BUG BYTES

NEWSLETTER

of

TIBUG

MARCH/APRIL 1996

T.I. BRISBANE USER GROUP
P.O. BOX 3051.
CLONTARF MDC, QLD, AUST 4019

NEXT MEETING
22 MARCH 1966

7.30 pm
at
Garry & Tracey Christensen
18 Zammit Street
Deception Bay.

COMMITTEE

PRESIDENT
Rex Jones - 396 1662

VICE-PRESIDENT
John Campbell - 351 3107

SECRETARY
Garry/Col Christensen - 888 4857

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Val Jones - 396 1662

EDITOR
Col Christensen - 284 7783

DISK LIBRARIAN
John Reynolds - 357 9758

TAPE LIBRARIAN
Bruce Campbell - 351 3107
Internet address
tibug@minerva.sv.net.au

BOOK LIBRARIAN
Trevor Campbell - 351 3107

MODULE LIBRARIAN
Bruce Campbell - 351 3107

The views expressed in articles published in TIBUG are those of the author and do not necessarily reflect the views of the Editor, Committee Members or Members of this User Group.

All items, articles, programs etc in this Newsletter are believed to be public domain.

Contributions to TIBUG are invited from both members and non-members. Articles for inclusion in the succeeding monthly newsletter are required at least two weeks before the monthly meeting and may be included in that newsletter at the discretion of the Editor. If you have a disk system, please supply script on disk with diagrams separately on paper and as clear and black as possible to facilitate photocopying.

Most original articles by members of TIBUG in this newsletter are on disk and are available to other User Groups on request.

Submissions of articles, reviews, comments and letters from mebers is encouraged, however the editor would ask that members keep the following in mind.

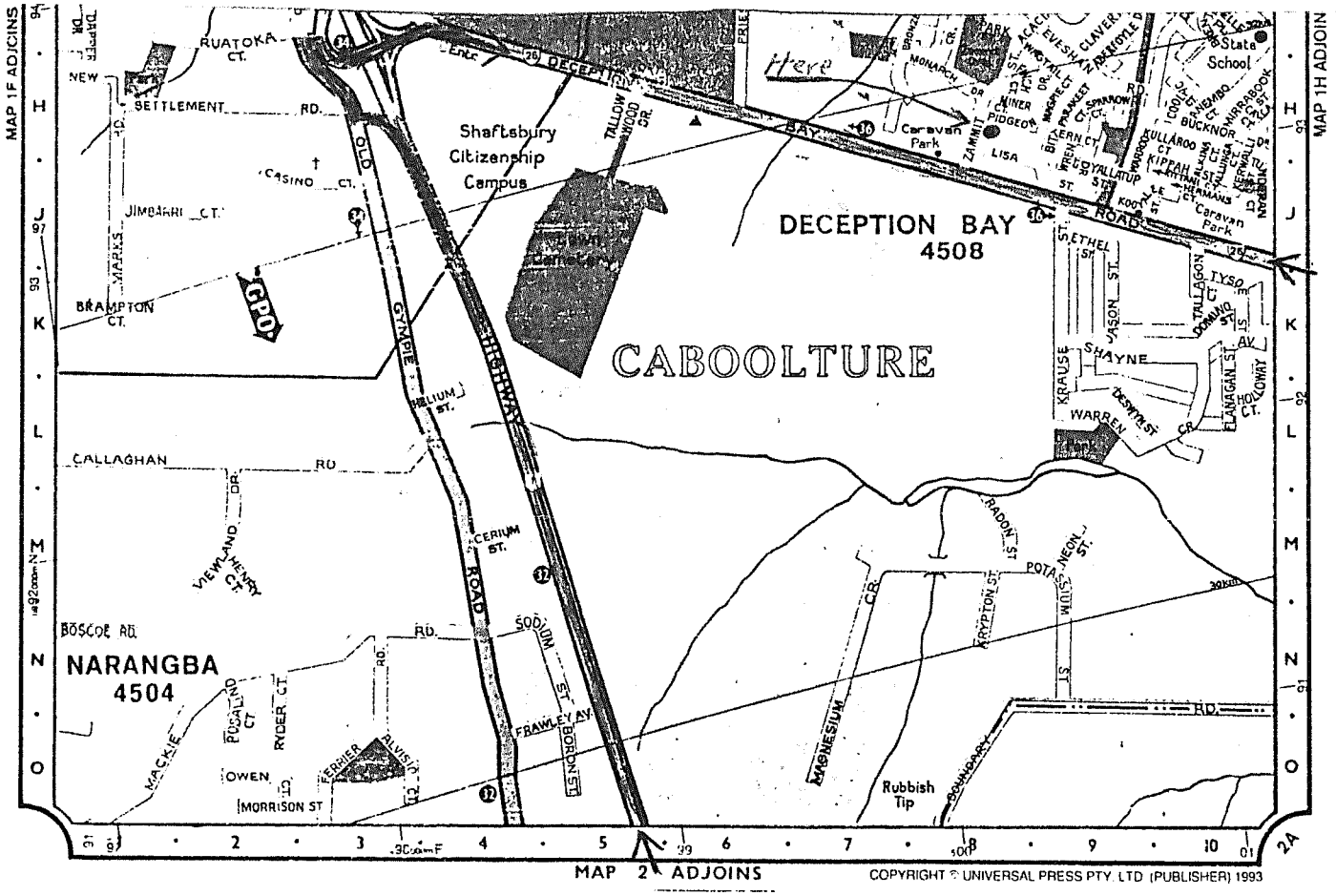
Submissions should be about computers, the TI community in particular, or have general interest value.
The preferred media is floppy disk (any format) however cassette tape is most acceptable for those members who do not have expanded systems. Please remember that handwritten submissions have to be retyped into the computer so that they can be reproduced. Typed submissions can also be used directly if the quality of the type is suitable for photocopying.
The newsletter is produced on the weekend preceding the monthly meeting. Any submissions made after the Friday, one week before the meeting will be held over until the following month.
Submissions are best sent directly to the Editor rather than through the PO Box. The address is Col Christensen, 17 Centaur Street, Redcliffe 4020. Contact the editor if you have any difficulties with preparing a submission or have any comments about the newsletter.

CONTENTS

CHANGE OF MEETING DATE

THE NEXT MEETING WILL BE HELD ON FRIDAY, 22ND MARCH AT 7.00 INSTEAD OF THE USUAL LAST FRIDAY OF THE MONTH.

The location is Garry's place at 18 Zammit Street, Deception Bay. (UBD map 1G H8). Coming from the south, you can go cross the Houghton Highway towards Redcliffe or, preferably, follow up the arterial road to the Bruce Highway, pass the Redcliffe/Kallangar turnoffs and pass the first Deception Bay turnoff. Take the second Deception Bay turnoff, turn right into Old Gympie Road and 100 metres on turn right again to cross over the Highway. Zammit Street is near the top of the first rise. Garry's house is the second on the right after Lisa Street and has a number of garden lights out front.



THE MEANING OF FUNNELWEB'S FILES

by Charles Good
Lima Ohio User Group

Listed below are the Funnelweb files on our two 3 disk sets of complete 40 and 80 column sets. Next to each file is Charles Good's DSKU comment detailing the function of that particular file. These are all the current files from v4.4 and v5.01 for 40 columns, and from v4.4 and v5.21 for 80 columns. Any of the original v4.4 files not listed below are now obsolete. Any user can obtain either or both of these 3 disk sets by sending 3 disks and a paid return mailer to me at P.O. Box 647, Venedocia Ohio 45894.

