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EVERY MONTH FOR YOU!

Color Micro Journal™

The Color Computer Monthly Magazine $1.95 per issue Vol. 1, Issue 1 September, 1983

THIS 'N THAT

The normal procedure for a new Magazine is for the Editor to state the aims and objectives in the first editorial, and I see no reason to deviate from that approach in this First Issue of **Color Micro Journal.** First, though, I want to answer the question we have heard most since the initial announcement of the **Color Micro Journal;**

Why ANOTHER Color Computer Magazine? As the saying goes, "that's a long story".

'68' Micro Journal made it's debut in 1979 as a Magazine for the Users of the Motorola 6800 CPU Chip, and has gained a devoted following worldwide. It became the "sounding board" for those users, and has been the major factor in the development of a consistency within the SS-50 Bus and FLEX community that is the envy of the "other guys". The 6809 Micro Processor made it's appearance a little later, and eventually showed up in a little "game machine" from Radio Shack called the **TRS-80C Color Computer.** It was "a natural" for **'68' Micro Journal** to become the first magazine to provide coverage of the Color Computer, and it has continued to provide information for the advanced users of the Color Computer every since. The SS-50 Bus Users saw the Color Computer as a way of introducing "new blood" into that market, and many of the **'68' Micro Journal** advertisers began producing products for the computer.

Continued on page 9

CHECKS /BAS

requires 32K, Ext-BASIC

CHECKS is an extremely "User Friendly" Color Computer Program that will eliminate the problems of making the Checkbook and Bank Statement agree. **CHECKS** is fully Menu Driven and is self explanatory; the Main Menu leads to a sub-Menu if required, and options are selected as required. A lot of error checking has been installed, and you have numerous opportunities to go back to the Main Menu "cleanly" should you find that you are "not where you want to be".

Basically, the Program operates just like you normally use your Checkbook and Bank Statement at the present time, and provides several "search" and "find" features that make it easy to separate out all of the Checks written for "Food", "Household Items", etc. The "Accounts" provided include FOOD, AUTO, HOME(IT) for household items, CLOTHES, HOME(EX) for home expenses, PET&ENT for Pet and Entertainment, MEDICAL, DEPOSIT, and a "YOU DEFINE" Account. A Data File is made up for the months Checks and Deposits and another one for the months Bank Statement when you enter the information from your Check Book or Bank Statement. The System "Closes" a file when ALL Checks are accounted for for each month from the Bank Statements (this does not mean that you do not have access to the information, just that all checks for that month have been cancelled). Cancelled Checks are marked with a "C" (i.e., Check #387 has not been cancelled, while Check #389C has been). Since I normally write a lot of checks each month, I normally enter the Checks and Deposits weekly so I won't have a lot to do when the Statement shows up. When it arrives,

This Month

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Magazine

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PROTECTORS

from Tom Mix Software

You have 4 ships armed with laser cannon and smart bombs. They have waves of enemy fighters; their mother ships have laser and heat-seeking mines. Get a new ship for each 5,000 points you score. Exciting arcade action with hi-res 4-color graphics.

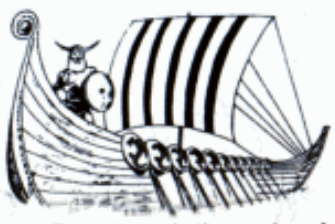
41331 32K Tape ~~$24.95~~ $21.21
Now 15% off til Sept 30

FLIGHT

by Dave Hooper and Mark Barnes from Prickly Pear

Fantastic graphics oriented Hi-Res flight simulator has 2 speeds, 4 difficulty levels, views from top and side, instrument panel and realistic joystick control. Don't crash or have to "go around!" Can you land on the runway to hear the synthesized voice say "perfect landing"?

33556 32K Extended Basic $19.95



VIKING

from Prickly Pear

Superb simulation game! Rise through the ranks of a Viking kingdom, increase your economic power and rank until you win the game by becoming ruler of all. 1 to 4 players can complete it in 2 to 4 hours.

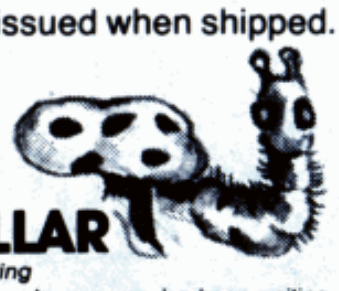
35109 16K Extended Tape $19.95

FROGGER

from CornSoft

One of the most popular arcade games ever ... now available for your Color Computer! Just as in the arcade game, you must dodge heavy traffic and jump the moving logs in the stream to get home. Fantastic graphics. One or two players, use keyboard or joystick.

22947 16K Tape $19.95



COLOR CATERPILLAR

from Soft Sector Marketing

This is the fast-action arcade game you've been waiting to play at home! You must hit mushrooms and caterpillars — segment by segment — moths and tumble bugs. The challenges: they are all moving; when hit they split into additional segments or metamorphose into different shapes; when you destroy a caterpillar, the new one that replaces it is a segment longer than the original!

36728 16K Tape ~~$19.95~~ $16.96
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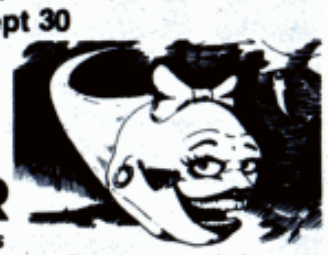


MS GOBBLER

from Spectral Associates

Use your joystick to guide Ms. Gobbler through 4 mazes on a black background with moving shapes to gobble. Avoid ghosts of different colors and personalities. Zip through the teleportation spot and use inviso-maze to make the walls disappear.

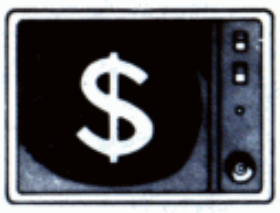
32500 32K Tape $21.95

WHIRLYBIRD RUN

from Spectral Associates

Pilot a chopper over varying terrain while destroying enemy bases with bombs and missiles. Destroy enemy fuel depots and win their fuel. Hi Res color graphics, machine language arcade game has three screens. Requires joysticks.

32511 16K Tape $21.95



DOLLARS AND SENSE

from Spectral Associates

Smarten' up! What's more important than learning about money? This new educational game will teach your child about dollars and coins. Easily reinforces coin recognition and value. Let the kids count the change!

27751 16K Extended Basic Tape $11.95

MASTER CONTROL II

from Soft Sector Marketing

This is a BASIC language program designed to decrease typing time and error while providing direct control of motor, trace, audio and run. With Automatic Line Numbering and a custom key you can re-use or change at any time; plus 50 preprogrammed command keys. Can be used on a 32K system.

21340 16K/32K Tape ~~$24.95~~ $21.21
Now 15% off til Sept 30

RAINBOW-WRITER SCREEN FORMATTER

by Rainbow Connection Software

The ultimate hi-res graphics text display. User definable 224 character set, 12 sizes in a multitude of colors with many screen features, including status/help screen. Works in all PMODES — save characters, symbols, and animated figures to use in your own BASIC or ML programs. Easily create dazzling displays — the possible uses are almost unlimited!

33455 16K Extended Basic Tape $29.95
32757 Disk $32.95

COLOR COMPUTERS NEWS 1981 BACK ISSUES

This is the complete collection of articles appearing in the first 4 issues of Color Computer News (May to December of '81). 17 different topics are covered plus continuing features like "ReMarks", Kids Page and New Products.

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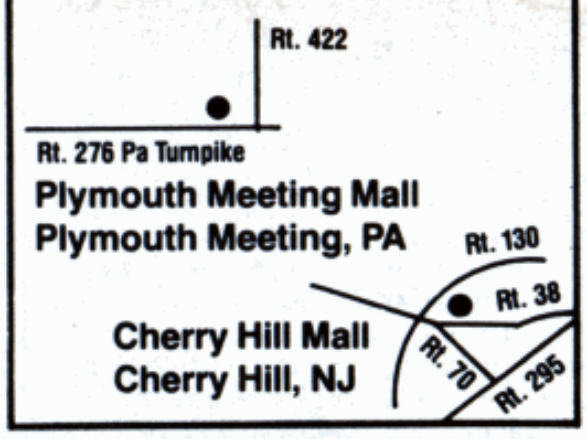

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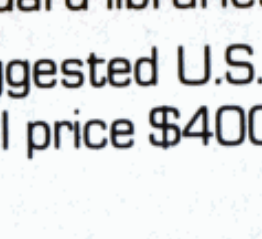

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CHECKS /BAS

Continued from page 1

the information is entered for it, and then the "B" option from Menu Item 6 is chosen to "Balance" the Checks and Statement. It is suggested that this be done with the Display first, and after any errors are corrected, you can then produce a Printer Output. The only "SPECIAL" item to be aware of is that BOTH the Check and Statement Files **MUST include** a Deposit No. **"D-1"** (normally the first Deposit); this is the Balance from Last Month, which is compared often in balancing the checks and statements. Menu Item No. **6** provides an overall Procedure for using the Program, and provides an easy way back to the Menu by selecting the **"A"** option, so all you have to do is "RUN" the Program, select #6 from the Main Menu to see what needs to be done first, and select "A" to get back to the Main Menu to accomplish that task. (Don't forget to Save any Data that you have entered - I normally name my Data Files **JAN-C-83** for January, 1983 Checks, **FEB-C-83** for February Checks, **JAN-S-83** for the January Statement, **FEB-S-83** for the February Statement, etc.) Changes to any items are easy through Main Menu selection #2, "VIEW OR CHANGE DATA". All in all, you will find it hard to get into trouble with this program, so go ahead and **USE IT.**

Rather than outline the procedure for using the Program, you can "read the listing" to get a feel for how it works by locating the Line Number to "GOTO" for each Menu Selection. For example, the Main Menu is in lines 40-150; lines 170 and 180 send you to the appropriate section of the program. If you select Item #6 from the Main Menu, the program goes to line number 3110, where lines 3120 through 3160 indicate that you would first input the Statement Data, then LAST MONTHS Check Data (which you would read in from a File) and "Balance" the Statement to cancel the checks from last month, then "output" THAT data to a File (if ALL checks have been cancelled, that file will be marked as "Closed" so you will know that ALL of the checks have been cancelled). You MAY need to go back two or three months if those Check Files have not been closed yet due to outstanding checks. Then you Input THIS MONTHS Checks and Deposits (either thru Main Menu #1 or from a File, or both) and again "Balance" the Statement to cancel any checks in this months File that are in this Statement, and SAVE the new File for this month. What you are doing with the Computer is the same thing you would do by hand when you receive a Bank Statement; go back and mark all of the Checks that have come in so you can determine those still outstanding and "Balance your Check Book". The Statement information input provides for both a fixed Bank Charge and a Percentage Charge; enter a 0 amount if they do not apply to your situation. Also, you may need to "dream up" Statement Numbers if your Bank does not use them; some Check Deposit slips have a number that has been marked out that you can use, or you can use something like 6-1 for the first Deposit in June, 6-2 for the next, etc. At any time you can select Item **"A"** to get back to the Main Menu. (NOTE: you need to have at least one check in the System to get the Item 6 Menu displayed - re Line Number 3110 -- "N" must be greater than 0.)

CHECKS has been developed over a period of time while working with my own Checking Account; adding this and deleting that, until it has become a very handy Program to have on the Computer. As with any Program, there is still this or that to try, but it is a fully functional program as it now stands. Since I have a 32K Color Computer, there has been no need to compress the program as of this time, so you will find the layout of the Program and the Code to be fairly modular and easy to follow. It would not be hard for a Programmer with a little experience with the Radio Shack BASIC to "slim" it down some (this would also be a good project for those learning BASIC to tackle - it is not complex, just long), or to change it to a Program which calls separate programs from the Menu to get the System running on a 16K Color Computer. I originally started with a Tape System, then went to the Disk System; BOTH Systems are supported by this one Program.

CHECKS uses Pokes and Peeks in two locations in the Program; one at Line Numbers 4380 and 4730 which effectively clears all data out of the computer to leave as much memory as possible for the Search through all Files for a particular item (it is used when Menu Item 9 is used), and the other is a Machine Language Routine loaded by Lines 5340 thru 5410 and used in Lines 5480 thru 5500. This routine SLOWS the Display of the Directory so you can read it as it is dispalyed (this routine was pulled from a Program in **"The RAINBOW"**). The value "Poked" in Line 5480 determines how fast the display scrolls. The Pokes in Line 5380 set up the "hooks", while the Data Statements contain the Code. The Search is much slower without the Pokes to open the buffer, with many more Disk accesses, but the program will work without them, and it will also work without the "slow down" for the Directory Listing.

Albert Yates

```
5 GOTO5340
10 GOTO20
11 SAVE"CHECK":END
20 CLEAR3500:DIMT$(100):DIMD$(10
0):DIMP$(100):DIMS$(100):DIMA(10
0):DIMF$(100):DIMU$(100):DIMAM(1
00):DIMAM$(100)
30 AA=20000:O=1
40 CLS:PRINT@13,"MENU"
50 PRINT:PRINT"1> INPUT CHECK DE
P.& STA.DATA
60 PRINT"2> VIEW OR CHANGE DATA"
70 PRINT"3> OUTPUT DATA TO TAPE
FILES
80 PRINT"4> INPUT DATA FROM TAPE
 FILES
90 PRINT"5> PRINT DATA ON PAPER
100 PRINT"6> BALANCE CHECK BOOK
110 PRINT"7> OUTPUT DATA TO DISK
 FILES
120 PRINT"8> INPUT DATA FROM DIS
K FILES
130 PRINT"9> SEARCH ALL FILES (J
AN-DEC)
140 PRINT"D> TO SEE DIRECTORY
150 PRINT:PRINT"SELECT>1-2-3-4-5
-6-7-8-9-D
160 C$=INKEY$
170 IFC$="1"THENGOTO200ELSEIFC$=
"2"THENGOTO500ELSEIFC$="3"THENGO
TO640ELSEIFC$="4"THENGOTO950ELSE
IFC$="5"THENGOTO1090ELSEIFC$="6"
THENGOTO3110ELSEIFC$="9"THENGOTO
4360ELSEIFC$="D"THENGOTO5350
180 IFC$="7"THENGOTO2140ELSEIFC$
="8"THENGOTO2460
190 GOTO160
200 CLS:PRINT:PRINT:PRINT"(1)INP
UT CHECKS OR DEPOSITS":PRINT"(2)
INPUT BANK STATEMENT":PRINT:PRIN
T"(M)TO GO TO MENU":PRINT
201 PRINT"DO not USE THE $ SIGN
ON INPUT.":PRINT:PRINT"PROGRAM W
ILL NOT DISPLAY NUMBERSPROPERLY
THAT ARE OVER $9999.99":PRINT:PR
INT:PRINT"   SELECT--> 1-2-M"
210 C$=INKEY$
220 IFC$="1"THENGOTO240ELSEIFC$=
"2"THENGOTO2670ELSEIFC$="M"THENG
OTO40
230 GOTO210
240 IFJ=0THENCLS:PRINT@192,"ENTE
R BALANCE FROM PREVIOUS FILE AS
ENTRY #D-1 A DEPOSIT":FORX=1TO25
00:NEXTX
250 IFN<1THEN N=1
260 FORJ=N TO100
270 CLS
280 IF J=1 THEN GOTO 300
290 PRINT "LAST CHECK #="T$((J)-
1)
300 PRINT"ENTRY#"(J),:PRINT"MEM=
";:PRINTMEM:PRINT
320 IFC$="2"THENPRINT"TYPE <XX>
WHEN FINISHED!":PRINT"ENTER A <C
> TO CHANGE TO CHECKS.":PRINT:PR
INT"ENTER YOUR DEPOSIT INFORMATI
ON."
330 IFC$="2"THENGOTO350
340 PRINT"TYPE <XX> WHEN FINISHE
D!":PRINT"ENTER A <D> TO CHANGE
TO DEPOSIT":PRINT:PRINT"ENTER YO
UR CHECK INFORMATION."
350 INPUT"NUMBER";T$(J)
360 IFT$(J)="XX"THEN N=J:GOTO40
370 IFT$(J)="C"THEN C$="1":N=J:G
OTO 250
380 IFT$(J)="D"THEN C$="2":N=J:G
OTO 250
390 INPUT"DATE:";D$(J)
400 INPUT"PAYABLE TO:";P$(J)
410 IFC$="2"THENPRINT"PAYABLE FR
OM":INPUTF$(J)
420 CLS:PRINT@7,"*****ACCOUNT***
**":PRINT:PRINT"(1)AUTO","(5)FOO
D","(2)HOME(IT)","(6)CLOTHES","(
3)HOME(EX)","(7)PET&ENT.","(4)ME
DICAL","(8)DEPOSIT",,"(9)YOU DEF
INE":PRINT:PRINT"SELECT-1-2-3-4-
5-6-7-8-9
430 CC$=INKEY$
440 IFCC$="1"THENS$(J)="AUTO":GO
TO480ELSEIFCC$="2"THENS$(J)="HOM
E(IT)":GOTO480ELSEIFCC$="3"THENS
$(J)="HOME(EX)":GOTO480ELSEIFCC$
="4"THENS$(J)="MEDICAL":GOTO480E
LSEIFCC$="5"THENS$(J)="FOOD":GOT
O480ELSEIFCC$="6"THENS$(J)="CLOT
HES":GOTO480
450 IFCC$="7"THENS$(J)="PET&ENT.
":GOTO480ELSEIFCC$="8"THENS$(J)=
"DEPOSIT":GOTO480ELSEIFCC$="9"TH
ENGOTO470
460 GOTO430
470 INPUT"YOU DEFINE ";S$(J)
475 GOTO485
480 PRINT:PRINTS$(J)
485 PRINT:INPUT"CHECK OR DEP. AM
OUNT:$";A(J)
490 NEXTJ
500 CLS
510 PRINT:PRINT:PRINT"(1)VIEW DA
TA AND MAKE CHANGES":PRINT"(2)TO
```

```
 VIEW SELECTED DATA" :PRINT"(3)T
O VIEW TOTALS AND %":PRINT"(4)TO
 VIEW OR CHANGE STATEMENT":PRINT
"(M)TO GO TO MENU":PRINT:PRINT"I
NPUT SELECTION-->1-2-3-4-M"
520 C$=INKEY$
530 IFC$="1"THENGOTO550ELSEIFC$=
"2"THENGOTO1270ELSEIFC$="3"THENG
OTO1680ELSEIFC$="4"GOTO2860ELSEI
FC$="M"THENGOTO40
540 GOTO520
550 IFN=0THENGOTO2210
560 FORJ=1TON
570 CLS
580 PRINT@1,OX$" <CHECKS> FILE "
FC$
590 PRINT@96,"ENTRY # "J:PRINT"T
OTAL ENTRYS ARE"N:PRINT"NUMBER =
"T$(J):PRINT"DATE    ="D$(J):PRIN
T"PAY TO ="P$(J):PRINT"ACCOUNT="
S$(J):PRINT"AMOUNT =";:PRINTUSIN
G"$$####.##";A(J)
600 PRINT:PRINT"PRESS<BAR>TO VIE
W NEXT ENTRY":PRINT:PRINT"PRESS<
C>TO CHANGE ENTRY":PRINT"PRESS<M
>TO GO TO MENU"
610 C$=INKEY$:IFC$=""THEN610ELSE
IFC$="C"THENGOTO2010ELSEIFC$="M"
THENGOTO40
620 NEXTJ
630 PRINT"LAST ENTRY":FORX=1TO50
0:NEXTX:GOTO40
640 CLS:PRINT@8,"OUTPUT TO TAPE
FILES"
650 PRINT:PRINT"REWIND TAPE PRES
S<PLAY>ONLY
660 PRINT"ENTER<M>TO GO TO MENU
670 PRINT:INPUT"INPUT FILE NUMBE
R 1-12";AGM$
680 IFAGM$="M"THENGOTO40
690 A=VAL(AGM$)
700 IFA<1ORA>12THENGOTO670
710 IFA=1THENGOTO810
720 IFC$="4"THEN AA=19000
730 MOTOR ON
740 PRINT"POSITIONING TAPE TO FI
LE#"A
750 IFA=2THENGOTO770
760 FORY=1TOA-1
770 FOR X=1TOAA:NEXTX
780 IFA=2THENGOTO800
790 NEXTY
800 MOTOR OFF
810 IFC$="4"THENGOTO970
820 PRINT:PRINT"(1)OUTPUTING CHE
CKS":PRINT"(2)OUTPUTING BANK STA
TEMENT":PRINT"TYPE<M>TO GOTO MEN
U":PRINT:PRINT"AFTER PRESSING<PL
AY&RECORD>":PRINT"MAKE SESECTION
-->1-2-M
830 CC$=INKEY$
840 IFCC$="1"THENGOTO860ELSEIFCC
$="2"THENGOTO2970ELSEIFCC$="M"TH
ENGOTO40
850 GOTO830
860 CLS:PRINT@192,"DATA IS NOW B
EING SAVED ON TAPE"
870 OPEN"O",#-1,"CHECKS"
880 PRINT#-1,N
890 FORJ=1TON
900 PRINT#-1,T$(J),D$(J),P$(J),S
$(J),A(J),F$(J)
910 NEXTJ
920 CLOSE#-1
930 PRINT"DATA IS NOW SAVED ON T
APE":FORX=1TO1500:NEXTX
940 GOTO40
950 CLS:PRINT@8,"INPUT FROM TAPE
 FILES"
960 GOTO650
970 PRINT"(1)INPUTTING CHECKS":P
RINT"(2)INPUTTING BANK STATEMENT
":PRINT"TYPE<M>TO GOTO MENU":PRI
NT:PRINT"AFTER PRESSING<PLAY>":P
RINT"MAKE SELECTION-->1-2-M
980 CC$=INKEY$
990 IFCC$="1"THENGOTO1010ELSEIFC
C$="2"THENGOTO3040ELSEIFCC$="M"T
HENGOTO40
1000 GOTO980
1010 PRINT"DATA IS NOW BEING LOA
DED IN"
1020 OPEN"I",#-1,"CHECKS"
1030 INPUT#-1,N
1040 FORJ=1TON
1050 INPUT#-1,T$(J),D$(J),P$(J),
S$(J),A(J),F$(J)
1060 NEXTJ
1070 CLOSE#-1
1080 PRINT"DATA IS NOW LOADED IN
TO THE     COMPUTER":FORX=1TO150
0:NEXTX:GOTO40
1090 CLS:PRINT:PRINT:PRINT "(1)P
RINT ALL CK.&DP, ON PAPER":PRINT
"(2)PRINT SELECTED DATA ON PAPER
":PRINT"(3)PRINT STATEMENT ON PA
PER":PRINT"(M)TO GO TO MENU":PRI
NT:PRINT"INPUT SELECTION-->1-2-3
-M
1100 CP$=INKEY$:IFCP$="1"THENGOT
O1120ELSEIFCP$="2"THENGOTO1480EL
SEIFCP$="3"THENPN=2:GOTO2860ELSE
IFCP$="M"THENGOTO40
1110 GOTO1100
1120 CLS:IFN=0THENGOTO2210ELSEPR
INT@224,OX$" CHECKS AND DEPOSITS
":PRINT"ARE BEING SAVED ON PAPER
1130 PRINT#-2,"
 "OX$" *** CHECKS AND DEPOSITS
*** "OX$
1140 PRINT#-2
1150 PRINT#-2,"NUMBER","DATE","T
O","AMOUNT","FROM"
1160 PRINT#-2:T=0:D=0
1170 FORJ=1TON
1180 IFS$(J)="DEPOSIT"THEND=D+A(
J)
1190 IFS$(J)<>"DEPOSIT"THENT=T+A
(J)
1200 PL$=LEFT$(P$(J),14)
1210 PRINT#-2,T$(J),D$(J),PL$,:P
RINT#-2,USING"$$####.##";A(J),:P
RINT#-2,"      "F$(J)
1220 NEXTJ
1230 PRINT#-2
```


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The WORD-PAK is a video board designed to plug into the expansion port of the Color Computer. The board produces an 80 column video display that compares easily with the high priced terminals. Software, included with the board, provides such terminal functions as; erase to end of line, erase to end of screen, home cursor, x-y cursor positioning, etc. and the ability to re-program the display for different screen formats. This last feature is useful in that it allows software, written for other computers (such as the Model I), to be run on the Color Computer. Additional software support includes a Flex patch, which allows the user to run ALL standard Flex software, and an enhanced version of TEXPRO III (text editor/processor).

