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TYNE & WEAR



ATARI 8-BIT USER GROUP

Newsletter of TWAUG

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Jan 1993



U—S—E—R—G—R—O—U—P

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8 : 16

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The subscription rates for the 4 issues
is £6.50.

Anyone wishing to receive the 8:16
newsletter should send their address to:

Mr.Colin Hunt
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TWAUG NEWSLETTER

EDITORIAL

Who to blame??

John Matthewson
David Ewens
Max Gerum

This Newsletter is entirely for the Atari 8-bit enthusiast. Yes, only 8-bit material will be published in this newsletter, our aim is to keep the ATARI 8-bit alive.

TWAUG Newsletter would like to make it clear that we are in no way connected to Atari Corporation or associated companies. The name ATARI and LOGO are for informational purposes only, to tell the readers of this newsletter and the Atari user in general, that we use and support Atari only.

This issue of TWAUG was produced with an Atari 130XE, Atari 1050 disk drive and printed with a Citizen 1200. The software used was Textpro version 4.54 word processor and Daisy-Dot III print processor.

Any articles published in this newsletter are copyright of the author, they can be used by other publications provided credit is given to the author and the original source of publication.

This newsletter will be published bi-monthly, the next issue should be ready by mid-March.

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Letter Section

This space is for your letters, there wont be any restriction on the amount you write. All letters received will be published in this newsletter unless otherwise instructed.

So please write in with your suggestions, questions, or any information you would like to share with other readers.

If a quick answer is needed, please enclose a SAE, we will try and answer within a week of receiving your letter. Your letter will still be published in this section. If we don't know an answer to a question we will find out for you and give you the answer as soon as possible.

Are you interested in having an article published in this newsletter? Anything at all, even an article that had been published before. But do give credit to the author and newsletter or magazine you saw it in. If it is of interest to you I am sure it will be to others too.

Address your letters to:

**TYNE &
WEAR
ATARI 8-BIT
USER
GROUP**

TWAUG
P.O.Box 8
Wallsend Tyne & Wear
NE28 6DQ



The NOSTALGIC corner

THE HISTORY OF THE GROUP

By Dave Ewens.

Back in the dark ages (1982 to be exact), my daughter Gillian and myself were wandering round an electrical shop in the centre of Newcastle, when we saw a section devoted to computers. We went from computer to computer looking at the demos that were being shown and came to a stop in front of a computer that was showing a demo of STAR RAIDERS. Within a very short time, we walked out of the shop proud owners of an ATARI 400, 1010 tape recorder and Star Raiders cartridge.

Before going home, we searched round all the shops selling Atari cassettes and books buying as many as we could. In one of the shops, we were given a leaflet advertising a new Atari club being formed in Newcastle the following Friday. After attending that first meeting, I was hooked.

When I arrived at that first club meeting, there were four other chaps there and I was told that they had been trying to start a BBC club but without success. One or two of them had Atari 8-BITS, so they decided to try and advertise as an Atari club and see if they would have more success. By the end of the meeting, four or five other 8-BIT owners had arrived and over the next few weeks, many more had joined.

Over the years since then, ST owners have started an ST section, but they haven't lasted long. 8-BIT members have come and gone, but there are still a few of the original members including myself.

During the last two or three years I've tried a few times to raise interest in starting up a newsletter, but although members thought it a good idea, nobody seemed willing to commit themselves to help running it. That is until a couple of months ago John Mattheuson, Max Gerum and myself decided to go ahead and give it a go. It has been hard work these last few weeks, finding articles for the newsletter and also putting it together. We have now collected a few interesting programs to put on disk, and with your support, T.W.A.U.G will go from strength to strength. We have already received offers of help from some of you and for this we are very grateful.

I have a lot to thank my Atari for, not only the enjoyment I get going to the weekly meetings at the club, but also for the many friends I've made all over the world. Sadly, some have moved on to other machines, but others, like myself, are happy to stay with our 8-BITS. To all you penpals I say "Thank you for your support and friendship over the years".

Often, when sitting here at my upgraded 130XE, 1050 drives and printer, I think back with fond memories of those early days with the Atari 400 and tape deck, all it costed me was 50 pounds, but I think it was the best investment I've ever made. Maybe one day Atari Corps will look back and realise how much they owe to the 8-BIT and just how popular it still is. Maybe they'll even think of giving it some support in the future. "MIRACLES DO HAPPEN SO THEY SAY!!".



DAISY-DOT III

USER'S GUIDE

Author David Richardson



Review by Max Gerum.

