

ENGINEERING NOTES  
on  
Radio Shack Color Computers

November 1986  
Vol. 3 No. 10

\$1.95

DYNAMIC



PROGRAMS

- \* STAR CONSTELLATIONS
- \* ADDRESS FILE (PART 2)
- \* DUELING CANONS
- \* DX STATIONS (HAM RADIO)

INSTRUCTIONAL SERIES

- \* HAM RADIO & COMPUTERS
- \* ML PROGRAMMING
- \* WRITING PROGRAMS
- \* INTERFACING COMPUTERS
- \* COCO 3

SERVICES

- \* NEW PRODUCTS
- \* PRODUCT REVIEWS
- \* HARDWARE PROJECT
- \* OPERATING HINTS

DYNAMIC COLOR NEWS is published monthly by DYNAMIC ELECTRONICS, INC., P.O. Box 896, Hartselle, AL 35640, phone (205) 773-2758. Bill Chapple, BA, BSE President; Dean Chapple, Sec. & Treas.; John Pearson, Ph. D. Consultant; Bob Morgan, Ph. D., Consultant.

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The purpose of this newsletter is to provide instruction on Basic & Machine Language programming, Computer theory, operating techniques, computer expansion, plus provide answers to questions from our subscribers.

The submission of questions, operating hints, and solutions to problems to be published in this newsletter are encouraged. All submissions become the property of Dynamic Electronics if the material is used. We reserve the right to edit all material used and not to use material which we determine is unsuited for publication.

We encourage the submission of Basic and Machine Language Programs as well as articles. All Programs must be well documented so the readers can understand how the program works. We will pay for programs and articles based upon their value to the newsletter. Material sent will not be returned unless return postage is included. Basic & ML programs should be sent on a tape or disk & comments should be sent as a DAT or BIN file.

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*****
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*   DYNAMIC   COLOR   NEWS   *
*
*           November 1986     *
*
*   Editor and Publisher     *
*   Bill Chapple W4GQC      *
*
*           Secretary        *
*           Dean Chapple     *
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## 256K & 512K MEMORY UPGRADES

If you have a 64K computer with sockets for the SAM and 4164 chips then you can update it to 256K or 512K. The ramdisk allows programs to be retained within your computer and loaded as needed. Features include:

- \* 40 Track Single Disk Swap  
Can serve as second drive.
- \* Fast 35/40 Track Ramdisk  
(2 Ramdisks with 512K).
- \* 32K to 200K printer spooler  
(400K with 512K RAM).
- \* More than 30 PMODE 4 screens  
at once.
- \* Pager configures computer for  
8 (16 with 512K) 32K pages.
- \* OS-9 Ram Disk 35-40 track  
single sided or 40 track  
double sided with 512K.
- \* Memory is protected when the  
computer is reset.
- \* Solderless installation.
- \* Miniature toggle switch can  
force computer into 64K mode.
- \* Compatible with all software.

Software is supplied on tape or disk except OS-9 is not available on tape. Specify your choice when ordering. Assemblies are complete ready to install with memories and 64K mode switch. Order ME-16 for 256K assembly, ME-14B provides extra 256K for ME-16. ME-16A for 512K assembly.

ME-16 - 256K RAM	\$99.95
ME-14B - Second 256K for ME-16	79.95
ME-16A - 512K RAM	169.95

## 128K UPGRADES

ME-10A Upgrades 64K Korean Computers to 128K. \$49.95

ME-12 - Upgrades all 64K computers with 4164 memory chips to 128K. \$49.95

## VIDEO REVERSER

An integrated circuit that mounts on the 6847 and reverses the video reducing eye strain. Minor soldering for CC-2. \$9.95

## MEMORY SAVER

(Uninterrupted Power Source)

Our UPS saves your programs from being lost due to power failures by providing power to the memories from its battery. The assembly consists of a control circuit, battery, miniature toggle switch and a light emitting diode (LED). The control circuit and battery mount under the keyboard or can be mounted outside. The switch enables the UPS and the LED glows when power is available. For all computers with 5 volt memories. \$59.95

## MEMORY MANAGER

(New Product)

A complete set of software for managing the second 32K memory bank for 64K and larger computers. Run Basic programs in both banks, continue a basic program from one bank to the other, use the second bank for a RAM DISK, configure the computer for the all RAM mode and store programs in the upper memory. \$27.95 cassette, \$29.95 disk.

24 hr phone. Checks, VISA & MC cards. Add \$3 ship.

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P. O. Box 896 (205) 773-2758  
HARTSELLE, AL 35640

# STARS

by  
Neil Edge

This program gives several star constellations. The patterns of the stars are displayed for the selected constellation, and they can be connected with a line to form a figure. This uses graphics and is a very interesting program for displaying various constellations.

```
10 CLS3:PRINT@6,"STAR CONSTELLAT
IONS.":PRINT@41,"BY NEIL EDG
E.":GOSUB1510
20 FORX=1TO200:NEXTX:PRINT@483,"
PRESS <D> FOR DIRECTIONS.";
30 FORX=1TO200:NEXTX
40 PRINT@490," ";
50 A$=INKEY$:IFA$=""THEN20ELSEIF
A$="D"THEN60ELSEIFA$<>"D"THEN
20
60 CLS:PRINT" WHEN THE CONSELATI
ON":PRINT"APPEARS ON THE SCRE
EN":PRINT"YOU WILL HAVE 3 OPT
IONS.":PRINT"1 PRESS L TO CON
NECT":PRINT"THE DOTS, 2 PRESS
B TO ":PRINT"GO BACK BEFORE
THE DOTS":PRINT"WERE CONNECTE
D, OR 3"
70 PRINT"PRESS M TO GO BACK TO":
PRINT"MENU."
80 FORX=1TO200:NEXTX:PRINT@416,"
PRESS <C> TO CONTIUNE";
90 FORX=1TO200:NEXTX:PRINT@423,"
";
100 C$=INKEY$:IFC$=""THEN80ELSEI
FC$="C"THEN110ELSEIFC$<>"C"TH
EN80
110 CLS:PRINT@2,"A) ANDROMEDA.":
PRINT@34,"B) AQUARIUS.":PRINT
@66,"C) ARIES.":PRINT@98,"D)
AURGIA.":PRINT@130,"E) CANCER
.":PRINT@162,"F) CANIS MAJOR.
":PRINT@194,"G) CAPRICORNUS."
:PRINT@226,"H) CASSIOPEIA."
120 PRINT@258,"I) CENTAURUS.":PR
INT@290,"J) CEPHEUS.":PRINT@3
22,"":PRINT@322,"K) GEMINI.":
PRINT@354,"L) END."
130 PRINT@418,"ENTER YOUR CHOICE
."
140 A$=INKEY$
150 IFA$=""THEN140ELSEIFA$="A"TH
EN170ELSEIFA$="B"THEN280ELSEI
FA$="C"THEN370ELSEIFA$="D"THE
N470ELSEIFA$="E"THEN590ELSEIF
A$="F"THEN690ELSEIFA$="G"THEN
830ELSEIFA$="H"THEN930ELSE160
160 IFA$="I"THEN1040ELSEIFA$="J"
THEN1250ELSEIFA$="K"THEN1370:
ELSEIFA$="L"THENEND
170 CLS2:PRINT@4,"ANDROMEDA, THE
MAIDEN.";
180 PMODE4,1:PCLS:CIRCLE(20,24),
2:PAINT(20,24),3,3:CIRCLE(24,
49),2:PAINT(24,49),3,3:CIRCLE
(36,89),1:CIRCLE(66,97),1
190 CIRCLE(56,79),1:CIRCLE(66,77
),1:CIRCLE(76,80),3:PAINT(76,
80),3,3:CIRCLE(79,130),3:PAIN
T(79,130),3,3:CIRCLE(72,60),1
:CIRCLE(62,50),3:PAINT(62,50)
,3,3:CIRCLE(78,56),1:CIRCLE(9
5,55),1
200 SCREEN1,1:A$=INKEY$
210 IFA$=""THEN200ELSEIFA$="L"TH
EN240ELSEIFA$="M"THEN110ELSEI
FA$="B"THEN230
220 GOTO200
230 GOTO180
240 LINE(20,24)-(24,49),PSET:LIN
E(24,49)-(36,89),PSET:LINE(36
,89)-(66,97),PSET
250 LINE(56,79)-(66,77),PSET:LIN
E(66,77)-(76,80),PSET:LINE(76
,80)-(79,130),PSET:LINE(79,13
0)-(72,60),PSET
260 LINE(72,60)-(62,50),PSET:LIN
E(62,50)-(78,56),PSET:LINE(78
,56)-(95,55),PSET
270 GOTO200
280 CLS3:PRINT@2,"AQUARIUR, THE
WATER CARRIER.";
290 PMODE4,1:PCLS:CIRCLE(60,34),
1:CIRCLE(80,29),1:CIRCLE(85,1
9),1:CIRCLE(80,59),1:CIRCLE(8
9,52),1:CIRCLE(99,49),1:CIRCL
E(104,59),1:CIRCLE(109,99),1:
CIRCLE(117,111),1
300 SCREEN1,1:A$=INKEY$
310 IFA$=""THEN300ELSEIFA$="L"TH
EN340ELSEIFA$="M"THEN110ELSEI
FA$="B"THEN330
320 GOTO300
330 GOTO 290
340 LINE(60,34)-(80,29),PSET:LIN
E(85,19)-(80,29),PSET:LINE(80
,29)-(99,49),PSET:LINE(99,49)
-(104,59),PSET:LINE(60,34)-(8
0,59),PSET:LINE(80,59)-(89,52
),PSET
350 LINE(89,52)-(99,49),PSET:LIN
```

```

E(104,59)-(109,99),PSET:LINE(
109,99)-(117,111),PSET
360 GOTO300
370 CLS4:PRINT@8,"ARIES, THE RAM
.":FORX=1TO250:NEXTX
380 PMODE4,1:PCLS:CIRCLE(44,108)
,1:CIRCLE(69,78),2:PAINT(69,7
8),3,3:CIRCLE(120,78),3:PAINT
(120,78),3,3:CIRCLE(135,85),1
:CIRCLE(135,95),1
390 SCREEN1,1:A$=INKEY$
400 IFA$=""THEN390ELSEIFA$="L"TH
EN430ELSEIFA$="M"THEN110ELSEI
FA$="B"THEN420
410 GOTO390
420 GOTO380
430 LINE(44,108)-(69,78),PSET:LI
NE(69,78)-(120,78),PSET
440 LINE(120,78)-(135,85),PSET:L
INE(135,85)-(135,95),PSET
450 LINE(135,95)-(120,78),PSET
460 GOTO390
470 CLS4:PRINT@6,"AURIGA, THE WA
GONER.";
480 PMODE4,1:PCLS
490 CIRCLE(112,28),1:CIRCLE(129,
51),3:PAINT(129,51),3,3:CIRCL
E(139,65),1:CIRCLE(138,72),1:
CIRCLE(134,69),1:CIRCLE(139,1
12),2:PAINT(139,112),3,3
500 CIRCLE(110,119),3:PAINT(110,
119),3,3:CIRCLE(93,75),2:CIRC
LE(84,100),2:CIRCLE(103,47),3
510 PAINT(129,51),3,3:PAINT(139,
112),3,3:PAINT(110,119),3,3:P
AINT(93,75),3,3:PAINT(84,100)
,3,3:PAINT(93,75),3,3
520 PAINT(103,47),3,3
530 SCREEN1,1:A$=INKEY$
540 IFA$=""THEN530ELSEIFA$="L"TH
EN560ELSEIFA$="M"THEN110ELSEI
FA$="B"THEN480
550 GOTO530
560 LINE(112,28)-(129,51),PSET:L
INE(129,51)-(139,65),PSET:LIN
E(139,65)-(138,72),PSET:LINE(
138,72)-(134,69),PSET:LINE(13
4,69)-(139,112),PSET
570 LINE(139,112)-(110,119),PSET
:LINE(110,119)-(93,75),PSET:L
INE(93,75)-(84,100),PSET:LINE
(93,75)-(103,47),PSET:LINE(10
3,47)-(129,51),PSET
580 GOTO530
590 CLS6:PRINT@7,"CANCER, THE CR
AB.";
600 PMODE4,1:PCLS:CIRCLE(76,46),
2:PAINT(76,46),3,3:CIRCLE(110
,64),2:PAINT(110,64),3,3:CIRC
LE(120,65),2:PAINT(120,65),3,
3:CIRCLE(154,51),2:PAINT(154,
51),3,3
610 CIRCLE(115,87),2:PAINT(115,8
7),3,3:CIRCLE(66,117),2:PAINT
(66,115),3,3
620 SCREEN1,1:A$=INKEY$
630 IFA$=""THEN620ELSEIFA$="L"TH
EN660ELSEIFA$="M"THEN110ELSEI
FA$="B"THEN650
640 GOTO620
650 GOTO600
660 LINE(76,46)-(110,64),PSET:LI
NE(110,64)-(120,65),PSET:LINE
(120,65)-(154,51),PSET
670 LINE(110,64)-(115,87),PSET:L
INE(110,64)-(66,117),PSET
680 GOTO620
690 CLS3:PRINT@3,"CANIS MAJOR, T
HE GREAT DOG.";
700 PMODE4,1:PCLS
710 CIRCLE(172,48),1:CIRCLE(173,
53),1:CIRCLE(163,53),1:CIRCLE
(163,73),4:PAINT(163,73),3,3:
CIRCLE(170,89),2
720 CIRCLE(138,68),1:CIRCLE(129,
69),2:CIRCLE(122,61),1:CIRCLE
(104,64),1
730 CIRCLE(127,75),1:CIRCLE(118,
80),2:CIRCLE(104,91),1:CIRCLE
(125,102),1
740 PAINT(170,89),3,3:PAINT(129,
69),3,3:PAINT(118,80),3,3
750 SCREEN1,1:A$=INKEY$
760 IFA$=""THEN750ELSEIFA$="L"TH
EN790ELSEIFA$="M"THEN110ELSEI
FA$="B"THEN780
770 GOTO750
780 GOTO700
790 LINE(172,48)-(173,53),PSET:L
INE(173,53)-(163,53),PSET:LIN
E(163,53)-(163,73),PSET:LINE(
163,73)-(170,89),PSET
800 LINE(163,73)-(138,68),PSET:L
INE(138,68)-(129,69),PSET:LIN
E(129,69)-(122,61),PSET:LINE(
129,69)-(104,64),PSET
810 LINE(129,69)-(127,75),PSET:L
INE(127,75)-(118,80),PSET:LIN
E(118,80)-(104,91),PSET:LINE(
118,80)-(125,102),PSET
820 GOTO750
830 CLS8:PRINT@2,"CAPRICORNUS, T
HE HORNED GOAT.";
840 PMODE4,1:PCLS:CIRCLE(172,36)
,2:PAINT(172,36),3,3:CIRCLE(1
73,44),2:PAINT(173,44),3,3:CI

