PERCOM Peripheral

Garland, Texas No. 6

Mind-Blowing Color Graphics

by Harold Mauch
President, Percom Data Company

One day last week, Tim McKee of our staff poked his head in my office and asked, "You wanna see something that will make your day?".

I was pretty well blitzed after spending the whole morning with an architech reviewing plans for our new 30,000 square-foot building; I didn't know whether to be annoyed at Tim's intrusion or delighted at a chance to escape. It wasn't a difficult decision.

I followed Tim to an unexplored corner of our main building where he designs 680X systems. Tim and Barney, one of our printed circuit designers, share what was once a stockroom. Now it's a mass of equipment and a mess of layouts, printouts and listings. A blackboard with a status chart of long-forgotten projects was the only item in the room that showed any semblance of order. Before I could query Tim about one of the projects, he brought up his system.

On a color monitor, perched on a stack of dog-eared listings, appeared expanding, shimmering circles -- framed circles, exploding circles, rotating circles, tension circles. Tim's mesmerizing phychedelics sent the mind reeling -- in circles, of course.

Finally, I realized that Tim had just described the system hardware: "...our Colorama card, an SBC/9, one of our M24SS static RAM cards..." And now was explaining how he could generate such dazzling animated displays: "Because display memory is in the processor map, update speed and animation detail are limited only by the processor itself. Which, with a 6809, is quite fast."

About this time somebody bumped Tim's bench. The monitor teetered. "Watch out!" I exclaimed. Tim, grinning sheepishly, steadied the stack of listings and went on.

"I'm using ASCII commands so the display is not as fast as direct memory commands, but the program interface is simpler. A circle is defined by setting its center coordinates in memory, then computing the circle X and Y points using the Pythagorean theorm. This approach is faster than a trig function and each calculation locates eight points. The shimmer effect happens because points overlap as the algorithm draws the circle -- eight points at a time."

I told Tim to clear up the software a bit (a bit?) if necessay, and we'd make his program available through the LFD Users Group. Wistfully, I headed back to my office, to the architech's plans and to other mundane pursuits.

CONTENTS

SPEECH PATCH FOR SUPER BASIC

by Tim McKee

Ed. Note: The last issue of the "Peripheral" introduced the subject of speech generation using a Texas Instruments' SPEAK & SPELL equipped with a Percom SPEAK-2-ME-2 [tm] adapter.

The listing given in this issue will allow you to patch Percom Super BASIC, version 1.0x, for speech. The pi function and tape commands have been eliminated.

New Function

SP 20 LET A=SP

When line 20 is executed, it will return A equal to the current status of the SPEAK & SPELL:
A=0 when not speaking
A=1 for speech in progress

New Commands

S(20 S(1000)

Line 20 will "speak" the word at address 1000 of the SPEAK & SPELL vocabulary. If the delay command, D(, was used previously, a delay will follow and then execution will continue.

W(20 W(1000)

Line 20 will "speak" the word at address 1000 of the SPEAK & SPELL vocabulary, wait for the word to end and then continue.

D(20 D(25)

Line 20 will set the delay associated with the S(command to 25. The delay is set in 0.1 millisecond increments. The delay is reset to zero after each S(command.

SL 20 SL

Line 20 will cause the next word to be spoken at half speed (slow speech).

NOTES

1. The address of words are *not* the same as those given in the SPEAK-2-ME-2 (tm) users manual. The addresses can be obtained with the following program:

```
10 INPUT "OLD VALUE ",O
20 IF O<0 LET O=65536+O
30 LET A=INT(O/256)
40 LET B=O-(256*A)
50 PRINT "NEW VALUE ";A+(256*B)
60 W( A+(256*B))
70 GOTO 10
```