40 Column files, Disk 1 of 3. Main system files

Filename	TYPE Comment
AS	PGM Assembly code ASSEMBLER part 1
AT	PGM Assembly code ASSEMBLER part 2
C1	PGM Char set for use by central menus
C2	PGM Another char set for central menus
CF	PGM Configures all funnelweb but editor
C6	PGM part 2 of funnelweb congfig program
(NOTE: 8 bit char sets have All Chars graphics)	
CHAR01	PGM USA 8 bit IBM graphics char set
CHAR02	PGM British 8 bit IBM graphics charset
CHAR03	PGM French 8 bit IBM graphics char set
CHAR04	PGM German 8 bit IBM graphics char set
CHAR05	PGM Italian 8 bit IBM graphics char set
CHAR06	PGM Swedish 8 bit IBM graphics char set
CHAR07	PGM Dutch 8 bit IBM graphics char set
CHAR08	PGM Spanish 8 bit IBM graphic char set
(NOTE: These 7 bit char sets used in Eurowriter mode)	
CHARA1	PGM British 7 bit national char set
CHARB1	PGM French 7 bit national char set
CHARC1	PGM German 7 bit national char set
CHARD1	PGM Italian 7 bit national char set
CHARE1	PGM Swedish 7 bit national char set
CHARF1	PGM Dutch 7 bit national char set
CHARG1	PGM No Spanish nationa 7 bit char set
CONFIG/40	D/V Expanded editor config data file
D1	PGM "Disk Utilities" user list
DR	PGM 40 column Disk Review, part 1
DS	PGM 40 column Disk Review part 2
EA	PGM Needed on disk for FW loaders work
ED	PGM 8 bit v5.01 40 column editor, part 1
EE	PGM 8 bit v5.01 40 column editor, part 2
F4TIAE	PGM British 40 column editor command line
F4TIBE	PGM French 40 col editor command line
F4TICE	PGM German 40 col editor command line
F4TIDE	PGM Italian 40 col editor command line
F4TIEE	PGM Swedish 40 col editor command line
F4TIFE	PGM Dutch 40 col editor command line
FO	PGM Text formatter part 1
FP	PGM Text formatter part 2
FW	PGM MAIN FW PROGRAM FILE, boots as EA5
HELP4A	PGM 40 col help screen
HELP4B	PGM 40 col help screen
HELP4C	PGM 40 col help screen
HELP4D	PGM 40 col help screen
HELP4E	PGM 40 col editor help screen
HELP4F	PGM 40 col editor help screen
HELP4G	PGM 40 col editor help screen
HELP4H	PGM 40 col editor help screen
HELP4I	PGM 40 col editor help screen
HELP4J	PGM 40 col editor help screen
INSTALL/ED	PGM 40 col editor config software
LL	PGM LOW LOADER, needed to boot LL files
LOAD	PGM MAIN FW PROGRAM FILE, boots from XB
ML	PGM 40 column MULTI LIST user list
QD	PGM QUICK DIRECTORY, use with formatter
QF	PGM part 2 of QUICK DIRECTORY
SL	PGM Needed to boot script load files
SYSCON	PGM CF/C6 configuration data file
UL	PGM Centeral menu "User List"

40 column files. Disk 2 of 3. Other system files, docs

Filename	Type Comment
-READ-ME	D/V General v4.4 overview doc
44REVIEW	D/V C. Good's review of v4.4
4PRINTFILE	D/V Sample source for editor help file
5-01REVIEW	D/V C Good's review of v5.01 editor
5-0REVIEW	D/V C Good's review of v5.0 editor
AR	PGM Archiver v3.03
C99PFIJO	D/F Used with C99 from within funnelweb
CHARA1	PGM Char set for use with DSKU
CHARUTIL	PGM Converts custom chars to 8 bit set
CHRCOAL/S	D/V Char set source code sample
CON/ED	D/V Condensed editor config data file
CP	PGM Boots c99 & returns to funnelweb
CT8K/O	D/F Boots funnelweb from supercart
DU	PGM Birdwell's DSKU v4.2 part 1
DV	PGM DSKU v4.2 part 2
DW	PGM DSKU v4.2 part 3
ED-BASIC	PGM Basic 7 bit 40 col editor, part 1
EE-BASIC	PGM Basic 7 bit v5.01 40 col editor pt2
FSAVE	D/F SAVE utility to make EA5 programs
FWDOC/EASM	D/V PROGRAM EDITOR doc
FWDOC/LOAD	D/V The XB LOAD menu doc
FWDOC/REPT	D/V Bug and update report of FW & LOAD
HELPMAKE40	PGM Turns DV80 source into 40col ed help
LDFW	D/F Boots FW from Minimem or EA module
MG	PGM DM1000 v3.5 part 1 of 2
MH	PGM DM1000 v3.5 part 2
SCRIPT	D/V Sample SL file
XB41HLD	PGM Boots TI FORTH from XB menu

40 column files. Disk 3 of 3. Documentation files

Filename	Type Comment
FWDOC/DR40	D/V 40 col Disk Review doc pt 1
FWDOC/DR41	D/V 40 col Disk Review doc part 2

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FWDOC/EASM D/V PROGRAM EDITOR doc
FWDOC/ED40 D/V v5.01 40 col editor doc part 1
FWDOC/ED41 D/V v5.01 40 col editor doc part 2
FWDOC/ED42 D/V v5.01 40 col editor doc part 3
FWDOC/PSRV D/V Assembly links to FW doc
FWDOC/SCLL D/V SL,UL,LL, and ML40/80 doc
FWDOC/UTIL D/V CF,CP,FSAVE,LDFW,UL,LH,CT8K/O doc
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80 column system/Disk 1 of 3. Main system files

Filename	Type	Comment
AS	P6M	Assembly code ASSEMBLER part 1
AT	P6M	Assembly code ASSEMBLER part 2
C1	P6M	Char set for use by central menus
C2	P6M	Another char set for use by central
CF	P6M	Configures all funnelweb but editor
C6	P6M	part 2 of funnelweb config program
(NOTE: The 8 bit char sets have IBM graphics)		
CHAR@1	P6M	USA 8 bit IBM graphics char set
CHAR@2	P6M	British 8 bit IBM graphic char set
CHAR@3	P6M	French 8 bit IBM graphic char set
CHAR@4	P6M	German 8 bit IBM graphic char set
CHAR@5	P6M	Italian 8 bit IBM graphic char set
CHAR@6	P6M	Swedish 8 bit IBM graphic char set
CHAR@7	P6M	Dutch 8 bit IBM graphic char set
CHAR@8	P6M	Spanish 8 bit IBM graphic char set
(NOTE: 7 bit char sets are for Eurowriter mode)		
CHARA1	P6M	USA 7 bit char set
CHARB1	P6M	British 7 bit national char set
CHARC1	P6M	French 7 bit national char set
CHARD1	P6M	German 8 bit national char set
CHARE1	P6M	Swedish 7 bit national char set
CHARF1	P6M	Dutch 7 bit national char set
CHAR61	P6M	Spanish 7 bit national char set
DR	P6M	80 column Disk Review part 1
DS	P6M	80 column Disk Review part 2
EA	P6M	Needed on disk for FW loaders work
ED	P6M	v5.21 80 column editor, part 1
EE	P6M	v5.21 80 column editor part 2
EF	P6M	v5.21 80 column editor part 3
F8TXBE	P6M	French command line for v5.21editor
F8TXCE	P6M	German command line for v5.21editor
F8TXEE	P6M	Swedish command line for 5.21editor
FO	P6M	Text formatter part 1
FP	P6M	Text formatter part 1
FW	P6M	MAIN FW PROGRAM FILE, boots as EA5
HELP8P	D/V	Program editor help file for v5.21
HELP8W	D/V	Text editor help file for v5.21
LOAD	P6M	MAIN FW PROGRAM FILE, boots from XB
ML	P6M	80 column MULTI LIST user list
QD	P6M	QUICK DIRECTORY use with formatter
QF	P6M	part 2 of QUICK DIRECTORY
SYSCON	P6M	CF/C6 configuration data file
UL	P6M	Central menu "User List"

