510 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
520 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
530 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
540 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
550 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
560 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
570 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
580 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
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610 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
620 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
630 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
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660 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
670 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
680 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
690 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
700 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
710 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
720 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
730 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
740 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
750 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
760 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
770 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
780 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
790 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
800 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
810 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
820 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
830 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
840 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
850 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
860 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
870 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
880 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
890 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
900 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
910 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
920 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
930 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
940 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
950 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
960 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
970 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
980 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
990 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE
1000 BIRTHDAY CHECKER - 1983 BY ERIC DOYLE

```

by Eric Doyle

Checksum Program

The hexadecimal numbers appearing in a column to the left of the listing should not be typed in with the program. These are merely checksum values and are there to help you go each line right. Don't worry if you don't understand the hexadecimal system, as long as you can compare two characters on the screen with the corresponding two characters in the magazine you can use our line checking program.

Type in the Checksum Program, make sure that you've not made any mistakes and save it to tape or disk

immediately because it will be used with most of the present and future listings appearing in Your Commodore.

At the start of each programming session, load Checksum and run it. The screen will turn brown with yellow characters and each time you type in a line and press the RETURN key a number will appear on the screen in white. This should be the same as the corresponding value in the magazine.

















If the two values don't relate to one another, you have not copied the line exactly as printed so go back and check each character carefully. When you find the error simply correct it and

















press RETURN again.

If you want to turn off the checker simply type SYS4132 and the screen will return to the familiar blue colours. You can then do whatever it was you wanted to do and if this doesn't use the area where Checksum lists you can go back to it with the same SYS command.

No system is foolproof but the chances of two errors cancelling one. Many of the listings are presented in lower case. To turn your computer to lower case mode press the Commodore key and the SHIFT key at the same time.

15

Mnemonic	Symbol	Keypress
[RIGHT]		CRSR left/right
[LEFT]		SHIFT & CRSR left/right
[DOWN]		CRSR up/down
[UP]		SHIFT & CRSR up/down
[F1]		F1 key
[F2]		SHIFT & F1 key
[F3]		F3 key
[F4]		SHIFT & F3 key
[F5]		F5 key
[F6]		SHIFT & F5 key
[F7]		F7 key
[F8]		SHIFT & F7 key
[HOME]		CLR/HOME
[CLR]		SHIFT & CLR/HOME
[RVSON]		CTRL & S
[RVSOFF]		CTRL & B

Mnemonic	Symbol	Keypress
[BLACK]		CTRL & 1
[WHITE]		CTRL & 2
[RED]		CTRL & 3
[CYAN]		CTRL & 4
[PURPLE]		CTRL & 5
[GREEN]		CTRL & 6
[BLUE]		CTRL & 7
[YELLOW]		CTRL & 8
[POUND]		£
[LARROW]		←
[UPARROW]		↑
[PF]		SHIFT & ↑
[INST]		SHIFT & INST/DEL
[REV T]		see text
[Cletter]		CBM + letter
[Sletter]		SHIFT + letter

LISTINGS

```

62 500 PRINT"CLM1"END
63 500 C1=1
64 500 GOSUB70
65 500 B=C
66 500 GOTO300
67 570 IF C=2 THEN GOTO400
68 500 B=C+1
69 500 GOTO60
70 500 GOTO300
71 500 C=C+1
72 500 GOTO300
73 500 C=C+1
74 500 GOTO300
75 500 C=C+1
76 500 GOTO300
77 500 GOTO300
78 500 GOTO300
79 500 GOTO300
80 500 GOTO300
81 500 GOTO300
82 500 GOTO300
83 500 GOTO300
84 500 GOTO300
85 500 GOTO300
86 500 GOTO300
87 500 GOTO300
88 500 GOTO300
89 500 GOTO300
90 500 GOTO300
91 500 GOTO300
92 500 GOTO300
93 500 GOTO300
94 500 GOTO300
95 500 GOTO300
96 500 GOTO300
97 500 GOTO300
98 500 GOTO300
99 500 GOTO300

```

PROGRAM, COLUMNAR CIPHER

```

10 10 DIM *****
11 *****
12 *****
13 *****
14 *****
15 *****
16 *****
17 *****
18 *****
19 *****
20 *****
21 *****
22 *****
23 *****
24 *****
25 *****
26 *****
27 *****
28 *****
29 *****
30 *****
31 *****
32 *****
33 *****
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92 *****
93 *****
94 *****
95 *****
96 *****
97 *****
98 *****
99 *****

```

```

62 500 PRINT"CLM1"END
63 500 C1=1
64 500 GOSUB70
65 500 B=C
66 500 GOTO300
67 570 IF C=2 THEN GOTO400
68 500 B=C+1
69 500 GOTO60
70 500 GOTO300
71 500 C=C+1
72 500 GOTO300
73 500 C=C+1
74 500 GOTO300
75 500 C=C+1
76 500 GOTO300
77 500 GOTO300
78 500 GOTO300
79 500 GOTO300
80 500 GOTO300
81 500 GOTO300
82 500 GOTO300
83 500 GOTO300
84 500 GOTO300
85 500 GOTO300
86 500 GOTO300
87 500 GOTO300
88 500 GOTO300
89 500 GOTO300
90 500 GOTO300
91 500 GOTO300
92 500 GOTO300
93 500 GOTO300
94 500 GOTO300
95 500 GOTO300
96 500 GOTO300
97 500 GOTO300
98 500 GOTO300
99 500 GOTO300

```

PROGRAM, FRACTION CIPHER

```

10 10 DIM *****
11 *****
12 *****
13 *****
14 *****
15 *****
16 *****
17 *****
18 *****
19 *****
20 *****
21 *****
22 *****
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96 *****
97 *****
98 *****
99 *****

```

```

62 500 PRINT"CLM1"END
63 500 C1=1
64 500 GOSUB70
65 500 B=C
66 500 GOTO300
67 570 IF C=2 THEN GOTO400
68 500 B=C+1
69 500 GOTO60
70 500 GOTO300
71 500 C=C+1
72 500 GOTO300
73 500 C=C+1
74 500 GOTO300
75 500 C=C+1
76 500 GOTO300
77 500 GOTO300
78 500 GOTO300
79 500 GOTO300
80 500 GOTO300
81 500 GOTO300
82 500 GOTO300
83 500 GOTO300
84 500 GOTO300
85 500 GOTO300
86 500 GOTO300
87 500 GOTO300
88 500 GOTO300
89 500 GOTO300
90 500 GOTO300
91 500 GOTO300
92 500 GOTO300
93 500 GOTO300
94 500 GOTO300
95 500 GOTO300
96 500 GOTO300
97 500 GOTO300
98 500 GOTO300
99 500 GOTO300

```


LISTINGS