2. New words may be formed by setting the delay with the D(command, outputting the beginning of one word using the S(command, allowing the first part of the word to be spoken and then outputting another word.

```
                        NAM   SPEECH    PATCH FOR SUPER BASIC 1.00
   (8000)       PIA     EQU   $8000
   (8000)       PIADTA  EQU   PIA
   (8001)       PIACTA  EQU   PIA+1
   (8002)       PIADTB  EQU   PIA+2
   (8003)       PIACTB  EQU   PIA+3
   (003C)       CA2HI   EQU   $3C
   (0034)       CA2LO   EQU   $34
   (237F)       NUMPAR  EQU   $237F
   (0ADE)       DCBIN2  EQU   $ADE
   (19C4)       CLRNUM  EQU   $19C4
   (0059)       NUMSTK  EQU   $59
   (1FCF)       DATA    EQU   $1FCF

   (0238)               ORG   $238       PATCH BASIC FUNCTION TABLE
0238 53                 FCC   'SP' REPLACE FUNCTION 'PI'
023A 00                 FCB   0
023B 2F AE              FDB   SPKFNC

   (0371)               ORG   $371       PATCH BASIC COMMAND TABLE
0371 53                 FCB   'S,'(,0 SPEAK WORD AND DELAY IF REQUESTED
0374 2F 00              FDB   SPK
```

```
0376 57              FCB   'W,'(,0 SPEAK WORD AND WAIT TILL FINISHED
0379 2F 12           FDB   SPKWT
037B 44              FCB   'D,'(,0 SET DELAY FOR NEXT 'S(' COMMAND
037E 2F 7E           FDB   SPKD
0380 53              FCB   'S,'L,0 SET SLOW SPEECH MODE
0383 2F A6           FDB   SPKSLW

  (2F00)             ORG   $2F00     UNUSED SPACE

2F00 8D 1D    SPK    BSR   SPKIT
2F02 FE 2FD0         LDX   DELAY     DELAY IF NEEDED
2F05 27 15           BEQ   SPKX
2F07 C6 10    SPK1   LDA B #16
2F09 5A       SPK2   DEC B
2F0A 26 FD           BNE   SPK2
2F0C 09              DEX
2F0D 26 F8           BNE   SPK1
2F0F 4F              CLR A
2F10 20 72           BRA   SPKDX
  *RESET DELAY TO 0 AND RETURN

2F12 8D 0B    SPKWT  BSR   SPKIT
2F14 BD 2FC4         JSR   STSSTR
2F17 B6 8002  SPKW1  LDA A PIADTB
2F1A 2A FB           BPL   SPKW1
2F1C 7E 1FCF  SPKX   JMP   DATA
2F1F BD 237F  SPKIT  JSR   NUMPAR
2F22 BD 0ADE         JSR   DCBIN2
2F25 37              PSH B
2F26 36              PSH A
2F27 30              TSX
2F28 7D 2FD2         TST   STSACT
2F2B 27 06           BEQ   SPEAK4
2F2D 4F              CLR A
2F2E B7 2FD2         STA A STSACT
2F31 8D 60           BSR   STROBE
2F33 7D 2FCE  SPEAK4 TST   INIT
2F36 26 21           BNE   SPEAK6
2F38 7F 8001         CLR   PIACTA
2F3B 7F 8003         CLR   PIACTB
2F3E 86 FF           LDA A #$FF