80 column system/Disk 2 of 3. Other system files, ed dc

Filename	Type	Comment
5-01REVIEW	D/V	C Good's review of v5.01 editor
AR	P6M	No Archiver v3.03
C99PFIX0	D/F	Used with C99 from within funnelweb
CHARA1	P6M	Char set for use with DSKU
CON/ED	D/F	Short version of CONFIG/ED
CONFIG/ED	D/V	Configuration data/use with INSTALL80
CP	P6M	Boots c99 & returns to funnelweb
CT8K/O	D/F	Boots funnelweb from supercart
DU	P6M	DSKU v4.2 part 1
DV	P6M	DSKU v4.2 part 2
DW	P6M	DSKU v4.2 part 3
FSAVE	D/F	SAVE utility to make EA5 programs
FWDOC/E128	D/V	Doc for v5.21 80 column editor
INSTALL80	P6M	Configures v5.21 80 col editor
LDFW	D/F	Boots FW from Miniscm or EA module
LH	P6M	LINE HUNTER assembly utility
LL	P6M	LOW LOADER, needed to boot LL files
M6	P6M	DM1000 v3.5
MM	P6M	DM1000 v3.5
SCRIPT	D/V	Sample SL file
SL	P6M	Needed to boot script load files
XB4THLD	P6M	Boots TI FORTH from XB menu

80 column system/Disk 3 of 3. Docs

Filename	Type	Comment
-READ-ME	D/V	General v4.4 overview doc
44REVIEW	D/V	C. Good's review of v4.4
FWDOC/DR80	D/V	column Disk Review doc
FWDOC/DR81	D/V	column Disk Review doc
FWDOC/DR82	D/V	column Disk Review doc
FWDOC/EASM	D/V	Editor/assembler doc
FWDOC/LOAD	D/V	The XB LOAD menu doc
FWDOC/PSRV	D/V	
FWDOC/REPT	D/V	Bug and update report of FW & LOAD
FWDOC/SCLL	D/V	SL,UL,LL, and ML40/80 doc
FWDOC/UTIL	D/V	CF,CP,FSAVE,LDFW,UL,LH,CT8K/O doc

DONE

1980s Home Computer Era — Part 4

Commodore: The company that crushed the TI99/4A

By BILL GASKILL

Last month's article covered Atari Computer Corporation and the machines they built during the late 1970s and throughout the 1980s. This month we cover Commodore Business Machines, or Commodore International as they later became known, and their impact on the home computer market of the 1980s.

COMMODORE

Commodore Business Machines was, yes I said "was," a company founded by Jack Tramiel, (pronounced TramEL, not TramEEL, as most people think), who was a survivor of the Nazi Holocaust. Tramiel took Commodore from a tiny typewriter parts company in 1958 to a billion dollar computer corporation that he walked away from in 1984. In the between times, he would rule his empire with a thundering velvet hand, to borrow a line from one of my favorite Dan Fogelberg songs, he would gain a reputation for being absolutely ruthless in business and, because of a bitter defeat he suffered at the hands of Texas Instruments in the handheld calculator market of the 1970s, which he later avenged many times over in the home computer market, he would gain a reputation as a man you did not want to cross.

For 99ers, the demise of Commodore International on March 25, 1994 probably went unnoticed. For owners of the Commodore Amiga, which was the only real Commodore computer that was left in Commodore's line up at the time of the demise, it created as much of a stir as Oct. 28, 1983 did for owners of the 99/4A. As one Amiga owner put it, "Even though we saw it coming, the demise of Commodore has left an empty feeling in our hearts."

Commodore International, which was headquartered in the Bahamas, went on the voluntary liquidation block in order to have its assets carved up to pay off creditors. The days of Jack Tramiel, the VIC-20, C64, the C128 and the huge profits of the 1980s were obviously long gone.

As with all decaying organisms, the rot at Commodore didn't just happen overnight. Four years earlier, in late 1990, rumors about the corporation's ailing or failing financial health appeared in the *Wall Street Journal* and elsewhere. Other rumors of a buyout by Hewlett-Packard, Sun Microsystems, and even Disney Studios were flying everywhere. By January 1991 six of the top executives at Commodore, which was still headquartered in West Chester, Pennsylvania, at the time, left in a flurry of pink slips and rolling heads. Speculation at the time said the blood-letting was over the failure of the Amiga 3000 in the marketplace.

Right about the time that heads were rolling in West Chester, the folks at Commodore were also busy trying to empty their warehouses of tons of Commodore 64s that couldn't be given away. They introduced the C64GS, which was a mutated, keyboardless Commodore 64 with a cartridge slot and joystick ports. What's that you say? You never heard of it? Well, you're not alone. The game-playing public never heard of it either and didn't buy many of them, despite the fact that Commodore was putting four games in each cartridge in an effort to push the machine.

SIGNS OF TROUBLE

Before this ill-fated attempt to generate cash flow took place, there were apparently many other signs of trouble. According to Neil Randall, writing about the 1989 World of Commodore Show in Toronto, Ontario, "The 1989 World of Commodore Show, held at the International Centre in Toronto, was just short of depressing. Gone were the multitude of booths hawking software for the 64/128; gone, even, was the multitude of booths boasting new Amiga software. And gone most significantly, was some of the crowd. If you're thinking of using the new decade as an excuse to upgrade to an Amiga, which Commodore would like all 64/128 owners to do, you might want to wait a bit. Commodore is pumping a fair amount of money into Amiga marketing, but the results aren't in yet."

It appears that Commodore, like Texas Instruments, had made a series of blunders in its quest to stay on top of the ever-changing personal computer market. These blunders attacked the loyal customer base that Commodore had built up during the Tramiel days and caused it to wane.

Examples of some of the major issues affecting customer loyalty seem to be the work that Commodore put into speeding up the C64 CPU and disk drive, only to drop the ball on adequate production of the "fixes," so the speed-up products were always on "back-order." Some third-party products like JiffyDOS finally appeared to fill in the gap left by Commodore's failure to deliver on its products and its failure to live up to its promises, but that did nothing to lessen the anger of C64 owners toward Commodore.

Another major mistake was the company's lack of commitment, or apparent lack of commitment, to the C128 line of computers and the company's inability to quell rumors of a lack of commitment if the rumors were just that, and not fact. Apparently, in their overzealous attempts to lure users to switch to the Amiga, Commodore officials decided to, or at least gave the perception that they had decided to abandon further development and/or support for the older 8-bit machine. Sheldon Leemon commented on this topic in the February 1987 issue of *Compute!*.

"Rumors persist that Commodore is going to downplay or even quietly drop the 128 after Christmas. Although the machine has sold fairly well in its first year it hasn't replaced the 64 in the hearts of the computer-buying public. More importantly, Commodore isn't making nearly as big a profit margin on the 128 as it is on the 64C," Leemon wrote.

They followed this blunder up with one of a similar nature in February 1990 that alienated existing Amiga owners.

A "trade-in" offer and grace period until March 31, 1990 was made for owners of

the Amiga 1000 to upgrade to the new Amiga 2000. The problem was, the trade-in was seen as an effort by Commodore to get the Amiga 1000 off the market so the 2000 could be shoved down everyone's throat. On top of this, Amiga owners were already angry at Commodore for not providing a stable DOS for the Amiga. That ought to sound familiar to Myarc Geneve 9640 owners.

Even before this, as early as 1986, Commodore was taking heat from the media for trying to push the Amiga as a business machine in a market that was clearly heading toward DOS-based systems. This rather bizarre marketing strategy apparently kept the Amiga away from buyers and software developers by the ton. But then, when Commodore did finally decide to target the home computer user, they stepped in you know what by alienating the existing customer base.

CDTV

Other signs of trouble at Commodore continued to surface. During the Consumer Electronics Show in June 1990 Commodore announced a new product called CDTV. CDTV (Commodore Dynamic Total Vision) was apparently supposed to link the Amiga 500 to a stereo and VCR. CDTV never got off the ground and by the time the C64GS disaster was taking place during the first quarter of 1991, everyone at Commodore was denying that CDTV was ever anything more than a rumor. Needless to say, corporate credibility continued to erode. Following is an excerpt from the January 10, 1991 issue of *Newsbytes Magazine*.