```



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      RCLE(133,59),2:PAINT(133,59),
      3,3
850 CIRCLE(118,66),2:PAINT(118,6
6),3,3:CIRCLE(103,74),2:PAINT
(103,74),3,3:CIRCLE(94,74),2:
PAINT(94,74),3,3:CIRCLE(120,8
8),2:PAINT(120,88),3,3
860 SCREEN1,1:A$=INKEY$
870 IFA$=""THEN860ELSEIFA$="L"TH
EN900ELSEIFA$="M"THEN110ELSEI
FA$="B"THEN890
880 GOTO860
890 GOTO840
900 LINE(172,36)-(173,44),PSET:L
INE(17,44)-(133,59),PSET:LIN
E(133,59)-(118,66),PSET:LINE(
118,66)-(103,74),PSET
910 LINE(103,74)-(94,74),PSET:LI
NE(103,74)-(120,88),PSET
920 GOTO860
930 CLS5:PRINT"CSSAPEIA THE LADY
IN HER CHAIR.";
940 PMODE4,1:PCLS
950 CIRCLE(124,36),1:CIRCLE(12,
45),1:CIRCLE(134,47),1:CIRCLE
(107,44),1:CIRCLE(123,52),1:C
IRCLE(124,55),1
960 CIRCLE(117,61),2:CIRCLE(128,
67),2:CIRCLE(130,87),2:CIRCLE
(109,107),2
970 PAINT(122,45),3,3:PAINT(117,
61),3,3:PAINT(128,67),3,3:PAI
NT(130,87),3,3:PAINT(109,107)
,3,3
980 SCREEN1,1:A$=INKEY$
990 IFA$=""THEN980ELSEIFA$="L"TH
EN1010ELSEIFA$="M"THEN110ELSE
IFA$="B"THEN940
1000 GOTO980
1010 LINE(124,36)-(122,45),PSET:
LINE(122,45)-(107,44),PSET:LI
NE(122,45)-(134,47),PSET:LINE
(122,45)-(123,52),PSET:LINE(1
22,45)-(124,55),PSET
1020 LINE(124,55)-(117,61),PSET:
LINE(117,61)-(128,67),PSET:LI
NE(128,67)-(130,87),PSET:LINE
(130,87)-(109,107),PSET
1030 GOTO980
1040 CLS6:PRINT@4,"CENTAURUS, TH
E HORSE-MAN.";
1050 PMODE4,1:PCLS
1060 CIRCLE(44,64),2:CIRCLE(57,6
3),2:CIRCLE(46,42),1:CIRCLE(5
0,50),1:CIRCLE(64,48),2
1070 CIRCLE(75,43),2:CIRCLE(100,
49),1:CIRCLE(113,59),1:CIRCLE
(96,57),1:CIRCLE(85,63),1
1080 CIRCLE(82,67),1:CIRCLE(77,7
2),1:CIRCLE(74,75),1:CIRCLE(7
8,80),2:CIRCLE(81,95),2
1090 CIRCLE(66,107),3:PAINT(66,1
07),3,3:CIRCLE(54,108),3:PAI
NT(54,108),3,3
1100 CIRCLE(99,92),1:CIRCLE(105,
90),1:CIRCLE(109,91),1:CIRCLE
(111,95),1:CIRCLE(116,100),1
1110 CIRCLE(123,105),2:CIRCLE(13
0,120),1
1120 PAINT(123,105),3,3:PAINT(78
,80),3,3:PAINT(81,95),3,3:PAI
NT(75,43),3,3
1130 PAINT(44,64),3,3:PAINT(57,6
3),3,3:PAINT(64,48),3,3
1140 SCREEN1,1:A$=INKEY$
1150 IFA$=""THEN1140ELSEIFA$="L"
THEN1180ELSEIFA$="M"THEN110EL
SEIFA$="B"THEN1170
1160 GOTO1140
1170 GOTO1050
1180 LINE(44,64)-(57,63),PSET:LI
NE(57,63)-(46,42),PSET:LINE(4
6,42)-(50,50),PSET:LINE(57,63
)-(64,48),PSET:LINE(64,48)-(7
5,43),PSET
1190 LINE(75,43)-(100,49),PSET:L
INE(100,49)-(113,59),PSET:LIN
E(113,59)-(96,57),PSET:LINE(9
6,57)-(85,63),PSET
1200 LINE(85,63)-(82,67),PSET:LI
NE(82,67)-(77,72),PSET:LINE(7
7,72)-(74,75),PSET:LINE(74,75
)-(78,80),PSET:LINE(78,80)-(8
1,95),PSET
1210 LINE(81,95)-(66,107),PSET:L
INE(66,107)-(54,108),PSET:LIN
E(81,95)-(99,92),PSET
1220 LINE(99,92)-(105,90),PSET:L
INE(105,90)-(109,91),PSET:LIN
E(109,91)-(111,95),PSET:LINE(
111,95)-(116,100),PSET
1230 LINE(116,100)-(123,105),PSE
T:LINE(123,105)-(130,120),PSE
T
1240 GOTO1140
1250 CLS6:PRINT@7,"CEPHUS, THE K
ING.";
1260 PMODE4,1:PCLS
1270 CIRCLE(168,28),1:CIRCLE(166
,34),1:CIRCLE(173,33),1:CIRCL
E(158,34),1:CIRCLE(183,50),1
1280 CIRCLE(184,67),1:CIRCLE(168
,56),1:CIRCLE(159,39),1
1290 CIRCLE(152,41),1:CIRCLE(147
,41),1:CIRCLE(149,45),1:CIRCL
E(149,48),1:CIRCLE(153,48),1

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# SPECTROGRAM

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- \* Tutorials on programming in Assembly, C, Pascal, and Basic
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COMPUTER TYPE:  64K Color Computer  32K Color Computer  16K Color Computer  4K Color Computer  Other—Specify \_\_\_\_\_

PERIPHERALS:  Printer Type \_\_\_\_\_  Modem Type \_\_\_\_\_  Disk Drive (0) (1) (2) (3)  Multi-Pak Interface  Other—Specify \_\_\_\_\_

LANGUAGES:  Extended Basic  Color Basic  Disk Basic  Basic809  Pascal  C Compiler

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|--|---|--|
| <p><b>#1 Home Management I</b></p> <ul style="list-style-type: none"> <li>Budget</li> <li>Checkbook Balance</li> <li>Cost of Living</li> <li>Tricycle</li> <li>Electronic Debitbook</li> <li>Account Manager</li> <li>Stock Market</li> <li>Word Processor</li> <li>Lottery Analyst</li> <li>Coco Database</li> <li>Coco Terminal</li> <li>Bar tender</li> </ul> | <p><b>#2 Home Management II</b></p> <ul style="list-style-type: none"> <li>Video Cassette Organizer</li> <li>Home Product Evaluation</li> <li>Electric, Gas &amp; Water Cost</li> <li>Baseball Manager</li> <li>Car Manager</li> <li>Ham Radio Log</li> <li>Home Inventory</li> <li>Personal Directory</li> <li>Recipe Machine</li> <li>Disk Labeler</li> <li>Password Scrambler</li> <li>Disk Directory Print</li> </ul> | <p><b>#3 Education</b></p> <ul style="list-style-type: none"> <li>Flash Card</li> <li>Spanish Lessons</li> <li>Typing Tutor</li> <li>Creativity Test</li> <li>Arithmetic Football</li> <li>Cost of Living</li> <li>Math Tutors 1, 2</li> <li>Trigonometry Tutor</li> <li>Typing Game</li> <li>Word Tests</li> <li>Talking Alphabet</li> <li>Clown Dunk Math</li> </ul> |
| <p><b>#4 Adventures</b></p> <ul style="list-style-type: none"> <li>Treasures of Barsoom</li> <li>Killer Mansion</li> <li>College Adventure</li> <li>Coco Terrestrial</li> <li>Escape</li> <li>Zactor</li> <li>Skid Flow</li> <li>Quest</li> <li>Naughtie</li> <li>Haunted House</li> </ul>   | <p><b>#5 Games</b></p> <ul style="list-style-type: none"> <li>Trek</li> <li>Galactic Conquest</li> <li>Warlords</li> <li>The Power Sword</li> <li>Steep</li> <li>Robot Bomber</li> <li>Force Field</li> <li>Rat Attack</li> <li>Caterpillar Cave</li> <li>Meteor</li> </ul>   | <p><b>#6 Utilities</b></p> <ul style="list-style-type: none"> <li>Disk Dir Prot</li> <li>Dr Pack &amp; Sort</li> <li>Disk Zapper</li> <li>Roll Out</li> <li>Doss Boss</li> <li>Disk Backup</li> <li>51-74 Editor</li> <li>51-74 Screen</li> <li>Autocopy</li> <li>Faxsort</li> <li>IO Error Ignore</li> <li>Text Screen Print</li> </ul>                               |

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```

1300 SCREEN1,1:A$=INKEY$
1310 IFA$=""THEN1300ELSEIFA$="L"
      THEN1320ELSEIFA$="M"THEN110EL
      SEIFA$="B"THEN1260
1320 LINE(168,28)-(166,34),PSET:
      LINE(166,34)-(173,33),PSET:LI
      NE(166,34)-(158,34),PSET
1330 LINE(166,34)-(183,50),PSET:
      LINE(183,50)-(184,67),PSET:LI
      NE(183,50)-(168,56),PSET:LINE
      (168,56)-(184,67),PSET
1340 LINE(168,56)-(158,39),PSET:
      LINE(158,39)-(166,34),PSET:LI
      NE(158,39)-(152,41),PSET:LINE
      (152,41)-(148,40),PSET
1350 LINE(147,41)-(149,45),PSET:
      LINE(152,41)-(149,45),PSET:LI
      NE(152,41)-(149,48),PSET:LINE
      (149,48)-(153,49),PSET
1360 GOTO1300
1370 CLS7:PRINT@7,"GEMINI, THE T
      WINS.";
1380 PMODE4,1:PCLS
1390 CIRCLE(112,12),1:CIRCLE(134
      ,17),2:CIRCLE(133,22),1:CIRCL
      E(159,49),1:CIRCLE(115,22),1
1400 CIRCLE(105,20),1:CIRCLE(122
      ,30),1:CIRCLE(108,45),1:CIRCL
      E(90,55),1:CIRCLE(114,65),1
1410 CIRCLE(138,75),2:CIRCLE(138
      ,100),1:CIRCLE(142,104),1:CIR
      CLE(149,106),1
1420 CIRCLE(128,100),1:CIRCLE(11
      3,100),2:CIRCLE(100,100),1
1430 PAINT(134,17),3,3:PAINT(138
      ,75),3,3
1440 SCREEN1,1:A$=INKEY$
1450 IFA$=""THEN1440ELSEIFA$="L"
      THEN1470ELSEIFA$="M"THEN110EL
      SEIFA$="B"THEN1380
1460 GOTO1440
1470 LINE(112,12)-(134,17),PSET:
      LINE(134,17)-(133,22),PSET:LI
      NE(134,17)-(159,49),PSET
1480 LINE(134,17)-(115,22),PSET:
      LINE(115,22)-(105,20),PSET:LI
      NE(133,22)-(122,30),PSET:LINE
      (122,30)-(108,45),PSET:LINE-(
      90,55),PSET:LINE-(114,65),PSE
      T
1490 LINE(114,65)-(138,75),PSET:
      LINE(138,75)-(138,100),PSET:L
      INE-H138,100),PSET:LINE-(142,
      104),PSET:LINE-(149,106),PSET
      :LINE(138,100)-(100,100),PSET
1500 GOTO1440
1510 PRINT@70,"";

```

```

1520 PRINTTAB(0)"COPYRIGHT (C) 1
      986.";
1530 RETURN

```

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# ML PROGRAMMING

## PART 7.

By John Galus

We are pleased to have John Galus continue this series. We have laid the ground work and John is continuing. An assembler is required for writing programs. If you are series about learning to program in machine language we suggest you purchase an assembler and follow John's instructions. - Editor

In past sections of this series dealing with Machine Language programming we did most of our work by "hand assembling" machine language codes. This method is tedious and difficult to understand. From now on we will use a Assembler to enter our programs. I will be using Radio Shack's EDTASM+ for all the examples in these articles since this Assembler is owned by most people. If you don't own an Assembler at this time I strongly suggest that you purchase one preferably a Disk based version. The goal of this series is to take a beginner who wishes to learn Assembler and provide instructions to introduce them to Assembly language programming. One thing that may confuse people is the difference between languages such as Basic Assembler and Machine language. Basic is know as a "high level" language in which the user does not need to understand the inner working of the computer to make it work. The Basic interpreter (which is actually a machine language program) contained in our Color Computer controls the machines operation. Machine language is the lowest level in which we actually work with the numbers that causes the 6809

micro-processor itself to perform some of its operations. Assembly language was developed to gives the programmer a method of entering instructions in a format that allows the entered text to be translated into machine language.

BASIC  
\*  
\*  
ASSEMBLER  
\*  
\*  
MACHINE

Even though we will be using EDTASM+ for our examples most Assemblers use the same format. See your EDITOR/ASSEMBLER for more information regarding your particular Assemblers commands. A usual line in a Assembly Language program starts with a line number followed by an optional Label a space delimiter an instruction or operation code (OP CODE) followed by another space and a Operand or Argument. Most Assembly language commands consists of an OP CODE and an OPERAND. Here is a simple example of a Assembly language line.

LINE NO.	LABEL FIELD	OP CODE FIELD	OPERAND FIELD
00100	START	LDA	#1

A optional comment may be placed after the Operand field. A comment may also be placed on any line by placing a (\*) symbol starting in the label field. Now that we know what makes up an Assembly line what do we do with it? This Assemble line must be entered into our Assembler and translated into machine language. First load your assembler into your computer. After loading you will see the sign on message followed by a flashing cursor you are now in EDTASM+'s EDITOR MODE where you can begin entering your programs. To en-

ter a program press "I" on the EDTASM+ to get into the "EDIT" mode. You should now see a number printed on the screen this number is for your convenience so that you will not have to enter line numbers before each line as in Basic. Next type in the above Assemble line as printed and press enter. This line is now placed in the EDIT BUFFER to see it type "P" and press ENTER this will print on the screen the last line you entered. To print an entire program in the Edit buffer type P#:\* or to print a single line type P followed by the line number in the above example P100. Now that we have a program in memory we may wish to "Assemble" it type A/NO/WE and press ENTER. The program will begin Assembling and you will see it listed on the screen. You probably have noticed that something appears to have gone wrong! Displayed on the screen you see an Error message "MISSING END" it seems we have a problem with our program. It's important to remember that all of our Assembly program must end with the END command. Get use to seeing error messages. Beginner Assembly language programmers will see them often! Here is the corrected revised version.