2F40 B7 8000         STA A PIADTA
2F43 7F 8002         CLR   PIADTB
2F46 86 3C           LDA A #CA2HI
2F48 B7 8001         STA A PIACTA
2F4B B7 8003         STA A PIACTB
2F4E C6 05           LDA B #5
2F50 4F       SPEAK5 CLR A
2F51 8D 40           BSR   STROBE
2F53 5A              DEC B
2F54 26 FA           BNE   SPEAK5
2F56 7C 2FCE         INC   INIT
2F59 C6 05    SPEAK6 LDA B #5
2F5B 4F       SPEAK7 CLR A
2F5C 37              PSH B
2F5D C6 04           LDA B #4

2F5F 64 00    SPEAK8 LSR   0,X
2F61 66 01           ROR   1,X
2F63 46              ROR A
2F64 5A              DEC B
2F65 26 F8           BNE   SPEAK8
2F67 33              PUL B
2F68 8D 23           BSR   OUTDIG
2F6A 5A              DEC B
2F6B 26 EE           BNE   SPEAK7
2F6D 86 80           LDA A #$80
2F6F 8D 22           BSR   STROBE
2F71 B6 2FCF         LDA A SPEED
2F74 8D 1D           BSR   STROBE
2F76 31              INS
2F77 31              INS
2F78 86 A0           LDA A #$A0
2F7A B7 2FCF         STA A SPEED
2F7D 39              RTS

2F7E BD 237F  SPKD   JSR   NUMPAR
2F81 BD 0ADE         JSR   DCBIN2
2F84 B7 2FD0  SPKDX  STA A DELAY
2F87 F7 2FD1         STA B DELAY+1
2F8A 7E 1FCF         JMP   DATA

2F8D 36       OUTDIG PSH A
2F8E 86 20           LDA A #$20
2F90 8D 01           BSR   STROBE
2F92 32              PUL A
2F93 43       STROBE COM A
2F94 B7 8000         STA A PIADTA
2F97 86 34           LDA A #CA2LO
2F99 B7 8001         STA A PIACTA
2F9C 36              PSH A
2F9D 32              PUL A
2F9E 36              PSH A
2F9F 32              PUL A
2FA0 86 3C           LDA A #CA2HI
2FA2 B7 8001         STA A PIACTA
2FA5 39              RTS


2FA6 86 60    SPKSLW LDA A #$60
2FA8 B7 2FCF         STA A SPEED
2FAB 7E 1FCF         JMP   DATA
```

```
2FAE 7D 2FD2  SPKFNC TST    STSACT
2FB1 26 02           BNE    STATS1
2FB3 8D 0F           BSR    STSSTR
2FB5 BD 19C4 STATS1  JSR    CLRNUM
2FB8 DE 59           LDX    NUMSTK
2FBA B6 8002         LDA A  PIADTB
2FBD 2B 04           BMI    SPKFNX
2FBF 6C 00           INC    0,X
2FC1 6C 06           INC    6,X
2FC3 39      SPKFNX  RTS


2FC4 86 E0   STSSTR  LDA A  #$E0
2FC6 B7 2FD2         STA A  STSACT
2FC9 8D C8           BSR    STROBE
2FCB 4F              CLR A
2FCC 20 C5           BRA    STROBE


2FCE 00      INIT    FCB    0
2FCF A0      SPEED   FCB    $A0
2FD0 00 00   DELAY   FDB    0
2FD2 00      STSACT  FCB    0
             END
     00  ERROR(S) DETECTED
```