"Commodore International announced the CDTV player, what it calls the industry's first interactive multimedia player, at Winter CES. The CDTV player, unveiled by none other than Nolan Bushnell, founder of Atari, and now general manager of Commodore's Interactive Consumer Products Division, will be shipped in the first quarter of 1991."

"The CDTV player is a smart, easy-to-use, next generation home component which offers computing power without computing complexity," offered Bushnell. "It's the real new media of the 1990s."

"The player connects to a TV set and

home audio system, including compact disk machines, to become an interactive entertainment, information and education center. A user controls the programs and the interactive audio/video with the use of an infrared pointing device. The heart of the CDTV player is a 1mb Amiga computer with a Motorola 68000 central processor chip. The suggested retail price will be $999 for the player and a range of from $30-$100 for the CDTV titles." No titles were actually available when the product was announced on Jan. 10, 1991.

The CDTV announcement by Bushnell was actually made jointly at a news conference by Commodore CEO Irving Gould, and Bushnell. The fact that Gould was so actively involved at that level (and even lower levels of Commodore business) should have told industry observers something. My read is that Gould knew things were bad way back when and was trying to pump up business.

An interesting sidelight on Gould is that Jack Tramiel literally gave him ownership in Commodore. Back when Texas Instruments beat Commodore up in the handheld calculator market Tramiel went to Gould, a Canadian financier, for capital to keep Commodore alive. In the deal they put together Tramiel gave Gould all of Tramiel's holdings in Commodore in return for the $2 million Tramiel needed, and if the company turned around, Gould would give Tramiel back whatever percentage of his former holdings that he (Gould) felt was fair. As it turned out, Jack Tramiel made Commodore and Irving Gould many millions of dollars and Gould recouped his investment many times over. But for reasons we don't know, he gave Tramiel back only about eight percent of his holdings. Little wonder that Tramiel left Commodore so suddenly in 1984. He got a chance to own rival Atari (which was virtually given to him by the folks at Warner Communications) and perhaps exact revenge for the raw deal he got from Gould.

TRAMIEL RESIGNS

Perhaps it can be argued that Commodore's troubles really began on Friday, Jan. 13, 1984 when president and CEO Jack Tramiel surprised the corporation and the computer world by suddenly resigning his post with the billion dollar firm, stating that it needed a "professional executive" at the helm. While at the head of the company he founded in 1958, Tramiel forced Texas Instruments out of the home computer market and dethroned Atari from its position as the world's top selling game machine. In the profit-driven business world that sure seems to say something about Tramiel's professionalism. Without Tramiel's driven, aggressive leadership, Commodore never seemed to achieve the heights it did when he steered the ship. The *Wall Street Journal* even called him "The Heart and Soul of Commodore." There's certainly no guarantee that Commodore would have survived even with Tramiel's leadership, especially with the unprecedented force of the PC clone explosion and the impact that it has had on the home computer market since 1986. But Tramiel left Commodore and bought Atari. Atari is still in business today. That says a lot.

Former *Compute!* magazine editor-in-chief Robert Lock puts it like this: "In a surprise announcement, Commodore president and chief executive officer Jack Tramiel resigned on Friday, Jan. 13 (1984). His direct, aggressive style has been a critical factor in driving Commodore to its position of preeminence in the low-priced personal computer market."

gineer at Intel. He and partner David Morse sold the Amiga to Commodore for $20 million in August 1984. Before the computer was purchased by Commodore it was known as the Lorraine, manufactured by the Amiga Corporation.

The Amiga Lorraine was based on a Motorola 68000 CPU running at 8 Mhz, which was faster than the Macintosh. There were also three custom VSLI chips in the "box" designed to handle graphics, sound and I/O. It came with 128K RAM that was expandable to 1 MB, and an internal 5.25-inch floppy drive.

"Commodore has purchased Amiga Corporation, which has developed a 68000-based microcomputer with a custom graphics coprocessor. Amiga had planned to sell the machine for less than $1,500. Shortly before the sale was announced, Atari sued Amiga, charging that the sale to Commodore violates agreements between Atari and Amiga through which Atari would have licensed the Amiga computer technology. Earlier, Amiga had sold its joystick line to Pride Electronics, which manufacturers the joysticks." (*Byte*, Oct 1984, p.9)

Amiga 500 — A low budget (under $650) Amiga introduced in January 1987. It came with 512K RAM where the original Amiga, which was introduced in June 1985, and sold for $2000, had only 256K RAM.

Amiga 1000 — The original Amiga. It was released in June 1985 and evolved from the original Amiga Lorraine computer that Commodore purchased from Amiga Corporation in 1984. By the time the Amiga 2000 was introduced, 1000s could be purchased for $849, or $1,199 with a color monitor.

Amiga 2000 — Introduced in January 1987 at a suggested retail price of just under $1,500 for the basic machine, which had one 3.5" floppy drive, seven expansion ports, and a 200 watt power supply. A monitor was extra. The machine was later [illegible] versions of the Amiga that supported multi-tasking. All were aimed at the corporate market or the work-at-home market rather than the home market.

Commodore 64 — More than 7 million 64s and 64Cs were sold. They were still available at a street price of around $149 in mid-1987 when the Amiga 2000 was released. In 1985 Commodore actually tried to shut down C64 production in order to concentrate on the C128 and the Amiga, but the unabated hunger for the 6510 CPU-powered machine swamped Commodore with orders, and the company was forced to restart production and rethink its strategy.

A sidelight to the introduction of the C64 is the fact that it was advertised as being CP/M compatible (via a plug-in cartridge with a Z80 coprocessor in it), but the cartridge didn't get produced by the time the machine was on retailer's shelves. I don't know if it ever got produced. So the Federal Trade Commission (FTC) took Commodore to task over it (based upon consumer complaints no doubt). In August 1984 the FTC and Commodore signed a consent agreement under which Commodore agreed not to advertise capabilities that don't yet exist.

Commodore 64C — A new-era C64 in a more pleasant looking, white, slim-line case, that also came bundled with Berkley Softwork's GEOS software as the Commodore-sponsored operating environment, and Odell Lake, an MECC educational program. Internally, the 64C was identical to the original Commodore 64. It appeared in June 1986 and carried a suggested retail price in the $225 range. By mid-1987 is was selling for $189 on the street.

GEOS was the product of Brian Daugherty, a Berkley, Calif., programmer who brought the Macintosh-like graphical operating environment to the C64. He introduced it at the Consumer Electronics Show in January 1986 and followed up with the add-ons geoCalc, geoDex, and [illegible] cessful C64 home computer — complete with a games controller and a four-game cartridge. The compact console will be launched at the Computer Entertainment Show at London's Earl's Court on Sept. 13."

The four games included on the starter cartridge were Klax, a puzzle game from Domark; Fiendish Freddy's Big Top 'o' Fun, which was a combination of six games in one, created by Mindscape; Flimbo's Quest, which was a damsel in distress game; and International Soccer. Wouldn't you have run out and grabbed a $100 game player just to get those exciting programs?

Commodore 128 — Announced in January 1985, released in April 1985, the 128 sold for $299.95 and was actually a Commodore 64, a 128K RAM (expandable to 512K) Commodore 128 and a Zilog 2 Mhz Z80A machine all in one computer case. It sported a 92-key keyboard, 80-column display for use in the 128 mode, BASIC 2.0 for the C64 and BASIC 7.0 for the C128. Like the Commodore 64, the C128 could display 16 colors and 8 sprites. By mid-1987 it was selling for $259 on the street. An LCD version (Liquid Crystal Display) was promised, but I'm not sure if Commodore was ever able to deliver on that promise. Very little evidence of the C128LCD exists in the media.

Commodore 128D — The same computer as the 128, just structured in a more business-like appearance with a detached keyboard and a console that had floppy disk drive(s) built in. It was first announced at the Consumer Electronics Show in January 1987 at a retail price of $550.