```

10 480 POKER-4, X-POKER-5, 1, 8PM
    AFTER 10:00
80 480 POKER-4, 8, 100 POKER-7, 3
00 470 SPIN-BALLS FREE 11:00PM
    BY JUST BUILT IN PLACE ON THIS
    800'S 800'S
30 480 SPINERS-"IF YOU DON'T LIKE
    I THE LOOK OF ME YOU CAN MAKE
    MYO CHANGE ME"
70 480 SPINERS-"WHO WOULD BE ME
    BE COULD YOU DESIGN ME A BOB"
    8:00 PM 800'S
70 480 SET UP/INSTALL YOUR SPEED
    N SOFTWARE
80 500 1000
80 480 SET UP/INSTALL YOUR SPEED
    SOFTWARE TO READ 8PM
80 500 800 8PM
80 480 SET UP/INSTALL YOUR SPEED
    SOFTWARE TO READ 8PM
80 500 800
80 480 SET UP/INSTALL YOUR SPEED
    SOFTWARE TO READ 8PM
80 500 800
    
```

PROGRAM NUMBER LIST

```

80 100 800 *****
80 110 800 A COMPUTER TALK
70 120 800 BASIC LOADERS
31 120 800 "
80 140 800 BY THE WAY 800'S
50 150 800 *****
80 160 800
80 170 800
80 180 800
80 190 800
80 200 800
80 210 800
80 220 800
80 230 800
80 240 800
80 250 800
80 260 800
80 270 800
80 280 800
80 290 800
80 300 800
80 310 800
80 320 800
80 330 800
80 340 800
80 350 800
80 360 800
80 370 800
80 380 800
80 390 800
80 400 800
80 410 800
80 420 800
80 430 800
80 440 800
80 450 800
80 460 800
80 470 800
80 480 800
80 490 800
80 500 800
80 510 800
80 520 800
80 530 800
80 540 800
80 550 800
80 560 800
80 570 800
80 580 800
80 590 800
80 600 800
80 610 800
80 620 800
80 630 800
80 640 800
80 650 800
80 660 800
80 670 800
80 680 800
80 690 800
80 700 800
80 710 800
80 720 800
80 730 800
80 740 800
80 750 800
80 760 800
80 770 800
80 780 800
80 790 800
80 800 800
80 810 800
80 820 800
80 830 800
80 840 800
80 850 800
80 860 800
80 870 800
80 880 800
80 890 800
80 900 800
80 910 800
80 920 800
80 930 800
80 940 800
80 950 800
80 960 800
80 970 800
80 980 800
80 990 800
80 1000 800
    
```

```

10 480 POKER-4, X-POKER-5, 1, 8PM
    AFTER 10:00
80 480 POKER-4, 8, 100 POKER-7, 3
00 470 SPIN-BALLS FREE 11:00PM
    BY JUST BUILT IN PLACE ON THIS
    800'S 800'S
30 480 SPINERS-"IF YOU DON'T LIKE
    I THE LOOK OF ME YOU CAN MAKE
    MYO CHANGE ME"
70 480 SPINERS-"WHO WOULD BE ME
    BE COULD YOU DESIGN ME A BOB"
    8:00 PM 800'S
70 480 SET UP/INSTALL YOUR SPEED
    N SOFTWARE
80 500 1000
80 480 SET UP/INSTALL YOUR SPEED
    SOFTWARE TO READ 8PM
80 500 800 8PM
80 480 SET UP/INSTALL YOUR SPEED
    SOFTWARE TO READ 8PM
80 500 800
80 480 SET UP/INSTALL YOUR SPEED
    SOFTWARE TO READ 8PM
80 500 800
    
```

```

10 480 POKER-4, X-POKER-5, 1, 8PM
    AFTER 10:00
80 480 POKER-4, 8, 100 POKER-7, 3
00 470 SPIN-BALLS FREE 11:00PM
    BY JUST BUILT IN PLACE ON THIS
    800'S 800'S
30 480 SPINERS-"IF YOU DON'T LIKE
    I THE LOOK OF ME YOU CAN MAKE
    MYO CHANGE ME"
70 480 SPINERS-"WHO WOULD BE ME
    BE COULD YOU DESIGN ME A BOB"
    8:00 PM 800'S
70 480 SET UP/INSTALL YOUR SPEED
    N SOFTWARE
80 500 1000
80 480 SET UP/INSTALL YOUR SPEED
    SOFTWARE TO READ 8PM
80 500 800 8PM
80 480 SET UP/INSTALL YOUR SPEED
    SOFTWARE TO READ 8PM
80 500 800
80 480 SET UP/INSTALL YOUR SPEED
    SOFTWARE TO READ 8PM
80 500 800
    
```



```

36 8000 DATA 24,25,26,18,19,20,
21,18,22,27,27,28,29,30,31,
0,255
37 8010 DATA 15,16,17,18,19,20,
21,18,22,27,27,28,29,30,31,
0,279
38 8020 DATA 18,19,20,18,19,20,
21,18,22,27,27,28,29,30,31,
0,279
39 8030 DATA 18,17,17,22,22,23,
27,27,27,27,18,19,20,27,27,2
7,240
40 8040 DATA 28,31,32,27,27,28,
29,18,19,20,20,18,19,20,20,1
0,288
41 8050 DATA 24,25,26,18,19,20,
21,18,22,27,27,28,29,30,31,2
1,312
42 8060 DATA 18,20,24,18,20,28,
15,15,15,21,21,27,27,28,29,1
8,336
43 8070 DATA 18,20,28,18,20,28,
28,28,29,18,20,18,19,20,20,
0,378
44 8080 DATA 18,27,27,28,29,28,
18,20,18,18,29,18,20,28,18,1
9,396
45 8090 DATA 18,20,28,28,28,28,
28,28,29,21,27,27,28,29,28,1
9,420
46 8100 DATA 18,20,28,28,28,28,
28,28,29,21,27,27,28,29,28,1
9,420
47 8110 DATA 20,27,27,27,28,29,
28,28,18,19,20,27,18,19,20,2
8,444
48 8120 DATA 21,22,27,27,27,28,
28,28,29,20,20,20,20,20,20,1
0,478
49 8130 DATA 18,18,18,20,18,24,
18,19,20,27,27,27,28,29,20,1
0,520
50 8140 DATA 20,20,18,20,20,18,
18,21,21,20,27,27,27,18,19,1
0,560
51 8150 DATA 20,20,24,20,18,18,
18,18,20,20,18,18,18,20,20,1
0,584
52 8160 DATA 20,20,20,27,27,27,
27,27,27,27,27,27,27,27,27,2
7,626
53 8170 DATA 18,20,18,18,18,20,
21,21,27,27,27,27,28,29,30,3
1,670
54 8180 DATA 27,27,27,27,28,29,
30,31,28,29,24,18,20,18,20,1
8,714
55 8190 DATA 27,27,27,27,27,27,
27,27,27,27,27,27,27,27,27,2
7,756
56 8200 DATA 27,27,27,27,27,27,
27,27,27,27,27,27,27,27,27,2
7,756
57 8210 DATA 28,28,28,28,28,28,
28,28,29,27,27,27,28,29,28,2
8,800
58 8220 DATA 28,28,28,28,28,28,
28,28,29,27,27,27,28,29,28,2
8,800
59 8230 DATA 28,28,28,28,28,28,
28,28,29,27,27,27,28,29,28,2
8,800
60 8240 DATA 28,28,28,28,28,28,
28,28,29,27,27,27,28,29,28,2
8,800
61 8250 DATA 28,28,28,28,28,28,
28,28,29,27,27,27,28,29,28,2
8,800
62 8260 DATA 27,27,27,27,27,27,
27,27,27,27,27,27,27,27,27,2
7,842

```