```
00100      START      LDA      #1
00110          END
```

To enter the second line simply type "I" again and move over to the Operation field and enter the command and then press ENTER. Now Assemble the program again using the same commands this time we have no errors. After Assembling a program you will notice that the Assembler has added hexadecimal numbers to the left of our line numbers. These numbers contain the starting location of the routine followed by the machine language hex numbers that make up the



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# Introducing

# CoCo Max<sup>TM</sup> II

There is absolutely nothing else on the Color Computer that is comparable to CoCo Max's power and ease of use. The most enjoyable time with a computer I ever had.  
- **Computerware Review May 1985**

I never expected to see anything like it on my CoCo screen. There isn't a single command to remember. Even a person who has no drawing ability like myself can create a presentable picture. I've spent hours just doodling enjoying all the things from silly to the serious. Fascinating experience. Buy it, you won't be sorry.  
- **6809 Express May 1985**

CoCo Max puts fun back into computing, offering a state of the art environment you find on much more expensive machines. Colorware has invested the kind of time and research that virtually secures its success, and that shows up on your screen.  
- **Hot CoCo July 1985**

CoCo Max is the most incredible product ever marketed for the CC. No review can do it justice. I've never given any product a 10...I give Colorware's CoCo Max (Hardware, Software and Documentation) a 10!  
- **Color Chronicle Vol III #6**

An outstanding program that almost turns your CoCo into a replica of the Macintosh. Terrific hi-res color, very easy to learn and use.  
- **Family Computing February 1986**

The pack is well constructed, the user's manual is complete with illustrations and well organized. An outstanding buy for the performance. Colorware's advertisement accurately describes the product. Their delivery was timely as promised.  
- **Rainbow June 1985**

**These were reviews of CoCo Max I.  
CoCo Max II will blow your socks off  
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- A 68 page scrapbook
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- Full error reporting, crash proof
- Custom patterns can be saved
- Printing in color (with CGP 115 or 220)
- Much MORE. (Note: CoCo Max II is available on disk only)

The reviews are nice, but see it for yourself\* and draw your own conclusion.

\*If you are not delighted with your CoCo Max II, we will immediately refund your purchase, including postage back.

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program. We often refer to the Assembly language as the "SOURCE CODE" and the machine language equivalent as the "OBJECT CODE".

This OBJECT code was what we were entering into our computer in the previous sections of this series. If the program above started at say \$7000 (hex 7000) then the object code at the left of the Assembly language program would appear as follows.

```
START  OBJECT  LINE  LABEL  OP
ADDRESS CODE   NO.  FIELD CODE
7000   86 01  00100 START  LDA
```

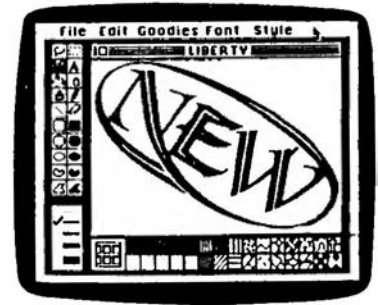
After the "ERROR" message at the end of the Assembled program is what is called the "Symbol Table". Here the starting address of the symbols used in your program are displayed. If you do not wish to list this symbol table you could use the NS or NO SYMBOL TABLE command in EDTASM+ useful when Assembling long programs. In the above example we used the "NO" or NO OBJECT code Assembler option. This Assembled the program but did not place it in memory where it could be tested and executed. Before running any Assembly language program we must learn a new command the SWI or software interrupt command used by EDTASM+ to "break point" the program and return us to the EDITOR. In this case it will return us to ZBUG's Editor where you will see we execute and test our programs. The above example was very simple and of not much use so let's write an Assembly language routine that clears the text screen. First eliminate the two line Assembly program now in the Edit buffer by typing D# new lines and press ENTER. Now type in the program below skip the line numbers since they are entered automatically for you.

```
00100 * CLEAR THE TEXT ROUTINE
00110   START     LDX   #$0400
```

```
00120           LDA   #$60 00130
CLS           STA   X+   00140
CMPX  #$600 00150           BNE CLS
00160           SWI   00170
END
```

After entering this routine you may wish to save it using the "W" Write command. Be sure to use the "V" Verify command to check to see if your program was saved correctly. The Verify command is similar to Basic SKIPF instruction and will prove very useful especially when writing long programs. You should begin to get use to Saving and Verifying programs often if you wish to write in Assembler because if you have made a mistake in the program logic you could destroy hours of labor in an instant this is why I recommend purchasing a Disk based Assembler where saving is not as much of a hassle as with the cassette based Assembler. We will now Assemble the program "IN MEMORY" using the IMcdirective as follows A/IM/WE. We turned on the "WE" WAIT FOR ERROR switch to detect errors and stop at each one. Always use the WE switch because it is important to fix all errors before testing a program. If the program has no syntax errors we can now execute it. Type "Z" to enter ZBUG and type GSTART. This will cause the routine to be executed starting at the label START. If the program works you should see the screen clear and you will see a message on the screen telling you that the program has ended and you have returned to ZBUG via the SWI instruction. If this didn't happen and the program appears to have "hung up" the computer press the reset button if this doesn't return you to the Editor you must turn off the computer and reload the saved text using the "L" LOAD command and examine the program. You may

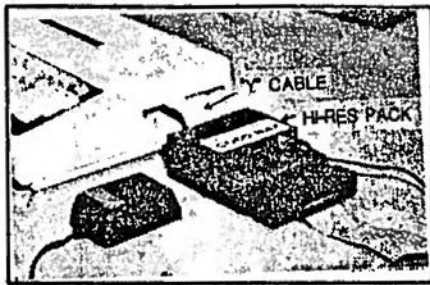
# CoCo Max II



You'll use it all the time and love using it.

## What is CoCo Max?

Simply the most incredible graphic and text creation "system" you have ever seen. A Hi-Res Input Pack (more on the pack later) is combined with high speed machine language software. The result will dazzle you.



CoCo Max disk system, with Y-cable.

## Is CoCo Max for you?

Anyone who has ever held a pencil or a crayon for fun, school or business will love it. A 4 year-old will have fun doodling, a 15 year-old will do class projects and adults will play with it for hours before starting useful applications (illustrations, cards, artwork, business graphics, flyers, charts, memos, etc.) This is one of the rare packages that will be enjoyed by the whole family.

## What made CoCo Max an instant success?

First there's nothing to learn, no syntax to worry about. Even a child who can't read will enjoy CoCo Max. Its power can be unleashed by simply **pointing** and **clicking** with your mouse or joystick. With **icons** and **pull down menus**, you control CoCo Max intuitively; it works the same way you think.

Don't be misled by this apparent simplicity. CoCo Max has more power than you thought possible. Its blinding speed will astound you.

It lets you work on an area 3.5 times the size of the window on the screen. It's so friendly that you will easily recover from mistakes: The **undo** feature lets you revert to your image prior to the mistake. As usual, it only takes a single click.

Later, we will tell you about the "typesetting" capabilities of CoCo Max II, but first let's glance at a few of its graphic creation tools:

With the **pencil** you can draw free hand lines, then use the **eraser** to make corrections or changes. For straight lines, the convenient **rubber-banding** lets you preview your lines before they are fixed on your picture. It's fun and accurate. Lines can be of any width and made of any color or texture.

The **paint brush**, with its 32 selectable brush shapes, will adapt to any job, and make complicated graphics or calligraphy simple. For special effects, the **spray can** is really fun: 86 standard colors and textures, all available at a click. It's like the real thing except the paint doesn't drip.

CoCo Max will instantly create many shapes: circles, squares, rectangles (with or without rounded corners), ellipses, etc. Shapes can be filled with any pattern. You can also add hundreds of custom patterns to the 86 which are included.

The **Glyphics** are 58 small drawings (symbols, faces, etc.) that can be used as rubber stamps. They're really great for enhancing your work without effort.



Pull down menus



Zoom In!

## Control Over Your Work

CoCo Max's advanced "tools" let you take any part of the screen, (text or picture) and perform many feats:

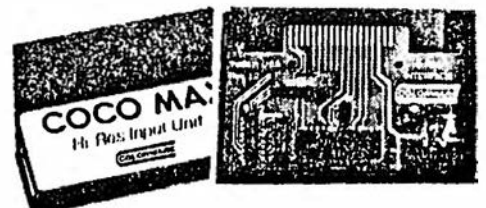
- You can move it around
- Copy it
- Shrink or enlarge it in both directions
- Save it on the electronic **Clipboard**
- Flip it vertically or horizontally
- Rotate it
- Invert it
- Clear it, etc. etc.

All this is done instantly, and you can always **undo** it if you don't like the results.

For detail work, the **fat bits** (zoom) feature is great, giving you easy control over each pixel.

To top it all, CoCo Max II works in color. Imagine the pictures in this ad in color. If you own a Radio Shack CGP-220 or CGP-115, you can even print your work in full color!

There is so much more to say, such as the capability to use CoCo Max images with your BASIC programs, the possibility to use CoCo Max's magic on any standard binary image file. There are also many advanced features such as the incredible **Jasso**.



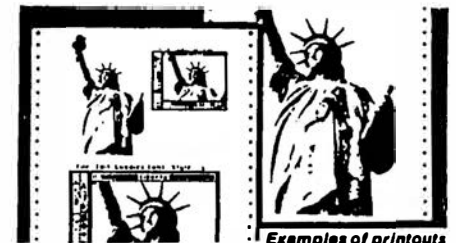
Inside the Hi-Res Input Pack

## Why a Hi-Res Input Pack?

Did you know that the CoCo joystick input port can only access 4096 positions (64x64)? That's less than 10% of the Hi-Res screen, which has 49152 points! (256x192). You lose 90% of the potential. The Hi-Res Input Pack distinguishes each of the 49152 distinct joystick or mouse positions. That's the key to CoCo Max's power. The pack plugs into the rom slot (like a rom cartridge). Inside the pack is a high speed multichannel analog to digital converter. Your existing joystick or mouse simply plugs into the back of the Hi-Res Pack.

## Electronic Typesetting...

You'll be impressed with CoCo Max's capability. Text can be added and moved around anywhere on the picture. (You can also rotate, invert and flip it...) At a click, you can choose from 14 built in **fonts** each with 16 variations. That's over 200 typestyles!



Examples of printouts

## Printing Your Creations

There are a dozen ways to print your work. All are available with a click of your joystick (or mouse) without exiting CoCo Max. Your CoCo Max disk includes drivers for over 30 printers!



notice that in Assembly language there is a "one to one correspondence" between commands; in other words each Assembly line performed a simple specific task while in Basic one command such as CLS perform a function that took many lines in a Assembly language program. So why use Assembly language? Because Assembly language is fast and allows you to do things not possible in Basic. You can use the simple Assembly commands in any way you wish to build larger more complex programs. In the above example we wrote an Assembly language program to simulate Basic's CLS command. We could have replaced this entire routine with a call (JSR) to the routine in Color Basic ROM located at \$A928 which would have done the same thing. Here lies a secret to Assembly language programming. A good Assembly language programmer should know as much as he can about the system he is working with to save work on coding by using the Basic ROM routines. I will try and do that when possible. We will examine ROM subroutines and other Assembly language programming techniques in future issues so stay tuned.

## OPERATING HINT

Checking Tape Programs - You can check the programs on a cassette tape by using the SKIPF command. Load the tape and rewind it. Then type SKIPF"X where X is a file that is not on the tape. The name of each file will be displayed on the screen as they are found on the tape. If there is an error the computer will give an error message and stop the recorder. All files or programs before the recorder stopped are good. If the recorder goes to the end of the tape without indicating an error then all of the files are good. Press the rear reset button to reset the computer.

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## CoCo 3 (Part 1)

What is all this noise we have been hearing about a new color computer? We finally were able to purchase one and will write some on it each month. First let's look back at the earlier computers so we can compare them with the CoCo 3. We first started out with a computer in a grey enclosure. It had a "D" circuit board and a powerful 4K of memory. We upgraded it to 16K by plugging in 4116 chips and later upgraded it to 32K by piggybacking 4116 chips. To upgrade to 64K required some rewiring and trace cutting.

The next computer for us was a grey computer with an "E" board. It was similar to the "D" board but had a few improvements on the circuit board. Next came the 285 or "F" board. Some of these were in grey enclosures and some were in white enclosures. Our white ones were called TDP computers and were made by Radio Shack and marketed by RCA. These were much easier to upgrade to 64K.

Next came the Color Computer 2. There are many versions of this computer. The earlier versions were similar to the older ones except 5 volt memory chips were used. The enclosure was changed to a light tan and white color. Later versions used two memory chips. These were designated 4416 for a 16K computer and 4464 for 64K computers. The advantage of these chips are that one chip could contain 4 bits or two chips could contain a byte. This reduced production costs and allowed the computers to be sold for less than \$100.

All of the computers operated the same way. Software for a "D" board computer would work on the new CC-2. They all used a 6847 video display generator and

a 6883 or 6885 SAM chip. The SAM chip controlled the memory and allowed partitioning the memory for two 32K banks of RAM and one 32K bank of ROM. This allowed addressing 96K of memory.

In 1985 memory expanders were introduced that increased the memory to 256K, and 512K. With 256K of memory, there was enough to contain the contents stored on a disk. Therefore it was possible to use the memory as a ramdisk. The ramdisk could be configured to act as a second disk drive and a disk could be backed up into the ramdisk. This allowed programs to quickly be loaded into the computer or provided a quick means for backing up a disk.

## CoCo 3

We finally got our new CoCo-3. Having read some reviews on it, we were anxious to see for ourselves what it would do. It has outputs for a television, video and audio for a composite monitor, and outputs for a RGB monitor. This gives three options compared to the television only option for the older models. The television output works simultaneously with the monitor outputs. We connected a television and an analog color monitor to make comparisons.

The big question is what is the difference between the CoCo 3 and the earlier computers? Will existing software work on the new computer? We want to answer these questions. As previously mentioned, the new computer will drive a monitor or television. Also there are three character displays. The first is the same 32 character format with reversed characters for small letters. This is the format that appears after power is turned on. A 40 or 80 character display can be obtained by typing in the following from the

## Checking Account Information System

Let your CoCo simplify the task of managing your checking accounts with CAIS. This menu-driven, disk-based program provides quick and easy access to your checking account transactions. Use CAIS to keep track of deposits, checks written, ATM withdrawals and other debit/credit transactions such as interest earned, service charges and pre-authorized transactions. Reconcile and balance your checking accounts in minutes. Other features include:

- \* Multi-drive capability to handle up to 8 checking accounts
- \* Display balance, account summary or disk utilization
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- \* Purge history records with option to print
- \* Print reconciliation statement and check register

Minimum system requirements are:

- \* 32K ECB with 1 disk drive
- Compatible with CoCo 3  
(In CoCo 2 mode)



### CAIS Order Form

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keyboard:

WIDTH 40 or WIDTH 80

After entering one of the Width commands, the screen is cleared. Both upper and lower case characters are displayed. For television operation, the characters are recognizable on a black and white set in the 40 character mode. The first few characters were not displayed, but by adjusting the horizontal control we were able to see them. We tried clearing the screen for different background colors and found that CLS5 worked the best for us. The 40 character mode was very clear on both the tv and monitor. The 80 character mode could be used on the tv for familiar text although some characters were a little difficult to recognize. On our color monitor the characters were recognizable in the 80 character mode after adjusting the color and background.

### Disk & Tape Compatibility

After experimenting with the monitor and television, it was time to try out the disk drive. We turned off the computer and plugged in a disk drive. Would an old style drive work with the new computer? The computer was turned on and after typing "DIR" the programs were displayed. We tried loading a few programs and most worked. However programs such as Telewriter with Telepatch and CoCoMAX would not work. It appears that 32K programs will work but 64K programs will not work. This is probably due to the different memory configurations. The same limitations exist for a tape recorder.

### Keyboard

The keyboard is similar to the one on the CoCo 2. The arrow keys are grouped together

on the right and two function keys are added. CTRL and ALT keys were added on the left. The Control function is used to send special characters to a printer or other device and this is a welcomed addition. The touch is the same as on the CoCo 2.

### Summary

Due to our crowded schedule this is all we can cover this month. The CoCo 3 is a very good computer but is not completely compatible with CoCo 2 software. Most programs written for a 32K CoCo 2 seem to work. Basic is the same although there are some extra commands for the CoCo 2. We took a quick look at the graphics and it has much better resolution. The larger memory will allow for the design of more complex programs such as those available for the IBM computers and clones.

### DCN PROGRAMS on Tape or DISK

A collection of the programs from May, June, & July 1985 DCN. The collection includes

1. 64K All RAM Program
2. 2-Bank address file Pgm.
3. Alarm Clock Program
4. Loan Interest Program
5. Character Generator pgm.
6. Bank Switching Program  
(Allows full use of other 32K bank for 64K comp.)

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## BASIC PROGRAMMING

In this series we are showing how to write basic programs. Each month we give a few instructions and details for writing programs.

### MORE DISK COMMANDS

Last month we gave a few basic disk commands. If you just have a tape for programs, you might be interested in looking at these commands to have an idea of what a disk is like. If you are using a disk, then these commands will allow you to get more use from your disk system.

### ? FREE (D)

The FREE command tells how many free granules are on the disk. If this number is greater than 10 then you have room to save most programs. If it is less than 10 then you should delete some older programs to give more room. The number in parenthesis is the drive number. If you only have one drive then this is called drive 0. For a 2 drive systems you will have drives 0 and 1. To determine the space on each then type the following:

```
?FREE(0) ENTER  
?FREE(1) ENTER
```

### KILLING FILES

If you need more room on your disk then you can delete older programs or files with the KILL command. The name of the file and its extension must be entered. The following are examples:

```
KILL "FIRST/BAS  
KILL "TEST/BIN  
KILL "PROGRAM/DAT
```



## COPYING FILES

The term FILES refers to any type program. The copy command allows files to be copied from one disk to another disk. Each month as we start writing Dynamic Color News, we have to copy some files from the previous month onto a new disk. After the command is entered, the computer reads the file from the disk into the computer's memory. Instructions are then printed on the screen to remove the original disk and insert the destination disk. After inserting the destination disk, press enter and the file is copied from the computer's memory onto the destination disk. To copy PROGRAM/DAT we would enter:

```
COPY "PROGRAM/DAT
```

## BACKING UP A DISK

Sometimes it is desirable to make a backup copy of a disk. For one disk drive the procedure is to insert the source disk, read some data into memory, insert the destination disk, and read data from memory to this disk. This takes several disk swaps and you should continue until the familiar OK appears on the screen.

If you have two disk drives or a disk drive and a ramdisk configured as a drive then you can backup a disk from one drive to a disk in another drive. The format is:

```
BACKUP A TO B
```

where A and B are the numbers of the drives.

## PROGRAMMING

Last month we gave part of an address file program. We want to continue with this program. There is much interest in this type program. For small businesses, it is necessary to keep mailing lists of customers for

billing and promotional purposes. We have to maintain a mailing list of DCN subscribers. We use our word processor but it has limitations. The largest disadvantage of using a word processor is the lack of sort capability.

## FILE PROGRAM DEVELOPMENT

Last month we gave part of an address file program. This month we want to continue the program and add additional features. Our objective is to design a file program that will allow us to arrange or sort them in order of Zip codes or last names. There are some other nice features we would like and will add before we are finished.

This month we added to the file we started last month. We redid part of the print section and added the ability to save and load our files. We used a disk, but the save and load parts can easily be modified to work on a cassette. The program is complete if you just want to enter, print, load, and save the files. We will look at sorting next month as we did not have time to cover it this month.

We made one major change. We put the number of the files at 9999 instead of 503. This allows us to save the number along with the files.

## ADDRESS FILE PROGRAM (Part 2)

```
5 CLS:PCLEAR1
10 PRINT"aADDRESS file pPROGRAM
20 PRINT"copyright (c) 1986
30 PRINT"dYNAMIC eLECTRONICS inc
40 POKE 500,39:POKE501,16:'PUT 1
  0000 IN 501 FOR MEMORY FOR ST
  ART OF FILES
50 BE=256*PEEK(500)+PEEK(501):NF
  =PEEK(9999)
60 PRINT"1 ADD TO FILE
70 PRINT"2 MODIFY FILE
80 PRINT"3 PRINT FILES
90 PRINT"4 CLEAR ALL FILES
```

```

100 PRINT"5 SORT FILE
102 PRINT"6 SAVE FILE
104 PRINT"7 LOAD FILE
110 INPUT"ENTER NUMBER";X
120 ON X GOTO 1000,2000,3000,400
    0,5000,6000,7000
1000 CLS:PRINT"THIS ADDS TO FILE
    S
1010 NF=PEEK(9999):POKE 9999,NF+
    1: BE=256*PEEK(500)+PEEK(501)
    :BF=BE+100*NFX 'SET UP MEMORY
    FOR START OF NEXT FILE
1012 PRINT"1012 NF="NF
1015 PRINT"THIS IS FILE #"NF
1017 INPUT"PRESS Y FOR A DIFFER
    FILE NO TO START";Y$:IF Y$="Y
    " THEN INPUT"ENTER NEW NUMBER
    ";NF:POKE 9999,NF:GO TO 1000
1018 PRINT"FILE NUMBER "NF
1020 M=BF:FOR J=0 TO 99:POKE M+J
    ,32:NEXT J : 'CLEAR MEMORY FOR
    NEW DATA
1030 PRINT"ENTER FIRST LINE":NC=
    15:GOSUB 1900
1040 PRINT"ENTER SECOND LINE":M=
    BF+15:GOSUB 1900
1050 PRINT"ENTER THIRD LINE":M=B
    F+30:GOSUB 1900
1060 PRINT"ENTER CITY":M=BF+45:G
    OSUB 1900
1070 PRINT"ENTER STATE":M=BF+60:
    GOSUB 1900
1080 PRINT"ENTER ZIP":M=BF+75:NC
    =10:GOSUB 1900
1090 PRINT"ENTER PHONE NUMBER":M
    =BF+85:GOSUB 1900
1100 POKE 502, NF:INPUT"PRESS EN
    TER FOR MORE ADDRESSES, PRESS
    1 TO RETURN TO MENU.";V
1105 NF=NF+1:POKE 502,NF
1110 IF V=0 THEN 1000 ELSE RUN
1900 'THIS STORES CHARACTERS IN
    MEMORY
1905 C=0:X=M 'COUNT CHARACTERS B
    EING ENTERED END MARK THE BEG
    INNING OF MEMORY
1910 FOR K=0 TO NC
1915 W1=PEEK(136):W2=PEEK(137):P
    RINT@0,"NO CHARACTER USED="K;
    " M="M:POKE 136,W1:POKE137,W2
1920 A$=INKEY$:IF A$="" THEN 192
    0
1925 PRINTA$;
1930 A=ASC(A$):IF A=13 THEN RETU
    RN
1935 IF A=8 THEN K=K-1:GO TO 192
    0
1940 POKE M+K,A:IF A=13 THEN RET

```

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```

*      CHESS-32K      *
*              by              *
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*              *
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* the COLOR COMPUTEK. It has a *
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* CO 81201:Specify disk or tape*
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```

```

URN
1942 NEXT K
1945 FOR AA=0 TO NC-1:POKE M+AA,
  32:NEXT AA
1950 PRINT"TOO MANY CHARACTERS -
  REDO"
1960 GO TO 1910
2000 '
3000 PRINT"THIS PRINTS THE FILES
  ON 6 LINES FOR LABELS
3002 INPUT"ENTER 1 TO PRINT TELE
  PHONE NUMBERS";TN
3006 NF=PEEK(9999):IF NF=0 THEN
  PRINT"THESE ARE NO FILES":INP
  UT"PRESS ENTER TO CONTINUE";W
  :RUN
3008 INPUT"ENTER 1 FOR PRINTER";
  P
3010 BE=256*PEEK(500)+PEEK(501):
  INPUT"ENTER FILE NUMBER OR PR
  ESS RETURN FOR ALL FILES";N
3012 IF N>NF THEN PRINT"LARGEST
  FILE IS"NF:GOTO3010
3015 IF N>0 THEN NF=N ELSE IF N=
  0 THEN NF=0
3016 CLS:PRINT:PRINT
3020 PP=0:M=BE+100*N
3030 PRINT"THIS IS FILE #"NF:X=1
  5:FOR J=0 TO 4
3032 IFJ=2 THEN 3400 'CHECK FOR
  EMPTY LINE
3035 W=J+1
3040 GOSUB 3900
3045 IF J=3 AND P=1 THEN PRINT#-
  2," ";:GOTO3070
3047 IF J=4 AND P=1 THEN PRINT#-
  2," ";:GO TO3070
3050 IF P=1 THEN PRINT#-2," "
3070 NEXT J
3080 X=10:M=M+75:J=0:W=6:GOSUB 3
  900:IFP=1 THEN PRINT#-2," "
3082 J=1:W=7:AP=P:IF TF=0 THEN P
  =0
3084 GOSUB 3900:P=AP
3086 IF P=1 THEN PRINT#-2,CHR$(1
  3):IF KK=32 THEN PRINT#-2," "
3095 XX=PEEK(136):YY=PEEK(137)
3115 PRINT
3120 NF=NF+1:IF NF=PEEK(9999) TH
  EN 3130 ELSE 3020
3130 INPUT"LAST FILE PRESS ENTER
  FOR MENU OR ENTER FILE NUMBER
  TO CONTINUE";X:IF X=0 THEN R
  UN ELSE NF=X:GOTO3020
3200 CLS:PRINT:PRINT:NC=15:M=BE+
  100*N:IF PP>5 THEN 3300
3210 M=M+15*(PP-1):GO SUB1900:GO
  TO3020

```

## DCN PROGRAMS on Tape or DISK

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2. Ball Team Sort Program.  
with information on sorting.
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Randomly picks questions and answers.
5. Address File Program.  
Print mailing labels, search for address by name, zip code, city, or state.

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## OPERATING HINT

You can disable the cartridge port with POKE 65314,54. Enable it with POKE 65315,52.