This review has been published in *BOOT* the newsletter of LACE and in the 8-16 newsletter of BAPAUG. But in view of this we believe it is still appropriate to publish this article in this first edition of our Newsletter. We also believe that there are still a lot of Atari users who haven't seen this article, or even know of this manual's existence. Every Daisy-Dot 3 user ought to have this User's Guide in their library, it will certainly improve the performance of DD3.

This manual is public domain, and has been endorsed by Roy Goldman, creator of DAISY-DOT III copyright 1990, and by permission of David Richardson this manual can be copied and distributed freely. Daisy-Dot III is not public domain and therefore isn't freely available.

This document is available only on disk, either on 5 double sided single density disks in ARCDed form, or 9 double sided single density disks in unARCDed form. The ARCDed files need to be unARCDed first before you can print the manual, the unARCDed disks are ready for printing. It is available from our PD library.

The manual consists of 47 pages of text and fonts, the title page, the index of the fonts in the manual, the Author's Notes and two articles on creating fonts with DD3 and one article on double-column printing. The article for printing in double-column is interesting because DD3 has not got a facility for this kind of printing.

The original 50 fonts from Daisy-Dot III are included in this manual and printed in their entirety. Instructions are included on setting character and line spacing for best results, and indicating which characters are not being used and which are being used for which special characters. Besides the original DD3 fonts, about 59 new fonts have been added including Printshop icons, which can be printed with any DD3 text, after conversion. There are also 10 graphics fonts which are pictures converted from digitized or Micropainter pictures, and of course the instruction on how to convert them.

There are also a number of special fonts. *CRAZYDOT.NLG* lets you create a "DOTTY" game of geometric designs, it can be found on page 10 in the manual. There is *CHESS.NLG* with which you can create and print a layout of a chess game, can be of interest for chess players, it is on page 12. There is a crossword puzzle font for puzzle and answers, on pages 14, 15, and 16. Page 14 is printed in double-column, first P14.1 is printed it prints the left side of the page, you now rewind the page back to the top and print P14.2 for the right side.

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There is a GRID.NLQ, you will find that on page 20, you can print your own graph paper with this font. Do you play the Yahtzee game, I am sure you are using score sheets to play that game, well now you can print your own with YAHTZEE.NLQ, on pages 22 and 23. There are also fonts to print Handsigns for the deaf page 19, Morse code on page 28 and Braille page 29 and on page 30 is a sample printout.

Now how do we print out this remarkable manual. First of all you need Daisy-Dot III and a Ramdisk will do nicely, otherwise one disk drive is sufficient. To check the content of each disk use a wordprocessor and you can check the set up of the pages at the same time. Each disk side to be printed contains the fonts and text for printing. You only print the textfiles without an extender, any NLQ extenders are the fonts which will be printed with the text. Each P file on the disk fills one page, first page is of course P1 and the last page number is P47.

The Title page is one page, Fontier.1 and Fontier.2 are three pages each and Fontier.3L and Fontier.3R print in double-column. Start with FONTIER.3L and print the ODD pages first, there are two pages 1 and 3, next return the paper to page 1 and print FONTIER.3R EVEN pages, 2 and 4. There is also an Index page which needs two pages, the Author's Notes covers two and a half pages.

So far all I've been telling you is what it contains but not about what it can do. You will have read above that the User's Guide manual contains icons. Before we can use these icons they must be converted to DD3 fonts. There are two utilities included on the manual disk for converting icons. I will not go into details now as it will all be explained later.

This newsletter title page is a good example about printing with DD3 icons included. The page has been printed in two passes, firstly I did set up and printed the border, and then fit in the main page. There is so much more that can be done.

The example below is a little more difficult to set up, as you can see it is a profit and loss account form. This was a challenge for me, I had to prove to myself that I was capable to do it and also show that the Atari computer isn't only a games machine. I wont bore you with all the details of how long it took to set it up, only how I began.

Firstly, I typed out the text with the spacing, secondly, I included the horizontal lines then I printed it out just to see how it will look on paper. You probably realize that it wasn't perfect the first time, neither was it on the second try. Adding the vertical lines was the most difficult of all, I had to make sure the tab setting was spaced properly. Here is the result, you can judge for yourself.

TWAUG NEWSLETTER

WK No	DATE			WEEKLY SUMMARY		
DAY	DATE	TAKINGS	TO BANK	CASH IN HAND B/FWD		
SUN				TOTAL TAKINGS		
MON				TOTAL (1)		
TUES				PAYMENTS		
WED				TO BANK		
THUR				TOTAL (2)		
FRI				TOTAL (1) & (2) C/FWD		
SAT						
TOTALS						
PAYMENTS				PAYMENTS		
BANK LOAN				ROAD TAX		
OTHER LOANS				PENSION		
FEES				TAX & N.I.		
PETROL				WAGES (1)		
REPAIRS/RENEWALS				WAGES (2)		
INSURANCE				SELF		
SUNDRIES				OTHERS		
TOTAL (3)				TOTAL (4)		
				TOTAL (3) & (4)		

I mentioned above about two programmes for converting Print Shop icons to DD3 fonts, below is a short description of the programmes. In the next issue I will go into more details on how to use these utility files.