ELECTRIC CRAYON [tm] ALARM CONTROLLER

by Sam Campbell

The ELECTRIC CRAYON is more than just a low-cost peripheral for adding color to a computer. Possibly because it was introduced before its time, little is really known about the CRAYON'S capabilities. As Tim McKee showed in his article, the ELECTRIC CRAYON is a self-contained control computer with built-in color graphics capability. It has many applications. Here's an alarm system that I have implemented with an ELECTRIC CRAYON.

Alarm systems do not have to be complicated, so why a computer-controlled alarm? The answer is speed. And improved security -- a computer-controlled alarm can be hard to detect. A computer alarm needn't be expensive. An ELECTRIC CRAYON, which is ideal for this application, costs about $250.00, including the necessay display RAM. Only a few other components are required: 1-Kbyte of program RAM and 1-Kbyte of EPROM, which are accommodated by the ELECTRIC CRAYON, a 6821 PIA chip to activate the CRAYON's auxiliary port and, of course, cabling.

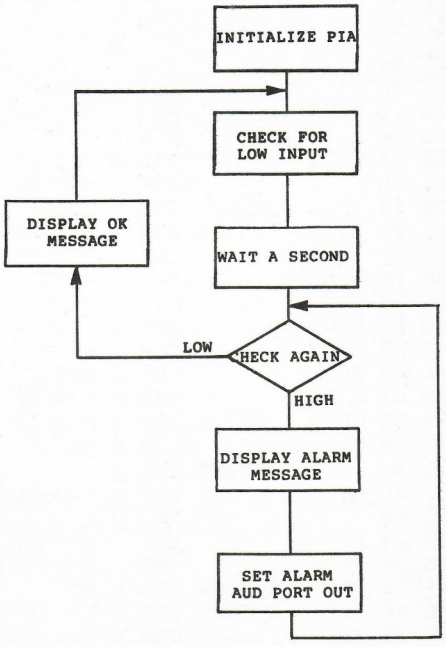
The sensor devices, reed switches, are readily available, simple to install and easy to connect. For a door sensor, the switch magnet is attached to the door. If the door is closed, the switch is closed. Window sensors can be similarly installed.

A possible set up is to use one bit for all sensors of a room, the sensors being connected in series. Alternatively, an entire house could be monitored using one large loop, leaving all the remaining 15 bits free for other chores -- to control the lighting in rooms, for example.

A program flow chart for operating this alarm system is given below. The code should be in EPROM. Since the ELECTRIC CRAYON color graphics operating system, EGOS(tm), includes a program loading function (Motorola S1-S9 format), the alarm program could be loaded into and executed from RAM.

Hopefully, this short article shows how easily and inexpensively the ELECTRIC CRAYON can be put to work in useful applications. You have probably thought of a dozen or so already.

ALARM SENSOR PROGRAM FLOW CHART



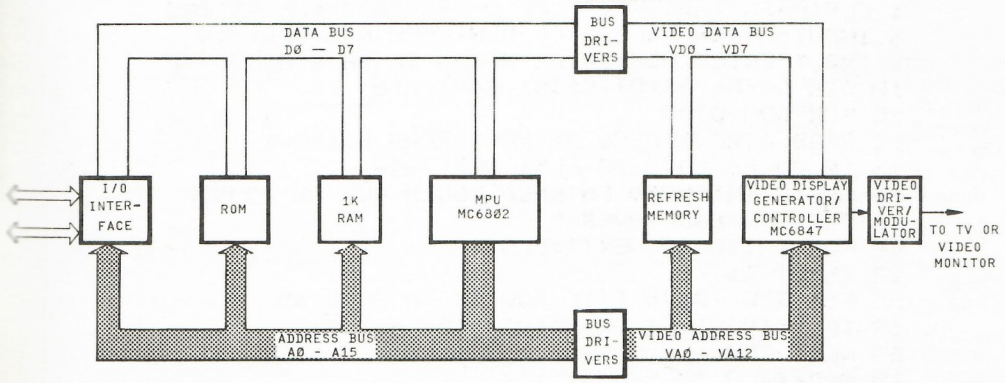
The ELECTRIC CRAYON [tm]

by Tim McKee

Percom makes a product you may not be aware of, the ELECTRIC CRAYON (tm). Promoted primarily to the TRS-80☆ computer market, the ELECTRIC CRAYON(tm) also has exciting possibilities for the 680X owner. A functional block diagram of the ELECTRIC CRAYON(tm) is shown in the figure below.

The ELECTRIC CRAYON(tm) has its own 6802 microprocessor and therefore is a computer in its own right. The only function of the 6802 MPU is to perform video operations as directed by the input from a parallel port. The 6802 performs its operations on a section of memory that it shares with a 6847 Color Video Display Generator IC, the same color chip that is used in the Radio Shack Color Computer.

The 6847 can generate a display with an X-Y resolution of 256 X 192 pictures elements (pixels) in two sets of two colors, or 128 X 192 pixels in two sets of four colors. Other lower-density graphic modes are available, as are a mixed alphanumeric-semigraphic mode and a full semigraphic mode. The output of the 6847 is conducted to a modulator that produces either composite video or an rf-modulated signal on TV channel 3 (NTSC).



