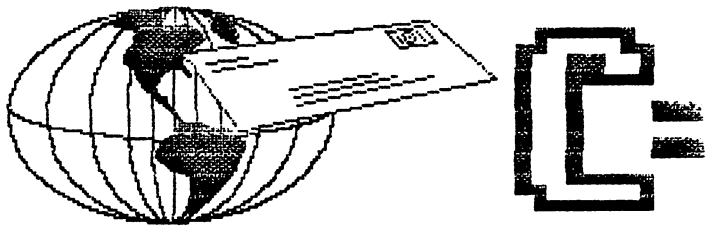
COMMODORE MAILINK

NEWSLETTER OF—
MEETING 64/128 USERS
THROUGH THE MAIL

Francis Redmond, President

JULY 1994



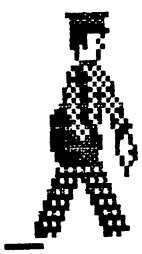
Hi Y'All:

I guess by now that you are all aware that I'm the new club president. To lay any minds to rest, I fully intend to continue the operation of the club in the same manner as current. The only difference so far as I'm concerned it that you may have to get used to the term, "Y'All".

Jean has graciously consented to stick with me for the first year and give me the benefit of her knowledge and experience. I feel like I will need all the help I can get. That also includes whatever good advice and help you folks can offer. I also appreciate the time and effort that the people who do the work to put out the newsletter and other jobs that keep the club going. After being introduced to some of their problems, I REALLY appreciate them.

Jean Nance is looking for an Editor for the November Mailink. Please contact her if you are interested.

Thank you.



ADDRESSES FOR MEETING 64/128 USERS THROUGH THE MAIL

Organization business and membership... Francis Redmond, president. Rt 7, Box 7614, Palestine, TX 75801.
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Membership addresses and biographies; corrections and changes... Brian Vaughan, 2101 Shoreline Dr. 352, Alameda, CA 94501

COMMODORE MAILINK

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All manuscripts, or any material for review or publication should be sent to the editor of the next issue (see "Editor's Desk"). Commodore MailLink reserves the right to edit submissions.

EDITOR'S NOTES

Well, it has been a new experience for me to edit a large newsletter. I regularly edit my own short four page newsletter with only about seven "articles."

The Mailink has been fascinating with disks coming in from all of you which often contained a variety of materials on separate files. In addition, many of you wrote letters with short matters, so I had very little word processing to do myself. My challenge was to organize which I decided to do my combining into longer files all the material be subject (articles, questions, feedback, etc.). I think it has gone well, but I may have missed someone. If so, my apologies - let me know and I will find your material and send it on for the next Mailink.

As for some technical details. All the newsletter is printed on a Panasonic KX-P1123 24 pin dot matrix using Perfect Print with Roma 10, 12, and 15 point plus larger for headlines.
I have a parallel interface (Skyles) which is absolutely necessary for Perfect Print and a big newsletter. I used GEO-Write using my 1764 RAM and 1581 disk drive as my key components for GEOS. I hope everyone is satisfied and that you will let me edit again.

For your information, the unsigned articles about the demise of Commodore are from Jean Nance. My response - I guess we can feel some grief, but I also can't wait for undesired C64/C128s to hit the local "market" scene at 25% of the present market prices.

The September editor is jean Nance. Deadline on material is August 20th.

Best, Dick Righter

Color Printing with Illustrator II and FGM.
By Emil Kalar

Busy Bee's Illustrator II by Hugh McMenamin opens new doors to printing graphics in color by changing ribbon colors and using The Fun Graphic Machine Clip Art type graphics and the Illustrator II. First of all, Illustrator II is TWS with the capablity of incorporating Clip Art graphics into text documents in a once through the printer operation.

In order to take advantage of this capability one needs a printer that has the ability to reverse or back up the line feeds and probably most Commodore ready printers will not do this. The printer here is the Panasonic KX-P1180 with the Super Graphix Jr. interface and all the following will be based on its use. Epson type printers should also work.

Any graphic chosen will have to be converted to FGM Clip Art to be used with the Illustrator II unless it is already Clip Art. Load it into FGM Clip Art program. Then separations must be made for each of the colors to be printed. This requires erasing everything else but the portion of the graphic being used for that particular color and then saving it as a Clip Art. One should have the latest update of FGM with the "Draw" mode included. This is for erasing (or adding)the odd pixels that cannot be erased using the cursor in "Text" mode on the screen. The draw program can be modified to exit to Clip Art instead of Creator to save an extra step. Good results will be obtained using graphics that are the "coloring book" type, in other words, just a black outline. This would be your black color and work graphic and should be saved to disk as it will be used over again to make each color separation. A registration mark should be placed (usually in the upper left corner) to keep the color separations in the correct location for proper alignment when printing. It can be erased later before final printing. C= V is a good choice. Sometimes it helps to reverse the screen to determine where the black outline is or to define boundaries of other colors or to fill in ("erase") large areas to be colored. Then it can be returned to normal when finished. In some cases it is possible to print the entire portion including the outline in the desired color and then when the black outline is added it will cover up the colored outline. Care should be taken to make the black printout last to avoid contamination of the colored ribbon. Colors can be mixed to provide other colors but again, be careful of contamination of ribbons. Outlined characters can be printed first in the fill color and then printed in black for the outline. Unless heavily used it is doubtful this procedure would contaminate the black ribbon.

What sets up the Illustrator II to print the graphic, reverse to the start of the graphic and then print out each separation are the following commands, entered while in the Illustrator II program:

?n??:-test demo
?tm1lm10rm10?
?1=27,106,36
One carraige return
?mo?+ Tells printer to reverse If
?mo?..graphic title
?1w? Pauses printer to change ribbons
?mo?..graphic title
?1w? Pauses printer
?mo?- Printer does not reverse after next graphic
?mo?..graphic title
?1w?

It would be a good idea to save the above commands to disk to avoid typing them in each time you check printing.
The characters inside of brackets denotes "reversed" character commands. If these commands are saved it will be titled whatever is in the first line.
Print a preview to the screen before printing on paper.

Making color separations can be very tedious work. If I did not have Fast Load versions of the programs I would have given up very soon after starting. Any errors require going back to FGM to correct them and then back to the Illustrator to check them out. As Hugh says in the manual, save often. Graphics should be placed on the topmost and leftmost part of the screen. Their location on the page will be governed by the margin commands. Preview first! Most credit goes to Hugh for making this work.

Before test printing any graphic in color, be sure to test print it in black (or any single color) to make sure that the different separations print where they are supposed to. I do not advise mixing any colors to obtain a different color. Your color ribbon will be contaminated. Also do not overink your ribbons. It makes the matter worse. One pixel line off vertically is usually caused by not previewing first before printing and will show up as a blank pixel line somewhere. Contamination can also occur if the pins on the printhead are not cleaned first before using a light colored ribbon. Print about five lines of solid graphic without any ribbon installed. Contamination will show up as smudges on solid color printing.

If you are interested but need some assistance, write me and I'll do what I can.

COMMODORE INTERNATIONAL <CBU.N> TO LIQUIDATE

NEW YORK, April 29 (Reuter) - Commodore International Ltd said it authorized the transfer of its assets to trustees for the benefit of its creditors and placed its major subsidiary, Commodore Electronics Ltd into voluntary liquidation.

The company said this is the initial phase of an orderly liquidation of both companies, which are incorporated in the Bahamas, by the Bahamas Supreme Court.