There are two Basic programs to convert Print Shop Icons into

Daisy-Dot 3 fonts. P5T00D38.BAS will convert one icon at a time, using P52DD3.MOD you can enter as many icons up to 30 maximum before conversion begins. The icons will be converted into a magnified font, therefore only one line can be printed before or after the font.



Using a macro file FNTSPLIT.MAC with Textpro the icons will be converted back to a single font and at the same time will be split horizontally into four parts by this conversion. It is now possible to print three or four lines before or after the font, depending on the size of the icon, as this example shows.

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After converting the icon back to a single font, with FNTSPLIT.MAC, the font can now be magnified.

Use the Magnify option from DD3 Font Utility to perform this task. I have used the magnification factor of double

height, the option is (2). There is also the option for triple height (3) and quadruple height (4). Double height is quite impressive don't you think!



Compare the size of this icon with the magnified version above and you can judge the result yourself. Printing a handbill with DD3 and if you also include a magnified font will look really good. This newsletter cover page for

instance is a very good example.

As mentioned earlier in this article, I will explain in more details how to use the conversion utility programmes and how to convert Print Shop Icons into DD3 fonts in the next issue. Now there is one drawback, anyone with only one disk drive and no Ramdisk won't be able to do the conversion from PSicons to DD3 fonts. The PS icons are on a Print Shop format and the converted icons are transferred to an Atari format.

The TWAUG newsletter management has decided that if there are Atari users who need help we will give it. Anyone who would like icons converted but is unable to do so for themselves should contact the newsletter. I (author of this article) am willing to do the conversion and magnify the fonts.

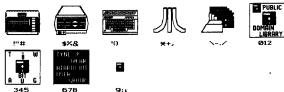
Anyone wishing to use this service should send his choice of the PS icons on Side A of a Print Shop formatted disk. You can choose up to 30 icons for conversion, but the converted and magnified icons take up a lot of sectors on the disk so your drive must be able to read medium density. The less icons you have on a disk the easier it will be for the drive when printing. I therefore recommend choosing only ten icons. I will return the converted icons on the B side of the disk formatted with Atari DOS in medium density, unless otherwise instructed. I will also supply you with a hard copy of the converted and magnified icons with the code under each icon which is needed when including in text. A small fee will be charge for this service to cover expenses and postage. The charge will be 75 pence, for one disk with printed copy.

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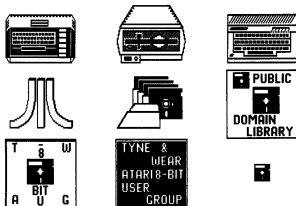
Anyone who uses our icon conversion service will receive a printed copy similar to this one, only your chosen icons will be on.

EXAMPLE

Here's a selection of icons used in this newsletter.



Here's the magnified version.



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The BLACK BOX is an add-on board for the Atari 600XL,800XL and 130XE 8-bit computers. It is a T-shaped board that plugs into the PDI port of the XL computer, or the ECI and cartridge ports of the 130XE. Connectors for both types of computers are built into the BLACK BOX so no adapter boards are necessary. A cartridge port is available on the board itself for 130XE users.

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For more information on these and other 8-bit products:

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USA**

or contact T.W.A.U.G. we will do our best to help

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REBOUND



NUCLEAR WASTE DUMP



Flip Ogart continually bounces up and down. You control only his horizontal movement with the joystick. Thus, you are not in total control of Flip, and the two of you must cooperate to accomplish your goal—save all the Ogarts. You start with five Flips, receiving a bonus Flip for each successfully completed screen.

Ogarts: These poor creatures are crying out for Flip's aid. Flip only needs to touch it. Saving all the Ogarts on one screen will send Flip on to the next screen.

Most of the walls in Rebound are visible, but some aren't.

Transporters: These look harmless arrows. But when Flip touches one, ZOOING! He breaks down and instantly reassembles at a different arrow.

Side Gaps: A screen may have gaps in the walls at the top, bottom and sides. If Flip bounces out one gap, he'll reappear through the opposite gap. Touching a switch makes all action in the lair spin opposite way. Switches look like rotating spirals.