The ELECTRIC CRAYON(tm) has yet to be fully utilized. Most of the TRS-80☆ owners use the ELECTRIC CRAYON(tm) strictly as a color graphics generator. It can do much, much more:

☆ Using the second PIA (peripheral interface adapter), the ELECTRIC CRAYON(tm) can be connected to a keyboard -- either unencoded or encoded -- and used as an intelligent, programmable color graphics data terminal.

☆ Connecting a keyboard, as mentioned above, the ELECTRIC CRAYON(tm) becomes a low-cost "single-board computer" which can be used for teaching computers in schools. Most computers used for tutorial applications have only two hex LED digits for output; the ELECTRIC CRAYON(tm), however, has a 16 X 32 character display capability.

☆ The ELECTRIC CRAYON can be used in a stand-alone mode, sensing inputs -- from a burglar alarm, for example -- and processing these inputs to initiate a warning response.

The ELECTRIC CRAYON(tm) is now equipped with an improved graphics operating system, EGOS, which is fast and easy to interface to.

EGOS features:

☆ Vector table to commonly used routines
☆ Automatic look-ahead for extension EPROM
☆ Ability to accommodate a second command table
☆ Input routine vectoring
☆ Interrupt vectoring

The EGOS inherent commands provide the following functions:

Set display mode

Set display color
Draw horizontal line
Draw vertical line
Set one point
Erase screen
Invert colors
Load a Motorola S1-S9 file

I feel it will take the 680X hobbyiest to exploit the full capabilities of the ELECTRIC CRAYON(tm).

Text-to-Speech with SPEAK-2-ME-2 [tm]

by Sam Campbell

The subject of text-to-speech capability using our SPEAK-2-ME-2 comes up at every micro show I attend.

SPEAK-2-ME-2 has no text-to-speech capability -- at least not directly. The program given below, however, generates text-to-speech. I think of it as a data base, or a word base, that can be used to easily piece sentences together. Although written in Micro Soft BASIC, it can be easily adapted for other BASICs.

Words are stored as data -- using read-data statements -- in an array whose length is set by variable D in line six. Line five sets sentence length and the length of the speech array. When a word is typed, the arrays are checked to see if the word is in the word base; if it is not, an error message is displayed and you can try again.

For example, suppose you enter FOR. It is not in the word base, but FOUR is. Therefore, you could enter FOUR on the retry.

When only one word is to be entered as data, enter the word first and enter a O second.

Speak & Spell has about a 3,000-word vocabulary to use as a base. And since our Advanced Speech Driver program can create new words from the Speak & Spell word list, your data base can be extended almost indefinitely. I would suggest entering a base only of commonly used words, since this should be adequate for most purposes.

```
0 REM** PROGRAM IS PROPERTY OF E.(SAM)CAMPBELL.
AND IS OFFERED AS A GIFT. IF MORE THAN ONE WORD
HAS THE SAME SOUND ENTER THE OTHER WORDS AS NEW
LINE. IF ONLY ONE WORD IS ENTERED, PUT A
ZERO(0) AS THE SECOND DATA.
1 CLS:PRINTTAB(20),"TYPE-2-SPEECH-2":CLEAR1000
5 INPUT"ENTER LENGTH OF SENTENCE DESIRED.";N
6 INPUT"ENTER NUMBER OF WORDS TO BE STORED.";D
10 DIM A$(D),B$(D),C$(N),C(N),A(D)
20 FOR ROW=0TOD
22 READ A(ROW):READ A$(ROW):READ B$(ROW)
25 IF ROW=D GOTO 50 ELSE NEXT ROW
45 CLS:PRINT"WORD ENTERED COULD NOT BE FOUND.
 START SENTENCE OVER."
46 FOR T=1TO500:NEXTT:CLS
50 INPUT D$
55 FOR ROW =0 TO D:IF ROW IS )D GOTO 45
58 IF A$(ROW)=D$ OR B$(ROW)=D$ GOTO60
59 NEXT ROW
60 R=R+1
65 C$(R)=D$:C(R)=A(ROW)
66 IF R=N GOTO 100 ELSE GOTO50
100 INPUT"ENTER TO SPEAK";X
101 CLS
110 FOR S=1TO N+1:IF S=N+1GOTO132
111 PRINTC(S),C$(S)
120 Z=USR2(C(S))
```

```
130 NEXTS
132 CLS:PRINT@900,"SAY AGAIN":INPUTX:IF X=1 CLS:
GOTO100
133 CLS:PRINT@900,"ENTER NEW WORDS":INPUTX:
IFX=1 CLS :R=0:GOTO50 ELSE CLS:GOTO1
250 'INTERNAL WORD LIST 2
255 REM** ENTER DATA WORD HERE ***
260 DATA -29429 :DATA 0,ZERO
270 DATA -1781 :DATA ONE,WON
271 DATA -1781:DATA 1,1
```