--New York Newsdesk 212-603-3310.

Miscellany

Since we did not receive the minimum required 3 orders for the QBB boexes at user discount prices, no order will be placed.

Also if any of your are interested in the "Harv Harris Tax program for the 64/128, please drop me a line and if enough interest is shown, I will myself purchase the duplication rights for the program and then fill any orders received. Must hear from you by Oct 15th. (Joe Fenn)

Bob Richey writes about "Address Labeler" written by him for the C64 and Star NX1000 series printer. It is given to Public Domain. Write him if you are interested.

COMMODORE BITES'THE'DUST!

The following message is from the "CBM" newsgroup on Internet. There are some wise comments by Bill Lueck, and three accounts from various news sources. This may be old news to most of you by the time the July MaiLink'comes out, the story broke just a few days too late to make the May MaiLink.

From: lueck?power.amasd.anatcp.rockwell.com (BILL LUECK)
Newsgroups: comp.sys.cbm
Subject: NEVER SAY'DIE... Date: Sat Apr 30 18:51:37 1994

The following is a story from AP describing the demise of Commodore as a company. Some of you may have already seen it.. Several people I talked to have been unhappy - even depressed - about this event, thinking that is means the end to the c64/128 community. I don't think this is necessarily true at all.. not for a long time, at least, if those of us in the community stick together and help each other, throuh Usenet C.S.C, the Commodore listserv, the #c-64 channel on IRC, local c64 BBS's, and person-to-person contacts - email, post mail, voice, and even (leaving cyberspace now..) IN-person contacts, including local users groups and get-togethers.

There have been, and still are, a lot of super individual and group efforts to provide new software and information about the C64 and about programming it. There is no reason why these on-going efforts should not continue - and even grow! Those of us reading this KNOW the C64/128 is a great machinge and want to continue to use it for a LONG time. As long as the spirit (and the action) is there, so will there be a C64/128 community. We just all have to make sure that the spirit never dies.

- Bill

COMMODORE INTERNATIONAL LIMITED TO LIQUIDATE

NEW YORK, April 29 /PRNewswire/ -- Commodore International Limited (NYSE: CBU) announced today that its Board Of Directors has authorized the transfer of its assets to trustees for the benefit of its creditors and has placed

either," Coursey said.

Commodore started 40 years ago as a typewriter repair company in the Bronx. Its extension to the adding machine business paved the way for it to make calculators and then personal computers by the mid-1970s. Commodore competed with Radio Shack for the first computers sold to homes and co-founder Jack Tramiel became a highly-regarded figure in the fledgling PC industry.

By the early 1980s, it was overshadowed in the PC business by Apple Computer Inc. and IBM. Software manufacturers didn't create as much software for Commodore's Amiga line as it did for Apple and IBM-compatible machines.

PRINTING WITH PRINT SHOP COMPANION ON 24-PIN PRINTERS - Brian Vaughan

The premier issue of C= World Magazine had a sidebar on Pg. 20 titled Old Software & New Printers. This article provided a fix for elongated vertical printing using the graphics mode of 24-pin printers which have an IBM Proprinter X24 emulation mode as does my Panasonic KX-P1124i & Canon BJ-200e printers. This short program simply adjusts the vertical line spacing to compensate for the extra row of pins on 24-pin printers. As published, it did not quite work with Print Shop Companion. I made two minor changes and it then worked perfectly:

```
10 OPEN 4,4
20 PRINT#4,CHR$(27)CHR$(65)CHR$(7);
30 PRINT#4,CHR$(27)CHR$(50);
40 CLOSE 4
```

My only change was the last number in Line 20 followed by adding a semi-colon at the end of the line to prevent an unnecessary linefeed. This fix will not work in Epson mode. Type-in the above program and SAVE it. When you are ready to use it, turn on your printer and place it in IBM mode. Then LOAD the above program and RUN it. Your printer will not make a sound but the command has been accepted. Now LOAD PSC and when you print with it, all will be perfect.

Printer Interface Plug Solutions

Many of our group of Commodore users have problems dealing with the cassette port plug which comes with our printer interfaces. At the request of Jean Nance,I am using my fast (ha-ha) typing speed to copy this article from thoughts to disk.

The simplest way to deal with this is to connect a datasette plug or glue an oblong plastic cap to the small plug of the interface.

I went a step further,and bought a switch and another piece of wire,so that I could turn the interface off whenever I wasn't using the printer. Some programs actually look for a +5 voltage from the cassette port and won't load from disk when the interface was plugged in (unless you have a switch and turn it off). An example of this is a game program by TITUS software called CRAZY CARS. Once the title screen was on,however,I could leave the interface on.

I was a little more adventurous,so I soldered the wire from the interface plug directly to pins B and 2 of the datasette plug. If you hold the plug with the screw facing upward,these pins will be the second ones form the left,with pin 2 being on the top. In the PROGRAMMER'S REFERENCE GUIDE,the right and left orientation is reversed because this is a diagram of the cassette port on the computer,rather than a view of the plug as it would face from the front. You will need to use a small size of wire inside the datasette plug. I ended up usinng a small piece of the red interface wire and soldered it to my wire leading to my switch. If any wire inside the plug is bare, a small dot of silicone sealer works more easily than tape to insulate it. Of course,the electrical tape will work all right on the outside of the plug if you had to splice a smaller wire to a larger one.

At one time someone suggested that many printers have a +5 volt source on pin 18 of its parallel port. This pin is on the top,far-right when looking at the rear of the printer. This is assuming that this socket is found on the back of the printer. I'm not that adventurous. I don't know where to connect the ground,and I don't want to burn out any circuits.

QUESTIONS

My keys are not responsive as they should be. My biggest problem is that the space bar doesn't work well. After the computer warms up for 5-10 minutes the space bar works OK.

I read somewhere to pry off the keys and spray Tuner/Control Cleaner & Lubricant. I did it and it didn't help. Actually, I didn't see any problem or how the spray could help.

Am I in need of a new keyboard? I see them advertised regularly like it if a common need. (Dick Righter)

I am writing to bring to the attention of our Commodore 1802 monitor owners a recent problem that I have encountered. The Commodore 1802 monitor has a faulty card or circuit board that causes power failure with no warning. The circuit board seems to not have enough support causing it to sag and crack in turn causing the monitor to flash and then have a total loss of power.

I have been told by a Commodore service repairman that Commodore paid to repair this for several years but has quit paying now. If Commodore know about it why didn't they recall the defective 1802's? Where is Commodore's responsibility to the 1802 and to it's die hard users! Do we dump the Commodore for the newer machines so we can have service in the future? (Linda Durbin)

Has anyone got "Billboard maker" to work with a 24 pin printer? (Dale Steenhoven - new member)

I'm getting "smear" marks at the end of text lines in LQ printing (using TWS on my C64). The smear marks are fainter than the text, but are very noticeable. I recently ordered a new batch of ribbons for my star NX-2400, and this is the first time that I've noticed them. The print gap lever is set all the way BACK (for faint or multiple-copy print). The text itself looks find. I need help, and fast! Thanks! (Lonnie Smather)

(Ed. note - I too had the same problem with a new type of ribbon. I has to do a lot of cleaning because ink got behind the metal guides. Eventually, it stopped. I'm thinking the ribbon was overinked or freshly inked.)