```

7,858
63 8270 DATA 27,27,27,27,27,27,
27,27,28,28,18,18,18,21,21,2
7,882
64 8280 DATA 27,27,27,27,27,27,
27,27,27,27,27,27,27,27,27,2
7,924
65 8290 DATA 27,27,27,27,27,27,
27,27,27,27,27,27,27,27,27,2
7,924
66 8300 DATA 27,27,27,27,27,27,
27,27,27,27,27,27,27,27,27,2
7,924
67 8310 DATA 28,28,28,28,28,28,
28,28,29,27,27,27,28,29,28,2
8,966
68 8320 DATA 27,27,27,27,27,27,
27,27,27,27,27,27,27,27,27,2
7,966
69 8330 DATA 28,28,28,28,28,28,
28,28,29,27,27,27,28,29,28,2
8,966
70 8340 DATA 27,27,27,27,27,27,
27,27,27,27,27,27,27,27,27,2
7,966
71 8350 DATA 28,28,28,28,28,28,
28,28,29,27,27,27,28,29,28,2
8,966
72 8360 DATA 28,28,28,28,28,28,
28,28,29,27,27,27,28,29,28,2
8,966
73 8370 DATA 28,28,28,28,28,28,
28,28,29,27,27,27,28,29,28,2
8,966
74 8380 DATA 28,28,28,28,28,28,
28,28,29,27,27,27,28,29,28,2
8,966
75 8390 DATA 28,28,28,28,28,28,
28,28,29,27,27,27,28,29,28,2
8,966
76 8400 DATA 28,28,28,28,28,28,
28,28,29,27,27,27,28,29,28,2
8,966
77 8410 DATA 28,28,28,28,28,28,
28,28,29,27,27,27,28,29,28,2
8,966
78 8420 DATA 28,28,28,28,28,28,
28,28,29,27,27,27,28,29,28,2
8,966
79 8430 DATA 28,28,28,28,28,28,
28,28,29,27,27,27,28,29,28,2
8,966
80 8440 DATA 28,28,28,28,28,28,
28,28,29,27,27,27,28,29,28,2
8,966
81 8450 DATA 28,28,28,28,28,28,
28,28,29,27,27,27,28,29,28,2
8,966
82 8460 DATA 28,28,28,28,28,28,
28,28,29,27,27,27,28,29,28,2
8,966
83 8470 DATA 28,28,28,28,28,28,
28,28,29,27,27,27,28,29,28,2
8,966
84 8480 DATA 28,28,28,28,28,28,
28,28,29,27,27,27,28,29,28,2
8,966
85 8490 DATA 28,28,28,28,28,28,
28,28,29,27,27,27,28,29,28,2
8,966
86 8500 DATA 28,28,28,28,28,28,
28,28,29,27,27,27,28,29,28,2
8,966
87 8510 DATA 28,28,28,28,28,28,
28,28,29,27,27,27,28,29,28,2
8,966
88 8520 DATA 28,28,28,28,28,28,
28,28,29,27,27,27,28,29,28,2
8,966
89 8530 DATA 28,28,28,28,28,28,
28,28,29,27,27,27,28,29,28,2
8,966
90 8540 DATA 28,28,28,28,28,28,
28,28,29,27,27,27,28,29,28,2
8,966
91 8550 DATA 28,28,28,28,28,28,
28,28,29,27,27,27,28,29,28,2
8,966
92 8560 DATA 28,28,28,28,28,28,
28,28,29,27,27,27,28,29,28,2
8,966
93 8570 DATA 28,28,28,28,28,28,
28,28,29,27,27,27,28,29,28,2
8,966
94 8580 DATA 28,28,28,28,28,28,
28,28,29,27,27,27,28,29,28,2
8,966
95 8590 DATA 28,28,28,28,28,28,
28,28,29,27,27,27,28,29,28,2
8,966
96 8600 DATA 28,28,28,28,28,28,
28,28,29,27,27,27,28,29,28,2
8,966
97 8610 DATA 28,28,28,28,28,28,
28,28,29,27,27,27,28,29,28,2
8,966
98 8620 DATA 28,28,28,28,28,28,
28,28,29,27,27,27,28,29,28,2
8,966
99 8630 DATA 28,28,28,28,28,28,
28,28,29,27,27,27,28,29,28,2
8,966

```

```

PROGRAM: MONSTER GOLF
-----
55 100 REM *****
56 101 REM *
57 102 REM * MONSTER GOLF SET
58 103 REM *
59 104 REM * BY TONY BROWN
60 105 REM *
61 106 REM *
62 107 REM * RETURN TO LOAD PA
63 108 REM *
64 109 REM * LOAD THE PLAY FORM
65 110 REM *
66 111 REM * TALK FIRST BEFORE
67 112 REM *
68 113 REM * LOADING INFO FORM
69 114 REM *
70 115 REM *
71 116 REM *****
72 120 REM
73 130 REM
74 140 REM
75 150 REM
76 160 REM * THIS CAN BE RUN W/
77 170 REM *
78 180 REM * THE CURRENT SPEECH
79 190 REM *
80 200 REM * BUT WILL NEED ADAP
81 210 REM * TIME
82 220 REM * TO RUN WITH OTHER
83 230 REM *
84 240 REM * SPEECH LIMITS.
85 250 REM *
86 260 REM *****
87 270 REM
88 280 REM
89 290 REM
90 300 REM
91 310 REM
92 320 REM
93 330 REM
94 340 REM
95 350 REM
96 360 REM
97 370 REM
98 380 REM
99 390 REM
100 400 REM
101 410 REM
102 420 REM
103 430 REM
104 440 REM
105 450 REM
106 460 REM
107 470 REM
108 480 REM
109 490 REM
110 500 REM
111 510 REM
112 520 REM
113 530 REM
114 540 REM
115 550 REM
116 560 REM
117 570 REM
118 580 REM
119 590 REM
120 600 REM
121 610 REM
122 620 REM
123 630 REM
124 640 REM
125 650 REM
126 660 REM
127 670 REM
128 680 REM
129 690 REM
130 700 REM
131 710 REM
132 720 REM
133 730 REM
134 740 REM
135 750 REM
136 760 REM
137 770 REM
138 780 REM
139 790 REM
140 800 REM
141 810 REM
142 820 REM
143 830 REM
144 840 REM
145 850 REM
146 860 REM
147 870 REM
148 880 REM
149 890 REM
150 900 REM
151 910 REM
152 920 REM
153 930 REM
154 940 REM
155 950 REM
156 960 REM
157 970 REM
158 980 REM
159 990 REM
160 1000 REM

```