Sucker Holes: When bouncing too close to a sucker hole will bring Flip's days to a close. But there is hope, switches can be used to change sucker holes into blow holes.

Blow Holes: Send Flip flying. But these are as safe as can be. But be careful, touching a switch changes these safe holes back into sucker holes.

Rotogart/Eatos are red and their faces rotate. Some like to just loaf around in one spot, if Flip gets too close, he is certain to become a snack.

Use joystick plugged into port 1. There are five different speeds, 1 is the slowest and 5 is very fast. Use the SELECT key to alter the speed. The speed is displayed in the top right hand corner of the menu screen.

Press the START key to begin. The aim of the game is to stack the waste bins in the dump, without having two of the same colours or shapes side by side or on top. You must stack all the bins horizontally first, if you happen to stack a bin on top of another and there is a space beside that one the stack will collapse. No explosion will occur if no two colours or shapes are the same, but should the bin fall on top of one of the same colour or shape you will be blown sky high.

To begin Select a low number to get used with the game before you attempt a higher number. This game is easy to follow, you only need to move the bins from side to side and the joystick button to drop the bin. You can also use the joystick button to restart the game when you have been blown up.

Make also sure that you have a good life insurance, if you are as good as I am, you wont get to the end.

Good luck!!!

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BUY, SALE and CONTACT section

FOR SALE

Any unwanted hardware, or software? Here is the space for you to advertise

WANTED

Are you looking for any material to help your computing? Look no further advertise here.

PENPALS and HELP

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One or two lines here for a help call will do wonders, someone out there will see your call.

This space is reserved to advertise your unwanted hardware and software. Only original software for sale can be advertised.

We, the management cannot be held responsible for the originality or condition of goods sold through the advertisement in this newsletter. Our advise to the buyer is check the condition of the goods before buying.

If you would like to make contact with new Atari enthusiasts, please place your advert in this section.

All adverts are free, except for those offering items for sale commercially.

Contact us at:



TWAUG

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NE28 6DQ

MASTERING THE ATARI 1020 PLOTTER

Tutorial with demonstration programs on the disk

by KRIS CRUZ

first published in ANTIC, The Atari Resource

Learn how to use the graphics power of the inexpensive Atari 1020 Color Plotter. This tutorial article provides a complete explanation of the 1020 commands plus four short demonstration listings. The BASIC programs work on all Atari computers of any memory size, with disk or cassette.

The Atari 1020 Color Plotter is a very useful and inexpensive printing tool. It lends itself to a wide variety of applications from geometry and physics diagrams to home finance graphs or even just high tech doodling! (See the October, 1985 ANTIC for more information about the 1020, including where it can be obtained. - ANTIC ED)

There are two general modes of operation-text and graphics. In the text mode you have a choice of 20, 40 or 80 column text in four different colors. You can also have the text rotated 90, 180, 270 or 360 degrees. This feature can be used to produce bright and colorful banners.

In the graphics mode you can use X,Y coordinates to plot graphs. You can also specify where you would like the axis drawn for your graph. Basically, if you are familiar with plotting and drawing on the screen, then you should have little trouble using the 1020 graphics mode. Figure 1 summarizes the text and graphics commands.

The commands are not difficult to use. But they must be sent in a manner which the plotter can understand. First, you must OPEN a channel to the 1020.

Type: OPEN #2,0,"P".

This opens a channel for output to the printer in the same manner as any other device. You are now automatically in the 40 column text mode. Any text you send out through a PRINT #2 statement will be printed in 40 columns. Next type: PRINT #2;"(ESC) (ESC) (CTRL) P". Now everything is printed 20 columns wide.

For 80 column text, type: PRINT #2; (ESC) (ESC) (CTRL) S. To print different colors, press the color button between printing or type: PRINT #2; (ESC) (ESC) (CONTROL) 0 (RETURN). And then type: PRINT #2;"Clany # 0-3"(RETURN) PRINT #2;"A". Notice how the pen barrel is rotated to change pens. Numbers for the different pen colors are shown below:

#	COLOR
0	Black
1	Blue
2	Green
3	Red

There are nine commands within the graphics mode. OPEN a channel to the plotter and type: PRINT #2;"(ESC) (ESC) (CONTROL) 0". This sets the plotter in the graphics mode.

The DRAW command is much like DRAWTO in BASIC. But with the plotter, X can be from 0 to 480 and Y can be from -999 to 999. The line is drawn from the current position to X,Y. Type: PRINT #2;"D450,0". This draws a black line across the paper and stops.

To have the pen barrel return to its HOME position, type:

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MASTERING THE ATARI 1020 PLOTTER (continue)

PRINT #2,"H". If you want dotted lines, type: PRINT #2,"L (any value 1-15)". Then type: PRINT #2,"D450,-10".