My 1581 with Jiffy DOS hangs up quite a bit. The 1581 supposedly had a controller chip causing mischief and this could be cured by a replacement. Think this is the source of the problem? I thought Jiffy DOS might cure the ailment but am not sure if it does or doesn't. ("Hangs up" essentially means both lights stay on but my operations crash.) (Donald Avers)

That Skyles interface - would you know if it is IEEE, a parallel standard. I'm guessing you are using it with GEOS. I have an old MSD-SD2 drive that has both serial and IEEE-488 outlets. I search for technical info about IEEE connections and wonder if your interface manual mentions such. (Donald Ayers)

(Ed. note - Yes I use it with GEOS and Perfect Print. The Serial takes for ever to print. It did not come with any manual. Can anyone help Don?)

Located any commodore ware on gardening? I think there was a type in program in either Gazette or Compute about such. Of, found any particularly nice accounting software for the 64? Something called KFS Accountant is out there but I've not sighed the beast. Any '85 RUN mags stockpiled or an Ahoy Dec '87? I could use some! (Donald Ayers)

(Ed. note - I haven't used gardening software. In business I have used "Integrated Software Accounts Receivable" for billing accounts - I picked it up 5 years ago(?) for $10 or so. It worked fine. Then I use Superbase 64 for my mailing lists (superb).

By DINAH WISENBERG BRIN, Associated Press Writer

WEST CHESTER, Pa. (AP) -- Commodore International Ltd., a pioneer in the personal computer industry, said late Friday it is going out of business.

The company plans to transfer its assets to unidentified trustees "for the benefit of its creditors" and has placed its major subsidiary, Commodore Electronics Ltd., into voluntary liquidation.

"This is the initial phase of an orderly voluntary liquidation of both companies," Commodore said in a brief statement. Company executives could not immediately be reached Friday evening.

The company last month reported an $8.2 million loss for the quarter ending Dec. 31 on sales of $70.1 million. A year earlier, Commodore lost $77.2 million on sales of $237.7 million in the same period.

In the latest report, Commodore said financial limits had thwarted its ability to supply products, leading to weakened sales. One of its new products, the Amiga CD32 video game, had sold poorly in Europe, where the company did most of its business.

Buy/Sell/Trade/Etc.

Need: Okimate 120 Printhead in good condition (9 pin)
Maverick Parameters Modules #9 & Above (To 12?) (Tom Grimm)

The GEOS Utilities Disk is a collection of GEOS programs written by Nathan Fiedler. All programs work on 64 and 128 in 40 & 80 column modes and were just updates. $15 (plus 6% sales tax in PA) send check or money order to Nathan Fiedler (new member)

With PD libraries disappearing and hard to find, can anyone supply me with a source of Koala type picture? (Emil Kalar)

The World of GEOS Handbook and Disk, volumes I, II, and III, also Handbook of Commodore Disks. Each $20 postpaid. US checks OK to Jane M. Jones in Australia. Also GEOS graphic artwork disks and other items.

WANTED: Your old non-working disk drives, memory-expander and other etc. Please send list with price to Robert W. Richey.

FREE for the cost of shipping. 30 issues of RUN from 5/88 to 2/92 and 34 issues of Compute Gazette from 11/85 to 6/90. Details on request. (Hubert T. Albachten)

WANTED: George Frainey is looking to collect ALL older versions of maverick, Kracker Jax, Fast Hack'em, Snapshot, Cannon, Shotgun etc. ... to preserve and archive all of the classic works by the great Commodore Programmers of the past.

FREE for the cost of shipping. Programs with original disks and manuals for C128 (some operate on C64). As follows: 1) GEOS 128 original version, v2.0 and v.2.OR (GeoRAM which will include); 2) GEOPUBLISH; 3) GEOFILE; 4) GEOWIZARD (Collete); 5) DISKPack Plus (7 GEOS programs); FUN GRaphics Machine v.410+; 7) The Write Stuff with BB Speller; 8) TimeWorks Swift Calc with Sideways; 9) ReRun GEOS Companion; 10) ReRun Productivity Pak version I, II, and III
The following books: 1) C128 Programmers Reference Guide; 2) Mapping the C 128; 3) All about the C64 - vol 2; 4) Machine Language for Beginners
(Bill Lyons)

For Sale: 250+ c64/128 original software titles available: PS & PS Companion, graphics, finances, Calc, games, copy programs, misc., and many books. $5 and up. Send SASE (legal size) for list. Dale Steenhoven (new member lister in this issue).

NEW MEMBERS

JIM BRAIN, 2306-B Hartland Rd., Hartland, MI 48353 Jim is an embedded computer systems engineer. Hobbies: Frisbee, carpentry, camping, hiking, Boy Scouts (scoutmaster), and singing. System: Four C-64s, C-64C, two VIC-20s, C-16, PET-403, PET-8032 & a 386SX PC; 1581 & two each 1541 & 1541-II disk drives, JiffyDOS & RapidDOS, 1764 REU, Canon BJ-10e, Okidata 180 & two 1525 printers, 1084S monitor, Turbo Processor 4 MHz accelerator, B.I. 80 column card, Excellerator+, Omnitroxix serial adapter, and 1671 & Supra Modem 2400 modems. Interests: Hardware design, virtual reality, programming, computers as controllers, C= trivia, and writing C= articles.

DAVID W. CHANCE, P. O. Box 242, Minco, OK 73059-0242 David restores old houses and also repairs VCRs. Hobbies: Woodworking, furniture refinishing, old movies, garage selling, and pen palling. System: C-64, 1581 & two 1541 disk drives, Star NX-10C printer, and a 1702 monitor. Interests: GEOS, making GeoPaint files of VCR parts, and utility programs. David is the brother of member Jim Chance.

NATHAN L. FIEDLER, 5711 Mt. Pleasant Rd., Bernville, PA 19506--8298 Nathan is a student. Hobbies: Basketball, golf, skiing, and mountain biking. System: C-64 & C-128, 1541-II & 1581 disk drives, CMD HD-52 Mb. hard drive, C=1764 REU modified to 1 Meg., and an Aprotek 1200 baud modem. Interests: Developing software for GEOS.

RICHARD GLISSON, P. O. Box 3533, St. Petersburg, FL 33731-3533 Richard is retired due to disability after having worked in construction. Hobbies: Reading science fiction & fantasy, tropical fish, art, martial arts, Oriental philosophy, astrology and the occult. System: C-64, 1571 & 1581 disk drives, 1750 REU clone, Star SG-10 & NX-1020 printers, 1702 monitors, 1670 modem, and a 1351 mouse. Interests: Graphics, GEOS, and learning ML programming.

LAUREL MAUL, 2337 W. 109th St., Chicago, IL 60643 Laurel is a retired Professor of

Nursing. Hobbies: Genealogy, Elderhostel, grandchildren, reading, and bridge. System: C-128, 1571 & 1581 disk drives, Panasonic KX-P1091i printer, Xetec Super Graphix Jr. interface, Thompson monitor, C= 300 baud & Aprotek Minimodem C, and Bob's Term Pro. Interests: Learning more about telecommunication, and learning how to print from various software such as "Pedigree-128".

GARY NOAKES, 6417 Hawthorne St., Landover, MD 20785-1711 Gary is a fire supression sprinkler fitter. Hobbies: Music, reading, and electronic tinkering. System: C-64, C-64C & C-128, 1541-II, 1571, 1581 & two 1541 disk drives, Panasonic KX-P1080, KX-P1091i & Star Gemini 10X printers, CBM-8702 & CBM-7622 monitors, 1670 & Everex 24E modems, and a 1351 mouse. Interests: Programming, writing computer articles, and GEOS.