Patch for GENERAL LEDGER program

The following patch and procedures were submitted by Gary Davis. Gary designed and wrote our fine General Ledger System for 6800/LFD systems.

The first patch modifies the Charge of Accounts program to correct a bug in the End of Month program, and the second patch modifies the End of Month program itself. The modification allows the user to run the EOM program without changing the accounting month.

```
1) Load and start Super Basic.
2) Remove the Write Protect tab from the ORIGINAL
   General Ledger disk and insert it in drive 1.
3) Type the following :
   #LOAD 1080
   #1612 OPEN #10,F0+2
   #1614 FOR F=1 TO 3:FOR J=1 TO 7:PRINT #10,F(F,J):NEXT J:NEXT F
   #1616 PRINT #10,L$(1),L$(2),LO
   #1618 CLOSE #10
   #SAVE 1080
   #LOAD 1300
   #2035 IF C1=Z1 THEN 2200
   #SAVE 1300
4) When the Drive Activity light turns off, remove the
   disk from the drive, replace the Write Protect tab,
   and store the disk.
5) Place your CURRENT Master disk in drive 1.
6) Type the following :
   #LOAD 1300
   #2035 IF C1=Z1 THEN 2200
   #SAVE 1300
7) When the Drive Activity light turns off, remove the
   disk from the drive and you are finished with this
   patch.
```

SUPER BASIC ADAPTED FOR CMS 9600

The following patches for adapting Super BASIC (ver 2.0) for operation with Creative Micro Systems' 9600 (6802-processor) were provided by Lt. Col. Anthony J. Gasbarre, P.O. Box 70, E. Sullivan, NH 03445. Thank you, Colonel.

ADDRESS	CODE
0152-0153	F81C
0154-0155	F7B6
015B	16

The code at 015B is for SYSMON 1.1 (8 bits, 1 stop bit, - by 64)

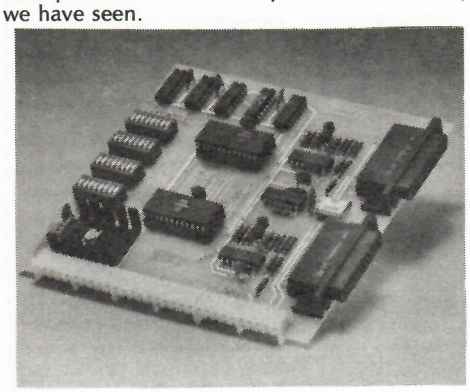
Colonel Gasbarre used the following configuration:

ADDRESS	CHANNEL	TYPE CODE	BASE ADDRESS	TYPE
016D	0	00	0000	-
0170	1	00	E3C0	Control Port (ACIA)
0173	2	00	E3CB	ACIA
0176	3	00	0000	-
0179	4	01	E3D0	PIA
017C	5	01	E3D8	PIA
017F	6	00	0000	-
0182	7	00	0000	-

Colonel Gasbarre made suggestions on ways to clarify the Reconfiguation section of the Super BASIC users manual, and also said he was entirely satisfied with Super BASIC -- that it was "great".

NEW PRODUCTS

We introduce new products for SYSTEM-50 computers several times a year. Our latest is a dual asynchronous serial communications interface module for the 30-pin bus. This SIO card packs more features per dollar than any we have seen.