```

PARTY I SHALL SLEEP UNTIL
YOU GET COMING TO "
87 860 REM REMARKS " TELL YOUR
880 REM SPEECH UNIT TO SPEAK NOW"
89 890 REMARKS:
90 900 REM
91 910 REM
92 920 REM
93 930 REM
94 940 REM
95 950 REM
96 960 REM
97 970 REM
98 980 REM
99 990 REM
100 1000 REM
101 1010 REM
102 1020 REM
103 1030 REM
104 1040 REM
105 1050 REM
106 1060 REM
107 1070 REM
108 1080 REM
109 1090 REM
110 1100 REM
111 1110 REM
112 1120 REM
113 1130 REM
114 1140 REM
115 1150 REM
116 1160 REM
117 1170 REM
118 1180 REM
119 1190 REM
120 1200 REM
121 1210 REM
122 1220 REM
123 1230 REM
124 1240 REM
125 1250 REM
126 1260 REM
127 1270 REM
128 1280 REM
129 1290 REM
130 1300 REM
131 1310 REM
132 1320 REM
133 1330 REM
134 1340 REM
135 1350 REM
136 1360 REM
137 1370 REM
138 1380 REM
139 1390 REM
140 1400 REM
141 1410 REM
142 1420 REM
143 1430 REM
144 1440 REM
145 1450 REM
146 1460 REM
147 1470 REM
148 1480 REM
149 1490 REM
150 1500 REM
151 1510 REM
152 1520 REM
153 1530 REM
154 1540 REM
155 1550 REM
156 1560 REM
157 1570 REM
158 1580 REM
159 1590 REM
160 1600 REM

```

CONNECTING A COMPILER