To plot points, you must be able to lift the pen from the paper while moving it. This requires the MOVE command. Type: PRINT #2,"M200,-200". The paper moves up and the pen moves to the center. However, no line is drawn. Now add 1 to either the X or Y and DRAW. Type: PRINT #2,"D200,-201". This is how points can be plotted. But usually the pen is left down to show the shape of the function being plotted.

DEMO PROGRAMS

For demonstrations and fundamental plotter patterns, we've included four listings on the disk.

Listing 1 shows how the functions of SIN, COS and TAN look when plotted. You will notice in lines 15, 30 and 50 that an asterisk (*) can be used to send more than one command in a single PRINT statement.

Listing 2 draws two groups of concentric circles which cross each other. Listing 3 draws spiraling triangles. It does this by changing the radius and the points where it connects the triangle.

Listing 4 draws two squares and connects each corners with a line. It can easily be modified to do the same for other shapes, by changing the step and the data representing which points to connect.

As you can see, there is much you can do with the Atari 1020 plotter. And even if you aren't interested in making graphics or charts in four colors, for much less than the cost of a dot-matrix printer you could purchase a 1020 simply to list your programs.

Figure 1

INSTRUCTION	FORM	MODE
GRAPHICS	ESC ESC CTRL G	-
TEXT	DEFAULT	AT CHANNEL OPENING
TEXT	A	TEXT FROM GR.
20 COL.TEXT	ESC ESC CTRL P	TEXT
40 COL.TEXT	ESC ESC CTRL N	TEXT
80 COL.TEXT	ESC ESC CTRL S	TEXT
HOME	H	GRAPHICS
PEN COLOR	C (VALUE 0-3)	GRAPHICS
LINE TYPE	L (VALUE 1-15)	GRAPHICS
0-SOLID	-	-
DRAW	DX,Y	GRAPHICS
MOVE	MX,Y	GRAPHICS
ROTATE TEXT	Q (0-3)	GRAPHICS
(Text to be rotated must start with P)		
INITIALIZE	I	GRAPHICS
(Sets current X,Y as HOME or 0,0)		
RELATIVE DRAW	JX,Y	GRAPHICS
(Used with init.)		
RELATIVE MOVE	RX,Y	GRAPHICS
(Used with init.)		
CHAR.SCALE	S (0-63)	GRAPHICS

TWAUG NEWSLETTER

COMMUNICATING WITH THE OTHER SIDE

OR HOW TO USE A MODEM

by James Cutler

There is one branch of ATARI 8 bit computing which doesn't often appear in current UK magazines - Communications. With these you can talk to a distant computer, access Bulletin Boards (BBS) or Log On to the many Information services such as COMPU SERVE, CIX, INFONET or PRESTEL.

What is needed?

1: A Modem (MOdulator DEModulator) these vary in price. I picked mine up for forty pounds. They are rated in BAUD or to be accurate Bits per second, Basic users will be quite satisfied with 300 or 1200 bps. This refers to the speed at which data is sent or received. Those with wealthy dads can go all the way up to 9600 bps.

The Modem connects to your phone plug and also to your computer via an RS232 connector such as DATATARI interface (About 30,00 from GRALIN INT) P-R Connection or the 050 interface. Its powered by yet another mains plug/lead.

To run your modem you need SOFTWARE . Msnoffice 2 has a good comms module. I use BOBTERM an excellent Public Domain programme with many useful additional features.

I hook up to COMPU SERVE a worldwide information service which costs 7.95 a month for basic services such as Electronic mail, an ONLINE Shopping mall, AP Online news updated hourly, Healthnet, Travel news, Oroliers Encyclopaedia (21 volumes online) Sports news, ON LINE Games etc. For a charge based on hourly percentage you can access sections (FORUMS) covering all computers, hobbies, specialist subjects etc. ATARI have sections on the 8bit, ST, and Portfolio. 8bit has masses of programs which you can download to your own computer. The newest TEXTPRO v5 is online.

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TWAUG NEWSLETTER

Here are the printed instructions, these are also on the disk, for the BONUS program on side B of this month's TWAUG disk.

TALKING MATH WIZARD

by Matthew Retcliff

Math Wizard, my arcade-style arithmetic practice program for school children, was published in the April, 1984 issue of Antic. This month's Super Disk Bonus is the Covox-enhanced sequel -- Talking Math Wizard.

When you zap a correct answer, Talking Math Wizard speaks the complete equation. For example, if a 27 is at the top of the screen and you zap "11+16," the program would say: "Eleven plus sixteen equals twenty-seven."