EDWARD ROHAN, 317 S. Rose St., Anaheim, CA 92805 Ed was marketing & distribution Mgr. for an air conditioning & refrigeration company and is now retired. Hobbies: Woodworking, automobile restoring, and cooking. System: Two C-64 & C-128s, three 1541-II and two each 1541, 1571 & 1581 disk drives, Star NX-1020 color & DEC-112 Postscript laser printers, 1084S & two NEC composite monitors, and a Supra 2400 baud modem. Interests: GEOS, especially GeoPublish, graphics, Postscript language graphics, assembling cables & power supplies, and coupling a C-64 to VCRs & CD-1 type machines for digitizing graphics.

CHRIS ROWE, 1707 Johnson Dr., Normal, IL 61761-2205 Chris is a disabled housewife. Hobbies: Crafts, fishing, camping, and "taking care of her husband". System: C-128, 1571 & MSD SD-2 disk drives, Star NX-1000 Rainbow printer, NEC monochrome monitor, Mach-128 cartridge, and a 1351 mouse. Interests: Word processing, and graphics.

DALE A. STEENHOVEN, 320 Hunter Ave., Joliet, IL 60436 Dale is pastor of the Will County Baptist Temple. Hobbies: His wife & two children, chess, garage sales, and eating out. System: C-128, SX-64 & an IBM PC, 1541, 1571 & 1581 disk drives, Star NX-1000C, Epson 3250 & Panasonic Laser 4410 printers, 1084S monitor, 1670 modem, and Mach-128, Warpspeed & Super Snapshot V4 cartridges. Interests: Buying & selling C= hardware & software, desktop publishing with GeoPublish, telecommunication with Deskterm-128, and using Billboard Maker, Certificate Maker & Superscript-128.

DONNA R. WILLIAMS, 918 Chestnut, Medford, OR 97501 Donna is a retired bookkeeper. Hobbies: Genealogy, painting in oil & water colors, and decorating. System: C-64 & C-128, 1571, and two each 1541 & Blue Chip disk drives, C=802, C=803 & Star Gemini-II printers, 1702, Sears SR3000 & Magnavox monitors, 1751 Super clone, and an Epyx FastLoad cartridge. Interests: Genealogy, word processing, correspondence, indexing books & magazine articles as well as her husband's shortwave contacts.

ADDRESS CHANGES

Ferol Austen, Exeter Mill #2112, 10 Chestnut St., Exeter, NH 03833

Teresa Gagnon, Box 1, Grand Marais MB, R0E 0T0 Canada

W. R. (Dick) Pattinson, 295 Price Rd., Salt Spring Is., BC., V8K 2E9 Canada

ADD SQUARE "MARK" TO LEFT OF BIO NAME AND CORRECT LAST NAME SPELLING

Norman Kiefer

LAST NAME SPELLING CORRECTIONS TO MAY BIOS

Frank Degutis
Donna Maglin

Review of Bridge 5.0

By Dan Faber

If you would like to play bridge, but not hassle yourself with travelling to the hall, meeting new people, or arguing with your partner after he/she trumps your one singleton ace, then read on. With a C-64/128 and a copy of Bridge 5.0, you can be competitive with a reliable but "quiet partner". This program provides for you a reactive partner and a pair of opposition players; what more can you ask for? Bridge 5.0, programmed by ARTWORX, is easy to use and can help teach you how to play a good game of bridge, as long as you have a copy of Charles Goren or another good bridge book.

After loading the program, C64 users have a choice of three ways to play: 1) choose "Play" and have four hands of cards dealt on the basis of a table of random numbers, 2) choose "SOUTH Gets Opening Hand" (my personal favorite!) and be dealt a hand which has at least 13 high card/distribution points, or 3) choose "Enter Hand Number" which allows you to select a hand at random or select one or more hands that you have previously played and enjoyed. For example, I have ten numbered hands that I try to play once a month. It's like playing my own games of duplicate bridge. After a month, I forget the bidding sequence and each game is as new and exciting as the first time I played it.

After choosing one selection, the cards are "shuffled", "dealt", and "sorted" into suits. Then bidding begins. Your hand (SOUTH) is displayed and a bid can be made by typing a level and a suit on the keyboard, ie., 2H is two hearts, 4NT is four no-trump, P is Pass, etc. Bids may be doubled by entering D but not redoubled. Your partner responds to your bid on the basis of the points in the hand. If you are learning, the computer will bid for you, by pressing the RETURN key. WEST, NORTH, EAST, and SOUTH are shown with their bids. It's fun to bid the first time yourself, then let the computer bid the same hand the second time and compare the results. It's a learning experience for those of us who are novice players! Bridge 5.0 is programmed mainly for point bidding a nd occasionally I am astonished when my partner (NORTH) has eight or nine cards in one suit and continues to pass. It would be nice if a three-level, pre-emptive opening bid by NORTH could be programmed in for such hands.

During play, your hand (SOUTH) is displayed along with the dummy's hand on the table. The display will show the bid, the trick number, the current trick count for WE and THEY, and the hand number. A play is made by typing a card on the keyboard, ie., QH is queen of hearts, TS is ten of spades, etc. If EAST or WEST gets the contract, SOUTH can only play cards in SOUTH's hand; but if NORTH or SOUTH gets the contract, SOUTH plays the cards in both the hands of SOUTH and NORTH (Dummy), just as in a real game. As in bidding, the computer will play the cards if RETURN is pressed.

Bridge 5.0 will play the Stayman Convention after a one no-trump is bid by SOUTH. Also, the Blackwood Convention is played if SOUTH bids four no-trump at the appropriate time. On occasion the cards, for some reason, become mixed up after sorting and cards entered on the keyboard do not appear on the table (screen). I find it best to quit (QU) the hand, and begin over with another deal. Play continues until all the cards are played or by entering one of the following commands at your turn: QU : terminates the hand, CL : ends play and awards all remaining tricks to WE, or CO : ends play and awards all remaining tricks to THEY.

After the hand has been played, it changes to a score-screen. The score is automatically calculated and recorded. This can lead to difficulties in learning because beginners must learn to score without help from the computer. After the scoring screen, a question appears: "Display All Hands?"; then the question, "Replay Hand XXX?", appears. By utilizing these commands, either Duplicate or Rubber bridge can be played, but the scoring is confusing with Duplicate bridge.

The color graphics of Bridge 5.0 are acceptable and easy to follow. I wholeheartedly recommend Bridge 5.0 as a fun game and especially to those of you who know something about cards and want to learn the fundamentals of contract bridge before experiencing a red face in front of expert bridge players.

REVIEW...