MEM-PAK $110.00

16K RAM/ROM expansion board. Expand RAM beyond 64K (using the C-C BUS) or put your programs/utilities in ROM for instant loading. The board utilizes 24 pin, compatible memory devices. (Supplied with 16K RAM).

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Free up your serial port for communication by adding this fully buffered, Centronics compatible, parallel printer port to your computer. The cartridge can be supplied with an optional real time clock for $122.95.

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The C-C BUS is an expansion bus which connects to the expansion port of the Color Computer and provides the user with six, software selectable, expansion ports. The bus is completely compatible with any size system and automatically senses system size to prevent contention problems. A unique feature of the C-C BUS is the ability to expand system memory size beyond 64K by adding one (or more) MEM-PAKs to the bus. A typical system might contain a disk controller, a parallel printer cartridge, a 16K RAM board, and a WORD-PAK, all installed and available to the computer.

PROTO-CoCo $ 10.95 (3/$20)

Build your own expansion projects on this prototyping baord that will mount inside a disk controller case when you're finished. Included is a manual with several expansion ideas.

BARE BOARDS

Save money by building your own. We will supply complete documentation including schematics, layout and parts list.

WORD-PAK BB	$17.95
C-C BUS BB	$22.95
P-C PAK BB	$17.95
MEM-PAK BB	$14.95

SPECIAL:

To celebrate Color Micro Journal's premier issue, we are offering the C-C BUS and the WORK-PAK at special prices. If you order before September 30, 1983 and you mention that you saw the add in Color Micro Journal, you can purchase the C-C BUS for only $129.95. Or you can purchase the WORK-PAK for only $99.95 if you order it with the C-C BUS at the regular price.

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N. Bergen, N.J. 07047
(201) 330-1898

```
1240 PRINT#-2,"TOTAL CHECKS=",:P
RINT#-2,USING"$$####.##";T
1250 PRINT#-2,"TOTAL DEPOSITS=",
:PRINT#-2,USING"$$####.##";D
1260 GOTO40
1270 CLS:IFN=0THENGOTO2210ELSEPR
INT@7,"WHICH ACCOUNT?":PRINT:PRI
NT"(1)FOOD","(6)AUTO","(2)HOME(I
T)","(7)CLOTHES","(3)HOME(EX)","
(8)PET&ENT.","(4)MEDICAL","(9)DE
POSIT","(5)CHECK #","(A)CHECK NA
ME",,"(B)YOU DEFINE":PRINT:PRINT
"SELECT-1-2-3-4-5-6-7-8-9-A-B
1280 C$=INKEY$
1290 IFC$="1"THENB$="FOOD":GOTO1
350ELSEIFC$="2"THENB$="HOME(IT)"
:GOTO1350ELSEIFC$="3"THENB$="HOM
E(EX)":GOTO1350ELSEIFC$="4"THENB
$="MEDICAL":GOTO1350ELSEIFC$="5"
THENGOTO1320ELSEIFC$="7"THENB$="
CLOTHES":GOTO1350
1300 IFC$="8"THENB$="PET&ENT.":G
OTO1350ELSEIFC$="9"THENB$="DEPOS
IT":GOTO1350ELSEIFC$="6"THENB$="
AUTO":GOTO1350ELSEIFC$="A"THENGO
TO1340ELSEIFC$="B"THENGOTO1330
1310 GOTO1280
1320 INPUT"ENTER CHECK # ";B$:GO
TO1350
1330 INPUT"ENTER YOUR ACCOUNT ";
B$:GOTO1350
1340 INPUT"ENTER CHECK NAME ";B$
1350 CLS:T=0:P=0
1360 PRINT@8,"***"B$"***"
1370 FORJ=1TON
1380 IFB$=S$(J)THENT=T+A(J):P=P+
1
1385 IFB$=T$(J)ORB$=LEFT$(T$(J),
LEN(T$(J))-1)THENT=T+A(J)
1390 IFB$=P$(J)THENT=T+A(J)
1395 IFB$=T$(J)ORB$=LEFT$(T$(J),
LEN(T$(J))-1)THENPRINTT$(J)"**"D
$(J)"**"P$(J)"**"S$(J):PRINTUSIN
G"$$####.##";A(J)
1400 IFB$=S$(J)THENPRINTT$(J)"**
"D$(J)"**"P$(J)"**";:PRINTUSING"
$$####.##";A(J)
1410 IFB$=P$(J)THENPRINTT$(J)"**
"D$(J)"**"S$(J)"**";:PRINTUSING"
$$####.##";A(J)
1420 IF P=10THEN PRINT"<MORE>PRE
SS<ENTER>";:INPUT P
1430 NEXTJ
1440 PRINT"TOTAL OF-"B$"-IS ";:P
RINTUSING"$$####.##";T
1450 PRINT"TO CONTINUE PRESS<SPA
CE BAR>"
1460 C$=INKEY$:IFC$=""THEN1460
1470 GOTO40
1480 CLS:IFN=0THENGOTO2210ELSEPR
INT@7,"WHICH ACCOUNT?":PRINT:PRI
NT"(1)FOOD","(6)AUTO","(2)HOME(I
T)","(7)CLOTHES","(3)HOME(EX)","
(8)PET&ENT.","(4)MEDICAL","(9)DE
POSIT","(5)YOU DEFINE":PRINT:PRI
NT"SELECT-1-2-3-4-5-6-7-8-9
1490 C$=INKEY$
1500 IFC$="1"THENB$="FOOD":GOTO1
540ELSEIFC$="2"THENB$="HOME(IT)"
:GOTO1540ELSEIFC$="3"THENB$="HOM
E(EX)":GOTO1540ELSEIFC$="4"THENB
$="MEDICAL":GOTO1540ELSEIFC$="5"
THENGOTO1530ELSEIFC$="6"THENB$="
AUTO":GOTO1540
1510 IFC$="7"THENB$="CLOTHES":GO
TO1540ELSEIFC$="8"THENB$="PET&EN
T.":GOTO1540ELSEIFC$="9"THENB$="
DEPOSIT":GOTO1540
1520 GOTO1490
1530 PRINT:INPUT"YOU DEFINE ";B$
1540 CLS:T=0
1550 PRINT@224,"SLECTED DATA IS
NOW BEING       PRINTED ON PAPER
"
1560 PRINT#-2,,"********** "B$"
IN  "OX$" **********"
1570 PRINT#-2
1580 PRINT#-2,"NUMBER","DATE","T
O","AMOUNT","FROM"
1590 PRINT#-2
1600 FORJ=1TON
1610 IFB$=S$(J)THENT=T+A(J)
1620 IFB$=S$(J)THENPL$=LEFT$(P$(
J),14)
1630 IFB$=S$(J)THENPRINT#-2,T$(J
),D$(J),PL$,:PRINT#-2,USING"$$##
##.##";A(J),:PRINT#-2,"      "F$(
J)
1640 NEXTJ
1650 PRINT#-2
1660 PRINT#-2,"TOTAL OF","  ****
* "B$" ***** IS",:PRINT#-2,USING
"$$####.##";T
1670 GOTO40
1680 T=0:B=0:C=0:D=0:E=0:F=0:G=0
:Q=0:S=0
1690 FORJ=1TON
1700 T=T+A(J)
1710 IFS$(J)="AUTO"THENB=B+A(J)
1720 IFS$(J)="FOOD"THENC=C+A(J)
1730 IFS$(J)="HOME(IT)"THEND=D+A
(J)
1740 IFS$(J)="HOME(EX)"THENQ=Q+A
(J)
1750 IFS$(J)="CLOTHES"THENE=E+A(
J)
1760 IFS$(J)="PET&ENT."THENF=F+A
(J)
1770 IFS$(J)="MEDICAL"THENG=G+A(
J)
1780 IFS$(J)="DEPOSIT"THENS=S+A(
J)
1790 IFS$(J)="DEPOSIT"THENT=T-A(
J)
1800 NEXTJ
1810 IFT=0THENPRINT"NO DATA IN F
ILE":GOTO 1450
1820 H=B/T*100:I=C/T*100:K=D/T*1
00:L=E/T*100:M=F/T*100:O=G/T*100
:R=Q/T*100:U=S-T
1830 CLS
1840 PRINT"CHECKS="INT(T)"BAL.="
INT(U)
1850 PRINT"AUTO   ="B,"OR"INT(H)
"%"
1860 PRINT"FOOD   ="C,"OR"INT(I)
"%"
1870 PRINT"HOME-I ="D,"OR"INT(K)
"%"
1880 PRINT"HOME-E ="Q,"OR"INT(R)
"%"
1890 PRINT"CLOTHES="E,"OR"INT(L)
"%"
1900 PRINT"PET&ENT="F,"OR"INT(M)
"%"
1910 PRINT"MEDICAL="G,"OR"INT(O)
"%"
1920 PRINT"AUTO":PRINT"FOOD":PRI
NT"HOME(IT)":PRINT"HOME(EX)":PRI
NT"CLOTHES":PRINT"PET&ENT.":PRIN
T"MEDICAL"
1930 Y=264:FORX=1TOH*.4:PRINT@Y+
X,CHR$(143+32);:NEXTX:PRINTINT(H
)"%"
1940 Y=296:FORX=1TOI*.4:PRINT@Y+
X,CHR$(143+48);:NEXTX:PRINTINT(I
)"%"
1950 Y=328:FORX=1TOK*.4:PRINT@Y+
X,CHR$(143+16);:NEXTX:PRINTINT(K
)"%"
1960 Y=360:FORX=1TOR*.4:PRINT@Y+
X,CHR$(143+96);:NEXTX:PRINTINT(R
)"%"
1970 Y=392:FORX=1TOL*.4:PRINT@Y+
X,CHR$(143+64);:NEXTX:PRINTINT(L
)"%"
1980 Y=424:FORX=1TOM*.4:PRINT@Y+
X,CHR$(128);:NEXTX:PRINTINT(M)"%
"
1990 Y=456:FORX=1TOO*.4:PRINT@Y+
X,CHR$(143+112);:NEXTX:PRINTINT(
O)"%"
2000 GOTO1460
2010 CLS:PRINT@12,"ENTRY#="(J)
2020 PRINT"(1)NUMBER  ="T$(J):PR
INT"(2)DATE    ="D$(J):PRINT"(3)
PAY TO  ="P$(J):PRINT"(5)ACCOUNT
 ="S$(J):PRINT"(6)AMOUNT  =";:PR
INTUSING"$$####.##";A(J):PRINT"P
RESS(7)TO CONTINUE":IFS$(J)="DEP
OSIT"THENPRINT"(4)PAY FROM="F$(J
)
2030 PRINT:PRINT"MAKE SELECTION-
-1-2-3-4-5-6-7
2040 C$=INKEY$
2050 IFC$="1"THENGOTO2070ELSEIFC
$="2"THENGOTO2080ELSEIFC$="3"THE
NGOTO2090ELSEIFC$="4"THENGOTO210
0ELSEIFC$="5"THENGOTO2110ELSEIFC
$="6"THENGOTO2130ELSEIFC$="7"THE
NGOTO600
2060 GOTO2040
2070 INPUT"TO CHANGE NUMBER TYPE
 NEW DATA  ";T$(J):GOTO2010
2080 INPUT"TO CHANGE DATE TYPE N
EW DATA    ";D$(J):GOTO2010
2090 INPUT"TO CHANGE PAY TO TYPE
 NEW DATA  ";P$(J):GOTO2010
2100 INPUT"TO CHANGE PAY FROM TY
PE NEW DATA";F$(J):GOTO2010
2110 PRINT"TO CHANGE ACCOUNT TYP
E NEW DATA":PRINT"AUTO","FOOD","
HOME(IT)","CLOTHES","HOME(EX)","
PET&ENT.","MEDICAL","DEPOSIT"
2120 INPUTS$(J):GOTO2010
2130 INPUT"TO CHANGE AMOUNT TYPE
 NEW DATA  ";A(J):GOTO2010
2140 CLS:PRINT@35,"OUTPUT DATA T
O DISK FILES":PRINT:PRINT"(1)OUT
PUT C.& D. TO DISK":PRINT"(2)OUT
PUR BK. STATEMENT TO DISK":PRINT
"(3)OUTPUT C.&D. W/BACKUP":PRINT
"(4)OUTPUT STATEMENT W/BACKUP":P
RINT"TYPE<M>TO GO TO MENU":PRINT
:PRINT"INPUT SELECTION 1-2-3-4
2150 PRINT:PRINT"BACKUP REQUIRES
 DISK IN DRIVE 1
2160 C$=INKEY$
2170 IFC$="1"THENGOTO2190ELSEIFC
$="2"THENGOTO2310ELSEIFC$="M"THE
NGOTO40ELSEIFC$="3"THENGOTO2190E
LSEIFC$="4"THENGOTO2310
2180 GOTO2160
2190 IFFREE(0)<2THENGOTO5470ELSE
PRINT@262,"WHAT MONTH-YEAR?":PRI
NT"       C.& D. EXAMPLE":PRINT
"  JAN-C-82  OR","JAN-C-83","  F
EB-C-82  OR","FEB-C-83"
2200 INPUTOX$
2205 IFLEN(OX$)>8THENPRINT"FILE
NAME TOO LONG":GOTO2200
2210 IF N=0 THENCLS: PRINT@224,"
NO DATA IN COMPUTER":FORX=1TO150
0:NEXTX:GOTO40
2220 GOTO3900
2230 OPEN"O",#1,OX$
2240 IFO>0THENFC$="OPEN"
2250 PRINT#1,N,FC$
2260 FORJ=1TON
2270 WRITE#1,T$(J),D$(J),P$(J),S
$(J),A(J),F$(J)
2280 NEXTJ
2290 IFC$="1"THENGOTO2400
2300 IFC$="3"THENGOTO2400
2310 IFFREE(0)<2THENGOTO5470ELSE
PRINT@262,"WHAT MONTH-YEAR?":PRI
NT@288,"      STATEMENT EXAMPLE"
:PRINT"  JAN-S-82  OR","JAN-S-83
","  FEB-S-82  0R","FEB-S-83"
2320 INPUTOM$
2325 IFLEN(OM$)>8THENPRINT"FILE
NAME TOO LONG":GOTO2320
2330 IF NK=0THENCLS:PRINT@224,"N
O DATA IN COMPUTER":FORX=1TO1500
:NEXTX:GOTO40
2340 GOTO4130
2350 OPEN"O",#1,OM$
2360 WRITE#1,CN,DN,NK,SA,SN,SC,S
T,SD
2370 FORK=1TONK
2380 WRITE#1,U$(K),AM$(K)
2390 NEXTK
2400 CLOSE#1
2410 IFC$="2"THENDRIVE0:SK=0
```

```
2420 IFC$="1"THENDRIVE0:SK=0
2430 IFC$="3"THENDRIVE1:SK=1:C$=
"1":CLS:PRINT@8,"BACKUP DRIVE 1"
:GOTO3900
2440 IFC$="4"THENDRIVE1:SK=1:C$=
"2":CLS:PRINT@8,"BACKUP DRIVE 1"
:GOTO4130
2450 GOTO40
2460 CLS:PRINT@35,"INPUT DATA FR
OM DISK FILES":PRINT:PRINT"(1)IN
PUT C.& D. FROM DISK":PRINT"(2)I
NPUT BK. STATEMENT FROM DISK":PR
INT"TYPE<M>TO GO TO MENU":PRINT:
PRINT"INPUT SELECTION -->1-2-M
2470 C$=INKEY$
2480 IFC$="1"THENGOTO2500ELSEIFC
$="2"THENGOTO2580ELSEIFC$="M"THE
NGOTO40
2490 GOTO2470
2500 PRINT@262,"WHAT MONTH-YEAR?
":PRINT@295,"C.& D. EXAMPLE":PRI
NT" JAN-C-82  OR","JAN-C-83","
 FEB-C-82  OR","FEB-C-83"
2510 INPUTOX$
2520 OPEN"I",#1,OX$
2530 INPUT#1,N,FC$
2540 FORJ=1TON
2550 INPUT#1,T$(J),D$(J),P$(J),S
$(J),A(J),F$(J)
2560 NEXTJ
2570 IFC$="1"THENGOTO2650
2580 PRINT@262,"WHAT MONTH-YEAR?
":PRINT@295,"STATEMENT EXAMPLE":
PRINT" JAN-S-82  OR","JAN-S-83"
,"  FEB-S-82  OR","FEB-S-83"
2590 INPUTOM$
2600 OPEN"I",#1,OM$
2610 INPUT#1,CN,DN,NK,SA,SN,SC,S
T,SD
2620 FORK=1TONK
2630 INPUT#1,U$(K),AM$(K)
2640 NEXTK
2650 CLOSE#1
2660 GOTO40
2670 CLS:INPUT"ENTER # OF CHECKS
 ON STATEMENT";CN
2680 INPUT"ENTER # OF DEPOSITS O
N STATEMENT";DN
2690 INPUT"ENTER MONTH OF STATEM
ENT";OM$
2700 INPUT"ENTER BALANCE ON STAT
EMENT";SA
2710 INPUT"ENTER INTREST ON STAT
EMENT";SN
2720 INPUT"ENTER SERVICE CHARGE
IF ANY";SC
2730 INPUT"ENTER TOTAL AMOUNT OF
 CHECKS";ST
2740 INPUT"ENTER TOTAL AMOUNT OF
 DEPOSITS";SD
2750 NK=CN+DN+1
2760 PRINT
2770 PRINT"INPUT C&D NUMBERS AND
 AMOUNTS
2780 PRINT"TYPE <XX> TO CHANGE L
AST ENTRY
2790 PRINT:PRINT"ENTER FIRST NUM
BER AND AMOUNT AS D-1 THEN THE A
MOUNT:PRINT
2800 FOR K=1TONK
2810 PRINT"#"K;:INPUT"CK OR DEPO
SIT NUMBER";U$(K)
2820 PRINT"#"K;:INPUT"CK OR DEPO
SIT AMOUNT";AM$(K)
2830 IF U$(K)="XX"THEN K=K-1:GOT
O2810
2840 NEXTK
2850 GOTO 40
2860 CLS:IFNK=0THENGOTO2330ELSEP
RINT#-PN,"(S)TATMENT "OM$" BL."S
A
2870 PRINT#-PN,"(C)HECKS "CN,"(D
)EPOSITS "DN
2880 PRINT#-PN," <NUMBER>
 <AMOUNT>
2890 NK=CN+DN+1
2900 GOTO4750
2910 PRINT#-PN,"****************
***************"
2920 CLS:PRINT#-PN:PRINT#-PN:PRI
NT#-PN,"(E)TOTAL CHECKS**=";:PRI
NT#-PN,USING"$$####.##";ST:PRINT
#-PN,"(F)TOTAL DEPOSITS=";:PRINT
#-PN,USING"$$####.##";SD
2930 PRINT#-PN,"(G)INTREST******
*=  ";:PRINT#-PN,USING"$$##.##";
SN:PRINT#-PN,"(H)SERVICE CHARGE=
  ";:PRINT#-PN,USING"$$##.##";SC
2940 PRINT
2950 IFCP$="3"THENPN=0
2960 GOSUB4890:GOTO40
2970 CLS:PRINT@192,"DATA IS NOW
BEING SAVED ON TAPE"
2980 OPEN"O",#-1,"STATEMENT"
2990 PRINT#-1,CN,DN,KN,SA,SN,SC,
ST,SD
3000 FORK=1TONK
3010 PRINT#-1,US(K),AM$(K)
3020 NEXTK
3030 GOTO920
3040 CLS:PRINT@192,"DATA IS NOW
BEING LOADED IN"
3050 OPEN"I",#-1,"STATEMENT"
3060 INPUT#-1,CN,DN,KN,SA,SN,SC,
ST,SD
3070 FORK=1TONK
3080 INPUT#-1,U$(K),AM$(K)
3090 NEXTK
3100 GOTO1070
3110 IFN=0THENGOTO2210ELSECLS:PR
INT"BALANCING CK BOOK WITH STATE
MENT"
3120 PRINT@38,"<LIST OF PROCEDUR
E>"
3130 PRINT"(1)INPUT STATEMENT DA
TA":PRINT"(2)INPUT LAST MONTHS C
K DATA":PRINT"(3)ENTER<B>BALANCE
 STATEMENT":PRINT"(4)OUTPUT LAST
 MONTHS CK DATA"
3140 PRINT"(5)INPUT THIS MONTHS
CK DATA":PRINT"(6)ENTER<B>BALANC
E STATEMENT":PRINT"(7)OUTPUT THI
S MONTHS CK DATA"
3150 PRINT:PRINT"(A)TO INPUT OR
OUTPUT DAT(MENU)":PRINT"(B)TO BA
LANCE STATEMENT":PRINT"MAKE SELE
CTION-->A-B
3160 CC$=INKEY$
3170 IF CC$="A"THENGOTO40ELSEIFC
C$="B"THENGOTO3190
3180 GOTO3160
3190 CLS:PRINT@160,"(1)BALANCE W
ITH PRINTER":PRINT"(2)BALANCE WI
THOUT PRINTER":PRINT:PRINT"MAKE
SELECTION--1-2
3200 CC$=INKEY$
3210 IF CC$="1"THENGOTO3230ELSEI
FCC$="2"THENGOTO3230
3220 GOTO3200
3230 CLS:PRINT@236,"WORKING"
3240 IFCC$="1"THENGOTO3510
3250 O=0:TA=SA:T=0
3260 FORJ=1TON
3270 FORK=1TONK
3280 AM(K)=VAL(AM$(K))
3290 IFT$(J)=U$(K)AND A(J)<>AM(K
)THENGOTO3800
3300 IFT$(J)=U$(K)THENT$(J)=T$(J
)+"C":GOTO3410
3310 IFRIGHT$(T$(J),1)="C"THENGO
TO3410
3320 NEXTK
3330 IFT>0THENGOTO3360
3340 IFO>0THENGOTO3360
3350 CLS:PRINT"OUTSTANDING CHECK
S AND DEPOSITS"
3360 TA=TA-A(J):O=O+A(J)
3370 IFS$(J)="DEPOSIT"THENT=T+A(
J)
3380 IFS$(J)="DEPOSIT"THENTA=TA+
(A(J)*2)
3390 IFS$(J)="DEPOSIT"THENO=O-A(
J)
3400 PRINTT$(J)"*"D$(J)"*"P$(J),
:PRINTUSING"$$####.##";A(J)
3410 NEXTJ
3420 PRINT
3430 CLS:PRINT@128,"TOTAL OF OUT
 DEPOSITS=";:PRINTUSING"$$####.#
#";T
3440 PRINT"TOTAL OF OUT CHECKS=
 ";:PRINTUSING"$$####.##";O
3450 IFO=0THENFC$="CLOSED"
3460 IFO>0THENFC$="OPEN"
3470 PRINT"CHECK BOOK SHOULD BE
 ";:PRINTUSING"$$####.##";TA-SN+
SC
3480 PRINT"SUBTRACT SERVICE CHAR
GE ";:PRINTUSING"$$##.##";SC:PRI
NT"ADD INTREST IF ANY      ";:PR
INTUSING"$$##.##";SN:PRINT"NEW C
HECK BOOK BALANCE";:PRINTUSING"$
$####.##";TA
3490 PRINT
3500 GOTO1450
3510 O=0:T=0:TA=SA
3520 FORJ=1TON
3530 FORK=1TONK
3540 IFT$(J)=U$(K)THENT$(J)=T$(J
)+"C":GOTO3700
3550 IFRIGHT$(T$(J),1)="C"THENGO
TO3700
3560 NEXTK
3570 IFO>0THENGOTO3630
3580 IFT>0THENGOTO3630
3590 PRINT#-2,"*************** W
ITH "OM$" BANK STATEMENT *******
********
3600 PRINT#-2
3610 PRINT#-2,"                OUT
STANDING CHECKS AND DEPOSITS
3620 PRINT#-2
3630 TA=TA-A(J):O=O+A(J)
```