```

PROGRAM: BYTES.LIB
-----
75 10 REM REMARKS
76 20 REM
77 30 REM
78 40 REM
79 50 REM
80 60 REM
81 70 REM
82 80 REM
83 90 REM
84 100 REM
85 110 REM
86 120 REM
87 130 REM
88 140 REM
89 150 REM
90 160 REM
91 170 REM
92 180 REM
93 190 REM
94 200 REM
95 210 REM
96 220 REM
97 230 REM
98 240 REM
99 250 REM
100 260 REM
101 270 REM
102 280 REM
103 290 REM
104 300 REM
105 310 REM
106 320 REM
107 330 REM
108 340 REM
109 350 REM
110 360 REM
111 370 REM
112 380 REM
113 390 REM
114 400 REM
115 410 REM
116 420 REM
117 430 REM
118 440 REM
119 450 REM
120 460 REM
121 470 REM
122 480 REM
123 490 REM
124 500 REM
125 510 REM
126 520 REM
127 530 REM
128 540 REM
129 550 REM
130 560 REM
131 570 REM
132 580 REM
133 590 REM
134 600 REM
135 610 REM
136 620 REM
137 630 REM
138 640 REM
139 650 REM
140 660 REM
141 670 REM
142 680 REM
143 690 REM
144 700 REM
145 710 REM
146 720 REM
147 730 REM
148 740 REM
149 750 REM
150 760 REM
151 770 REM
152 780 REM
153 790 REM
154 800 REM
155 810 REM
156 820 REM
157 830 REM
158 840 REM
159 850 REM
160 860 REM
161 870 REM
162 880 REM
163 890 REM
164 900 REM
165 910 REM
166 920 REM
167 930 REM
168 940 REM
169 950 REM
170 960 REM
171 970 REM
172 980 REM
173 990 REM
174 1000 REM

```


LISTINGS

63	1800	0474	180.0, 175, 150, 2.75,
64	1800	0476	180.0, 175, 150, 2.75, 150, 2.75,
65	1800	0478	175, 150, 2.75, 150, 2.75,
66	1800	0480	175, 150, 2.75, 150, 2.75,
67	1800	0482	175, 150, 2.75, 150, 2.75,
68	1800	0484	175, 150, 2.75, 150, 2.75,
69	1800	0486	175, 150, 2.75, 150, 2.75,
70	1800	0488	175, 150, 2.75, 150, 2.75,
71	1800	0490	175, 150, 2.75, 150, 2.75,
72	1800	0492	175, 150, 2.75, 150, 2.75,
73	1800	0494	175, 150, 2.75, 150, 2.75,
74	1800	0496	175, 150, 2.75, 150, 2.75,
75	1800	0498	175, 150, 2.75, 150, 2.75,
76	1800	0500	175, 150, 2.75, 150, 2.75,
77	1800	0502	175, 150, 2.75, 150, 2.75,
78	1800	0504	175, 150, 2.75, 150, 2.75,
79	1800	0506	175, 150, 2.75, 150, 2.75,
80	1800	0508	175, 150, 2.75, 150, 2.75,
81	1800	0510	175, 150, 2.75, 150, 2.75,
82	1800	0512	175, 150, 2.75, 150, 2.75,
83	1800	0514	175, 150, 2.75, 150, 2.75,
84	1800	0516	175, 150, 2.75, 150, 2.75,
85	1800	0518	175, 150, 2.75, 150, 2.75,
86	1800	0520	175, 150, 2.75, 150, 2.75,
87	1800	0522	175, 150, 2.75, 150, 2.75,
88	1800	0524	175, 150, 2.75, 150, 2.75,
89	1800	0526	175, 150, 2.75, 150, 2.75,
90	1800	0528	175, 150, 2.75, 150, 2.75,
91	1800	0530	175, 150, 2.75, 150, 2.75,
92	1800	0532	175, 150, 2.75, 150, 2.75,
93	1800	0534	175, 150, 2.75, 150, 2.75,
94	1800	0536	175, 150, 2.75, 150, 2.75,
95	1800	0538	175, 150, 2.75, 150, 2.75,
96	1800	0540	175, 150, 2.75, 150, 2.75,
97	1800	0542	175, 150, 2.75, 150, 2.75,
98	1800	0544	175, 150, 2.75, 150, 2.75,
99	1800	0546	175, 150, 2.75, 150, 2.75,
100	1800	0548	175, 150, 2.75, 150, 2.75,
101	1800	0550	175, 150, 2.75, 150, 2.75,
102	1800	0552	175, 150, 2.75, 150, 2.75,
103	1800	0554	175, 150, 2.75, 150, 2.75,
104	1800	0556	175, 150, 2.75, 150, 2.75,
105	1800	0558	175, 150, 2.75, 150, 2.75,
106	1800	0560	175, 150, 2.75, 150, 2.75,
107	1800	0562	175, 150, 2.75, 150, 2.75,
108	1800	0564	175, 150, 2.75, 150, 2.75,
109	1800	0566	175, 150, 2.75, 150, 2.75,
110	1800	0568	175, 150, 2.75, 150, 2.75,
111	1800	0570	175, 150, 2.75, 150, 2.75,
112	1800	0572	175, 150, 2.75, 150, 2.75,
113	1800	0574	175, 150, 2.75, 150, 2.75,
114	1800	0576	175, 150, 2.75, 150, 2.75,
115	1800	0578	175, 150, 2.75, 150, 2.75,
116	1800	0580	175, 150, 2.75, 150, 2.75,
117	1800	0582	175, 150, 2.75, 150, 2.75,
118	1800	0584	175, 150, 2.75, 150, 2.75,
119	1800	0586	175, 150, 2.75, 150, 2.75,
120	1800	0588	175, 150, 2.75, 150, 2.75,
121	1800	0590	175, 150, 2.75, 150, 2.75,
122	1800	0592	175, 150, 2.75, 150, 2.75,
123	1800	0594	175, 150, 2.75, 150, 2.75,
124	1800	0596	175, 150, 2.75, 150, 2.75,
125	1800	0598	175, 150, 2.75, 150, 2.75,
126	1800	0600	175, 150, 2.75, 150, 2.75,
127	1800	0602	175, 150, 2.75, 150, 2.75,
128	1800	0604	175, 150, 2.75, 150, 2.75,
129	1800	0606	175, 150, 2.75, 150, 2.75,
130	1800	0608	175, 150, 2.75, 150, 2.75,
131	1800	0610	175, 150, 2.75, 150, 2.75,
132	1800	0612	175, 150, 2.75, 150, 2.75,
133	1800	0614	175, 150, 2.75, 150, 2.75,
134	1800	0616	175, 150, 2.75, 150, 2.75,
135	1800	0618	175, 150, 2.75, 150, 2.75,
136	1800	0620	175, 150, 2.75, 150, 2.75,
137	1800	0622	175, 150, 2.75, 150, 2.75,
138	1800	0624	175, 150, 2.75, 150, 2.75,
139	1800	0626	175, 150, 2.75, 150, 2.75,
140	1800	0628	175, 150, 2.75, 150, 2.75,
141	1800	0630	175, 150, 2.75, 150, 2.75,
142	1800	0632	175, 150, 2.75, 150, 2.75,
143	1800	0634	175, 150, 2.75, 150, 2.75,
144	1800	0636	175, 150, 2.75, 150, 2.75,
145	1800	0638	175, 150, 2.75, 150, 2.75,
146	1800	0640	175, 150, 2.75, 150, 2.75,
147	1800	0642	175, 150, 2.75, 150, 2.75,
148	1800	0644	175, 150, 2.75, 150, 2.75,
149	1800	0646	175, 150, 2.75, 150, 2.75,
150	1800	0648	175, 150, 2.75, 150, 2.75,

70 1000 DATA 100,20,100,1,50,10
 0,100,177,49,88,910,50,100,
 0,00,1000
 71 1000 DATA 000,000,000,100,0
 0,00,100,0,100,0,100,0,100,0,0
 0,00,1000
 72 1000 DATA 001,000,000,000,100,0
 0,00,100,0,100,0,100,0,100,0,0
 0,00,1000
 73 1000 DATA 000,000,000,000,100,0
 0,00,100,0,100,0,100,0,100,0,0
 0,00,1000
 74 1000 DATA 000,000,000,000,100,0
 0,00,100,0,100,0,100,0,100,0,0
 0,00,1000
 75 1000 DATA 000,000,000,000,100,0
 0,00,100,0,100,0,100,0,100,0,0
 0,00,1000
 76 1000 DATA 000,000,000,000,100,0
 0,00,100,0,100,0,100,0,100,0,0
 0,00,1000
 77 1000 DATA 000,000,000,000,100,0
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 78 1000 DATA 000,000,000,000,100,0
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 79 1000 DATA 000,000,000,000,100,0
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 80 1000 DATA 000,000,000,000,100,0
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 81 1000 DATA 000,000,000,000,100,0
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 82 1000 DATA 000,000,000,000,100,0
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 83 1000 DATA 000,000,000,000,100,0
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 84 1000 DATA 000,000,000,000,100,0
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 85 1000 DATA 000,000,000,000,100,0
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 86 1000 DATA 000,000,000,000,100,0
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 87 1000 DATA 000,000,000,000,100,0
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 88 1000 DATA 000,000,000,000,100,0
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 89 1000 DATA 000,000,000,000,100,0