```

+ ++ + ++ + ++ ++ ++ + ++ + ++ +
+
+          RENEWAL TIME?          +
+
+ The date beside your name on +
+ the address label indicates +
+ the last issue you will re- +
+ ceive. Send in your renewal +
+ if you want to continue re- +
+ ceiving technical informa- +
+ tion on Color Computers. +
+ This is the last issue for +
+ those with 11/86. +
+
+ + ++ + ++ + ++ ++ ++ + ++ + ++

```

```

3300 NC=10:M=M+75+10*(PP-6):GO S
    UB 1900:GOTO 3020
3400 AA=BE+100*Nf+30:KK=PEEK(AA)
    :IF KK=32 THEN NEXT J ELSE 30
    35
3899 '
3900 PRINTW;:FOR K=0 TO X-1
3905 AX=M+X*J+K
3910 A=PEEK(AX):B=PEEK(AX+1):IF
    A=32 AND B=32 THEN 3940
3915 A$=CHR$(A):PRINTA$;:IF P=1T
    HEN PRINT#-2,A$;
3917 X$=INKEY$:IF X$="" THEN 392
    0 ELSE 3950
3920 NEXT K
3940 PRINT:RETURN
3950 IF X$="L" THEN INPUT"LINE N
    UMBER TO CHANGE";PP:GOTO3200:
    RETURN
3960 IF X$="F" THEN INPUT"NEW FI
    LE NUMBER";NF:RETURN
3965 NEXT K:RETURN
3999 END
4000 PRINT"THIS CLEARS ALL FILES
    ":INPUT"PRESS ENTER TO CLEAR
    FILES OR BREAK TO ABORT";CF
4010 POKE 9999,0:RUN
5000 '
6000 PRINT"THIS SAVES THE FILES
6010 NF=PEEK(9999):BE=9999:EN=BE
    +100*Nf+1:PRINT"NUMBER OF FIL
    ES="NF
6020 PRINT"BEGINNING="BE:PRINT"E
    Nding="EN
6025 Z=FREE(0):IF Z<10 THEN PRIN
    T"NOT ENOUGH ROOM":END
6026 PRINT"THERE ARE "Z" GRANULE
    S FREE"
6030 INPUT"ENTER NAME FOR FILES"
    ;N$
6040 SAVEM N$,BE,EN,BE
6050 INPUT"PRESS ENTER FOR ANOTH
    ER SAVE";X
7000 INPUT"ENTER 1 FOR DIRECTORY
    ";X:IF X=1 THEN DIR
7010 INPUT"ENTER FILE TO LOAD";F$
    $:LOADM F$
7020 PRINT"FILE "F$" IS LOADED":
    RUN

```

## OPERATING HINT

For Deleting characters using the extended basic's editor just pres the "D" key for each character. This saves having to count the characters when using the multiple character delete method.

## DUELING CANNONS

This exciting game allows you to use your skill in selecting the proper angle and number of bags of power. The object of this game is to hit the opponents cannon on the opposite side of the mountain by determining the angle (5-175) and bags of powder (1-40). The small arrow indicates a players turn. You can cancel an entry by pressing 'C'. The angle may contain decimals, but the powder must be in whole numbers.

This program is provided by T & D Subscription Software (See their advertisement on page 7) and is used by permission.

```

1 REM COPYRIGHT (C) T&D SOFTWARE
    1986      **** CANNONS ****
2 GOTO60000
5 CLS
10 PMODE 4,1:PCLS:PI=3.141593/18
    0
20 DIM AZ$(10),YY(256),SQ(100),A
    X(100),AY(100),B(1)
21 FOR LE=0 TO 10:READ AZ$(LE):N
    EXT LE
22 VT=1:N$="D U E L I N G C A N
    N O N S":GOSUB5000:VT=3
23 N$="OBJECT IS TO HIT CANNON O
    N OTHER":GOSUB5000
24 N$="SIDE OF MOUNTAIN. DETERM
    INE":GOSUB5000
25 N$="ANGLE + BAGS OF POWDER TO
    USE..":GOSUB5000
26 N$="HIT 'C' TO CANCEL ENTRY":
    GOSUB5000
27 N$="PLAYER TURN HAS A @UNDER
    BOX.":GOSUB5000
28 VT=VT+1:N$="BY":GOSUB5000
30 VT=VT+2:N$="S C O T T D A N
    Y O W":GOSUB5000
69 FOR X=1 TO 100:SQ(X)=(X/10)R:
    NEXT X
70 PCLS
105 SCREEN 1,1
110 NP=0:IV=0
120 P=RND(0)*20+139:HG=RND(0)*70
    +25
130 FOR I=0 TO 255:YY(I)=P:NEXT
    I
140 FOR I=159 TO P STEP -1:LINE

```

```

(0,I)-(255,I),PSET:NEXT I
150 FOR I=107 TO 147:HX=SIN(((I-
106)*4.5+180)*PI)*HG
160 YY(I)=HX+P
170 LINE (I,HX+P)-(I,159),PSET:N
EXT I
180 WIND=INT(RND(0)*10):IF RND(0
)>.5 THEN WIND=-WIND
184 LINE(0,160)-(255,190),PRESET
,BF
190 DRAW"S6;BM82,162;D7;R2;NU6;R
2;U7;BD7;BR1;BR4BU7"
191 DRAW"R4;L2;D7;L2;R4;BR1;BR4;
BU7"
192 DRAW"ND7;F5;D2;NU7;BR4;BU7"
N
193 DRAW"D7;R2;E2;U3;H2;L2;BD7;B
R5;BR4;BU7"
194 DRAW"BD2;NR5;BD3;R5;BD2;BR4;
BU7"
195 HM$="BM154,162"
196 DRAW HM$
197 DRAW AZ$(ABS(WIND))
198 HM$=""
200 IF WIND=0 THEN 240
210 LINE (107,10)-(147,10),PSET
220 IF WIND>0 THEN LINE(107,10)-
(120,5),PSET:LINE(107,10)-(12
0,15),PSET:GOTO 240
230 LINE(147,10)-(134,5),PSET:LI
NE(147,10)-(134,15),PSET
240 B(0)=RND(0)*15+55-5*ABS(WIND
)
250 B(1)=RND(0)*15+185+5*ABS(WIN
D)
260 FOR I=0 TO 1:FOR J=B(I)-2 TO
B(I)+2:LINE (J,P-4)-(J,P),PS
ET:NEXT J
280 NEXT I
290 FOR I=1 TO IV:PSET(AX(I),AY(
I),0):NEXT I
295 GOSUB 1100:GOSUB 1000
298 IF NP=0 THEN 299 ELSE IF NP=
1 THEN 304
299 LINE(45,164)-(48,167),PSET:L
INE(40,166)-(43,164),PSET:LIN
E(44,163)-(44,174),PSET:LINE(
217,164)-(220,167),PRESET:LIN
E(212,166)-(215,164),PRESET:L
INE(216,163)-(216,174),PRESET
:GOTO 310
304 LINE(217,164)-(220,167),PSET
:LINE(212,166)-(215,164),PSET
:LINE(216,163)-(216,174),PSET
:LINE(45,164)-(48,167),PRESET
:LINE(40,166)-(43,164),PRESET
:LINE(44,163)-(44,174),PRESET
310 DRAW"S4;BM2,180;BD1;D6;U4;NR
4;U2;E1;R3;F1;D6;BR4;BU7"
A
311 DRAW"D1;ND6;E1;R3;F1;D6;BR4;
BU7"
N
312 DRAW"BD1;D5;F1;R3;E1;U2;NL2;
BU2;U1;H1;L3;G1;BD6;BR5;BR4;B
U7"
G
313 DRAW"D7;R5;BR4;BU7"
L
314 DRAW"NR5;D3;NR4;D4;R5;BR4;BU
7"
?
315 DRAW"BF1;E1;R1;F1;D1;G1;D2;B
D2;D1;BR10;BU7"
?
320 GOSUB 2000:AN=Z
321 IF A$="C" THEN GOSUB1000
323 IF A$="C" THEN 320
330 IF AN<5 OR AN>175 THEN GOSUB
1000:GOTO 320
335 GOSUB 1100
340 DRAW"BM128,180;ND7;R4;F1;D1;
G1;NL4;F1;D2;G1;NL4;BR1;BR4;B
U7"
B
341 DRAW"BD1;D6;U4;NR4;U2;E1;R3;
F1;D6;BR4;BU7"
A
342 DRAW"BD1;D5;F1;R3;E1;U2;NL2;
BU2;U1;H1;L3;G1;BD6;BR5;BR4;B
U7"
G
343 DRAW"BD1;D1;F1;R3;F1;D2;G1;L
3;H1;BU5;E1;R3;F1;BD6;BR4;BU7
"
S
345 DRAW"BF1;E1;R1;F1;D1;G1;D2;B
D2;D1;BR4;BU7"
?
370 GOSUB 2000:BG=Z
371 IF A$="C" THEN GOSUB 1100
373 IF A$="C" THEN 370
380 IF (BG<>INT(BG)) OR BG<1 OR
BG>40 THEN GOSUB 1100:GOTO 37
0
390 PLAY"T64;C"
430 BG=BG*10:IF NP=1 THEN AN=AN+
180
440 PY=P-5:PX=B(NP):IV=0
450 IV=IV+1
460 X=BG*IV*COS(AN*PI)/10+B(NP)-
WIND*SQ(IV)
470 Y=BG*IV*SIN(AN*PI)/10:IF NP=
0 THEN Y=P-Y+16*SQ(IV) ELSE Y
=P+Y+16*SQ(IV)
480 IF X<3 OR X>254 OR Y<0 THEN
650
490 IF Y>P+7 THEN 510
500 IF X>B(NP)-5 AND X<B(NP)+5 T
HEN 570
510 YM=(ABS(PY-Y)/((ABS(PX-X))+.
0001))*SGN(Y-PY)
520 ST=SGN(X-PX):RN=X-PX:CC=0
530 IF N=1 THEN CC=RN:RN=0:ST=-S
T
540 L=PX+CC:M=PY+YM*ABS(CC)
550 IF YY(L)<M THEN 610

```



```

560 CC=CC+ST:IF ABS(CC-RN)>ABS(S
    T) THEN 540
570 PSET(X,Y,5)
580 PX=X:PY=Y:AX(IV)=X:AY(IV)=Y
590 IF YY(X)<Y THEN L=X:M=YY(X):
    GOTO 610
600 GOTO 450
610 IF ABS(X-B(0))<3 OR ABS(X-B(
    1))<3 THEN 660
620 IF X<3 OR X>254 THEN 650
630 FOR I=1 TO 25:BX=L-2+RND(0)*
    4:BY=M+RND(0)*2:PSET(BX,BY,5)
    :PLAY"L255;E-":PSET(BX,BY,0)
640 NEXT I
650 NP=1-NP:GOTO290
660 FOR I=X-10 TO X+10 :PLAY"L25
    5;F-;A-":LINE (I,P-(RND(0)*10
    ))-(X,P),PSET:NEXT I
661 LINE(0,160)-(255,191),PRESET
    ,BF
662 DRAW"BM89,164;BD1;D5;F1;R3;E
    1;U1;BU3;U1;H1;L3;G1;BD6;BR5;
    BR4;BU7"'C
663 DRAW"BD1;D5;F1;R3;E1;U5;H1;L
    3;G1;BD6;BR5;BR4;BU7"'O
664 DRAW"D1;ND6;E1;R3;F1;D6;BR4;
    BU7"'N
665 DRAW"R4;L2;D7;BR3;BR4;BU7"'T
666 DRAW"R4;L2;D7;L2;R4;BR5;BU7"'
    I
667 DRAW"D1;ND6;E1;R3;F1;D6;BR4;
    BU7"'N
668 DRAW"D6;F1;R3;E1;U6;BR4"'U
669 DRAW"NR5;D3;NR4;D4;R5;BR4;BU
    7"'E
670 DRAW"BF1;E1;R1;F1;D1;G1;D2;B
    D2;D1;BR10;BU7"'?
671 DRAW"BM106,176;BR1;BD3;NE3;D
    1;F3;BR5;BU7"'<
672 DRAW"D2;F2;ND3;E2;U2;BR5"'Y
673 DRAW"BD6;E5;BR5;BU1"'/
674 DRAW"ND7;F5;D2;U7;BR4"'N
675 DRAW"BR1;F3;D1;G3;BR8;BU7"'>
680 A$=INKEY$:IF A$="" THEN 680
690 IF A$="Y" THEN 70
700 END
1000 C=0:HM$="BM60,180":LINE(54,
    178)-(127,191),PRESET,BF:RETU
    RN
1100 C=0:LINE(171,178 (255,191)
    , ESET,BF:HM$="BM174,180":RE
    " RN
2000 L$="0"
2003 DRAW"S4"
2004 DRAW HM$

```