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VISA

```
3640 IFS$(J)="DEPOSIT"THENTA=TA+
(A(J)*2)
3650 IFS$(J)="DEPOSIT"THENO=O-A(
J)
3660 IFS$(J)="DEPOSIT"THENT=T+A(
J)
3670 PL$=MID$(P$(J),1,15)
3680 PRINT#-2,T$(J),D$(J),PL$,
3690 PRINT#-2,USING"$$####.##";A
(J)
3700 NEXTJ
3710 PRINT#-2,"TOTAL OF OUTSTAND
ING DEPOSITS=",:PRINT#-2,USING"$
$####.##";T
3720 PRINT#-2,"TOTAL OF OUTSTAND
ING CHECKS=",:PRINT#-2,USING"$$#
###.##";O
3730 IFO>0THENFC$="OPEN"
3740 IFO=0THENFC$="CLOSED"
3750 PRINT#-2,"CHECK BOOK SHOULD
 BE",:PRINT#-2,USING"$$####.##";
TA-SN+SC
3760 PRINT#-2,"SUBTRACT SERVICE
CHARGE OF",:PRINT#-2,USING"$$###
#.##";SC
3770 PRINT#-2,"ADD INTREST OF",,
:PRINT#-2,USING"$$####.##";SN
3780 PRINT#-2,"NEW CHECK BOOK BA
LANCE IS ",:PRINT#-2,USING"$$###
#.##";TA
3790 GOTO1450
3800 CLS:PRINT@160,"CHECK#"T$(J)
" AMOUNT DOSEN'T":PRINT"AGREE WI
TH STATEMENT AMOUNT"
3810 PRINT:PRINT"          CHECKBO
OK
3820 PRINT"#"T$(J)" "D$(J)" "P$(
J)" "A(J)
3830 PRINT"          STATEMENT
3840 PRINT"#"U$(K),AM$(K)
3850 PRINT:PRINT"(1)CHECKBOOK NU
MBER":PRINT"(2)CHECKBOOK AMOUNT"
:PRINT"(3)STATEMENT NUMBER":PRIN
T"(4)STATEMENT AMOUNT
3860 PRINT:PRINT"WHICH ONE TO CH
ANGE 1-2-3-4
3870 WTC$=INKEY$
3880 IFWTC$="2"THENGOTO5150ELSEI
FWTC$="1"THENGOTO5430ELSEIFWTC$=
"4"THENGOTO5170ELSEIFWTC$="3"THE
NGOTO5450
3890 GOTO3870
3900 S=3
3910 DSKI$SK,17,S,A$,B$
3920 G$=OX$
3930 J$=MID$(A$,1,8)
3940 IFG$=J$THENGOTO4050
3950 H$=MID$(A$,33,8)
3960 IFG$=H$THENGOTO4050
3970 E$=MID$(A$,65,8)
3980 IFG$=E$THENGOTO4050
3990 I$=MID$(A$,97,8)
4000 IFG$=I$THENGOTO4050
4010 IFFL=0THENA$=B$:FL=1:GOTO39
30
4020 S=S+1:FL=0
4030 IFLEFT$(A$,1)=CHR$(255)THEN
GOTO2230
4040 GOTO3910
4050 CLS:IFSK=0THENPRINT@12,"DRI
VE 0"
4060 IFSK=1THENPRINT@12,"DRIVE 1
"
4070 PRINT"THERE IS ALREADY A FI
LE ON THIS DISK NAMED "OX$
4080 PRINT"DO YOU WANT TO WRITE
OVER THE   OLD FILE?"
4090 PRINT:PRINT"(Y)YES":PRINT"(
N)NO":PRINT:PRINT"MAKE SESECTION
-->Y-N
4100 CC$=INKEY$
4110 IFCC$="Y"THENGOTO2230ELSEIF
CC$="N"THENGOTO40
4120 GOTO4100
4130 S=3
4140 DSKI$SK,17,S,A$,B$
4150 G$=OM$
4160 J$=MID$(A$,1,8)
4170 IFG$=J$THENGOTO4280
4180 H$=MID$(A$,33,8)
4190 IFG$=H$THENGOTO4280
4200 E$=MID$(A$,65,8)
4210 IFG$=E$THENGOTO4280
4220 I$=MID$(A$,97,8)
4230 IFG$=I$THENGOTO4280
4240 IFFL=0THENA$=B$:FL=1:GOTO41
60
4250 S=S+1:FL=0
4260 IFLEFT$(A$,1)=CHR$(255)THEN
GOTO2350
4270 GOTO4140
4280 CLS:IFSK=0THENPRINT@12,"DRI
VR 0"
4290 IFSK=1THENPRINT@12,"DRIVE 1
"
4300 PRINT"THERE IS ALREDY A FIL
E ON THIS  DISK NAMED "OM$
4310 PRINT:PRINT"DO YOU WANT TO
WRITE OVER THE   OLD FILE?"
4320 PRINT"(Y)YES":PRINT"(N)NO":
PRINT:PRINT"MAKE SELECTION-->Y-N
"
4330 CC$=INKEY$
4340 IFCC$="Y"THENGOTO2350ELSEIF
CC$="N"THENGOTO40
4350 GOTO4330
4360 CLS:PRINT:PRINT"  ALL FILES
 (JAN-DEC) SEARCH
4370 PRINT:PRINT"ENTER<M>TO GO T
O MENU
4380 PRINT:POKE 35,127:POKE 36,2
54
4390 INPUT"ENTER NAME OF CHECK F
OR SEARCH ";AA$
4395 IFAA$="M"THENGOTO40
4400 INPUT"WHAT YEAR 83,84,85,EC
T.";WY$
4410 IFWY$="M"THENGOTO40
4420 TC=0
4430 PRINT#-2,"          *******
*** SEARCH ALL FILES (JAN-DEC) *
*********"
4440 PRINT#-2
4450 BB$="JAN-C-"+WY$:GOSUB5190:
GOSUB4620
4460 BB$="FEB-C-"+WY$:GOSUB5190:
GOSUB4620
4470 BB$="MAR-C-"+WY$:GOSUB5190:
GOSUB4620
4480 BB$="APR-C-"+WY$:GOSUB5190:
GOSUB4620
4490 BB$="MAY-C-"+WY$:GOSUB5190:
GOSUB4620
4500 BB$="JUN-C-"+WY$:GOSUB5190:
GOSUB4620
4510 BB$="JUL-C-"+WY$:GOSUB5190:
GOSUB4620
4520 BB$="AUG-C-"+WY$:GOSUB5190:
GOSUB4620
4530 BB$="SEP-C-"+WY$:GOSUB5190:
GOSUB4620
4540 BB$="OCT-C-"+WY$:GOSUB5190:
GOSUB4620
4550 BB$="NOV-C-"+WY$:GOSUB5190:
GOSUB4620
4560 BB$="DEC-C-"+WY$:GOSUB5190:
GOSUB4620
4570 PRINT:PRINT"END OF FILES
4580 FOR X=1 TO 80:PRINT#-2,"-";
:NEXT X
4590 PRINT#-2,""
4600 PRINT#-2,"TOTAL",,,,:PRINT#
-2,USING"$$####.##";TC
4610 FORX=1TO500:NEXTX:GOTO40
4620 PRINTBB$
4630 OPEN"I",#1,BB$
4640 INPUT#1,N,FC$
4650 FORJ=1TON
4660 INPUT#1,T$(J),D$(J),P$(J),S
$(J),A(J),F$(J)
4670 NEXTJ
4680 CLOSE#1
4690 FORJ=1TON
4700 IF LEFT$(AA$,3)=LEFT$(P$(J)
,3)THENPRINT#-2,T$(J),D$(J),P$(J
),S$(J),:PRINT#-2,USING"$$####.#
#";A(J)
4710 IF LEFT$(AA$,3)=LEFT$(P$(J)
,3) THEN TC=TC+A(J)
4720 NEXTJ
4730 POKE 35,127:POKE 36,234
4740 RETURN
4750 FORK=1TONK
4760 AM(K)=VAL(AM$(K))
4770 PRINT#-PN, K" #"U$(K),:PRIN
T#-PN,USING"$$####.##";AM(K)
4780 IFCP$="3"THENGOTO4850
4790 IF K=11THEN GOSUB 4890
4800 IF K=25THEN GOSUB 4890
4810 IF K=39THEN GOSUB 4890
4820 IF K=53THEN GOSUB 4890
4830 IF K=67THEN GOSUB 4890
4840 IF K=81THEN GOSUB 4890
4850 NEXTK
4860 GOSUB 4890:GOTO2910
4870 INPUT"TO CHANGE ENTER FIRST
 NUMBER";XS
4880 IF XS>NK THEN GOTO 4870
4890 IFCP$="3"THENRETURNELSEPRIN
T"PRESS<ENTER>TO CONTINUE"
4900 INPUT"ENTER FIRST DIGIT TO
CHANGE";XS$
4910 IF XS$=""THEN RETURN
4920 IF VAL(XS$)>NK THEN GOTO 49
00
4930 IFXS$="S"THENGOTO5120
4940 IFXS$="C"THENGOTO5130
4950 IFXS$="D"THENGOTO5140
4960 IFXS$="E"THENGOTO5080
4970 IFXS$="F"THENGOTO5090
4980 IFXS$="G"THENGOTO5100
4990 IFXS$="H"THENGOTO5110
5000 CLS:K=VAL(XS$)
5010 AM(K)=VAL(AM$(K)):PRINT"#"U
$(K),:PRINTUSING"$###.##";AM(K)
5020 PRINT:PRINT"1>TO CHANGE NUM
BER":PRINT"2>TO CHANGE AMOUNT":P
RINT"3>TO CONTINUE":PRINT:PRINT"
MAKE SELECTION 1-2-3
5030 C$=INKEY$
5040 IFC$="1"THENGOTO5060ELSEIFC
$="2"THENGOTO5070ELSEIFC$="3"THE
NRETURN
5050 GOTO5030
5060 PRINT:INPUT"TYPE NEW NUMBER
";U$(K):CLS:GOTO5010
5070 PRINT:INPUT"TYPE NEW AMOUNT
";AM$(K):CLS:GOTO5010
5080 INPUT"ENTER NEW CHECKS TOTA
L";ST:GOTO2920
5090 INPUT"ENTER NEW DEPOSITS TO
TAL";SD:GOTO2920
5100 INPUT"ENTER NEW INTREST";SN
:GOTO2920
5110 INPUT"ENTER NEW SERVICE CHA
RGE";SC:GOTO2920
5120 INPUT"ENTER NEW STATEMENT B
AL,";SA:GOTO2860
5130 INPUT"ENTER NEW NUMBER OF C
HECKS";CN:GOTO2860
5140 INPUT"ENTER NEW NUMBER OF D
EPOSITS";DN:GOTO2860
5150 INPUT"NEW CHECKBOOK AMOUNT"
;A(J)
5160 CLS:PRINT@236,"WORKING":GOT
O3250
5170 INPUT"NEW STATEMENT AMOUNT"
;AM$(K)
5180 GOTO5160
5190 S=3
5200 DSKI$0,17,S,A$,B$
5210 G$=BB$
5220 J$=MID$(A$,33,8)
5230 IFG$=J$THENRETURN
5240 H$=MID$(A$,1,8)
5250 IFG$=H$THENRETURN
5260 E$=MID$(A$,65,8)
5270 IFG$=E$THENRETURN
5280 I$=MID$(A$,97,8)
5290 IFG$=I$THENRETURN
5300 IFFL=0THENA$=B$:FL=1:GOTO52
20
5310 S=S+1:FL=0
5320 IFLEFT$(A$,1)=CHR$(255)ANDS
```

```
>10THENGOTO4570
5330 GOTO5200
5340 PCLEAR1:GOTO20
5350 FORX=1000TO1010
5360 READA:POKEX,A
5370 NEXTX
5380 POKE383,126:POKE384,3:POKE3
85,232:POKE422,126:POKE423,3:POK
E424,232
5390 DATA52,16,142,0,1
5400 DATA189,167,211,53
5410 DATA16,57
5420 RESTORE:GOTO5480
5430 INPUT"NEW CHECKBOOK NUMBER"
;T$(J)
5440 GOTO5160
5450 INPUT"NEW STATEMENT NUMBER"
;U$(K)
5460 GOTO5160
5470 CLS:PRINT@224,"DISK FULL RE
PLACE DISK":FORX=1TO1500:NEXTX:G
OTO40
5480 CLS:POKE1003,125
5490 DIR
5500 POKE1003,0
5510 PRINT:PRINT"FREE GRANULES="
;:PRINTFREE(0)
5520 PRINT"PRESS<M>TO GO TO MENU
5530 C$=INKEY$:IFC$="M"THENGOTO4
0ELSEGOTO5530
```

THIS 'N THAT

Continued from page 1

With the knowledge that '68' Micro Journal was not reaching the majority of the Color Computer Users due to it's advanced level of material, we began seriously considering publishing a "pure Color Computer" magazine also. At the time, there was a couple of well established Magazines already on line, and several more "coming out", so we decided to see what would happen (relying on a single manufacturer and a single computer to support 5 or 6 magazines seemed a little shaky). The decision to go ahead with the Color Micro Journal was based on many factors.

There have been many rumors floating around about what Radio Shack will do with the Color Computer and compatible computers, from dropping the Color Computer to a new "Super" Color Computer. The normal Radio Shack policies of not releasing any SOLID information on their future plans leaves any one relying on their products with the feeling that they are skating on thin ice. Witness the IBM PC; the day it hit the store, there was a LARGE amount of Software and Hardware available for it. WHY? Because IBM released the information needed by those that were going to provide independent support for the computer in time for it to have a viable base of Software and Hardware WHEN the computer was available. The Color Computer floated along for a YEAR before MUCH decent Software became available, and about the time we start seeing some decent Software for it, they change the ROMs and it is back to the drawing board for a lot of the writers. It should be evident by now, to ANYONE, that the amount of OUTSIDE Software and Hardware support available for a personal computer system has a MAJOR effect on it's sales potential. I think we will see a so-called "Super" CoCo from Radio Shack in the future, but that is only my OPINION. They sure will be missing the boat if they DON'T make some "real use" of the 6809 Systems.

It IS fairly certain that they will announce a 64K Color Computer which will sell for $399; possibly around the end of July. We also think that they will announce the availability of the

STAR—KIBBITS

I'd like to thank all of you who stopped by our booth at the Color Computer show in Chicago in April. I certainly enjoyed meeting so many old friends and new customers, and had a delightful time. We even managed to liven up the last day of the show by raffling away a TV set and holding a Dutch auction. Sure hope there's another show soon!

If you have a disk system, I'd like to urge you to use the verify option. Before saving to the disk, type VERIFY ON (or include it in a program). After the disk system writes to the disk it reads the data back to make sure it was written properly. While this really slows everything down, it's a worthwhile precaution to help guard against loss of programs or data. (Quite common in other systems, too.)

Several customers have asked about our update policy. It's fairly simple: within 90 days of purchase, an update is free — just return the original disk or cassette. After 90 days an update costs $10 (to make things interesting, we will also accept one pre-1965 silver dollar.)

We also have a liberal policy on software upgrades. If you now own HUMBUG or STAR-DOS, we will give you full credit toward the 64K versions. That means that 64K HUMBUG will cost you just $20 more, while 64K STAR-DOS will cost you just $25 more.

What, you say, is so special about the 64K versions? Quite a bit. STAR-DOS 64, for example, provides upper and lower case display with 40, 51, or 64 characters per line; it can be used with 35-, 40- or 80-track drives, single-or double density, single- or double-sided. But, aside from the fact that it provides a simple, straightforward interface to the disk, a very interesting aspect is its compatibility with other 6809 operating systems. For example, many programs written for FLEX™ (a trademark of Technical Systems Consultants Inc.) will also work with STAR-DOS 64. We are using TSC's text editor and macro assember with STAR-DOS right now. They work just fine, but the big difference is that their disk format is compatible with other software for the Radio Shack disk system.

As to 64K HUMBUG, that's an intersting story too. This HUMBUG runs as a utility under either STAR-DOS 64 or Flex (that's right, the same HUMBUG runs with either — it even runs on bigger systems using Flex.) That makes HUMBUG unique — it is the only monitor that runs under Color Computer Flex. HUMBUG provides all the facilities that are needed for machine and assembly language programming and debugging in a 64K environment. You can start and stop programs, insert breakpoints, even single-step through programs. There is just no other way to do these things in a 64K Color Computer!

One of the problems with a monthly column is keeping up with publishing deadlines. As you probably noticed last month, I have already fallen behind. But at least there is one consolation — the sooner you fall behind, the more time you have to catch up. See you next month.

SPELL 'N FIX

Regardless of whose text processor you use, let SPELL 'N FIX find and fix your spelling and typing mistakes. It reads text faster than you can, and spots and corrects errors even experienced proofreaders miss. It is compatible with all Color Computer text processors. $69.29 in the Radio Shack disk or cassette versions; $89.29 in the Flex version. (20,000 word dictionary is standard; optional 75,000 word Super Dictionary costs $50 additional.)

HUMBUG — THE SUPER MONITOR

A complete monitor and debugging system which lets you input programs and data into memory, list memory contents, insert multiple breakpoints, single-step, test, checksum, and compare memory contents, find data in memory, start and stop programs, upload and download, save to tape, connect the Color Computer to a terminal, printer, or remote computer, and more. HUMBUG on disk or cassette costs just $39.95, special 64K version for FLEX or STAR-DOS 64 costs $59.95

STAR—DOS

A Disk Operating System specially designed for the Color Computer, STAR-DOS is fully compatible with your present Color Computer disk format — it reads disks written by Extended Disk Basic and vice versa. STAR-DOS for 16K or 32K systems costs $49.90; STAR-DOS 64 for 64K systems costs $74.90.

STAR FLEX

The best implementation of FLEX for the Color Computer. Complete with all utilities, text editor, macro assembler, and HUMBUG debug monitor, $250.00.

ALL IN ONE — Editor Etc.

Three programs in one — a full function Editor, a Text Processor and a Mailing List/Label program. All this for just $50. Requires STAR-DOS and 32K, or STAR-DOS 64, or FLEX, specify which.

DBLS for Data Bases

DBLS stands for Data Base Lookup System. A super-fast system for searching for a selected record in a sequential disk file. Supplied with SPELL 'N FIX's 20,000 word dictionary as a sample data file — lets you look up the spelling of any word in under FOUR seconds. Priced at $29.95. Requires STAR-DOS.

CHECK 'N TAX

Home accounting package combines checkbook maintenance and income tax data collection. Written in Basic for either RS Disk or Flex, $50.

REMOTERM

REMOTERM — makes your CoCo into a host computer, operated from a remote terminal. $19.95.

NEWTALK

NEWTALK — a memory examine utility for machine language programmers which reads out memory contents through the TV set speaker. $20.

SHRINK

SHRINK — our version of Eliza, in machine language and extremely fast. $15.

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STAR-KITS

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OS-9 Operating System at the same time. The new Radio Shack Price List contains a Part Number 26-3030 with a list price of $69.95, and a Part Number 26-3036 with a list price of $99.95. Although there is no description of either of these parts, we understand that P/N 26-3030 is the **OS-9 Operating System including the Editor, Assembler, and DeBug.** This is a Standard OS-9 Level 1 System except that the Disk Format is different from that used by GIMIX, HELIX, etc. P/N 26-3036 is thought to be **BASIC09.** The features of BASIC09 are almost unbelievable. It is an extremely fast BASIC Language that was developed specifically for the 6809, and will run standard BASIC instructions and programs while **ALSO** having the capability of running most Pascal Programs **WITH VERY LITTLE CHANGE.** It includes a powerful text editor, multipass compiler, a run-time interpreter, a high-level interactive debugger, and a system executive. **WOW!!** OS-9 and BASIC09 are products of **Microware Systems Corp.** (see Advertisement this issue).

OS-9 is an extremely POWERFUL Operating System which supports many UNIX style operations. This ALSO means that it is an EXTREMELY COMPLEX Operating System. If you are just learning to get along with the Radio Shack Disk Operating System, or the FLEX Disk Operating System, be ready to spend a **LOT** OF **TIME** learning to use this System. I'm NOT suggesting that you do not get OS-9, I just want you to begin WITH YOUR EYES WIDE OPEN. If Radio Shack can come up with a set of Manuals to make the use of this Operating System understandable to the new computer user, THEY WILL HAVE ACCOMPLISHED THE COUP OF THE CENTURY. If you are an old hand with UNIX, you will have little problem. One thing is for certain; you will be the **Big Man On Campus** when you get OS-9 running on your "little old Game Machine".

Then there is the "Baby CoCo", or the Model 10. This one is a puzzle! Rather than sticking with the 6809 Chip with SOME compatibility with something they already have, they go off on a tangent and install a 6803 CPU. Don't get me wrong, the 6803 is a good Chip, but **NO ONE** that was supporting the Color Computer has a 6803 Assembler, or was ready in any other way to support that computer. Also, as is normal, Radio Shack is not using much of the 6803's capabilities in the Model 10. "The Word" has it that that computer was to be competition for VIC-20s, Sinclairs, etc. Well, it COULD be a lot more computer than either of those machines **WITH THE PROPER SUPPORT!!** But, "The Word" also has it that they did not expect the Sinclairs to go down to $25 in K-Marts, etc., and that they only produced ONE production run of the Model 10 and are undecided what to do with it now (see what the problems are with NO SOLID INFORMATION from Tandy - would YOU want to invest MONTHS of YOUR time and several hundred dollars to support a computer that you had "heard" may not be continued long enough for you to even get your product on the market??).

We DO **KNOW** where **DRAGON DATA** expects to be in the next year. First, in partnership with **TANO CORP.** at 4301 Poche Court West, New Orleans, LA 70129, there will be a 64K **DRAGON 64** available in early August which will sell for $399 and be set up for the US TV Systems with an RS-232 Port for compatibility with the RS Color Computer. THEY are actively pursuing getting **OS-9** running on the DRAGON 64 (target availability is Sept - Oct '83), and **TANO** will also be selling other ALREADY ANNOUNCED products such as a **twin 6809** based Computer aimed at the Business and Educational Market. DRAGON DATA has also announced a computer (targeted for next year) that will have a unique bus structure which will run **68000-based and 8086-based software either individually or both together.** (The above information came from an interview with Tony Clarke, Dragon Data's managing director, as published in the July 1983 Issue of **DRAGON USER** - distributed by SM Distribution, 16-18 Trinity Gardens, London SW9 England.)