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 90 1000 DATA 000,000,000,000,100,0
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 91 1000 DATA 000,000,000,000,100,0
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 92 1000 DATA 000,000,000,000,100,0
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 93 1000 DATA 000,000,000,000,100,0
 0,00,100,0,100,0,100,0,100,0,0
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 94 1000 DATA 000,000,000,000,100,0
 0,00,100,0,100,0,100,0,100,0,0
 0,00,1000
 95 1000 DATA 000,000,000,000,100,0
 0,00,100,0,100,0,100,0,100,0,0
 0,00,1000
 96 1000 DATA 000,000,000,000,100,0
 0,00,100,0,100,0,100,0,100,0,0
 0,00,1000
 97 1000 DATA 000,000,000,000,100,0
 0,00,100,0,100,0,100,0,100,0,0
 0,00,1000
 98 1000 DATA 000,000,000,000,100,0
 0,00,100,0,100,0,100,0,100,0,0
 0,00,1000
 99 1000 DATA 000,000,000,000,100,0
 0,00,100,0,100,0,100,0,100,0,0
 0,00,1000
 1000 DATA 000,000,000,000,100,0
 0,00,100,0,100,0,100,0,100,0,0
 0,00,1000

WILLIAM TELL



Here are the first two parts of
 William Tell which will build up
 over the next few months into the
 full program. These parts will
 not run individually so, after
 you type them in, save them onto
 a tape or disk and keep it safe.
 The first installation will
 contain full instructions on what
 to do to bring all of the parts
 together.

PROGRAMS: WTL.DAT

00 10 00000,00-00,00-0000
 01 00 100 1-10 TO 00-00-00 FOR 00
 0 00 00
 02 00 000 00-00,00-0000
 03 00 00-00-00-0000 00-00-00-00-00
 04 00 000000 00 0000 0000
 05 00 000000 00 0000 0000 0000
 06 00 000000 00 0000 0000 0000
 07 00 0000 00 0000 0000 0000
 08 00 0000 00 0000 0000 0000
 09 00 0000 00 0000 0000 0000
 10 00 0000 00 0000 0000 0000
 11 00 0000 00 0000 0000 0000
 12 00 0000 00 0000 0000 0000
 13 00 0000 00 0000 0000 0000
 14 00 0000 00 0000 0000 0000
 15 00 0000 00 0000 0000 0000
 16 00 0000 00 0000 0000 0000
 17 00 0000 00 0000 0000 0000
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 91 00 0000 00 0000 0000 0000
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 93 00 0000 00 0000 0000 0000
 94 00 0000 00 0000 0000 0000
 95 00 0000 00 0000 0000 0000
 96 00 0000 00 0000 0000 0000
 97 00 0000 00 0000 0000 0000
 98 00 0000 00 0000 0000 0000
 99 00 0000 00 0000 0000 0000
 1000 DATA 000,000,000,000,100,0
 0,00,100,0,100,0,100,0,100,0,0
 0,00,1000

LISTINGS

Table with columns for item number, description, and price. Includes items like 'C1 2000 DATA 102, 173, 101, 3, 2008...', 'C2 4000 DATA 30, 30, 30, 70, 50, 30...', and 'C7 4000 DATA 102, 1, 100, 84, 100, 0...'. A 'PROGRAM: MTR.ENG' box is visible in the middle.

LISTINGS

67	840 DATA 187,000,188,200,197 0,000,000,0,000,130,0,000,1 00,0,00,0100	76	960 DATA 0,0,0,0,0,0,0,0,0,0 0,0,0,0,000,00,0,010	68	1120 DATA 188,07,00,180,07,1 00,180,07,100,180,07,071,180 07,000,180,1800
68	880 DATA 188,0,0,0,000,0,000,1 0,0,0,00,130,0,00,00,07,01 0	77	980 DATA 0,0,0,0,0,0,0,0,0,0 0,0,0,0,000,00,0,010	69	1140 DATA 00,171,100,00,00,1 00,0,00,00,00,00,0,0,0,0,0
69	900 DATA 00,0,00,170,100,110 100,01,10,0,00,100,0,00,040 000,1000	78	1000 DATA 0,0,0,0,0,0,0,0,0,0 0,0,0,0,000,00,0,010	70	1160 DATA 0,0,0,0,0,0,0,0,0,0 0,0,0,0,000,00,0,010
70	920 DATA 188,100,000,100,110 100,01,10,0,00,100,0,00,040 000,1000	79	1020 DATA 0,0,0,0,0,0,0,0,0,0 0,0,0,0,000,00,0,010	71	1180 DATA 0,0,0,0,0,0,0,0,0,0 0,0,0,0,000,00,0,010
71	940 DATA 187,000,190,100,100 0,000,000,0,00,130,0,000,00 0,0,001,0100	80	1040 DATA 0,0,0,0,0,0,0,0,0,0 0,0,0,0,000,00,0,010	72	1200 DATA 0,0,0,0,0,0,0,0,0,0 0,0,0,0,000,00,0,010
72	960 DATA 000,0,00,000,0,000,1 0,0,0,00,130,0,00,00,07,01 000	81	1060 DATA 0,0,0,0,0,0,0,0,0,0 0,0,0,0,000,00,0,010	73	1220 DATA 0,0,0,0,0,0,0,0,0,0 0,0,0,0,000,00,0,010
73	980 DATA 187,000,190,100,100 0,000,000,0,00,130,0,000,00 0,0,001,0100	82	1080 DATA 0,0,0,0,0,0,0,0,0,0 0,0,0,0,000,00,0,010	74	1240 DATA 0,0,0,0,0,0,0,0,0,0 0,0,0,0,000,00,0,010
74	1000 DATA 000,0,00,000,0,000,1 0,0,0,00,130,0,00,00,07,01 000	83	1100 DATA 0,0,0,0,0,0,0,0,0,0 0,0,0,0,000,00,0,010	75	1260 DATA 0,0,0,0,0,0,0,0,0,0 0,0,0,0,000,00,0,010
75	1020 DATA 187,000,188,200,187 0,000,000,0,00,130,0,07,000 0,0,001,1000	84	1120 DATA 0,0,0,0,0,0,0,0,0,0 0,0,0,0,000,00,0,010	76	1280 DATA 0,0,0,0,0,0,0,0,0,0 0,0,0,0,000,00,0,010
76	1040 DATA 000,0,00,000,0,000,1 0,0,0,00,130,0,00,00,07,01 000	85	1140 DATA 0,0,0,0,0,0,0,0,0,0 0,0,0,0,000,00,0,010	77	1300 DATA 0,0,0,0,0,0,0,0,0,0 0,0,0,0,000,00,0,010
77	1060 DATA 187,000,188,200,187 0,000,000,0,00,130,0,07,000 0,0,001,1000	86	1160 DATA 0,0,0,0,0,0,0,0,0,0 0,0,0,0,000,00,0,010	78	1320 DATA 0,0,0,0,0,0,0,0,0,0 0,0,0,0,000,00,0,010
78	1080 DATA 000,0,00,000,0,000,1 0,0,0,00,130,0,00,00,07,01 000	87	1180 DATA 0,0,0,0,0,0,0,0,0,0 0,0,0,0,000,00,0,010	79	1340 DATA 0,0,0,0,0,0,0,0,0,0 0,0,0,0,000,00,0,010
79	1100 DATA 187,000,188,200,187 0,000,000,0,00,130,0,07,000 0,0,001,1000	88	1200 DATA 0,0,0,0,0,0,0,0,0,0 0,0,0,0,000,00,0,010	80	1360 DATA 0,0,0,0,0,0,0,0,0,0 0,0,0,0,000,00,0,010
80	1120 DATA 000,0,00,000,0,000,1 0,0,0,00,130,0,00,00,07,01 000	89	1220 DATA 0,0,0,0,0,0,0,0,0,0 0,0,0,0,000,00,0,010	81	1380 DATA 0,0,0,0,0,0,0,0,0,0 0,0,0,0,000,00,0,010
81	1140 DATA 187,000,188,200,187 0,000,000,0,00,130,0,07,000 0,0,001,1000	90	1240 DATA 0,0,0,0,0,0,0,0,0,0 0,0,0,0,000,00,0,010	82	1400 DATA 0,0,0,0,0,0,0,0,0,0 0,0,0,0,000,00,0,010
82	1160 DATA 000,0,00,000,0,000,1 0,0,0,00,130,0,00,00,07,01 000	91	1260 DATA 0,0,0,0,0,0,0,0,0,0 0,0,0,0,000,00,0,010	83	1420 DATA 0,0,0,0,0,0,0,0,0,0 0,0,0,0,000,00,0,010
83	1180 DATA 187,000,188,200,187 0,000,000,0,00,130,0,07,000 0,0,001,1000	92	1280 DATA 0,0,0,0,0,0,0,0,0,0 0,0,0,0,000,00,0,010	84	1440 DATA 0,0,0,0,0,0,0,0,0,0 0,0,0,0,000,00,0,010
84	1200 DATA 000,0,00,000,0,000,1 0,0,0,00,130,0,00,00,07,01 000	93	1300 DATA 0,0,0,0,0,0,0,0,0,0 0,0,0,0,000,00,0,010	85	1460 DATA 0,0,0,0,0,0,0,0,0,0 0,0,0,0,000,00,0,010
85	1220 DATA 187,000,188,200,187 0,000,000,0,00,130,0,07,000 0,0,001,1000	94	1320 DATA 0,0,0,0,0,0,0,0,0,0 0,0,0,0,000,00,0,010	86	1480 DATA 0,0,0,0,0,0,0,0,0,0 0,0,0,0,000,00,0,010
86	1240 DATA 000,0,00,000,0,000,1 0,0,0,00,130,0,00,00,07,01 000	95	1340 DATA 0,0,0,0,0,0,0,0,0,0 0,0,0,0,000,00,0,010	87	1500 DATA 0,0,0,0,0,0,0,0,0,0 0,0,0,0,000,00,0,010
87	1260 DATA 187,000,188,200,187 0,000,000,0,00,130,0,07,000 0,0,001,1000	96	1360 DATA 0,0,0,0,0,0,0,0,0,0 0,0,0,0,000,00,0,010	88	1520 DATA 0,0,0,0,0,0,0,0,0,0 0,0,0,0,000,00,0,010