COMMODORE WORLD

Jim Green

A new Commodore magazine from Creative Micro Designs (CMD). First issue, April 15, 1994, contains 17 articles and 24 advertisements on 44 pages

Articles, FROM THE EDITOR: Doug Cotton's comments. ON THE HORIZON: Ten articles from Commodore and the Computer Industry. JUST ASKING: Answers to questions by Commmodore users. THE CONNECTION: Information from CEE-64 ALIVE; disk magazine. dieHard; a magazine for C-64, C-128, Plus/4 and Vic-20. Loadstar; disk magazine. Fun Graphic Machine (FGM); information and tips. FOREIGN EXCHANGE: News from Commodore products in Europe. USER GROUP CONNECTION: Commodore User groups around the USA. TOP TIPS: Computer tips from Tim Walsh. Well known for his MAGIC column in RUN magazine. JUST FOR STARTERS: Interesting article for new computer users. PRINTERS & INTERFACES: Help in choosing the right printer and interface. IN REVIEW: About QWKRR 128, an off-line QWK mail reader for the C-128. GRAPHIC INTERPRETATION: Morphing under GEOS. GEOPROGRAMMIST: Using the GEOPROGRAMMER. BASIC INSTINCTS: Shows how to make a simple BASIC

game. ADVANCED TECHNIQUES: Good information for Commodore programmers. PERIPHERAL VISION: Discusses the CMD DOS (disk operating system). CARRIER DETECT: Information and a list of COLOR 64 BBS. OVER THE EDGE: Comments about PENTIUM, the Intel processor.

A very impressive effort for the premier issue. A one year subscription (8 issues) costs $29.95 To subscribe dial 1-800-638-3263

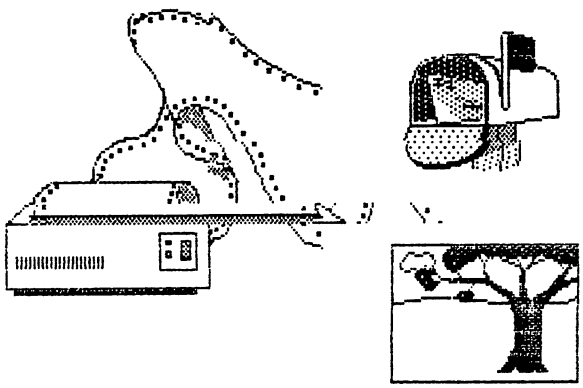
FURTHER COMMENTS ON COMMODORE WORLD

Jean Nance

I received complimentary copies just too late for a review in the May issue. All in all it is very promising. The plan is to have one large article, and a series of columns. The lead article in this first issue is the article on printers and interfaces, and it is excellent.

Were there things I didn't like? It seemed that there was too much supposedly non-advertising space given to CMD products, but I guess that is their privilege. The price seems high. The subscription price comes out to $3.74 per issue in the U.S., or $4.99 in Canada. Pretty steep! My advice? Subscribe if you can afford it. Phone the 800 number Jim Green gives above, or write CMD, P.O. Box 646, East Longmeadow, MA 01028. Make checks payable to "Creative Micro Designs, Inc".

If your budget is really tight, you might be almost as happy with DieHard, available at a much lower price through the offer in the May MailLink. DieHard is 38 pages including covers, 9 of which are advertising, 10 issues a year. It is a smaller and less slick publication, but well worth the price. See Bruce Kurson's offer in the May MailLink.



Super Snapshot V5

By: Gregg Hoover

It's probably safe to say that anyone who's had their Commodore for more than a few weeks has heard much, both good and bad, of the Snapshot V5 cartridge. It is an impressive cartridge, but there are a few bugs in it.

To quote from the instruction manual: "With all of its features, there should be no reason for unplugging your cartridge." Snapshot does indeed include just about everything imaginable and the only time I unplug my cartridge is to run that rare program that just won't work with a cartridge in the slot.

Turbo DOS

The largest file an unaided 64 can load into memory in one gulp is 202 blocks, so I dug though my disks and found a single 202 block program to use for comparisons. Using no fast load routine of any kind the 202 block file took 2:13 to load. Using a Mach 128 cartridge reduced the time to 25 seconds. Super Snapshot's Turbo DOS reduced the time still further to 14 seconds. Load time can be reduced further still by using the special Turbo 25 format which I will describe later.

Snapshot Archive Utility

The Snapshot feature is an archival utility that takes a "snapshot" of your computer's memory and stores it onto disk. When the file is run the memory is reconfigured to what it was when the Snapshot was taken. This is a nice feature because large programs are usually stored as several files which are loaded into the computer after the first file disables any fast load cartridge you may have. Snapshot will capture ALL of these files at once, compress them, and store them as one large file which may be loaded an run as a single BASIC file. The Snapshot process usually works quite well but there are certain types of protection that Snapshot will not defeat, as well as a few programs that won't capture properly, if at all.

Turbo 25

Turbo 25 saves a disk file in a special format which allows for exceptionally fast loading; 200+ blocks in about six seconds. Of course there are both difficulties and drawbacks to the converted programs. Turbo 25 files are stored in a non-standard format that only Snapshot or the special disk loader can read, and that ordinary DOS commands will not work with at all. A special scratch routine is included in the Utilities program, but you cannot rename, rearrange, or copy the individual files. If you want Turbo 25 files changed or moved somewhere else you must either go through the conversion process again or use a nybbler to copy the whole disk.

Disk and File Copiers

The standard copier is cartridge based and can use any memory that you may have added to your system, such as an REU or the C128 video RAM. I haven't used this utility myself as I have always preferred nybblers.

The nybbler provided is Shotgun II, and comes on the companion disk. It can handle altered density, some RapidLoc protected disks, and it can copy a 1571 formatted disk without flipping the disk. This copier will work with two drives and

I've found it to be very reliable. Included in the package are several parameters, one of which worked for me when even the Maverick parameter failed.

The file copying system is less than a dream come true (in fact it can be a nightmare), but I often use it since it is conveniently located on the cartridge and includes a handy utility menu for scratching and renaming files. Unfortunately, the file copier frequently fails to update the directory properly. If you're lucky the directory will not be changed at all and a second attempt will be successful. Otherwise, validating the disk MIGHT solve the problem, or you may have to reformat and start over or do some digging with a disk editor.

Computer Enhancements

In addition to Turbo DOS fast loading, Snapshot adds a host of other enhancements to make the 64 a pleasure to work with. There are the usual shortcuts you would expect to find on any fast load cartridge: Single character commands for displaying the directory, loading and saving BASIC files, and reading the disk error channel; shortcuts for selective directories, changing the device number, opening and closing of the command channel, and changing the screen and border colors; and if that isn't enough you can change the functions of the F keys to almost anything you want.

Other commands have been added to BASIC's repertoire. You may put a special "boot sector" on a disk so that Snapshot will automatically boot a particular program at powerup, or you may boot the program with the BOOT command. The OLD command is supported and will work even after pushing a reset button, and the "T" command accesses a file reader. Basic Plus adds commands for merging and appending files, auto numbering, deleting lines, renumbering lines, and tracing programs in progress.

Monitors

Snapshot has several monitors available depending on what you want to do. By pressing the button on the cartridge you may select a full-featured ML monitor that allows access to RAM, the disk drive, video RAM, Ram Expansion Units, and even a track and sector editor. Separate monitors are included for examining, saving and loading sprites, character sets, and digitized sound samples.

The Screen Capture utility allows you to capture and hold any displayed screen and either print the screen on your printer (in three different sizes) or save the screen to disk in a variety of formats: Koala, Blazing Paddles, Art Studio, Run Paint, Artist 64, Doodle!, and Flexidraw. You may also load, view and print graphic files saved in these formats.

And to put a little icing on the cake, these features may be accessed while a program is running! Once you've finished with them you may jump back into your program, which will continue at the point where it was interrupted, just as though nothing had happened.