Between the Radio Shack "rumors" and the announcement from Dragon Data, it appears that at least something similar to a Color Computer, as we know it, will be around for a while. Let me add that Radio Shacks history leads one to believe that any new "Color Computer" will at least have some compatibility with the Color Computer that we now know, and that they will NOT drop ALL SUPPORT for it (they are still providing some support for the Model I).

Since it appears that there will be something to build a magazine around for the next few years, what can **Color Micro Journal** accomplish that is not already being covered by other magazines? For starters, our connection with **'68' Micro Journal** gives us an edge in providing information about the new Operating Systems that will be available for the Color Computer and Dragon Systems; **FLEX** (which has been running on the Color Computer for a couple of years now, and is the Operating System that has a MULTITUDE of readily available Software including major Data Base Management Systems, Business Programs, Word Processors, Programming Languages, etc.), **OS-9** (a Multi-Tasking Operating System similar to UNIX), and possibly **UniFLEX** (a Multi-User Multi-Tasking Operating System which is a little more similar to UNIX). We also feel that there is a need for a Magazine that will allow advertising at a rate that new producers of Color Computer products can afford; a need for a Magazine that has **INFORMATION** for new users as well as the "old pros"; a Magazine that helps **YOU** learn MORE about your computer, what is AVAILABLE for it, and HOW TO USE what IS available for it. The major thrust of **Color Micro Journal** is toward **USING** your Computer.

Color Micro Journal is a Magazine
FOR Color Computer USERS
BY Color Computer USERS!

We, the staff of **Color Micro Journal,** need **YOUR** help in making this a Magazine for **YOU.** Believe it or not, what YOU are interested in is the same thing that several thousand OTHER Color Computer Users are interested in. The questions YOU have are being asked by thousands of others. It is a well know fact that the majority of the GOOD Software is developed by a Personal Computer User that had a problem to solve, and did not have to solve it within a limited period of time to be able to put food on the table. If you have developed a Program to solve a problem, pass it on; it is just what some other Color Computer User needs. If you have developed a Hardware Modification, send it in. Trying to get the Computer turned on? Drop us a note; we'll publish it and you may be surprised at how many replies you will get, and how many different ways a computer can be turned on. Seriously, if you are stumped, yell for help! The Color Computer has been in the field long enough that the large majority of the problems have been solved by SOMEONE. conversely, if YOU have solved a problem, send that solution in; it will help a LOT of other users who have the same problem.

The "Tabloid" Format of **Color Micro Journal** was chosen for several reasons. First, is drastically reduces the cost of printing a magazine, which we can pass on to the Readers and Advertisers. Second, it drastically reduces the lead time required for actually printing the magazine, providing the most up-to-date information to the reader. Third, it is easier to read than a "glossy" page. And, fourth, it is a "relaxed, informal" medium of information transfer that we hope will be the hallmark of the **Color Micro Journal** Magazine. We hope to minimize OUR work by publishing your submissions just like we receive them. This helps YOU, the reader, in two ways; we need less staff, meaning lower magazine costs, and, more important, there is MUCH LESS CHANCE FOR ERRORS in Programs, Articles, etc., that you read. As I said, **Color Micro Journal** is a Magazine **FOR** the Color Computer USERS **BY** the Color Computer USERS. All we are doing here at **Computer Publishing Inc.** is providing YOU with a vehicle and central location for SHARING INFORMATION. The material YOU provide, and the questions YOU ask, determine WHAT goes into YOUR Magazine.

OK; what format can we work with effectively? We can work with ANY type of **ASCII** Format - a DATA File on Color Computer Tape or Disk, a .TXT File in FLEX Format, etc. Of course, we can easily work with either a Tape or Disk **BASIC Program.** If you have a Word Processor and can send an ASCII File from it on either Tape or Disk, no problem. If not, then send any text (again, if you are also sending a BASIC Program, just send the Program in Binary Format on Tape or Disk), either Typed or Printed (**WITH A GOOD RIBBON**) with a MAXIMUM of **40 Characters per Line** (no more than 4.0 inches wide), single spaced, and we can take it from there. If you have a question, drop me a line. What kind of Programs and Articles are we looking for? ANYTHING relevant to the present or future "Color Computer" types of Computers; the Model 10 "Baby CoCo", the TRS-80C Color Computer, the DRAGON and its

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ancestors, etc. Remember, these computers are being purchased by new owners every day, so what may seem like "old hat" to you may be just exactly what THEY need to know. Hopefully, there will be something for every one in each issue; from the basics to advanced Machine Language information, covering both Hardware and Software. Again, if it interests YOU, there are a lot of other people in the SAME boat.

One of the most popular sections of the **'68' Micro Journal** over the years has been a section of the Magazine we call the "Bit Bucket". This section consists of letters, short programs, routines, etc., THAT ACCOMPLISH SOME TASK. We will install a section like the "Bit Bucket" in the **Color Micro Journal,** and will give you a **minimum** of a **6 MONTH EXTENSION** to your Subscription for the **Color Micro Journal** for any short program, routine, operating hint, hardware fix, or whatever, that we accept for publication (many of the subscribers to **'68' Micro** maintain their subscriptions in this manner). Get on the band wagon and send in your "secrets" TODAY!

I hope you find some useful information in Issue Number 1 of **Color Micro Journal.** Let us know what you like and dislike; the Magazine will be as good as YOU make it.

Robert L. Nay
Editor

COMPUTER *TAPES?*

When I started learning about computers in general and Co Co in particular it seemed the most natural thing in the world to use cassette tapes and recorders to store information. This likely had something to do with the fact that I was doing a lot of custom cassette recording and duplicating. And the truth is that I am still intrigued by the use of such simple and fairly inexpensive systems with relatively powerful computers. I think even more could be done.

But, there are a few things that seem to get overlooked by some folks whose only exposure to cassette may have been in computer applications. I'll try to note some of the things that may be helpful to the non-audio user.

One of the first things that caught my eye was that programs were being developed and sold to solve various problems that can occur when trying to make copies of certain programs. As a computer neophyte, I don't pretend to understand just what the problems are. I'm so new the warrantee hasn't even run out on my first computer - a CoCo, of course. But I do know that regardless of the nature or format of the save, almost any half decent cassette recorder with a patch cord or two from your nearest audio or electronics shop will copy, sound for sound, whatever is on your tape to or from another similar recorder.

You may have to experiment with various combinations of volume and tone - yes I said tone - controls. But, sooner or later you will find a combination that works. After I get one to work I like to experiment further to find the upper and lower limits of usable settings and use settings that are in the middle of the range. Your owners manual should tell you how to record from other machines. On less expensive ones the AUX input will often record from earphone or speaker jacks. First, try copying music or voice. If it sounds clean it should work for computer tapes.

Oh yes! Don't forget to write down the combination that works, when you find it.

I mentioned that tone controls might make a difference in your success. Of course, some of you don't even have any such controls. But, just because you can't change your bass or treble, don't give up yet. Although the presence of tone controls often indicates a better quality recorder this is not always so. Even if your recorder is not a better quality machine chances are that you can still find a combination that will work. As a matter of fact, you may benefit from the considerable differences sometimes found between one tape and another. Some tapes are obviously more bass or treble than others, given the same recording conditions. usually a treble sounding tape will give a good boost to the upper voltage. On really good systems it us usually better not to use Dolby and other equalizations.

Speaking of differences in tapes, I find the idea of paying near three dollars for a "computer tape" apalling. There are definitely different quality tapes. But, the tape that can't handle the frequency requirements of cassette I/O probably hasn't been made. And other requirements have really little to do with computers. I am referring to requirements like leaderless tapes.

Personally, I almost prefer having a leader tape over a leaderless one. With a leader tape I can start the recorder (in record mode) on the leader and as it sweeps onto the tape I am sure it has erased anything that may have been near the beginning. Similarly, I continue on record a short distance beyond the end of a save. This removes any unhealthy spikes from the area. Also, if I want to locate that segment by listening the space will both identify the end/start and leave room for hand queing.

My next point applies to recording of any kind. Regardless of the name on the package, if the tape has a dull rough finish on the oxide side (the side facing out in a cassette) it's like running fine sandpaper over one spot on your recorder. It will wear a groove in head or heads much earlier than normal. When I am buying tape the very first thing I look for is this smooth shiny finish on the side you normally see in the cassettes ports. Not just on the back which is almost always shiny. Finding a good finish is usually a problem with "dime store" packs. I don't even look at them any more.

Where can you buy economical tapes that are worth having? Audio supply houses all over are advertising tapes. If you can get a look at them you may do quite well at as low as fifty cents each. If you have a club or several friends you can buy in boxes of a hundred and get such prices. Ask what different tapes they have and keep an eye open for the smooth finish. Try a couple before you buy a lot. Sometimes you can get low level tapes that don't put out the same volume as others. Ask about this too. Also, you will find that usually cassettes put together with five screws are pretty mechanical quality and less apt to jam.

From time to time I see a suggestion in an article that you record nothing over the space you expect to use then go back and do the save. If your erase head isn't too effective this can be a real help. If you have a record volume control set it at zero while doing this. Since this takes a lot of time and since I have a good bulk eraser I always run mytapes over it before I use them. But, good erasers are expensive - from about seventy five dollars up. Most of the cheaper permenant magnet type erasers are a little marginal for fidelity sound but they should be a big help at computer frequencies.

Since there are so many types, kinds, brands etc. of cassette recorders it is impossible to be specific in an article like this. But, by and large, if a recorder sounds good it will do well with cumputer work - given the proper connections. Noisy scratchy sounding machines will be a pain. Happy recording.

Jim LaLone

BASIC
Users Notes

CoCo VARPTR for Non Extended Systems

As those of you who have non-extended CoCo's know, there are many nice additions to the CoCo Basic, that extended basic gives you. One of these nice additions is the VARPTR command. This command, returns the memory location where a given variable is stored. This is useful in a variety of ways. For instance, if you are doing a sort, you can look up the string variables in memory, and instead of physically moving the strings around, you can simply change the pointers to where the strings are stored. This avoids garbage collection delays as well as makes your program run faster. An other use for the command is to access the floating point variables, for direct manipulation in order to do more efficient floating point operations, such as multiply and divide instructions.

The use of varptr, allows all kinds of neat things to be accomplished. Well, now that we know a little about the possibilities, let's delve into just how we can accomplish this magic. As some of you may remember from my first article, there exists a subroutine in the CoCo roms, that will find a variable. The routine is called FNDVAR, and it looks up a variable in the symbol table, and returns it's value. If it is not there, it will allocate it. Now that last point bears repeating, if it is not there, it wil be allocated. Bingo, we can now create basic variables from within a machine code program, directly, and without basics' being the wiser. We can use this to assign values to strings and things. There are two ways to set up varptr. One uses a exec or usr call, and the other, doesn't need any machine code.

Since I am particularly fond of machine code, let's attack the first one. It will be reasonable, to assume that we can have two basic variables for our exclusive use, so we will use VA (variable address) and VN$, (variable name string). To use the routine, we first set VN$ equal to the variable that we need the address of, and then call our machine language program. The program will then return the value of the location of the variable in the variable VA. We will not bother to lookup elements in an array at this time, we will work on that later as your understanding of how basic works improves. Listing 3 is a simple basic program that will load our code into memory, and get it ready for execution. Listing 2 is the actual machine code program that does the work. We will be using a new rom call this time. It is called STORFP, and it transfers the primary floating point accumulator to the memory address that is pointed to by the X register. This will be used to set the value back into the basic variable VA.

In a previous issue of 68 Micro Journal in an article on using USR, we touched on the other routines that we

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will use. For those of you who are just coming on-board, we will give you a quick review of those routines. Routine #1 is FLOATD. This routine will take a two byte value held in the D accumulator (a&b), and convert it to a floating point value. Routine #2 is the one that forms the guts of our program. It is called FNDVAR. You set up for the call to this routine, in the following manner. You set the name of the variable desired into locations $37,$38, and then JSR $B38F. The location of the variable returns in locations $39 & $3A. Variables are stored in memory, as two byte names. In the case of a numeric variable, the two bytes are stored just as they are given, that is in ascii without the high bit set. Strings are referenced on the other hand, by setting the high bit on the second byte of the string name. I think that the listings are commented well enough for most of you to follow, so lets' get busy, and look them over.

Listing 1. is a 94 byte machine code program, that does the magic that we need done. Basically it locates the variable VN$, then extracts the name. It then looks that name up, and saves the address. After locating the variable asked for, it looks up the variable VA, and then gets the location of the variable and converts it to floating point and shoves it into the variable VA. The STORFP routine resides at $BC35, and requires that the X register be pointing to the memory location to store it.

Listing 2. is a simple way to accomplish almost the same result, the only difference being, that if you reassign the located variable to a previously defined variable, it changed the location of the requested variable in the symbol table. One might force it to work, if he experimented with it long enough to discover just how the variables are shifted around, and found a way to compute the offset required in order to make it work. Suffice it to say, that as long as you are printing the result, whether from local mode, or from a program, the correct results will be obtained.

Listing 3. is the basic loader for the machine code program. Be sure and type at least 96 *'s, and do not leave any space between the line number and the REM statement. You should then goto line 20. When it ends, your machine code will be stuffed in the REM statement, and lines 20 onward may be deleted, and the routine used as needed. As previously mentioned in the first article, (published in 68 Micro Journal), this technique of embedding machine code inside of a REM statement is extremely handy. You can easily embed up to 250 or so bytes of code in a long remark statement, and if you are handy with a monitor, you can embed even longer programs. There are a couple of things to watch out for however. Since Microsoft uses a 0 to end a line, your code CANNOT have a 0 in it, as the interpreter will think that it is the end of a line, and set it's pointers up during a list, cleanly clobbering your code. You will note that there is a comment in the assembly listing about this.

Woody Baker

Listing 1.

```
                        ORG   $0D2C   Doesn't matter, is pic code
0D2F  CC 56 CE  START   LDD   #$56CE  VN$..name of where name needed is
0D2F  DD 37             STD   $37     Set up for FNDVAR
0D31  BD B3 8F          JSR   $B38F   Go look up variable.
0D34  9E 39             LDX   $39     Point to the name
0D36  E6 84             LDB   0,X     Pick up length of string
0D38  C1 03             CMPB  #03     If >3, then invalid name,
0D3A  22 4B             BHI   ERROR   ..so issue a function call error
0D3C  AE 02             LDX   2,X     Pickup pointer the string.
0D3E  C1 03             CMPB  #3      See if 2 character name; e.g. A1$..
0D40  26 0C             BNE   NOTHRE  Nope, just single letter ordinary.
0D42  A6 02     THREE   LDA   2,X     Pick up 3rd character of name
0D44  81 24             CMPA  #$24    Check for string
0D46  26 3F             BNE   ERROR   If 3 and not string, then error
0D48  EC 84             LDD   0,X     Get name
0D4A  CA 80             ORB   #$80    Set string
0D4C  20 19             BRA   GO      Skip the zero operation
0D4C  C1 02     NOTHRE  CMPB  #2
0D50  26 0C             BNE   ONE     If not 1 character then
0D52  A6 01             LDA   1,X     ..see if second character is string
0D54  81 24             CMPA  #$24
0D56  26 0D             BNE   NOSTRG
0D58  C6 80     STRING  LDB   #$80    Set up a string
0D5A  A6 84     NXT     LDA   0,X     Get variable name and go find it
0D5C  20 09             BRA   GO
0D5E  C6 01     ONE     LDB   #1      Make a single character
0D60  5A                DECB          To eleminate 0's.  We need a 0 here
0D61  A6 84             LDA   0,X     Get the variable name
0D63  20 02             BRA   GO      Continue
0D65  EC 84     NOSTRG  LDD   0,X     Get charcter name
0D67  DD 37     GO      STD   $37     Set up for first, find it
0D69  BD B3 8F          JSR   $B38F   ..and locate the variable.
0D6C  9E 39             LDX   $39     Get address.
0D6E  34 10             PSHS  X       Save reqested variable address
0D70  CC 56 41          LDD   #$5641  VA....where to put it.
0D73  DD 37             STD   $37     Set up to find VA
0D75  BD B3 8F          JSR   $B38F   Look it up
0D78  35 06             PULS  D       Get address back.
0D7A  9E 39             LDX   $39     Get address of VA
0D7C  34 10             PSHS  X       Save it
0D7E  BD B4 F4          JSR   $B4F4   FLOATD...convert to fp.
0D81  35 10             PULS  X       Get variable address back.
0D83  BD BC 35          JSR   $BC35   Move fp accuml to memory
0D86  39                RTS
0D87  7E B7 06  ERROR   JMP   $B706   Issue a function call error
```

LISTING 2

```
2 VA=0:VN$="VA":A=0:REM A= TEST
VARIABLE, VA AND VN$ USED FOR
3 REM THE SECOND METHOD.  VN SHO
ULD BE SET TO THE NAME OF THE
4 REM VARIABLE TO LOOK FOR.
5 REM LINE 20 IS AN EXAMPLE OF H
OW TO DO VARPTR FROM WITHIN
6 REM BASIC.  ONE COULD DEFINE A
 FUNCTION TO RETURN THE
7 REM VALUE.  THE 65 IS "A", AND
 THE 0 IS BECAUSE IT IS ONLY
8 REM A SINGLE VARIABLE.  ADDING
 128 TO THE ASCII VALUE OF
9 REM THE SECOND CHARACTER OF TH
E NAME, WILL LOCATE STRINGS.
10 REM THE SECOND CHARACTER OF T
HE NAME MUST BE POKED INTO
11 REM LOCATION 56.  LINES 30-50
 SHOW ANOTHER WAY OF LOOKING
12 REM FOR A VARIABLE NAME.  IT
REQUIRES THAT THE NAME OF THE
13 REM VARIABLE TO FIND BE HELD
IN VN$, THE ADDRESS WILL BE
14 REM RETURNED IN VA.
19 REM
20 POKE 55,65:POKE56,0:EXEC 4596
7:PRINT PEEK(57)*256+PEEK(58):EN
D
29 REM....LOOK UP VA
30 A=ASC(LEFT$(VN$,1)):POKE55,A
31 A=ASC(MID$(VN$,2,1)):POKE56,A
:REM IF STRING THEN MUST HAVE
32 EXEC 45967: REM THE HIGH BIT
SET...VN$="A"+CHR$(128): WILL LO
OK
34 PRINT PEEK(57)*256+PEEK(58):R
EM ONLY CAN PRINT IT
50 PRINT VARPTR(VA):REM FOR EXTE
NDED BASIC CHECK
```

LISTING 3.

```
10 REM**************************
**********************************
**********************************
******************
11 A=1:VA=0:VN$="A"+CHR$(0)
15 EXEC (PEEK(25)*256+PEEK(26)+5
):PRINT VA
16 PRINT VARPTR(A):REM AS A CHEC
K FOR EXTENDED BASIC
17 END
20 I=PEEK(25)*256+PEEK(26)+5:REM
 INSTALL CODE...DELETE 20 ONWARD
22 FOR J=I TO I+93:READA:POKE J,
A:NEXTJ
25 DATA 204,86,206,221,55,189,17
9,143,158,57,230,132,193,3,34,75
,174
26 DATA 2,193,3,38,12,166,2,129,
36,38,63,236,132,202,128,32,25,1
93,2
27 DATA 38,12,166,1,129,36,38,13
,198,128,166,132,32,9,198,1,90
28 DATA 166,132,32,2,236,132,221
,55,189,179,143,158,57,52,16,204
29 DATA 86,65,221,55,189,179,143
,53,6,158,57,52,16,189,180,244,5
3,16
30 DATA 189,188,53,57,126,183,6
```

WHY
C O C O
Can't READ

INTRODUCTION

As a software developer, I am sensitive to new systems, disk drives, disk controllers, software, and other parameters which affect the market in which I sell my products. Users whose systems cannot read the diskettes that I send are understandably upset and call or write me quickly about such problems. Luckily, such problems have been rare.

In the past, I have avoided most media interchange related problems by shipping 5.25" diskettes in a single sided single density 35 track, FLEX or OS9 format, and 8" diskettes in a single sided single or double density, FLEX, UNIFLEX or OS9 format. I can make the diskettes flippies by punching extra index and write protect holes in the covers. This has proven generally very reliable over several years and over many new products, including several otherwise incompatible systems, such as CMS, Gimix, Motorola, Radio Shack, Smoke Signal, Southwest Tech, etc.

Recently, I have had a rash of complaints from COCO FLEX users who could not read the diskettes I had sent them. After consultation with several of them and after trying several experiments on my own COCO, I now can ship diskettes to COCO users and be reasonably certain that they will be able to read the diskettes. This discussion attempts to share some of this information about the COCO disk problems and solutions.

HARDWARE

The disk-related hardware of the COCO is composed of the following major components:

one to four 5.25" disk drives
one disk controller cable
one to four disk drive power supplies
one or more 5.25" diskettes
one disk controller

The Radio Shack supplied hardware for the COCO follows that company's general philosophy of providing minimal (or almost minimal) hardware at fairly high prices, and partially supporting this by designing it just incompatibly enough to make competition initially somewhat difficult.

DISK DRIVES

The Radio Shack supplied disk drives have the following attributes, when compared to the competitors' disk drives:

single or double density
35 tracks, not 40 or 80
single-sided, not double-sided
30 msec step rate, not 6 or 12
no head load solenoid
minimum filtering of read signal

These specifications are for an almost minimal unit. The only item above a minimal disk drive is the capability of recording in double density mode, which some very early drives (initial SA400 production) could not do. The Radio Shack supplied software uses double density exclusively, although the drives are capable of single density.

The provision of only 35 tracks, rather than 40 or 80, causes no direct problems other than the lack of storage, when using the Radio Shack supplied software, since it supports only 35 tracks and cannot use more, even if the drives actually have more than 35 tracks. It can cause media interchangeability problems if a Radio Shack supplied drive is used with FLEX or other software supporting more tracks on the disk drives. These can be minimized by interchanging diskettes with data restricted to the first 35 tracks on the diskette; however, the receiver of a diskette sometimes has no control over the format placed on the diskette by the sender.

The restriction to single sided, rather than double sided, recording format causes essentially the same problems as does the restriction to 35 tracks. The loss of capacity is much greater in this case, however, since adding another head to the drive doubles its capacity, and adding 5 tracks only increases its capacity by one seventh. The diskettes may be safely made flippies, doubling the offline, although not online, capacity of a given number of diskettes.

The slowness of the head step rate (30 milliseconds) causes no problems except for materially slowing disk operations, especially those involving heavy use of random file access. Many drives become very noisy when stepping at this slow a rate, but seem to work properly.

The lack of a head load solenoid implies that the drive head is loaded whenever a diskette is in a drive with the head closed. This will increase media wear somewhat since all heads will be contacting the media whenever the motors are on, rather than only the head of a selected drive contacting the media. This also worsens the problems associated with turning power on and off when a diskette is in a drive, since the heads will be contacting the media, and not retracted. The Radio Shack software provides no head load settling time, since the Radio Shack supplied drives need no such delays. However, more sophisticated disk drives require head load delay to prevent occasional problems, especially when writing, due to initial bouncing of the head on the media. FLEX and other non Radio Shack supplied software provide head load delays, anticipating the use of drives with head load solenoids. If Radio Shack supplied software will be used to support a system with such drives, the jumpers on the drives should be selected in the HM (head load when motor on) mode, not in the HS (head load when selected) mode, to help prevent disk write errors and to reduce the number of read and write retries.