Commodore 128B — Like the Educator 64, an obscure Commodore product that I had never heard of, nor saw any of, but found in an ad in the October 1984 issue of *Byte* being liquidated by Protecto. It carried a price tag of $995, but that includ-

COMMODORE —

Continued from Page 15)
ed the computer with dual floppies, a monitor and printer, designed to make the package attractive to the small business owner, I think.

Commodore 264 — Originally shown at the Winter Consumer Electronics Show in January 1984, but never released. Eventually released as the Plus/4 in June 1984.

Commodore 364 — A deluxe version of the 264 that was dropped.

Commodore Educator 64 — Not being a Commodorian, I'd never seen nor heard of this machine until I ran across it being liquidated by a company named M.C.S. in Livonia, Mich., that had an ad in the December 1986 issue of *Compute!*. The machine looks just like a PET 8032 but the ad says that it is 100 percent C64 compatible. The Educator 64 also has a totally different keyboard than the 8032, so it's possible that Commodore created some hybrid computer for school use that was a all-in-one PET case and chassis outside, but a C64 inside. At any rate, the liquidation price was $199.95.

Commodore HHC-4 — The HHC (Hand Held Computer)-4 was a calculator-sized computer with a chiclet-style keyboard, separate numeric keypad, a single-line 24-character liquid crystal display, 4K of RAM that was expandable to 16K, and BASIC built in. Optional peripheral "modules" attached to the left side of the HHC-4. It could be hooked to a full-sized computer like the VIC or C64 and could use their peripherals, such as the datasette recorder, dot matrix printer, display monitors, etc. At the Winter (January) 1983 Consumer Electronics Show Commodore said the HHC-4 would retail for $199. I don't believe the computer was actually released, mainly because of the eroding profit margin that also caused TI to drop the 99/2.

Commodore LCD — A prototype 3-pound laptop with 32K RAM and an 8-line liquid crystal display. It never made it to production as far as I can determine, but it was shown at the Winter 1985 CES.

Commodore MAX — I have no information on this computer but, based upon what I have been able to uncover, it was a 'project' that never actually became a computer. Reference to it may be found in the October 1982 issue of *Compute!* magazine on page 6.

Commodore PC-10, aka Commodore Colt PC/XT — Commodore's entry-level PC clone, it was sold in places like Wal-Mart, but never caught on in the United States. The PC10 was announced at the January 1987 Consumer Electronics Show in two versions — the PC10-1, which had 512K RAM and a single disk drive, and the PC10-2 which offered 640K RAM and two disk drives. The PC10-1 retailed for $999, while the PC10-2 sold for $1,199.

Commodore PC-40 — An 80286-powered Commodore PC circa 1989 that came with a 12 Mhz CPU, 1 Mb of RAM, a 40 Mb hard disk and VGA graphics.

Commodore PET (Personal Electronic Transactor) — Debuted in June 1977 but not actually released for sale until August 1977. The PET was designed by MOS Technology (a subsidiary of the Commodore corporation) engineer Chuck Peddle, who also designed the 6502 chip that Apple, Atari and many other computer manufacturers used as their CPU. PET was available in 4K and 8K versions, with built-in black and white screen, a calculator style keyboard and a cassette recorder.

The first units built for display at the January 1977 Consumer Electronics Show had wood cases spray painted to look like yellow metal, black and white screens taken from new Zenith televisions that Commodore engineers bought for $89.95 at a nearby appliance store, and Sanyo tape recorders that had been modified to fit into the wooden cases.

Commodore PLUS/4 — A 64K RAM machine that was introduced in June 1984. It came with a word processor, database, spreadsheet and graphics programs built-in, and was powered by the new 7501 CPU, which was machine language compatible with the VIC-20 and C64's 6502 chip. But the Plus/4 was not compatible with the Commodore 64 because of memory differences. This decision or oversight on Commodore's part spelled doom for the Plus/4 because it meant all new and different software would have to be purchased for use on the Plus/4. Billed as their productivity machine, the Plus/4 did not have sprites in its BASIC programming language, nor did it have a sound chip. It sold for $299 in department stores such as K-Mart, Target etc.

Commodore PLUS/16 — Billed as "The Learning Machine," the Plus/16 was an entry level machine that looked just like the Plus/4, but it had only 16K RAM and used a cassette recorder as the primary storage device. It retailed for just under $100.

Commodore SX/64 — A transportable (luggable) version of the C64, complete with a 5-inch black and white or color monitor, one or two 170K floppy disk drives and the same internal chips as the C64. Originally billed as the SX-100, by the time it was released it was called the SX-64. It weighed in at around 30 pounds and was by no means a portable (I lifted one in a K-Mart store in Colorado Springs way back then). The black and white monitor with a single floppy drive sold for $995. The color monitor version with two floppies was $1,295. Decent photo and description of one can be found in the March 1983 issue of *Compute!* magazine, page 24.

Commodore VIC-20 — Introduced in June 1980 with 5K RAM, at $299. Over 2 million of them were sold. The VIC in VIC-20 stands for Video Interface Chip. It is this computer, some of which were made in Japan, and others in Commodore's U.S. factories which brought the TI99/4A to its knees and ultimately to its death.

Commodore VIC-20 Experimental — An interesting photo of a VIC-20 with a built-in Sony Watchman TV can be found in the March 1983 edition of *Compute!* on page 28. The computer was never produced, however, the folks at Commodore said it was "only an example of what could be done, not what will be done."

MBC17NB — An 80286-based laptop that was produced for Commodore by Sanyo Information Systems in late 1990. It appears to have been released only through Commodore UK.

TI EMULATION NEWS

FROM! CUE

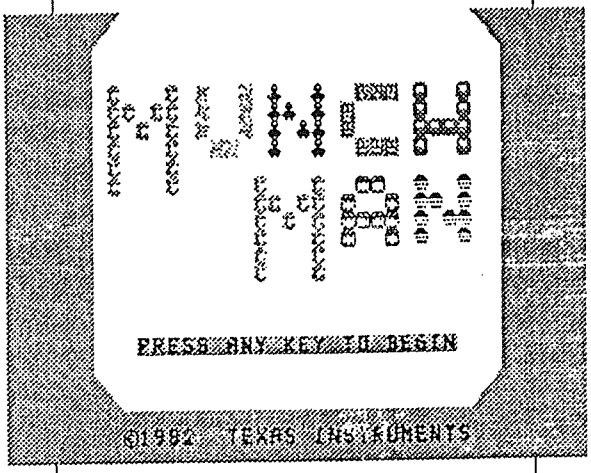
by Don Grim

The TI 99 home computer continues to be used despite the eventual extinction of its hardware. There are many reasons people continue to use the TI computer with some reasons being special capabilities (music, speech, sprites), comfort of use, and nostalgia.

Since the future is leaning strongly towards the use of the IBM compatible computer, the hope of using TI software in the future is stronger if it can be emulated on an IBM compatible computer. The good news, for current and future TI fans, is there is an emulator available today that accomplishes the goal called the TI Emulator (or V9T9) by Ed Swartz. With this emulator, you can transfer TI programs from a TI computer to an IBM compatible computer by using a null modem cable connected to each serial port. Since programming languages, like TI Extended BASIC, can be transferred, new TI programs can be written and run on an IBM compatible computer by way of the TI Emulator.

I found out about the TI Emulator a few months ago in the FIDO message system. I might have found out about it sooner but it is "hidden" on the Night Owl 13 shareware CD which labels it as a "TI calculator emulator" instead of a "TI computer emulator". That is a natural labeling mistake since more people are familiar with TI calculators than TI computers.

The version from the Night Owl CD is version 4 and it is very nice. What I like about it is you



can adjust the speed so you can run programs slower or faster than the original TI computer. I guess the best compliment is that I'll forget I'm not using a TI computer since the emulation is so good.

When I registered the TI Emulator, I found out that it is at version 6 and it is now called V9T9. Version 6 has added many enhancements including the start of speech emulation. Ed Swartz plans to release future versions to make more enhancements including improved speech and possibly the option to read TI disks directly from the disk drive on the IBM compatible computer. The next version may arrive as early as December 1995.