```

2010 A$=INKEY$:IF A$="C" THEN RE
    TURN ELSE IF A$="." THEN 2012
    ELSE IF A$="" THEN 2010
2011 A=ASC(A$):IF A=13 THEN 2020
    ELSE IF A$<"0" OR A$>"9" THE
    N 2010
2012 IF C>=6 THEN 2010
2014 IF A$="." THEN A$=":"
2015 DRAW AZ$(ASC(A$)-48):C=C+1
2016 IF A$=":" THEN A$="."
2020 IF A=13 THEN Z=INT(VAL(L$)*
    10)/10:RETURN
2030 IF A>45 AND A<58 AND A<>47
    AND C<6 THEN L$=L$+A$:GOTO 20
    10
2040 IF A<>163 THEN 2010
2050 GOTO2010
2060 L$=LEFT$(L$,LEN(L$)-1):C=C-
    1:GOTO 2010
3000 DATA BR2G2D3F2R1E2U3H2BR6
3010 DATA BF1E1R1D7NL2R2BR4BU7
3020 DATA R3F1D1G4D1R4BR4BU7
3030 DATA R4D3NL2D4L4BR4BR4BU7
3040 DATA D3R4NU3D4BR4BU7
3050 DATA NR4D3R3F1D2G1L3BR4BR4B
    U7
3060 DATA BR1NR3G1D6R3E1U1H1L3BE
    4BR5
3070 DATA R4D1G3D3BR3BR4BU7
3080 DATA D7R4U7L4D3R4BD4BR4BU7
3090 DATA NR4D3R4NU3D4L4BR4BR4BU
    7
3100 DATA BD7BR2NU1R1NU1BR6BU7
5000 M=LEN(N$):IF M/2<>INT(M/2)
    THEN N$=N$+" ":GOTO 5000 ELSE
    FOR N=1 TO M/2
5010 PLAY"L100;D+":PRINT@VT*32-1
    6-N,LEFT$(N$,N);RIGHT$(N$,N):
    NEXT N:VT=VT+1:RETURN
60000 PCLEAR4:GOTO5

```

### BACK ISSUES

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BY  
Bill Chapple W4GQC

We are excited about the response we have received for this series. There are many applications for using computers with ham radio. If you are interested in hardware interfacing, then you should read our interfacing computers section. There is only a small amount of hardware required for most interfacing requirements. This month we show how to convert ASCII from a computer to TTL level signals. This allows logic circuits to be controlled by the computer and allows the computer to detect logic signals. Most of our effort will be devoted to software because of the limited amount of hardware required.

With our interface circuit board we can write software to use our computer as a Morse Code generator. I have been using the internal electronic keyer in my FT-757. This works good but I can't send as fast as I would like to with it. Also my timing gets confused when I vary my sending speed. So I want a Morse code program that will allow me to type the characters I want to send from the keyboard. With the interface board completed, this reduces to a software problem. I am anxious to complete the Morse Code program so I can type in the characters and have them automatically sent through my transceiver. Hopefully next month we will have this software ready for Dynamic Color News.

This month we are presenting a DX or foreign station program. I like to work foreign code (CW) stations on the bottom end of 7 and 14 Megahertz. A lot of times I have heard foreign stations give their call signs and wondered from what

country they were transmitting.

The program allows notes to be typed on the screen. Use this for printing call signs or any other desired information. If you want to have the countries printed for a call sign press the down arrow and the screen will be copied to another memory area. This saves your notes. Then you are prompted to enter the first character of the DX station's call letters. The countries with call signs beginning with the letter or number are displayed. Some letters have more countries than the screen can display. You are instructed to press enter for more countries. When all countries have been printed, you are prompted for another character or to press the down arrow to return to the note section.

I have found this program to be very useful for quickly finding the countries for DX stations. After returning to the note section, my notes are as I left them. It takes about 6 seconds to move from the note section to the DX section because basic is used to move the display. I did not find this to be a problem. This program is included in a package of programs for ham radio. See our advertisement in this issue. Extended basic is required.

### DX PROGRAM

```
2 'HAM RADIO DX PROGRAM
4 'COPYRIGHT (c) 1986
6 'DYNAMIC eLECTRONICS iNC.
10 CLS:PRINT"THIS ALLOWS WRITING
   NOTES ON THE SCREEN. PRESS '
   DOWN ARROW' TO SEARCH FOR DX
   COUNTRIES":PRINT
20 X$=INKEY$:IF X$="" THEN 20
30 IF X$=CHR$(10) THEN 50
40 PRINTX$;:GOTO20
50 FOR J=1024 TO 1536:AA=PEEK(J)
   :POKE J+3000,AA:NEXT J:A=PEEK
   (136):POKEJ+1,A:A=PEEK(137):P
   OKE J+2,A
60 CLS
```

```

70 PRINT"ENTER FIRST LETTER OF D
  X STATION OR PRESS DOWN ARROW
  TO ESCAPE
80 X$=INKEY$:IF X$="" THEN 80
90 CLS
100 IF X$<>CHR$(10) THEN 130
110 FOR J=1024 TO 1536:A=PEEK(J+
  3000):POKE J,A:NEXT:A=PEEK(J+
  1):POKE136,A:A=PEEK(J+2):POKE
  137,A
120 GO TO 20
130 X=ASC(X$):Y=X-48:IF Y>9 THEN
  170
140 IF X<48 THEN 70
150 ON Y GOSUB 220,230,240,260,2
  80, 300,310,320,330
160 GOTO 70
170 Y=Y-16
180 ON Y GOSUB 370,390,410,440,4
  50,470,500,520,550,560,590,64
  0,660,670,680,700,730,740,750
  ,770,800,850,900,910,930,950
190 GOTO70
200 '
210 'NUMBERS FOLLOW
220 PRINT"1A0 SOV. MIL ORDER OF
  MALTA","1S SPATLY IS.":RETURN
230 PRINT"NO 2 PREFIXES":RETURN
240 PRINT"3A MONACO",,"3B6,7 AG
  ALEGA & ST. BRANDON",,"3B9 MAU
  RITIUS & RODRIQUEZ IS.",,"3C E
  QUATORIAL GUINA",,"3C0 ANNOBAN
250 RETURN
260 PRINT"4K -CE9 SOUTH GEORGIA
  IS.",,"4S SRI LANKA":PRINT"4U
  I.T.U. GENEVA & UNITED NATION
  S HEADQUARTERS":PRINT"4W YEME
  N",,"4X & 4Z ISRAEL":RETURN
270 '
280 PRINT"5A LIBYA",,"5B ZC CYPR
  US",,"5H TANZANIA",,"5N NIGER
  IA",,"5R MALAGASY REP.",,"5T M
  AURITANIA":PRINT"5U NIGER":PR
  INT"5V TOGA":PRINT"5W WESTERN
  SAMOA":PRINT"5X UGANDA",,"5Z
  KENYA":RETURN
290 '
300 PRINT"60 -T5 SOMALI":PRINT"6
  W SENEGAL":PRINT"6Y JAMAICA":
  RETURN
310 PRINT"70 PEOPLE'S DEM. REP.
  OF YEMEN":PRINT"7P LESOTHO":P
  RINT"7Q MALAWI":PRINT"7X ALGE
  RIA":PRINT"7Z SAUDIA ARABIA":
  RETURN
320 PRINT"8J ANTARCTICA":PRINT"8
  P BARBADOS":PRINT"8QVS9 MALDI
  VE IS.":PRINT"8R GUYANA":RETU

```

```

RN
330 PRINT"9A.(M1).17 SAN MARINO"
  :PRINT"9G GHANA":PRINT"9H MAL
  TA":PRINT"9J ZAMBIA":PRINT"9K
  KUWAIT":PRINT"9L SIERRA LEON
  E"
340 '
350 PRINT"9M2 WEST MALAYSIA":PRI
  NT"9M6 8 EAST MALAYSIA":PRINT
  "9N NEPAL":PRINT"9Q ZAIRE":PR
  INT"9U BURUNDI":PRINT"9V SING
  APORE":PRINT"9X RWANDA":PRINT
  "9Y TRINIDAD & TOBAGO":RETURN
360 '
370 PRINT"A2 BOTSWANA":PRINT"A3
  TONGA":PRINT"A4 OMAN":PRINT"A
  5 BHUTAN":PRINT"A6 UNITED ARA
  B EMIRATES":PRINT"A7 QATAR":P
  RINT"A9 BAHRAIN":PRINT"AA UNI
  TED STATES OF AMERICA":PRINT"
  AP PAKISTAN":RETURN
380 '
390 PRINT"BV TAIWAN":PRINT"BY CH
  INA":RETURN
400 '
410 PRINT"C2 NAURU":PRINT"C3 AND
  ORRA":PRINT"C5 THE GAMBIA":PR
  INT"C6BAHAMAS":PRINT"C9 MOZAM
  BIQUE":PRINT"CE CHILE":PRINT"
  CE9/KC4 ANTARCTICA":PRINT"CE9
  FALKLAND IS.":PRINT"CE0A EAS
  TER IS.":PRINT"CEOX SAN FELIX
  ":INPUT"PRESS ENTER";X
420 PRINT"CE0Z JUAN FERNANDEZ":P
  RINT"CM CO CUBA":PRINT"CN MO
  ROCCO":PRINT"CP BOLIVIA":PRIN
  T"CR9 MACAO":PRINT"CT PORTUGA
  L":PRINT"CT2 AZORES":PRINT"CT
  3 MADEIRA":PRINT"CX URUGUAY":
  RETURN
430 '
440 PRINT"D2 3 ANGOLA":PRINT"D4
  CAPE VERDE":PRINT"D6 COMOROS
  ":PRINT"DA DF DJ DK DL FED.
  REP. OF GERMANY":PRINT"DU PHI
  LIPPINES":RETURN
450 PRINT"EA SPAIN":PRINT"EA6 BA
  LEARIC IS":PRINT"EA8 CANARY I
  S":PRINT"EA9 CEUTA AND MELILL
  A":PRINT"E1 IRELAND":PRINT"EL
  LIBERIA":PRINT"EP IRAN":PRIN
  T"ET ETHIOPIA":RETURN
460 '
470 PRINT"F FRANCE":PRINT"FB8W C
  ROZET":PRINT"FB8X KERQUELEN I
  S.":PRINT"FB8Y FALKLAND IS.":
  PRINT"FB8Z AMSTERDAM & ST PAU
  L IS.":PRINT"FC CORSICA":PRIN

```

T"FG GUADELOUPE":PRINT"FG FS  
 SAINT MARTIN":PRINT"FH MAYOT  
 TE":PRINT"FK NEW CALEDONIA":P  
 RINT"FM MARTINIQUE  
 480 PRINT"F0 CLIPPERTON IS.":PRI  
 NT"FO FRENCH POLYNESIA":PRINT  
 "FP ST PIERRE & MIQUELON":PRI  
 NT"FR GLORIOSO IS.":PRINT"FR  
 JUAN DE NOVA EUROPA":PRINT"FR  
 REUNION":PRINT"FR TROMELIN":  
 PRINT"FW WALLIS & FUTUNA IS."  
 :PRINT"FY FRENCH GUIANA":RETU  
 RN  
 490 '  
 500 PRINT"G ENGLAND":PRINT"GD IS  
 LE OF MAN":PRINT"GI NORTHERN  
 IRELAND":PRINT"GJ GC JERSEY":  
 PRINT"GM SCOTLAND":PRINT"GU G  
 C GUERNSEY & DEP":PRINT"GW WA  
 LES":RETURN  
 510 '  
 520 PRINT"H4 VR4 SOLOMON IS.":PR  
 INT"HA HUNGARY":PRINT"HB SWIT  
 ZERLAND":PRINT"HB0 LIECHTENST  
 EIN":PRINT"HC ECUADOR":PRINT  
 "HC8 GALAPAGOS IS.":PRINT"HH  
 HAITI":PRINT"HI DOMINICAN REP  
 UBLIC":PRINT"HK COLOMBIA":INP  
 UT"PRESS ENTER";X:CLS  
 530 PRINT"HK0 MALPELO IS.":PRINT  
 "HK0 SAN ANDREA & PROVIDENCIA"  
 :PRINT"HL HM KOREA":PRINT"HP  
 PANAMA":PRINT"HR HONDURAS":P  
 RINT"HS THAILAND":PRINT"HV VA  
 TICAN":PRINT"HZ 7Z SAUDIA ARA  
 BIA":RETURN  
 540 '  
 550 PRINT"I IT ITALY":PRINT"IS S  
 ARDINIA":RETURN  
 560 PRINT"J2 FL8 DJIBOUTI":PRINT  
 "J3 VP2G GRENADA & DEP":PRINT  
 "J5 CR3 GUINEA-BISSAU":PRINT"  
 J6 VP2L ST LUCIA":PRINT"J7 VP  
 2D DOMINICA":PRINT"J8 VP2S ST  
 VINCENT & DEP"  
 570 PRINT"JA-JN KA JAPAN":PRINT"  
 JD KA1 MINAMI TORISHIMA":PRIN  
 T"JD KA1 OGASAWARA":PRINT"JT  
 MONGOLIA":PRINT"JW SVALBARD":  
 PRINT"JX JAN MAYEN":PRINT"JYJ  
 ORDAN":PRINT"J2/A ABU AIL JAB  
 AL AT TAIR":RETURN  
 580 '  
 590 PRINT"K W N AA AL UNITED STA  
 TES OF AMERICA":PRINT"KC4 ANT  
 ARCTICA":PRINT"KC6 (E. CAROLI  
 NE IS.) FED. STATES OF MICRON  
 ESIA":PRINT"KC6 (W. CAROLINE

IS.) REPUBLIC OF BELAU"  
 600 PRINT"KG4 GUANTANAMO BAY":PR  
 INT"KH1 KB6 BAKER, HOWLAND &A  
 M PHOENIX IS.":PRINT"KH2 KG6  
 GUAM":PRINT"KH3 KJ6 JOHNSTON  
 IS.":PRINT"KH4 KM6 MIDWAY IS.  
 ":INPUT"PRESS ENTER";X:CLS  
 610 PRINT"KH5 KP6 PALMYRA JARVIS  
 IS.":PRINT"KH5K KP6 KINGMAN  
 REEF":PRINT"KH6 HAWAIIAN IS."  
 :PRINT"KH7 KURE IS.":PRINT"KH  
 8 KS6 AMERICAN SAMOA":PRINT"K  
 H9 KW6 WAKE IS":PRINT"KH0 KG6  
 R S T MARIANAIS":PRINT"KL7 A  
 LASKA"  
 620 PRINT"KP1 KC4 NAVASSA IS.":P  
 RINT"KP2 KV4 VIRGIN IS.":PRIN  
 T"KP4 PUERTO RICO":PRINT"KP4  
 KP5 DESECHEO IS.":PRINT"KX6 M  
 ARSHALL IS.":RETURN  
 630 '  
 640 PRINT"LA LB LF LG LJ NORWAY"  
 :PRINT"LA FALKLAND IS.":PRINT  
 "LU ARGENTINA":PRINT"LU-Z FA  
 LKLAND IS. SOUTH GEORGIA IS.S  
 OUTH ORKNEY IS. SOUTH SANDWIC  
 H IS. SOUTH SHETLAND IS.":PRI  
 NT"LX LUXEMBOURG":PRINT"LZ B  
 ULGARIA":RETURN  
 650 '  
 660 PRINT"M1 SAN MARINO":RETURN  
 670 PRINT"N UNITED STATES OF AM  
 ERICA":RETURN  
 680 PRINT"0A PERU":PRINT"0D LEBA  
 NON":PRINT"OE AUSTRIA":PRINT"  
 OH FINLAND":PRINT"OH0 ALAND I  
 S.":PRINT"OJ0 MARKET REEF":PR  
 INT"OK CZECHOSLOVAKIA":PRINT"  
 ON BELGIUM":PRINT"OR4 ANTARCT  
 ICA":PRINT"OX XPGREENLAND":PR  
 INT"OY FAROE IS.":PRINT"0Z DE  
 NMARK":RETURN  
 690 '  
 700 PRINT "P2 PAPUANEW GUINEA":P  
 RINT"PA PD PE PL NETHERLANDS"  
 :PRINT"PJ2 3 4 9 NETH. ANTILL  
 ES":PRINT"PJ5 6 7 8 ST. MAAR  
 TEN SABA ST EUSTATIUS":PRINT"  
 PY PP PR-PW BRAZIL":PRINT"PY0  
 FERNANDO DE NORONHA":PRINT"P  
 Y0 ST PETER & ST PAUL ROCKS":  
 PRINT"PY0 TRINDADE  
 710 RETURN  
 720 '  
 730 PRINT"NO Q PREFIXES":RETURN  
 740 PRINT"NO R PREFIXES":RETURN  
 750 PRINT"S2 BANGLADESH":PRINT"S  
 7 SEYCHELLES":PRINT"S9 CR5 SA