The minimal filtering on the disk drive boards will cause the number of read and write retries and unreadable sectors on disk to be larger than they would have been otherwise. Other drives provide one or more additional levels of analog and digital filtering on the drive boards, increasing the signal to noise ratio. A digital filter may be added to the disk controller board to compensate somewhat for the lack of filtering on the disk drive boards; this is described later.

DRIVE CABLE

The Radio Shack supplied cable is not wired in a one to one basis. The drive 4 select line is in a nonstandard position on the cable. However, this cable may be used with non Radio Shack drives or standard cables may be used with Radio Shack or non Radio Shack drives by simple cuts and jumpers on the drive boards or on the disk controller board. For instance, if drive 4 select is being used for side select by non Radio Shack software (such as FLEX), but fewer than four drives are attached to the cable, the correct side select line may simply be jumpered to the drive 4 select line, either on one of the drive boards or on the disk controller board.

POWER SUPPLIES

The Radio Shack supplied disk drive power supplies are marginal, in terms of percent ripple, dip, and spike measures. They are not alone, however; many of the mail-order disk drive boxes with power supplies (often costing $70 to $100) suffer from the same problems. There should be less than 1% ripple, dip, and spike variation in the +5 volt supply to each drive. The +12 volt supply is less critical but should not vary by more than 5% during normal operation.

Many such power supplies suffer from false economy in terms of amount of capacitance provided for gross regulation, allowing both voltages to dip during motor power-up periods. Several supplies reviewed had less than 5000 MFd capacitance on each of the voltages. Substantially increasing this amount (to around 20,000 MFd each) should improve regulation substantially, if the transformer is rated highly enough. Each drive should be assumed to require approximately 1 ampere at +5 volts and 3 amperes at +12 volts during motor power-up, but only 1 ampere during normal motor speed conditions. Thus, power supplies providing only 1 ampere at +12 volts may be used, but only with large capacitors to provide a source of the excess +12 volt current during motor power-up periods. The worst case occurs if the +5 volt supply is derived from the +12 volt supply, which many are, since the power-on transients may then also affect the +5 volt logic on the board.

Adding fuses, appropriately rated MOVs, and reverse diodes on the DC supply lines would be an inexpensive manner in which to try to protect the disk drives from power surges and power supply failures. Adding an MOV

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and bathtub filter capacitor across the 115 volt AC line would further protect the power supply and drives from power surges and power line induced interference.

Insufficient regulation will probably cause nothing more than a larger than expected number of read and write retry operations, unless it is serious. The timing marks on the disk drive flywheel provide a quick means of checking for motor speed variations. Under a flourescent lamp, the marks should appear almost stationary; if they do not, the cause should be immediately determined and corrected.

Main power spikes may be transmitted through inexpensive power supplies and destroy data on the track over which the head is placed. Placing 5 volt MOV's across the +5 volt regulated supplies may prevent some problems; however, the best solution is to remove the diskettes before turning power on or off. However, power outages may cause several problems due to the fact that the power switch for the drives may still be turned on when the power returns, and the power line will be very noisy when it is abruptly turned off and again when it is turned on.

DISKETTES

The Radio Shack supplied diskettes are adequate, though quite overpriced, for their use on the COCO. In the many hundreds of 8" and 5.25" diskettes I have sent to customers in recent years, problems have been almost unrelated to brand. I now use the least expensive, diskettes available (currently $1.29 each plus $0.12 per cover in hundreds quantities) and have fewer problems with them than with the premium diskettes previously used. The double track 5.25" drives supported by COCO FLEX may well require the higher quality diskettes, although this is probably more dependent upon the quality of the drives than upon the quality of the diskettes.

DISK CONTROLLER

The Radio Shack disk controller follows the Radio Shack tradition of using an almost minimal design. The board uses a Western Digital 1793 Disk Formatter, which is very commonly used and supports double density operations, a WD 1691 Data Separator, which interfaces directly to the 1793, a WD 2143 Four Phase Clock Generator, which interfaces directly to the 1691, and a 74LS629 VCO. This portion of the interface board is taken essentially verbatim from the Western Digital 179X Applications manual on page 14.

The primary additions to this Western Digital circuit include pulse shaping of read and write signals, with the write pulse set at 450 nsec and read pulse set at 200 nsec, and the buffering of the output lines with open collector gates. The primary modification to this circuit concerns the fact that the TG43 (track greater than 43) output from the 1793 is not connected to the 1691; instead, the TG43 input to the 1691 is connected to a latch controlled by the software. The Radio Shack software sets this input high when a drive is accessing a track number greater than 21 and low otherwise. This has no direct effect on read operations, but causes write pre-compensation during disk write operations. The usage of write pre-comp in this manner is unusual. Most 40 track 5.25" disk drives do not specify pre-comp at all in their design manuals. The supposition is that write pre-comp was added to attempt to alleviate some of the problems with reading causes by deficiencies in the disk controller board, as discussed below.

The disk controller board provides an 8K byte ROM which contains the disk drivers used by the Basic interpreter and logic supporting optional 6809E non maskable interrupt at the end of 1793 commands plus 6809E halt during double-density data transfers to and from the 1793, along with drive selection, motor control, density control, and write pre-compensation control.

The halt logic is necessary to enable the 6809E to transfer data fast enough to or from the 1793 while in double density mode. When activated, it halts the 6809E whenever a reference is made to the 1793 data register, until the 1793 provides a DRQ (data request) output. The NMI logic is necessary to force the 6809E out of a (potentially) halted mode when the 1793 completes or aborts an operation, activating its INTRQ (interrupt request) output. Thus, a very tight loop may be established to transfer data to or from the 1793 data register without checking the 1793 status register or the number of bytes transferred.

The disk controller board has the following memory map to the COCO:

C000-DFFF	8K ROM containing disk drivers, etc.	
FF40	control register:	
	bit	usage
	7	nmi
	6	drive 3 select
	5	double density
	4	pre-comp
	3	motor
	2	drive 2 select
	1	drive 1 select
	0	drive 0 select
FF48	1793 command register	
FF49	1793 track register	
FF4A	1793 sector register	
FF4B	1793 data register	

The Radio Shack disk controller board does not provide any of the following hardware services provided by many other disk controllers:

- motor-on delay timer
- off-speed detector
- motor status sensor
- drive-ready status sensor
- motor-off delay timer
- head-load delay timer
- head-load status sensor
- additional filtering of raw read

The motor-on delay timer provides a fixed delay, usually by holding the 1793 ready line inactive, to allow time for the disk drive motor to start and to stabilize at the correct speed, before allowing the 1793 to attempt to read from or write to the disk drive. The Radio Shack software provides a one second delay to allow the drive time to start and stabilize. If this delay is not performed, the 1793 will attempt operations on a disk drive that is not ready to respond correctly and may abort an operation simply because the drive is not turning at the correct speed, causing unnecessary retry operations.

The off-speed detector and motor status sensor are often provided in addition to or in place of the motor-on delay timer. An off-speed detector is usually implemented as a missing pulse detector which holds the 1793 ready line inactive if the index sensor on the selected drive is not providing pulses at a rate very close to the proper interval. The motor status sensor allows the software to determine the current status of the motor-on line on the controller board, thus simplifying the housekeeping work of the disk driver software.

The drive-ready sensor may be used only with a drive which implements the logic required to determine that it is turning at the proper speed, has a diskette installed, and is ready to receive or transmit data. It could thus replace the off-speed detector and motor status sensor in some cases.

The motor-off delay timer automatically turns the drive motors off at a fixed amount of time after the last access. Because of the lack of this timer on the Radio Shack disk controller, the drive motors are often accidentally left running when they could be powered off. This usually happens when a disk access is not followed by a keyboard input operation, since the Radio Shack keyboard input routine must implement a software timer to decide when to turn the motors off.

The head-load delay timer and head-load status sensor provide better control over the status of the head-load solenoid. Unfortunately for the Radio Shack disk controller board, the Radio Shack supplied disk drives have no head-load solenoid and thus have no need for a head-load delay timer or head-load status sensor. Their inclusion on the board would have simplified the software supporting the drives with head-load solenoids. The Radio Shack software also assumes no head-load delay required, thus causing potential problems for drives which do not load the heads until selected. Drives with head-load solenoids which are to be used with the Radio Shack software should be strapped so that the heads are loaded whenever the motor is on.

The only digital filtering provided for raw read signals is the 200 nsec. pulse shaping provided by 74LS221 single-shot U7. The 1793 data sheet specifies that this pulse may be as short as 200 nsec. or as long as 600 nsec. This filter may be materially improved by increasing the pulse width substantially; increasing C21 to 200-250 pfd. would have the desired effect. If the change is made, it should be done on a trial basis and in a manner in which it may be easily

removed; depending upon the drives, extra filtering may not improve actual the overall read performance. The purpose of digital filtering here is to reduce noise on the raw read line by forcing the filtered output to remain in the active state, once activated, for a minimum amount of time represented by the pulse width, thus stabilizing the filtered read data.

Still another source of problems with the disk controller board concerns some of the components themselves. Several of the components, especially those in the VCO circuit associated with the 74LS629, should be of very high quality, since the stability of their values is critical to the proper functioning of the raw read data separation logic. However, they are of standard quality, causing excess drifting of their values associated with temperature and age, and necessitating frequent adjustment to maintain standards of voltage and frequency in the VCO and write pre-compensation circuits.

The interface board has three potentiometers for adjustment of the VCO and write pre-compensation circuits. These should be 14-turn precision units, but instead are 3/4-turn inexpensive units, making precise alignment difficult to achieve and to maintain. Even dropping the disk controller board may upset the delicate adjustments. R8 and R15 must be adjusted while the disk controller is in the idle state. R8 is adjusted so that a 1.4 volt level may be measured on pin 2 of U11. Then R15 is adjusted so that a 2.02 MHz signal may be measured on pin 16 of U12. R16 must be adjusted while the 1793 is executing a continuous write command. It is adjusted so that 200 nsec. pulses are detected on pin 4 of U12. Unfortunately, R16 cannot be adjusted without using a ROM port extender card or without removing the COCO case. Note that adjustment of these potentiometers requires a high-impedence voltmeter (R8), a frequency counter or oscilloscope (R15), and an oscilloscope (R16).

SOFTWARE

The Radio Shack supplied software (in terms of the ROM based BASICs) supports the Radio Shack supplied controller and drives on a minimal basis. Ideally, a complete ROM based disk operating system would be provided, including a logical interface which would shield the user from the details of the hardware and disk format. This system would include logical file open and close, sequential and random read and write on the byte and sector levels, and catalog utility operations such as rename and delete.

What Radio Shack actually provides (and documents) for non-BASIC programmers is a low-level subroutine which is capable of "read or write specified drive, track, and sector" and "restore specified drive to track zero" operations only. It is contained in the Extended Disk BASIC ROM.

This routine, called DSKCON, is capable only of double (not single) density, 35 (not 40 or 80) track, single (not double) sided operations, with head step rate fixed at 30 (not 6, 12, or 20) milliseconds. It has no provision for specification for automatic write verification, which should properly always be performed to prevent lost data and files. None of these parameters are modifiable without moving the entire routine to RAM and/or rewriting it. DSKCON was obviously designed for the ROM based Extended Disk BASIC and implements an almost minimal interface to the disk controller board.

The entry point of DSKCON is pointed to by the contents of addresses $C004

JUST GOOD SOFTWARE

DISK DOUBLE ENTRY - If you have spent hours trying to balance your Debits and Credits, this program is for you! Designed for small business, club, and personal use. Enter transactions in a journal type format. Program will maintain current account balances, produce Trial Balance, Income, and Balance Sheet reports and complete Account Ledgers. Will handle up to 300 accounts including report headings and totals. Up to 1400 average transactions on a diskette. Summary reports and four levels of subtotals available. REQUIRES 32K and a user understanding of standard double entry accounting concepts. - $44.95 in BASIC with Machine Language subroutines.

DISK DATA HANDLER - 64K - Designed to use the full 64K RAM, but may also be configured for 32K. Uses standard ROM's - No special operating system required! Allows you to design disk data files for your specific needs. You define a basic record of up to 14 fields and 246 characters. Provides fast selection and sorting based on any field or combination of fields in this record. Powerful on screen input and update. User defined output of reports to screen, printer, or disk files which may be read by your BASIC programs for any computational or special formatting requirements. Printer reports allow headings, page breaks, and page numbering, and let you pass control codes to drive your printer's special features. Maximum number of records you may work with at one time will depend on RAM configuration and record size - 64K (32K) 1850 (500) - 21 char records, 179 (49) - 246 char records. An optional Extended record linked to the basic record may also be defined. The size of this Extended record is not a factor in determining maximum number of records. Will provide the growth capability needed for your increasingly sophisticated applications. $54.95 in BASIC with Machine Language subroutines.

DATE-O-BASE CALENDAR - Puts you in charge of your schedule! Graphically displays any monthly calendar between 1700 and 2099. You put in up to twelve 28 character memos per day - calendar shows where the memos are -call up of day shows details. Use for appointments and a log of past activity. Study the chronology of the American Revolution or note the day your mortgage will be paid off. Search capability allows you to list or print all memos between two specified dates or only ones meeting key word criteria. Date computation shows elapsed time between two dates in days, weeks, months, and years. REQUIRES 32K in BASIC.
TAPE DATE-O-BASE CALENDAR - $16.95 - (max. 400 memos/tape file).
DISK DATE-O-BASE CALENDAR - $19.95 - (over 4,000 memos/disk - max. 300 memos/month).

We want your SUGGESTIONS!

That's INTEREST-ing - Time to let your computer do some real computation! This program will help you solve problems dealing with time, money, and INTEREST. Calculates present value, future value, and capital recovery for any combination of payments you specify. Rate of Return computation to predict how hard your money will be working. Special section to compute bond yields (current and to redemption). Amortization schedules about any way you want them - even allows you to change terms in mid schedule! All answers available on screen or printer. $29.95 in BASIC.

MATH TUTOR - Five programs that go from math fact (+, −, X, /) drill to full addition, subtraction, multiplication, and division at four levels of difficulty. Provides a step by step approach with error correction and rewards for good performance. - $13.95 in BASIC.

SPELLING TEACHER - Up to 200 of their spelling words stored on tape or disk are presented in four lively study modes including a scrambled word game. - $12.95 in BASIC.

ALPHA-DRAW - A subroutine designed to let you easily add characters to your graphic displays. You define X and Y coordinates and a string variable of one or more characters and Alpha-Draw will do the rest. Includes all keyboard characters. Comes with instructions for a true line numbered merge of tape files. Works great with the Screen Print program! - $8.95 in BASIC.

GRAPHIC SCREEN PRINT PROGRAM -
Works in ALL PMODES and lets you shift screen image anywhere on the printed page. Relocatable code lets you use all of your 16K or 32K machine. Available for both Color Basic 1.0 and 1.1. Use EXEC 41175 to see which you have and SPECIFY with order. In Machine Language.
SPECIFY PRINTER TYPE
$7.95 - For TRS-80® LP-VII/VIII & DMP 100/200/400.
$9.95 - For Epson GRAFTRAX®, PROWRITER®, NEC® PC 8023A-C, Microline® 82A/83A (with OKIGRAPH® I), Microline 84, IDS-440/445, Paper Tiger® 460/560, Micro Prism® 480, Prism® 80/132 (with dot plotting), Micro Peripherals, Inc. 88G/99G, Centronics 739, Star Micronics, Inc. GEMINI-10/15. TRS-80® DMP 120
(Trademarks of Tandy Corp., Epson America, Inc., C-Itoh, NEC America, Okidata Corp., Integral Data Systems, Inc.)

ALL PROGRAMS require Extended Color Basic and are delivered on cassette. All, except Tape Date-O-Base Calendar, are DISK System compatible.

Custom Software Engineering, Inc.

807 Minutemen Causeway (D-3), Cocoa Beach, Florida 32931
(305) 783-1083

For VISA and Master Card orders: Include type, account number, expiration date, signature and phone number. Sorry! No COD's.

U.S. and CANADA add $1.00 per order for shipping. Overseas $2.50 per order. All prices in U.S. dollars. Florida residents add 5% sales tax. Return within two weeks if not completely satisfied.

RAINBOW CERTIFICATION SEAL
ALL LISTED PROGRAMS

and $C005. Its parameter list is pointed to by the contents of addresses $C006 and $C007, the reverse of the the normal parameter passing logic in which the address of a parameter list is passed in a register to a routine. This parameter list is composed of the following parameters:

```
Operation Code              1 byte
    $00 = restore to track 0
    $02 = read sector
    $03 = write sector w/o verify
  Drive Number              1 byte
    $00 to $03
  Track Number              1 byte
    $00 to $34
  Sector Number             1 byte
    $01 to $12
  Buffer Pointer            2 bytes
    address of a 256 byte buffer
    for read/write data
  Status Response (on=error) 1 byte
    bit     meaning
     7      drive not ready
     6      write protected
     5      write fault
     4      seek error/
              sector not found
     3      CRC error
     2      lost data
     1      busy
```

DSKCON does not permanently modify any registers except for the condition code register. Any outputs of DSKCON are placed into the status response parameter and read buffer. The parameter and variable addresses are pointed to in ROM and hence constant, at least for a given ROM version. The parameter list is at addreses $00EA thru $00F0. The NMI logic causes a branch to $0109 when the NMI input to the 6809E is activated, in which is usually placed a branch to a subroutine in DSKCON to complete the operation. DSKCON also uses locations at $008A and from $097E to $0986 for temporary storage. The assembler language programmer must ensure that the contents of these locations are always maintained or preserved between calls to DSKCON.

Given the limitations of DSKCON, many assembler language programmers choose to write their own disk drivers. For instance, every known version of FLEX for the COCO contains its own disk drivers. They usually support single and double density, single and double sided, 35 to 80 track, 6 to 30 msec. step rate, head load delay timer, write verify, and other features which are not implemented well by DSKCON and the Radio Shack disk controller board. Unfortunately, they have followed different standards for density and side selection and are generally compatible only in single sided, single density, 35 or 40 track mode. Also, unfortunately for non-FLEX COCO users, the formats of the FLEX catalog and data sectors are quite different from the formats used by COCO Extended Disk BASIC, so conversion requires special programs, and the disk and catalog routines are not transferrable.

CONCLUSIONS

The Radio Shack TRS-80 Color Computer offers users an inexpensive means of owing a computer with great potential. Even though Radio Shack has taken a minimal approach on much of the hardware and software, the user will be able to avoid many of the problems and thus to use the system productively by following some of the suggestions discussed in this article. In particular, the following points should be emphasized:

keep the disk controller adjusted;
if using disk drives with head load solenoids, set drive option to load head when motor is on;
try increasing the raw read pulse duration to 400-550 nsec.;
replace VCO and precomp components with precision units (R8, R9, R11, R13, R15, R16, C14, C17);
when using DSKCON, always read back sector just written and retry write operation if necessary;
consider using a "real" operating system, such as FLEX, rather than the resident COCO BASIC DOS.

With these suggestions, the Color Computer should become much more reliable in the use of its disk drives. Maybe if enough people make these changes, their computers will be able to read the diskettes I send them and I can stay off the telephone.

E. M. (Bud) Pass, Ph.D.
Computer Systems Consultants, Inc.

INSIDE the DRAGON 32

Just what is this Dragon 32 that you see on the upper left hand corner of the cover of Rainbow Magazine? The Dragon 32 is England's answer to the Color Computer. (And a most impressive answer it is!) To start with, the first thing you notice when you first see it, is that it has an improved keyboard. Upon closer inspection, it is similar to the original Model I keyboard manufactured by Hi-Tek. It is a standard 53 key Qwerty keyboard with a very nice smooth feel to it. Upon powering up, you get the following logo:

(C) 1982 DRAGON DATA LTD,
16K BASIC INTERPRETER 1.0,
(C) 1982 by MICROSOFT

As you can guess, it is the same Microsoft who wrote the Basic for the Color Computer. To my surprise when comparing the Quick Reference Card of the Dragon 32 to that of the Coco, they have the exact error codes and statements except for DLOAD. The reason DLOAD is missing is that the Dragon 32 has no serial port. Instead it has a parallel port. One interesting command I noticed on the Dragon Quick Reference Card is the presence of a PRINT#-2 command instead of the usual LPRINT commands associated with parallel ports. This eliminates changing all the PRINT#-2 commands of a Color Computer program to LPRINT commands. Even though the commands are the same, the actual BASIC is different from the Color Computer. This is because TANDY has exclusive rights to their version of Microsoft Basic for the Color Computer. While not all Coco Basic programs will run as is on the Dragon 32, I tried several RS Rompaks and they all worked correctly. I even tried a long machine language program (Donkey King) and had no problems. Included with my Dragon 32 was a pamphlet of programs for it. This list has programs from Spectral Associates and Mark Data that have been previously sold for the Coco. This leads to the assumption that even though Coco programs may not run "as is" on the Dragon, they can be converted to do so.

The Dragon 32 is aptly named as it comes stock with 32K of RAM. Unlike the 32K Coco from RS, Dragon uses two sets of 16K chips instead of (8) 64K chips. There are various hardware differences in the Dragon. The Dragon uses the PAL tv system instead of the U.S. NTSC system. Since there are no VHF tv stations in England, the RF output is on channel 33 and the bandwidth is 8 MHz instead of 6. The video mixer chip is a LM1889 instead of a MC1372. The power supply (220 volts, 50 Hz) is outside the computer and is connected via a DB-9 socket on the back next to the power switch. The two joystick, cassette and parallel printer jacks are on the left side along with the RF output and reset button. The Rompak port is on the familiar right hand side but there is no door. The Dragon 32 has one jack that the stock Coco doesn't have. There is a five pin din jack on the back for video out. This is a decided advantage for those who want to do work processing to its fullest.

To summarize, the Dragon 32 is a fine computer with very close similarities to the Color Computer. The extra features of a better keyboard, parallel printer port, video output jack and white case are a definite advantage. But the best news is that a Dragon will soon be coming to your neighborhood! Starting this summer, a U.S. version of the Dragon will begin production in Florida. It will be a NTSC version with a serial port. Price will be very competitive with the Color Computer and will give potential Color Computer buyers another choice.

Bob Rosen, Pres.
SPECTRUM PROJECTS

EDITOR'S NOTE

Since this was written, things have been firmed up for the American version of the Dragon. It is being manufactured and distributed by

TANO CORPORATION
4301 Poche Court West
New Orleans, La. 70129
(504) 254-3500

The "Standard" Dragon will be a 64K System which carries a suggested retail price of $399.00, with an estimated initial delivery date of July 1983. Joy Sticks, Disk Drives, and Software will also be available.

--- RLN ---

DOODLE BUG

BY COMPUTERWARE
P.O. BOX 669
ENCINITAS, CA. 92024

CASETTE $24.95 DISK $29.95

THE GAME I TESTED WAS A 16K CASETTE VERSION. THIS IS A TAKEOFF FROM THE POPULAR LADYBUG ARCADE GAME WITH VERY GOOD GRAPHICS. IT PLAYS JUST AS FAST AND MEAN AS THE ORIGINAL. THIS GAME IS DEFINITELY FOR THE LADYBUG FAN AND A REAL CHALLENGE FOR NOVICE OR PRO. THE PLAY IS THE SAME FOR ALL LEVELS, THE DIFFERENCE IS THE NUMBER OF LADY BUGS YOU GET. FOR EACH BOARD YOU CLEAR THE BUGS CHASEING YOU CHANGE AND GET SMARTER SO THAT EACH BOARD GETS HARDER.