88	1280 DATA 000,0,00,000,0,000,1 0,0,0,00,130,0,00,00,07,01 000	97	1380 DATA 0,0,0,0,0,0,0,0,0,0 0,0,0,0,000,00,0,010	89	1540 DATA 0,0,0,0,0,0,0,0,0,0 0,0,0,0,000,00,0,010
89	1300 DATA 187,000,188,200,187 0,000,000,0,00,130,0,07,000 0,0,001,1000	98	1400 DATA 0,0,0,0,0,0,0,0,0,0 0,0,0,0,000,00,0,010	90	1560 DATA 0,0,0,0,0,0,0,0,0,0 0,0,0,0,000,00,0,010
90	1320 DATA 000,0,00,000,0,000,1 0,0,0,00,130,0,00,00,07,01 000	99	1420 DATA 0,0,0,0,0,0,0,0,0,0 0,0,0,0,000,00,0,010	91	1580 DATA 0,0,0,0,0,0,0,0,0,0 0,0,0,0,000,00,0,010
91	1340 DATA 187,000,188,200,187 0,000,000,0,00,130,0,07,000 0,0,001,1000	100	1440 DATA 0,0,0,0,0,0,0,0,0,0 0,0,0,0,000,00,0,010	92	1600 DATA 0,0,0,0,0,0,0,0,0,0 0,0,0,0,000,00,0,010
92	1360 DATA 000,0,00,000,0,000,1 0,0,0,00,130,0,00,00,07,01 000				
93	1380 DATA 187,000,188,200,187 0,000,000,0,00,130,0,07,000 0,0,001,1000				
94	1400 DATA 000,0,00,000,0,000,1 0,0,0,00,130,0,00,00,07,01 000				
95	1420 DATA 187,000,188,200,187 0,000,000,0,00,130,0,07,000 0,0,001,1000				

Listings

61	188, 288, 331, 330, 3934 1000 DATA 801, 0, 0, 808, 808, 808 0, 808, 808, 808, 8, 8, 801, 801, 801, 801 1, 801, 801, 801	75	0, 8, 800, 0 10 DATA 0, 0, 808, 808, 808, 808 "UPPER" IN LOWER 10000: 808 0
77	7170 DATA 801, 7, 7, 891, 891, 891 100, 891, 891, 891, 891, 891, 891, 891 79, 891	83	70 NEXT 1, 878, 87888 80 DATA 78, 8, 10, 78, 100, 18, 78 189, 17, 188, 188, 808, 808, 188, 81, 1 80, 188, 1788
83	1000 DATA 31, 31, 31, 30, 30, 31, 898, 898, 898, 898, 898, 898, 898, 898, 0, 0, 8178	70	80 DATA 808, 808, 78, 808, 123, 0, 80, 808, 808, 808, 808, 80, 808, 73 8, 808, 180, 78, 8178
84	7180 DATA 898, 898, 898, 898, 898, 898, 8, 898, 0, 8, 8, 898, 898, 898, 898, 898, 898, 898, 898	31	70 DATA 808, 123, 898, 188, 898, 808, 188, 871, 181, 123, 123, 898, 1, 77, 8, 898, 891, 8988
87	7800 DATA 898, 898, 898, 0, 0, 0, 0, 898, 8, 8, 8, 898, 898, 898, 898, 8, 8, 898, 8988	78	80 DATA 188, 898, 898, 188, 891, 1, 81, 898, 188, 898, 898, 8, 898, 898, 188, 898, 898, 898
88	8810 DATA 88, 88, 88, 88, 88, 88, 88, 78, 88, 88, 88, 88, 88, 88, 88, 1, 78, 1888	88	80 DATA 898, 898, 898, 898, 898, 898, 188, 898, 898, 188, 898, 178, 898, 188, 188, 178, 898, 8988
89	4980 DATA 80, 0, 891, 89, 898, 89, .80, 891, 891, 0, 898, 89, 898, 89, 89, 0, 1488	89	100 DATA 898, 898, 898, 898, 898, 898, 81, 898, 123, 898, 898, 78, 898, 188, 1, 88, 891, 8988
90	4980 DATA 188, 891, 123, 174, 13 2, 123, 188, 37, 188, 174, 130, 188, 188, 891, 188, 898, 8988	88	100 DATA 188, 898, 898, 898, 898, 898, 898, 8, 898, 891, 8988
91	7800 DATA 888, 888, 188, 898, 898, 188 0, 0, 177, 898, 148, 174, 898, 898, 898, 8, 898, 891, 8988	88	740 DATA 898, 8, 898, 898, 4, 8988 898, 898, 188, 898, 898, 898, 898, 1, 88, 4, 898, 8988
92	7800 DATA 888, 174, 898, 8, 898, 174, 898, 898, 188, 898, 898, 898, 188, 891, 287, 898, 8988	87	120 DATA 8, 120, 898, 188, 4, 898, 8, 120, 898, 188, 898, 188, 898, 188, 898, 898
93	8900 DATA 188, 188, 188, 0, 188, 188, 188, 188, 188, 188, 188, 188, 188, 188, 188, 18888	88	100 DATA 88, 118, 898, 188, 898, 0, 88, 898, 898, 898, 898, 898, 898, 898, 898, 188, 898, 89888
94	7800 DATA 887, 898, 898, 891, 80 1, 898, 898, 4, 898, 891, 898, 891, 41, 18, 188, 188, 8988	88	170 DATA 898, 898, 188, 188, 898, 4, 898, 1, 898, 898, 23, 13, 178, 188, 8, 188, 1888
95	7800 DATA 78, 891, 898, 147, 17, 17, 78, 78, 898, 898, 38, 898, 898, 8 8, 78, 1888	87	180 DATA 8, 120, 898, 188, 4, 898, 8, 120, 898, 188, 898, 188, 898, 188, 898
96	8110 DATA 87, 88, 38, 78, 891, 77, 88, 88, 88, 13, 17, 87, 898, 891, 8, 8, 8988	86	100 DATA 88, 118, 898, 188, 898, 0, 88, 898, 898, 898, 898, 898, 898, 898, 898, 188, 898, 89888
97	8100 DATA 38, 17, 38, 88, 78, 891, 78, 81, 38, 88, 38, 78, 891, 38, 87, 8 8, 8988	86	100 DATA 898, 898, 188, 188, 898, 188, 898, 188, 898, 188, 898, 898, 898, 898, 898, 898, 898, 89888
98	1000 DATA 48, 38, 0, 891, 89, 898, 0, 0, 0, 0, 0, 0, 8, 8, 8988	85	800 DATA 188, 898, 188, 188, 898, 0, 77, 7, 178, 898, 898, 898, 4, 898, 0, 78, 120, 89, 8988
99	1710 DATA 0, 0, 0, 0, 898, 898, 898, 898, 0, 0, 0, 0, 0, 0, 0, 0, 0, 8, 8988	85	800 DATA 898, 898, 188, 188, 898, 0, 898888

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40	3 KEY * THE CLOS PROG *OPEN OPEN *
50	2 KEY * TAPE OR DISK THIS P PROGRAM *
30	4 KEY * SHOULD BE ENTERED W 0 OPEN *
60	8 KEY * IN THE CASE, BORG SH ULD BE *
40	8 KEY * USED IN THE CASE CH IT *
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B A E A H

Bug Finder

We'd like to remind our readers that we run a Bug Finder service.

If you have typed in one of our programs and despite much checking, you still can't get it to run, then send us the following:

Two copies of your program on tape or disk.

A description of your problem. If possible a listing of your work (you may omit this).

A stamped, self-addressed envelope for return of the program to you.

Should any of the above be missing then we will not be able to deal with your query.

We will try to point out where you have made errors and place a corrected copy of the program back on to your tape or disk before we return it to you.

Do not send a program to us as soon as it stops working, please check it several times first.

We do get a large number of queries and so it may take a while for us to deal with yours personally.

Note we can only deal with problems relating to programs published in *Your Commodore*.

At the *Your Commodore* office we receive hundreds of letters from readers every month. We do try and answer each individually but sometimes this is impossible due to pressure of work. If you have written to us and not received a personal reply, we apologise for this but we cannot promise to reply to every item of mail we receive. If you find that your question or letter really needs an answer, then inclusion of an S.A.E. will guarantee a reply, although this may still take time to arrive.

Dogel!

Unfortunately the guidelines found their way into the SIMPLE program that we published in the August 1988 issue of the magazine. You will find the instructions below together with more detailed instructions on how to enter the program.

These are the only connections that the program requires, if you still have problems we suggest that your typing very carefully.

Entry Instructions

- 1) Type in and save the program.
- 2) Enter the following:
POKE 16048,0:POKE 44,0:NEW

- 3) Load the SIMPLE basic loader.
- 4) Type: RUN
- 5) When finished type: NEW
- 6) Enter the listing presented here.

PROGRAM: SIMPLE CONNECTION