```

O TOME & PRINCIPE":PRINT"SK S
L SM SWEDEN":PRINT"SP POLAND"
:PRINT"ST SUDAN":PRINT"STØ SO
UTHERN SUDAN":PRINT"SU EGYPT"
:PRINT"SV GREECE":PRINT"SV CR
ETE":PRINT"SV DODECANESE":PRI
NT"SV MOUNT ATHOS
76Ø '
77Ø PRINT"T2 VR8 TUVALU":PRINT"T
3Ø VR1 W. KIRIBATI (GILBERT &
OCN IS.)":PRINT"T31 VR1 C. K
IRIBATI (BRIT PHOENIX IS.)":P
RINT"T32 VR3 EAST KIRIBATI (L
INE IS)":PRINT"T7 (M1 9A)SAN
MARINO":PRINT"TA TURKEY":INPU
T"PRESS ENTER";X:CLS
78Ø PRINT"TF ICELAND":PRINT"TG G
UATEMALA":PRINT"TI COSTA RICA
":PRINT"TI9 COCOS IS.":PRINT"
TJ CAMEROON":PRINT"TL CENTRAL
AFRICAN REPUBLIC":PRINT"TN C
ONGO":PRINT"TR GABON":PRINT"
T CHAD":PRINT"TU IVORY COAST"
:PRINT"TY BENIN":PRINT"TZMALI
":RETURN
79Ø '
80Ø PRINT"UA UK1 3 4 6 UV UW1-6
UN1 EUROPEAN RUSSIAN SFSR":PR
INT"UA1 UK1 FRANZ JOSEF LAND"
:PRINT"UA1 UK1 ANTARCTICA"
81Ø PRINT"UA2 UK2F KALININGRADSK
":PRINT"UA UK UV UW9-Ø ASIATI
C R.S.F.S.R.":PRINT"UB UK UT
UY5 UKRAINE":PRINT"UC2 UK2A/C
/I/L/Ø/S/W WHITE R.S.S.R.":IN
PUT"PRESS ENTER";X:CLS
82Ø PRINT"UD6 UK6C/D/K AZERBAIJA
N":PRINT"UF6 UK6F/O/Q/V GEORG
IA":PRINT"UG6 UK6G ARMENIA":P
RINT"UH8 UK8H TURKOMAN":PRINT
"UI8 UK8 UZBEK":PRINT"UJ8 UK8
J/R TADZHIK"
83Ø PRINT"UL7 UK7 KAZAKH":PRINT"
UM8 UK8M N KIRGHIZ":PRINT"UO5
UK5Ø MOLDAVIA":PRINT"UP2 UK2
B/P LITHUANIA":PRINT"UQ2 UK2G
/Q LATVIA":PRINT"UR2 UK2R/T
ESTONIA":RETURN
84Ø '
85Ø PRINT"V2 VP2A ANTIGUA ,BARBU
DA":PRINT"V3 VPI BELIZE":PRIN
T"VE VO VY1 CANADA":PRINT"VE1
SABLE IS.":PRINT"VE1 ST. PAU
L IS.":PRINT"VK LORD HOWE IS.
":PRINT"VK9 WILLIS IS.":PRINT
"VK9 CHRISTMAS IS.":PRINT"VK9
COCOS-KEELING IS.":INPUT"PRE
SS ENTER";X
86Ø PRINT"VK9 MELLISH REEF":PRI
NT"VK9 NORFOLK IS.":PRINT"VKØ
FALKLAND IS.":PRINT"VKØ HEARD
IS.":PRINT"VKØ MACQUARIE IS.
":PRINT"VO CANADA":PRINT"VP2E
ANGUILLA":PRINT"VP2K ST. KIT
TS. NEVIS":PRINT"VP2M MONTSER
RAT":PRINT"VP2V BRIT VIRGINIS
.":PRINT"VP5 TURKS
87Ø PRINT"VP8 LUZ SOUTH GEORGIA
IS.":PRINT"VP8 LU-Z SOUTH ORK
NEY IS.":PRINT"VP8 LU-Z SOUTH
SANDWICH IS.":PRINT"VP8 LU-Z
CE9 HFØ 4K SOUTH SHETLAND I
S.":PRINT"VP9 BERMUDA":PRINT"
VQ9 CHAGOS"
88Ø PRINT"VR6 PITCAIRN IS.":PRIN
T"VS5BRUNEI":PRINT"VS6 HONG K
ONG":PRINT"VS9 MALDIVE IS.":P
RINT"VU INDIA":PRINT"VU7 ANDA
MAN & NICOBAR IS.":PRINT"VU7
LACCADIVE IS.":RETURN
89Ø '
90Ø PRINT"W UNITED STATES OF AME
RICA":RETURN
91Ø PRINT"XE MEXICO":PRINT"XF4 R
EVILLA GIGEDO":PRINT"XP GREEN
LAND":PRINT"XT UPPER VOLTA":P
RINT"XU KAMPUCHEA":PRINT"XV V
IETNAM":PRINT"XW LAOS":PRINT"
XZ BURMA":RETURN
92Ø '
93Ø PRINT"Y2-9 DM DT GERMAN DEM
REP":PRINT"YA AFGHANISTAN":PR
INT"YB YC INDONESIA":PRINT"YI
IRAQ":PRINT"YJ NEW HERBRIDES
":PRINT"YK SYRIA":PRINT"YN HT
NICARAGUA":PRINT"YO ROMANIA"
:PRINT"YS ELSALVADOR":PRINT"Y
U YUGOSLAVIA":PRINT"YV VENEZU
ELA":PRINT"YVØ AVE
94Ø '
95Ø PRINT"Z2 ZE ZIMBABWE":PRINT"
ZA ALBANIA":PRINT"ZB GIBRALTA
R":PRINT"ZC CYPRUS":PRINT"ZD7
ST. HELENA":PRINT"ZD8 ASCENS
ION IS.":PRINT"ZD9 TRISTAN DA
CUNHA & GOUGH IS.":PRINT"ZF
CAYMAN IS.":PRINT"ZK1 SØ COOK
IS.":PRINT"ZK1 NO COOK IS.":
PRINT"ZK2 NIUE":IN
96Ø PRINT"ZL NEW ZEALAND":PRINT"
ZL AUCKLAND & CAMPBELL IS.":P
RINT"ZL CHATHAM IS":PRINT"ZL
KERMADEC IS":PRINT"ZL5 ANTARC
TICA":PRINT"ZM7 TOKELAU IS"
97Ø PRINT"ZP PARAGUAY":PRINT"ZS1
-6 (H5 S4 S8 T4 V9) SOUTH AFR

```



```
ICA":PRINT"ZS1 ANTARCTICA":PR
INT"ZS2 PRINCE EDWARD & MARIO
N IS.":PRINT"ZS3 (NAMIBIA) S
.W. AFRICA":RETURN
```

## INTERFACING COMPUTERS

For the past few issues we have been discussing using the serial ASCII port for interfacing devices. The reason we have been devoting so much effort to this port is that ASCII is standard for all computers. This means that an ASCII interface will work with an Apple, Commodore, Attari, Radio Shack, or IBM computer plus many more.

## HARDWARE

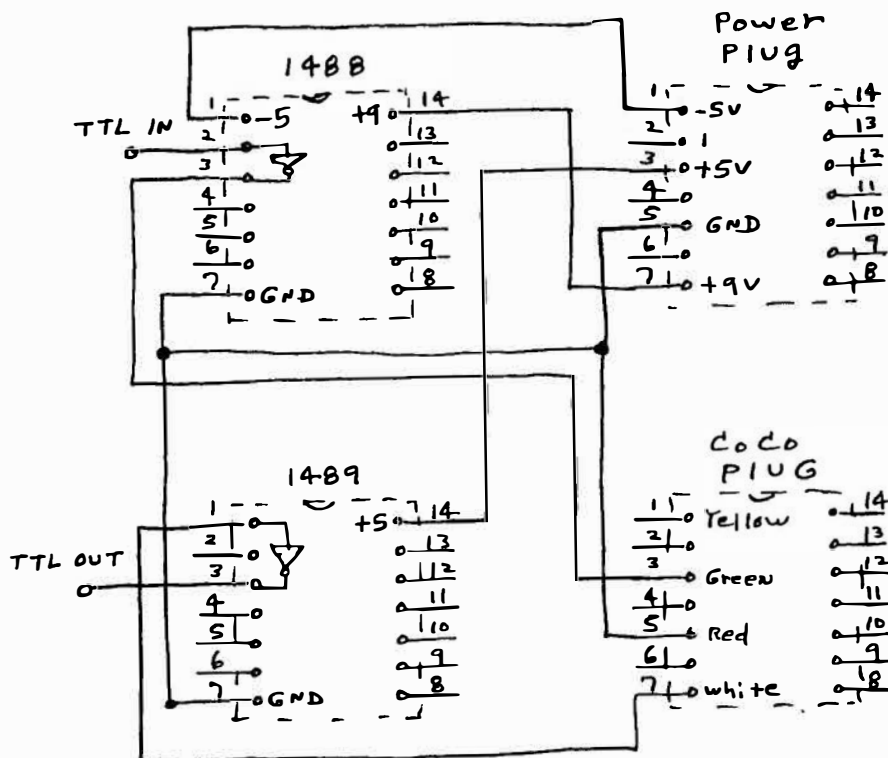
Last month we suggested a power supply to be used for an interface circuit board. This month we will show how to interface the computer and give a

wiring diagram with suggested components. With the chips available today, an interface circuit can be built with a minimum amount of chips.

## THE INTERFACE PROBLEM

The voltage appearing at the receive data input and the transmitted data output for an RS-232 port varies from a negative value to a positive value. The actual value of the voltage variations is not critical. Plus or minus voltages of 5 or 10 volts works fine.

Microprocess and transistor-transistor logic (TTL) chips require signals that vary from 0 to 5 volts. Thus it is required to convert the ASCII + and - variations to a 0 or 5 volt level. Also a TTL signal must be converted to the + and - voltages in order to send a 1 or 0 on an ASCII port. Fortunately two chips were designed for these conversions. The part identi-



RS-232 INTERFACE

FIGURE 1

fications and Radio Shack parts are MC1488 (276-2650) Quad Line Driver and a MC1489 (276-2521) Quad Line Receiver. These chips will handle 4 interfaces each. Since we are only interested in one, we just used one section of each.

A wiring diagram of the RS-232 interface is shown in Figure 1. We mounted two 14 pin sockets on our circuit board for the power supply and the cable to the color computer. A 14 pin header was wired to the power supply discussed last month, and this header plugs into the socket. For interfacing to the computer, we cut a printer cable in half and wired a header to the cut end.

### CHECKING OUT THE INTERFACE

After wiring the interface board, you can enter the following programs to verify the board's operation:

```
10 INPUT"ENTER 0 OR 1 TO
   OUTPUT";V
20 POKE 65312,2 * V
30 GOTO 10
```

The preceding program will cause pin 3 of the 1489 chip to change voltage values. This can be measured with an inexpensive multimeter.

```
10 A=PEEK (65314) AND 1
20 ?A
30 GOTO 10
```

The preceding program indicates a change in logic at pin 2 of the 1488. Connect this pin to +5 volts and then to ground to indicate a change on your computer's screen.

### SOFTWARE

In our September issue we gave a program for sending a byte using the ASCII port. This month we want to look at recovering a byte sent from an-

other device. Remember the bit scheme required for ASCII.