IN THE MAZE THERE ARE HEARTS, DOTS AND LETTERS. THESE ADD TO YOUR SCORE AS YOUR LADY BUG EATS THEM , HOWEVER THERE IS A PROBLEM AS YOU TRY TO EAT THESE GOODIES THE BUGS FROM THE BUG BOX IN THE CENTER OF THE MAZE TRY TO EAT YOUR LADY BUG. IF YOU TIME IT RIGHT YOU CAN GO THROUGH THE REVOLVING DOORS AND LOOSE THESE PESKY VILLAINS. THE OTHER PROBLEM IS THE SKULLS PLACED AT RANDOM AROUND THE MAZE. THESE WILL KILL YOU AND MUST BE AVOIDED AT ALL COSTS. THE LETTERS MUST BE EATEN WHEN THEY ARE THE RIGHT COLOR TO SPELL OUT THE WORDS SPECIAL AND EXTRA. THIS CAN BE DONE BY PRESSING THE FIRE BUTTON ON THE JOYSTICK TO HALT YOUR LADYBUG'S FORWARD MOTION OTHERWISE YOU RUN RIGHT OVER THEM. IF YOU SPELL"EXTRA" YOU GET AN EXTRA LADYBUG. AND FOR "SPECIAL" YOU GET A FULL SET OF NEW LADY BUGS TO PLAY WITH.

THIS IS A FUN GAME AND WILL CHALLENGE YOU TO TRY TO BEAT IT. I AM NOT SURE WHAT THE HIGHEST SCORE THAT HAS BEEN MADE BUT I AM SURE THAT WHOEVER MADE IT WILL STILL BE TRYING TO BETTER IT. IT'S THAT KIND OF GAME.

Joe Patrick

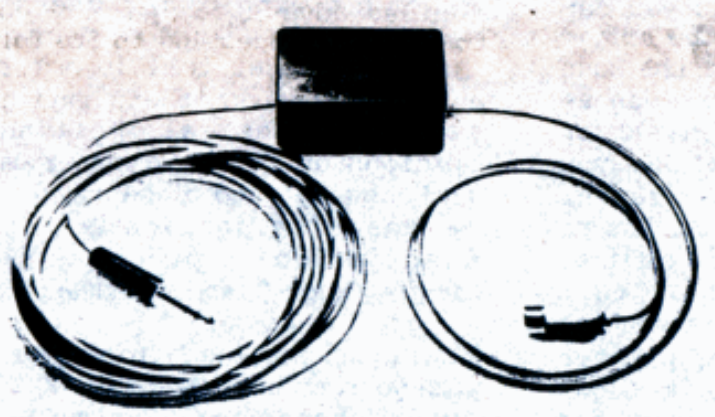
Stuart Hawkinson
6695 S. W. 203rd Court
Aloha, OR 97007
(503) 642-9146

July 5, 1983

N E W S R E L E A S E !

FOR IMMEDIATE RELEASE

DISK LOADER for the TRS-80 Color Computer loads most 16K machine language programs from tape to disk. This new program takes tape based machine language programs, stores them on disk, and allows them to run automatically. DISK LOADER is especially designed to load programs which interfere with normal disk operation. Saves multiple copies, allows renaming the program, and automatically gives program load and execute addresses. DISK LOADER is supplied on tape with easy-to-operate instructions. Works with any 32K or 64K Color Computer Disk system. $13.95 ppd from Stuart Hawkinson, 6695 S. W. 203rd Court, Aloha, OR 97007.



NEW SALEM RESEARCH
West Main Street
New Salem, Mass. 01355

NEW PRODUCT ANNOUNCEMENT

KALEIDOPHONE ALLOWS YOU TO "SEE" MUSIC ON TV

Here's something new to do with your CoCo besides playing games!

The Kaleidophone allows you to interface to any hi-fi and see the music on TV. It's easy to install -- just plug into the headphone jack on the hi-fi and the joystick port on your computer.

Besides the hardware (which includes all necessary plugs and cables) you receive a free issue of Kaleidophonics, a cassette "magazine" of programs for the Kaleidophone. The current issue consists of more than a dozen display programs in BASIC (just choose them from a menu) plus nine machine language routines for high speed effects.

There's also an "instant program" feature which is very nice -- you just type in letters on the keyboard to create a whole new display program in seconds. Of course, you can also program it yourself in BASIC or machine language. Ten pages of detailed instructions are included.

The price seems reasonable, considering that you get both the hardware, fully assembled, and quite a lot of software to run it (future updates are also planned). You can even use the display modes that are unavailable in Extended BASIC!

Parents may find this a good way to get their kids interested in computing. And it's a great solution to the old question of "What can you do with it besides play games?"

Kaleidophone, New Salem Research, West Main Street, New Salem, Mass. 01355. $49.95. 16K, either BASIC.

SPECTRUM

32K RAM Button	$ 2.99
NANOS Reference Card	$ 3.99
64K RAM Button	$ 4.99
Coco Editor Assembler	$ 6.95
Coco Tech Manual	$ 7.95
16K RAM Chips	$ 9.95
Coco Secrets Revealed Book	$ 14.95
LED On/Off Indicator	$ 14.95
Coco Light Pen	$ 19.95
ATARI Joystick Interface	$ 19.95
Video Interface Kit	$ 24.95
16K-32K Upgrade Kit	$ 25.95
6883 SAM Chip	$ 29.95
6809E CPU Chip	$ 29.95
Basic ROM 1.1	$ 36.00
64K RAM Chips	$ 49.95
MARK DATA Keyboard	$ 69.95
BOTEK Printer Interface	$ 69.95
Extended Basic ROM	$ 84.00
Disk Controller	$ 139.95
COLOR COMPUTERS	$ CALL

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COMMUNICATING
with your
Color Computer

One of the added features of the Color Computer is the built in RS232 interface. It can be used to hook up a serial printer like the DMP-100. More important though, it can be used to help you communicate. Communicate? That's right!! There is a whole new world of telecommunications that many COCO owners are unaware of. Besides playing games and writing programs, you can hook up a modem to your RS232 port. A modem is an electronic device which converts the computer's electrical pulses bit by bit into audible sounds that can be transmitted over the phone lines. Modem stands for MOdulator/DEModulator and there are two types available.

The two types of modems currently available on the market are the Direct-connect modem and the Acoustic-coupled modem. Both have their advantages. The Direct-connect unit hooks right into the phone lines. The Radio Shack DC Modem I (26-1172) allows you to unplug your phone from the jack and hook it into their unit. Then you can plug the cable from the Modem I back into your phone jack. This assumes that your phone and jack are modular. If not, Radio Shack sells two adapters, 279-393 and 279-351, that will convert your hook up to modular. Since the Direct-Connect unit hooks right into the line, virtually no external noise can be detected which means someone else in the room can be watching tv or listening to a stereo. The Acoustic-Coupled Modem is even easier to hook up. The hookup is the same as adding a telephone answering machine. If you have no extra jacks, Radio Shack sells two "Y" adapters, 279-357 and 279-370, for modular and 4 prong systems. The Acoustic-Coupled Modem is more susceptible to line noise as you are placing your phone's receiver into the unit's two cups. This can be a problem if you are calling long distance and the signal on the other end is weak. Another problem is that today's modern phones might not fit the modem's circular cups (Slim line phones). One advantage to this modem is that it is more flexible to use with multi-line phone systems than the DC Modem I because all you have to do is push buttons to use the modem on another line. The only other piece of hardware you will need for your modem is a serial cable to hook it up to the RS232 port. For Radio Shack modems, you will need a 4-pin DIN to 4-pin DIN cable and for non-Radio Shack modems a 4 pin DIN to DB25 cable. These are available from the Shack as catalog numbers 26-3020 and 26-3014 respectively. Also, available from Spectrum Projects are two cables which you might need. One is a Printer/Modem Extension Cable which allows you to place your modem in another location. It extends your 3 foot Radio Shack cable another 10 feet. The second cable is the RS232 Expansion Cable. This is a "Y" adapter cable which allows you to hook up your printer and modem inline independently at the same time. This eliminates constant swapping out of cables, since the Color Computer has only one RS232 port. Also, as you will see later on, it will come in handy when using a smart terminal program.

Now that you have the hardware situation taken care of, you will need software. As with the modems, there are two types of software. The first type is known as Dumb Terminal Software. Radio Shack sells a version under the Videotex name. It is catalog number 26-2222 and includes one free hour on the Dow Jones and Compuserve Networks. The software allows access to these networks, but that's about all it does. It lacks the desired features that a smart terminal program contains.

Now you might ask, what can a Smart Terminal Program do for me that a Dumb Terminal doesn't? The Smart Terminal Program can take the information you access from a telecommunications system and store it into your computer's memory. After you go off line from a system, you have the option of printing it out or writing it as a cassette or disk file. Or, you can type a message offline and then upload with a single keystroke to the Host computer. Since networks such as Compuserve and The Source charge for their services, this can save you money as it can transmit it faster than you can type and it allows you to examine it for errors while offline. Another nice feature of a Smart Terminal Program is that it enables you to change any RS232 or printer parameters. For example, it allows you to access half duplex systems and use 1200 baud modems. You can run your printer at 1200 baud and insert a carriage return after a linefeed. Another bonus a Smart Terminal Program has to offer is that you can scroll online or offline up to 12 lines at a time. Where can you purchase such a program? Spectrum Projects sells their Smart Terminal Package under the name COLORCOM/E. It is available on Rompack or Disk for $49.95. It does not offer any free time for Compuserve and Dow Jones, but does offer the desired features of a Smart Terminal Program. One can still purchase from Radio Shack a Universal Sign Up Kit (26-2224) to go on line with Compuserve and Dow Jones. However, this kit contains no software. It can be used though in conjunction with a Smart Terminal Program.

Now that you know more about the hardware and software which is involved, you may ask, what else can I access besides large data bases which charge for the use of their systems? The answer is a growing phenomena called Bulletin Board Services which are mushrooming all over the United States. What is a Bulletin Board Service, you ask? A Bulletin Board Service, or BBS for short, consists of an individual with a personal computer and an auto-answer modem set up to have outside callers access their computer. (Yes, your own mini compuserve!) Aside from the auto answer modem, one needs special BBS Software to run the system. For example, Spectrum Projects owns and operates TWO BBS's which totally support the Color Computer. The first system can be accessed by dialing (212) 441-3755. It is operated and run on a Model III with four double-headed disk drives. It has a disk storage capacity of 2.6 megabytes. The system is FREE and NO PASSWORDS are needed to access the system. Some features of the system are a message retrieval section, a downloading section, a merchandise section, and a Color Graphics section. Using the Smart Terminal Program COLORCOM/E, you can dial into the system and capture files from the download section. These files consist of games and utilities which you can run on your Color Computer. Also, as an added feature, Color Graphics can be accessed through the phone lines right onto your TV set. COLORCOM/E has the ability to read 8 bit color Graphics. In the message retrieval section you can leave or retrieve messages with other users of the system. It is a way to get info on the Color Computer that is not readily available through other channels. You can ask technical questions, get opinions on Color Computer Hardware or Software, and place an ad. In the merchandise section is a list and description of products from the leading Color Computer advertisers.

There is one last thing you can do with your modem. Become a COCO sysop! Sysop stands for SYStem OPerator. The second BBS which is operated by SPECTRUM PROJECTS can be accessed by dialing (212) 441-3766. It will also be accessed if you call BBS#1 and it is being used. It is switched over from BBS#1 to BBS#2 via ringover. The second Bulletin Board is operated on a Color Computer. The minimum requirements to run a BBS on a Color Computer are 64K of RAM, two disk drives, and a auto answer modem. And of course, BBS software!

Bulletin Boards have proven to be very profitable investments as yours truly can attest to. Just imagine sitting in front of your COCO BBS and watching it be accessed by a complete stranger at any time of day or night from anywhere in the world! Make way for the Bulletin Board System - THE WAVE OF THE FUTURE!!!

Bob Rosen, Pres.
Spectrum Projects

SYSTEMS SOFTWARE

SOFTWARE DEVELOPMENT SYSTEM

The Micro Works Software Development System (SDS80C) is a complete 6809 editor, assembler and monitor package contained in one Color Computer program pack! Vastly superior to RAM-based assemblers/editors, the SDS80C is non-volatile, meaning that if your application program bombs, it can't destroy your editor/assembler. Plus it leaves almost all of 16K or 32K RAM free for **your** program. Since all three programs, editor, assembler and monitor are co-resident, we eliminate tedious program loading when going back and forth from editing to assembly and debugging!

The powerful screen-oriented Editor features finds, changes, moves, copys and much more. All keys have convenient auto repeat (typamatic), and since no line numbers are required, the full width of the screen may be used to generate well commented code.

The Assembler features **all** of the following: complete 6809 instruction set; conditional assembly; local labels; assembly to cassette tape or to memory; listing to screen or printer; and mnemonic error codes instead of numbers.

The versatile monitor is tailored for debugging programs generated by the Assembler and Editor. It features examine/change of memory or registers, cassette load and save, breakpoints and more. **SDS80C Price: $89.95**

MICRO WORKS COLOR FORTH

- Forth is faster to program in than Basic
- Forth is easier to learn than Assembly Language
- Forth executes in less time than Basic

Forth is a highly interactive language like Basic, with structure like Pascal and execution speed close to that of Assembly Language. The Micro Works Color Forth is a Rompack containing everything you need to run Forth on your Color Computer.

Color Forth consists of the standard FORTH Interest Group (FIG) implementation of the language plus most of FORTH-79. It has a super screen editor with split screen display. Mass storage is on cassette. Color Forth also contains a decompiler and other aids for learning the inner workings of this fascinating language. It will run on 4K, 16K, and 32K computers. Color Forth contains 10K of ROM, leaving *your* RAM for *your* programs! There are simple words to effectively use the Hi-Res Color Computer graphics, joysticks, and sound. The 112-page manual includes a glossary of the system-specific words, a full standard FIG glossary and complete source listing. COLOR FORTH ... THE BEST! From the leader in Forth, Talbot Microsystems. **Price: $109.95**

MICROTEXT: COMMUNICATIONS VIA YOUR MODEM!

Make your Color Computer an intelligent printing terminal with off-line storage! The Microtext module is just what you'll need for:

- Talking to a timeshare system or information service
- Printing out what is received as it is received
- Saving received text to cassette tape
- Re-displaying the received text even while on-line
- Communications with other computers
- Using your computer as a general-purpose 300-baud terminal
- Downloading programs from other computers

The Microtext module is a program pack containing not only firmware but a second serial port so that both your printer and modem can be connected at the same time. Microtext can be configured for any serial printer that will work with the Color Computer, even if it requires line feeds! But even if you don't have a printer, you can keep a permanent copy of your data by storing to cassette tape. Also, any Radio Shack/Centronics-compatible parallel printer may be used by adding the Micro Works' PI80C parallel interface.

For those of you with special terminal applications, Microtext has selectable parity; it sends odd, even, mark or space. With mark parity (which is default) you can send to computers requiring either seven or eight bits. All 128 ASCII codes can be sent. Exchange programs with other Color Computer users! Basic programs may be downloaded from other computers or timesharing systems.

You'll find many uses for this versatile module! Available in ROMPACK, ready-to-use, for **$59.95.**

MACHINE LANGUAGE

MONITOR TAPE: A cassette tape which allows you to directly access memory, I/O and registers with a formatted hex display. Great for machine language programming, debugging and learning. It can also send/receive RS232 at up to 9600 baud, including host system download/upload. 19 commands in all. Relocatable and reentrant. **CBUG Tape Price: $29.95**

MONITOR ROM: The same program as above, supplied in 2716 EPROM. This allows you to use the entire RAM space. And you don't need to re-load the monitor each time you use it. The EPROM plugs into the Extended Basic ROM Socket or the Romless Pak I. **CBUG ROM Price: $39.95**

SOURCE GENERATOR: This package is a disassembler which runs on the color computer and generates your own source listing of the BASIC interpreter ROM. Also included is a documentation package which gives useful ROM entry points, complete memory map, I/O hardware details and more. A 16K system is required for the use of this cassette. **80C Disassembler Price: $49.95**

MACRO-80C

This is a **disk-based editor, macro assembler and monitor,** written for Color Computer by Andy Phelps. THIS IS IT — The ultimate programming tool!

The powerful 2-pass macro assembler features conditional assembly, local labels, include files and cross referenced symbol tables. MACRO-80C supports the complete Motorola 6809 instruction set in standard source format. There are no changes, constraints or shortcuts in the source language definition. Incorporating all of the features of our Rompack-based assembler (SDS80C), MACRO-80C contains many more useful instructions and pseudo-ops which aid the programmer and add power and flexibility.

The screen-oriented text editor is designed for efficient and easy editing of assembly language programs. The "Help Key" feature makes it simple and fun to learn to use the editor. As the editor requires no line numbers, you can use the arrow keys to position the cursor anywhere in the file. MACRO-80C allows global changes and moving/copying blocks of text. You can edit lines of assembly source which are longer than 32 characters.

DCBUG is a machine language monitor which allows examining and altering of memory, setting break points, etc.

The editor, assembler and monitor — as well as sample programs — come on one Radio Shack compatible disk. Extensive documentation included. **MACRO-80C Price: $99.95**

HARDWARE

PARALLEL PRINTER INTERFACE — Serial to parallel converter allows use of all standard parallel printers. PI80C plugs into the serial output port, leaving your Rompack slot free. You supply the printer cable. **PI80C Price: $69.95**

MEMORY UPGRADE KITS: Consisting of 4116 200ns., integrated circuits, with instructions for installation. **4K-16K Kit Price: $39.95. 16K-32K Kit** (requires soldering experience) **Price: $39.95.** For Rev. level E, ET, NC and TDP-100s, we carry 64K chips; upgrading is easy! Eight prime **64K chips** and instructions: **$64.95**

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BOOKS

6809 Assembly Language Programming, by Lance Leventhal, **$16.95**

TRS-80 Color Computer Graphics, by Don Inman, **$14.95**

Assembly Language Graphics for the TRS-80 Color Computer, by Don Inman, **$14.95**

Starting Forth, by L. Brodie, **$19.95**

GAMES

Star Blaster — Blast your way through an asteroid field in this action-packed Hi-Res graphics game. Available in ROMPACK; requires 16K. **Price: $39.95**

Pac Attack — Try your hand at this challenging game by Computerware, with fantastic graphics, sound and action! Cassette requires 16K. **Price: $24.95**

Haywire — Have fun zapping robots with this Hi-Res game by Mark Data Products. Cassette requires 16K. **$24.95**

Dunkey Munkey — Arcade excitement awaits those who dare to conquer the Munkey! Joystick and 32K required, by Intellectronics. Cassette: **$24.95**

Colorpede — Great graphics, two-player option, and pause control in this exciting game by Intracolor Communication. Cassette requires 16K: **$29.95**

Adventure — *Black Sanctum* and *Calixto Island* by Mark Data Products. Each cassette requires 16K: **$19.95** each.

Cave Hunter — Experience vivid colors, bizarre sounds and eerie creatures in hot pursuit as you wind your way through a cave maze in search of gold treasures. This exciting Hi-Res game by Mark Data Products requires 16K for cassette version. **$24.95**

Starfire — Fly around the planet defending Earthlings from being snatched up by aliens in this challenging game from Intellectronics. Cassette requires 16K: **$21.95**

Doodle Bug — Joystick-controlled Doodle Bugs must move quickly through mazes while being chased by enemy bugs in Hi-Res game by Computerware. Cassette requires 16K: **$24.95**

Astro Blast — You'll need to act fast as you protect Earth from wave after wave of alien invaders in this Hi-Res game by Mark Data. Cassette requires 16K: **$24.95**

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laser war/bas

TRS-80C Color Computer
16K Extended Basic

After spending a year and a half learning Basic and some machine language on my Sinclair micro I decided it was time to go to a machine with a little more versatility. Partly because of the lower cost I decided to buy the TRS-80C Color Computer.

After a month or so I wrote a short Basic program to test the speed of the CoCo. I was pleasantly surprised.

About the Program

The program is fully documented on the screen. Use the Right Joystick to move the laser cannon left and right; use the firebutton to shoot down the "H" wing fighters. There will be 10 fighters (more if you have consecutive hits). A hit will be so indicated on the graphics screen and a score after each round.

The following will explain the mechanics of the program:

90 - A$ draws "HIT" on graphics screen
100 - L$ is sound for laser cannon fire
110 - B$ prints the title at the top of the graphics screen
130-180 - draws the starbase
190-220 - draws "H" wing fighter and "gets" it in matrix dimensioned by A(11,11)
240 - sets variables to zero for score keeping, number of attempts, and number of fighters to appear
260 - to randomly place fighters on screen and erase previous position of laser cannon
280 - laser fire from fighter
290 - "puts" fighter randomly on screen controlled by X and Y
300 - detects whether fire button is pressed or not
310 - fires the cannon from joystick position vertically
320 - variable N keeps track of no. of shots fired
330 - checks for hit or no-hit
350 - explosion and sound if fighter is hit
370 - back to main loop
380 - subroutine to set new position of cannon once each time through the main loop
400-490 - routine to place the next fighter on screen if previous one is missed
500-530 - subroutine for instructions
540-600 - gives score and status of starbase and restart
1000 - Subroutine to create animation

Note: For greater speed enter from the keyboard: **POKE 65495,0** (will not work on machines manufactured before Oct '82). Before saving to tape do the following: **POKE 65494,0.** If you fail to do this the program will not load back into the machine. To test your machine **POKE 65495,0.** If your cursor speeds up considerably you can probably safely run the program at the high speed. If there is no noticeable difference in the cursor **POKE 65494,0** to get it back to normal (if the whole system is hung up, hit RESET and reload the Program) and then RUN the program.