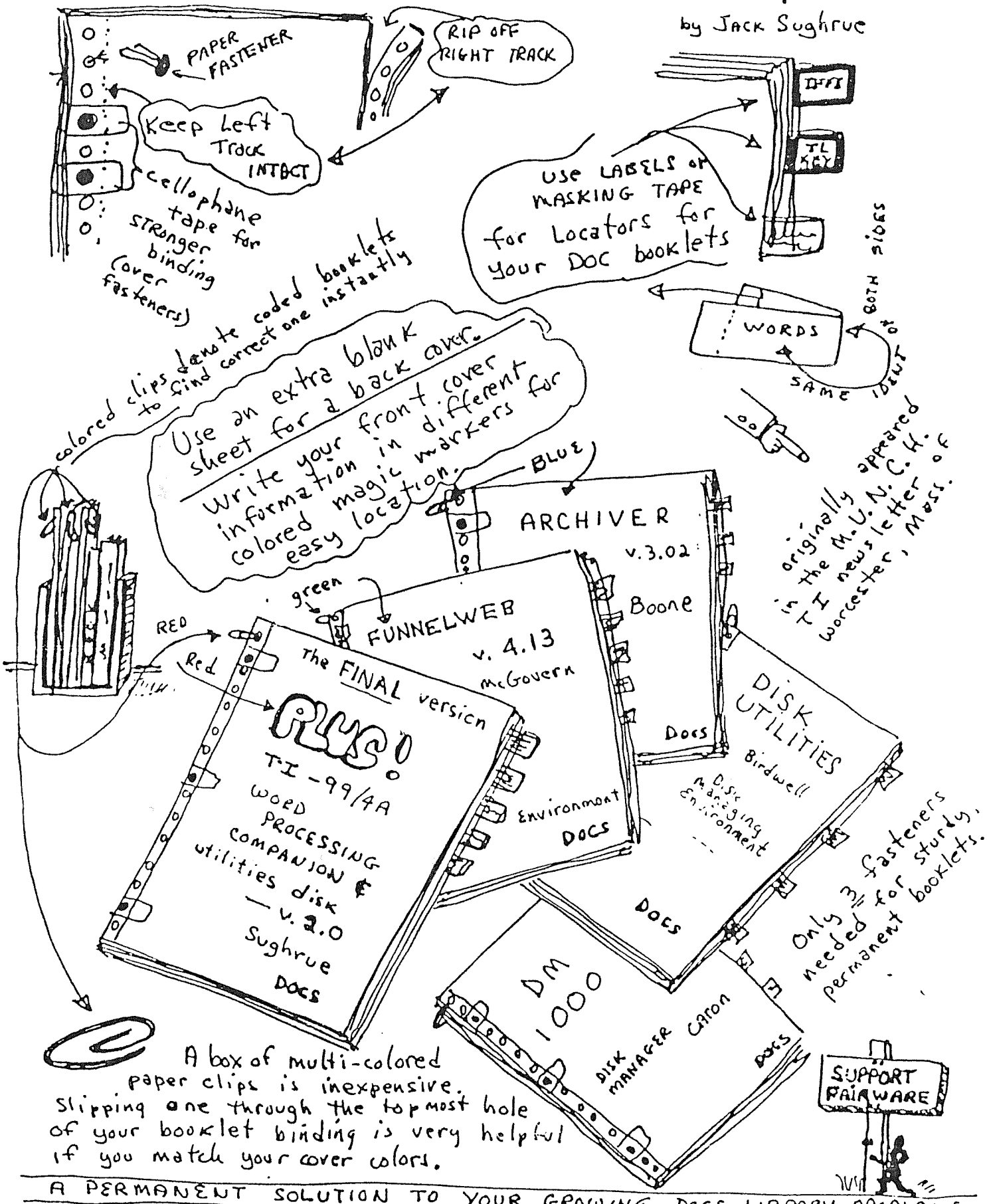
When you look at version 6 of V9T9, it doesn't include the ROM and GROM which has the startup screen and TI BASIC which was burnt into the hardware of the original TI computer. However, there are various demos that you can run that show how nicely the emulator runs programs. To get the ROM and GROM, plus any TI programs, moved to the V9T9, you can transfer it from your TI computer. An easier option, which I chose, is you can order the ROM and GROM plus 3 programs of your choice for $15 from Ed Swartz. Ed relays the $15 to TI since he has a special licensing agreement with Texas Instruments.

When you register V9T9 for the $25 asking price, you can also order more programs for the nominal price of $1 each. The $25 goes to Ed for his fine programming efforts and he relays the dollars for purchased programs to Texas Instruments. So, V9T9 is made available in such a way that even if you don't own an original TI 99 computer, you can still run TI software on an IBM compatible computer by using V9T9 emulation.

At this point in time, I haven't run into any problems with V9T9. Since I can slowdown the Munch Man game (Packman clone) in the TI Emulator, I was finally able to get through all the levels which was impossible for me on the original TI computer. V9T9 is an amazing program. Let me know if you should have any comments or questions regarding V9T9.

BUILT-IN BOOKLETS with Tractor-Feed Paper

by Jack Sughrue



A box of multi-colored paper clips is inexpensive. Slipping one through the top most hole of your booklet binding is very helpful if you match your cover colors.

A PERMANENT SOLUTION TO YOUR GROWING DOCS LIBRARY PROBLEMS

THE TI-99 HOME COMPUTER TIMELINE

Bill Gaskill

part 1 of 4

1993 marks the 10th anniversary of the decision by Texas Instruments to abandon the Home Computer. I have compiled the information in this timeline not in celebration of TI's decision to orphan the 99/4A, but rather to honor the community that remains ten years after TI's decision. I hope you enjoy the reading.

THE BIRTH OF THE MICROCOMPUTER INDUSTRY

1947: Bell Labs engineers John Bardeen, Walter Brattain and William Shockley invent the transistor, which paves the way for the creation of smaller computers.

1955: IBM becomes the first computer manufacturer to offer plug-in peripherals for their computers. Although the computers are of the mainframe type, the concept will catch on and become an integral part of microcomputer technology.

1959: Texas Instruments releases the first integrated circuit after its engineers figure out how to put more than one transistor on the same material and connect them without wires.

1964: John G. Kemeny and Thomas E. Kurtz develop the BASIC programming language at Dartmouth College. BASIC will become a mainstay in the microcomputer world.

1969: Intel, then a one-year old company, releases a 1K-bit RAM chip, which is the largest amount of RAM ever put on an integrated circuit up to that time.

1972: Intel introduces the 8008 chip in April 1972. It becomes the first 8-bit microprocessor to hit the market.

- Nolan Bushnell founds Atari and ships the Pong game.

1973: The first "mini" floppy disk is introduced.

1974: Intel introduces the 8080 chip in April 1974. The 8080 is the first microprocessor capable of addressing 64K bytes of memory.

-Texas Instruments releases the TMS 1000 4-bit chip. It becomes an immediate success as over 100 million are sold for use in video games, microwave ovens, calculators and other electronics products.

- In an article appearing in the July 1974 issue of Radio Electronics, author Jonathan Titus tells readers how to build the Mark 8 "personal minicomputer."

- Motorola begins work on the M6800 chip, designed by Chuck Peddle. Peddle would later leave Motorola to join MOS Technology, the creators of the 6502 chip. Peddle ultimately became Commodore's Systems Division Director, responsible for the release of the PET 2001 in October 1977, after Commodore acquired MOS Technology in order to have its own chip source.

- Naval Post-graduate School instructor Gary Kildall creates a new operating system for Intel's 8080 microprocessor called CP/M, an acronym for Control Program for Microcomputers. It sells for $70.

- Creative Computing magazine is founded by David H. Ahl in Morristown, New Jersey.

- Brian W. Kernighan and Dennis M. Ritchie of Bell Labs develop the C programming language.

1975: Texas Instruments introduces the TMS 9900 microprocessor, the first 16-bit chip on the market, but it does not sell.