Features:

- Available with or without an optional on-card bit-rate generator (BRG). The BRG may be used to produce transmit/receive clock rates, thereby freeing up to five pins on the system bus for other use -- such as extended One Megabyte addressing.
- Compatible with both the older and newer versions of the System-30 bus.
- Design permits control of serial to parallel and parallel to serial data conversion, parity generation and verification, and modem control -- with minimal software overhead.
- Output signals of each channel are current-limited for protection against a short-circuit load.
- Transmit and receive rate of each channel may be individually selected. Moreover, the transmit rate of a channel may be different from its receive rate. Data rate: 110, 300, 1200, 2400, 4800, 9600, and 19,200 bits/sec.
- Communications signals are compatible with RS-232-C standard levels. Clock signals are TTL compatible.
- Low price: Only $59.95 without the optional bit-rate generator, only $74.95 with the BRG components installed. Field upgrade BRG kit is only $19.95.

Some thumbnail descriptions of other new products are set forth below. These briefs were prepared by Dale French of our technical staff.

M24SS Static RAM Card: A 24K-byte static RAM board organized into three independent 8K byte blocks. Works with either the standard SS-50 bus or the 1 Megabyte extended addressing bus. Comes assembled, burned-in and tested. Users manual includes source listing of diagnostic memory test. Also available in 8- and 16K byte configurations.

M48DSS Dynamic RAM Card: A low power 48K byte dynamic RAM board organized into three independent 16K byte blocks. Works with either the standard SS-50 bus or the 1 Megabyte extended addressing bus. Comes assembled, burned-in and tested. Users manual includes source listing of diagnostic memory test. Also available in 16- and 32K byte versions.

ColoRAMa-50: A memory-mapped color VDG board. Generates alphanumerics, semigraphic displays. Full graphic resolutions range from 64 x 64 pixels to 256 x 192 pixels. Displays in two, four or eight colors, depending on the display resolution. Two and four-color displays may be complemented. Board is

designed to accomodate a low cost Radic Shack modulator for TV set display. Comes with one Kbyte of display RAM which provides for alphanumeric, semigraphics and two low-density full graphic display formats. Also provides for 2K byte EPROM. Cassette I/O provides for low-cost file storage. Users manual includes source listing of display OS. Works with 1Megabyte extended addressing bus. The ColoRAMa-50 occupies an 8K byte block of memory in the upper half of a 64K byte address space. Board accomodates additional RAM for higher density display modes.

The COLOR CONNECTION: A cable/circuit card assembly which is used to adapt the 6809-based TRS-80 Color Computer to the SS-50 bus. The COLOR CONNECTION allows access to LFD-400 mini-disk storage, RAM expansion, interfacing (via the ELECTRIC WINDOW, e.g.) to a word-processing quality BW display system, etc.

SS-50 Bus Motherboard: A seven-slot system bus card that can also be used as an extender card for servicing function cards.

SS-30 Bus Motherboard Kit: Accomodates up to eight 30-pin I/O cards. Supplied complete with PC board connectors and components required for application as an I/O extension motherboard for the SS-50 bus.

Since the last Peripheral was issued, many new 680X programs have been released, including MPX/9, a 6809 DOS for our LFD disk systems, and a 6809 version of Percom Super BASIC.

To place an order or request product literature, call our toll-free order number, 1-800-527-1592. For additional technical information call (214) 272-3421.

ED. NOTE

A supplement to this issue of the Peripheral is available from Percom Data Company. The supplement includes more specific information -- for example, additional notes on product improvement and maintenance -- and a 'short-form' product price list. This supplement may be obtained from Percom by calling our toll-free order number, 1-800-527-1592. From within Texas, call [214] 272-3421.

TRADEMARKS APPEARING IN THIS ISSUE:

Percom Data Company, Inc.: ColoRAMa-50, ELECTRIC CRAYON, EGOS, ELECTRIC WINDOW, LFD-400, LFD-800, MPX/9, PSYMON and SBC/9.

Tandy Radio Shack Corp.: TRS-80