Game Utilities

Snapshot would be a gamer's dream come true if these utilities worked 100% of the time, but sadly, most of them don't.

Extended Life (according to the instructions) allows you to save your place in a game so that you can return to it at any time. I've never tried this option myself. I've always used Infinite Lives which works on most programs.

Joystick Swap, Sprite Killer, and Joystick Autofire are included, but rarely work.

Additional Features

Snap Term is a simple terminal program for those who like to get on the BBS's but don't like to wait for their favorite terminal program to load. The buffer editor is very handy, but Snap Term doesn't store phone numbers so get out your phone book.

I've never used the sprite editor since the editor/animator on GameMaker is the best I've seen (if you know of a better one I'm all ears). But it's there if you want it.

In Conclusion

That sums up the greater part of Snapshot's features. If you've been putting off getting one due to rumors of bugs I think you will find that the bugs are minor when compared to all of the fantastic tools Snapshot has to offer. I bought it at a time when I really couldn't afford it, but even so I have never once regretted the investment.

FEEDBACK

In the January MaiLink I asked for advice about a problem involving my Xetec Super Graphic Sr. printer interface. The wire and contact to the tape port was not secure, it would pull out if the computer or interface were moved slightly. Several people sent me suggestions on fixing this, but I am chicken about making and breaking contacts, soldering etc. George Frainey sent me a tape player plug with a wire to which the red wire from the interface could be attached, and it is solved my problem. I suggested that those who had schemes for such a device submit a MaiLink article to this issue, but I'm not sure that anyone has.

In Loadstar #118, Fender Tucker mentions my problem (and incidentally give our group and our newsletter some free publicity). In the "Bits" column, Fender has a different solution to the problem, and says he did this to both his Xetec interfaces long ago. His scheme involves redoing connections inside the interface itself, such that you don't need the wire to the tape port at all. If you don't take Loadstar, there are lots of members who do and someone would probably be willing to send you a description of Fender's method. Apparently this works for most but not all printers.
JEAN NANCE

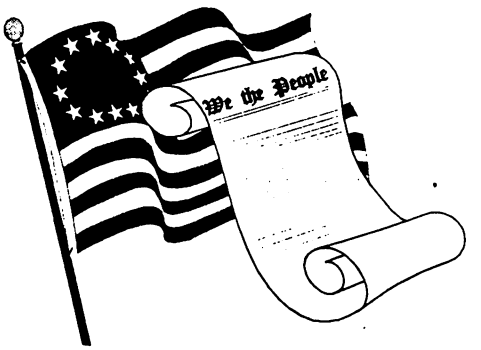
IMPORTANT

LOADSTAR USER GROUP RATE RAISED

As of June 1st, there was an increase in the user group rate for LOADSTAR disk magazine subscriptions and renewals. The New rates are:

1 year	U.S. $69.95
International (Includes Canada)	$84.95

This is still a good deal, $20 off the regular U.S. rate and $25 off the regular International rate. You will also need to give a group registration number when subscribing or renewing, as well as the name of our group. Our group registration number is **GRTX03**. Record this if you are thinking of subscribing or renewing soon. It will be repeated in the September "Information" section.



Feedback regarding Ink Jet Printers versus Laser Jet Printers
Bob Reeves

In searching for a new printer to replace my Panasonic 1091 - a 9-pin printer which emulates the Epson FX-80 printer. I looked at both ink jet printers and laser jet printers. The main criteria for the new printer was to find one that could work with all of my existing programs.

The ink jet printers and laser jet printers both produce 300 dpi. This is where the similarities between the two types of printers end.

Even though the $300 average cost of an ink jet printer is considerably less than the $700 average cost of a low-end laser jet printer, there are other factors to take into consideration.

The eight cents cost per page for the ink jet printer is higher than the three cents cost per page for the laser jet printer. If you use a thousand sheets of paper a year, the initial cost plus printed page costs of a laser jet printer would be equal to the ink jet printer after six to seven years.

As for size, ink jet printers are about the same size as a dot matrix printer while laser jet printers are about two to three times the size as a dot matrix printer.

My biggest concern although an infrequent

occurance regarding ink jet printers is ink smear. The printed output tends to smear when it comes in contact with water. This does not occur with laser jet printers.

During my research for a printer, I found that ink jet printers do not have FX emulation. In the end, I choose the Epson Action Laser 1500 printer because it works with my existing software by using the FX/LQ emulation mode. Also, by adding a Postscript card, I can achieve true 300 dpi output with GEOS.

Feedback

To anyone who asked Tom Adams to send them the CEE 64 Alive Demo Disk:

The address for the author of MLABEL v2.2 (shareware) and DWeeziLabel (commercial) programs has an incomplete zip code. It should have been as follows:

David B. Ferguson
3729 Terneuzen Ave
Modesto, CA 95356-0734

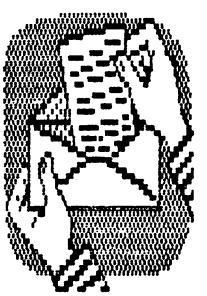
This item was mentioned in thearticle about a cassette sleeve printing program to be used with GEO Publish. (Donald H. Squire)

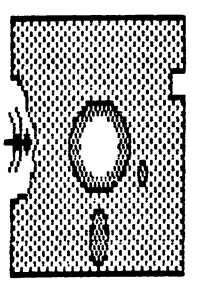
I have had a lot of trouble with the US postage service system. It seems you can't mail a package to just any address, even if it is alegal address and the person has a PO box. I know, I mailed the same package three times (the last time, I changed the address to the persons home address.) before it quit comming back to me. I send letters to other members and figured they just were too busy or for some other reason, they never returned an answer. Well, I found the reason. When I send a letter and check to another member, it got lost in the mail. After checking I found that this was not the first time. So, if you think someone should be writing you and they're not, then write them. Because it could have got lost in the good old US Mail.

While I am on the subject of packages, I found that UPS will not accept a package unless it is ina corrugated cardboard box. It can not be wrapped (even in the heavy brown wrapping paper). Also the UPS rates for packages are much higher than the Post Office rate here in our city. Now isn't that strange. (Robert W. Ritchey)

Many members, like myself, now have antique printers. They find it extremely hard to locate good ribbons for their printers. Many have gone to re-inking their own, in an effort to obtiain a good quality of print. I have found American Ribbon Co. very helpful, by specializing in hard to find and color inks (red, blue, green, purple or brown) they have multi-strike and high-yield 3X the print life. All at reasonable prices. They will also remanufacture the old cartridges for you. They also keep long hours and have friendly service. To obtain a free catalog, dial 1-800-327-1013 or write: American Ribbon Co., 2895 Prospect Road, Fort Lauderdale, FL 33309. Some of the ribbons I have been looking for lately were Seikosha GP-550, Tandy DWP-510, MCI X-printer. They had them all and their prices were as much as half what Radio Shack would charge for the same ribbon. (Linda Durbin)

Emil Kalar in the May newsletter explained how to print in color with a color printer. For what its worth, I did the same using different color ribbons for each pass. It is slow and tedious, but it can be done. I purchased the ribbons from Ribbonland (800-221-4892).





THE EVOLUTION OF THE CHIP

By FRANK GALLER

We sit before our computer and tap some keys. Before us on the screen appears a message. We tap more keys, an image appears. Tap a key and a printer nearby buzzes and clicks and prints out the message or reproduces the picture.

What mystery goes on inside the "box?"