- Micro Instrumentation and Telemetry Systems, a company founded by Ed Roberts as a vehicle for supporting his experiments in electronics, introduces the MITS Altair 8800 microcomputer in January. MITS becomes the first company or corporate venture into microcomputers for sale to the general public and the Altair becomes the first microcomputer to have software written for it by third-party programmers. Its open bus architecture also allows people to begin making hardware peripherals, making it the first microcomputer to also have third-party hardware add-ons created for it. The whole Altair kit, including the 8080 processor, motherboard, power supply, and 256 bytes of memory sold for $395.

- MOS Technology introduces the 6501 microprocessor, a short-lived predecessor to the famous 6502 that would power the Apple, Atari and Commodore machines from their introduction to their obscelescence.

- Byte Magazine publishes its first issue in September.

- Bill Godbout and George Morrow (who would later build the Morrow Computer) build the first 16-bit computer with RAM and a built-in cassette interface. An advertisement for the unnamed computer appears in the first issue of Byte Magazine, but not one of the computers is sold.

1976: Zilog, a computer chip company which is founded by former Intel employee Federico Faggin, introduces the Z80 microprocessor.

- Shugart introduces a 5 1/4" floppy disk drive in December that sells for the unheard of price of $390. It is housed in a cast aluminum case. In 1979 the company will enter into an agreement with Matsushita of Japan to produce the now familiar sheet metal enclosed case that would retail for $125 and sell for $50 in OEM quantities. This is the same disk drive that Texas Instruments would sell to 99ers for almost $500 in 1979-83.

- Apple Computer Inc. is formed in April by Steve Jobs and Steve Wozniak.

- Texas Instruments makes the decision to produce a personal computer built around its unpopular TMS 9900 microprocessor. This is Mistake #1 according to Joseph Nocera, in his "Death of a Computer" article.

1977: The Radio Shack Division of Tandy Corporation and Commodore Business Machines join the new microcomputer market with introductions of the TRS-80 and PET 2001 (Personal Electronic Terminal) respectively. The TRS-80 is announced in August and the PET in October.

- Computer Shack, later known as Computerland, opens its first store in February.

- Ohio Scientific Instruments offers the first microcomputer with Microsoft BASIC in ROM.

- Axiom Corporation of Glendale, California enters the microcomputer printer market with the first low-cost electrosensitive line printer in the industry.

- The research and development process for TI's planned personal computer is in full swing and a corporate decision is made to assign the task of creating the computer to the Consumer Products Group which makes watches and hand held calculators at TI. Chief Operating Officer J. Fred Bucy decides to move the Consumer Products Group from Dallas to Lubbock, Texas, which is only 29 miles from his home town of Tahoca. This is Mistake #2 according to Joseph Nocera.

1978: The Plato computer aided instruction system is developed at the University of Illinois. Control Data Corporation would license these applications to Texas Instruments late in 1983, but by then, the fate of the Home Computer was already sealed.

- Machine and operating system independent UCSD Pascal is released by the Regents of the University of California at San Diego for $200.

- In March, Texas Instruments begins trying to recruit personal computer specialists by running full page ads entitled "Your Experience with personal computers is going to open an unlimited career at TI." in trade publications. The ads seek qualified applicants for Personal Computer Product Marketing Managers, Systems Programmers, Digital Design Engineers, Product Design Engineers, Application Software Specialists and Marketing Support Engineers. The recruitment efforts are largely unsuccessful when potential applicants discover the job is in Lubbock, Texas rather than close to the center of the microcomputer industry, which is northern California's Silicon Valley, situated only an hour's drive from San Francisco.

- In April, Texas Instruments releases a recreational Solid State Software Leisure Library module for the TI58 and 59 programmable calculators, coining and trademarking the term Solid State Software.

- Intel introduces the 8086 microprocessor.

- In August MICROpro releases Seymour Rubenstein's Word-Master word processor, which is the predecessor to WordStar.

- Illinois residents Ward Christensen and Randy Suess create the first microcomputer bulletin board system, conceived, designed, built, programmed, tested and installed in the 30 day period between January 16th and February 16th 1978.

- The $895 Exidy Sorcerer is released in October by Exidy Computers of Sunnyvale, California. The machine sports 8K RAM, a 64 column by 30 row screen and the ability to use plug-in modules which are the size of 8-track tapes. The Sorcerer appears to be the first "Home Computer" to support ROM cartridge use.

- In December Axiom Corporation introduces the EX-801 printer and EX-820 printer/plotter for $495 and $795 respectively. Both have available interfaces for the Apple II, TRS-80, PET and Exidy personal computers.

- Epson introduces the MX-80 dot matrix printer, shocking the industry with its low price and high performance.

- Over 14 million microprocessors are manufactured by year's end, with the 8-bit 6502 chip and TI's 4-bit TMS 1000 chip leading the pack.

JAN 1979: Double sided disk drives are announced but few are available as manufacturers run into difficulty gearing up for production.

FEB 1979: Rumors begin to fly about TI's new personal computer, despite the fact that it has not been formally announced. The rumors say the

computer will have 40K of ROM, it will generate 20 lines of 40 characters on a standard television, have provisions for accommodating video disk players and video tape recorders, and it will have support for sophisticated sound production.

- Atari enters the personal computer market in February by announcing the 400 and 800 models. The 400 is a non-expandable 8K computer with a membrane keyboard, a single cartridge slot and a cassette port. It will sell for $500. The 800 is an 8K computer expandable to 48K. It comes with a cassette recorder, a full keyboard, 8K BASIC built in and high resolution graphics capabilities. It will sell for $1000. Neither machine appears until August, and then only in limited quantities.

MAR 1979: The FCC begins regulating microcomputers that employ radio frequency modulators. Their action is spurred by the rash of previous complaints received when Citizen Band radios created havoc for TV viewers.

- Texas Instruments releases the new Speak and Spell learning aid for children. It is based on the TMS 1000 chip and two 128K DRAM chips, each with the ability to store over 100 seconds of speech.

APR 1979: McGraw-Hill buys Byte and onComputing magazines.

- Tandy begins selling their TRS line of personal computers through their own stores. Several other makers of personal computers withdraw their products from department store shelves after meeting with poor sales and low product acceptance.

- Despite early failure by U.S. department stores to move personal computers, department stores in Europe begin to surface as the major source of sales for Commodore's PET and Radio Shack's TRS-80.

- The CompuServe on-line information service is founded.

MAY 1979: Dan Bricklin and Bob Frankston release their new Visicalc spreadsheet, written for the Apple II computer.

JUN 1979: Texas Instruments announces the TI-99/4 Home Computer at the Consumer Electronics Show in June at a retail price of $1150 with a 13" color monitor. It will not appear in any quantity until almost a year later however, and then it will prove to be a flop in the market place.

Software titles announced as being available for the new Home Computer include: Beginning Grammar, Demonstration, Diagnostic, Early Learning Fun, Early Reading, Football, Home Financial Decisions, Household Budget Management, Investment Analysis, Number Magic, Personal Record Keeping, Physical Fitness, Speech Construction, Tax/Investment Record Keeping, Video Chess, and Video Graphs.

Peripherals announced as being available are a Speech Synthesizer, an RS232 interface, joysticks, disk storage and a thermal printer. No memory expansion is available. The price for the console/monitor bundle is $1150 with the Solid State Software command modules listed running anywhere from $19.95 to $69.95 in price.

Actual release dates on several of the announced products would vary from the June 1979 release information.

Beginning Grammar,	2q/1979
Demonstration	2q/1979
Diagnostic	2q/1979
Disk Storage	2q/1980
Early Learning Fun,	2q/1979

Early Reading,	4q/1979
Football,	2q/1979
Home Financial Decisions,	2q/1980
Household Budget Management,	2q/1979
Investment Analysis,	never released under this name
Joysticks	2q/1980
Number Magic,	2q/1979
Personal Record Keeping,	4q/1979
Physical Fitness,	2q/1979
RS232 interface	2q/1980
Speech Construction,	never released under this name
Speech Synthesizer	2q/1980
Tax/Investment Record Keeping	4q/1979
Thermal Printer	2q/1980
Video Chess,	2q/1979
Video Graphs,	2q/1979

- MicroPro releases WordStar.