```
Start bit
Data bits
Parity bit (if used)
Stop bits
```

The signal stays at a logical "1" until data is ready to be sent. Then a "0" is sent as a start pulse. Timing begins when the transition from a 1 to 0 is detected. It is necessary to start the timing at the middle of the start pulse. After a time interval we can look at 65314 to see if the next bit is a 0 or 1. The following is a routine for waiting for a 0 on the input port:

```
0 LDA E 65314 'Look at input
3 ANDA I 1 'AND A with 01
5 TSTA 'Is A=0?
6 BNE 0 'GO to 0 if A<>0
```

Next we need to time half of the start pulse so we can begin our timing at the middle of the start pulse. We used the following for this:

```
0 LDA I 1' Put a 1 in A
2 LDB D 150 'Put the value in
   150 in B
4 ADDDB I 1 'Add 1 to B
6 ASRB ' Arithmetic Shift
7 DECB ' Decrement B (B=B-1)
8 BNE 7 'GO TO 7 if B<>0
10 DECA 'DEcrement A
11 BNE 2 'GO TO 2 if B<>0
```

After the start pulse we have to start counting the number of bits received to determine if we have completed the byte.

For our DYTERM program we used memory 4009 to contain the count of our bits. This must be cleared as we start. Also we used 4010 to accumulate our byte from each bit.

Now we can start our timing routine. This is the same as we gave on page 20 of our September issue. After the timing routine, we look at 65314 to see if

the next bit is a 0 or 1. We AND this value with 01 and rotate right A (RORA). This puts the new bit into the carry bit. We then rotate right 4010 which puts this new bit into the most significant location of 4010. Following is our procedure for this:

```
0 LDA E 64314 'A=PEEK(65314)
3 ANDA I 1 'A=A AND 1
5 RORA 'Rotate Right A
6 RORE 4010 'Rotate Right 4010
```

We have to increment our bit counter and compare it with the number of bits we are receiving for each byte. We used 4009 for our bit counter and if it is equal to 9 we ended. Our routine for this follows:

```
0 LDA E 4009 'Bit Counter
3 INCA 'Increment A
4 CMPAI 9 'Compare A with 9
6 BEQ END 'End if equal
```

If you are experienced in assembly language programming then you should be able to write your own program with the information we have presented. Next month we will give a complete terminal program you can use. For those interested in Ham Radio, the procedure for decoding Morse Code is similar to what we are presenting here.

## EDITOR'S COMMENTS

The Color Computer 3 finally arrived. As with anything new we were anxious to try it out. It supports an RGB or analog monitor and a television. Because of the interest in this new computer we will write something about it each month. Our first editorial is in this issue. Basically it seems to work fine for 32K programs. Special programs that require 64K will not work. The disk drives, tape I/O and printer ports are the same. It has 32,

40, and 80 character display modes. The 40 and 80 character modes give true lower case characters. Included is better graphics plus some additional commands which we will cover in the editorials.

The response to our ham radio series is good so we will be continuing with this series. We are including a program that displays the countries of foreign (DX) stations.

In our interfacing computers series we are showing how to build a hardware interface unit for using the printer port. I have designed interfaces for controlling motors using other computers. With the chips available it is possible to build interface circuits with a minimum of parts. The interface circuit we are presenting in this issue will work with any computer that has an ASCII port.

We are continuing with our address file program. This is something we need for our own mailing requirements, and others have expressed an interest in this type program. This month we have a program that can handle 200 addresses. We will continue and expand this program to allow sorting and merging with another file.

We are happy to have John Galus to continue our machine language programming series. His first editorial is in this issue. He is continuing the series and will be showing how to write machine language programs using an assembler.

We received a letter stating that we leave readers hanging. This is not our intention and we do not close out a series until we think that we have finished it. Because of limited time, sometimes we have to let things go until next time. So bear with us and we will continue the next month.

We are very much interested in drawing pictures using COCO MAX and in digitizing pictures.

Recently we purchased a Cam-corder (Camera-recorder) and will be doing some experimentation with computerized pictures. We are writing a program that will print a PMODE 4 graphics picture to a standard printer. We want to expand and be able to make our own billboards.

I have been using our new 256K memory which gives 4-64K banks. This has really been a help in writing because I can put our word processor in one bank and programs in the other bank. When we are reviewing a product, we can go to the bank that contains the product and run it. Then we can quickly return to our word processor to write what we have observed.

This month we will did not cover OS-9. We will continue with it next month.

I want to thank each of you for your support. Last year at this time I was suffering from my accident, but this year I am doing fine. I hope each of you have a Happy Thanksgiving.

#### HAM RADIO SOFTWARE

1. Morse Code for beginners. Practice program makes it easy to learn Morse code.
2. Antenna Design gives lengths and element spacing for dipole to 4 element Yagis.
3. DX quickly finds countries for DX stations.

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Add autokey, block move, word delete, automatic printing of multiple copies, find and global replace, two column directory, key clicks plus much more to your Telewriter Word Processor. Also allows the Telewriter to work with the Color Computer 3. \$19.95 disk.

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## PRODUCT REVIEWS

This section is open to all producers and dealers of color computer products. We will review your product free of charge and write an editorial on the product. We do not use a rating system but will explain what the product does, and what can be expected from it. Any comments about the review from the firm submitting the product will be printed in a later issue.

### CoCo MAX II

CoCo MAX II is a powerful high level graphics program. It allows an inexperienced person to make a very impressive drawing with a minimum of experience. Some of the features include:

- Multiple drive capability.
- 14 different character fonts.
- A special "Glyptic font.
- Dynamic 2-dimensional shrink and stretch.
- Rotate function.
- A disk clipbook.
- Point & click loading of images files.
- Show page features window locator.
- Alternate pattern sets can be saved and loaded from a disk.
- A wide selection of printer drivers.

CoCo MAX II consists of a cartridge and software. The cartridge can be plugged into a slot on a multipack adapter or used with a Y cable. It is available on disk or tape and we reviewed the disk version.

The first thing to do is to make a backup copy and configure the backup disk for your printer. We used an Epson FX-85 for this review. After the backup is made and configured, the

cartridge needs to be plugged into a Y cable or slot on a multipack adapter. Turn the computer off until the cartridge is installed. A joystick is plugged into the CoCo MAX II cartridge.

Next turn on the computer and RUN "COCOMAX". After a few seconds you will be presented a graphics screen. At the bottom of the screen are many patterns for choosing a background. These are used when figures are filled in. At the left are tools which perform the draw operations. Across the top are the pull down menus.

CoCo Max works by moving the cursor with the joystick to the desired figure. For example suppose it is desired to draw a filled box. Move the cursor to the filled box figure at the left and click the fire button. This selects the filled box. Now move the cursor to the screen and press the fire button. This marks the beginning of the filled box. As the joystick is moved, the box grows or shrinks. Move the joystick until the box is the desired size and then click the fire button. If you desire another tool, return to the toolbox and select another one. The following is a list of the tools:

Lasso, Editing Box, Hand, Alpha-numeric, fill, spray can, paint brush, pencil, rubber band lines, eraser, rectangle, filled rectangle, rounded rectangle, rounded filled rectangle, circle and ellipse, filled circle, free-hand shape, free-hand with fill, polygon, polygon with fill.

Each of the pull down menus consist of several functions that can be done. The File menu allows the page to be cleared, a page to be loaded or saved, a directory, and the graphics page to be printed.

The Edit menu allows you to

UNDO your mistakes. An object inside an edit box can be operated on with the following commands: Clear, Inert, Trace Edged, Flip horizontal, Flip vertical.

The Goodies menu consists of a Grid which is 8 pixels apart. This provides points for lines, circles, and rectangles to lock on. Fat Bits is a zoom-in function that allows a blown up picture of part of the work. Show page reduces your picture so that all of it will appear on the page. Scrool page allows the screen to become a window and you can scroll different parts of the picture.

The Font menu provides different type styles for printing characters on the screen. Select the style desired with the joystick and fire button.

The Style menu allows the characters to be shaded. It consists of the following: Plain, Bold, Italic, Outline, Shadow, Left, Middle, and Right.

As stated earlier to use CoCo MAX II a mouse or joystick is positioned to the item desired. Then move to the screen and press the joystick to use the selected item. A figure will grow or shrink as the joystick is moved. Press the fire button to mark the end of the figure and then move to another location.

We found CoCo Max II to be very powerful and to perform as advertised. A digitizer option is available that will allow pictures from a video source to be entered into the computer. CoCo Max is produced by Colorware Inc., 78-03A Jamaica Ave., Woodhaven, NY 11421 and is distributed by Colorware and dealers. CoCo Max II costs \$79.95.

+ + + DCN STAFF + + +

## NEW PRODUCTS

This section is available free for producers and dealers of color computer products. These products have not been reviewed by us but are included for our reader's information.

### Artificial Intelligence for your CoCo

Three Programs -

The Happiness Expert asks 30 random questions from its database, then draws a graph of your responses and calculates your Happiness Quotient (on a scale from 50 to 150, with 100 being average). It then offers some advice on one of your lowest responses.

The Poet composes endless - and we mean endless - reams of poetry on your printer or screen.

The Therapist asks you "What is your Problem", then engages you in a lively conversation. Some of its program keywords are Love, Money, Life, Purpose, Meaning, Sex, and Fear. Your session can also be printed, if you like.

Of course, the title screen states that this software is sold for fun and amusement only. No therapeutic benefit is intended.

These programs are available from Thinking Software, Inc., 46-16 65th Place Woodside, NY 11377 (718) 429-4922

### CLASSIFIED ADS

1. 10 cents a word, \$3 minimum.
2. Name, Address, & Telephone listed free.
3. Send payment with ad.
4. Closing date 1st of the

preceeding month. Ex. Nov ad closing is Oct. 1.

For Sale: Two used good condition Radio Shack Model 1 disk drives with case and power supply. Will work on color computers by adding a controller. \$75 each or \$120 for both. Larry Richey, 1409 Peach Orchard Rd., Hartselle, AL 35640.  
(205) 773-7414.

## DISPLAY ADS

(Rate sheet 2 - March 1986)  
Closing 1st of preceeding month.

Pages	1 time	2 times	3 times
*2	25	23	22
1	30	27	25
1/2	23	20	18
1/3	19	17	15
1/4	15	13	12

\* We can use colored paper at no extra charge if ads are on both sides.

We can do ads in Red, Blue, or Brown. No all one color ads will be accepted. For color ads send artwork for each color. Add 40% for each color. Example: One page black and red for 3 times costs \$25 + 10.00 = \$35.00 each month.

### PREMIUM QUALITY DISKS

You don't have to pay a lot for QUALITY disks. Our disks are boxed in tens complete with labels, sleeves, and write protect tabs. Don't confuse these with cheaper disks as they carry a lifetime warranty and will be replaced should they become defective.

DSK-1 SSDD for CoCo \$7.95 /box  
DSK-2 DSDD for MSDOS \$8.95 /box

Add \$1.50 S/B

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## NEW 256K MEMORIES

for 2-chip CC-2 (ME-18)  
16K or 64K to 256K

Have you ever wished you could stop what you are doing, load another program, and then return to the original program without losing anything? This is possible with our new ME-18 expanders. This plug in assembly increases the memory 4 times. The memory assembly is in two modules partitioned as 4-64K memory banks which are hardware selectable by two toggle switches. Features include:

- \* Powerful Memory Manager Software to allow maximum use of each 64K bank.

- \* 4-64K memories. You can load any combination of 64K programs such as word processors, OS-9, terminal programs, or spread sheets. Each bank is entirely independent allowing you to quickly go from one to the other by selecting the bank with the toggle switch.

- \* Ramdisk in each bank. Basic or machine language programs can be stored in the second 32K bank for any of the selected 64K memory banks. You can have special programs in one or two banks and your basic programs in the other banks. The ramdisk quickly loads and runs the programs from the computer's memory.

- \* Independent banks. Each of the 4 banks is completely independent allowing any combination of programs to be entered. The unselected banks are protected and the data can not be altered until the bank is again selected.

For example one bank can contain a word processor, the second a machine language game program, the third a terminal program, and the fourth a spread sheet. When banks are switched all variables are preserved allowing the program to run or continued when the banks are reselected.

- \* Plug in installation. For 64K computers, installation involves removing the two memory chips and inserting the assemblies into the empty sockets. Two small holes are required for the switches to complete the installation. For 16K computers a jumper must be soldered to upgrade the computer to 256K.

- \* Low cost. ME-18 \$119.95

## 128K UPGRADES

ME-10A Similar to the ME-18 except upgrades 2-chip 64K computers to 128K for 2-64K bank operation. Ramdisk software is included. \$49.95

ME-12 Upgrades 8-chip 4164 type 64K computers to 128K. Ramdisk software is included. \$49.95.

## 64K UPGRADE

ME-10 Upgrades 16K CC-2 to 64K. Ramdisk software is included \$34.95.

## EXTENDED BASIC

Add extended basic to CC-2 computers \$34.95.

Free Catalog

24 Hour phone. Checks, VISA & MC cards. Add \$3 ship.

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**SUPER PROGRAMMING AID**



"Best value of the year", see the review in the July Rainbow.

The Super Programming Aid is the best integrated software utility available for your COCO. Add what Tandy left out, COPY and MOVE statements, FIND, PRINT FORMAT, KEY CLICKER, PROGRAMMABLE KEYBOARD, MULTIPLE EDIT SESSIONS, MERGE PROGRAMS, TYP-O-MATIC keys and much more, saves hours of time for BASIC programmers. Version II and III add many more features, PRINT SPOOLER, FULL SCREEN EDIT COMAND, SCREEN PRINTING and more.

VERSION I — \$19.95 — for 16K & 32K COCO  
 VERSION II — \$24.95 — for 64K COCO  
 VERSION III — \$29.95 — for COCO 3

Call or Write            Bangert Software Systems  
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**DCN PROGRAMS on Tape or DISK**

This is our third collection of programs from Dynamic Color News. This collection includes:

1. RESTORE - Page -1 Program that restores a basic pgm which was lost due to a hard reset or typing NEW.
2. FAST FOOD - This program quickly displays the total for a fast food order.
3. BAR GRAPH - Display results in easy to see bars over a 12 month period.
4. MEMORY PEEK & POKE - Page -1 program that can be loaded with another pgm.
5. GRAPHICS DRAW. Draw figures on the screen. Save and load drawings.

DCN-3 Tape or Disk \$11.95 \*  
 Add \$2 shipping, Foreign \$3

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