The wizardry is performed with lightning speed and precision accuracy by an obmect smaller than a postage stamp, affectionately called a "chip." Its technical name is "microprocessor."

Who shall we credit for its inven- tion? Who were its ancestors? Let us look backward in time.

Stepping backward into the yesterday of electricity is like stepping into a room full of doors. Open a door and there is yet another room full of doors. Let us go back to the first recorded time of electrical history.

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The ancient Greeks started mankind on the long path to a comprehensive description of all electric and magnetic phenomena. They noted the magnetic forces between pieces of certain black stones (magnetite) and the attractive forces between amber when rubbed with wool, and light obmects such as fragments of leaves or straw.

In fact, the Greek word for amber is ELECTRON. The Greek word for the black stones of Magnesia in Asia Minor, is MAGNET.

The first known technical description of the use and testing of magnets and their properties was written in 1269 by Petrus Perigrinus, a French physicist. In 1600 William Gilbert, physician for Queen Elizabeth published "De Magnete," thereby inaugurating an era which placed greater emphasis on the careful observation of exper- imental fact

In the following paragraphs on my trail to the "chip" or microprocessor, I have selected some of the most outstanding discoverers of electrical phenomena and properties. Without these fundamental discoveries, the science of electricity would have halted. To name all, would not serve the purpose of this paper.

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LUIGI GALVANI (1737 - 1798), a physician and physicist at the University of Bologna, Italy. While investigating the electrical nerve impulses in frogs he discovered that dissimilar metals applied to a frog's leg generated an electrical impulse. The electrical impulse caused the frog's leg to twitch. Because of his discovery, the word "galvanize" is part of our language.

ALEESANDRO VOLTA (1745 - 1827), Italian physicist invented the electrophorus, a devise to generate static electricity. He found that animal tissue was not needed to generate electrical current and in 1800 invented the first battery capable of continuous current. The "volt", a unit of electomotive force, was named in honor of Alessandro Volta.

PETER MUSSENBROCK, professor of physics in Leiden (Leyden), the Netherlands, constructed the first capacitor, known as the Leyden Jar, to store an electric charge. It is still used in classroom demonstrations of static electricity.

GEORGE SIMON OHM, (1789 - 1854), a German physicist who discovered the principles concerning the flow of current through a conductor that are expressed in Ohm's law.

In 1833 he was made director of the Polytechnic School of Nuremberg and in 1849 he was awarded a professorship at the University of Munich. The primary importance of his work lies in his discovery of the distribution of electromotive force in an electrical circuit, and establishing the relationship connecting resistance, electromotive force, and current strength. This became known as Ohm's law; $I = E / R$. In his

honor the unit of resistance to the flow of current through a conductor was named the "ohm."

ANDRE MARIE AMPERE, (1775-1836), a French physicist who helped establish the science of electrodynamics. Ampere constructed a current-measuring galvanometer, now called an ammeter. Before 1948 the ampere was defined in terms of the coulomb and was equal to one coulomb of charge a second. Named after him, the ampere is one of the seven basic units in the International system.

CHARLES AUGUSTIN de COULOMB, (1736-1806), French engineer and physicist who is most famous for his investigations of electrostatic and magnetic forces. He was a brilliant mechanical engineer and only started his work on electrostatic and magnetic forces in 1877. His work on magnetic compasses lead to the invention of the torsion balance which made it possible to measure small electrostatic and magnetic forces with great accuracy. A coulomb is the quantity of electricity transported in one second by one ampere, named in honor of him.

GEORGE BOOLE (1815-1864), an English mathemetician who was the originator of mathematical logic. Boole was a self-taught mathemetician, and his "Mathematical Analysis of Logic" in 1847 brought him a professorship in Queens College, Ireland. For many years the main application of his work was to set theory, but with the advent of the computer in the 1940's Boolean Algebra was useful in the design and description of computer circuitry.

Press Release: Due to an attempted hostile takeover of the "Friendz & Contax" Commodore magazine, the organization was forced to dissolve and reorganize under the name of "Commodore Voice." All past subscriptions will be honored and converted to the new title.

For information contact Steve Hedges (Australia) or Andrew Schwartz.

MICHAEL FARADAY (1797-1867), Engish physicist and chemist discovered electromagnetic induction. He found that a permanent magnet plunged into a coil of wire generated a current, the basis for all electric generators. The farad, the unit of capacitance honors his contribution to the electrical sciences.

NIKOLA TESLA (1856-1943), a Serbian-American inventor and researcher was educated at the University of Prague. He discovered the rotating magnetic field, the basis for most alternating current machinery such as dynamos, transformers, generators, and electric motors. He invented the Tesla coil, the principle which is used today to induce the high voltage for TV sets, automobile ignition, and similar devices needing high voltages.

Crowded among the spirits of these great theoretical scientists stand many more men great enough to have scientific laws or electrical and magnetic units of measurements named for them, such as Oersted, Gauss, Maxwell, Hertz, and Kirchoff.

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The accumulated knowledge of these theoreticians provided the foundation for a new breed of practical scientists and inventors; the Industrial Revolution of the 18th and 19th Centuries provided the instruments and tools.

About the beginning of the 20th Century men like Edison, Morse, Bell, DeForest, Steinmetz, Tesla, Westinghouse and others began an explosion of devices that would make life for mankind easier and more pleasurable.

Foremost of the inventors was THOMAS ALVA EDISON (1847-1931), American inventor and pioneer industrialist. Edison rose to become a folk hero in his day and one of the most prolific inventors of all time. During his lifetime more than 1000 patents were granted on work of his own and of teams under his supervision.

Three of his inventions---the phonograph, a practical incandescent lamp and electric system, and a moving picture camera helped found giant industries and change the life and leisure of the world.

Edison was also a manufacturer, a business man, and a founder of organized research as well as one of the most colorful and paradoxical personalities of his time.

In 1879 it was in Edison's laboratory that the vacuum tube was born---quite by accident. Edison was trying to keep the filament of his electric bulb from depositing a blackish substance on the inside of the bulb. In an experiment he placed a plate near the filament. The plate and filament were connected outside the bulb by and ammeter.

To Edison's surprise, when power was turned on. the meter indicated a current flow. This phenomenon is now known as the Edison Effect. He was more interested in perfecting the bulb as a light source and the discovery lanquished for about 20 years.

In 1901, JOHN AMBROSE FLEMING resumed investigating the Edison Effect and invented the diode, a two element vacuum tube. In 1906 electronic amplification became possible when LEE DE FOREST invented the triode.

Radio was on its way!

Before, during, and must after WW II the vacuum tube was the dominant electronic component of radio. Later in that period the vacuum tube would be used extensively in television, industrial devices, and military equipment such as radar, sonar, transmitters, and receivers.

But the vacuum tubes were inefficient, heat-generating devices, fragile and submect to microphonic vibration of the internal elements. They also demanded large power sources. Auxiliary components such as resistors, capacitors, and transformers had to be large and capable of dissipating large amounts of heat.

So the search went on for something better.

With the end of WW II, industry, scientists, and engineering could turn to peace time applications.

History also tells us that wartime creates great minds.

Foremost in that era was ALBERT EINSTEIN (1879-1955) an Austrian scientist, one of the greatest physicists of all time. Einstein is best known as the creator of special and general theories of relativity. He was one of the pioneers of the quantum theory. He also made contributions of outstanding importance to the kinetic theory of matter.