Victor Rogers

```
10 'LASER WARS
20 'BY VICTOR ROGERS
30 '3107 ELMORE AVE.-CHATTANOOGA
,TENNESSEE 37415
40 CLS3
50 GOSUB 500
60 DIM A(11,11)
70 CLS
80 J=JOYSTK(0)
90 A$="BM110,170;U5;D10;U5;R3;U5
;D10;U5;B;R6;U7;B;U2;U1;B;R9;D5;
U10;L3;R6"
100 L$="V31T2550 4;AGFED"
110 B$= "BM60,0;D8;R4;B;R3;U8;R4
;D4;L4;R4;D4;B;R3;R4;U4;L4;U4;R4
;B;R3;R4;L4;D4;R3;L3;D4;R4;B;R3;
U8;R4;D4;L4;R1;D1;R1;D1;R1;D1;R1
;D1;R1;B;R6;U8;D8;R1;U1;R1;U1;R2
;D1;R1;D1;R1;U8;D8;B;R3;U8;R4;D4
;L4;R4;D4;B;R3;U8;R4;D4;L4;R1;D1
;R1;D1;R1;D1;R1;D1;R1"
120 PMODE4,1:PCLS
130 CIRCLE(128,90),30,,.25
140 CIRCLE(128,65),20,,.25
150 CIRCLE(128,127),45,,.25
160 LINE(45,140)-(94,55),PSET
170 LINE(211,140)-(162,55),PSET
180 LINE(94,55)-(162,55),PSET
190 DRAW"BM128,127;U4;D8;U4;R10;
U4;D8"
200 CIRCLE(134,127),4,,.25
210 CIRCLE(132,127),4.5,,.25
220 GET(128,122)-(138,132),A,G
230 DRAW B$
250 SCREEN 1,1
260 X=RND(234)+12:Y=RND(43)+12:L
INE(J*4,192)-((J*4)+6,186),PRESE
T,BF:LINE(105,175)-(134,155),PRE
SET,BF
270 GOSUB 380
275 SCREEN 1,1
290 PUT(X,Y)-(X+10,Y+10),A,AND
295 GOSUB1000
296 IFX>12 AND R<=123THENX=X-10E
LSE X=X+10::IF Y>12 AND R1<12 TH
EN Y=Y-10ELSE Y=Y+10
298 PUT(X,Y)-(X+10,Y+10),A,PSET
299 SOUND12,1:LINE(X,Y+9)-(J*4,1
75),PSET:LINE(X,Y+9)-(J*4,175),P
RESET
300 P=PEEK(65280):IF P=254OR P=1
26 THEN PLAY L$
310 IF P=254 OR P=126 THEN LINE(
J*4,192)-(J*4,12),PSET:LINE(J*4,
192)-(J*4,12),PRESET:N=N+1
320 IFN>10THEN GOTO400
330 IF PPOINT(X+5 ,Y+5)=0 OR PPO
INT(X+6,Y+5)=0 OR PPOINT(X+7,Y+5
)=0 OR PPOINT(X+4,Y+5)=0 OR PPOI
NT(X+7,Y+5)=0 THEN 350
340 GOTO 360
350 CIRCLE(X+5,Y+5),2:PAINT(X,Y)
,0,1:LINE(X,Y)-(X+10,Y+10),PRESE
T,BF:PLAY"V31O1T255ADBAGFED":F=F
+1:N=0:T=T+1:DRAW A$:GOTO260
360 LINE(J*4,192)-((J*4)+6,186),
PRESET,BF
370 GOTO270
380 J=JOYSTK(0):LINE(J*4,192)-((
J*4)+6,186),PSET,BF
390 RETURN
400 LINE(X,Y)-(X+10,Y+10),PRESET
,BF:N=0
410 SOUND 200,4:SOUND 220,4
420 PUT(122,61)-(132,69),A,PSET
430 FOR G=1 TO 500:NEXT
440 LINE(122,61)-(132,69),PRESET
,BF
450 CIRCLE(128,65),20,,.25
460 PUT(123,85)-(133,95),A,PSET
470 FOR G=1 TO 500:NEXT
480 T=T+1:IF T>=10 THEN 540
490 LINE(123,85)-(133,95),PRESET
,BF:GOTO260
500 PRINT@39,"***LASER WARS***"
510 PRINT@65,"TO DESTROY  FIGHTE
RS USE RIGHT JOYSTICK(MOVE RIGHT
, LEFT AND   PRESS FIREBUTTON).
YOU HAVE (10)SHOTS AT EACH FIGHT
ER.  THERE   WILL BE (10) FIGHTE
RS ATTACK YOU AND YOUR STARBASE.
  GOOD LUCK     COMMANDER!!!!!!"
520 PRINT@327,"PRESS ANY KEY TO
BEGIN."
530 G$=INKEY$:IF G$<>"" THEN RET
URN ELSE 530
540 CLS3:SCREEN0,1
550 PRINT@65,"YOU DESTROYED "F"
 OF "T"     FIGHTERS."
560 IF F>7 THEN PRINT@256,"*THE
STARBASE IS SECURE*" ELSE PRINT@
256,"*THE STARBASE IS LOST*"
570 PRINT@325,"AGAIN? (Y/N)"
580 R$=INKEY$:IFR$=""THEN580
590 IFR$="N"THEN ENDELSE600
600 RUN40
1000 LINE(X,Y)-(X+10,Y+10),PRESE
T,BF
1005 R=RND(234)+12:R1=RND(43)+12
1020 RETURN
```

Rail Runner

BY COMPUTERWARE
P.O. BOX 669
ENCINITAS, CA. 92024

CASETTE $21.95 DISK $26.95

I TESTED THE TAPE VERSION WHICH TAKES 16K. THIS GAME IS A "RESCUE" TYPE GAME WITH A SCREEN WHICH IS IN SOME WAYS LIKE FROGGER. THE MOVEMENT OF YOUR RAIL RUNNER IS CONTROLLED BY THE ARROW KEYS ON THE KEYBOARD AND THE SCREEN IS QUITE BUSY. THE GAME WILL PROBABLY APPEAL MORE TO THE YOUNG THAN THE EXPERIENCED PLAYER. THE SCREEN IS FILLED WITH TRACKS OCCUPIED BY MOVING HANDCARS AND ENGINES, AND YOU MUST MANEUVER YOUR RAIL RUNNER FROM THE TOP OF THE SCREEN TO THE BOTTOM WITHOUT BEING HIT THEN ENTER THE SQUARE WHERE THE HOBOES WAIT TO BE RESCUED. ON THE SECOND BOARD THE YARD IS REAL BUSY. THE GRAPHICS ARE WELL DONE BUT THERE IS LITTLE SOUND TO GO WITH THE MOVEMENT OF THE SCREEN.

THIS GAME WILL APPEAL TO THE FROGGER FANS BY VIRTUE OF IT'S FROGGER LIKE SCREEN. AND IT WILL APPEAL TO THE YOUNGER PLAYERS BY VIRTUE OF IT'S INTERESTING SCREEN. IT SHOULD BE A VERY GOOD PROGRAM FOR DEVELOPMENT OF HAND EYE COORDINATION IN THE YOUNGER PLAYER. THE PLAY IS QUITE FAST AND THERE ARE THREE LEVELS OF DIFICULTY TO KEEP THE GAME INTRESTING THE FIRST LEVEL IS SIMPLE AND THE THIRD IS COMPLEX REQUIREING TWO PASSES TO SAVE THE HOBO. FOR THE YOUNGER PLAYER I HEARTILY RECOMMEND BUYING IT.

Joe Patrick

P B J, Inc.

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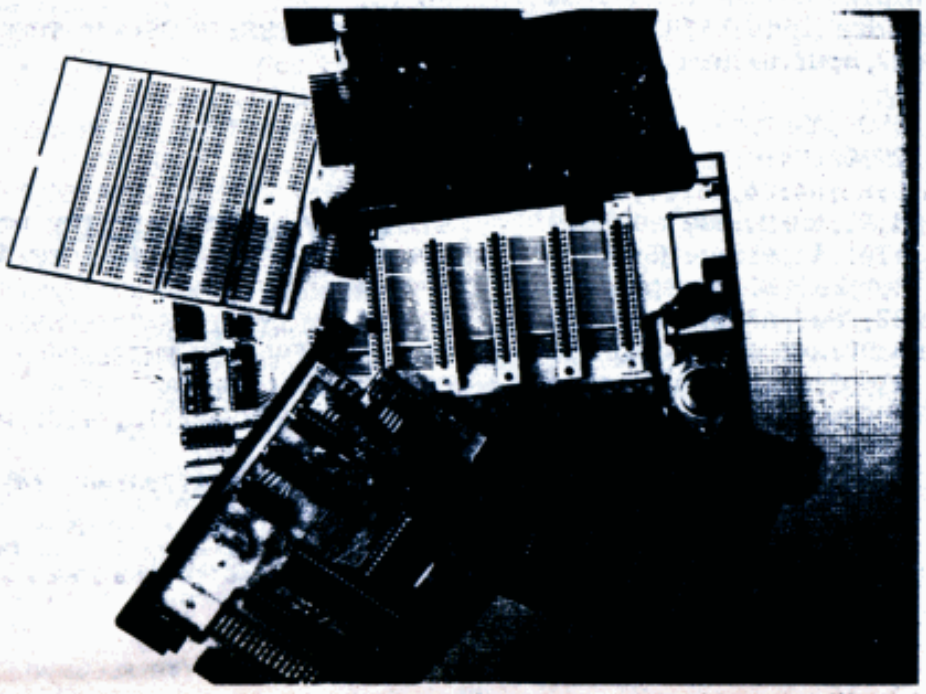

PRODUCT ANNOUNCEMENT

PBJ, Inc. is pleased to announce the availability of the following products for the Radio Shack Color Computer.

WORD-PAK
The WORD-PAK is a video board designed to plug into the expansion port of the Color Computer and provides the user with a high quality, 80 column video output. The board is compatible with most non-graphic Basic programs and can be used with disk through the use of a "Y" cable. Software provided with the board provides terminal functions such as; erase to end of line, erase to end of screen, home cursor, sound bell, x-y cursor positioning, etc. and the ability to reprogram the screen format for compatibility with other computers. Additional software support includes a Flex patch, which allows the user to run ALL standard Flex software without modification, and an enhanced version of TEXPROIII (text editor/processor). Future software support will include spreadsheet and business application programs.

C-C BUS
The C-C BUS is an expansion bus which connects to the expansion port of the Color Computer and provides the user with six software selectable expansion ports. The board is completely compatible with any size system, and automatically senses system size to prevent contention problems. The board also allows the user to expand memory beyond the 64K limit by utilizing a bank switching scheme. A typical system might contain a disk controller, a parallel printer cartridge, a 16K RAM board and a WORD-PAK all installed and available to the CPU. The C-C BUS can also be supplied with an optional power supply to power the peripheral cartridges/boards.

MEM-PAK 16K RAM/ROM expansion board (supplied with 16K RAM).

P-C PAK Centronics compatible parallel printer port (real time clock available as an option).

PROTO CoCo Prototyping board.

All of the above are available as bare boards with documentation. Prices are as follows:

WORD-PAK	$139.95 (a&t)	$23.95 (bb)
C-C BUS	$125.00 (a&t)	$27.95 (bb)
MEM-PAK	$110.00 (a&t)	$17.95 (bb)
P-C PAK	$ 79.95 (a&t)	$18.95 (bb)
PROTO CoCo	$ 14.95	

MEGAPEDE

DISTRIBUTED BY
COMPUTERWARE
P.O. BOX 669
ENCINITAS, CA. 92024

CASETTE $21.95 DISK $26.95

THE GAME I TESTED WAS A 16K CASETTE VERSION. THIS IS AN EXCELLENT ADAPTATION OF THE ARCADE MILLIPEDE GAME. IT HAS EXCELLENT HI-RES. GRAPHICS, AND GOOD PLAY ACTION FROM SLOW TO VERY FAST ON FOUR DISTINCT LEVELS. THE ONLY THINGS MISSING FROM THE PLAYFIELD ARE THE DDT CANISTERS AND THE WANDERING BUG AT THE BOTTOM OF THE SCREEN.

ONE OF THE NICE TOUCHES OF THIS GAME IS THE ABILITY TO DO ALL OF YOUR NECESSARY SELECTIONS FROM THE JOYSTICK INSTEAD OF HAVING TO USE THE KEYBOARD. THE PLAY ON THE FIRST TWO LEVELS (NICE AND RUFF) IS SLOW AND VERY GOOD FOR THE BEGINNER ,BUT THE OTHE TWO (FOWL AND MEAN) ARE DEFINITELY FOR THE ADVANCED PLAYER AS THE ACTION BECOMES FAST AND FURIOUS. THOSE OF YOU WHO HAVE PURCHASED THE WICO ADAPTOR FOR THE ATARI JOYSTICKS WILL FIND THAT NOT EVERYTHING WILL WORK PROPERLY. I EXPERIENCED SOME TROUBLE IN GETTING THIS AND THE JOYSTICKS MODIFIED BY THE ARTICLE IN CREATIVE COMPUTING TO SELECT THE ROUGH PLAY LEVEL. OTHERWISE THERE WAS NOT ANY PROBLEMS.

THE BOARD IS WELL DONE AND I FOUND THAT THE HIGHER THE LEVEL SELECTED THE MORE MUSHROOMS ON SCREEN THESE CAN HELP YOU IF THEY ARE IN A ROW BY ROUTING THE MILLAPEDE TOWARD YOU. BUT WATCH OUT THERE ARE ALWAYS AT LEAST FOUR HEADS ON THE BOARD AND THE FLEAS FALL AT RANDOM AND VERY FAST. THIS IS VERY LIKE MILLIPEDE IN IT'S ACTIONS. I FOUND NO GHOSTS (THAT IS THINGS ON THE SCREEN THAT YOUR SHOTS PASS THROUGH WITHOUT EFFECT) OR OTHER STRANGE SUDDEN MOVES WHICH OCCUR IN SOME OTHER GAMES. ONE THING I DID FIND WAS THAT YOU CAN SEEMINGLY GET HUNG UP IN A SLOT BETWEEN THE MUSHROOMS. THIS OCCURS BECAUSE YOU ENTERED THE ROW DIAGONALLY AND CAN ONLY LEAVE THAT WAY. DURING THE HEAT OF THE GAME THIS FACT WILL PROBABLY ESCAPE YOU. IT SURE DID ME!

OF THE GAMES OF THIS TYPE I HAVE PLAYED THIS IS THE SMOOTHEST AND MOST ENTERTAINING I HAVE SEEN. IT IS WELL WORTH YOUR TIME AND MONEY TO GET A COPY . TRY IT YOU'LL LIKE IT !

Joe Patrick

Color Computer Software

SUPER SLEUTH DISASSEMBLER (specify for 680x/6502 or for Z80/8080/5i)	**Each $99-FLEX $101-OS/9**
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baby COCO

There it was, sitting in a glass cabinet along with its user manual - Tandy's newest computer. It was **SMALL!** According to the salesman, it is going to blow the competition out of the water. Radio Shack's marketing people call it the Micro Color Computer. The manual designates it as the MC-10. I hereby dub it (may I have the ceremonial sword, please?) Baby CoCo.

I picked one up recently, and had a fascinating weekend poking around inside. Herewith is my first report.

HOW GOOD IS IT?

Graphics are the same as you get on the standard (non-extended BASIC) CoCo. This puts the Baby CoCo in the same league as the Timex 1000, which is a long way behind the VIC-20, TI-99/4A, and Atari 400.

Text on the screen is identical to the standard CoCo -- 32 characters wide by 16 lines high. No lower-case is supported, although you can get reversed letters. I doubt that we will see any 51x24 upgrades for this computer. These depend on the 6883 SAM Chip, which is not present in the Baby CoCo.

Memory is 4K standard. Surprise: This is 4224, not 4096. A 16,384 byte expander module is to be made available in the future. Baby CoCo is a little above most of its competition in this regard -- partly because the graphics are so poor.

BASIC is (of course) from Microsoft, with Radio Shack's syntax. Provided PEEK and POKE are not used, almost anything written for the standard CoCo will work on the Baby CoCo if it fits into memory. You will (for the present, at least) have to type it in because the cassettes are not compatible.

A couple of surprises:

* The ELSE clause is missing.

* The Baby CoCo has several functions not available in the standard CoCo unless you get Extended BASIC: VARPTR, LOG, EXP, SQR.

* Contrary to the manual's statement, POKE will work to any address between 0 and 65535. Video RAM is from 16384 to 16895. Just for fun, try POKE 20,0 and see if you can figure out what happened (it won't break the MC-10, though you will have to switch it off to regain control).

* CLEAR has a second parameter, whose function is identical to that in the standard CoCo. There is also an EXEC statement. Sorry, no CLOADM -- hence no assembler. There is no information in the manual about machine language programs. But a USR function exists if we can only figure out where to POKE the execution address.

Cassette tapes use a similar format. Some salesmen will insist that it is the same. This does not mean you can CSAVE a program on the CoCo and get it to CLOAD on the baby CoCo. We'll discuss this matter further another time.

Printer interface is identical to the standard CoCo. The manual does not give you the POKE values for non-standard baud rates. Here they are.

Baud Rate	Value of n
300	244
600	118 (default)
1200	56
2400	24

These values all work using a Bo-Tek interface. To use a baud rate other than 600, simply POKE the value from the table above into 16932. For example, setting your machine to 2400 baud is done by:

```
POKE 16932,24
```

I have tested all of these numbers out with a BoTek interface ($69.95, their address is 4949 Hampshire, Utica MI 48087) and an Epson MX-80 printer. If you have occasional bad characters, try adjusting the number up or down slightly.

Serial Interface is (sorry 'bout that) almost identical to the standard CoCo. My regret is because the 6803 has a built-in UART which Radio Shack has not used. It will probably work but only at unusable baud rates such as 244.5.

Expansion is going to be difficult on the system. There is no ROM socket, only a card-edge on the back similar to the Timex machine. Reliability of the connection should be fairly good -- they have a couple of screw holes that will allow a firm grip to whatever plugs in there. Of course, no gold-plated contacts.

There is no provision for joysticks.

CONCLUSION

What will Radio Shack Accomplish with their new computer? Not much at the current price. Once they get it below $100, advertising should get the machine to sell -- but only if they come up with lots of inexpensive software on cassette. With no ROM pack socket, that may be exactly what they have in mind.

by John Beckett

for the attention of the **EDITOR**

NEWS RELEASE
. . . the following news item should be of interest to your readers !

Spectrum Projects is pleased to announce their newest product, the "SPECTRUM CONTROL CENTER". The SCC eliminates ever having to grope around behind your Color Computer, fumbling with cables and plugs by extending all the jacks to an interface box which can be mounted anywhere.

Features of the "SPECTRUM CONTROL CENTER" are :
1) A switch selected Printer/Modem port. Now both your printer and modem can be plugged in at the same time, but individually selected by a top mounted switch.
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SYNTHER 7

BY COMPUTERWARE
P.O. BOX 669
ENCINITAS, CA. 92024

CASETTE $21.95 DISK $26.95

THE PROGRAM I TESTED WAS A 16K CASETTE VERSION. THIS IS A GOOD ELECTRONIC SYNTHESIZER PROGRAM FOR THE COLOR COMPUTER. IT PRODUCES AN EXCELLENT RANGE OF MUSICAL NOTES FROM THE COMMON TO THE EXOTIC. THE PROGRAM IS QUITE COMPLEX SO THE BOOK MUST BE READ FIRST OR YOU WILL BE LIKELY TO HAVE MUTCH TROUBLE GETTING STARTED. IT IS PLEASANT TO HAVE THE DISPLAY OF ALL THE KEYS AND SETTINGS ON THE SCREEN OF THE TV. AUDIO COMES FROM THE TV SPEAKER AS WELL AS THE CASETTE PLUG MAKING IT POSSIBLE TO RECORD YOUR MASTERPIECES ON TAPE. IT IS ABOUT LIKE USING ONE OF THE PORTABLE SYNTHESIZERS ON THE MARKET.

THE SYNTHESIZER RESPONDS WELL AND IT IS POSSIBLE TO SET UP A COMBINATION USING THE BASIC VOICES WHICH SOUNDS EITHER LIKE A PLEASANT ORGAN OR THE WILDEST "OUTER SPACE" TYPE OF MUSIC. YOU HAVE COMPLETE CONTROLL OF "ADSR" WHICH GIVES YOU TOTAL CONTROLL OVER THE SOUNDS THAT YOU WILL GENERATE. THE KEYBOARD IS REPRESENTED BY THE UPPER OR "QWERTY" ROW WITH THE NUMERIC KEYS REPRESENTING THE FLATS AND SHARPS. THE LOWER TWO ROWS CONTROLL SETTING OF VOICE, ADSR, AND OTHER PAREMITERS SUCH AS FELT WHICH CONTROLLS THE DURATION OF THE NOTE OR THE BREAK FEATURE WHICH SIMULATES THE UP OR DOWNWARD SLIDE OF A NOTE. IT IS POSSIBLE TO PRODUCE A NOTE WHICH WILL MAKE THE PROGRAM APPEAR TO BE LOCKED UP COMPLETELY. THIS IS EASILY ESCAPED FROM BY USING THE CANCEL KEY. THE CONDITION USUALLY OCCURS WHEN YOU SELECT A NOTE WHICH IS TOO LOW TO HEAR AND THE FELT STOP HAS BEEN SET TO 1 WHICH PRODUCES A LOW CONTINUOUS NOTE YOU CAN'T HEAR. THE KEYBOARD ACTION IS CLEAN AND SMOOTH THE NOTES ARE ACCURATE AND WITHOUT STATIC OR POP.

THE PROGRAM DOCUMENTATION EXPLAINS THE OPERATION OF THE SYNTHESIZER QUITE WELL. HOWEVER A NEOPHYTE LIKE MYSELF, WHO HAS LITTLE MUSICAL EXPERIENCE, WILL NEED TO CAREFULLY READ THE BOOK AND POSSIBLY SOME OTHERS ALSO. BEFORE BECOMING COMPETENT IN USING IT. NOT HAVING BEEN EXPOSED TO SYNTHESIZER OPERATION BEFORE I FOUND MYSELF FREQUENTLY BEWILDERED BY THE TECHNICAL TERMS ENCOUNTERED IN THE MANUAL.

THIS PROGRAM WILL BE A HIT WITH THE PEOPLE WHO ARE INTO ELECTRONIC MUSIC. IT IS A VERY EASY PROGRAM TO USE ONCE YOU UNDERSTAND HOW TO USE IT. ONCE FAMILIAR WITH THE STOPS AND KEYBOARD RANGE YOU WILL ENJOY CREATING YOUR OWN ORGAN OR "STAR WARS" TYPE MUSIC. GIVE IT A TRY AND YOU WILL SPEND MANY HOURS PLAYING YOUR OWN KIND OF MUSIC. YOU MIGHT EVEN WRITE A NEW HIT TUNE .

Joe Patrick

SUPER
Lunar Lander

Requires 16K, EXT-BASIC, and Joystick

"Lunar Lander" was one of the popular early Arcade Games at about the time that the Color Computer began to appear in the Radio Shack Computer Centers. With the, at that time, unusual BASIC Graphic and Sound Commands provided by the Extended Basic ROM, it was a natural for the new Computer (and was one of the first Games available for it). With an Aero-Space Engineering Degree in my pocket, many hours of flying under my belt, and an interest in Science Fiction, it was "fore-told" that I would obtain the game for my new Computer.

Probably due to my background, I was a little disappointed in the original game. It simply provided joystick control of the Lander to the landing site, a few "deadly" meteors that went straight across the Screen (if it moved, it was deadly), and the Lander ALWAYS started at the same location. Besides, what better way to learn the Color Computers' "on board" language than to see what could be done to make Lunar Lander more realistic and challenging.

I added the Opening, more stars in the background, more meteors (some deadly, some miss you), angular motion for the meteors, gravity and orbital forces, the retracting 'Antenna' and 'Landing Legs', and a random starting location and velocity for the Lander which allows the Player to save the Lander IF he/she is quick enough. The "Gravity Force" is balanced against the "Thrust Available" such that it takes almost FULL Thrust to set the Lander down safely (obviously, if you are coming down too fast, you are NOT going to get it stopped in time - i.e., you have to plan ahead; WATCH OUT FOR THAT METEOR!!; What's the fuel state? It wasn't like this in training.). The next project was to add horizontal scrolling with several different landing sites, and a visual representation of the amount and direction of the thrust being used. How about a "real time" fuel gauge? Scoring depending on time, fuel used, etc.? It seemed that a Machine Language Routine would be needed to handle the horizontal scrolling, so it became necessary to look into the Basic ROMs and the Instruction Set of the new CPU. One thing led to another, and I never got back to "SUPER Lunar Lander".

As it now stands, it is an interesting and challenging game. No attempt has been made to stream-line the program to make use of the idiosyncrasies of BASIC in general, or the Color Computer BASIC specifically (that is left up to you). It is simple and easy to follow. The instructions for playing the game begin at Statement No. 2000.