Helping me program this magic was the \$39.95 Covox Voice Master Junior. However, you do not need a Covox or any other special equipment to play Talking Math Wizard -- only the MATHWIZ.BAS, MATH.SYS and WIZTALK.SPK files. If you own a Covox Voice Master or Voice Master Junior, you can can get rid of my voice from the file and put in your own voice -- or any other sound you choose.

To RUN this BONUS program "Talking Math Wizard" on Side B of this month's TWAUG disk, insert the disk and switch on. It is setup as an AUTORUN.SYS. You will be presented with a game option menu and by fine-tuning these options, you can change the type and difficulty of the problems. Plug a joystick into port 1. Move the stick up and down to put the flashing cursor next to the item you want to change. Push the stick left or right to change the value of that option. Options include:

1. Minimum starting number (MIN): The smallest value used in the math problems.

2. Maximum starting number (MAX): The largest value used in the

problems. This value must exceed MIN by at least five.

3. Percent Correct to Advance: Each round has six problems. To go to the next round, in which both MIN and MAX increase, your score must match or beat this value.

4. Difficulty Increment: The number by which MAX will increase after each round.

5. Rounds per game.

6. Problem type: Select addition, subtraction or multiplication.

The high score, most recent score and type of math problem for the high-score game are displayed near the top of the menu screen.

Press the joystick button to begin the game. The number of the current round, the problem number and your percentage of correct answers appear at the far right. The current problem type appears at the top of the screen. The answer box is below.

As the round begins, six problems scroll toward the bottom of the screen, where you are stationed with a number blaster (flashing cursor). An answer to one of the problems is selected at random, spoken and displayed at the top of the screen. Move the cursor under the problem whose answer corresponds to the one displayed above. Press the joystick button to select the matching problem. If more than one problem has the indicated solution, choose the one nearest the cursor to save time and earn more bonus points at the end of the round.

If your answer is correct, the

TWAUG NEWSLETTER

TALKING MATH WIZARD (continue)

problem is blasted back to the top of the screen. The correct answer is displayed beneath it, and then the entire problem is spoken. Then the next answer is displayed and spoken, and the scrolling continues. If you blast an incorrect answer, it is ignored except for a lowering of your success percentage.

If a problem reaches the bottom of the screen before you can answer it, it will scroll back to the top of the screen. There, the correct answer will be displayed and the entire problem will spoken.

If your percentage of correct answers is below the minimum, you must repeat the round. If your percentage is high enough, you will receive a bonus for speed and accuracy.

When all rounds are complete, the main menu comes up again and the high score is displayed. At this point you may press [ESCAPE] to exit to BASIC, or select new options and play another game.

INSERT YOUR VOICE

For Covox owners who want to insert new speech data, here's how to do it. First load the Voice Master software, version VM800 for the Atari 800. The XL/XE versions will not work properly with Talking Math Wizard II.

Note the USR calls in lines 50, 110, 190 and 210. With VM800 loaded, simply enter what you see in the REM portion of each line. The VM800 "wedge" software automatically translates those commands into the proper USR calls for you. Note that you may get an error with the SSAVE command. My version of VM800 has trouble parsing it, but the syntax is easily corrected.

RUN WIZTALK.BAS from this month's TWAUG Disk. Put a joystick in port 1 and the Voice Master

microphone plugged into port 2. WIZTALK will prompt you for each word it needs to learn. Speak the word distinctly and quickly. After the program learns the word, it is played back for you immediately. If the word sounds all right to you, press the trigger to move on to the next word. Otherwise, pull back on the joystick to say that word again.

After each word is learned, total size of the current speech data is displayed. Keep a close eye on this: It must not exceed 12,000 bytes or it will be too large to fit in Talking Math Wizard. You may need to run WIZTALK a few times before you get a feel for how fast to talk.

Once you're done, copy MATHWIZ.BAS (the main program), MATH.SYS (which contains data for three assembly language routines) and WIZTALK.SPK to another disk and RUN "D:MATHWIZ.BAS".

NEW ATARI USER

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PAGE 6
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CRACKING THE CODE

This article has first appeared in issue #5 of the then called "The U.K. ATARI Computer Owners Club" and from issue 8 onwards the name changed to "MONITOR".

A lot of articles about Assembly and Machine code is being written at present, but I found that this article, which has been written by Keith Mayhew and Roy Smith, is well written and presented. TWAUG therefore decided to re-print this 16 part series for the benefit of those who are interested in Machine code.

The re-typing of all 16 parts is being done by Max Cerum, who has volunteered to do the work. Mind you the volunteering was by force, the other two chaps are younger and bigger than I am. HEHE!