ERWIN SCHRODINGER (1887-1961), an Austrian Physicist originated the wave theory. He shared the Nobel Prize in 1933 with PAUL DIRAC (1902-1984), who developed the wave equation.

IT WAS THEIR WORK EXPLAINING THE BEHAVIOR OF THE ELECTRON IN SEMICONDUCTORS WHICH MADE POSSIBLE THE INVENTION OF THE TRANSISTOR.

About the early Twentieth Century the number of great individual theorists of electrical phenomenon had begun to diminish and fade into history. Inventions became the product of teams of scientists and engineers working for large industries.

THE TRANSISTOR--HISTORICAL BACKGROUND.

The point-contact transistor was invented in 1948 by two scientists at Bell Telephone Laboratories, JOHN BARDEEN, and WALTER H. BRATTAIN. Although it was the first solid-state amplifier it soon became obsolete. In 1951 the munction transistor was invented by their colleague WILLIAM SCHOCKLEY, and it became the basis of all later types of transistors. As a result of their work, the three men shared the Nobel Prize in Physics.

The TRANSISTOR is a small electronic amplifying device made from a wafer of semiconductor material, usually germanium or

silicon. Although the transistor is basically an amplifier it could perform other mamor tasks such as oscillation, electronic switching, controlled rectification, and automatic control.

Previously, the limited frequency response of the transistor was a serious drawback. for a time it seemed that the revolutionary device would be limited to audio frequency applications. However, improved design and better manufacturing techniques extended the upper operating frequency limit, and transistors now could handle frequencies greater tham 100 billion hertz (100 GHz. Associated with the high frequency capability of a transistor is high-speed switching capability, which enables a transistor type calculator or computer to perform thousands of operations per second. Its power handling capability was increased so that some transistors could deliver kilowatts of output.

Since its first commercial appear- ance in the late 1940's, by the 1980's the transistor had almost entirely supplanted the vacuum tube in electronic equipment, including radios, televisions receivers, home high-fidelity systems and digital computers. Several thousand transistors had been used in a single computer, saving space and power and reducing heat output.

The transistor broadened the scope of electronics to include such areas as computer memory, logic and switching circuits minicomputers, minicalculators, medical electronic devices and automatic control systems for industry.

The immediate use of transistors after their invention found them soldered on printed circuit boards as discrete components along with capacitors, resistors, and transformers. It wasn't long before the demand for smaller more efficient products led to further advancement in electronics.

MICROELECTRONICS

A mamor technological break-through in elctronics during the 1970's was in the microminiaturization of the basic elements of computers. The first transitors used in computers to replace vacuum tubes were about one cubic centimeter in size. Soon they were reduced to pinhead dimensions. Next, entire circuits integrating hundreds of components, were being etched onto silicon chips whose surface areas were no larger than that of the original transistors. These circuits are called "integrated circuits," or ICs.

Relatively cheap to produce, integrated circuits also saved energy, a significant point in the conservation-conscious years of the late 1970's. The use of the integrated circuit spread rapidly.

MICROPROCESSOR

The microprocessor is any type of miniature electronic device that contains the arithmetic, logic, and control circuitry necessary to perform the functions of a digital computer's central processing unit. In effect this kind of integrated circuit can interpret and execute program instructions as well as handle arithmetic operations.

The microprocessor was developed in the late 1970's as a result of large-scale integration (LSI), which made it possible to pack thousands of transistors, diodes, and resistors on a tiny silicon chip less that 0.2 inch (5 mm) square. During the early 1980's very-large scale integration (VLSI) vastly increased the circuit density of microprocessors. A single VLSI circuit holds hundreds of thousands of electronic components on a chip identical in size to the LSI circuit.
The production of inexpensive microprocessors enabled computer engineers to develop microcomputers. Such computer systems are smaller than portable television sets but have enough computing power to perform many business, industrial and scientific tasks. The microprocessor also permitted the development of so-called intelligent terminals employed in retail stores. Commonly called a "computer on a chip," the microprocessor, moreover, provides automatic control of industrial robots, surveying instruments, and various kinds of hospital equipment. It has also brought about the computerization of a wide array of consumer products, including programmable microwave ovens, self tuning television sets, and

electronic games. In addition some automobiles feature micro-processor controlled ignition and fuel systems designed to improve performance and fuel economy.

DIGITAL ELECTRONICS

Digital systems built with large-scale integrated circuits have made a tremendous impact on modern life-syles. In communications, control, and information processing, digital electronics has permitted a level of sophistication that was unthinkable as recently as the early 1970's. It is now possible to afford a desktop personal computer whose capability rivals that of the best scientific computers of the early 1960's.

DIGITAL means that the information is represented by a variable that can assume only a limited number of discrete values. Because many physical devices can assume two distinct values---for example, ON and OFF---most digital systems use two-valued variables. In contrast the variables in and ANALOG system assume a continuum of values. Digital circuits have a greater tolerance to noise and component variations than do analog circuits. The reason is that digital circuits only sense which of the two permitted values each input variable has assumed, and they perform a logical operation on these variables to produce the value of the ouput variable. Any disturbance of an input variable or component that does not cause an incorrect value of the output variable is unobserved at the output. Noise in an analog system corrupts the signals, and some quality degradation is unavoidable.

Digital systems are a collection of elements that are capable of processing, storing and communicating information that is represented in digital form. Digital electronics encompasses the design, implementation, and application of these systems.

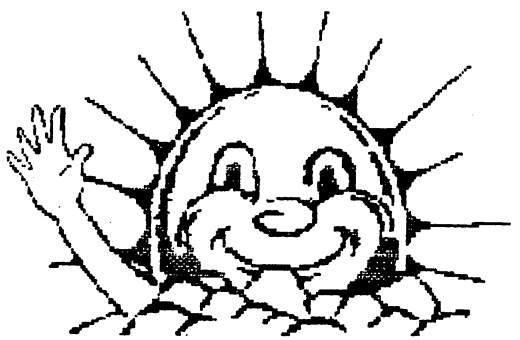
LOGIC CIRCUITS. There is a close connection between the operations that are performed in the processing of digital signals and mathematical logic. The algebra of logical variables is called BOOLEAN algebra after GEORGE BOOLE, the British mathematician who introduced the concept of logical variable in connection with his studies of thought processes. Boolean algebra was first applied to the design of digital systems by CLAUDE SHANNON of Bell Laboratories in 1938.

Logical variables gave only two possible values---0 and 1, or false and true. These are expressed in declarative statements. Furthermore these declaratives must be mutually exclusive; that is, if a statcment is not true, it must be false.

CONCLUSION

By no stretch of the imagination does this paper claim to include all the contributors to the invention of the microprocessor. Neither does it attempt to be a course of instruction on the operation of the transistor or microprocessor. I hope that it will serve as a guide to those who wish to make further investigation into the history of any of the great men whose theories formed the background for this remarkable invention. Or encourage them to delve deeper into the operation of it.

Some further miniaturization of the microprocessor is possible. Experts estimate it will could go as small as a 10th of a micron square making it ten times smaller and faster than it is at present and still maintain present levels of efficiency.

Where will it lead? Artificial intelligence and biological research are two of the many directions the microprocessor can take, both leading to possibly longer, happier lives. Other paths we leave to the imagination of the science fiction writers.

The Encyclopedias Americana and Brittanica were the main source of my material. Other bits of information were the contribution of Frank A. Galler, BSEE.