The general sections of the Program are as follows:

2 - 85 = the Opening
90 - 270 = Logo and Starting options
280 - 350 = Initialization
360 = Stars
370 - 500 = Draw Mountains
510 - 590 = "beep", draw Lander with or w/o Antenna or Legs
600 - 716 = Meteors
720 = calc. Horizontal Vel.
730 -750 = chk fuel, do "free fall"
756 - 790 = calc Vertical Vel, fuel used (depends on power applied)
800 & 810 = if low fuel, "beep" warning
840 & 850 = if "down", was it a "safe" landing (re. State. #1230)
870 - 920 = chk if inside the galaxy
925 = if below mountains, forget the meteors
930 - 965 = ?? hit by a meteor
970 - 1150 = ?? hit a mountain
1160 - 1200 = "explosion" (size depends on how hard you hit)
1210 - 1310 = "Mission Debriefing"
2000 --> = Instructions and Starting Options

Finally, to help in evaluating the Program, and as a GREAT aid in "customizing" it, I have also included a Cross-Reference of "SUPER Lunar Lander".

Robert L. Nay

```
2 PMODE 4,1: PCLS: SCREEN 1,1
4 S=0: S1=0
6 FOR B=1 TO 50: X=RND(255): Y=R
ND(191)
8 PSET(X,Y,1): NEXT
10 FOR S=1 TO 21
12 A$="S"+STR$(S)
14 B$="BM"+STR$(127-4*S)+","+STR
$(93-2*S)
16 C$="BM"+STR$(130-5*S)+","+STR
$(97+2*S)
18 DRAW "XA$;C1;XB$;NU4R4 BR2BU1
NU3F1R2E1NU3BD1 BR2U4F4NU4 BR2E4
F3NL6F1 BR2U4R3F1G1L1NF2L2"
20 DRAW "XC$;D4R4 BR2E4F3NL6F1 B
R2U4F4NU4 BR2U4R3F1D2G1L3 BR7NR4
U2NR2U2R4 BD4BR2U4R3F1G1L1NF2L2"
22 FOR T=1 TO INT(2500/S):NEXT
24 IF S1=22 THEN 70
26 NEXT S
28 FOR S1=1 TO 22
30 IF S1=22 THEN 18
32 A$="S"+STR$(S1)
34 B$="BM"+STR$(127-4*S1)+","+ST
R$(93-2*S1)
36 C$="BM"+STR$(130-5*S1)+","+ST
R$(97+2*S1)
38 DRAW "XA$;C0;XB$; NU4R4 BR2BU
1NU3F1R2E1NU3BD1 BR2U4F4NU4 BR2E
4F3NL6F1 BR2U4R3F1G1L1NF2L2"
40 DRAW "XC$;C0;D4R4 BR2E4F3NL6F
1BR2U4F4NU4 BR2U4R3F1D2G1L3 BR7N
R4U2NR2U2R4 BD4BR2U4R3F1G1L1NF2L
2"
42 FOR T=1 TO INT(2500/S):NEXT
60 NEXT S1
70 GOSUB80
75 GOTO90
```


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```
80 PLAY"L4;V31;T2;O3;1;T6;6;1;6;
T2;11;T6;10;6;1;O2;T2;A#;O3;T6;D
#;O2;A#;O3;D#;T2;G#;T6;G;F;D#;O3
;T2;6"
85 RETURN
90 CLS
91 PRINT@10,  "**************"
92 PRINT@41,  "*              *"
96 PRINT@72,  "* - S U P E R - *
"
100 PRINT@104,"*              *
"
101 PRINT@136,"* LUNAR  LANDER *
"
102 PRINT@168,"****************
"
103 PRINT@202,"*":PRINT@214,"*"
104 PRINT@233,"*":PRINT@247,"*"
105 PRINT@264,"*      BY      *
"
110 PRINT@295,"*   ROBERT L NAY
 *"
115 PRINT@326,"*       1981
   *"
120 PRINT@419,"FOR INSTRUCTIONS
PRESS 'I'"
125 PRINT@449,"ELSE PRESS RIGHT
'FIRE' BUTTON"
130 PRINT@490,"TO START GAME";
135 GOTO240
210 GOTO220
215 PRINT@448,"         TO START
 AGAIN"
220 PRINT@416, "   PRESS RIGHT '
FIRE' BUTTON"
240 W=PEEK(65280)
250 IFW=126THEN280
260 IFW=254THEN280
265 IF INKEY$="I"THEN2000
270 GOTO240
280 X=30+RND(185):Y=30+RND(50)
290 B=RND(140):D=RND(140):F=RND(
140):H=RND(140)
291 B1=RND(120):F1=RND(120)
292 D1=RND(120):H1=RND(120)
300 I=RND(10):J=RND(10):K=RND(10
):L=RND(10):S=4500
301 IX=RND(12):IY=RND(10)-4:JX=R
ND(10):JY=RND(12)-5
302 KX=RND(12):KY=RND(10)-4:LX=R
ND(16):LY=RND(14)-7
310 N=0:V=0:A=0:C=0:E=255:G=255:
O=90:P=32:Q=0
311 A1=0:E1=255:C1=0:G1=255
312 AA=6: AM=6: LG=0
314 C$="NH"+STR$(AA)+"NU"+STR$(A
M)+"NE"+STR$(AA)
316 D$="NG"+STR$(LG): E$="NF"+ST
R$(LG)
320 T=RND(8)-4:U=RND(8)-4
330 PMODE4,1
340 PCLS
350 SCREEN1,1
360 FORM=1TO25:PSET(RND(255),RND
(140)):NEXTM
370 LINE(0,191)-(45,146),PSET
380 LINE-(53,154),PSET
390 LINE-(67,141),PSET
400 LINE-(90,161),PSET
410 LINE-(105,146),PSET
420 LINE-(165,191),PSET
430 LINE(200,191)-(240,161),PSET
440 LINE-(255,141),PSET
450 DRAW"S4"
460 DRAW"BM53,154;F5R5F14"
470 DRAW"BM90,161;G30"
480 DRAW"BM105,146;D4F20G10L3G10
"
490 DRAW"BM67,141;D10F6"
500 DRAW"BM240,161;F10G10"
510 X=X+N:Y=Y+V
515 SOUNDY,1
520 IFX>255THENX=255
530 IFX<0THENX=0
540 IFY>191THENY=191
550 IFY<0THENY=0
560 A$="BM"+STR$(X)+","+STR$(Y)
570 DRAW"S2;C0;L7H5U2E5R5;XC$;R5
F5D2G5L13D3R3;XD$;R15;XE$;R3U3L8
"
572 IF Y>155 THEN RT=0
574 IF Y<140 THEN RT=6
576 AA=RT: AM=RT: LG=ABS(RT-6)
580 DRAW A$
583 C$="NH"+STR$(AA)+"NU"+STR$(A
M)+"NE"+STR$(AA)
586 D$="NG"+STR$(LG): E$="NF"+ST
R$(LG)
590 DRAW"S2;C1;L7H5U2E5R5;XC$;R5
F5D2G5L13D3R3;XD$;R15;XE$;R3U3L8
"
600 PSET(A,B,0):A=A+I:IFA<255THE
N620
610 B=RND(140):I=RND(8):A=0
620 PSET(A,B,1)
622 PSET(A1,B1,0):A1=A1+IX:B1=B1
+IY:IFA1=>255THEN625
623 IFB1<0THEN625
624 IFB1<160THEN626
625 B1=RND(140):IX=RND(12):IY=RN
D(10)-4:A1=0
626 PSET(A1,B1,1)
630 PSET(C,D,0):C=C+J:IFC<255THE
N650
640 D=RND(140):J=RND(8):C=0
650 PSET(C,D,1)
652 PSET(C1,D1,0):C1=C1+JX:D1=D1
+JY:IFC1=>255THEN655
653 IF D1<0THEN655
654 IFD1<160THEN656
655 D1=RND(140):JX=RND(12):JY=RN
D(10)-4:C1=0
656 PSET(C1,D1,1)
660 PSET(E,F,0):E=E-K:IFE>0THEN6
80
670 F=RND(140):K=RND(8):E=255
680 PSET(E,F,1)
682 PSET(E1,F1,0):E1=E1-KX:F1=F1
+KY:IFE1<0THEN685
683 IFF1<0THEN685
684 IFF1<160THEN686
685 F1=RND(140):KX=RND(12):KY=RN
D(13)-5:E1=255
686 PSET(E1,F1,1)
690 PSET(G,H,0):G=G-L:IFG>0THEN7
10
700 H=RND(140):L=RND(8):G=255
710 PSET(G,H,1)
712 PSET(G1,H1,0):G1=G1-LX:H1=H1
+LY:IFG1<0THEN715
713 IFH1<0THEN715
714 IFH1<160THEN716
715 H1=RND(140):LX=RND(12):LY=RN
D(12)-5:G1=255
716 PSET(G1,H1,1)
720 T=T+(JOYSTK(0)-P)/O:N=INT(T)

730 IFS>0THEN756
740 U=U+2:V=INT(U)
750 GOTO840
756 U=U+(Y-64)/512
760 U=U+(JOYSTK(1)-P)/O:V=INT(U)
770 S=S-ABS((JOYSTK(1)-64)/2)
780 S=S-ABS(JOYSTK(0)-32)
790 IFS<0THENS=0
800 IFS>1000THEN840
810 PLAY"V31;T255;L255;O5;CB"
840 IFY<186THEN870
850 IFU>1.5THENQ=1:GOTO1160
860 GOTO1200
870 IFY>6THEN890
880 Q=3:GOTO1160
890 IFX<249THEN910
900 Q=3:GOTO1160
910 IFX>8THEN925
920 Q=3:GOTO1160
925 IFY>140 THEN 970
930 IFINT(ABS(X-A)+ABS(Y-B))<8TH
ENQ=2:GOTO1160
940 IFINT(ABS(X-C)+ABS(Y-D))<8TH
ENQ=2:GOTO1160
950 IFINT(ABS(X-E)+ABS(Y-F))<8TH
ENQ=2:GOTO1160
960 IFINT(ABS(X-G)+ABS(Y-H))<8TH
ENQ=2:GOTO1160
965 GOTO510
970 IFX>45THEN990
980 Y1=INT(181-(1*(X)+0)):GOTO11
40
990 IFX>53THEN1010
1000 Y1=INT(181-(-1*(X)+90)):GOT
O1140
1010 IFX>67THEN1030
1020 Y1=INT(181-(.93*(X)-12.214)
):GOTO1140
1030 IFX>90THEN1050
1040 Y1=INT(181-(-.87*(X)+108.3)
):GOTO1140
1050 IFX>105THEN1070
1060 Y1=INT(181-(1*(X)-60)):GOTO
1140
1070 IFX>165THEN1090
1080 Y1=INT(181-(-.75*(X)+123.75
)):GOTO1140
1090 IFX>200THEN1110
1100 GOTO510
1110 IFX>240THEN1130
1120 Y1=INT(181-(.75*(X)-150)):G
OTO1140
1130 Y1=INT(181-(1.33*(X)-290))
1140 IFY>Y1 THEN Q=4:GOTO1160
1150 GOTO510
1160 FORR=1TO4*(ABS(U)+6)
1170 CIRCLE(X,Y),R,5:NEXTR
1180 FORR=4*(ABS(U)+6)TO1 STEP-1
1190 CIRCLE(X,Y),R,0:NEXTR
1194 FORXX=1TO2
1195 PLAY"T255;L255;O1CDEFGABAGF
EDC;O2;CDEFGABAGFEDC;O3;CDEFGABA
GFEDC;O4;CDEFGABAGFEDC;O5;CDEFGA
BAGFEDC"
1196 NEXTXX
1200 FORM=1TO500:NEXTM
1210 CLS:PCLS
1220 IFQ<>0THEN1230
1222 PRINT:PRINT" *CONGRATULATIO
NS, YOU MADE IT* "
1224 GOSUB80
1226 GOTO1270
1230 IFQ=1THENPRINT"YOU CRASHED,
 TOUCHDOWN TOO HARD":GOTO1270
1240 IFQ=2THENPRINT"YOU WERE HIT
 BY A METEOR":GOTO1270
1250 IFQ=3THENPRINT"YOU HIT THE
EDGE OF THE GALAXY":GOTO1270
1260 PRINT"YOU CRASHED ON THE MO
UNTAINS"
1270 PRINT:PRINT:PRINT"FLIGHT ST
ATISTICS:"
1280 PRINT" FUEL REMAINING  :";S
1290 PRINT" VERT. VELOCITY  :";-
U
1300 PRINT" HOR.  VELOCITY  :";T
1310 GOTO215
2000 CLS
2010 PRINT"YOU ARE THE PILOT OF
THE LUNAR"
2020 PRINT" LANDER.":PRINT
2030 PRINT"YOU CONTROL THE CRAFT
 BY USING"
2040 PRINT" THE RIGHT JOYSTICK."
:PRINT
2050 PRINT"THE OBJECT OF THE GAM
E IS TO"
2060 PRINT" LAND THE CRAFT ON LE
VEL GROUND"
2070 PRINT" AT A VERTICAL SPEED
OF LESS"
2080 PRINT" THAN -1.5 FEET PER S
ECOND.":PRINT
2090 PRINT"(ANY KEY TO CONTINUE)
"
2100 IF INKEY$=""THEN2100
2110 CLS
2120 PRINT"HOWEVER, IT IS NOT VE
RY EASY.":PRINT
2130 PRINT"IN OUTER SPACE, THERE
 ARE"
2140 PRINT" RANDOM METEORS THAT
WILL"
2145 PRINT" EXPLODE YOUR CRAFT I
```

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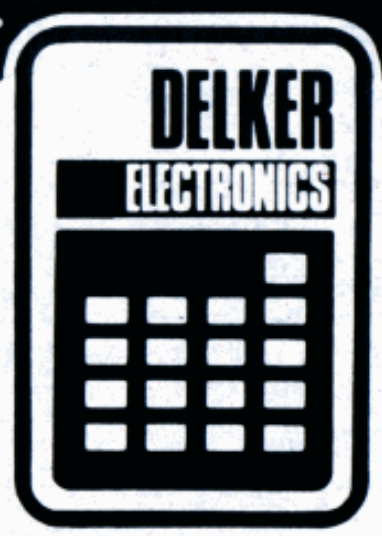

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```
F YOU"
2147 PRINT" GET TOO CLOSE.":PRIN
T
2160 PRINT"THE METEORS ARE THE M
OVING"
2170 PRINT" POINTS OF LIGHT. THE
 STARS"
2180 PRINT" ARE THE STATIONARY P
OINTS OF"
2190 PRINT" OF LIGHT AND ARE HAR
MLESS.":PRINT
2200 PRINT"(ANY KEY TO CONTINUE)
"
2210 IF INKEY$=""THEN2210
2220 CLS
2230 PRINT"AND TO MAKE THINGS WO
RSE,"
2240 PRINT" YOU HAVE A LIMITED A
MOUNT"
2250 PRINT" OF FUEL TO LAND WITH
.":PRINT
2260 PRINT"WHEN YOUR FUEL GETS L
OW, A"
2270 PRINT" 'LOW FUEL' ALARM WIL
L SOUND"
2280 PRINT" TO INFORM YOU OF THE
 IMPENDING"
2290 PRINT" DANGER.":PRINT
2300 PRINT"WHEN THE ALARM STOPS,
 YOU ARE"
2310 PRINT" OUT OF FUEL, AND THE
 REST WILL"
2320 PRINT" BE HISTORY.":PRINT
2330 PRINT"(ANY KEY TO CONTINUE)
"
2340 IF INKEY$=""THEN2340
2350 CLS
2360 PRINT"FINALLY, DO NOT ATTEM
P TO LAND"
2370 PRINT" ON THE MOUNTAINS.":P
RINT
2380 PRINT"YOUR ENGINES ARE NOT
'TIP'"
2390 PRINT" PROOF SO ANY ATTEMP
TO DO"
2400 PRINT" SO WILL RESULT IN AN
 EXPLOSION.":PRINT
2410 PRINT"PRESS ANY KEY TO STAR
T THE"
2420 PRINT" GAME, AND GOOD LUCK.
"
2430 IF INKEY$=""THEN2430
2440 GOTO280
```

"SUPER Lunar Lander" Cross-Reference

```
A    310 600 610 620 930
A$   12 32 560 580
A1   311 622 625 626
AA   312 314 576 583
AM   312 314 576 583
B    6 290 600 610 620 930
B$   14 34
B1   291 622 623 624 625 626
C    310 630 640 650 940
C$   16 36 314 583
C1   311 652 655 656
D    290 630 640 650 940
D$   316 586
D1   292 652 653 654 655 656
E    310 660 670 680 950
E$   316 586
E1   311 682 685 686
F    290 660 670 680 950
F1   291 682 683 684 685 686
G    310 690 700 710 960
G1   311 712 715 716
H    290 690 700 710 960
H1   292 712 713 714 715 716
I    300 600 610
IX   301 622 625
IY   301 622 625
J    300 630 640
JX   301 652 655
JY   301 652 655
K    300 660 670
KX   302 682 685
KY   302 682 685
L    300 690 700
LG   312 316 576 586
LX   302 712 715
LY   302 712 715
M    360 1200
N    310 510 720
O    310 720 760
P    310 720 760
Q    310 850 880 900 920 930 940 950
     960 1140 1220 1230 1240 1250
R    1160 1170 1180 1190
RT   572 574 576
S    4 10 12 14 16 22 26 42 90 300 730
     770 780 790 800 1210 1280 2000
     2110 2220 2350
S1   4 24 28 30 32 34 36 60
T    22 42 320 720 1300
U    320 740 756 760 850 1160 1180
     1290
V    310 510 740 760
W    240 250 260
X    6 8 280 510 520 530 560 890 910
     930 940 950 960 970 980 990 1000
     1010 1020 1030 1040 1050 1060
     1070 1080 1090 1110 1120 1130
     1170 1190
XX   1194 1196
Y    6 8 280 510 540 550 560 572 574
     756 840 870 925 930 940 950 960
     1140 1170 1190
Y$   265 2100 2210 2340 2430
Y1   980 1000 1020 1040 1060 1080 1120
     1130 1140

18 CALLED BY   30
70 CALLED BY   24
80 CALLED BY   70 1224
90 CALLED BY   75
215 CALLED BY  1310
220 CALLED BY  210
240 CALLED BY  135 270
280 CALLED BY  250 260 2440
510 CALLED BY  965 1100 1150
620 CALLED BY  600
625 CALLED BY  622 623
626 CALLED BY  624
650 CALLED BY  630
655 CALLED BY  652 653
656 CALLED BY  654
680 CALLED BY  660
685 CALLED BY  682 683
686 CALLED BY  684
710 CALLED BY  690
715 CALLED BY  712 713
716 CALLED BY  714
756 CALLED BY  730
840 CALLED BY  750 800
870 CALLED BY  840
890 CALLED BY  870
910 CALLED BY  890
925 CALLED BY  910
970 CALLED BY  925
990 CALLED BY  970
1010 CALLED BY 990
1030 CALLED BY 1010
1050 CALLED BY 1030
1070 CALLED BY 1050
1090 CALLED BY 1070
1110 CALLED BY 1090
1130 CALLED BY 1110
1140 CALLED BY 980 1000 1020 1040
               1060 1080 1120
1160 CALLED BY 850 880 900 920 930
               940 950 960 1140
1200 CALLED BY 860
1230 CALLED BY 1220
1270 CALLED BY 1226 1230 1240 1250
2000 CALLED BY 265
2100 CALLED BY 2100
2210 CALLED BY 2210
2340 CALLED BY 2340
2430 CALLED BY 2430
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Articles submitted for publication should be accompanied by the authors **Full Name, Address, Date, and Telephone Number.** It is preferred that articles be submitted as a **.TXT File** on a **FLEX Formatted 5 or 8 inch Disk,** or as an **ASCII File on a Radio Shack Disk or Tape** (a **/DAT** File). BASIC Programs should be submitted on Disk or Tape in the normal Binary Format.

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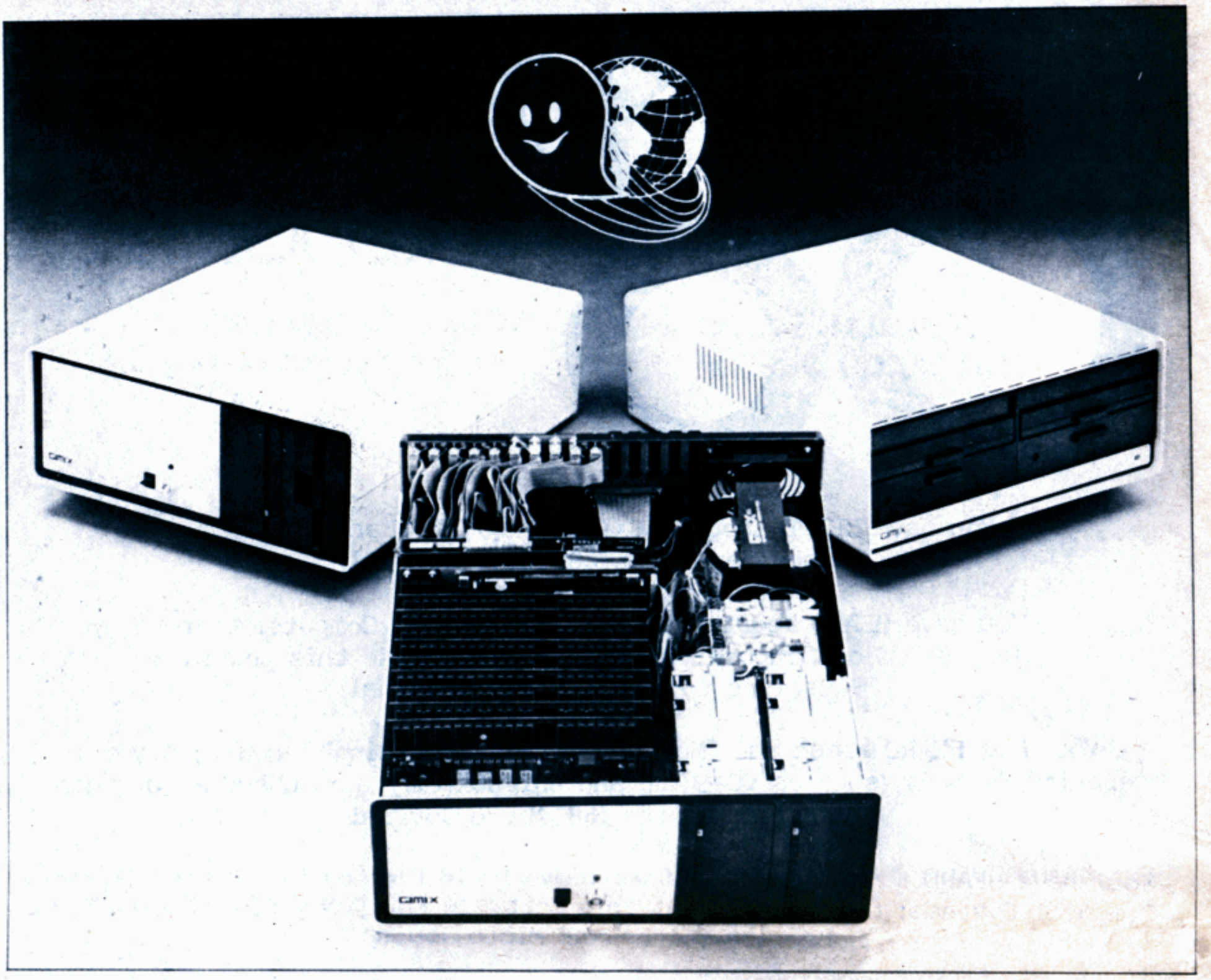

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