Part 1
by Keith Mayhew and Roy Smith

Whenever you write a program in a high-level language, like BASIC or FORTH, before it can be executed or understood by the microprocessor, it must first be converted into machine code. These high-level languages cannot run as fast as machine code because of the extra time consumed in 'interpreting' each line of your program into machine code. An interpreter only converts one line at the time, so the constant flow of the program is being interrupted for conversion of the next line. A more time efficient method of executing a high-level language is to 'compile' the whole program into one large block of machine code, thus there is no time spent converting lines during program execution. This seems a far better way of implementing high-level languages, but there is a problem in that it consumes vast amounts of memory, which is often impractical on a home micro.

but it can result in anything from ten to twenty times the speed of the interpreter.

If you could write programs in machine code, then you would, in effect, be getting right to the heart of the machine. This has its advantages and disadvantages. The advantages include faster implementation of your programs, allows you to access all the functions available in your machine, programs take up less memory and are more efficient. The disadvantages are that writing programs in machine code will often take longer, this is because the high-level languages (BASIC etc.) offer an 'abbreviated' command to implement many machine code subroutines which you would have to write yourself when using machine code.

In this series of articles we hope to not only teach you machine code, but also to show you how and when to use it. In practice, it is usually far more rewarding to combine machine code and high-level languages, mainly BASIC, getting the best features from both. Obviously, many commercially available programs are written purely in machine code, but this has been achieved by many hours of hard work, and if you are making money out of the program it is well worth the effort. For most people's purposes the hybrid method would be more suitable, using small sections of machine code to enhance a BASIC program. The main uses of machine code in this context are speeding up graphics and making animation smoother, for instance fine scrolling. Certain things can only be implemented in machine code, i.e. changing colour many times down the screen (DLI's), or updating clocks or continuously checking for a key depression (VBI's).

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NUMBER BASES.

Before you can start, you must be familiar with number bases 2 and 16, i.e. binary and hexadecimal, as you will be using them repeatedly. You are already familiar with base 10, that's decimal, base 2 and 16 are very similar. The least significant digit, that is the far right hand one, represents the base number to the power of 0, that is always 1 or 'units', the next digit represents the base number to the power of 1, then 2, etc. For binary (base 2), from the least significant digit onwards the numbers represent: 1, 2, 4, 8, 16, 32, 64, 128, 256 etc. As the base number is 2, the only digits used are '0' and '1', so a binary number of '1101' would be equivalent to, working from the right:

$(1 \times 1) + (0 \times 2) + (1 \times 4) + (1 \times 8) = 13$, in decimal.
See figure 1 for a worked example.

Hexadecimal, base 16, works on the same principle, i.e. the least significant digit onwards represents: 1, 16, 256, 4096, 65536, etc. Obviously, you can represent very large numbers with only a few digits in hexadecimal compared to binary. As the base is 16, you need to use 16 digits, obviously 0 to 9 are alright but 10, 11, etc. are two digits long. To get over this problem, characters are used to represent these last six digits, so the complete set is:

0 1 2 3 4 5 6 7 8 9 A B C D E F,
where A=10, B=11, C=12, D=13, E=14, F=15. Let's work out an example. To see what '3FB' in hexadecimal represents, we start from the right hand digit with:

$(B \times 1) + (F \times 16) + (3 \times 256) = 1019$,
or $(11 \times 1) + (15 \times 16) + (3 \times 256) = 1019$,
in decimal.

For a worked example see figure 2.

We have shown how to convert from binary to decimal and also hexadecimal (hex) to decimal, we will now show how to do the reverse.

To convert a decimal number to binary, for example decimal number 213, you must find the largest number of a power of two that will subtract from 213, in our example it is 128 (256 is too high). Subtracting 128 from 213 leaves 85. This means that you must now write a '1' in the 128 column.

You must now work your way through the columns to the least significant digit (64, 32, 16, 8, 4, 2, 1) and you must use every column. The next column is '64' and this will subtract from 85, therefore this column is also a '1', leaving 21. The next column '32' is too large to subtract from 21 so you must write a '0' in this column and move on to the next column '16'. 16 from 21 leaves 5 with a '1' in that column. Column '8' has a '0', column '4' will subtract from 5 and leaves 1, thus you have a '1' in column '4'. Column '2' is a '0' and obviously column '1' is a '1'. See figure 3.