- Color monitors for personal computers are expected to drop below the $1000 mark by late 1979.

JUL 1979: Milton Bradley Company begins advertising in national trade publications for Electronic Product Engineers, Software Engineers and Microcomputer Programmers, and Electronic Technicians.

- Wayne Ratliff develops the Vulcan Data Base at the Jet Propulsion Labs in Pasadena, California. Ashton-Tate later picks up the program and markets it as dBase II.

- Word of a Japanese invasion into the personal computer market hits the media, much like the never-to-appear MSX invasion of the mid-80's, after Nippon Electric Corporation (NEC) enters the market with their Astra series of 16-bit systems.

AUG 1979: TI releases a $250 hand held language translater that features speech, which means translated words are not only displayed, but are also spoken. The unit will have $50 plug-in modules available for English, Spanish, French, German, Russian, Chinese and Japanese. Each module displays 1000 words in the resident language, 500 of which can be spoken by the speech synthesizer.

SEP 1979: New England Electronics proudly announces that it has been selected to be an authorized distributor of the "revolutionary TI-99/4 Personal/Educational Computer!"

- Computerland begins advertising the 99/4 also, calling it "The Remarkable Home Computer". They also carry the Atari 800 and refer to it as the "Timeless" computer.

Several other major distributors are also lined up by TI in the closing months of 1979. They begin advertising the 99/4, but fail to receive them and are forced to placate the few people who are willing to pay $1150 for the machine. TI has already gotten off on the wrong foot with their retailers.

OCT 1979: Texas Instruments releases the TMS9927 Video Controller chip.

- Rodnay Zaks, who would author the book "Your First TI-99/4A Program" in 1983, releases "6502 Games" through Sybex Publishing.

NOV 1979: Moore Business Systems agrees to market the TI-99/7, a $5000 business computer based upon the TMS 9900 microprocessor. The 99/7 is one of three computers to be built on the TMS 9900 chip, but it will

eventually die, due to internal squabbling at TI, without any production units being shipped.

- Zenith buys the Heath Company, manufacturers of the H-8 and H-11 computer kits.

- Computer Shopper publishes its first issue. A special charter subscription of 12 issues for $10 is offered.

- Milton Bradley releases Big Trak, a programmable toy vehicle. The chip in Big Trak allows the user to program intricate travel paths and fire the truck's weaponry in single burst, short burst or long burst modes. It sells for $43 with trailers that may be purchased separately for $13 each.

- Milton Bradley also releases its Microvision hand held mini video game machine, which has its own screen. Microvision comes with the game BlockBuster. Six other games, Bowling, Star Trek, Phaser Strike, Connect Four, Vegas Slots and Mindbuster are also available, sold separately.

DEC 1979: Len Buckwalter reviews the new TI-99/4 Home Computer for Mechanics Illustrated magazine on page 46. He calls the machine easy to use and delivers a generally positive review, discussing Home Financial Decisions, and Milton Bradley's Connect Four, Hangman, Yahtzee and Zero Zap cartridges.

- Image Computer Products of Northbrook, Illinois announces the TI Six Pack, which consists of six BASIC games on cassette. They are; Mind Master, Skill Builder, Strategy Pack, Tournament Brickbat, Wall Street Challenge, and Wildcatting.

Comparison Charts

Based on maximum config of each machine

CPU VDP DISK HARD MOUSE
Machine RAM RAM DRIVES YES PORT
(K) (K)

TI-99/4A 32 16 4 DS/QD 4 30mb N
Myarc 9640 2024 192 4 DS/QD 4 30mb Y
IBM PC 640 64 2 DS/DD 2 30mb N
Atari ST 520 960 64 2 DS/DD 1 40mb Y 1040
960 64 2 DS/DD 1 40mb
Apple 512
MAC 448 64 2 DS/DD 1 80mb Y
PLUS 4032 64 2 DS/QD 1 80mb Y
Amiga 896 128 2 DS/QD 1 80mb Y
Note: 1 DS/DD Drive=360k 1 DS/QD Drive=720k

Video Keybrd RS232 PIO 1000 Machine Outpu
Fixed? Ports Ports $$

TI-99/4A Compos Y 4 2 .4 RF Mod
Myarc Compos N (any NO NO 1.1 9640 RGB
IBM) LIMIT LIMIT
IBM PC TTL N 2 1 2.0 RGB
Atari ST 520 RGB/MON Y 1 1 1.2 1040
RGB/MON Y 1 1 1.5
Apple 512 MONO Y 2 1 2.0
MAC ONLY
Apple Mac MONO Y 2 2 4.5
PLUS ONLY
Amiga RGB/MON Y 1 2 2.2

Machine Low Res Colors High Res Colors

TI-99/4A 32x24 16 246x192 16
Myarc 256 512x424 16
9640 256x192 (512)
IBM PC 160x100 16 320x200 4
Atari ST 64 640x400 2 All 320X200 (512)
Apple MAC All 512X384 2 512x384 2
AMIGA 320X200 64 640x200 16 (4096)
Note:Number in () is total Pallette

Machine Text Qual Output Type

TI-99/4A 40x24 2/3 Compos Color
Myarc
9640 80x50 3/4 Compos Color RGB color/mono
IBM PC 80x25 2/3 TTL RGB color/mono
Atari ST
All 80x48 3/4 Only Atari Monitors
Apple MAC All 80x26 4 Built in
AMIGA 80x25 1 RGB Color/
mono

Output Ratings
1-Poor 2-Good 3-Very good 4-Excellant
This file was supplied for TEXPAC BBS by
Shane Ferret.

TI-99/4A RGB Interface Revisited

Which is the best?

by Lou Amadio

I was talking to Eric Ockenden at the December meeting about the various TI console to RGB monitor interfaces that have been proposed over the years. Apparently Eric has built them all and said that he was in a position to advise on which was the best. Of all the designs that he tried, including one from TI, Eric liked a hybrid that he made using a Peter Schubert design, described in the May 1988 TND, but using the Geoff Trott sync separator from the RGB design in the Feb 1990 TND.

Eric made me curious, so I convinced Geoff that we should look into it during the Christmas break. We used the console introductory screen for all of the comparisons.

First we looked at the colours produced with an 80 column card which uses the TMS9958 video chip. This chip produces sharp characters with brilliant colours, particularly in the reds. White, however, we thought had just the slightest trace of red in it. On measuring the R,G and B levels, we found that the R drive out of the chip was 50% higher than the other colours.

Next we tried Eric's hybrid design. Setting up proved to be particularly awkward as we had six pots to adjust. What was worse, there was some interaction between the pots and it was possible to cause some colours to saturate. Adjustment was difficult, even using a CRO. Geoff reminded me that it was the complexity of this circuit that prompted him to design his RGB interface in the first place! The final result was good, but not as good as that produced by the 80 column card.

Finally we tried Geoff's own design (Feb 1990). When set up as per the original article (2.76 volts at the base of the G-Y amplifier) the image was sharp, but colour saturation was a little low, particularly in the reds. Geoff said that the colour levels in his design were based on the specification in the TMS9929 manual. We then changed the output resistors from 330 ohms to 220 ohms for blue and green and to 150 ohms for the red. This brought the B and G to R colour ratio in line with that from the 80 column card (1:1.5). The results were more pleasing with respect to colour saturation and the image sharpness was just as good as before.

All in all then, the February 1990 RGB design by GWT was found to be the best for standard consoles and can be made even better with the small modifications described above. My thanks to Eric Ockenden for supplying the PCB and overlay used in this comparison.

T. I. B. U. G.
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QLD, AUST 4019

106
DENNIS REMMER
P.O. BOX 30
TOOWONG QLD 4066