```

PB 10 PRINTCHR$(C);PRINTCHR$(C)
    PRINT$ " 255A...:255A:1"
CB 20 FOR L=10010:GOTO1515:END$
    :C:
CB 30 FORA=1000:REPEAT:G=DECOR
    1:G=0:G=POKE:G=4000
CB 40 IF G=1000:PRINT"ERROR FOR
    NO IN LINE":END
CB 50 GOTO PRINT$G:ALL:FOR
    G1=1:END
CB 60 PRINT$G:GOTO:G1:G1,95,
    95,95,15,77,95,95,95,15,77,9
    5,95,95,95,77,95,95,95,95
CB 70 IF 10000,95,95,1000,75,95,
    95,95,15,95,95,15,95,15,95,9
    5,95
CB 80 PRINT$G:GOTO:1001,75,95
    ,95,95,15,95,95,95,95,15,95,
    95,95
  
```

- 7) Type: RUN
- 8) Type: MONITOR
- 9) Enter the following to save the program:
S "SIMPLE".A,1000,2000 for disk or:
S "SIMPLE".A,1000,2000 for tape.

Software Submissions.

Readers who have sent, or who are thinking of sending, programs for possible publication will be pleased to know that we are now up to date with all such items.

We would like to thank all contributors for their patience in waiting for a reply from us.

A new computerised system has

been set up to deal with readers submissions which should enable us to deal with them much quicker.

Should you have any queries about submissions please write to:

Program Submissions Query
Your Commodore
1 Golden Square
London W1R 3AB.

Puzzle Corner

Puzzle A

Consider the word **ACCESS**. You will see that it contains three consecutive letters viz. **ACC**.

There are 26 such triplets. Obviously many of them do not appear in any recognisable English word. How many words can you find that have three consecutive letters? Remember, they don't have to be at the start of the word.

Puzzle B

As a change from triangles, how many rectangles are there in **Diagram A**.

Send your entries to, November Puzzle Corner, Your Commodore 1 Golden Square, London W1R 3AB

The first two correct answers pulled out of the hat on the closing date of November 30th will receive a free Your Commodore binder.



Diagram A

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