To convert from decimal to hex a similar method is used. For example, to convert 602 decimal to hex you again find the largest column to subtract, which is '256', but you must remember that unlike binary where there is only '0's and '1's, the digits used can be from '0' to 'F'. The way to do this is to find out how many times the column number will subtract from the example number. In our case '256' will subtract from 602 twice (602-512) which leaves 90. This means that in column '256' you write a '2'. The next column is '16' which subtracts from 90 five times (90-80) which leaves 10. Therefore in column '16' you write a '5'. Finally, as the remainder will be less than 16, it can be written into the last column, but remember, if the remainder is a number from 10 to 15 you must write its hex equivalent (A to F). In our example you would write an 'A'. See figure 4.

Converting from binary to hex is very simple, as any hex digit can be expressed by four binary digits.

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CRACKING THE CODE

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So taking our previous example of 11010101 (213 decimal), it can be split into two groups of four digits, thus working from the left to right the first block is 1101, which in decimal is $0+4+1=13$ or 'D' in hex. The second block is 0101, which in decimal is $4+1=5$ or '5' in hex. Therefore the hex equivalent of 11010101 is 'D5'. See figure 5 for another example.

To convert the other way i.e. from hex to binary is a reversal of this process. For example, '25A' in hex is three groups of four digits in binary. See figure 6 for a breakdown of the code.

Number bases are prefixed by standard notations in machine code terminology. Binary numbers are prefixed by 'X' and hexadecimal numbers by 'H'. There is no prefix for decimal numbers. That concludes number bases and conversions, you will be using them constantly when writing in machine code, so it is recommended that if you are not familiar with them, you practice on your own examples.

In future issues we will continue this series delving deeper into machine code as we progress.

128	64	32	16	8	4	2	1	
1	1	0	1	0	1	0	1	#13 DEC

FIGURE 5

16	8	4	
D	5	A	#62 DEC

FIGURE 6

1111	0110	BINARY
0110011	100	DECIMAL
F	6	HEX

FIGURE 7

7	6	5	4	3	2	1	0	
128	64	32	16	8	4	2	1	TWO TO THE POWER OF
1	1	0	1	0	1	0	1	= COLUMN
1	1	0	1	0	1	0	1	BINARY
32 + 64 + 16 + 1								DECIMAL

FIGURE 8

16	8	4	2	1	0	
1600	800	400	200	100		TEN TO THE POWER OF
7	6	5	4	3		= COLUMN
25000000	00000000	5000	0000	1000		HEX
63000 + 5000 + 1000 + 11						DECIMAL
6350011						

FIGURE 9

8	4	2						
8	4	2						HEX
0	1	1	0	1	0	1	0	DECIMAL
0	0	0	0	1	0	1	0	3 GROUPS OF 4
0	0	0	0	1	0	1	0	BINARY

FIGURE 10

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STARSECTOR DEFENCE

Stardate 2306.7

Captain's Log...

Received an urgent message from Comstar that the Nebulus, our sister ship, has been reported lost in an uncharted sector of space. We have been assigned to investigate and assist in rescue operations. End of Captain's Log...

You are in command of the battle cruiser Centurion. Your mission -- to rescue any remaining members of the crew of the Nebulus. Use a joystick plugged into port 1 to control your vessel. Push the stick to the right or the left to rotate the ship, and push it forward to move in the direction you're facing. Forward thrust continues until you release the joystick, at which point your ship decelerates until it stops. If you pull back on the stick, reverse thrusters act as breaks. As an emergency measure, you can hyperwarp through space by moving into the screen's border. If you do this though, you'll loose 40 percent of your current energy.

CONVERT MOVEMENT INTO ENERGY

Your ship uses the latest in Ion-energy-conversion technology. As it hurtles through space, it scoops up ions and converts them into energy. Therefore, in order to maintain your energy reserves, you must keep moving. If you let your energy level hit zero, your shields will disappear and you'll be defenceless. If you're hit by enemy fire during this period, you'll be destroyed.

Your enemies are members of a mechanical race built cons ago to protect this sector of space. Their saucers are equipt with powerful lasers that drain your shields in proportion to the saucers' distance from your ship. And if an alien ship picks up one of the surviving members of the Nebulus' crew, you are penalized five points.

In self defence, your ship is armed with plasma torpedoes, which you fire with the joystick trigger. You can fire up to two at a time, and you get 10 points for each ship you destroy.

OTHER DANGERS AND AN ESCAPE ROUTE

If you hit one of the stars strewn about the sector, your ship will be destroyed; if you hit an asteroid, you'll loose 30 percent of your energy. Don't loose hope, however. You can always use the black hole at the screen's center to transport yourself at random to another part of the sector. Since you're using the black hole's gravitational force, no energy is consumed, but there's always the risk of emerging on top of a sun or an asteroid! The game ends when your ship is destroyed.

You can stop the game during play by pressing any key. To resume play, simply move the joystick. Good luck, Commander.

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